

Luciano Melodia

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Education

Friedrich-Alexander University Erlangen–Nuremberg	<i>M.Sc. Mathematics, Digital Humanities</i>	<i>Oct. 2024 – Mar. 2026</i>
◦ Thesis: Universal Coefficients and the Mayer–Vietoris Sequence for Moore Homology		
Friedrich-Alexander University Erlangen–Nuremberg	<i>B.Sc. Mathematics, Computer Science</i>	<i>Oct. 2021 – Sept. 2024</i>
◦ Thesis: Algebraic and Topological Persistence		
University of Regensburg	<i>M.A. Information Science</i>	<i>Apr. 2015 – Mar. 2018</i>
◦ Thesis: Deep Learning for Estimating Absorbed Radiation Dose in Nuclear Medicine Diagnostics		
University of Regensburg	<i>B.A. German, Italian, Information Science, Media Informatics</i>	<i>Oct. 2012 – Mar. 2015</i>
◦ Thesis: Development of a Punctuation Platform with Linguistic Modules for Information Retrieval		
University of Regensburg	<i>Concurrent IT Training Program</i>	<i>Oct. 2012 – Apr. 2013</i>

Professional Experience

FAU Department of Mathematics	<i>Erlangen</i>
<i>Research Assistant</i>	<i>Apr. 2023 – Sept. 2026</i>
◦ Teaching assistant for Topology (2023, 2026), Functional Analysis (2026), Real Analysis III (2024, 2026), Real Analysis II (2025), Linear Algebra I (2024), Mathematics for Engineers A2: Calculus (2025), Mathematics for Engineers A4: Stochastics (2025), and Topology and Applications (2024).	
◦ Substitute lecturer for courses taught by Prof. Dr. Li and Prof. Dr. Meusburger on the Tietze extension theorem, connectedness and path-connectedness, and continuity.	
◦ Lecturer for course units on mathematical proof writing.	
◦ Exam proctoring, grading, and mentoring.	
Corscience GmbH & Co. KG	<i>Erlangen</i>
<i>Working Student</i>	<i>Aug. 2021 – Aug. 2022</i>
◦ Deep convolutional networks on multi-GPU systems for automatic detection of calibration spikes in ECG data achieving >99 % accuracy (10-fold cross-validation, approx. 1M real-world samples, state of the art).	
◦ Residual networks for detection of ECG traces in documents with an IoU of approx. 98 % (10-fold cross-validation, approx. 10M augmented samples), state-of-the-art image segmentation.	
◦ Image segmentation of ECG traces using matrix factorization methods with an IoU of approx. 99 %, statistically highly significant, state of the art.	
Siemens Energy AG	<i>Erlangen</i>
<i>Research Associate</i>	<i>Sept. 2018 – Dec. 2021</i>
◦ Development of a novel topology-based interpolation method for industrial sensor data and handwriting data; published at IWCIA, with an open-source implementation.	
◦ Design of a method to estimate the capacity of neural networks for signal data; reduction of training costs by approx. €25,000 per year; presented at ICPR, source code available as open source.	
◦ Development of a hierarchical KKS classifier for power-plant sensors using topological data analysis (Betti curves) with accuracies of up to 93 %; published at PKDD, with an open-source implementation.	
◦ Extensive teaching and examination experience in data science and computer science (lectures, seminars, tutorials, e-exams) with excellent course evaluations.	
◦ Supervision of multiple B.Sc. and M.Sc. theses on sensor-signal classification, ECG analysis, gas-sensor time series, and industrial dashboards.	
◦ Technologies: Python (3.8/3.9), TensorFlow 2.x, CUDA 11, cuDNN 8, Linux (Ubuntu, Arch), and Windows.	
◦ Teaching assistant for Conceptual Modeling (2019), New Technologies in Data Management (2019, 2020),	

2021), Process-Oriented Information Systems (2019, 2020, 2021), Topological Data Analysis (2020), Homological Data Analysis (2021).

- Lecturer for Knowledge Discovery in Databases (2021).

mb Support GmbH

Scientific Stuff

- Industrial document digitization pipeline using high-performance OCR.
- Integration of the Asterisk telephony API into Openviva C2.
- Market and statistical analysis using deep learning.

Regensburg

June 2015 – Mar. 2018

Chair of German Linguistics

Research Assistant

- Subject-matter editing and proofreading of academic texts and examinations.
- Organization and coordination of academic conferences.
- Technical maintenance and updates of the university website.
- Design and implementation of an academic social network.

University of Regensburg

Oct. 2013 – Sept. 2015

Apostelkeller

Chef

- Planning and preparing menus for up to 140 guests.
- Front-of-house support and waiting tables with direct guest interaction.
- Inventory management and stock control in the kitchen.

Regensburg

Sept. 2012 – Dec. 2015

Anatol GmbH & Co. KG

Translator

- Translation between Italian, German, Polish, and English.

Regensburg

Oct. 2012 – Aug. 2014

Skills

Programming: Python (expert), Rust (advanced), C++ (basic)

Web Technologies: HTML5, CSS3 (expert), JavaScript, PHP (advanced)

Typesetting: L^AT_EX (expert)

Operating Systems: Linux (Arch, Ubuntu) and macOS (expert), Windows (advanced)

Languages: German (native), English (C2), Italian (C2), Polish (B2), Spanish (A2)

Sports: Lifting (240kg Deadlift, 120kg Bench, 150kg Squat), Muay Thai 4:2:1 – W:L:D •, Weng Chun •

Hobbies: Competitive cooking, fiction (Amor Towles & Benedict Jacka)

Publications

Homological Time Series Analysis of Sensor Signals from Power Plants. 2021

Luciano Melodia, Richard Lenz

10.1007/978-3-030-93736-2_22 ↗

Estimate of the Neural Network Dimension Using Algebraic Topology and Lie Theory. 2021

Luciano Melodia, Richard Lenz

10.1007/978-3-030-68821-9_2 ↗

Persistent Homology as a Stopping Criterion for Voronoi Interpolation. 2020

Luciano Melodia, Richard Lenz

10.1007/978-3-030-51002-2_3 ↗

On the Use of the Verb *brauchen* with and without *zu* with the Infinitive. 2015

Luciano Melodia

ISBN 978-3-8325-3808-8 ↗

Conferences

Reviewer: Learning on Graphs (LOG, 2022–24) ↗, DBKDA (2020–24) ↗, GT-RL @ ICLR (2022) ↗, TDA in ML @ NeurIPS (2020) ↗.

Author: ICPR (2021) ↗, IWCIA (2020) ↗, ECML PKDD (2019–2020) ↗, Destandardization and Standard Variety (2013) ↗.

Invited Talk: International Conference on Practical Mathematical Discourse (2020) ↗.

Attendance: Colloquium on Lie Groups [🔗](#), SIGMOD/PODS (2020) [🔗](#), Language Management and Orthography (2015) [🔗](#).

Awards, Scholarships, and Service

Best Reviewer Award, Learning on Graphs (LOG) 🔗	2024
Recipient of the Oskar Karl Forster Scholarship 🔗	2024
Student Representative for the Department of Mathematics, Friedrich-Alexander University Erlangen-Nuremberg	2024
Member of the German Informatics Society 🔗	2019–2020
Member of the Computational Intelligence and Machine Learning Research Group (CIML) 🔗	2017–2018
Student Representative for the Faculty of Language, Literature, and Cultural Studies, University of Regensburg	2016