Luciano Melodia

Curriculum vitae
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PROFESSIONAL EXPERIENCE

2023–25 Student Assistant at Algebra and Geometry, Representation Theory and Operator Algebras and Applied Analysis FAU[1].

- Tutor in „Analysis III“.
- Tutor in „Topology and Applications“.
- Tutor in „Topology“.
- Lecture representation of Prof. Ph.D. Kang Li (Tietze Extension Theorem).
- Tutor in „Linear Algebra“.
- Conducting proof lessons.
- Conducting exercise lessons.
- Examination, supervision and correction.

2024–25 Private tutor in German and Mathematics.

- Abitur, 10 students, Bavarian Gymnasium.
- Secondary school, 2 students, Bavarian Mittelschule.
- Elementary school, 1 student.

2021–22 Working student at Corscience GmbH & Co. KG, Erlangen.

- Automatic detection of calibration spikes in ECG data.
- Detection of multiple ECG curves on documents.
- Image segmentation using machine learning.

2019–21 Researcher at 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.
- Planning and implementation of the
  - lecture „Knowledge Discovery in Databases“.
  - seminar „Persistent Homology in Data Analytics“.
  - seminar „Topological Data Analysis“.

[1] Friedrich-Alexander University Erlangen-Nürnberg.

  - seminar „New Technologies in Data Management“.
  - exercise lessons in „Process Oriented Information Systems“.
  - exercise lessons in „Computer Science for Engineers“.
  - exercise lessons in „Conceptual Modeling“.

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.
- Integration of the telecommunication interface ASTERISK.
- Induction of new employees into 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.

2012–15 Chef in event gastronomy at Apostelkeller, Regensburg.

- Cooking according to a fixed menu for up to 140 guests.
- Waitressing and stock management.

2012–15 Staff-based services at Trademarketing Service GmbH, Salzgitter.

- Goods management and ordering.
- Goods receipt.

2012–14 Translator at Anatol GmbH & Co. KG, Regensburg.

- Italian – German translation.
- Polish – German translation.
- English – German translation.

2010 Volunteer at 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 on Knowledge Discovery in Databases
  - 2020 Seminar on Persistent Homology in Data Analytics
  - 2020 Seminar on Topological Data Analysis
  - 2019-21 Exercises in Process Oriented Information Systems
  - 2018-21 Seminar on New Technologies in Data Management
  - 2018-21 Exercises in Computer Science for Engineers
  - 2018 Exercises in Conceptual Modeling

Conferences

2024 Learning on Graphs
2023 Learning on Graphs
2023 15^{th} International Conference on Advances in Databases, Knowledge, and Data Applications
2022 Learning on Graphs
2022 International Conference on Learning Representations
2021 Machine Learning for Irregular Time Series
2021 International Conference on Pattern Recognition
2020 Topological Data Analysis and Beyond
2020 International Conference on Practical Mathematical Discourse
2020 International Workshop on Combinatorial Image Analysis
2020 European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases
2019 European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases
2019 Symposium on Principles of Database Systems
2017 Kolloquium zum Sprachmanagement
2013 Destandardisierung und Standardvarietät

Service

2024 Reviewer for Learning on Graphs
2024 Student Representative for the Department of Mathematics at the Friedrich-Alexander University Erlangen-Nürnberg
2023 Reviewer for Learning on Graphs
2023 Reviewer for the International Conference on Advances in Databases, Knowledge, and Data Applications
2022 Reviewer for Learning on Graphs
2022 Reviewer for the Workshop Geometrical and Topological Representation Learning, International Conference on Learning Representations
2021 Reviewer for the Workshop Topological Data Analysis and Beyond, Neural Information Processing Systems

2020 Reviewer for the International Conference on Advances in Databases, Knowledge, and Data Applications
2020 Member of the Gesellschaft für Informatik e.V.
2019 Member of the Gesellschaft für Informatik e.V.
2018 Member of the Computational Intelligence and Machine Learning Group, CIML University Regensburg
2017 Member of the Computational Intelligence and Machine Learning Group, CIML University Regensburg
2016 Student Representative for the Department of Language, Literature and Cultural Sciences at the Regensburg University

Supervision

5. B.Sc. Hahn (2021): Classification of Sensor Signals from Power Plants.
4. M.Sc. Sauerhammer (2021): A Classification Dashboard for Sensor Signals from Power Plants.
3. B.Sc. Schäfer (2021): Learning Validation Models from Sensors of a Power Plant.
2. M.Sc. Seidel (2020): Classification of Microbes using Time Series Gas Sensor Array Data.
1. M.Sc. Siddiqui (2020): Extraction of Fetal and Maternal Heartbeats from ECG Signals.

PAPERS

2024 **Luciano Melodia**: Algebraic and Topological Persistence. Bachelor thesis. Friedrich-Alexander Universität Erlangen-Nürnberg.

2023 **Luciano Melodia**: Notes on Simplicial and Singular Homology. Seminar paper. Friedrich-Alexander Universität Erlangen-Nürnberg.

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 a 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 Estimation of Absorbed Radiation Dose for Nuclear Medicine Diagnostics. Library of the University of Regensburg, Master Thesis in Information Science.

2015 **Luciano Melodia**: On the Use of the Paradigm *brauchen* with and without *zu* with Infinitives. In Kateřina Šichová, Reinhard Krapp, Paul Rössler et al. (ed.): Standard Varieties of German – Case Studies from Social Practice, Logos, Berlin.

EDUCATION

2024 – 26, M.Sc.	Mathematics, Friedrich-Alexander University Erlangen-Nürnberg. Minor: Digital Humanities.
2021 – 24, B.Sc.	Mathematics, Friedrich-Alexander University Erlangen-Nürnberg. Topic: Algebraic and Topological Persistence. Minor: Computer Science.
2015 – 18, M.A.	Information Science, Regensburg University. Topic: Deep Learning for Radiation Dose Calculation.
2012 – 15, B.A.	German Philology, Regensburg University Topic: Information Retrieval and Punctuation. Majors: Italian Philology, Information Science, Media Informatics.
2012 – 13	Web Developer, Rechenzentrum Regensburg University.
2012	Abitur, Albertus-Magnus-Gymnasium, Regensburg.

CERTIFIED MOOCS

2021	The Rust Programming Language, Udemy.
2020	The Python Mega Course: Build 10 Real World Applications, Udemy.
2018	Mathematics for ML - Multivariate Calculus, Imperial College London.
2018	Mathematics for ML - Linear Algebra, Imperial College London.
2018	Discrete Mathematics, Shanghai Jiao Tong University.
2018	Introduction to Complex Analysis, Wesleyan University.
2018	Exploratory Data Analysis, Coursera.
2018	Intermediate R - Practice Course, Coursera.
2018	Intermediate R, Coursera.
2018	Introduction to R, Coursera.
2018	Supervised Learning in R - Regression, Coursera.
2018	Supervised Learning in R - Classification, Coursera.
2018	Text Mining - Bag of Words, Coursera.
2018	Deep Learning in Python, Coursera.
2018	Introduction to Machine Learning, Coursera.
2018	Intro to Python for Data Science, Coursera.
2018	Machine Learning Toolbox, Coursera.
2018	Credit Risk Modeling in R, Coursera.
2018	Data Visualization in R, Coursera.
2018	Data Visualization with ggplot2 II, Coursera.
2018	Data Visualization with ggplot2 I, Coursera.
2016	Beer Sommelièr, Sperber Bräu.

INTERESTS

Coding	Python, JavaScript.
Software	GUDHI, Dionysus, Keras.
Languages	German (native), English (C2), Italian (C2), Polish (B2).

Hobbies	Cooking, Reading.
Sports	Boxing.

REFERENCES

Prof. Ph.D. Kang Li
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Friedrich-Alexander University Erlangen-Nürnberg
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Prof. Dr.-Ing. Richard Lenz
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