europass

Velu Prabhakar Kumaravel

Passport: Z6716694 | **Work permit:** Germany | **Date of birth:** 24/06/1991 | **Place of birth:** Cuddalore, India | **Nationality:** Indian | **Gender:** Male | **Phone:** (+39) 3923267459 (Mobile) | **Email address:** vpr.kumaravel@gmail.com | **Address:** Lehmkuhlenbusch, 4, 27753, Delmenhorst, Germany (Work)

ABOUT MYSELF

I am an interdisciplinary researcher at the intersection of engineering and neurocognitive science, with expertise in EEG signal processing and a strong commitment to understanding and treating mental health disorders, particularly using respiration-based interventions.

WORK EXPERIENCE

16/03/2026 - CURRENT - CHIETI, ITALY

POST-DOCTORAL RESEARCH FELLOW UNIVERSITA DEGLI STUDI "D'ANNUNZIO" CHIETI-PESCARA

Investigating Brain-Respiration Coupling during Meditation in exper and novice Meditators.

15/02/2023 - 15/02/2026 - OLDENBURG, GERMANY

SCIENTIFIC ASSISTANT UNIVERSITY OF OLDENBURG AND HANSE-WISSENSCHAFTSKOLLEG

Research on mobile EEG-based feedback system for auditory perceptual learning. Funded by Hearing4all – Cluster of Excellence for Hearing Research (DFG Project ID 390895286) and Hanse-Wissenschaftskolleg.

01/02/2022 - 31/07/2022 - LAUSANNE, SWITZERLAND

VISITING PHD STUDENT SWISS FEDERAL INSTITUTE OF TECHNOLOGY LAUSANNE (EPFL)

Developed machine learning approaches for epileptic seizure detection within the PEDESITE project (Personalized Detection of Epileptic Seizure in the IoT Era), funded by the Swiss National Science Foundation.

EDUCATION & TRAINING

01/11/2018 - 27/02/2023 - TRENTO, ITALY

PHD IN COGNITIVE AND BRAIN SCIENCES- FONDAZIONE BRUNO KESSLER / CENTER FOR MIND-BRAIN SCIENCES (CIMEC), UNIVERSITY OF TRENTO

Ph.D. research focused on mobile EEG solutions for studying neural correlates of cognitive functions in newborns and infants. Developed a novel MATLAB-based EEG preprocessing pipeline to enhance signal-to-noise ratio, released as open-source software to promote accessibility and reproducibility in neuroimaging research.

Final grade: Cum Laude | **Thesis:** Signal Processing Methods for Reliable Extraction of Neural Responses in Developmental EEG

24/09/2015 - 16/03/2018 - BOLOGNA, ITALY

MASTER OF SCIENCE IN TELECOMMUNICATIONS ENGINEERING- UNIVERSITY OF BOLOGNA

Final grade: 103/110 | **Thesis:** Experimental Evaluation of BITalino: A Low-cost Modular Platform for Biosignals Acquisition

08/08/2008 - 15/05/2012 - CHENNAI, INDIA

BACHELORS OF ENGINEERING IN ELECTRONICS AND COMMUNICATIONS ENGINEERING-
MADRAS INSTITUTE OF TECHNOLOGY, ANNA UNIVERSITY

Final grade: 7.98/10 | **Thesis:** Biomedical Image Segmentation using Combined Watershed and Level Set Method

LANGUAGE SKILLS

Mother tongue(s): **TAMIL**

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C1	C1	C1	C1	C1
ITALIAN	B1	A2	A2	A2	A2
GERMAN	A1	A1	A1	A1	A1

PUBLICATIONS

NEAR: An artifact removal pipeline for human newborn EEG data 2022

This paper presents NEAR, a novel automated artifact-removal pipeline for human newborn EEG data, designed to improve the quality of neonatal EEG recordings by detecting bad channels and adapting artifact subspace reconstruction to the unique noise characteristics of newborn data. NEAR was shown to outperform existing methods in reproducing established EEG responses from noisy developmental datasets. The software can be found online at https://github.com/vpKumaravel/NEAR.

Velu Prabhakar Kumaravel, Elisabetta Farella, Eugenio Parise, Marco Buiatti SI: Developmental EEG Methods - A Tutorial Approach (Developmental Cognitive Neuroscience).

Adaptable and Robust EEG Bad Channel Detection Using Local Outlier Factor (LOF) 2022

This paper proposes a robust EEG bad channel detection method based on the Local Outlier Factor (LOF) algorithm, which adapts to different EEG datasets by identifying noisy channels relative to local clusters rather than global distributions. The approach was validated across newborn, infant, and adult EEG data and shown to outperform existing state-of-the-art methods in detecting bad channels.

Velu Prabhakar Kumaravel, Marco Buiatti, Eugenio Parise and Elisabetta Farella Sensors, MDPI Journal. Biomedical Sensors.

Efficient Artifact Removal from Low-Density Wearable EEG using Artifacts Subspace Reconstruction 2021

This conference paper presents an evaluation of the Artifact Subspace Reconstruction (ASR) algorithm for efficient automatic removal of transient and non-stationary artifacts from low-density wearable EEG recordings. The study demonstrates that ASR can significantly improve signal quality even with as few as eight channels in mobile EEG systems, supporting its use for real-world neural signal acquisition outside laboratory settings.

Velu Prabhakar Kumaravel Fondazione Bruno Kessler, Trento, Italy,CIMeC, University of Trento, Italy ; Victor Kartsch; Simone Benatti; Giorgio Vallortigara; Elisabetta Farella; Marco Buiatti International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC). EMBC

Contrasting cognitive, behavioral, and physiological responses to breathwork 2025

This study evaluated the efficacy of MindGym-generated immersive anxiolytic experiences delivered via 360-degree VR, measuring physiological responses including ECG, EDA, EMG, and respiration, alongside cognitive performance and anxiety reduction. Results showed that VR delivery maintained the full effectiveness

of the original MindGym experiences, supporting the translation of immersive therapeutic content to accessible platforms.

My role in this project was to develop preprocessing algorithms for ECG, EDA, and respiration signals, and to perform quality control analysis on the preprocessed data to include or exclude subjects based on signal quality.

Ninette S, Micah J, Caitlin L, Geena W, Velu K, Taylor K, Félix S, Nicco R PLOS Mental Health

HONOURS AND AWARDS

09/01/2026 INTO Brain (Turin, Italy)
Finalist of Aldo Fasolo Science Communication in Neuroscience Award
Links https://www.intobrain.it/en/news/premio-aldo-fasolo-i-finalisti-2025/

30/09/2022 Center for Mind/Brain Sciences, University of Trento, Italy
Think Open @ CIMeC Awards 2022 Received recognition for the open-source toolbox NEAR, designed following FAIR principles and contributing significant scientific value to the field of developmental cognitive science.
Links https://twitter.com/cimec_unitrento/status/1575797402061049857

28/01/2021 Center for Mind/Brain Sciences, University of Trento, Italy
CIMeC Doctoral Day - Best Poster Award Best Poster Award for presenting my research on the NEAR toolbox at CIMeC Doctoral Day.
Links https://github.com/vpKumaravel/dsday2021_poster

Larsen & Toubro Infotech
Star Award Winner for Two Consecutive Times (2014) Quarterly award recognizing top performers in the Business Unit.

PROJECTS

1. **MNE - Python:** Contributed the implementation of LOF - based bad channel detection (mne.preprocessing.find_bad_channels_lof), now included in the official MNE Python library for automated M/EEG preprocessing (available since v1.7).
2. **EEGLAB Plugin -** Automated bad channel detection and artifact removal for newborn and infant EEG data (NEAR pipeline), compliant with FAIR principles.

Links https://github.com/mne-tools/mne-python/blob/maint/1.7/mne/preprocessing/_lof.py |
https://github.com/vpKumaravel/NEAR

GRANTS

H4A & HWK Fellowship

Awarded a 24-month fellowship on “Mobile EEG-based Feedback System for Auditory Perceptual Learning,” including a 9-month research stay at Hanse-Wissenschaftskolleg and a 15-month research position at the University of Oldenburg.

Links https://hearing4all.de/en/career/fellowships/h4a-hwk-fellowship/

15/09/2015 - 31/07/2016
University of Bologna Action 1 Grant

Full tuition fee waiver awarded by the University of Bologna (Italy) to outstanding international students.

SKILLS

Professional Skills

- Laboratory techniques (EEG, EDA, EMG recordings)
- Signal acquisition and preprocessing
- Data analysis and visualization
- Experimental design
- Building Machine Learning models for EEG classification

Digital and Technical Skills

- Programming languages and frameworks
- Data analysis software (MATLAB/EEGLAB, Python/MNE-Python)
- Version control / code repositories (GitHub, GitLab)
- Office tools (MS Office, Google Workspace)
- Writing and Citation tools (LaTeX, Zotero)

ACADEMIC SERVICE

Peer Review

Reviewer for Journal of Psychophysiology, Journal of Neural Engineering, Biomedical Physics & Engineering Express, Frontiers in Neuroergonomics, Neuroscience, IEEE EMBC, IEEE COINS, DATE.

Conference Committees

Technical Program Committee Member, DATE Conference 2025 for the track "Smart Society and Digital Wellness"

ADDITIONAL INFORMATION

Professional Interests

- Brain-body interactions
- Consciousness and Sense of Self
- Seamless neurotechnology for mental wellness

Personal hobbies

- Reading non-fiction
- Hiking and Walking
- Meditation and Pranayama