BELÉN MARTÍN URCELAY

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EDUCATION

Georgia Institute of Technology (GT)   *Atlanta, U.S.A.*
Ph.D. Computer Engineering   August 2022 - August 2026
    - Advisors: Prof. Christopher Rozell and Prof. Matthieu Bloch
    - Topic: Efficiently teaching machine learning algorithms
    - Research Visit: Collaborated with Prof. Andreas Krause at ETH Zurich   *Fall 2023*
M.Sc. Electrical and Computer Engineering   August 2020 - August 2022
    - GPA: 4.0/4.0
    - Specialization: Signal Processing
    - Minor: Industrial and Systems Engineering (ISyE)
    - Relevant Coursework: Online Decision Making in ML, Statistical Signal Processing, Convex Optimization

Universidad de Navarra (UNAV)   *San Sebastián, Spain*
M.Sc. Telecommunications Engineering   January 2019 - July 2020
    - Grade: 9.13/10
    - Master Thesis at the University of Sheffield with Prof. Iñaki Esnaola   *Spring 2020*
B.Sc. Telecommunication Systems Engineering   August 2014 - July 2018
    - Grade: 8.93/10
    - Exchange semester at the University of Hong Kong. GPA: 3.94/4   *Fall 2017*

RESEARCH EXPERIENCE

Graduate Research Assistant   September 2020 - Present
Advisors: Prof. Christopher Rozell and Prof. Matthieu Bloch   *Georgia Institute of Technology, U.S.A.*

· Conducted research on machine teaching to minimize data requirements for training machine learning algorithms.
· Designed, implemented and analyzed machine teaching algorithms.
· Demonstrated theoretically and empirically exponential gains in training speed compared to randomly selecting examples, even when the initialization conditions are unknown.

Guest Graduate Researcher   August 2023 - December 2023
Advisors: Prof. Andreas Krause   *Eidgenössische Technische Hochschule (ETH), Switzerland*

· Conducted research on Reinforcement Learning with Human Feedback (RLHF).
· We looked into ways for Large Language Models (LLM) to interpret natural language into actionable reward functions for agents to effectively optimize their performance.

Master Thesis   February 2020 - July 2020
Advisors: Prof. Iñaki Esnaola   *University of Sheffield, United Kingdom*

· Developed sensor placement guidelines that guarantee robustness in the information collected in a smart city environment.
· Accurately estimated missing entries employing a 'matrix completion' technique: The Singular Value Thresholding (SVT) algorithm. This led to a 7-12% error reduction for recovered entries.
· Thesis awarded distinction of Excellence by Universidad de Navarra.

Research Assistant   September 2018 - December 2018
Advisor: Dr. Andreas Niedermeier   *Fraunhofer IIS, Erlangen, Germany*

· Created a detector of transient signals for audio compression with Machine Learning (ML). A computationally less expensive way than the state-of-the-art algorithm the department was employing.
· Designed, implemented and analyzed Deep Neural Networks (DNN) in Python with TensorFlow.

Bachelor Thesis
Advisor: Prof. Ainhoa Rezola

January 2018 - July 2018
Ceit - IK4, Spain

· Conducted research on temperature dependence of frequency-selective IQ imbalance in Ultra-Wide-Band multi-Gbps transmitters for point-to-point communications.
· Programmed an encoder to compensate for temperature drifts in the antenna to avoid system degradation.
· Thesis awarded distinction of Excellence by Universidad de Navarra.
· Contributed to a paper on IEEE Transactions on Microwave Theory and Techniques.

Undergraduate Research Assistant
Advisor: Prof. Leticia Zamora

June 2016 - July 2016
Universidad de Navarra, Spain

· Contributed to a monitoring system using wearable sensors to detect and alert caregivers of unusual behavior in elderly patients, such as lack of movement or falls.
· Processed the data gathered by the accelerometers to detect falls.

TEACHING EXPERIENCE

Teaching Fellow
Georgia Institute of Technology

· ECE 3077 - Introduction to Probability and Statistics for ECE   August 2024 - December 2024
    · Lectured to 70 students.
    · Developed course materials:
       · A module on linear regression, logistic regression, and neural networks.
       · Exams and homework problems designed to reinforce key concepts.
    · Led interactive problem-solving sessions one hour per week, helping students work through quiz questions in small groups

Graduate Teaching Assistant
Georgia Institute of Technology

· ECE2020 - Digital System Design   May 2021 - August 2021
    · Conducted office hours four hours per week.
    · Independently graded assignments for a class of 37 students, providing detailed feedback to foster learning.
· Opportunity Research Scholars (ORS) Program   August 2020 - May 2021
    · Managed undergraduate research groups effectively.
    · Collaborated with students on fellowship applications and conference proposals.

Undergraduate Teaching Assistant
Universidad de Navarra

· Microcontrollers and Microprocessors   January 2018 - May 2018
    · Facilitated lab sessions twice a week.
    · Explained Assembly language to 15 Junior Engineering students.
· Calculus and Algebra   August 2015 and August 2016
    · Supported review sessions for 200 1st year engineering students.

Private Tutor
May 2015 - January 2020

· Teaching Algebra, Statistics and Coding to engineering students.
· Teaching Math, Physics and Chemistry to high school students.

WORK EXPERIENCE

Software Developer
San Sebastián, Spain

July 2019 - January 2020
Developair

· Contributed to the development a tool for automatic adjustment of simulation parameters used in the railway sector.
· Implemented a user interface with JavaScript.

Technological Development Intern
Hernani, Spain

June 2017 - August 2017
Orona

· Executed comprehensive validation protocols for a new user interface for elevator screens.
· Collaborated with cross-functional teams to provide actionable feedback leading to user interface improvements.

Member of the Tractive System Team
San Sebastián, Spain

June 2017 - August 2017
Formula Student

· Engineered a real-time wireless communication system for a competition-grade electric single-seater, contributing to the team's qualification in *Formula Student Germany 2016*.

TECHNICAL SKILLS

Languages: Spanish (native), English (bilingual, C2), Basque (medium, B1), German (basic, A1-2)

Programming Languages:

· Python (advanced; 4 years experience with projects on optimization and machine learning)
· MATLAB (proficient; 7 years of academic and research-based projects)
· LaTeX (proficient; regularly used for typesetting academic papers and reports)
· C++ (familiar with Visual Studio environment; developed several applications for coursework)

Frameworks: Torch, Tensorflow, scikit-learn

AWARDS

Scholarships

· Rafael del Pino Excellency Fellowship	2022 - 2024
· Fulbright Scholarship	2020 - 2022
· P.E.O. International Peace Scholarship	2020 - 2022
· Georgia Tech. Electrical and Computer Engineering (ECE) Scholarship	2020 - 2021
· Travel grant by the National Science Foundation (NSF) to attend NASIT workshops	June 2022 and June 2023
· International Mobility Program Connecting Talent Fellowship	January - July 2020

Honors

· Best Academic Record Prize by Kutxabank	2018
· Special End of Studies Award by Universidad de Navarra	2018
· A+ (Special mention - Top of the class) in 22 courses, 42% of the credits (ECTS)	2014 - 2020
· Summa Cum Laude	
· Graduated top of the class for master's degree	2020
· Graduated top of the class for bachelor's degree	2018

SCHOLARLY CONTRIBUTIONS

Peer-Reviewed Publications

· "Enhancing Human-in-the-Loop Learning for Binary Sentiment Word Classification" **B. Martin-Urcelay**, C. Rozell, M. Bloch. CDC 2024. Conference on Decision and Control.
· "Reinforcement Learning from Human Text Feedback: Learning a Reward Model from Human Text Input." **B. Martin-Urcelay**, A. Krause, G. Ramponi. ICML 2024 Workshop on Models of Human Feedback for AI Alignment.

- "Temperature-Dependent I/Q Imbalance Compensation in Ultra-Wideband Millimeter-Wave Multi-Gigabit Transmitters," A. Rezola, J. F. Sevillano, D. del Río, **B. Martin-Urcelay**, I. Gurutzeaga, I. Vélez, R. Berenguer. in IEEE Transactions on Microwave Theory and Techniques, vol. 68, no. 1, pp. 340-352, Jan. 2020.

Under Review

- "Online Machine Teaching under Learner's Uncertainty: Gradient Descent Learners of a Quadratic Loss", **B. Martin-Urcelay**, C. Rozell, M. Bloch.
- "MANGO: Learning Disentangled Image Transformation Manifolds with Grouped Operators", B. Ancelin, Y. Chen, A. Saad-Falcon, P. Guan, C. Kaushik, N. Singh, **B. Martin-Urcelay**

Invited Talks

- "The Art of Prompt Engineering: Converting Language to Rewards in Reinforcement Learning with ChatGPT", **B. Martin-Urcelay**, G. Ramponi, A. Krause. 26th of February 2024, Georgia Tech – Amazon Supply Chain Research Day, Atlanta, Georgia.
- "Human in Machine Teaching: Human and Mathematically Interpretable Query Selection", **B. Martin-Urcelay**, C. Rozell, M. Bloch. 24th of March 2023, Computer Research Association's IDEALS workshop, Honolulu, Hawaii.

Poster Presentations

- "Efficient Bayessian Learning from Pairwise Comparisons by Humans" **B. Martin-Urcelay**, C. Rozell, M. Bloch. Invited presenter by ETH to the Institute for Machine Learning's Symposium. September 2023, Malbun, Liechtenstein.
- "Teaching a Word Classifier based on Human's Perception of Valence" **B. Martin-Urcelay**, C. Rozell, M. Bloch. Northamerican School of Information Theory (NASIT). June 2023, Philadelphia, Pennsylvania.
- "Online Machine Teaching under Learner Uncertainty" **B. Martin-Urcelay**, C. Rozell, M. Bloch. CRA-WP Grad Cohort for Women. April 2023, San Francisco, California.
- "Online Machine Teaching with Uncertainty in Initial State" **B. Martin-Urcelay**, C. Rozell, M. Bloch. Northamerican School of Information Theory (NASIT). August 2022, Los Angeles, California.
- "Iterative Machine Teaching to an Unknown Learner" **B. Martin-Urcelay**, C. Rozell, M. Bloch. CRA-WP Grad Cohort for Women. April 2022, New Orleans, Louisiana.
- "Iterative Machine Teaching to an Unknown Learner" **B. Martin-Urcelay**, C. Rozell, M. Bloch. Student Symposium on Decision and Control. April 2022, Atlanta, Georgia.

PEER REVIEW

IEEE International Symposium on Information Theory (ISIT), 2023

NeurIPS 2023 Workshop on Adaptive Experimental Design and Active Learning in the Real World, 2023

[SELECTED] LEADERSHIP AND PUBLICH OUTREACH

Graduate Chair   May 2021 - Present
Women in Electrical and Computer Engineering (WECE)   *Georgia Institute of Technology*

- Created volunteering opportunities to empower and promote STEM fields among local girls.
- Carried out initiatives focused on providing academic and emotional support to graduate female students.

Program Coordinator   May 2021 - May 2023
Clarkston Futures Mentorship Program   *Georgia Institute of Technology*

- Organized STEM workshops to foster academic interest among refugee students at Clarkston High School.
- Provided after school academic support and tutoring to 20 refugee students.

Fundraiser   October 2019 - August 2023
PSE - Pour un Sourire d'Enfant

· Developed proposal strategies and forged partnerships with public and private entities to increase funding avenues.
· Successfully pitched and secured €18,995 from Fundación Pelayo, contributing to a total of €40,995 raised in 2021 for NGO projects supporting underprivileged children.

Weekly Volunteer   September 2014 - February 2020
Aspace

· Provided consistent support and companionship to individuals with cerebral palsy, improving their social integration and well-being.

Seminar Participant   November 2019
Seminar on People Management and Leadership   *IESE Business School*

· Cultivated problem diagnosis and decision making skills in professional settings through pragmatic business cases.

Robotics Instructor   February 2019
Gautena

· Prepared and taught a robotic workshop tailored for the unique learning needs of eight autistic teenagers.

Class President   September 2015 - June 2017
Telecommunication Engineering Cohort   *Universidad de Navarra*

· Effectively served as a liaison between the student body and faculty, advocating for student interests and contributing to administrative decision-making.