

# Luciano Melodia

*Curriculum vitae*

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 📄 [melodia\\_l\\_1](#) ♂ Born on 27.03.1994  
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## PROFESSIONS

- 2024–25 Private tutor in German and mathematics.
- Abitur preparation for 8 students from the Bavarian Gymnasium in maths.
  - Secondary school (10th grade) preparation for 1 student in German and maths.
- 2023–24 Tutor Algebra and Geometry, Representation Theory and Operator Algebras, FAU<sup>1</sup>.
- Planning and implementation of the exercise lesson in „Topology and Applications“.
  - Planning and implementation of the exercise lesson in „Topology“.
  - Planning and implementation of the exercise lesson in „Linear algebra I“.
  - Planning and conducting intensive proof lessons.
  - Examination supervision and correction.
- 2021–22 Working student Corscience GmbH & Co. KG, Erlangen.
- Automatic detection of calibration spikes and time stamps in ECG data.
  - Detection of multiple ECG curves on documents.
  - Image segmentation using machine learning.
- 2019–21 Researcher Siemens Energy AG, Erlangen.
- Programming with CUDA v.11.0, Tensorflow 2.4, CuDNN v.8.0.4.
  - Programming in Python v.3.8 and v.3.9.
  - Work with Ubuntu 20.04, Solus 4, Archlinux 5.11.
  - Implementation and use of convolutional nets, LSTM nets, residual nets, autoencoders, topological autoencoders, and Boltzmann machines for processing time series.
- 2018–21 Researcher Chair of Computer Science 6, FAU.
- Correction of written exams and assistance in oral exams.
  - Self-directed preparation and execution of e-exams.
  - Corrections to module descriptions for the Data Science program.
- 2015–18 Data scientist at mb Support GmbH, Regensburg.
- Implementation of a document pipeline for mass digitization of handwritten documents using neural networks and incorporation into the database application openVIVA.
  - Installation of the telecommunication interface ASTERISK in openVIVA.
  - Induction of new employees in openVIVA.
  - Statistical data and market analysis.
- 2013–15 Research assistant Chair of German Linguistics, Regensburg University.
- Examination correction, correction of books and texts.
  - Website maintenance.
  - Organization and conduct of conferences.
  - Implementation of the punc.space web platform.

<sup>1</sup> Friedrich-Alexander University Erlangen-Nürnberg.

- 2012–15 Chef in event gastronomy at Apostelkeller, Regensburg.
- Cooking according to fixed menu for up to 140 guests.
  - Waitressing and stock management.
- 2012–15 Staff-based services Trademarketing Service GmbH, Salzgitter.
- Goods management and ordering.
  - Goods admission.
- 2012–14 Translator at Anatol GmbH & Co. KG, Regensburg.
- Italian – German translation.
  - Polish – German translation.
  - English – German translation.
- 2010 Compassion project, Alten- und Pflegeheim St. Josef, Regensburg.

#### ACADEMIC WORK

- Teaching
- Department of Mathematics, Friedrich-Alexander Universität Erlangen-Nürnberg
    - 2024 Exercises in Topology and Applications
    - 2024 Exercises in Linear Algebra I
    - 2023 Exercises in Topology
  - Department of Computer Science, Friedrich-Alexander Universität Erlangen-Nürnberg
    - 2021 Lecture Knowledge Discovery in Databases
    - 2020 Seminar Persistent Homology in Data AnalyticsSeminar
    - 2020 Seminar Topological Data Analysis
    - 2019 – 2021 Exercises Process Oriented Information Systems
    - 2018 – 2021 Seminar New Technologies in Data Management
    - 2018 – 2021 Exercises Computer Science for Engineers
    - 2018 Exercises Conceptual Modeling
- Conferences
- Learning on Graphs (LOG, 2023, 2022)
  - 15<sup>th</sup> International Conference on Advances in Databases, Knowledge, and Data Applications (DBKDA, 2023)
  - International Conference on Learning Representations (ICLR, 2022)
  - Machine Learning for Irregular Time Series (ML4ITS, 2021)
  - International Conference on Pattern Recognition (ICPR, 2021)
  - Topological Data Analysis and Beyond (NeurIPS, 2020)
  - International Conference on Practical Mathematical Discourse (ICPMD, 2020)
  - International Workshop on Combinatorial Image Analysis (IWCIA, 2020)
  - European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML/PKDD, 2020, 2019)
  - Symposium on Principles of Database Systems (SIGMOD/PODS, 2019)
  - Kolloquium zum Sprachmanagement (2017)
  - Destandardisierung und Standardviertel (2013)
- Service
- Reviewer Learning on Graphs (LOG, 2023, 2022)
  - Reviewer International Conference on Advances in Databases, Knowledge, and Data Applications (DBKDA, 2023, 2020)
  - Reviewer Geometrical and Topological Representation Learning (ICLR, 2022)
  - Reviewer Topological Data Analysis and Beyond (NeurIPS, 2021)
  - Member Gesellschaft für Informatik e.V. (2019 – 20)
  - Member Computational Intelligence and Machine Learning Group (2017 – 18)
  - Student Representative Information Science (Regensburg University, 2016)

## Supervision

B.Sc. D. Hahn (2021):

*Classification of Sensor Signals from Power Plants.*

M.Sc. C. Sauerhammer (2021):

*A Classification Dashboard for Sensor Signals from Power Plants.*

B.Sc. J. Schäfer (2021):

*Learning Validation Models from Sensors of a Power Plant.*

M.Sc. M. Seidel (2020):

*Classification of Microbes using Time Series Gas Sensor Array Data.*

M.Sc. M.R. Siddiqui (2020):

*Extraction of Fetal and Maternal Heartbeats from ECG Signals.*

## PAPERS

- 2023  **Luciano Melodia:** Notes on Simplicial and Singular Homology. Friedrich-Alexander Universität Erlangen-Nürnberg, Preprint.
- 2021   **Luciano Melodia** and Richard Lenz: Homological Time Series Analysis of Sensor Signals from Power Plants. Machine Learning for Irregular Time Series. Machine Learning and Principles and Practice of Knowledge Discovery in Databases. In Michael Kamp, Irena Koprinska, Adrien Bibal et al. (ed.): Communications in Computer and Information Science. Springer Nature, Switzerland.
- 2021   **Luciano Melodia** and Richard Lenz: Estimate of the Neural Network Dimension Using Algebraic Topology and Lie Theory. Image Mining. Theory and Applications VII. Pattern Recognition and Information Forensics. In Alberto Del Bimbo, Rita Cucchiara, Stan Sciaroff et al. (ed.): Lecture Notes in Computer Science. Springer Nature, Switzerland.
- 2020   **Luciano Melodia** and Richard Lenz: Persistent Homology as Stopping-Criterion for Voronoi Interpolation. Proceedings of the International Workshop on Combinatorial Image Analysis. In Tibor Lukić, Reneta Barneva, Valentin Brimkov et al. (ed.): Lecture Notes in Computer Science. Springer, Cham.
- 2018   **Luciano Melodia:** Deep Learning Schätzung zur absorbierten Strahlungs-dosis für die nuklearmedizinische Diagnostik. Library of the University of Regensburg, Master Thesis in Information Science.
- 2015   **Luciano Melodia:** Zur Verwendung des Paradigmas brauchen mit und ohne zu mit Infinitiv. In Katešina Šichová, Reinhard Krapp, Rössler Paul et al. (ed.): Standardvarietät des Deutschen – Fallbeispiele aus der sozialen Praxis, Logos, Berlin.

## EDUCATION

- 2021 – 24 *Mathematics* **B.Sc.**  
Thesis: "Algebraic and topological persistence".  
Minor: computer science, Friedrich-Alexander University Erlangen-Nürnberg.
- 2015 – 18 *Information Science* **M.A.**  
Thesis: "Deep learning estimation of absorbed radiation dose for nuclear medicine diagnostics".  
Minor: biophysics, Regensburg University.
- 2012 – 15 *German Philology* **B.A.**  
Thesis: "Development of an application for punctuation research using linguistic modules for information retrieval".  
Majors: italian philology, information science, media informatics, Regensburg Uni-

versity.

2012 – 13

*Web Developer*, Rechenzentrum Regensburg University.

2012

*Abitur*, Albertus-Magnus-Gymnasium, Regensburg.

#### INTERESTS

Coding

Python, Rust,  $\text{\LaTeX}$ , CSS, HTML, XML, JavaScript, PHP, C#, Java.

Software

GUDHI, Dionysus, Keras, Theano and Tensorflow.

Languages

German (native), English C2, Italian C2, Polish B2 and Spanish A2.<sup>2</sup>

Hobbies

Cooking, Reading.

Sports

Muay Thai.

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<sup>2</sup> Language levels are self estimates according to the [CEFR](#) standard.