

Mehmet Esat Belviranlı

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Research Interests

- Heterogeneous architectures, runtime systems, performance modeling, systems research for deep learning and cyber-security, autonomous systems, task-based execution, NVMs, deep memory hierarchies, source-to-source translation, parallel programming paradigms.

Education

- **University of California, Riverside** Riverside, CA
Doctor of Philosophy in Computer Science and Engineering *Sep. 2009 - Sep. 2016*
Thesis: Efficient Execution of Scientific Applications on Heterogeneous Architectures
Advisor: Prof. Laxmi N. Bhuyan
- **Bilkent University** Ankara, Turkey
Master of Science in Computer Science and Engineering *Sep. 2006 - Aug. 2009*
Thesis: A Circular Layout Algorithm for Clustered Graphs
Advisor: Prof. Ugur Dogrusoz
- **Bilkent University** Ankara, Turkey
Bachelor of Science in Computer Science and Engineering *Sep. 2001 - May 2006*

Work Experience

- **Oak Ridge National Laboratory** Oak Ridge, TN
Computer Scientist, Computer Science and Mathematics Division *Dec. 2018 - Current*
Supervisor: Dr. Jeffrey S. Vetter
- **Oak Ridge National Laboratory** Oak Ridge, TN
Postdoctoral Research Associate, Computer Science and Mathematics Division *Nov. 2016 - Nov. 2018*
Mentor: Dr. Seyong Lee
- **University of California, Riverside** Riverside, CA
Research Assistant, Computer Science and Engineering Department *Sep. 2010 - Sep. 2016*
Advisor: Prof. Laxmi N. Bhuyan
- **Samsung Information Systems America** San Jose, CA
Processor Architect Intern, Advanced Processor Lab *Jun. 2013 - Sep. 2013*
Mentor: Dr. Sung-Soo Park
- **Tom Sawyer Software** Oakland, CA
Software Engineer *Aug. 2007 - Jul. 2008*
Manager: Dr. Brett Zane-Ulman

Publications**Journals**

- J1. [Mehmet E. Belviranlı](#), Laxmi N. Bhuyan, and Rajiv Gupta, "A Dynamic Self-Scheduling Scheme for Heterogeneous Multiprocessor Architectures," *ACM Transactions on Architecture and Code Optimization (TACO)*, January 2013.
- J2. Ugur Dogrusoz, [Mehmet E. Belviranlı](#), and Alptug Dilek, "CiSE: A Circular Spring Embedder Layout Algorithm," *IEEE Transactions on Visualization and Computer Graphics*, June 2013.
- J3. Alptug Dilek, [Mehmet E. Belviranlı](#), and Ugur Dogrusoz, "VISIBIOweb: Visualization and Layout Services for BioPAX Pathway Models," *Nucleic Acids Research*, July 2010.

Conferences

- C1. Mehmet E. Belviranlı, and Jeffrey S. Vetter, “FLAME: Graph-based Hardware Representations for Rapid and Precise Performance Modeling,” *IEEE Design, Automation & Test in Europe Conference & Exhibition (DATE)*, March 2019.
- C2. Pak Markthub, Mehmet E. Belviranlı, Seyong Le, Jeffrey S. Vetter, and Satoshi Matsuoka, “DRAGON: Breaking GPU Memory Capacity Limits with Direct NVM Access,” *ACM/IEEE International Conference for High Performance Computing, Networking, Storage, and Analysis (SC)*, November 2018.
- C3. Mehmet E. Belviranlı, Seyong Lee, and Jeffrey S. Vetter, “Designing Algorithms for the EMU Migrating-threads-based Architecture,” *IEEE High Performance Extreme Computing Conference (HPEC)*, September 2018. [Best Paper Finalist]
- C4. Mehmet E. Belviranlı, Seyong Lee, Jeffrey S. Vetter, and Laxmi N. Bhuyan, “Juggler: A Dependency-Aware Task Based Execution Framework for GPUs,” *ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP)*, February 2018.
- C5. Amir A. Abdolrashidi, Devashree Tripathy, Mehmet E. Belviranlı, Daniel Wong, and Laxmi N Bhuyan, “Wireframe: Supporting Data-dependent Parallelism through Dependency Graph Execution in GPUs.,” *IEEE/ACM International Symposium on Microarchitecture (MICRO)*, October 2017.
- C6. Mehmet E. Belviranlı, Farzad Khorasani, Laxmi N. Bhuyan, and Rajiv Gupta, “CuMAS: Data Transfer Aware Multi-Application Scheduling for Shared GPUs,” *ACM International Conference on Supercomputing (ICS)*, June 2016.
- C7. Farzad Khorasani, Mehmet E. Belviranlı, Rajiv Gupta, and Laxmi N. Bhuyan, “Stadium Hashing: Scalable and Flexible Hashing on GPUs,” *IEEE International Conference on Parallel Architectures and Compilation Techniques (PACT)*, October 2015.
- C8. Mehmet E. Belviranlı, Peng Deng, Laxmi N Bhuyan, Rajiv Gupta, and Qi Zhu, “PeerWave: Exploiting Wavefront Parallelism on GPUs with Peer-SM Synchronization,” *ACM International Conference on Supercomputing (ICS)*, June 2015.
- C9. Chih H. Chou, Mehmet E. Belviranlı, and Laxmi N. Bhuyan, “Thermal Prediction and Scheduling of Network Applications on Multicore Processors,” *ACM/IEEE Symposium on Architectures for Networking and Communications Systems (ANCS)*, October 2013.

Workshops

- W1. Mehmet E. Belviranlı, Weize Yu, and Selcuk Kose, “Ultra-Fine Grain Power Management at Datapath-Level: Fact or Fiction,” *ACM International Conference on Architectural Support for Programming Languages and Operating Systems - Wild and Crazy Ideas Session (ASPLOS - WACI)*, January 2015.
- W2. Mehmet E. Belviranlı, Chih Hsun Chou, Laxmi N. Bhuyan, and Rajiv Gupta, “A Paradigm Shift in GP-GPU Computing: Task Based Execution of Applications with Dynamic Data Dependencies,” *Sixth International Workshop on Data Intensive Distributed Computing (DIDC, co-located with HPDC)*, January 2014.

Posters

- P1. Mehmet E. Belviranlı, Seyong Lee, and Jeffrey S. Vetter, “Programming the EMU Architecture: Algorithm Design Considerations for Migratory-Threads-Based Systems,” *ACM/IEEE International Conference for High Performance Computing, Networking, Storage, and Analysis (SC)*, November 2018.
- P2. Pak Markthub, Mehmet E. Belviranlı, Seyong Le, Jeffrey S. Vetter, and Satoshi Matsuoka, “Efficiently Extending GPU Addressable Memory with NVM,” *NVIDIA GPU Technology Conference (GTC)*, March 2018.
- P3. Cagri Aksay, Fatma Arik, Esra Ataer, Asli Ayaz, Ozgun Babur, Mehmet E. Belviranlı, Ahmet Cetintas, Emek Demir, and Ugur Dogrusoz, “PATIKAweb: A Web Service for Querying, Visualizing, and Analyzing a Graph Based Pathway Database,” *Intelligent Systems for Molecular Biology (ISMB)*, June 2005.

Teaching and Mentoring Experience

- **Mentoring** Oak Ridge National Laboratory
Mentored four Ph.D. students via
ORNL/ORISE-ASTRO internship program Spring'17, Summer'17, Spring'18, Summer'18
- **Co-Lecturer & Teaching Assistant** University of California, Riverside
Parallel Processing Architectures Spring'14, Spring'15, > 30 students
Advanced Computer Architecture Fall'13, > 30 students
Design and Architecture of Computer Systems Spring'15, > 30 students
- **Teaching Assistant** Bilkent University, Ankara, Turkey
Object Oriented Software Engineering Spring'09, > 100 students
Algorithms and Programming Fall'08, > 100 students

Grants

Contributed significantly to writing of several proposals, including the following which were awarded:

- DARPA/MTO-ERI Award: *Domain Specific Systems on a Chip*, 2018-2022. (PI: Jeffrey S. Vetter, awarded \$6M, <http://ft.ornl.gov/research/dssoc>)
- NSF Award: *Energy Efficient Computing on GPU-based Heterogeneous Systems*, 2015-2018. (PI: Laxmi N. Bhuyan)
- NSF Award: *Efficient CPU-GPU Communication for Heterogeneous Architectures*, 2014-2017. (PI: Laxmi N. Bhuyan)

Professional Activities and Service

- Technical program committee member
 - ISC High Performance (ISC), 2019
 - Principles and Practice of Parallel Programming (PPoPP) Artifact Evaluation, 2018
- Publications and web chair
 - International Conference on Supercomputing (ICS), 2015
- External reviewer
 - Journals: TPDS, TACO, JPDC, PARCO, JETCS, CCPE
 - Conferences: ASPLOS, ISCA, MICRO, IPDPS, EURO-PAR
- Lab-level point of contact and reviewer for DoE- Exascale Computing Project (ECP) Pathforward Program, 2017-2019
- Served as mentor in SC'18 Mentor-Protege program, 2018
- Professional societies
 - Member, IEEE
 - Member, ACM

Awards

- Best Paper Finalist in IEEE High Performance Extreme Computing Conference, 2018
- 1st year graduate fellowship awarded by University of California, Riverside, 2009
- Full scholarship and stipend awarded by Bilkent University, Ankara, Turkey, 2001-2006
- Outstanding success in national university entrance exam:
 - 89th over 1.5 million candidates, Turkey, 2001
- Abroad Undergraduate Education Fellowship by Turkish Government, Turkey, 2001