

Richard McManus

Research Interest Advanced semiconductor devices | RF/THz silicon transistors | spacer and dielectric engineering | Monte-Carlo particle-interaction modeling (TOPAS/GEANT4) | radiation-sensing semiconductor systems | mixed-signal front-end technologies

Education

2024-Present	University of California, Berkeley PhD Electrical Engineering and Computer Science GPA: 4.0 Research Focus: Advanced Semiconductor Devices Curriculum Major: Solid-State Devices Curriculum Minor: Machine Learning
2020-2024	University of Notre Dame BS Electrical Engineering GPA: 3.944 Graduated Magna Cum Laude Concentrations: Semiconductors & Nanotechnology; Photonics

Honors and awards

May 2024	The James L. Massey Award For achievement in Electrical Engineering, recalling communication theory, undergraduate teaching, and the Binary Examination
May 2024	First Place Senior Design – University of Notre Dame EE Awarded to the top senior capstone project out of 10 competing teams based on technical innovation, execution, and presentation
November 2023	Tau Beta Pi National Engineering Honor Society
April 2023	IEEE-Eta Kappa Nu National Electrical & Computer Engineering Honor Society

Research experience

2024-Present	High-Speed Ultra-thin-body Silicon MOSFETs Using Air Spacers University of California, Berkeley Advisor: Dr. Sayeef Salahuddin <ul style="list-style-type: none">• Simulated device performance and process flow with TCAD• Fabricated test structures in the Berkeley Marvell Nanolab
2024-Present	Single Particle Radionuclide Detection for Continuous Monitoring of Theranostic Biodistribution University of California, Berkeley Advisor: Dr. Mekhail Anwar

- Simulated particle interaction dynamics and exploratory device structures with GEANT4
- Developed a novel setup for monoenergetic calibration from Compton scattering

2022-2024

Adiabatic Reversible Logic for Energy Efficient Computing

University of Notre Dame

Advisor: Dr. Greg Snider

- Designed process flow and masks for nanofabrication
- Fabricated AlN contour-mode resonators in the ND Nanofabrication Facility
- Developed PCBs for system integration

2023-2024

Single Electron Detection for Topological Quantum Circuits

University of Notre Dame

Advisor: Dr. Greg Snider

- Simulated Coulomb blockade diamonds to extract capacitance and conductance parameters of a fabricated single electron transistor

Teaching experience

2025-2026

Teaching Assistant – Integrated Circuit Devices

University of California, Berkeley

Lecturer: Dr. Asir Khan

- Developed course structure, including homework, exams, and final projects, in collaboration with an incoming faculty member

2024

Teaching Assistant – Fundamentals of Semiconductors

University of Notre Dame

Lecturer: Dr. Kai Ni

- Led weekly tutorial sessions with a cohort of ~30 students to review course material and example problems

2023

Teaching Assistant – Digital Integrated Circuits

University of Notre Dame

Lecturer: Dr. Matthew Morrison

- Conducted weekly office hours to assist students in developing an 8-bit MIPS using the Cadence Design Suite

Industry Experience

2023

Environmental Test Engineering Intern

The Boeing Company

St Louis, MO

- Led the performance testing of two large-scale chillers to simulate on-aircraft cooling
- Gained hands-on experience in a variety of labs: Airflow, Thermal, Vibration, Arc Heater, etc.

2020-2024

Co-founder & Chief Engineer

Mound Power, LLC

- Developed multi-axis force-measurement hardware and embedded electronics; led engineering across eight prototype generations
- Filed U.S. patent (pending) and deployed technology within professional baseball organizations

Publications

- Journal Publications** M. Istiaque Rahaman, **R. A. McManus**, D. J. Noronha, G. P. Szakmany, A. O. Orlov, and G. L. Snider, "Overcoming challenges in single electron charge detection of nanoscale dipoles," *Journal of Vacuum Science & Technology B*, vol. 42, no. 6, p. 063208, Dec. 2024, doi: 10.1116/6.0004052.
- Conference Publications** **R. A. McManus**, R. Lall, B. Rostami, C. Vadali, and M. Anwar, "Enabling Continuous Monitoring of ^{225}Ac -Based Targeted Alpha Therapy Biodistribution via Energy Calibration of a Wearable γ -Spectrometer," *International Journal of Radiation Oncology, Biology, Physics*, vol. 123, no. 1, p. S244, Sept. 2025, doi: 10.1016/j.ijrobp.2025.07.1382.
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Patents

- Patent Pending** **McManus, R.A.**, "MULTI-AXIS FORCE MEASUREMENT METHOD AND ASSEMBLY," Serial No.: 18/217,382, Filed: June 30, 2023
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Professional training

- 2024-2025 **Path to the Professoriate Berkeley Graduate Division**
A structured, year-long program to demystify the route to becoming an Assistant Professor
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Community Service/Outreach

- 2025-Present **Community Resources for Science**
Be a Scientist Mentor
- Guide 7th grade students through the scientific process over a six-week project cycle, helping them design and conduct experiments based on their own ideas
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Relevant Skills

TCAD (Synopsys Sentaurus), ADS, GEANT4/TOPAS, Python, PCB design (KiCad/Eagle), Verilog, nanofabrication (lithography, etching, deposition, metrology, etc.)