# LUKE ROULEAU

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## EDUCATION

**University of Florida**, *Herbert Wertheim College of Engineering*, Gainesville, FL **May 2022**
**Bachelor of Science in Computer Engineering, Summa Cum Laude** GPA: 4.0/4.0

## SKILLS, & INTERESTS

**Skills**

**Programming Languages**: Assembly, C, C++, Python, JavaScript
**Deep Learning**: PyTorch & CUDA, Proficient in modern deep learning architectures, deep learning compilers (Apache TVM, TIDL), and deep learning hardware design
**System Programming**: Experienced in Linux system programming (multi-process, drivers)
**Signal Processing**: Specialized in radar signal processing
**GUI UX Design**: Skilled in user experience design for graphical user interfaces

**Interests**

Design of xNNs from Info Theory Principles, AI-enabled Applications, IoT / Edge Embedded Systems (Federated Learning), Entrepreneurship

## PROFESSIONAL EXPERIENCE

**Texas Instruments Inc., *Systems Engineer in the Machine Learning Lab,*** Dallas, TX **June 2023 – Present**

- **Developed Custom TVM Deep Learning Compiler:** Successfully developed a custom TVM compiler that translates PyTorch models into int8 quantized C code for a custom RISCV CPU + Accelerator. This involved composing custom Relay IR compiler passes to annotate sub-graphs intended for custom hardware, partitioning graphs according to annotations, planning memory for custom subgraphs, and implementing a custom "codegen" to emit code which calls handwritten accelerated kernels. This resulted in the successful execution of object detection (vision) and keyword detection (audio) networks compiled from PyTorch with the custom compiler upon receiving silicon in December.
- **Implemented Compiler Validation Framework**: Developed an automated testing and validation framework using Python and common PyTorch model libraries such as Torchvision, Torchaudio, TIMM, and HuggingFace Transformers. This framework verifies the custom TVM compiler against a diverse set of models and use cases, demonstrating proficiency in automated testing and model validation.
- **Studied Network Theory and Design under Dr. Arthur Redfern**: Under the mentorship and management of Dr. Arthur Redfern in the Machine Learning Lab, established a strong foundation in various neural network architectures including NN, CNN, RNN, and Transformers. Gained in-depth understanding of implementing powerful models on hardware, showcasing expertise in machine learning theory and application.

**Texas Instruments Inc., *Applications Engineer,*** Dallas, TX **Summer 2021, May 2022 – June 2023**

- **mmWave Sensing Estimator**: Developed the mmWave Sensing Estimator, a radar configuration and tuning GUI with over 90k visits, to facilitate the generation and modification of configuration parameters for mmWave Radar Devices.
- **Addressed Customer Pain-Point with SPI Package**: Independently developed and delivered a package to export raw radar data over SPI from mmWave devices in response to a shortage of capture cards, effectively addressing a major customer pain-point.
- **Refined Technical Communication Skills**: Refined technical and inter-business communication skills by actively participating in the Engineer-to-Engineer (E2E) Forum, earning the "Prodigy" designation as an important contributor.

**University of Florida, *Senior Design Project,*** Gainesville, FL **November 2021 – May 2022**

- **Developed Autonomous Robot**: Developed an autonomous robot equipped with a 6DOF arm, showcasing expertise in robotics and autonomous systems. Utilized advanced technologies such as the *Nvidia Jetson AI platform, jetson-inference*, *Intel RealSense, and ROS Melodic.*
- **Achieved 3rd Place in IEEE Competition**: Placed 3rd out of 40+ universities at the *IEEE Southeast Con Hardware Competition 2022* with only a team of two, demonstrating competitive skills and teamwork.

**Warren B. Nelms Cybersecurity Institute, *Undergraduate Researcher,*** Gainesville, FL **May 2019 – May 2020**

- **Fellowship-Funded Research:** Conducted research funded by the prestigious *Research Experience for Undergraduates Fellowship*, demonstrating recognition and support for his work.
- **Developed NQR Techniques**: Worked under the guidance of Dr. Swarup Bhunia to develop Nuclear Quadruple Resonance (NQR) invisible tagging techniques, showcasing his skills in advanced scientific research and development.
- **Applied Machine Learning for Food Quality Validation:** Utilized Support Vector Machine Modeling in MATLAB to validate the chemical composition of foods, supplements, and medicines, highlighting his ability to apply machine learning techniques to real-world problems.

## LEADERSHIP AND INVOLVEMENT

**RoboTIcs Volunteer, Dallas TX** **June 2023 – Present**

***Volunteer* –** Expresses desire to teach empowering skills to younger generations through the TI Robotics mentorship program

**Theta Tau Professional Engineering Organization,** Gainesville FL **January 2020 – August 2022**

***Pledge Class President* –** Elected leader of Theta Gamma Pledge Class of the Zeta Gamma (UF) Chapter

**IEEE Design Team,** Gainesville FL **August 2021 – May 2022**

***Software Team Lead* –** Lead developer overseeing robotic software development for UF IEEE Hardware Design Team

**Tone Def A Cappella,** Gainesville FL **January 2021 – December 2021**

***President* –** Responsible for the selection and composition of pieces for the service-based student a cappella group

## AWARDS

**University of Florida Dean's List** **August 2018 – Present**

**Florida Bright Future Scholarship** **June 2018 – Present**

**National Science Foundation *Research Experience for Undergraduates* Fellowship Grant** **June 2019 – March 2020**