
Sayan Ghosh

Washington State University,
The School of Electrical Engineering and Computer Science,
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Education

2015 - present

Washington State University, Pullman, WA

PhD, Computer Science

School of Electrical Engineering and Computer Science

Expected Graduation: Fall, 2018

Academic Status: PhD candidate. Passed PhD qualifying and preliminary exam.

PhD program committee members: Drs Assefaw Gebremedhin (WSU), Carl Hauser (WSU), Ananth Kalyanaraman (WSU), Pavan Balaji (ANL) and Mahantesh Halappanavar (PNNL).

2012 - 2014

University of Houston, Houston, TX

PhD studies, Computer Science

Dept. of Computer Science

2010 - 2012

University of Houston, Houston, TX

MS, Computer Science

Title: *Energy Efficiency of Parallel Scientific Kernels*

Dept. of Computer Science, August 2012

2002 - 2006

Asansol Engineering College, Asansol, India

Bachelor of Technology, July 2006

Information Technology

Experiences

Pacific Northwest National Laboratory

Alternate Sponsored Fellow,

Advanced Computing, Mathematics and Data Division

Fall 2017 - Spring 2018

Richland, WA

Supervisor: Dr. Mahantesh Halappanavar

Focus: Graph analytics, One-sided programming models.

Washington State University

Graduate Research Assistant,

School of Electrical Engineering and Computer Science

Spring 2015 - Spring 2017

Pullman, WA

Graduate Adviser: Dr. Assefaw Gebremedhin

Focus: Graph analytics, Combinatorial algorithms, One-sided programming models.

University of Houston

Graduate Research Assistant,
College of Natural Sciences and Mathematics
Spring 2011 - Fall 2014
Houston, TX

Graduate Adviser: Dr. Barbara M. Chapman

Focus: Power/energy analysis and modeling of scientific kernels, Application parallelization using compiler directives, One-sided programming models.

University of Texas Health Science Center

Graduate Research Assistant,
Spring 2010 - Fall 2010
Houston, TX

Graduate Adviser: Dr. Stefan Birmanns

Focus: Application parallelization using compiler directives.

Thomson Reuters

Software Developer
July 2008 - Dec 2009
Bangalore, India

Focus: Database development and maintenance.

NTT Innovation Institute, Inc. (formerly Keane India Pvt. Ltd.)

Software Developer
July 2006 - July 2008
Bangalore, India

Focus: Database development and maintenance.

Internships

- May-Aug 2018, Data Sciences division, Pacific Northwest National Laboratory, Richland, WA. *Focus:* Distributed-memory graph analytic algorithms, such as community detection and maximal weight matching.
Supervisors: Drs. Mahantesh Halappanavar and Arif Khan
- May-Aug 2017, Data Sciences division, Pacific Northwest National Laboratory, Richland, WA. *Focus:* Distributed-memory network community detection.
Supervisor: Dr. Mahantesh Halappanavar
- May-Aug 2016, Mathematical and Computer Sciences division, Argonne National Laboratory, Chicago, IL. *Focus:* C++ bindings for MPI-3 RMA.
Supervisors: Drs. Pavan Balaji and Yanfei Guo
- May-Aug 2014, Mathematical and Computer Sciences division, Argonne National Laboratory, Chicago, IL. *Focus:* Asynchronous interface for updating distributed matrices in Elemental, a distributed-memory dense linear algebra library.
Supervisor: Drs. Pavan Balaji and Antonio J. Peña
- May-Aug 2013, Argonne Leadership Computing Facility, Argonne National Laboratory, Chicago, IL. *Focus:* Design and prototype of a one-sided communication runtime on top of MPI-3, that led to development of an OpenSHMEM implementation over MPI-3 RMA (OSHMPI).
Supervisor: Dr. Jeff Hammond
- May-Aug 2012, Total R&T, Houston, TX. *Focus:* Evaluation of directive based programming models like OpenMP, PGI, HMPP and OpenACC on Finite Difference kernels on GPU and multicore CPUs.
Supervisors: Drs. Terrence Liao and Henri Calandra
- Jun-Sept 2011, Pacific Northwest National Laboratory, Richland, WA. *Focus:* Power/energy profiling of scientific kernels on a multi-GPU platform.
Supervisors: Drs. Darren Kerbyson, Kevin Barker and Abhinav Vishnu

Publications /Presentations

- Journals
 - “Performance of CPU/GPU compiler directives on ISO/TTI kernels” by Sayan Ghosh, Terrence Liao, Henri Calandra and Barbara Chapman. Computing Journal, Springer Vienna, November, 2013.
- Papers
 - Conferences
 - * “Distributed Louvain Algorithm for Graph Community Detection” by Sayan Ghosh, Mahantesh Halappanavar, Antonino Tumeo, Ananth Kalyanaraman, Hao Lu, Daniel Chavarrià-Miranda, Arif Khan and Assefaw Gebremedhin. 32nd IEEE International Parallel and Distributed Processing Symposium (IPDPS).
 - * “One-Sided Interface for Matrix Operations using MPI-3 RMA: A Case Study with Elemental” by Sayan Ghosh, Jeff Hammond, Antonio J. Peña, Pavan Balaji, Assefaw Gebremedhin and Barbara Chapman. 45th International Conference on Parallel Processing (ICPP).
 - * “Parallelization of Bin Packing on Multicore Systems” by Sayan Ghosh and Assefaw Gebremedhin. 23rd International Conference on High Performance Computing, Data, and Analytics (HiPC).
 - * “Native Mode-Based Optimizations of Remote Memory Accesses in OpenSHMEM for Intel Xeon Phi” by Naveen Namashivayam, Sayan Ghosh, Dounia Khaldi, Deepak Eachempati and Barbara Chapman. 8th International Conference on Partitioned Global Address Space Programming Models (PGAS), 2014. (*Best Paper*)
 - Workshops
 - * “Implementing OpenSHMEM using MPI-3 one-sided communication” by Jeff Hammond, Sayan Ghosh and Barbara Chapman. 2013 1st OpenSHMEM Workshop: Experiences, Implementations and Tools.
 - * “Performance Analysis of the NWChem TCE for Different Communication Patterns” by Priyanka Ghosh, Jeff Hammond, Sayan Ghosh and Barbara Chapman. 2013 Workshop on Performance Modeling, Benchmarking and Simulation of High Performance Computer Systems (PMBS13), in conjunction with SC’13.
 - * “Experiences with OpenMP, PGI, HMPP and OpenACC directives on ISO/TTI kernels” by Sayan Ghosh, Terrence Liao, Henri Calandra and Barbara Chapman. 5th International Workshop on Multi/Manycore Computing Systems (MuCoCoS) Workshop in conjunction with SC’12.
 - * “Energy Analysis of Parallel Scientific Kernels on Multiple GPUs” by Sayan Ghosh, Sunita Chandrasekaran and Barbara Chapman. 2012 Symposium of Application Accelerators in High Performance Computing (SAAHPC).
- Posters
 - “Towards a More Asynchronous GraphBLAS” by Sayan Ghosh and Assefaw Gebremedhin. 2016 SIAM workshop on Combinatorial Scientific Computing (CSC’16).
 - “Performance of ISO/TTI kernels on CPU/GPU using OpenMP, PGI, HMPP and OpenACC directives” by Sayan Ghosh, Terrence Liao, Henri Calandra and Barbara Chapman. 2013 Rice Oil and Gas HPC Workshop, Rice University, Houston, TX.
 - “Power and Energy Prediction of Multi-GPU kernels Using Non-linear Regression” by Sayan Ghosh, Sunita Chandrasekaran and Barbara Chapman. 2013 Nvidia GPU Technology Conference, San Jose, California.

- “Statistical Power and Energy Modeling of multi-GPU kernels” by Sayan Ghosh, Sunita Chandrasekaran and Barbara Chapman, General poster. SC’12.
- “Programming Strategies for GPUs and their Power Consumption” by Sayan Ghosh and Barbara Chapman. 2011 International Conference on Parallel Architectures and Compilation Techniques (PACT)

Teaching Assistanceships

- Spring 2016, Washington State University, EECS, Distributed Computing, CPTS 464/564 (*Course Instructor:* Dr. Dave Bakken)
- Fall 2015, Washington State University, EECS, Computer Communication Networks, CPTS 455 (*Course Instructor:* Dr. Carl Hauser)
- Spring 2015, Washington State University, EECS, Distributed Computing, CPTS 464/564 (*Course Instructor:* Dr. Dave Bakken)
- Fall 2010, UT Health Science Center, Introductory Course on Data Structures (*Course Instructor:* Dr. Stefan Birmanns). This was an unofficial appointment, just assisted my advisor in taking the course and prepared course materials.

Activities/Grants

- Participant, 2018 Argonne Training Program on Extreme-Scale Computing (AT-PESC), July 29-August 10, St. Charles, IL
- NSF/IEEE TCPP Travel grant, 32rd International Parallel and Distributed Processing Symposium (IPDPS), Vancouver, BC, Canada
- NSF/IEEE TCPP Travel grant, 23rd International Conference on High Performance Computing, Data, and Analytics (HiPC), Hyderabad, India
- Student Volunteer, Supercomputing 2016, Salt Lake City, Utah
- Booth setup personnel, Gulf Coast Advanced Supercomputing (GCAS) booth, Supercomputing 2014, New Orleans, Louisiana
- Booth duty at Gulf Coast Advanced Supercomputing (GCAS) booth, Supercomputing 2013, Denver, Colorado
- Student Volunteer at Architectural Support for Programming Languages and Operating Systems (ASPLOS) conference, Rice University, Houston, 2013
- Co-taught a classroom session on OpenACC at Nvidia Global Technology Conference (GTC), San Jose, CA, 2013
- Booth duty at OpenMP booth and Gulf Coast Advanced Supercomputing (GCAS) booth, Supercomputing 2012, Salt Lake City, Utah
- Represented University of Houston in OpenMP booth at Multicore Developers Conference, San Jose, CA, 2011

Memberships

- ACM Special Interest Group in High Performance Computing (SIGHPC)
- Institute of Electrical and Electronics Engineers (IEEE)
- Society for Industrial and Applied Mathematics (SIAM)