

# Arpan Gujarati

Assistant Professor, CS, UBC, Vancouver

ICICS/CS Building 201-2366 Main Mall  
Vancouver, BC Canada V6T 1Z4  
+1 (604) 822 2501  
✉ arpanbg@cs.ubc.ca  
📄 arpangujarati.github.io/

## Education

- 2014–2020 **Ph.D. in Computer Science (*Summa Cum Laude*)**  
Max Planck Institute for Software Systems (MPI-SWS), Saarbrücken/Kaiserslautern, Germany  
and Technical University of Kaiserslautern (TU-KL), Kaiserslautern, Germany  
Advisor: Björn B. Brandenburg (tenured faculty, head of the Real-Time Systems Group, MPI-SWS)  
Thesis: *Towards “Ultra-Reliable” CPS: Reliability Analysis of Distributed Real-Time Systems*  
(submitted in December 2019, defended in October 2020)
- 2012–2014 **Preparatory Phase (Graduate Coursework)**  
Max Planck Institute for Software Systems (MPI-SWS), Saarbrücken/Kaiserslautern, Germany  
and Saarland University (UdS), Saarbrücken, Germany
- 2007–2011 **B.E. (Hons.) in Computer Science**  
Birla Institute of Technology and Science (BITS), Pilani, India

## Work Experience

- 2023– **Tenure-Track Assistant Professor**  
Computer Science Department, University of British Columbia (UBC), Vancouver, Canada  
Focus areas: Cyber-physical systems, real-time systems, distributed systems
- 2021–2023 **Research Associate**  
Computer Science Department, University of British Columbia (UBC), Vancouver, Canada  
Manager: Margo Seltzer  
Focus areas: Securing industrial cyber-physical systems like robotic arms; specifically, self-driving laboratories in the Hein Lab in the Chemistry department at UBC
- 2022 **Sessional Lecturer (six months)**  
Electrical and Computer Engineering Dept., University of British Columbia (UBC), Vancouver, Canada  
Focus areas: Teaching Real-Time System Design (CPEN 432)
- 2020–2021 **Postdoctoral Researcher**  
Max Planck Institute for Software Systems (MPI-SWS), Saarbrücken/Kaiserslautern, Germany  
Advisor: Jonathan Mace  
Focus areas: Building efficient systems for deep neural network inference serving in cloud
- 2020 **Visiting International Research Student (VIRS) (one month)**  
Electrical and Computer Engineering Dept., University of British Columbia (UBC), Vancouver, Canada  
Hosts: Sathish Gopalakrishnan and Karthik Pattabiraman  
Focus areas: Building reliable machine learning frameworks for resilient intelligence at the edge
- 2012–2019 **Graduate Research Assistant**  
Max Planck Institute for Software Systems (MPI-SWS), Saarbrücken/Kaiserslautern, Germany  
Advisor: Björn B. Brandenburg  
Focus areas: Scheduling and fault-tolerance in real-time systems

- 2015 **Research Intern (three months)**  
 Microsoft Research, Redmond, WA, USA  
 Mentors: Kathryn S. McKinley, Sameh Elnikety, Yuxiong He  
 Focus areas: Distributed autoscaling of machine learning inference services
- 2011–2012 **Software Development Engineer**  
 Cloud Networking Group, Citrix R&D, Bengaluru, India  
 Manager: Sanjay Gupta  
 Focus areas: Management Service VM for the Xen Server
- 2011 **Software Development Intern (six months)**  
 Visual and Parallel Computing Group, Intel, Bengaluru, India  
 Team: Display Features and Miniport  
 Focus areas: Prototype code optimizations for kernel-mode graphics drivers

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## Honors and Awards

- RTSS '23 **Best Reviewer Award**  
 44<sup>th</sup> IEEE Real-Time Systems Symposium
- Dagstuhl '23 **Invited to attend Dagstuhl seminar 23341**  
 on Functionally Safe Multi-Core Systems
- RTSS '22 **Best Paper Award**  
 43<sup>rd</sup> IEEE Real-Time Systems Symposium
- QRS '21 **Best Paper Award**  
 21<sup>st</sup> IEEE International Conference on Software, Quality, Reliability, and Security
- SIGBED '21 **Paul Caspi Memorial Dissertation Award**  
 ACM Special Interest Group on Embedded Systems
- SYSTOR '21 **Distinguished Reviewer Award**  
 14<sup>th</sup> ACM International System and Storage Conference
- OSDI '20 **Distinguished Artifact Award**  
 14<sup>th</sup> USENIX Symposium on Operating Systems Design and Implementation
- RTAS '20 **Distinguished Paper Award**  
 26<sup>th</sup> IEEE Real-Time and Embedded Technology and Applications Symposium
- ECRTS '18 **Best Presentation Award**  
 30<sup>th</sup> Euromicro Conference on Real-Time Systems
- Middleware '17 **Best Student Paper Award**  
 18<sup>th</sup> ACM/IFIP/USENIX International Middleware Conference
- HLF '14 **Young Researcher**  
 2<sup>nd</sup> Heidelberg Laureate Forum
- ECRTS '13 **Outstanding Paper Award**  
 25<sup>th</sup> Euromicro Conference on Real-Time Systems

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## Professional Activities

### Co-chair

RTSS-BP Real-Time Systems Symposium Brief Presentations Track (2023)

### Technical Program Committee

EMSOFT ACM International Conference on Embedded Software (2024)

ECRTS Euromicro Conference on Real-Time Systems (2023)

- Middleware International Middleware Conference (2023)
- RTAS Real-Time and Embedded Technology and Applications Symposium (2022)
- RTSS Real-Time Systems Symposium (2021, 2022, 2023)
- SYSTOR International Systems and Storage Conference (2021, 2022)
- ICDCS International Conference on Distributed Computing Systems (2021)
- [Journal Reviewer](#)
- RTS Real-Time Systems: The International Journal of Time-Critical Computing Systems (2022)
- JSys Journal of Systems Research (2021, 2023)
- TECS ACM Transactions on Embedded Computing Systems (2019, 2020)
- TDSC IEEE Transactions on Dependable and Secure Computing (2019)

## Peer-Reviewed Publications

### Conference Publications

- DSN '24 **RABIT, a Robot Arm Bug Intervention Tool for Self-Driving Labs**  
Zainab Saeed Wattoo, Petal Vitis, Ruizhe Zhu, Noah Depner, Ivory Zhang, Jason Hein, Arpan Gujarati, and Margo Seltzer  
54<sup>th</sup> IEEE/IFIP International Conference on Dependable Systems and Networks, Brisbane, Australia
- ISSRE '23 **Evaluating the Effect of Common Annotation Faults on Object Detection Techniques**  
Abraham Chan, Arpan Gujarati, Karthik Pattabiraman, and Sathish Gopalakrishnan  
34<sup>th</sup> IEEE International Symposium on Software Reliability Engineering, Florence, Italy
- RTSS '22 **In-ConcReTeS: Interactive Consistency meets Distributed Real-Time Systems, Again!**  
Arpan Gujarati, Ningfeng Yang, and Björn B. Brandenburg  
43<sup>rd</sup> IEEE Real-Time Systems Symposium, Houston, USA
- DSN '22 **Arming IDS Researchers with a Robotic Arm Dataset**  
Arpan Gujarati, Zainab Saeed Wattoo, Maryam Aliabadi, Sean Clark, Xiaoman Liu, Parisa Shiri, Ameer Trivedi, Ruizhe Zhu, Jason Hein, and Margo Seltzer  
52<sup>nd</sup> IEEE/IFIP International Conference on Dependable Systems and Networks, Baltimore, USA
- DSN '22 **The Fault in Our Data Stars: Studying Mitigation Techniques against Faulty Training Data in ML Applications**  
Abraham Chan, Arpan Gujarati, Karthik Pattabiraman, and Sathish Gopalakrishnan  
52<sup>nd</sup> IEEE/IFIP International Conference on Dependable Systems and Networks, Baltimore, USA
- QRS '21 **Understanding the Resilience of Neural Network Ensembles against Faulty Training Data**  
Abraham Chan, Niranjhana Narayanan, Arpan Gujarati, Karthik Pattabiraman, and Sathish Gopalakrishnan  
21<sup>st</sup> IEEE International Conference on Software, Quality, Reliability, and Security
- OSDI '20 **Serving DNNs like Clockwork: Performance Predictability from the Bottom Up**  
Arpan Gujarati, Reza Karimi, Safya Alzayat, Wei Hao, Antoine Kaufmann, Ymir Vigfusson, and Jonathan Mace  
14<sup>th</sup> USENIX Symposium on Operating Systems Design and Implementation
- RTAS '20 **Real-Time Replica Consistency over Ethernet with Reliability Bounds**  
Arpan Gujarati, Sergey Bozhko, and Björn B. Brandenburg  
26<sup>th</sup> IEEE Real-Time and Embedded Technology and Applications Symposium

- ECRTS '19 **From Iteration to System Failure: Characterizing the FITness of Periodic Weakly-Hard Systems**  
 Arpan Gujarati, Mitra Nasri, Rupak Majumdar, and Björn B. Brandenburg  
 31<sup>th</sup> Euromicro Conference on Real-Time Systems, Stuttgart, Germany
- ECRTS '18 **Quantifying the Resiliency of Fail-Operational Real-Time Networked Control Systems**  
 Arpan Gujarati, Mitra Nasri, and Björn B. Brandenburg  
 30<sup>th</sup> Euromicro Conference on Real-Time Systems, Barcelona, Spain
- EuroSys '18 **Tableau: A High-Throughput and Predictable VM Scheduler for High-Density Workloads**  
 Manohar Vanga, Arpan Gujarati, and Björn B. Brandenburg  
 13<sup>th</sup> European Conference on Computer Systems, Porto, Portugal
- Middleware '17 **Swayam: Distributed Autoscaling to Meet SLAs of Machine Learning Inference Services with Resource Efficiency**  
 Arpan Gujarati, Sameh Elnikety, Yuxiong He, Kathryn S. McKinley, and Björn B. Brandenburg  
 18<sup>th</sup> ACM/IFIP/USENIX International Middleware Conference, Las Vegas, USA
- RTSS '15 **When is CAN the Weakest Link? A Bound on Failures-In-Time in CAN-Based Real-Time Systems**  
 Arpan Gujarati and Björn B. Brandenburg  
 36<sup>th</sup> IEEE Real-Time Systems Symposium, San Antonio, USA
- RTSS '14 **Linux's Processor Affinity API, Refined: Shifting Real-Time Tasks towards Higher Schedulability**  
 Felipe Cerqueira, Arpan Gujarati, and Björn B. Brandenburg  
 35<sup>th</sup> IEEE Real-Time Systems Symposium, Rome, Italy
- ECRTS '13 **Schedulability Analysis of the Linux Push and Pull Scheduler with Arbitrary Processor Affinities**  
 Arpan Gujarati, Felipe Cerqueira, and Björn B. Brandenburg  
 25<sup>th</sup> Euromicro Conference on Real-Time Systems, Paris, France
- [Journal Publications](#)
- RTS '18 **Correspondence Article: A Correction of the Reduction-Based Schedulability Analysis for APA Scheduling**  
 Arpan Gujarati, Felipe Cerqueira, Björn B. Brandenburg, and Geoffrey Nelissen  
 Real-Time Systems, August 2018
- RTS '15 **Multiprocessor Real-Time Scheduling with Arbitrary Processor Affinities: From Practice to Theory**  
 Arpan Gujarati, Felipe Cerqueira, and Björn B. Brandenburg  
 Real-Time Systems, Volume 51, Issue 4, pp. 440–483. Springer Verlag, 2015
- [Workshop Publications](#)
- Disrupt '24 **Harnessing Explainability to Improve ML Ensemble Resilience.**  
 Abraham Chan, Arpan Gujarati, Karthik Pattabiraman, and Sathish Gopalakrishnan  
 Disruptive Ideas and New Interdisciplinary Results Track at the 54<sup>th</sup> IEEE/IFIP International Conference on Dependable Systems and Networks, Brisbane, Australia
- WoSoCER '20 **New Wine in an Old Bottle: N-Version Programming for Machine Learning Components**  
 Arpan Gujarati, Sathish Gopalakrishnan, and Karthik Pattabiraman,  
 10<sup>th</sup> IEEE International Workshop on Software Certification

CERTS '18 **Using Schedule-Abstraction Graphs for the Analysis of CAN Message Response Times**

Mitra Nasri, Arpan Gujarati, and Björn B. Brandenburg

3<sup>rd</sup> Workshop on Security and Dependability of Critical Embedded Real-Time Systems, Luxembourg