Mehmet Esat Belviranli

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Research Interests

- Diversely heterogeneous architectures, analytical performance & resource modeling, autonomous computing, deep learning acceleration, parallel programming paradigms, runtime systems.

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

- **Colorado School of Mines**   Golden, CO
  Assistant Professor, Computer Science Department   *Aug. 2019 - Current*

- **Oak Ridge National Laboratory**   Oak Ridge, TN
  Computer Scientist, Computer Science and Mathematics Division   *Dec. 2018 - Aug. 2019*
  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. Jeffrey S. Vetter

- **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. <u>Mehmet E. Belviranli</u>, Laxmi N. Bhuyan, and Rajiv Gupta, "A Dynamic Self-Scheduling Scheme for Heterogeneous Multiprocessor Architectures," *ACM Transactions on Architure and Code Optimzation (TACO)*, January 2013.

J2. Ugur Dogrusoz, <u>Mehmet E. Belviranli</u>, and Alptug Dilek, "CiSE: A Circular Spring Embedder Layout Algorithm," *IEEE Transactions on Visualization and Computer Graphics*, June 2013.

J3. Alptug Dilek, <u>Mehmet E. Belviranli</u>, and Ugur Dogrusoz, "VISIBIOweb: Visualization and Layout Services for BioPAX Pathway Models," *Nucleic Acids Research*, July 2010.

Conferences

C1. Mohammad Monil, <u>Mehmet E. Belviranli</u>, Seyong Lee, Malony Allen, and Jeffrey S. Vetter, "MEPHESTO: Modeling Energy-Performance in Heterogeneous SoCs and Their Trade-Offs," *2020 International Conference on Parallel Architectures and Compilation Techniques (PACT)*, September 2020.

C2. <u>Mehmet E. Belviranli</u>, 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.

C3. Pak Markthub, <u>Mehmet E. Belviranli</u>, 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.

C4. <u>Mehmet E. Belviranli</u>, 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]

C5. <u>Mehmet E. Belviranli</u>, 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.

C6. Amir A. Abdolrashidi, Devashree Tripathy, <u>Mehmet E. Belviranli</u>, 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.

C7. <u>Mehmet E. Belviranli</u>, 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.

C8. Farzad Khorasani, <u>Mehmet E. Belviranli</u>, 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.

C9. <u>Mehmet E. Belviranli</u>, 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.

C10. Chih H. Chou, <u>Mehmet E. Belviranli</u>, 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. <u>Mehmet E. Belviranli</u>, 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. <u>Mehmet E. Belviranli</u>, 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. <u>Mehmet E. Belviranli</u>, 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, <u>Mehmet E. Belviranli</u>, 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, <u>Mehmet E. Belviranli</u>, 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

- **Teaching**   Colorado School of Mines
  Taught senior course, CSCI-442 Operating Systems   Fall'19, Spring'20, Fall'20

- **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

Professional Activities and Service

- Program committee member
  – IEEE International Parallel & Distributed Processing Symposium (IPDS), 2021
  – International Conference on Parallel Processing (ICPP), 2020
  – Principles and Practice of Parallel Programming (PPoPP), 2020
  – ACM/IEEE System Level Interconnect Prediction Workshop (SLIP), 2019
  – IEEE Computer Society Annual Symposium on VLSI (ISVLSI) Student Research Competition, 2019
  – ISC High Performance (ISC), 2019
  – Principles and Practice of Parallel Programming (PPoPP) Artifact Evaluation, 2018

- External review committee member
  – International Conference on Parallel Architectures and Compilation Techniques (PACT), 2019

- 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

- Mentored 5 Ph.D. students under Oak Ridge Institute for Science and Education program, 2016-current

- Professional societies
  – Member, IEEE
  – Member, ACM

Awards

- Oak Ridge National Laboratory (ORNL) Significant Event Award, 2019

- 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