AARON S. CRANDALL, PHD

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E-mail: crandall@gonzaga.edu *Projects*: GitLab | GitHub

CURRICULUM VITAE EXECUTIVE SUMMARY

Current Appointment:

- Assistant Professor at Gonzaga University – Tenure track, year 4

Interests:

- Gerontechnology, artificial intelligence, STEM education, smart environments, UX design

Education:

- Ph.D. Computer Science, Washington State University, 2011
- MS Computer Science, Oregon Health and Science University, 2007
- BSEE Computer Engineering, The University of Portland, 2001

Publishing:

- Citation Metrics as of Summer 2023 Total Publications: 42 || Citations: 1879 || h-index: 19

Academic Experience:

- 3 years Assistant Professor (TT) at Gonzaga University
- 4 years Clinical Associate Professor at Washington State University – Instructed 1200+ students
- 5 years Research Professor at Washington State University
- Lecturer in CompSci: Capstone, Software Engineering, DevOps, OS, AI/ML, Security, & Linux
- Advising MS graduate students, Co-advising PhD students

Grant Writing and Fundraising Experience:

- NASA: 1x CubeSat Launch | US NIH Funding: $1.6M | Google: $37k | DoD/NAVSEA: $40k
- Private Donations Fundraising: $140k
- Submitted grants to: NIH, NASA, NSF, DoD, SBIRs, state programs, commercial & private sources

Industry Experience:

- 2x Tech Startup CEO, 5 yrs IT systems, 4 yrs software engineering, 1 yr networking & telcom
- USPTO Patent: Recognition in Multi-Entity Environments (US 13/538,882)

Invited Talks:

- IFA+, NAE, Alzheimer's Assoc. of America, several universities

Other Projects and Service:

- Editor: Journal of Reliability of Intelligent Environments
- Lead Guest Editor: Journal of Sustainability
- Lead Guest Editor: Journal of Artificial Intelligence and Smart Environments
- Committee member: Digital Health, Intelligent Env (IE), ICTAI, DH
- Reviewer for scientific journals and conferences
- Gonzaga University Faculty Senator
- WSU CompSci capstone curriculum coordinator – Total of 65 teams in 4 years
- Student club advising: GU ACM, GU Robotics, Cougs In Space, Palouse RoboSub
- High school tutor: WA State Programming-based capstone projects, 4 years
- WSU & Gonzaga Annual Hackathon Judge and Event Mentor, 10 years
- NSF i-Corps, WSU, UW, & Spokane business plan competitions award winner

EDUCATION

PhD	Computer Science	Washington State University, USA	2011
MS	Computer Science	Oregon Health & Science University, USA	2007
BS	Electrical Engineering	University of Portland, USA	2001

RESEARCH

Published Research Areas and Interests:

- Gerontechnology, Artificial Intelligence, Systems Engineering, Smart Environments/Ubiquitous Computing, Behaviometrics, User Experience

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PUBLICATIONS

Citation Metrics as of Summer 2023 Total Publications: 42 || Citations: 1879 || h-index: 19

Dissertation

Crandall, **Aaron S.** (2011). "Behaviometrics for Multiple Residents in a Smart Environment". PhD thesis. Washington State University.

Journal Articles

Crandall, **Aaron S.**, Gina Sprint, and Bryan Fischer (2023). "Generative Pre-Trained Transformer (GPT) Models as a Code Review Feedback Tool in Computer Science Programs". In: *Journal of Computing Sciences in Colleges*. [Accepted, To Appear].

Crandall, **Aaron S.**, Steven Mamolo, and Mathew Morgan (2022). "SkiMon: A Wireless Body Area Network for Monitoring Ski Flex and Motion During Skiing Sports". In: *Sensors* 22.18. DOI: 10.3390/s22186882.

Hajiamini, Shervin, Behrooz Shirazi, **Aaron Crandall**, and Hassan Ghasemzadeh (2019). "A Dynamic Programming Framework for DVFS-based Energy-Efficiency in Multicore Systems". In: *IEEE Transactions on Sustainable Computing* 5 (1), pp. 1–12. DOI: 10.1109/TSUSC.2019.2911471.

Hajiamini, Shervin, Behrooz Shirazi, **Aaron Crandall**, Hassan Ghasemzadeh, and Chris Cain (2018). "Impact of Cache Voltage Scaling on Energy-Time Pareto Frontier in Multicore Systems". In: *Sustainable Computing: Informatics and Systems* 18, pp. 54–65. DOI: 10.1016/j.suscom.2018.02.011.

Hu, Yang et al. (2016). "Smart home in a box: usability study for a large scale self-installation of smart home technologies". In: *Journal of Reliable Intelligent Environments* 2.2, pp. 93–106. DOI: 10.1007/s40860-016-0021-y.

Thomas, Brian L., **Aaron S. Crandall**, and Diane J. Cook (2016). "A Genetic Algorithm Approach to Motion Sensor Placement in Smart Environments". In: *Journal of Reliable Intelligent Environments* 2.1, pp. 3–16. DOI: 10.1007/s40860-015-0015-1.

Cook, Diane J., **Aaron S. Crandall**, Brian L. Thomas, et al. (2013). "CASAS: A Smart Home in a Box". In: *Computer*. Vol. 46. 7. IEEE, pp. 26–33. DOI: 10.1109/MC.2012.328.

Seelye, Adriana M. et al. (2013). "Naturalistic assessment of everyday activities and prompting technologies in mild cognitive impairment". In: *Journal of the International Neuropsychological Society* 19.4, pp. 442–452. DOI: 10.1017/S135561771200149X.

Chen, Chao, Diane J. Cook, and **Aaron S. Crandall** (2013). "The User Side of Sustainability: Modeling Behavior and Energy Usage in the Home". In: *Pervasive and Mobile Computing* 9.1, pp. 161–175. DOI: 10.1016/j.pmcj.2012.10.004.

Cook, Diane J., **Aaron S. Crandall**, Geetika Singla, et al. (2010). "Detection of Social Interaction in Smart Spaces". In: *Cybernetics and Systems: An International Journal* 41.2, pp. 90–104. DOI: http://doi.org/br9dcr3.

Crandall, **Aaron S.** and Diane J. Cook (2009). "Coping with multiple residents in a smart environment". In: *Journal of Ambient Intelligence and Smart Environments* 1.4, pp. 323–334. DOI: 10.3233/AIS-2009-0041.

Conference Articles

Crandall, **Aaron S.** (2022). "A 3D Mesh Based Approach to In Home Safe Walking Spaces for Older Adults". In: *International Conference on Smart Education, Health, and ICT*. URL: https://arxiv.org/abs/2209.12393.

Compy, K. et al. (2020). "An Upper Bound on the State-Space Complexity of Brandubh". In: *2020 IEEE Conference on Games (CoG)*, pp. 519–525. DOI: 10.1109/CoG47356.2020.9231534.

Hajiamini, Shervin et al. (2018). "A Dynamic Programming Technique for Energy-Efficient Multicore Systems". In: *Ninth International Green and Sustainable Computing Conference (IGSC)*, pp. 1–6. DOI: 10.1109/IGCC.2018.8752159.

Fritz, R. et al. (2017). "Health-Assistive Smart Homes With A Clinician-In-The-Loop". In: *Innovation in Aging* 1.suppl_1, pp. 683–683. ISSN: 2399-5300. DOI: 10.1093/geroni/igx004.2437. URL: https://doi.org/10.1093/geroni/igx004.2437.

Zulas, A Leah, **Aaron S Crandall**, and Maureen Schmitter-Edgecombe (2014). "Caregiver Needs from Elder Care Assistive Smart Homes: Children of Elder Adults Assessment". In: *Human Factors and Ergonomics Society*. Vol. 58. HFES 1, pp. 634–638. DOI: 10.1177/1541931214581150.

Crandall, **Aaron S.**, Leah Zulas, et al. (2012). "Visualizing Your Ward: Bringing Smart Home Data to Caregivers". In: *Emerging Technologies for Healthcare and Aging Workshop in the Proceedings of Computer Human Interaction*. CHI'12.

Zulas, Leah et al. (2012). "Caregiver Needs from Elder Care Assistive Smart Homes: Nursing Assessment". In: *Human Factors and Ergonomics Society*. Vol. 56. 1, pp. 125–129. DOI: 10.1177/1071181312561003.

Crandall, **Aaron S.** and Diane J. Cook (2012). "Smart Home in a Box: A Large Scale Smart Home Deployment". In: *Workshop on Large Scale Intelligent Environments*. WOLSIE'12, pp. 169–178. DOI: 10.3233/978-1-61499-080-2-169.

Thomas, Brian L. and **Aaron S. Crandall** (2011). "A Demonstration of PyViz, a Flexible Smart Home Visualization Tool". In: *IEEE International Conference on Pervasive Computing and Communications Workshops*. PerCom Workshops, pp. 304–306. DOI: 10.1109/PERCOMW.2011.5766889.

Crandall, **Aaron S.** and Diane J. Cook (2010). "Using a Hidden Markov Model for resident identification". In: *Proceedings of the International Conference on Intelligent Environments*. IE'10, pp. 74–79. DOI: 10.1109/IE.2010.21.

Cook, Diane et al. (2009). "Collecting and disseminating smart home sensor data in the CASAS project," in: *CHI Workshop on Developing Shared Home Behavior Datasets to Advance HCI and Ubiquitous Computing Research*. CHI '09.

Crandall, **Aaron S.** and Diane J. Cook (2008a). "Attributing Events to Individuals in Multi-Inhabitant Environments". In: *IET International Conference on Intelligent Environments*. IE '08. Amsterdam, The Netherlands: IOS Press, pp. 1–8. ISBN: 978-0-86341-894-5. DOI: 10.1049/cp:20081164.

Crandall, **Aaron S.** and Diane J. Cook (2008b). "Resident and Caregiver: Handling Multiple People in a Smart Care Facility". In: *AI in Eldercare: New Solutions to Old Problems*. Menlo Park, California, USA: AAAI Press, pp. 39–47. ISBN: 978-1-57735-394-2.

Jakkula, Vikramaditya R., **Aaron S. Crandall**, and Diane J. Cook (Oct. 2007). "Knowledge Discovery in Entity Based Smart Environment Resident Data Using Temporal Relation Based Data Mining". In: *Proceedings of the IEEE International Conference on Data Mining Workshops*. ICDM'07. Washington, DC, USA: IEEE Computer Society, pp. 625–630. DOI: 10.1109/ICDMW.2007.60.

Jakkula, Vikramaditya, Diane J. Cook, and **Aaron S. Crandall** (Sept. 2007). "Temporal pattern discovery for anomaly detection in a smart home". In: *The IET International Conference on Intelligent Environments*. IE '07, pp. 339–345. ISBN: 978-0-86341-853-2. DOI: 10.1049/cp:20070390.

Book Chapters

Crandall, **Aaron S** and Diane J Cook (2016). "Current state of the art of smart environments and labs from an ambient assisted living point of view". In: *Active and assisted living: technologies and applications*, pp. 11–28.

Zulas, A. Leah and **Aaron S. Crandall** (2014). "Assessing Professional Caregiver Needs In Assistive Smart Homes". In: *Handbook of Smart Homes, Health Care and Well-being*. Springer International Publishing, pp. 1–10. DOI: 10.1007/978-3-319-01904-8_14-1.

Crandall, **Aaron S.** and Diane J. Cook (2013). "Behaviometrics for Identifying Smart Home Residents". In: *Human Aspects in Ambient Intelligence: Contemporary Challenges and Solutions*. Ed. by Tibor Bosse et al. Paris: Atlantis Press, pp. 55–71. ISBN: 978-94-6239-018-8. DOI: 10.2991/978-94-6239-018-8_4.

Crandall, **Aaron S.** and Diane J. Cook (2011). "Tracking systems for multiple smart home residents". In: *Behaviour Monitoring and Interpretation*. Ed. by B. Gottfried and H. Aghajan. Vol. 9. Ambient Intelligence and Smart Environments. Nieuwe Hemweg 6B, 1013 BG Amsterdam, The Netherlands: IOS Press. ISBN: 978-1-60750-730-7. DOI: 10.3233/978-1-60750-731-4-65.

Crandall, **Aaron S.** and Diane J. Cook (2010a). "Learning Activity Models for Multiple Agents in a Smart Space". In: *Handbook of Ambient Intelligence and Smart Environments*. Ed. by Hideyuki Nakashima, Hamid Aghajan, and Juan Carlos Augusto. Springer US, pp. 751–769. DOI: 10.1007/978-0-387-93808-0_28.

Crandall, **Aaron S.** and Diane J. Cook (2010b). "Tracking systems for multiple smart home residents". In: *Ambient Intelligence and Smart Environments*. IGI Global, pp. 65–82. DOI: 10.3233/978-1-60750-731-4-65.

Jakkula, Vikramaditya R., **Aaron S. Crandall**, and Diane J. Cook (2009). "Enhancing Anomaly Detection Using Temporal Pattern Discovery". In: *Advanced Intelligent Environments*. Ed. by Achilles D. Kameas et al. Springer US, pp. 175–194. DOI: 10.1007/978-0-387-76485-6_8.

Crandall, **Aaron S.** (2004). "Survive Catastrophic Internet Loss (Hack #45)". In: *BSD Hacks*. O'Reilly Media. ISBN: 978-0-596-00679-2s.

Other Scientific

Crandall, **Aaron S.**, Konstantin Shvedov, et al. (2020). *Hololens Clutter Detection and Senior Care Support System*. Washington State University Academic Showcase. URL: https://showcase.wsu.edu/2020/04/02/hololens-clutter-detection-and-senior-care-support-system/.

Lee, Insun et al. (2018). "Walking Spaces with Locality-Sensitive Hashing". In: *Washington State University EECS Senior Design Poster Competition*. DOI: 10.7273/000000040.

Phillips, Colin et al. (2017). "Walking Spaces". In: *Washington State University EECS Senior Design Poster Competition*. DOI: 10.7273/000000039.

Crandall, **Aaron S**, Diane J Cook, and Maureen Schmitter-Edgecombe (2016). "Introduction to the Technologies for Healthy Aging Minitrack". In: *Hawaii International Conference on System Sciences*. HICSS. IEEE, pp. 3437–3437.

Barrows, Bryan et al. (2016). "Web-based On-board Real-time Rendering Data System (WORRDS)". In: *Washington State University Academic Showcase*. URL: https://hdl.handle.net/2376/6126.

Aztiria, Asier, **Aaron Crandall**, and Gordon Hunter (2014). "Introduction to the thematic issue on Challenges in Engineering Intelligent Environments". In: *Journal of Ambient Intelligence and Smart Environments* 6.5, pp. 487–488.

Crandall, **Aaron S.**, Brian L. Thomas, and Diane J. Cook (2012). "Exploring Smart Home Sensor Placement Algorithms". In: *Washington State University Academic Showcase*.

Crandall, **Aaron S.** and Diane J. Cook (2010). "Bayesian Updating for Individual Tracking in Smart Homes". In: *Washington State University Academic Showcase*.

Crandall, **Aaron S.** and Diane J. Cook (2008). "Smart Home Resident Detection and Identification Using Simple Sensors". In: *Washington State University Academic Showcase*.

Crandall, **Aaron S.**, Diane J. Cook, et al. (2008). "CASAS Project: A Comprehensive Smart Home Research Testbed". In: *Washington State University Academic Showcase*.

SUPPORT

External Research Grant Funding

CougSat – An Educational Vehicle for Future Space Engineers (PI)		
NASA CubeSat Launch Initiative (CSLI)	2017–2023	$12k + Satellite Launch

Training Program for Undergraduate Gerontechnologists (CO-I)		
HHS, National Institutes of Health	2013–2019	$1,604,828

Robot Control via RGB Video and Convolutional Neural Networks (CO-PI)		
Google	2016	$37,763

External Student Support / Projects Grant Funding

Palouse Robosub AUV Artificial Intelligence Updates and Robonation 2020 (PI)		
US DOD / US NAVY / NAVSEA	2019–2020	$20,000

Undergraduate Program Computing Equipment for Classroom DevOps (PI)		
Washington State Omnibus Funding	2020	$16,000

CougSat I Project (PI)		
Boeing Company	2019	$10,000

CougSat I Project (PI)		
Boeing Company	2018	$15,000

AUVSI Student AUV Competition - CS (PI)		
US DOD / US Navy / NAVSEA	2018	$10,000

Key Components of CougSat Prototyping (PI)		
Boeing Company	2017	$10,000

AUVSI Student AUV Competition - CS (PI)		
US DOD / US Navy / NAVSEA	2017	$10,000

External Entrepreneurial Support / Projects Grant Funding

Real Time 3D Tracking for Action Games (PI)		
University of Washington Buerk Center Prototyping Fund	2019	$1,563

Laser RevEng - Next Generation Laser Tag Technologies Phase-2 (PI)		
National Science Foundation (NSF) I-Corps	2019	$5,000

Hardware Prototyping for Laser Tag Platform (PI)		
National Science Foundation (NSF) I-Corps	2018	$5,000

Internal Support / Projects Grant Funding

HazARd Project: Eyetracking-based Notification Acknowledgement Interface (PI)		
Steeves-Betzler Student Support Grant	2023	$2,208

HazARd Year 2 Student Support (PI)		
McDonald Student Work Fund	2022–2023	$4,300

NeuroTafl Phase 2 Student Support (PI)		
McDonald Student Work Fund	2022–2023	$2,700

HazARd: An Augmented Reality Fall Prevention System (PI)		
Gonzaga University Research Council	2022–2023	$1,700

Gonzaga in Berlin Site Visit (PI)		
Gonzaga International Programs / Study Abroad	2022	$3,500

NeuroTafl Phase 1 Development (PI)		
Robert W Gillette Summer Innovation Challenge	2022	$3,500

HazARd: An Augmented Reality Fall Prevention System (PI)		
Robert W Gillette Innovation Challenge	2021–2022	$7,000

Upgrades to WSU Observatory: Networking, Lighting, and Inclusiveness Updates (CO-PI)		
WSU tech fee fund	2019	$18,000

Other Solicited Donations

WSU CompSci Capstone program		
External Industry Collaborators	2016–2020	$85,000

Gonzaga University Hackathon 2022		
External Industry Donors	2022	$3,200

Gonzaga University Hackathon 2022		
External Industry Donors	2021	$1,200

CougSat and Cougs in Space Undergraduate Cubesat Program		
Industry and Individual Donors	2017–2020	$69,300

WSU Crimson Code Hackathon		
Industry and Individual Donors	2018	$7,000

Student Server Mini "Condos"		
Individual Private Donors	2013	$1,000

PATENTS

US Patents Issued	
Activity Recognition in Multi-Entity Environments	US 13/538,882

TEACHING EXPERIENCE

Gonzaga University Courses Taught
Appointment: Assistant (TT) Professor

Year	*Term*	*Course Number*	*Course Title*
2023	Summer	CPSC 310	Information Warfare
2023	Spring	CPSC 224	Software Development (2 sections)
		CPSC 334	Linux & DevOps
		CPSC 390	Independent Study: Tafl Game Complexity & Theory
2022	Fall	CPSC 121	Computer Science I
		CPSC 491	Software Engineering / Senior Design (2 sections)
		CPSC 499	Computers and Society / Ethics (2 sections)
2022	Spring	CPSC 224	Software Development (2 sections)
2021	Fall	CPSC 346	Operating Systems (2 sections)
		CPSC 224	Software Development
2021	Spring	CPSC 224	Software Development (2 sections)
		CPSC 223	Algorithms & Abstract Data Structures
2020	Fall	CPSC 412	Linux and DevOps
		CPSC 224	Software Development

Washington State University Courses Taught
Appointment: Clinical (Teaching) Associate Professor

Year	*Term*	*Course Number*	*Course Title*
2020	Spring	CptS 421	Software Design Project I / CompSci Capstone
		CptS 423	Software Design Project II / CompSci Capstone
		CptS 233	Advanced Data Structures in Java
2019	Fall	CptS 421	Software Design Project I / CompSci Capstone
		CptS 423	Software Design Project II / CompSci Capstone
		CptS 233	Advanced Data Structures in Java
		CptS 499	Rubber Duck Debugging to improve chatbot capabilities
2019	Spring	CptS 423	Software Design Project II / CompSci Capstone
		CptS 233	Advanced Data Structures in C++
		CptS 499	3D Tracking and Localization Tech Development
2018	Fall	CptS 421	Software Design Project I / CompSci Capstone
		CptS 321	Object Oriented Design Principles
2018	Spring	CptS 423	Software Design Project II / CompSci Capstone
		CptS 321	Object Oriented Design Principles
2017	Fall	CptS 421	Software Design Project I / CompSci Capstone
		CptS 223	Advanced Data Structures in C++
2017	Spring	CptS 423	Software Design Project II / CompSci Capstone
		CptS 223	Advanced Data Structures in C++
2016	Fall	CptS 421	Software Design Project I / CompSci Capstone
		CptS 223	Advanced Data Structures in C++

Washington State University Courses Taught
Appointment: Assistant Research Professor

Year	*Term*	*Course Number*	*Course Title*
2016	Spring	CptS 486	Gerontechnology II
2015	Fall	CptS 485	Gerontechnology I
2015	Spring	CptS 499	Social Media Geolocation Visualization
2013	Fall	CptS 499	Security Basics
2012	Fall	CptS 499	Security Basics
2012	Spring	CptS 499	Linux IT Basics
2011	Fall	CptS 580	Special Topics: Machine Learning
2011	Spring	CptS 580	Special Topics: Advanced Distributed Systems

Courses Developed

CPSC 310	Special Topics in Information Warfare
CPSC 334/419	Linux & DevOps
CptS 485/486	Gerontechnology I/II
CptS 499	Special Topics in Security Basics
CptS 499	Special Topics in Linux IT Basics

Professional Experience

Assistant Professor - Tenure Track 4^{th} year, Gonzaga University 2020–Present

- GU's School of School of Engineering and Applied Science tenure track faculty
- Full suite of expected faculty responsibilities: research, teaching, service, and advising
- Teaching courses on data structures, software engineering, Linux, and DevOps
- Developed and pitched faculty-led study abroad program: Gonzaga in Berlin / Information Warfare

Software Developer, Schweitzer Engineering Laboratories 2021

- Summer contract position in the Research & Development Automation Support group
- Focused on rebuilding tools to restore SEL PowerPC Real Time Automation Control devices
- Software developed in Python for Linux systems, including Windows Subsystem for Linux
- Package used FPGA JTAG programmers, uBoot, serial consoles, and direct memory controls
- Designed system with user survey work for user interface optimization
- Development processes included Git for version control, pytest, and user feedback testing
- Tools deployed to field with 30% improved speed and significant reduction in failure rates

Clinical (Teaching) Associate Professor, Washington State University 2016–2020

- WSU's School of Electrical Engineering and Computer science senior instructional faculty
- Specializing in computer science courses, both in core CS topics such as data structures as well as software engineering through the senior capstone course series
- Developed new software engineering courses to expand offerings for the new BS Software Engineering degree added to the program
- Served as computer science capstone course coordinator and commercial outreach lead
  - Mentored / oversaw 65 project teams in four years
  - Collaborate with university fundraising to support program which raised $80k per year, up from $10k per year when I took over the program
  - Recruit projects from over 70 companies and individuals, with a continual year to year growth of around 30% for the last four years of my tenure as program lead
- Increased cross-discipline projects and student STEM experiences through new senior design projects involving multiple engineering disciplines
- Improved student outcomes through new student clubs and experience opportunities in the areas of: space engineering, computer security, robotics, and IT projects.
- Instructed over 1200 undergraduates in four years.

Chief Executive Officer, Laser RevEng, LLC Fall 2017–2020

- Founder and CEO for a tactical entertainments-focused technology startup, Laser RevEng, LLC
- Leading efforts to develop and integrate real time location tracking technologies, augmented reality, and user experience design for the company
- Participating in the NSF I-Corps training program
- Leading a team with 4 other engineers and business/communications company members
- Developing an IP portfolio in conjunction with the WSU Office of Commercialization
- Participated in three business plan competitions:
  WSU (4th place) – Univ Wash (2nd round) – NWBPC (final round)

Chief Executive Officer, BehavioMetrics, LLC Spring 2015–2017

- Founder and CEO for a gerontechnology-focused technology startup, BehavioMetrics, LLC
- Licensed technologies from Washington State University to transition from research to commercial offerings
- Lead business development, fundraising, and technology development of smart home tech for senior care

Assistant Research Professor, Washington State University Summer 2012–2016

- WSU's School of Electrical Engineering and Computer science and the Center for Advanced Studies in Adaptive Systems (CASAS)
- Research areas include advanced machine learning approaches, human factors for smart home technologies, and large scale smart home deployments
- Designed and implemented a world class gerontechnology-focused research testbed
  - Led team of four engineers, three graduate students, and two staff
  - Led outreach and recruitment efforts to onboard healthcare industry collaborators
  - Coordinated development of data collection hardware and software systems
  - Efforts resulted in installation of 30 in-home multi-year smart home systems for research data collection
  - Project eventually led to an international program of 100's of smart home systems for worldwide data collection, research, and publishing

Postdoctoral Research Associate, Washington State University Spring 2011–Summer 2012

- Research included novel approaches to sensor placement, gerontechnology user needs surveying, and continued research on tracking and identification
- Work included construction and maintenance of a large scale smart home research testbed (30 homes), development of research software infrastructure, department recruiting efforts, and senior capstone project advising

Research Assistant or Teaching Assistant, Washington State University Fall 2006–December 2010

- Research assistant for WSU's CASAS research center developing smart homes
- Teaching assistant for a wide variety of computer science courses, as detailed in the teaching section of this vitae

R&D Software Engineering Internship, Schweitzer Engineering Laboratories Summer 2007

- Architected and implemented a C37.118 Synchrophasor network server to increase company's footprint in distributed power grid monitoring

Systems Engineer, Adaptx Fall 2005–Fall 2006

- IT and software engineer for a growing startup company
- Implemented digital pen mapping system for FalconView, which lead to company's first sales on the order of $3 million in licensing fees

Research Systems Engineer, Oregon Graduate Institute / OHSU Summer 2002–Summer 2005

- Win32, Solaris, Linux servers, desktops. Wireless network planning and support
- Developed several in-house tools to complete research projects with faculty, including outdoor wireless networks, high-speed grant submission scripts to NSF Fastlane, and Linux kernel interfaces for honeypot security testing

IT Consultant, Wilco Farmers March 2002

- Windows workstation support and development of sales reporting tools, which increased sales in the next quarter by 15% due to more accessible metrics analysis

Power & Lighting Engineer, PAE Consulting Engineers Summer 2001–Fall 2001

- Building-scale power design, site surveys and illumination engineering

Co-Op, Cypress Semiconductor Summer 2000–Summer 2001

- Ported place and route software from Solaris to Linux which addressed a shift in 34% of customer build environments and opened up new sales opportunities

Telecommunications Student Worker, University of Portland Spring 1999–Summer 2000

- Phone, network, and student support. Developed web-based computer registration systems to significantly reduce university IT support calls from students in campus dormitories

Engineering Internship, Nabisco Co. Summer 1998

- Built network backup systems for bakery floor computers, which were irreplaceable at the time
- Networked HVAC controls to speed up maintenance ticket responses
- Developed Web-based inventory reporting to assist purchasing department decision making

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STUDENTS

STUDENTS - CO-ADVISING

- Shervin Amini (PhD completed Spring 2019): "Dynamic power management in multi-core systems"
- Brian Thomas (PhD completed Summer 2017): "Occupancy detection and prediction for smart environments"

STUDENTS - COMMITTEE MEMBER

- James Irwin (Masters of CompSci, Summer 2020)
- Zhaodong Wang (PhD of CompSci, Fall 2019)
- Oscar de Haro (MS of Mechanical Engineering, Fall 2019)
- Hu Yang (PhD Spring 2019)
- Bryan Minor (PhD Summer 2016)

INVITED TALKS

Gonzaga University, Spokane, WA

- "RabbitMQ Message Broker," GU ACM Student Chapter Spring 2022
- "Smart Homes and Gerontechnology," CAS Faculty Seminars Spring 2022

Intel Wireless IoT Technologies Research Group, Portland, OR

- "Smart Homes and Artificial Intelligence for Gerontechnology and Aging Support," Spring 2018

2016 National Academy of Neuropsychology Annual Conference, Seattle, WA

- "Workshop on Technologies for Healthy Aging," NAN Fall 2016

2016 Hawaii International Conference on System Sciences, Kauai, HI

- "Introduction to the Technologies for Healthy Aging Minitrack," HICSS Winter 2016

2016 Life Science Washington Leadership Summit, Spokane, WA

- "Panel on Lessons Learned Transitioning Technology out of the Laboratory," LSW Spring 2016

2015 Palouse Knowledge Corridor Investment Forum, Moscow, ID

- "Bevy360: A BehavioMetrics Product for Enabling Aging in Place," PKC Summer 2015

IEEE Washington Region 6 Annual Gathering, Pullman, WA

- "Bevy360: A BehavioMetrics Product for Enabling Aging in Place," IEEE Social Summer 2015

EU-US Frontiers of Engineering, National Academy of Engineering, Seattle, WA

- "Smart Homes as a Decision Support Framework," NAE FOE Fall 2014

IFA+, Co-located with IFA, Berlin, Germany

- "Decision Support in Healthcare with Smart Environments and AmI," IFA+ Summer 2014

Alzheimer's Association, Heart of America Chapter, Prairie Village, Kansas

- "Smart Environments for Monitoring Cognitive Decline," Defining Hope Conference Fall 2013

Oregon Health & Science University, Portland, Oregon

- "Smart Environments and Behaviometrics," Biomedical Eng. & ORCATECH Spring 2012

Washington State University, Pullman, Washington

- "Using Git with Python projects," Python Working Group — Fall 2019
- "What is Net Neutrality?," Issues and Forums Committee of WSU — Spring 2018
- "Using SSH," Linux User's Group WSU — Fall 2010, 2011, 2015, & 2017
- "Bevy360: Technology-based Circles of Care for Seniors," IEEE Palouse Chapter — Fall 2015
- "LaTeX for technical writing," Linux User's Group WSU — 2014 & 2016
- "WSU CASAS Commercialization Efforts," WSU i3 — Fall 2013
- "Virtual Currency Technologies and Bitcoin," Computer Security Group — Fall 2013
- "Smart Environments and Behaviometrics," WSU Vancouver, ENCS — Spring 2012
- "Introduction to Linux," Linux User's Group WSU — Fall 2010 & 2011
- "Identification and Tracking of Smart Home Residents," (Preliminary Exam) — Fall 2010
- "Introduction to Smart Homes," IEEE Palouse Chapter — Fall 2009
- "Linux Security Fundamentals," WSU Computer Security Group — Fall 2009

Oregon State University, Corvallis, Oregon

- "The CASAS Smart Home Research Project," Computer Science Colloquium — Fall 2011

Cypress Semiconductor, Beaverton, Oregon

- "Smart Home Technologies," Cypress Technical Talk Series — Fall 2011

University of Portland, Portland, Oregon

- "Smart Home Technologies and Elder Care," ACM Student Chapter — Summer 2011

University College Dublin, Dublin, Ireland

- "CASAS Smart Homes for Tracking and Behaviometrics Technologies," CASL Colloquium — Summer 2009

Awards and Fellowships

- WSU's Top Three Most Engaged RSO of The Year – Cougs in Space — 2019
- WSU business plan competition, 4^{th} place — 2018
- Outstanding Performance and Leadership, Summer NIH ADAR Program — 2017
- Washington St. Univ. Computer Science Ph.D. Student of the Year — 2008–2009

Service

National Science Foundation

- Reviewer for Smart & Connected Communities — 2021

Departmental Services

Faculty Senator, Gonzaga University — 2021–2023

- Serving as a faculty representative for the School of Engineering and Applied Sciences.
- Member of the Academic Committee.

Student Club Advisor: GU ACM Student Chapter, Gonzaga University — 2021–2023

- Founded a student chapter of the Association of Computing Machinery at Gonzaga University
- Organizing Hackathons, reviewing resumes, hosting tech talks, and supporting a learning environment for students

Student Club Advisor: GU ASME / Aerospace Club, Gonzaga University — 2020–2023

- Serving as a faculty lead for American Society of Mechanical Engineers club at Gonzaga

- Provided organizational feedback and mentorship to computer engineering, sensor systems, and data analysis teams

Student Club Advisor: GU Robotics, Gonzaga University 2020–2022

- Serving as a faculty lead for the robotics & robosub club
- Focused efforts on adding non-engineering team members, increasing social media footprint, and making connections to improve funding resources for the club

Computer Science Representative, Renourad Lecture Series, Gonzaga University 2021–2022

- CS department member recruiting special guest lectures for Gonzaga University.

GU SEAS Laptop Recommendation Committee, Gonzaga University 2022
GU Computer Science Space Design Committee, Gonzaga University 2022
GU Computer Science Faculty Hiring Committee, Gonzaga University 2021–2023
Department Strategic Planning Committee: Infrastructure Focus, Gonzaga University 2021

- Focused on establishing student, staff, and faculty needs in regards to equipment, space, IT resources, and makerspaces.

Curriculum Coordinator: CompSci Senior Design, Washington State University 2016–2020

- Responsible for the coordination, development, and advancement of the computer science senior design (capstone) program at EECS
- Continually in contact with industry partners to secure projects and to incorporate industry feedback about needed training for new graduates
- Raised the number of companies involved in capstone from 2 in 2016 to 15 in 2019
- Raised industry donations to capstone from $20k/year in 2016 to $80k/year in 2020
- While leading capstone, the quantity of students has roughly tripled and I have continually reviewed and updated the program to match both the needs of the students and the needs of modern technologies used in industry
- Currently proposing overhauls to the program to include more professional mentorship, leadership training, and improved project scoping

Curriculum Coordinator: CptS 223 - Advanced Data Structures, Wash. St. Univ. 2016–2020

- Lead curriculum development for the computer science advanced data structures course
- Used industry feedback to redesign course materials to better prepare students for internships and careers including:
  - Changed the course to be taught on the GNU/Linux operating system platform
  - Introduced Git as a version control tool and requiring all project work be submitted via Git for grading
  - Converted all assignments to use google test / google mock to introduce testing into the early curriculum
  - Added DevOps style Continuous Integration to all assignments
- Gathered and documented course materials for ABET review

Washington STate Academic RedShirt (STARS) Program Mentor, Wash. St. Univ. 2016–2019

- Serve as a mentor in the Washington STate Academic RedShirt (STARS) Program for need-based, notably underrepresented, students transitioning from high school to an engineering program

ABET Capstone Materials CS Lead, Washington State University 2019

- Assembled and documented the CS capstone courses during the departmental ABET review.
- Guided tours and spoke with the ABET representatives on behalf of the department.

Advise, Attend, and Judge Crimson Code Hackathon, Washington State University 2012–2019

- Advise students during preparation for annual hackathon events
- Attend hackathons to mentor teams
- Participated in hackathon (not competition stage): 2016, 2018 & 2019

- Judged hackathon: 2013–2015, & 2017

Student Club Advisor: Cougs in Space, Washington State University 2016–2020

- Faculty advisor for the student group focused on training, education, and outreach for students in the field of space and space engineering
- Guided club from 6 members in 2016 to 120 members in 2019 - making it the largest club in Voiland College Engineering and Architecture
- Engaged multiple companies in supporting and mentoring CiS teams, including Blue Origin, NASA, Planetary Resources, Raytheon, Systima Technologies, Boeing, and Lockheed Martin
- Flagship project is CougSat I - a cubesat for STEM training
- Currently developing CougDrive I - a cubesat ready Hall Effect Thruster for CougSat II and Cislunar (send it to the moon!) satellites

Student Club Advisor: Palouse RoboSub, Washington State University 2018–2020

- Faculty advisor for a student club which designs and builds an autonomous underwater vehicle.
- The RoboSub is used to compete in the AUVSI annual competition, and is backed by my NAVSEA grants

Student Club Advisor: Linux User's Group, Washington State University 2016–2020

- Faculty advisor for the local LUG group, which promotes and teaches open source software

Student Club Advisor: Ham Radio Club, Washington State University 2013–2018

- Faculty advisor for the student group related to amateur radio projects and education

Student Club Advisor: Hurling At WSU, Washington State University 2015–2017

- Faculty advisor for the student group participating and promoting in the sport of hurling

Student Club Advisor: Computer Security Group, Washington State University 2012–2016

- Faculty advisor for the student group related to all aspects of security systems

Senior Capstone Project Faculty Advisor, Washington State University 2009, 2010, 2012–2014

- Participate in the engineering school's senior capstone project process by being the faculty advisor to senior design teams

Student Recruiting, Washington State University 2007–2020

- Volunteer to assist during university and departmental recruiting events. These events have included tours of the department research labs, introducing prospective students to either the undergrad or grad programs

College Research Promotional Events, Washington State University 2008–2020

- Present past and ongoing research to visitors from industry, alumni, fellow research institutions, and prospective students

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COMMUNITY DEVELOPMENT

Gonzaga Hackathon Adviser, Gonzaga University ACM & Women in Computing Clubs 2021–2022

- Pitched and led first open engineering hackathon at Gonzaga University
- Led team of five+ students per year to coordinate and execute events
- Recruited industry funding from multiple companies
- Recruited industry advisors and judges for event
- 85 students participated at the 2022 hackathon, including high school teams
- 63 students participated at the 2021 hackathon, 31% of entire student body

Spokane CyberCup Coordinator 2023

- Coordinated CyberCup IV, a regional capture the flag cybersecurity competition
- Advertised and drew participants from 6 universities and two high Schools

- Collaborated with faculty from three institutions
- 110 undergraduate and high school students participated
- Raised $3,600 from companies to provide event resources

Raspberry Pi Condo @ WSU, WSU Linux User's Group 2012–2020

- Proposed, raised funds, and implemented a student-run server condo
- Ran student training on using Raspberry Pi boards as a server platform
- Worked with WSU IT to connect and secure condo network
- Over 8 years, condo hosted over 60 small computing boards and projects

WSU Annual Hackathon Judge and Planner, WSU ACM Student Club 2014–2017

- Coordinate with student organizers during event planning
- Attend and judge competition entries along with industry leaders

High School Capstone Advisor, Colfax and Pullman High Schools 2009–2011

- Duties included one on one sessions with local high school seniors interested in a computer science career. The sessions included guided instruction in programming projects, real-world engineering preparation and group work.

Linux User's Group @ WSU, WSU 2007–2014

- Participated in the LUG student group for events, advocacy and help desk work
- Served as the group's elected Treasurer for the 2009 & 2010 school years
  - Reconciled group financials with university
  - Spearheaded fund raising for over $1000/year to fund events
- Worked on the group's biannual computer gaming events

Washington State University Computer Security Group, WSU 2009–2012

- Member of this student group, focused on exploring computer and network security

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Professional Societies and Activities

Editor:

- Journal on Reliability of Intelligent Environments 2015–2018

Lead Guest Editor:

- Journal of Sustainability
  Challenges of Engineering Intelligent Environments 2021–2022
- Journal of Artificial Intelligence and Smart Environments
  Thematic Issue on Challenges in Engineering Smart Environments 2014

Demos and Videos Track Committee:

- International Conference on Intelligent Environments (IE) 2014

Advertising Committee:

- International Conference on Intelligent Environments (IE) 2013

Workshop Committee:

- SmartHealthSys (UbiComp) 2014
- Workshop On Large Scale Intelligent Environments (WOLSIE) 2013

Program Committee:

- International Conference of Intelligent Environments (IE) 2021–2023
- IEEE Pervasive Computing - Pervasive Health Technologies (PerHealth) 2021
- Digital Health Summit (DH) 2016–2018
- International Conference on Tools with Artificial Intelligence (ICTAI) 2012 & 2013
- International Workshop on Situation, Activity and Goal Awareness (SAGAware) 2012

- International Conference on Computational Informatics and Technology Enhanced Education (ICCITEE) 2012 & 2013

Professional Memberships:

- Association for Computing Machinery, Senior Member 2009–present
- Institute of Electrical and Electronics Engineers, Member 2010–present

Society Memberships:

- Lions International, Member 2008–2014
- Boy Scouts of America, Eagle Scout

CERTIFICATIONS

Collaborative Institutional Training Initiative (CITI Program)

- Responsible Conduct of Research for Engineers
- Human Subjects Research - Social/Behavioral Research Course
- CITI Conflicts of Interest - Conflicts of Interest

Washington State University

- Institutional Review Board (IRB) training
- Helping Entities Implement Privacy and Security Protections (HIPAA)
- Family Educational Rights and Privacy Act (FERPA)

SCIENTIFIC PUBLICATION REVIEWING

Journal Reviewing:

- Sensors 2016–2022
- Pervasive and Mobile Computing 2011–2016
- North American Power Association (NAPA) 2014
- International Journal of Ad Hoc and ubiquitous Computing 2013
- Computing 2012
- International Journal of Computer Engineering Research (IJER) 2012
- ACM Transactions on Autonomous and Adaptive Systems (TAAS) 2012
- ACM Transactions on Intelligent Systems and Technology (ACM-TIST) 2012
- International Journal of Computer Engineering Research 2012
- Journal of Computer Science and Technology 2010

Conference Reviewing:

- International Conference on Intelligent Environments (IE) 2010 & 2014–2022
- Digital Health Summit (DH) 2016–2019
- Pervasive Computing (PerCom) 2014
- Ubiquitous Computing (UbiComp) 2014
- IEEE International Conference on Tools with Artificial Intelligence (ICTAI) 2013
- ACM SIGKDD Conference on Knowledge Discovery and Data Mining 2012
- International Workshop on Situation, Activity and Goal Awareness (SAGAware) 2012
- IEEE SmartGridComm Symposium on Wide-Area Monitoring, Protection & Control (WAMPAC) 2012
- PerCom Workshop on the Impact of Human Mobility on Pervasive Systems (PerMoby) 2012
- International Conference on Advances in Computing, Comm. and Informatics (ICACCI) 2012
- SeaCube International Workshop Series 2011
- IEEE PerCom Workshop on Smart Environments (SmartE) 2010

- IEEE International Conference on Tools with Artificial Intelligence (ICTAI) 2010
- IEEE Consumer Communications and Networking Conference 2010

EDITING

- Edited, executed book layout, and published book *Cyclopus Adventures* by Jaxon A. Froderberg, ISBN 978-1-03-402536-8

SELECTED ENGINEERING PROJECTS

PAJ7620 Gesture Sensor Driver - https://github.com/acrandal/RevEng_PAJ7620
Created fork of PAJ7620 driver licensed until MIT open source license. Converted available Arduino code to an object-oriented structure. Driver features added based on documentation and reverse engineering efforts.

10k ft. Competition Rocket Telemetry Module https://github.com/acrandal/GU-Rocketry-ATA-Module
Designed, implemented, and tested a 1U Cube Sat form factor rocket telemetry module with real time RF transmission for in-flight tracking. Built electronics, power controls, 3D printed, and designed aluminum frame.