

## Education

- 2013–2019 **Ph.D. in Computer Science**, *University of California, Irvine*  
Awarded ICS Dean's Fellowship (4 Years of Full Financial Support)
- 2008–2010 **M.Sc. in Computer Engineering**, *University of California, Santa Barbara*
- 2004–2008 **B.Sc. in Computer Engineering**, *University of California, Santa Barbara*

## Research & Work Experience

- 2021 – present **Assistant Professor**, COMPUTER SCIENCE, San Diego State University
- Research in runtime resource management for energy-efficient execution of cyber-physical systems.
- 2020 – 2021 **Experienced Researcher**, DEVICE TECHNOLOGIES, Ericsson
- Identifying and addressing runtime optimization challenges across the system stack for distributed applications executing on networks of cyber-physical systems.
- 2019 – 2020 **Postdoctoral Researcher**, CENTER FOR EMBEDDED AND CYBER-PHYSICAL SYSTEMS, University of California, Irvine
- Postdoctoral Researcher**, CHAIR OF INTEGRATED SYSTEMS, Technical University, Munich
- Key contributor to the collaborative Information Processing Factory (IPF) project, investigating cross-layer runtime management solutions of cyber-physical systems using computational self-awareness.
- 2015 – 2019 **Graduate Student Researcher**, DUTT RESEARCH GROUP, University of California, Irvine
- Adaptive On-chip Memory Management in Future Many-core Systems
    - Developed novel software solutions to simultaneously exploit the features of new memory technologies and application semantics during on-chip memory management in many-core systems.
  - Adaptive and Autonomous Resource Management in Mobile Systems
    - Provided policies in software for adaptive resource management of unpredictable workloads.
    - Developed autonomous hierarchical supervisors to manage system goals in response to abrupt runtime changes.
- 2016 **Software Engineering Intern**, CHROME OS, Google
- Performed research in viability of non-volatile memory (NVM) main memory replacement for mobile SoCs. Proposed and evaluated large last-level cache controller policies for NVM main memory systems by extending the gem5 simulator.
- 2015 **Software Engineering Intern**, TECHNICAL INFRASTRUCTURE, Google
- Performed platforms research in software management of multi-tiered main memory hierarchies. Evaluated the validity of incorporating non-uniform memory accesses in cloud applications by collecting and simulating memory traces from live workloads.
- 2011 – 2013 **Software Developer**, SPARC SYSTEMS GROUP, Oracle
- Member of platform development teams for SPARC Systems providing bootstrapping source code to initialize chip and system state. Developed firmware to manage various platform I/O peripherals. Platforms include SPARC Blade, Volume, and Enterprise.
- 2010 – 2013 **Android Application Developer**, ProDIGIQ
- Contracted to independently develop and release to market Android applications for multiple airports around the United States. Apps provide services including real time updates of flight time tables, local information regarding parking and rentals, and embedded forms to be electronically submitted.

- 2009 – 2010 **Engineer**, SPECIAL TECHNOLOGIES LABORATORY, National Security Technologies
  - Designed mobile embedded sensor devices. Devices consist of RTOS running on a microcontroller managing peripheral sensor data as well as networked over multiple communication links. Developed device specific communication protocol. Integrated and implemented communication between devices and user interface software.
- 2007 **Summer Intern**, INFORMATION TECHNOLOGY SOLUTIONS, Northrop Grumman
  - Coded, implemented, and presented a complete data storage management system from start to finish in conjunction with a Six Sigma project. Interface consisted of a web application form in Apache Struts framework using JavaServer Pages that performed queries and updates on an Oracle database. Contributed C code for matrix inversion in parallel across a cluster using Linux MPI library for modeling parasitic capacitive coupling.

## Research Interests

- System Software and Architecture for Heterogeneous Systems
- Runtime Resource Management
- Memory Management in Software and Architecture
- Computational Self-awareness

## Teaching & Mentoring Experience

- 2018 – **Instructor**
- present
  - Intro to Software Systems, San Diego State University
    - Fall/Spring 2022, Fall/Spring 2021
  - Digital Logic Design, UC Irvine
    - Fall 2018
- 2017 **Certificate in Teaching Excellence Program**, Division of Teaching Excellence and Innovation, University of California, Irvine
  - Trained and certified in designing lessons using evidence-based pedagogical principles, analyzing and assessing teaching practices, and effectively facilitating learning
- 2017 **Associate Training**, Center for the Integration of Research, Teaching and Learning, University of California, Irvine
  - Trained and certified in effective teaching and learning, and scholarly teaching that uses the CIRTLL ideas to demonstrably improve learning of students
- 2017 – 2018 **Mentor**, International Summer Undergraduate Research Fellowship, University of California, Irvine
  - Proposed research projects for undergraduate interns
  - Supervised four undergraduate students from Korean universities in completing proposed projects
- 2014 – 2016 **Volunteer Tutor Lead**, Rocket Science Tutors, Santa Ana Unified School District
  - Lead mentor in after school program to encourage local students' involvement in STEM subjects
  - Nominated for Engage UCI award for Excellence in Service
- 2010 **Graduate Student Mentor**, Apprentice Researchers Program, University of California, Santa Barbara
  - Spent 4 weeks as mentor aiding a high school student apprentice in completing an engineering research project

## Computer Skills

Programming Languages	C, C++, Java
Scripting	Python
Compilers	LLVM Compiler Infrastructure
HDLs	Verilog, VHDL

Architectural Simulators	gem5
EDA Tools	Mentor ModelSim, Cadence PSpice
FPGA Tools	Xilinx ISE
Miscellaneous	Git Version Control System, L <sup>A</sup> T <sub>E</sub> X

## Conference Papers

- 2021 Sandra Hernández, José Araujo, Patric Jensfelt, Ioannis Karagiannis, Ananya Muddukrishna, Bryan Donyanavard, **Cross-layer Configuration Optimization for Localization on Resource-constrained Devices**, *International Conference on Intelligent Robots and Systems (IROS)*
- 2020 Biswadip Maity, Bryan Donyanavard, Nikil Dutt, **Self-aware Memory Management for Emerging Energy-efficient Architectures**, *11th International Green and Sustainable Computing Workshops (IGSC)*
- 2020 Florian Maurer, Bryan Donyanavard, Amir Rahmani, Nikil Dutt, Andreas Herkersdorf, **Emergent Control of MPSoC Operation by a Hierarchical Supervisor / Reinforcement Learning Approach**, *Design, Automation & Test in Europe Conference & Exhibition (DATE)*
- 2019 Bryan Donyanavard, Armin Sadighi, Florian Maurer, Tiago Mück, Amir Rahmani, Andreas Herkersdorf, Nikil Dutt, **SOSA: Self-Optimizing Learning with Self-Adaptive Control for Hierarchical System-on-Chip Management**, *52nd IEEE/ACM International Symposium on Microarchitecture (MICRO)*
- 2019 Eberle Rambo\*, Bryan Donyanavard\*, Minjun Seo\*, Florian Maurer\*, et al., **The Information Processing Factory: A Paradigm for Life Cycle Management of Dependable Systems**, *Embedded Systems Week Special Session (ESWEEK)*
- 2019 Biswadip Maity, Bryan Donyanavard, Nalini Venkatasubramanian, Nikil Dutt, **Workload Characterization for Memory Management in Emerging Embedded Platforms**, *The 6th International Embedded Systems Symposium (IESS)*
- 2018 Bryan Donyanavard, Amir Mahdi Hosseini Mozannah, Tiago Mück, Nikil Dutt, **Exploring Hybrid Memory Caches in Chip Multiprocessors**, *13th International Symposium on Reconfigurable Communication-centric Systems-on-Chip (ReCoSoC)*
- 2018 Amir Rahmani\*, Bryan Donyanavard\*, Tiago Mück\*, Kasra Moazemmi\*, Axel Jantsch, Onur Mutlu, Nikil Dutt, **SPECTR: Formal Supervisory Control and Coordination for Many-core Systems Resource Management**, *Proceedings of the Twenty-Third International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*
- 2018 Bryan Donyanavard, Amir Rahmani, Tiago Mück, Kasra Moazemmi, Nikil Dutt, **Gain Scheduled Control for Nonlinear Power Management in CMPs**, *Design, Automation & Test in Europe Conference & Exhibition (DATE)*
- 2017 Tiago Mück, Bryan Donyanavard, Nikil Dutt, **PoliCym: Rapid Prototyping of Resource Management Policies for HMPs**, *Proceedings of the 28th International Symposium on Rapid System Prototyping: Shortening the Path from Specification to Prototype (RSP)*
- 2016 Bryan Donyanavard\*, Tiago Mück\*, Santanu Sarma, Nikil Dutt, **SPARTA: Runtime Task Allocation for Energy Efficient Heterogeneous Many-cores**, *International Conference on Hardware/Software Codesign and System Synthesis (CODES+ISSS)*
- 2016 Hossein Tajik, Bryan Donyanavard, Nikil Dutt, **On Detecting and Using Memory Phases in Multimedia Systems**, *Proceedings of the 14th ACM/IEEE Symposium on Embedded Systems for Real-Time Multimedia (ESTIMedia)*
- 2010 Yi-Chu Wang, Bryan Donyanavard, Tim Cheng, **Energy-Aware Real-Time Face Recognition System on Mobile CPU-GPU Platform**, *European Conference on Computer Vision (ECCV Workshops)*

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## Journal Articles

- 2022 Sina Shahhosseini, DongJoo Seo, Anil Kanduri, Tianyi Hu, Sung-Soo Lim, Bryan Donyanavard, Amir M Rahmani, Nikil Dutt, **Online Learning for Orchestration of Inference in Multi-User End-Edge-Cloud Networks**, *ACM Transactions on Embedded Computing Systems (TECS)*
- 2021 Biswadip Maity, Saehanseul Yi, Dongjoo Seo, Leming Cheng, Sung-Soo Lim, Jong-Chan Kim, Bryan Donyanavard, Nikil Dutt, **Chauffeur: Benchmark Suite for Design and End-to-End Analysis of Self-Driving Vehicles on Embedded Systems**, *ACM Transactions on Embedded Computing Systems (TECS)*
- 2021 Biswadip Maity, Bryan Donyanavard, et al., **SEAMS: Self-Optimizing Runtime Manager for Approximate Memory Hierarchies**, *ACM Transactions on Embedded Computing Systems (TECS)*
- 2020 Eberle Rambo, Bryan Donyanavard, Minjun Seo, Florian Maurer, et al., **The Self-Aware Information Processing Factory Paradigm for Mixed-Critical Multiprocessing**, *IEEE Transactions on Emerging Topics in Computing*
- 2020 Tianyi Zhang, Minjun Seo, Bryan Donyanavard, Nikil Dutt, Fadi Kurdahi, **Predicting Failures in Embedded Systems using Long Short-Term Inference**, *IEEE Embedded Systems Letters (ESL)*
- 2018 Tiago Mück, Bryan Donyanavard, Kasra Moazemmi, Amir Rahmani, Axel Jantsch, Nikil Dutt, **Design Methodology for Responsive and Robust MIMO Control of Heterogeneous Multicores**, *IEEE Transactions on Multi-Scale Computing Systems (TMSCS)*
- 2018 Majid Shoushtari, Bryan Donyanavard, Luis Angel D Bathen, Nikil Dutt, **ShaVe-ICE: Sharing Distributed Virtualized SPMs in Many-Core Embedded Systems**, *ACM Transactions on Embedded Computing Systems (TECS)*
- 2016 Aviral Shrivastava, Nikil Dutt, Jian Cai, Majid Shoushtari, Bryan Donyanavard, Hossein Tajik, **Automatic Management of Software Programmable Memories in Many-core Architectures**, *IET Computers & Digital Techniques*
- 2016 Hossein Tajik, Bryan Donyanavard, Janmartin Jahn, Joerg Henkel, Nikil Dutt, **SPMPool: Runtime SPM Management for Memory-Intensive Applications in Embedded Many-Cores**, *ACM Transactions on Embedded Computing Systems (TECS)*

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## Book Chapters

- 2021 Bryan Donyanavard, Amir M Rahmani, Axel Jantsch, Onur Mutlu, Nikil Dutt, **Intelligent Management of Mobile Systems Through Computational Self-Awareness**, *Handbook of Research on Methodologies and Applications of Supercomputing*
- 2020 Bryan Donyanavard et al., **Reflecting on Self-Aware Systems-on-Chip**, *A Journey of Embedded and Cyber-Physical Systems*

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## Selected Projects

- OS/middleware Contribute to MARS resource management policy framework and offline simulator - <https://github.com/duttresearchgroup/MARS>
- gem5 Added support for software programmable memories (SPMs) in gem5 - <https://github.com/duttresearchgroup/gem5-spm>

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## Academic Services

Technical DAC 2022

Program

Committee

Artifact ECTRS 2021, 2022

Evaluation

Committee

External ISCA 2022

Review

Committee

- Peer Reviewer
- 2014: CASES, ESTIMedia, ACM SAC
  - 2015: ACM TODAES, CODES+ISSS
  - 2016: ACM SAC, CODES+ISSS, VLSI Design, SCOPES
  - 2017: VLSI Design, DATE
  - 2018: DATE, IEEE TC, ACM TACO
  - 2019: DATE, GLSVLSI, IEEE TVLSI
  - 2020: CODES+ISSS, IEEE TC, IEEE ISVLSI, IEEE Design & Test, CCPE, IEEE TVLSI
  - 2021: DATE, ACM TACO, IEEE TVLSI, ASP-DAC, ACM TECS
  - 2022: ACM TECS

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## References

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