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MING ZHAO

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RESEARCH INTERESTS

Distributed/Cloud Computing, Big data, High-performance computing, Autonomic Computing, Virtualization, Storage Systems, Operating Systems

EDUCATION

Ph.D. in Electrical and Computer Engineering, May 2008
University of Florida, Gainesville, FL
Dissertation: File System Virtualization and Autonomic Services for Grid Data Management
Committee: Renato J. Figueiredo (Chair), José A. B. Fortes, Tao Li, Sanjay Ranka

M.S. in Pattern Recognition and Intelligent Systems, Automation, July 2001

Tsinghua University, Beijing, China
Dissertation: A Human-computer Interaction System for Content-based Image Retrieval
Committee: Gang Rong (Chair), Zhaoqi Bian, Changshui Zhang, Jie Zhou

B.S. in Automation, Excellent Graduate Award winner, July 1999
Tsinghua University, Beijing, China
Dissertation: An Approach to Automated Palmprint Recognition Based on K-L Transform

PROFESSIONAL EXPERIENCE

Associate Professor, August 2014 – August 2015
School of Computing, Informatics, & Decision Systems Engineering, Arizona State University, Tempe, AZ

Director, August 2008 – August 2015
Research Laboratory for Virtualized Infrastructures, Systems, and Applications (VISA)
School of Computing, Informatics, & Decision Systems Engineering, Arizona State University, Tempe, AZ

Associate Professor, August 2014 – August 2015
School of Computing and Information Sciences, Florida International University, Miami, FL

Director, August 2008 – August 2015
Research Laboratory for Virtualized Infrastructures, Systems, and Applications (VISA)
School of Computing and Information Sciences, Florida International University, Miami, FL

Assistant Professor, August 2008 – August 2014 School of Computing and Information Sciences, Florida International University, Miami, FL

Visiting Faculty Fellow, Jul 2013 – Aug 2013, Jul 2014 – Aug 2014
Air Force Research Laboratory, Rome, New York

Research Assistant, January 2003 – August 2008
Advanced Computing and Information Systems Laboratory (ACIS)
National Science Foundation Industry/University Cooperative Center for Autonomic Computing (CAC)
Department of Electrical and Computer Engineering, University of Florida, Gainesville, FL

Research Intern, May 2006 – August 2006
IBM Research Division, Austin Research Lab, Austin, TX

Research Assistant, August 1999 – July 2001
National Key Laboratory of Intelligent Technology and Systems
Department of Automation, Tsinghua University, Beijing, China

AWARDS

- **VMware Faculty Award**, 2014
- **U.S. Air Force Visiting Faculty Fellowship**, 2014
- **Excellence in Research**, Florida International University School of Computing and Information Sciences, 2014
- **VMware Graduate Fellowship** (awarded to my PhD student Yiqi Xu), 2014
- **National Science Foundation (NSF) Faculty Early Career Development (CAREER) Award**, 2013
- **U.S. Air Force Summer Faculty Fellowship**, 2013

- **McKnight Doctoral Fellowship** (awarded to my PhD student Gregory Jean-Baptise), 2013
- **Excellence in Student Mentoring**, Florida International University School of Computing and Information Sciences, 2012
- **Best Student Paper Award** of 7th International Conference on Autonomic Computing (ICAC), 2007

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RESEARCH

My research interests are in experimental computer systems, including distributed/cloud computing, big data, high-performance computing, and operating systems. I am also interested in the cross-disciplinary studies that bridge systems research with other domains, and I have worked with applications from computational physics and chemistry, earth sciences, biomedicine, neuroscience, etc. Today's challenging applications often require large amounts of data and resources, supported by computer systems with increasing scale, complexity, and dynamism. My goal is to explore novel data and resource management solutions to provide such applications with efficient, robust, and secure computing. Central to my solutions is innovating in **virtualization** to create new abstractions for management and in **autonomic** techniques to achieve self-management of the target systems.

My research efforts are targeted to generate both fundamental scientific values and practical societal impacts. I have published over 50 peer-reviewed articles on premiere systems research venues, which have been cited more than **1200** times and include **Best Paper winner and runner-ups**. My research results have also been used by various **production systems**. For example, my work on cloud storage caching (dm-cache) is now deployed at a leading European cloud service provider (CloudVPS) and adopted by many others (e.g., **Facebook FlashCache**[1]).

To support my fundamental research, I have been awarded over **$1.8M** of funds as the PI (including the NSF **CAREER** award and Air Force **SFFP** award) and over **$2M** as the Co-PI from federal agencies (**NSF**, **ARO**, **AFOSR**, **DHS**) and industry companies (**VMware, CloudVPS**). I also work closely with federal laboratories (Sandia National Labs, Los Alamos National Lab, Air Force Research Lab) and industry companies (VMware, IBM, Fusion-io, Marvell Semiconductor) to solve the practical problems that are critical to them. I received the FIU SCIS **Excellence in Research** award in 2014.

GRANTS

[G1] **National Science Foundation Award**, "II-NEW: GEARS - An Infrastructure for Energy-Efficient Big Data Research on Heterogeneous and Dynamic Data," 2016 – 2019 (**PI**; **Amount**: $750,000)

[G2] **National Science Foundation Award**, "CDS&E/Collaborative Research: DataStorm: A Data Enabled System for End-to-End Disaster Planning and Response," 2016 – 2019 (**PI**; **Amount**: $692,774)

[G3] **National Science Foundation Award**, "NVM-enabled Host-side Caches," 2016 – 2019 (**PI**; **Amount**: $304,251)

[G4] **National Science Foundation Award**, "Student Travel Support for ACM HPDC-2015," 2015 (**PI**; **Amount**: $15,000)

[G5] **Helmsley Charitable Trust Award**, "Vertically Integrated Projects (VIP)," 2015 – 2017 (**Co-PI**; **Amount**: $270,000)

[G6] **Florida Center for Cybersecurity (FC2) Cybersecurity Seed Grant**, "Vulnerability and Survivability of Cyberspace: Basic Science to Applications," 2015 – 2016 (**PI**; **Amount**: $50,000)

[G7] **National Science Foundation Award**, "Student Travel Support for ACM HPDC-2015," 2015 (**PI**; **Amount**: $15,000)

[G8] **VMware Faculty Award,** "QoS-driven Resource Management for Virtualized Data-intensive Computing Environments," 2015 – 2016 (**PI**; **Amount**: $92,000)

[1] Mohan Srinivasan and Mark Callaghan, "FlashCache," *O'Reilly Open Source Convention (OSCON)*, July 2010. (http://cdn.oreillystatic.com/en/assets/1/event/45/Flashcache%20Presentation.pdf)

[G9] **Department of Defense Air Force Research Lab Summer Faculty Extension Award**, "Virtual Machine based Moving Target Defense for Mission-Critical Cloud Computing," 2014 (**PI**; **Amount**: $20,000)

[G10] **National Science Foundation Award,** "RET in Engineering and Computer Science SITE: Research Experience for Teachers on Cyber-Enabled Technologies," 2014 (**Senior Personnel**; **Amount**: $498,000)

[G11] **Department of Defense Air Force Research Lab Summer Faculty Extension Award**, "Autonomic Cloud Management for Mission-critical Applications," 2013 (**PI**; **Amount**: $10,000)

[G12] **Department of Defense Air Force Research Lab Summer Faculty Extension Award,** "Cross-layer Optimization for Virtual Machine Resource Management," 2013 **(PI**; **Amount**: $7,000**)**

[G13] **Department of Defense Army Research Office Award**, "Enabling Time-sensitive Applications on Virtualized Computing," 2013 – 2015 (**PI**; **Amount**: $642,654)

[G14] **National Science Foundation Award,** "Research Experiences for Undergraduates Supplement for CAREER: Coordinated QoS-driven Management of Cloud Computing and Storage Resources," 2013 – 2014 **(PI**; **Amount**: $16,000**)**

[G15] **National Science Foundation Award,** "Research Experiences for Veterans Supplement for CAREER: Coordinated QoS-driven Management of Cloud Computing and Storage Resources," 2013 – 2014 **(PI**; **Amount**: $16,000**)**

[G16] **National Science Foundation Faculty Early Career Development (CAREER) Award**, "Coordinated QoS-driven Management of Cloud Computing and Storage Resources," 2013 – 2018 (**PI**; **Amount**: $456,985)

[G17] **National Science Foundation Award**, "Research Experiences for Veterans Supplement for HECURA: Collaborative Research: QoS-driven Storage Management for High-end Computing Systems," 2013 – 2014 (**PI**; **Amount**: $8,000)

[G18] **CloudVPS Faculty Award**, "Flash Caching for Cloud Computing," 2012 – 2013 (**PI**; **Amount**: $8,200)

[G19] **Computing Research Association/The Coalition to Diversity Computing Award**, "Collaborative Research Experience for Undergraduates," 2012 – 2013 (**PI**; **Amount**: $11,300)

[G20] **CloudVPS Faculty Award**, "Flash Caching for Cloud Computing," 2011 – 2012 (**PI**; **Amount**: $14,294)

[G21] **National Science Foundation Award**, "MRI: Development of an Integrated, Geospatial Analytics Research Instrument," 2011 – 2014 (**Co-PI**; **Amount**: $678,693)

[G22] **Florida International University RESEED Award**, "Cross-Layer Virtual Machine Resource Management on Chip Multiprocessing Simultaneous Multithreading Systems," 2011 – 2012 (**PI**; **Amount**: $39,956)

[G23] **Department of Homeland Security Award**, "A Research and Educational Framework to Advance Disaster Information Management in Computer Science PhD Programs," 2011 – 2015 (**Co-PI**; **Amount**: $400,000)

[G24] **National Science Foundation Award**, "Research Experiences for Undergraduates Supplement for HECURA: Collaborative Research: QoS-driven Storage Management for High-end Computing Systems," 2010 – 2014 (**PI**; **Amount**: $64,000)

[G25] **National Science Foundation Award**, "Streamlining High-End Computing with Software Persistent Memory," 2010 – 2013 (**Co-PI**; **Amount**: $759,999)

[G26] **National Science Foundation Award**, "HECURA: Collaborative Research: QoS-driven Storage Management for High-end Computing Systems," 2010 – 2014 **(PI**; **Amount**: $448,343)

PUBLICATIONS

- **Google citations:** http://scholar.google.com/citations?user=pAcF2lEAAAAJ
- **Paper downloads:** http://visa.lab.asu.edu/publications

Conference Proceedings

[C1] Y. Xu and M. Zhao, "IBIS: Interposed Big-data I/O Scheduler," *Proceedings of the 25th International Symposium on High-Performance Parallel and Distributed Computing*, May 2016. (**Acceptance Rate: 15.5%)**

[C2] S. Biookaghazadeh, Y. Xu, S. Zhou, and M. Zhao, "Enabling Scientific Data Storage and Processing on Big-data Systems," *Proceedings of the Big Data in the Geosciences Workshop* (co-held with 2015 IEEE International Big Data Conference), October 2015.

[C3] W. Li, G. Jean-Baptise, J. Riveros, G. Narasimhan, T. Zhang, and M. Zhao, "CacheDedup: In-line Deduplication for Flash Caching," *Proceedings of the 14th USENIX Conference on File and Storage Technologies* (FAST'16), February 2016 (**Acceptance Rate: 23%)**

[C4] D. Arteaga, J. Cabrera, J. Xu, S. Sundararaman, and M. Zhao, "CloudCache: On-demand Flash Cache Management for Cloud Computing," *Proceedings of the 14th USENIX Conference on File and Storage Technologies* (FAST'16), February 2016 (**Acceptance Rate: 23%)**

[C5] M. Zhao and J. Liu, "Applications of Future Network Technologies to Disaster Management," *Looking Beyond the Internet: Applications and Services in the Year 2021*, January 2016.

[C6] L. Wang, J. Xu, and M. Zhao, "QoS-driven Cloud Resource Management through Fuzzy Model Predictive Control," *Proceedings of the 12th International Conference on Autonomic Computing* (ICAC), July 2015. (**Acceptance Rate: 27%)**

[C7] S. Kundu, R. Rangaswami, M. Zhao, A. Gulati, and K. Dutta, "Revenue Driven Resource Allocation for Virtualized Data Centers," *Proceedings of 12th International Conference on Autonomic Computing (ICAC),* July 2015. (**Acceptance Rate: 27%)**

[C8] M. Zhao, F. D'Ugard, K. Kwiat, and C. Kamhoua, "Multi-level VM Replication based Survivability for Mission-critical Cloud Computing," *Proceedings of the 1st IEEE/IFIP Workshop on Security for Emerging Distributed Network Technologies (co-located with IEEE/IFIP International Symposium on Integrated Network Management)*, May 2015.

[C9] J. Li, K. Zhao, X. Zhang, J. Ma, M. Zhao, and T. Zhang, "How Much Can Data Compressibility Help to Improve NAND Flash Memory Lifetime?" *Proceedings of the 13th USENIX Conference on File and Storage Technologies (FAST'15)*, February 2015. (**Acceptance Rate: 21%)**

[C10] M. Roger, Y. Xu, and M. Zhao, "BigCache for Big-data Systems," *Proceedings of the IEEE International Conference on Big Data (BigData2014)*, October 2014.

[C11] D. Otstott, N. Evans, L. Ionkov, M. Zhao, and M. Lang, "Enabling Composite Applications through an Asynchronous Shared Memory Interface," *Proceedings of the IEEE International Conference on Big Data (BigData2014)*, October 2014.

[C12] C. A. Kamhoua, L. Kwiat, K. A. Kwiat, J. S. Park, M. Zhao, and M. Rodriguez, "Game Theoretic Modeling of Security and Interdependency in a Public Cloud," *Proceedings of the 7th IEEE International Conference on Cloud Computing (CLOUD2014)*, June 2014.

[C13] D. Arteaga and M. Zhao, "Client-side Flash Caching for Cloud Systems," *Proceedings of the 7th ACM International Systems and Storage Conference (Systor'14)*, June 2014.

[C14] D. Otstott, J. Cabrera, and M. Zhao, "A Host-side Integrated Flash Scheduler for Solid State Drives," (Work-in-progress Paper) *Proceedings of the 12th USENIX Conference on File and Storage Technologies (FAST'14)*, February 2014.

[C15] G. Jean-Baptise, D. Arteaga, and M. Zhao, "Inline Deduplication for Storage Caching," (Work-in-progress Paper) *Proceedings of the 12th USENIX Conference on File and Storage Technologies (FAST'14)*, February 2014.

[C16] Y. Lu, M. Zhao, G. Zhao, L. Wang, and N. Rishe, "Massive GIS Database System with Autonomic Resource Management," *Proceedings of the International Conference on Machine Learning and Applications (ICMLA'13)*, December 2013.

[C17] J. Quan, Y. Shi, and M. Zhao, "The Implications from Benchmarking Three Different Data Center Platforms," *Proceedings of the 1st Workshop on Benchmarks, Performance Optimization, and Emerging hardware of Big Data Systems and Applications (BPOE 2013, co-held with IEEE BigData 2013)*, October 2013.

[C18] Y. Xu and M. Zhao, "Two-level Throughput and Latency IO Control for Parallel File Systems," *Proceedings of the 8th International Workshop on Feedback Computing (FeedbackComputing, co-held with FCW2013)*, June 2013.

[C19] Y. Xu, A. Suarez, and M. Zhao, "IBIS: Interposed Big-data I/O Scheduler," (short paper) *Proceedings of the 22nd ACM International Symposium on High-Performance Parallel and Distributed Computing (HPDC2013)*, June 2013. (**Acceptance Rate: 25%)**

[C20] Y. Liu, R. Figueiredo, Y. Xu, and M. Zhao, "On the Design and Implementation of a Simulator for Parallel File System Research," (short paper) *Proceedings of the 29th IEEE Conference on Massive Data Storage (MSST2013)*, May 2013. (**Acceptance Rate: 27%)**

[C21] S. Liu, S. Ren, G. Quan, and M. Zhao, "Profit Aware Load Balancing for Distributed Cloud Data Centers", *Proceedings of the 27th IEEE International Parallel and Distributed Processing Symposium (IPDPS2013)*, May 2013. (**Acceptance Rate: 21%)**

[C22] R. Koller, L. Marmol, R. Rangaswami, S. Sundararaman, N. Talagala, and M. Zhao, "Write Policies for Host-side Flash Caches," *Proceedings of the 11th USENIX Conference on File and Storage Technologies (FAST'13)*, February 2013. (**Acceptance Rate: 18%)**

[C23] D. Arteaga, M. Zhao, P. V. Riezen, and L. Zwart, "A Trace-driven Analysis for Block-level Caching in Cloud Computing Systems," (Work-in-progress paper) *Proceedings of the 11th USENIX Conference on File and Storage Technologies (FAST'13)*, February 2013.

[C24] Y. Xu, A. Suarez, and M. Zhao, "IBIS: Interposed Big-data I/O Scheduler," (Work-in-progress paper) *Proceedings of the 11th USENIX Conference on File and Storage Technologies (FAST'13)*, February 2013.

[C25] L. Wang, J. Xu, and M. Zhao, "Modeling VM Performance Interference with Fuzzy MIMO Model," *Proceedings of the 7th International Workshop on Feedback Computing (FeedbackComputing, co-held with ICAC2012)*, September 2012.

[C26] L. Wang, J. Xu, and M. Zhao, "Application-aware Cross-layer Virtual Machine Resource Management," *Proceedings of the 9th International Conference on Autonomic Computing (ICAC2012)*, September 2012. (**Best Paper Runner-up; Acceptance Rate: 24%)**

[C27] Y. Xu, D. Arteaga, M. Zhao, Y. Liu, R. Figueiredo, and S. Seelam, "vPFS: Bandwidth Virtualization of Parallel Storage Systems," *Proceedings of the 28th IEEE Conference on Massive Data Storage (MSST'12),* April 2012. (**Acceptance Rate: 24%**)

[C28] D. Arteaga, D. Otstott, and M. Zhao, "Dynamic Block-level Cache Management for Cloud Computing Systems," (Work-in-progress Paper) *Proceedings of the 10th USENIX Conference on File and Storage Technologies (FAST'12)*, February 2012.

[C29] S. Kundu, R. Rangaswami, A. Gulati, M. Zhao, and K. Dutta, "Modeling Virtualized Applications using Machine Learning Techniques," *Proceedings of the 8th Annual International Conference on Virtual Execution Environments (VEE2012)*, March 2012. (**Acceptance Rate: 34%**)

[C30] H. Duran-Limon, L. Silva-Bañuelos, V. Tellez-Valdez, N. Parlavantzas, and M. Zhao, "Using Lightweight Virtual Machines to Run High Performance Computing Applications: The Case of Weather Research and Forecasting Model," *Proceedings of the 4th IEEE International Conference on Utility and Cloud Computing (UCC2011)*, December 2011. (**Acceptance Rate: 28%)**

[C31] D. Arteaga and M. Zhao, "Towards Scalable Application Checkpointing with Parallel File System Delegation," *Proceedings of the 6th IEEE International Conference on Networking, Architecture, and Storage (NAS2011)*, July 2011. (**Acceptance Rate: 31%**)

[C32] L. Wang, J. Xu, M. Zhao, Y. Tu, and J. Fortes, "Fuzzy Modeling based Resource Management for Virtualized Database Systems," *Proceedings of the 19th Annual Meeting of the IEEE International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems (MASCOTS2011)*, July 2011. (**Acceptance Rate: 35%**)

[C33] Y. Wu and M. Zhao, "Performance Modeling of Virtual Machine Live Migration," *Proceedings of the 4th IEEE International Conference on Cloud Computing* (*CLOUD2011*), July 2011. (**Acceptance Rate: 19%**)

[C34] L. Wang, J. Xu, M. Zhao, and J. Fortes, "Adaptive Virtual Resource Management with Fuzzy Model Predictive Control," *Proceedings of the 6th International Workshop on Feedback Control Implementation and Design in Computing Systems and Networks (FeBID, co-held with ICAC'11)*, June 2011.

[C35] Y. Liu, R. Figueiredo, D. Clavijo, Y. Xu, and M. Zhao, "Towards Simulation of Parallel File System Scheduling Algorithms with PFSsim," *Proceedings of the 7th IEEE International Workshop on Storage Network Architecture and Parallel I/O (SNAPI, co-held with MSST'11)*, May 2011.

[C36] D. Arteaga, M. Zhao, C. Liu, P. Thanarungroj, and L. Weng, "Cooperative Virtual Machine Scheduling on Multi-core Multi-threading Systems — A Feasibility Study," *Proceedings of the Workshop on Micro Architectural Support for Virtualization, Data Center Computing, and Cloud (MASVDC, co-held with MICRO2010)*, December 2010.

[C37] Y. Xu, L. Wang, D. Arteaga, M. Zhao, Y. Liu, and R. Figueiredo, "Virtualization-based Storage Management for High-end Computing Systems," *Proceedings of the 5th Petascale Data Storage Workshop (PDSW, co-held with Supercomputing'10)*, November 2010.

[C38] J. Liu, R. Rangaswami, and M. Zhao, "Model-Driven Network Emulation with Virtual Time Machine," *Proceedings of Winter Simulation Conference (WSC2010)*, December 2010.

[C39] P. Rattanatamrong, P. Raiturkar, M. Zhao, B. Mahmoudi, J. DiGiovanna, J. Principe, R. Figueiredo, J. Sanchez, and J. Fortes, "Model Development, Testing and Experimentation in a CyberWorkstation for Brain-Machine Interface Research," *Proceedings of the 32nd Annual International IEEE EMBS Conference (EMBC2010)*, September 2010.

[C40] S. Kundu, R. Rangaswami, K. Dutta, and M. Zhao, "Application Performance Modeling in a Virtualized Environment," *Proceedings of the 16th IEEE International Symposium on High-Performance Computer Architecture (HPCA-16)*, January 2010. (**Acceptance Rate: 18%**)

[C41] J. Xu, M. Zhao, and J. Fortes, "Cooperative Autonomic Management in Dynamic Distributed Systems," *Proceedings of the 11th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS2009)*, November 2009.

[C42] J. Martinez, L. Wang, M. Zhao, and M. Sadjadi, "Experimental Study of Large-scale Computing on Virtualized Resources," *Proceedings of the 3rd International Workshop on Virtualization Technologies in Distributed Computing (VTDC, co-held with ICAC'09)*, June 2009.

[C43] J. Xu, M. Zhao, and J. Fortes, "Applying Network Science to Cooperative Autonomic Management in Dynamic Distributed Systems," *Network Science Report*, October 2008.

[C44] M. Zhao, P. Rattanatamrong, J. DiGiovanna, B. Mahmoudi, R. Figueiredo, J. Sanchez, J. Príncipe, and J. Fortes, "BMI Cyberworkstation: Enabling Dynamic Data-Driven Brain-Machine Interface Research through Cyberinfrastructure," *Proceedings of International Conference of Engineering in Medicine and Biology Society (EMBC2008)*, August 2008.

[C45] M. Zhao and R. Figueiredo, "A User-level Secure Grid File System," *Proceedings of International Conference for High Performance Computing, Networking, Storage and Analysis (SC07)*, November 2007. (**Acceptance Rate: 20%**)

[C46] M. Zhao and R. Figueiredo, "Experimental Study of Virtual Machine Migration in Support of Reservation of Cluster Resources," *Proceedings of the 2nd International Workshop on Virtualization Technology in Distributed Computing (VTDC, co-held with Supercomputing'07)*, November 2007.

[C47] J. Xu, M. Zhao, J. Fortes, R. Carpenter, and M. Yousif, "On the Use of Fuzzy Modeling in Virtualized Data Center Management," *Proceedings of the 4th International Conference on Autonomic Computing (ICAC2007)*, June 2007. (**Best Student Paper; Acceptance Rate: 14%**)

[C48] J. DiGiovanna, L. Marchal, P. Rattanatamrong, M. Zhao, S. Darmanjian, B. Mahmoudi, J. C. Sanchez, J. Principe, L. Hermer-Vazquez, R. Figueiredo, and J. Fortes, "Towards Real-time Distributed Signal Modeling for Brain Machine Interfaces," *Proceedings of International Conference on Computational Science (ICCS'07)*, Pages: 964–971, May 2007.

[C49] M. Zhao and R. Figueiredo, "Application-tailored Cache Consistency for Wide-area File Systems," *Proceedings of the 26th International Conference on Distributed Computing Systems (ICDCS2006)*, July 2006. (**Acceptance Rate: 13%**)

[C50] M. Zhao, J. Xu, and R. Figueiredo, "Towards Autonomic Grid Data Management with Virtualized Distributed File Systems," *Proceedings of the 3rd IEEE International Conference on Autonomic Computing (ICAC2006)*, Pages: 209-218, June 2006. (**Acceptance Rate: 20%**)

[C51] A. Matsunaga, M. Tsugawa, M. Zhao, L. Zhu, V. Sanjeepan, S. Adabala, R. Figueiredo, H. Lam, and J. Fortes, "On the Use of Virtualization and Service Technologies to Enable Grid-computing," *Proceedings of the 11th International Euro-Par Conference (EuroPar2005)*, Pages: 1–12, August 2005.

[C52] M. Zhao, V. Chadha, and R. Figueiredo, "Supporting Application-tailored Grid File System Sessions with WSRF-based Services," *Proceedings of the 14th IEEE International Symposium on High Performance Distributed Computing (HPDC2005)*, Pages: 24–33, July 2005. (**Best Paper Runner-up, Acceptance Rate: 17%**)

[C53] M. Zhao, J. Zhang, and R. Figueiredo, "Distributed File System Support for Virtual Machines in Grid Computing," *Proceedings of the 13th IEEE International Symposium on High Performance Distributed Computing (HPDC2004)*, Pages: 202–211, June 2004. (**Acceptance Rate: 15%**)

[C54] J. Paladugula, M. Zhao, and R. Figueiredo, "Support for Data-intensive, Variable-granularity Grid Applications via Distributed File System Virtualization—A Case Study of Light Scattering

Spectroscopy," *Proceedings of International Workshop on Challenges of Large Applications in Distributed Environments (CLADE, co-held with HPDC2004)*, Pages: 12–21, June 2004.

Journals

[J1] Y. Li, C. Liu, M. Zhao, R. Li, H. Xiao, K. Wang, and J. Zhang, "Multi-Topic Tracking Model for Dynamic Social Network," Physica A: Statistical Mechanics and its Applications, Volume 454, 15, Pages 51–65, July 2016.

[J2] H. Duran-Limon, L. A. Silva-Bañuelos, V. H. Tellez-Valdez, N. Parlavantzas, and M. Zhao, "Efficient Execution of the WRF Model and other HPC Applications in the Cloud," pp. 1-18, Earth Science Informatics, March 2016.

[J3] Y. Lu, M. Zhao, G. Zhao, L. Wang, and N. Rishe, "v-TerraFly: Large Scale Distributed Spatial Data Visualization with Autonomic Resource Management," *Journal of Big Data*, 1:4, Pages: 1-19, 2014.

[J4] J. DiGiovanna, P. Rattanatamrong, M. Zhao, B. Mahmoudi, L. Hermer, R. Figueiredo, J. Principe, J. Fortes, and J. Sanchez, "Cyber-Workstation for Computational Neuroscience," *Frontiers in Neuroengineering*, Vol. 2, Article 7, Pages: 1-11, January 2010.

[J5] J. Xu, M. Zhao, J. Fortes, R. Carpenter, and M. Yousif, "Autonomic Resource Management in Virtualized Data Centers using Fuzzy-logic-based Approaches," *Cluster Computing*, Vol. 11, No. 3, Pages: 213-227, September 2008.

[J6] M. Zhao, J. Zhang, and R. Figueiredo, "Distributed File System Virtualization Techniques Supporting On-demand Virtual Machine Environments for Grid Computing," *Cluster Computing*, Vol. 9, No. 1, Pages: 45-56, January 2006.

[J7] S. Adabala, V. Chadha, P. Chawla, R. Figueiredo, J. Fortes, I. Krsul, A. Matsunaga, M. Tsugawa, J. Zhang, M. Zhao, L. Zhu, and X. Zhu, "From Virtualized Resources to Virtual Computing Grids: the In-VIGO System," *Journal of Future Generation Computing Systems*, Vol. 21, No. 6, Pages: 896-909, June 2005. (**Authors are listed alphabetically; The 2nd most cited paper on FGCS**)

[J8] M. Zhao and G. Rong, "A Human-computer Interaction System for Content-based Image Retrieval on Internet," *Journal of Tsinghua University (Science and Technology, Special Issue)*, August 2001.

[J9] Z. Wang, M. Zhao, and Q. Yu, "Modeling of Branching Structures of Plants," *Journal of Theoretical Biology*, Vol. 209, No. 4, Pages: 383-394, April 2001.

[J10] M. Zhao, W. Shu, G. Rong, and Z. Bian, "Automated Palmprint Recognition based on K-L Transform," *Journal of Tsinghua University* (English abstract available on Ei Compendex), Vol. 40, No. 9, Pages: 100-103, September 2000.

Technical Reports

[T1] E. V. Hensbergen and M. Zhao, "Dynamic Policy Disk Caching for Storage Networking," IBM Research Report (RC24123), November 2006.

PRESENTATIONS

[P1] "It's All about Cache," *Invited Talk*, Xi'an Dianzi University, Xi'an, Shanxi, China, June 2016.

[P2] "IBIS: Interposed Big-data I/O Scheduler," *Invited Talk*, Huazhong University of Science and Technology, Wuhan, Hubei, China, June 2016.

[P3] "It's All about Cache," *Invited Talk*, Huazhong University of Science and Technology, Wuhan, Hubei, China, June 2016.

[P4] "On the Use of Control Theory to Manage Advanced Computer Systems," *Invited Talk*, University of Science and Technology of China, Hefei, Anhui, China, June 2016.

[P5] "It's All about Cache," *Invited Talk*, Shanghai Jiaotong University, Shanghai, China, June 2016.

[P6] "IBIS: Interposed Big-data I/O Scheduler," *25th International Symposium on High-Performance Parallel and* Distributed *Computing (HPDC)*, Kyoto, Japan, June 2016.

[P7] "It's All about Cache," *Invited Talk*, New Mexico State University, Las Cruces, NM, USA, April 2016.

[P8] "Client-side Flash Caching for Cloud Systems," *7th ACM International Systems and Storage Conference (Systor)*, Haifa, Israel, June 2014.

[P9] "Challenges and Opportunities of Virtualization and Cloud Computing to Mission-critical Applications," *Invited Talk*, Air Force Research Laboratory, Rome, NY, USA, August 2014.

[P10] "IBIS: Interposition-based Big-data IO Scheduler," *Invited Talk*, Trends in High Performance Distributed Computing Workshop, Northwestern University, Evanston, USA, March 2014.

[P11] "Towards QoS and QoIA driven Cloud Management," *Invited Talk*, Air Force Research Laboratory, Rome, NY, USA, August 2013.

[P12] "High-performance Storage Management in the Big Data Era," *Invited Talk*, Sandia National Laboratories, Albuquerque, NM, USA, August 2013.

[P13] "High-performance Storage Management in the Big Data Era," *Invited Talk*, Los Alamos National Laboratory, Los Alamos, NM, USA, August 2013.

[P14] "IBIS: Interposition-based Big-data IO Scheduler," *Invited Talk*, Fusion-io, San Jose, CA, May 2013.

[P15] "Towards QoS-driven Resource Management of the Cloud (and beyond)," *Invited Talk*, Huawei Technologies, Santa Clara, CA, USA, May 2013.

[P16] "Towards QoS-driven Resource Management of the Cloud (and beyond)," *Invited Talk*, Huangzhong University of Science and Technology, Wuhan, China, May 2013.

[P17] "QoS-driven Management of Cloud Storage," *Invited Talk*, Huangzhong University of Science and Technology, Wuhan, China, May 2013.

[P18] "Towards QoS-driven Resource Management of the Cloud (and beyond)," *Invited Talk*, Zhejiang University, Hangzhou, China, May 2013.

[P19] "Towards QoS-driven Resource Management of the Cloud (and beyond)," *Invited Talk*, Tsinghua University, Beijing, China, April 2013.

[P20] "Towards QoS-driven Resource Management of the Cloud (and beyond)," *Invited Talk*, Chinese Academy of Science, Institute of Computing, Beijing, China, April 2013.

[P21] "Towards QoS-driven Resource Management of the Cloud (and beyond)," *Invited Talk*, Beihang University, Beijing, China, April 2013.

[P22] "Towards QoS-driven Resource Management of the Cloud (and beyond)," *Invited Talk*, IBM T.J. Watson Research Center, York Town, New York, USA, March 2013.

[P23] "Storage Management Challenges: from Parallel File Systems to Big Data Systems," *Invited Talk*, Trends in High Performance Distributed Computing Workshop, Rutgers University, Piscataway, NJ, USA, March 2013.

[P24] "Towards QoS-driven Resource Management of the Cloud (and beyond)," *Invited Talk*, IBM Almaden Research Center, San Jose, CA, USA, February 2013.

[P25] "Towards QoS-driven Resource Management of the Cloud (and beyond)," *Invited Talk*, VMware, Palo Alto, CA, USA, February 2013.

[P26] "Towards QoS-driven Resource Management of the Cloud (and beyond)," *Invited Talk*, Xerox Palo Alto Research Center, Palo Alto, CA, USA, February 2013.

[P27] "QoS-driven Storage Management for High-end Computing Systems," *HEC FSIO Research and Development Conference*, Washington D.C., USA, August 2011.

[P28] "Towards Simulation of Parallel File System Scheduling Algorithms with PFSsim," *IEEE International Workshop on Storage Network Architecture and Parallel I/O (SNAPI, co-held with MSST'11)*, Denver, CO, USA, May 2011.

[P29] "Cooperative Virtual Machine Scheduling on Multi-core Multi-threading Systems — A Feasibility Study," *Workshop on Micro Architectural Support for Virtualization, Data Center Computing, and Cloud (MASVDC, co-held with MICRO 2010)*, Atlanta, GA, USA, December 2010.

[P30] "QoS-driven Storage Management for High-end Computing Systems," *HEC FSIO Research and Development Conference*, Washington D.C., USA, August 2010.

[P31] "QoS-driven Storage Management for High-end Computing Systems," *HEC FSIO Research and Development Conference*, Washington D.C., USA, August 2009.

[P32] "Scalable and Flexible Grid Data Management with Distributed File Systems Virtualization," *Invited Talk*, IBM T.J. Watson Research Center, Hawthorn, NY, USA, August 2008.

[P33] "Scalable and Flexible Grid Data Management with Distributed File Systems Virtualization," *Invited Talk*, George Washington University, Washington D.C., USA, March 2008.

[P34] "Scalable and Flexible Grid Data Management with Distributed File Systems Virtualization," *Invited Talk*, University at Buffalo, Buffalo, NY, USA, February 2008.

[P35] "A User-level Secure Grid File System," *International Conference for High Performance Computing, Networking, Storage and Analysis (SC'07)*, Reno, NV, USA, November 2007.

[P36] "Experimental Study of Virtual Machine Migration in Support of Reservation of Cluster Resources," *International Workshop on Virtualization Technologies in Distributed Computing (VTDC'07)*, Reno, NV, USA, November 2007.

[P37] "Dynamic Policy Disk Cache for Storage Networking," *IBM Research Seminar*, IBM Austin Research Laboratory, Austin, TX, USA, August 2006.

[P38] "Application-tailored Cache Consistency for Wide-area File Systems," *International Conference on Distributed Computing Systems (ICDCS'06)*, Lisbon, Portugal, July 2006.

[P39] "Towards Autonomic Grid Data Management with Virtualized Distributed File Systems," *International Conference on Autonomic Computing (ICAC'06)*, Dublin, Ireland, June 2006.

[P40] "Supporting Application-tailored Grid File System Sessions with WSRF-based Services," *International Symposium on High Performance Distributed Computing (HPDC'05)*, Research Triangle Park, NC, USA, July 2005.

[P41] "Distributed File System Support for Virtual Machines in Grid Computing," *International Symposium on High Performance Distributed Computing (HPDC'04)*, Honolulu, HI, USA, June 2004.

[P42] "Support for Data-intensive, Variable-granularity Grid Applications via Distributed File System Virtualization—A Case Study of Light Scattering Spectroscopy," *International Workshop on Challenges of Large Applications in Distributed Environments (CLADE'04)*, Honolulu, HI, USA, June 2004.

SOFTWARE

(**Software downloads:** http://visa.lab.asu.edu/software)

- **IBIS (Interposed Big-data IO Scheduler)**: A distributed IO scheduler for the storage systems (HDFS) in big-data computing systems (Hadoop). It provides per-application storage bandwidth allocation and supports various performance management policies such as performance isolation and proportional slowdown. It also supports a new flash-memory-based distributed caching layer (*BigCache*) to transparently accelerate big-data applications. (URL: *http://visa.lab.asu.edu/ibis*)
- **vMoodle**: A novel virtualization-based online education system. It incorporates cloud-hosted virtual machines (e.g., Amazon EC2 virtual machines) to support a variety of course activities with good scalability and availability, and provide these activities through a convenient online learning environment (e.g., Moodle) that teachers and students are already familiar with. In addition, the

vMoodle App further exploits the increasing popularity of smart phones and tablets to allow users access vMoodle from anywhere at any time. (URL: *http://visa.lab.asu.edu/vmoodle*)

- **dm-cache:** A general-purpose and highly-customizable block-level disk caching utility for storage systems. It has been optimized for using emerging solid-state drives (SSD) as caches and supporting scalable virtual machine storage in cloud computing systems. It has been deployed for production use by a leading European cloud service provider, CloudVPS since summer 2012. It has also been extended by other industry companies for various purposes, including Facebook (the Flashcache product), Marvell, Rocket Fuel, Kubisys, and Open-E. (URL: *http://visa.lab.asu.edu/dmcache*)
- **vPFS (Virtual Parallel File System):** A virtualization-based storage management solution for high-performance computing systems. It is designed to support Quality of Service based storage resource management for applications to achieve their desired performance on today's and future large-scale computing systems. It is developed in collaboration with researchers from the University of Florida and IBM Research. (URL: *http://visa.lab.asu.edu/hecura*)
- **FMPC (Fuzzy Modeling Predictive Controller)**: An advanced fuzzy-modeling-based predictive resource controller for data centers and cloud systems. It supports efficient resource allocations for applications with dynamic and complex behaviors and optimizes resource management globally to meet the applications' Quality of Service requirements and the entire system's revenue objective. It is developed in collaboration with researchers from the University of Florida and Intel. (URL: *http://visa.lab.asu.edu/tiki/fmpc*)
- **GVFS (Grid Virtual File System):** A user-level virtual file system for grid computing which allows application to transparently access data across a grid system with their desired performance, consistency, security, and fault-tolerance. It has been deployed in the production In-VIGO grid computing system since 2003 and has supported thousands of scientific job executions. (URL: http:/visa.lab.asu.edu/*gvfs*)
- **In-VIGO:** A virtualization-based middleware system for grid computing. It pioneered the use of virtualization technologies to offer flexible execution environments for scientific applications and collaborative tools with different requirements. It integrates virtualized back-ends and offers a web-based interface for users to submit requests for application execution or creation of collaborative environments. In-VIGO has been in production use since 2003 and served thousands of scientific jobs from over 600 users across 11 countries. (URL: *http://invigo.acis.ufl.edu*)
- **BMI Cyberworkstation:** A distributed software system for brain-machine interface research. It supports in vivo brain signal sampling, reliable across-laboratory messaging, parallel brain signal modeling, real-time robotic control, and flexible Web-based management. It has been in production use since 2006 by researchers from different laboratories nationwide, including the University of Florida, the University of Miami, the State University of New York, and the University of California. (URL: *http://bmi.acis.ufl.edu*)

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TEACHING

My teaching efforts are carried out in a **symbiotic** fashion with my research activities. I innovate in teaching by using the outcomes of my research to develop novel education materials and infrastructure, while the outcomes of my teaching also provide invaluable feedback and prepare important workforce for my further innovation in research.

To teach students the current technologies, I have created a new graduate course on **Virtualized Systems** and a new undergraduate-level course on **Cloud Computing**, which are both one-of-a-kind in the nation. To help students learn important real-world systems, I have also significantly revised the core Operating Systems courses at the undergraduate and graduate levels. I was **among the first** in the nation to use Linux kernel-level programming (on virtual machines) and more recently Android kernel programming (on physical smartphones/tablets) to design all the projects in the undergraduate Operating Systems course. I created a variety of interesting courses activities including field trips to local cloud data centers to engage the students and help them understand the course subjects as well as their real-world impacts.

To provide students an effective learning environment, I have created a novel virtualization-based online education system, **vMoodle**, which allows teachers and students to conveniently use cloud resources and mobile devices for online learning in a convenient environment (Moodle) that the users are already familiar with. This system has already been adopted successfully for several FIU computer science classes.

My teaching has been well received and highly rated by students across the diverse set of undergraduate and graduate courses that I have offered.

CURRICULUM DEVELOPMENT

(Course materials: http://visa.lab.asu.edu/education)

- **CEN 4083 – Introduction to Cloud Computing**, Florida International University (Spring 2015)
  Creator and **Instructor.** Created this course to teach the use and programming of several important cloud computing paradigms, including *Infrastructure-as-a-Service*, *Platform-as-a-Service*, and *big-data computing*. This course was offered as a shared course to several major Florida public universities (physical to *FIU* and online to *University of Central Florida*, *University of South Florida*, and *FIU*), and allows me to reach a large body of students simultaneously. In collaboration with IBM, I also organized a *CloudHackathon* to engage students in industry-leading cloud computing technologies and provide them mentoring from industry cloud computing experts.
- **COP 4338 – Programming III**, Florida International University (Spring 2012)
  Instructor. Offered this advanced programming course in a highly interactive fashion by writing and debugging code with students together in class. This teaching style has substantially helped students not only understand the basics of the C language but also master the practical skills of challenging, low-level C programming.
- **COP 4604 – Advanced UNIX Programming**, Florida International University (Fall 2014)
  Instructor. Significantly revised this course to include new materials on programming across various key Unix environments, including *FUSE-based user-level file system* development on Linux and *mobile app development* on Android devices.
- **COP 4610 – Operating Systems Principles**, Florida International University (Spring 2010, Fall 2010, Spring 2012, Spring 2013)
  Instructor. Significantly revised the lab component of this course to help students learn important, advanced real-world operating systems. This course was among the first in the nation to use *Linux kernel-level programming* and *virtual machines* for all the projects (since 2010). It was also the first to use *Android kernel-level projects* on *physical Android devices* for the entire course (since 2013).

- **CDA 5565 – Virtualized Systems**, Florida International University (Spring 2009, Fall 2011)
  Creator and **Instructor.** Created this course to teach the fundamental concepts and principles of virtualization (including *virtual machines*, *virtual storage*, and *virtual networks*) and its enabled computing systems. Through collaboration with local cloud computing companies (Terremark, Citrix), it also provides students unique *field trips* to real-world cloud data centers.

- **COP 6611 – Advanced Operating Systems**, Florida International University (Fall 2008, Fall 2009, Fall 2012)
  Instructor. Significantly revised this course to include new materials on *virtualization* and *cloud computing*. Created interesting, real *debate*-based new form of exercises to help students not only deeply understand the materials but also learn how to articulate their arguments and communicate their ideas. Mentored the students' *research-oriented course projects* throughout the entire research cycle, from initial literature survey and proposal to final oral presentation and written report.

- **CDA 6939 – Advanced Topics in Computer Architecture**, Florida International University (Spring 2012, Fall 2014)
  Instructor. Significantly revised this course to include new materials on *parallel computer architecture*, from classic instruction-level and thread-level parallelisms to emerging data-level parallelism, and *distributed system architecture*, including key concepts and algorithms (e.g., logical clocks, Paxos) on synchronization and consistency. It also includes a fun discussion on "*How to become a billionaire*" which helps the students understand the technological innovations behind successful IT startups, appreciate the impacts of computing research, and get them motivated in graduate studies.

- **CIS 6933 – Graduate Seminar**, Florida International University (Fall 2011, Spring 2012)
  Coordinator. Organized a total of *53 seminars* given by researchers invited from universities and industry companies including five distinguished lectures given by members of National Academy of Science/Engineering, 20 invited faculty lectures, three industry lectures, and six FIU faculty lectures.

- **EEL 6892 – Virtual Computers,** University of Florida (Fall 2006, Fall 2007)
  Guest Lecturer. Created and gave guest lectures on *storage virtualization*, from virtual block devices to virtual file systems, as well as its role in system virtualization.

INFRASTRUCTURE DEVELOPMENT

vMoodle – Virtualization-based Online Education System (**Production Site**: http://visa.lab.asu.edu/vmoodle)

- Created this novel education system to enhance learning using emerging *cloud*, *mobile*, and *social networks* technologies. vMoodle allows teachers and students to conveniently use cloud-hosted virtual machines (e.g., Amazon EC2) and mobile devices (e.g., Android) to conduct a wide variety of educational activities (e.g., virtual machine based demos and assignments) in a familiar online learning environment (e.g., Moodle) from anywhere at any time. It further integrates popular social networks (e.g., Facebook) to enhance the communications between instructors and students and improve the effectiveness of education.

CloudHackathon (http://visa.lab.asu.edu/hackathon)

- Organized a CloudHackathon in collaboration with IBM to help students learn cloud computing using leading-edge technologies. Students were provided Bluemix, an industry-leading Platform as a Service, including IBM's big-data platforms and Watson—IBM's cognitive system, for their projects. IBM cloud computing experts were invited to give guest lectures to the students and provide input and feedback to their projects. The students developed a variety of exciting projects during the hackathon, using cloud, big-data, and mobile computing technologies.

OUTREACH ACTIVITIES

(Outreach materials: http:// visa.lab.asu.edu/outreach)

- **FIU Engineering Expo:** Hosted a whole-day session on the theme of cloud and high-performance computing for more than one hundred K-12 students, including one high-school class, three middle-school classes, and one elementary school class from the local community. My own students and I created and organized a variety of interactive activities including taking apart computers (laptops, Wii, and mobile devices), hosting Minecraft on cloud, and hacking an iRobot.
- **FIU CodeDojo:** My PhD student Gregory Jean-Baptise (McKnight Fellow, a past FIU undergraduate) has been a teacher to elementary students in two FIU CodeDojo coding clubs for over a year. With his instructions and help, the students started their first program using Scratch and progressed to a complete Arduino project built from electronic components and the code to operate these devices.

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MENTORING

I have graduated one Ph.D. (woman) and am currently supervising **seven** Ph.D. students, two of whom are on track to graduate in 2015. I have graduated three master students and am currently supervising another two. I have also spent substantial efforts working with undergraduate students. I have mentored **54** undergraduates on their research projects (sponsored by my NSF REU grants) and senior capstone projects.

I am dedicated to **broadening the participation** of students from underrepresented groups in computing. Among my graduate students, four are **Hispanics**, one is **African American**, and five are **women**. Among the undergraduates that I have mentored, 44 are **Hispanics**, five are **African Americans**, 11 are **women**, one is **disability**, and five are **veterans**. I have successfully acquired funding from NSF and CRA to support undergraduate research on exciting topics including cloud, big-data, and high-performance computing.

By engaging students early on using my own research activities, I have successfully created a **pipeline** for local undergraduate students, who are mostly from underrepresented groups, to join my graduate program. **Three** of these undergraduates are now my Ph.D. students and **two** are my Master students. One student is awarded the prestigious **McKnight Doctoral Fellowship**.

With my mentoring and support, my graduate students have been highly prolific in their research—they have presented papers in many top computing conferences (ICAC, FAST, MSST, BigData, MASCOTS) and attended research internships in leading industry companies (VMware, CloudVPS, Panasas, Fusion-io Marvell Semiconductor,) and federal laboratories (Sandia National Labs, Los Alamos National Lab, and Air Force Research Lab). One PhD student also won the highly-competitive **VMware Graduate Fellowship** (one of the only four awards) in 2014.

Because of the above record, I received the FIU SCIS **Excellence in Student Mentoring** award in 2012.

GRADUATE STUDENTS

(**Student Profiles**: http://visa.lab.asu.edu/people)

Ph.D. Students

- Saman Biook Aghazadeh (*Intern at ITER Systems*)
- Dulcardo Arteaga Clavijo (*Ph.D. Candidate, Intern at CloudVPS and Fusion-io*)
- Jorge Cabrera (*Intern at Sandia National Laboratories, FIU Outstanding Graduate*)
- Runyu Jin
- Wenji Li
- Gregory Jean Baptise (*McKnight Fellow, Intern at Sandia National Laboratories and VMware*)
- Douglas Otsott (*Ph.D. Candidate, Intern at Marvel Semiconductor and Los Alamos National Lab, FIU Outstanding Graduate*)
- Michel Roger
- Qirui Yang

M.S. Students

- Revathy Venkataraman
- Rachel Chavez (*Air Force Summer Fellow, Graduated*)

Past Students

- Lixi Wang (*Ph.D., Amazon*)
- Yiqi Xu (*Ph.D., ITER Systems*)
- Harini Kondamudi (*M.S.*)

- Gowthami Thota (*M.S.*)

UNDERGRADUATE STUDENTS

Research Experiences for Undergraduates (**More Information**: http://visa.lab.asu.edu/reu)

- **Resource Management on Mobile Devices** (Spring 2015 – Present)
  - Eduardo Castillo, Steven Ignetti
- **Mission-critical Cloud Computing** (Summer 2014 – Present)
  - Francois D'Ugard, Olena Tkachenko
- **Cloud and Social Networking based Disaster Management** (Summer 2013 – Fall 2014)
  - Andres Acosta, Francois D'Ugard, Terry Henderson, Olena Tkachenko
- **Autonomic Cloud Management for Mission-critical Computing** (Fall 2013 – Fall 2014)
  - Elsa Barredo Baltar (*Outstanding Graduate*), Francois D'Ugard, Steven Ignetti, Peter Reidy
- **High-performance Virtualization and Cloud Computing** (Summer 2013 – Fall 2013)
  - Bryan Jimenez, Filip Panovski
- **Flash Caching for Cloud Computing Systems** (Spring 2011 – Summer 2013)
  - Stephen Bromfield, Jorge Cabrera (*Outstanding Graduate, my current PhD student*), Abraham Ciokler, Daniel Florez, Gregory Jean-Baptise (*my current PhD student*), Douglas Otstott (*Outstanding Graduate, my current PhD student*), Michel Roger (*my current master student*), Mario Salisbury, Adrian Suarez
- **Cloud Computing of Traditional High-performance Applications** (Spring 2011 – Summer 2011)
  - Carlos Davila, Emmanuel Sacristan
- **QoS-driven Storage Management for High-end Computing Systems** (Fall 2010 – Spring 2011)
  - Eduardo Castillo, Rachel Chávez (*my master student*), Alejandro Fuste, Yesenia Sosa, Sebastian Zanlongo

Senior Capstone Projects (**More Information**: visa.lab.asu.edu http://visa.lab.asu.edu/seniorproject)

- **Flash-optimized IO Architecture and Scheduling** (Fall 2013 – Spring 2014)
  - David Garcia, Cesar Martinez, Michel Roger (*my current master student*), Rahimil Vazquez
- **Cloud and Social Network based Emergency Preparedness System** (Fall 2013)
  - Andres Acosta, Elsa Barredo Baltar (*Outstanding Graduate*), Bryan Jimenez, Jonathan Lozano, Francisco Peleato
- **vMoodle Social** (Spring 2013)
  - Gregory Jean-Baptise (*my current PhD student*), Karren Fernandez
- **Solid State Drive based Energy Efficient Cloud Storage** (Fall 2012)
  - Jorge Cabrera (*Outstanding Graduate*, *my current PhD student*), Alexis Jefferson, Jesus Ramos, Salma Rodriguez, Tiffany Da Silva
- **vMoodle Mobile** (Summer 2012)
  - Eduardo Castillo, Rachel Chávez (*my master student*), Gerardo Guijarro, Carlos Lacasa, Claudia De Leon
- **vMoodle Resource Management** (Spring 2012)
  - Leduan Camarero, Reynier Ortiz, Qais Mazhar, Austin von Nehring,
- **vMoodle Cloud** (Fall 2011)
  - Junior Monel Bazile, Darien Ruiz, Gisselle Ginarte, Jose Hernandez, Diana Serpa Riveron

- **vMoodle** (Fall 2010)
  - Stephen Bromfield, Joseph Hayon, Lionel Nimmo, Marcos Di Pietro

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SERVICE

I am actively contributing my services to the activities of my research communities. I have served as the Program Committee Chair for one workshop (USENIX **FeedbackComputing**) and the Program Committee Member of more than **40** conferences and workshops, including **ICAC**, **ICDCS**, **CLOUD**, **CCGrid**, **BigData**, **BDSE**, **HPDC**, and **HPCC**. I have also been involved in the Organizing Committee of over 20 conferences and workshops as Publicity Chair, Demo Chair, Doctoral Symposium Chair, and Local Chair etc. I have reviewed articles for **15** journals, including ACM **TAAS**, IEEE **TC**, IEEE **TCC**, IEEE **TCST**, ACM **TECS**, IEEE **TPDS**, **FGCS**, **JPDC**, and **Cluster Computing**, as well as grant proposals for **NSF** and **DOD**.

Internally at FIU, I organized a successful **Computer Science Colloquium** for the 2011-2012 academic year. A total of 53 speakers were invited to the colloquium, including three members of National Academy of Science/Engineering, 26 researchers from industry and other universities, six FIU faculty members, and 17 FIU graduate students. In addition, I have been on 22 Ph.D. dissertation and candidacy exam committees.

COMMITTEES

External Committees

- **Technical Program Committee Chair**, The 7th International Workshop on Feedback Computing (FeedbackComputing 2013)
- **Technical Program Committee Member**
  - International Conference on Autonomic and Trusted Computing (**ATC**), 2010
  - IEEE International Conference on Big Data Science and Engineering (**BDSE**), 2014, 2013
  - IEEE International Conference on Big Data (**BigData**), 2014, 2013
  - Workshop on Benchmarks, Performance Optimization, and Emerging hardware of Big Data Systems and Applications (**BPOE**), 2013
  - International Conference on Computer and Management (**CAMAN**), 2013
  - IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (**CCGrid**), 2015, 2014, 2013, 2012
  - IEEE International Conference on Cloud Computing (**CLOUD**), 2015
  - IEEE International Conference on Cloud Computing Technology and Science (**CloudCom**), 2014
  - International Workshop on Feedback Computing (**FeedbackComputing**), 2015
  - IEEE International Symposium on High Assurance Systems Engineering (**HASE**), 2015, 2014
  - IEEE International Conference on High Performance Computing and Communications (**HPCC**), 2013
  - ACM International Symposium on High-Performance Parallel and Distributed Computing (**HPDC**), 2016, 2014, 2013
  - International Conference on Autonomic Computing (**ICAC**), 2015, 2014, 2013
  - International Conference on Computer Communications and Networks (**ICCCN**), 2015
  - IEEE International Conference on Distributed Computing Systems (**ICDCS**), 2015
  - IEEE International Conference on Parallel and Distributed Systems (**ICPADS**), 2012
  - Workshop on Mirco Architectural Support for Virtualization, Data Center Computing, and Clouds (**MASVDC**), 2010
  - International Workshop on Management of Cloud Systems (**MoCS**), 2013, 2012

- IFIP International Conference on Network and Parallel Computing (**NPC**), 2013
- IEEE Non-Volatile Memory System and Applications Symposium (**NVMSA**), 2015
- International Conference on Progress in Informatics and Computing (**PIC**), 2014
- IEEE/IPSJ International Symposium on Applications and the Internet (**SAINT**), 2012
- International ICST Conference on Sensor Systems and Software (**S-Cube**), 2012, 2010
- International Workshop of Software-Defined Data Communications and Storage (**SDDCS**), 2015
- International Workshop on System Management Techniques, Processes, and Services (**SMTPS**), 2012
- IEEE International Workshop on Storage Network Architecture & Parallel I/Os (**SNAPI**), 2011
- International Workshop on Virtualization Technologies in Distributed Computing (**VTDC**), 2015, 2013, 2012, 2011, 2010, 2009
- Workshop on Containers (**WoC**), 2015.

▫ **Publicity Chair**

- International ICST Conference on Cloud Computing (**CloudComp**), 2010
- International Conference on Autonomic Computing (**ICAC**), 2014, 2013, 2012, 2011
- International Green Computing Conference (**IGCC**), 2011
- IEEE International Workshop on Storage Network Architecture & Parallel I/Os (**SNAPI**), 2011
- International Workshop on Virtualization Technologies in Distributed Computing (**VTDC**), 2011, 2010, 2009

▫ **Poster/Demo Chair**

- International Conference on Autonomic and Trusted Computing (**ATC**), 2010
- International Conference on Software Engineering and Knowledge Engineering (**SEKE**), 2013, 2012, 2011

▫ **Doctoral Symposium Chair**, The 11th IEEE/IPSJ International Symposium on Applications and the Internet (**SAINT** 2011)

▫ **Travel Grant Chair**, The 24th ACM International Symposium on High-Performance Parallel and Distributed Computing (**HPDC** 2015)

▫ **Local Chair**

- IEEE/ACM International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems (**MASCOTS**), 2010
- International ICST Conference on Sensor Systems and Software (**S-Cube**), 2010

▫ **Cyber Chair**

- International Conference on Autonomic Computing (**ICAC**), 2010, 2009, 2008, 2007

Internal Committees

▫ **Computer Science Colloquium Chair**, School of Computing and Information Sciences, Florida International University (2011 – 2012)

▫ **Graduate Committee**, School of Computing and Information Sciences, Florida International University (2009 – 2010)

▫ **Infrastructure Committee**, School of Computing and Information Sciences, Florida International University (2008 – 2009)

REVIEWS

Journal Article Reviews

- ACM Transactions on Autonomous and Adaptive Systems (**TAAS**) (2013: 2 manuscripts)
- **Cluster Computing**: The Journal of Networks, Software Tools and Applications (2008: 2 manuscripts; 2009: 2 manuscripts; 2010: 5 manuscripts; 2011: 3 manuscripts; 2012: 4 manuscript; 2013: 1 manuscript; 2014: 3 manuscripts; 2015: 2 manuscripts)
- **Computer Science Journal** (2014: 2 manuscripts)
- **IBM Journal of Research and Development** (2013: 1 manuscript; 2015: 1 manuscript)
- IEEE Transactions on Cloud Computing (**TCC**) (2014: 1 manuscript; 2013: 2 manuscripts)
- IEEE Transactions on Control Systems Technology (**TCST**) (2014: 1 manuscript)
- IEEE Transactions on Computers (**TC**) (2006: 1 manuscript; 2013: 2 manuscripts; 2014: 7 manuscripts; 2015: 1 manuscript)
- ACM Transactions on Embedded Computing Systems (2015: 1 manuscript)
- IEEE Transactions on Parallel and Distributed Systems (**TPDS**) (2006: 1 manuscript; 2007: 1 manuscript; 2010: 1 manuscript; 2012: 4 manuscript; 2013: 4 manuscripts; 2014: 2 manuscripts; 2015: 1 manuscript)
- **Journal of Computers** (2013: 1 manuscript)
- Journal of Emerging Technologies in Computing Systems (**JETC**) (2011: 1 manuscript; 2012: 1 manuscript)
- Journal of Information Science and Engineering (**JISE**) (2011: 1 manuscript; 2012: 1 manuscript; 2013: 2 manuscripts)
- Journal of Parallel and Distributed Computing (**JPDC**) (2009: 2 manuscripts)
- Frontiers of Computer Science in China (**FCS**) (2011: 3 manuscript; 2012: 1 manuscript)
- Future Generation Computer Systems (**FGCS**) (2012: 1 manuscript; 2013: 1 manuscript)
- Scalable Computing: Practice and Experience (**SCPE**) (2013: 2 manuscripts)
- Sustainable Computing: Informatics and Systems (**SUSCOM**) (2011: 1 manuscript)

Grant Proposal Reviews

- **Reviewer** for Department of Defense Army Research Office (2010: 1 proposal; 2014: 1 proposal)
- **Panelist** of National Science Foundation grant review panel (2015: 8 proposals)
- **Panelist** of National Science Foundation grant review panel (2010: 8 proposals)
- **Panelist** of National Science Foundation grant review panel (2010: 7 proposals)

PROFESSIONAL SOCIETIES

Member, Institute of Electrical and Electronics Engineers (Computer Society)

Member, Association for Computing Machinery (Special Interest Group on Operating Systems)

Member, USENIX, the Advanced Computing Systems Association

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