Lorena Qendro

Curriculum Vitae

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Experience

06/2022–present **Senior Research Scientist**, *Nokia Bell Labs*, Cambridge.
I focus on developing efficient machine learning solutions, with a particular specialization in federated learning and enhancing machine learning performance under resource constraints. My efforts are directed towards devising algorithms and systems designed to boost the speed, efficacy, and reliability of machine learning models for real-world applications.

08/2020–12/2020 **Research Intern**, *Arm*, Cambridge.
In the ML Research team, I investigated techniques including input filtering and probabilistic deep learning to defend quantized deep learning models against various adversarial attacks, aiming for scalable and efficient generalization.

07/2018–09/2018 **Software Engineer**, *Geospock*, Cambridge.
At Geospock, within the Analytics Team, I contributed to developing 'extrapol8', a Scala library. This tool enabled efficient, parallel loading of data from any geo-temporal region into an Apache Spark in-memory dataset, enhancing insights from extensive legacy and sensor-generated data.

02/2017–05/2018 **Software Engineer**, *Connected Places Catapult*, London.
At Connected Places Catapult, known for urban strategies and data science, I led the backend development of Tombolo Digital Connector in the Data Science Team. This Open Source platform unifies diverse data, employing various spatial and temporal systems. My role spanned the software's full life cycle, including promoting it within relevant Open Source communities.

08/2015–02/2017 **Software Engineer**, *Ellexus (now Altair)*, Cambridge.
In my role at Ellexus, a high-performance computing startup, I developed new features for software products, focusing on UI and core functionalities using Java, C, and Bash. I was also involved in the customer pipeline, from evaluation to continuous support.

05/2015–07/2015 **Research Intern**, *Nokia Bell Labs*, Dublin.
My work centered on studying and adapting machine learning methods to process sensor data from mobile devices and wearables, with an emphasis on in-device constraints like energy and computation. During my internship, I developed deep learning solutions and experiments tailored for mobile platforms.

10/2013–06/2014 **Research assistant**, *Telekom Innovation Laboratories, T-Labs*, Berlin.
I concentrated on leveraging machine learning to automatically categorize social media users' lifestyles. The objective was to utilize ML algorithms to identify and predict lifestyle segments, defined by the interplay of life motivations, technological inclinations, and income.

Education

2018–2022 **Ph.D. in Computer Science**, *University of Cambridge*, Cambridge.
Thesis: Efficient, robust and uncertainty aware mobile health.
Supervisor: Prof. Cecilia Mascolo.

2011–2014   **MEng Computer Engineering**, *University of Bologna*, Italy.
Thesis: Life style detection from social media.
Institute: Telekom Innovation Laboratories, Berlin.
Supervisors: Prof. Michela Milano, Dr. Tim Polzehl.

2006–2011   **BEng Computer Engineering**, *University of Bologna*, Italy.
Thesis: Solutions for the deployment of an Eclipse plugin.
Supervisor: Prof. Enrico Denti.

Publications

- Hong Jia, Young D Kwon, Dong Ma, Nhat Pham, **Lorena Qendro**, Tam Vu, Cecilia Mascolo
  UR2M: Uncertainty and Resource-Aware Event Detection on Microcontrollers
  IEEE International Conference on Pervasive Computing and Communications, PerCom'24

- Tong Xia, Ting Dang, Jing Han, **Lorena Qendro**, Cecilia Mascolo
  Uncertainty-aware Health Diagnostics via Class-balanced Evidential Deep Learning.
  IEEE Journal of Biomedical and Health Informatics, February 2024

- Chi Ian Tang, **Lorena Qendro**, Dimitris Spathis, Fahim Kawsar, Akhil Mathur, Cecilia Mascolo
  Balancing Continual Learning and Fine-tuning for Human Activity Recognition.
  Human-Centric Representation Learning Workshop, AAAI'24

- Chi Ian Tang, **Lorena Qendro**, Dimitris Spathis, Fahim Kawsar, Cecilia Mascolo, Akhil Mathur
  Kaizen: Practical Self-Supervised Continual Learning With Continual Fine-Tuning.
  Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision, WACV'24

- Sotirios Vavaroutas, **Lorena Qendro**, Cecilia Mascolo
  Uncertainty-Informed On-Device Personalisation Using Early Exit Networks on Sensor Signals.
  Proceedings of the 31st European Signal Processing Conference, EUSIPCO'23

- Sotirios Vavaroutas, **Lorena Qendro**, Cecilia Mascolo
  Uncertainty Estimation with Data Augmentation for Active Learning Tasks on Health Data.
  Proceedings of the 45th Annual International Conference of the IEEE Engineering in Medicine & Biology Society, EMBC'23.

- **Lorena Qendro**
  Efficient, robust and uncertainty aware mobile health.
  PhD Thesis, University of Cambridge, September 2022.

- Tong Xia, Jing Han, **Lorena Qendro**, Ting Dang, Cecilia Mascolo
  Hybrid-EDL: Improving Evidential Deep Learning for Uncertainty Quantification on Imbalanced Data.
  Trustworthy and Socially Responsible Machine Learning Workshop, NeurIPS 2022.

- Andrea Ferlini*, Dong Ma*, **Lorena Qendro***, Cecilia Mascolo
  Mobile health with head-worn devices: Challenges and opportunities.
  IEEE Pervasive Computing, Volume: 21, Issue: 3, 01 July-Sept. 2022.

- **Lorena Qendro**, Cecilia Mascolo
  Towards Adversarial Mitigation with Early Exit Ensembles.
  Proceedings of the 44th IEEE International Engineering in Medicine and Biology Conference, EMBC'22.

- **Lorena Qendro**, Cecilia Mascolo
  Towards Adversarial Mitigation with Early Exit Ensembles.
  Proceedings of the 44th IEEE International Engineering in Medicine and Biology Conference, EMBC'22.
- Zahra Tarkhani*, **Lorena Qendro***, Malachy O'Connor Brown, Oscar Hill,
  Cecilia Mascolo, Anil Madhavapeddy
  Enhancing the Security & Privacy of Wearable Brain-Computer Interfaces. Preprint.
- **Lorena Qendro***, Alexander Campbell*, Pietro Lio', Cecilia Mascolo
  Robust and Efficient Uncertainty Aware Biosignal Classification via Early Exit Ensembles.
  IEEE International Conference on Acoustics, Speech, & Signal Processing, ICASSP'22.
- **Lorena Qendro***, Alexander Campbell*, Pietro Lio', Cecilia Mascolo
  Early Exit Ensembles for Uncertainty Quantification.
  Proceedings of Machine Learning Research (PMLR) Machine Learning for Health, ML4H'21. [Best Thematic Paper Award]
- **Lorena Qendro***, Alexander Campbell*, Pietro Lio', Cecilia Mascolo
  High Frequency EEG Artifact Detection with Uncertainty via Early Exit Paradigm.
  Workshop on Human In the Loop Learning, ICML'21. (* Equal Contribution)
- **Lorena Qendro**, Jagmohan Chauhan, Alberto Gil C. P. Ramos, Cecilia Mascolo
  The Benefit of the Doubt: Uncertainty Aware Sensing for Edge Computing Platforms.
  Proceedings of the Sixth ACM/IEEE Symposium on Edge Computing, SEC '21.
- **Lorena Qendro**, Sangwon Ha, Rene' de Jong, Partha Maji
  Stochastic-Shield: A Probabilistic Approach Towards Training-Free Adversarial Defense in Quantized CNNs.
  Proceedings of the 1st Workshop on Security and Privacy for Mobile AI, MobiSys'21.
- Tong Xia, Jing Han, **Lorena Qendro**, Ting Dang, Cecilia Mascolo
  Uncertainty-Aware COVID-19 Detection from Imbalanced Sound Data.
  Proceedings of the Annual Conference of the International Speech Communication Association, Interspeech'21.
- Alessandro Montanari, Manuja Sharma, Dainius Jenkus, Mohammed Alloulah, **Lorena Qendro**, Fahim Kawsar
  ePerceptive: energy reactive embedded intelligence for batteryless sensors.
  Proceedings of the 18th Conference on Embedded Networked Sensor Systems, Sensys'20.
- Nicholas D. Lane, Sourav Bhattacharya, Petko Georgiev, Claudio Forlivesi, Lei Jiao, **Lorena Qendro**, Fahim Kawsar
  DeepX: A Software Accelerator for Low-Power Deep Learning Inference on Mobile Devices.
  Proceedings of the 15th ACM/IEEE International Conference on Information Processing in Sensor Networks, IPSN'16.
- Nicholas D. Lane, Petko Georgiev, **Lorena Qendro**
  DeepEar: Robust Smartphone Audio Sensing in Unconstrained Acoustic Environments using Deep Learning.
  Proceedings of the 2015 ACM international joint conference on pervasive and ubiquitous computing, UbiComp'15. [Best Paper Award]

Technical skills

Programming languages

Java, Python, C, SQL, Bash, R, JavaScript, Scala, Kotlin.

Development Tools

Tensorflow, PyTorch, Git, Gradle, Maven, JUnit, Jenkins, Wercker, Hibernate, PostgreSQL(+ PostGIS), MySQL, DB2.

Languages

Albanian: Native - **Italian:** Fluent - **English:** Fluent

Awards

2021	**Best Thematic Paper Award.** Early Exit Ensembles for Uncertainty Quantification. *ML4H '21.*
2018	**Nokia Bell Labs Studentship.** Scholarship for the undertaking of the Ph.D. in Computer Science at the University of Cambridge. (Unrestricted gift donation to the CS Department by Nokia Bell Labs.)
2015	**Best Paper Award.** DeepEar: Robust Smartphone Audio Sensing in Unconstrained Acoustic Environments using Deep Learning. *UbiComp '15.*
2013	**Study Abroad Scholarship**. European Erasmus Programme.
2011–2013	**Study Grant**. Scholarship for undertaking the MEng in Computer Engineering at the University of Bologna.

Student Supervision

2021–2022	Sotiris Vavaroutas. "Uncertainty Estimation with Data Augmentation for Active Learning Tasks". Terry Fawden. "On-device Personalisation Using Early Exit Neural Networks". Centre for Doctoral training (Engineering Department) research project co-supervision with Prof. Cecilia Mascolo.
2021	Oscar Hill. "Security Aspects of brain computer interfaces". Malachy O'Connor-Brown. "Adversarial attacks on brain computer interfaces". UROP internship co-supervision with Zahra Tarkhani and Anil Madhavapeddy.
2019–2020	Yu Chen Lim. "Implementation and Evaluation of a Spiking DeepSense". Part II thesis supervision.
2018–2020	Course supervisor for "Mobile and Sensor Systems". University of Cambridge, UK.
2012	Undergraduate Tutor. Taught welcome courses for students with additional educational debt, helping them in the transition from high school to university. University of Bologna, Italy.

Community Service

2021–2022	PhD Student Representative. Staff-Student Consultative Forum, Computer Lab.
2021–2022	Women@CL Tech Co-chair. University of Cambridge, UK.
2020	Reviewer for The Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT'20). Cancun, Mexico. Reviewer for Oxbridge Women in Computer Science Conference. Cambridge, UK.
2019–2020	Director of Events. Cambridge University Entrepreneurs.
2019–2020	Women@CL Graduate Representative. University of Cambridge, UK.
2019–present	Social Media Reach Lead, Community Relations Team. IEEE Pervasive Computing Magazine.
2019	Pannelist & Poster Session Committee member for ACM S3 Workshop, MobiCom'19. Los Cabos, Mexico. Student Volunteer. IMWUT'19, London, UK.
2018–2019	President of Cambridge University Albanian Society.
2007–2013	Student Representative. Faculty Board, University of Bologna, Italy.