

Curriculum Vitae - Allan M. Espinosa

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Objective

Interested in research internship positions working with distributed or parallel filesystems groups to support data-intensive science applications at petascale computing levels.

Education

PhD student in Computer Science (2008—present)
University of Chicago
Advisor: Ian Foster

MS in Computer Science (March 2011)
Thesis Title: Cybershake on Opportunistic Cyberinfrastructures
University of Chicago
Advisor: Ian Foster

BS in Electronics and Communications Engineering (2007)
Program Awardee, Latin Honors (*Cum Laude*), GPA: 3.63
Ateneo de Manila University, Philippines

Research Experience

Distributed Systems Laboratory, University of Chicago

- *Swift* – Designed scientific workflows to support bioinformatics, earthquake/ geoinformatics and molecular dynamics simulations as loosely-coupled and tightly-coupled applications in petascale systems such as the Argonne IBM BlueGene/P and TACC Ranger SUN Constellation aside from distributed resources like the Open Science Grid. Also submitted several patches containing feature enhancements and bug fixes to the opensource project. (project page: <http://www.ci.uchicago.edu/swift>)
- Modelling large scale scientific workflows on opportunistic computing environment such as the Open Science Grid. Current work involves scaling hundreds of thousands of jobs along with its needed data transfer requirements. Explored performance models and analyzed various scheduling and data transfer mechanisms.
- Tested IO performance of parallel filesystems such as IBM GPFS and SUN Lustre. Results were used to design collective IO mechanisms to remove data access bottlenecks that occur in large-scale scientific workflows.

Communications group, Ateneo de Manila University

- Monitoring tropical rain using state of the art acoustic sensors. The university was the first

- to use such devices for studying rain.
- Characterized performance of a 26 GHz WIPAS link under tropical rain conditions. Research was performed in collaboration with the Japan Radio Co. and Philippine Long Distance and Telephone Co.
- Developed software for monitoring the received signal levels of 5 GHz wireless basestations for characterizing its performance under Philippine rain.
- Deployed proof-of-concept video services in the university. Worked with an education and technology oriented NGO (Fit-Ed) to deploy a platform for delivering content on what it means to be a Filipino (Sino ka Pinoy?).

Biomedical engineering initiative, Ateneo de Manila University

- A multi-disciplinary collaboration with the Medical City (a private hospital) and Ateneo School of Medicine and Public Health.
- Prototyped a medical image retrieval system using secure grid infrastructures with a group of undergraduate computer science students.
- Developing systems and analyzing SPICE models for ISFET in application to biomedical sensors.

High performance computing group, Ateneo de Manila University

- Part of the university's representative to the proposed EUAsia project—Interconnection and interoperability or Grids between Europe and Asia coordinated by the National Institute of Nuclear Physics (INFN).
- Part of the initiative for a national grid (RP Grid) infrastructure lead by the Advanced Science and Technology Institute (ASTI).
- Installed and deployed a low-latency interconnect (Myrinet) cluster. Facilities were provided by the National Advanced Institute of Industrial Science and Technology (AIST), Japan as part of the MedGrid project.
- Currently deploying a new ethernet-based interconnect Beowulf cluster. Funded by the Commission on Higher Education, Center of Excellence in Mathematics (CHED-COE) grant.
- Deployed and tested small grid testbeds using the Globus Toolkit v4.0.
- Installed grid middleware (AliEn) for participating in the PANDA Grid, a computing facility to support the anti-Proton ANnihilation at Darmstadt (PANDA). Collaborated with colleagues from the University of Glasgow and Gesellschaft für Schwerionenforschung mbH (GSI) to connect Ateneo de Manila University to the grid.

Work History

Argonne National Laboratory

Guest Graduate Researcher (October 2008—present)

University of Chicago

Research Assistant (June 2008—present)

Cybersoft

Consultant (July 2007—November 2007)

- co-developed software to aid an automated OCR process using image processing techniques.

Ateneo de Manila University

Assistant Instructor (April 2007—June 2008)

- affiliated with the Electronics, Computer and Communications Engineering (ECCE) Department.
- involved in the department's various multi-year collaborative research projects.

- provided mentoring to undergraduate research students in terms of skills and project direction.

Cluster System Administrator (February 2004—June 2008)

- Provides technical assistance for the users of the system.
- Responsible for maintaining two Beowulf clusters.
- Have participated in research initiatives requiring the university's computational facilities in various fields such as molecular dynamics, mesoscale climate modeling, cellular automata, coding theory, and medical image analysis.

Philippine Long Distance and Telephone Company

Intern (April—May 2006)

- Affiliated with the Products and Services Engineering Division of the Network Services Group.
- Developed an internal web application in support for provisioning digital PBX services for local employees.
- Involved in the deployment and prototyping of various network services such as video conferencing, IP TV and other enterprise systems.

Philippine Science High School

Research Assistant (June 2001—May 2002)

- explored the different features of the LEGO RCX Mindstorms system.
- Gave student input for the development of the Science Education Institute's (SEI) robotics curriculum for high schools.
- Co-organized and facilitated a robotics workshop for high school teachers

Publications and Conference Presentations

M. Wilde, I. Foster, K. Iskra, P. Beckman, Z. Zhang, A. Espinosa, M. Hategan, B. Clifford, I. Raicu, "Parallel Scripting for Applications at the Petascale and Beyond," in *Computer*, vol. 42, no. 11, pp. 50-60, 2009.

A. Espinosa, "Collective data management strategies for loosely coupled petascale programming," poster at the SC09 Early Adopters Ph.D. Workshop, Portland, OR, Nov. 2009.

M. Wilde, I. Raicu, A. Espinosa, Z. Zhang, B. Clifford, M. Hategan, S. Kenny, K. Iskra, P. Beckman, and I. Foster, "Extreme-scale scripting: Opportunities for large task-parallel applications on petascale computers," in *Journal of Physics Conference Series*, vol. 180, no. 1, July 2009.

N. Libatique, G. Tangonan, R. Gustilo, W. Seah, C. Pineda, M. L. Guico, G. Abrajano, R. Ching, J. L. Zamora, A. Espinosa, A. C. Valera, R. Lamac, H. Dy, J. Pusta, E. M. Trono, A. Gimpaya, J. R. San Luis, S. J. Gonzales and A. T. Lotho, "Design of a Tropical Rain--Disaster Alarm System: A New Approach based on Wireless Sensor Networks and Acoustic Rain Rate Measurements," presented at the *IEEE Instrumentation and Measurement Technology Conference*, Singapore, May 2009.

Z. Zhang, A. Espinosa, K. Iskra, I. Raicu, I. Foster, M. Wilde, "Design and evaluation of a collective I/O model for loosely-coupled petascale programming," presented in the IEEE Workshop on Many-Task Computing on Grids and Supercomputers, Nov 2008.

A. Espinosa, N. Libatique and G. Tangonan, "Design and Engineering of a Supply Chain

Management System for Drug Delivery Applications,” Philippine Computing Science Congress 2008, Mar. 2008, Manila.

A. Espinosa, R. Saldana, “Building and Benchmarking a New Beowulf Cluster for Grid Computing and Other Applications,” Philippine Computing Science Congress, Mar. 2008, Manila.

A. Espinosa, N. Libatique, G. Tangonan, C. Pineda, R. Llamac, et. al., “Multipath design configuration for microwave networks using real-time rain data,” presented in the National ECCE Conference, Nov 2007, Manila.

N. Libatique, A. Espinosa, G. Tangonan, M. Guico, C. Ramos, “Patient Driven Mobile Phone-Enabled Medical Health Services,” presented in the 5th ICT-Asia Seminar, Nov 2007, Taipei.

R. Saldana, A. Espinosa, “Medical Image Analysis and Information Retrieval with Grid Computing Applications,” presented in the 5th ICT-Asia Seminar, Nov 2007, Taipei.

A. Espinosa, N. Libatique, G. Tangonan, C. Pineda, “Rapid deployable disaster management systems,” presented in the 5th ICT-Asia Seminar, Nov 2007, Taipei.

R. Saldana, A. Espinosa, P. Tioseco, K. Layug, “A Web-Based Query and Retrieval System of Federated DICOM Image Archives,” presented in the International Medical Informatics Symposium in Taiwan, Nov 2007, Taipei.

A. Espinosa, Implementation of a multi-hop routing scheme from attenuation links based on temporal rain models, BS Thesis, Mar 2007, Ateneo de Manila University.

R. Saldana, A. Espinosa. “Benchmarking Beowulf clusters using high performance linpack (HPL) and cellular automata” in Symposium on the Mathematical Aspects of Computer Science. organized by the Computing Society of the Philippines, Oct 2006, Cavite.

A. Espinosa, E. Bueta, A. Baterina. Robotag: The implementation of robotic kit that combines primitive behavior to promote higher levels of competence, Research Paper, Philippine Science High School, Mar 2002, presented in the national finals of the Intel Philippine Science Fair 2002, Manila.

Invited Lectures and Seminars

Best Practices in Computer Programming. A lecture describing individual and team training of students for national and international programming contest. Presented in the First Philippine Inter-Collegiate Programming Contest. Organized by the Computing Society of the Philippines. Oct 2007.

Overview of C programming. A seminar for high school students in preparation for the Asia Pacific International Olympiad. May 2007.

Computer programming workshop for high schools. Ateneo Junior Summer Seminar. May 2007.

Introduction to Grid computing. Technical series hosted by the Ateneo Electronics Engineering Society. Feb 2007.

LEGO robot design. Philippine Robot Olympiad Orientation. hosted by Ateneo de Manila University. Aug 2004.

Batibot: a dancing robot. presented at the Third International Robot Olympiad, Hongkong. Nov 2001

Courses Taught

- University of Chicago – (Lab instructor) C/C++ programming (CMSC 10600), (Teaching Assistant) Operating Systems (CMSC 230000)
- Ateneo de Manila University (Lecturer) – Data Communications (TCOM 141), Electromagnetic Theory and Applications (ENGPS 172), Circuits II Laboratory (ELC 106.2), Analog Communications Systems Laboratory (TCOM 121.2, CE 170), Microprocessor Systems Laboratory (ELC 141.2/ CE 141), Introduction to Computer Programming (CE 21), Introduction to Data Structures (CE 22), Optical Communications and Transmission Media laboratory (TCOM 151.2), Switching Theory and Digital Design Laboratory (ELC 111.2), Database Systems (CIE 122), Operating Systems (CE 155)

Awards and Certifications

- Association for Computing Machinery-International Collegiate Programming Contest
 - Honorable Mention, World Finals 2006, hosted by Baylor University, San Antonio, Texas
 - Honorable Mention, World Finals 2005, hosted by Shanghai Jiaotong University, Shanghai, China
 - Best Local Team and Second Runner-up, Asia Regional Finals 2005, hosted by Ateneo de Manila University, Philippines
 - Philippine Champions and Second Place, Asia Regional Finals 2004, hosted by the University of Asia and the Pacific, Philippines
 - Fifth Place, Asia Regional Finals 2003, hosted by the University of Asia and the Pacific, Philippines
- Certified IT Engineer, Philippine National IT Standards Foundation (formerly JITSE Philippines)
- DOST-SEI Merit Scholarship recipient (2002).
- Ateneo College Scholarship fund recipient (2002).
- Best Project in Computer Science and Engineering (2002), Intel Philippine Science Fair
- Excelled in various local (Philippine) competitions. Nature of competitions include computer programming and engineering quiz contests. Most events are hosted by other top local universities such as De La Salle University and the University of the Philippines.

Skills and Competencies

- Proficient in computer programming as exhibited by various competitions. Experienced with various languages such as C, C++, Java, Ruby, and Perl.
 - Exposed to various numerical methods and algorithms.
 - Able to create and develop numerical models of physical systems using probabilistic methods.
- Skilled in multiple system administration tasks in terms of creating various *nix scripts using bash and Perl.
- Capable in designing network systems and architectures for various applications.
- Can develop scalable web applications using Ruby on Rails and J2EE.
- Used high performance libraries such as the message passing interface (MPI) to develop parallel programs.
- Integrated distributed systems using grid middleware such as the Globus Toolkit v4.0 and AliEn

v2.12. Also able to deploy simple grid test beds and participate in production grids.

Professional Affiliations

Association for Computing Machinery (2003—present)

Institute for Electronics and Communications Engineers of the Philippines (2004—present)

Extra-curricular and Community Involvement

- Student volunteer, Supercomputing 2009, Portland, OR.
- Technical Assistant for judging. ACM-ICPC, Asia Regional Finals 2006, hosted by Ateneo de Manila University, Philippines.
- President (2006), Internal Vice-President (2005). Ateneo Science Guild—an upperbody in charge of all science-related organizations.
 - Represented the student body in the school administration as a board member of the Council of Organizations.
 - Made recommendations for the sound levels for student activities using sound propagation concepts in physics.
- Developed and maintained a website for the Ateneo Chemical Society (2004).
- Street Sweeper (Dec 2004). Ateneo Labor Trials Program c/o Marikina Waste Management Office.

References

Available upon request.

Last update: 2011 March 14