

# Biswadip Maity

## Doctoral Candidate in Computer Science

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**Research Interests** : Self-aware Embedded Systems, Memory Systems, System Software and Architecture for Heterogeneous Systems.

## EDUCATION

Degree	University	Concentration	Year	CGPA
PhD	University of California, Irvine	Computer Science	2023 (expected)	-
MS	University of California, Irvine	Computer Science	2019	3.9/4.0
BE	Jadavpur University	Computer Science and Engineering	2015	8.85/10

## SKILLS

<b>Programming</b>	C++, .Net (C#), C, Python, Java, Javascript, Verilog, PHP, HTML/CSS
<b>Assembly</b>	8085, 8086, 8051, Atmel, Microchip, ARM Cortex M3, RISC-V
<b>Architectures</b>	x86, ARM v7-A, v8-A, RISC-V
<b>Development Utilities</b>	perf, VS Code, git, Azure stack, Dockers, Kubernetes, ELK
<b>Hardware tools</b>	Cadsoft Eagle, Xilinx ISE, Keil, MPLab, Coccox, PlatformIO
<b>Simulation</b>	Matlab, Gem5, Sniper-sim

## RESEARCH EXPERIENCE

Ongoing Jan 2018	<b>Self-aware Resource Management, UC Irvine, Advisor : Dr. Nikil Dutt</b> Developing new runtime approaches on emerging systems to support data-centric applications. <ul style="list-style-type: none"><li>&gt; Resource allocation and dynamic power management in heterogeneous multicore systems</li><li>&gt; Integration of self-organizing machine learning techniques and formal reactive control methods</li><li>&gt; Exploring effects of quality controlled approximation on computer memory</li></ul> <span>C++</span> <span>Gem5</span> <span>Linux Kernel Module</span> <span>perf</span> <span>ARM-A</span> <span>ASM</span> <span>Computer Architecture</span> <span>UNIX</span>
Sept 2020 June 2020	<b>Research Intern, Facebook, Performance and Capacity</b> <ul style="list-style-type: none"><li>&gt; Developed framework to collect millisecond level metrics @ scale from many-core production servers.</li><li>&gt; Currently running as part of the <i>dyno</i> telemetry daemon on all FB servers.</li><li>&gt; Identified architectural bottlenecks in popular Facebook services (e.g., AdIndexer, ZippyDB).</li></ul> <span>Intel Top-Down</span> <span>C++</span> <span>x86</span> <span>perf</span> <span>Computer Architecture</span> <span>@Scale</span>
Dec 2019 Sept 2019	<b>Visiting Researcher, Technische Universität München (TUM), Advisor : Prof. Dr. sc.techn. Andreas Herkersdorf</b> <ul style="list-style-type: none"><li>&gt; Added controllable error knobs in the cache-hierarchy for memory accesses on a RISC-V core (Ariane).</li><li>&gt; Enable software control of error knobs from user-space applications.</li></ul> <span>System Verilog</span> <span>C++</span> <span>RISC-V</span> <span>ASM</span> <span>Computer Architecture</span> <span>Cache-Hierarchy</span>

## SELECTED PUBLICATIONS

Oct 2021	<b>Biswadip Maity</b> , Saehanseul Yi, Dongjoo Seo, Leming Cheng, Sung-Soo Lim, Jong-Chan Kim, Bryan Donyanavard and Nikil Dutt, <b>Chauffeur : Benchmark Suite for Design and End-to-End Analysis of Self-Driving Vehicles on Embedded Systems</b> , ACM Transactions on Embedded Computing Systems, ESWEEK-TECS special issue (ACM-TECS).
Jul 2021	<b>Biswadip Maity</b> , Bryan Donyanavard, Anmol Surhonne, Amir Rahmani, Andreas Herkersdorf and Nikil Dutt, <b>SEAMS : Self-optimizing Runtime Manager for Approximate Memory Hierarchies</b> , ACM Transactions on Embedded Computing Systems (ACM-TECS).
Oct 2019	Kasra Moazzemi, <b>Biswadip Maity</b> , Saehanseul Yi, Amir M. Rahmani and Nikil Dutt, <b>HESSLE-FREE : Heterogeneous Systems Leveraging Fuzzy Control for Runtime Resource Management</b> , ACM Transactions on Embedded Computing Systems, ESWEEK-TECS special issue (ACM-TECS).

## PROFESSIONAL EXPERIENCE

- Sept 2019** | **Cloud Infrastructure Engineering Intern, Tinder, CA, USA**  
**Jun 2019** | Improved runtime performance monitoring infrastructure of Tinder micro-services to support hierarchical rule-evaluation.
- › Created a python-based parser to generate Abstract-Syntax-Tree (AST) of PromQL queries.
  - › Developed a DFS algorithm to analyse the AST, and split the rule evaluation into hierarchical-computation.
  - › Enabled support for multi-threaded query evaluation.
  - › Obtained 60% reduction in computational resource requirement.
- Python Dockers Kubernetes Prometheus PromQL Graphana Abstract Syntax Tree Depth First Search
- Aug 2017** | **Software Engineer, Microsoft, India**  
**Jul 2015** | Developed UX framework to support the entire shopping experience offered by Bing ([www.bing.com/shop](http://www.bing.com/shop)). In a team of 3 developers, worked with the ads team and developed a rich engaging framework to feature different products and help users make an informed choice of purchase. Other relevant work :
- › Developed search answers for Bing, Bing for mobile and Cortana
  - › Worked on Leisure Planner, Interactive Maps and a Product Carousel with Embedded Ads
  - › Mined user logs to analyse performance of these answers and drilling down to optimize each resource that is being sent to the client
- ASP.NET C# Typescript Elastic Satori D3.js html css Instrumentation Logging MVC Agile
- Jul 2015** | **Device Developer, [www.exporthdmx.com](http://www.exporthdmx.com), India**  
**Jan 2013** | Created electrical schematics and corresponding low level C code for microcontroller based devices to control various industrial lighting equipment. These are now being sold commercially in India.
- › Worked with interfacing a variety of electronic ICs for tasks like multiplexed Analog-to-Digital Conversion (ADC), constant current LED drive
  - › Used communication protocols like I2C, SPI, USB to coordinate the system
  - › Used power electronics to develop a 6-channel digital dimmer using a Insulated Gate Bipolar Transistor for resistive loads upto 4kW in each channel
  - › Developed a lighting control desk for theatre performances which can save cues in memory and recall them easily
  - › Programmed light and sound shows across Bangladesh and India using ShowCAD
- Microcontrollers C Eagle ADC Multiplexer PWM IGBT AC Dimmer RTOS i2c spi DMX ePaper

## LEADERSHIP

- › **Student Mentor**, DuttResearchGroup (DRG)
  - › Mentored several Undergraduate and Masters student interns at DRG.
  - › Proposed research projects and supervise students in completing proposed projects.
- › **Convenor**, Jadavpur University Science Club (JUSC)
  - › Conducted workshops for school students on application of basic science.
  - › Held regular sessions to teach undergrad students Robotics (Manual and Autonomous Robots).
- › **Founder and Volunteer** Social Initiative by Jadavpur University Science Club  
Under my leadership, JUSC won INR 65k prize money at the State Science Fair. Being a dedicated volunteer of empowerment through education, we used this fund to support the tutoring of 30 underprivileged students attending sub-par government schools in the fundamentals of English and Maths.

## FELLOWSHIPS, HONORS AND AWARDS

- › **Research Gift, Facebook, 2021**  
Offered by Facebook for for Studying Hyperscale Data Center Platform Power Management
- › **DAAD Scholarship, 2019**  
Offered by German Academic Exchange Service to serve as visiting researcher in Germany
- › **Best All Round Graduate Award**, class of 2015  
Jadavpur University
  - › Alumni Association Gold Centered Silver Medal
  - › Purna Chandra Laha Memorial Silver Medal
  - › Dipak Kumar Chowdhury Memorial Gold Centered Silver Medal
- › **Charpak Scholarship, 2014**  
Offered by the French government to undertake a research internship in France
- › **Indian National Olympiad in Informatics (INOI) 2011** qualifier.  
Among the 18 students invited to attend International Olympiad in Informatics (IOI) training camp organized by Indian Association for Research in Computing Science (IARCS)
- › **INSPIRE Scholarship, 2011**  
Selected for being in the top 1% out of 100,000 candidates (on completion of high school).
- › **National Cyber Olympiad** All India Rank : 58, held in 2010