Brair Tilboon Elberier

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Security Clearance: Active (secret)

Education

University of California, Los Angeles CA.
Doctor of Philosophy, Electrical and Computer Engineering *(GPA: 3.9)* **September 2025-June 2029**

- *Research* | Low power, autonomous, microrobot development – swarm algorithms, computer vision, optimal sensing

University of California, Los Angeles CA.
Master of Science, Electrical and Computer Engineering *(GPA: 3.9)* **September 2023-June 2025**

- *Coursework* | Neural Networks & Deep Learning, I-II Large Scale Data Mining and Algorithms, Computational Robotics, AI on Chip, Large Scale Social & Complex Networks

University of Washington, Seattle WA.
Bachelor of Science, Electrical and Computer Engineering *(Major GPA: 3.64)* **September 2017-June 2022**

- *Dual Concentration* | Embedded Computing Systems, Digital VLSI
- *Coursework* | Embedded Systems Design, Very Large-Scale Integrated Design I-II, Computer Architecture I-II, Data Structures Algorithms, Machine Learning, Systems Programming, Hardware/Software Interface, Design of Digital Circuits and Systems I-II, Devices and Circuits I-II, Linux Development, Continuous/Discrete Time Linear Systems

Research Experience

LEMUR Lab, University of California, Los Angeles. **September 2023 – present**
Graduate Research Assistant, (Advisor: Ankur Mehta)

- My research focuses on hardware/software development for low-power, small-scale, battery-free autonomous robots
- Developed control algorithms concentrated on state estimation (Kalman filtering) for applications in computer vision
- Designed hardware and communication algorithms for autonomous, battery-free robotic swarm navigation

MIT Lincoln Laboratory, Boston Ma. **June 2024-October 2025, June 2025-Present**
Graduate Research Assistant, (Advisor's: Stefan Wolpert & George Pantazis)

- National GEM Consortium Fellow: completed two research appointments and continued as a part-time researcher
- Built an end-to-end vision/control stack for real-time thermal detection and closed-loop autonomous UAV guidance
- Partnered with ModalAI to extend platform capabilities; transitioned system to ARL for upkeep and use within JSOC

Iyer Lab, University of Washington. **September 2021 – September 2022**
Undergraduate Research Assistant, (Advisor: Vikram Iyer)

- Designed embedded, battery free, wireless gliding sensor nodes, with an origami body triggered by wireless actuators
- Setup the embedded environment to program the onboard Nordic nRF52 through Arduino ide bootloader
- Wrote and tested embedded code for sensors and wireless data collection to implement low power/Bluetooth settings

Reality Lab, Paul G. Allen School of Computer Science. **December 2021 – September 2022**
Virtual Reality Engineer, Undergraduate Research Assistant (Advisor: Barbara Mones)

- Developed VR system to test humans' ability to interface with alternate species, specifically the Giant Pacific Octopus
- Collected image data of Giant Pacific Octopuses and used a physics algorithm to map human motion onto the model
- Utilized Unity's Real-time Development Platform to create an immersive experience to test the VR simulation

NASA, Seattle WA. **June 2022 – September 2022**
Embedded Systems Engineer, NASA Space Grant Recipient

- Received a NASA Space Grant to complete the communication network for the UW CubeSat team's SOC-I satellite
- Created a Hash-based Message Authentication Code (HMAC) algorithm, for message encryption and validation
- Setup the data packets and protocols for both up linking, and downlinking messages between satellite and subsystems

Publications

- **Elberier B.**, Hernandez M., and Mehta A. "Computer Vision Informed Parameter Estimation". *IEE CASE* 2025.
- Johnson K., Arroyos V., **Elberier T.**, Fuller S., Iyer V., and Gollakota S. "Autonomous Battery-free Origami Robots for Aerial Sensor Deployment". *Science Robotics* (2023).

Qualifications

Programming Language: Java, C, C++, C#, System Verilog, Python, Swift, SQL, HSpice, Bash, Assembly language
Engineering Platforms: Arduino, Cadence Virtuoso, RaspberryPi, ModelSim, Verilog, InVision, LTSpice, Unity, Git

Teaching Experience

University of California Los Angeles, ***Department of Electrical and Computer Engineering***

- Systems Design Capstone (ECE180DA/DW) | Capstone focused on system design planning, analysis, and validation

University of Washington, ***Paul G. Allen School of Computer Science***

- Design of Digital Circuits and Systems (CSE371) | Intermediate course on digital design and verification on FPGA's
- Introduction to Digital Design (CSE369) | Introductory course on logic design concepts, state machines, and FPGA's

University of Washington, ***Department of Electrical and Computer Engineering***

- Advanced Technical Communications (EE393) | Course on relevant industry technical communication skills
- The University Community (GENST199) | Led thirty engineering undergrad students in their transition to college

Seattle Public Schools, ***AVELA Course Instructor***

- Introductory Embedded Systems Teacher | Arduino, python, and circuitry for underrepresented high school students
- Intermediate Python Programming Teacher | Taught high school students python basics through coding fractals

Previous Industry Experience

Advanced Micro Devices (AMD), Austin TX. **September 2022-October 2023**

Silicon Design Engineer I

- Bridged silicon design and Simulation/BIOS/Firmware teams to support system-visible features on client products
- Developed programming references for internal and external customers throughout the product development cycle
- Coordinated updates with device verification and SOC teams to ensure feature alignment and validation

Dialog Semiconductor, Santa Clara CA. **June 2021 – October 2021**

Applications Engineer, Intern

- Designed digital circuitry to integrate system functions into a single custom circuit, for minimized power consumption
- Designed, tested, and documented 4-bit chainable binary counter using GPAK designer to customer specification
- Designed, tested, and documented multi-purpose chainable analog-to-digital converter to customer specifications

FishTail Design Automation, Portland OR. **June 2020-June 2021**

Software Development Engineer, Intern

- Developed an IOS phone application that stores and recommends new experiences and interests for users
- Utilized Google backend development service – Firebase, to store user data and access data from the cloud
- Implemented web-scraping to gather information from different online databases and utilize within app-interface

WMI Worldwide, Bellevue WA. **May 2019-October 2020**

Computer/Data Engineer, Co-op

- Managed the data and payments of Microsoft partners worldwide for Microsoft's M365 Partner Accelerator program
- Maintained the company's computer network and tasked with fixing any technological issues (hardware or software)
- Strength tested code to find potential weaknesses in software, and maintained GitHub repositories of code

Center for Information Assurance and Cybersecurity, University of Washington **January 2019 – June 2019**

Computer Engineer, Capstone Assistant

- Designed, developed, and tested 4 Wi-Fi enabled stair climbing robots to compete in robotic hacking competition
- Programed pulse width modulated motor controls in python compatible with raspberryPi multicontroller
- Designed consolidated and regulated power delivery system for electronics requiring various source voltages

Personal Projects

Haptic Touch VR Controller

- Created a basic form of a human exoskeleton using a RaspberryPi 4 in combination with an Arduino and motors
- Limits a user's movements in the real world based upon inputs from the virtual world

ARM CPU Design

- Designed logic for a pipelined 5-cycle CPU in SystemVerilog using ARM ISA targeted for an Altera FPGA
- Wrote unit-level test benches to verify the CPU throughout development using ModelSim waveform viewer

Arithmetic Logic Unit Physical Design

- Micron design contest winner for fastest five operation ALU schematic and layout design using Cadence Virtuoso
- Used HSPICE to simulate and optimize design, and DRC, LVS to verify design functionality

Committee Positions

Speaker, Electrical & Computer Engineering Graduate Orientation	**June 2025**
Curriculum Committee Representative, Department Electrical & Computer Engineering	**September 2021-June 2022**
Panelist, UW Scholar-Donor Recognition Luncheon	**September 2021**
Speaker, Electrical & Computer Engineering Undergraduate Orientation	**September 2021**
NACME Corporate Scholar, NACME	**December 2021**
Selection Committee Member, Teens in Public Service	**March 2020**

Awards, Grants, & Scholarships

National GEM Consortium Fellowship	**May 2024**
NASA Space Grant Recipient	**June 2022**
Boeing Emerging Leader Scholarship, UW College of Engineering	**August 2021**
Kenneth and Sylvia Steen Endowed Scholarship, Department Electrical & Computer Engineering	**August 2021**
Lawrence & Lucille Frey Endowed Scholarship, Department Electrical & Computer Engineering	**August 2021**
NACME Corporate Scholarship, NACME	**December 2021**
Arthur Burman Winter Endowed Scholarship, Department Electrical & Computer Engineering	**July 2020**
National Action Council for Minorities in Engineering Scholarship, College of Engineering	**June 2020, 2021**