

# Kleanthis Avramidis

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RESEARCH INTERESTS	Physiological and Biomedical Signal Processing, Music Information Retrieval Multimodal Representation Learning, Self-supervised Learning, Affective Computing
EDUCATION	<p><b>PhD in Computer Science</b> <span style="float: right;"><i>08/2021 - Present</i></span> University of Southern California (USC), Los Angeles, CA Advisor: Prof. Shrikanth Narayanan Current GPA: 3.90/4</p> <p><b>Joint BSc &amp; MEng in Electrical Engineering</b> <span style="float: right;"><i>10/2015 - 07/2021</i></span> National Technical University of Athens (NTUA), Greece Advisor: Prof. Petros Maragos GPA: 8.40/10 (top 12%), Specialization GPA: 9.14/10</p>
RESEARCH PROJECTS	<p><b>PRECOG: Multimodal Integration of Neural and Biobehavioral Signals for Predicting Preconscious Responses</b> <span style="float: right;"><i>05/2023 - Present</i></span> USC – UCLA</p> <ul style="list-style-type: none"><li>• Developing representation learning models for brain activity signals (EEG)</li><li>• Analysis of human physiology (ECG, GSR, eye-tracking) in controlled settings</li><li>• Inference on detecting biomarkers of depression and suicidal ideation</li></ul> <p><b>Sensor Fusion for Affective State Detection in Driving</b> <span style="float: right;"><i>05/2022 - Present</i></span> USC – Toyota Research Institute NA – MIRISE</p> <ul style="list-style-type: none"><li>• Developing methods for sensor fusion &amp; self-supervision on physiological signals</li><li>• Coordinating multiple data collection processes in the driving setting</li><li>• Applied methods for Time-Series Segmentation and Clustering to detect change points in drivers' affective state; authored 1 article</li></ul> <p><b>CVI Evaluation through Eye-tracking Technology</b> <span style="float: right;"><i>02/2022 - Present</i></span> USC – Children's Hospital Los Angeles</p> <ul style="list-style-type: none"><li>• Designing maps of visual saliency on stimulus images to assess differences of Cortical Visual Impairment (CVI) cases against controls</li></ul> <p><b>Automatic Differentiation of Pediatric Papilledema</b> <span style="float: right;"><i>02/2022 - 08/2023</i></span> USC – Children's Hospital Los Angeles – External Sites</p> <ul style="list-style-type: none"><li>• Building deep learning models to differentiate Papilledema from pseudo-cases in challenging pediatric cases, with data collected from multiple sites</li><li>• Contributed 1 publication and 2 abstracts within an interdisciplinary team</li></ul> <p><b>Wearable Bio-sensing for Family Well-being</b> <span style="float: right;"><i>10/2021 - 08/2023</i></span> UT Austin – Texas A&amp;M – USC</p> <ul style="list-style-type: none"><li>• Configured scripts to clean and process raw data from multiple wearable sensors</li><li>• Leading the development of statistical and learning methods to identify predictive elements of family reported well-being and conflict</li><li>• Contributing and cooperating with collaborators from the Psychology field</li><li>• Expanding methodologies to relevant projects on assessing workplace stress</li></ul> <p><b>Diploma Thesis, NTUA</b> <span style="float: right;"><i>05/2020 - 07/2021</i></span> Title: Affective Analysis and Interpretation of Brain Responses to Music Stimuli</p> <ul style="list-style-type: none"><li>• Applied elements of Multiscale Fractal Analysis to extract affective characteristics from musically-induced EEG signals. Authored 1 publication.</li><li>• Developed multimodal models to connect music audio and EEG features using adversarial and contrastive learning objectives. Authored 1 publication.</li></ul>

WORK EXPERIENCE	<p><b>Signal Analysis and Interpretation Lab</b> <span style="float: right;"><i>08/2021 - Present</i></span>  University of Southern California, Los Angeles, CA  <i>Graduate Research Assistant</i>, under Prof. Shrikanth Narayanan</p> <ul style="list-style-type: none"> <li>• Building a multi-step training framework for audiovisual learning of music representations from official video clips, authored 1 abstract and poster</li> <li>• Coordinator of project-wise lab and colab meetings, research mentor of a master's student and a sophomore student in Electrical Engineering</li> </ul> <p><b>Toyota Research Institute North America</b> <span style="float: right;"><i>05/2023 - 08/2023</i></span>  Toyota Motor North America, Ann Arbor, MI  <i>Research and Development Co-op</i>, under Paul Schmalenberg, MSc</p> <ul style="list-style-type: none"> <li>• Developed methods for sensor fusion &amp; anomaly detection on biosignals</li> <li>• Created machine learning models for contact-less heart rate estimation</li> <li>• Coordinated machine learning software for physics-informed AI applications</li> </ul> <p><b>Computer Vision, Speech &amp; Signal Processing Lab</b> <span style="float: right;"><i>07/2019 - 07/2021</i></span>  National Technical University of Athens, Greece  <i>Undergraduate Research Assistant</i>, under Prof. Petros Maragos</p> <ul style="list-style-type: none"> <li>• Conducted Research in Musical Instrument Recognition  Co-authored 2 publications, completed my MEng Diploma Thesis</li> </ul>
SKILLS	<p><b>Programming Languages:</b> Python, C++, MATLAB, L<sup>A</sup>T<sub>E</sub>X  <b>Tools and Libraries:</b> Unix, Git, Jupyter, PyTorch, Pandas, Scipy, Librosa, PyDub, ts-learn, scikit-learn, scikit-image, OpenCV, Transformers  <b>Service:</b> IEEE (Graduate Student Membership, Reviewer: ICASSP), ACM (Student Membership, Reviewer: TOMM), ISRE 2022: Student Volunteer  <b>Languages:</b> Greek (native), English, German</p>
HONORS AWARDS	<ul style="list-style-type: none"> <li>☆ <b>Future Vision Forum Award</b> <span style="float: right;"><i>10/2022</i></span>  Acceptance and grant to participate with a poster presentation at invitation-only Symposium of Human-Centric Computing in Ophthalmology</li> <li>☆ <b>Oxford Summer School in Machine Learning 2022</b> <span style="float: right;"><i>08/2022</i></span>  Accepted to participate at the Machine Learning for Healthcare track</li> <li>☆ <b>Second Prize @ NEUROHACK 2022</b> <span style="float: right;"><i>01/2022</i></span>  Award for a Machine Learning model that identifies and utilizes important biomarkers in predicting Dementia</li> <li>☆ <b>Computer Science PhD Fellowship</b> <span style="float: right;"><i>08/2021</i></span>  University of Southern California</li> <li>☆ <b>A Great Moment for Education</b> <span style="float: right;"><i>01/2016</i></span>  Award and Grant from Eurobank EFG for the highest University Entrance Examination Score of my High School</li> </ul>
TALKS EVENTS	<ol style="list-style-type: none"> <li>1. <b>Society for Affective Science Annual Conference (SAS 2023)</b>  Talk: "Psychophysiology Sensing via Wearables to model Family Well-being"  <i>March 2023, Long Beach, CA</i></li> <li>2. <b>2022 Future Vision Forum: Human-Centric Computing</b>  Poster: "Deep Learning Modeling to differentiate Papilledema from Pseudopapilledema in Pediatric Cases"  <i>November 2022, Los Angeles, CA</i></li> <li>3. <b>International Society for Research on Emotion (ISRE 2022)</b>  Poster: "Context-aware Representations of Affect in Media from Music and Visual Streams: A Self-supervised Approach"  <i>July 2022, Los Angeles, CA</i></li> </ol>

PUBLICATIONS

1. **K. Avramidis**, Dominika Kunc, Bartosz Perz, Kranti Adsul, Tiantian Feng, Przemysław Kazienko, Stanisław Saganowski, and Shrikanth Narayanan  
“Scaling Representation Learning from Ubiquitous ECG with State-Space Models”  
*arXiv preprint arXiv:2309.15292 (currently under review)*, 2023
2. S. Stewart, **K. Avramidis**, T. Feng, and S. Narayanan  
“Emotion-Aligned Contrastive Learning Between Images and Music”  
*arXiv preprint arXiv:2308.12610 (currently under review)*, 2023
3. **K. Avramidis**, T. Feng, D. Bose, and S. Narayanan  
“Multimodal Estimation of Change Points of Physiological Arousal in Drivers”  
*Proc. Int’l Conf. on Acoustics, Speech and Signal Processing Workshops*, 2023
4. **K. Avramidis**, K. Adsul, D. Bose, and S. Narayanan  
“Signal Processing Grand Challenge 2023–E-Prevention: Sleep Behavior as an Indicator of Relapses in Psychotic Patients”  
*Proc. Int’l Conf. on Acoustics, Speech and Signal Processing (ICASSP)*, 2023
5. **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
6. **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.
7. **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.
8. **K. Avramidis**, A. Zlatintsi, C. Garoufis, and P. Maragos  
“Multiscale Fractal Analysis on EEG Signals for Music-Induced Emotion Recognition”  
*Proc. European Signal Processing Conference (EUSIPCO)*, 2021.
9. **K. Avramidis**, A. Kratimenos, C. Garoufis, A. Zlatintsi, and P. Maragos  
“Deep Convolutional and Recurrent Networks for Polyphonic Instrument Classification from Monophonic Raw Audio Waveforms”  
*Proc. Int’l Conf. on Acoustics, Speech and Signal Processing (ICASSP)*, 2021.
10. A. Kratimenos, **K. Avramidis**, C. Garoufis, A. Zlatintsi, and P. Maragos  
“Augmentation Methods on Monophonic Audio for Instrument Classification in Polyphonic Music”  
*Proc. European Signal Processing Conference (EUSIPCO)*, 2020.