



# Dr.-Ing. Fuzhan Rahamanian

## WORK EXPERIENCE

### Accelion

CTO & Co-Founder

10/2024 - Present

- Founded a AI-StartUp for building an acceleration platform for improving the battery value chain.

### Technical University of Munich (TUM)

Research Assistant

01/2024 - Present

- Led an international collaboration of laboratory automation integrating AI-planners, data analysis, management, and hardware orchestration
- Supervision of numerous involved parties and budget requirements and successful contribution to financial grants application
- Managed platform development, quality assessment, and deliverable coordination for BIG-MAP work packages

### Karlsruhe Institute of Technology (KIT)

#### PoLiS Cluster of Excellence

AI Researcher

01/2020 - 12/2023

- Coordination and Planning of Inter-Academic Projects for the Development of a web-based asynchronous material acceleration platform as part of BIG-MAP
- Successfully lead the optimization of electrolyte formulations through active learning algorithms between Forschungszentrum Jülich and KIT

### BASF SE - Ludwigshafen

AI Research Internship

01/2023 - 05/2023

- Plan, lead, and deployment of an interdisciplinary project between department of Digitalization and Battery that substantially reduced battery testing time and material costs in 6 months
- Coordinated constructive collaboration and open dialog between the involved industrial and academic parties
- Pipeline development data driven modelling and AI-aided solution for electrochemical processes

### Ulm University - Experimental Physics / Visual Computing

xAI Research Scientist and Teaching Assistant

06/2017 - 02/2020

- Responsible for the *Physics Praktika* and supervision of 30 students
- Developed an explainable deep learning platform with Tensorflow ([GitHub](#)) for feature visualization

## EDUCATION

### LANGUAGES

Persian	English		
Native Speaker	Fluent		
German	Arabic		
B2, acquiring C1	Elementary		
Italian			
Elementary			

### Technische Universität München (TUM)

PhD, Data Science and Digitalization

08/2023 - 06/2024

1.0\* - Summa Cum Laude

Dissertation: *Design and Implementation of Enablers in Materials Acceleration Platforms for Battery Research*

### The University of Huddersfield, United Kingdom

Master of Science, Artificial Intelligence

09/2019 - 09/2021

0.8\* - With Distinction

Thesis: *Outlier treatment and efficient synthetic data generation for heart failure prediction*

### Ulm University, Germany

Master of Science, Biophysics

09/2018 - 06/2019

1.9 - (Good)

Thesis: *Functionalizing of cantilever in AFM for Biophysical applications*

### Ulm University, Germany

Master of Science, Advanced Materials

11/2016 - 06/2019

1.6 - (Good)

### Amirkabir University of Technology - Tehran Polytechnic, Iran

Bachelor of Engineering, Biomedical/Medical Engineering

09/2012 - 06/2016

16.90/20

## PROJECTS

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### Autonomous millimeter scale high throughput battery research system (Auto-MISCHBARES)

11/2022 - 12/2023

AI Research Project

- Took the lead on the development of the AI strategy, Data governance, scientific publication and review. Coordinated and the strategic planning between interdisciplinary collaborators.
- Developed a transparent AI solution through a web-based asynchronous platform for integrating combinatorial synthesis, high-throughput characterization, quality control assessment, automatic analysis, machine learning and data management
- Design of a user-friendly, reactive Web Interface for experimental definition ([GitHub](#))

### Attention-based ReCurrent Algorithm for Neural Analysis (ARCANA)

01/2023 - 08/2023

Collaborative Industrial AI Project

- Design and implementation of a time-series algorithm for the estimation of the state of health prediction of battery materials and evaluation of their cycling stability. ([Python Package](#))
- Development, optimization and training of the model on big data samples using high-performance computing infrastructure (curiosity supercomputer) @BASF ([GitHub](#))
- Delivered measurable time savings for different stakeholders

### Modular and Autonomous Data Analysis Platform (MADAP)

04/2022 - 12/2022

Research project

- Lead an outcome-driven solution for electrochemical application across an interdisciplinary team located in Aachen, Münster, and Ulm
- Designed & implemented object-oriented & abstract application for analyzing & visualizing electrochemical datasets
- Deployed the application as a [Python Package](#) usable via GUI or CLI ([GitHub](#))

### Hierarchical Experimental Laboratory Automation and Orchestration (HELAO)

02/2020 - 08/2021

Internationally applied Laboratory Automation Framework

- Team leadership and project management of the platform development for battery research between KIT and CalTech
- Actively used in two laboratories in Ulm and Münster for running closed loop optimization on multiple instruments without human intervention ([GitHub](#))

### Development of feature visualization using TensorFlow (Luna)

11/2020 - 08/2022

XAI Research project

- Translation of the lucid package developed by OpenAI Microscope from TensorFlow 1 to 2 ([GitHub](#))
- Capable of analyzing any Deep Learning TensorFlow-based models and visualizing their neurons, channels, layers, and output layers

### Outlier treatment and efficient synthetic data generation for heart failure prediction

12/2020 - 08/2021

Masterthesis

- Applied data mining and cleaning methods for outlier detection, dimensionality reduction and feature selection
- Performed data augmentation techniques including SMOTE, Adasyn and generative models (cGAN)
- Built reliable ML algorithm with high recall value for medical decision-making support

## AWARDS

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### Zeiss Women Award 2024 - Digital Research

10/2024

For women with ambition in Digital & IT

⇒ <https://www.zeiss.de/corporate/ueber-zeiss/gegenwart/newsroom/pressemitteilungen/2024/women-award.html>

### BIG-MAP PhD Award - Exceptional scientific contribution and leading role in the BIG-MAP project

10/2023

Battery Interface Genome - Materials Acceleration Platform

### The Departmental Prize for the Best Overall Performance on Postgraduate study in Computer Science

03/2022

### The Departmental Prize for the Best Postgraduate Project in Computer Science

University of Huddersfield: School of Computing and Engineering

### The Chancellor's Prize for Outstanding achievement by a postgraduate student

03/2022

University of Huddersfield: Sir George Buckley (Chancellor)

### STIBET scholarship

10/2018

DAAD (Deutschen Akademischen Austauschdienstes)

### Interview and published article by Südwest Presse"

01/2018

Ulm und Neu Ulm: „Ich erwarte sehr viel von mir“

### Selected as Elite Student Rank (top 0.5% of all University applicants)

06/2012

University Entrance Examination Committee in Mathematics and Physics

## EXTRACURRICULAR CERTIFICATIONS

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<b>Udacity Nanodegrees</b>	07/2019 - 02/2020
AI programming with Python, Machine learning, Deep learning, Deep Reinforcement Learning	
<b>Data science (Bosch AI Talent accelerator scholarship)</b>	06/2022 - 11/2022
<ul style="list-style-type: none"><li>• Disaster Response pipeline: ETL / ML pipeline and a deployed Flask WebApp</li><li>• Identification of customer segments: Data preprocessing, feature transformation and clustering</li><li>• Object detection in an urban environment: EDA, Transfer learning, Tf Object Detection API, augmentations</li></ul>	
<b>Coursera</b>	08/2020 - 10/2020
Machine learning, Convolutional Neural Network, TensorFlow, Object-Oriented-Programming	
<b>Management Workshop</b>	10/2020 - 11/2020
Project management course provided by Hector School of Engineering and Management, part of the MBA Program of KIT	

## PUBLICATION HIGHLIGHTS

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### 2024 - Attention towards chemistry agnostic and explainable battery lifetime prediction

Nature - npj Computational Materials

### 2024 - Autonomous millimeter scale high throughput battery research system

RSC - Digital Discovery

### 2023 - Conductivity experiments for electrolyte formulations and their automated analysis

Nature - Scientific Data

### 2022 - One-shot active learning for globally optimal battery electrolyte conductivity

Batteries & Supercaps

### 2022 - Enabling Modular Autonomous Feedback-Loops in Materials Science through Hierarchical Experimental Laboratory Automation and Orchestration

Advanced Materials Interfaces

## CONFERENCES

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### Presentation "Workflows and orchestration in Self Driving Laboratories, Machine Learning" - INT workshop

02/2024

Artificial Intelligence for Materials Science, Department of Informatics, Karlsruhe Institute of Technology (KIT)

### Presentation "Elements for Materials Acceleration Platforms" - BIG-MAP EUnified Battery Data Space Workshop

01/2024

BIG-MAP - European Union's Horizon 2020, Grindelwald, Switzerland

### Presentation "Autonomous millimeter scale high throughput battery research system (Auto-MISCHBARES)"

06/2023

eMRS Conference Strasbourg, RSC Conference Dublin

### Presentation: "AI Accelerated Asynchronous Experimentation for Battery Materials Discovery"

11/2021

MRS Conference Boston

### Presentation: "How can machine learning and autonomy accelerate chemistry?"

09/2020

Chemical Science Symposium

## TEACHING EXPERIENCE

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### Karlsruhe Institute of Technology (KIT)

Tutor of Machine learning and Data management for chemistry, Assistant in Physical Chemistry  
Praktikum for beginners

### Ulm University

Tutor of Computer Vision, Tutor of Deep Learning for Graphics and Visualisation  
Corrector of Geometry, Corrector of Analysis for Engineering and Computer Science, Corrector of applied discrete mathematics