Thomas **Rolland**

trolland@protonmail.ch | github.com/Usanter | linkedin.com/in/usanter

Research Scientist focused on large-scale machine learning systems, with expertise in parameter-efficient Transformers and speech processing. Experience in building scalable training pipelines for synthetic data and developing robust models. Passionate about building interpretable and privacy-aware AI systems aligned.

Selected Technical Skills

- **Programming Languages**: Python, Bash, C, LaTeX
- **Frameworks**: Pytorch, HuggingFace-Transformers, ESPnet, Speechbrain, Kaldi, Keras
- **Expertise**: Automatic Speech Recognition (ASR), Text-To-Speech (TTS), Machine Learning (ML), Signal Processing, Transformers, Data Augmentation, Multilingual & Multimodal ML
- **Engineering Strengths**: Parameter-efficient training, model evaluation pipelines
- **Infrastructure**: Distributed training, Dataset scaling, Model optimisation, Git
- **Soft Skills**: Team collaboration, technical communication, mentorship, and project coordination.

Professional Experience

Postdoctoral Researcher | Jun 2024 - Present
INESC-ID, Lisbon (Portugal)
- Designed novel Transformer variants reducing parameter count by 70%, maintaining accuracy for ASR tasks.
- Built and scaled speech data pipelines to 1,000+ hours using synthetic TTS and custom filtering.
- Applied multimodal learning for speech pathology detection, bridging acoustic and linguistic features.

Visiting Research Scientist | 2019
Radboud University (The Netherlands) & UZA Antwerp University Hospital (Belgium)
- Developed multilingual ASR adaptation strategies for low-resource children's speech.
- Built diagnostic tools with speech therapists; designed cognitive modelling workflows.

Research Intern | Apr - Sep 2018
IRIT, Toulouse (France)
- Investigated sparse coding vs. autoencoders for representation learning in speech and image signals.

Java Developer Intern | 2016
AirFrance, Toulouse (France)
- Created a web-based monitoring platform using large-scale databases to track and analyze ticket sales from travel agencies.

Education

PhD degree, Computer Science
2018–2024 | INESC-ID & IST Lisbon | Thesis: "Towards Improved Children's Automatic Speech
- Developed parameter-efficient and multilingual state-of-the-art models for children's ASR.
- Achieved high-performance adaptation using PEFT and synthetic data augmentation.
- Achievements: PhD defended with highest honours.

Master's Degree, Artificial Intelligence & Signal Processing
2016–2018 | Univ. Toulouse III | Ranked 1st in Class
- Thesis on sparse coding vs. neural networks for learning speech units.

Bachelor's degree, Computer Science
2013–2016 | Univ. Toulouse III | Theoretical Computer Science

Selected Publications

Thomas Rolland and Alberto Abad. *Exploring Shared-Weight Mechanisms in Transformer and Conformer Architectures for Automatic Speech Recognition.* Interspeech 2025 (Q1).

Thomas Rolland and Alberto Abad. *Introduction to Partial fine-tuning: A comprehensive evaluation of end-to-end children's automatic speech recognition adaptation.* Interspeech 2024 (Q1).

Thomas Rolland and Alberto Abad. *Shared-Adapters: A novel Transformer-based parameter efficient transfer learning approach for children's automatic speech recognition.* Interspeech 2024 (Q1).

Thomas Rolland and Alberto Abad. *Improved children's automatic speech recognition combining adapters and synthetic data augmentation.* International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2024 (Q1).

Thomas Rolland and Alberto Abad. *Exploring adapters with conformers for children's automatic speech recognition*. International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2024 (Q1).

(Full list on `https://scholar.google.com/citations?user=-TeQwvAAAAAJ&hl=en&authuser=1`)

Technical Projects

Parameter-Efficient Transformer Variants
- Built 70% smaller Transformer models using looped mechanisms and shared-weight PEFT for ASR.

Scalable ASR Pretraining with Synthetic Data
- Created a 1,000+ hour dataset via TTS augmentation; implemented quality control filters; ensured fault-tolerant ingestion.

Multimodal Pathology Detection
- Combined acoustic and linguistic embeddings to classify cognitive and respiratory conditions

Professional Development & Events

Center for Responsible AI Forum

Porto 2024
- Presented speech safety work; discussed ethics and deployability

ELLIS Lisbon Unit Symposium

Lisbon 2024
- Participated in research exchanges on foundational AI models

TAPAS Workshop Series

2018 - 2022
- Contributed across workshops on speech pathology, machine learning, ethical data collection, and responsible AI deployment under the Horizon 2020 network.

(Additional events available on request)

Community & Teaching

- **Chair**, WOCCI 2025 | ISCA SIG on Child-Computer Interaction
- **Invited Assistant Professor**, IST Lisbon – Speech Processing (2025)
- **Board Member**, ISCA-SAC & Co-Founder of SpeechPitch Podcast (2021–2023)
- **Reviewer:** Interspeech (Q1), ICASSP (Q1), SLT, DAC

Foundings projects

Accelerat.AI

2023 - 2025

Contributed to EU-funded initiative connecting academia and industry to build scalable conversational AI systems. Focused on Transformer-based modeling and speech technology R&D.

2018 - 2022

Training Network on Automatic Processing of PAthological Speech (TAPAS)

Contributed in the TAPAS project, part of the Horizon 2020 Marie Skłodowska-Curie Actions Innovative Training Network, to address communication challenges faced by individuals in Europe with speech pathologies.

Languages

French: Native **English**: Fluent in spoken and written communication **Portuguese** : Basic (learning)