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UTAustin Portugal

Advanced Computing Training Program
Final Report

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The work environment at the Texas Advanced Computing Center gathers a comprehensive cyberinfrastructure ecosystem of leading-edge resources in high performance computing (HPC), visualization, data analysis, storage, archive, cloud, data-driven computing, connectivity, tools, APIs, algorithms, consulting, and software, together with a team of skilled experts, that help researchers in the pursuit of their work. My work program attempted to take the best advantage of this eclectic range of possibilities by encompassing training in machine learning, high performance computation and visualization techniques.

I began my training at TACC with the Data Mining & Statistics group, under Drs. Weijia Xu and Zhao Zhang's supervision in the field of data mining, more specifically, in deep learning applied to image and video recognition, I also took the time to better understand the impact of machine learning techniques on multiple fields of physics, including my own work. During this time I worked with high-performance storage systems, such as Maverick 2 and Stampede 2 and learned how to work and manage large scale systems as those available at TACC.

Soon after I worked with Dr. João Barbosa in visualization with High performance Computation, especially regarding the optimization of computational resources and how to structure simulations to run faster and more efficiently in large computing systems, such as those available at TACC. This was important to my own research work. During this period, I trained in new programming tools, including Keras, Torch, VectorFlow, MPI and Paraview. I also had the chance to attend several of the courses available at TACC on a multitude of topics, which I must recommend for the quality of their contents.

A word of appreciation to everyone at TACC with whom I had the opportunity to interact scientifically, starting with the director Dan Stanzione, but not forgetting Paul Nevrátil, Bill Barth and their teams. We have had interesting and inspiring conversations.

Initially I had two main goals in my participation in the UT Austin Portugal Program. The first, to learn new skills which I could bring back home and teach (spread the work so to speak), specially within my team. Since I have arrived, I have organized in collaboration with the UT Austin Portugal Program and TACC a summer school on data visualization, and I hope it to be a prototype for other activities.

The second objective was to collaborate with people at TACC to scale up my own research work, namely simulation with quantum many-body systems, to be able to produce simulations with higher resolution and modeling larger systems, which require the type of computer systems available at TACC. I believe that the training received at TACC was a push in the right direction, much to the merit of the insights from Dr. João Barbosa, but what I believe to be the main contribution to my current research is the collaborations the remain after leaving Texas.

My overall impression of this experience is highly positive: the institution has excellent working conditions, the team there is collaborative and welcomes you, the city has a vibrant culture and a high standard of living.