James Rosenthal

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Summary

I am a Ph.D. student in electrical engineering with experience in embedded systems, RF design, and communication systems. I have worked on biomedical, consumer, and aerospace systems across the product life-cycle. I am a US citizen and am eligible for employment within the USA.

Education

2018–Present **Ph.D.**, *Electrical & Computer Engineering, University of Washington, Seattle, WA, USA* .
Advisor: Prof. Matthew S. Reynolds
Research Focus: Ultra-low power embedded communication systems for neural implants
NSF Graduate Research Fellow, GPA: 3.94/4.00, (J1-J3, C3-C7)
Teaching Assistant: Intro to Digital Design, Technical Writing, Advanced Topics in Comms

2016-2018 **Master's of Science**, *Electrical & Computer Engineering, University of Washington, Seattle, WA, USA*.
GPA: 3.93/4.00

2008-2013 **Bachelor's of Science**, *Electrical Engineering, University of Minnesota–Twin Cities, MN, USA*.
GPA: 3.73/4.00

Work Experience

Spring 2019 **ViaSat** Tempe, AZ
RF Engineering Intern
Design, simulation, analysis, and testing of K-band RF circuitry for satellite internet.

Summer 2017 **NASA Langley Research Center** Hampton, VA
Electrical Engineer
Design, fabrication, and testing of a custom nanosatellite flight computer board.

2013-2016 **NASA Langley Research Center** Hampton, VA
Electrical Engineer
Hardware and systems design for terrestrial and stratospheric flight systems. Served as lead avionics engineer for the Radiation Dosimetry Experiment (C2) high-altitude balloon and the On-orbit Autonomous Assembly of Nanosatellite (C1) projects.

2013 **Synapse Product Development** Seattle, WA
Electrical Engineering Intern
Design, fabrication, and testing of consumer electronics.

2012 **Airbus** Toulouse, France
Electrical Engineering Intern
Research and development of a CDMA wireless modem implemented on FPGAs.

2011-2012 **University of Minnesota UAV Research Group** Minneapolis, MN
Research Assistant
Design, fabrication, and testing of sensors for drones. Flew specific flight patterns as the drone test pilot for research on controls and system identification.

Summer 2010 **University of Arizona Neurorobotics Laboratory** Tucson, AZ
Research Assistant
Firmware and instrumentation engineer working on humanoid robots.

2009 **University of Minnesota UAV Research Group** Minneapolis, MN
Research Assistant
Instrumentation engineer and flight test pilot of fixed-wing and rotary-wing research drones.

Grants & Scholarships

2019 **Bergstrom Award for Art & Science**, Co-Investigator

2018 **National Science Foundation Graduate Research Fellow** (NSF GRFP)

2018 **NASA Space Technology Research Fellowship** (declined for NSF GRFP)

2011 **Roger M. Nordby Engineering Scholarship**

2009 **New Look Laser Technologies Essay Scholarship Winner**

2008 **Academy of Model Aeronautics Student Achievement Scholarship**

2008-2012 **University of Minnesota *Gopher Gold* Scholarship**

Honors

2019 **IEEE Wireless Sensor Networks Conference** Student Paper Award Finalist (C4 & C5)

2017 **NASA Group Achievement Award – Autonomy Incubator**

2016 **NASA Group Achievement Award – Radiation Dosimetry Experiment** (C2)

Peer-Reviewed Publications (J–journal, C–conference)

J3 **J. Rosenthal** and M.S. Reynolds, "A 1.0 Mbps 198 pJ/bit Bluetooth Low Energy (BLE) Compatible Single Sideband Backscatter Uplink for the NeuroDisc Brain-Computer Interface," *IEEE Trans. on Microwave Theory and Techniques*, 2019.

J2 **J. Rosenthal**, A. Sharma, E. Kampianakis, M.S. Reynolds, "A 25 Mbps, 12.4 pJ/bit Backscatter Data Uplink for the NeuroDisc Brain Computer Interface," *IEEE Trans. on Biomedical Circuits and Systems*, 2019.

J1 A. Sharma, E. Kampianakis, **J. Rosenthal**, A. Pike, A. Dadkhah, and M.S. Reynolds, "Wideband UHF DQPSK Backscatter Communications in Reverberant Cavity Animal Cage Environments," *IEEE Trans. on Antennas and Propagation*, 2019.

C7 L. Arjona, **J. Rosenthal**, J.R. Smith, and C.T. Moritz, "High Performance Flexible Protocol for Backscattered-based Neural Implants," *ICEAA - IEEE Antennas and Propagation in Wireless Comms. Conference*, 2019.

C6 **J. Rosenthal**, A. Pike, and M.S. Reynolds, "A 1 Mbps 158 pJ/bit Bluetooth Low Energy (BLE) Compatible Backscatter Communication Uplink for Wireless Neural Recording in an Animal Cage Environment," *IEEE Conference on RFID*, 2019.

C5 **J. Rosenthal** and M.S. Reynolds, "A 158 pJ/bit 1.0 Mbps Bluetooth Low Energy (BLE) Compatible Backscatter Communication System for Wireless Sensing," *IEEE Topical Conference on Wireless Sensors and Sensor Networks (WiSNet)*, 2019.

C4 A. Dadkhah, **J. Rosenthal**, and M.S. Reynolds, "ZeroScatter: Zero-Added-Component Backscatter Communication using Existing Digital I/O Pins," *IEEE Topical Conference on Wireless Sensors and Sensor Networks (WiSNet)*, 2019.

C3 **J. Rosenthal**, A. Sharma, E. Kampianakis, and M.S. Reynolds, "A 6.25 Mbps, 12.4 pJ/bit DQPSK Backscatter Wireless Uplink for the NeuroDisc Brain-Computer Interface," *IEEE International Conference on Biomedical Circuits and Systems (BioCAS)*, 2018.

C2 **J. Rosenthal**, B. Hayes, and C. Mertens. "A Silicon Micro Dosimeter for High-Altitude Measurements of Cosmic Radiation," *IEEE Aerospace Conference*, 2018.

C1 J. Pei, L. Murchison, A. Ben Shabat, V. Stewart, **J. Rosenthal**, et al. "Ground Demonstration on the Autonomous Docking of Two 3U Cubesats using a Novel Permanent-Magnet Docking Mechanism." *AIAA Aerospace Sciences Meeting*, 2017.

Posters, Presentations, and Demos

Presentation "A 1 Mbps 158 pJ/bit Bluetooth Low Energy (BLE) Compatible Backscatter Communication Uplink for Wireless Neural Recording in an Animal Cage Environment," *IEEE Conference on RFID*, 2019.

Presentation + Poster "A 158 pJ/bit 1.0 Mbps Bluetooth Low Energy (BLE) Compatible Backscatter Communication System for Wireless Sensing," *IEEE WiSNet*, 2019.

Presentation + Poster "A 6.25 Mbps, 12.4 pJ/bit DQPSK Backscatter Wireless Uplink for the NeuroDisc Brain-Computer Interface." *IEEE BioCAS*, 2018.

Presentation "A Silicon Micro Dosimeter for High-Altitude Measurements of Cosmic Radiation." *IEEE Aerospace Conference*, 2018.

Poster "Fully Wireless Instrumentation for a Bi-Direction BCI," *NeuroFutures Conference*, 2018.

Demo "IBPoet: An Interactive & Biosensitive Poetry Composition Device," in *ACM UbiComp Conference*, 2017.

Poster "Aerodynamic Characterization of the Mini Ultra Stick Airframe." *National Conference for Undergraduate Research*, 2012.

Demos *Numerous demos and informal presentations for fundraising, lab visitors, and outreach guests.*

Volunteering & Outreach

2018 **UW** *Summer Youth Electronics Design*, Instructor

2018 **UW** *GEARUP*, Outreach Presenter

2017-Present **UW** *Engineering Days*, Outreach Presenter

2018-Present **UW** *Graduate and Professional Student Senate*, Senator

2016-2018 **UW** *EE Graduate Student Association*, President

2017 **UW** *EE Soldering Workshop*, Instructor

2016-2018 **Washington State Opportunities Scholar Program**, Mentor

2016 **Big Brothers Big Sisters**, Mentor

2013-2016 **NASA** *HUNCH* Outreach Mentor, providing hands-on experience to students building space-flight hardware

2015 **NASA** *Virtual Career Fair*, Speaker

2018 **NASA** *RaD-X Outreach*, Presenter

2013-2016 **NASA** *Speaker's Bureau*, Volunteer speaker at local schools and libraries

2014-2016 **NASA** *College of William & Mary's Focus on the Future*, Volunteer speaker

2013 **International Rescue Committee**, *Refugee Resettlement*, Volunteer

Technical Experience

Programming	Matlab (proficient), Verilog, Embedded C (basic), Python (basic), BASH (basic)
Software	Altium Designer, Eagle CAD, LTSpice, HFSS, ADS, CST (basic)
Protocols	Bluetooth Low Energy, UART, SPI, I2C, CAN, USB
Lab Equipment	Proficient with circuit prototyping and debugging, Network Analyzers, Spectrum Analyzers, Oscilloscopes, Multimeters, Soldering (through-hole, surface-mount)
Testing Experience	Thermal Vacuum Chamber, Burn-in, Radiation Beam Calibration, IACUC-approved Animal Testing

Languages & Outside Interests

English	Fluent
French	Negotiation Level
Flying	FAA Private Pilot Glider Certificate (Current)
HAM Radio	FCC Technician Class License (KK4VMN)