Simon David **Lindner**

Data Scientist · Complex Systems Researcher

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Personal Details

Name: Simon David Lindner
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Research Interests

My research focuses on complex systems and network science applied to health and language. I have established data-driven frameworks for epidemiology and healthcare analytics, ranging from wastewater-based forecasting to mapping gender-specific multimorbidity networks. Currently, I am expanding these methods to natural language processing by analyzing the semantic topology of legal texts. This expertise underpins my proposed research in computational psychiatry, where I aim to track temporal network dynamics in psychotherapy to predict patient outcomes and visualize therapeutic change.

Education

Medical University of Vienna — *Vienna, Austria*
PhD, Complex Systems — *2020 – 2026 (Expected)*
- Dissertation: Data-driven approaches to healthcare analytics, multimorbidity networks, and wastewater-based epidemiology.

University of Vienna — *Vienna, Austria*
MSc in Physics — *2017 – 2020*
- Thesis: *Thermodynamics of systems with emergent structures*.

University of Vienna — *Vienna, Austria*
BSc in Physics — *2012 – 2017*
- Thesis: *Methods for van der Waals Corrections in Ab Initio Molecular Dynamics*.

ETH Zürich — *Zürich, Switzerland*
Undergraduate Studies — *2010 – 2012*

Work Experience

SUSTech-ETH Institute of Risk Analysis, Prediction & Management (Risks-X) — *Austria (Remote)*
Research Associate — *2026 – Present*
- Analyzing longitudinal legal data to construct dynamic language networks, tracking semantic shifts and structural evolution over time.

Leto Space GmbH — *Vienna, Austria*
Data Scientist — *2024*
- Designed and evaluated machine-learning models for information extraction from unstructured data.

Complexity Science Hub Vienna / Medical University of Vienna — *Vienna, Austria*
Researcher (Complex Systems & Computational Health) — *2020 – 2024*
- Member, Austria's COVID-19 Forecasting Committee: developed wastewater-based and short-term epidemic forecasts that informed national public health decisions.
- Analyzed electronic health records to map multimorbidity networks, uncovering gender-specific associations and socioeconomic health disparities.
- Built privacy-preserving analytics for international collaborations using synthetic data generation and federated learning.

Net Research Experience

Pre-PhD: 2 years (full-time equivalent)

Programming & Data Engineering

Python	NumPy, Pandas, scikit-learn, TensorFlow, PyTorch, Statsmodels
Data Engineering	SQL, ETL pipelines, large-scale data processing
Tools	Git, Docker, Linux, LaTeX, R, MATLAB
Visualization	Matplotlib, Plotly, interactive dashboards

Machine Learning & Statistical Methods

Statistical Modeling	Regression (LASSO, Ridge, GLMMs), Survival Analysis, Bayesian inference
Time Series	Dynamic Time Warping, trajectory clustering, forecasting
ML Methods	Random Forests, Gradient Boosting, SVM, dimensionality reduction (PCA, UMAP)
Deep Learning	CNNs, RNNs/LSTMs, transfer learning
NLP & LLMs	BERT, GPT, transformer fine-tuning, prompt engineering
Network Science	Graph analysis, agent-based modeling, epidemic models (SIR/SEIR)

Academic Publications

Estimating unreported SARS-CoV-2 infections in Austria — *Heliyon*
DOI: 10.1016/J.HELIYON.2025.E43748 — *Aug 2025*
First Author

Sex, Gender, and Stroke Recovery: Functional Limitations and Inpatient Care Needs in Canadian and European Survivors — *International Journal of Stroke*
DOI: 10.1177/17474930241288033 — *Sep 2024*

Socioeconomic Gender Variables Impact the Association between Hypertension and Chronic Health Issues: Cross-Sectional Study — *Journal of Personalized Medicine*
DOI: 10.3390/JPM14080890 — *Aug 2024*

A comparison of synthetic data generation and federated analysis for enabling international evaluations of cardiovascular health — *Scientific Reports*
DOI: 10.1038/S41598-023-38457-3 — *Jul 2023*
First Author

The interplay of adipokines, body composition and glucose homeostasis in pregnant women with a history of RYGB operation — *Nutrients*
DOI: 10.3390/NU15112498 — *Apr 2023*

Homophily-based social group formation in a spin-glass self-assembly framework — *Physical Review Letters*
DOI: 10.1103/PHYSREVLETT.130.057401 — *Jan 2023*

Meteorological factors and non-pharmaceutical interventions explain local differences in the spread of SARS-CoV-2 in Austria — *PLOS Computational Biology*
DOI: 10.1371/JOURNAL.PCBI.1009973 — *Apr 2023*

Sex Differences in Clinical Characteristics and Outcomes of Patients with SARS-CoV-2 Infection Admitted to Intensive Care Units in Austria — *Journal of Personalized Medicine*
DOI: 10.3390/JPM12040517 — *Mar 2022*

Agent-based simulations for protecting nursing homes with prevention and vaccination strategies — *Journal of the Royal Society Interface*
DOI: 10.1098/RSIF.2021.0608 — *Dec 2021*

Thermodynamics of structure-forming systems — *Nature Communications*
DOI: 10.1038/S41467-021-21272-7 — *Feb 2021*
First Author

Invited Talks & Conference Presentations

Stratifying Cancer Patients Using Visit Trajectory Analysis

NetSI London Seminar Series 2025, Northeastern University

Invited seminar

London, Oct, 2025

Stratification of Cancer Patients Using Visit Trajectory Analysis

CCS 2024 — Conference on Complex Systems

Contributed talk · Complexity in Health

Exeter, Sep, 2024

The Impact of Gender and Socio-Economic Factors on Hypertension and Comorbidities in Europe

NetSci 2023 — Medical NetSci Satellite

Satellite talk

Vienna, Jul, 2023

Homophily-based social group formation in a spin-glass self-assembly framework

CCS 2022 — Conference on Complex Systems

Contributed talk

Palma de Mallorca, Oct, 2022

Thermodynamics of structure-forming systems

NERCCS 2021 — Northeast Regional Conference on Complex Systems

Contributed talk (online)

Apr, 2021