

# Frank Fundel

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## Personal Profile

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I am currently pursuing a master's degree in Computer Science at Ulm University, with a strong interest in Representation Learning and Image Synthesis. My academic path has been marked by a strong foundation in Machine Learning and Deep Learning, leading to a published thesis on Computational Bioacoustics. My experience ranges from implementing cutting-edge Object Detection and Image Segmentation techniques at Liebherr to researching Diffusion models and Semantic Correspondence. I'm passionate about research and dedicated to solve complex problems in the field of computer vision.

## Education

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### University of Ulm / Ludwig Maximilian University

Ulm and Munich, Germany

Master of Science in Computer Science

Since 2022

- Specialization in Deep Learning, Deep Vision and Neuroinformatics
- Research on Computational Bioacoustics, Image Segmentation and Image Generation
- Thesis on Semantic Correspondence of Diffusion Models at Computer Vision & Learning group at LMU
- Final grade of 1.2 (expected)

### Stellenbosch University

Stellenbosch, South Africa

Study Abroad for Master's Project

2022 - 2023

- Focus on Computational Bioacoustics and Deep Learning
- Project on Unsupervised Learning for improved Bioacoustic Monitoring
- Part of an ongoing research project aimed at being published

### University of Ulm

Ulm, Germany

Bachelor of Science in Computer Science

2018 - 2022

- Focuses included Machine Learning, Deep Learning for Graphics, Dialogue Systems, and Computational Bioacoustics
- Thesis on using Bioacoustic Classification using Transformer Networks which was published in a dedicated journal
- Final grade of 2.0

### Technical High School Ehingen

Ehingen, Germany

General University Entrance Qualification

2015 - 2018

- Final grade of 1.9

## Work Experience

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### Predori GmbH

Neu-Ulm, Germany

Data Scientist (Working Student)

Since Aug 2023

- Focused on Large Language Models and Retrieval Augmented Generation.

### Liebherr Digital Development Center GmbH

Ulm, Germany

Research Scientist (Working Student)

Apr 2022 - Aug 2023

- Training models for Image Classification with Vision Transformers and Zero-Shot Instance Segmentation.
- Engaged in Visualization and Out of Distribution Detection.
- Participated as a presenter at Paper Discussions.

### Self-Employed

Ulm, Germany

Commercially Active as Software Developer

Since Feb 2017

- Project management and development in the app, database, and server area.
- Full stack development using technologies like React Native, Node JS, Firebase, Elastic Search, and Chat Bots.

### Institute for Dialogue Systems

Ulm University

Research Assistant

Dec 2021 - Mar 2022

- Developed a Deep Learning model to convert Audio-to-3D Facial Movement.
- App development for hologram representation.

### Fledermausschutz Neu-Ulm

Neu-Ulm, Germany

Volunteer

Since May 2022

- Mainly conducting educational lectures.
- Involved in emergency care and nursing of bats.

# University Projects

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## Distillation of Diffusion Features for Semantic Correspondence Thesis

Munich, Germany

Computer Vision & Learning group at LMU

2023

- Research focused on Distillation Techniques, Semantic Correspondence and Diffusion models.
- **Acquired knowledge:** Training of large models, Deep Features, Distillation Techniques

## Scene Graph Conditioned Diffusion Models Project

Ulm, Germany

University of Ulm

2023

- Research focused on Scene Graph Conditioned Diffusion models.
- **Acquired knowledge:** Diffusion models, Conditioning Techniques

## Few-Shot Segment Anything Model Project

Ulm, Germany

University of Ulm

2023

- Developed novel methods for Instance Segmentation using Few-Shot prompting.
- **Acquired knowledge:** Vision Transformers, Parameter Efficient Fine-Tuning

## Computational Bioacoustics Research Project and Thesis

Ulm, Germany and Stellenbosch,  
South Africa

University of Ulm and Stellenbosch University

2022-2023

- Developed Transformer-based Networks for Bat Call Classification and Mixed Call Synthesis.
- Further research on Unsupervised Learning for Bioacoustics Monitoring.
- **Acquired knowledge:** Transformer models, Unsupervised Learning, Data Engineering, Research, Scientific Writing.

# Skills

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**Programming** Python, Java, JavaScript, C#

**Frameworks & Libraries** PyTorch, TensorFlow, MATLAB, React Native

**Soft Skills** Visualizations and Design, Presentation Skills, Lecturing

# Achievements

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2023 **3rd Place**, Ocean Hackathon International

Brest, France

Illegal fishing detection using high-frequency radar and Deep Learning.

# Publications

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## JOURNAL ARTICLES

Automatic bat call classification using transformer networks

Frank Fundel, Daniel A. Braun, Sebastian Gottwald

*Ecological Informatics* p. 102288. 2023

# Interests

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**Nature** I love being outside, swimming, camping and looking for anything that is alive.

**Sports** I like to go hiking, biking, scuba diving and doing fitness training to get some fresh ideas.

**Tinker** I always enjoyed tinkering on small projects ranging from complex apps, tools and IoT devices to making chocolate, custom wild-camera traps and hydrophones.

**Art** Sometimes I like to spend time drawing, painting and crafting.

# Languages

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**English** Professional proficiency

**German** Native proficiency

**French** Basic knowledge

**References available upon request.**