Zhengchun Liu

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Education

- **Universitat Autònoma de Barcelona** Barcelona, Spain
  Ph.D. in Computer Science, Advisor: Dr. Emilio Luque *2013.09 - 2016.07*
  - Sobresaliente Cum Laude (the highest honor) and International mention
- **Northwestern Polytechnical University** Xi'an, Shaanxi, China
  MSc. in Guidance, Navigation and Control, Advisor: Jun Yang *2010.09 - 2013.04*
- **Northwestern Polytechnical University** Xi'an, Shaanxi, China
  BSc. in Manufacturing Engineering of Flight Vehicle *2006.09 - 2010.06*
  - Comprehensive Evaluation: 94.2/100, Ranking: 3/94; GPA: 84.6/100

Research Work Experience

1. **Argonne National Laboratory, United States** 2016.09 - present
   Postdoctoral Appointee, Advisor: Rajkumar Kettimuthu, Mentor: Sven Leyffer
   – Building robust analytic models for science at extreme scales
   – Modeling, simulating & optimizing for large data transfers over wide area networks
   – Simulating to explain the behavior of scientific workflows over a distributed infrastructure.
   – Designing cyberinfrastructure for on-demand scientific experiment data analysis.
   – Architecture, methods, and algorithms to support self-tune and self-manage science ecosystems.

2. **Universitat Autònoma de Barcelona, Barcelona, Spain** 2013.09 - 2016.08
   Research Fellow, PhD candidate, Advisor: Emilio Luque
   – Modeling & simulating hospital emergency department using HPC and agent-based model.
   – Modeling & simulation for healthcare operations management.
   – Healthcare system operation data analysis and population aging study.
   – Model verification, model parameters calibration and model validation.
   – Optimization, Parallel programming, Agent-based modeling and simulation.

3. **Oak Ridge National Laboratory, Tennessee, U.S.A.** 2015.12 - 2016.04
   Visiting Researcher, Host: Kalyan S. Perumalla
   – Performance modeling, verification and validation for scientific simulation on multi-GPU clusters.
   – Developed a framework template for efficient simulation on multi-GPU and multi-Core clusters.
   – Designed and developed a large-scale vehicle evacuation simulator on GPUs using CUDA.
   – Implemented an earthquake wave propagation model on multiple GPUs using CUDA.

4. **Northwestern Polytechnical University, Xi'an, China** 2006.09 - 2013.09
   – Designed and developed a rapid control prototype and testbed system for designing drones.
   – Design and implement flight control algorithms on real-time embedded control systems.
   – Developed a distributed, hardware-in-the-loop interactive simulation system for fixed-wing drone.
   – Learned and earned collaborative leadership.
   – Six-Degree-of-Freedom flight dynamics model of fixed-wing drone.

Engineering Work Experience

1. **Xi'an FengLiTong Electronic CO. LTD. Shaanxi, China** 2010.05 - 2013.06
   – *Software Engineer (Part-time)*
   – μC/OS-II real-time operating system porting and board support package developing.
   – USB driver and filesystem on ARM Cortex-M3 MCUs for exchanging data.
   – GPS data parsing, reliable communication via GSM network.
   – Implemented the over-the-air firmware updating service using In-Application Programming.
   – Developed a backend communication server for million vehicle-traveling-data-recorders.
   – Effective communication skills were improved through collaborating with more than 20 engineers.

2. **Outsourcing Service** as an Embedded Engineer 2010.09 - 2013.07
   – Designed and developed a Human Machine Interfaces, and 8051 MCU based integrated power management for ambulances (hardware design and firmware programming).
   – Designed and developed a temperature control system for machine tool oil-cooling (hardware design and firmware programming).

Selected Awards, Grants & Honors

- The 1st Place in the 10th Marathon of Parallel Programming Contest . . . . . Oct. 2015
- The 1st Place in the 5th Spanish Parallel Programming Contest . . . . . Sep. 2015
- The 2nd Place in the 4th Spanish Parallel Programming Contest . . . . . Sep. 2014
- China National Scholarship, Ministry of Education, China
  (award to 0.2% of outstanding undergraduate students) . . . . . Oct. 2009
- Champion of the Chinese Robot Competition (dancing session) . . . . . Dec. 2008
- China National Scholarship, Ministry of Education, China
  (award to 0.2% of outstanding undergraduate students) . . . . . Oct. 2008
- First Class Scholarship for Undergraduate Students (annual) . . . . . 2006 - 2009

Technical Skills

- Proficient in C/C++, Python, MATLAB and Embedded C Programming.
- Extensive experience with Parallel software development, including MPI and programming models for multicore and heterogeneous architectures (e.g. CUDA, OpenCL, OpenMP).
- Familiar with cluster computing framework (e.g., Apache Spark) and massive datasets mining.
- Extensive development experience with backend software on Linux.
- Extensive experience with embedded system, real-time OS, hardware and firmware development.

Professional Service

- *Co-Chair*: SRMPDS 2017
- *Technical Program Committee*: SIMUL 2015; SIMUL 2016; DAAC 2017

- *External Reviewer*: COMPUTATION TOOLS 2015; Euro-Par 2017; CLUSTER 2017; HiPC 2017; WoWS 2017.

Advising

- **Joanna Czyżewska**, Wroclaw University of Science and Technology, Poland Summer 2015
  – *European Undergraduate Summer Internship program*
  – Modeling and simulating patients who Leave Without Being Seen in emergency department;
  – Characterizing overcrowding in emergency department under unforeseen scenarios.

Personal Statement & Research Interests

- I am hard-working, self-motivated, enthusiastic and have multidisciplinary background. I am experienced at working to tight deadlines and under considerable pressure. I will be able to do more if I am given an opportunity.
- Research interests: Modeling and Simulation, High Performance Computing, Embedded Systems, Big Data Analysis and Machine Learning, Multi-Agent Systems, and Operations Research.

Publications

§Refereed conference papers

1. **Zhengchun Liu**, Rajkumar Kettimuthu, Ian Foster, Peter H. Beckman. Towards a Smart Data Transfer Node. International Workshop on Innovating the Network for Data Intensive Science in conjunction with SC'17 (*to appear*).
2. Rajkumar Kettimuthu, **Zhengchun Liu**, David Wheeler, Ian Foster, Katrin Heitmann, Franck Cappello. Transferring a Petabyte in a Day. International Workshop on Innovating the Network for Data Intensive Science in conjunction with SC'17 (*to appear*).
3. **Zhengchun Liu**, Rajkumar Kettimuthu, Sven Leyffer, Prashant Palkar and Ian Foster. A mathematical programming and simulation based framework to evaluate cyberinfrastructure design choices. The 13th IEEE International Conference on eScience. (*to appear*).
4. **Zhengchun Liu**, Prasanna Balaprakash, Rajkumar Kettimuthu and Ian Foster. Explaining Wide Area Data Transfer Performance. In Proceedings of the 26th International Symposium on High-Performance Parallel and Distributed Computing (HPDC 2017), 167-178.
5. **Zhengchun Liu**, Dolores Rexachs, Francisco Epelde, and Emilio Luque. Support managing population aging stress of emergency departments in a computational way. Procedia Computer Science, Volume 108, 2017, Pages 149-158 (ICCS 2017).
6. **Zhengchun Liu**, Eduardo Cabrera, Dolores Rexachs, Francisco Epelde, and Emilio Luque. Simulating the Micro-level Behavior of Emergency Department for Macro-level Features Prediction. 2015 Winter Simulation Conference, Huntington Beach, CA, USA. December 6–9, 2015.
7. **Zhengchun Liu**, Eduardo Cabrera, Manel Taboada, Francisco Epelde, Dolores Rexachs and Emilio Luque. Quantitative Evaluation of Decision Effects in the Management of Emergency Department Problems. Procedia Computer Science, Vol 51, 433-442 (ICCS 2015).
8. Xueping Zhu, **Zhengchun Liu**, and Jun Yang. Research on Co-simulation Method in ADAMS and MATLAB for Missile Seeker's Stabilization Platform Design. AsiaSim 2013. November 6 - 8, 2013.

9. **Zhengchun Liu**, Eduardo Cabrera, Dolores Rexachs and Emilio Luque. A Generalized Agent-Based Model to Simulate Emergency Departments. The Sixth International Conference on Advances in System Simulation, Nice, France. October 12 - 16, 2014.

§Refereed journal papers

1. **Zhengchun Liu**, Dolores Rexachs, Francisco Epelde, and Emilio Luque. An Agent-based Model for Quantitatively Predicting and Analyzing the Complex Behavior of Emergency Departments. Journal of Computational Science, Vol.21, pp 1123, 2017.
2. **Zhengchun Liu**, Dolores Rexachs, Francisco Epelde, and Emilio Luque. A simulation and optimization based method for calibrating agent-based emergency department models under data scarcity. Computers & Industrial Engineering, Vol. 103, 2017.
3. **Zhengchun Liu**, Francisco Epelde, Dolores Rexachs and Emilio Luque. A Bottom-up Simulation Method to Quantitatively Predict Integrated Care System Performance. The 16th International Conference for Integrated Care (from ICIC'16). 23-25 May 2016 Barcelona, Spain.

§Under peer review

1. **Zhengchun Liu** and Kalyan S. Perumalla. Efficient Large-scale Parallel Stencil Computation on Multi-Core and Multi-GPU Accelerated Clusters. (*under peer review*).

§Other selected papers

1. **Zhengchun Liu** and Emilio Luque. Modeling and Simulation for Healthcare Operations Management using High Performance Computing and Agent-Based Model. [thesis overview] Journal of Computer Science & Technology, Vol. 17, No. 1, 2017.
2. Linglong Li, Yaodong Yang, **Zhengchun Liu**, Stephen Jesse, Sergei V. Kalinin and Rama K. Vasudevan. Correlation between Piezoresponse Nonlinearity and Hysteresis in Ferroelectric Crystals at Nanoscale. Applied Physics Letters, Vol. 108, Issue 17, 2016.
3. **Zhengchun Liu**. High Performance Computing Based Simulation for Healthcare Decision Support. The Second International BSC Doctoral Symposium, Barcelona, Spain. May 5 - 7, 2015.
4. **Zhengchun Liu**, Eduardo Cabrera, Dolores Rexachs and Emilio Luque. Study of Emergency Department by Using High Performance Computing. XXV Jornadas de Paralelismo. Sep. 16-18, 2014.
5. **Zhengchun Liu**, Qi Liu and Jun Yang. Research on Missile's Integrated Testing Platform Based on HLA. Computer and Modernization. 2013, 1(6): 179-181.
6. **Zhengchun Liu**, and Jun Yang. Design and Implementation of a Missile Seeker Virtual Test-Bed Based on High Level Architecture. Proceedings of the 3d MACE. July 27-29, 2012.

– Last updated on October 20, 2017