Alan Preciado Grijalva

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EDUCATION

University of Applied Sciences Bonn-Rhein-Sieg — **Bonn, Germany**
Master of Science in Autonomous Systems — Apr 2019 - Dec 2021

- **Cumulative GPA:** 1.7 / 4.0 (1.0 highest grade)
- **Relevant Coursework:** Artificial Intelligence, Machine Learning, Neural Networks, Deep Learning, Natural Language Processing, Mathematics for Robotics and Control, Robot Perception
- **Thesis:** Self-supervised Learning for Sonar Images: Enhancing Multimodal Perception for Underwater Applications

Autonomous University of Baja California — **Baja California, Mexico**
Honors Bachelor of Science in Physics — Feb 2013 - Dec 2017

- **Cumulative GPA:** 94.45/ 100.0 (100.0 highest grade)
- **Thesis:** Microstructures for a Scalable Multi-layer Ion Trap for Quantum Information Processing

University of Göttingen — **Gottingen, Germany**
Student Exchange (Bachelor of Science in Physics) — Aug 2016 - Aug 2017

- **Cumulative GPA:** 1.7 / 4.0 (1.0 highest grade)
- **Relevant Coursework:** Biophysics, Statistical Mechanics, Soft-matter, Machine Learning, Compute
- **Scholarships:** ALAS Foundation, UABC Foundation, DAAD (13,000$ awarded for top 4% of program)

PROFESSIONAL EXPERIENCE

Epirus Inc. — **Torrance, California**
Machine Learning Engineer (current) — May 2022 - Present

- **Project:** Modeling generalizable neural networks for RF power amplifiers (PA) with applications to digital pre-distortion (DPD), Digital Twin surrogates and RF chain simulations
- **Contribution:** Designed, implemented and trained neural networks on real-life IQ waveforms (ANNs, CNNs, RNNs, Volterra series, Short-time Fourier Transforms (STFTS), ComplexRNNs)
- **Contribution:** Built optimized data pre-processing and training pipelines in TensorFlow/AWS (multi-GPU training, parallel data processing (terabytes of data))
- **Contribution:** Built scalable cloud infrastructure for model training and deployment (Docker, AWS ECR, AWS SageMaker, Weights & Biases, Matlab Deep Learning Toolbox)
- **Impact:** Targeting low-power, low-memory and microsecond latency neural networks for deployment on FPGAs
- Mentored interns during summer, actively interviewing candidates on technical areas and attending conferences

Infovision Inc. — **Dallas, Texas**
Computer Vision Engineer (4 months) — Feb 2022 - May 2022

- **Contribution:** Implemented pose estimation algorithms (OpenPose, PifPaf) in Nvidia Jetson Xavier devices for real-time multi-person pose estimation
- **Contribution:** Implemented image segmentation models (Mask R-CNN, PointRend) on real-life phone screen datasets to estimate amount of surface damage
- **Tools:** Pytorch, TensorRT, Detectron2, OpenCV

German Research Center for Artificial Intelligence (DFKI) — **Bremen, Germany**
Machine Learning Researcher (1 year, 4 months) — Oct 2020 - Feb 2022

- **Project:** Improve the perception capacities of underwater systems using deep learning and multimodal approaches
- **Contribution:** Implemented self-supervised learning algorithms in tensorflow for underwater sonar image classification, and image translation algorithms for image enhancement
- **Contribution:** Creation of a new underwater image dataset, implemented ROS nodes for data logging (camera-sonar), post-processing hundreds of gigabytes of data
- **Impact:** Project will benefit from created dataset, pre-trained models, published poster (ICCV) and paper (CVPR)
- **Tools:** Python, Tensorflow, OpenCV, ROS, Scikit-learn, Keras

Fraunhofer Institute for Algorithms and Scientific Computing (SCAI) — **Bonn, Germany**
Machine Learning Researcher (1 year, 7 months) — Aug 2019 - Mar 2021

- **Project:** Detect anomalies due to ice accumulation in wind turbine time-series, perform high-quality reconstruction of 3D CFD turbulence data
- **Contribution:** Performed unsupervised anomaly detection of time series using generative models (Variational Autoencoders). Achieved 96 % classification accuracy on custom wind turbine simulation time series data
- **Contribution:** Implemented Variational Autoencoders on 2D and 3D turbulent datafor high-quality reconstruction
- **Impact:** Provided first insights into wind turbine data interpretability, results were presented to partner company
- **Tools:** Python, Pytorch, Torchvision, Scikit-learn, Time Series Analysis

SKILLS

- **Programming / Frameworks:** Python, C# , Matlab, Pytorch, Tensorflow2, Keras, ROS, Flask, CUDA

- **ML / CV Libraries:** OpenCV, Scikit-learn, Pandas, Numpy, Seaborn, TensorRT, AWS (S3, ECR, RDS, SageMaker)
- **Other Technologies:** Git, Linux, LateX, Docker, Nvidia Jetson
- **Languages:** Spanish (native), English (Toefl IBT 106), German (B2.2)

PUBLICATIONS

- **Alan Preciado-Grijalva**, Bilal Wehbe, Miguel Bande Firvida, Matias Valdenegro-Toro. *Self-supervised Learning for Sonar Image Classification*. **CVPR** (LatinX in AI Workshop), April 2022.

- **Alan Preciado-Grijalva.** *Self-supervised Learning for Sonar Images: Enhancing Multimodal Perception for Underwater Applications.* Bonn-Rhein-Sieg University of Applied Sciences, **Master Thesis Report**, December 2021.

- **Alan Preciado-Grijalva**, Rodrigo Iza-Teran. *Anomaly Detection of Wind Turbine Time Series using Variational Recurrent Autoencoders*. **arXiv**, December 2021.

- Venkata Santosh Muthireddy, **Alan Preciado-Grijalva** (Equal Contribution). *Evaluation of Deep Neural Network Domain Adaptation Techniques for Image Recognition*. **arXiv**, October 2021.

- Matias Valdenegro-Toro, **Alan Preciado-Grijalva**, Bilal Wehbe. *Pre-trained Models for Sonar Images*. Global **OCEANS**, August 2021.

- Ramon F. Brena, Evelyn Zuvirie, **Alan Preciado**, Aristh Valdiviezo, Miguel Gonzalez-Mendoza Carlos, Zozaya-Gorostiza. *Automated evaluation of foreign language speaking performance with machine learning*. International Journal on Interactive Design and Manufacturing (**IJIDeM**), March 2021.

- **Alan Preciado-Grijalva**. *Generative Models for the Analysis of Dynamical Systems with Applications*. Bonn-Rhein-Sieg University of Applied Sciences, **Research and Development Report**, October 2020.

- A. Bautista-Salvador, H. Hahn, G. Zarantonello, **A. Preciado-Grijalva** , J. Morgner, M. Wahnschaffe, C. Ospelkaus. *Multilayer ion trap technology for scalable quantum computing and quantum simulation*. **New Journal of Physics**, March 2019.

- **Alan Preciado-Grijalva**, Ramon Brena. *Speaker fluency level classification using machine learning techniques*. **arXiv**, August 2018.

INTERNSHIPS

UnitedHealth Group (UHG) — **Cypress, California**
Technical Consultant (6 months) — Oct 2018 - Mar 2019

- **Contributions:** Developed tools using relational databases (SQL and Microsoft Access) to automate the workflow for the creation of contracts. This reduced the time taken to generate contracts significantly

Monterrey Institute of Technology — **Monterrey, Mexico**
Machine Learning Intern (5 months) — May 2018 - Sep 2018

- **Contributions:** Implemented pipelines to train machine learning models for classification of audio segments from human conversations. Tools used: Keras, Scikit-learn, MFCC Spectrograms. Presented poster at the International Meeting of Artificial Intelligence and its Applications (RIIAA)

Softtek — **Ensenada, Mexico**
Junior Software Engineer (4 months) — Jan 2018 - Apr 2018

- **Contributions:** Designed a WebApp using .NET technologies with an emphasis on entity framework. Tools used: C # , SQL, CSS

National Metrology Institute of Germany (PTB) — **Brunswick, Germany**
Physics Researcher (7 months) — Mar 2017 - Sep 2017

- **Project:** Build and characterize state-of-the art micro semiconductors (ion traps) for quantum computing
- **Contributions:** Worked in ultra clear room systems doing gold layer deposition, sputtering, performed ion trap characterization via high resolution microscopy and electrical breakdowns
- **Impact:** Results helped my group understand better the limits and operating conditions of multi-layered ion traps, conference poster presentation, paper published in journal

Joint Quantum Institute (JQI) — **Maryland, USA**
Physics Research Intern (4 months) — June 2015 - Sep 2015

- Built an optical switch using tapered optical nanofibers to be able to manipulate the transmission intensity of a 1064 nm laser. Presented poster results at the Quantum Information Division (DICU) annual meeting

SELECTED PROJECTS

- Image Captioning with Attention: Deep networks with attention for image captioning using Tensorflow. Jun-Jul 2020
- Deep Learning for Domain Adaptation (DA): Benchmarking SOTA DA neural networks with Pytorch. Feb-Apr 2020
- Rosbag Analyzer: Visualize Rosbag topics as an interactive web timeline. Oct 2019 - Jan 2020
- Environmental Sound Classification: Benchmarking CNNs for audio event classification with Keras. May-Aug 2018