

## Research Interests

Performance, power, and thermal management of processors, monolithic 3D systems, DNN accelerators, EDA development, computer architecture, embedded systems, HW/SW co-design, compilers, machine learning.

## Education

- 2017–present **PhD Computer Engineering**, *Boston University*, Boston. GPA - 3.90/4.0.  
Advisor: Prof. Ayse Coskun
- 2014–2015 **MS Computer Engineering**, *Columbia University*, New York. GPA - 3.55/4.0.
- 2008–2012 **BE Information Systems**, *BITS-Pilani Goa Campus*, India. GPA - 7.82/10.0.

## Relevant Experience

- 2017–present **Graduate Research Assistant**, *Peac Lab*, Boston University.
- Improve thermal integrity in Monolithic 3D ICs.
  - Build a simulator for temperature estimation of emerging integration and cooling techniques.
- 2016–2017 **Hardware Performance Engineer**, *IBM*, New York.
- Modeling and performance analysis of the IBM z Systems I/O subsystem, including the ASIC, system buses and the physical interfaces such as Fibre Channel and Ethernet. Languages: C/C++ and Java.
- 2015 **Software Engineer II (Intern)**, *Cisco*, San Jose.
- Built a framework to automate unit testing for packet forwarding on simulated router in order to provide full automation, regression and speedy unit testing. Languages: C and Python.
- 2012–2013 **Software Engineer**, *Samsung Research India*, Bangalore.
- Developed data synchronization solution for multiple applications for Android & Tizen phones, to bundle network activities of applications together to minimize battery consumption. Language: C.

## Posters and Publications

- [1] Krithika Dhananjay, Prachi Shukla, Vasilis F. Pavlidis, Ayse K. Coskun, and Emre Salman. Monolithic 3d integrated circuits: Recent trends and future prospects. In *In Transactions on Circuits and Systems II (TCAS II): Express Briefs*, 2021.
- [2] Prachi Shukla, Sean S. Nemptzow, Vasilis F. Pavlidis, Emre Salman, and Ayse K Coskun. Temperature-Aware Optimization of Monolithic 3D Deep Neural Network Accelerators. In *Asia and South Pacific Design Automation Conference (ASP-DAC)*, 2021.
- [3] Prachi Shukla and Ayse K. Coskun. Maintianing Thermal Integrity in Monolithic 3D systems. *Poster at Student Research Forum (SRF) at ASPDAC 2021*.
- [4] Zihao Yuan, Geoffrey Vaartstra, Prachi Shukla, Zhengmao Lu, Evelyn Wang, Sherief Reda, and Ayse K Coskun. A Learning-based Thermal Simulation Framework for Emerging Two-phase Cooling Technologies. In *Design, Automation & Test in Europe Conference & Exhibition (DATE)*, 2020.
- [5] Prachi Shukla, Ayse K. Coskun, Vasilis F. Pavlidis, and Emre Salman. An Overview of Thermal Challenges and Opportunities for Monolithic 3D ICs. In *Great Lakes Symposium on VLSI (GLSVLSI), 2017 (Invited Paper)*.
- [6] Zihao Yuan, Geoffrey Vaartstra, Prachi Shukla, Sherief Reda, Evelyn Wang, and Ayse K Coskun. Modeling and optimization of chip cooling with two-phase vapor chambers. In *International Symposium on Low Power Electronics and Design (ISLPED)*, 2019.
- [7] Zihao Yuan, Geoffrey Vaartstra, Prachi Shukla, Mostafa Said, Sherief Reda, Evelyn Wang, and Ayse K. Coskun. Two-phase Vapor Chambers with Micropillar Evaporators: A New Approach to Remove Heat from Future High-Performance Chips. In *Intersociety Conf. on Thermal and Thermomechanical Phenomena in Electronic Systems (ITherm)*, 2019.

- [8] Zihao Yuan, Geoffrey Vaartstra, Prachi Shukla, Mostafa Said, Sherief Reda, Evelyn Wang, and Ayse K. Coskun. An EDA Tool for Co-designing High-Performance Processors and Emerging Cooling Technologies. *Workshop on Open-source EDA Technology (WOSET)*, 2018.
- [9] Prachi Shukla and Ayse K. Coskun. Modeling next-generation hybrid cooling systems for high-performance processors. *Poster presented at Design Automation Conference (DAC) in Richard Newton Young Scholars Program*, 2018.
- [10] Prachi Shukla and Ayse K. Coskun. Modeling next-generation hybrid cooling systems for high-performance processors. *Poster presented at Computing Research Association for Women (CRA-W)*, 2018.
- [11] Prachi Shukla. ML-IDS: A machine learning approach to detect wormhole attacks in Internet of Things. In *Intelligent Systems Conference (IntelliSys)*, 2017.

## Academic Projects at Boston University

- Spring 2018 **Advanced Computing Systems : Thermal Management on a Multi-Core Architecture.**  
Prof. Ayse K. Coskun
  - o Implemented reactive and proactive DVFS techniques to control high temperatures on a simulated 12-core "Magny Cours" processor in HotSpot thermal simulator. Benchmark: PARSEC, Language: C.
- Fall 2017 **Embedded Systems : Smart Guide.**  
Prof. Ayse K. Coskun
  - o Built an embedded system using gumstix boards and ultra-sonic sensors connected through bluetooth, to help the visually challenged in navigation. Language: C
- Fall 2017 **Advanced Data Structures : DeDuplicator.**  
Prof. Ari Trachtenberg
  - o Designed and implemented an efficient data storage locker that utilizes deduplication, and a command-line interface for it. The locker could add, retrieve, and delete files and directories. Language: Java.

## Technical skills

- Languages Python, C, C++, Java, SystemVerilog, Verilog, SystemC, OCaml, Haskell
- Tools HotSpot thermal simulator, SCALE-Sim, Pintool, QEMU, GDB Debugger, AnyLogic simulator, Quartus, Cadence CtoS compiler, Synopsys VCS

## Awards and Achievements

- 2020 Fellowship to attend the virtual Grace Hopper Celebration 2020.
- 2019 Fellowship to attend the Society of Women in Engineering (SWE) Conference.
- 2018 A. Richard Newton Young Fellowship to attend the 55th Design Automation Conference.
- 2018 Travel grant to attend 2018 CRA-W Grad Cohort Workshop for Women.
- 2017 Rank #1 in a class of 50, course: Embedded Systems.
- 2017 Rank #5 in a class of 60, course: Advanced Data Structures.
- 2017 Distinguished Computer Engineering Fellowship at Boston University.
- 2015 Course Assistant Fellowship at Columbia University with full tuition waiver and stipend.
- 2012 Certificate of Excellence at BITS-Pilani Goa for contributions as teaching assistant.

## Teaching Experience

- Summer 2019 Course Instructor for the Electrical Engineering Course at the BU Summer Challenge Program.
- Spring 2019 Teaching Assistant (TA) of Advanced Data Structures, Prof. Ari Trachtenberg, Boston University.
- Fall 2018 TA of Advanced Data Structures, Prof. Richard Brower and Prof. David Casatañón, Boston University.
- Fall 2015 TA of Programming Languages and Translators, Prof. Stephen A. Edwards, Columbia University.
- Spring 2015 TA of Discrete Mathematics, Dr. Ilia Vovsha, Columbia University.
- Spring 2012 TA of Advanced Computer Organization, Dr. Biju K. Raveendran, BITS-Pilani Goa Campus.