

# FROMSA TESHOME NEGASA

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## OBJECTIVE

Seeking a PhD position with research interests in speech processing, voice analysis, machine learning, and computer vision. Passionate about exploring the intersection of auditory and visual signal processing, leveraging AI to enhance voice perception, recognition, and synthesis for real-world applications.

## EDUCATION

- **UNIVERSITÉ JEAN MONNET** September 2023 – Ongoing  
*Erasmus Mundus Joint Masters Degree in Photonics for Security Reliability Sustainability and Safety (PSRS)* [🔗](#) Saint-Étienne, France
  - **Grade:** 16.13 / 20 (Université Jean Monnet), 4.8 / 5 (University of Eastern Finland)
  - **Relevant Courses:** Fourier Optics, Digital Image Processing, Optical Engineering with Zemax, Basics of Signal Processing, Machine Vision, Machine Learning, Speech Processing
- **TIANJIN UNIVERSITY** June 2022  
*Bachelor of Engineering in Chemical Engineering and Technology* Tianjin, China
  - Completed a Propaedeutic Education program in Chinese Language prior to commencing major coursework
  - **Grade:** 3.01 / 4 over 175 credits
  - **Relevant Courses:** Scientific Computing in MATLAB, Numerical Methods
- **UNIVERSITY OF THE PEOPLE** June 2022  
*Associate of Science in Computer Science* Online
  - **GPA:** 3.59 / 4.00
  - **Relevant Courses:** Statistical Inference, Programming in Python

## EXPERIENCE

- **SONY Europe R&D, Stuttgart Laboratory 1 (SL1)** [🔗](#) March 2025 – August 2025  
*Master Thesis Researcher* Stuttgart, Germany
  - Developing DL models for hyperspectral image reconstruction from Computer Tomography Imaging Spectrometer
  - Optimizing and minimizing neural network architectures for efficient mobile deployment
  - Implementing a pipeline in Android, integrating image acquisition, reconstruction, and biometric analysis
- **LISSI Laboratory and IMRB (Mondor Institute of Biomedical Research)** October 2024 - January 2025  
*M2 Research Internship* Créteil, France
  - Developing ML/DL methods to analyze cell migration patterns in Duchenne Muscular Dystrophy research
  - Implementing automated tracking systems to study myoblast migration through optical microscopy data
  - Collaborating with interdisciplinary teams to evaluate disease progression using cell migration analysis
- **Tianjin University** September 2022 – August 2023  
*Graduate Student Assistant, School of Chemical Engineering* Tianjin, China
  - Developed ML models for industrial applications and image processing at SMART Bio-informatics Lab

## PROJECTS

- **Multi-Functional Biometric System** October 2024 - January 2025  
*Tools: Python, OpenCV, TensorFlow, PyQt,* [🔗](#)
  - A unified system for face recognition (verification, identification, expression, age, gender, and pose estimation).
  - Included human body pose estimation and an integrated GUI for seamless user interaction.
- **Speech Classification** January 2025  
*Tools: Python, Scipy, Matplotlib, sounddevice* [🔗](#)
  - A multi-classifiers ML system that classifies audio signals into two classes ("forward" and "backward").
  - Utilized spectrogram analysis, Principal Component Analysis (PCA), and model training and evaluation workflow.
- **Text-Based LLM Chat Interface and Multi-Modal LLM App with Text and Image Inputs** October 2024  
*Tools: Python, Colab, ngrok, FastAPI* [🔗](#) [🔗](#)
  - Developed a GUI for LLMs with text and image inputs through Colab-hosted APIs.
- **Hyperspectral Imaging: Spectral Image Analysis** April 2024  
*Tools: Nuance Ex-VIS Camera, MATLAB* [🔗](#)
  - Captured and analyzed spectral images with a Nuance Ex-VIS camera under simulated daylight.
- **Undergraduate Thesis Project: Amharic Character Recognition with U-Net** January 2022 - June 2022  
*Tools: Sequential CNN, Factored CNN, U-Net, Python* [🔗](#)
  - Pre-processed datasets from literature sources and implemented on different architectures.

- Achieved 93% accuracy on Amharic character recognition.
- **Research Project: China-ASEAN Online Program on Data Science and Big Data** September 2020 - December 2020  
Tools: Python, Keras [\[🔗\]](#)
  - Led a four-person research team on Named Entity Recognition (NER) in Natural Language Processing.
  - Designed and implemented NLP models for entity extraction and classification.
- **ICHEME Process Design Project: Process Simulation and Optimization** November 2021 - June 2022  
Tools: Aspen Plus, AutoCAD
  - Optimized vertical flash drum equipment sizing and developed a comprehensive process flow by integrating P&IDs.

## SKILLS

- **Programming Languages:** Python, MATLAB, Kotlin
- **Deep Learning and Computer Vision Frameworks:** TensorFlow, OpenCV
- **Web & Database Technologies:** HTML, CSS, SQL
- **Other Tools & Technologies:** Microsoft Office, L<sup>A</sup>T<sub>E</sub>X(Overleaf), Git
- **Research Skills:** Literature Review, Data Analysis, Good Laboratory Practice, Problem Solving
- **Languages:** English (IELTS: 7.0/Duolingo: 135), Mandarin Chinese (HSK 5), Amharic (Native)

## HONORS AND AWARDS

- **Erasmus Mundus Joint Master's Degree Scholarship** September 2023  
Education, Audiovisual and Culture Executive Agency, European Commission [\[🔗\]](#)
  - Associated with Erasmus Mundus Joint Master Degree Photonics for Security Reliability and Safety (PSRS)
- **Distinguished International Student Award** July 2018  
Tianjin University
  - Awarded the Full Attendance Scholarship and the Second Prize Scholarship of Propaedeutic Education of Chinese Language.
- **Chinese Government Scholarship** September 2017  
Chinese Scholarship Council [\[🔗\]](#)
  - Associated with Tianjin University, School of Chemical Engineering

## CERTIFICATIONS

- MATLAB Fundamentals, MathWorks, [\[🔗\]](#) Mar 2025
- Android Developer Fundamentals, Udacity, [\[🔗\]](#) Oct 2024
- OpenCV Bootcamp, OpenCV University, [\[🔗\]](#) Feb 2024
- Google Data Analytics Professional Certificate, Google via Coursera, [\[🔗\]](#) Jun 2023
- Chinese Proficiency Test, HSK (Level 5), Center for Language Education and Cooperation, [\[🔗\]](#) May 2022
- Machine Learning, Stanford University via Coursera, [\[🔗\]](#) Apr 2021

## REFERENCES

1. **Amine Nait-Ali** [\[🔗\]](#)  
Professor, Biometrics Research Group  
University of Paris-Est Créteil (UPEC)  
Email: naitali@u-pec.fr  
Relationship: Local PSRS Coordinator and **Biometrics II** course Instructor at UPEC
2. **Mohamad KHALIL** [\[🔗\]](#)  
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Relationship: **Computer Vision and Speech Processing** Instructor at UPEC
3. **Polina Kuzhir** [\[🔗\]](#)  
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4. **Nathalie Destouches** [\[🔗\]](#)  
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Relationship: EMJMD PSRS Head Coordinator and **Fourier Optics** Instructor at UJM

# Motivational Letter

In a world where AI can copy human voices almost perfectly, the question of what's real and what's fake has become more important than ever. Deepfake technology, which can create synthetic voices that sound just like real ones, is a growing threat to digital security. It challenges the trust we place in online communication. My academic journey has been shaped by an unwavering curiosity about the intersection of biometrics, AI, and security. As I've studied signal processing and machine learning, I've learned how tools like facial recognition, hyperspectral imaging, and voice analysis can help protect information. This realization has inspired me to work on creating AI solutions that can detect deepfakes and make authentication systems more reliable.

My academic path has been unique and rewarding, taking me through different fields and research areas. Currently, I'm pursuing an Erasmus Mundus Joint Master's Degree in Photonics for Security, Reliability, and Safety (PSRS), specializing in biometrics and intelligent vision. Through my coursework and research, I've gained a solid foundation of deep learning, signal processing, and spectral analysis—skills that are highly relevant for analyzing voice signals and classifying real and fake ones. For my master's thesis at Sony Europe, I'm working on hyperspectral image reconstruction, using deep learning to find patterns in complex data. While the domain may differ, the principles of feature extraction, pattern recognition, and AI-driven classification remain the same, which makes it easier for me to apply them in voice biometrics.

During my second semester at the University of Eastern Finland, I studied signal processing under the guidance of Prof. Hannu Lamanen. I explored key concepts like Fourier transforms, digital filters, spectral data analysis, and convolution techniques. My lab work also helped me improve my technical skills, especially in processing data from photonics instruments. This experience has given me a strong analytical foundation. Working with spectrograms in both photonics and speech processing has helped me understand frequency-domain representations, a key part of voice analysis.

At Université Paris-Est Créteil, I expanded my knowledge in speech processing by working on deep learning models for voice classification. In a hands-on project, I implemented multiple machine learning classifiers like SVM, KNN, and Dense Neural Networks to identify spoken commands based on spectrogram features. This project taught me how to work with speech datasets, extract useful features, and evaluate classification models—skills that are directly applicable to voice biometrics and deepfake detection. My experience with MATLAB and Python, along with my background in spectral analysis, has prepared me well to tackle the challenges of detecting synthetic speech and improving AI-based voice forensics.

One aspect that particularly excites me about this PhD opportunity is the mobility and international collaboration it offers, mirroring my experience in the Erasmus Mundus program. Having studied and conducted research in multiple institutions across different countries, I have developed a deep appreciation for the value of interdisciplinary collaboration and the cross-cultural exchange of ideas. Adapting to new research environments has strengthened my ability to integrate knowledge from various domains, work with diverse teams, and approach challenges with a global perspective. Engaging with leading experts from multiple institutions will allow me to further refine my expertise while contributing to a dynamic, international research community. This mobility-driven approach not only aligns with my past experiences but also fuels my excitement for expanding my academic and professional horizons.

Beyond technical skills, my journey as an international student has taught me adaptability, resilience, and collaboration. Moving from China to several European countries for my studies has pushed me to face challenges and grow. Each new experience has improved my problem-solving skills and fueled my passion for the pursuit of knowledge. I've thrived in diverse, multicultural environments, and I believe this will help me work effectively with researchers from different backgrounds in this PhD program. My previous research experiences during internships and projects have also taught me how to balance teamwork with independent research.

As biometric technology evolves, voice analysis stands out as an accessible and promising modality for security applications. Combining AI with human judgment to detect fake speech is a fascinating challenge, and I'm excited to explore it. My goal is to use my background in signal processing, AI, and biometrics to create innovative solutions that make voice-based security systems more reliable. This PhD program feels like the next logical step in my academic journey. I believe it will allow me to apply my skills while engaging more with speech processing and forensic analysis in the associated partners of the PhD. I'm excited by the opportunity to contribute to cutting-edge research in this field and work with experts to develop the next generation of AI-powered voice security solutions.