

# M. Talha Imran

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## RESEARCH INTERESTS

Design of efficient Disaggregated Memory Systems housing heterogeneous memory and compute in modern datacenters

## EDUCATION

- **Ph.D. Computer Science and Engineering** (Aug 2018 – Present)  
*Pennsylvania State University*  
GPA: 3.93/4.00  
Advisor: Prof. Aasheesh Kolli
- **Bachelor of Electrical Engineering** (Sep 2011 - Jun 2015)  
*National University of Sciences and Technology, Pakistan*  
GPA: 3.96/4.00 - Silver Medal

## RESEARCH AND WORK EXPERIENCE

- **Graduate Student Research Assistant** (Aug 2018 - Present)  
*Pennsylvania State University*  
Exploring design of efficient Disaggregated Memory Systems to improve resource utilization in rack-scale computing. I am currently working on efficient provisioning and orchestration of serverless applications from Cloud providers' perspective.
- **Research Intern** (3 months: May 2019 - Aug 2019)  
*Facebook, Menlo Park*  
Team: AI HW/SW Codesign  
Conducted first-order evaluation of Deep Learning (DL) accelerator microarchitecture specifications on up and coming DL networks for content comprehension and recommendation applications. We also devised an analysis methodology to characterize an accelerator's software-backend dev. cost arising from HW design complexity.
- **Sr. Software Development Engineer** (3 years: Aug 2017 – Jul 2018  
Jul 2015 – Jul 2017)  
Software Development Engineer  
*Mentor Graphics, Pakistan (now Mentor, a Siemens Business)*  
Team: Sourcery CodeBench IDE  
Added early initialization and multicore debug support (using GDB) for embedded boards running baremetal apps and OS kernels: cross toolchains, scratch codes dev., bring-up via JTAG, and Linux JTAG debug patches. Improved testing infrastructure for verifying *build* and *debug* workflows. We adhered to release cycles for multi-component IDE in a geographically dispersed team working with open source teams (GCC, GDB, QEMU) to fix workflow bugs.
- **Undergrad Research Assistant** (1 year: Aug 2014 – Jun 2015)  
*RISE Research Center, National University of Sciences and Technology, Pakistan*  
Project: Humanoids & Legged Robotics - RoboCup SPL 2015  
*Software Architecture & Tools for Humanoid Robots* - Programmed humanoid NAO robots to play soccer autonomously as a team. Worked on system software architecture, footstep planning and utilities for remote system visualization in realtime.

## SKILLS

- Programming:  
*Professional proficiency:* C++(17), Python, JAVA, C  
*Basic proficiency:* Assembly, OpenCL, Verilog
- Kubernetes, Microservices, Protobuf, Build Systems, Agile Development

## **TALKS**

- “Rethinking Resource Disaggregation”. Young Architect Workshop, International Symposium on High Performance Computer Architecture (HPCA), Feb 2019.

## **RELEVANT COURSEWORK**

### **Pennsylvania State University (Graduate)**

- Operating System Design (CSE-511)  
*Projects:* Parallel Distributed File System using GRPC; Synchronization using Path Expressions
- Fundamentals of Computer Architecture (CSE-530)  
*Project:* Survey of Disaggregated Memory Systems
- Language based Security (CSE-597 Special Topics)  
*Project:* Survey of Secure Information Flow in Distributed Systems
- Beyond Von Neumann Computing: Technology and Architecture Interactions (CSE-597 Special Topics)  
*Project:* Analysis of software-backend dev. cost for Intel Loihi Spiking Neural Network accelerator
- Binary Level Analysis (CSE-597 Special Topics)  
*Project:* Evaluation of methods for Debug Information Recovery from Stripped Binaries
- Algorithm Design and Analysis (CSE-565)

### **National University of Sciences and Technology (Undergraduate)**

Digital System Design (EE-421), Embedded System Design (EE-423), Digital Signal Processing (EE-330), Digital Image Processing (EE-333)

## **TEACHING**

*Graduate Teaching Assistant:* Introduction to Computer Architecture (CMPEN-431), Penn State University (Spring '19)

## **AWARDS, HONORS & SCHOLARSHIPS**

- Graduate Fellowship at Pennsylvania State University (2018-2019)
- Team Role Model award at Mentor Graphics annual appraisal (2017)
- Senior Design Project featured at IEEE International Conference on Robotics and Automation - Developing Countries Forum (2015)
- Chancellor's Silver Medal – Academics (2011-2015)
- NUST High Achievers' Scholarship (2011-2015)

## **REFERENCES**

- Prof. Aasheesh Kolli, Assistant Professor, CSE, Penn State University, [akolli@psu.edu](mailto:akolli@psu.edu)
- Dr. Irina Calciu, Senior Researcher, VMware Research, [icalciu@vmware.com](mailto:icalciu@vmware.com)
- Dr. Ehsan K. Ardestani, Research Scientist, Facebook, [ehsanardestani@fb.com](mailto:ehsanardestani@fb.com)
- Prof. Anand Sivasubramaniam, Distinguished Professor, CSE, Penn State University, [anand@cse.psu.edu](mailto:anand@cse.psu.edu)
- Prof. Vijay Narayanan, Robert Noll Chair Professor, CSE and EE, Penn State University, [vijaykrishnan.narayanan@psu.edu](mailto:vijaykrishnan.narayanan@psu.edu)