Luciano Melodia

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Education

Friedrich-Alexander Universität Erlangen Nürnberg (∅ 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 (∅ 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 (∅ 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 (∅ 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 (∅ 1.7)   *Oct 2012 – April 2013*
Studienbegleitende IT-Ausbildung

Albertus-Magnus-Gymnasium Regensburg (∅ 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
- 2026, 2023 Tutor in Topology
- 2026, 2024 Tutor in Analysis 3
- 2025 Tutor in Mathematics for Engineers A4 (stochastic)
- 2025 Tutor in Analysis 2
- 2024 Tutor in Topology and Applications
- 2024 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 *Erlangen*
Corscience GmbH & Co. KG *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 ninetynine 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 ninetyeight 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 ninetynine percent tested with sigma six significance, which is state of the art

Research Assistant *Erlangen*
Chair for Computer Science 6 / Siemens Energy AG *Sept 2018 – Dez 2021*

- Correction of written exams
- Assistance in oral exams
- Preparation and execution of eletronic exams
- Participation in the data science program
- Supervision and execution of

  1. 2021 lecture on Knowledge Discovery in Databases ∅1.56
  2. 2020 seminar on Persistent Homology in Data Analytics
  3. 2020 seminar on Topological Data Analysis ∅1.14
  4. 2019, 2020, 2021 exercises in Process Oriented Information Systems ∅1.18
  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 *Regensburg*
mb Support GmbH *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 *Universität Regensburg*

Chair for German Linguistics *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 *Regensburg*
Apostelkeller *Sept 2012 – Dez 2015*
- Cooking with menu for up to 140 guests
- Waitressing
- Stock management

Service Staff *Regensburg*
Trademarketing Service GmbH *Nov 2012 – Mai 2015*
- Goods management, receipt and ordering.

Translator *Regensburg*
Anatol GmbH & Co. KG *Oct 2012 – Aug 2014*
- Translation between Italian – German – Polish – English

Volunteer *Regensburg*
Alten- und Pflegeheim St. Josef *Aug 2010*

Publications

Homological Time Series Analysis of Sensor Signals from Power Plants. ***Luciano Melodia***, Richard Lenz 10.1007/978-3-030-93736-2_22 ☑	2021
Estimate of the Neural Network Dimension Using Algebraic Topology and Lie Theory. ***Luciano Melodia***, Richard Lenz 10.1007/978-3-030-68821-9_2 ☑	2021
Persistent Homology as a Stopping Criterion for Voronoi Interpolation. ***Luciano Melodia***, Richard Lenz 10.1007/978-3-030-51002-2_3 ☑	2020
Zur Verwendung des Paradigmas *brauchen* mit und ohne *zu* mit Infinitiv. ***Luciano Melodia*** 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 Conference on Pattern Recognition ☑ ○ Author, full paper	*2021*
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 ↗   *2020*
- Reviewer, Program Committee

Symposion 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*
- Author, full paper

Sprachmanagement & Orthografie ↗   *2015*

Destandardisierung und Standardvarietät ↗   *2013*
- Author, full paper

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: LaTeX

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

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

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

Hobbies: Cooking, Novels

References

Prof. Dr. Catherine Meusburger ↗   *2024-26*
- Department of Mathematics
- Friedrich-Alexander Universität Erlangen-Nürnberg
- Professor for Representation Theory and Mathematical Physics
- ✉ catherine.meusburger@fau.de
- ☎ +49 9131 85-67034

Prof. Dr. Kang Li ↗   *2022-26*
- Department of Mathematics
- Friedrich-Alexander Universität Erlangen-Nürnberg
- Professor for Representation Theory and Operator Algebras
- ✉ kang.li@fau.de
- ☎ +49 9131 85-67060

Prof. Dr. Richard Lenz ↗   *2018-21*
- Department of Computer Science
- Friedrich-Alexander Universität Erlangen-Nürnberg
- Professor for Evolutionary Data Management
- ✉ richard.lenz@fau.de

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Prof. Dr. em. Elmar Lang ↗ *2018-21*
- Department of Biophysics
- Universität Regensburg
- 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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