Rachel D. Newton

(480) 694 – 6880 | rhoadesr@umich.edu | www.linkedin.com/in/rach-newton

EDUCATION

University of Michigan (UM) | Ann Arbor, Michigan — GPA: 3.94/4.00
Doctor of Philosophy in Electrical Engineering, College of Engineering — *Anticipated May 2025*
Master of Science in Electrical Engineering, College of Engineering — *Received April 2022*
Arizona State University (ASU), Barrett, the Honors College | Tempe, Arizona — GPA: 4.00/4.00
Bachelor of Science in Electrical Engineering, Ira A. Fulton Schools of Engineering — *Received May 2020*
Bachelor of Science in Computational Mathematics, College of Liberal Arts and Sciences — *Received May 2020*

- Inducted Eta Kappa Nu (May 2017)
- Inducted Tau Beta Pi (December 2017)

PUBLICATIONS

R. Newton, Z. Du, L. Balzano, P. Seiler, "Manifold Optimization for Data Driven Reduced-Order Modeling," in *59th Allerton Conference* (September 2023*).* doi: 10.1109/Allerton58177.2023.10313500.

R. Newton, Z. Du, P. Seiler, L. Balzano, "Optimality of POD for Data-Driven LQR with Low-Rank Structure," in *IEEE Control Systems Letters*, vol. 8 (January 2024): 85-90. doi: 10.1109/LCSYS.2023.3344147.

A. Chen, **R. D. Rhoades**, A. J. Halton, J. C. Booth, X. Shi, X. Bu, N. Wu, and J. Chae, "Wireless Wearable Ultrasound Sensor to Characterize Respiratory Behavior." In: Ossandon, M.R., Baker, H., Rasooly, A. (eds) Biomedical Engineering Technologies. *Methods in Molecular Biology*, vol 2393 (November 2021): 671-682. https://doi.org/10.1007/978-1-0716-1803-5_36

A. Chen, J. Zhang, L. Zhao, **R. D. Rhoades**, D. Kim, N. Wu, J. Liang, J. Chae, "Machine-learning enabled wireless wearable sensors to study individuality of respiratory behaviors", *Biosensors and Bioelectronics* 173, no. 112799 (November 2020). DOI: 10.1016/j.bios.2020.112799.

A. Chen, A. J. Halton, **R. D. Rhoades**, J. C. Booth, X. Shi, X. Bu, N. Wu, and J. Chae, "Wireless Wearable Ultrasound Sensor on a Paper Substrate to Characterize Respiratory Behavior," *ACS Sensors* 4, no. 4 (March 2019): 944–952. DOI: 10.1021/acssensors.9b00043.

RESEARCH EXPERIENCES

Machine Learning for Control Systems with Dr. Laura Balzano and Dr. Peter Seiler at UM — *January 2021-Present*

- Implemented two Grassmannian optimization algorithms to compute the reduced-order model for a small-scale wind farm system
- Currently developing theoretical limitations by leveraging recent publications on similar problems

Fulton Undergraduate Researcher for Chae Research Group at ASU — *January 2018 – December 2018*

- Developed firmware for wireless wearable biomedical sensors to transmit data to auxiliary devices
- Programmed an Android application to receive and analyze the data received from sensors programmed in Java with Android Studio

Senior Design Project with Dr. David Allee at ASU — *September 2019 – May 2020*

- Developed a sound identification machine learning algorithm that utilizes a convolutional neural network (CNN) to analyze and categorize the spectrogram of different sound datasets
- Utilized a remote server to decrease wall clock time required to train the algorithm during the refinement process

Barrett Honors Thesis with Dr. Christ Richmond at ASU — *September 2019 – May 2020*

- Determined an estimation of the Adaptive Matched Filter (AMF) using the Chernoff bound
- Developed a MATLAB program to compare the AMF (well-known and exactly calculated) with the estimation under a variety of circumstances and conditions

WORK EXPERIENCES

Electrical Surety Analysis Intern for Sandia National Laboratories — *June 2020 – August 2020*

- Developed a COMSOL 2D axisymmetric Multiphysics simulation model to predict the direct effects of a lightning strike on various materials
- Improved model performance by performing mesh refinement and atmospheric independence studies

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WORK EXPERIENCE CONTINUED

Electromagnetic Effects Engineering Intern for The Boeing Company *May 2019 – August 2019*

- Developed a COMSOL 3D Multiphysics simulation model to predict the performance of an aircraft test configuration
- Verified resolutions to 10 manufacturing defects to ensure continued production
- Compiled information for the 777-9 aircraft electromagnetic effects documentation including information for designers and for certification documentation to demonstrate compliance with FAA regulation 25-581
- Developed a full-plane 3D finite element analysis model in MSC Patran to determine the impacts of a possible design change to lightning indirect effects on the 737-8 aircraft

Test Engineering Intern for Viasat, Inc. *May 2018 – May 2019*

- Developed the test hardware for validation of a fixed ~20GHz local oscillator module for a space broadband receiver
- Designed test software to automate the Device Under Test cycle for the module utilizing Iron Python
- Aided in hosting an educational outreach booth at the annual Chief Science Officers Summer Institute

Subject Area Tutor for ASU University Academic Success Programs *August 2017 – May 2020*

- Provided one-on-one and group tutoring in the subjects of Mathematics, Physics, and Chemistry
- Skilled in tutoring advanced mathematics including Calculus I, II, III, Differential Equations, and related coursework
- Improved customer service by applying student feedback and attending regular trainings

LEADERSHIP EXPERIENCE

High-Voltage Systems Lead at Sun Devil Motorsports – Formula Electric *August 2016 – May 2020*

- Organized a team to begin design on an electric powertrain for the Formula Electric competition
- Developed the high-voltage accumulator and tractive system for the 2020 Formula SAE Electric vehicle
- Worked alongside a team of 8 other engineering students in designing and analyzing electronic components to connect the 10+ subsystems of the 2018 Formula SAE car while adhering to the Formula SAE competition rules

Volunteer and Member at Girl Scouts of America *April 2003 – Present*

- Received the Gold Award for creating and implementing an instrument cleaning instructional program for former high school band and two middle school bands

AWARDS AND RECOGNITION

- National Science Foundation Graduate Research Fellowship — Fall 2022-Present
- J. and H. Hughes Electrical Engineering Fellowship at UM — Fall 2020-Summer 2021
- Fulton Schools of Engineering Dean's List — Fall 2016-Spring 2020
- New American University Scholar – ASU President's Award — Fall 2016-Spring 2020
- Texas Instruments Scholarship — Fall 2017-Spring 2020
- James F. Golder Memorial Scholarship — Fall 2019-Spring 2020
- Ford Motor Company Undergraduate Engineering Scholarship — Fall 2018-Spring 2019
- Tau Beta Pi Association Scholarship Forge No. 70 — Fall 2018-Spring 2019
- ASAP-METS Scholarship — Fall 2017-Spring 2019
- Solutions Grant, Scholarship — Fall 2016-Spring 2017
- AZ Cactus Pine Girl Scouts Scholarship — Spring 2017
- Girl Scout Gold Award — Fall 2016