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

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
PhD fellowship from China Scholarship Council . . . . . Sep. 2013
China National Scholarship (awarded to 0.2% of outstanding undergraduate students) . Oct. 2009
Champion of the Chinese Robot Competition (dancing session) . . . . . Dec. 2008
China National Scholarship (awarded to 0.2% of outstanding undergraduate students) . Oct. 2008
First Class Scholarship for Undergraduate Students (annual) . . . . . 2006 - 2009

Research Work Experience

1. 2016.09 - present, **Argonne National Laboratory, United States**
   Postdoctoral Appointee
   – Robust Analytic Models for Science at Extreme Scales project
   – Modeling & simulating, Optimizing for large data transfers over Wide Area Networks
   – Simulating to explain the behavior of scientific workflows over a distributed infrastructure.

2. 2013.09 - 2016.08, **Universitat Autònoma de Barcelona, Barcelona, Spain**
   Research Fellow, PhD candidate, Advisor: Dr. 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. 2015.12 - 2016.04, **Oak Ridge National Laboratory, Tennessee, U.S.A.**
   Visiting Researcher, Host: Dr. 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. 2006.09 - 2013.09, **Northwestern Polytechnical University, Xi'an, China**
   – 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. 2010.05 - 2013.06, **Xi'an FengLiTong Electronic CO. LTD. Shaanxi, China**
   – *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. 2010.09 - 2013.07, **Outsourcing Service** as an Embedded Engineer
   – 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).

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.

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.

Publications & Presentations

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. **Zhengchun Liu**, Prasanna Balaprakash, Rajkumar Kettimuthu and Ian Foster. Explaining Wide Area Data Transfer Performance. (*to appear in HPDC'17*).

3. **Zhengchun Liu** and Kalyan S. Perumalla. Optimizing High Performance 3D Stencil Computations on Large Scale Heterogeneous Platforms. (*work in progress*).

4. **Zhengchun Liu**, Dolores Rexachs, Francisco Epelde, and Emilio Luque. Support managing population aging stress of emergency departments in a computational way. (*to appear in ICCS'17*).

5. 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.

6. **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.

7. **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, 2017.

8. **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. 23-25 May 2016 Barcelona, Spain.

9. **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.

10. **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, ICCS 2015.

11. Xueping Zhu, **Zhengchun Liu** and Jun Yang. Model of Collaborative UAV Swarm Toward Coordination and Control Mechanisms Study. Procedia Computer Science, ICCS 2015.

12. **Zhengchun Liu**. High Performance Computing Based Simulation for Healthcare Decision Support. The Second International BSC Doctoral Symposium, Barcelona, Spain. May 5 - 7, 2015.

13. **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.

14. **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.

15. 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.

16. **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 May 11, 2017***