5th Year CoLab Report

CoLab Programs at UT Austin

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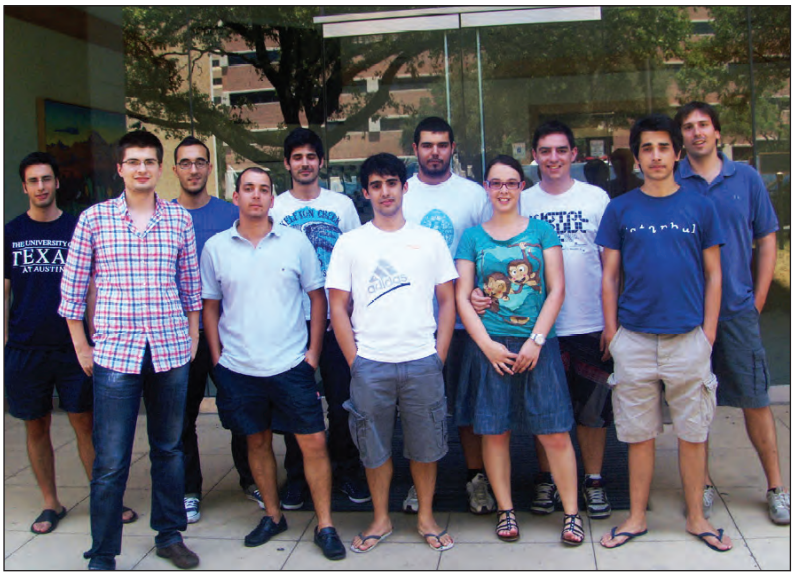

UT Austin | Portugal

International Collaboratory for Emerging Technologies, CoLab

Cover photos:
ROW 1: *Advanced Computing summer interns, Future Places workshop*
ROW 2: *Doctoral Symposium, Digital Media doctoral students on exploratory visit*

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ROW 1: *Ana Margarita Barreto (Digital Media Leadership Program); Sara Moreira (ISDT student); Hugo Machado (PhD in Digital Media student); Soraia Ferreira (PhD student on exploratory visit);* ROW 2:*Tiago Gama Rocha (PhD student on exploratory visit); Claudia Pernencar ((PhD student on exploratory visit); Ioli Campos (Digital Media Leadership Program); Afonso O'Neill (Visiting Doctoral student); Jasmina Stoyanova (PhD in Digital Media student);* ROW 3: *Ana Cabral Martins (PhD in Digital Media student); Carlos Oliveira (PhD student on exploratory visit);Teresa Vieira (Digital Media Leadership Program); Carlos Figueiredo (PhD student on exploratory visit).*

Digital Media

Executive Summary

In its fifth year, the UT Austin | Portugal Digital Media Program continued to build on its successes in establishing digital media as a significant field of activity in Portugal. We believe that the efforts of the program have laid the foundation for innovative educational programs and established durable networks of researchers and practitioners that extend not just between Portugal and Austin, but across the world. This report outlines the accomplishments of the program in the 2010-2011 academic year. Some of the highlights of Year 5 include:

- Continued research into a broad range of digital media topics, leading to 28 published journal articles in Year 5 alone, as well as a best paper award at an ACM conference
- A second class of digital media PhD students at both U.Porto and UNL, educating 24 new students across both universities
- Eleven specialty courses in Portugal taught by UT faculty and experienced digital media professionals from Austin
- The Gary Chapman International School on Digital Transformation, which in its third year saw its most successful event ever, raising awareness of the positive social potential of digital communication technologies
- The Future Places digital media festival, which brought internationally recognized multimedia artists to Porto
- An internship program that not only gave six Portuguese valuable professional experience, but also raised the profile of Portugal among digital media organizations in Austin
- Facilitation of exchanges of experts between Portugal and Austin, which led to three presentations by Portuguese researchers at South by Southwest Interactive, one of the world's largest technology conferences
- Further outreach to the general public through participation in events such as the U.Frame and Monstra film festivals and the sponsorship of a film series at the Cinemateca Portuguesa

Over the past five years, the UT Austin | Portugal Digital Media has catalyzed an incredible amount of activity related to digital media in Portugal, and Year 5 was one of the most active years yet. The program intends to carry this momentum into a sixth year, furthering the goal of making Portugal an internationally recognized center for digital media work.

The UT Austin | Portugal Digital Media Program was established in 2007 to build capacity in Portugal for emerging digital media industries. Three areas are at its core: research, education, and building capacity. In the research area, the program reviewed and selected proposals for FCT-funded research projects and continues to support the awardees through travel and communication assistance. Three permanent educational programs resulted from the program's efforts: an MA program at U.Porto and PhD programs at U.Porto and UNL. The program has built capacity for digital media activity in Portugal through a variety of ways including an internship program and events like the Gary Chapman International School on Digital Transformation and the Future Places digital media festival. Taken together, the program's efforts in these areas have led to relationships, cultural capital, and an international profile that should last for years to come.

Partner Institutions

Core Collaborating Institutions

- **The New University of Lisbon**
  - » Faculty of Science and Technology (FCT)
  - » Faculty of Social Sciences and Humanities (FCSH)
  - » Faculty of Economics
- **The University of Porto**
  - » Faculty of Engineering
  - » Faculty of Fine Arts
  - » Faculty of Humanities
  - » Faculty of Economics and INESC Porto
- **UT Austin**
  - » College of Communication
  - » Department of Radio, Television and Film
  - » School of Journalism
  - » Department of Advertising
  - » Department of Communication Studies
  - » School of Information
  - » Lyndon Baines Johnson School of Public Affairs
  - » College of Fine Arts
  - » Department of Computer Sciences
  - » Department of Computer Engineering

Additional Participating Institutions involved in projects, festivals, events, series, and post-docs

- Instituto Superior Technico, Computer Sciences
- University of Minho
- University of Coimbra
- University of Aveiro
- Universidade Lusófona de Humanidades e Tecnologias
- Universidade Católica Portuguesa – Porto

Key Personnel

Portugal

Artur Pimenta Alves, *Professor, Department of Electrical and Computer Engineering, University of Porto*

Nuno Correia, *Associate Professor of Computer Science, Faculty of Science and Technology, New University of Lisbon*

Heitor Alvelos, *Associate Professor, Department of Design, Faculty of Fine Arts, University of Porto*

João Mário Grilo, *Professor, Department of Communication, Faculty of Social Sciences and Humanities, New University of Lisbon*

José Azevedo, *Professor, University of Porto*

Carlos Guedes, *Associate Professor, FEUP, University of Port*

University of Texas at Austin

Sharon Strover, *Professor, Department of Radio-Television-Film*

Karen Gustafson, *Telecommunications and Information Policy Institute*

Bruce Pennycook, *Professor, Department of Radio-Television-Film and Department of Music; collaborating faculty and Future Places co-director*

Joseph Straubhaar, *Professor, Department of Radio-Television-Film; collaborating faculty*

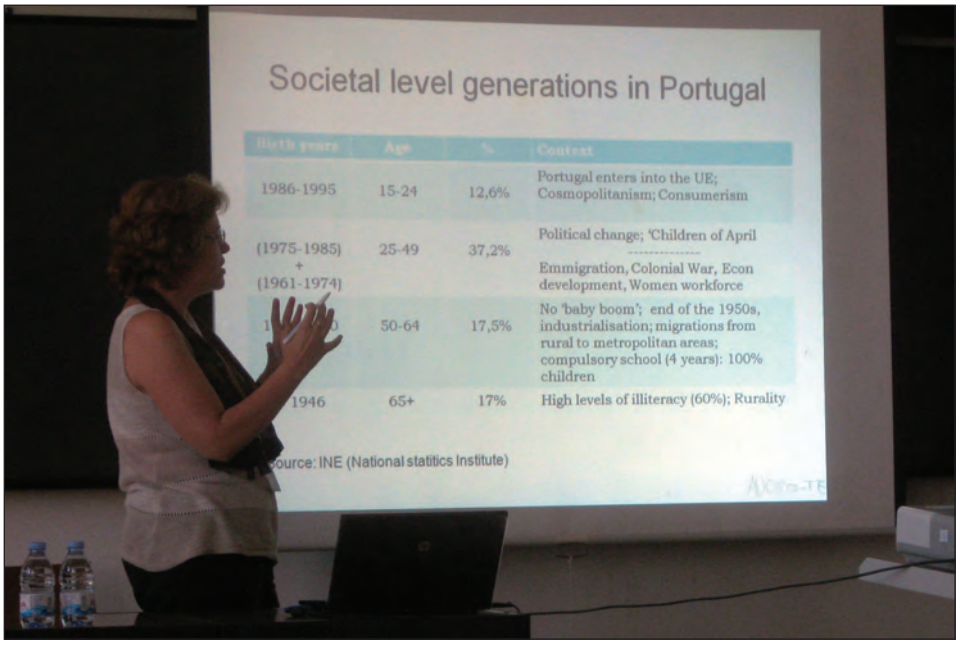
Rosental Alves, *Professor, School of Journalism; collaborating faculty*

Research

As part of its mission, the UT Austin | Portugal Digital Media Program held two calls for collaborative research projects in 2009 and 2010. The program reviewed proposals and selected a total of nine projects for FCT funding. In 2009, it recommended the Digital Inclusion and Kinetic Controller projects, and in 2010 it selected one exploratory project, See-through-Sound, and five more research projects for funding. These projects require substantial collaboration between principal investigators from Portuguese universities and collaborators from both UT Austin and an industrial partner. Below are short summaries of research activity on these projects in Year 5. More comprehensive information, including research abstracts and publication updates is available in Appendix A.

Digital Inclusion

The Digital Inclusion research project is a comparative study of technology access issues in Texas and Portugal. Led by Professor Joseph Straubhaar of UT Austin and Professor Cristina Ponte of UNL, the project has involved a total of 27 PhD students from the UNL, U.Coimbra, U.Porto, and UT Austin plus 11 master's students and 28 undergraduate students from UT Austin. It aims to understand what social, economic, and technical factors create barriers to participation in digital life. In Year 5, the team had 19 journal articles published or accepted for publication and presented papers at 27 conferences based on this research.



Professor Cristina Ponte, UNL, Digital Inclusion project.

Kinetic Controller Driven Adaptive & Dynamic Music Composition Systems

Small digital devices such as iPhones and Nintendo Wii controllers offer a great deal of promise for controlling music software. Professors Carlos Guedes of U.Porto and Bruce Pennycook are developing software systems for using these controllers in live performance and composition. Pennycook spent Spring 2011 in Porto in order to collaborate more closely with Guedes. During Year 5, Guedes also received funding, partially through the Fulbright Program, to spend the 2011 school year in Austin. Members of the research team presented work at six conferences during 2010-2011 and papers were included in the published proceedings from each.

Project Breadcrumbs

Project Breadcrumbs investigates new software interfaces for organizing and sharing news items. Professors Álvaro Reis Figueira and José Paulo Leal of U.Porto are collaborating with Luis Francisco-Revilla of UT Austin to develop a web-based application that enables users to save interesting news items, organize them, and share them with other users. It also includes a keyword-matching algorithm that attempts to find relationships between saved items. In spring 2011, Figueira and Leal came to Austin to move development of the application forward. The team presented related papers at five conferences during the 2010-2011 year.

Professor Álvaro Reis Figueira, U.Porto works with Luis Francisco-Revilla of UT Austin on Project Breadcrumbs.

IDTV Health

Interactive television holds great promise for meeting the health information needs of older patients. The IDTV Health project, led by Manuel José Carvalho de Almeida Damásio of Universidade Lusófona de Humanidades e Tecnologias, evaluates how well these systems will work with users with little technological sophistication and how interactive TV can be integrated into the healthcare system. In Year 5, the team published three journal articles and presented eight conference papers related to this research.

ImTV

Television programming is no longer confined to the traditional TV set; a variety of new viewing contexts have emerged with the adoption of multimedia computers, smart phones, and tablet computers. This project first investigates how young people in Portugal and the United States view television today, and secondly develops new interfaces for streaming TV content and interactive cable systems. Principal investigator João Miguel Costa Magalhães of UNL is joined by Sharon Strover and Luis Francisco-Revilla of UT Austin in coordinating this effort. In May, 2011 research assistant Nick Muntean traveled to Lisbon to administer a survey assessing the viewing habits of UNL undergraduates.

A team works on the INVITE project.

INVITE

The goal of the INVITE project is to see how a networked virtual environment can be used to teach and nurture interpersonal “soft skills.” With development spearheaded by Rui Prada of IST and Jorge Peña of UT Austin, the software targets adult learners such as college students and working professionals who want to improve their communication and collaboration skills. In March 2011, Prada came to Austin with two graduate students to meet with Peña and plan future work on the project.

LIFEisGAME

LIFEisGAME is an endeavor to develop a serious game to help autistic children understand human emotions. It combines the computer animation expertise of principal investigator Verónica Costa Texeira Pinto Orvalho of U.Porto with the motion-tracking research of J.K. Aggarwal and user-need assessment work of Yan Zhang, both of UT Austin. In May 2011, Aggarwal visited Orvalho’s lab and consulted on the progress of the project. In August, Orvalho presented the work at the SBIM-ACM SIGGRAPH conference, winning the best paper award. In total, the team has published six articles on this work and presented papers at 11 conferences in Year 5.

REACTION

Data mining the vast amount of news created each day is the emphasis of Retrieval, Extraction and Aggregation Computing Technology for Integrating and Organizing News or REACTION. With Mário Jorge Costa Gaspar Silva of the University of Lisbon at the helm, the research team is investigating effective ways to collect and organize large bodies of news articles and then novel interfaces for presenting news to readers. Members of the team presented work based on this project at four conferences in Year 5.

See-Through-Sound

This exploratory research project attempts to see if computer audio technology can provide useful ways of understanding the physical environment. Principal investigator José Tomás Marques Henriques of UNL is developing sound patterns to describe the surroundings to the user and then building a prototype that incorporates spatial-sensing technology to help users navigate physical spaces.

Education

PhD, Digital Media

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

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

As of September 2011, there are 25 students from U.Porto and 26 students from UNL pursuing doctoral degrees. They are co-supervised by professors in Portugal and Austin, and the program includes a research fellowship in Texas. Students are eligible to apply to UT Austin doctoral programs for a dual degree. One student, João Beira, is currently in residence at UT Austin, pursuing dual PhDs from both UT and U.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. Several UT Austin faculty collaborated with Portugal faculty on teaching long semester classes for doctoral students. These classes are detailed later in the report. This roster is also available in Appendix B1.

PhD Students 2008 - 2012

André Valentim Pires Almeida	2008	U.Porto - FBA
Diogo Nuno Crespo Ribeiro Cabral	2008	UNL/FCT
João Jose Gonçalves Barros Cruz	2008	U.Porto / FBA
Luisa Maria Lopes Ribas	2008	U.Porto - FBA
Margarida Ribeiro Ferreira Carvalho	2008	UNL/FCSH
Sofia Catarina Mosca Ferreira Mota	2008	UNL / FCSH
Afonso Gouveia O'Neill	2009	UNL / FCT
Ana Duarte Cabral Martins	2009	UNL / FCSH
Ana Margarida de Sousa Júlio Mendes Barata	2009	UNL / FCSH
André Miguel Guedelha Sabino	2009	UNL / FCT
António Carvalho Maneira	2009	UNL / FCSH
Edgar dos Anjos Teixeira	2009	U.Porto
Filipe José Pais Ferreira	2009	U.Porto / FEUP
Gilberto Bernardes de Almeida	2009	U.Porto / FEUP
Heitor Manuel Pereira Pinto da Cunha e Alvelos*	2009	U.Porto / INESC

*(Post-Doc)

PhD Students 2008 - 2012 (cont'd)

João Filipe Fernandes Castanheira Beira	2009	U.Porto / FEUP
Luís Manuel de Frias Machado	2009	UNL / FCSH
Marta Isabel Santos Paiva Ferraz da Conceição	2009	UNL / FCT
Mónica Sofia Santos Mendes	2009	UNL/FCT
Nuno Duarte Martins	2009	U.Porto
Paulo Alexandre Valente de Jesus Rosa	2009	UNL / FCT
Paulo Nuno Gouveia Vicente	2009	UNL / FCSH
Rossana Henriques dos Santos	2009	UNL / FCT
Rui Miguel Fernandes Robalo Avelan Coelho	2009	UNL / FCSH
Sandra Mónia Couto Coelho	2009	U.Porto / FEUP
Sofia Ester Pereira Reis	2009	UNL
Tiago Miguel Gonzaga Videira	2009	UNL / FCSH
Amarante Abramovici	2010	U.Porto / FEUP
Ana Figueiras	2010	UNL / FCSH
André Correia	2010	UNL / FCSH
Andre Holzapfel (Post-Doc)	2010	U.Porto / UT Austin
Andreia Teles Vieira	2010	UNL / FCSH
Bruno Daniel Nascimento Nobre	2010	UNL / FCT
Bruno Miguel Ferreira de Oliveira	2010	U.Porto / FC
Carlos Manuel Carvalho Santos Oliveira	2010	UNL / FCSH
Carlos Manuel Moita de Figueiredo	2010	U.Porto / FEUP
Cláudia Cristina da Silva	2010	UNL / FCSH
Cláudia Pernencar	2010	UNL / FCSH
Dora Santos Silva	2010	UNL / FCSH
Eduardo José Marques Pereira	2010	U.Porto / FEUP
Filipe Cunha Monteiro Lopes	2010	U.Porto / FEUP
Frederico Gustavo Menezes M. Ribeiro Pereira	2010	U.Porto/FE
Hugo Miguel Gonçalves Crespo Machado da Silva	2010	U.Porto / FEUP
Isabel Maria Silva Paiva	2010	UNL / FSCH
Jasmina Stoyanova	2010	U.Porto / FEUP
Luís Fernandes	2010	UNL / FCT
Luís Filipe de Matos Martins Gomes	2010	UNL / FCSH
Pedro Jerónimo Pedrosa	2010	U.Porto / FLUP
Ricardo David Castaneda Marin	2010	U.Porto / FEUP
Tiago Araújo e Gama Constante da Rocha	2010	U.Porto / FEUP / UT Austin
Vânia Guiomar da Silva Gonçalves	2010	U.Porto / FEUP
Fernando Nabais	2011	UNL

PhD Students 2008 - 2012

Helder Pestana	2011	UNL
Moisés de Castro Coelho	2011	UNL
Guida Paola Silveira Casella	2011	UNL
Hugo Castanho	2011	UNL
Ana Nunes Jorge	2011	UNL
Inês Martins Sequeira Rodolfo	2011	UNL
Filipa Pires	2011	UNL
David Gorjão Alves da Silva	2011	UNL
Paulo Manuel da Costa Martins	2011	UNL
Diana Cristina Valente Marques	2011	U.Porto
Daniel dos Santos Catalão	2011	U.Porto
Fernando Manuel Pereira Governo	2011	U.Porto
Frederico Franco Madeira da Fonseca	2011	U.Porto
Henrique Manuel Carvalho de Sousa Serro	2011	U.Porto
Leandro Filipe Oliveira Gomes	2011	U.Porto
Luís Miguel Barbosa da Costa Leite	2011	U.Porto
Nelson Manuel Cardoso Pereira	2011	U.Porto
Paulo Jorge Fontes Domingues	2011	U.Porto
Pedro Miguel Silva Carlos Sousa Ângelo	2011	U.Porto
Rita de Sá Catarino Tavares	2011	U.Porto
Rodrigo Guerreiro Vaz Guedes de Carvalho	2011	U.Porto
Yago Parra Moutinho Stucky de Quay	2011	U.Porto
André Rocha	2012	UNL
Carlos Ramos	2012	UNL
David dos Santos	2012	UNL
Helena Santos	2012	UNL
José Luís Andrade	2012	UNL
Paula Neves	2012	UNL
Pedro Suspiro	2012	UNL
Victor Moura Pinto	2012	UNL
Eduardo José Botelho Batista Morais de Sousa	2012	U.Porto
Gustavo Miguel Beça Rodrigues da Costa	2012	U.Porto
Jaime Fins	2012	U.Porto
João Miguel Barros Aguiar Pereira	2012	U.Porto
Jorge Augusto Moreira Ribeiro	2012	U.Porto
Nuno Miguel Moreira Baldaia de Queirós	2012	U.Porto

MA, Digital Media

U.Porto's Master of Arts in Multimedia program entails one year of coursework complemented by a second year dedicated to thesis or project work. This two-year multidisciplinary program offers the following emphases:

- Arts and culture
- Education
- Interactive music and sound design
- Technologies

A number of new courses have been created to support the new area of interactive music, such as the Generative Music and Multimedia in Performing Arts courses taught by UT Professor Bruce Pennycook. In addition, the Sound Design for Digital Media, course co-taught by UT Austin Professor Andrew Garrison and Tom Hammond expanded the program's aural media offerings. Appendix B2 provides a roster of students.

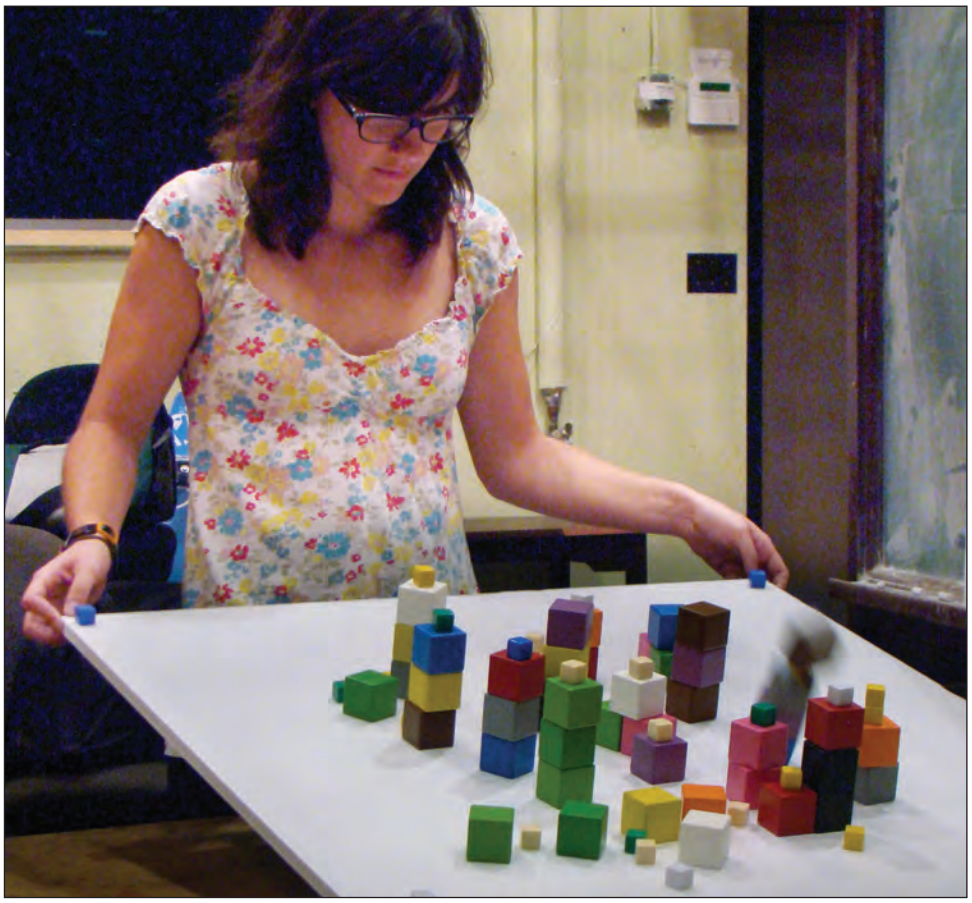
ZON Digital Animation Summer Laboratory

The ZON Digital Animation Advanced Lab at UT Austin was conducted in June and July of 2011. This program is jointly funded by ZON and the UT Austin | Portugal collaboration, with ZON sponsoring all of the direct student expenses and UT funding all instructional expenses. ZON is interested in cultivating the next generation of media talent in the country. This collaboration advances the goals of the program, nurturing relationships with industry partners to tailor education to the needs of Portugal's media industry.

Ten professional animators from Portugal participated in an intensive, residential program of study led by UT instructors Geoff Marslett and Ben Bays. For several weeks, the participants studied a variety of animation processes and techniques, met with some of Austin's top animation experts, and developed individual projects to be submitted to the annual Prémio ZON Creatividade em Multimédia competition in Portugal.

In Animated Project Conception and Management, Marslett taught the basics of animated film writing, character design, storyboarding, animatic creation and project management. The class included study of stop motion and rotoscoping techniques and Flash, Photoshop, and After Effects applications, and concluded with students using compositing techniques to bring all of these elements together into one cohesive project. Students rated the course 4.9 out of 5.

Compositing and Image Integration, led by Ben Bays, focused on the integration of image, video and 3D surfaces, with compositing and projection in Maya and After Effects. Course topics included the creation of matte paintings, façades and digital environments; the use of tracking data on human performance footage to build articulated skeletons for use in 3D animation; and building spatial volumes and physical simulations. This course was rated 4.92 out of 5.



The third course of the intensive laboratory, Animation Techniques: Visitors and Modules, introduced the students to a variety of specialists from the Austin media industry. Enrichment lectures were given by industry experts on concept art, 3D animation and Flash and motion tracking, among other topics. A table of speakers may be found in Appendix C.

ZON Animation Lab Guest Speakers 2010-2011

Student	Employer	Profession
Wiley Atkins	Zebra Imaging, Austin Community College	Holograms
Brad Clark	Rigging Dojo; DigitalFish; Motus Digital, LLC	Motion Tracking
David Levy	Steambot Studiots	Concept Art
Lance Meyers	Electronic Arts	3D Animation
Mike Wood	Industrial Light and Magic Singapore	Matte Painting

"Just having a talented group of people together, in the same space, everyone with different backgrounds and goals, makes the Animation Lab a constant learning experience.

The teachers – both the regulars and the guests – take it to a whole other level, due to their vast experience of working in both the film and gaming industries."

--João Alves of Lisbon Labs

ZON Animation Lab Students 2011

Student	Employer
João Alves	Lisbon Labs
Sofia de Botton	Laureate International Universities
Anabela Faria	Bang Bang Animation
Dulce Gonçalves	Multimedia Superior Studies of the Instituto Politécnico de Bragança
Ana Gomes	GameInvest
Filipa Lopes	Biodroid Entertainment
David Mourato	Digital Unit
Joana Paiva	Freelance, contracts include MTV Portugal
Manuel Rodrigues	Freelance, Contracts include Artes Grácas
Diana Salavisa	Freelance

The program also featured a variety of recreational activities which gave participants the opportunity to experience local culture. The visitors toured the city of Austin, learned traditional country western dancing in a Texas music hall, floated in tubes down a local river, and enjoyed local cuisine such as Tex-Mex and barbecue, among other pastimes.

Animation students enjoy traditional Texas barbeque.

Digital Media Summer Institute 2011/2012

The Digital Media Summer Institute is an annual event held in Lisbon and Porto. UT faculty teach intensive credited courses on a specialized topic in their area of expertise. This year, five short courses were offered with two in Lisbon and three in Porto. This is the fifth year the UT Austin | Portugal Digital Media program has offered the summer institute, which has served over 200 students to date. Syllabi and evaluations are available in Appendix D. Brief course descriptions follow.

Collaborative Database Documentary Workshop (Karen Kocher, Lisbon)

In this three-week course, Karen Kocher of UT's Radio-TV-Film department taught five students how to produce database documentaries, interactive documentaries based around discrete media assets such as video, audio, and still photography. These elements are connected together and accessed through a graphical user interface based around software such as Google Maps, Korsakow, and Adobe Flash presentations. Students gave the course an average rating of 4.6 out of 5 for their overall opinion of the course.

Collaborative Screenwriting (Richard Lewis, Lisbon)

Students worked as a team in this three-week course taught by UT screenwriting professor Richard Lewis. The format was intended to develop the collaboration skills necessary for working in the film and TV industries where scripts are often produced by writing teams. The course ended with students selecting one of the collaborative projects and finishing the work individually. The 13 students gave it an overall rating of 4.83 out of 5.

Entrepreneurial Journalism for the Digital Age (Rosental Alves, Porto)
Digital media have transformed the news business, and students learned how to adapt to the changing environment in this class taught by UT journalism professor Rosental Alves. After learning about the changes in business and distribution models for journalism, students developed prototype projects that could take advantage of the opportunities offered by digital distribution. Students gave this course an average overall evaluation of 4.55 out of 5.

Experimental Animation (Jeanne Stern, Porto)
Traditional character animation requires skills that take years to develop, but existing media-making skills can be leveraged to create appealing and interesting animated works. Austin School of Film instructor and UT MFA alumna Jeanne Stern taught a workshop to 15 students. The workshop ended with a public screening at the historic theater Passos Manuel, to an audience of about 35 people. On average, students gave this course an overall rating of 4.9 out of 5.

Short Form Documentary Production (Nancy Schiesari, Porto)
This special course was offered exclusively to members of the editoral staff of Público, a national Portuguese newspaper. Ten professional journalists attended this class, which covered the basics of documentary production with a specific focus on producing video content for the online version of the newspaper. This course was not for credit. In the final evaluation, the average rating for the course overall was 4.63.

Research Methods (Joseph Straubhaar and Sharon Strover, Lisbon)
This two-part course will introduce students to basic research methods, relying on a social sciences methodological approach. The course will consider issues of epistemology, conceptualization, and measurement, and then move across various research techniques including focus groups, interviews, surveys (online and offline) and field experiments, ethnography, and other Internet-friendly approaches. We will emphasize how one frames research questions and consider alternative assessment schemes for various research questions. Students should be prepared to write a brief research proposal during the course, and they will complete several homework assignments tailored to specific methodologies and elements of research and analysis.

Cinematography (Steve Mims, Lisbon)
In this class students will learn production and post-production concepts, strategies and techniques for creating advanced documentary projects. The class is structured around creation of a short collaborative documentary (groups of two) to shoot and edit a six minute short during the course. The course will focus on filmmaking strategies to optimize visual and audio design by utilizing lighting, lenses and camera placement for both interviews and verite filming. Post-production will focus on a contemporary streamlined workflow with particular emphasis on an editorial organization and decision making. The class will analyze shooting and editorial decisions from successful documentary films for reference.

Human-Computer Interaction (Luis Francisco-Revilla, Porto)
Students in this course will develop an overarching view of the field of Human-Computer Interaction (HCI). Students in this course will develop their skills to envision, and evaluate novel information interaction systems. The goal of the reading assignments is that every student develops an overarching view of the field of HCI including the areas of interaction design, social interaction, emotional interaction, interfacing, and empirical methods in HCI. Consequently, it is expected of every student to read all chapters and papers, understand them, and participate actively in the class discussions. The course will also include class presentations and a final exam.

Full Semester Courses 2011

The Digital Media Program facilitated six full-semester courses to expand the options of graduate students in Portugal. In Fall 2010, UT professor Sharon Strover taught a communication theory seminar via videoconference to UNL students. Spring 2011 saw several team-taught courses with UT Austin and U.Porto faculty. UT professor Karin Wilkins joined U.Porto professor Helena Santos by videoconference for a research methods seminar. Two UT faculty traveled to Porto for collaborative courses. Bruce Pennycook spent the entire semester in Porto and taught two courses titled “Multimedia in Performing” and “Generative and Automatic Music.” UT professor Andrew Garrison split his time between Austin and Porto and contributed to a sound design course and a documentary production lab. In total, this effort expanded the course offerings for about 70 students. Syllabi and evaluations are available in Appendix E.

Full Semester Courses 2011

Instructor	Course	Location	Semester	Enrollment	Eval.
Sharon Strover	Communication Theory	Lisbon	Fall 2010	9	N/A
Bruce Pennycook	Multimedia in Performing Arts	Porto	Spring 2011	10	4.17
Bruce Pennycook	Generative Music	Porto	Spring 2011	7	4.00
Andrew Garrison	Documentary Lab	Porto	Spring 2011	12	4.20
Andrew Garrison	Sound Design	Porto	Spring 2011	11	4.75
Karin Wilkins	Research Methods	Porto	Spring 2011	13	4.33

Invited Talks and Presentations

As part of its effort to share expertise, the Digital Media Program coordinates visits by UT faculty to the partner institutions in Portugal. In many cases, the program arranges and funds travel so the faculty can focus on their guest lectures and public presentations. It's often the case that faculty teaching courses in Porto or Lisbon will also provide a public lecture during their time in Portugal. Below are examples of faculty visits and presentations from the past year. Talks related to the funded research projects are denoted with an asterisk.

UT Presentations in Portugal 2011

Speaker	Dates	Location	Topic/Title
Sharon Strover	1/2011	TEI, Madeira	Prospects of Digital Media in Portugal
Russell Pinkston	2/11-14/2011	U.Porto	Interactive Music *
Bruce Pennycook	4/2011	Catholic University (Porto)	Kin.Mps: Musical Phrase Analysis Systems; Two Approaches to EA Music*
J.K. Aggarwal	5/2011	U.Porto	Human Tracking with Cameras*
Bruce Pennycook	5/2011	UNL; School of the Arts IPCB; ESMAE; UMInho (Guimaraes)	Two Approaches to EA Music*
Karin Wilkins	5/2011	U. Porto	Advocacy Communication
Sharon Strover	5/5/2011	Porto, 9th Annual European Academy of Design Conference	Mashing up Consumers, Citizens and Users
Tom Schatz	5/23-27/2011	Lisbon (Cinemateca)	Film, Globalization, New Media Platforms
Jeanne Stern	6/2011	U.Porto	The Art of the Moving Image
Rosental Alves	6/2011	U.Porto	Entrepreneurial Journalism
Nancy Schiesari	7/2011	U.Porto	Journalism and Video? (Público)
Laura Stein	7/19/2011	Universidade Lusófona, Lisbon	Health Literacy*

* Related to funded research projects

Design and Computation Series

A collaboration between the University of Texas, Universidade Nova de Lisboa and Instituto Superior Técnico, the Design & Computation event was a speaker series that addressed design and computation, particularly in game environments and interactivity. The series had an all-star lineup of speakers who gave one or two day talks to both students and the public. From renowned game designer Ernest Adams to the groundbreaking research of Dr. Anthony Brooks, this well-attended series fostered the creativity and innovation at the partner universities.

Design and Computation Series Overview 2010 – 2011

Speaker	Institution	Dates	Topic
Yacov Sharir	UT Austin	4/11-13/2011	Identity, the Post-Human Body and Digital Practices
Ernest Adams	Designer's Notebook	4/18-20/2011	Interactive Game Design & Development
Dan Olsen & Peter Hall	UT Austin	5/11-18/2011	Mapping as Visual Inquiry
Panos Markopoulos	Eindhoven University of Technology	5/25-26/2011	Awareness & Persuasion with Ambient Intelligence
Anthony Brooks	Aalborg University	5/26-28/2011	SoundScapes Research

Visiting Scholars and Researchers in Austin

Program students and faculty come to Austin as official visiting researchers and scholars in order to pursue research for their doctoral theses and to further progress research projects funded by the UT Austin | Portugal program research projects. As visiting researchers, they may take full advantage of the UT library system's extensive resources, meet regularly with faculty advisors, and, in the case of funded team projects, collaborate with members of their research teams. Visiting researchers and scholars are supported by funds from sources including FCT and Fulbright fellowships, which pay for the long-term visitors' travel, lodging, and living expenses. The program in Austin provides extensive logistical support for months before each visit, applying for the prospective visitors' official university status, working with the UT International Student and Scholar Services office to generate the documentation required for visa applications, and addressing any immigration-related questions that arise.

Visiting Doctoral Students in Residence

Student	Home Institution	Research Topic
Spring 2011		
Marta Isabel Santos Paiva Feraz da Conceição	UNL	Learning systems & child development
Luis Manuel Machado de Frias	UNL	Interactive narrative media
Luis Filipe Gomes	UNL	Digital marketing
António Maneira	UNL	Interactive learning
Ana Cabral Martins	UNL	Film and interactivity
Afonso O'Neil	UNL	Public policy decision making
Paulo Nuno Vicente	UNL	Digital journalism
Summer 2011		
Álvaro Figueira (Faculty)	U.Porto	Project Breadcrumbs
Henrique Alves (Doctoral student)	U.Porto	Project Breadcrumbs
Lurdes Macedo (Doctoral student)	U.Porto	Visiting researcher
Fall 2011		
Marta Isabel Santos Paiva Feraz da Conceição	UNL	Learning systems & child development
Luis Frias	UNL	Interactive narrative media
Antonio Maneira	UNL	Interactive learning
Afonso O'Neill	UNL	Public policy decision making
Alcimar Queiroz (Scholar—PhD)	Lisbon Univ. Inst.	Digital media & socio-economic development
Rossana Santos	UNL	Human computer interaction
Carlos Figueiredo	U.Porto	Registered student
Isabel Paiva	UNL	Registered student
João Beira	UNL	Dual PhD Student
Tiago Videira	UNL	Generative, interactive music tools

Seven doctoral students who made exploratory visits in Fall 2010 returned as visiting researchers to develop their doctoral projects in Sprint 2011. Three members of different research teams came to Austin during the summer of 2011, and six doctoral students are in residence as visiting researchers during this fall. In addition, Carlos Guedes, a faculty member of the program and principal investigator of the CoLab-Funded Kinetic Controller Driven Music Systms project, is in Austin throughout this fall, collaborating with co-principal investigator Bruce Pennycook as well as working with graduate students.

Visiting Registered Students

Two Digital Media doctoral program students, Carlos Figueiredo of U. Porto and Isabel Paiva of UNL, are attending UT in the fall semester of 2011, as registered, full-time, non-degree-seeking graduate students. At least two more doctoral program students are expected to register for courses in Spring 2012. Another registered student, João Beira of U. Porto, was admitted to the doctoral program in Radio-TV-Film at UT Austin in 2010, and continues to pursue coursework toward his degree.

Visiting Faculty

UT Austin has a vast number of resources for research and professional development, and the Digital Media Program helps Portuguese faculty members take advantage of these resources by coordinating visits to Austin. In some cases, faculty spend a semester or more in residence in Austin becoming deeply familiar with the university and the city, while in other cases, faculty members use short trips to catch up on collaborative research projects and sit in on courses. A list of Portuguese faculty visitors is below.

Visiting Faculty Members

Faculty	Institution	Research Topic	Timeframe
Domingos Ferreira	UNL	Marketing	Fall 2010
Maria Fernanda Fernandes	UNL	Political communication	Fall 2010
Carlos Guedes	U.Porto	Music composition	Fall 2011
Álvaro Figueira	U.Porto	Project Breadcrumbs	Summer 2011

Exploratory Visits to Austin

Before coming to Austin to attend classes or do research for a semester, doctoral students take advantage of exploratory visits. Each student may make one seven to ten day visit, during which he or she meets with faculty members and prospective co-advisors, sits in on classes, and explores the university and surrounding city. The program arranges and pays for each student's airfare and hotel costs and basic health insurance, and provides orientation information and support before and during the visit.

Since the fall semester of 2010, the number of doctoral students making exploratory visits has increased sharply, and a basic breakdown by semester and home institution is represented in the table above. During exploratory visits, students meet with faculty from UT programs including the Department of Radio-TV-Film, the Department of Art and Art History, the Department of Advertising, the School of Information, the College of Education and the School of Journalism.

Exploratory Visits Overview

Semester	UNL Students	U.Porto Students	Total
Fall 2010	10	3	13
Spring 2011	6	4	10
Fall 2011 (as of September)	5	2	7

Exploratory Visits 2010-2011

Student	Institution	Timeframe
Vitor Jose Badalinho	UNL	Fall 2010
Marta Isabel Santos Paiva Feraz da Conceição	UNL	Fall 2010
Luis Manuel de Frias Machado	UNL	Fall 2010
Luis Filipe Gomes	UNL	Fall 2010
Antonio Maneira	UNL	Fall 2010
Eduardo José Marques Pereira	U. Porto	Fall 2010
Ana Duarte Cabral Martins	UNL	Fall 2010
Afonso Gouveia O'Neill	UNL	Fall 2010
Frederico Gustavo Pereira	U. Porto	Fall 2010
Paulo Alexandre Valente de Jesus Rosa	UNL	Fall 2010
Edgar dos Anjos Teixeira	U. Porto	Fall 2010
Paulo Nuno Vicente	UNL	Fall 2010
Tiago Miguel Videira	UNL	Fall 2010
Ana Figueiras	UNL	Spring 2011
Carlos Figueiredo	U. Porto	Spring 2011
Hugo Machado	U. Porto	Spring 2011
Carlos Oliveira	UNL	Spring 2011
Isabel Paiva	UNL	Spring 2011
Cláudia Pernencar	UNL	Spring 2011
Tiago Gama Rocha	U.Porto	Spring 2011
Rossana Santos	UNL	Spring 2011
Cláudia Silva	UNL	Spring 2011
Jasmina Stoyanova	U.Porto	Spring 2011
Amarante Abramovici	U.Porto	Fall 2011
Soraia Alexandra Mesquita Ferreira	U.Porto	Fall 2011
Bruno Daniel do Nascimento Nobre	UNL	Fall 2011
André Alves Pires Correia	UNL	Fall 2011
Dora Santos Silva	UNL	Fall 2011
Luís Álvaro da Silva Fernandes	UNL	Fall 2011
Andreia Teles Vieira	UNL	Fall 2011

Building Capacity

In addition to the research and formal education programs, The UT Austin | Portugal Digital Media Program also organizes projects that engage Portugal's digital media scene with the broader international community. Two of these events, the Gary Chapman International School on Digital Transformation and Future Places, raise the profile of Portugal and provide students and practitioners valuable opportunities to network with peers from around the world. The internship program places Portuguese graduate students with Austin workplaces, giving them a real-world educational experience.

The Gary Chapman International School on Digital Transformation

The International School on Digital Transformation took place in Porto from July 17-22, drawing more than 50 scholars, entrepreneurs, students, and activists from 11 countries. Now in its third year, the program has been renamed for its founder, renowned Internet policy scholar and University of Texas faculty member Gary Chapman, who passed away suddenly in December 2010.

This intensive residential program brings together a diverse collection of established and emerging scholars and other professionals from around the world, fostering a sustainable network of scholars and activists committed to exploring ways digital media can strengthen civil society. The School featured talks, discussions, and hands-on exercises focused on themes including:

- Information access and open civic discourse
- Digital tools for government transparency
- Evolving Internet content regulation and the public's right to information
- Digital media and the democratic process
- Factors influencing the growth of online civic engagement

ISDT Faculty 2010 – 2011

Faculty	Institution	Country
Sunil Abraham	Centre for Internet and Society	India
Ademar Aguiar	INESC Porto	Portugal
Graham Attwell	Pontydysgu	U.K. (Wales)
Andy Carvin	National Public Radio	U.S.
Carol Flake Chapman (Associate Faculty)	Freelance Journalist	U.S.
Cristina Costa	University of Salford	U.K.
Fiorella De Cindio	University of Milano	Italy
Kay Firth-Butterfield (Associate Faculty)	St. Edward's University	U.S.
Sara de Freitas	University of Coventry	U.K.
Diego Gómez	Hiperbarrio Colombia	Colombia
Derek Lackaff	Elon University	U.S.
Smári McCarthy	International Modern Media Institute	Iceland
Alison Powell	London School of Economics	U.K.
Leslie Regan Shade	Concordia University	Canada
Laura Stein	University of Texas at Austin	U.S.
Jillian C. York	Electronic Frontier Foundation	U.S.

Previous iterations of ISDT continue to have impact in Portugal and world-wide. Here are some examples of projects that emerged out of ISDT10.

- ISDT10 student Tiago Assis collaborated with ISDT10 speakers Pedro Markun and Daniela Silva of Esfera on the International Open Data Hackathon. Working with the Porto-based hackerspace Hacklaviva, Assis maintained a real-time communication link with Esfera's offices in Sao Paulo. During the Hackathon, members of Hacklaviva converted government data about Portuguese ministers of parliament into machine-readable formats.
- ISDT09 and ISDT10 speakers Laura Stein and Tanya Notley collaborated on a research paper about the opportunities and challenges groups face in using digital media in human rights advocacy.
- ISDT10 participants Carina Lopes and Olaf Veerman, who is based in Lisbon, started a project called "Good Craft" which deploys open solutions for international development groups.
- RLabs, a project of ISDT10 speaker Marlon Parker, inspired participant Tiago Gama Rocha to develop a similar project in Porto, offering a mobile help line for disadvantaged communities.

More information, including ISDT evaluations, a list of students, and the program is available in Appendix F.

Future Places 2010

The 2010 Future Places digital media festival took place in Porto from October 12 - 16. In its third year, the festival hosted a variety of speakers, community advocacy groups, researchers, and several outstanding artists from around the world. These included renowned copyright scholar Siva Vaidhyanathan, internationally known musician Blaine Reininger, and prominent cultural and technological activist group MediaLab Prado. The festival facilitated connections among media professionals and artists of diverse backgrounds, laying the foundation for sustained creative relationships. Co-curated by Heitor Alvelos of U.Porto and Karen Gustafson of UT Austin, the festival facilitates connections among media professionals and artists of diverse backgrounds, laying the foundation for sustained creative relationships.

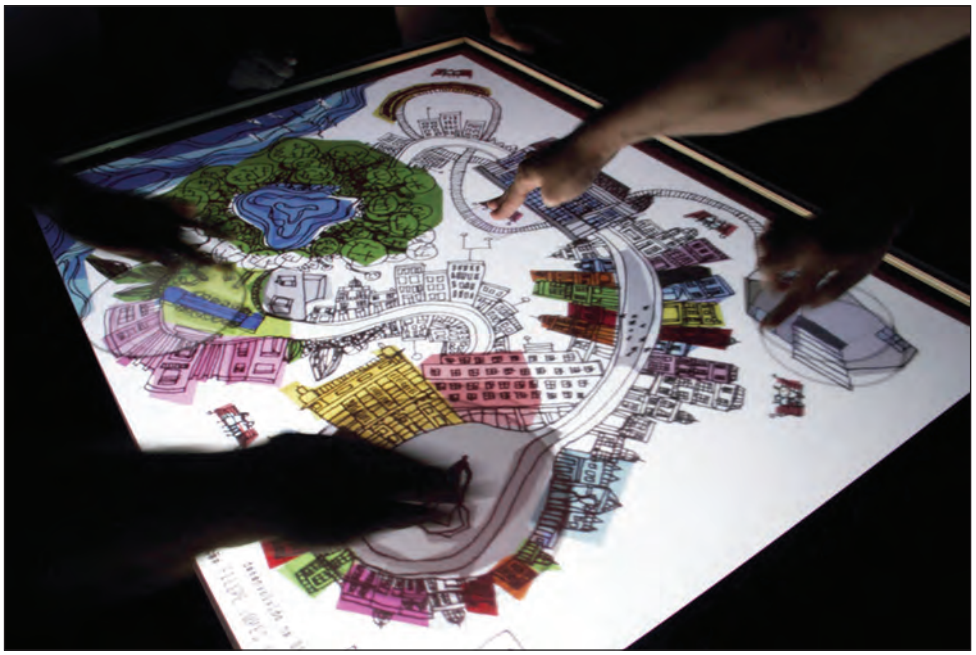
The festival offered four workshops including a seminar in programming for Android phones, sponsored and conducted by Portuguese telecommunications company SAPO, a workshop on community building and digital technologies, a course on community and digital radio, and a session on creating video narratives with mobile devices.

Over 100 digital media artists from 23 countries submitted proposals to the Future Places competition. Additionally, the festival attracted the interest of Rádio e Televisão de Portugal, Portugal Canal, Público, TimeOut Porto, Antena 1, and other principal media outlets. This coverage strengthened awareness of Porto as a center of digital media creativity.


RISORANTE
PIZZERIA
S. MARTINO
REY D'EL TRAPO
CASA AMETISTA
Casa Ametista


ESCREVE O FUTURO

Siva Vaidhyanathan was the keynote speaker at Future Places 2010.



The Future Places festival is making a lasting impact in local and international artist communities, producing ongoing community-oriented projects and nurturing pre-existing ones. Projects incubated within Future Places include:

- *Type the Future,* an interactive installation that explores public expression and invites the participation of local Porto residents.
- Radiofutura, the festival's own radio station. The Radiofutura project explores the potentials of new digital forms of radio and public engagement, giving participants the opportunity to contribute content while also teaching them how to set up a mobile radio station.
- *It's Raining Families,* a project produced by Spanish activist organization Asociación Visible, will continue to use photography and public events to explore the endless web of relations between citizens of Porto.
- *The Stories of Chairs* project will invite participants to contribute personal reflections on one of Northern Portugal's most active industries (furniture).
- *The C.C.Stop Porto* musicians' collective, an organization that is active year-round, has been substantially fostered by Future Places. The collective will perform concerts at the 2011 festival, and will launch the festival's second record, produced at the 2010 Future Places.

Bios of 2010 Future Places speakers are available in Appendix G.

Future Places festival also took place in 2011 and 2012 and is expected to happen already in 2013. All information about this event can be found at: http://futureplaces.org/.

Digital Media Leadership Program

The UT Austin | Portugal internship program, known as the Digital Media Leadership Program, began in the Fall of 2008 and has brought many talented Portuguese graduate students and early-career professionals to Austin to intern for innovative digital media companies as well as to participate in research internships performing cutting-edge research in the field. Following is a table of students received, and more information about their specific intern placements.

Internships 2010 - 2011

Intern	Expertise	Host Company	Timeframe
Ana Barreto/***RI***	Advertising	Matt Eastin	Fall 2010
Cintia Morais/***DMLP*** *U.Porto Media*	Digital journalism	Knight Center	Feb. – April 2011
Edgar Teixera/***RI*** *U.Porto*	Policy Research	Joe Straubhaar	Fall 2010
Gilberto de Almeida/***RI*** *U.Porto*	Music	Bruce Pennycook	Fall 2010
Hugo Almeida Rodrigues	Film	Kyle Henry	Dec. – January 2010
Hugo Castanho/***DMLP*** *UNL*	Web design/Coding	Infochimps	Oct. – Dec. 2010
Ioli Campos/***DMLP*** *UNL*	Digital journalism	KUT	Feb. – May 2011
Ivo Correia da Silva/***ZON LU****	Film		Spring/Summer 2011
Katerina Markova/***DMLP*** *U.Porto*	Web design/coding	Infochimps	Feb. – May 2011
Nuno Martins/***DMLP*** *Viatecla*	Web design/Coding	Innography	Nov. – January 2011
Paulo Martins/***DMLP*** *U.Porto Media*	Digital journalism	KUT	Feb. – April 2011
Raquel Laranjo /***ZON LU****	Film		Spring/Summer 2011
Rui Silva/***DMLP*** *U.Porto*	Sound	Andrew Garrison	Fall 2011
Teresa Viera/***DMLP*** *U.Porto*	Videography/ Photography	KUT	Fall 2011
Zara Pinto/***ZON*** LU*	Film		Spring/Summer 2011
Diana Castilho/***DMLP***	Marketing	Mercury Mambo	Fall 2011

RI: Research Internship
DMLP: Digital Media Leadership Internship
ZON: ZON winner
*Lusophone University of Humanities &Technologies

The following organizations offer internship opportunities to CoLab students; bold print indicates those companies who have received one or more students as interns.

Digital Media Leadership Program Industry Partners (**Bold** = DMLP intern Placement)

Company	Industry
501 Post	**Film post production**
Action Figure	Post production
Amaze Entertainment Austin	Video game design
Arkane Studios	Video game design
Arthouse Texas	Art and Design
Bioware Austin	Video game design
Chaotic Moon	Mobile software development
Compass Learning	Educational applications
The Digital Media Collaboratory	Multimedia
Emmis Austin Radio	Radio stations
Enspire Learning	Educational applications
GirlStart	Educational non-profit
Harry Ransom Center – Film Department	Archiving
Hubvine	Digital data collection
Infochimps	**Digital data collection**
Innography	**Digital patent technology**
Knight Center for Journalism in the Americas	**Journalism non-profit**
KUT	**Public radio**
Livestrong	Health advocacy non-profit
Milkshake Media	Media group
Mercury Mambo	**Marketing Firm**
NCSoft	Game design
L337 Media	Video game design
Pangaea	Software development
Powerhouse Animation	Animation
Projekt202	User Interface / Web Design
Pulse Interactive	Mobile gaming
Skateland	**Independent film production**
Sony Online Entertainment	Interactive
SolarWinds	IT
South By Southwest	Film / Digital / Music festival
Spacetime Studios	Video game design
Super! Alright!	Multimedia
Texas Business and Education Coalition	Non-profit organization
Texas Monthly Magazine	Print Journalism
UT Documentary Center	Documentary production
Via Vivo	Educational applications
YDreams	Interactive

Public Communication

The reach of the Digital Media Program extends beyond the research, education, and formal outreach programs outlined above. It also uses a variety of means to engage the broader public and raise the profile of the program. These range from regular communication through newsletters to facilitating participation in public events such as film festivals.

Monstra Animation Festival

UT Austin Radio-TV-Film professor Richard Lewis and RTF lecturers Geoff Marslett and Ben Bays taught workshops to 30 aspiring animators and screenwriters as part of the Monstra Festival of Animation in Lisbon from March 21 - 25. Attendees were also treated to cutting-edge animated works and talks from UT faculty on animation and screenwriting.

Digital Bits

Digital Bits is a monthly email newsletter that promotes the work of the program. It is distributed to researchers and students affiliated with the Digital Media Program. It features four to five items each month that announce opportunities such as film festivals, describe educational programs and feature the funded research projects. About 600 readers receive the newsletter each month, with about a quarter of recipients reading it. Chris McConnell, a research assistant at UT Austin, compiles and edits the newsletter each month. A sample newsletter is included in Appendix H1.

CoLab News Letter

Colab Square is a monthly newsletter that details the recent work of the UT Austin | Portugal Program across all of its areas. It is produced out of the main office in Lisbon and coordinated by Carolina Enes. It boasts a monthly subscriber base of 852 readers who receive a pdf of the newsletter via email. A sample newsletter is included in Appendix H2.

Cinemateca Portugesa Film Series

In addition to classes, the Summer Institute 2011 featured public screenings of films significant to an understanding of globalization and new media platforms. The screenings were held at the Cinemateca Portuguesa, a historic theater in the heart of Lisbon, from 23 to 27 May. Professor Tom Schatz, a renowned film scholar from the University of Texas, introduced the films each evening with a short talk relating the movies to the theme of media convergence, allowing viewers to situate familiar films within broader changes in the global entertainment industry. The screening series included the Dark Knight. Information concerning the screening list is available in Appendix I.

U.Frame 2011

U.Frame is an annual international academic video festival held in Porto and Galicia. It is sponsored by universities in Brazil, Singapore, the US and Spain. UT Austin has provided faculty jurors, speakers and student entrants for four years. In 2010, UT Austin students Angela Chen and Angela Torres each screened films at the festival in La Coruña. The Digital Media Program also sent UT screenwriting professor Stuart Kelban to facilitate a workshop on story development. The following UT Austin RTF students and alumni were accepted into U.Frame 2011:

- Nicolas Siegenthaler, *Titans*
- Soham Mehta, *Fatakra*
- Nathan S Duncan, *Great Outdoors*
- Ivete Lucas, *La Lupita*
- John Moore, *Untitled Moon Project*

In addition, the following students from U.Porto had films screened at the festival:

- Ana Temudo Gaio Lima - Corpo Difuso e Outros Gestos
- Raquel Azevedo Moreira - Pescado
- Hernâni Reis Baptista - Imposição
- Hernâni Reis Baptista - Execuções

South By Southwest Interactive 2011

Several Portuguese and US members of the Digital Media program contributed to the panels at Austin's South by Southwest (SXSW) Interactive conference in March 2011. Over 19,000 people from over 60 countries attended the world's largest computer conference. SXSW Interactive is part of the SXSW Festival, which attracted approximately 286,000 attendees in 2011. Panel capsules are available in Appendix J.

- PhD student Mónica Mendes and UNL professor Nuno Correia presented "Big Brother Goes Green: Surveillance for Sustainable Forests," featuring their research on Real-Time Video Interactive Systems for Sustainability (RTiVISS), systems which offer participants a way to remotely monitor natural environments for forest protection.
- "Neither Moguls nor Pirates: Grey Area Music Distribution" was presented by postdoctoral researcher Heitor Alvelos of U. Porto. The panel discussed emerging modes of music distribution that do not fall under traditional digital music piracy practices or established music industry practices.
- Portuguese Secretary of State for Science, Technology and Higher Education Manuel Heitor and U. Porto professors Artur Pimenta Alves and Heitor Alvelos, participated in the SXSW Technology Summit. The Summit had an international focus with sessions designed to provide a detailed snapshot of the state of the interactive and new media industries in16 countries, including Portugal.
- CoLab Director David Gibson of the IC² Institute and U. Porto professor Artur Pimenta Alves participated in another panel at the SXSW Technology Summit entitled "International Examples of Regional Creative Industries Development."
- Sharon Strover, Director of the CoLab Digital Media program at UT Austin, addressed the frequently misunderstood concept of net neutrality, exploring it in the context of recent U.S. Federal Communications Commission policy in her talk "Why the FCC Can't Please Anyone: Net Neutrality Blues."
- Former UT Austin | Portugal postdoctoral fellow Derek Lackaff, now Assistant Professor of Communications at Elon University, led a panel on Iceland's recent experiments with models of governance in "Rebooting Iceland: Crowdsourcing Innovation in Uncertain Times." The panel included the participation of newly elected Icelandic government officials.

ZON Prize

Three of the ten finalists for the 2010 Prémio ZON Creatividade em Multimédia prize for short films were alumni of UT Austin Portugal programs. The nationwide contest features the categories of short film, digital animation, and multimedia content and applications, and offers the largest monetary award in Portugal for a multidisciplinary competition.

The finalists included ZON Intensive Script Development Lab participants Ricardo Filipe Feio and Pierre-Marie Jézéquel (photo above) and UT Austin | Portugal internship program alumnus Pedro Resende (photo right), who visited Austin in 2009 to work with local post-production company 501 Post. The contest offers the largest monetary award in Portugal for a multidisciplinary competition. Resende's submission "Talvez," which won first prize in the short film competition, was shot in Austin with a crew of UT students and alumni.

Advanced Computing

Executive Summary

The Advanced Computing program of the UT Austin | Portugal CoLab has often been considered a subset of the Digital Media group, while at other times programmatic events have happened in cooperation with the CoLab Advanced Mathematics program. Advanced Computing represents the pivotal discipline of exercising the theories of mathematics to provide digital media applications that result in products and services. Advanced Computing directors are Alberto Proenza in Portugal and Kishav Pingali in Austin.

Key Personnel

Jay Boisseau, *UT Austin*

Pedro Medeiros, *FCT/UNL*

Keshav Pingali, *UT Austin*

Alberto José Proença, *U. Minho*

Luís Silva, *U.Coimbra*

Research

The Advanced Computing research projects approved by the FCT have provided extensive graduate student involvement, as well as participation with Industry and have helped build collaborative frameworks.

PRIA: Parallel Programing Refinements for Irregular Applications

The purpose of the PRIA group – led by João Luís Sobral at UMinho, with Kishav Pingali and Don Steve Batory at UT Austin – is to identify and modularize refinements (a.d.a. patterns, skeletons) that parallelize irregular computations in programs and to compose such refinements to map base programs to efficient, platform-specific, parallel applications. Members of the research team presented work at five conferences during 2009-2010 and papers were included in the published proceedings from each.

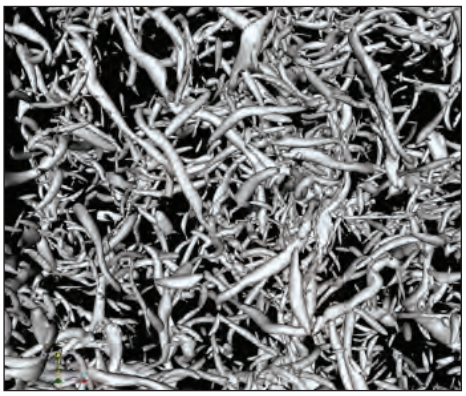
SIMCARD, Cardiovascular Imaging, Modeling and Simulation

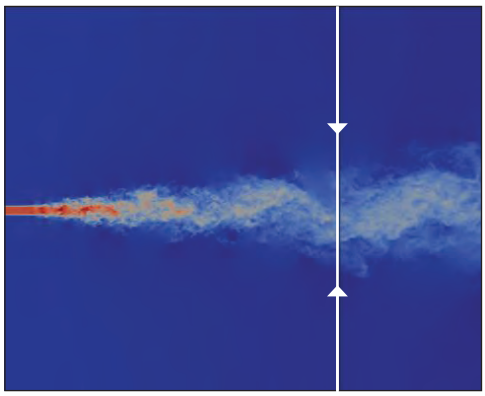
Principal Investigator Adélia Sequeira with UTL/IST coordinates this highly collaborative project to develop computational tools for the simulation of mathematical models describing the anatomical structure and the physiological response of the human cardiovascular system in healthy or pathological states. Over 70 publications have resulted from this research to date. Through this project, ollaborations have been initiated between UTL/IST, UT Austin, UPorto/FE, UTL/SEG, and the Hospital Santa Maria.

INTELLIPave

Principal Investigator José Carlos Ferreira Maia Neves at UMinho works with Luis Alberto dos Santos Antunes, ULisboa, and Jorge Aberto Prozzi, UT Austin, to develop formal machinery (an intellect based on symbolic computation and logic programming) to apply and to test a new model that receives data from sensors installed in a highway, in a full scale and in real time conditions, which will assess the behavior of asphalt pavements.

Images from the research project, "Large-eddy Simulation Applications to Combustion." Left: Detail of the file scales of motion (small eddies) of a massive direct numerical simulation (DNS). Right: Side view of a massive direct numerical simulation (DNS) of a planar turbulent jet run at the TACC. The number of collocation points is over one billion.





Large-eddy Simulation Applications to Combustion

The goal of this project is to better understand the dynamics of fire and combustion for applications related to fighting forest fires. The project aims specifically to clarify the interplay between the geometry and dynamics of turbulent/nonturbulent interfaces in shear free or free shear flows, in order to explore the physics of the passive scalar in the challenging context of large-scale vortices and intense vorticity structures, to finally understand how to model the dynamics of the passive scalar, scalar variance and scalar dissipation near jet edges. Principical Investigator is José Carlos Fernandes Pereira, at IST/UTL. This research has helped in concluding one PhD thesis and six MSc dissertations, and has resulted in several journal publications.

Additional Research Activities by Topic

Computational biology (Professors Tandy Warnow and Keshav Pingali, UT Austin, and Professor Joao Sobral, University of Minho)

- Professors Pingali and Warnow worked with Diogo Telmo Neves and Professor Joao Luis Sobral from the University of Minho on the development of a parallel version of a computational biology code called "SuperFine". This research led to a publication in the ACM-SAC conference titled “Parallelizing Superfine” by Diogo Neves, Tandy Warnow, Joao Sobral, and Keshav Pingali.

System for programming parallel graph algorithms (Professor Keshav Pingali and Dr. Roman Manevich, UT Austin and Professor Miguel Monteiro, New University of Lisbon, Portugal)

- Professors Pingali and Monteiro performed research on parallel programming patterns for irregular computations such as those that deal with large graphs. The work is being performed jointly with Dr. Roman Manevich (UT Austin) and Pedro Monteiro, a graduate student of Professor Miguel Monteiro. Pedro Monteiro visited Professor Pingali’s research group in summer 2011. This research led to a publication titled “Parallelizing Irregular Algorithms: A Pattern Language” by Pedro Monteiro, Miguel Monteiro and Keshav Pingali at the 18th Conference on Pattern Languages of Programs (PLoP).

High-performance linear algebra libraries (Professors Robert van de Geijn and Don Batory, UT Austin and Professor Joao Sobral, University of Minho)

- Van de Geijn taught a module at the June 2010 workshop at Minho.
- Summer 2010, 2011: Performed research with Rui Goncalves, PhD student, University of Minho.
- One of van de Geijn's students, Bryan Marker, worked closely with Rui and published the following paper with Don Batory and Rui Goncalves. Taylor L. Riché, Don Batory, Rui Gonçalves, Bryan Marker. "Architecture Design by Transformation". FLAME Working Note #54. The University of Texas at Austin, Department of Computer Science. Technical Report TR-10-39. Dec. 14, 2010.

Distributed computing (Professor Vijay Garg and David Alves, Coimbra)

- April 2011: Hosted David Alves for a visit to my research lab (PDSLAB) at the University of Texas, Austin. Exchanged research ideas.
- July-August 2011: Hosted Andre de Costa (University of Minho) and Andre Lourenco (University of Coimbra) as summer interns. Mentored their projects on fault-tolerance in distributed systems.
- September 2011-January 2012: Hosted David Alves (Coimbra) for a semester long visit to UT Austin. He is attending my course on Distributed Systems and collaborating on research in Map-Reduce and P2P systems.
- August 2011 - current: Co-supervision of David Alves for Ph.D. dissertation.
- September-November 2011: Hosted Portuguese postdoc, Bruno Oliveira, to visit and work on software engineering for modular programming and graph representations.

CoLab UT-CVC-Portugal Collaboration Project (Professor Chandrajit Bajaj, UT Austin and Professor Adelia Sequeira, Technical University of Lisbon)

- Work in our group has been in collaboration with Prof. Adelia Sequeira of Technical University of Lisbon (and also jointly with the research group of Alfio Quarteroni of EPFL Lausanne and Luciano Teresi of U of Rome, both of whom are collaborators of Adelia Sequeira). The primary goal of this collaboration is to produce methods and tools for modeling and pulsatile flow-structure simulations using spatially realistic models of the cardiovascular system reconstructed from multi-detector CT imaging.
- July/ August 2010: Prof. Luciano Teresi of the University of Rome and a collaborator of Prof. Alfio Quateroni of EPFL Lausanne, and Prof. Adelia Sequeira, visited us for 6 weeks. We embarked on a wide range of future interactions within our general project on cardiovascular modeling and finite element mesh generation that involved Prof Sequeira and Prof. Quarteroni. Some improvements on our software meshing pipeline were achieved, as well as interfaces were developed to the COMSOL simulation software.
- November 2010: Adelia Sequeira visited ICES to discuss ongoing progress of her students Simone Rossi and Ana Joao) in our collaboration and also to update us on the use of the CVC software we had shared with her. Some issues on data sharing were also discussed.

- July / August 2011: Dr. Bajaj's lab hosted summer intern Ana Joao from the Technical University of Lisbon, and a student of Prof. Adelia Sequeira. Ana worked on understanding/incorporating heart valves into the geometric models of the human heart that had been recently created in our lab, so they are better appropriate for simulation in packages such as COMSOL.

*Center for Subsurface Simulation (*Professor Mary Wheeler, UT Austin)

- Workshop on Fluid Dynamics in Porous Media 2011 was held in Coimbra in September 2011. The meeting was attended by 48 participants including M. Wheeler and postdoc Ben Ganis from UT Austin and representatives from Portuguese petroleum industry.
- Current collaborative research activities on dynamic Biot systems for geophysics and involves Professors José Augusto Ferreira and Silvia Barbeiro from Coimbra, Professor Andro Michelic from Lyon, France and Professor M. Wheeler from UT, Professor Miguel José Patrício Dias from Portugal will be visiting in the winter to collaborate on fracture mechanics problems.
- In the Spring, Professors Ferreira and Barbeiro will be coming to UT to continue work on geophysics, modeling, and will be bringing a recent PhD from Coimbra to visit as a postdoctoral fellow.

Cardiovascular Engineering Group (Professor Tom Hughes, UT Austin and Professor Adelia Sequeira, Technical University of Lisbon)

- September 2010: Presented research progress during the Annual Conference of the UT Austin|Portugal Program at the Calouste Gulbenkian Foundation and gave an invited talk titled “Mathematical Modeling of Coupled Drug and Drug-encapsulated Nanoparticle Transport in Patient-Specific Coronary Artery Walls under Normal and Diseased Condition," at the Applied Mathematics and Numerical Analysis Seminar organized by the Mathematics Department of Instituto Superior Técnico, Lisbon, Portugal.
- December 2010: Presented an overview of Cardiovascular Modeling to The University of Texas at Austin Mechanical Engineering course "Clinical Cardiology". About thirty attendees of students and Cardiologists.
- January 2011: Presented two technical papers titled “Modeling of Particle Transport and Adhesion in the Authentic Vasculature” and “Mathematical Modeling of Coupled Drug and Drug-Encapsulated Nanoparticle Transport in Patient-Specific Coronary Artery Walls” at the workshop on Isogeometric Analysis 2011: Integrating Design and Analysis in Austin, TX.
- March 2011: Presented a poster at 2nd International conference on Computational & Mathematical Biomedical Engineering (CMBE 2011) entitled "Aneurysm Enlargement Using a Fiber-based Growth Model".
- June 2011: Presented a paper titled “Mathematical Modeling of Coupled Drug and Drug-encapsulated Nanoparticle Transport in Patient-Specific Coronary Artery Walls" as an invited speaker at the Coupled Problems 2011 conference in Kos, Greece.
- November 2011: Featured an overview of the Biomechanics research in cranial aneurysms in The Missy Project quarterly newsletter. Distribution of around 500 recipients.

Education

WACS: Winter Advanced Computing Seminars

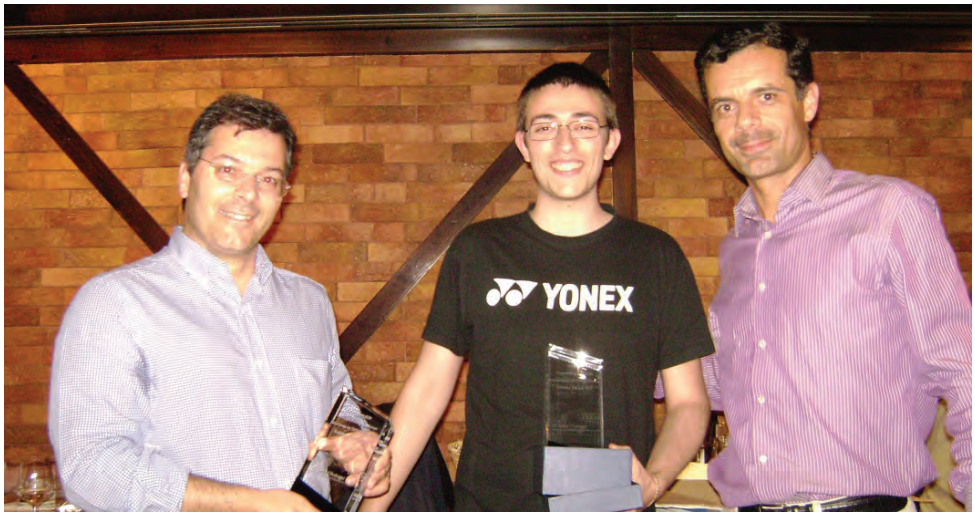
During the week of January 10, 2011, a series of winter seminars was presented by three Texas faculty members that came to Braga to give talks on the science of programming. This event was designed for PhD students in Computer Science and in Computational Sciences in pursuit of the joint degree at Minho-Aveiro-Porto. Participants came from Lisbon, Aveiro, Guarda, Porto, and the Algarve.

Monday, Prof. Keshav Pingali (the Director of the Advanced Computing field in CoLab@Austin), showed that many scientific applications are based against a small set of basic operations, from which it is possible to abstract rules and to bring reasoning to a higher level of abstraction when developing applications to take advantage of parallel platforms.

Tuesday, Dr. Martin Burtscher illustrated that a GPU - commonly used as a vector co-processor to speed up scientific computations - can also be quite efficient to run non-regular applications. Results on an *n-body* simulation case showed that a single GPU device can be faster than 16 of the fastest Intel Xeon devices with 8 cores each. For parallel computing students, Dr. Martin also provided a presentation on a performance analysis tool he developed, including assistance to install this tool in a cluster system and take advantage of its outputs to improve code quality.

Wednesday, Prof. Calvin Lin opened the sessions with an introduction to the current development in parallel languages that contain the best of two competing worlds: a global view of all data, and control on its locality to improve robustness and efficiency. The previous sessions complemented this first session, by showing how these new devices can be efficiently programmed and how we should move towards a real science of parallel programming.

All presentations were followed with active interventions and dialogue.



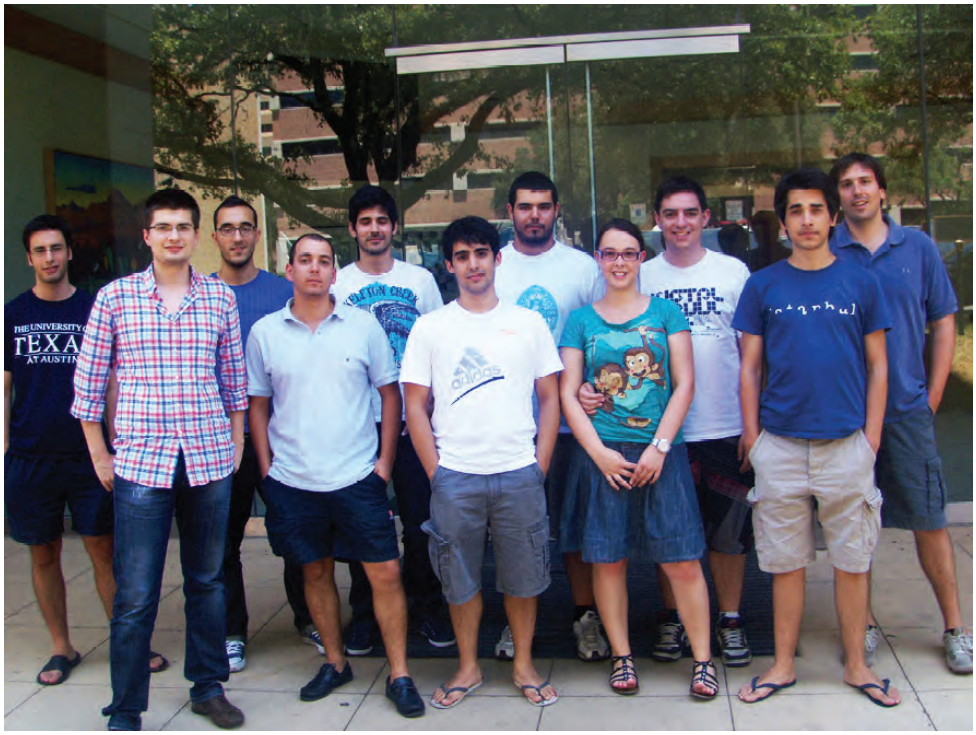
Workshop: CPU Programming for Scientific Application

July 6-8, 2011, the University of Coimbra hosted a workshop in which approximately 75 scientists explored the development of high-performance applications using the latest GPUs in the market. This unique workshop was presented by world class experts: *Jonathan Cohen* from NVIDIA Inc., *Donald Fussell* and *Peter Ruymgaart* from UT Austin and *Martin Burtscher* from Texas State University.

The workshop provided morning presentations followed by practical workshops in the afternoon, in which participants joined a programming competition. Attendees were divided into teams, supervised by *Alcides Fonseca* (DEI/FCTUC), *Nuno Subtil* (NVIDIA), *João Barbosa* (UMinho) and *Gabriel Falcão* (DEEC/FCTUC). The workshop challenge was to implement the Floyd-Warshall algorithm to find the shortest path in a weighted graph. The contesters were to parallelize the algorithm and tune it to provide the best performance with the GPUs available. For the problem given, a quad-core i7 CPU would take over 6 minutes computing. Most participants improved the execution down to 80 seconds using a Tesla GPU, while the winner employed further optimizations that reduced processing time to 16 seconds. Winners of the competition included: first place to *Paulo Flores* and *Gil Lacerda,* from IST Lisbon, second place to *Luís Ribeiro* (DEEC/ FCTUC) and third place to *José Rui Faustino* and *Michael Oliveira,* Physics Department FCTUC.

Advanced Computing Interns

In summer 2011, UT Austin hosted a total of 15 post-graduate interns from Portugal (Minho, Coimbra, and Porto): Ana João, Carlos Mota, Mónica Graca, Jóse Neto, Ricardo Freitas, Tiago Henriques, Andre da Costa, Artur Miguel, Nuno da Silva, Ricardo Alves, Tiago Gomes, and Andre Lourenco.



As in previous years the spectrum of computer science fields that the interns engaged in has wide ranging from irregular application mapping to heterogeneous system, distributed computing platforms, data visualization and simulation to social and network information mapping and flow analysis.

“This initiative contributes to the enrichment of those involved in a multitude of ways. Not only have I been learning and gaining a new perspective on several areas of computer science, I've also been applying what I was taught during the past few years in a real world scenario. This experience has been invaluable for me…” stated David Neto from the University of Coimbra.

The advantages of the program and experience of working alongside top researchers is one of the most common topics when talking with the students including André Lourenço from the University of Coimbra: “The internship enables students to interact closely with research teams working in state-of-the-art topics of Computer Science… and learn from them.” Ricardo Alves from the University of Minho adds that the internships “provides a bridge between Portuguese and UT Austin research teams and transforms the student into a valuable asset for both…”

Nuno Silva and Ricardo Alves from the University of Minho, Ricardo Freitas and Tiago Henriques joined the High Performance Graphics and Parallels Systems group led by Professor Donald Fussell. Nuno Silva focused his research on efficient and physically based techniques to accurately represent the appearance of complex materials. “Accurate appearance of materials such as cloth or leader still represents a major challenge in computers graphics today, specially is real-time is taken into account,” Nuno stated.

Ricardo Alves dedicated is internship to mapping Barns-Hut irregular applications to heterogeneous platforms using the GAMA framework, still in development Ricardo Freitas and Tiago Henriques attempted to develop a program that simulates "drip painting", a form of abstract art in which paint is dropped onto a canvas, using Lattice Boltzmann Model (LBM) as the fluid simulation technique. Mónica Sofia and Tiago Gomes, from UCoimbra and UPorto respectively, joined Professor Keshav Pingali Distributed System group and worked closely with Dimitris Prountzos. Their project for the summer involved exploring new approaches to parallelize Lee's algorithm using Galois System.

André Costa (U.Minho) and André Lourenço (U.Coimbra) joined Vijay Garg distributed system group. André Costa worked with two projects, one to define new agreement policies for Accurate Byzantine Agreement and the other developing an efficient algorithm to decompose a finite state machine into smaller machines, which can ultimately be used to reduce the number of backups needed to support faults in distributed systems – while André Lourenço dedicated his internship to Faults Handling in Distributed Systems, more specifically on Fused Data Structures. "I'm implementing two erasure correcting codes, raptor and turbo codes. Furthermore, I will be measuring the improvement they bring to the whole fusion fault handling system…" he stated.

Professor Lili Qiu group welcomed David Neto and Carlos Mota, from the University of Coimbra into the research group. Under her tutoring David and Carlos develop information-gathering tools directed towards social networks in order to find and map traffic flow patterns of their users. To achieve their goal they exploited distributed crawling techniques to enable faster gathering of large volumes of information.

"My project consists of exploiting FPGAs devices and realizing their capabilities. I'm implementing both regular and irregular memory access algorithms to test on Gorilla architecture, a recent programming model tool," is how Artur from the University of Minho describes his project under the tutoring of Professors Derek Chiou and professor Andreas Gerstlauer from ECE department on FPGA irregular application mapping.

"The UT Austin - Portugal interchange program provides a remarkable experience for the people involved and their institutions. This kind of collaboration provides vast insight and knowledge, often serving as a basis for greater projects," Nuno Silva stated.

Mathematics

Executive Summary

The CoLab Advanced Mathematics initiative involves the Institute for Computational Engineering and Science (ICES) and the Department of Mathematics at UT Austin and mathematical research centers and groups in four Portuguese universities including the Mathematics Department of Instituto Superior Técnico (IST), the Mathematics Department of the School of Sciences of UL (FCUL), the Mathematics Department of the School of Sciences and Technology of UNL (FCTUNL), and the Departmant of Mathematics of the School of Sciences and Technology of U. Coimbra (FCTUC).

Key Personnel

Luis A. Caffarelli, *UT Austin*

Irene Gamba, *UT Austin*

Diogo Gomes, *IST*

Luís Nunes Vicente, *U.Coimbra*

Research

Applied Mathematics: From Dynamical Systems to Cryptography

Researchers from several disciplines are joining efforts in applied mathematics including dynamical systems, financial mathematics, game theory, optimal control, viscosity solutions, number theory, and cryptography. In dynamical systems the main focus research areas are Aubry-Mather theory, renormalization and attractors of semilinear parabolic equations. In financial mathematics focus is being placed on developing forward price models, interest rate models and stochastic volatility models, and first passage times in diffusion processes. Game theory oligopoly models are being considered to investigate the following issues: uncertainty, signaling, dynamic price discrimination (linear prices and non linear pricing), research and development programs, location decisions, advertising strategies and their effects, trade policy models and competitive strategies in spatial networks, as well as mean-field games and its applications. Optimal control theory and viscosity solutions of Hamilton-Jacobi equations are essential to understand important problems in dynamical systems (Aubry-Mather theory) and in mathematical finance. These directions are being pursued, as well as certain problems in multiple criteria decision-making. Finally, in the emerging applied area of cryptography, the group is examining post-quantum cryptography in order to propose cryptosystems based on rational points on curves over function fields and show that they are robust to quantum adversaries. These diverse efforts are overseen by Principle Investigator Professor Diogo Gomes, IST.

Aberrant Crypt Foci and Human Colorectal Polyps: Mathematical Modeling and Endoscopic Image Processing

Isabel Maria Narra de Figueíredo, Univ. of Coimbra is Principal Investigator for this project that focuses on the mathematical modeling and endoscopic imaging

processing of aberrant polyps and aberrant crypt foci (ACF, which statistically precede polyp formation). Multiscale methods are used in a modeling process which involves partial differential equations and level set methods, to simulate the dynamics and shape of ACF and polyps populations. The project's aim in image processing is to develop computerized and fast algorithms to identify and assess ACF and polyps patterns, captured in vivo by endoscopy in order to facilitate and speed up screening methods towards CRC prevention.

Nonlinear partial differential equations

Nonlinear partial differential equations (PDEs) are central in modern applied mathematics, both in view of the significance of the concrete problems they model and the novel techniques that their analysis generates. This project's Principal Investigator is José Miguel Urbano, Univ. of Coimbra. Advancement in understanding of these equations can be related to many applications such as the motion of multi-phase fluids in porous media, the melting of crushed ice (and phase transitions in general), the behavior of composite materials, the pricing of assets in financial markets, or the quantum drift diffusion in semiconductors.

Reaction-diffusion in porous media

In recent decades, diffusion in porous media has attracted researchers from several disciplines, such as geosciences, environmental sciences, mechanics, biology, chemistry, petroleum engineering, biomedical engineering, physics and mathematics. Diffusion in porous media has applications to problems such as groundwater contamination, diffusion in polymers, and flow in oil reservoirs. The aim of this project is to introduce memory effects in the models for fluid flows in porous media characterized by small-scale and large-scale heterogeneities in several contexts. The Principal Investigator is José Ferreira, Univ. of Coimbra.

UT Austin Visits by Portuguese Researchers

December 2010

Diogo Gomes, Director, CoLab Mathematics, Portugal Prof. Gomes visited the Department of Mathematics at UT Austin from December 12 - 17, 2010 to meet with collaborators and discuss the progress of doctoral students in the dual degree program with UT Graduate Advisor, *Dan Knopf.*

January 2011

Jose Miguel Urbano, University of Coimbra and *Juha Videman, I*nstituto Superior Técnico (IST) Lisbon visited the Institute for Computational Engineering and Sciences (ICES) and the Department of Mathematics at UT Austin on January 17 - 18, 2011 to meet with collaborators in connection with their CoLab Research project, Nonlinear Partial Differential Equations. They then traveled to Corpus Christi, Texas to meet with the Costal Ocean Modeling group affiliated with Texas A&M on January 20-21, 2011.

Dr. Luis Daniel Abreu visited the Department of Mathematics at The University of Texas at Austin from 23 January till 6 of February with the purpose continuing his collaboration with *Prof. John Gilbert.* During this period they finished a research paper entitled "Contraction of Gabor frames to the interval (-1,1)"

March 2011

Diogo Gomes, Director, CoLab Mathematics, Portugal Prof. Gomes visited the Department of Mathematics at UT Austin from March 02 - 11, 2011 to meet with collaborators and discuss the progress of doctoral students in the dual degree program with UT Graduate Advisor, *Dan Knopf.* He also attended special lectures held in the Institute for Computational Engineering and Sciences by *Pierre Louis Lions.*

Prof. Isabel Figueiredo visited the Institute for Computational Engineering and Sciences from March 14 - May 06, 2011 to continue her joint research on Mathematical Modeling and Endoscopic Image Processing.

Agnese Di Castro (U Coimbra) and *Fernando Charro* (UT Austin) have initiated a collaboration in the area of Analysis of Nonlinear Partial Differential Equations. Their focus is on “Regularity for singular/degenerate PDE's” in the mathematics section of a UT Austin | Portugal project, coordinated by *Prof. José Miguel Urbano* (U Coimbra).

For this purpose, *Agnese Di Castro* visited Austin from March 27 - April 9, 2011. The two researchers studied local properties of solutions of some nonlinear PDE's (e.g. a semilinear equation associated to the p-laplacian). In particular they proved quantitative local estimates such as lower/upper bounds, quantitative Harnack inequalities and Hölder estimates and discussed the application of these estimates. For instance, in the case of the p-Laplace equation, they studied the possibility of obtaining *a-priori* bounds of Gidas-Spruck type uniform in *p*, as well as many other applications in the study of some limiting fully nonlinear PDEs.

April 2011

Prof. Antonio Salgueiro (U Coimbra) was in residence at The University of Texas at Austin, Department of Mathematics for the period April 1, 2011 to May 15, 2011 to collaborate with *Prof. John Luecke* in connection with the UT Austin-Portugal Program, International Collaboratory for Emerging Technologies, CoLab.

August 2011

Ana Margarida Melo (Portuguese) and *Filippo Viviani* (Italian) visited the UT Department of Mathematics from August 23 - September 4, 2011 to collaborate with *Prof. Sean Keel* in the area of algebraic geometry.

Visits to Portugal by UT Faculty

Former UT Faculty member, *Dr Cristina Caputo* visited *Professor Delfim Torres* at the University of Aveiro during June 16 - 28, 2011. Their collaboration started at the University of Texas in 2008. During her visit at the University of Aveiro, Dr. Caputo had several working sessions with Professor Torres on the calculus of variations and fractional calculus. They have some preliminary results related to a duality concept for the fractional derivatives. Dr Caputo, who is currently on the faculty at the University of Arkansas, is thankful to the CoLab program for having had this wonderful opportunity.

Dr. Georg Stadler visited the University of Coimbra and delivered a plenary presentation at the "Congress on Numerical Methods in Engineering – CMNE

Images from Dr. Stadler's plenary presentation: a) Seismic wave originating from point source at north pole using a simplified earth model; b) Seismic surface wave; c) Volume rendering of waves originating from a synthetic earthquake; visualization by Greg Abram (TACC).

2011," which presented the current status of an interdisciplinary cooperation on a study of inverse wave propagation, which is pursued at the Institute for Computational Engineering and Sciences (ICES) at UT Austin, in collaboration with the Institute for Geophysics at UT. The team combines efficient numerical methods (discontinuous Galerkin discretization for coupled acoustic/elastic wave equations) and uses parallel HPC resources (as for instance provided by TACC) to approach a so-called inverse problem, whose ultimate goal is to improve our knowledge about the interior of the Earth. *Prof. Richard Tsai* of the Institute for Computational Engineering and Sciences and the Department of Mathematics, UT Austin, visited *Prof. Isabel Figueiredo* at U Coimbra from October 5 to October 8, 2011 to continue their collaboration on an ongoing research program.

Postdoc Visits to UT Austin

Filippo Cagnetti (IST, Lisbon) is planned to be in residence in the Department of Mathematics at The University of Texas at Austin for the Spring 2012 semester as a Postdoctoral Fellow funded by the FCT. He will collaborate on research in Partial Differential Equations with *Prof. Luis Caffarelli* and *Prof. Alessio Figalli.*

Education

Summer School, Lisbon: Aubry-Mather Theory and Optimal Transport with Nonlinear PDEs Workshop

The Aubry-Mather theory and Optimal Transport Summer School and Nonlinear PDEs Workshop were held at the Instituto Superior Técnico June 13 - 24, 2011. During the first week courses were presented by Luigi Ambrosio (SNS Pisa), Patrick Bernard (CEREMADE - Université Paris-Dauphine), Yann Brenier (Université de Nice), and Alessio Figalli (UT Austin). A workshop week followed this event, to dig deeper into nonlinear PDEs. The event was sponsored by the UT Austin-Portugal Program in the Area of Mathematics (CoLab), and the

Center for Mathematical Analysis, Geometry and Dynamical Systems (CAMGSD-LARSyS, and was part of the program of the Portuguese International Center for Mathematics (CIM). Organizers were Alessio Figalli (UT Austin) and Diogo Gomes (Instituto Superior Técnico).

Attendees included about 32 PhD students from Portugal, UT Austin, France, Italy, England, Switzerland, and other European countries. The workshop included a list of about twenty internationally acclaimed researchers in the area of Nonlinear PDEs.

Students were provided the opportunity to (1) learn the basics of optimal transportation and Aubry-Mather theory; (2) discover several of the connections between them; (3) have an overview on the latest progresses and discoveries, to also have a better idea of the current directions of research. The focus of the courses was on the application of optimal transport to the calculus and heat flows in metric measure (Ambrosio), the Lax- Oleinik semi group and its relation to Hamilton-Jacobi equations (Bernard), the connections between optimal transport and fluid mechanics (Brenier), and the links between optimal transport, functional inequalities and Riemannian geometry (Figalli). The second week provided the opportunity to deepen this instruction as participants interacted and exchanged ideas in a non-lecture environment.

Summer School, UT Austin: PDEs & Mathematical Physics

An RTG Summer School on topics in Analysis, PDEs and Mathematical Physics was held at The University of Texas at Austin July 18 - 29, 2011. Prerequisites for the course were advanced calculus, linear algebra, and undergraduate partial differential equations. Nine students from Portugal were selected to participate: *Susana Gomes, Joao Meireles, Maria Luísa Vilelas, Catarina Lopes Dias, João Matias, João Pedro Casimiro Rijo, Andreia Teixeira, Simão Correia, Jocelyn Lochon.* Courses included:

- The enigma of the equations of fluid motion: a survey of existence and regularity results by *Natasa Pavlovic* (University of Texas at Austin)
- Introduction to dispersive partial differential equations by *Nikos Tzirakis* (University of Illinois Urbana-Champaign)
- Introduction to the derivation of transport equations from quantum mechanics by *Thomas Chen* (University of Texas at Austin)
- Mathematical challenges from non-linear fiber optics by *Dirk Hundertmark* (University of Illinois Urbana-Champaign)

Workshop, Portugal: Fluid Dynamics In Porous Media

September 12-14, 2011, The workshop on Fluid Dynamics in Porous Media was an initiative of the UT Austin | Portugal program for Mathematics, in partnership with CMUC (Centre for Mathematics of University of Coimbra). It was held in the Department of Mathematics of Faculty of Sciences and Technology of the University of Coimbra, on September 12-14, 2011. The organizers included: *Sílvia Barbeiro* (U Coimbra), *José Ferreira* (U Coimbra), *Gonçalo Pena* (U Coimbra) and *Mary Wheeler,* (UT Austin).

The event focused on mathematical models and numerical simulation in fluid dynamics in porous media bringing together mathematicians, engineers, geoscientists, and computing experts in a cooperative environment. The workshop was comprised of seven fifty-minute plenary sessions. The proceedings of the workshop will be published in a special edition of "Textos da Matemática" of the Department of Mathematics of the University of Coimbra.

Summer School And Workshop 2012

A Summer School and Workshop are planned to explore Stochastic Control and Mathematical Finance, July 02 - July 13, 2012 at the Universidade Nova de Lisboa. *Diogo Gomes,* Director, CoLab Mathematics, Portugal, IST Lisbon and *Gordan Zitkovic,* Dept. of Mathematics, Univ. of Texas are organizing the event.