2016: ACTIVITIES REPORT

UT Austin | Portugal

INTERNATIONAL COLLABORATORY FOR EMERGING TECHNOLOGIES, COLAB

Research Collaboration between Portuguese Scientific Institutions and The University of Texas at Austin

TEXAS
The University of Texas at Austin

FCT
Fundação para a Ciência e a Tecnologia
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

CRUP
CONSELHO DE REITORES DAS UNIVERSIDADES PORTUGUESAS

PROLOGUE

Looking back into the future

December 19, 2016

This report marks the conclusion of the ninth year of CoLab, the collaboration involving The University of Texas at Austin and several top-tier universities throughout Portugal. Over these nine years the component collaborations of CoLab—Digital Media, Applied Mathematics, Advanced Computing, and Emerging Technologies (now primarily Nanotechnology)—have both broadened and deepened in scope. What has led to the broadening and deepening are the personal relationships that have evolved from the institutional collaborations, informal yet professional relationships that have grown and prospered beyond the academic interactions that were initially anticipated. As a consequence, we envision, and hope, that these relationships will continue long after CoLab ceases to exist. Only through such individual relationships will long-term, inter-university research productivity be enhanced and impactful knowledge created.

At the same time, though, it is necessary to "institutionalize the individual relationships" to foster and even accelerate knowledge creation by ensuring that the research streams developed and the progress made under CoLab continue unabated. Thus, one of the goals for year ten of CoLab is to strengthen both individual and institutional relationships to increase the probability of their continuation. This will especially require intensive and comprehensive efforts from all stakeholders to build a research-oriented infrastructure for the future.

Perusal of this report will reveal the accomplishments that have been achieved in all four CoLab components. Workshops, faculty and graduate student exchanges, training sessions, and conferences continued at a high level in 2017. Quantitatively, the research outputs have increased year-over-year. Likewise, the quality of the research continues to improve. Moreover, new, non-FCT financial and nonfinancial resources are now being used to leverage CoLab activities, and new Portuguese partners—institutions such as M-ITI as well as individuals—have been added to the "mix" to increase the reach, effectiveness, and efficacy of the program.

Looking Back into the Future

In brief, 2016 was a very good year for the UT Austin|Portugal CoLab Program. Much has been done to strengthen research and scientific collaborations between institutions in Portugal and The University of Texas at Austin. Yet much remains to be accomplished.

For example, collaboration between UT Austin researchers and Iberian Nanotechnology Laboratory (INL) researchers has been growing and a formal initiative is being planned for 2017. Simultaneously, the 2016 UT Austin-Portugal Program call for joint research projects is about to launch, stimulating additional scientific collaboration between Portuguese researchers and UT Austin researchers.

A new addition to this call is the inclusion of research relating to the thematic areas of atmosphere, climate, space, ocean, energy, and emerging methods of data science. These areas reflect an attempt to expand CoLab-related research and meld it into the concept of the Atlantic International Research Center (AIR Center), an emerging transatlantic, north-south, inter-country research collaboration systematically addressing the thematic areas. If the AIR Center, an international public-private partnership with a headquarters in the Azores, is to be successful, much time, effort, and creativity is required. Consequently, it is likely that CoLab will be tasked as a contributor to assist in the creation and development of the AIR Center in 2017. This means that 2017 will be a very full year, filled with activities to solidify existing institutional relationships, initiating (and conducting) joint research projects, and helping to create a new, global collaboration.

2017 should be a very exciting year for CoLab. Please read and carefully digest the contents of this report. We believe you will find it most elucidating.

Respectfully,

Robert A. Peterson, Ph.D., Principal Investigator

Marco Bravo, Co-Principal Investigator and Executive Director

Robert A. Peterson

Principal Investigator of the UT Austin | Portugal Program at The University of Texas at Austin.

Marco Bravo

Co-Principal Investigator and Executive Director of the UT Austin | Portugal Program at The University of Texas at Austin.

2016: ACTIVITIES REPORT

UT Austin | Portugal

INTERNATIONAL COLLABORATORY FOR EMERGING TECHNOLOGIES, COLAB

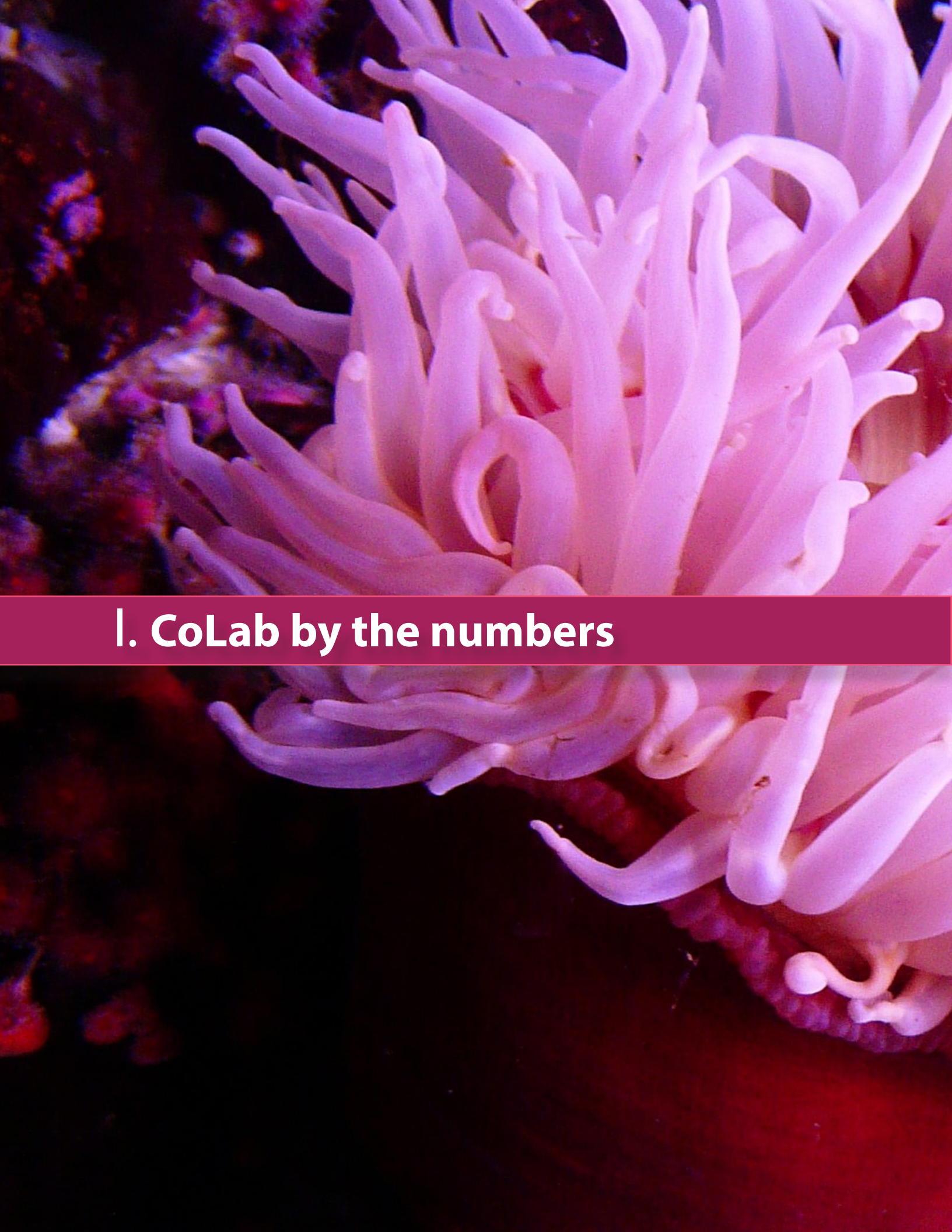
Research Collaboration between Portuguese Scientific Institutions and The University of Texas at Austin

2016: ACTIVITIES REPORT

UT Austin | Portugal

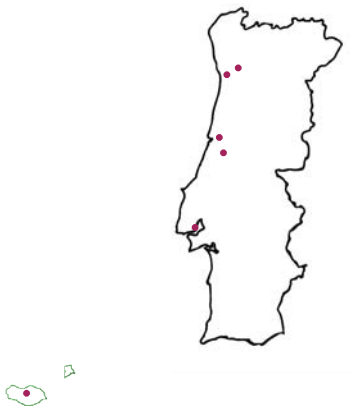
INTERNATIONAL COLLABORATORY FOR EMERGING TECHNOLOGIES, COLAB

Research Collaboration between Portuguese Scientific Institutions and The University of Texas at Austin



I. CoLab by the numbers

Participating Institutions



50+ schools and other Institutions

13 Digital Media Industrial Affiliates companies

Faculty

72+ Professors|Instructors

Researchers

35+ (PI researchers)

Advanced education programs

3 Doctoral programs:

» Digital Media

University of Porto (UPorto), School of Engeneering

University of Porto (UPorto), School of Fine Arts

University of Porto (UPorto), School of Sciences

University of Porto (UPorto), School of Economics

University of Porto (UPorto), School of Humanities

New University of Lisbon (UNL), School of Sciences and Technologies

New University of Lisbon (UNL), School of Social and Human Sciences

» Advanced Computing

University of Minho

University of Porto (UPorto)

Instituto Superior Técnico (IST)

» Applied Mathematics

University of Coimbra (UC)

Instituto Superior Técnico (IST)

1 Masters program (multimedia)

University of Porto (UPorto)

Students

308+ total students; **148** Ph.D. students: **139** Digital Media students, **12** Advanced Computing students, **11** Applied Mathematics students, **5** Emerging Technologies students; **133+** MsC students: **104** Digital Media students, **24** Advanced Computing students, **8** Emerging Technologies students, and **10** post-docs: **37** Digital Media students, **3** Advanced Computing students, **5** Applied Mathematics students

45 students who have already completed a degree (37 DM, 3 AC, 5 MAT)

Other:

» **113** PhD scholarship grants (5 selected; 25 applications - 2016 Call)

» **11** Post-doc scholarship grants

5 Spinoff companies

BAGABAGA studios · realizasom · GIMME DA BLUES · faceinmotion · PLUNC

Industry affiliates

BRANDIA CENTRAL branding leaders · BYCOM INDUSTRIES · LIVING THE DIGITAL WORLD INNOVAGENCY · cinemateca portuguesa museu do cinema · CRITICAL SOFTWARE · DUVIDEOFILMES · casa da música · FUNDAÇÃOSERRALVES · Porto Editora · Media Capital · rrog exceeding media challenges · inveli · ZON LUSOMUNDO · Público · YDREAMS

R & D projects

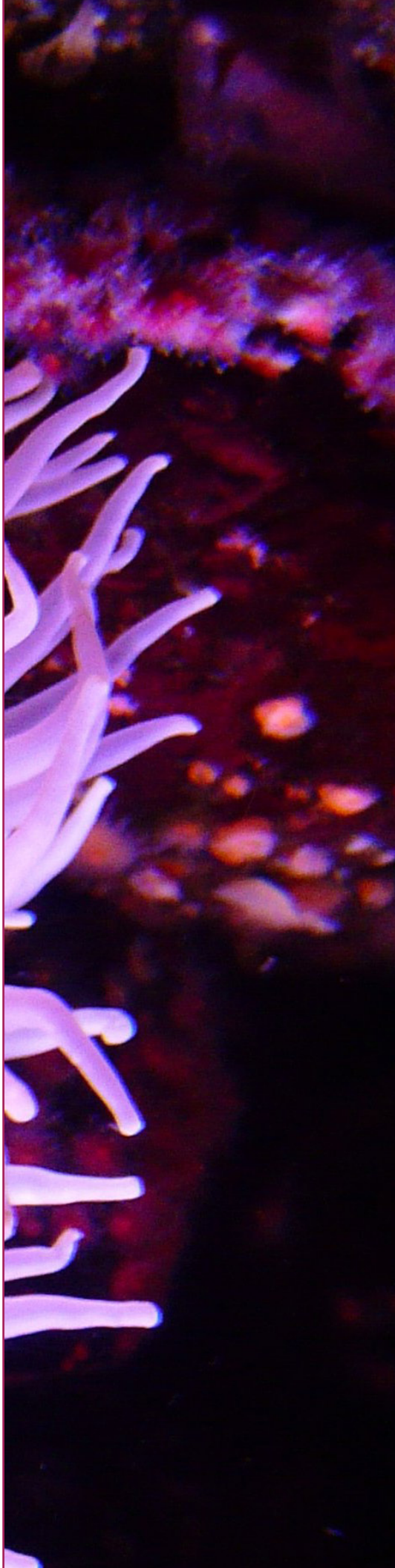
Phase I (2007-2012): **46** applications, **20** projects funded.

Phase II (2013-present):

- Two calls in 2014:
  - » FCT | RFP call in Portugal: **45** applications, **10** projects funded, **5** exploratory, **5** strategic, **4** Digital Media, **5** Emerging Technologies, **1** Advanced Computing. Total funding **$1.4M**
  - » RFP call at UT Austin: **32** applications, **6** projects funded. Total funding **$650K**
- FCT joint call for projects did not open in 2015 and 2016.

Private funding: **$58K**

External funding complementary to FCT (US and EU sources of matching funds): **$4.5M**



II. Distinguished visitors

Minister of Science, Technology, and Higher Education with Dr. António Rendas and CRUP, June 12th-14th

On June 12-14, 2016, Prof. Manuel Heitor, the Minister of Science, Technology, and Higher Education of Portugal, visited The University of Texas at Austin. The Minister was accompanied by Prof. António Rendas, Rector of the New University of Lisbon and Board member of the UT Austin-Portugal Program representing the Council of Rectors of Portuguese Universities. The goal of this visit was to discuss past and current activities and deepen the discussion about the future direction of the UT Austin|Portugal Program.

Minister Heitor and Prof. Rendas started the visit by discussing the program with CoLab Co-PIs, researchers, and students and viewing relevant demonstration projects in the areas of climate and space science at the VisLab, led by Prof. Don Fussell and João Barbosa, a Portuguese Ph.D. student in the Advanced Computing area.

They then discussed potential collaborations with faculty from the Energy Institute, hosted by Associate Director Michael Webber, followed by a discussion with Prof. Byron Tapley, Director of the Center for Space Research and responsible for important space research initiatives such as the Grace project with NASA.

Minister Heitor and Prof. Rendas also had the opportunity to visit the Texas Advanced Computing Center (TAAC), hosted by Director Dan Stanzione and Matthew Vaughn, and discuss research projects in the area of data science with a focus on big data and machine learning.

The visit proceeded with a discussion with Prof. Tom Truskett and his research group on nanotechnology and a visit to Prof. Brian Korgel's Center for Next Generation Photovoltaics and a tour of the Center for Nano- and Molecular Science, hosted by Prof. Damon Smith and Hugo Celio.

On the second day, Minister Heitor and Prof. Rendas visited the Austin Technology Incubator, hosted by its Director Isaac Barchas, and met with the Vice President for Research, Prof. Daniel Jaffe.

(L-R) Dr. António Rendas (CRUP), Marco Bravo (UT Austin) and Dr. Manuel Heitor, Minister of Science, Technology, and Higher Education

Minister of Science, Technology, and Higher Education, President of the FCT, and UT Austin |Portugal delegation, Nov 15th-17th

From November 15th to 17th, 2016, Prof. Manuel Heitor, the Minister of Science, Technology, and Higher Education of Portugal, visited The University of Texas at Austin. The Minister was accompanied by Prof. Paulo Ferrão, President of the Portuguese Foundation for Science and Technology ,and Mrs. Carolina Rego Costa, Advisor to the Minister. A delegation representing the UT Austin|Portugal program, led by Prof. Fernando Santana, the Director of the program in Portugal ,and Prof. Nuno Correia (Digital Media), Prof. Fernando Silva (Advanced Computing), Prof. José Urbano (Applied Mathematics), and Prof. Paula Vilarinho (Nanotechnology), also participated in the visit. The main objectives of this visit were discussing past and current activities within UTEN and the four areas of the CoLab initiative and engaging in discussions with UT Austin faculty and researchers regarding the Minister's endeavor to create the Atlantic International Research (AIR) Center in the areas of Space, Climate, Oceans, Energy, and Data Science.

This visit coincided with the presence of more than 20 Portuguese entrepreneurs that were visiting UT this week to participate in the UTEN GSP 2016 orientation week during November 14th to 18th. The orientation enabled the entrepreneurs to showcase their technology innovations and to meet with U.S. companies and venture capitalists interested in forging partnerships.

The visit started with a meeting with UT Austin CoLab faculty and students/researchers, followed by the UTEN Mastermind pitches of Portuguese startup companies, and then by a networking session with the Portuguese companies and United States mentors.

The second day was initiated with a meeting with Professor Gregory Fenves, President of UT Austin, who reinforced the utmost importance of the collaboration with Portugal to the university. A thorough discussion with UT Austin faculty in the areas of Space, Energy, and Oceans followed. Then, Minister Heitor and Professor Ferrão met with Professor Jay Hartzell, Dean of the McCombs School of Business to discuss organizational and financing aspects of the AIR Center. In the afternoon, there was a discussion with Prof. Sharon Mosher, Dean of the Jackson School of Geosciences, followed by an interactive presentation and discussion session with CIESS research staff and affiliated Jackson School researchers led by Professor Zong-Liang Yang (Department of Geological Sciences/CIESS). This meeting included Dr. Jay Banner (Department of Geological Sciences), Dr. Dan Breecker (Department of Geological Sciences), Professor Svetlana Ikonnikova (Bureau of Economic Geology), Dr. Charles Jackson (UTIG), and Dr. Burke Fort (Center for Space Research).

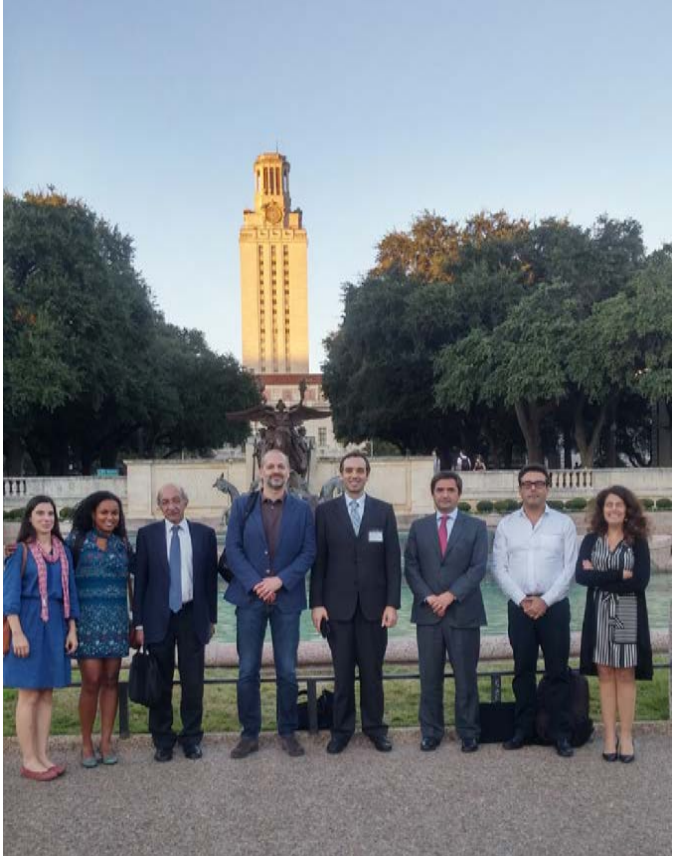
Meeting with Faculty at Jackson School of Geosciences

The program has received considerable international recognition, especially because of its internationalization and specialization focus. Universities understand these to be key elements in a new era of international affairs, where governments and industry collaborate by co-creating and sharing knowledge.

Manuel Heitor, Portugal's Minister of Science, Technology, and Higher Education

We're getting a database of startup companies from a different culture that our faculty and graduate students can analyze for academic papers. That's a dimension that wasn't considered when the program was started. CoLab has supported faculty and graduate students in mathematics, computer science, nanotechnology, and digital media both in Portugal and at UT Austin. That's beneficial to the university by facilitating publishing high quality papers in peer-reviewed journals.

Robert Peterson, Principal Investigator, UT Austin|Portugal Program



Visit of Portuguese delegation , led by FCT President Professor Ferrão

Meeting With the Dr. Gregory Fenves, President of UT Austin

III. Digital Media

"The Digital Media Program supports an innovative doctoral program shared between the University of Porto and the New University of Lisbon and engages in research projects uniting UT Austin and Portuguese-based researchers and companies. Our priority domains include e-health, video games and gamification, and developing new applications and services for education and e-government purposes. We also explore and support open data/open media developments. Our many workshops, conferences, courses and festivals have contributed to increasing capacity and deepening networks within the Portuguese creative, commercial and scholarly communities."

Sharon Strover (2015)
Co-Director Digital Media Program
UT Austin | Portugal

1. Introduction and background

The Digital Media Program was designed to support the creation of new intellectual capabilities in understanding and creating content, platforms, and applications in the digital arena. The initial and continuing goal remains the same: To enhance Portugal's graduate programs, research, and entrepreneurship in digital media by ensuring their internationally recognized quality through active collaboration. As more economies, entertainment, services, and educational institutions move online, a digitally-skilled workforce is mandatory. Highly proficient university-trained people will lead this sector, and the Digital Media Program has been designed to support and explore creative and sector-specific media opportunities, to develop masters and doctoral students skilled in digital media, and to engage in research in a subset of targeted areas. To that end, the program has focused on three types of investments.

First, the program created a doctoral program shared between two primary partner institutions (University of Porto and the New University of Lisbon) and also supported a large multimedia masters degree program at the University of Porto. Students in these programs have engaged in both long semester and intensive summer courses taught by UT Austin faculty. Moreover, the program has invested in bringing Portuguese students and faculty to UT Austin to pursue research and educational endeavors as well as to engage some of the opportunities present in Austin, a city known for its high tech sector; for hosting international conference SXSW, which includes the major interactive media activities; for its game development sector; and for a variety of other media-related activities that represent cutting edge developments in areas from health to government. As of 2016, the Madeira Institute for Interactive Technologies (M-ITI) began a three year relationship with the Digital Media Program through a separate contract to add to, renew and further research collaborations already in place through the UT Austin | Portugal Program.

Second, though capacity-building, the Digital Media Program has supported various international festivals and symposia to create opportunities for exhibiting new work and for convening and cultivating a peer culture and broader social network in digital media. Affiliated Portuguese graduate students themselves organized a major effort in Lisbon called PLUNC, described in more detail later in this document, and the program has supported a festival and conference in Porto called FuturePlaces for several years; this conference typically focuses on matters of intellectual property. The point of these events is to broaden ties within Portugal and to reinforce connections with researchers and experts outside of the country as well.

Third, the Digital Media Program has supported various research efforts linking UT Austin and Portuguese faculty and graduate students. Working on FCT-sponsored competitive grants as well as other projects funded both in and outside of the program, the emerging corps of digital media researchers promises to add to the knowledge base and to contribute to international forums addressing digital media issues. The program's research and development communities have expanded aggressively into the e-health arena; new relationships with media industries are taking shape through strategic alliances brokered through New Europe Media (NEM) and with student-led start-ups. One of the Digital Media/FCT-supported projects evolved into an H2020 project currently underway. With the program's first doctoral students now graduating and taking various employment positions, the impact of the program will grow and be evident in a variety of settings.

These events and programs have been broad-based and typically facilitated interaction with different institutions such as Lisbon's Cinemateca, other Portugal-based festivals, businesses such as those supporting the PLUNC Festival, and government organizations.

The Digital Media Program is co-creating expertise by adapting and creating enhanced capacities, particularly those reliant on broadband connections, to improve productivity and to broaden the reach and efficiencies of digital tools. Education and research work hand-in-hand with capacity building. Our strategy has been to identify a handful of focus areas and to ensure that they are addressed in multiple ways, i.e., in research, in courses, and in other supporting activities. Our focus areas include:

- Video Games and Virtual Reality
- Creating Content
- Media Industries and the New Digital Literacy
- e-Health, e-Government, Education
- Building Capital, Collaboration, and Interaction

2. Evolution

The Digital Media program continues to deepen its education and research activities even as it has identified other clusters of productive activity to support new initiatives. Some of our newest emphases are:

- Bringing the faculty and students of M-ITI into the program to deepen training and expertise in digital storytelling and in civic participation applications;
- Working with new industry organizations New Europe Media, ADDICT and TICE to coordinate our investigations of the role of ICTs in developing creative clusters. These organizations represent aggregates of several businesses and communities with whom we can partner;
- Using the concept of "open" to leverage Portugal's development efforts in business, in access, in software and in hardware. We plan to hold annual Open Institutes in various locations to highlight how openness operates to the advantage of business, education, and services. We anticipate working closely

with sponsors in order to develop applied projects that can demonstrate openness in operation;

- Supporting student-led initiatives in festivals (such as PLUNC) and installations that can showcase digital media work and create visible, public platforms illustrating their possibilities in art and civil society;
- Continuing to seek funding and research opportunities for doctoral students; our successful grant funding for students is a step in this direction;
- Cultivating research in e-health initiatives.

3. Institutions

Legal Entity / Institution	Department	Location
UTA	Telecommunication and Information Policy Institute (TIPI) Department of Radio, Television and Film Moody College of Communication Knight Center for Journalism in the Americas School of Information College of Fine Arts (Theatre & Dance; Butler School of Music) School of Journalism College of Education	Austin, Texas
UPORTO	Department of Informatics Engineering Department of Sociology Department of Design Faculty of Economics INESC Porto	Porto, Portugal
UNL	Department of Computer Science, Department of Communication Sciences Faculty of Science and Technology Universidade Lusófona (Lisboa) Faculty of Social Sciences and Humanities	Lisbon, Portugal
ESMAE	School of Music and the Performing Arts	Porto, Portugal
IST - Universityof Lisbon	Computer Science Department	Lisbon, Portugal
Público	Rádio e Televisão de Portugal	Porto, Portugal
Madeira*	Madeira Interactive Technology Institute	Madeira, Portugal
FCT	Portuguese Foundation for Science and Technology	Lisbon, Portugal

4. Key people

Portugal

Key People	Associated Institution	Main Events	Associated Courses, etc.
Heitor Alvelos	U. Porto, Outreach Program Director, Design	FuturePlaces, SXSW	Futures of Uncertainty
José Azevedo	U.Porto Academic Director, Department of Sociology	Summer Institutes; FuturePlaces	
Antonio Coelho, Director 2014-2015	U.Porto Coordinator, Master of Multimedia Program	Institutes	Summer institute games course; Game Development and Design
Rui Rodriques	U.Porto Coordinator, Master of Multimedia Program	FuturePlaces, Summer Institutes	
Nuno Correia, Director 2013	FCT-UNL, Computer Science	E-Health, PLUNC, Open Institute	Post-doc
João Mário Grilo	FCSH-UNL Communication Sciences	Summer Institutes	Post-doc
Carlos Guedes	New York University	FuturePlaces; Summer Institute	Former Fulbright Fellow at UT Austin & post-doc; currently at NYU University's Middle Eastern campus.
Monica Mendes	Belas-Arts, University of Lisbon	New Agendas; PLUNC	AZ Labs
Valentina Nisi	M-ITI, Vice-President of the Board,Assistant Professor	Open Institute, Explorations in Art and Interactivity	
Nuno Nunes	President of M-ITI, Associate Professor, President of ARDITI	UT|Austin Portugal retreat and presentation (2015), Explorations in Art and Interactivity	
Raul Moreira Vidal	U.Porto, Dept. of Informatics Engineering		Multimedia MA

The University of Texas at Austin

Key People	Associated Institution	Main Events	Associated Courses, etc.
Rosental Alves	Professor and Knight Chair in Journalism; Director, Knight Center for Journalism in the Americas	TICE and ADDICT; Instructor in several courses; numerous talks within Portugal	Entrepreneurial Journalism
Phil Doty	Professor, Radio-Television-Film	Open Institute	
Bruce Pennycook	Professor, Professor of Composition, Butler School of Music; Director, Center for Entertainment Technologies	Summer Institutes; research collaborator	Digital games design; interactive technologies
Joseph Straubhaar	Professor, Radio-Television-Film	Summer Institute; research collaborator	Research Methods
Sharon Strover	Director Digital Media UT Austin, Director, Telecommunications and Information Policy Institute (TIPI)	Summer Institutes, Open Institute, E-Health	Research methods; Information Society;

5. Education and Training Activities

5.1. Academic degrees

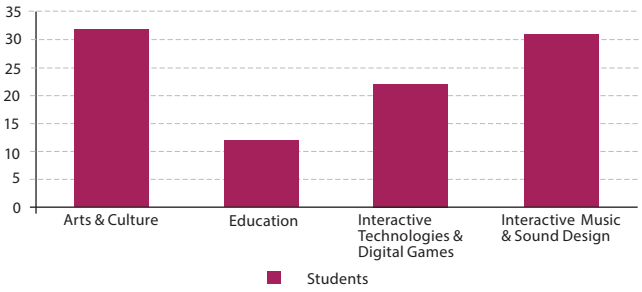
Master of Arts Program in Digital Media

To train the digital media professionals and researchers of the future, the UT Austin|Portugal Program offers a Master of Arts in Multimedia. This program enables students to pursue advanced studies in communication and multi-media. In 2016 97 students were enrolled in this masters program. The program, currently coordinated by Professor Raul Vidal, offers students a choice of four specializations:

- Arts and Culture
- Education
- Interactive Music and Sound Design
- Interactive Technologies & Digital Games

New courses to support the emerging area of interactive music include Digital Interactive Systems, Sound Design for Digital Media, Music Information Retrieval, and Automatic Music Generation, among others. The program description can be found here. The current distribution of enrolled students, is displayed in the graph

Enrolled Students



Doctor of Philosophy Program in Digital Media

The four-year Digital Media degree program at the University of Porto and UNL, which began officially in fall 2009, was designed with a multidisciplinary structure supporting four specializations:

- Production of Audiovisual and Interactive Content,
- Technology,
- Journalism, and
- Industry, Publics, and Markets

Students are co-supervised by professors in Portugal and at UT Austin, and the program includes a research fellowship in Texas. Students are eligible to apply to UT Austin doctoral programs for a dual degree:

- Doctorate in Digital Media from FCSH, New University of Lisbon
- Doctorate in Digital Media from FCT, New University of Lisbon
- Doctorate in Digital Media from FEUP, University of Porto

The program entails a full year of organized courses, including theoretical, methodological and laboratory-based work. Roughly in the middle of the second year, students present their dissertation research ideas, with the intention of spending their remaining two years working on their original research. Students seek co-supervisors from among the UT Austin faculty, and they may spend a fellowship year in Austin. UT Austin faculty members contribute several courses to the currriculum both by co-teaching and by offering stand-alone classes.

Post-Doctoral Fellowships in Digital Media

The UT Austin|Portugal program additionally has an ongoing call for post-doctoral fellowships at The University of Texas at Austin and partner universities in Portugal to study specific areas in digital media. The fellowships are open to Portuguese citizens and other EU nationals residing in Portugal. For example, in 2016, a senior staff member for Publico received fellowship support to be at UT Austin for several months, working both with the Knight Center for Journalism in the Americas (Professor Rosenthal Alves, Journalism) as well as Telecommunications and Information Policy Institute (TIPI). Professor Jorge Rosa (FCSH) was also hosted in 2016.

Faculty for the various programs come from a variety of fields and are experts in their respective fields. Over the years they travel between UT Austin and the participating Portuguese institutions and regularly teach classes and participate in the various festivals, symposia and media events organized by the associated institutions.

5.2. Ph.D. students

Participants 2016

The Doctoral Program has had 161 students since its inception in 2009, and 27 people have received their doctorate degrees. Enrolled students at the two institutions are as follows for 2015-16:

- UP 2015/16: 14 (total for UP = 91)
- UNL 2015/16: 16 (total for UNL=70)

2016 Doctoral Graduates' Dissertations and Current Positions

- University of Porto
  - José Eduardo Marques Pereira, "3D Visual Perceptual Reasoning in a Unified Data-driven Approach"

    Advisors: Jaime Cardoso and Ricardo Morla

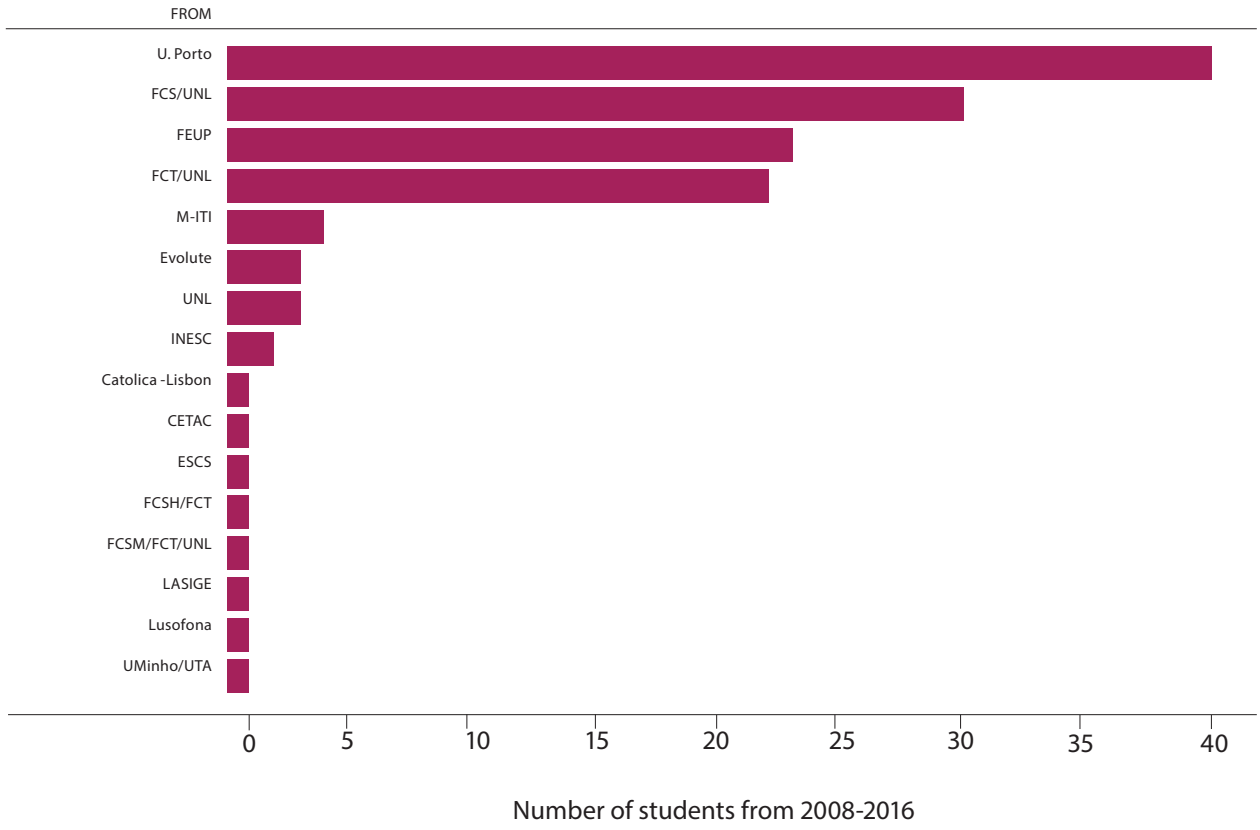
    Position: Researcher at INESCTEC

  - Sandra Couto Monia Coelho, "The Exaltation of the Sense - Haptic Art"

    Advisor: Miguel Correia Velhote

    Position: communication designer, media artist, researcher

Digital media students by University



» Georgios Sioros, "Syncopation the Transformation"

Advisor: Carlos Guedes

» Filipe Monteiro Cunha Lopes, "Musical Composition with Space"

Advisor: Carlos Guedes

- New University of Lisbon

» Cláudia Silva, "Expanding Participation in Locative Media among and about Latinos/as in Austin, Texas"

Advisors: António Granado and Joseph Straubhaar

Position: Post-doc, M-ITI

» Carlos Manuel Oliveira, "Choreographic Objects: Abstractions, Transductions, Expressions"

Advisor: Carla Fernandes

Position: Independent researcher

» Ana Figueras, "How to Tell Stories using Visualization: Strategies towards Narrative Visualization"

Advisor: Antonio Granado

» Marta Ferraz, "A Bioelectric Approach to Human Development. Bringing Technology Back to the Human Body"

Advisor: Antonio Camara (FCT) and Co-supervisor Paul Resta, UT Austin

5.3. Short courses

The 10th annual 2016 Summer Institute offered students and professionals in Lisbon and Porto the opportunity to explore a variety of digital media topics. Instructors from The University of Texas at Austin taught intensive short courses including the following:

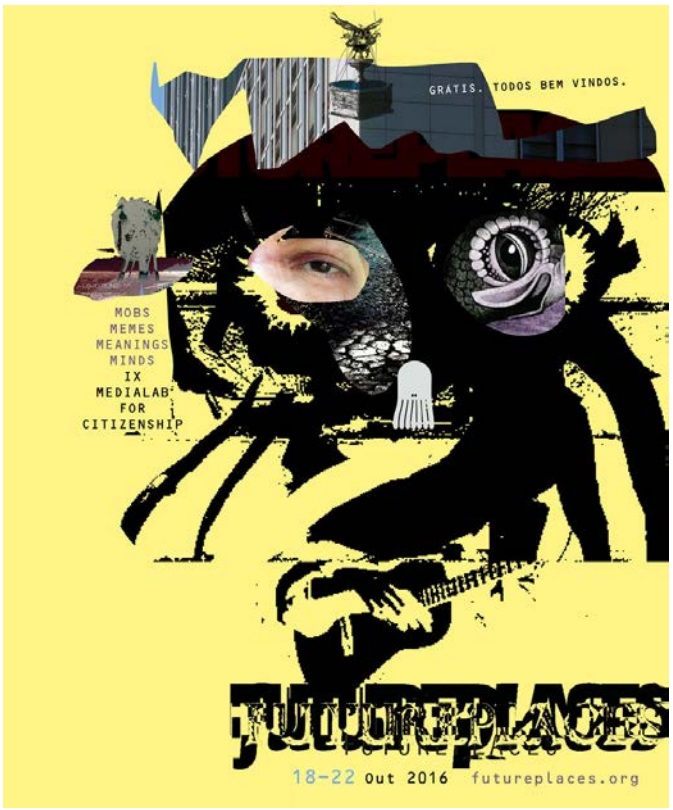
- Research Methods for Digital Media - Sharon Strover, UT Professor and Director, Digital Media UT Austin
- VR, 3D and Journalism - R.B. Brenner, UT Professor, and Cameron Blake, Washington Post
- Business Plan Development for the Videogame Industry Part I; and Entrepreneurial Finance Part II: Start-up and Greenlighting - Heidi Toprac and Paul Toprac, UT Professors
- Innovation and Creative Cities: Remaking the Innovation Economy - Craig Watkins, UT Professor

FuturePlaces festival

The 2015/2016 FuturePlaces festival in Porto explored interactive media's contributions to the development and enhancement of local cultures. FuturePlaces has been a great success that brought participants from around the world to explore and celebrate contemporary cultures through competitions, concerts, receptions, and academic keynotes and panels. FuturePlaces also presents a diverse selection of workshops, and showcases workshop outcomes during the course of festival events. In this sense, the festival is both a learning and a presentation opportunity, as well as a chance for people to meet, mingle, talk, and grow relationships. A more detailed description appears elsewhere in this report.

New Media and Digital Art Festival: PLUNC

The New Media and Digital Art Festival PLUNC had its first successful festival September 24-27, 2015, and was organized in collaboration with the UT Austin|Portugal Program. The



theme was interactivity. The September 29-October 2, 2016 event focused on different social and cultural approaches to the approximation, proximity, and pathways between the two shores of the Tagus River, more specifically the strands of the cities of Almada and Lisbon, where the festival took place. With an exhibition hub in Lisbon, Fundação Portuguesa das Comunicações – Museu das Comunicações, and another exhibition hub in Almada, Casa da Cerca – Centro de Arte Contemporânea, there were various activities spread across other spaces on both sides of the river.

Creative Colab 16

Creative Colab '16 (February 5, 2016) explored and discussed different perspectives on digital media drawn

from the intersections between creativity and collaboration. The discussion unfolded on three main vectors: storytelling, audience+market, and interaction with Valentina Nisi (M-ITI), Ana Correia de Barros (Fraunhofer Portugal AICOS), and Peter Beyls. This event was organized by students in the Digital Media Doctoral Program at the University of Porto, M-ITI, and The University of Texas at Austin, and presented and moderated by RTP journalist Daniel Catalão.

2016 UT Austin|Portugal Program Annual Conference

Sharon Strover along with Nuno Correia and Antònio Coelho presented to the panel of distingushed guests the overview, research, and future plans of the Digital Media Program. They welcomed the opportunity to present media processing applications in the fields of health, government, and education to, among others, Robert Sherman (US Ambassador to Portugal) and Manuel Heitor (Portuguese Minister of Science, Technology and Higher Education). Additional invited UT faculty included Professors Keri Stephens, Wenhong Chen, and Kathleen Tyner, accompanied by doctoral student Elizabeth Glowacki.

A group of M-ITI researchers and Ph.D. students attended the UT Austin|Portugal Program Annual Conference. Vanessa

Cesário, Mara Dionísio and Luís Ferreira, all Ph.D. students in Digital Media, presented their work in the exhibition section.

Of the 45 posters and eight demonstrations at the conference, all of the demonstrations were from the Digital Media Program as were 43 of the posters.

The Future of Journalism

R. B. Brenner (UT School of Journalism) and Camerona Blake (Washington Post) joined Professors Antonio Camara and Paulo Nuno Vicente at UNL to discuss the impact of new technologies on journalism. Organized by UT Austin and the iNOVA Media Lab, in conjunction with Bagabaga Studios and the Jose Saramago Foundation, this event drew a large audience of professionals as well as academics.

Panel Organized

Wenhong Chen (2016). Organized a panel titled "Mobile Ventures' Identity and Privacy Management." for SXSW Interactive.

Workshop

W. Chen (2016). Held a workshop, "Digital Research Method: Studying Social Capital & Social Networks in the Digital Age," at the Chinese Association of Social Network Analysis meeting, Xi'An, China

5.4. Visiting Scholars

- Sergi Bermúdez, exploratory visitor from M-ITI

Bermúdez is the Head of the NeuroRehab Lab, an interdisciplinary research group that investigates at the intersection of technology, neuroscience and clinical practice to find novel solutions to increase the quality of life of those with special needs. During his first visit to UT Austin, Sergi participated in "Art and Interactivity: Exploring Research Opportunities with Madeira," met with professors such as Jacek Gwizdka, and gave a presentation for James Sulzer's group.

- Deborah Castro, visiting researcher from M-ITI

Castro is a post-doctoral researcher at M-ITI and has visited UT Austin on several occasions. Indeed, she contributes to the management of the partnership between M-ITI and UT Austin. During her stay in Austin in fall 2016, she continued her work with Joseph Straubhaar, met with a number of faculty members and worked on the organization of "Art and Interactivity: Exploring Research Opportunities with Madeira" together with Cecilia Garrec. Her research interests lie in the field of television studies, digital media, media audiences, transmedia storytelling, and fandom.

- Valentina Nisi, exploratory visitor from M-ITI

Nisi's research focuses on designing and producing interactive narrative experiences connected to local territory and culture. Her interests range from interactive and transmedia storytelling, mobile, augmented and virtual reality, 360 immersive storytelling to journalism. She participated in "Art and Interactivity: Exploring Research Opportunities with Madeira" and met with several faculty members during her visit to Austin. She also gave two presentations for Joseph Straubhaar's and Kathleen Tyner's courses.

- Nuno Nunes, exploratory visitor from M-ITI

Nunes' research focusses on designing, building, and evaluating interactive systems and services spanning different areas of human life such as sustainability, design innovation, digital culture and engineering. Nuno came to Austin to participate in the "Art and Interactivity: Exploring Research Opportunities with Madeira" event. He met with UT Austin faculty and gave presentations for Christine Julien's and Unmil Karadkar's courses.

- Cláudia Silva, exploratory visitor from M-ITI

Silva is a post-doctoral researcher at M-ITI who graduated from the UT Austin|Portugal Program. Her interests focus on the study of how locative media as a whole is changing the way we understand space and place through the production of place-based information for digital mobile technologies. She participated in "Art and Interactivity: Exploring Research Opportunities with Madeira."

- Maurizio Teli, exploratory visitor from M-ITI

Teli works at the boundaries of sociology of technology and IT design. He focuses on the collaborative affordances of digital technologies, specifically on the way they can be observed and understood as social practices, how they can be technically designed, and on their potential political and institutional configurations. He came to UT Austin to participate in "Art and Interactivity: Exploring Research Opportunities with Madeira" and meet with UT Austin faculty. He gave a presentation for Wenhong Chen's course as well.

5.5. Talks and Presentations

Selected Faculty Presentations in Portugal

Paul Resta (December, 2016). New technologies and education. UNL/FCT.

Nancy Schiesari (December, 2016). Digital storytelling and 3D. M-ITI.

Valentina Nisi (November, 2016). Art and Interactivity. UT Austin.

Nuno Nunes (November, 2016). Sensors and the Monitored Environment. UT Austin.

2016 UT Austin|Portugal Program Annual Conference

Mauritzio Teli, (August 2016). Participatory Design Conference. Aarhus, Denmark

Sharon Strover (May, 2016). Annual Conference; Madeira conference. M-ITI

Sharon Strover, (June, 2016). Madeira conference. M-ITI

Joe Straubhaar (June, 2016). Madeira conference. M-ITI

WenHong Chen (May, 2016), Annual Conference.

Jacek Gwidzzka (October, 2016). U. Porto.

Pat Aufderheide (October, 2016). American University Professor and Founder, Center for Media and Social Change. U. Porto, FuturePlaces keynote

6. Research Activities

6.1. Research Projects

FCT research calls have funded four projects in the Digital Media area that have resulted in joint research:

"Games for Media and Information Literacy," UT PI Kathleen Tyner; PT PI Maria da Conceição Gonçalves Costa, Lusofona-COFAC, Cooperativa de Formação e Animação Cultural, CRL (COFAC)

"Relevance Mining and Detection Systems," UT PI Matt Lease; PT PI Álvaro Pedro de Barros Borges Reis Figueira - Instituto de Engenharia de Sistemas e Computadores do Porto (INESC Porto/FE/UP)

"Recognition of Irony in Multicultural Social Media," UT PI Byron Wallace; PT PI Paula Cristina Quaresma da Fonseca Carvalho - Instituto de Engenharia de Sistemas e Computadores, Investigação e Desenvolvimento em Lisboa (INESC ID/INESC/IST/UTL)

"Roots and Wings: Glocalized Networks and Mobile Media Entrepreneurship in Austin and Lisbon," UT PI: Wenhong Chen; PT PI: José Azevedo

In addition to the above projects, the Digital Media Program funded four health communication projects in late 2015 that continued through 2016. The principal investigators collaborating on these research projects are listed below:

- Keri Stephens (UT) and Manuel Damasio (Lusofona), "Using Redundant Messages to Increase Physical Activity in Dialysis Patients"
- Mike Mackert (UT) and Manuel Dimasio (Lusofona), "Improving Prenatal Health Communication: Engaging Men via E-health"
- Jay Bernhardt (UT) and J. Paulo Moreira (UNL), "Using Smartwatches for Health Tracking and Interventions

with U.S. and Portuguese Users"

- Jacek Gwidzka (UT) and Carla Teixeira Lopes (U Porto), "Evaluating Consumers' Understanding of Online Health Information"

Complete project teams can be found at http://medical.novasearch.org/uta-ehealth-symposium-15/ .

6.2. Publications & Presentations

Accepted Publications or Presentations

Costa, C., Car, V., and Papadimitriou, S. (forthcoming) . "Good Practices and Emerging Trends." In Frau-Meigs, D., Flores, J., Velez, I., Public Policies in Media and Information Literacy in Europe: Cross-country Comparisons. London: Routledge.

Costa, C., Rogado, J., Sousa, C. and Henriques S. (forthcoming). "Playing Digital Security - Youth voices on their digital rights." Special Issue of International Journal of Games Based Learning (IJGBL), IGI Global.

Nisi, V., Costanza, E., and Dionisio, M. (2016). "Placing Location-Based Narratives in Context Through a Narrator and Visual Markers." Interacting with Computers. https://doi.org/10.1093/iwc/iww020

Barbosa, D., (2016). "Digital In-store Shopping." U. Porto Journal of Engineering, 2:1, 44-48 ISSN 2183-6493.

Dionisio, M., Nisi, V., Nunes, N., and Bala, P. (2016). "Transmedia Storytelling for Exposing Natural Capital and Promoting Ecotourism." In F. Nack & A. S. Gordon (Eds.), Interactive Storytelling (pp. 351–362). Springer International Publishing. https://doi.org/10.1007/978-3-319-48279-8_31

Casella, G. (2016). "Remixing the Archive." Webdocumentário - O Paradigma da Interatividade e a Tradição do Documentário, UBI, 31st March 2016. http://labcom-ifp.ubi.pt/files/webdocumentario/#speakers.

Casella, G. (2016). "Digital Storytelling for Archaeological Communication." Poster presented at UT Austin|Portugal Annual Conference 2016, 23-24 Maio, Reitoria da Universidade Nova de Lisboa http://utaustinportugal.org/news/annual_conference_2016.

Casella, G. " Histórias do Zambujal 50 anos de Investigação do Instituto Arqueológico Alemão em Torres Vedras." 27th May 2016, Museu Municipal Leonel Trindade, Torres Vedras. (Content Production, Interpretation Team)

Casella, G., "Stories of Zambujal." v.01, Interactive Documentary to enhance the exhibition.

Casella, G. "Lost and Transformed Cities: A Digital Perspective." International Conference, November 17-18, 2016, FCSH-UNL, Lisboa. (Executive Committee and Communication) https://lostcitiesconference2016.wordpress.com/

Costa, C., Tyner, K., Henriques, S., and Sousa, C. (2016). " Games." Accepted for presentation at ECREA2016 conference, Prague, 9th-12th of November 2016.

Byron Wallace, CoNLL 2016 paper: http://www.byronwallace.com/static/articles/amir-et-al-CoNLL-2016.pdf.

Byron Wallace, NAACL 2016 paper: https://arxiv.org/pdf/1603.00968v2.pdf

Abstracts or full papers presented, published or in review

Tyner, K. Costa C., Huang, G. (2016). "Extended Play: Connecting Game Design with Media Education." Media Education Summit, Centre for Excellence in Media Practice and John Cabot University, Rome, Italy, November 4-5, 2016. In review for a joint publication of the Media Education Research Journal and the Journal of Media Literacy Education, expected Fall 2017.

Pedro, L., Santos, C., Batista, J., Cabral, G., Pais, F. and Costa, C. (2016). "Social Network Analysis and Digital Learning Environments: A Framework for Research and Practice using the Sapo Campus platform." In Proceedings of INTED2016 Conference, Valencia, Spain, 7-9 March 2016, pp.1061-1070.

Costa, C., Tyner, K., Henriques, S., and Galego, C. (2016). "The Power of Games: a Review of Research on Game-Based Learning." 66th ICA Annual Conference, Fukuoka, Japan, 9-13 June, 2016.

Costa, C., Rogado, J., Henriques, S. and Sousa, C. (2016). "Inside the Black-box: A Path for Children's Rights in a Digital Connected Presence." IAMCR Pre Conference - Children's and Young People's Rights in the Digital Age, London, UK, 26-27 July, 2016.

Faísca, J. and Rogado, J. (2016). "Personal Cloud Interoperability Fully Decentralized Identity Management. " IEEE 17th International Symposium - A World of Wireless, Mobile and Multimedia Networks (WoWMoM), PhD Forum, Coimbra, Portugal, 21st-24th June 2016.

Rogado, J., Costa, C., Sousa, C. and Henriques, S. (2016). "Inside the Black-box: Playing Digital Security." Playful Learning Conference, Manchester, UK, 13-15 July, 2016.

Costa, C., Tyner, K., Henriques, S., and Sousa, C. (2016). "Game-learning and Media Literacy - A Research Methodology Review." IAMCR Conference - Memory, Commemoration and Communication: Looking Back, Looking Forward, Leicester, UK, 27-31 July, 2016.

Chen, W. (2016). "Handle with Care: Digital Methods, Sociological Imagination & the Chinese Dream." The Inaugural Chinese University of Hong Kong Research Summit "Digital Methods & Social Development," Hong Kong

Chen, W. (2016). "Your Privacy is Very Important to Us." iSchool, University of Toronto.

Chen, W., Azevedo. J. Moutinho, N., Meneses, R., Huang, G., and Stephens, B. (2016). "Roots and Wings: Mobile Media

Posters presented at the conference

Entrepreneurship." UT Portugal Program, Lisbon.

Silvio Moreira, Byron C. Wallace, Hao Lyu, Paula Carvalho, and Mário J. Gaspar da Silva. "Modelling Context with User Embeddings for Sarcasm Detection in Social Media." In Proceedings of the Conference on Computational Natural Language Learning (CoNLL), pages 167–177. Association for Computational Linguistics (ACL) / Special Interest Group on Natural Language Learning (SIGNLL), 2016.

Ye Zhang, Stephen Roller, and Byron C. Wallace. "MGNC-CNN: A Simple Approach to Exploiting Multiple Word Embeddings for Sentence Classification." In Proceedings of the North American Chapter of the Association for Computational Linguistics (NAACL), pages 1522–1527. Association for Computational Linguistics (ACL), (2016).

Chen, W., Huang, G., Miller, J., Lee, K-Y., Mauro, D., Stephens, B., and Li, X (2016). "Mobile Ventures' Identity and Privacy Management." International Communication Association, Fukuoka, Japan.

Reis, C., "Instagram Photography: Toward a Contextual Framework for Profiling and Categorization of Social Media Photography." Digital Media Doctoral Symposium | FuturePlaces 2016.

6.3. Research Development

A hosted event, Explorations in Art and Interactivity, was held in Austin November 7-11, 2016 to introduce and facilitate research collaborations with both M-ITI faculty and University of Porto and New University of Lisbon doctoral students. Week-long presentations, meetings and conferences were arranged by TIPI (Technology and Information Policy Institute) among members of several Colleges at UT Austin.

Professors Joe Straubhaar and Sharon Strover worked with faculty at M-ITI who are developing an H2020 teaming research proposal.

Doctoral student Claudia Pernancar visited Austin in order to liaise with the Dell Medical School and researchers in the health communication arena.

Dr. Keri Stephens wrote a proposal that would entail having doctoral students from the DM program work directly with UT health researchers. This proposal was submitted to a competition called Catalyst.

Sharon Strover successfully received a grant to deepen our research collaboration by sponsoring proposal development workshops.

7. Research Outreach: Innovation, Entrepreneurship, and Technology Commercialization Activities

Porto-based studio Open Field, a collaboration of four program students, has successfully launched its start-up with several commercial advertising as well as civic contracts.

8. Visits to Austin

- Cláudia Pernancar, exploratory visitor from NOVA

Pernancar has a research project in the area of mobile tracking data using biochips and wearables to better treat Crohn's disease. She made important connections at UT

Austin's Dell Medical Center.

- Vanessa Cesário, exploratory visitor from M-ITI and University of Porto

Cesário's research project explores how digital technologies and informal learning can support museums in fostering and creating learning experiences for children. During her stay in Austin, she participated in "Art and Interactivity: Exploring Research Opportunities with Madeira" and met with UT faculty members such as Kathleen Tyner.

- Paulo Bala, exploratory visitor from M-ITI and New University of Lisbon

Bala is researching the synergies between immersive journalism and emotion. His work aims to understand how journalism institutions can use immersive journalism to create emotionally impactful reports, extracting guidelines and design patterns and creating tools to help journalists' future work. He was one of the participants in "Art and Interactivity: Exploring Research Opportunities with Madeira." During his visit, he met with a number of professors, such as R. B. Brenner.

- Mara Dionísio, exploratory visitor from M-ITI and New University of Lisbon

Dionísio's research interests intersect the fields of human-computer interaction, storytelling, and entertainment. She is studying how to leverage mobile transmedia entertainment to raise tourists' awareness of local cultural and natural heritage. She was one of the participants in "Art and Interactivity: Exploring Research Opportunities with Madeira," and met with Professor Susanne Scott and other UT faculty members during her stay in Austin.

- Luís Ferreira, exploratory visitor from M-ITI and New University of Lisbon

Ferreira was part of the M-ITI delegation that came to Austin to participate in "Art and Interactivity: Exploring Research Opportunities with Madeira." He is currently developing a serious game based on music therapy and reminiscence therapy that aims to enhance not only the life quality of Alzheimer's patients, but also the life quality of family caregivers. During his stay in Austin, he met with various professors.

- Patricia Nogueira, visiting researcher from the University of Porto

Nogueira spent her time researching the role of the audience in interactive documentary. She will process data from Canada's National Film Board in order to understand the audience's online behavior.

- Greicy Kelly Silva, exploratory visitor from M-ITI and New University of Lisbon

Silva participated in "Art and Interactivity: Exploring Research Opportunities with Madeira." Her interest is focused on the analysis of the digitalized platform, centered on the peer-to-peer lodging sector through the lenses of three dimensions: network analysis, interaction, and social capital. In Austin, she met with Professor Randolph Bias.

- Sara Tranquada, exploratory visitor from M-ITI and New University of Lisbon

Tranquada came to Austin to attend "Art and Interactivity: Exploring Research Opportunities with Madeira" and meet with several UT Austin professors. She is particularly interested in analyzing the role of women in technical fields. Her research interests also include the connection of the physical world with the virtual world (internet of things).

- Gustavo Magalhaes, visiting student

Magalhaes continued his research on open government while working with various faculty at UT Austin as well as City of Austin government officials on open government initiatives.

- Ioli Campos, visiting student

Campos continued her doctoral research at UT Austin in 2016.

- Jorge Matins Rosa, visiting scholar from FCSH

Rosa, a post-doctoral researcher, discussed strategies to further develop partnerships and a collaborative project on social networks.

Student Research Presentations at FuturePlaces Doctoral Consortium

- Eduardo Morais, University of Porto, "Hacking (and) Educational Practice"

Though digital media present a challenge to the future of academic institutions, and a serious criticism of how educators engage with new technologies is needed, in Arts Education technologies are treated as mere tools rather than as media and environments. Pedagogical hacking, according to its original meaning of material practice and exploration, may well be an avenue of inquiry. How can Arts educators and digital resources interact in (crafting) hacking pedagogies?

- Ilo Aguiar, FCSH/New University of Lisbon, "Comparing and Evaluating Data-driven Journalism: How the

Audience Interacts with Data Visualization"

Visualizations became essential to understanding large datasets and abstract information. Data visualizations are increasingly used to tell compelling stories, particularly in news media, enabling users to explore the data. But are they? This research examines how readers interact and evaluate data visualizations in news media through quantitative and qualitative analysis of behavior and interaction of the readers with the visualizations.

- Jaime Fins, University of Porto, "Advertising in Immersive Virtual Gaming Environments: Towards a Framework for Measuring Brand Placement Effectiveness under Controlled Variable Conditions"

Immersive virtual reality is predicted to be the next "big thing" in the coming years. However, little is still known about how brands will be able to use this medium to promote their products. Along with the prediction that virtual reality will be mainly fueled by gaming, this project has the main objective developing a framework that will allow the design and implementation of virtual reality gaming experiments to measure brand placement effectiveness.

- Janna Joceli, FCSH/New University of Lisbon, "Social Media Technicity: Affordances, Politics and Digital Methods"

The notion of technicity encompasses how digital devices are perceived and mastered through their technical features. The central idea of this research lies in investigating the affordances of social media technicity and the role it plays in digital research, taking into account the politics of the platforms and digital methods while attempting to identify analytical capacities and limitations of device-driven research. Social media technicity may be detected in application programming interfaces, algorithms and research strategies. The main contributions of this investigation will be: repurposing social media platform studies grounded on device-driven research; building a guidance framework on applied social media research techniques; and, based on medium specificities, presenting indicators or solutions to remove biases in further work.

- Carla Nave Saraiva, FCT/New University of Lisbon, "PaintMyEmotions: Designing a Tool to Promote Emotional Wellbeing"

I propose to design and develop a self-reflection tool (PaintMyEmotions) that allows people to express, monitor, and better understand their affective states in a fun and engaging way. Through this tool I intend to study wellbeing and emotional intelligence, and also explore the intersection between emotions, contextual factors, colors, and photographs.

- Cláudio Reis, University of Porto, "Instagram Photography: Toward a Contextual Framework for Profiling and Categorization of Social Media Photography"

In times of ubiquitous photography, the elusive cultural form of the social media image is of paramount significance. Taking Instagram as a representative social media photo-sharing platform, I aim to study the influence of its interface and ecosystem on the photographic output of its users, analyze workflow patterns of creation and exposure, and anticipate the development of future trends.

- André Rocha, FCT/New University of Lisbon, "Fablab to Farmlab - The Definition of a Set of Tools for Open Agriculture"

A Fablab is defined as a set of industrial-grade digital fabrication tools in a workshop. The workshop is inserted in a global network of connected labs that share knowledge in the form of files in an open source environment. A Farmlab, in turn, is aimed at defining a set of tools for Open Agriculture. It is not intended to make almost anything, as in the Fablab concept, but to produce almost any food and to empower local communities around this structure to do so. This project is broad and multidisciplinary; it begins as a tour of the Farmlabs project objectives, then contextualizes its main purpose, which is to address its importance and integration with my doctoral project.

- Eduardo M. Pereira, University of Porto, "Humans in Action at Different Levels - The Overview and the Intersection Line"

This project provides a bird-eye view of the ecosystem of human activity analysis in computer vision by suggesting the categorization of actions at three different levels, the group in the scene, the whole in the frame, and the parts in the body, as defined by the domain settings in which the application resides. It also presents a critical discussion regarding possible common approaches in the different domain settings.

- Farley Milano, FCSH/New University of Lisbon, "Design Thinking Canvas Autonomous: Conceptual Design Automation for Mobile Apps"

- Juliana Monteiro, University of Porto, "Unveiling Digital Media's Storytelling Potential for Promoting Inter-generational Dynamics and the Preservation of Cultural Identity"

This project explores new forms of inter-generational communication powered by storytelling in digital media, and the opportunities they offer to preserve cultural identity and heritage. We live in an increasingly aging society, where a majority of seniors live isolated from a fast-paced society,

where time is a precious and rare resource. At the same time, a new generation exists, mainly composed of digital natives with high technological skills, and often growing up with free time and no aims to pursue. We propose to reunite these two sides of society so they can give back to one another, by leveraging cultural heritage through inter-generational dynamics driven by storytelling in digital media.

- Vanessa Cesário, University of Porto, "Muestory: Discovering Museums through Games and Stories"

Museums are the powerhouses of knowledge that promote informal learning through exhibits and the stories behind them. Nevertheless, museums are not always designed to engage and interest younger audiences. Hence, the museum space provides a unique opportunity to harness this valuable resource that can be enriched digitally to satisfy all demographics. The Muestory Project explores how digital technologies and informal learning can facilitate museums in fostering and creating learning experience for visitors, especially by using stories to drive informal learning along with location-based gaming.

- Dora Santos Silva, FCSH/New University of Lisbon, "Innovation in Media and in my Life Post-PhD"

Doing a PhD is an immersive, life-changing experience that forces us to look at science, the world and our own professional path in a different way. This presentation is a parallel journey between innovation in digital journalism focused on culture – my PhD thesis – and my own innovation path during and after the PhD.

Other Visits to Portugal

- UT Austin Professors visit M-ITI

Professors Sharon Strover and Joseph Straubhaar (Department of Radio-TV- Film) visited M-ITI in May. They served as external experts for a proposal development effort across two days. Beyond that, M-ITI researchers demonstrated M-ITI projects in areas such as digital storytelling, civic participation, and rehabilitation. Straubhaar lectured on "Social Class and Television in Latin America", and Strover lectured on "The Value of Making Connections: Rural Regions and the Internet."

- Building Bridges: a UT Austin | Portugal Initiative

The UT Austin|Portugal Digital Media Program hosted a delegation of Portuguese researchers from a variety of universities for a full week of scheduled events during January 22-27. The goal of the various events was to continue to foster and create research collaborations between UT Austin and Portuguese researchers. Portuguese delegates included Nuno Correia, Ruí Rodrigues, António Coelho, Raul Vidal, Sergio Nunes, and Manuel Damasio. The week started out with a series of dynamic student presentations followed by numerous exploratory meetings all related to digital media.

- Explorations in Art and Interactivity

On the occasion of a visiting delegation from M-ITI, the Digital Media Program hosted a week-long event culminating with a conference containing presentations from select UT and M-ITI faculty at The Foundry. Faculty from RTF, the I-School, Journalism, Communication, and the Department of Art were present. The Foundry, UT's newest space that houses 3D printing stations, an electronics lab, a laser cutter, a gaming media lab, and video wall, offered demonstrations. M-ITI's faculty members are some of the leaders in digital art, health applications, sensors, the environment (with a tourism edge), and immersive storytelling. Their visit to Austin served as an exploratory mission to further establish collaborative research with faculty members at The University of Texas at Austin.

9. External funding complementary to FCT

External funding for Digital Media activities came from a variety of sources beyond the FCT:

- $156, 000 from Madeira to support the Madeira Interactive Technology Institute collaboration
- $25,000 from The University of Texas at Austin to support collaborative research proposal efforts
- Five funded doctoral scholarships per year from European Union grant
- European research grant H2020 as a follow-on from the original Digital Media FCT-funded effort Cognitus (high definition services based on user-generated plus broadcast content)
- Possible funding from a current EU research proposal for teaming on "Excellence in Technology and Design for Sustainable Development" (the lead institutions are the Laboratory of Robotics and Engineering Systems (LARSYS) in Portugal and University College London).

10. Looking Ahead

Many of our plans are referenced in earlier sections of this report, and with one year remaining in our program, we hope to bring to fruition several of our goals. They include:

(1) Stabilizing funding for the doctoral program and establishing a solid base of research projects that can support their efforts. Digital Media would like to initiate a small, competitive program of seed grants for doctoral students to encourage the growth of larger projects thereafter. Educational offerings, especially longer and more intensive courses, will continue.

(2) Continuing the research emphases in e-health, video games, creative content explorations, and developing systems and applications for the domains of education, health and government. E-government endeavors are highly related to the efforts around openness, creation and re-use and sharing of data.

(3) Developing the Open Institute. The Open Institute is a direct inheritor of the earlier International School for Digital Transformation. It will continue to probe the ways that openness can benefit businesses, education, and creativity in Portugal. The program looks forward to working with colleagues in mathematics, nanotechnology, and computer science to explore some research and development possibilities. In line with this, the program also will continue the efforts featured in FuturePlaces around copyright and Creative Commons solutions. It plans to work with Routledge on generating an edited book that will grow out of the next Open Institute, which is planned for Madeira. A group there has offered to host the Institute.

(4) Extending the excellent research cluster in the e-health area. There is clear interest from many researchers in Portugal and also obvious need for more work to exploit the opportunities becoming evident in linking technology to health solutions. The program plans to deepen the research and development network within Portugal. The 2015 conference drew people from many different groups and regions, which is evidence of how important this subject domain is. Bringing more energy and effort together will strengthen aggregate expertise. Seed grants should lead to additional funded work in e-health.

(5) TICE, NEM and ADDICT are still young organizations, and the program anticipates working with them as much as possible. They will assist in linking research to applications, and helping to identify the types of research most usable to their constituencies. Similarly, Digital Media Program work with the Creative Commons and UPTEC's technology incubator, and with digital media start-ups Baga and OpenField, will push more of Digital Media's work toward new user groups. These organizations will be targeted for new networking opportunities that exist across several digital media activities.

(6) Developing programs that capitalize on data visualization and science communication capabilities. Communicating complex information efficiently and effectively is a core domain in the Digital Media Program. This capability is fundamental to success in education, health, government, and science domains.

EXPLORATIONS OF ART & INTERACTIVITY

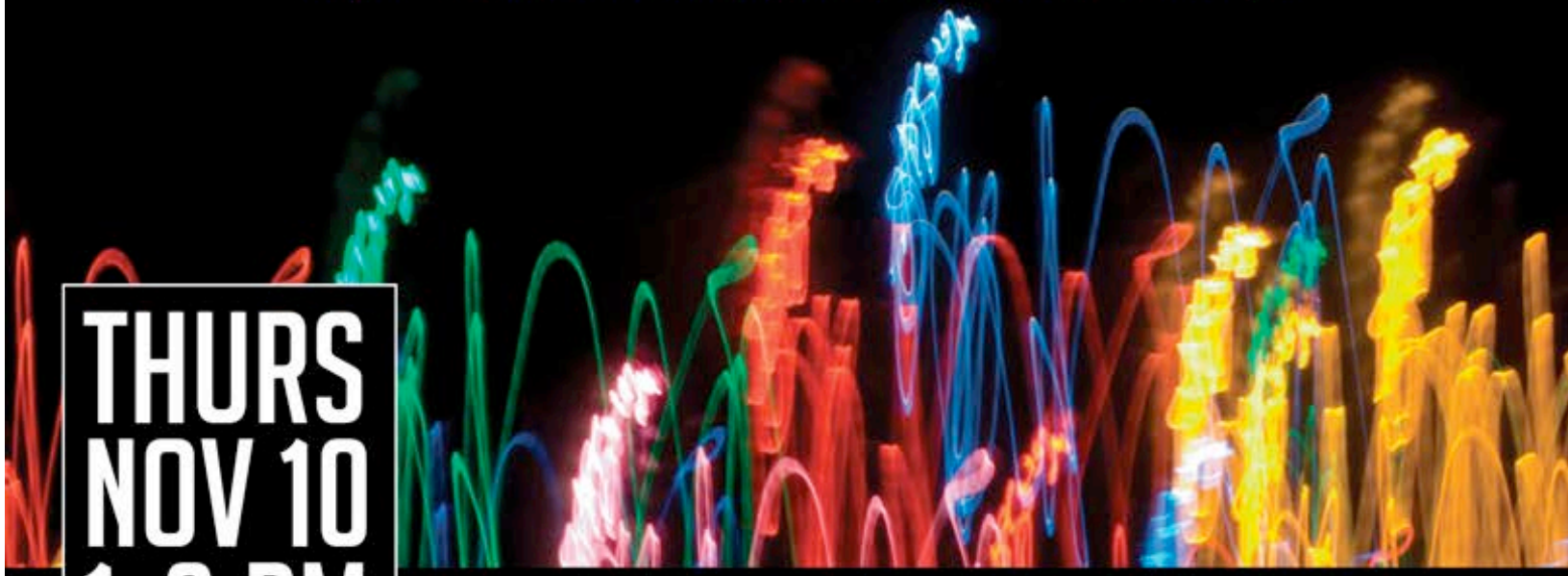
Join UT and Portuguese faculty, scholars, and pioneers in Digital Art, Health Applications, Sensors and Environmental Tourism, and Immersive Storytelling as they present their research and demonstrate creative applications for new technology.

Madeira Interactive Technologies Institute (Portugal) | UT3D & Department of Radio-Television-Film
The Butler School of Music | Department of Theatre and Dance
rtf.utexas.edu/events/explorations-art-and-interactivity

Presentations & Demonstrations include:

- 3D/VR First Ever Camera
- Serious Games, Neuroscience, and Rehabilitation
- Storytelling and Digital Media: Making Sense of the World
- A sociologist designing. A short story of collaborative projects
- Ad Mortuos –Interactive Dance, Music, and Visualization
- Building an "Intelligent Accompanist" for Interactive Pieces in Max/MSP
- An Investigation in the Use of Point Cloud Generating Devices in Interactive Movement Performance
- UT3D : VR Projects You Want to Know About
- Whoa Board
- Review of UT's new digital facilities at The Foundry, including 3D printing stations, electronics lab, laser cutter, gaming media lab, and video wall

1-4 pm: Presentations & Demos (Open to the Public) - *The Foundry (DFA 3.200) • 510 E 23rd St.*
4–6 pm: Reception (Invitation Only) - *Visual Arts Center (VAC) • 2300 Trinity St.*



THURS NOV 10 1–6 PM

Made possible by the research collaboration with Madeira Interactive Technologies Institute (M-ITI) & Technology and Information Policy Institute (TIPI)

tipi The University of Texas at Austin Technology and Information Policy Institute Moody College of Communication

IV. Emerging Technologies

"The Emerging Technologies Program in the UT|Portugal Program has been working to foster economic development in Portugal by enhancing Portugal's graduate programs and research capability in nanotechnology, fostering collaboration between academic researchers and Portuguese companies, and introducing and catalyzing best practices for new business creation, entrepreneurship and technology transfer to Portuguese industry."

Brian A. Korgel
Co-Director Emerging Technology Program
UT Austin | Portugal

1. Introduction and background

The main purpose of the UT Austin|Portugal Program in Emerging Technologies is to advance a collaborative vision in nanotechnology research, education, and training, as well as to explore common interests in technology commercialization. Of special interest is promoting the transfer of new nanotechnologies to industry in Portugal and nurturing the formation of new companies located in Portugal to exploit the latest scientific and technological advances. The program is jointly coordinated by UT Austin and Portugal and has two goals:

- Enhance Portugal's graduate programs and research in nanotechnology by creating seamless exchange opportunities for faculty and students to share new knowledge, ideas, experiences, and capabilities;
- Foster economic development in Portugal by bridging UTEN with state-of-the-art nanotechnology researchers, with the aim of creating and instituting new best practices for transferring new nanotechnology to the private sector to target global markets.

2. Evolution

In addition to the individuals who have been involved within the program during the first few years, the UT Austin team engaged James Sham, a visiting professor in the Art and Art History department, and Professor David Bourell of the Mechanical Engineering Department. The complete team of UT investigators that has been involved within the program includes the following individuals:

- Chemical Engineering
  - » Brian A. Korgel
  - » Nicholas A. Peppas
  - » Nathaniel Lynd
  - » Delia Milliron
  - » George Georgiou
  - » Lydia M. Contreras
  - » Jennifer A. Maynard
  - » Thomas M. Truskett
  - » Michael Baldea

- Biomedical Engineering
  - » Nicholas A. Peppas (also Chemical Engineering)
  - » Laura J. Suggs
  - » Jeanne C. Stachowiak
  - » James W. Tunnell

- Mechanical Engineering
  - » Paulo J. Ferreira
  - » Carolyn C. Seepersad
  - » David L Bourell

- Electrical and Computer Engineering
  - » Emanuel Tutuc

- Aerospace Engineering
  - » Nanshu Lu

- Physics
  - » Elaine Li

- IC^2 Institute
  - » Prentiss Riddle

- Art and Art History
  - » James Sham

3. Institutions

- The University of Texas at Austin – Chemical Engineering, Biomedical Engineering, Electrical and Computer Engineering, Mechanical Engineering, IC^2 Institute, Physics, Art, and Art History
- University of Aveiro (Aveiro, Portugal) - Materials and Ceramic Engineering
- Instituto de Telecomunicações (Aveiro, Portugal)
- Universidade Nova de Lisboa (Lisbon, Portugal) - CENIMAT
- University of Porto (Porto, Portugal) – Biomedical Engineering, Chemistry, and Biochemistry
- Instituto Superior Técnico (Lisbon, Portugal) – Molecular Physical Chemistry
- University of Minho (Minho, Portugal) – Chemistry, Polymer Engineering,
- University of Lisbon (Lisbon, Portugal) – iMed

4. Key people

- Portugal

  Paula Vilarinho, Director (Portugal)
  - » Associate Professor, University of Aveiro
  - » President of the Portuguese Materials Society (SPM)
  - » Department of Materials and Ceramic Engineering

» Centre for Research in Ceramics and Composite Materials (CICECO)

- The University of Texas at Austin

Brian A. Korgel, Director (UT Austin)

» Edward S. Hyman Endowed Chair in Engineering
» T. Brockett Hudson Professor of Chemical Engineering
» Director, Industry/University Cooperative Research Center for Next Generation Photovoltaics

Paulo Ferreira, Co-Director (UT Austin)

» Robert & Jane Mitchell Endowed Faculty Fellowship in Engineering
» Director, Texas Materials Institute Electron Microscopy Facility

5. Education and training activities

5.1. Ph.D. students

- Participants 2015-2016
  » Douglas Pernik, Yixuan Yu, Cherrelle Thomas, Adrien Guillassier, Emily Adkins, Yangning Zhang, John Clegg, Angela Wagner, Heidi Culver

5.2. Postdoctoral fellows

- Participants 2015-2016
  » Yixuan Yu
  » Julia Vela-Ramirez

5.3. Short courses

Additive Manufacturing Summer School

- Duration: June 6-7, 2016
- Organized by Paula Vilarinho and Brian Korgel. The course took place in the Department of Materials and Ceramics Engineering at the University of Aveiro.
- Additive Manufacturing (AM) is more commonly referred to as 3D Printing.
- Nearly 40 participants from industry, technological centers, and academia were exposed to the basic principles of AM, the current state of AM as a processing technology, and how it is expected to shape the next 25 years of production.
- Carolyn Seepersad and David Bourell of UT Austin led the course, which explored where AM currently stands and how AM will affect production in the next 25 years.

5.4. Visiting scholars

- 2015 - 2016 Participants
  » Pedro Duarte, University of Aveiro, spent 1 year at UT Austin with the Carolyn Seepersad group.
  » Manuela Fernandes, University of Aveiro, spent six months at UT Austin with Paulo Ferreira's research group.
  » Dr. Rui Domingues, University of Minho, spent six months with the Nicholas Peppas group at UT Austin.
  » Also from Nicholas Peppas' group, Heidi Culver and John Clegg, of UT Austin, spent one week in Guimaraes (University of Minho).
  » Two other students from Nicholas Peppas' group, Julia Vela-Martinez and Angela Wagner, spent two weeks in Lisbon while Marissa Wechsler spent time visiting the University of Minho.
  » Willi Aigner of Technische Universität München, supervised by Prof. Rui Pereira (U Aveiro), had previously spent two months with the Korgel Group. He returned to UT Austin and spent a week working with the team.

Professor Bourrell teaching at the Additive Manufacturing Summer School

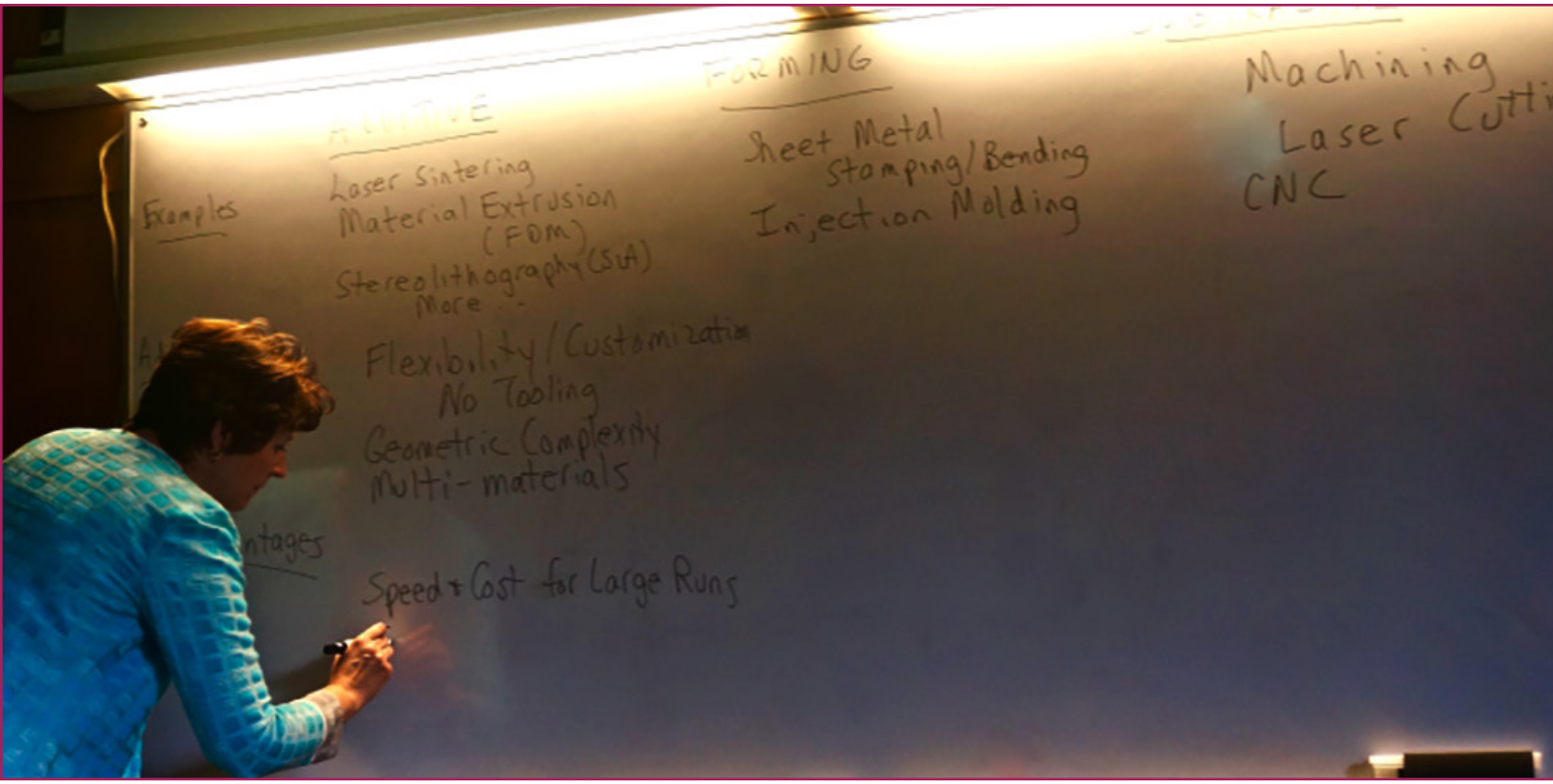
This 3D Printer, BEETHEFIRST, printed items during additive manufacturing summer school

5.5. Talks and Presentations

- Brian Korgel – Faculdade de Engenharia, University of Porto, "Innovation Arts and the Conception of Rapid Design Pivot"
- Brian Korgel – NanoPortugal (nanoPT) International Conference (February 16-19, 2016), International Iberian Nanotechnology Laboratory,"Silicon and Germanium Nanowires for Lithium and Sodium Ion Batteries"
- James Sham – 5th Emerging Technology Workshop (February 24, 2016), University of Aveiro, "Creating Collaboration between Artists and Scientists / Engineers."

James Sham ath the 5th Emerging Technology Workshop

Professor Seepersad teaching at the Additive Manufacturing Summer School



A group picture of the participants of the Additive Manufacturing Summer School

- Manuela Fernandes – 13th FEMS Junior Euromat Conference (July 10-14, 2016), Lausanne, Switzerland, "Microstructural Evolution of K0.5Na0.5NbO3 Thin Films by In-situ TEM Sintering." Received Best Oral Presentation honor.
- Carolyn Seepersad – 2016 Annual International Solid Freeform Fabrication Symposium (August 8-10, 2016), The University of Texas at Austin, Austin, TX: "Indirect Selective Laser Sintering of Yttria-stabilized Zirconia for Dental Applications."

6. Research Activities

6.1. Research Projects

- Brian Korgel, "Graphene-based Semiconductor Photocatalysis for a Safe and Sustainable Water Supply: An Advanced Technology for Emerging Pollutants Removal," UTAP-ICDT/CTM-NAN/0025/2014.
- Nicholas Peppas, "Multidisciplinary Strategy to Develop Novel Multicomponent Nanoscale Systems for Immune Modulation," UTAP-ICDT/DTP-FTO/0016/2014.
- Carolyn Seepersad and David Bourell, "Additive Manufacturing of Yttria-Stabilized Zirconia (YSZ) for Dental Applications"

6.2. Publications & Presentations

- Nicholas A. Peppas and John R. Clegg. "The Challenge to Improve the Response of Biomaterials to the Physiological Environment." *Regen Biomater,* 2016. 3(2), 67-71.
- Amit Mahajan, Brian J. Rodriguez, Ian Reaney, Angus Kingon, Zoltán Kónya, Ákos Kukovecz and Paula M. Vilarinho. "Three dimensional (3D) Barium Titanate / MWCNTs Ferroelectric Nanostructures Grown by Hydrothermal Synthesis." In press.
- Carolyn Seepersad et al. "Indirect Selective Laser Sintering of Yttria-stabilized Zirconia for Dental applications." In progress.
- Carolyn Seepersad et al. "Silicate-based Ceramic Powders Formulation for Selective Laser Sintering." In progress.

6.3. Research Development

The Emerging Technologies program has begun talks with researchers at the Iberian Nanotechnology Laboratory (INL) for significant collaborations beginning in 2017. A draft memorandum of understanding (MOU) between INL and UT Austin has been developed to create a collaborative space at INL to be called the UT corner at INL to host visiting students, post-docs, and faculty from UT to carry out research at INL in collaboration with INL researchers and Portuguese faculty members.

This year there was an emphasis on discussions around the topic of additive manufacturing. A summer school workshop was held at the University of Aveiro led by Profs. Carolyn Seepersad and David Bourell on this topic. The workshop was highly successful and the event will be held again next year. There have been significant discussions among UT and Portuguese researchers about new proposals for the upcoming FCT call focusing on additive manufacturing.

Research interactions have begun to create interdisciplinary projects spanning Emerging Technologies and Digital Media. The visit of James Sham (visiting UT projessor in Art)

to Aveiro for the 5th Emerging Technologies Workshop was an important aspect of these efforts.

7. Research Outreach: Innovation, Entrepreneurship, and Technology Commercialization Activities

Profs. Korgel and Vilarinho organized a workshop titled Value@nano – Value Creation from Emerging Knowledge –- in Lisbon December 5-7, 2016. A series of speakers were invited to participate in the event, including Professors Michael Sailor and Leigh Canham and venture capitalist Paul Thurk of ARCH Venture Partners.

The workshop had the following objectives:

- To understand the key concepts and options in technology commercialization.
- To understand how to assess technologies for their commercialization potential.
- To understand the steps that a technology goes through in the journey from the laboratory to the marketplace.
- To explore the commercialization channels leading to value creation from emerging knowledge.

8. Visits to Austin

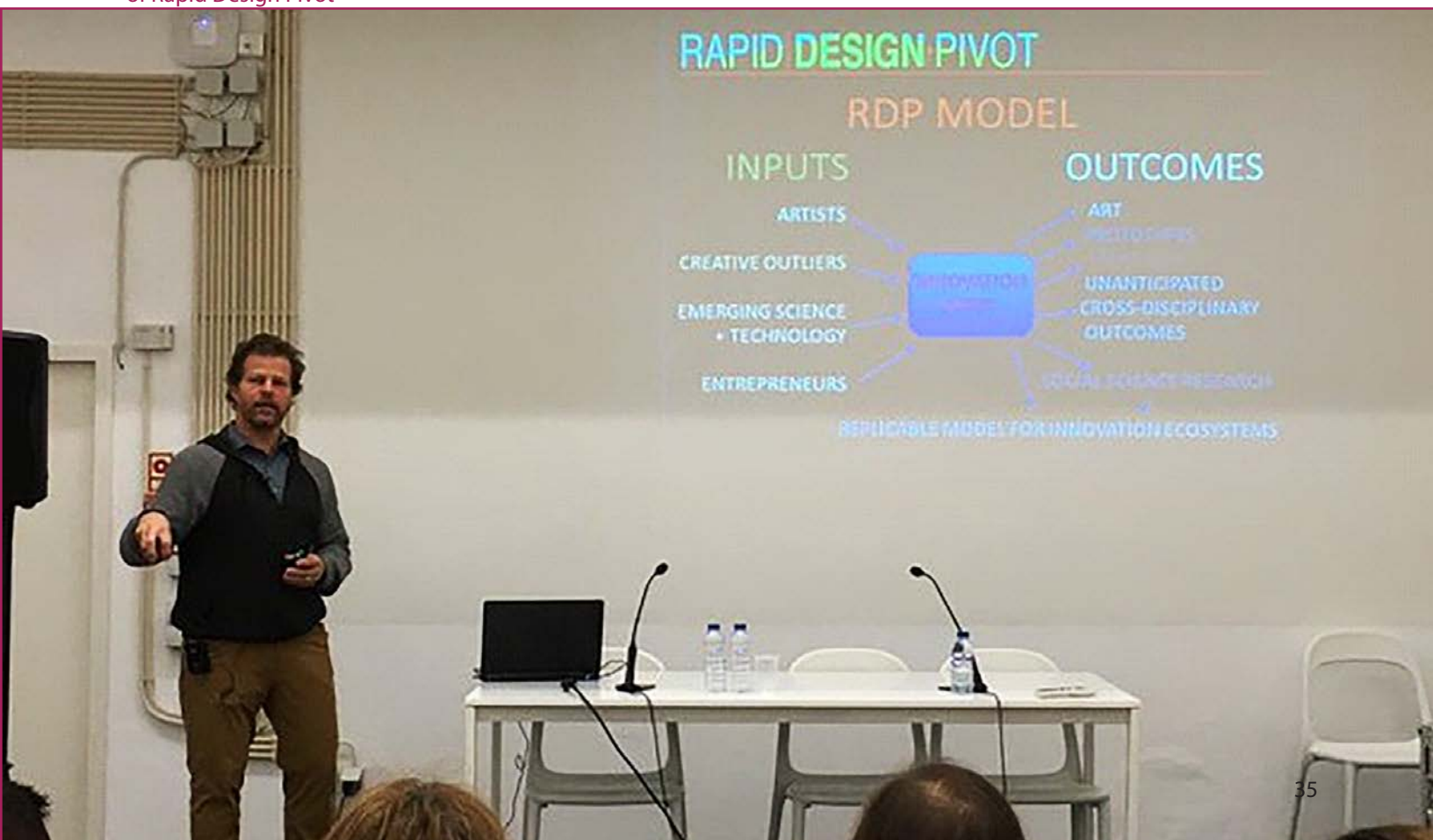
Portuguese Minister of Science Technology and Higher Education, Dr. Manuel Heitor, and Rector of the University of Nova, Dr. Antonio Rendas, visited UT Austin in June 2016. The visitors stopped by the Norman Hackerman Building and met with students and Jon Peck from the Korgel Group as well as the chair of the UT Austin McKetta Department of Chemical Engineering, Professor Tom Truskett.

9. Post-Docs and Alumni

As mentioned previously, Yixuan Yu of UT Austin remained at UT for a post-doc position upon completion of his Ph.D. Yu assisted with some of the work done in the Korgel Group.

In terms of faculty exchange, Dr. Rui Domingues of University of Minho spent 6 months at UT working closely with the Peppas group. Professor Peppas' group saw

Professor Brian Korgel during his talk at the Faculdade de Engenharia, University of Porto, "Innovation Arts and the Conception of Rapid Design Pivot"



significant exchange of faculty and Ph.D. students over the course of the past year.

10. Capacity-building Events

5th Emerging Technologies Workshop

The workshop, which was organized by Paula Vilarinho, took place at the University of Aveiro on February 24, 2016. UT Austin was represented by Professors James Sham and Paulo Ferreira, who joined about 50 other scientists from numerous universities in Portugal. Sham's talk, "Creating Collaborations between Artists and Scientists / Engineers," served as a catalyst for a brainstorming session that helped participants think of ideas for collaborative projects. Sham has spent significant time collaborating with Brian Korgel's group at UT and provides a very different and unique perspective that has often been very valuable.

The team in Portugal put together a review video of the workshop that can be found here.

UT Austin|Portugal Program Annual Conference

The UT Austin|Portugal Program Annual Conference took place in Lisbon, Portugal May 23-24, 2016. Speakers from the Emerging Technologies group included:

- Paula Vilarinho (University of Aveiro)
- Brian Korgel (UT Austin)
- Ana Senos (University of Aveiro)
- Cristina Freire (University of Porto)
- Helena Florindo (University of Lisbon)

In addition to the Emerging Technologies portion of the program, which was led by Vilarinho and Korgel, Professor Peppas was one of the participants in a roundtable discussion that highlighted future developments for the UT Austin|Portugal CoLab Program.

During the Emerging Technologies overview, each of the aforementioned individuals spoke about various parts of the program, including an introduction to the Emerging Technologies landscape in Portugal, information on the various interactions and exchanges taking place through the collaborative effort as well as highlights and updates on all of the various projects that are receiving funding, such as the additive manufacturing project.

11. External funding complementary to FCT

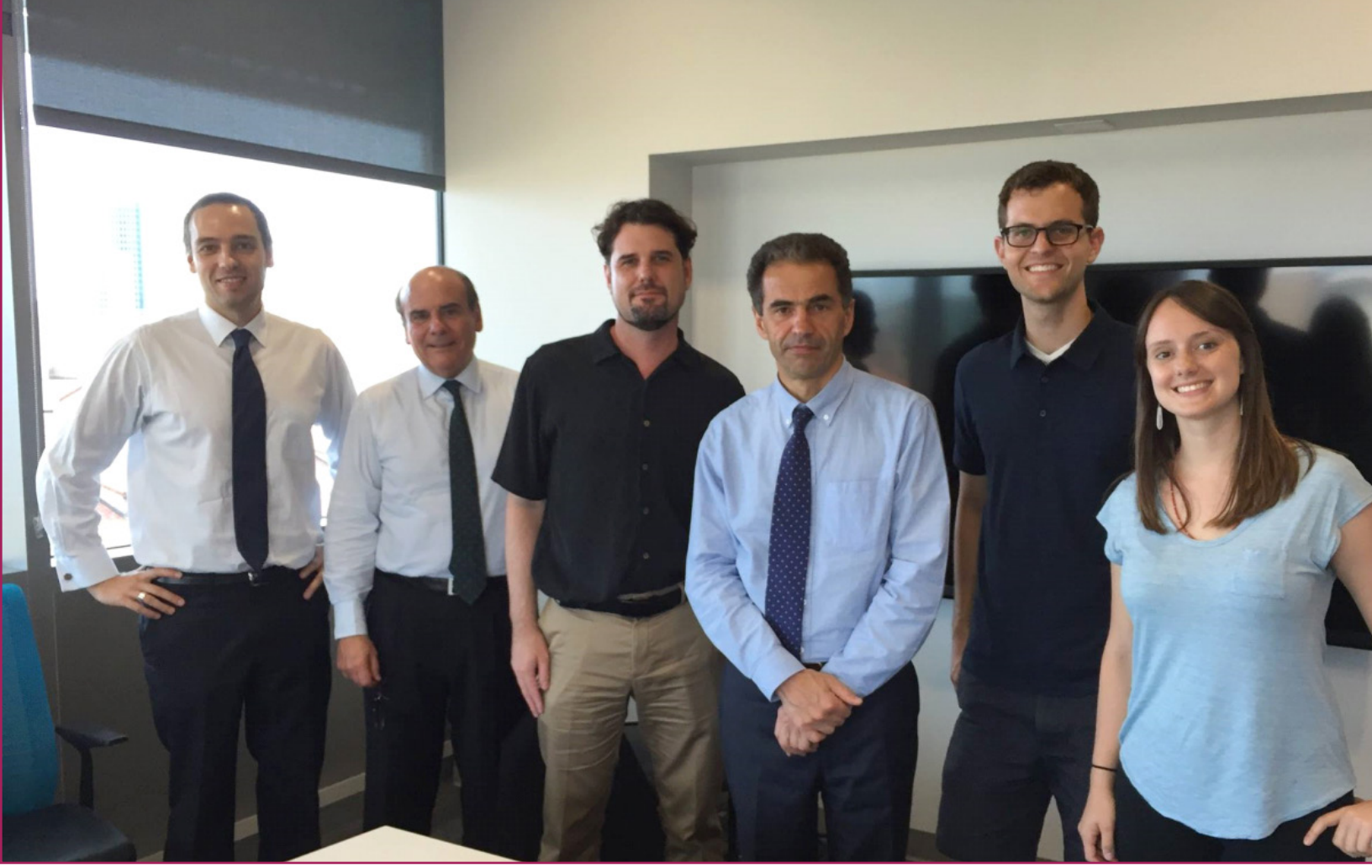
The National Science Foundation has previously provided the Korgel group with approximately $14,000 in funds to assist this collaboration with the intent that a gradute student would spend a few months in Portugal doing research. The plan is for these funds to be utilized shortly. Additionally, UT Austin is preparing a proposal for the National Science Foundation Materials Research Science and Engineering Center (MRSEC) program that will involve international collaboration with Portugal, interfacing with the UT Austin |Portugal Emerging Technologies Program. UT was invited by NSF to submit a full proposal.

12. Other

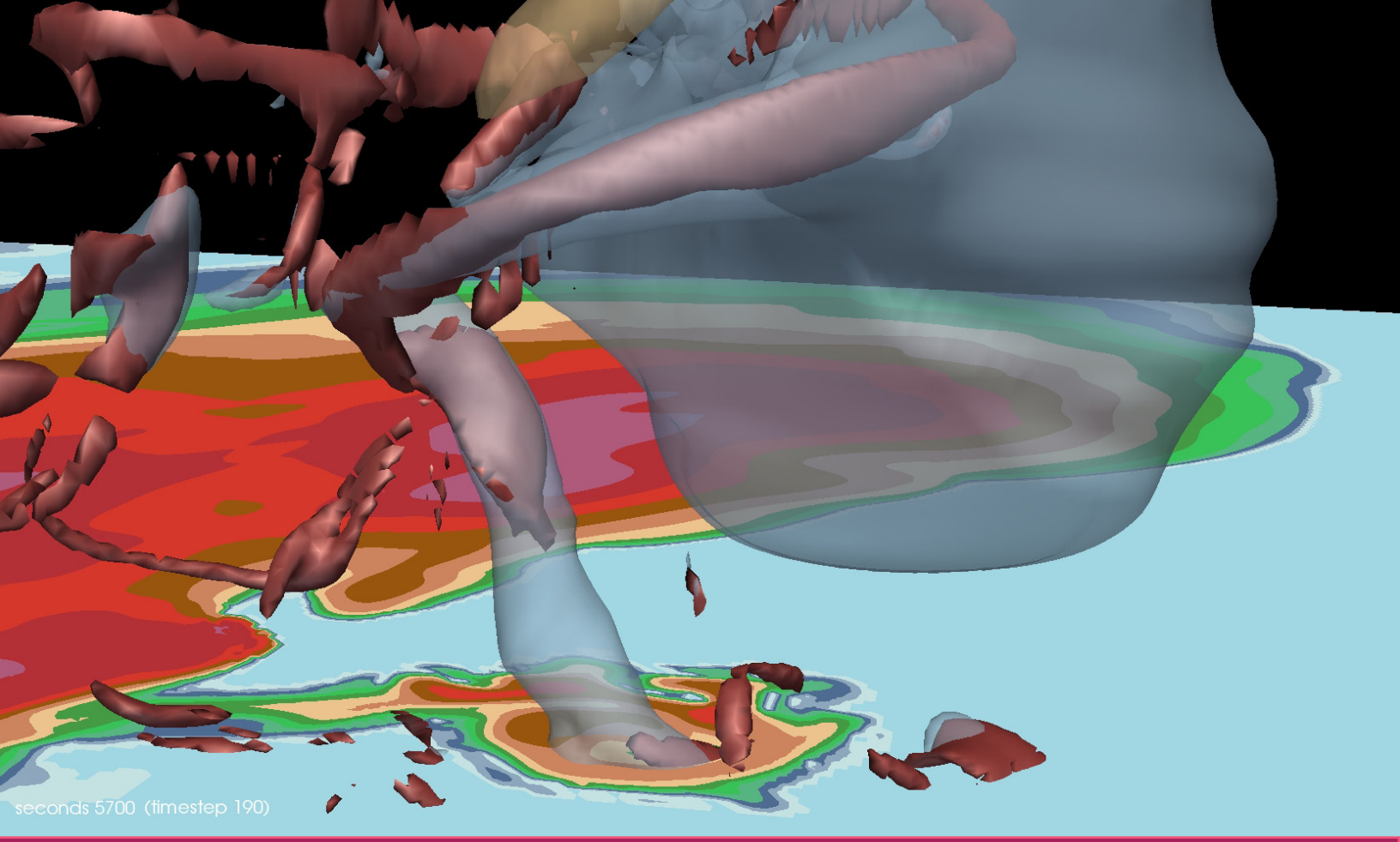
One important note about a collaborator of the UT Austin CoLab program that we would like to highlight was the induction of Professor Rui Reis of the University of Minho to the (US) National Academy of Engineering (NAE). Professor Nicholas Peppas of UT Austin nominated Professor Reis for inclusion in this prestigious group due in part to his contributions to biomaterials and tissue engineering in regenerative medicine. It was announced in February 2016 that Professor Reis would become one of only 232 foreign researchers to receive the honor of becoming a member of this very distinguished group. More information is available in the press release that the NAE released.

13. Looking ahead

Another educational workshop will be held in June 2017 for a week at the University of Aveiro on additive manufacturing led by Professors Carolyn Seepersad and David Bourrell.



(L-R) Marco Bravo (Co-PI UT Austin|Portugal), Antonio Rendas (Rector, Universidade Nova de Lisboa/NOVA), Tom Truskett (Chair, McKetta Department of Chemical Engineering, UT Austin), Manuel V. Heitor (Minister of Science, Technology and Higher Education), Doug Pernik, and Emily Adkins (both from the Korgel Group).



V. Advanced Computing

"Computing is central to life in the 21st century. The Advanced Computing part of the Portugal-UT Colab program has helped Portuguese institutions to make advances in information technology and to connect with hi-tech companies in the US through summer and winter schools, short courses, joint research projects, faculty visits, and student internships."

Keshav Pingali
Co-Director Advanced Computing Program
UT Austin | Portugal

1. Introduction and background

The UT Austin|Portugal collaboration in the area of Advanced Computing covers a variety of subjects including computer science, high-performance computing (HPC), computer graphics, computational sciences, and applications to multidisciplinary engineering. Today, these areas are foundational to most of science and even areas like the humanities and arts, where computers and quantitative methods are increasingly being used.

UT Austin has world-class departments and researchers in these areas. The Department of Computer Science is one of the top ten CS departments in the world and is known for its contributions to many areas, including formal methods for verifying hardware and software (Professor Allen Emerson won the Turing Award, the highest award in Computer Science, in 2007 for his contributions to this area), distributed and parallel computing, graphics and visualization, and programming language research.

UT Austin is also home to the Texas Advanced Computing Center (TACC), which is a National Supercomputing Center funded by the National Science Foundation (NSF). TACC has some of the fastest supercomputers in the world, including Stampede, installed in 2012 and in the top 12 in the June'16 TOP500 list. It has almost 500,000 cores, and a peak performance of over 8.5 petaflops (8,500 trillion computations per second). A second generation of Stampede is being built and tested, based on the Knights Landing multicore package from Intel, and this system is already 117th in the TOP500 list.

Given these strengths, it is natural for Advanced Computing to be a core part of the UT Austin|Portugal CoLab program.

2. Evolution

In the first phase of the CoLab program, the Portuguese side was anchored by the University of Minho, Braga, and included activities at the Universities of Coimbra, Aveiro, and UNL. During the current phase, activities have been broadened to include the University of Porto and the Instituto Superior Técnico (IST), University of Lisbon.

3. Institutions

- University of Porto, Porto
- Instituto Superior Técnico (IST), University of Lisbon
- University of Minho, Braga

4. Key people

- Portugal
  - » Adélia Sequeira, Instituto Superior Técnico, Lisbon
  - » Fernando Silva, University of Porto, Porto
  - » Alberto Proença, University of Minho, Braga

- The University of Texas at Austin
  - » Keshav Pingali, Department of Computer Science
  - » Don Fussell, Department of Computer Science
  - » Chandrajit Bajaj, Institute for Computational Engineering and Sciences (ICES)
  - » Thomas Hughes, Institute for Computational Engineering and Sciences (ICES)
  - » Michael Sacks, Institute for Computational Engineering and Sciences (ICES)

5. Education and training activities

The main Portuguese institutions involved in this area offer advanced courses in their masters degrees in Computer Science. IST has a PhD program in Computational Engineering that started in 2007/2008 as part of the joint initiative with UT Austin. It offers advanced courses in multidisciplinary engineering and computational sciences. These courses constitute a good initial preparation basis for graduates to start research in the area of advanced computing and also to benefit from internships in a more competitive and challenging environment at UT Austin.

In Advanced Computing, João Barbosa is working towards a dual PhD degree. In the past three months, several students at Porto have expressed interest in the dual degree program.

Training activities have been mostly directed towards two main types of initiatives:

1. Summer internships for about 15 masters/PhD students per year at UT Austin.

2. Advanced schools and workshops in Portugal with invited specialists in leading-edge topics.

5.1. Ph.D. students

On December 26, 2012 FCT opened the 2013 call for applications for doctoral scholarships in the UT Austin|Portugal Program that included Advanced Computing in the following areas:

- Computer Science, namely in methodologies and techniques in high performance computing (HPC), distributed/grid computing, and large-scale data analysis and management;

- Computational Engineering and/or science with specific requirements in advanced computing.

One scholarship has been given to Ana João from IST, who was already enrolled in the IST PhD program in Computational Engineering. She is presently concluding her PhD with the thesis "Medical Imaging for Improved Accuracy in Clinical Applications." She presented her results in several international conferences and published several papers in international journals and conference proceedings.

5.2. Graduates' dissertations and current positions

Roberto Ribeiro, who did his PhD at the University of Minho, will join TACC as a staff member. João Barbosa is currently employed part-time at TACC as well.

5.3. Short courses

Summer School on Isogeometric Analysis, IST, Lisbon, May 2016

In his short course, Professor Thomas J.R. Hughes described how this new approach, based on rich geometric descriptions from CAD, might lead to a single geometric model that serves as a basis for both design and analysis. This technique, suggested ten years ago, is rapidly becoming a new paradigm for geometric design and a mainstream analysis methodology, which is now supported by a new theoretical foundation for FEA.

More than 50 participants from both academic and private institutions from all over Portugal participated in this six hour short course, where an extended introduction to IGA was given, from very basic tools and methods, to complex applications in linear and nonlinear elasticity, fluids and fluid-structure interaction. The course ended with a description of several open problems that represent opportunities for future research.

This course was integrated within the collaborative research activities involving the groups of Professors Hughes and Sequeira from the Instituto Superior Técnico. It followed the UT Austin|Portugal Annual Conference 2016, on the 23rd and 24th May.

Summer School in Advanced Scientific Computing

June 20-23, 2016, University of Minho, Portugal.

(http://advcomp.di.uminho.pt/SS-AdvSciComp16/)

Description: This summer school was a week-long workshop that introduced researchers, faculty, staff, students, and industrial partners to high performance computing, data analytics, and scientific visualization. Technology experts from TACC taught attendees how to effectively use advanced computing resources and technologies like Stampede, Maverick, and Wrangler.

The course was taken by researchers and post-graduate students in scientific computing, both from science and engineering areas, with a need to efficiently use intensive computing resources, and to process and visualize large quantities of data.

Lecturers: Dave Semeraro (vizualization expert at TACC), Harald Servat (HPC engineer at Intel), Joao Barbosa (graphics expert at TACC), Todd Evans (performance analysis expert at TACC), and Victor Eijkhout (numerical linear algebra expert at TACC).

IBM Watson System used by students in Porto

- Summer course on Automated Question and Answer Systems using the IBM Watson System, FCUP, Universidade do Porto, June 2016.

(http://mapi.map.edu.pt/pages/112)

Description: This course was taught by Professor Bruce Porter, Chair of the CS Department at UT Austin, who is an expert in artificial intelligence (AI). AI expert systems have been around for many years, but recent advances in machine learning and high-performance computing have led to an explosive growth in the capabilities of expert systems. Building a computer program capable of answering

questions with human-level competence has been one of the grand challenges of artificial intelligence. A major highlight of this area is the IBM Watson system, which was able to win the Jeopardy contest on television, beating out all human competitors.

Porter's course taught the fundamentals of such systems, using the IBM Watson system as an example. Topics included natural language processing, knowledge representation, automated reasoning, machine learning, and information retrieval. Students worked in teams to develop applications that use Watson as a cloud service in novel ways.

In the spirit of a capstone experience, the class focused on projects and group work that culminated in building a novel application of question answering. The class also read and discussed research publications on various aspects of the technology, primarily focused on the Watson system. Approximately 20 students participated in the course.

IBM WatsonSystem used by students in Porto (June 2016)

UT Austin|Portugal Workshop on Nonlinear Mechanics and Applications in Life Sciences

October 27-29, 2016, Instituto Superior Técnico, University of Lisbon, Portugal

(http://cemat.tecnico.ulisboa.pt/NMLS2016/)

Description: This workshop reinforced Portuguese competences in nonlinear mechanics and in complex problems arising from applications of mathematical modeling and simulations in the life sciences. The workshop provided a place to exchange recent developments, discoveries, and progress in this challenging research field.

The main goal was to bring together doctoral candidates, post-doctoral scientists, and graduate students interested in the field, giving them the opportunity to make scientific interactions and new connections with established experts in the interdisciplinary topics covered by the event. Another important goal of the workshop was to promote collaboration between members of the different areas of the UT Austin|Portugal community.

6. Visits to Austin

Visiting researchers and interns

As in past summers, the Advanced Computing Program hosted a dozen Portuguese graduate students from Minho, Porto, and Lisbon who did internships at The University of Texas at Austin.

Six students from the University of Minho (Filipe Oliveira, Carlos Sá, Luis Calado, Sergio Caldas, Nelson Torres and Tiago Santos) worked as part of Professor Donald Fussell's research team. They focused on exploring new techniques for efficient scheduling of irregular applications on heterogeneous and mobile chips. The students were challenged to implement two physics simulation applications for computer graphics: 1) thin cloth simulation and 2) 2D incompressible fluid dynamics. During the internship they also interacted closely with Professor Etienne Vouga from the Graphics and Parallel Systems group, who guided them through the physics and math side of the applications, and they were mentored by João Barbosa in the implementation and testing of the code on the Stampede supercomputer at the Texas Advanced Computing Center.

Luis Cubal dos Reis and Joao Ferreira Trindade from the University of Porto worked in Keshav Pingali's Center for Grid and Distributed Computing in the Institute for Computational Engineering and Science (ICES) at UT Austin. Luis did research on the parallelization of MATLAB codes on GPUs under the supervision of Sree Pai, a postdoctoral associate in Pingali's lab. Joao worked with Andrew Lenharth, a research associate in Pingali's lab, where he studied the parallelization of graph analytics algorithms on multicore CPUs.

Diana Oliveira and Júlia Pinheiro, two students from the Instituto Superior Técnico (IST), worked in Professor Michael Sacks' Research Center for Cardiovascular Simulation at ICES under the supervision of Dr. João Soares. Their work consisted of the design of a bioreactor under specific settings and on the study of the effect of the bulk modulus and of constitutive parameters for a constitutive model for simulations of the heart focused on heart deformation and contraction in order to find the best values to mimic the real human case. Two other students from IST, Tiago Brito and

David Matos, were supervised by Professor Emmet Witchel from the Department of Computer Science and worked in collaboration with his PhD student Yige Hu and new faculty member Vijay Chidambaram. Their work consisted of creating benchmark tools to analyze the performance of SQLite databases in different contexts that can be used to calculate the throughput of SQLite and study how certain applications interact with the databases. During their stay at UT Austin they managed to deliver two fully functional prototypes that evaluate the performance and analyze how real applications use SQLite databases.

To celebrate the successful completion of these internships, the group had lunch at a Brazilian restaurant near the UT campus, as shown in the photo above. Alas, there was no bacalhau on the menu, but the interns loved the feijoada and felt that their experience in Austin would be very valuable for them in the future.

7. External funding complementary to FCT

Some of Pingali's research grants are leveraged to support the CoLab program. Here is a list of some of these grants.

- National Science Foundation - $375,000 (September 2013-August 2017)
- National Science Foundation - $535,000 (October 2014-September 2018)
- DARPA Transparent Computing - $990,000 (May 2015-April 2018)
- DARPA BRASS Program - $1.2 million (November 2015-October 2018)

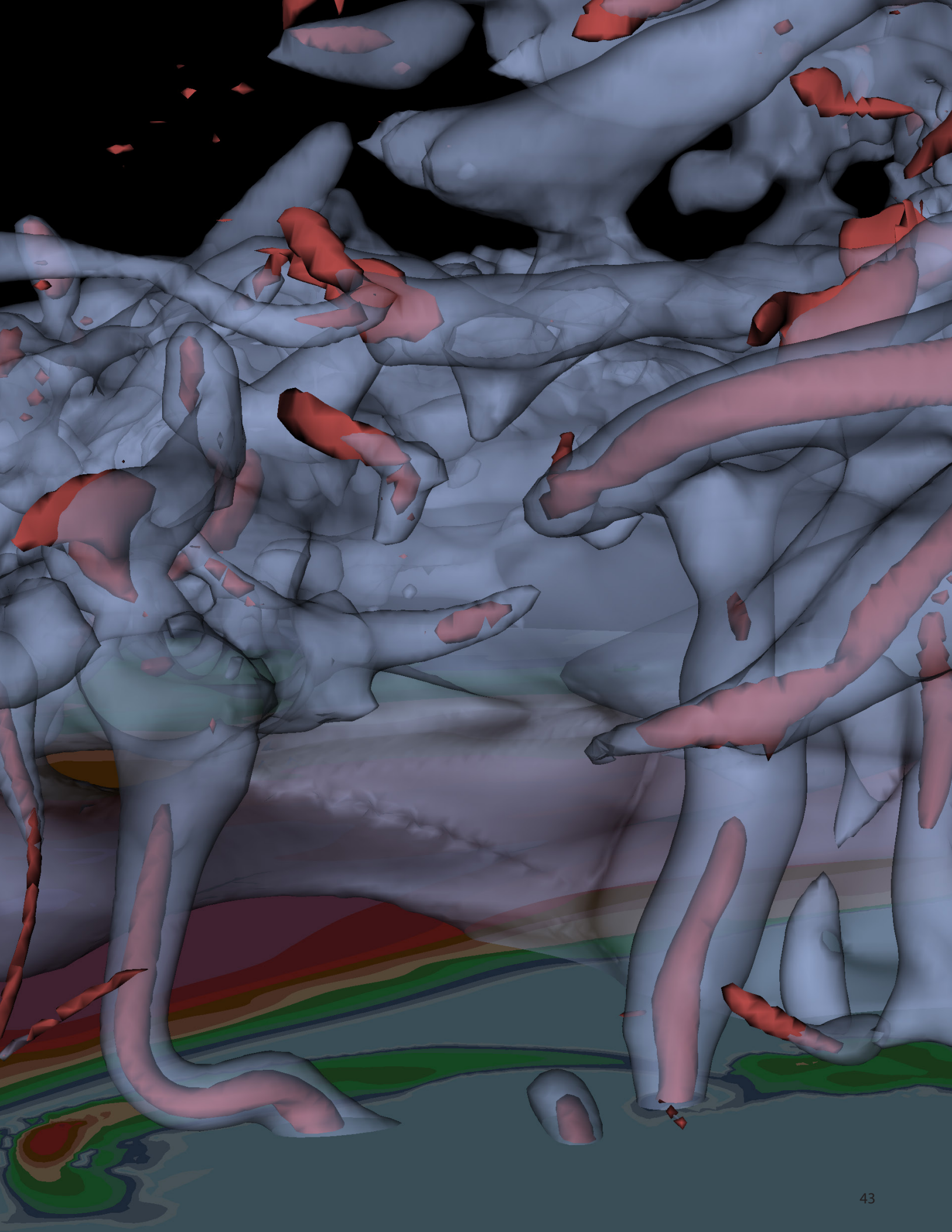
8. Looking ahead

We will continue the internships and support summer/ winter courses as we have for the past nine years.

(R) Visualization by Greg Foss, Texas Advanced Computing Center, University of Texas at Austin, Amy McGovern, University of Oklahoma, and Corey Potvin, NOAA/National Severe Storms Lab. ▶

(L)Portuguese visitors from the University of Porto

Research collaboration between Portuguese scientific institutions and the University of Texas at Austin



VI. **Applied Mathematics**

" The mathematical sciences are part of nearly all aspects of everyday life--the discipline has underpinned such beneficial modern capabilities as Internet search, medical imaging, computer animation, numerical weather predictions, and all types of digital communications."

USA National Academy of Sciences (NAS)
2014 Report "Mathematics in 2025 "

Research collaboration between Portuguese scientific institutions and The University of Texas

1. Introduction and background

The UT-Portugal Mathematics Program involves the Department of Mathematics at UT Austin and the Institute for Computational Sciences and Engineering (ICES) at The University of Texas at Austin, along with mathematical research centers and groups in four Portuguese universities, namely at the Mathematics Department of Instituto Superior Técnico (IST) of the University of Lisbon, the Mathematics Department of the School of Sciences of the University of Lisbon (FCUL), the Mathematics Department of the School of Sciences and Technology of the New University of Lisbon (FCTUNL), and the Department of Mathematics of the School of Sciences and Technology of the University of Coimbra (FCTUC). In this second phase of the program, the Mathematics Department of the School of Sciences of the University of Porto is also one of the main partners.

Through ongoing collaborations, Portuguese and UT Austin faculty strengthened their academic connections, resulting in a number of joint publications, postdoctoral visits, long-term visits by Portuguese faculty members to UT Austin, and ongoing research projects. In addition, the program has increased the international recognition of Portuguese scientists, as well as bringing to Portugal top researchers in a diverse class of topics for summer schools, workshops, and research seminars.

CoLab, a long-term collaborative project, was established nine years ago with the goal of increasing research collaborations in emerging technologies with an emphasis on media and digital content, advanced computing and mathematics.

2. Institutions

- Department of Mathematics at The University of Texas at Austin
- Institute for Computational Engineering and Sciences (ICES) at The University of Texas at Austin
- Mathematics Department of Instituto Superior Technico (IST) of the University of Lisbon
- Mathematics Department of the School of Sciences of The University of Lisbon (FCUL)
- Mathematics Department of the School of Sciences and Technology of the University of Coimbra (FCTUC)
- Mathematics Department of the School of Sciences and Technology of the University of Nova de Lisboa (UNL)

3. Key people

- Portugal
  - » Jose Miguel Urbano, Director
  - » Juha Videman, Co-Director

- The University of Texas at Austin
  - » Irene M. Gamba, Director
  - » Luis Caffarelli, Co-Director
  - » Alessio Figalli, Faculty
  - » Alexis Vasseur, Faculty
  - » Clint Dawson, Faculty
  - » Mary F. Wheeler, Faculty

4. Education and training activities

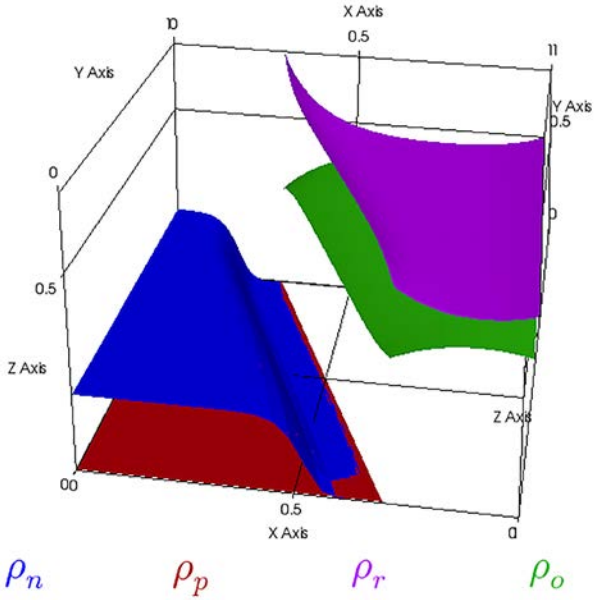
Irene M. Gamba was part of the Scientific Committee and Alexis Vasseur was part of the Organizing Committee for the international “Particle Sytems & PDEs IV Conference” held in Braga, Portugal in mid-December 2015. This conference was carried out jointly by Centro de Matemática da Universidade do Minho (CMAT) and Centro de Matemática, Aplicações Fundamentais e Investigação Operacional da University of Lisboa (CMAF-IO) in conjunction with the UT Austin-Portugal CoLab initiative. (See https://sites.google.com/site/meetingpspdeiv/). Alexis Vasseur was also an invited speaker. Four UT students attended this event as well, Logan Stokols, Matthew Novak, Sam Krupa, and Jianguo Liu.

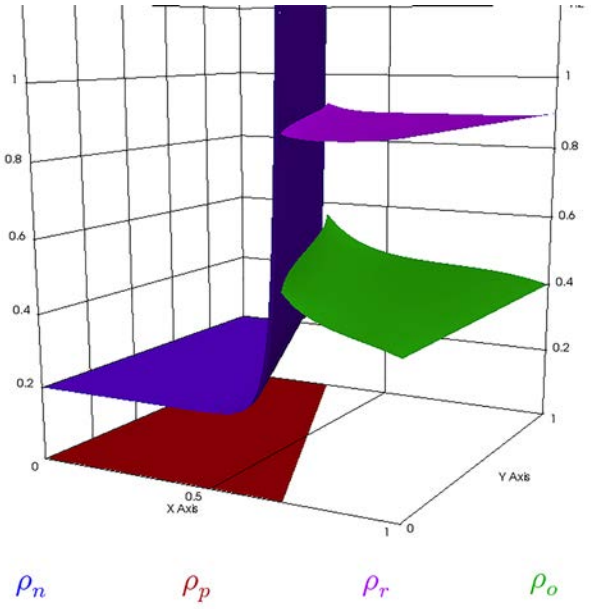
The CoLab FPO co-sponsored a workshop titled "Mathematics of Complex Systems: From Precision Medicine to Smart Cities” held at the University of Coimbra November 21-22, 2016. The Scientific Committee was composed of Aderito Araujo (UC), Luis Caffarelli (UTA), Irene M. Gamba (UTA), Jose Miguel Urbano (UC), and Juha Videman (IST). Invited speakers included Kui Ren, UT Austin; Des Higham, University of Stathclyde, UK; Gonzalo Correia, Delft University of Technology, The Netherlands; Philip K. Maini, University of Oxford, UK; Luís Rocha, Indiana University, USA (and Instituto Gulbenkian de Ciência, Portugal).

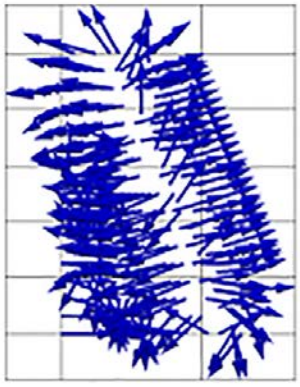
Information can be found at http://www.mat.uc.pt/colab2016/participants.html.

5. Research Activities

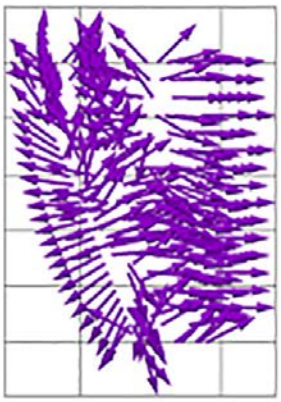
- Ali Samii–CSEM graduate student supported under the CoLab program, Fall 2016.
- Michael Harmon–CSEM graduate student supported under the CoLab program (Summer 2016- 6 weeks). Both Harmon and Sammi have engaged in further



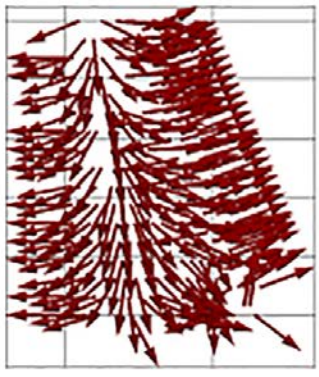




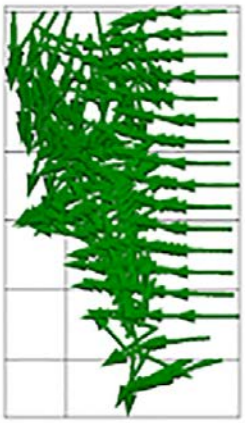
(a) J_n



(b) J_r



(c) J_p



(d) J_o

Numerical algorithms based on Galerkin methods for the modeling of reactive interfaces in photo electrochemical (PEC) solar cells. Densities of charge carriers for devices with oblique interfaces, with densities of order 10^1. Left figure at zero potential bias. Right figure at 0.5 potential bias (Harmon, Gamba, Ren, JCP, 2016)

developments for numerical algorithms based on Galerkin methods for the modeling of reactive interfaces in photoelectrochemical (PEC) solar cells as initiated by Harmon under the direction of I.M. Gamba and K. Ren. This project includes the new participation of Juha Viderman and Jose Miguel Urbano.

6. Visits to Austin

Visiting researchers and Faculty Visits

- In April 2016, Dr. Juha Videman visited UT Austin to collaborate on research with Dr. Clint Dawson on the "Analysis and Simulation of Multi-Component Groundwater Contaminant Transport" as part of the UT Austin/Portugal Colab Project "Phase Transitions and Free Boundary Problems."
- In April 2016, Dr. Joao Nogueira visited UT Austin to collaborate on ongoing research with Dr. Cameron Gordon and Dr. Alan Reid in order to continue a collaboration on knot groups related to a special kind of the so called Montesinos knots that generalize pretzel type of links. Knot Theory has a direct impact on protein and DNA modeling. The visits were very useful and good progress was made on the project. A preliminary draft of the results on Montesinos knots has been completed. There is more work to do, however, and the collaboration will continue.
- In October 2016, Dr. Stanislav Kondratev visited UT Austin from the University of Coimbra to initiate a collaboration on research with Dr. Irene M. Gamba on plasma particle models with applications to tokomak dynamics.
- Jose Miguel Urbano, Luis Caffarelli, and Rafayel Teymurazyan are developing a project on non-local problems with optimal control with strong variation in spatial structures, with applications ranging from complex particle systems in chemistry to financial engineering. Dr. Jose Miguel Urbano visited UT Austin to interact with Dr. Luis Caffarelli's group and presented a lecture at a research seminar titled "On A Regularity Conjecture For Degenerate Elliptic PDEs."
- Isabel N. Figueiredo and Bjorn Engquist continue their work on analysis and simulations on homogenization techniques applied to periodic model reduction for the average behavior of ACF at the tissue level in colon cancer modeling.

7. Post-Docs and Alumni:

Professor Stefania Patrizi (ITS 2013), Currently an Assistant Professor at UT Austin)

Professor Filippo Cagnett (ITS, 2013), currently Lecturer at the University of Sussex, UK

Dr. Farid Bozorgnia (IST, 2013 to 2015)

Dr. Raimundo Leitao (2014), Assistant Professor Appointment in Mathematics at Universidade Federal do Ceara, Fortaleza, Brazil

Levon Nurbekyan (Mach-April 2013), PhD Co-advised by Diogo Gomes and Alessio Figalli, Mathematics

Rafayel Teymurazyan, in the Mathematics Department of the School of Sciences and Technology of the University of Coimbra (FCTUC), visited ICES in October and November 2016. He presented a lecture titled "Singularly Perturbed Fully Nonlinear Parabolic Problems and their Asymptotic Free Boundaries."

Stanislav Kondratev, in the Mathematics Department of the School of Sciences and Technology of the University of Coimbra (FCTUC), visited ICES in October 2016. He presented a lecture titled "On the Bulk Velocity of Brownian Ratchets."

Veronica Quitalo, an alumna of the CoLab program Phase I, after an appointment at Purdue University in Indiana, has been now appointed a postdoc in the Mathematics Department of the School of Sciences and Technology of the University of Coimbra (FCTUC), and has developed a collaboration with Silvia Barbeiro, also at FCTUC.

8. Capacity Building Events

Several Workshops and Conferences co-sponsored by UT Austin|Portugal Colab, with UT Austin based NSF Grants and other Institutions from Portugal as reported in item 4 in this report.

9. External funding complementary to FCT

In addition to Co-Lab funding, the Applied Mathematics Program has obtained several sources of matching funds, including those from the National Science Foundation (NSF) DMS-1107465 Grant Research Network in Mathematical Sciences (RNMS) in "Kinetic Description of Emerging Challenges in Multiscale Problems of Natural Sciences" (Ki-Net) for $600,000, as well as support from CMAT, University of Minho; CMAF, University of Lisbon; and other funded projects from the Portuguese FCT - Fundação para a Ciência e a Tecnologia.

- National Science Foundation, $400,000 (September 2012-February 2017)
- National Science Foundation $240,000 (January 2013-December 2017)

10. Publications

C. Dawson and J.H. Videman. "A Streamline Diffusion Finite Element Method for the Viscous Shallow Water Equations." J. Comput. Appl. Math. 251 (2013), 1-7.

V. Quítalo. "A Free Boundary Problem Arising from Segregation of Populations with High Competition." Arch. Rational Mech. Anal. 210 (2013), 857-908.

L. Caffarelli, R. Leitão, and J.M. Urbano. "Regularity for Anisotropic Fully Nonlinear Integro-differential Equations." Math. Ann. 360 (2014), 681–714.

Rolf Stenberg and Juha Videman. "On the Error Analysis of Stabilized Finite Element Methods for the Stokes Problem." arXiv:1412.2893. SIAM J. Numer. Anal. 53 (2015), no. 6.

Y. He, I.M.Gamba, H-C.Lee, and K.Ren. " On the Modeling and Simulation of Reaction-transfer Dynamics in Semiconductor-electrolyte Solar Cell." SIAM J. Appl. Math.75, (2015) no. 6,2515–2539.

Stanislav Kondratyev, José Miguel Urbano, and Dmitry Vorotnikov. "On the Bulk Velocity of Brownian Ratchets." arXiv: 1408.1548, SIAM J. Math. Anal. 48 (2016).

M. Harmon, I.M. Gamba, K. Ren. "Multi-scale Transport with Reactive-Interfaces In Photo Electro Chemical (PEC) Solar Cells Modeling." arXiv: 1604.07855v2. Journal for Computational Physics (2016).

Isabel N. Figueiredo, Carlos LeaL, Romanazzi, Giuseppe, and Bjorn Engquist. "Homogenization Model for Aberrant Crypt Foci." SIAM J. Appl. Math. 76 (2016), no. 3, 1152–1177.

Tuomo Kuusi, Léonard Monsaingeon, and Juha Videma. "Systems of Partial Differential Equations in Porous Medium." arXiv:1412.5414. Nonlinear Anal.133 (2016), 79-101.

Ali Samii, C. Dawson, and C. Michoski. "A Parallel and Adaptive Hybridized Discontinuous Galerkin Method for Anisotropic Nonhomogeneous Diffusion, Computer Methods in Applied Mechanics and Engineering." June 2016.

Ali Samii, N. Panda, C. Dawson, and C. Michoski. "A Hybridized Discontinuous Galerkin Method for the Nonlinear Korteweg–de Vries Equation." Journal of Scientific Computing, July 2016.

Luis A. Caffarelli, Veronica Quitalo, and Stefania Patrizi. "On a Long Range Segregation Model." arXiv:1505.05433, submitted for publication, (2015).

Tom Gustafsson, Rolf Stenberg, and Juha Videman." Mixed and Stabilized Finite Element Methods for the Obstacle Problem." arXiv:1603.04257, submitted for publication (2016).

Juhana Siljander, and José Miguel Urbano. "On the interior Regularity of Weak Solutions to the 2-D Incompressible Euler Equations." arXiv:1604.06616, submitted for publication (2016).

Gleydson C. Ricarte, Rafayel Teymurazyan, and José Miguel Urbano. "Singularly Perturbed Fully Nonlinear Parabolic Problems and their Asymptotic Free Boundaries." arXiv:1604.01294, submitted for publication (2016).

11. Looking ahead

Juha Videman (IST) plans to visit UT Austin in April, 2017 and Dr. Leonard Monsaingeon (IST) in March-April, 2017 to pursue a scientific project started earlier with Clint Dawson and his team on the numerical investigation of the long time for coupled systems of partial differentials in porous media.

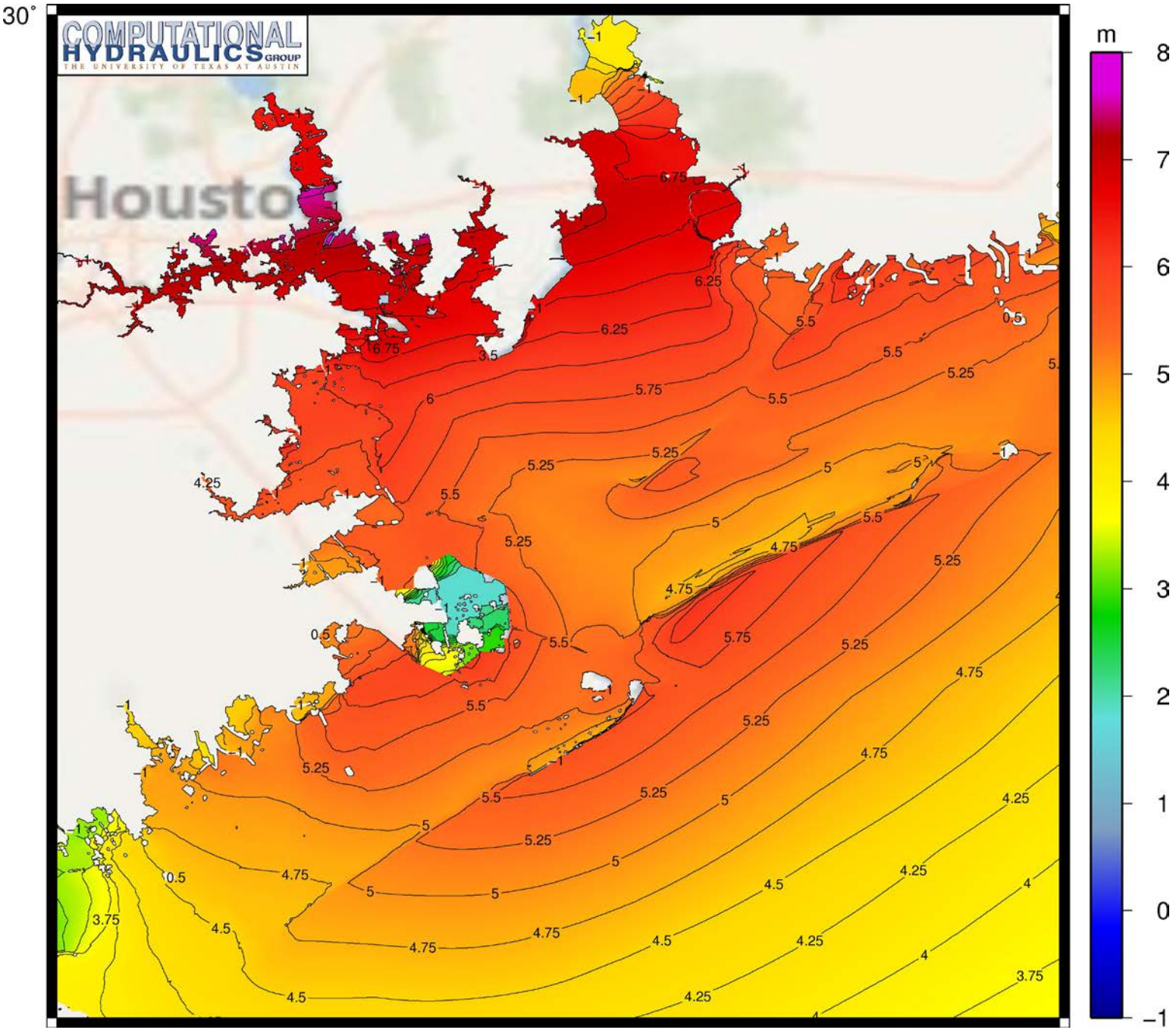
Juha Videman has initiated a project jointly with Ali Samii, Clint Dawson, Irene Gamba, and Kui Ren to further study modeling reaction interfaces in photoelectrochemical (PEC) solar cells.

Farid Bozorgnia is scheduled to visit UT Austin in January-February 2017 to continue discussing segregation modeling with Luis Caffarelli and looking into a possible collaboration with Stefania Patrizi and Jose Miguel Urbano on systems of reaction-diffusion equations modeling biological molecule (RNA) interactions.

Hugo Tavares (IST) works in elliptic systems, geometric measure theory, and free boundary problems. He is particularly interested in reaction diffusion systems with competitive terms, and its relation with segregation and partition problems. He will visit UT Austin Spring 2017 to collaborate with Luis Caffarelli and Stefania Patrizi.

Fabio Chalub (UNL) and Irene M. Gamba (UT Austin) expect to develop a collaboration on mathematical models in epidemiology and evolution by means of studies of replicator-mutator modeling. This will be carried on in consultation with Lauren Meyer at the Developmental Biology and Statistics Departments at UT Austin. There is a plan to coadvise potential graduate student Tiago Costa, a recent graduate from UNL in applied mathematics who is applying to the ICES and also Mathematics graduate programs at UT Austin.

Simulated severe hurricane directly impacting the Houston region. Maximum water surface elevation (in meters) over duration, Credit: Clint Dawson Computational Hydraulics Group, ICES



VII. Research Projects

Research collaboration between Portuguese scientific institutions and the University of Texas at Austin

1. Digital Media Program: Annual Project Report

"GamiLearning Project"

Kathleen Tyner. Co-Principal Investigator

The University of Texas at Austin

August 2015-October 2016

Overview of the GamiLearning Project

The Games for Media and Information Literacy (MIL) Learning project (GAMILearning) aims to develop the critical and participative dimensions of media literacy of tweens through the gamification of the learning experience. Working with cohorts of youth aged 9 to 12 in Portugal and Austin, Texas, the project builds on field-tested research to address the need for student awareness and skill in managing their digital identities with game play and production. In the process, the project explores the way that game analysis and production support a wide range of media literacy and learning skills.

The GAMILearning project: 1) is a media education project that will empower teachers and particularly students in the creation of digital games, enabling them to acquire media and information literacy skills; 2) capitalizes on available visual programming game engines and on SAPO Campus to create new methods and processes that enable childpeer learning in a classroom setting; and 3) advances the methodologies to create and assess the separate but related impacts of game design, pedagogy and community experiences on media and information literacy development in the learning process.

GamiLearning partners include researchers from COFAC/ CICANT, University Aveiro, PTC-Sapo Campus, and The University of Texas at Austin. Conceição Costa of the University of Lusafona and Kathleen Tyner of The University of Texas at Austin are co-investigators for the project.

This report provides details for project activities between August 2015 and October 31, 2016. These activities are related to the following proposal tasks: 1) State of the Art: Review of Best Practices; 2) Research Design; 3) Sample Recruitment; 4) Curriculum Design; 5) Fieldwork; and 6) Publication and Dissemination. Activities are reported below on a timeline from August 2015-November 4, 2016.

Research Sample Recruitment and Curriculum Design – August 2015-February 2016

In Fall 2015, the GamiLearning project contacted and met with local middle schools and after-school programs to recruit a research sample from the Austin Independent School District (AISD) for the GamiLearning fieldwork. In early 2016, one middle school school, Covington Middle School, agreed to work with GamiLearning to plan the curriculum integration and to implement the research in Fall 2016. A Covington Middle School teacher, Mr. Jeffrey Bryan, volunteered to implement the class. Regular meetings were scheduled with the teacher to design curriculum for the GamiLearning curriculum objectives and to strategically integrate them into Mr. Bryan's class. The project implementation was scheduled for a one-month period in November 2016.

Curriculum Refinement – February 2016 – August 2016

Co-investigator Kathleen Tyner of The University of Texas at Austin worked with Covington Middle School teacher Jeffrey Bryan in regularly scheduled meetings to discuss and refine the GamiLearning curriculum for the fieldwork. In addition, Mr. Bryan joined the SAPO Campus site to collaborate online with the international group of GAMILearning partners. Working with project partners and the teacher at the GamiLearning project sites in Portugal, GAMILearning partners developed a scope and sequence to support and coordinate international curriculum activities for the Fall 2016 fieldwork.

Research Design and Curriculum Coordination with GamiLearning Portuguese Partners - May 2016

In May, 2016, Kathleen Tyner of The University of Texas at Austin traveled to Lisbon for the first GamiLearning meeting with partners at Lusófona University in Lisbon. The meeting was intended to refine the tasks, curriculum and data collection instruments for project implementation. The meeting agenda is attached in Appendix A.

Research design and data collection instruments were refined for field-testing in Fall 2016. These instruments include field testing of a media and information learning scale, pre- and post-questionnaires, observation protocols and interviews related to the relationship between media and information literacy skills and game-based learning and design; the efficacy of an online identity management curriculum; and attitudes about game design in the curriculum. In addition, tasks related to participation, sharing and dissemination of the GamiLearning project for all research partners were refined at the meeting.

Two games-based learning activities that aim to introduce basic technical skills in digital security workshops were created by the Portuguese team for use and field-testing in Portugal and in Austin: 'The Secret Alphabet' and 'Sharing the Secret' aimed for fieldwork and dissemination . A detailed description can be found on the GamiLearning website: http://gamilearning.ulusofona.pt/. Two apps for Android were created for teachers, parents and children to allow them play with the activities in a digital format. The apps are publically available for download in the following URLs: http://netlab.ulusofona.pt/im/praticas/DiffieHellman.apk and http://netlab.ulusofona.pt/im/praticas/Alphabet.apk

The May project meeting was scheduled in coordination with the UT Austin | Portugal Annual Conference on May 23-24, in Lisbon, Portugal. GamiLearning participated in conference sessions and created a poster for the meeting. The poster is attached in Appendix B.

Research Agreements and Permissions with The University of Texas at Austin and Austin Independent School District – June 2016 to September 2016

The research approval process was initiated in Austin, Texas for approval with two entities: the Institutional Review Board at The University of Texas at Austin (UT Austin) and the Austin Independent School District Department of Research and Evaluation. The approval to implement the GamiLearning fieldwork was granted from UT Austin on August 12, 2016 and from AISD on September 21, 2016.

Review of Best Practices: State of Art

In order to assess best practices in the field of games for learning, two reviews of recent research (2010-2015) related to the efficacy and implementation of games and learning were conducted to support the curriculum development and were presented at conferences and submitted for publication. A full list of conference presentations and publications follows in the Dissemination Section of this report. The research questions investigated in these studies were broken down into four central questions related to best practices for the integration of game-based learning:

1) How can we reach the optimum game design, mechanics and attributes in game-based learning in order to promote motivation, engagement, challenge and reward that at the same time supports intended learning outcomes?

2) How can learning content best be learned and promoted via gameplay?

3) What are the learning benefits and educational impact of using games to support the learning objectives of traditional school content?

4) Can recreational commercial games be used to promote learning and if so, what of kinds of learning?

These questions are intended to guide future research related to the study of game design and mechanics in the learning environment related to its affordances for both learners and teachers and the way that they affect the optimum design and best pedagogical practices for game-based learning in physical and virtual spaces.

In addition, GamiLearning researchers conducted a literature review related to best practices game-based learning as it relates to media and information literacy. In particular, the researchers wanted to study field-tested data collection measurements and theories related to this topic, particularly for our context of youth aged 9-12.

The review indicates that the research on the link between media and information literacy and game-based learning is broad and complex. As a result, the researchers created a data collection instrument based on field-tested instruments for use in fieldwork in Fall 2016.

Fieldwork

In Spring 2016, the school site in Austin, Texas planned for 3 classes taught by one of the few game design teachers in the school system, Mr. Jeffrey Bryan. In August 2016, Covington Middle School decided to schedule only one class. Fieldwork began on October 3, 2016 and is in progress. In mid-November, 2016, the data collected by The University of Texas researchers will be analyzed for comparison with the data collected by the GAMILearning partners in Portugal.

Dissemination of Presentations and Publications

The Portuguese version of the Gamilearning website was launched and is available at: http://gamilearning.ulusofona.pt/. The English version is in progress. Dissemination at the website will include studies, papers and publications or links for the publications websites, depending on authorship rules of publishers. In addition, GamiLearning researchers have presented papers at conferences over the last year and have submitted numerous papers for publication. A list of articles presented, published, and under review by the GamiLearning research team is presented here.

Accepted Publications or Presentations

C. Costa, V. Car, and S. Papadimitriou, (2016). "Good Practices and Emerging Trends." In D. Frau-Meigs, J. Flores, I. Velez, Public Policies in Media and Information Literacy in Europe: Cross-country Comparisons. London: Routledge.

C. Costa, J. Rogado, C. Sousa, and S. Henriques (2016)."Playing Digital Security - Youth Voices on their Digital Rights." Special Issue of International Journal of Games Based Learning (IJGBL), IGI Global.

C. Costa, K. Tyner, S. Henriques, and C. Sousa, "Games ." ECREA2016 Conference, Prague, 9th-12th of November 2016.

Abstracts or Full Papers Presented, Published or in Review

K. Tyner, C. Costa, and G. Huang, (2016). "Extended Play: Connecting Game Design with Media Education." Media Education Summit, Centre for Excellence in Media Practice and John Cabot University, Rome, Italy, November 4-5, 2016. In review for a joint publication of the Media Education Research Journal and the Journal of Media Literacy Education, expected Fall 2017.

L. Pedro, C. Santos, J. Batista, G. Cabral, F. Pais, and Costa, C. (2016). "Social Network Analysis and Digital Learning Environments: a Framework for Research and Practice Using the Sapo Campus Platform." Proceedings of INTED2016 Conference, Valencia, Spain, 7th-9th March 2016. pp.1061-1070.

C. Costa, K. Tyner, S. Henriques, and C. Galego (2016). "The Power of Games: a Review of Research on Game-based Learning." 66th ICA Annual Conference, Fukuoka, Japan

C. Costa, J. Rogado, S. Henriques, and C. Sousa, "Inside the black-box: A path for children rights in a digital connected presence," IAMCR Pre Conference - Children's and Young

People's Rights in the Digital Age, London, UK, 26th-27th July 2016.

J. Faísca, and J. Rogado, "Personal Cloud Interoperability Fully Decentralized Identity Management," IEEE 17th International Symposium - A World of Wireless, Mobile and Multimedia Networks (WoWMoM), PhD Forum, Coimbra, Portugal, 21st-24th June 2016.

J. Rogado, C. Costa, C. Sousa, and S. Henriques, "Inside the black-box: playing digital security," Playful Learning Conference, Manchester, UK

Appendix A: GamiLearning Meeting Agenda

GamiLearning (UTAP-ICDT/IVC-ESCT/0020/2014) 1st meeting agenda

May 28-29, 2015, Lusófona University, Room U.0.7, Campo Grande 388, Lisbon

Thursday 28 May 2015

13.45-14:00	Registration (Participants will sign for their attendance)
14.00-14.10	Welcome and Introduction – Conceição Costa & all Brief presentation of project members and Institutions (ULHT, UA, UTA and PT-SAPO
14:10-15:00	Project Governance and tools: Conceição Costa, Ana Cunha & Bruno Melo, Q&A (all)
15:00-16:00	Project WBS review and approval – Conceição Costa & all
16:00-16:15	Coffee/Tea Break
16.15-17:30	"An Introduction to Privacy, Trust and Digital Identity" José Rogado, ULHT; Q&A important for the Design of Training program in Managing Online Identity – moderator: Conceição Costa

Friday 29 May 2015

09.15:9:30	Registration (Participants will sign for their attendance)
09.30-10:15	State of Art - an Overview of recent projects in "cyber security", Kathleen R. Tyner (UTA)
10:15-11:00	State of Art - Gamification and SAPO Campus: lessons from the field, Luis Pedro (UA)/ Carlos Santos
11:15-11:30	Coffee/Tea Break
11:30-12:30	SAPO Campus & GamiLearning project Space creation on the fly: Luis Pedro/Carlos Santos/
12:30-12:45	SAPO Campus now and a vision for Future: Benjamin Junior/Pedro Figueira Torres (PT-SAPO)
12.45-13.45	Lunch
13.45-14:45	SAPO Campus New Features Development: Working on User, Research and Technical Requirements, Luis Pedro/Carlos Santos (UA) lead; all researchers participate
16:00-16:15	Coffee/Tea Break
16:15-17:15	Working on GamiLearning visual identity: Activity leaded by Rute Muchacho (ULHT)
17:15-17:30	GamiLearning meeting wrap up

UT Austin | Portugal

GAMILearning Project

Games for Media and Information Literacy Learning Objetives, Research Design and recent Outcomes

Costa, C., Henriques, S., Sousa, Rogado, J. and C., Tyner, K.

1 Centre for Research in Applied Communication, Culture and New Technologies (CICANT) – Universidade Lusófona de Humanidades e Tecnologias
University of Texas-Austin

Introduction

Gamilearning project

Goals

- To explore the value and effectiveness of game-based learning activities in educational contexts;
- To identify key aspects for engagement and successful learning in game-based activities;
- To examine the relationship between gaming activities in educational settings and interdisciplinary learning;
- To understand the power of game-based activities to promote learning, knowledge and information literacy skills among children.
- To evaluate students' learning progression and educators' attitudes about the gamification of the learning environment;
- To promote MIL through student critical analysis and creative production of games;
- To analyze variables in the learning environment that support best practices and challenges for the use of online gaming activities;
- To identify variables that explore the relationship between MIL learning and gaming using mixed methods approaches that contribute to the research base of the integration of gaming in learning environments

Research problem

- Can we promote and develop MIL skills, such as critical understanding, awareness, creativity, participative actions, interactive practices and empowerment, by facilitating the use of game-based activities in educational contexts?
- What is the relationship between effective learning, motivation, engagement and game based activities for educational purposes?

Our central innovation is that children should not only be involved in the games-activities creation and design, but they should be the **designers and creators of such games.**

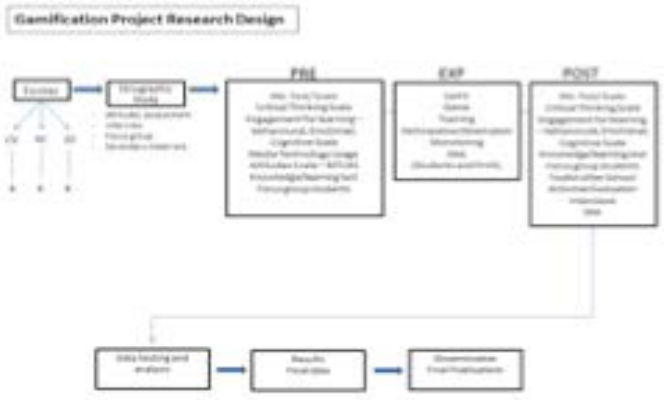
They will **create, produce, share, critique, play and reflect upon**.

Media literacy

In a digitally mediated society, media literacy is a bundle of sociocultural competencies (Livingstone et al., 2013) that include:

- operational skills (such as encryption and computing), editorial skills (including reading, writing and production of multimedia), organizational skills (navigating, sorting, filtering and evaluation) (Frau-Meigs, 2014).

Research Design



Outcomes

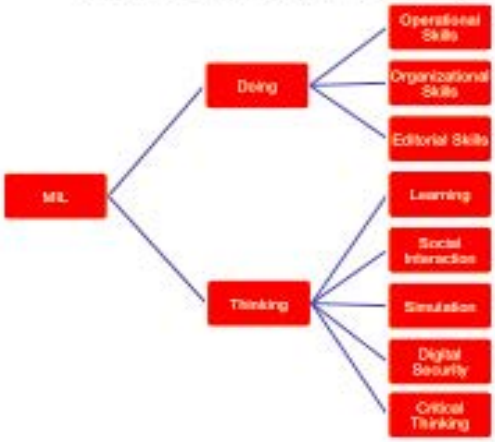
1. MIL SCALE

Research has denoted a **clear lack of tools/measures in this field**, especially for the study of new literacies media (NLM).

Media literacy, in different contexts, can only be understood by combining imminently comprehensive qualitative methodologies, with quantitative methodologies, properly validated and verified (Literat, 2014).

Need to create and validate a scale for measuring media literacy, based on the multidimensional conceptual model explained above.

The scale will be validated for the **students of the second and third cycles** of the Portuguese basic education (5th, 6th, 7th, 8th and 9th grades).



2. Playing Digital Security

Download the App for Android
http://netlab.ulusofona.pt/images/stories/Alphabet.apk

With the goal of explaining the basics of encryption to children, and the fundamental role it plays in today's digital presence, a playful activity was created. It demonstrates how a simple encryption algorithm, the Caesar's Cipher, can be used to encrypt text by means of an hand-made artifact (the Cipher Wheel). This serves as the basis of a group activity, where children exchange encrypted messages based on a previously shared secret, playing the role of senders and receivers. These messages are forwarded through a third group, the intruders, who try to sneak into the conversation, exploring various possible secrets with their Cipher Wheels, or other strategies they can imagine. An android app for supporting this activity has also been developed and can be downloaded from : http://netlab.ulusofona.pt/images/stories/Alphabet.apk

Future Steps

1. Preparing field work in schools: detail of learning and research activities to be conducted in Portugal and Austin
2. Field work
3. Results
4. Dissemination activities

Roots and Wings:

Glocalized Networks and Mobile Media Entrepreneurship in Austin and Lisbon

- Research Team
  - » Wenhong Chen and José Azevedo

The Roots and Wings project centers on how entrepreneurs in the mobile media industries leverage digital technologies and glocalized networks for start-up, product development, marketing, and innovation. Dr. Wenhong Chen at UT Austin and José Azevedo at University of Porto have been leading an interdisciplinary research team with rich experience in entrepreneurship research and practice to collect interview, survey, and digital trace data since the beginning of 2015. A mixed-method design allows a triangulation of quantitative, qualitative, and digital data that enhance reliability and validity. The comparison between United States and Portugal will illustrate cultural and institutional contexts that affect venture formation. We have focused on the following research activities:

- analyzing the cultivation and the structure of entrepreneurs' glocalized networks in terms of size, composition, and embedded resources,
- documenting entrepreneurs' professional and business use of digital media technologies, especially social and mobile media,
- examining the effects of glocalized networks and digital technologies on entrepreneurship in terms of ideation, developing business plans, accessing financial resources, generating business models, and entering geo-cultural or transnational markets, and
- assessing glocalized networks as mechanisms, especially their mediating and moderating effects in linking digital media technologies and entrepreneurship.

Research Design, Data Collection and Analysis

- We have completed more than 60 hours of ethnographic fieldwork and more than 50 semi-structured in-depth interviews, with 45 interviews transcribed and analyzed. We will complete more ethnographic observations of key events and sites as well as more interviews in Lisbon. Drawing on the already-collected ethnographic and interview data, we have two papers in progress addressing research activities 1, 2 and 3, respectively.
- We have extracted and analyzed digital trace data of more than 600 entrepreneurs. Using Crunchbase, one of the largest tech startup database of tech ventures, we identified about 5000 startups and their founders in the mobile media and technology sectors and randomly selected 700 founders out of these 5000. Then, out of the 700, we successfully scraped LinkedIn data of 615 entrepreneurs and their 16,972 endorsers. The merged Crunchbase and LinkedIn data allow network analysis that demonstrates the significance of glocalized networks to mobile startups' funding as well as the glaring disadvantage experienced by women and minority entrepreneurs. We are preparing a major paper based on these findings.
- We has been preparing a survey of 200 entrepreneurs in Austin and Lisbon. The survey questionnaire in English has been designed and pretested in Austin. The survey questionnaire is adapted and translated into Portuguese. We expect to carry out the survey in Spring 2017.

Additional Grant Effort

- We intent to use this project to provide preliminary data for grant applications targeting NSF's Science, Technology, and Society and the Kaufman foundation. We are in conversation with colleagues in Brazil, China, and Canada to expand the study globally.

Publications, Talks, and Conferences (*indicating student collaborator)

We have presented preliminary findings at national and international conferences and are in the process or submitting to top-tier journals and major conferences.

Keynote Speeches/Invited Talks

W. Chen (2016), "Handle with Care: Digital Methods, Sociological Imagination & the Chinese Dream," Keynote Speech at the Inaugural Chinese University of Hong Kong Research Summit Digital Methods & Social Development

W. Chen (2016), "Your Privacy is Very Important to Us - American Mobile Ventures," Privacy Practices. Invited Talk at the iSchool, University of Toronto.

W. Chen, J. Azevedo, N. Moutinho, R. Meneses, * G. Huang, and * B. Stephens (2016). "Roots and Wings: Mobile Media Entrepreneurship. Invited Talk at UT-Portugal Program, Lisbon.

Conference Paper/Presentation

W. Chen, * G. Huang., * J. Miller, K-Y. Lee, , * D. Mauro, * B. Stephens, and * X. Li (2016). "Mobile Ventures' Identity and Privacy Management," Paper presented at International Communication Association, Fukuoka, Japan.

Panel organized

W. Chen (2016). Mobile Ventures' Identity and Privacy Management. SXSW Interactive.

Workshop

W. Chen (2016). Digital Research Method: Studying Social Capital & Social Networks in the Digital Age. The Chinese Association of Social Network Analysis, Xi'An, China

Work In Progress

W. Chen, Stephens, B., et al. "Glocalized Networks and Mobile Entrepreneurship: Empirical Evidence."

W. Chen, Huang, G., Miller, and J. Mobile "Ventures' Identity and Privacy Management."

Conference Panel Submitted

W. Chen, Park, Y., & Quan-Haase, A. Privacy and Data Management: User and Producer Perspectives. Panel proposal submitted to International Communication Association 2017

W. Chen, Entrepreneurial Networks in the Digital Age. Panel proposal submitted to the International Network for Social Network Analysis 2017

In collaboration with:

INESC-ID / University of Lisboa (Portugal): Joaquim Jorge, Daniel Simões Lopes and Instituto de Telecomunicações / University of Beira Interior (Portugal): Abel Padrão Gomes

Sponsor: Portuguese Science and Technology Foundation 7P0045

Project Period: August 1, 2015 – December 31, 2017

Report Period: August 1, 2015 – August 31, 2016

Total Award: $14,935.00

Chandrajit Bajaj traveled to Lisbon, Portugal, November 10 – 13, 2015, to present the lecture, "Statistical Bio-Modeling for Predictive Medicine" at Instituto Superior Tecnico, Campus Alameda at the Autumn School and Workshop. He also discussed collaborative research with Prof. Joaqium Jorge of IST.

Postdoc Sergio Duarte Dias was invited in the Fall of 2015 to the CVC as part of this research collaboration but was unable to finally come.

Dr. Abel Gomes, University in Beira Interior (UBI) visited CVC and UT from June 10, 2015 for a week, to discuss research and finalize a joint paper "Geometric Detection Algorithms for Cavities on Protein Surfaces in Molecular Graphics: A Survey" and submitted it to the Computer Graphics Forum.

Dr. Bajaj and Dr. Gomes also attended the 2015 SIAM Conference on Geometric and Physical Modeling, October 12-15, 2015. Dr. Bajaj presented an invited talk, "Fast Approximate and Scalable Geometric Optimization."

Journal Publications that cite this project grant:

1. M. Rasheed, R. Bettadapura, and C. Bajaj, "X-ray, Cryo-EM and Computationally Predicted Protein Structures Used in Integrative Modeling of HIV Env Glycoprotein gp120 in Complex with CD4 and 17b, "Elsevier Journals, Vol 6: pp. 833-839, March, 2016.

2. A. Gillette, A. Rand, and C Bajaj, "Construction of Scalar and Vector Finite Element Families on Polygonal and Polyhedral Meshes, "Comput. Methods Appl. Math., SSN (Online) 1609-9389, ISSN (Print) 1609-4840, DOI: 10.1515/cmam-2016-0019, May 2016.

3. M. Awad, A. Rushdi, M. A. Abas, S. Mitchell, A. Mahmoud, C. Bajaj, and M. Ebeida, "All-Hex Meshing of Multiple-Region Domains without Cleanup." (25th IMR), Procedia Engineering, November 2016.

4. Simões, Tiago Lopes, Daniel, Dias, Sergio, Fernandes, Francisco, Pereira, João, Jorge, Joaquim, Bajaj, Chandrajit, and Gomes, Abel, "Geometric Detection Algorithms for Cavities on Protein Surfaces in Molecular Graphics: A Survey", Computer Graphics Forum, Accepted for Publication, 2016.

Invited Keynote and Invited Speeches

4. "Fast, Approximate and Scalable Geometric Optimization," for Mathematics Colloquium at University of Arizona, April 14-16, 2016, Tucson, Arizona

5. Speech at the Second Biennial Gordon Research Conference (GRC) on Image Science, June 5-10, 2016 Stonehill College, Easton, MA.

6. "Scalable Geometric Optimization with Applications to Prediction of Assemblies, " TU Berlin (Technische Universitat Berlin), June 21, 2016, Berlin, Germany.

7. "Disk Density Tuning of a Maximal Random Packing," The International Geometry Summit 2016 (IGS), Solid and Physical Modeling (SPM), Technische Universitat Berlin, June 22, 2016, Berlin, Germany.

8. "Algebra and Geometry of Reproducing Hilbert Space Kernel" Banff International Research Station-Casa Matematica Oaxaca, Computational Algebra and Geometric Modeling Workshop, Aug 7-12, 2016, Oaxaca, Mexico.

9. "Application of IGA and Meshfree Methods to Coupled Problems and Contact," at USACM Conference on Isogeometric Analysis and Meshfree Methods, October 10-12, 2016, La Jolla, California.

EXPRESS - Expression and Recognition of Irony in Multicultural Social Media

- Research Team
  - » Byron C. Wallace, The University of Texas at Austin, USA

Project aims and overview

The main goal of this exploratory project was to develop machine learning (ML) and natural language processing (NLP) methods to automatically detect the use of irony in social media. This aim entails analyzing the expression of irony in social media from a cross-lingual and multicultural perspective.

Automating irony and sarcasm detection is a challenging and unsolved problem. Previous efforts to realize this aim have been limited in their approach, and have tended to focus on shallow textual cues (e.g., words in a tweet) indicative of ironic intent. Some of these efforts have led to modest improvements in detection accuracy, but these studies have not generally explored specific linguistic patterns that indicate irony. Moreover, previous efforts have largely failed to capitalize on contextual cues external to the utterance to be classified (e.g., speaker attributes).

The UT Austin component of this project (Task 2) concerns the development of machine learning methods to improve irony recognition in social media automated irony detection. The UT team was previously led by PI Wallace and is now headed by PI Lease (Wallace departed to join Northeastern University in fall 2016). We have made significant progress toward this aim, as we detail below. Indeed, some of the work supported by this project received media coverage in multiple outlets, highlighting its impact. [1]

Moreover, this exploratory project has greatly strengthened the collaborative ties between INESC-ID and UT Austin.

Research accomplishments and outputs

This project has resulted in three publications in high-quality venues [1, 2, 3]. We summarize these contributions briefly below:

- Modelling context with user embeddings for sarcasm detection in social media. In this paper, we proposed a novel means of exploiting context when determining whether a tweet was intended sarcastically. Specifically, we induced user embeddings using neural networks, which are vectors that aim to capture meaningful attributes of individuals. Figure 1 shows a dimensionality-reduced scatter of user embeddings (vectors); we can see that, even though we did not explicitly train it to, the vectors tend to cluster according to political leanings, which we believe suggests that they indeed capture meaningful attributes of users.
  Our model then jointly capitalizes on these embeddings and representations of the text (e.g., tweet) being classified when making its prediction, as shown in Figure 2. We demonstrated [1] that this 'context-aware' approach (which exploits representations of speakers, not just text) improves predictive performance.
- Exploiting multiple sets of embeddings for text classification [3]. Word embeddings are vector representations of words that are used as inputs for neural classification models – so when we build a model to classify social media posts as ironically intended or not, we rely on word embeddings as model inputs. Notably, embeddings tend to capture salient semantic information; e.g., the vectors for the words 'spinach' and 'broccoli' will be close to one another.
- Many 'pre-trained' word embedding sets are readily available on the web. These have been constructed using very different data sets and models, and thus will provide different sorts of external context for the model regarding words and their relationships. An important practical problem when building text classification systems (such as an irony detector) is therefore how to pick the best set of embeddings for one's task. In this paper, we proposed and evaluated a novel means of jointly exploiting multiple sets of word embeddings, thus obviating the need to pick just one, and improving classification performance. We specifically demonstrated that this improved automated recognition of ironic posts on the social media news website reddit [3].
- Active Discriminative Text Representation Learning [2]. Again focussing on learning representations to contextualize classification decisions, we very recently proposed an approach to making the best of minimal domain expert resources for text classification tasks. In particular, we developed and evaluated a novel active learning method for neural text classification models, which aims to select examples that will result in discriminative representations of words. While our focus in this work was sentiment analysis (a task related to, but distinct from, sarcasm detection), we believe this general method will be important for porting our irony detection models to new languages wherein there may not be much available training data.

[1] https://www.newscientist.com/article/2100007-ai-reads-your-tweets-and-spots-when-youre-being-sarcastic/; https://techcrunch.com/2016/08/04/this-neural-network-tries-to-tell-if-youre-being-sarcastic-online/

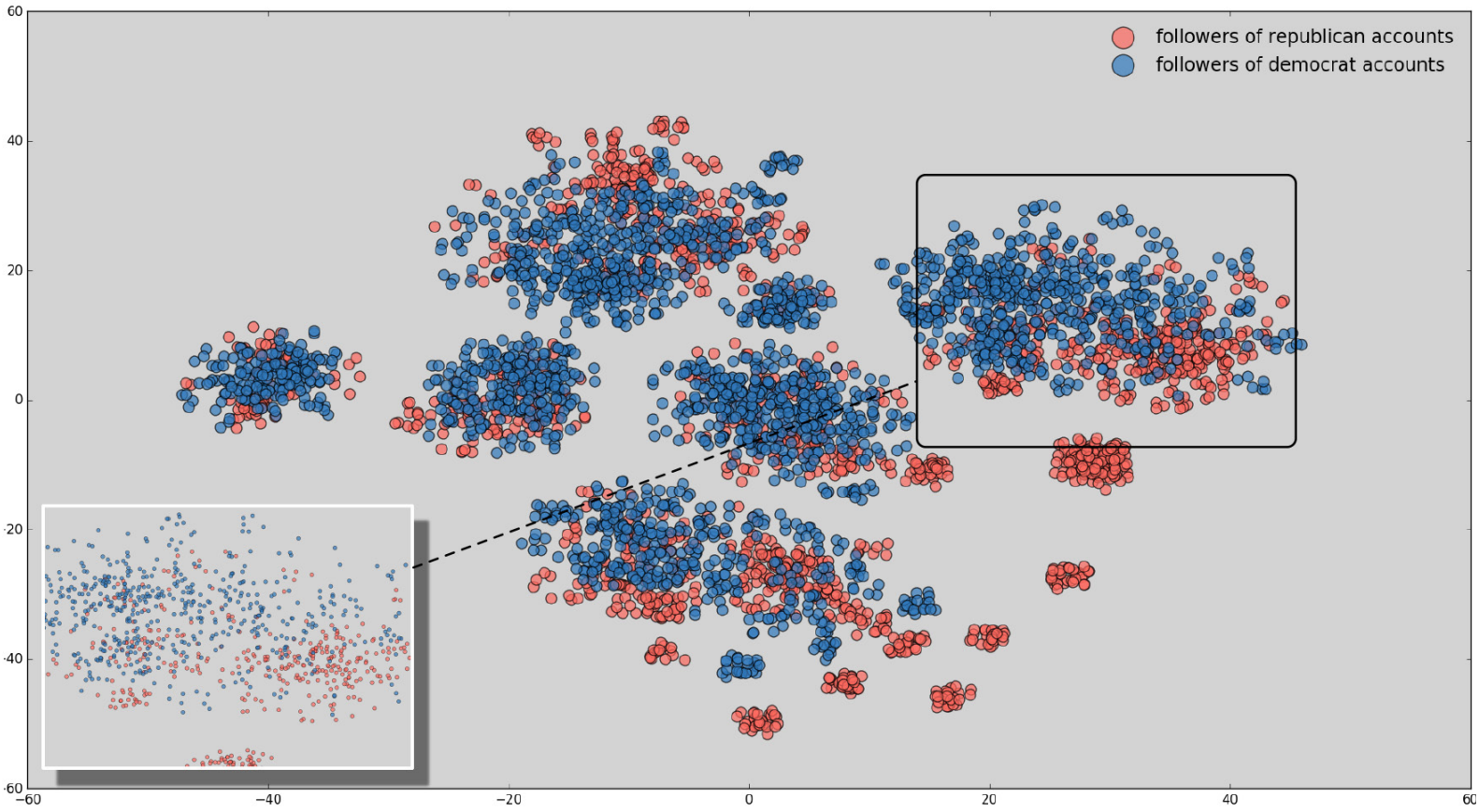


Figure 1: Users colored according to the politicians they follow on Twitter: the blue circles represent users that follow at least one of the (democrat's) accounts: @BarackObama, @HillaryClinton and @BernieSanders; the red circles represent users that follow at least one of the (republican's) accounts: @marcorubio, @tedcruz and @realDonaldTrump. Users that follow accounts from both groups were excluded. We can see that users with a similar political leaning tend to have similar vectors.

Ongoing and future Work

We are still working on cross-lingual methods of irony detection. We believe that exploiting the models developed as part of this work – including user embeddings, multiple embedding sets, and active learning – will result in strong cross-lingual classification performance.

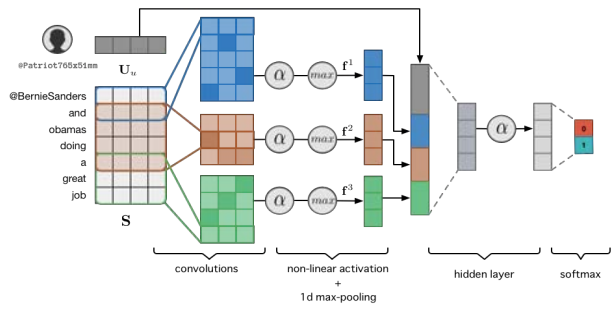


Figure 2: Illustration of our model for sarcasm detection. The model learns to represent and exploit embeddings of both content and users in social media.

References

[1] S. Amir, B. C. Wallace, H. Lyu, and P. C. M. J. Silva., "Modelling context with user embeddings for sarcasm detection in social media". In Conference on Computational Natural Language Learning (CoNLL), page 167–177, 2016.

[2] Y. Zhang, M. Lease, and B. C. Wallace. "Active discriminative text representation learning." AAAI Conference on Artificial Intelligence (AAAI), 2017 (forthcoming).

[3] Y. Zhang, S. Roller, and B. C. Wallace. "MGNC-CNN: A simple approach to exploiting multiple word embeddings for sentence classification." North American Chapter of the Association for Computational Linguistics (NAACL), pages 1522–1527, 2016.

2. Emerging Technologies Program: Annual Project Report

"Exploring stresses to develop functional nanoceramics by in-situ tem sintering (tensosint)"

Exploratory R&D Projects in Emerging Technologies (UTAP-EXPL/CTM-NAN/0018/2014)

- PRINCIPAL CONTRACTOR:
  - » University of Aveiro (UA)
- PARTICIPANT INSTITUTION:
  - » The University of Texas at Austin (UTA)

Introduction

The main objective of this work was to investigate the role of stresses on the microstructural design of functional ceramics using in-situ TEM sintering and K0.5Na0.5NbO3 (KNN), a lead free piezoelectric material, as the base material for these studies. The project relies on a strong collaboration between a team from the University of Aveiro (UA), Portugal, with recognized experience in the development of functional ceramic materials, led by Professor Ana Senos, and a team from The University of Texas,at Austin, led by Professor Paulo Ferreira, with expertise in electron microscopy and sintering of nanoscale films.

Results

Thin films of KNN were prepared in UA by magnetron sputtering. Careful control of the target quality, microstructure and sputtering deposition conditions, such as source, power, pressure and time, was needed. Various thin films geometries were produced (Fig 1) following specific deposition conditions. The thickness was controlled by deposition time after determining the calibration curves for each compound. The quality of the films was controlled by characterizing 1) the adhesion and macroscopic defects, 2) the thickness of the film, and 3) the composition, microstructure, and structure of the films. The films produced were amorphous after deposition. Subsequently, the films were subjected to rapid thermal annealing (30ºC/s) treatments (RTA) using different temperatures. The microstructural evolution was investigated. We found that the films were still poor crystalline at 550ºC but the crystallization degree increased at temperatures higher than 600ºC. For the TEM work, a PhD student from the UA team, Manuela Fernandes, spent 6 months in UT Austin getting training in TEM and Precession Electron Microscopy. The characterization of as-deposited KNN films after NaCl dissolution by XRD and STEM imaging showed an amorphous structure and the expected KNN composition. In addition, traces of chlorine were still present after NaCl dissolution. The microstructures and corresponding diffraction (Fig. 2) indicate that at 500 °C crystallization has started. At 600 °C it is possible to observe the grain structure more clearly, although some amorphous material is still present. The presence of porosity can also be observed, while the grain size of KNN increases significantly with temperature and time. At the moment, we have been preparing the samples for in-situ TEM. This involves the use of the FIB and subsequent transfer of the film to a FEI chip. Subsequently, Ph.D student Manuela will be trained on a more advanced instrument, namely an FEI aberration-corrected TEM/STEM, to perform in-situ the grain growth of the KNN films.

Figure 1: Types of films produced by magnetron sputtering

Outcomes of the project

1) Talk: "Microstructural evolution of K0.5Na0.5NbO3 thin films by in-situ TEM sintering", 13th FEMS Junior Euromat Conference, Lausanne, Switzerland, 10-14 July 2016

2) Poster: "Exploring stresses to develop functional nanoceramics by in-situ TEM sintering," UT Austin|Portugal Annual Conference, Lisbon, Portugal, 23-24 May 2016.

3) Award: Best oral presentation in Functional Materials, 13th FEMS Junior Euromat Conference, Lausanne, Switzerland, 10-14 July 2016.

4) Transmission Electron Microscopy Training at UT Austin and INL; Focused Ion Beam Training at INL; Aberration-corrected TEM/STEM training at INL (starting).

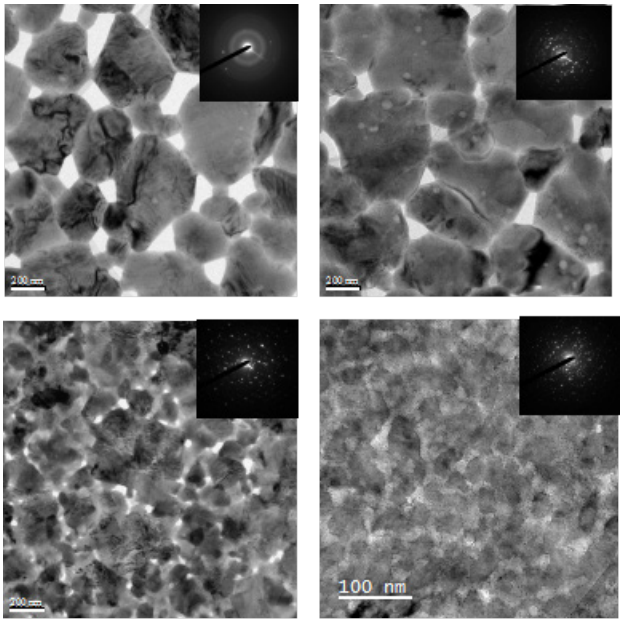


Figure 2: Bright field TEM images and correspondent diffraction of KNN thin films heated for 30 min at a) 500 °C, b) 600 °C, c) 700 °C and d) 750 °C

"Graphene-based Semiconductor Photocatalysis for a Safe and Sustainable Water Supply: An Advanced Technology for Emerging Pollutants Removal"

- Research Team
  - » Dr. Ana Cristina Moreira Freire, University of Porto, Portugal
  - » Dr. Brian Korgel , The University of Texas at Austin, USA

Research Summary

To allow for the most efficient and effective way to approach the project, the team devised a plan which separated the project into a number of distinct phases. During this first year, the majority of the work has been done on the preparation of graphene. Some of the primary objectives of this early phase work have been:

- to cost-effectively produce graphene flakes in large quantities
- to fabricate novel graphene-based multifunctional nanophotocatalysts by coupling these graphene flakes with semiconductor MOs, MSNs and POMs

The experimental work focused on optimizating the preparation of graphene flakes, mainly by ultrasonic exfoliation of graphite in organic solvents with high boiling points. In the experiments, graphite powder was dispersed in organic solvents, followed by sonication and centrifugation; the yield of graphene was monitored spectroscopically. The organic solvents that were tested included benzylamine (BA), N-methyl-2-pyrrolidone (NMP), N,N-dimethylformamide (DMF), isopropanol (iPrOH), and butyrolactol (GBL). Besides the effect of the solvent on the yield of graphene, the initial amount of the parent graphite, volume of the solvent (liquid height), sonication time and power, size of sonication probe and size and shape of the vessel were studied. The best results were achieved for BA, NMP and DMF. Besides the sonication–based exfoliation method, shear force was also utilized to laterally exfoliate graphite into graphene flakes. Fabrication of graphene flakes using ball milling also gave a high yield of graphene flakes, and the results are comparable to those obtained by ultrasonic exfoliation in liquid phase.

Exfoliated graphene and commercial graphene were oxidized with different oxidants – ozone, m-CPBA, HNO_3, $KMnO_4$ - in order to have a fine-tuning of the oxygen surface groups.

The commercial graphene as well as graphene obtained by mechanical exfoliation methods were doped with S or dual doped with N, S heteroatoms. Sulphur or tiotriazine derivatives were selected as S and N, S precursors, respectively. The doping process was carried out by ball milling mixtures of doped agents with graphene followed by thermal treatment in inert atmosphere. The effect of time of ball milling and the initial amount of doped agent was investigated. S-doped and N, S-dual doped graphene were characterized by different techniques.

Exfoliated graphene flakes were used in subsequent experiments aimed at the deposition of metal sulfide nanophases by a single-source method that employs alkyldithiocarbamate complexes as the precursors. In general, the novel hybrid carbon nanostructures were prepared by a wet chemical or sonication method and the growth of metal sulphide nanocrystals on the exfoliated graphene was performed in situ using mild temperatures. Both copper sulfide and silver sulfide have been investigated at this stage as the nanophases deposited onto the exfoliated graphene flakes. Water-dispersible copper sulfides were first investigated in colloidal form for their photocatalytic activity using an organic dye (Rhodamine B) as the model pollutant. A number of parameters have been assessed such as the photocatalytic activity dependence on crystalline phase and the use of H_2O_2 as co-catalyst. The results indicated that this metal sulfide is a promising semiconductor to couple to exfoliated graphene. As such, the preparation of hybrid nanostructures comprising CuS copper sulfide and exfoliated graphene has been initiated.

The plan for the second year is to focus on the characterization of these new hybrid nanomaterials. In addition to using microscopy characterization via SEM and TEM, the team will utilize XPS and FTIR to explore the morphology, components dispersion and loading, extent of GF functionalization, composition and chemical bonding. The team will also employ less traditional methods such as Raman spectroscopy.

During the past year, another primary task of the project was to perform photocatalytic tests at lab scale. Photocatalytic experiments have been carried out using copper sulfide nanocrystals for visible light photodegradation of Rhodamine B at room temperature. These studies have been performed by using distinct reacting parameters in order to assess several conditions for the use of copper sulfides as photocatalysts. Assessment of the copper sulphide nanophases obtained shows that the degradation rate of RhB seems to depend on the type of copper sulphide and its ability to disperse in water. The best degradation values of RhB were obtained in the presence of djurleite ($Cu_{1.94}S$) and digenite ($Cu_{1.8}S$). This showed nearly 100% degradation after 120 minutes. After that, preliminary photocatalytic experiments were performed for graphene-based materials, CuS/EG, Ag_2S/EG, and the exfoliated graphene flakes (for comparative purposes), using Rhodamine B. The results obtained thus far indicate a slight increase in the visible light photodegradation of that organic dye as compared to the use of the exfoliated graphene.

Several glassy carbon electrodes were modified with graphene-based nanomaterials that were prepared during the production phase, namely the polyoxymethylene (POM) graphene nanomaterials. The modified electrodes were fully characterized by cyclic voltammetry using two different redox probes in order to access its available surface for the electrocatalytic reactions. Results showed an improvement

after nanomaterials immobilization. These techniques were then applied towards the electrooxidation of citalopram, trazadone and carbamazepine and the results evaluated. Different experimental conditions were tested such as POM loading on graphene, type of POM, amount of nanomaterial immobilized at the electrode surface, type and pH of electrolyte solution, and scan rate.

Publications

Papers in international scientific periodicals with referees

1. C. Estrada, F. M. Silva, S. F. Soares, J. A. P. Coutinho, and T. Trindade," An Ionic Liquid Route to Prepare Copper Sulphide Nanocrystals Aiming at Photocatalytic Applications." RSC Advances, 2016, 6, 34521-34528.

2. Paula Paíga, Lúcia H.M.L.M. Santos, Sandra Ramos, Sandra Jorge, Jaime Gabriel Silva, and Cristina Delerue-Matos, "Presence of Pharmaceuticals in the Lis River (Portugal): Sources, Fate and Seasonal Variation." Science of the Total Environment (STOTEN), 2016, under review.

3. Diana M. Fernandes, Marta Nunes, Belén Bachiller-Baeza, Inmaculada Rodríguez-Ramos, Antonio Guerrero-Ruiz, Cristina Delerue-Matos, and Cristina Freire, "PMo11V@N-CNT Electrochemical Properties and its Application as Electrochemical Sensor for Determination of Acetaminophen." Journal of Solid State Electrochemistry, 2016, DOI 10.1007/s10008-016-3463-5.

Submitted papers

1. P. Paíga, L.H.M.L.M. Santos, and C. Delerue-Matos, "Development of a Multi-residue Method for the Analysis of Pharmaceuticals and Some of their Metabolites in Aqueous Environmental Matrices by SPE-UHPLC-MS/MS." Journal of Pharmaceutical and Biomedical Analysis, 2016

2. Mariana P. Araújo, O. S. G. P. Soares, A. J. S. Fernandes, M. F. R. Pereira, and C. Freire, "Tuning the Surface Chemistry of Graphene Flakes: New Strategies for Selective Oxidation." 2016

"Additive Manufacturing of Yttria-Stabilized Zirconia (YSZ) for Dental Applications"

- Research Team
  - » Pedro Goncalo Pereira Duarte, University of Aveiro, Portugal
  - » Dr. Paula Vilarinho, University of Aveiro, Portugal)
  - » Dr. Carolyn Seepersad , The University of Texas at Austin, USA)
  - » Dr. David Bourell , The University of Texas at Austin, USA

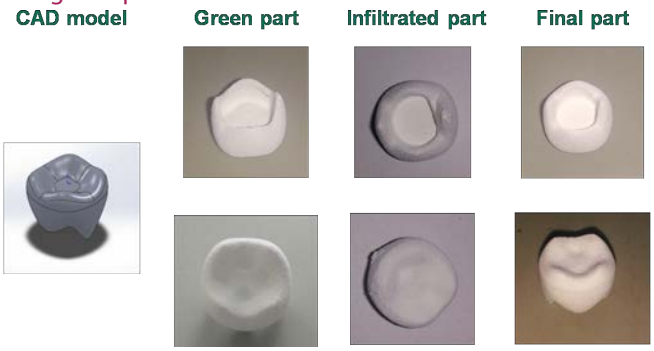
Summary

This project investigated selective laser sintering (SLS) as a production method for ceramic materials for dental applications. Selective laser sintering is an additive manufacturing technique that is widely used to fabricate metallic and polymeric parts. Compared with other additive manufacturing processes, material properties are less anisotropic and match those of conventionally fabricated parts more closely. However, it is difficult to fabricate ceramic materials directly with selective laser sintering because of the high sintering temperatures required and the propensity for residual thermal stresses caused by layered sintering to induce cracking in relatively brittle ceramic parts. If ceramic parts with reasonably high hardness and strength could be fabricated with selective laser sintering, it would be possible to create customized dental implants quickly and directly from a digital model of a patient's damaged tooth.

An indirect selective laser sintering approach was chosen for this project as a means of achieving better dimensional control, better surface finish and more homogenous and competitive mechanical properties than those of direct sintering for dental applications. The indirect approach involves using a sacrificial binder to adhere the ceramic particles together during the selective laser sintering step, followed by binder removal, high temperature sintering, and infiltration to avoid excessive shrinkage. In this project, porcelain and YSZ powders, with mean particle size of 60 µm, were laser sintered together with a polyamide-based sacrificial binder. Prior to laser sintering, the ceramic powders were heat-treated to make them suitable for SLS.

After refining the indirect sintering process with a series of sintering and infiltration steps, mechanical properties of the resulting ceramic parts were measured and found to be very limited. The maximum compressive strength was approximately 120 MPa, relative to values on the order of 2000 MPa for conventionally fabricated YSZ. The reduction in mechanical properties can be attributed to incomplete infiltration of the green parts during sintering, resulting in residual porosity in the interior of the part, whereas complete infiltration (and very low levels of porosity) were observed in the outer skin of the part up to a depth of approximately 1 mm. Recent work has focused on indirectly fabricating thin ceramic shells that can be sintered and infiltrated completely, with mechanical properties that much more closely approximate those of conventionally fabricated ceramics. The interior of the shell is backfilled with dental composites for enhanced overall structural strength and integrity of the part. Although it is a two-step approach, it retains the desired capability of additively manufacturing dental pieces of customized shape (the shells) while the backfilled interior requires no special shape and makes use of conventional materials and processes. Current research is focused on characterizing the hardness, strength, and porosity of these indirectly fabricated shells.

For dental parts fabricated with indirect selective laser sintering, the green parts are fabricated with selective laser sintering from YSZ powder with a polyamide binder. Post-processing steps include high temperature sintering and infiltration with a ZrO2 solution. Prior to use, the final part needs to be glazed and back-filled with a dental composite.



Dental parts fabricated with indirect selective laser sintering. The green parts are fabricated with selective laser sintering from YSZ powder with a polyamide binder. Post-processing steps include high temperature sintering and infiltration with a ZrO2 solution. Prior to use, the final part needs to be glazed and back-filled with a dental composite.

Journal publications in preparation

"Indirect selective laser sintering of yttria-stabilized zirconia for dental applications"

"Silicate-based ceramic powders formulation for selective laser sintering"

Participation in conferences

"Indirect selective laser sintering of yttria-stabilized zirconia for dental applications, " 2016 Annual International Solid Freeform Fabrication Symposium, Austin, USA.

"Indirect selective laser sintering of porcelain parts," Shaping Ceramics VI, Montpellier, France.

"Indirect selective laser sintering of silicate-based ceramic parts," 2016 Annual International Solid Freeform Fabrication Symposium, Austin, USA.

Multidisciplinary Strategy to Develop Novel Multicomponent Nanoscale System for Immune Modulation

- Research Team
  - » Dr. Rui Reis, University of Minho, Portugal
  - » Dr. Manuela Gomes, University of Minho, Portugal
  - » Dr. Nicolas A. Peppas , The University of Texas at Austin, USA

In the past year, the Peppas Laboratory in collaboration with Dr. Rui Reis and Dr. Manuela Gomes from University of Minho have made significant strides in the development of molecularly imprinted polymers for protein recognition, sequestration, and delivery to cells for drug delivery and regenerative medicine applications. Molecular imprinted polymers (MIPs) exhibit selectivity for proteins on the basis of molecular weight and isoelectric point by possessing a geometric, electrostatic, and chemical complementary structure to the template protein (see illustration in Figure 1).

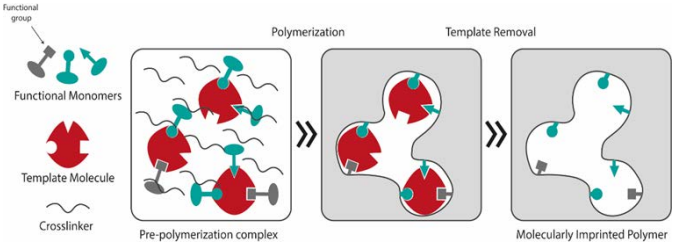


Figure 1: Molecular Imprinting Process (MIP). Once the appropriate template molecule, functional monomer(s) and cross-linker(s) are selected, all components are mixed together in a proper solvent (e.g., deionized water, phosphate buffer) forming the prepolymerization complex (template-functional monomer). Polymerization is then allowed to take place and specific cavities and binding sites are stabilized. Finally, removal of the template and other washing steps eliminate unreacted monomer and cross-linker molecules, resulting in a MIP.

We have worked extensively with the development of uniform nanoparticles for the delivery of therapeutic cargo to cells. We optimized an inverse emulsion polymerization to make poly(methacrylic acid-co-acrylamide) nanoparticles, which can be imprinted throughout the polymer bulk with whole proteins (cytochrome c, hemoglobin), or surface-imprinted with protein epitopes (TGF-beta) (see illustration in Fig 2a, b, d). These P(MAA-co-Aam) nanoparticles can be readily functionalized with cationic molecules, aromatic compounds, or synthesized oligopeptides via carbodiimide-mediated coupling, to enable hydrophobic or electrostatic interactions with protein residues, enhance drug loading capacity for delivery purposes, or impart intelligent pH-responsive swelling properties (see illustration in Fig 2c).

In addition to developing intelligent nanomaterials for the recognition, sequestration, and delivery of bioactive molecules, we have also enhanced our understanding of the fundamental polymer properties that explain molecular recognition through molecular imprinting. On the surface of biodegradable (caprolactone) constructs, we synthesized poly (acrylamide-co-diethylaminoethyl methacrylate-co-methacrylic acid) polymers imprinted with lysozyme, cytochrome c, and trypsin as model templates. These polymers were capable of recognizing high isoelectric point protein biomarkers in isolation and in serum-mimicking solutions of albumin, gamma globulin, and fibrinogen, as well as in competitive conditions with multiple biomarkers.

This body of work has resulted in multiple presentations and publications in peer-reviewed journals this year, as shown herein.

- J. R. Clegg, J.X. Zhong, A.S. Irani, J . Gu, D.S. Spencer, and N.A. Peppas. "Characterization of Protein Interactions with Molecularly Imprinted Hydrogels that Possess Engineered Affinity for High Isoelectric Point Biomarkers," Journal of Biomedical Materials Research, under review.
- H. R. Culver, S. D. Steichen , M. Herrera-Alonso, and N. A. Peppas, "Versatile Route to Colloidal Stability and Surface Functionalization of Hydrophobic Nanomaterials." Langmuir 2016, 32 (22), 5629–5636.
- H. R. Culver, J. R. Clegg, and N. A. Peppas, "Analyte-Responsive Hydrogels: Intelligent Materials for Biosensing and Drug Delivery," Accounts of Chemical Research, under review.
- M. I. Neves, M. E. Wechsler, M. E. Gomes, R. L. Reis, P. L. Granja, and N. A. Peppas, "Molecularly Imprinted Intelligent Scaffolds for Tissue Engineering Applications." Tissue Engineering Part B: Reviews 2016, accepted.

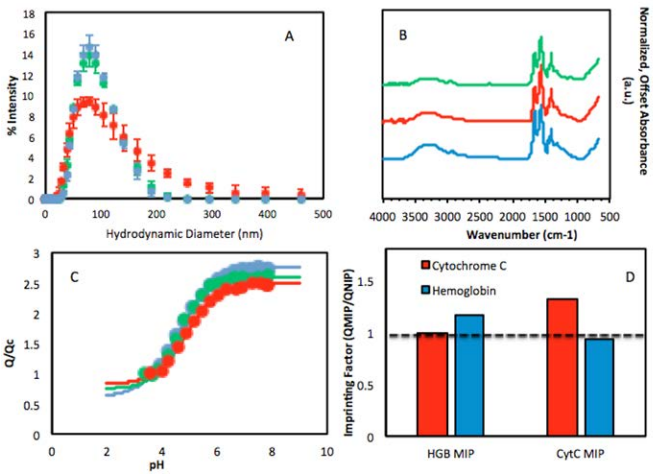


Figure 2. P(MAA-co-Aam) nanoparticles can be imprinted with hemoglobin (green) or cytochrome c (red) without significantly altering (a) the swollen hydrodynamic diameter, (b) the polymer composition as evidenced by FTIR or (c) the pH-responsive swelling. Imprinted polymers adsorb a greater quantity of template than non-imprinted controls (d) following either hemoblobin (HGB) or cytochrome c (CytC) templating.

"MRI-based computational modeling of blood flow and nanomedicine deposition in patients with peripheral arterial disease: insights into disease management"

- Research Team
  - » Dr. Thomas J. R. Hughes, The University of Texas at Austin, USA) (PI)
  - » Dr. Adelia Sequeira, Instituto Superior Técnico (IST), Portugal (Co-PI)
  - » Dr. Shaolie S. Hossain, The University of Texas at Austin & Texas Heart Institute, USA (Co-PI)

Summary

Peripheral arterial disease (PAD) is generally attributed to the progressive vascular accumulation of lipoproteins and circulating monocytes in vessel walls leading to the formation of atherosclerotic plaques. This is known to be regulated by the local vascular geometry, hemodynamics, and biophysical conditions. An isogeometric analysis framework has been developed to analyze blood flow and vascular deposition of circulating nanoparticles (NPs) into the superficial femoral artery (SFA) of a PAD patient. The local geometry of the blood vessel and the hemodynamic conditions are derived from magnetic resonance imaging (MRI), performed at baseline and after 24 months post intervention. A dramatic improvement in blood flow dynamics is observed post intervention. A 500% increase in peak flow rate is measured in vivo as a consequence of luminal enlargement. Furthermore, blood flow simulations reveal a 32% drop in the mean oscillatory shear index, indicating reduced disturbed flow post intervention. The same patient information (vascular geometry and blood flow) is used to predict in silico in a simulation of the vascular deposition of systemically injected nanomedicines. NPs, targeted to inflammatory vascular molecules including VCAM-1, E-selectin and ICAM-1, are predicted to preferentially accumulate near the stenosis in the baseline configuration, with VCAM-1 providing the highest accumulation (approx. 1.33 and 1.50 times higher concentration than that of ICAM-1 and E-selectin, respectively). Such selective deposition of NPs within the stenosis could be effectively used for the detection and treatment of plaques forming in the SFA. The MRI-based computational protocol can be used to analyze data from clinical trials to explore possible correlations between hemodynamics and disease progression in PAD patients, and potentially predict disease occurrence as well as the outcome of an intervention.

The research has benefitted from close collaboration of the UT Austin and Instituto Superior Técnico (IST) teams and visits to each other's institutions. Dr. S. Hossain visited IST in November 2015, Dr. T. J. R. Hughes visited IST in May 2016, Dr. S. Sequeira visited UT Austin in July 2015, and Dr. Jorge Tiago, a collaborator of Dr. A. Sequeira at IST, visited UT Austin in September 2015 and April 2016.

Publications

S. Hossain, Y. Zhang, X. Fu, G. Brunner, J. Singh, T. J. R. Hughes, D. Shah, and P. Decuzzi. "Magnetic Resonance Imaging-based Computational Modelling of Blood Flow and Nanomedicine Deposition in Patients with Peripheral Arterial Disease." Royal Society Interface, April 15, 2015. DOI: 10.1098/rsif.2015.0001 http://rsif.royalsocietypublishing.org/content/12/106/20150001.

S. Hossain, "An Image-Based Computational Framework for Analyzing Disease Occurrence and Treatment Outcome in Patients with Peripheral Arterial Disease." Advances in Computational Fluid-Structure Interaction and Flow Simulation: New Methods and Challenging Computations, (Editors: Y. Bazilevs and K. Takizawa), Springer International Publishing, 2016. 409-419.

Presentations

S. Hossain, Y. Zhang, X. Fu, G. Brunner, J. Singh, D. Shah, T. J. R. Hughes, and P. Decuzzi, "MRI-based Computational Modeling of Blood Flow and Nanomedicine Deposition in Patients with Peripheral Arterial Disease." Annual Meeting of the Biomedical Engineering Society, San Antonio, Texas, October, 2014.

S. Hossain, Y. Zhang, X. Fu, G. Brunner, J. Singh, D. Shah, T. J. R. Hughes, and P. Decuzzi, "MRI-based Computational Modeling of Blood Flow and Nanomedicine Deposition in Patients with Peripheral Arterial Disease." 13th US National Congress of Computational Mechanics, San Diego, California, July, 2015

S. Hossain, "An Image-based Computational Framework for Analyzing Disease Occurrence and Treatment Outcome in Patients with Peripheral Arterial Disease," Workshop on Innovative Modeling Techniques for Predictive Medicine, Instituto Superior Técnico, Lisbon, Portugal, November, 2015.

T. J. R. Hughes, S. Hossain, and A. Sequeira, "Computational Cardiovascular Medicine: Coronary and Peripheral Artery Disease." UT Austin | Portugal International Collaboration for Emerging Technologies CoLab Annual Conference, Rectorate UNL, Campus de Campolide, Lisbon, Portugal, May 23-24, 2016.

T. J. R. Hughes, S. Hossain, and A. Sequeira, "Future Prospects of Computational Medicine." UT Austin | Portugal International Collaboration for Emerging Technologies CoLab Annual Conference, Rectorate UNL, Campus de Campolide, Lisbon, Portugal, May 23-24, 2016.

3. Advanced Computing Program: Annual Project Report

CE4BLIND – 2016 PROJECT REPORT

The goal of the CE4BLIND project is to employ state of the art mobile and RFID technologies along with interactive machine vision algorithms and 3D printing to provide a novel navigation assistant for the blind. The system allows 3D data for a real-world environment to be captured and converted into 3D maps that can be used to guide blind users through the captured environment at a much finer granularity than would be available from GPS and maps alone. 3D maps can be printed on a 3D printer at an appropriate spatial resolution to allow blind users to learn the key geometric features of an environment by touch before interacting with that environment. The user then navigates through the environment using a portable appliance that provides audible and/or tactile location cues triggered by RFID tags located at key points in the environment or by features identified using the vision capability of the portable appliance.

The PIs for this project are João Barroso and Hugo Paredes of the University of Trás-os-Montes e Alto Douro campus in Portugal. Because the success of the project depends heavily on the battery life of the portable appliance, and because the current appliance has very large power requirements for a portable device, the PIs have partnered with the Graphics and Parallel Systems Laboratory under the Direction of Donald Fussell at UT Austin to analyze and ameliorate key sources of energy usage.

Key accomplishments of the overall project including this collaborative effort for the 2015-2016 academic year are listed below.

- Validation of user location using contextual visual features (virtual tagging included in Hugo Fernandes' PhD thesis), which is a general concept on the use of computer vision in a way in which objects in the scene act as virtual tags, with special focus on the ability of using their detection to increase the contextual awareness of a blind user with relation to her/his surroundings, demonstrating the estimated location by the recognition of the expected visual elements.
- Refactoring of the mobile phone application for blind navigation in order to support enhanced integration capabilities including multiple location technologies, input from visual context recognition, and multimodal interfaces (Luis Fernandes masters thesis).
- Spatial context object recognition using Google's Cloud Vision, an approach for visual recognition of objects and text randomly found in a scene that has been tested on a set of Vuzix Smart Glasses (Android OS). The recognition system works by means of a periodic scan using the integrated camera of the smart glasses, which is sent over the internet to Google's Cloud Vision service. The resulting output is processed and delivered to the user through the CE4BBLIND prototype's interface module.
- 3D Maps (3D printing) is a contribution that enables blind users to perceive their spatial location from tactile stimulation, but also contextual information from a mobile application that provides this information using audio. In the proposed model, 3D map sections embedding NFC technology support the application scenario.
- Creation of a test scenario to test the CE4BLIND prototype using portions of the University of Trás-os-Montes e Alto Douro campus to create a test scenario with actual blind users. This test scenario embeds all the technologies and features expected from the project prototype and serves as a general validation of all the developments made to the prototype under this project.

Visits to UT Austin

- João Barroso and Hugo Paredes (2 visits)

July/August 2015: meetings with Marco Bravo and Eli Mercer. Visit to the UT Art Department Digital Fabrication Lab and meeting with lab manager Eric McMaster. Visit to the Computer & Vision Research Center at UT Austin and meeting with Professor Jagdish Aggarwal's postdoc Shaohua Wan. Visit to Vislab at UT Austin and meetings with João Barbosa and Professor Don Fussel.

October 2016: meeting with Professor Don Fussell and João Barbosa. Visit to TACC and Vislab. Work meetings with João Barbosa.

- Hugo Fernandes (1 visit)

May/June 2016: extended stay (1 month) at UT Austin. Hugo Fernandes worked under the supervision of João Barbosa and Professor Don Fussell, dividing himself between the optimization of the prototype that represents the proof of concept of his doctoral thesis, the partial writing of his thesis, and also helping in the tasks related to energy consumption and optimization, which were all defined as the results expected from the visit. Some memory leaks (bugs) have been corrected in the computer vision module and power probes have been designed to perform power consumption profiling. Using Google's Tango device and Android Studio, two apps have been developed: one that visually locates the user in a known environment, returning the translation in meters (X,Y,Z) from a known reference point (0,0,0); and another that returns a depth frame (per user request) from the depth sensor of the Tango device to test the optimization results of the clustering techniques. As a result of these studies, energy-intensive portions of the CE4BLIND application have been identified and strategies for improving energy efficiency and mobile device battery life have been developed.

Presentations, communications and demonstrations

Project presentation at UT Austin | Portugal Annual Conference, Lisbon Portugal, May 23-24, 2015.

Project demonstration at "Encontro Ciência'16", Lisbon Congress Center, July 4-6, 2016.

Keynote speech by João Barroso entitled "Orientation and Navigation of Blind People Using Technology" at SEMIME 2016, Lisbon, January 29-30, 2016.

Published paper and thesis list

2016

Rocha, T., Fernandes, H., Paredes, H., and Barroso, J. (2016). "Combining NFC and 3D Mapping to Enhance the Perception of Spatial Location for the Blind." International Conference on Universal Access in Human-Computer Interaction (pp. 607-615). Springer International Publishing.

Fernandes, H., Paredes, H., Filipe, V., and Barroso, J. (2017)." Virtual Tagging Detection for Context Awareness Using Computer Vision." Proceedings of the 7th International Conference on Software Development and Technologies for Enhancing Accessibility and Fighting Info-exclusion - DSAI 2015, Vila Real, Portugal. ACM Digital Library. accepted for publication

Filipe, V., Faria, N., Paredes, H., Fernandes, H., and Barroso, J. "Assisted Guidance for the Blind Using the Kinect Device." Proceedings of the 7th International Conference on Software Development and Technologies for Enhancing Accessibility and Fighting Info-exclusion - DSAI 2015, Vila Real, Portugal. ACM Digital Library. accepted for publication)

UAIS Journal

Fernandes, H. Filipe, V., Paredes, H., and Barroso, J. (2017). "A Review of Navigation and Orientation Assitive Technologies for the Visually Impaired." Universal Access in the Information Society. Springer. submitted

Thesis

Luís Fernandes (2016) "Wearable Devices for Blind Orientation and Navigation," under project CE4blind - Context extraction for the blind using computer vision, with project reference UTAP¬EXPL/EEI¬SII/0043/2014 and the supervision of Professors Hugo Paredes and João Barroso (Masters' thesis)

Hugo Fernandes. "Model of Blind Guidance Using Computer Vision and Contextual Information," under project CE4blind - Context extraction for the blind using computer vision, with project reference UTAP¬EXPL/EEI¬SII/0043/2014 and Portuguese Science and Technology Foundation's research grant with reference SFRH/BD/89759/2012 and the supervision of Professors João Barroso and Vitor Filipe (PhD thesis)

VIII. **Appendix**

COLAB SQUARE Newsletters

December|2015

COLABSQUARE

UT Austin | Portugal International Collaboratory for Emerging Technologies, CoLab

DECEMBER | 2015 . NUMBER | 56

YOU CAN FIND IN THIS COLABSQUARE EDITION:

PORTO WINTER SCHOOL ON GRAPH ANALYTICS AND APPLICATIONS

The Computer Science Department of the Faculty of Sciences of University of Porto will hold a Winter School on Graph Analytics and Applications, from 14 to 16 December 2015.

The school will deliver a mix of lectures, case study presentations and hands-on session in the domain of large scale data analytics with emphasis on the analysis of graphs/networks. Its intended target audience are PhD students and young researchers, but all interested in the field are welcome.

Big Data has become ubiquitous, and applications from all fields are rapidly scaling up in the size of both the available data and the underlying models. To extract insights from vast amount of data efficiently, parallel programming is essential, and several new programming models and implementations have been proposed. This school is a research training event geared precisely towards large scale data analytics and it offers a set of lectures and tutorials given by leading experts from both the academia and the private sector. With complex networks being pervasive and omnipresent in many social, biological and communication systems, there will be a focus on scalable graph algorithms and on the associated high performance software platforms. The attendees are expected to gain insight into some of the state-of-the-art solutions and to improve their vision on the associated research challenges.

Registration is free (and it includes access to all the sessions and to the coffee breaks), but there is a limit on the number of attendees.

Key Speakers:

- Deepak Ajwani & Alessandra Sala (Bell Labs)
- Bin Shao (Microsoft)
- Toyotaro Suzumura (IBM)
- Bruno Gonçalves (Aix-Marseille Université)
- Keshav Pingali & Donald Nguyen (University of Texas at Austin)
- Pedro Ribeiro (University of Porto)

Organizing committee: Fernando Silva, Pedro Ribeiro and Keshav Pingalli

More information: http://graph15.dcc.fc.up.pt/

ADVANCED COMPUTING AUTUMN SCHOOL AND WORKSHOP

From 9 to 13 November Instituto Superior Técnico (IST - University of Lisbon) held an Autumn School on "Data Driven Computations in the Life Sciences" and a Workshop on "Innovative Modeling Techniques for Predictive Medicine".

The School (composed of lectures and computational tutorials) and the Workshop, were organized by Adélia Sequeira of IST, within the scientific collaboration UT Austin | Portugal in the area of Advanced Computing. They focused on mathematical modeling and simulation in the Life Sciences, a rapidly developing interdisciplinary research field that connects mathematics, computational sciences and engineering to biology and medicine. Starting from high-resolution volumetric medical imaging, the development of spatially realistic physiological models for predictive medicine leads to complex mathematical models to capture heterogeneous processes of multiscale nature, that require highly efficient numerical algorithms and high performance computing techniques for their simulation.

The School and the Workshop brought together doctoral candidates, postdoctoral scientists and other researchers in applied mathematics, bioengineering and medicine, giving them the opportunity to interact and connect with the following experts that were specifically invited for the event:

Lecturers:

Autumn School - Miguel Ángel Fernández, INRIA, Paris – Rocquencourt (France), Alessandro Reali, Università di Pavia (Italy), Alessandro Veneziani, Emory University, Atlanta (USA);

Workshop - Chandrajit Bajaj, ICES/UT Austin, (USA), Antonio Fasano, Univ. Firenze, (Italy), Shaolie Hossain, Texas Heart Institute/Houston and ICES/UT Austin, (USA), Willi Jäger, Univ. Heidelberg, (Germany), Paula Oliveira, Univ. Coimbra (Portugal), Maria Neuss-Radu, Univ. Erlangen-Nürnberg, (Germany), Michael Sacks, ICES/UT Austin, (USA), Alessandro Veneziani, Emory University, Atlanta, (USA).

More than 50 participants, mostly from Portugal, but also from Germany, Italy and Russia, attended both events.

More information: http://cemat.tecnico.ulisboa.pt/DDCLS2015/

8 YEARS RESEARCHING THE CITY

The annual FUTUREPLACES Medialab for Citizenship celebrated its 8th consecutive year October 20-24, 2015. Curated by Heitor Alvelos, FUTUREPLACES renewed its commitment to the City of Porto as a testbed for new ways of media engagement.

The all-time motto "All Welcome" was brought to the fore, signalling the importance of fostering further inclusiveness in the social fabric. UPTEC (U.Porto's Science and Technology Park) and Passos Manuel were the main venues hosting 13 Citizen Labs, four keynotes, the annual digital media doctoral symposium, three concerts, a series of installations and more. Worthy of note is the opening of "Open Lab", a brand new media venue managed by students of the UTAustin-Portugal program in Digital Media. An open forum and an installation officially inaugurated its activities; expect more in the coming months. FUTUREPLACES was also visited by delegates of PLUNC and OFFF Porto, and was preceded by the UD15 International Doctoral Design Research Conference, further cross-fertilising synergies with current media agents. The Radio Manobras Futuras and Design Advanced Resources collectives were again present, documenting, interviewing and broadcasting.

Guests for this edition of FUTUREPLACES included:
Chris Csikszentmihalyi (ERA Chair at Madeira Interactive Technologies Institute), whose opening keynote addressed "Political Economics of Design: recognizing that funding trumps form or function";
Jono Podmore (Professor of Music at Hochschule für Musik und Tanz Köln, as well as archivist for rock legends CAN), with a masterclass entitled "In the Box or Out of the Box? On the relationship between digital and analogue audio technology and its impact on the music itself";

@ "Porto Pelo Porto"

VOX EXPRESS @ Passos Manuel

Anabela Duarte (Post-doctoral researcher affiliated with the Center for Post-Colonial Studies of the University of London, as well as former singer for Mler Ife Dada), coordinating the Vox Express intervention and providing her views and testimonies on the relationship between Art and Science;
Paul Stacey (Education specialist at Creative Commons and owner of EdTechFrontier), whose interactive keynote "Global Citizens in a Global Commons" wrapped up the very intense Citizen Lab debriefing marathon.

The focus throughout FUTUREPLACES was, as usual, on ways of opening up the spectrum for citizen engagement: this was evident both in the various masterclasses, and in the Citizen Labs, whose subjects ranged from farming with Arduino to musique concrète on live radio, from a PowerPoint support group to further ethnographic enquiry of unknown areas of the city. A particularly fruitful relationship was established with UPTEC via Paul Stacey's workshop "Open Business Models", attended by a multitude of representatives from various incubated companies.

Exhibitions included "Calligraphy of a Mute Body" by Marta Calejo, the ongoing collective visual ethnographic project "Porto Pelo Porto", the Miguel Januário installation "Reclaim the Future" and a one-night-only showcase of arcane computer games. Concerts included a Scientific Pop recital, a Live Coding jam, a Mutant Hotel Bar improv and the resident FuturePlaces Impromptu All-Stars Orchestra performing a new piece entitled "Gravitas".

This 8th edition of FUTUREPLACES was especially marked by the desire to further consolidate and foster the heritage of the medialab, now nearing one decade of

activity. With this in mind, the FUTUREPLACES Youtube channel is now hosting a multitude of videos from past editions, focusing on interviews, keynote addresses and concerts; a flickr page includes every official photo ever taken since 2008; further writing is updated on the "Publications" section of the website; and a new project, "FUTUREPLACES Audiolab", will serve as a channel for curated audio editions stemming from eight years of sound recordings.

As the City keeps changing, so the concept of "Future" keeps changing, and likewise FUTUREPLACES keeps updating its mission. Expect further news and fronts to keep opening up via **futureplaces.org**.

Miguel Januário installation "Reclaim the Future"

NEXT STEPS FOR MULTIMEDIA RESEARCH

"Next Steps for Multimedia Research" (and other careers), a debate session included in the Futureplaces Festival, gathered several students and faculty with the purpose of initiating a forum of questions and suggestions about the Doctoral Program in Digital Media. The event took place in Porto and was streamed live, allowing remote participants to interact trough skype.

Three main topics where debated: 1. Future prospects after the doctoral program in Digital Media; 2. Impact of the doctoral program in future research initiatives or entrepreneurship; 3. Suggestions on how to improve the program and the partnership with UT Austin.

In result of this session and after collecting new inputs by email from students and former students of the Doctoral Program, a list of 44 questions and suggestions was addressed to the directors of the Doctoral Program.

In summary, it is recognized that the desired professional career after the PhD is not necessarily, or only, oriented to an academic life, but can be too. Thus, how to benefit from this diversity of skills, objectives and future links? How to adjust and shape the doctoral program to this reality?

Furthermore, there are several bridges that can be built during the doctoral program. They can be created with labs, private companies, but also amplify the value of interdisciplinary collaborations. Such bridges can be established in Portugal, namely by reinforcing the work between Porto, Lisbon and Madeira (among the universities participating in the Doctoral Program), but also with the UT Austin, by identifying new ways of benefiting from this partnership.

The debate was organized and moderated by Carlos Figueiredo (PhD in Digital Media, 2014), and had as speakers, Fátima São Simão (Responsible of the Creative Industries Pole UPTEC), Nuno Martins (PhD in Digital Media, 2013, Associate Professor in the IPCA - School of Design, designer several times awarded, and founder of the Talk About Cancer project: **FalarSobreCancro.org**), Eduardo Marques (finalist PhD student, researcher at INESC, and with a relevant professional experience in the private sector and as entrepreneur), Ivo Teixeira (3rd year PhD student, and one of the founders of the Open Lab), Luis Agrellos (1st year PhD student, Managing-Partner of the GEMA company).

The video of the Next Steps session is **available online** (after minute 13:08'')

DESIGNING OPEN BUSINESS MODELS

In its 8th edition, futureplaces2015 gave special attention to the topic of sustainability and openness. On the 22nd October, Paul Stacey, Associate Director of Global Learning at Creative Commons, held a workshop about Designing Open Business Models, at UPTEC - the Science and Technology Park of the University of Porto.

The main purpose of this session was to demonstrate how one can adopt an open attitude in business (for example, by openly licensing a product) and still make money from it.

With over 30 participants, from entrepreneurs to freelancers and students, the session started with an overview of the **Creative Commons (CC) licenses** and a short introduction to the **business model canvas**, both the original version and an updated version prepared by Paul, which specifically includes CC licenses and social good. There was also a chance to present the brand new Creative Commons Toolkit for Business, conceived and developed by the CC Portuguese Affiliate, which will be launched soon on **Creative Commons blog**.

During the workshop, the typical fears of openness were addressed through the presentation of real case studies including examples of open source software, open education resources, museums, authors, large platforms and other businesses. Cases like the **Tribe of Noise**, **Reijksmuseum**, **Open Words**, **The Noun Project**, **Posiba**, **Tumuult**, **Nina Paley**, **Seats2Meet**, **500Px**, **Autodesk's training and tutorial materials** were analysed during the session to explain how open business models actually prove to be sustainable and thriving.

Finally, Paul presented a selection of books about new approaches to economy and the participants had the opportunity to actually design an open business model for their own projects and discuss implementation strategies. More news and articles about open business will continue to be discussed at Creative Commons in its various platforms, namely, on Creative Commons blog and the **Made With Creative Commons website**, created for this purpose only.

DIGITAL MEDIA DOCTORAL SYMPOSIUM

Digital Media students and graduates from U. Porto and UNL presented their research projects at the Digital Media Doctoral Symposium, Porto, 21st October. Included in the FUTUREPLACES festival program the DM Doctoral Symposium gives all students the chance to present their work to an audience of their peers and faculty and exchange ideas, concerns and thoughts with the audience.

The event started with welcome remarks by Sharon Strover, Heitor Alvelos, Nuno Correia and António Coelho followed by an opening keynote from Chris Csikszentmihalyi, European Research Area Chair at Madeira Interactive Technologies Institute, entitled "Political Economics of Design: recognizing that funding trumps form or function". Chris's presentation reflected on how the schism between paper design on one side, and the actual material world that is produced on the other, is as wide now as it has ever been. Design for sustainability, design criticism, and speculative design constantly outstrip what actually gets made in the world, posing the real question of whether design can be an effective agent of social change. The invited opening keynote speaker also showed all present how new forms of cooperative approaches to the production of our material culture are possible.

The DM Doctoral Symposium included 11 presentations on various student's work in areas as diverse as on how design and digital media can be engaged with a local culture; cinematography, documentary cinema and film scenes affective classification; e-government portals improvement; interactive systems; facial skin texturing to help artists render emotions and exploring emotions trough photographs, colouring and storytelling; open farming; innovation in extreme scenarios; and integrated communication in the context of participatory culture (Library Network).

Along with the presentations of the student's ongoing projects the program included two graduated – Jorge Pereira and Cláudia Lima, from U. Porto – and a first year students- Michelle Kasprzak, U. Porto - presentations.

The event concluded with a much participated debate, not only between students but also between students and faculty.

Digital Media Doctoral Symposium Presentations:

Chris Csikszentmihályi (European Research Area Chair at Madeira Interactive Technologies Institute) - Political Economics of Design: recognizing that funding trumps form or function.

Jorge Pereira (Alumni U. Porto) - Stories told, stories to tell — strategy, communication and participation with design and digital media engaged with a local culture

Carlos Ramos (FCT) - Interactive installations with cinematographic content, objects and data

Madalena Miranda (FCSH) - Collective Portraits Take Place in Contemporary History: a contribute to documentary cinema in digital media environment

João Castro Pereira (FCT) - Usability Evaluation and Methodology Development for E-Government Portals Improvement

Pedro Ângelo (U. Porto) - Designing Interactive Systems with dataflower

Luís Frias (FCSH) - EMOTAG - Film Scenes Affective Qualitative Classification

Teresa Vieira (U. Porto) - Consistent Facial Skin Texturing to Help Artists Render Emotions

Carla Nave Saraiva (FCT) - PaintMyEmotions: Exploring Emotions through Photographs, Coloring and Storytelling

André Rocha (FCSH) - GROUU – Open Farming

Michelle Kasprzak (1st year student, U. Porto) - Innovation in Extreme Scenarios

Cláudia Lima (Alumni, U. Porto) - Library Network: Integrated Communication in the Context of Participatory Culture.

António Coelho and PhD Graduate Jorge Pereira

Chris Csikszentmihalyi

All FUTUPLACES Photos by Luís Barbosa.
http://luisbarbosaphotography.com/

WORKSHOP AND LECTURE "ANALYZING SOCIAL MEDIA WITH DIGITAL METHODS"

Bernhard Rieder, associate professor in the University of Amsterdam, was in FCSH/UNL on October 21st, where he gave a short introductory workshop on data extraction and visualisation with Netvizz and Gephi, and a lecture entitled «Analyzing Social Media with Digital Methods: Possibilities, Requirements and Limitations».

Both events were promoted by the Digital Media PhD program and by the FCSH chapter of the research unit CIC.Digital (Center for Research in Communication, Information and Digital Culture), through an invitation made by Janna Joceli, one of the new students of the doctoral program.

Professor Rieder, besides teaching in the Media Studies department of UA, is one of the main researchers behind the Digital Methods Initiative, led by Richard Rogers. His work is focused on the theory and history of software and on the application and critique of digital methods for Internet research. As a software developer, he has contributed to tools such as Netvizz, Instagram Hashtag Explorer and DMI-TCAT, which were also discussed both in the workshop and the lecture.

[Text by Jorge Martins Rosa, Photo by Janna Joceli de Omena]

UT AUSTIN | PORTUGAL @ ICT 2015

The UT Austin | Portugal Program participated in the ICT 2015 - Innovate, Connect, Transform, an event organised by the European Commission, with Fundação para a Ciência e a Tecnologia (FCT), that took place in Lisbon, from October 20 to 22.

More than 6.000 visitors were present during the three day event, offering the UT Austin | Portugal Program the opportunity to present its past, ongoing and future work and activities.
The international partnerships with the American universities – UT Austin, CMU and MIT – showcased several research projects. Ana Jorge, a Digital Media PhD student from the UT Austin | Portugal Program, presented her wok "Interactive Visualizations of Movies' Collections and Contents in Time and Space".

FACULTY WELCOMES NEW UNL DIGITAL MEDIA PHD STUDENTS

The official start of the 2015/2016 Digital Media PhD course at UNL took place October 13, at FCSH, with a welcome session to all first year students from FCT/UNL and FCSH/UNL followed by the first class in História e Tendências dos Media Digitais, with professors Rui Cádima and Jorge Rosa.

Several faculty of the Digital Media Doctoral Program and executive staff of UT Austin | Portugal were present to introduce the PhD program to the new students and to meet all newcomers.

RESULTS OF THE 2015 CALL FOR DOCTORAL SCHOLARSHIP IN DIGITAL MEDIA

The 2015 Call for Doctoral Scholarship in Digital Media received 38 applications.

The jury evaluated the 38 applications according to the evaluation criteria's defined in the **announcement** having recommended for funding the 9 PhD scholarships mentioned in the referred announcement.

AUTUMN SCHOOL ON NONLINEAR SCIENCE

Instituto Superior Técnico (University of Lisbon) held an Autumn School on Nonlinear Science, from 5 to 9 October 2015.

The school brought together prominent researchers, known for their expertise in modeling, analysis and simulation of nonlinear phenomena, and graduate and post-graduate students from around the world for five days of research training. The event, that had about 50 participants, comprised an intensive program for a weeklong short courses complemented by tutorial sessions ran by post-graduate students. It focused on non-local or nonlinear partial differential equations with applications ranging from phase transitions and free boundary problems to porous media flows and contaminant transport in subsurface environments.

School Speakers:
Clint Dawson (Institute for Computational Engineering & Sciences, (ICES), UT-Austin, USA);
K.R. Rajagopal (Texas A&M, USA);
Tuomo Kuusi (Aalto University, Finland);
Peter Knabner (Universitat Erlangen-Nuerenberg, Germany);
Alexei Novikov (Penn State University, USA)

Scientific Committee: Clint Dawson (UT Austin), José Miguel Urbano (Universidade de Coimbra), Juha Videman (Instituto Superior Técnico, Universidade de Lisboa)

Organizing Committee: Margarida Baia, Farid Bozorgnia, Léonard Monsaingeon, Juha Videman (Instituto Superior Técnico, Universidade de Lisboa)

More information:
https://nls2015.math.tecnico.ulisboa.pt

PLUNC

FIRST EDITION OF THE INTERNATIONAL DIGITAL ART AND NEW MEDIA FESTIVAL IN LISBON AND ALMADA

PLUNC started as a small conspiracy in Porto, during Futureplaces 2013. Gathered around a dinner table, a few CoLab students from Lisbon (or studying in Lisbon and Almada) asked themselves why digital art seemed to be constantly adrift their own city, and why so few events allowed them to show work in it.

Two years later PLUNC emerged with its own identity, addressing the lack of events and spaces - in the Lisbon/Almada area - showing New Media and Digital Art. It is a platform for people in this field to present work, blend in, learn from each other, experience, collaborate and discuss projects in the intersection of Art and Technology. The Open Call plays an important role on the development of the festival as it is partially shaped by the selected works. And finally, an opportunity to show work in this area was created.

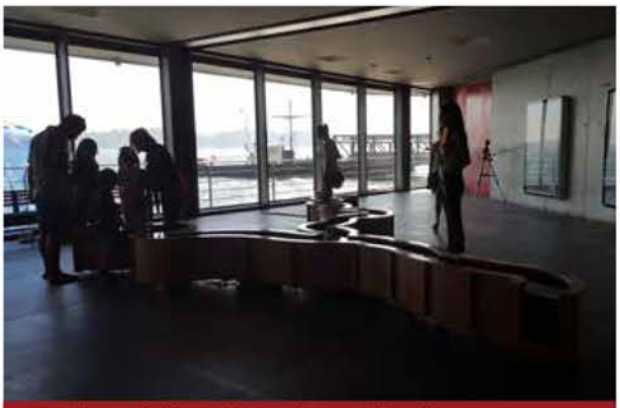
In order to bring both shores of Almada and Lisbon closer together, this year's edition targeted interactive works that focused on the concepts of proximity, approximation and pathways. To fully experience the festival, between September 24 and 27, people had to make journeys between the two shores of the Tagus

River with activities taking place in 7 different spaces spread in the Cacilhas - Cais do Sodré axis.

During these four days, PLUNC had several exhibitions, workshops, talks and performances, welcoming a total of 33 artists and guests from different countries creating an informal space for ongoing dialogue and interaction between artists, their work and the public.

Five spaces gathered a total of 13 interactive installations that the audience could engage with. "On the Shores" brought a selection of works in which the core concepts of the exhibition were differently explored and was divided in four different spaces: two deactivated waiting rooms at the fluvial terminals in Cais do Sodré and Cacilhas; Casa da Cerca - Centro de Arte Contemporânea and Ginjal Terrasse.

Both fluvial terminals were specifically designed to display the different interactive works and respect their specific needs. In Cais do Sodré, there was Els Viaene's "The Mamori Expedition" replaying and materializing a journey she once made, through her outstanding interactive sculpture. The different sounds, the water, the contour of the piece approximated the audience and re-created a journey into a new experience.



Els Viaene's "The Mamori Expedition"

Cuppetelli & Mendoza's piece "Nervous Structure" on the other hand, a site-specific installation, had an immediate response to the audience's movements and the idea of approximation and proximity between viewer and work, although automatic, seemed to incite an autonomous response. This was also the case with José Carlos Neves "Amachina", where the deconstruction of the idea of interface was a core component of the work.
Connecting Cais do Sodré to the south shore and Casa da Cerca, was a telescope pointed at the "Tweeting Antennas", by Ivan Vuksanov and Francisco Salgado. This work, selected through our open call, devised an obsolete communication system- the flag semaphore language - replicated by obsolete and dysfunctional objects - two TV antennas - using new media (Twitter) to convey messages in real time.

Also, on the south shore of the Tagus River, remained the two other locations for the "On the Shores" exhibitions. At Ginjal Terrasse, "Anthemusa" by André Sier, invited both local and virtual users to draw figures which were projected through a laser beam pointed towards Lisbon. Further down, at the Cacilhas terminal, there were different works displayed, such as Alex Rothera's "Cove", an application that is now available for iOS devices, and "RootIO" by Jude Munkudane and Christopher Csikszentmihalyi, a radio-on-a-bucket system through which users can live-broadcast messages by dialing a number and having it immediately spread to listeners tuned to this station.

The concepts of approximation, proximity and pathways will remain as basic principles for future editions of the festival, as these concepts are vital to its dynamic.

This year we focused on a flow made possible through the ferry boats that connect Cacilhas and Cais do Sodré through our partnership with Transportes de Lisboa. We verified however, that it was not easy to engage passers-by and regular passengers in our festival and will work towards improving this engagement in the future.

The fifth exhibition space was located at the Faculty of Fine Arts of the University of Lisbon (FBAUL) and presented "Drawing ++", a small selection of works by Golan Levin and Zach Lieberman curated by the latter. We affectionately named the show as our own physical easter bunny, since it was hard to locate within the labyrinthic FBAUL building.

Drawing ++

"Drawing ++" was nevertheless directly connected to the workshop and talk given by Zach Lieberman, and managed to promote and attract the curiosity of both participants and students in the building.

4 other workshops took place at FBAUL and one was developed at FabLab Lisbon. We opted for some of the

Zach Lieberman Talk

Open Lab "Hack the Oceans"

workshops to start earlier than the festival's opening as we intended part of the results to be shown at the exhibitions. This was the case with "Paperbots", the workshop by Isabel Paiva and "Hack the Oceans", by Sebastian Muellauer, Benjamin Gaulon and Steffen Klaue. While "Paperbots" remained at the exhibition space at Cais do Sodré, "Hack the Oceans" became an Open Lab and had a performative launch on September 25, at the emblematic Cais das Colunas.

Two other Performances took place during the festival: "Biomediation" by Yago de Quay and João Beira, which unveiled "the role of the brain and emotions as audiovisual feedback and as an instrument for live performance", and "Kobayashi" by Ivo Teixeira, Rodrigo Carvalho, Patrícia Nogueira, Francisca Rocha Alves and Daniel Rodrigues Correia, who grasped the core concepts of this year's edition and provided a live audiovisual performance made of daily excerpts of the crossovers between Cacilhas and Cais do Sodré.

Finally, with the purpose of better understanding all these works and promoting dialogues between artists and audience, all artists were invited to talk about their work process and ideas. Additionally to these talks, there were also the Open Call Talks, which resulted from our Open Call, the Transtalks on the ferry boats, and a conference entitled "Augmented Aesthetics" questioning the role of technology on human perception, with special guests Sally Jane Norman and Heitor Alvelos, and invited artist Alex Rothera.

We see PLUNC as a successful event, a first edition of something that can be much more and yet has a lot to trim. What we learned so far is that there is indeed the need to provide opportunities like these to artists, as we do lack physical space and platforms (in the Lisbon/Almada area) to show and talk about new media and digital art, trends and cultures. Sometimes the digital needs tangibility.

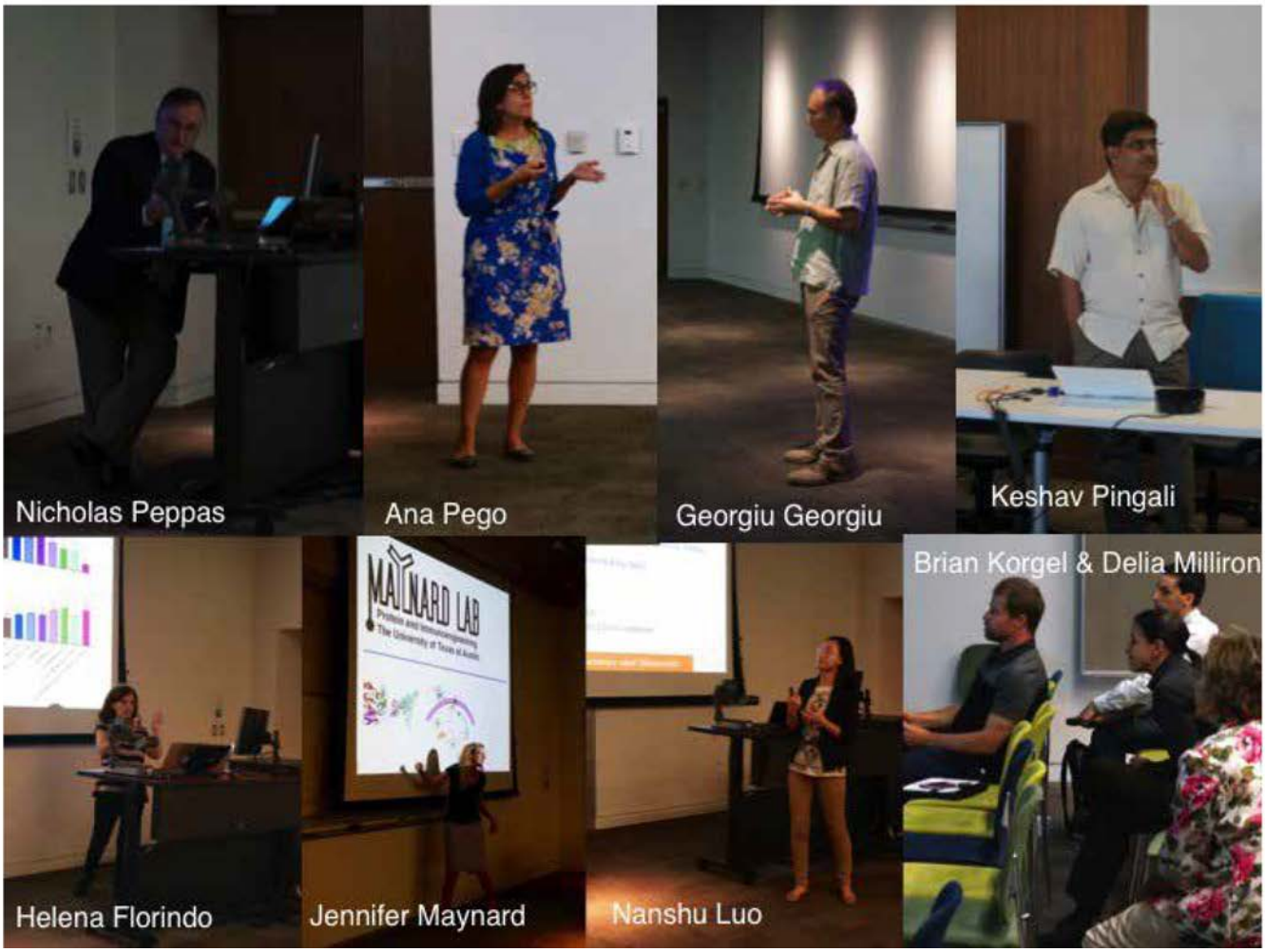
More information: www.plunc.pt

1ST US WORKSHOP ON NANOSCIENCES / NANOTECHNOLOGIES

With the coordination of Brian Korgel and Paula Vilarinho (Emerging Technologies) the 1st US Workshop on Nanosciences/Nanotechnologies took place at the University of Texas at Austin, 14 and 15 September, with the purpose of stimulating collaborations between Portuguese and UT Austin researchers at the University of Texas at Austin.

This meeting took the form of a workshop with presentations of scientific topics from Portuguese and US researchers, round table meetings to discuss joint projects and visits to facilities. A group of 10 researchers was selected from a range of Portuguese researchers who express an interest in participating. Participants were: Joana Doria Vaz Pinto (UNova de Lisboa), Carlos Miguel Calisto Baleizao (IST, University of Lisbon), Maria do Rosario Gomes Ribeiro (IST, University of Lisbon), Ana Paula Pego (University of Porto), Joao Tedim SMALLMATEK, Aveiro, Pedro Duarte (U Aveiro), Rob Pullar (U Aveiro), Maria Fernanda Paiva Proenca (U Minho) and Shahid Mumtaz (U Aveiro) from Portugal and Nanshu Lu, Nate Lynd, Laura Suggs, James Tunnell, Delia Milliron, Emanuel Tutuc, Jeanne Stachowiak, George Georgiou, Lydia Contreras and Jennifer Maynard, from UT Austin.
The 3 of the 5 Principal Investigators (PI) of the Portuguese projects recently approved by FCT under this program (namely: Ana Senos from the University of Aveiro, Cristina Freire, from the University of Porto and Helena Florindo from the University of Lisbon) also joined the meeting and presented the current results on their projects already ongoing. The same was done by the PIs of the US projects, Carolyn Seepersad and Nicholas A. Peppas both from UT Austin. The Portuguese students involved in the program also participated in this meeting. This meeting enhanced significantly the participation of American researchers, promoted partnerships and exposed the Portuguese researchers to the environment and resources (human and infrastructure) of R&D of UT Austin.

For a summary of the meeting please visit
https://www.youtube.com/watch?v=2Ahw17szYAQ.



ADVANCED COMPUTER RESEARCHERS PARTICIPATE IN EMERGING TECHNOLOGIES MEETING IN AUSTIN

The September Austin Meeting organized by Brian Korgel and Paula Vilarinho (Emerging Technologies) provided a challenging opportunity for an additional level of cross-disciplinary cooperation between Portuguese and UTA faculties: most sessions clearly displayed the role of modelling/simulation of nanomaterials and the impact of big data requirements in some key areas, which often require access to high performance computational resources with adequate software development. TACC at Austin runs one of the top 10 supercomputer centers worldwide; however, these resources are not unlimited and software applications should follow strict and contemporary rules to be efficient in this new world of heterogeneous computing, where cluster nodes are now a mix of shared memory multi-core devices with computing accelerators based on manycore devices with different computing paradigms. Researchers in Advanced Computing under CoLab, both at Austin and in Portugal, have been addressing these issues in their activities, and some opportunities for future collaboration were identified during this 2-day meeting in Austin in September.

EMERGING TECHNOLOGIES STUDENT'S INTERNSHIPS AT UT AUSTIN

Pedro Duarte, a PhD student of the University of Aveiro, Portugal, started his internship at UT Austin (from June 2015 until May 2016), coordinated by Carolyn Seepersad (UT Austin) and Paula Vilarinho (U Aveiro). With the title "Additive manufacturing of Yttria-Stabilized Zirconia for Dental Applications", the objective of the proposed research is to design and provide proof-of-concept for an additive manufacturing technique — based on indirect selective laser sintering of nanostructured yttria-stabilized zirconia (YSZ) powders — for fabricating customized ceramic dental components directly, without a mold.

Another PhD student of the University of Aveiro, Portugal, Manuela Fernandes, also just started her internship at UT Austin (from November 2015 until April 2016). Coordinated by Paulo Ferreira (UT Austin) and Ana Senos (U Aveiro) she will be studying thin films of KNN in different substrates, with in-situ TEM heating experiments from room temperature to 1000 °C.

Pedro Duarte (U Aveiro Portugal), Carolyn Seepersad (UT Austin) and Paula Vilarinho (U Aveiro Portugal) *@* UT Austin in September 2015. Pedro Duarte is the first intern student within Emerging Technologies.

Manuela Fernandes (U Aveiro Portugal) *@* UT Austin in November 2015

WORKSHOP ON MOLECULAR GEOMETRY AND VISUALIZATION

INESC-ID Lisboa organized a Workshop on Molecular Geometry and Visualization, in September 11, at the Centro de Congressos do Instituto Superior Técnico. This workshop gathered members of an exploratory research project, supported by the UT Austin | Portugal program, which aims to develop more efficient algorithms to detect pockets in very large molecules. Such algorithms are important in the design of new drugs, as they can predict the location where drugs can bind to a specific protein and, consequently, determine its implications on protein function.

Dr. Chandrajit Bajaj, professor of Computer Science at the University of Texas at Austin, was the special speaker of this workshop, and shared his vast expertise in this area with the Portuguese project members, allowing to refine the technical approach and better define the scope and contributions expected from the research project.

This workshop was supported by the Fundação para a Ciência e Tecnologia through the project A-MOP - Algorithms for Macro-Molecular Pocket Detection, UTAP-EXPL/QEQ-COM/0019/2014.

For more information please visit
https://sites.google.com/site/amopworkshop2015/

UTEN TEAM MEETS WITH APPLICANTS OF GLOBAL STARTUP PROGRAM

In September, IC2 Institute Program Director Marco Bravo led the UTEN team as it traversed Portugal to meet the entrepreneurs who applied for the Global Startup Program. To assist all applicants in making their strongest presentation, the team scheduled two-day visits in Coimbra, Lisbon, and Porto. At each location, on Day One they provided a workshop on Entrepreneurial Storyboarding and constructing a value proposition for the US market. Day Two was devoted to interviews.

The workshop day was met with high enthusiasm. Fernando Sousa of Video Observer said, "Our three managing founders attended this workshop and it was of great value. We spent a day reviewing our business model and the value chain, from the market problem that we address to the different actors in our business model. The workshop obliges you to break down your business model to the important and essential pieces, and focus on what is important—helping you to define your value offer to different market players."

Incubation

Eight ventures have been selected for assistance in business development:

- Biopremier
- Celfinet
- Dognaedis
- Eyesee
- Line Health
- Veniam
- WY Group
- Xhockware

These early stage firms have strong international market potential, and the GSP team will help them address global market challenges. In November, these entrepreneurs visited Austin to attend strategy sessions, meet with industry experts, and expand on the insights gained in September's workshop. Lourenço Oliveira, Business Developer for Line Health, described GSP's role as a very positive one, saying, "UTEN brings American startup know-how to the Portuguese ecosystem. They teach us best practices and methods, without which we couldn't aim at becoming successful entrepreneurs."

Acceleration

The GSP team will also be helping another ten businesses in an acceleration process to increase their access to international opportunities:

- BeMicro
- BVCreative
- Ciengis
- Coolfarm

- doDoc
- Peekmed
- Petable
- Switch
- Sword Health
- Watt-IS

These firms have a product ready to meet global needs, with market-appropriate branding materials, that has already met with success in domestic sales.

Results

The 2015 GSP cohort has seen significant results. For example, in the past six months Take the Wind has signed a distributor agreement with Skillqube in Germany, finalized a multi-year exclusive distribution deal in Philadelphia, and secured a contract agreement with the American Heart Association (AHA) to showcase Body Interact at AHA's October conference in Orlando.

Line Health (formerly PharmAssistant) has reimagined the business's value proposition to enlarge its potential in the US market. The firm changed its name and its branding, redesigned its main product, and is now conducting a clinical pilot with the NeuroTexas Institute. CEO Diogo Ortega said, "GSP has added an immense value since our first interaction one year ago, as our internal KPI's show."

The University Technology Enterprise Network (UTEN) is an initiative sponsored by the Portuguese government and established by the IC² Institute to provide Portuguese technology firms with opportunities for international outreach, acceleration, and business development. The Global Startup Program (GSP) selects burgeoning Portuguese firms for global market acceleration.

For more UTEN GSP news check online: www.utenportugal.org/.

TEXAS GOVERNOR Takes the Wind. Governor Greg Abbott enjoyed a demonstration of Body Interact (a product of UTEN GSP's venture Take the Wind) while visiting UT-Rio Grande Valley Regional Academic Health Center with Senator Cornyn, VA Secretary McDonald, and Congressman Hinojosa. Photo courtesy of Governor's Staff

DIGITAL MEDIA DOCTORAL STUDENTS' NEWS

Fernando Nabais contributes with essay to "Digital Movement" book

Digital Media PhD student Fernando Nabais contributes with an essay to the just released Digital Movement book by publisher Palgrave Macmillan. This book is the recent addition to the Palgrave Studies in Performance and Technology and was edited by Nicolas Salazar Sutil and Sita Popat, following the conference Corporeal Computing:

A Performative Archaeology of Digital Gesture, that was held in the University of Surrey in September 2013. "Digital Movement addresses the evolving ways in which movement and its technological mediation can inform creative thinking and embodied practices. In order to identify unique cross-disciplinary links within human movement research this book brings together experts from a number of creative disciplines including dance, theatre, sculpture, as well as computer and mathematical art, whilst offering an integration of scholarly perspectives from cultural, media and performance studies." The book is a collection of thematic essays from several artists and theorists, such as Sally Jane Norman, University of Sussex, UK, Thecla Schiphorst, Simon Fraser University, Canada, Mark Coniglio, Independent Artist, UK, or Tom Calvert, Simon Fraser University, Canada, among others.

Nabais essay, I_CARE_US: Flying Robots and Human-Robot Interaction in Digital Performance, analyses the aesthetic exploration of drones in digital performance, framing it in the history of robotic art and the earlier experiences of Futuristic Aerial Theatre, in the 1920's. Nabais own piece, I_CARE_US, a performance for one drone and one performer, premiered in Teatro São Jorge, Lisboa, in 2014, is also dissected in its aesthetic dimension as in its contribution to studies in human-robot interaction.

Tiago Videira concludes his PhD

Tiago Videira finished his PhD thesis, entitled "Instrumental Fado: A generative interactive system" which was approved unanimously at FCSH/UNL in November 2nd.

Here is his testimonial:

"My PhD was a life changing experience and a fantastic opportunity to learn, grow and become a more mature, well-rounded human being. The two years I've lived in Austin, in particular, were absolutely overwhelming. The outcome of this process resulted in an interdisciplinary journey in which I detail how I have deeply studied and formalized a musical practice (in this case Portuguese Fado) and then programmed a computer model able to automatically generate instrumental songs, which are sound-alikes of the musics and sounds typically associated with fado practice. The model is modular and flexible and can be adapted to generate many other kinds of songs. With the right data it can generate Satie like music, Danny Elfmanish music or any other musical practice desired. The main purpose of this journey has been to illustrate my methodologies step by step (kinda like a how-to book, or a kitchen recipe book) in such a way that researchers can then use it to study and model whatever musical practice they desire.

In the first part of my dissertation I show how the concept of fado historically emerged, what it represents, and how it has changed. Moreover, I offer a detailed, holistic and systematic characterization of the musics and sounds associated with it (both instrumental and vocal), providing a series of factual and empirical descriptors. I discuss some values associated with fado through a systematic analysis of the performance practice itself, as portrayed by its performers, audiences and scholars, along the course of history, and offer a detailed characterization of its traits. A combined interdisciplinary methodology following the lines of ethnomusicology (ethnographic and historiographic methods) and psychology of music has been used.

I have complemented the analysis with the use of computational musicology on empirical data. I have conceived a musical corpus with 100 transcriptions, identified as fado, found in the written sources. These transcriptions are piano reductions, adapted for the domestic market, of both the instrumental accompaniment and vocal line sung, the vocal line being reduced to an instrumental version. This corpus was edited and will soon be made available as a digital database (**http://fado.fcsh.unl.pt**). This database consists of the musical scores, MIDI files, analytical, formal and philological commentaries, as well as slots for relevant information (sources, designations, date(s), authorship(s)) for each fado. The creation of this new digital object is relevant for archival and patrimonial purposes. I have applied music information retrieval techniques, followed by statistical procedures, on the corpus, in order to identify some patterns and rules shaping its characteristics. The results and conclusions allow a better understanding of what fado is and open doors regarding the construction of a theory, parametrization and modeling of the music and vocal sounds associated with it, for pedagogical, patrimonial and composition purposes, namely automatic generation of similar music.

The second part of the dissertation deals mainly with computational creativity. After providing a state of the art, I conceive and describe a model based on the previous sections: a digital system, capable of generating new instrumental music (based both on the instrumental and vocal line usually present in fado practice, the vocal line being reduced to an instrumental version), following the processes and rules previously found. I also discuss and present ideas for automatic evaluation of the system and future work to be done, namely the ability to expand the model to suit other musical practices."

UPCOMING EVENTS

Porto Winter School on Graph Analytics and Applications
14-16 December, 2015

Venue: CS Department, FCUP, University of Porto

Organizers: DCC/FCUP & UT-Austin

Sponsored by: CoLab project between Portugal and the University of Texas at Austin

Registration is free with limit on the number of attendees.

More Information: http://graph15.dcc.fc.up.pt/

---

xCoAx 2016: 4th International Conference on Computation, Communication, Aesthetics and X
7-8 July 2016

Location: Bergamo, Italy

Call open until 31 January 2016 - Topics:
Computation; Communication; Aesthetics; X; Algorithms / Systems / Models; Artificial Aesthetics; Audiovisuals / Multimodality; Creativity; Design; Interaction; Games; Generative Art / Design; History; Mechatronics / Physical Computing; Music / Sound Art; Performance; Philosophy of Art / of Computation; Technology / Ethics / Epistemology .

xCoAx is an exploration of the intersection where computational tools and media meet art and culture, in the form of a multi-disciplinary enquiry on aesthetics, computation, communication and the elusive x factor that connects them all.

Organizing committee

André Rangel, CITAR / Portuguese Catholic University

Alison Clifford, University of the West of Scotland

Graeme Truslove University of the West of Scotland

Jason Reizner, Faculty of Computer Science and Languages, Anhalt University of Applied Sciences

Mario Verdicchio, University of Bergamo (Conference Chair)

Miguel Carvalhais, ID+ / Faculty of Fine Arts, University of Porto

Pedro Tudela, i2ADS / Faculty of Fine Arts, University of Porto

More information: http://xcoax.org/

ONGOING OPPORTUNITIES

"USA@PT Grants" 2016

- Grants to Support the Participation of Speakers from the U.S. at Conferences and Seminars in Portugal
- Deadlines for applications open for Conferences, seminars and workshops in Portugal from April to December 2016

http://www.flad.pt/en/usapt-grants-2016/

Joint Transnational Call for funding of European Research Projects on Internet of Things

- Deadline - 13th January 2016

http://www.fct.pt/calendario/docs/CHIST-ERA_Call_2015_Leaflet.pdf

---

MORE OPPORTUNITIES can be found at FCT website: http://www.fct.pt/concursos/

USEFUL LINKS
www.utaustinportugal.org www.fct.pt www.utexas.edu www.ic2.org www.ati.utexas.edu www.austin-chamber.org www.utenportugal.org

We want to hear from you! Want to share your doubts and concerns about something you read? Want to see other topics featured in next month's newsletter? Want to contribute with articles or art? Please send all your feedback to Carina Borges - cap.borges@fct.unl.pt

UT Austin | Portugal
International Collaboratory for Emerging Technologies, CoLab

The University of Texas at Austin

FCT Fundação para a Ciência e a Tecnologia

COLAB SQUARE Newsletters

March 2016

COLABSQUARE

UT Austin | Portugal International Collaboratory for Emerging Technologies, CoLab

MARCH | 2016 . NUMBER | 57

YOU CAN FIND IN THIS COLABSQUARE EDITION:

FOTOCATGRAF PROJECT AT GREEN BUSINESS WEEK

The project FOTOCATGRAF, funded under the programme UT Austin|Portugal – FCT, Emerging Technologies, participated in the Green Business Week – National Week for Green Growth, which took place at Lisboa Congress Centre, Lisbon, Portugal between the 1st and 3rd of March 2016.

The project FOTOCATGRAF was represented with a booth at the trade fair AcquaLiveExpo – Water, Waste and Environment publicizing its innovative graphene-based photocatalyst technology by which wastewater treatment plants are able to improve their processes for degradation of emerging pollutants such as pharmaceuticals, hormones and their metabolites, contributing to a safe and sustainable water supply, which is one of the grand global challenges of the 21st century.

About FOTOCATGRAF project

FOTOCATGRAF project aims at producing a new generation of high-performance graphene-based photocatalysts for the removal of emerging pollutants – pharmaceuticals – from the wastewater treatment plants (WWTPs) of the centre region of Portugal, monitored by Águas do Centro Litoral (AdCL), S.A., Grupo Águas de Portugal.

It refers to a nanotechnology-enabled photocatalytic water treatment process, which constitutes a new solution to develop the next-generation of water supply and wastewater treatments to produce higher

Clara Pereira presenting the project.

quality water using less energy and with lower costs, fulfilling one of the GBW main pillars: AcquaLiveExpo – Water, Waste and Environment.

Based on the continuous interaction between the industrial partner AdCL, Águas de Portugal, and the Research Teams REQUIMTE-University of Porto, CICECO-University of Aveiro and INESC-TEC, with the collaboration of UT Austin (USA), the photocatalytic performance of the innovative graphene-based photocatalysts will be firstly evaluated at laboratorial scale in the degradation of wastewater samples supplied by AdCL. The most efficient nanophotocatalysts will be then produced at pilot scale and introduced in a pilot WWTP of AdCL. Complementary toxicity studies will be considered as an assessment factor for the selection of the best treatment.

Furthermore, an electrochemical sensor will be designed to read the electric impulse associated with graphene-based electrocatalyst detectors. The sensor will be integrated with off-the-shelf microcontrollers to form wireless sensor networks that can be deployed on the pilot WWTP and allow for automatic, high cadence or even real-time, collection of data to monitor the concentration of the most persistent and prejudicial pharmaceuticals for the environment. The resulting data can then be mined to detect patterns that will allow a deeper understanding of the usage and life-cycle of these pollutants in the environment and, also, to make the photocatalyst requirements in the wastewater treatment station more sustainable

The project structure, objectives, consortium, working packages, outputs and preliminary results were presented in the GBW trade fair by Dr. Clara Pereira, a researcher from REQUIMTE-UP, during an oral presentation in the forum AcquaLiveExpo.
Flyers were also distributed within the booth by other team members: Dr. Cristina Freire (PI) from from REQUIMTE-UP, Dr. Cristina Matos from REQUIMTE-ISEP and Dr. Ana Estrada from CICECO-UA.

About the Green Business Week

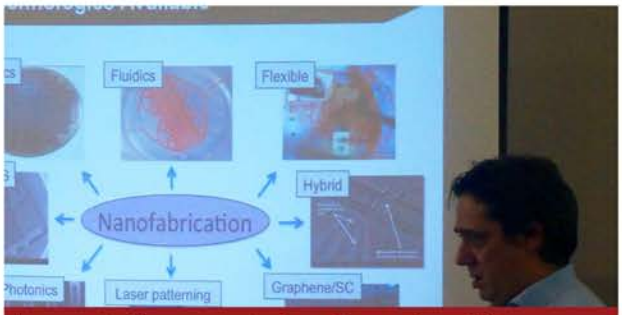
The AIP Foundation (Portuguese Industrial Association) organized the Green Business Week – National Week for Green Growth with the support of Environmental Ministry and several partners.

The Green Business Week (GBW) is a booster event of economic growth, skilled and sustainable employment, science and research, technology, innovation and entrepreneurship, leveraged by the growth in the world of the Green Economy, which records values above 4% per year.

The main pillars were:
SmartCitiesLive – Solutions for SmartCities and Smartgrids
AcquaLiveExpo – Water, Waste and Environment
EnergyLiveExpo – Energy, Energy Efficiency, Renewable Energy, Climate Change and Information Technologies.

FOTOCATGRAF Project Team (from left to right) Cristina Freire (PI), Cristina Matos, Ana Estrada

5TH EMERGING TECHNOLOGIES WORKSHOP: PROMOTING COLLABORATIONS



A presentation moment. Joao Gaspar from INL presenting his R&D activities.

The 5th Emerging Technologies Workshop organized by Paula Vilarinho was held at the University of Aveiro (Auditório Mestre Hélder Castanheira, Livraria da Universidade de Aveiro) on February 24th.

The workshop gathered all UT Austin | Portugal program academic areas: Advanced Computing, Digital Media, Emerging Technologies and Mathematics, aiming at fostering the collaboration between the areas.

During this one day meeting over 50 scientists attended the workshop, coming from different universities in Portugal: University of Aveiro, University of Coimbra, University of Lisbon, University of Minho, University of Porto, New University of Lisbon and International Iberian Nanotechnology Laboratory (INL). Two guests from The University of Texas at Austin were also present, Dr. James Sham and Professor Paulo Ferreira.

The Vice-Rector for Research at the University of Aveiro, Professor José Fernando Mendes welcomed the participants to the meeting and Prof. Fernando Santana the National Director Portugal of The UT Austin | Portugal Program strengthen the importance and timing of this Workshop. In this phase of the program and in the next one is crucial that interdisciplinary among the four areas is promoted.

The Opening session: from right to left Professors Fernando Santana (FCT UNL), José Fernando Mendes (UA) and Paula M. Vilarinho.

The brainstorming meeting around on establishing R&D collaborations between the different areas started with a morning session in which participants presented their research achievements and scope of their interests. James Sham lecture on "Creating collaboration between artists and scientists / engineers" was the motto for the group work that followed. The afternoon's brain storming sessions were devoted to discussions in the form of round-tables combining scientists from different areas, aiming to establish possible collaborations and create ideas for project proposals.

Working groups during brain storming session.

After each 15 minutes of brain-storming the teams were changed and ideas for projects collected. Around 30 ideas for common projects were selected.

The workshop ended with a visible excitement of the participants, looking forward to continue their collaborations started during that day.

The group photo.

CREATING COLLABORATION BETWEEN ARTISTS AND SCIENTISTS / ENGINEERS

On February 24th, in the context of the 5th Emerging Technologies Workshop, James Sham (UT Austin) gave a lecture entitled "Creating collaboration between artists and scientists / engineers".
The session was held at Auditório Mestre Hélder Castanheira, Auditório da Livraria da Universidade de Aveiro.

James Sham during his lecture.

Bio James Sham

James Sham is an inter-disciplinary contemporary artist whose research focuses on interfacing technologies and material processes from a variety of disciplines within contemporary art. His artwork has been exhibited in venues as diverse as the Tate Modern (London), Appetite Gallery (Buenos Aires), Kunstprojects (Berlin), The Open Works Institute (Bucharest), White Box Gallery (New York City), and the Asian Arts Initiative (Philadelphia) and has screened and published on European Cable Network Broadcast (Germany and France), the Ellensburg Film Festival (Seattle) among others. Having received an MFA in Sculpture & Extended Media from Virginia Commonwealth University in 2008, and a BA in Studio Art and Philosophy from Dartmouth College in 2005, Sham is now based in Austin, Texas and Washington, DC, where he is Assistant Professor of Sculpture in the Department of Fine Arts and Art History at George Washington University.

PROFESSOR RUI L. REIS ELECTED TO THE NATIONAL ACADEMY OF ENGINEERING

Professor Rui L. Reis, Vice Rector of the University of Minho, was elected to the (United States) National Academy of Engineering (NAE).

According to NAE's official press release, Dr. Rui L. Reis, a Full Professor of Tissue Engineering, Regenerative Medicine and Stem Cells, at the Department of Polymer Engineering, School of Engineering, University of Minho, was recognized "for his contributions to biomaterials and tissue engineering in regenerative medicine".

Rui L. Reis is among 22 foreign members elected this year by the NAE, alongside with the 80 new U.S. members, bringing the total U.S. membership to 2,275 and the number of foreign members to 232.
Prof. Rui L. Reis is the first member from Portugal to be elected in the National Academy of Engineering.
Election to the National Academy of Engineering is among the highest professional distinctions accorded to an engineer. Academy membership honors those who have made outstanding contributions to "engineering research, practice, or education, including, where appropriate, significant contributions to the engineering literature" and to "the pioneering of new and developing fields of technology, making major advancements in traditional fields of engineering, or developing/implementing innovative approaches to engineering education."

In the UT Austin | Portugal Program Rui L. Reis and other collaborators at the University of Minho interact and collaborate with Prof. Nicholas A. Peppas of UT on the development of advanced scaffolds for tissue engineering and regenerative medicine.

For more information and for a complete list of all new members, please visit NAE's official news.

MASTERCLASS DATA2FORM

The Masterclass data2form, a MIL initiative (Media Innovation Labs, University of Porto) with support from UT Austin program | Portugal, organized by Professor Bruno Giesteira (FBAUP, Design Department) took place 14th and 15th February at the MIL Auditorium (Porto) and counted with lecturers Ana Isabel Carvalho and Ricardo Lafuente, of the "Journalism ++", aimed to introduce the bases and nuances of the areas of information design and data visualization.

These disciplines have been gaining prominence over the last decade, underpinned by growing interest in fields such as journalism, date science and graphic design for the informative and educational potential of complex information of visual representation.

An extensive historical evolution of the representation of information and data, complemented with the exploration of various examples and key figures approach from the Middle Ages to the present day and the immediate future was exposed. Practices, tools and contemporary workflows in areas such as data journalism were also articulated. At the same time, were also provided practical resources and visualization projects demonstrations.

A video of the event is available here.

Lecturers Ana Isabel Carvalho and Ricardo Lafuente.

INNOVATION ARTS AND THE CONCEPTION OF RAPID DESIGN PIVOT

As an organisation of the Media Innovation Lab at the University of Porto, with the support of the UT Austin | Portugal Program, Brian Korgel was in Porto on the 15th of February to talk about how artists can partnership with scientists to innovate.

Citing Brian Korgel "The concept of Innovation Arts is founded on the idea that innovation and technology development/implementation/commercialization can be significantly accelerated by creating collaborations between artists, creative designers, science/technology pioneers and entrepreneurs. At UT Austin, James Sham (visiting professor of Art & Art History) and I have been working to create collaborations between artists and scientists/engineers."

The project began with funding from Skolkovo Institute of Technology (Skoltech) in Moscow, Russia, called Rapid Design Pivot led by Korgel, Sham and Adam Bock, Senior Lecturer in Entrepreneurship at the University of Edinburgh (UK). Rapid Design Pivot aimed to partner inventors and artists to produce art exhibitions and technology prototypes using state-of-the-art scientific discoveries and technological advances as a creative medium. Within an environment that encourages breaking of norms by introducing artists and creative outliers into the design process to catalyze partnerships between artists and developers, the goal has been a range of outcomes as vast as they are diverse: On one side of the spectrum, art projects that are created with otherwise unavailable materials, interdisciplinary expertise and resources; whereas, on the other side of the spectrum, artists have the opportunity to make work without any disciplinary boundary with other experts—this could lead to spin-off ventures, start-ups and a plethora of opportunities for true innovation and impact. Rapid Design Pivot encompassed research from all three facets of Entrepreneurship, Technological Innovation and Contemporary Art. Expanding on industrial designer Raymond Loewy's concept of MAYA (Most Advanced, Yet Acceptable): if the most advanced innovations have social acceptability as their limits, we aim to expand the "fringe" of innovation by introducing creative outliers to purposefully create pivots in thinking when it comes to development. By partnering artists with scientists and inventors, we aim to interface the developments that are "Most Advanced," with the ideas in creative practice that from the outside seem "Barely Acceptable." After the end of Skoltech funding, the project now continues with additional funding from UT Austin and the first art installation is scheduled for February, 2017, called Omnibus Filing involving artworks from James Sham, Patrick Killoran, Daniel Bozhkov and Steven Brower.
An audience composed of Faculty, researchers and PhD students from science and arts had the chance to listen and share ideas about this issue. This partnership can be extremely fruitful for future research projects.

Bio Brian A. Korgel

Brian Korgel during his presentation.

Brian A. Korgel is the Edward S. Hyman Chair in Engineering and T. Brockett Hudson Professor of Chemical Engineering at the University of Texas at Austin. He directs the Industry/University Research Center (I/UCRC) for Next Generation Photovoltaics, the Emerging Technologies area of the UT|Portugal program and serves as Associate Editor of the journal Chemistry of Materials. He received his PhD in Chemical Engineering from UCLA in 1997 and was a post-doctoral fellow at University College Dublin, Ireland, in the Department of Chemistry.

He works at the intersection of nano & mesoscopic materials chemistry and complex fluids, tackling problems in lithium ion batteries, photovoltaic devices and medicine. He has given more than 260 invited talks and has published 240 papers. He has been Visiting Professor at the University of Alicante in Spain, the Université Josef Fourier in France and the Chinese Academy of Sciences in Beijing. He has co-founded two companies, Innovalight and Piñon Technologies, and received various honors including the 2012 Professional Progress Award from the American Institute of Chemical Engineers (AIChE) and election to Fellow of the American Association for the Advancement of Science (AAAS).

CREATIVE COLAB '16"

Creative Colab '16" was an invitation to explore and discuss various perspectives on digital media, drawn from the intersections between creativity and collaboration that took place on the 5th of February, in UPTEC-PINC, Porto. The discussion unfolded on three main vectors: audience+market, storytelling, and interaction. This session was an initiative of the students of the first year of Digital Media Doctoral Program at University of Porto, Madeira Interactive Technologies Institute, and the University of Texas at Austin, with the generous Support of UPTEC-PINC.

Following a seminar structure, three guests presented diverse views on each subject, offering their viewpoints as researchers and practitioners in digital media:
Ana Correia de Barros [Audience + market]

Valentina Nisi [Storyteling]

Peter Beyls [Interaction]

The audience was encouraged to partake in a final roundtable with the speakers, moderated by Daniel Catalão. The discussion identified several insights on technology and interaction, as well as new questions and concerns, brought by emerging technologies into the fields of creativity and collaboration.

A video of the event is available here.

For more information please visit the event's website.

UTEN GLOBAL STARTUP PROGRAM: ORIENTATION WEEK FOR ACCELERATION COHORT

The IC2 Institute hosted the Global Startup Program's Orientation Week for the acceleration companies.

Held from February 1st to 5th, this year's Orientation Week brought to Austin the leaders of 10 of the most promising Portuguese technology ventures carefully selected from among dozens of applicants to be part of the GSP 2016 cohort, and promoted soft-landing learning and facilitate networking and matchmaking among entrepreneurs, major corporations, venture capital firms, angel investors, incubator directors, and international service providers interested in actionable knowledge about doing business in the United States and in particular the process of going global.

The Portuguese companies that visited Austin represent sectors including cleantech, data analytics, industrial applications, eCommerce/B2C, and healthcare. These were Watt-IS, BeMicro, Ciengis, Coolfarm, Findster, Petable, BeeVeryCreative, Peekmed, Sword Health, and doDOC.

The events scheduled helped reduce risk, open markets, and connect a select group of eight Portuguese technology-based companies with professionals in the Austin entrepreneurial ecosystem to help grow these companies globally, particularly in the United States.

During the week, companies were trained to deliver effective communication of their value proposition to the Austin community through a success committee mastermind with more than 30 mentors at the IC2 Institute and featured on a startup community immersion event at the Capital Factory for more than 50 Austin technology leaders.

Tangible results during the orientation week:

- Coolfarm is negotiating a potential pilot with a Texas company.
- Petable is discussing a trial project with a local veterinarian clinic and further the development of their platform by adding some new features.
- Findster sold 3 units of their product and has a trial going on with a local company for feedback.
- Sword Health has pilot confirmed verbally, a NDA signed, and a Business Agreement and contract approval in process with one of the most famous hospitals in town. Had several meetings with orthopedics and clinic directors

- PeekMed had multiple meetings with orthopedic customers and is exploring a pilot project.
- BeMicro had one-on-one engagements with business people in the solar power industry and system integrators and a meeting with a potential USA distributor is in the works.

PORTUGUESE DELEGATION IN AUSTIN A SUCCESS!

TIPI had the honor and pleasure of hosting a delegation of Portuguese researchers from a variety of universities for a full week of scheduled events during January 22-27, 2016.

The goal of the various meetings was to continue to foster and create research collaborations between UT Austin and Portuguese researchers.

Delegates included: Nuno Correia, Rui Rodrigues, António Coelho, Raul Vidal, Sério Nunes and Manuel Damásio.

TIPI had the honor and pleasure of hosting a delegation of Portuguese researchers from a variety of universities for a full week of scheduled events during January 22-27, 2016.

The goal of the various meetings was to continue to foster and create research collaborations between UT Austin and Portuguese researchers.

Delegates included: Nuno Correia, Rui Rodrigues, António Coelho, Raul Vidal, Sério Nunes and Manuel Damásio.

The week started out with a series of dynamic student presentations followed by numerous exploratory meetings all related to digital media:

- RB Brenner/Virtual Reality
- B Pennycook/New iniciatives at the Butler School of Music
- J Bernhardt/Health Communications
- B Korgel/Applied Science at the atomic and molecular scale
- P Toprac/Gaming

and culminating with an outstanding conference hosted at the I-School, with Randolph Bias as Master of Ceremonies!

Knigth Center visit

Rosental Alves was our gracious host has he led our delegation trough a historical timeline of the creation of the Knight Center at UT. Confronted by a series of funding challenges, Alves shared his innovative and astute ways of ensuring funding through the years. Sharon Strover and Cecilia Garrec were present along with Knight Center staff members for this informative and entertaining talk!

Diana Marques in "The Women in Science" project

Diana Marques, Digital Media PhD student, from University of Porto, participates in "The Women in Science" project by Ciência Viva that features more than 100 Portuguese women whose careers are related to science. The project, which was released on March 8 in celebration of the International Women's Day, is composed of portraits of the selected women taken by five different photographers, and brief statements from each about their life and career in science. All images and accompanying texts can be seen on an interactive kiosk at the Pavilion of Knowledge in Lisbon as well as on a printed book published by Ciência Viva. The distinguished women represent the many specializations in science, from microbiology to space exploration, from chemistry to sociology, from computer science to science history; and their contributions to the advancement and distribution of human knowledge and their roles in society can one day inspire younger generations of explorers.

"I was honored to be invited to this project and contribute with a different angle to a career in science as a scientific illustrator and animator", Diana says. "For over ten years I've been inspired by scientists and have worked side by side with them and with publishers, museum professionals, journalists and many others to diffuse the scientific messages. Accompanying my portrait at the Women in Science project you can read "representing science with static and moving images is my profession and passion. As a visual communicator I aim to simplify and beautify the scientific words to captivate and to promote interpretations. The results are to be seen in a book or museum close to you".

Photo Credits_Clara Azevedo (Ciência Viva).

Digital Media PhD Graduates

PAULO ROSA

Thesis: Minimal Computation Structures for Visual Information Applications based on Printed Electronics

In the early nineties, Mark Weiser wrote a series of seminal papers that introduced the concept of Ubiquitous Computing. Accordingly to Weiser, computers require too much attention from the user, drawing his focus from the tasks at hand. Instead of being the centre of attention, computers should be so natural that they would vanish into the human environment. Computers become not only truly pervasive but also effectively invisible and unobtrusive to the user. This requires not only for smaller, cheaper and low power consumption computers, but also for equally

convenient display solutions that can be harmoniously integrated into our surroundings. With the advent of Printed Electronics, new ways to link the physical and the digital worlds became available. By combining common printing techniques such as inkjet printing with electro-optical functional inks, it is starting to be possible not only to mass-produce extremely thin, flexible and cost effective electronic circuits but as well to introduce electronic functionalities into products where it was previously unavailable. Indeed, Printed Electronics is enabling the creation of novel sensing and display elements for interactive devices, free of form factor. At the same time, the rise in the availability and affordability of digital fabrication technologies, namely of 3D printers, to the average consumer is fostering a new industrial (digital) revolution and the democratisation of innovation. Nowadays, end-users are already able to custom design and manufacture on demand their own physical products, accordingly to their own needs. In the future, they will be able to fabricate interactive digital devices with user-specific form and functionality from the comfort of their homes.

This thesis explores how task-specific, low computation, interactive devices capable of presenting dynamic visual information can be created using Printed Electronics technologies, whilst following an approach based on the ideals behind Personal Fabrication. Focus is given on the use of printed electrochromic displays as a medium for delivering dynamic digital information. Accordingly to the architecture of the displays, several approaches are highlighted and categorised. Furthermore, a pictorial computation model based on extended cellular automata principles is used to programme dynamic simulation models into matrix-based electrochromic displays. Envisaged applications include the modelling of physical, chemical, biological, and environmental phenomena.

The main contributions of this research work can be listed as:

- Contextualization of the potential of Printed Electronics and Personal Fabrication in driving Ubiquitous Computing;
- Development of task-specific, visual information applications using direct addressing and passive-matrix addressing electrochromic displays and open source hardware;
- Systematization of visual content types in electrochromic displays;
- Reframing of the use of Pictorial Entities as a tangible way of experimenting with complex systems through the use of matrix addressing electrochromic displays.

DORA SANTOS SILVA

Dora Santos Silva finished her PhD thesis, entitled "Cultural Journalism in a Digital Environment: New Models, Practices and Possibilities", which was approved unanimously with Very Good at FCSH/UNL in January 28th.

Here is her testimonial:

"My PhD was one of the most challenging and enriching experiences of my life. It was an opportunity to immerse myself in an area which I am passionate about and to discover so many others, to meet people with amazing research pursuits and enthusiastically engage with them, and to experience other academic realities.

My research proposed to examine how European media which specialize in culture or have an important cultural section are innovating in a digital environment. Specifically, I intended to see how these innovation strategies are being taken in relation to: the approach to culture and dominant cultural areas; the editorial model (content presentation and delivery, news values, genres and angles); the use of hypertextuality, multimediality, interactivity and other digital features to enhance long-form and short-form culture stories; brand identity, extensions and positioning in a digital environment; engagement with the public and "prosumers"; sustainable business models.

This was perhaps, to the best of my knowledge, the first systematic study on cultural journalism in the digital environment using a quantitative and qualitative approach to address the above-mentioned objectives and considering innovation as a motto or driver.

The first four chapters of the thesis are dedicated to the state of the art of the central concepts of the research: culture, cultural journalism, digital journalism and media innovation.

Chapter V addresses the research design. To answer eight research questions I conducted a mixed-methods study, combining case studies of four media projects, which integrates qualitative web features and content analysis with quantitative web content analysis. I selected as case studies two major general-interest journalistic brands which started as physical newspapers – The Guardian

(London, UK) and Público (Lisbon, Portugal) – a magazine specializing in international affairs, culture and design – Monocle (London, UK) – and a native digital media project that was launched by a cultural organization – Notodo, by La Fábrica.

Chapter VI shows the findings, which resulted from observations and collection of data between 1st January 2013 and 31st March 2015, and web content analysis from the same period with a total sample of 1372 journalistic pieces. The data method collection was complemented by face-to-face qualitative interviews with 16 professionals from the four case-studies mentioned, and by visits to their headquarters.

In the end, the findings suggest, on one hand, that we are witnessing a paradigm shift in culture coverage in a digital environment, challenging traditional boundaries related to cultural themes and scope, news values, genres, content delivery, engagement and business models. Innovation in the analyzed media lies especially along the dimension of product (format and content), brand positioning and process (business model and ways to engage with users). On the other hand, there are still perennial values that are crucial to innovation and sustainability, such as commitment to journalism, consistency (to the reader, to brand extensions and to the advertiser), intelligent differentiation and the capability of knowing what innovation means and how it can be applied, since this thesis also confirms that one formula doesn´t suit all. Changing minds, exceeding cultural inertia and optimizing the memory of the digital platforms, looking at them as living, organic bodies, which continuously interact with the readers in many different ways, and not as a closed collection of articles, are still the main challenges for some media.

Looking toward a promising future, I also include in the final chapter a set of good practices that have proven to be successful in the analyzed case studies. This is our contribution to Jeff Jarvis' famous question "Now that your Internet has ruined news, what now?"

As it was not at all a solitary experience, I would like to express my gratitude to all the people with whom I shared it, and especially my dear PhD advisor, Prof. António Granado, the inspirational Profs. Rosental Alves and Sharon Strover, all the editors and journalists from my four case-studies with whom I had the privilege to talk to, my PhD colleagues, my family and the UT Austin Portugal CoLab program itself."

FILIPE LOPES
Thesis: Musical composition with the space

My work has focused on issues that deal with a very popular field of study: Sound and Space. We all know that any musical work takes place at a specific time and place, so, what makes a musical work specific to a given location? Does it makes sense to embrace space in its expressive fullness? If yes, how to do it? My investigation presents a musical composition model in which space is deeply implicated in the creative and musical interpretative process. The word complicity is used to define the implication of space in the musical composition, indicating the idea of space and music being articulated but also envisaging numerous levels of engagement. Based on that idea, I defined what is musical composition in space, musical composition for space and finally musical composition with space. The latter represents the higher form of complicity and consists of three different but complementary phases: the repertoire of articulations, the systematization of the repertoire of articulations and the musical performance.

The PhD was a very important step in my academic life but also, and not least, in my personal, professional and compositional life. Definitely one of the hardest things I achieved with many ups and downs, nevertheless, very interesting. It was challenging to have to ask myself pertinent questions that do not have a single answer and need to be researched, as well as to prepare all the conceptual methodologies and practical work that could led me to come up with a robust hypothesis. To be able to create musical works to test the hypothesis I propose was very inspiring and one of the reasons I started this PhD. I had the pleasure of spending three months in Austin with my good friend Rui Dias and benefit from the help of Prof. Bruce Pennycook that, in addition to welcome us in a very generous and friendly way, provided me the contact with musical works that would shape my research method as well as very rich theoretical discussions. The UT Austin program was indeed very important in making a decision about where I would go to do my PhD as it was also very important the opportunity to work closely with my mentor Prof. Carlos Guedes.

About the future we know little but I think I made a very good decision to join this program. I have become much more critical about my creative work, my compositional ideas and interests, much more mature in how to solve problems and more aware of the exciting relationship regarding sound, music and space.

UPCOMING EVENTS

Futurália 2016

16-19 March

www.futuralia.fil.pt

ONGOING OPPORTUNITIES

FLAD Healthcare 2020 | 2016

Deadline – 18th March

http://www.flad.pt/aviso-flad-healthcare-2020-concurso-2016/

Joint Transnational Call of ProSafe CSA (Research and innovation projects in nanomaterials safety)

Deadline – 20th May

https://www.fct.pt/apoios/cooptrans/csa/prosafe/index.phtml.en

More opportunities in http://www.fct.pt/concursos/index.phtml.en

USEFUL LINKS

www.utaustinportugal.org www.fct.pt www.utexas.edu www.ic2.org www.ati.utexas.edu www.austin-chamber.org www.utenportugal.org

We want to hear from you! Want to share your doubts and concerns about something you read? Want to see other topics featured in next month's newsletter? Want to contribute with articles or art? Please send all your feedback to Carina Borges - cap.borges@fct.unl.pt

UT Austin | Portugal
International Collaboratory for Emerging Technologies, CoLab

THE UNIVERSITY OF TEXAS AT AUSTIN

FCT Fundação para a Ciência e a Tecnologia

June 2016

COLABSQUARE

UT Austin | Portugal International Collaboratory for Emerging Technologies, CoLab

JUNE | 2016 . NUMBER | 58

YOU CAN FIND IN THIS COLABSQUARE EDITION:

OPEN CALL – PLUNC 2016

NEW MEDIA AND DIGITAL ART FESTIVAL

PLUNC's second edition will take place in the riverine areas of Lisbon and Almada, between September 29th and October 2nd, 2016. The Open Call is now open until July 17th. You can submit finished projects, prototypes, ideas and original experiences in the realm of digital art and new media. Interactive projects that involve the public, either through the results or through interactive processes implicit in the execution. The selected projects will integrate the festival's exhibition. The call results will be announced on August 8th.

PLUNC 2016
OPEN CALL!

Deadline: 17 Julho

PLUNC

PLUNC wants to bring together artists and new media and digital art students, in order to showcase to the public projects that intersect art and technology, through exhibitions, workshops, talks, performances and round tables. PLUNC is an informal space of permanent dialogue and interaction between authors, their works, and the public. The first edition of the festival showcased works, and was attended by 32 artists, such as Zach Lieberman, Cuppetelli & Mendonza, André Sier, Els Viaene, Alex Rothera and José Carlos Neves. The festival is organized in collaboration with UT Austin | Portugal Program.

More information about the Open Call can be found here: http://bit.ly/1qFK1bq

SUMMER SCHOOL IN ADVANCED SCIENTIFIC COMPUTING

From June 20 to June 23 the University of Minho, Braga, will be hosting a Summer School in Advanced Scientific Computing.

This Summer School is targeted for researchers and PG students in:

- Computer Science, which aims to update their knowledge in development of efficient software that takes advantage of current multi-core and many-core processor architectures, and
- Computational Sciences, which aims to improve the efficiency of their end-user software, both at the algorithm and data structures level, to get more robust and faster code execution when using multi-core and manycore computing systems.

The School agenda follows a success program developed at the Texas Advanced Computing Center (TACC), which will be offered again this summer at TACC in August. All instructors from TACC will come to Braga to present their courses for the first time in Europe, with the support of TA's from U. Minho during the lab classes.

These lab classes will use computing resources at TACC, namely the world largest computer cluster open to the scientific community, Stampede, and in the top 10 in the TOP500 list.

Number of attendees is limited and registration is free and mandatory, through the form in the website.

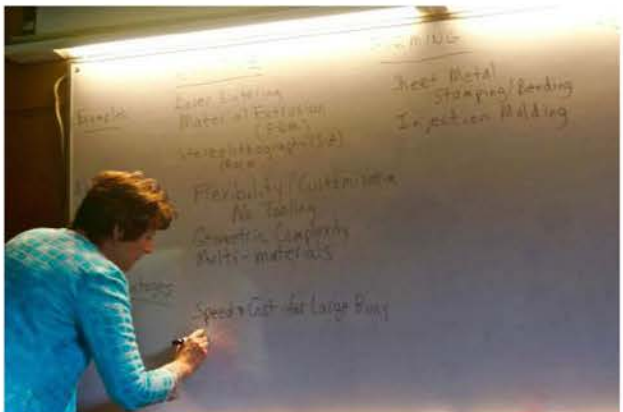
ADDITIVE MANUFACTURING SUMMER SCHOOL

The Additive Manufacturing (AM) Summer School under the auspices of the Emerging Technologies Initiative of The UT Austin | Portugal Collaboratory for Emerging Technologies, CoLab, was organized by Paula M. Vilarinho and Brian Korgel and took place at the Department of Materials and Ceramics Engineering of the University of Aveiro, from 6 to 7 June 2016.

The Director of the Department of Materials and Ceramic Engineering, Professor Mário Ferreira welcome the participants and strengthen the importance and timing of this School.

During 2 days approximately 40 participants coming from the Industry, Technological Centers and Academia were exposed to the basic principles of AM, the current state of AM as a processing technology and to what is predicted to be the future of this technology and how it is expected to shape the next 25 years of production.

Additive Manufacturing (AM), also known as 3D Printing, is a technology that has grown by double digits for the last 20 years and has garnered international interest in the last few years.



A moment during lecturing with Professor Carolyn Seepersad

The primary goal of the course was to provide sufficient information about AM for participants to evaluate where in their working activities the technology might make sense to employ. Upon completion of this course, the participants had a basic knowledge of all seven types of AM processes, the types of materials that are used for each, how to design for AM applications, how to evaluate the economic value of using AM in a manufacturing application and how the technology arose. The lecturers discussed the midterm and long-term future of the technology and where it is headed.

The lecturers are international recognised experts in the field. Carolyn Seepersad is an Associate Professor of Mechanical Engineering and General Dynamics Faculty Fellow at the University of Texas at Austin. Dr. Seepersad's research involves the development of methods and computational tools for engineering design and additive manufacturing. Her research interests include simulation-based design of complex systems and materials, design for additive manufacturing, innovation, and environmentally conscious design of products and energy systems. David Bourell is the Temple Foundation Professor of Mechanical Engineering at The University of Texas at Austin. He is currently director of the Laboratory for Freeform Fabrication. Bourell's areas of research include particulate processing with emphasis on sintering kinetics and densification, and materials issues associated with laser sintering (LS).

The course was designed for:

- Engineers, technical personnel and managers working in AM or contemplating moving into the field;
- Students, researchers and academics who want to AM have a basis for assessing AM and its utility in their business;
- Company decision makers who would like to have a basis for assessing AM and its utility in their business; (iv) any employee who wants to get up to speed with AM and to move past the hype into the reality of what AM has done and can do.

The course started with an overview of AM. Additive Manufacturing (AM), also known as 3D Printing (3DP) is a potent collection of manufacturing processes. They are economically applicable for certain types of manufactured goods and production runs. This overview described the rationale for using AM instead of a conventional manufacturing process for a given manufacturing run. Examples of broad application areas based on this rationale were presented. Followed by an overview of the AM processes, a detailed description of the seven ASTM categories of AM processes was presented. The manufacturing advantages and disadvantages were discussed. Society has become aware of AM in the last 2-3 years, but the technology as a whole is almost 30 years old. The history of AM was given from the viewpoint of the patent literature. Prior to active AM processing are AM precursors and AM prehistory. Precursors are AM technologies that were developed in the 1960s-70s before all the technical infrastructure was in place; thus, these technologies were not feasible for embodiment as commercial manufacturing equipment. AM prehistory dates back almost 150 years to two broad areas: layered manufacturing and photosculpture. The course continued with the presentation of materials for AM. Not every material can be printed on any AM equipment. Feedstocks must be shaped into the proper form to be processable on a specific piece of AM equipment. It must be amenable to required post-processing, and it must have acceptable service properties and metrology. This presentation reviews the commercial materials available for AM (polymers,

Group photo

metals, ceramics, composites) for each of the major AM technologies. AM service microstructure and properties will be presented and compared to those obtained using conventional manufacturing approaches. Design for AM was the following topic. AM removes many of the design constraints associated with molding, machining, and other conventional manufacturing processes, but it introduces its own set of design challenges. AM part designers must be aware of the accuracy and resolution limits of commercial AM machines, as well as the attainable part and material properties. The presentation described the latest design for AM guidelines for powder bed fusion and fused deposition modelling. Before concluding a perspective on the breadth of current AM was probed by presenting three diverse topics. These included a review of current ASTM/ISO standards related to AM and new standards under development. The repeatability and reliability of AM/3DP was considered using as a specific case the mechanical properties of laser sintered polyamide. Finally, novel application of AM was presented, which deal with conversion of digital photographs into AM back-lit images (lithophanes) and AM of metamaterials. For the conclusion of the course the future of AM/3DP was presented and discussed. AM is a rapidly growing and expanding field. The future of the technology was broken into two sections: a mid-term perspective of what will be happening in the next 3-5 years and a long-term perspective that includes organ printing and volume-based AM/3DP. Participants were also invited to engage in forward-thinking discussions of how AM/3DP can be applied to their own challenges. The course ended with a lively Round Table that discussed the questions raised by the participants.

A moment during lecturing with Professor David Bourell

By the end of the second day there was a visible excitement of the participants, looking forward to the continuation of the ideas and collaborations started during these days.

A movie promoting the workshop will be soon prepared.

DIGITAL MEDIA SUMMER INSTITUTE 2016

The 2016 edition of the Digital Media Summer Institute is already in motion. The tenth annual Summer Institute offers students and professionals in Lisbon and Porto the opportunity to explore a variety of digital media topics, with renowned instructors and alumni from the University of Texas at Austin providing intensive short courses in May, June and July.

This year's Summer Institute started May 25-27 with a workshop with Professor Sharon Strover (UT Austin Dept. of Radio, Television and Film), at FCSH/UNL, entitled "Research Methods for Digital Media". In this workshop, organized as a seminar with intensive attention to students' research interests, participants had the opportunity to examine fundamental premises of research design and approaches for working with digital media projects and issues. Core topics included: the conceptualization process; writing research questions; thinking about causality; alternative design options.

Professors R.B. Brenner (UT Austin Dept. of Journalism) and Cameron Blake (Washington Post) gave a workshop at Porto (University of Porto, June 3) and Lisbon (FCSH/UNL, June 6-7) about "Virtual Reality, 3D and Journalism".

All interested can still attend the upcoming courses, namely "Business Plan Development for the Videogame Industry", take will take place at University of Porto and will be divided in two parts:

"Entrepreneurial Finance" (with Heidi Toprac, June 20-23) and Part II: Start UP and Greenlighting (with Paul Toprac July 5-8). This two-part course will guide students through the process of developing a business plan. It will help students define and describe their product, their management team, as well as their sales, marketing, operations and development plans. In addition, students will learn how to forecast their game's financial results, and incorporate their forecasts into their business plans. The

course will help students understand the potential sources of funding that may be available, and how they should present themselves and their ideas to potential investors.

Professor Heidi Toprac will address the following concepts:

- Company and Management: Management Team, Sources of Funding, Term Sheets
- Financial Plan: Revenue and Expenses Forecast
- Financial Plan: Balance Sheet and Ratios
- Financial Plan: Cash Flow, Payback, Breakeven
- Elevator Pitches

And after a one-week break, Professor Paul Toprac will lead the students through the following:

- Product and Services: Description, Validation, Roadmap
- Market Analysis: Market Segmentation, Growth, Future Potential, Competition
- Go to Market Strategy: Sales and Marketing Plan, Milestones, Key Metrics
- Wrap Up: Executive Summary, Putting All Together, How to Present
- Game Pitches

From June 27 to July 1, at FCSH/UNL Craig Watkins (UT Austin Department of Radio, Television and Film) will lead a workshop on "Innovation & Creative Cities: Remaking the Innovation Economy". This class is organized as a research workshop and practicum. The course will be organized, in part, like a design studio (i.e., open

Virtual Reality, 3D and Journalism workshop

dialogue & brainstorming, visualizing ideas, designing research protocols, and pitching ideas for a final project). The primary aim is to design a research study of the creative practices among artists, designers, hackers, entrepreneurs, etc. in Lisbon. Students will design and conduct test interviews and/or observations of the creative processes and spaces that support it. In addition, the workshop can involve mapping the mix of spaces and settings (i.e., co-working spaces, informal labs, studios) that have become the sites for digital media makers, social innovators, and creative workers looking to create their own social, occupational, and economic opportunities.

Finally, the Open School for Digital Transformation, at Porto, will receive various speakers and workshops, from July 14 to 16.

DIGITAL MEDIA UT AUSTIN FACULTY VISITS M-ITI

UT Austin Professors Sharon Strover and Joe Staubhaar visited, May 31st, the Madeira Interactive Technologies Institute (M-ITI), and gave two lectures on Digital Media.

Professor Staubhaar addressed students and faculty at M-ITI on "Social Class and Television in Latin America - the Rise of a New Lower Middle Class, a Growing Cosmopolitan Elite, and Their Impacts on Program Preferences and New Television Technology Use."

Professor Strover presented on "The Value of Making Connections: Rural Regions and the Internet". This visit was covered by local press, with a newspaper article and a TV piece at RTP Madeira.

6 Madeira

PERGUNTAS A...

Joseph Straubhaar

Media digitais suscitam interesse no M-ITI

INVESTIGADORES VISITARAM O M-ITI E PROFERIRAM CONFERÊNCIAS TEMÁTICAS

Local press coverage

UT AUSTIN PORTUGAL ANNUAL CONFERENCE IN LISBON

The UT Austin Portugal program held its Annual Conference at the Rectorate building of the New University of Lisbon, May 23 and 24.

With near 200 participants, this two days event brought together students, professors, investigators and leaders from Portugal and USA institutions, covering all areas of the Program - Advanced Computing, Applied Mathematics, Digital Media and Emerging Technologies - to present Program's achievements and discuss Future developments. The event opened with the welcome remarks by António Rendas (rector NOVA), Fernando Santana (UT Austin Portugal National Director), Marco Bravo (UT Austin International Director), Robert A. Peterson (UT Austin PI), Robert A. Sherman (US Ambassador), António Cunha (President CRUP), Paulo Ferrão (President FCT) and Manuel Heitor (Minister of Science, Technology and Higher Education).

The four areas of the Program present their achievements concerning courses, events, projects, students, startups, etc. Moderated by João Sentieiro, these panels, that had more than 20 speakers, where an exciting opportunity for the audience to know all the work that has been developed in all areas of the Program, namely concerning courses, workshops, student's work and research activities.

The second day started with a roundtable with entrepreneurs associated with the UTEN Global Startup Program. With moderation by Greg Pogue companies representatives presented their statements about the challenges of going global and debated this issue with other invested discussants.

Following was a roundtable discussion about future Program developments, moderated by Miguel Castanho (Vice-President FCT), with statements from Nicholas Peppas (UT Austin), Thomas J. R. Hughes (UT Austin), Amílcar Soares (IST), Fernando Lau (IST) and also the discussants Lars Montelius (INL), José Manuel Mendonça (FEUP/INESC TEC) and Heitor Alvelos (FBAUP).

Closing the event Robert A. Peterson did a summing up of the achievements and future presented and discussed at the Conference and Fernando Santana, Marco Bravo, Miguel Castanho and Maria Fernanda Rollo (Secretary of State for Science, technology and Higher Education) address the closing remarks for the audience.

Almost two hundred participants filled the UNL Rectorate Auditorium

Roundtable with entrepreneurs

Welcome remarks at the Opening Session

STUDENTS AND INVESTIGATOR'S POSTERS AND DEMOS

A total of 45 Posters and 8 Demos were presented at the UT Austin Portugal Annual Conference, as a result of the Call for Posters and Demos published for this purpose. These reflected student's and investigator's work from all areas of the Program - Advanced Computing, Applied Mathematics, Digital Media and Emerging Technologies -, both from Portugal and UT Austin universities and research centres.

A student presenting his Demo

A total of 45 Posters were presented

ADVANCED COMPUTING SHORT COURSE ON ISOGEOMETRIC ANALYSIS

On May 25th, Professor Thomas J.R. Hughes from the Institute for Computational Engineering and Sciences (ICES, UT Austin) gave a short course on Isogeometric Analysis at the Instituto Superior Técnico, University of Lisbon.

Isogeometric Analysis (IGA), as Prof. Thomas J.R. Hughes explained, aims to overcome the major bottleneck in the engineering design-through-analysis process: the conversion of Computer Aided Design (CAD) systems in which industrial designs are encapsulated, to analysis-suitable formats from which finite element meshes can be developed and Finite Element Analysis (FEA) programs can be used for the computational simulations. This still remains, until now, an enormous obstacle to the efficiency of the overall engineering product development cycle.

During the Short Course, Professor Thomas J.R. Hughes described how this new approach, based on rich geometric descriptions from CAD, might lead to a single geometric model that serves as a basis for both design and analysis.

This technique, suggested ten years ago, is rapidly becoming a new paradigm for geometric design and a mainstream analysis methodology, which is now supported by a new theoretical foundation for FEA.

More than 50 participants coming from both academic and private institutions, from all over the country, participated in this six hours Short Course where an extended introduction to IGA was given, from the very basic tools and methods, to complex applications in linear and nonlinear elasticity, fluids and fluid-structure interaction.

The course ended with a description of several open problems, representing opportunities for future research.

This Course was integrated within the collaborative research activities involving the groups of Prof. Thomas J.R. Hughes and Prof. Adélia Sequeira from the Instituto Superior Técnico. It followed the UT Austin|Portugal Annual Conference 2016, on the 23rd and 24th May.

PORTUGUESE AMBASSADOR DOMINGOS FEZAS VITAL VISITS AUSTIN

On April 26-27, Domingos Fezas Vital, the Portuguese Ambassador to the United States, visited Austin and The University of Texas. The Ambassador was accompanied by Rui Boavista Marques, Trade and Investment Commissioner of aicep Portugal Global.

While at the University, the Ambassador met with CoLab Principal Investigator Robert Peterson, UTEN Portugal Director Marco Bravo, and members of the UTEN team to learn about their work supporting business development by Portuguese companies through the UTEN Global Startup Program.

The conversation touched on recent growth in Portuguese exports to the US, international successes by Portuguese companies in the financial security and cleantech sectors, the upcoming Web Summit in Lisbon, and potential city-to-city relationships between Austin and cities in Portugal. The Ambassador also met with CoLab academic directors Sharon Strover, Keshav Pingali, and Brian Korgel and a number of Portuguese graduate students to learn about CoLab's ongoing research and education activities.

Other stops during the Ambassador's visit included Austin City Hall to meet with Mayor Steve Adler and Economic Development Director Kevin Johns, and a meeting with Texas Governor Greg Abbott.

Ambassador Domingos Vital with Governor Greg Abbott

TALKS: THE FUTURE OF JOURNALISM AT FCSH/NOVA

Experts in journalism and in its future have been joining in Lisbon to discuss who will be making journalism and with what technology, resources and mindset.

The first session, on April 15th, was dedicated to the challenges that journalists will face in the future, with particular emphasis on cultural journalism and digital environment. The Spanish journalist Alfonso Armada and the cultural producer and former journalist/editor António Mega Ferreira were the guests in a debate moderated by Dora Santos Silva, alumna of the Digital Media program.

In the second session of Conversations on the Future of Journalism, on 6th June, the protagonists were virtual reality and other emerging technologies applied to the media. "What will be the future of journalism" marked the starting point of the debate between R. B. Brenner, Director of the School of Journalism at the University of Texas at Austin, and journalist for over 30 years, António Câmara, founder of Ydreams, and Cameron Blake, prototype engineer at The Washington Post, with moderation of Paulo Nuno Vicente, alumnus of the Digital Media program and iNOVA Media Lab coordinator, a digital creation lab and spin-off of the UT Austin Digital Media program, located at FCSH/NOVA. This initiative is co-organized by iNOVA Media Lab, Bagabaga Studios and José Saramago Foundation, with the support of UT Austin | Portugal CoLab, Instituto Cervantes, Fundacion Gabriel García Márquez para el Nuevo Periodismo Iberoamericano (FNPI) and Antena 1.

The future of journalism will be discussed again in another two sessions until December 2016.

DIGITAL MEDIA DOCTORAL STUDENTS' NEWS

Exploratory visitors in Austin

UT Austin received in April visiting researchers Luciano Moreira (FEUP) and Claudia Pernencar (U. NOVA). They both were extremely proactive in setting up meetings with faculty. Luciano had extensive interactions with Dr. Joan Hughes in the College of Education. Claudia made some new and important connections with the Dell Medical center for her research in Mobile tracking data using biochips and wearables. Also, Professor Jorge Martins Rosa from FCSH/UNL visited the DM program in April. During his stay he toured the campus, visited the Vis-Lab and attended the UT3D showcase of movies. He also strengthened his ties to faculty and discussed strategies to further develop the partnerships within the DM PhD program. He has begun the first steps toward a future application for a collaborative research project on social networks.

Professor Sharon Strover with Luciano Moreira and Cláudia Pernencar

Patricia Nogueira also visited Austin for three months and found herself immersed in a fruitful and insightful environment. She audited courses, expanded her reading references, and interacted with a number of film students and filmmakers.

Horácio Tomé-Marques at MTF - Music Tech Fest, Berlin

Student Horácio Tomé-Marques participated this May in one more edition of MTF - Music Tech Fest, this time in Berlin at the Funkhaus, the historical former RDA Radio Studios.

Besides doing a final presentation of the project/ performance FindingSomething BondingSound / WhiteMatter (by Horácio, Francisco Marques Teixeira and Fanni Fazakas) for the MusicBricks Incubation Award, he, with his friend and MuARTs partner Francisco and other international participants (artists, fashion designers and tech geeks from institutions such as Ars Electronica and MIT Media Labs) participated in the Transhumanism Performance Lab, facilitated by Jasmine Idun and Peter Kirn. In about five days, the group managed to create, produce and put on stage a special show for and with Viktoria Modesta, considered the first bionic pop artist.

Between brainstormings, conceptual possibilities, art essence's discussions, last generation sensors, high-tech artefacts, conductive paints, etc., they worked on software and hardware that allowed them to capture Viktoria relaxation and concentration brain states and used these states to control sounds and lights — breath like sounds and blue lighting when she was more relaxed and a pop like sounds and red lighting when she was focused and more concentrated. The performance also has included sensors such as movement detectors.

Transhumanism Performance Lab Team

When at exploring new concepts and ideas — also responding to one of the aims of the MTF hack labs, which is to create and propose technology for the future of the arts —, Horácio even designed a new brain computer interface focused on usability and easiness for performative events contexts (arts, fashion, etc) via hacking an used and broken interface.

Horácio also was a facilitator of the #AIOTILabs [promoted by MTF and the EU Alliance for Internet of Things Innovation, AIOTI.eu]

"Um quotidiano / an everyday"

"What speaks to us, seemingly, is always the big event, the untoward, the extra-ordinary (...) How should we take account of, question, describe what happens every day and recurs everyday: the banal, the quotidian, the obvious, the common, the ordinary, the infra-ordinary, the background noise, the habitual?"

Georges Perec

"um quotidiano / an everyday" is a participatory mobile photography project, initiated during the artist residency of Cláudio Reis, organized by Porto Lazer, at the arts venue Av. Espaço Montepio, Porto, Portugal, from March 30th to May 7th.

We are all photographers this day and age; we all carry along in our pockets a camera camouflaged as a phone. Above all, we all have a unique gaze over things surrounding us.

Aiming to materialize this collective gaze, "um quotidiano / an everyday" launched an open-call through social media asking for people to share with the project pictures of their everyday, providing as a possible reward the publication of a selection of pictures across the project's social media platforms, and the inclusion in the residency's group exhibition.

"um quotidiano / an everyday" collected during the residency period a total of 659 pictures, from 123 participants, representing 29 countries.

While the online publishing procedure, still active today, tentatively inquires the curatorial pattern of "feature accounts", experimenting how to maintain a visual balance capable to motivate both photography-committed users and casual photographers to participate, the selection procedure for the group exhibition at Av. Espaço Montepio followed a different approach.

The exhibition design sought to provide a distinct user experience, whereby the collection of pictures was transposed to the physicality of print-based media, shifting the velocity of reading a digital feed of pictures to the more contemplative relation established toward paper and ink.

Designed in close rapport with the architecture of the exhibition venue, the selection of photographs was printed in small formats, reminiscent of Polaroids – an instant film format closely linked to the immediacy of photography produced through contemporary mobile communication devices – while introducing reading disruptions in comparison to the prevalent online viewing patterns of platforms such as Instagram.

After the successful opening of the collective exhibition at Av. Espaço Montepio, "um quotidiano / an everyday" now continues online through social media platforms Facebook, Instagram and Tumblr.

www.facebook.com/umquotidiano
www.instagram.com/umquotidiano
umquotidiano.tumblr.com
www.umclaudio.com

PhD Conclusions

CLÁUDIA SILVA
Tittle: Expanding Participation in Locative Media among and about Latinos/as in Austin, Texas
Defense day: May 19th 2016
Grade: Unanimously Very good

Being born and raised elsewhere, and receiving a Ph.D. that started in Portugal and developed in the United States was a unique experience. It enabled me to expand my cultural and social capital substantially and, overall, it was a great preparation for my international career development. The four years at the University of Texas at Austin taught me the perks of collaborative research work, which was eye-opening to me, as I interacted with peers from different fields. Those four years also allowed to become somewhat familiar with that locality.

In fact, my research was done entirely with local communities in Austin, in the field of location-based media, under the steady guidance of Professor Joseph Straubhaar. Until recently, studies of locative media had predominantly focused on the experiences of those who are already familiar with

the online world and have the right skills to take fully advantage of GPS-enabled phones. My research shifted this focus to investigate participation in the general use of locative media and, specifically, in the production of locative storytelling by focusing on Latino, low-income and low-end smartphone users.

Access to mobile technologies is no longer an issue for this group, as they are heavy users of smartphones and have been considered the audience of the future in regards to digital media in the U.S. Despite all this evidence, research about Latinos and locative media is scarce. My research tried to fill this gap in the literature. Thus, my dissertation addressed the broad question of "how locative media may foster awareness about local history, of unknown or forgotten information, and social events among and about Latinos/as in a place that faces historical spatial segregation." In order to respond this question, a set of ethnographic and qualitative techniques mixed with a multiple-case study were used as a method.

One of the main contributions of this work to the field is the proposition of the term "spatial participation gap", which I define as the unequal access to spaces and hybrid spaces and the inability, due to social constraints, to change spaces into places. What this concept attempts to convey is the need to address the inequalities in regards to space and place and its effects on the creation of locative content. Taking into account that locative technologies such as smartphones are becoming increasingly widespread, it is urgent to address this gap and understand its specificities. What can we do to create means that low-income populations and newcomers to a city become able and motivated to fully explore the public and physical space more equally? In the discussion chapter, I offer a set of suggestions to approach the challenges of the spatial participation gap. Other findings are:

- It is not the number of years of residence in a certain place that makes one very knowledgeable on her/his locality.
- Locative storytelling may be better adopted if integrated with everyday activities.
- Usability is fundamental to increase participation in the production of locative content.

Looking forward, I intend to pursue this line of research and deepen my research skills under a Postdoc researcher position, somewhere in the world where I have not been yet.

GEORGE SIOROS

My approach to music creation has always been an interdisciplinary one, often combining knowledge from computer science, music cognition and musicology. My doctoral thesis entitled "Syncopation as Transformation" revolves around the subject of automatic generation and analysis of musical rhythm. Syncopation is a rhythmic phenomenon present in various musical styles and cultures. During this research, I developed a set of simple rhythmic transformations that can serve as a formalized model for syncopation for the purposes of generation and analysis of music. The transformations are based on fundamental features of the musical meter and syncopation, as seen from a cognitive and a musical perspective. Based on this model, rhythmic patterns can be organized in tree structures where patterns are interconnected through simple transformations. The model was applied in the design of three listening experiments that explore the relation between syncopation and groove, i.e. the sensation of wanting to move when listening to music. Besides the development of the theoretical concepts, I developed a software application of the model for the creative exploration of rhythms during a music performance. It generates variation in a real-time music input, such as an audio input or MIDI "clips", by automatically "shifting" notes off or on the beat.

UPCOMING EVENTS

- Summer School in Advanced Scientific Computing
  20-23 June, 2016

  University of Minho, Braga

  http://www.di.uminho.pt/SS-AdvSciComp16/

ONGOING OPPORTUNITIES

- Transnational Joint Call 'Digging Into Data Challenge'
  Trans-Atlantic Platform for the Social Sciences and Humanities (T-AP)

  Deadline for submission of proposals: June 29

  For more information: https://www.fct.pt/apoios/cooptrans/csa/tap/index.phtml.en

MORE OPPORTUNITIES can be found at FCT website: http://www.fct.pt/concursos/

USEFUL LINKS

www.utaustinportugal.org www.fct.pt www.utexas.edu www.ic2.org www.ati.utexas.edu www.austin-chamber.org www.utenportugal.org

We want to hear from you! Want to share your doubts and concerns about something you read? Want to see other topics featured in next month's newsletter? Want to contribute with articles or art? Please send all your feedback to Carina Borges - cap.borges@fct.unl.pt

UT Austin | Portugal
International Collaboratory for Emerging Technologies, CoLab

The University of Texas at Austin

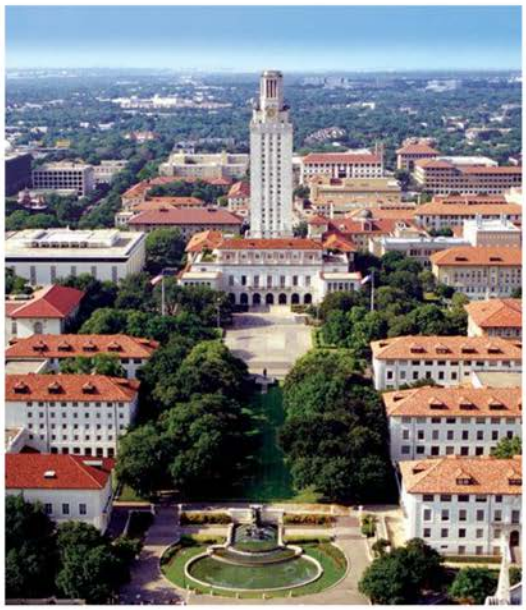
FCT Fundação para a Ciência e a Tecnologia

September 2016

COLABSQUARE

UT Austin | Portugal International Collaboratory for Emerging Technologies, CoLab

SEPTEMBER | 2016 . NUMBER | 59



YOU CAN FIND IN THIS COLABSQUARE EDITION:

WORKSHOP – MATHEMATICS OF COMPLEX SYSTEMS

The CoLab Workshop "Mathematics of Complex Systems: from precision medicine to smart cities" will be held at the Department of Mathematics of the University of Coimbra, Portugal, on December 5-6, 2016. The aim of the workshop is to bring together scientists and researchers who wish to be involved in the emerging field of complexity theory, in particular in the understanding of the nature and the behaviour of complex systems, such as cities or cells. Another goal of the event is to promote collaboration and facilitate communication between members of the different areas of the UT Austin - Portugal community.

Registration is free and includes access to all the sessions and the coffee breaks. We welcome submissions for a limited number of minisymposia or contributed talks.

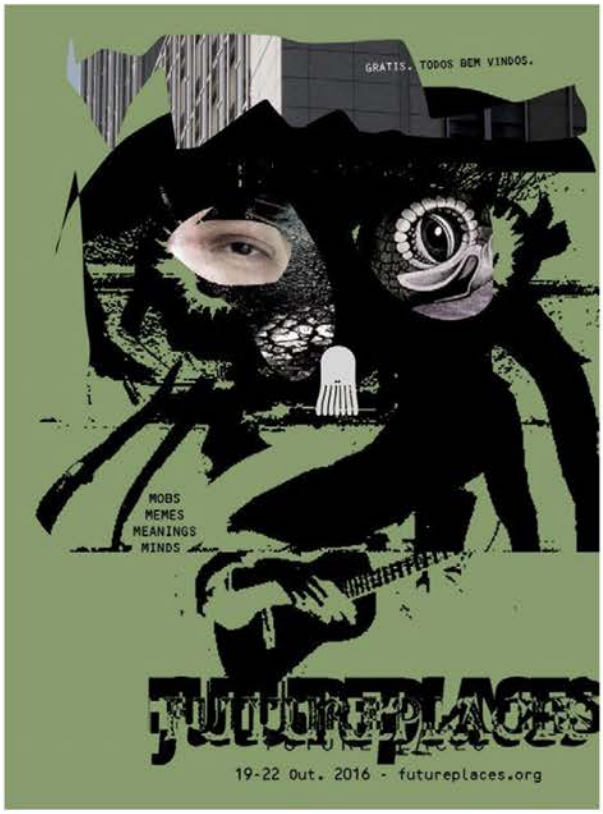
- **Website:** http://www.mat.uc.pt/colab2016/
- **Scientific Committee:** A. Araujo (CMUC), L. Caffarelli (UT Austin), I. Gamba (UT Austin), J.M. Urbano (CMUC), J. Videman (IST-UL)
- **Local Organizing Committee:** A. Araujo (CMUC), J. Gouveia (CMUC), R. Barreiro (IP-Setúbal), V. Quítalo (CMUC)
- **Sponsored by:** UT Austin - Portugal Program and CMUC (Centre for Mathematics, University of Coimbra)

FUTUREPLACES 9TH EDITION

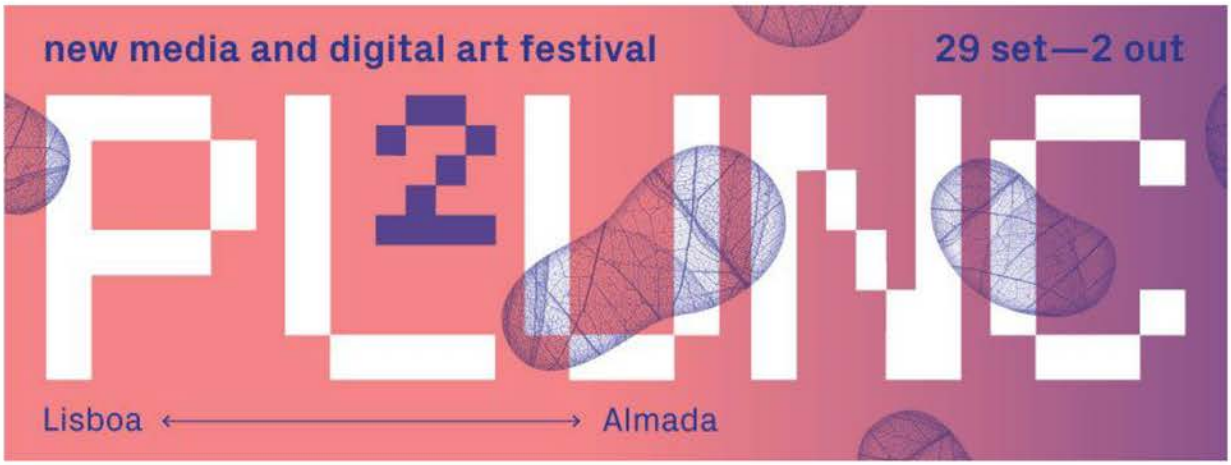
FUTUREPLACES, medialab for citizenship, is back for its ninth consecutive edition: October 19-22.

Free events and activities include a keynote lecture by Patricia Aufderheide ("Collaborative Creativity: How to Share the Challenge of Imagining the Future"), the Digital Media Doctoral Symposium, workshops in partnership with the University of Porto's Digital Museum and the Ephemera Archive, a historical exhibition of student activist documentation, and a footnoted film screening of Dolores Wilber's performance "147 pianos", documenting a 2013 recital at Lukas Piano Service on Chicago's west side where close to 200 musicians played piano scores all together, all at once.

A full list of activities and the full program can be accessed at futureplaces.org



PLUNC RETURNS SEPTEMBER 29TH



The 2nd edition of PLUNC - New Media and Digital Art Festival takes place between 29 September and 2 October 2016. Four days of a festival that presents to the broadest possible audience, projects and works that merge and intersect art and technology through exhibitions, workshops, talks and performances.

In this second edition, we sought to stabilize and optimize the structure and concept of PLUNC festival, solidifying the roots planted in the first edition, in order to allow its growth in future editions and affirm the festival in the national and international scene.

MANUELA FERNANDES AWARDED IN THE JUNIOR EUROMAT CONFERENCE

Manuela Fernandes, Ph.D student of the Advanced Materials and Processing doctoral program (AdvaMTech) at the Department of Materials and Ceramic Engineering, was awarded by Alemnis GmbH at the 13th FEMS Junior Euromat Conference, as the best oral presentation in the area of functional materials. The conference was held in Lausanne, Switzerland, from 10 to 14 July, 2016.

The work entitled "Microstructural evolution of K0.5Na0.5NbO3 thin films by in-situ TEM sintering", was developed between the University of Aveiro, with supervision of Ana Senos and Paula Vilarinho, and the University of Texas at Austin, with supervision of Paulo Ferreira, within the UT Austin|Portugal program.

UT AUSTIN PORTUGAL PROGRAM AT CIÊNCIA2016

The UT Austin Portugal Program participated in the national conference Ciência 2016, in Lisbon, from July 4 to 6.

Fernando Santana, UT Austin Portugal National Director and Professor Teresa Romão (FCT/UNL) presented the UT Austin Portugal Program and the Digital Media PhD Program in a session that gathered all FCT (Fundação para a Ciência e a Tecnologia) supported Portuguese international partnerships with American universities – UT Austin, CMU and MIT.
All presentations are available at the Ciência 2016 website: http://www.ciencia2016.pt/

Professor Teresa Romão presenting @ Ciência 2016

Several UT Austin Portugal PhD students and investigators had the opportunity to showcase their research work, namely João Barroso (UTAD; PI of the CE4BLIND: Context extraction for the blind using computer vision project), Rui Avelans Coelho (FCSH/UNL - Digital Media PhD student) and Inês Rodolfo (FCT/UNL – Digital Media PhD student) and Gonçalo Dias da Silva (FCT/UNL Graduate student) and several other students participated by sending posters of their work.

With more than 4400 registered participants, 200 institutions, 334 speakers, 523 posters, 74 sessions and debates about technology and science and 7 plenary sessions, this meeting aimed to gather the scientific community in an open presentation and discussion of the major issues, results and questions in today's international debate and that characterize the technological and scientific activity in Portugal.

SUMMER SCHOOL IN ADVANCED SCIENTIFIC COMPUTING AT U. MINHO

The University of Minho hosted the Summer School in Advanced Scientific Computing in June 20-23, at Campus de Gualtar, Braga. The Summer School gave the scientific community the opportunity to make contact with some of the most recent resources and technologies in advanced computing. This event welcomed 60 researchers mainly from Portugal, but also from Spain, England, and Germany.

Afterwards, the Summer School in Advanced Scientific Computing was a week-long workshop which introduced researchers, faculty, staff, students, and industrial partners to high performance computing, data analytics, and scientific visualization. This event was appropriated for all skill levels, from new users of advanced computing technologies to those who have research projects requiring powerful computing, visualization, storage or software capabilities.

The attendees should be motivated to take advantage of modern computer architectures based on an increasing number of CPU cores to better explore their potential.

Technology experts from the Texas Advanced Computing Center (https://portal.tacc.utexas.edu/training/summer-institute) have taught attendees on how to effectively use advanced computing resources and technologies like Stampede, Maverick, and Wrangler.

The course and lab classes in this Summer School were taught by experts in High Performance Computing (HPC) from TACC, from the University of Texas at Austin, with experience in similar courses.

This lecture team was composed by Dave Semeraro, João Barbosa, Todd Evans and Victor Eijkhout. Noteworthy, this edition featured a talk from Intel expert Harald Servat, who brought to us details on the new 36 dual-core Xeon Phi aka Knights Landing. Moreover, this Summer School was a unique opportunity in Europe and the contents were very close to those that TACC staff taught on the TACC Summer Supercomputing Institute, using the same course and training materials and accessing the same remote HPC resources at TACC.

More info:
http://www.di.uminho.pt/SS-AdvSciComp16

DIGITAL MEDIA DOCTORAL STUDENTS' NEWS

PhD Conclusions

EDUARDO M. PEREIRA
Thesis title: Humans in Action at Different Levels: the group, the whole, and the parts.
Defense day: July 4, 2016

My dissertation provides a bird-eye of the ecosystem of human activity analysis in computer vision by suggesting the categorization of actions in three different levels, the group in the scene, the whole in the frame, and the parts in the body, defined by the domain settings in which the application resides. We look for an intermediate characterization that provides a natural bridge between the type of content of the application, i.e. the perceptual inputs, and the application needs, i.e. the inferences. Therefore, my thesis investigates motion and relational-context representations, as the perceptual inputs, to support the modelling and detection of human action at each defined level, as the inferences.

The research was conducted under three domain settings, surveillance, multimedia and behavioral, which support the context and research gaps to tackle: i) efficient global motion representation for different surveillance scenarios; ii) individual and collective representations for social behavior analysis in surveillance scenarios; iii) importance of motion to identify relevant movement and integrate contextual information into multimedia video classification; iv) combination of motion features that capture expressiveness intention and characterization in non-verbal communication scenario. This PhD provided me the unique opportunity to work with top-level researchers around the world, namely USA, Canada, Colombia and Japan, and explore different approaches of computer vision and machine learning regarding the analysis of human activity. Thanks to my work, nowadays I'm working as a Senior Research Scientist in one of the biggest company in the world, namely UTRC in Cork, Ireland, where I'm continuing my research topic applied to very demanding and real problems.

SANDRA COELHO (FEUP)
Thesis Tittle: The exaltation of a sense - haptic art
Advisor: Miguel Velhote Correia (FEUP)

UPCOMING EVENTS

- **PLUNC**
  29 September – 2 October
  Almada and Lisbon

  www.plunc.pt

- **FUTUREPLACES**
  October 19-22
  Porto

  www.futureplaces.org

- **WORKSHOP: MATHEMATICS OF COMPLEX SYSTEMS**
  December 5-6
  University of Coimbra

  www.mat.uc.pt/colab2016/

ONGOING OPPORTUNITIES

- **2016 Call for Doctoral Scholarships in DM at U.Porto**

  Deadline: September 26

  More information: http://www.up.pt/pdmd

MORE OPPORTUNITIES can be found at FCT website: http://www.fct.pt/concursos/

USEFUL LINKS
www.utaustinportugal.org www.fct.pt www.utexas.edu www.ic2.org www.ati.utexas.edu www.austin-chamber.org www.utenportugal.org

We want to hear from you! Want to share your doubts and concerns about something you read? Want to see other topics featured in next month's newsletter? Want to contribute with articles or art? Please send all your feedback to Carina Borges - cap.borges@fct.unl.pt

UT Austin | Portugal
International Collaboratory for Emerging Technologies, CoLab

The University of Texas at Austin

FCT Fundação para a Ciência e a Tecnologia

2016: ACTIVITIES REPORT

UT Austin | Portugal

International Collaboratory for Emerging Technologies, CoLab

Research Collaboration between Portuguese Scientific Institutions and The University of Texas at Austin

www.utenportugal.org

Coordination: Marco Bravo and Robert A. Peterson, The University of Texas at Austin

Editors: Marco Bravo and Robert A. Peterson, The University of Texas at Austin

Design & production: Francisca Aroso Pinto de Oliveira, The University of Texas at Austin

Content and photographs were contributed by Adélia Sequeira, Alberto Proença, Alexis Schrubbe, António Coelho, Brian Korgel, Carlos Guedes, Carina Borges, Cecilia Garrec, Coral Franke, Donald Fussell, Fernando Santana, Fernando Silva, José Urbano, João Grilo, Juha Videman, Keshav Pingali, Marco Bravo, Nuno Correia, Paula Vilarinho, Paulo Ferreira, Pedro Madeira, and Sharon Strover.

Similarly the efforts of many were needed to coordinate the activities and events described in this report. Our appreciation goes out to all, as well as to you, the reader.

PRODUCED BY

TEXAS
The University of Texas at Austin

WHAT STARTS HERE CHANGES THE WORLD

THE UNIVERSITY OF TEXAS AT AUSTIN

FCT Fundação para a Ciência e a Tecnologia
Ministério da Ciência, Tecnologia e Ensino Superior

CRUP Conselho de Reitores das Universidades Portuguesas