DR. SHAKEEL A . SHEIKH

Novartis AG, Basel, Switzerland

◇ Webpage ◇ E-mail ◇ LinkedIn ◇ Github ◇ Google Scholar ◇

EXPERIENCE

Data Science Innovation Fellow, Novartis AG[1], Switzerland *Dec. 2024 - Present*
AI for Target Identification of Genes in Oncology
Project 1. *In Silico Perturbation of Single Cell (scRNA) Sequencing Using Foundation Models (LLMs)*
Project 2. *LLMs for Proteomics & Agentic Frameworks*

PostDoc Scientist, Idiap Research Institute (EPFL)[2], Switzerland *Nov. 2023 - Dec. 2024*
Project: ChaSpeePro, Swiss National Science Foundation Funding
In collaboration with University of Geneva and Geneva Hospital
PI: *Dr. Ina Kodrasi*
Description: *Self-supervised Learning and GNNs for Pathological Speech*

PostDoc Research Scientist, Bielefeld University, Germany *March 2023 - Nov-2023*
Project: Graph DL Based Cortex Tumour Detection in Human Brain
Funding → *German Humboldt*
PI: *Prof. Yaochu Jin*
Description: Worked on MRI Images Using Graph Neural Networks and 3D U-Nets

NLP Internship, LIG Lab, Grenoble Alpes University, France *Jan 2019 - June-2019*
Project: Neural MT in Low Resource Settings Using Pretrained Contextual Embeddings
Supervisor: Prof. Laurent Besascier

Database cum QAC Engineer, BQE Software Inc., India *2015 - 2016*
Worked on Data Conversion Using MySQL

EDUCATION

PhD, University of Lorraine, Inria, Loria, CNRS, France *Oct 2019 - Feb-2023*
Thesis: Deep Learning for Audio Based Stuttering Detection, Article in Press
Funding → *French National Research Agency*
Supervisor: Prof. Slim Ouni

M1. Computer Science, Grenoble Alps University, France *2018 - 2019*
Project: Neural Machine Translation in Low Resource Settings Using Pretrained BERT Embeddings
Supervisor: Prof. Laurent Besascier

M.S. Computer Science, Istanbul University,, Turkey *2017 - 2019*
Project: Intelligent Clustering of Authentic Religious Texts based on Contextual Similarity Using DL
CGPA → *3.67/4, Rank → 1*

B.Tech, Computer Science Engineering, University of Kashmir, India *2011 - 2015*
CGPA → *83.48/100, Rank → 1*

TEACHING EXPERIENCE

Teaching Assistant, Deep Learning (EE-559 → MS Course), EPFL, Switzerland *Spring Session 2024*
with Prof. Cavallaro Andrea (Director → Idiap Research Institute)
Supervision of Master Project HateSpeech Classification Using Language Models

[1] *Global Top 5: Novartis is a leading Institute in AI for Biomedical Research*
[2] *Idiap research institute is affiliated with EPFL having a QS 2022 university world rank of* **14**

Deep Learning, Bielefeld University, Germany *Mar 2023 - Nov 2023*
With Prof. Yaochu Jin, Masters Course

COLLABORATION

Dr. Yacouba Kaloga, IDIAP Research Institute, Switzerland *Nov 2023 - Present*
ChaSpeePro Project

Dr. Patrick Marmaroli , Microsoft, Estonia *July 2025 - Present*
Pathological Speech Agents

Prof. Björn W. Schuller , TU Munich/Imperial College London *July 2025 - Present*
Pathological Speech Agents

Dr. Md Sahidullah, Institute for Advancing Intelligence, CG CREST *Nov 2023 - Present*
ChaSpeePro Project Collaboration/Pathological Speech Agents

RESEARCH PROPSAL GRANTS

Multimodal Stuttering Detection Using Self-Supervised Learning 2023
Inria Research Institute, France

INTERNATIONAL FELLOWSHIPS GRANTS

Deep Learning & **NLP Summer Schools**
DeepLearn Summer School 2022 DeepLearn2022, Spain *July 2022*
ULPGC, Universitat Rovira i Virgili, IRDTA, Gran Canaria, Spain
Advanced Language Processing School 2021, France *Jan 2021*
LIG Research (Univ. Grenoble Alpes) and Naver Labs Europe, France
Lisbon Machine Learning Summer School 2020, LxML2020, Portugal *July 2020*
IST, INESC-ID, Unbabel, Priberam Labs and Cleverly, Portugal
Oxford Machine Learning Summer School 2020 OxML2020, UK *Aug 2020*
AI for Global Goals and in partnership with Oxford Saïd Business School, Oxford Deep Medicine Program, and Canada CIFAR, UK.

Travel Grants
European Signal Processing Conference 2021 2021
European Signal Processing Conference 2021 2022
MOMI2022: Le Monde des Mathematiques Industrielles 2022 2022
ACM International Conference on Multimedia 2022 2022

ONLINE CERTIFICATION COURSERS

Retrieval Augmented Generation (RAG) by DeepLearning.AI on Coursera 2025
Fundamentals of AI Agents Using RAG and LangChain by IBM on Coursera 2025
Natural Language Processing in TensorFlow by DeepLearning.AI on Coursera 2020
Deep Neural Networks with PyTorch with IBM on Coursera with IBM on Coursera 2020
Convolutional Neural Networks in TensorFlow, DeepLearning.AI 2019
Introduction to TensorFlow for AI, ML, and DL, DeepLearning.AI 2019
Machine Learning by Stanford University on Coursera 2018
Neural Networks and Deep Learning by DeepLearning.AI on Coursera 2018
A Crash Course in Data Science by Johns Hopkins University 2017

PROJECTS

Building a Large Language Model (LLM) for Kashmiri Language (from Scratch) (In Progress):

- Developing a Transformer-based LLM architecture (ChatGPT) from scratch, including attention mechanisms (and its variants e.g., masked attention).
- Implementing training pipelines and decoding strategies (such as Top-K Sampling) using NLP techniques and deep learning principles (In progress).

ChaSpeePro: A Deep Learning Tool for Healthcare Pathological Speech Detection

- Developed graph neural network models specifically designed for pathological speech analysis.
- Utilized data from a wide range of speakers to create a comprehensive model, enhancing the accuracy of speech disorder detection.
- Integrated GNNs with wav2vec2 embeddings to effectively capture and analyze complex speech patterns and relationships.
- Achieved significant improvements in diagnostic precision compared to conventional methods.
- Contributed to advancing the state-of-the-art in healthcare diagnostics for speech pathology, leading to more reliable and effective detection and classification.

MRI2Graph: A Python tool for converting medical MRI images to Graphs for Eloquent Cortex Tumours

- Developed MRI2Graph, a Python tool for converting medical MRI images into graph representations for analyzing eloquent cortex tumors.
- Implemented graph neural networks (GNNs) and 3D U-Nets, leveraging the MONAI library for efficient model development and medical image processing.
- Utilized PyTorch for model training and applied Weights & Biases to track experiments, monitor model performance, and manage hyper-parameter optimization.

StutterNet and its Variants (Private Repo)

- **StutterNet:**
  - Designed a deep learning model to detect speech dysfluencies using audio modality.
  - Implemented using Python and PyTorch, achieving state-of-the-art performance on relevant datasets.
- **Multicontextual StutterNet:**
  - Enhanced the base StutterNet model by incorporating multiple context windows.
  - Increased model robustness and detection accuracy through diverse contextual information.
  - Utilized advanced neural network techniques to fuse multi-contextual data effectively.
- **Adversarial StutterNet:**
  - Integrated adversarial training methods to improve model robustness.
- **SSL for Speech Disorder Detection:**
  - Employed self-supervised learning (SSL) techniques to detect speech disorders with minimal labeled data.
  - Leveraged large amounts of unlabeled speech data to pre-train models, enhancing performance with limited supervision.

ACM MM Challenge: End-to-End and SSL for ComParE 2022 Stuttering Sub-Challenge

- Developed end-to-end and speech embedding-based systems trained in a self-supervised manner for the ACM Multimedia 2022 ComParE Challenge, focusing on the stuttering sub-challenge.
- Employed embeddings from the pre-trained wav2vec2 model for stuttering detection (SD) on the KSoF German dataset.
- Benchmarked several methods for SD after extracting embeddings.
- Achieved a UAR of 41.0% on test sets, respectively, surpassing the best challenge baseline (DeepSpectrum) by 37.6%.
- Demonstrated further improvement by concatenating various layer embeddings achieving a UAR of 42.7% on the test set.
- Ranked 4^{th} in the ACM Multimedia 2022 Grand Challenge.

Neural Machine Translation (NMT) in Low Resource Settings:

- Developed and implemented a NMT system for low-resource languages.
- Integrated BERT with OpenNMT and PyTorch frameworks to build and train the translation models.
- Conducted extensive experiments to evaluate the performance of BERT-augmented NMT in comparison to baseline models.

Robotics and IoT: Balloon Detection and Obstacle Avoidance in C++ & ROS

- Developed a C++ and ROS-based system for real-time balloon detection and obstacle avoidance in robotics applications.
- Implemented computer vision algorithms and integrated them with robotic systems to enhance autonomous navigation and object interaction.

NachOS Operating System Design in C & C++

- Developed an operating system prototype, NachOS, using C and C++.
- Implemented core OS components such as process scheduling, memory management, shell and file systems.

Babble: Thread Server in C

- Developed a multi-threaded server to manage concurrent client requests.
- Designed and implemented thread management mechanisms and synchronization techniques for high performance.

Virtual Memory Allocator in C

- Implemented a virtual memory allocator to manage memory allocation and deallocation efficiently.
- Designed memory management algorithms to optimize performance and resource utilization i.e replicating already built memory allocators.

***Data Conversion**:*

- Converted clients' data from legacy software to the company's new platform using MySQL, ensuring seamless data migration.
- Developed robust data conversion processes to prevent data loss during the transition, preserving the integrity of critical information.

- Successfully migrated large datasets, minimizing downtime and ensuring a smooth transition for clients switching to our software.
- Implemented optimized MySQL queries and scripts, resulting in significant performance improvements during the data migration process.

TECHNICAL STRENGTHS

AI Models	Geneformer, CNNs, Transformer (base of ChatGPT/LLMs), Graph Networks, LSTMs, etc.,
Computer Languages	Python, C/C++, MATLAB, MySQL. Java
Software & Tools	PyTorch, HuggingFace, PyTorch Geometric, Monai, Weighhts & Biases, Cluster Grid Computing, SpeechBrain, Gensim, NLTK, TensorFlow, Git, Matlab, Octave, Numpy, Keras, Pandas, Scipy, Sckit-Leaarn, OpenNMT, OpenMP, OpenMPI, HTML, Docker (basic), AnnData, Seurat, LangChain (Basics)
Agentic Frameworks	crewAI, LangChain, FineTuning (LoRA, QLoRA), OpenAI, Azure Foundry
Data Modalities	Omics, Speech, Image, and Text
Spoken Languages	English, Arabic (Conversational), French (A1), German (A1), Turkish, Kashmiri

HONOURS & AWARDS

Swiss National Science Foundation 2023-2024
PostDoc Research, IDIAP Research Institute, Switzerland

German Humboldt Funding 2023-2025
PostDoc Research, CITEC Research Lab, University of Bielefeld, Germany

Gold Medalist 2021
Rank 1^{st} *in B.Tech CSE, University of Kashmir.*

Certificate of Merit 2021
Rank 1^{st} *in B.Tech CSE, University of Kashmir.*

Turkish Government Scholarship 2016 - 2019
MS, Istanbul University, Turkey.

HSC Rank 2nd in Mathematics 2010
Achieved 2^{nd} *Rank in Mathematics in HSC (Kashmir State).*

PROFESSIONAL SERVICES

Reviewer

Journals	IEEE/ACM Transactions on Audio, Speech, and Language Processing (**IF = 5.4**) Circuits, Systems, and Signal Processing (**IF = 2.3**) Neurocomputing (**IF = 6.5**) EURASIP (**IF = 2.0**) Biomedical Signal Processing and Control (**IF = 4.9**) IEEE JBHI (**IF = 7.7**)
Conferences	ICASSP 2024, 2025 (***Rank 1 Conference for Speech***)
Volunteer	Interspeech 2022
Founder	Kashmir Guidance: Working to help, guide and support the students for international education and exchange; specifically and limited to students of Jammu and Kashmir (Society Contribution).

PUBLICATIONS

Journal Articles (Peer-reviewed)

[1] **Shakeel A. Sheikh**, M Sahidullah, Fabrice Hirsch, and Slim Ouni. "Machine learning for stuttering identification: Review, challenges and future directions". In: *Journal of Neurocomputing (**IF = 6.5**)* 514 (2022), pp. 385–402. ISSN: 0925-2312. DOI: 10.1016/j.neucom.2022.10.015.

[2] **Shakeel A. Sheikh**, Md Sahidullah, F Hirsch, and Slim Ouni. "Stuttering Detection Using Speaker Representations and Self-supervised Contextual Embeddings ". In: *International Journal of Speech Technology* (2023).

[3] **Shakeel A. Sheikh**, Md Sahidullah, Fabrice Hirsch, and Slim Ouni. "Advancing Stuttering Detection via Data Augmentation Class-Balanced Loss and Multi-Contextual Deep Learning". In: *Journal of IEEE Biomedical Informatics (**IF = 7.7**)* (2023). DOI: 10.1109/JBHI.2023.3248281.

[4] **Shakeel A. Sheikh**, Md Sahidullah, and Ina Kodrasi. "Overview of Automatic Speech Analysis and Technologies for Neurodegenerative Disorders: Diagnosis and Assistive Application". In: *IEEE Journal of Selected Topics in Signal Processing (**IF = 13.7**)* (July 2025).

Conferences (Peer-reviewed)

[5] **Shakeel A. Sheikh**, Yacouba Kaloga, Sahidullah Md, and Ina Kodrasi. "Graph Neural Network for Pathological Speech Detection". In: *Proc. of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP → **Core A**)*. 2025. DOI: 10.1109/ICASSP49660.2025.10890110.

[6] **Shakeel A. Sheikh** and Ina Kodrasi. "Impact of Speech Mode in Automatic Pathological Speech Detection". In: *Proc. of European Signal Processing Conference (EUSIPCO → Core B)*. 2024. DOI: 10.23919/EUSIPCO63174.2024.10714947.

[7] **Shakeel A. Sheikh**, Md Sahidullah, F Hirsch, and Slim Ouni. "Robust Stuttering Detection via Multi-task and Adversarial Learning". In: *Proc. of 30th European Signal Processing Conference (EUSIPCO → Core B)*. 2022. DOI: 10.23919/EUSIPCO63174.2024.10714947.

[8] **Shakeel A. Sheikh**, Md Sahidullah, Fabrice Hirsch, and Slim Ouni. "StutterNet: Stuttering Detection Using Time Delay Neural Network". In: *Proc. of 29th European Signal Processing Conference (EUSIPCO → Core B)*. 2021, pp. 426–430. DOI: 10.23919/EUSIPCO54536.2021.9616063.

[9] **Shakeel A. Sheikh**, Md Sahidullah, Fabrice Hirsch, and Slim Ouni. "End-to-End and Self-Supervised Learning for ComParE 2022 Stuttering Sub-Challenge". In: *Proc. of 30th ACM International Conference on Multimedia (ACMMM2022 → **Core A***)*. 2022. DOI: 10.1145/3503161.3551588.

[10] Yacouba Kaloga, **Shakeel A. Sheikh**, and Ina Kodrasi. "Multiview Canonical Correlation Analysis for Automatic Pathological Speech Detection". In: *Proc. of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP → **Core A**)*. 2025. DOI: 10.1109/ICASSP49660.2025.10888902.

Preprints, Posters & Scientific Reports

[11] **Shakeel A. Sheikh**, Md Sahidullah, Fabrice Hirsch, and Slim Ouni. *Stuttering Identification using Deep Learningm MOMI2022, Inria Antipollis, Nice, France*. 2022.

[12] **Shakeel A. Sheikh** and K. M. Shafi. *Text Embedding Techniques for Sentiment Analysis: A Empirical Review*. 2022.

Book Chapters

[13] Sheikh Shakeel Ahmad. "Self-supervised Learning for Pathological Speech Detection". In: *Intersection of Machine Leanring and Computational Social Sciences*. Ed. by Akib Khanday, Salah Bouktif, Mohd Wajid Anas, and Tanzeel Rabani Syed. CRC, 2024.

INVITED TALKS

- KU Leuven, Belgium (**World Rank = 45**)
- King Faisal University, KSA
- Alfaisal University, KSA
- Idiap Research Institute (EPFL), Switzerland (**World Rank = 14**)
- IIT Roorkee, India
- IIT Jammu, India
- Novartis Biomedical Research Institute, Switzerland
- University of Kashmir, North Campus

REFERENCES

On request