Richard A. McManus Jr.

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Education

University of Notre Dame **Class of 2024**

- **Major**: Electrical Engineering **Concentrations**: Semiconductors and Nanotechnology, Photonics
- Dean's List IEEE-HKN Tau Beta PI Sorin Scholar Grand Challenges Scholar Boeing Scholar
- Overall GPA: 3.923 Major GPA: 3.961

Experience

Co-founder, CEO, and Chief Engineer of Mound Power, LLC **2020 - Present**

- Organized and directed a team to design and manufacture a novel multi-axis force measuring device and mobile application to analyze human ground reaction forces
- Filed provisional and non-provisional utility patents: *Multi-Axis Force Measurement Method and Assembly*
- Spearheaded product development across 8 unique prototypes
- Validated and implemented by data scientists at the Chicago Cubs
- Generated over $35,000 in revenue and non-dilutive funding from multiple sources
- Selected to represent Notre Dame in the 2021 ACC Inventure Prize Competition
- Presented technology at 2022 American Baseball Coaches Association Convention
- Awarded "Best Undergraduate Venture" out of 150+ competing ventures in the 2022 McCloskey New Venture Competition by a panel of industry professionals

Teaching Assistant – Digital Integrated Circuits – CSE 30342 – Dr. Matthew Morrison **2023 - Present**

- Assisted students in developing and simulating an 8-Bit MIPS using Cadence
- Students begin by designing single MOSFETs and work up to a microprocessor including an ALU, controller, and 40-pin pad frame,

Environmental Test Engineering Intern – The Boeing Company **Summer 2023**

- Lead the performance testing of two large scale chillers to simulate on-aircraft cooling (customer requirements, planning, setup, data acquisition, analysis, etc.)
- Gained experience in a variety of labs: Airflow, Thermal, Vibration, Arc Heater, etc.

Activities and Class Projects

Adiabatic Reversible Logic Undergraduate Research– Dr. Greg Snider's Group **2021 - Present**

- Fabricated AlN piezoelectric MEMS resonators in Notre Dame's Nanofabrication Facility
- Designed and assembled multiple PCBs for microprocessor testing
- Developed a Python GUI to remotely synchronize and program two Zurich waveform generators using the Zurich LabOne Python API
- Assembled a novel test environment for thermal testing of adiabatic microprocessors
- Developed Verilog code to integrate a Virtex-7 VC707 FPGA with an adiabatic MIPS to write instructions, synchronize clock signals, and store results to memory

Integrated Circuit Fabrication – EE 40063 – Dr. Alan Seabaugh **2023 - Present**

- Completed a 2 μm gate-length CMOS process to fabricate MOSFETs, inverters, TLM test structures, ring oscillators, and 5000-transistor sound chips that play the Notre Dame Victory March
- Gained experience in photolithography, plasma ashing, reactive-ion etching, RCA cleaning, oxidation, implantation, plasma-enhanced and low-pressure chemical vapor deposition (PECVD and LPCVD), xenon difluoride etching, sputter deposition, step profiling, ellipsometry, probe station testing, etc.

Grand Challenges Scholar **2021 - Present**

- Accepted into highly selective research-oriented honors program that provides mentorship to researchers focused on engineering the tools of scientific discovery
- Integrated 5 core competencies into academic plan: Research, Interdisciplinary Coursework, Entrepreneurship, Global Experience, Community Engagement
- Attended the 2023 Device Research Conference in Santa Barbara, CA

Relevant Skills

- Autodesk Eagle, Cadence Virtuoso and Spectre, C/C++, Fusion 360, FDM 3D Printing, KiCad, LabOne, Matlab, PathWave Advanced Design System, Python, Solidworks, SLA 3D Printing, Verilog, Vivado

Relevant Courses

- Autonomous Mobile Robots (EE 40085), Control Systems (EE 40024), Electromagnetic Fields (EE 30348), Electronic and Optoelectronic Devices (EE 30357), Fundamentals of Semiconductors (EE 30347), IC Fabrication (EE 40063), Introduction to Quantum Mechanics (EE 60587), Logic Design (CSE 20221), Microelectronic Circuit Design (EE 30342), Optics and Photonics (EE 40468), Power Electronics (EE 30043), Signals and Systems (EE 30344), VLSI Circuit Design (CSE 40462)