Nicholas Selby

Director of Engineering at Renewvia Solar Africa

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EDUCATION

Massachusetts Institute of Technology • Ph.D. Electrical Engineering and Computer Science **2021**

Massachusetts Institute of Technology • M.S. Mechanical Engineering **2018**

Georgia Institute of Technology • B.S. Mechanical Engineering • Mathematics Minor • Highest Honors **2016**

SELECTED EXPERIENCE

Renewvia Solar Africa, Nairobi, Kenya — *Director of Engineering since Jan. 2022*

- **Leads** engineering, procurement, construction, and O&M of dozens of solar minigrids and C&I plants across Africa
- **Manages** team of five engineers and dozens of technical staff in Kenya and Nigeria
- Commissioned 541 kW, 1.1 MWh solar minigrid in Kenyan refugee camp
- Led design for 32 future minigrids and one **40 MW** project

Massachusetts Institute of Technology, Cambridge, MA — *Research Assistant, Jan. 2018 – Sept. 2021*

- Innovated in **advanced manufacturing** workforce development by building robotic education platform
- Developed novel, cloud-based "TeachBot" system with ROS and Node.js
- **Published** human-subject test experiment demonstrating learning gains
- Research presentation **won First Place** at MIT research exhibition

MIT Media Lab, Cambridge, MA — *Research Assistant, Aug. 2016 – Dec. 2017*

- Innovating in **wireless networking technologies** to enable accurate sensing using wireless signals
- Developed **patented** novel drone-mounted wireless communication relay for warehouse inventory control
- Created new signal processing techniques, **outperforming state-of-the-art by 20x**
- **Published** and demonstrated work at two subject-specific international conferences

Brown Water Laboratory, Atlanta, GA — *Research Assistant, Summer 2016*

- Implemented **machine learning** algorithms for **public health** applications
- Developed **novel, low-cost PCB** device monitoring water quality for deployment in developing countries
- **Wrote software** for novel infant anthropometric device for deployment in USAID sites worldwide
- Deployed low cost disease vector tracking device in Mozambique using **computer vision**

Airdash, LLC, Atlanta, GA — *Founder, May 2015 – May 2016*

- **Launched startup with $20,000** seed funding developing high altitude wind turbines
- Created **CFD** model of turbine to optimize aerobody shapes
- **Prototyped** 7 ft. diameter scale model for **wind tunnel testing** of aerodynamics and stability

Sandia National Laboratories, Albuquerque, NM — *Research Assistant, Summer 2013*

- **Designed, prototyped, and demonstrated** novel fractional quantum hall effect sensor for use in quantum physics
- Simulated with **MATLAB and CAD** software and manufactured with **CNC machining**
- **Published** article in *American Institute of Physics* journal, *Review of Scientific Instruments*

Jet Propulsion Laboratory, Pasadena, CA — *Research Assistant, May 2013 – May 2014*

- **Constructed hexacopter** drone for topographical mapping
- Compiled data on power systems for **glacial, deep-sea, volcanic, and asteroid robotics**
- Generated power system options overview analysis for **presentation and publication**

PUBLICATIONS, PATENTS, & CONFERENCE PRESENTATIONS

NS Selby and HH Asada. "Learning of Causal Observable Functions for Koopman-DFL Lifting Linearization of Nonlinear Controlled Systems and Its Application to Excavation Automation." *IEEE Robotics and Automation Letters*, 6 (4). 2021.

NS Selby, J Ng, GS Stump, G Westerman, C Traweek, and HH Asada. "TeachBot: Towards Teaching Robotics Fundamentals for Human-Robot Collaboration at Work." *Heliyon*, 7 (7). 2021.

Y Ma, **NS Selby**, and F Adib. "Methods and Apparatus for Wideband Localization." U.S. Patent No. 10,575,277. 2020.

Y Ma, **NS Selby**, and F Adib. "Full-duplex, bi-directional, analog relay." U.S. Patent No. 10,389,429. 2019.

Y Ma, **NS Selby**, and F Adib. "Minding the Billions: Ultra-wideband Localization for Deployed RFIDs." *ACM Annual International Conference on Mobile Computing and Networking*. Snowbird, UT, USA. 2017.

Y Ma, **NS Selby**, and F Adib. "Drone Relays for Battery-Free Networks." *ACM Conference on Applications, Technologies, Architectures, and Protocols for Computer Communication*. Los Angeles, CA, USA. 2017.

D Torello, **NS Selby**, J Kim, J Qu, and LJ Jacobs. "Determination of Absolute Material Nonlinearity with Air-Coupled Ultrasonic Receivers." *Ultrasonics*. 2017.

NS Selby, D Torello, JY Kim, LJ Jacobs. "Calibration of Air-Coupled Transducers for Absolute Nonlinear Ultrasonic Measurements." *Review of Progress in Quantitative Nondestructive Evaluation*. Atlanta, GA, USA. 2016.

D Torello, **NS Selby**, J Kim, J Qu, and LJ Jacobs. "Determination of Absolute Material Nonlinearity in Aluminum and Fused Silica with Air-Coupled Ultrasonic Receivers." *Review of Progress in Quantitative Nondestructive Evaluation*. Atlanta, GA, USA. 2016.

NS Selby, M Crawford, L Tracy, JL Reno, and W Pan. "in-situ Biaxial Rotation at Low Temperatures in High Magnetic Fields." *Review of Scientific Instruments,* 85, 095116 (2014); doi: 10.1063/1.4896100.

NS Selby and N Daley. "Simulation and Optimization of Car Design." *ASME 2014 International Design & Engineering Technical Conferences & Computers & Information in Engineering Conference*. Buffalo, NY, USA. 2014.

AWARDS

National Science Foundation Innovation Corps Teams Grant. 2020.

National Science Foundation Innovation Corps Fusion Grant. 2019.

First Place Presenter. *MIT Mechanical Engineering Research Exhibition.* 2019.

National Science Foundation Graduate Research Fellowship Honorable Mention. *NSF*. 2016.

Best Oral Presentation. Undergraduate Research Symposium. *Georgia Institute of Technology*. 2016.

Richard K. Whitehead Jr. Memorial Award. Awarded to **top three** ME seniors. *Georgia Institute of Technology*. 2016.

President's Undergraduate Research Award. *Georgia Institute of Technology*. 2015.

Air Products Undergraduate Research Award. *Air Products and Chemicals, Inc.* 2015.

Best Utility Simulation for Product Design. *American Society of Mechanical Engineers*. 2014.

Stamps President's Scholarship. Merit-based, full cost of attendance scholarship **to top 12 of 14,000** applicants. 2012.

SKILLS

Solar	EPC+O&M, AC- DC- and hybrid-coupled systems, off- and on-grid systems, Aurora Solar, VRM, ThunderCloud and Koios, SunnyPortal, myPower24
Programming	Python (incl. PyTorch, ROS, NumPy), C/C++ (incl. OpenCV), C#, Java, MATLAB and Simulink, HTML/CSS/JavaScript (incl. Node.js), LabVIEW, MS Excel and PowerBI
Prototyping	CAD, FEA, CFD, Soldering, CNC and Conventional Machining, MIG and TIG Welding, Waterjet, Laser Cutting, Plasma Cutting, 3D Printing
Miscellaneous	Robotics and Control, Machine Learning, Internet of Things, DFMA, Public Speaking, Teaching