

Cecilia Ferrando

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Education

University of Massachusetts Amherst

Amherst, MA

PHD IN COMPUTER SCIENCE

Aug. 2019 - May 2024 (exp.)

- CICS Fellow (merit scholarship for Computer Science students, 2019-2020)
- Cadence Women in Technology Scholar (2019-2020)
- Committee Against Racism and for Equity (2020-), WiDS Amherst 2021 Co-Chair (2020-)

Carnegie Mellon University

Pittsburgh, PA

MS IN COMPUTATIONAL DESIGN, FOCUS ON MACHINE LEARNING

Aug. 2016 - May 2018

- Fulbright Scholar

Polytechnic University of Turin and Collegio Carlo Alberto

Turin, Italy

HONORS BS+MS DOUBLE DEGREE, MAJORS: ECONOMICS AND STATISTICS, ARCHITECTURE

Sep. 2010 - Jul. 2016

- Collegio Carlo Alberto "Allievi" Scholar
- Alta Scuola Politecnica Scholar
- Won EU-funded scholarship to study abroad in Paris, France (2014-2015)

Research Experience

University of Massachusetts Amherst

Amherst, MA

RESEARCH ASSISTANT TO PROF. DANIEL SHELDON, PROBABILISTIC MACHINE LEARNING

Aug. 2019 -

- Published research on uncertainty quantification in differential privacy
- Performed extensive literature reviews
- Implemented code for differentially-private inference and uncertainty estimation, as well as output visualization
- Developing new methods and algorithms for reasoning about differential privacy noise in various inference problems
- Adapting bootstrap methods for uncertainty estimation and bias reduction in differentially-private inference problems
- Analyzing disparate impact of the bias induced by privacy mechanisms, for example on deep neural networks
- Responsible for organizing weekly meetings for eight PhD and Master's students in prof. Sheldon's lab

Carnegie Mellon University

Pittsburgh, PA

RESEARCH ASSISTANT TO PROF. DANIEL CARDOSO LLACH, SPATIAL MACHINE LEARNING

May 2017 - Apr. 2018

- Published research on applications of machine learning for spatial analysis of architectural plans
- Presented Master's thesis work at Spatial Cognition 2018, winning Best Poster Presentation award
- Implemented graph learning techniques and visibility graphs to study spatial hierarchies
- Developed novel method to mathematically encode the spatial "footprint" of architectural plans
- Trained statistical models to correctly classify architectural plans based on their graph embedding
- Contributed to curating an exhibition on the origins of computer-aided design (CAD)

Industry Experience

Cadence Design Systems

Pittsburgh, PA

MACHINE LEARNING SOFTWARE ENGINEER

Jun. 2018 - May 2019

- Conducted applied research on generative adversarial networks, capsule networks, graph matching, implementing algorithms from scratch
- Improved the performance of a company-specific classification algorithm by 11% by integrating capsule networks in existing algorithm
- Communicated results with audiences of different expertise and background
- Invited to present my methods and results at Cadence Machine Learning Summit 2019, attendees included company's top scientific and executive leadership

Procore Technologies

Carpinteria, CA

QUANTITATIVE RESEARCH INTERN

May 2017 - Jul. 2017

- Developed data analytic app for uncertainty estimation of statistics derived from user data. The company has adopted my app for routine use in their survey data analysis pipeline
- Communicated quantitative results with technical and non-technical audiences
- Collaborated with UX, Engineering and Finance teams

Publications

C. Ferrando, S. Wang, D. Sheldon, *General-Purpose Differentially-Private Confidence Intervals*, Theory and Practice of Differential Privacy (TPDP) 2020

C. Ferrando, N. Dalmaso, J. Mai, D. Cardoso Llach, *Architectural Distant Reading – Using Machine Learning to Identify Typological Traits Across Multiple Buildings*, CUMINCAD 2019

Posters and Presentations

C. Ferrando, D. Sheldon *Parametric bootstrap for correcting clamping and truncation bias in differential privacy*, Women in Machine Learning Workshop, NeurIPS 2020

C. Ferrando, *A Machine Learning Framework for Spatial Analysis*, Best Poster Presentation award, Spatial Cognition 2018

Selected Projects

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| Fall 2019 | Adaptive robust regression for heteroskedastic data , UMass Amherst CS689
Machine Learning, final project with Kenta Takatsu |
| Spring 2017 | HP-Intel NASA Design Challenge “Life in Space” , 1st prize winning team project |
| Fall 2016 | The Harmonograph , Carnegie Mellon 15-112 Fundamentals of CS and Programming,
final project, 2nd prize over 400+ projects |

Honors & Awards

SCHOLARSHIPS AND FELLOWSHIPS

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| 2020 | Cadence Women in Technology Scholarship , Cadence Design Systems |
| 2019 | CS Fellowship , CICS, University of Massachusetts Amherst |
| 2016-2018 | Fulbright Scholarship (\$40,000) , US Department of State |
| 2010-2016 | Collegio Carlo Alberto “Allievi” Scholarship (\$17,000) , Collegio Carlo Alberto, Turin, Italy |
| 2010-2016 | Alta Scuola Politecnica , top 1% students, Polytechnic University of Turin, Italy |
| 2014-2015 | Erasmus+ Scholarship , European Union |

AWARDS

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| 2020 | NeurIPS 2021 registration award , Women in Machine Learning |
| 2020 | GHC 2020 registration award , CICS, University of Massachusetts Amherst |
| 2020 | ICML 2020 registration award , Women in Machine Learning |
| 2020 | ICLR 2020 registration award , Women in Machine Learning |
| 2019 | NeurIPS 2019 travel and registration award , NeurIPS Conference |
| 2019 | NeurIPS 2019 travel award , CS Women, CICS, University of Massachusetts Amherst |
| 2017 | First Prize , HP-Intel “Life in Space” Design Challenge, CMU team |
| 2017 | Second Prize , Carnegie Mellon 15-112 best CS projects over more than 400 |
| 2009 | Albo delle Eccellenze , top high-school students in Italy, Italian Ministry of Education |

CONFERENCE PRESENTATIONS

2018 **Spatial Cognition 2018 Best Poster Award**, Spatial Cognition 2018, Tuebingen, Germany

Teaching & Mentorship

University of Massachusetts Amherst

Amherst, MA

GRADUATE MENTOR, CICS UNDERGRADUATE SUMMER RESEARCH PROGRAM

Jun. 2020 - Aug. 2020

- Mentored two undergraduate students conducting applied research connected to differential privacy
- Provided weekly 1-1 guidance and feedback tailored on each student

Service & Leadership

- 2020- **Committee Against Racism and for Equity**, CICS, University of Massachusetts Amherst. Piloting new PhD Application Support Program for underrepresented applicants.
- 2020- **Women in Data Science (WiDS) Amherst**, Co-Chair. Leading the committee organizing inaugural WiDS Amherst 2021 conference.
- 2020 **UMass Graduate CS Women group**, Social Co-Chair. Organized networking events for CS women graduate students and faculty.
- 2020 **New Student Committee**, CICS, University of Massachusetts Amherst. Contributed to PhD candidate visit day.
- 2018 **Greater Pittsburgh Community Food Bank**, volunteered with the Cadence Global Giving program.

Skills

Programming Python (NumPy, SciPy, PyTorch, TensorFlow, jupyter, matplotlib), C++, Matlab, git, LaTeX
Design Adobe Photoshop, InDesign, Illustrator, PremierePro. Autodesk AutoCAD, 3DSMax. Rhino, Grasshopper
Languages Italian (native), English (advanced), French (advanced)