

JEFFREY GOEDERS

Assistant Professor
Department of Electrical and Computer Engineering
Brigham Young University
450J Engineering Building
Provo, UT 84602

jgoeders@byu.edu
github.com/jgoeders
801-422-3499

EDUCATION

- 2016 The University of British Columbia, Ph.D., Computer Engineering**
Advisor: Steve Wilton
Dissertation Title: Techniques for Enabling In-System Observation-based Debug of High-Level Synthesis Circuits on FPGAs
- 2012 The University of British Columbia, M.A.Sc., Computer Engineering**
Advisor: Steve Wilton
Thesis Title: Power Estimation for Diverse FPGA Architectures
- 2012 University of Toronto, B.A.Sc. w/ Honors, Computer Engineering**

PROFESSIONAL EXPERIENCE

July 2016 to Present **Brigham Young University, Assistant Professor**
Department of Electrical and Computer Engineering

PUBLICATIONS

Book Chapters

1. **Jeffrey Goeders**, Graham M. Holland, Lesley Shannon, and Steven J.E. Wilton, "Systems-on-Chip on FPGAs", in FPGAs for Software Programmers, Springer, 2016.
2. Andrew Canis, Jongsok Choi, Blair Fort, Bain Syrowik, Ruo Long Lian, Yu Ting Chen, Hsuan Hsiao, **Jeffrey Goeders**, Stephen Brown, and Jason Anderson, "LegUp high-level synthesis", in FPGAs for Software Programmers, Springer, 2016.

Peer-Reviewed Journal Articles

3. (*Under Review, submitted June 2021*) Hayden Cook, Jacob Arscott, Brent George, Tanner Gaskin, **Jeffrey Goeders**, and Brad Hutchings, "Inducing Non-Uniform FPGA Aging Using Configuration-Based Short Circuits", in ACM Transactions on Reconfigurable Technology and Systems (TRETs), 2021.
4. (*Under Review, submitted April 2021*) Eli Cahill, **Jeffrey Goeders**, and Brad Hutchings, "Approaches for FPGA Design Assurance", in ACM Transactions on Reconfigurable Technology and Systems (TRETs), 2021.

5. Benjamin James, Michael Wirthlin, and **Jeffrey Goeders**, “Investigating How Software Characteristics Impact the Effectiveness of Automated Software Fault Tolerance”, in IEEE Transactions on Nuclear Science (TNS), vol. 68, no. 5, pp. 1014-1022, Apr 2021.
6. Al-Shahna Jamal, Eli Cahill, **Jeffrey Goeders**, and Steven JE Wilton, “Fast Turnaround HLS Debugging using Dependency Analysis and Debug Overlays”, in ACM Transactions on Reconfigurable Technology and Systems (TRETs), vol. 13, no. 1, pp. 1-26, Feb 2020.
7. Benjamin James, Heather Quinn, Michael Wirthlin, and **Jeffrey Goeders**, “Applying Compiler-Automated Software Fault Tolerance to Multiple Processor Platforms”, in IEEE Transactions on Nuclear Science (TNS), vol. 67, no. 1, pp. 321-327, Jan 2020.
8. Matthew Bohman, Benjamin James, Michael Wirthlin, Heather Quinn, and **Jeffrey Goeders**, “Microcontroller Compiler-Assisted Software Fault Tolerance”, in IEEE Transactions on Nuclear Science (TNS), vol. 66, no. 1, pp. 223-232, Jan 2019.
9. **Jeffrey Goeders**, and Steven J.E. Wilton, “Signal-Tracing Techniques for In-System FPGA Debugging of High-Level Synthesis Circuits”, in IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), vol. 36, no. 1, pp. 83-96, Jan 2017.
10. **Jeffrey Goeders** and Steven J.E. Wilton, “Power Aware Architecture Exploration for Field Programmable Gate Arrays”, in Journal of Low Power Electronics (JOLPE), vol. 10, no. 3, pp. 297-312, Sep. 2014.
11. Jason Luu, **Jeffrey Goeders**, Michael Wainberg, Andrew Somerville, Thien Yu, Konstantin Nasartschuk, Miad Nasr, Sen Wang, Tim Liu, Nooruddin Ahmed, Kenneth B Kent, Jason Anderson, Jonathan Rose, and Vaughn Betz, “VTR 7.0: Next Generation Architecture and CAD System for FPGAs”, in ACM Transactions on Reconfigurable Technology and Systems (TRETs), vol 7, no. 2, pp. 6:1–30, Jul 2014.

Peer-Reviewed International Conference Publications

Note: Conferences which were refereed by abstract, or had acceptance rates close to 100% are not listed in this section. Most relevant conferences in this field are the “4-Fs”: Int’l Symposium on Field-Programmable Gate Arrays (FPGA), Int’l Conf. on Field-Programmable Technology (FPT), Int’l Conf. on Field-Programmable Logic and Applications (FPL), Int’l Conf. on Field-Config. Custom Computing Machines (FCCM). Acceptance rates for these conferences are regularly below 30%.

12. Benjamin James, and **Jeffrey Goeders**, “Automated Software Compiler Techniques to Provide Fault Tolerance for Real-Time Operating Systems”, in Design, Automation and Test in Europe Conference (DATE), Feb 2021.
13. Tanner Gaskin, Hayden Cook, Wesley Stirk, Robert Lucas, **Jeffrey Goeders**, and Brad Hutchings, “Using Novel Configuration Techniques for Accelerated FPGA Aging”, in International Conference on Field-Programmable Logic and Applications (FPL), Aug 2020.

Conferences

Note: Conferences which were refereed by abstract, or had acceptance rates close to 100% are not listed in this section. Most relevant conferences in this field are the “4-Fs”: Int’l Symposium on Field-Programmable Gate Arrays (FPGA), Int’l Conf. on Field-Programmable Technology (FPT), Int’l Conf. on Field-Programmable Logic and Applications (FPL), Int’l Conf. on Field-Config. Custom Computing Machines (FCCM). Acceptance rates for these conferences are regularly below 30%.

14. None, “”, in , .
15. L. Alcantara, J. Miera, B. Ariun-Erdene, C. Teng, **P. Lundrigan**, “The Hitchhiker’s Guide to Successful Remote Sensing Deployments in Mongolia”, in , .
16. **P. Lundrigan**, N. Patwari, S. K. Kasera, “On-off Noise Power Communication”, in , .

17. S. Maheshwari, **P. Lundrigan**, S. K. Kasera, "Scheduling Virtual WiFi Interfaces for High Bandwidth Live Video Upstreaming Using Multipath TCP", in , .
18. **P. Lundrigan**, K. Min, N. Patwari, S. K. Kasera, K. Kelly, J. Moore, M. Meyer, S. C. Collingwood, F. Nkoy, B. Stone, and K. Sward , "An In-Home IoT Architecture for Epidemiological Deployments", in , .
19. K. Min, **P. Lundrigan**, N. Patwari, "Smart Home Air Filtering System: A Randomized Controlled Trial for Performance Evaluation", in , .
20. **P. Lundrigan**, M. Khaledi, M. Kano, N. Subramanyam, and S. Kasera, "Mobile Live Video Upstreaming", in , .
21. R. Buck, R. Lee, **P. Lundrigan**, and D. Zappala, "WiFu: A composable toolkit for experimental wireless transport protocols", in , .
22. C. Lavin, M. Padilla, J. Lamprecht, **P. Lundrigan**, B. Nelson, and B. Hutchings, "HMFlow: Accelerating FPGA Compilation with Hard Macros for Rapid Prototyping", in , .
23. C. Lavin, M. Padilla, J. Lamprecht, **P. Lundrigan**, B. Nelson, and B. Hutchings, "RapidSmith: Do-It-Yourself CAD Tools for Xilinx FPGAs", in , .
24. C. Lavin, M. Padilla, **P. Lundrigan**, B. Nelson, and B. Hutchings, "Rapid prototyping tools for FPGA designs: RapidSmith", in , .

Invited Papers

25. **P. Lundrigan**, N. Patwari, S. K. Kasera, "STRAP: Secure TRansfer of Association Protocol", in , .

Journals

26. S. Hegde, K. Min, J. Moore, **P. Lundrigan**, N. Patwari, S. C. Collingwood, and K. E. Kelly, "Household Indoor Particulate Matter Measurement Using a Network of Low Cost Sensors", in , .
27. J. Moore, P. Goffin, **P. Lundrigan**, N. Patwari, K. Sward, J. Weise, M. Meyer, "Managing In-home Environments Through Sensing, Annotating, and Visualizing Air Quality Data", in , .
28. Tim Strayer, Samuel Nelson, Amando Caro, Joud Khoury, Bryan Tedesco, Olivia DeRosa, Carsten Clark, Kolia Sadeghi, Michael Matthews, Jake Kurzer, **Philip Lundrigan**, Vikas Kawadia, Dorene Ryder, Keith Gremban, Wayne Phoel, "Content Sharing with Mobility in an Infrastructure-less Environment", in , .
29. B. Mager, **P. Lundrigan**, and N. Patwari, "Fingerprint-Based Device-Free Localization: Performance in Changing Environments", in , .

Demos

30. Kyeong T. Min, **Philip Lundrigan**, and Neal Patwari, "IASA - Indoor Air Quality Sensing and Automation", in , .

SERVICE

2020 TPCs: IPSN, WoWMoM (publicity co-chair); Reviewer: Transactions on Mobile Computing

TALKS

STRAP and Beyond*BYU Networking Club, December 2019, Provo, UT***Networking Research for Linux***BYU Linux Club, September 2019, Provo, UT***On-off Noise Power Communication***MobiCom 2019, October 2019, Los Cabos, Mexico***EpiFi: An In-Home IoT Architecture for Epidemiological Deployments***BYU CCL Lab, April 2018, Provo, UT**BYU IT Student Seminar, March 2018, Provo, UT***STRAP: Secure TRansfer of Association Protocol***The 27th International Conference on Computer Communications and Networks (ICCCN), July, 2018, China***An Infrastructure for Generating Exposomes: Initial Lessons from the Utah PRISMS Platform***27th Annual Meeting of the International Society of Exposure Science (ISES), October 2017, Research Park Triangle, NC***In-Home Real-Time Sensor Networks***33rd Annual Utah Conference on Safety & Industrial Hygiene, October 2016, Salt Lake City, UT***Mobile Live Video Upstreaming***ITC 28, September 2016, Wurzburg, Germany**BBN Lunch Talk, July 2015, Cambridge, MA*

GRANTS

Sep. 2020 to August 2023 **Spectrum Sharing Via Interference-resilient Passive Receivers and Passive-aware Active Services**

NSF, \$258,000

Principal Investigator: Karl Warnick

Co-Investigators: Philip Lundrigan

July 2019 to April 2020 **Mongolian Ger Air Quality Measurement and Analysis**

Deseret International Charities, \$15,250

Principal Investigator: Philip Lundrigan

March 2019 to March 2020 **Self-Sustainable Air Quality Sensor**

Ira A. Fulton College of Engineering, \$12,500

Principal Investigator: Philip Lundrigan

September 2018 to May 2020 **PRISMS Informatics Platform - Federated Integration Architecture**
NIH, \$21,208
Principal Investigator: Philip Lundrigan

PROFESSIONAL EXPERIENCE

May 2015 to August 2015 **Network Scientist Intern, Raytheon BBN Technologies**

Worked on DARPA's Squad X project, designing an architecture for flexible distribution of content and information. Using ns3, built a framework to measure effectiveness of various content distribution approaches.

May 2014 to August 2014 **Network Scientist Intern, Raytheon BBN Technologies**

Worked on DARPA's Content-Based Mobile Edge Networking (CBMEN) project using Android phones. Improved, measured, and tested the design of the basic ad hoc networking functionality. Thoroughly studied the benefits of using asynchronous I/O compared to synchronous I/O for all network communication. Developed new method for managing multiple TCP connections with neighboring nodes. Built Android application and deployed on 15 devices in the field to measure the improvements. Collaborated closely with three other researchers to improve various components of the system.

July 2013 to January 2014 **Wireless Researcher, Xandem Technology**

Built system for fall detection and localization using wireless sensor network for elderly care. Lead development of small team to implement real-time room-level localization algorithm using machine learning. Worked with raw wireless data to develop features for machine learning algorithm. Conducted experiments to evaluate and measure the accuracy of localization algorithm.

April 2012 to August 2012 **Software Engineering Intern, Ancestry.com**

Researched an alternative way to store and search large amounts of data using Apache Solr. Built testing framework to compare storage alternatives. Built a new wiki system for the development team to use.

OPEN SOURCE PROJECTS

2016 Duplicate Image Finder

Using perspective hashing, I built a tool that detects duplicate images in photo libraries. It has over 100 stars on GitHub and I have worked with contributors to make the project better.

2015 Home Assistant

Core contributor to open source home automation hub software. Allows for different third party home automation systems to be integrated easily and controlled from a centralized location.