JUAN RODOLFO ALVAREZ-PADILLA

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EDUCATION

Carnegie Mellon University | Pittsburgh, United States *Aug 2022 - Dec 2027*
PhD in Electrical and Computer Engineering

- Research in motion prediction, planning and controls for autonomous driving and agile robotics
  - Current Projects: (1) Sampling-based control for adaptive locomotion in quadrupeds and (2) Trajectory prediction in construction zones
- Courses: Optimal Control and Reinforcement Learning, Planning for Robotics, Advanced Intro to Machine Learning, Learning for Robotics

Durham University | Durham, United Kingdom *Oct 2016 - May 2018*
Master of Science by Research - Engineering

- Thesis: **Secondary-Side Control in Dynamic Wireless Power Transfer Systems for Double-Sided Inductor-Capacitor-Capacitor and Series-Series Compensation Topologies**

Universidad de Guadalajara | Guadalajara, Mexico *Aug 2011 - Jul 2015*
Bachelor of Science in Communications and Electronics Engineering

- concentration in Control Systems Engineering and graduated with honors (Summa Cum Laude)| GPA 97/100

WORK EXPERIENCE

Gesta Labs Industry 4.0 Innovation Studio | Guadalajara, Mexico
CTO *Feb 2022 - Aug 2022*

- Led the development of Computer Vision Projects focused on Manufacturing applications and Smart Cities in Mexico, the USA and Canada.
- Designed development policies and good practices for the development team.

Head of Computer Vision *Sep 2020 - Jan 2022*

- Developed feasibility analysis of Computer Vision projects.
- Designed business proposals.
- Trained state-of-the-art deep neural networks for classification, object detection, and semantic segmentation tasks.
- Deployed Deep Learning models on the edge and the cloud.
- Worked on the following projects:
  - *Quality Inspection in Automotive Industry*
    * Designed a geometric algorithm to measure the deviation of joint towers of a cylinder head of an engine by using object detection and semantic segmentation deep learning models.
    * Trained a YOLOv4 model to detect the towers from the image of a cylinder head of an engine with a map of 0.94.
    * Trained a U-Net model to segment the base and the top of the tower with a mean IoU of 0.91.
    * Performed a statistical analysis to find deviation thresholds of the towers.

      – *Wildlife Damage Calculation on crops in Agricultural Insurance Industry*
* Trained a U-Net model to segment wildlife crop damage from satellite images of crop fields.
* Developed an algorithm to calculate crop damage due to wildlife from the output of a segmentation model and geospatial information from a satellite image.

Bosch Mexico | Guadalajara, Mexico

AI Engineer   *Jan 2019 - Sep 2020*

- Developed solutions for industry related problems and new products at the Innovation Department of Bosch Mexico. Worked on the following projects:

  - *Indoor Localization in Logistics Industry*
    * Designed the localization algorithm of a Real-Time Localization System (RTLS) based on Ultra-Wide-Band signals by using a Kalman filter.
  - *Stamping Monitoring in Smart Manufacturing Industry*
    * Designed an anomaly detection algorithm using an autoencoder neural network and data of the typical performance of a machine for a stamping monitoring device entirely designed in Mexico.
  - *AI for managers in Human Resources Department*
    * Designed a course for the Career Development Platform of Bosch Guadalajara, which aimed to teach the managers and non-AI related employees what is AI at a high level and what they can do and not do with AI.
    * Created content material and evaluations for the course.

TEACHING EXPERIENCE

NVIDIA Deep Learning Institute | Guadalajara, Mexico

Certified Instructor   *Jul 2021 - Present*
- Instruct the course of Fundamentals of Deep Learning for free to students, academics and administrative leaders in Latin America as part of the NVIDIA University Ambassador Program.

Universidad de Guadalajara | Guadalajara, Mexico

Associate Lecturer in Control Systems Engineering   *Jan 2018 - Jul 2022*
- Instructed two courses, Classical control and Modern Control. Classical control includes linear systems modeling with transfer functions, time and steady-state response analysis, and controller design techniques. Modern control covers linear systems modeling with state-space representation, controllers and observers design, and a controller implementation as a capstone project.

Subject Lecturer in Leadership   *Jan 2018 - Jul 2018*
- Instructed a Leadership course to Mechanical Engineering and Industrial Engineering students. The goal of the course was to teach students the meaning of leadership, kinds of leadership, strategies to solve conflicts and work in teams.

Subject Lecturer in Mathematical Methods II Lab   *Jan 2016 - Jul 2016*
- Taught engineering students how differential equations are applied in real-world use cases.

Student General Counselor   *Nov 2014 - Sep 2015*
- Elected as one of the three student counselors of the Engineering campus. The University General Counsel of the Universidad de Guadalajara is the very highest authority of the university where administrative, academic and student leaders take decisions and set the direction of the university.
- Evaluated undergraduate and postgraduate programs at the Education Commission of the University General Counsel.

Durham University | Durham, United Kingdom

Teaching Assistant   *Dec 2016 - Feb 2017*

- Worked on the control system modeling Lab as a demonstrator for MEng and BEng students at the Engineering and Computer Science School during four sessions of 4 hours.

RESEARCH EXPERIENCE

Guadalajara City Science Group | Guadalajara, Mexico
Research Fellow *Jun 2021 - Present*
- Design Multi-Agent simulations for mobility indicators. The aim of the **CS Guadalajara Lab**, which is part of the MIT City Science group network, is to research the informal settlement problem of Latin American countries and support local communities to address education, mobility and infrastructure issues.

Durham Energy Institute | Durham, United Kingdom
Research Fellow *Oct 2016 - Dec 2017*
- Conducted research on a control strategy to track the maximum power efficiency level in a dynamic wireless power system for roadway-powered electric vehicles under the supervision of **Dr. Hongjian Sun**.

Mobile Robots Lab at Universidad de Guadalajara | Guadalajara, Mexico
Research Fellow *Oct 2011 - Jul 2015*
- Led the student revision team of the book ***Fundamentos de Robótica y Mecatrónica con Matlab & Simulink*** by **Dr. Marco Perez-Cisneros**.
- Worked on the Robot Soccer team in the hardware and localization groups.

HONORS, AWARDS & SCHOLARSHIPS

- Carnegie Institute of Technology Fellowship 2022, Carnegie Mellon University
- Fulbright-García Robles Scholarship 2021, US-Mexico Commission for Educational and Cultural Exchange
- Best Lecturer Award, Electronics Undergraduate 2020 Cohort of Universidad de Guadalajara
- SENER Sustainability Scholarship 2016, Mexican National Council for Science and Technology
- Performance Excellence Award 2016, National Center of Higher Education Evaluation from Mexico
- Outstanding Student Recognition 2015, Universidad de Guadalajara
- Research Motivation Fellowship for Honors Students 2013, Universidad de Guadalajara

PROFESSIONAL DEVELOPMENT

- Deeptech Bootcamp 2019 at MIT, Cambridge, USA (Acceptance rate of 9%)
- Shaping Horizons 2019 Summit at University of Cambridge, Cambridge, UK
- Innovation in Education and Pedagogic Transformation Workshop from MIT and Harvard University at Guadalajara, Mexico
- Innovation and Entrepreneurship Seminar from Harvard T.H. Chan of Public Health at Guadalajara, Mexico
- Leadership and Innovation in Engineering Education Seminar from MIT, Harvard University, Olin College, Tufts University and Northeastern University at Boston, USA

LEADERSHIP & EXTRA-CURRICULAR

- Co-organized "XXXI International Conference and XVII National Conference of Informatics and Computer Science ANIEI-CUCEI 2018" - a national conference of the informatics society of Mexico, Guadalajara, Mexico.

- Co-organized "XV Symposium of Mexican Studies and Students in the UK" in 2017 - an international symposium organized by the Student Mexican Society of the United Kingdom, Durham, UK.
- Elected Secretary of the Durham University Mexican Society (DUMexSoc) 2016-2017.
- Co-organized "DIVECFEST 2014" - a conference of the Electronics and Computer Science School of the University of Guadalajara, Guadalajara, Mexico.
- Elected Student Member of the Education Commission at Universidad de Guadalajara 2014-2015.
- Elected General Student Counselor at Universidad de Guadalajara 2014-2015.
- Elected President of the student society of the Electronics and Computer Science School at Universidad de Guadalajara 2013-2014.

TECHNICAL SKILLS

Programming Languages
• Python • C++ • ANSI C • Matlab • Bash

Software Development Tools
• Git • Docker • Flask

Frameworks and Libraries
• ROS • Tensorflow • Pytorch • MXNet • OpenCV • NVIDIA Deepstream • NVIDIA TensorRT • NVIDIA Triton Server • Intel OpenVINO

LANGUAGES

- Spanish: Native Speaker
- English: TOEFL IBT/102
- French: TCF/B1
- German: Goethe Zertifikat/A2

PROGRAMMING PROJECTS

Personal projects can be found at **https://github.com/jrapudg**.