Kleanthis Avramidis

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RESEARCH INTERESTS

Physiological & Biomedical Signal Processing, Efficient & Grounded Representations, Multimodal Representation Learning, Multimodal Interactions, Health and Wellness

EDUCATION

PhD in Computer Science *08/2021 - 12/2026*
University of Southern California (USC), Los Angeles, CA
Thesis: *Towards Efficient and Grounded Biosignal Representations*
Advisor: Prof. Shrikanth Narayanan

Joint BSc & MEng in Electrical Engineering *10/2015 - 07/2021*
National Technical University of Athens (NTUA), Greece
Thesis: *Affective Analysis and Interpretation of Brain Responses to Music Stimuli*
Advisor: Prof. Petros Maragos

SELECTED PROJECTS

SENTINEL: Neurobehavioral Trajectories in Everyday Life *08/2026 - Present*
USC – UCLA

- Longitudinal characterization of physiological and behavioral trajectories associated with depression, suicidal ideation, and resilience.
- Integration of repeated laboratory assessments with wearable and smartphone sensing to examine changes across contexts and time.

Entrainment in Expert and Novice Musicians *07/2025 - Present*
USC Center for Music, Brain, and Society

- Methods to quantify and compare neurophysiological entrainment to music
- Identification of differences in attentional strategies and emotional responses
- Predominant musical elements in driving entrainment intensity

Speech Paralinguistics from Facial Muscle Activity *09/2024 - Present*
USC – Technical University of Munich (TUM)

- Developing machine learning models for translating between EMG activations and audio speech waveforms with application to silent speech interfaces
- Analysis of the temporal dynamics of muscle activation in speech production
- Affective elements of speech in vocal versus silent articulation

PRECOG: Multimodal Integration of Neural and Biobehavioral Signals for Predicting Preconscious Responses *05/2023 - 08/2025*
USC – UCLA

- Developing representation learning models for brain activity signals (EEG)
- Analysis of human physiology (ECG, GSR, eye-tracking) in controlled settings
- Inference on detecting biomarkers of depression and suicidal ideation
- Applied trial-based bootstrapping to regularize deep learning modeling of short experimental trials, applied on eye tracking; first-authored 2 articles

Sensor Fusion for Stress Detection in Driving *05/2022 - 06/2025*
USC – Toyota Research Institute NA – MIRISE

- Developing methods for sensor fusion & self-supervision on physiological signals
- Coordinating multiple data collection processes in the driving setting
- Applied methods for Time-Series Segmentation and Clustering to detect change points in drivers' affective state; authored 2 articles

CVI Assessment through Eye Tracking *02/2022 - 06/2024*
USC – Children's Hospital Los Angeles

- Designing maps of visual saliency on stimulus images to assess differences of Cortical Visual Impairment (CVI) cases against controls

Automatic Differentiation of Pediatric Papilledema *02/2022 - 08/2023*
USC – Children's Hospital Los Angeles – External Sites

- Building deep learning models to differentiate Papilledema from pseudo-cases in challenging pediatric cases, with data collected from multiple sites
- Contributed 1 publication and 2 abstracts within an interdisciplinary team

Wearable Sensing for Family Well-being *10/2021 - 08/2023*
UT Austin – Texas A&M – USC

- Configured scripts to clean and process raw data from multiple wearable sensors
- Leading the development of statistical and learning methods to identify predictive elements of family reported well-being and conflict
- Contributing and cooperating with collaborators from the Psychology field
- Expanding methodologies to relevant projects on assessing workplace stress

WORK EXPERIENCE

Signal Analysis and Interpretation Lab *08/2021 - Present*
University of Southern California, Los Angeles, CA
Graduate Research Assistant, under Prof. Shrikanth Narayanan

- Building a multi-step training framework for audiovisual learning of music representations from official video clips, authored 1 abstract and poster
- Coordinator of project-wise lab and colab meetings, research mentor of undergraduate and master's students from the US, Denmark, and Greece

Audio & Acoustics Research Group *05/2026 - 08/2026*
Microsoft Corporation, Redmond, WA
Research Intern, under Dimitra Emmanouilidou, PhD

- Developed foundation models for advancing brain-computer interfaces
- Proposed evaluation methods to better interpret models trained on biosignals

Chair of Health Informatics *05/2025 - 06/2025*
Technical University of Munich, Germany
Visiting Doctoral Researcher, under Prof. Björn Schuller

- Contributed to a study on Silent Paralinguistics, including data collection design and analysis of surface electromyography (EMG) during speech production

Meta Reality Labs *05/2024 - 08/2024*
Meta Platforms Inc., New York City, NY
Research Scientist Intern, under Nariman Farsad, PhD

- Developed AI methods for advancing augmented reality experiences
- Created machine learning models for decoding neuromotor signals

Toyota Research Institute of North America *05/2023 - 08/2023*
Toyota Motor North America, Ann Arbor, MI
Research and Development Co-op, under Paul Schmalenberg, MSc

- Developed methods for sensor fusion & anomaly detection on biosignals
- Created machine learning models for contact-less heart rate estimation
- Coordinated machine learning software for physics-informed AI applications

Computer Vision, Speech & Signal Processing Lab *07/2019 - 07/2021*
National Technical University of Athens, Greece
Undergraduate Research Assistant, under Prof. Petros Maragos

- Conducted Research in Musical Instrument Recognition
  Co-authored 2 publications, completed my MEng Diploma Thesis

SKILLS

Tools and Libraries: Python, LaTeX, Git, Jupyter, PyTorch, Pandas, Scipy, Librosa, scikit-learn, scikit-image, OpenCV, Transformers, Neurokit2, MNE-Python

Service: IEEE (Graduate Student Membership, Reviewer: ICASSP, ISBI, IJCNN, WASPAA, J-BHI, TBME), ACM (Student Membership, Reviewer: TOMM, MM), Nature (Reviewer: Biomedical Engineering, npj Digital Medicine, Scientific Reports), ISCA (Reviewer: Interspeech, SLT), Elsevier (Reviewer: BSP-C)

Languages: Greek (native), English (proficient), German (intermediate)

MENTORSHIP

- **Andreas Peter Juhl Hansen**, MSc at Aalborg University *2025 – 2026*
- **Simon Bock Segaard**, MSc at Aalborg University *2025 – 2026*
- **Jeppe Roden Münster**, MSc at Aalborg University *2025 – 2026*
  then PhD at Aalborg University
- **Eileen Yang**, MSc at USC *2025 – 2026*
- **Ioanna Chourdaki**, MEng at NTUA *2024 – 2025*
  then PhD Student at USC
- **Angelly Cabrera**, BSc at USC *2023 – 2024*
  then Associate Researcher at NIST
- **Kranti Adsul**, MSc at USC *2023*
- **Shanti Stewart**, MSc at USC *2022*
  then PhD Student at Queen Mary University of London

HONORS AWARDS

☆ **USC Center for Music, Brain, and Society Pilot Grant** *06/2025*
to investigate neural entrainment to music in expert and novice musicians

☆ **USC ECE Research Festival – Outstanding Poster Award** *11/2024*

☆ **USC GSG Professional Development Fund** *05/2024*
Travel award towards attending IEEE EMBC 2024

☆ **IEEE EMBC NextGen Scholar Award** *04/2024*
Grant towards conference registration at IEEE EMBC 2024

☆ **Gerondelis Foundation Scholarship** *06/2023*

☆ **Best Poster Award**: Artificial Intelligence to Classify Fundus Photographs of Pediatric Pseudopapilledema and Papilledema, 48th AAPOS Annual Meeting *05/2023*

☆ **Future Vision Forum Award** *10/2022*
Acceptance and grant to participate with a poster presentation at
invitation-only Symposium of Human-Centric Computing in Ophthalmology

☆ **Oxford Summer School in Machine Learning 2022** *08/2022*
Accepted to participate at the Machine Learning for Healthcare track

☆ **Second Prize @ NEUROHACK 2022** *01/2022*
Award for a Machine Learning model predicting Dementia

☆ **Computer Science PhD Fellowship** *08/2021*
University of Southern California

☆ **A Great Moment for Education** *01/2016*
Award and Grant from Eurobank EFG for the highest
University Entrance Examination Score of my High School

TALKS EVENTS

1. **CuttingEEG Local Garden Symposium**
   Talk: "Scaling Psychiatric Biomarkers in Context and Time"
   September 2026, San Diego, CA
2. **Apple Workshop on Machine Learning for Health**
   Poster: "Scaling Representation Learning from Ubiquitous ECG with SSMs"
   October 2025, Cupertino, CA
3. **Chair of Health Informatics, Technical University of Munich**
   Talk: "Biobehavioral Signal Processing for Mental Health Understanding"
   June 2025, Munich, Germany
4. **Mapping Brain-Body-Behavior Signal Dynamics**
   Event: Satellite Workshop at ICASSP 2025 (Student Volunteer)
   April 2025, Hyderabad, India
5. **Society for Affective Science Annual Conference (SAS 2023)**
   Talk: "Psychophysiology Sensing via Wearables to model Family Well-being"
   March 2023, Long Beach, CA
6. **2022 Future Vision Forum: Human-Centric Computing**
   Poster: "Deep Learning Modeling for Papilledema Diagnosis"
   November 2022, Los Angeles, CA
7. **International Society for Research on Emotion (ISRE 2022)**
   Poster: "Context-aware Representations of Affect in Media from Music and Visual Streams: A Self-supervised Approach"
   July 2022, Los Angeles, CA

TEACHING

1. **CSCI 698: Practicum in Teaching Computer Science** *Fall 2026*
   University of Southern California (Teaching Assistant)
2. **CSCI 467: Foundations of Machine Learning** *Spring 2026*
   University of Southern California (Teaching Assistant)

SELECTED PUBLICATIONS

1. **K. Avramidis**, I. Tashev, D. Emmanouilidou
   "BrainCodes: A Lightweight EEG Foundation Model over Discrete Neural Codes".
   arXiv preprint arXiv:2610.29320, 2026.
2. **K. Avramidis**, I. Tashev, D. Emmanouilidou
   "Probing Spatial and Spectral Grounding in EEG Foundation Models".
   arXiv preprint arXiv:2610.29367, 2026.
3. **K. Avramidis**, M. Hughes, and others, and S. Narayanan
   "A Point Process Model of Skin Conductance Responses in a Stroop Task for Predicting Depression and Suicidal Ideation".
   Proc. Int'l Conf. on Acoustics, Speech and Signal Processing (ICASSP), 2026
4. **K. Avramidis**, W. Jeong, A. Kommineni, and others, and S. Narayanan
   "Deep learning characterizes Depression and Suicidal Ideation from Eye Movements".
   npj Digital Medicine, 2026

5. **K. Avramidis**, T. Feng, W. Jeong, W. Cui, R. Leahy, and S. Narayanan
"Neural Codecs as Biosignal Tokenizers".
arXiv preprint arXiv:2510.09095, 2025

6. J. Lee, K. Huang, **K. Avramidis**, and others, and S. Narayanan
"Articulatory Feature Prediction from Surface EMG during Speech Production".
Proc. Interspeech, 2025

7. A. Timmons, A. Tutul, **K. Avramidis**, and others, and Theodora Chaspari
"Developing Personalized Algorithms for Sensing Mental Health Symptoms in Daily Life".
npj Mental Health Research, 2025.

8. A. Kommineni, **K. Avramidis**, R. Leahy, S. Narayanan
"Knowledge-guided EEG Representation Learning"
Proc. IEEE Engineering in Medicine and Biology Conference (EMBC), 2024

9. **K. Avramidis**, D. Kunc, B. Perz, and others, and S. Narayanan
"Scaling Representation Learning from Ubiquitous ECG with State-Space Models"
IEEE Journal of Biomedical and Health Informatics (J-BHI), 2024

10. **K. Avramidis**, S. Stewart, and S. Narayanan
"On the Role of Video Context in Enriching Music Representations"
Proc. Int'l Conf. on Acoustics, Speech and Signal Processing (ICASSP), 2023

11. **K. Avramidis**, M. Rostami, M. Chang, and S. Narayanan
"Automating Detection of Papilledema in Pediatric Fundus Images with Explainable Machine Learning"
Proc. Int'l Conf. on Image Processing (ICIP), 2022.

12. **K. Avramidis**, C. Garoufis, A. Zlatintsi, and P. Maragos
"Enhancing Affective Representations of Music-Induced EEG through Multimodal Supervision and Latent Domain Adaptation"
Proc. Int'l Conf. on Acoustics, Speech and Signal Processing (ICASSP), 2022.