Sebastian E. Zapata

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EDUCATION

Brigham Young University:

- *PhD, Electrical and Computer Engineering* – July 2026
- *BS, Electrical Engineering* – April 2021, GPA 3.7

Coursework: Power Systems, Feedback Control Strategies, Robotic Manipulators, Embedded Programming, Computer Vision and Self-driving Cars, Wireless Communications and Networking

SKILLS

- Power electronics, IoT and sensors, automation, robotics, battery design, and 3D modeling
- Coding: Python, C, C++, JavaScript, HTML, CSS, MATLAB, Java, R
- Tools: KiCAD, OpenCV, RTOS, MATLAB, AutoCAD Electric, Fusion360, LTSpice
- Languages: German (intermediate low), Spanish (native)

PATENTS & PUBLICATIONS

- Automated Flushing System for Microfluidic Devices. *U.S Provisional Patent #63/828,558, filed 2025*
- Methods and Design of a Tennis Ball Machine. *U.S. Provisional Patent #63/754,391, filed 2025*
- Mobile Application for a Tennis Ball Machine. *U.S. Provisional Patent #63/754, 491, filed 2025*
- Automation platform for microfluidic device post-processing. *Goenner, et.al, Nature - Scientific Reports 2025*
- Robotic system for NanoPOTS technology (single-cell proteomics). *Webber, et.al, ACS Journal 2022*

PERSONAL PROJECTS SELECTION *(comprehensive list available at www.sebastian-zapata.com)*

- Engineered a **100W solar power station** with MPPT controller, 12V $LiFePO_4$ battery, and 300W inverter
- Developed a **wireless tennis ball machine**, using BLDC motors, servos, sensors, LiPo batteries, and Wi-Fi
- Implemented a **LoRa radio system** and measured performance in terms of throughput and reliability
- Designed a **5-degrees-of-freedom robotic manipulator** with inverse kinematics and visualization
- Re-engineered the **battery pack design** and **wheel control software** of the BYU Mars Rover Team

ENGINEERING EXPERIENCE

Research Assistant, Electrical and Computer Engineering BYU – Provo, Utah (Sep 2021 – present)

- Assembled a microfluidic characterization station capable of precise pressure and flow control, real-time sensor monitoring, and automated experimentation. Supported PID flow control, custom scripting, and data capture for IV-style device characterization
- Built system to automate multi-hour post processing and validation stages of 3D-printed microfluidic devices, eliminating operator-induced errors and device failure

Embedded Software and Design Engineer, Tennis Drills LLC – Orem, Utah (Summers 2024, 2025)

- Designed C/C++ firmware for an ESP32 microcontroller to control and monitor BLDC motors, servo motors, LiPo battery levels, and a variety of sensors to build a custom tennis ball machine

Research Assistant, Chemistry and Biochemistry Department BYU – Provo, Utah (Jul 2020 – Aug 2021)

- Created an automated system for the nanoPOTS technology (single cell proteomics) using high precision motors (Zaber Technologies®), Xbox controller input, computer vision, and Python

LEADERSHIP & VOLUNTEERING

Electrical Team Leader, BYU Wind Energy Club – Provo, Utah (Nov 2020 – Apr 2021)

- Recruited, organized, and led a multidisciplinary team of 8 students to build a custom wind generator

Student Coach, MTC Cafeteria (BYU Dining) – Provo, Utah (May 2019 – Apr 2020)

- Individually coached 40+ supervisors on leadership skills and developed/delivered SOPs for 300+ student workers in a cafeteria with nearly 6,000 customers per day