

# Jacob M. Delgado-López

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## Education

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- **University of Puerto Rico Mayagüez (UPRM)** **GPA: 3.97**
  - Bachelor's of Computer Science and Engineering Aug 2019 – Present

## Research Experience

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- **UPRM - Edge Computing Group** **Jan'24 - Present**
  - Advisor: Dr. Wilfredo Lugo Beauchamp
  - Developed a real-time diagnosis tool for MonkeyPox that was deployed on a web application hosted on a Jetson Nano
  - Currently developing a computer vision based diagnosis tool for melanoma that will be deployed on an Arduino Nano
- **Stanford University - LINXS Summer Research Program** **Jun'23 - Aug'23**
  - Advisor: Dr. Jeannette Bohg
  - Established a new baseline leveraging part-wise segmentation and Contact-GraspNet (CGN) 6-DoF grasp generation
  - The baseline showed clear robustness when proposing grasps in comparison to prior works in progress such as AO-Grasp
- **Carnegie Mellon University - Robotics Institute Summer Scholars (RISS)** **May'22 - Aug'22**
  - Advisor: Dr. Zackory Erickson
  - Proposed a novel method for human-robot interaction involving capacitive sensors and Sim2Real transfer for assistive tasks
  - Provided insight on achieving Sim2Real transfer by optimizing parameters in Assistive Gym's simulation framework
- **Harvard University - SEAS Research Experience for Undergraduates (REU)** **Jun'21 - Aug'21**
  - Advisor: Dr. Jules Gardener
  - Aided in developing a pan-sharpening method for Hyperspectral Electron Energy Loss Spectroscopy (EELS) data processing
- **Cornell University - LSAMP Summer REU** **Jun'20 – Aug'20**
  - Advisor: Dr. Adrian Sampson
  - Contributed in the development and implementation of a novel synthesis-aided compiler for digital signal processors
- **National Science Foundation I-CORPS Puerto Rico** **May'20 – Jun'20**
  - Worked in a 5-week intensive bootcamp for aspiring entrepreneurs looking to establish a science-based business
  - Produced positive results on the desire and viability for a zoological sample processing laboratory in Puerto Rico
- **Massachusetts Institute of Technology (MIT) - LLRISE** **Jul'18 – Jul'18**
  - Built a small-range radar system which produced high accuracy when determining the distance of various objects
  - Collected data through field testing and presented my findings to the scientists and engineers at MIT's Lincoln Laboratory

## Awards & Honors

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- **Computer Science and Engineering Honor Award - UPRM (Sep'23):** Awarded in recognition of the dedication, responsibility and high performance demonstrated as an undergraduate student in Computer Science and Engineering

## Publications

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- **Jacob M Delgado-López, Ricardo A Morell-Rodriguez, Sebastián O Espinosa-Del Rosario, Wilfredo E Lugo-Beauchamp.** **Computer Vision for Real-Time MonkeyPox Diagnosis on Embedded Systems:** Submitted to the International Symposium on Intelligent Computing and Networking 2025 Conference
- **Jacob M Delgado-López, Juan D Guadalupe-Rosado, Andrea P Seda-Hernandez, Miguel Giboyeaux-Camilo, Wilfredo E Lugo-Beauchamp.** **Model Compression Engine for Wearable Devices Skin Cancer Diagnosis:** Submitted to the International Symposium on Intelligent Computing and Networking 2025 Conference
- **Jacob M Delgado-López, Yufei Wang, Zackory Erickson.** **Sim2Real Transfer for Capacitive Sensors Utilizing Assistive Gym's Capacitive Sensing Simulation Framework:** Published in the RISS Working Papers Journal 2022

## Recent Projects

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- **Model Compression Engine for Wearable Devices Skin Cancer Diagnosis (Aug'24 - Present):** AI-powered healthcare solutions can provide rapid and reliable diagnoses in places lacking healthcare infrastructure. This work seeks to illustrate the viability of AI deployment in biomedical applications where computational resources are limited. The focus is on creating a real-time skin cancer diagnostic tool for deployment on the Raspberry Pi and Arduino Nano. The initial model obtained an F1-Score of 85% and current experiments involve utilizing LiteRT and Apache TVM for compression
- **Computer Vision for Real-Time MonkeyPox Diagnosis On Embedded Systems (Aug'24 - Present):** Embedded systems and model compression techniques can make AI tools more accessible in resource-constrained environments such as rural areas and disaster-prone regions. This project involved creating and deploying a diagnosis tool for MonkeyPox on an NVIDIA Jetson Nano using the TensorRT framework. The baseline model obtained a 94% F1-Score pre-compression and post-compression for FP32, FP16, and INT8 while significantly reducing the power consumption by a factor of 2
- **Articulated Object Grasp Generation Utilizing Part-Wise Segmentation (Jun'23 - Aug'23):** For robots to interact well in human environments, they must have the capability to manipulate articulated objects. My research gauged the effectiveness of utilizing Contact-GraspNet (CGN) grasp generation and partwise segmentation techniques for generating good grasps. This baseline would help strengthen the conclusions of my lab's AO-Grasp paper submission. The baseline demonstrated a high success rate of approximately 80% when determining good grasps on everyday household objects
- **Sim2Real Transfer for Capacitive Sensors Utilizing Assistive Gym's Capacitive Sensing Simulation Framework (Aug'22 - Nov'22):** This project sought to address safety concerns related to human-robot interaction by leveraging a novel method involving capacitive sensors and exploring the feasibility of Sim2Real transfer. I designed and manufactured a tool with built-in capacitive sensors to collect data. In tandem, I utilized the Assistive Gym capacitive sensing simulation framework to gather data in simulation as the basis for Sim2Real transfer. My findings gave insights into efficient Sim2Real transfer by optimizing simulation parameters like the number of electrode nodes and the permittivity

## Teaching & Mentorship

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- **Research Mentor - UPRM** **Aug'24 – Present**
  - I mentor five undergraduate students by developing their research skills technical writing and oral communication.
- **Teaching Assistant (TA) - UPRM** **Aug'22 – May'24**
  - My job was to teach, hold office hours, grade papers, and give out various assignments like projects, tests, labs, and quizzes
- **Tutor in STEM courses - UPRM** **Jul'20 – May'24**
  - I offered tutoring on several topics such as Calculus (I, II, III), Physics (I, II), Engineering, and Computer Science

## Talks

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- **REU Information Session - UPRM (Oct'23 and Oct'24):** Highlighted the importance and benefits of REU programs for students interested in conducting research, as well as provided guidance on finding, applying, and excelling in them
- **What is Graduate School, and is it right for you? - UPRM (Oct'24):** Explored the intricacies of graduate school and the reasons to consider pursuing an advanced degree as an undergraduate student based on career aspirations
- **How do you make a strong application? - UPRM (Oct'24):** Discussed the deliverables expected for graduate school and industry positions, as well as provided advice on creating solid applications tailored to the student's career goals
- **LINXS Scholar Alumni Workshop Speaker Event - Stanford (Aug'24):** Invited to discuss my experience in the LINXS REU program with the 2024 summer cohort and offered suggestions on navigating their research and networking

## Relevant Coursework and Skills

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- **Coursework:** Artificial Intelligence | Machine Learning | Computer Vision | TinyML | High Performance Computing | Database Systems | Statistics | Differential equations and Lineal Algebra | Computer Architecture | Computer Networks
- **Technical Skills:** Python | Pytorch | Tensorflow | C/C++ | Java | Arduino | SQL | Racket | Javascript | Git | Ms Excel