A Message from the Director

Dear Friends of the ACIS lab,

Thanks to the continued support of many of you, the ACIS lab continues to thrive as a place where outstanding researchers work with state-of-the-art equipment to advance information-processing science and technology. In this issue we share with you news about the most important assets of the ACIS lab: people and infrastructure. Despite the lab’s young age, ACIS folk are making ACIS well known nationally and internationally, at major technical conferences and in industry. ACIS alumni are now working at, among others, Amazon, Florida International University, Intel, IBM, Microsoft and VMWare. I expect this trend to grow as our programs develop and more students join the lab and graduate. ACIS faculty continue to be successful in securing competitive funding for research projects and the infrastructure needed for their execution. This issue mentions some of these projects which promise to further position ACIS as a unique laboratory in the world for research on virtualization, cloud and distributed computing, computer architecture and autonomic computing. You are welcome to contact us to learn more about ACIS activities and I invite you to come, visit and even spend time working with us – ACIS has become an exciting place to learn, do research, make friends and enjoy turning novel ideas into functioning systems. You can reach me at fortes@ufl.edu.

Sincerely yours,
José A. B. Fortes (on behalf of ACIS lab members)

Meet the ACIS Lab

ACIS Lab folk at the University of Florida. Pictured, top row (left to right): Ramkumar Shanka, Tae Woong Choi, Clay Hughes, James Poe, Jianyang Xu, David Wolinsky. Middle row (left to right): Dr. Tao Li, Girish Venkatasubramanian, Dr. Renato Figueiredo, Pierre St. Juste, Yonggang Liu, Dr. José Fortes. Bottom row (left to right): Andréa Matsunaga, Mauricio Tsugawa, Prapaporn Rattanatamrong, Xin Fu, Dina Stoeber, Priya Bhat. Not pictured: Dr. Herman Lam, Dr. Oscar Boykin, Julie Walters, Jing Xu, Selvi Kadirvel and Yuchu Tong.
Infrastructure Expansion Enables Cutting-edge Research

ACIS is renewing and considerably extending its computational resources—within the lab and across multiple institutions—with newly funded and continuing equipment projects. Here is an overview of what has taken place this year:

**Atanasoff:** Our IBM/SP2 distributed memory parallel computer was decommissioned, after providing years’ worth of CPU cycles to researchers in ACIS, the QTP (Quantum Theory Project) group and other ACIS collaborators. As usual in the computing field, newer and faster machines become available with every year that goes by. As we disassembled Atanasoff (see pictures), we made room and power in our data center available for our new systems.

**NSF MRI:** The shared-memory cluster funded by the ongoing Major Research Infrastructure (MRI) project “Acquisition of Instrumentation for Coupled Experimental-Computational Neuroscience and Biology Research” is now our most powerful computing system. It is a 32-CPU (128-core) IBM eServer 1350 cluster organized as two 64-core, 512GB NUMA systems. Given the new cluster’s large number of cores and memory capacity, it was a bit challenging to virtualize, but now it is running Xen just fine—kudos to Mauricio Tsugawa, a senior ACIS student researching virtual network architecture.

**NSF CRI Archer:** Another ongoing infrastructure project is funded by the NSF Computing Research Infrastructure (CRI) project entitled “Archer: Seeding a Community-based Computing Infrastructure for Computer Architecture Research and Education.” While the equipment will not arrive at the ACIS Lab until 2010, the distributed system is up and running with clusters at Florida State University, Northeastern University and the University of Texas at Austin, with another cluster at the University of Minnesota to come online in fall 2009. ACIS student David Wolinsky provided remote configuration and management for the active clusters. More information on the Archer project is available at http://archer-project.org.

**NSF CRI Autonomic Testbed:** A new project funded by the CRI program, slated to start in the fall of 2009, “An Instrumented Datacenter Infrastructure for Research on Cross-Layer Autonomics” is a collaboration among the three university sites of the Center for Autonomic Computing (UF, Rutgers University and the University of Arizona). It will deploy a distributed set of instrumented clusters that will enable research on cross-layer autonomic computing—connecting services with virtualization and platform architecture in complex distributed systems—one a realistic data center testbed.

**NSF CRI DiRT:** Another new project also funded by the CRI program, the “Distributed Research Testbed (DiRT)” creates a testbed across five U.S. universities (the University of Mississippi, Notre Dame, University of Hawaii, University of Chicago, and UF). The testbed consists of cluster and storage nodes that will provide researchers with access to a heterogeneous, geographically distributed set of resources with flexibility in the configuration of virtualized and data-intensive wide-area experiments.

**Amazon EC2:** In addition to physical local resources, we have obtained access to the Elastic Cloud (EC2) infrastructure through an Amazon Web Service grant. The resource credits will be used for research of systems “at scale,” giving us the flexibility of dynamically bringing up and down pools of hundreds of virtual machines on the distributed data centers hosted by Amazon.
Dr. Fortes presents keynote address at ISPDC ’09. Dr. Fortes gave a keynote address at the 8th International Symposium on Parallel and Distributed Computing (ISPDC ’09), held July 1-3, 2009, in Lisbon, Portugal. Dr. Fortes’ talk, entitled “Decoupling Quality of Service, Resource Management and Connectivity in Clouds and Data Centers,” dealt with resource management systems for distributed computing and data center environments.

Yonggang Liu and Priya Bhat join ACIS Lab. Two graduate students have joined the ACIS Lab since our last newsletter. Yonggang Liu, a graduate of Beihang University in China, is doing research with Dr. Figueiredo on the IPOP project (for more information on the IPOP project, visit IPOP on the Web at http://www.grid-appliance.org/wiki/index.php/IPOP). Priya Bhat is the recipient of a University of Florida Alumni Graduate award for a four-year term and is currently studying computer architecture, concurrent and distributed computing, virtual machines, machine learning and pattern recognition, and real-time applications under the direction of Dr. Fortes. Welcome, Yonggang and Priya!

Linton Abraham and Jonathan Wyers visit for the summer. Linton Abraham is visiting the ACIS Lab for the summer to participate in the IPOP project. Linton is currently an undergraduate student at Clemson University and is conducting research under the direction of Dr. Sebastien Goasguen. Jonathan is a high school student from Potomac Falls High School in Loudoun County, VA, and was placed with the lab through the University of Florida’s Student Science Training Program (SSTP). During his stay at ACIS, Jonathan will be working with Dr. Figueiredo on monitoring and visualization of data from PlanetLab.

Casey, Vineet and Maurício defend PhD theses. Casey Jeffery and Vineet Chadha defended their theses this year. Casey Jeffery was advised by Dr. Figueiredo on a project entitled, “Hypervisor-based Fault Tolerance in Many-core Computing Platforms.” For his dissertation, Casey developed an application that uses idle resources in distributed computing systems to provide dynamic fault tolerance that compensates for failures on the single-transistor level. Vineet Chadha, also advised by Dr. Figueiredo, focused his thesis research on input/output (I/O) workloads in data centers. He defended his thesis on October 13, 2008. Finally, Maurício Tsugawa, a student of Dr. Fortes’, became the most recent ACIS PhD graduate when he defended his thesis on virtual networking on July 10. Congratulations to Dr. Jeffery, Dr. Chadha, and Dr. Tsugawa!

Dr. Li receives NSF Career Award. Dr. Tao Li of ACIS Lab has been awarded a National Science Foundation CAREER grant. As stated on the NSF web site, the CAREER award recognizes young faculty “who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations.” Congratulations, Dr. Li!
News @ACIS

Tae Woong, Andrea and Jing defend thesis proposals. Three graduate students have defended their thesis proposals since our last newsletter. Tae Woong Choi, a PhD student working with Dr. Boykin, presented his thesis proposal concerning general search systems and peer-to-peer (P2P) networks on June 29. Andréa Matsunaga, a PhD student of Dr. Fortes, has been involved in several major projects at ACIS, including the Transnational Digital Government Project and the AFRESH (Atomic-scale Friction Research and Education Synergy Hub) Project. Andréa’s work addresses problems faced in deploying and managing scientific applications on cloud systems. Jing Xu is also under the direction of Dr. Fortes. She presented her thesis proposal, entitled “Autonomic Application and Resource Management of Virtualized Distributed Computing Systems,” on May 22. Congratulations to all our new doctoral candidates!

INCISE report published. Dr. Fortes has recently published a report on the National Science Foundation funded Workshop for Instrumentation Needs of Computer and Information Science and Engineering Research. Dr. Fortes organized the workshop, which was held in conjunction with the 2008 Computing Research Association conference in Snowbird, Utah. The workshop brought together academics working on computer and information science and engineering to discuss the instrumentation needs of the community at large and make recommendations for funding agencies and grant writers. The report is available at https://www.acis.ufl.edu/~jooly/acis/INCISEFinalReport.pdf. To request a hard copy of the final report on the INCISE workshop, please contact Dina at dstoeber@acis.ufl.edu.

Girish presents at MMCS ’09. Girish Venkatasubramanian, a PhD student working with Dr. Figueiredo, presented a paper at the Workshop on Managed Many-core Systems (MMCS ’09) in Washington, D.C., on March 7th of this year. The MMCS workshop was held in conjunction with the Fourteenth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS ’09). Girish also presented a poster at ASPLOS ’09 on his work with Dr. Figueiredo’s Archer Project.

Andréa presents at e-Science ’09. Andréa Matsunaga, a graduate student working with Dr. Fortes, presented a paper at the 4th IEEE International Conference on e-Science, held in Indianapolis, December 10-12, 2008.

David gives invited talks at two spring conferences. ACIS student David Wolinsky gave invited talks at the the Open Science Grid (OSG) All Hands Meeting, held March 2-5 at the LIGO Livingston Observatory in Livingston, LA; and at Condor Week, held at the University of Wisconsin April 20-23.

Xin receives CIFellow award. ACIS student Xin Fu has been awarded a Computing Innovation Fellowship. The Computing Innovation Fellow Program is organized by the Computing Community Consortium (CCC) and the Computing Research Association (CRA) with funding from the National Science Foundation and grants fellowships to new PhD students starting one- to two-year postdoctoral positions. Xin will begin her postdoctoral study with Dr. Sarita Adve at the University of Illinois at Urbana-Champaign this fall.

Ming and Jing had a baby! ACIS alum Ming Zhao and ACIS student Jing Xu had a baby on October 24, 2008. We welcome Eileen, no longer the newest member, but still the smallest member, of ACIS Lab.

Conference Publications

The following is a list of recent publications by ACIS members:

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Find out more!

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Upcoming Events

**David to present at SC09.** David Wolinsky, a graduate student working with Dr. Figueiredo, will present a paper at the upcoming Supercomputing conference (SC09), to be held in Portland, Oregon, November 14-20, 2009.

**Girish to present at SBAC.** Girish Venkatasubramanian, another graduate student working with Dr. Figueiredo, will present a paper at the 21st International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD 2009), to be held October 28-31 in Sao Paulo, Brazil.

**Dr. Figueiredo plans Archer tutorial.** Dr. Figueiredo will present a tutorial on Archer Project at the 42nd Annual IEEE/ACM International Symposium on Microarchitecture (MICRO 2009), to be held in New York City, this December 12-16. In this tutorial, Dr. Figueiredo will instruct attendees on how to use Archer, a comprehensive resource-sharing system for research and education in computer architecture.

**Dr. Figueiredo to co-chair ICAC 2010.** Dr. Figueiredo will co-chair program next year’s International Conference on Autonomic Computing (ICAC 2010) with Emre Kiciman in Washington, D.C. Dr. Kiciman is a research scientist at Microsoft.

**CAC semiannual meeting to be held in October.** The next meeting of the Center for Autonomic Computing will be held October 29 & 30, 2009, at Mississippi State University. The CAC meeting will be held in conjunction with a planning meeting for MSU faculty researching autonomic computing, in hopes of creating a CAC university site at MSU in 2010. More information on the fall CAC meeting can be found at the main CAC website at http://www.nsfcac.org.

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