

Luciano Melodia

📍 Erlangen

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Education

Friedrich-Alexander Universität Erlangen Nürnberg (Ø 1.1)

Oct 2024 – March 2026

M.Sc. Mathematics, Digital Humanities

- **Thesis:** Universal Coefficients for Étale Groupoid Homology
- **Topics:** Algebraic Topology, Tensor Categories, Homological Algebra

Friedrich-Alexander Universität Erlangen Nürnberg (Ø 2.0)

Oct 2021 – Sept 2024

B.Sc. Mathematics, Computer Science

- **Thesis:** Algebraic and Topological Persistence (1.0)
- **Topics:** Applied Topology, Persistent Homology

Universität Regensburg (Ø 1.6)

April 2015 – March 2018

M.A. Information Science

- **Thesis:** Deep Learning Estimation of Absorbed Radiation Dose (1.3)
- **Topics:** Machine Learning, Deep Learning, Matrix Factorization

Universität Regensburg (Ø 2.0)

Oct 2012 – March 2015

B.A. German Philology, Italian Philology, Media Informatics, Information Science

- **Thesis:** Development of a Punctuation Platform with Linguistic Modules for Information Retrieval (1.7)
- **Topics:** Natural Language Processing, Information Retrieval, Electronic Corpora

Universität Regensburg (Ø 1.7)

Oct 2012 – April 2013

Studienbegleitende IT-Ausbildung

Albertus-Magnus-Gymnasium Regensburg (Ø 2.7)

Sept 2004 – May 2012

Abitur

Experience

Student Assistant

Erlangen

Algebra and Geometry

April 2023 – March 2026

Representation Theory and Operator Algebras

Applied Analysis

Applied Mathematics

- Tutor in Mathematics for Engineers A4 (stochastic)
- Tutor in Analysis 2, 3
- Tutor in Topology and Applications
- Tutor in Topology
- Tutor in Linear Algebra 1
- Lecture on the Tietze Extension Theorem
- Lecturer for mathematical proof sessions
- Lecturer for exercise sessions
- Supervision and correction of written exams

Tutor

Erlangen

Private

Jan 2024 – Dez 2025

Preparation for

- mathematics, 2 students, undergraduate studies
- computer science, 1 student, undergraduate studies
- chemical and biological engineering, 1 student, undergraduate studies
- physics, 1 student, undergraduate studies

- Abitur, 13 students, bavarian Gymnasium
- secondary school, 2 students, bavarian Mittelschule
- secondary school, 3 students, bavarian Realschule
- elementary school, 1 student, bavarian Grundschule

Werkstudent

Corscience GmbH & Co. KG

Erlangen

Aug 2021 – Aug 2022

- Deep convolutional networks trained on multiple GPUs for automatic detection of calibration spikes in ECG data; achieved an accuracy of over ninety-nine percent on ten-fold cross validation with a data set of about one million real world samples tested with sigma five significance, which is state of the art
- Residual networks for detection of ECG curves in documents; achieved an IOU of approximately ninety-eight percent on ten-fold cross validation with a data set of about ten million artificially enlarged samples using generative neural networks tested with sigma three significance, which is state of the art
- Image segmentation using matrix factorisation techniques to isolate ECG curves. Achieved an IOU of approximately ninety-nine percent tested with sigma six significance, which is state of the art

Research Assistant

Chair for Computer Science 6 / Siemens Energy AG

Erlangen

June 2015 – March 2018

- Correction of written exams
- Assistance in oral exams
- Preparation and execution of electronic exams
- Participation in the data science program
- Supervision and execution of
 1. 2021 lecture on Knowledge Discovery in Databases Ø1.56
 2. 2020 seminar on Persistent Homology in Data Analytics
 3. 2020 seminar on Topological Data Analysis Ø1.14
 4. 2019, 2020, 2021 exercises in Process Oriented Information Systems Ø1.18
 5. 2018, 2019, 2020, 2021 seminar on New Technologies in Data Management
 6. 2018, 2019, 2020, 2021 exercises in Computer Science for Engineers
 7. 2018 exercises in Conceptual Modeling
- Supervision of theses:
 1. M.Sc. Sauerhammer (2021): A Classification Dashboard for Sensor Signals from Power Plants
 2. M.Sc. Seidel (2020): Classification of Microbes using Time Series Gas Sensor Array Data
 3. M.Sc. Siddiqui (2020): Extraction of Fetal and Maternal Heart-beats from ECG Signals
 4. B.Sc. Hahn (2021): Classification of Sensor Signals from Power Plants
 5. B.Sc. Schäfer (2021): Learning Validation Models from Sensors of a Power Plant
- Programming with CUDA v.11.0, Tensorflow 2.4, CuDNN v.8.0.4. in Python v.3.8 and v.3.9
- Operating systems: Ubuntu 20.04, Solus 4, Archlinux 5.11, Windows 11

Data Scientist

mb Support GmbH

Regensburg

June 2015 – March 2018

- Industrial document-digitization pipeline for mass paper-pile scanning; scanning-street engineering; one-percent character-error-rate OCR via Google Cloud Vision and custom recurrent neural networks; ergonomic user-interface integration for Openviva C2; Industrial scanning throughput benchmark: capacity for approximately sixty million documents in continuous operation
- Asterisk telecommunication-API integration into Openviva C2 with ergonomic design, roughly five thousand lines of PL/SQL and Python
- Statistical data and market analysis with deep neural and convolutional networks and regression methods

Research Assistant

Chair for German Linguistics

Universität Regensburg

Oct 2013 – Sept 2015

- Proofreading of books and papers
- Correction of exams
- Organisation of conferences
- Maintenance of the university website
- Implementation of a scientific social network featuring a custom JavaScript-written search engine for real-time online usage, comprising approximately a thousand lines of code

Chef

Apostelkeller

*Regensburg
Sept 2012 – Dez 2015*

- Cooking with menu for up to 140 guests
- Waitressing
- Stock management

Service Staff

Trademarketing Service GmbH

*Regensburg
Nov 2012 – Mai 2015*

- Goods management, receipt and ordering.

Translator

Anatol GmbH & Co. KG

*Regensburg
Oct 2012 – Aug 2014*

- Translation between Italian – German – Polish – English

Volunteer

Alten- und Pflegeheim St. Josef




*Regensburg
Aug 2010*

Publications





Homological Time Series Analysis of Sensor Signals from Power Plants. <i>Luciano Melodia</i> , Richard Lenz 10.1007/978-3-030-93736-2_22 ↗	2021
Estimate of the Neural Network Dimension Using Algebraic Topology and Lie Theory. <i>Luciano Melodia</i> , Richard Lenz 10.1007/978-3-030-68821-9_2 ↗	2021
Persistent Homology as a Stopping Criterion for Voronoi Interpolation. <i>Luciano Melodia</i> , Richard Lenz 10.1007/978-3-030-51002-2_3 ↗	2020
Zur Verwendung des Paradigmas <i>brauchen</i> mit und ohne <i>zu</i> mit Infinitiv. <i>Luciano Melodia</i> ISBN 978-3-8325-3808-8 ↗	2015

Conferences

Learning on Graphs, LOG ↗ ◦ Reviewer, Program Committee	2022-24
Advances in Databases, Knowledge, and Data Applications ↗ ◦ Reviewer, Program Committee	2020-24
Geometrical and Topological Representation Learning, Workshop at ICLR ↗ ◦ Reviewer, Program Committee	2022
International Workshop on Combinatorial Image Analysis ↗ ◦ Author, full paper	2020
International Conference on Practical Mathematical Discourse ↗ ◦ Guest talk, Introduction to Persistent Homology	2020
Topological Data Analysis and Beyond, Workshop at NeuRIPS ↗ ◦ Reviewer, Program Committee	2020
Symposium on Principles of Database Systems, SIGMOD/PODS ↗	2020

European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases, ECML/PKDD 	2019-2020
Sprachmanagement & Orthografie 	2015
Destandardisierung und Standardvarietät 	2013

Awards, Grants and Service

Top Reviewer Award from Learning on Graphs 	2024
Oskar-Karl-Forster Scholarship Fellow 	2024
Student Representative for the Department of Mathematics at Friedrich-Alexander Universität Erlangen-Nürnberg	2024
Member of the Gesellschaft für Informatik e.V. 	2019-20
Member of the Computational Intelligence and Machine Learning Group 	2017-18
Student Representative for the Department of Language, Literature and Cultural Sciences at Universität Regensburg	2016

Addendum

Programming: Python, Rust, C++

Web Technologies: HTML5, CSS3, Javascript, PHP

Typesetting: L^AT_EX











Operating Systems: Arch Linux, Ubuntu, Mac OS, Windows

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

Sports: Muay Thai, Boxing, Weng Chun, Table Tennis


Hobbies: Cooking, Novels

References

Prof. Dr. Catherine Meusburger  ◦ Department of Mathematics ◦ Friedrich-Alexander Universität Erlangen-Nürnberg ◦ Professor for Representation Theory and Mathematical Physics  catherine.meusburger@fau.de  +49 9131 85-67034	2024-26
Prof. Dr. Kang Li  ◦ Department of Mathematics ◦ Friedrich-Alexander Universität Erlangen-Nürnberg ◦ Professor for Representation Theory and Operator Algebras  kang.li@fau.de  +49 9131 85-67060	2022-26
Prof. Dr. Richard Lenz  ◦ Department of Computer Science ◦ Friedrich-Alexander Universität Erlangen-Nürnberg ◦ Professor for Evolutionary Data Management  richard.lenz@fau.de  +49 9131 85-27899	2018-21
Prof. Dr. em. Elmar Lang  ◦ Department of Biophysics ◦ Universität Regensburg	2018-21

- Professor for Computational Intelligence

✉ elmar.w.lang@ur.de

Prof. Dr. Paul Rössler 

2013-16

- Department of German Philology

- Universität Regensburg

- Professor for German Linguistics

✉ paul.roessler@ur.de

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