

## Education

- **Saarland University** Saarbrücken, Germany  
*Ph.D. Computer Science, Advisor: Prof. Isabel Valera* 2021 - Present
  - **Research Interests:** Deep generative modeling, probabilistic modeling for time-series data.
  - ELLIS Ph.D. student, co-advised by Prof. Ole Winther.
- **Bogazici University** Istanbul, Turkey  
*M.Sc. Computer Engineering, Advisor: Prof. Lale Akarun* 2018 - 2021
  - GPA: 3.8/4
- **Bogazici University** Istanbul, Turkey  
*B.Sc. Physics* 2013 - 2018
  - **Accomplishments:**
    - \* Ranked as 3rd in the class of 2018 with GPA:3.47/4
    - \* Recipient of Fulbright Ph.D. Grant (2018)
    - \* Turkish Research Council Undergraduate Scholarship (\$20k) (2014-2018)
    - \* Awarded with Bogazici University Honor Certificate

## Research Experience

- **Saarland University** Saarbrücken, Germany  
*Research for Ph.D. Thesis* Present
  - Building Macroeconomic Time-Series Foundation Models for forecasting, scenario-planning, and counterfactuals using comprehensive multi-country economic data.
  - Interpretable and robust probabilistic transformer architectures for multivariate time-series analysis.
  - Efficient and expressive architectures for learning implicit neural representations.  
*Amortized inference based learning for INRs which enables conditional usage and provides (up to) 10 fold speed improvement during inference.*
  - Real-life applications for personalized stress nowcasting.  
*Development of hierarchical ML pipelines for detecting and forecasting stress levels using wearable data.*
  - Expressive auto-regressive generative models with INRs.
  - Scalable methods for personalized time-series imputation and forecasting for healthcare domain.
- **Bank for International Settlements** Basel, Switzerland  
*Visiting Researcher* Spring 2025
  - Worked with Fernando Perez-Cruz on Macroeconomics Time-Series Foundation Models.
- **Technical University of Denmark** Copenhagen, Denmark  
*Visiting Researcher* Summer 2025
  - Collaborated with Prof. Ole Winther on time-continuous generator functions.
- **Bogazici University** Istanbul, Turkey  
*Research for M.Sc. Thesis* Fall 2020 - Summer 2021
  - Worked with Prof. Lale Akarun and Prof. Ali Taylan Cemgil (currently at DeepMind) on analysis and regularization of deep generative second order ordinary differential equations.
- **Bogazici University** Istanbul, Turkey  
*Medical and Biological Physics Research Group* Fall 2019 - Fall 2020
  - Worked with Prof. Mehmet Burcin Unlu as a graduate research assistant with the focus on building deep learning models for medical physics problems in spatio-temporal domain.
- **University of California, Irvine** Irvine, CA  
*Undergraduate Research Assistant* Summer 2017
  - Worked on designing electronic circuits for photo-magnetic imaging system and developing a data acquisition pipeline for CT guided molecular fluorescence tomography system using MATLAB.

## Manuscripts

- **Koyuncu, B.**, Kwon, B., Lombardi, M. J., Perez-Cruz, F., Shin, H. S. (2025). A Foundational Model For Conditional Forecasting Macroeconomic Variables. Under review.
- **Koyuncu, B.**, Koyuncu, B., DeVries, R., Winther O., Valera, I. (2025). Temporal Variational Implicit Neural Representations. Under review.
- Peis, I., **Koyuncu, B.**, Valera, I., Frellsen, J.(2025). Hyper-Transforming Latent Diffusion Models. International Conference on Machine Learning (ICML).
- **Koyuncu, B.**, Bauerschmidt, T.N., Valera, I.(2024). E-ProTran: Efficient Probabilistic Transformers for Forecasting. Workshop on Structured Probabilistic Inference & Generative Modeling, ICML.
- **Koyuncu, B.**, Kiran, A. D., ..., Valera, I. (2024). From Laboratory to Everyday Life: Personalized Stress Prediction via Smartwatches. Machine Learning for Life and Material Science Workshop, ICML.
- **Koyuncu, B.**, Sanchez-Martin, P., Peis, I., Olmos, P. M., Valera, I. (2023). Variational Mixture of Hyper Generators for Learning Distributions Over Functions. International Conference on Machine Learning.
- Parlatan, U., Ozen, M. O., Kecoglu, I., **Koyuncu, B.**, ..., Demirci, U. (2023). Label-Free Identification of Exosomes using Raman Spectroscopy and Machine Learning. Small, 2205519.
- **Koyuncu, B.**, Melek, A., Yilmaz, D., Tuzer, M., Unlu, M. B. (2022). Chemotherapy Response Prediction with Diffuser Elapser Network. Scientific Reports, 12(1), 1-13.
- **Koyuncu, B.** (2021). Analysis of ODE2VAE with Examples. Fourth Workshop on Machine Learning and the Physical Sciences, NeurIPS. arXiv:2108.04899

## Talks & Presentations

- **VaMoH: Inferring distributions over functions** Alicante, Spain  
*at ELLIS Alicante Unit* April 2023
- **Using CNNs to learn dynamics of coupled PDEs** Istanbul, Turkey  
*at Bogazici University* March 2020
- **Utilizing deep learning models to predict chemotherapy response** Istanbul, Turkey  
*at Kodluyoruz Research* February 2020
- **Solving Combinatorial Optimization Problems with RL** Istanbul, Turkey  
*at Inzva* November 2019

## Teaching

- **Advanced Time Series Analysis** Saarland University  
*Assistant Instructor* Spring 2025
  - Teaching EM, HMM, Variational Inference modules
  - Leading sessions on Transformers and Foundation models.
- **ProbAI Summer School** Copenhagen  
*Assistant Instructor* Summer 2024
  - TA for Variational Inference and Optimization, and Introduction to Deep Generative Models sessions.
- **Machine Learning Course** Saarland University  
*Assistant Instructor* Spring 2023
  - Preparation of course material for regression and classification modules.
  - Preparing and maintaining semester project on sentiment prediction in Twitter.
- **Data Science and AI Project** Saarland University  
*Assistant Supervisor* Spring 2023
  - Supervising undergraduate and master students for term-project “Conformal Predictions for Traffic Sign Recognition”.

## Skills

- **Programming languages:** Python, MATLAB, C++, Cython, SQL
- **Frameworks:** Pytorch, Keras, Tensorflow, ROOT, Git