Luciano Melodia

Curriculum vitae
Last update on 12th June 2024.

luciano.melodia@fau.de
karhunenloeve
melodia_l_1
0000-0002-7584-7287
+49 175 3372526
Regensburg, Germany

PROFESSIONAL EXPERIENCE

2024–25 Private tutor in German and Mathematics.
- Abitur, 9 students, Bavarian Gymnasium.
- Secondary school, 2 students, Bavarian Mittelschule.
- Elementary school, 1 student.

2023–24 Tutor for Algebra and Geometry,
Tutor for Representation Theory and Operator Algebras, FAU[1].
- Planning and implementation of exercise lessons in „Topology and Applications“.
- Planning and implementation of exercise lessons in „Topology“.
- Planning and implementation of exercise lessons in „Linear Algebra“.
- Conducting intensive proof lessons.
- Examination supervision and correction.

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“.
  - 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“.

[1] Friedrich-Alexander University Erlangen-Nürnberg.

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

12. Learning on Graphs (2024, 2023, 2022)
11. 15^{th} International Conference on Advances in Databases, Knowledge, and Data Applications (2023)
10. International Conference on Learning Representations (2022)
9. Machine Learning for Irregular Time Series (2021)
8. International Conference on Pattern Recognition (2021)
7. Topological Data Analysis and Beyond (2020)
6. International Conference on Practical Mathematical Discourse (2020)
5. International Workshop on Combinatorial Image Analysis (2020)
4. European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (2020, 2019)
3. Symposium on Principles of Database Systems (2019)
2. Kolloquium zum Sprachmanagement (2017)
1. Destandardisierung und Standardvarietät (2013)

Service

8. Reviewer for Learning on Graphs (LOG, 2024, 2023, 2022)
7. Student Representative for the Department of Mathematics (Friedrich-Alexander University Erlangen-Nürnberg, 2024)
6. Reviewer for the International Conference on Advances in Databases, Knowledge, and Data Applications (2023, 2020)
5. Reviewer for the Workshop Geometrical and Topological Representation Learning, International Conference on Learning Representations (2022)
4. Reviewer for the Workshop Topological Data Analysis and Beyond, Neural Information Processing Systems (NeurIPS, 2021)
3. Member of the Gesellschaft für Informatik e.V. (2019 – 20)
2. Member of the Computational Intelligence and Machine Learning Group, CIML University Regensburg (2017 – 18)
1. Student Representative for the Department of Language, Literature and Cultural Sciences (Regensburg University, 2016)

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: Theoretical Computer Science.
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.

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
Department of Mathematics
Friedrich-Alexander University Erlangen-Nürnberg
Professor for Representation Theory and Operator Algebras
kang.li@fau.de
+49 9131 85-67060

Prof. Dr.-Ing. Richard Lenz
Department of Computer Science
Friedrich-Alexander University Erlangen-Nürnberg
Professor for Evolutionary Data Management
richard.lenz@fau.de
+49 9131 85-27899

Prof. Dr. rer. nat. Elmar Lang
Department of Biophysics
Professor for Computational Intelligence
elmar.w.lang@ur.de

Prof. Dr. phil. Paul Rössler
Department of German Philology
Professor for German Linguistics
paul.roessler@ur.de
+49 941 943-3444