

# Nikolaos (Nikos) Flemotomos

Ming Hsieh Department of Electrical and Computer Engineering  
University of Southern California  
3710 McClintock Ave., Room RTH 317  
Los Angeles, CA 90089

✉ flemotom@usc.edu  
☎ +1 213 421 7498  
🌐 nikosfl.github.io  
📄 /in/nikosfl

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RESEARCH INTERESTS Speaker Diarization and Role Recognition, Speech Recognition, Behavioral Signal Processing

EDUCATION **Ph.D., Electrical Engineering** expected May 2022  
University of Southern California, Los Angeles, CA, U.S.A.

**M.Sc., Electrical Engineering** Dec 2018  
University of Southern California, Los Angeles, CA, U.S.A.  
GPA: 4.00/4.00

**Diploma (5-years degree), Electrical and Computer Engineering** Apr 2016  
National Technical University of Athens, Athens, Greece  
Thesis: *Robust Acoustic Features for Distant Speech Recognition*  
GPA: 9.34/10.00

RESEARCH EXPERIENCE **University of Southern California**, Los Angeles, CA, U.S.A.  
Signal Processing and Interpretation Laboratory (SAIL)  
*Graduate Research Assistant* May 2017 to present  
Supervisor: Prof. Shrikanth Narayanan

- Developing computational methods to represent intersectional dimensions of identity (e.g., gender, age, social status, profession) in order to study how such dimensions affect conversational interactions.
- Leveraging speaker role information in various speech processing tasks (e.g., diarization, speech recognition).
- Leading a subgroup that develops a real-world system which, after processing recordings of psychotherapy sessions, gives feedback to the therapist. The system is used for computer-aided therapist training.

**Microsoft Research**, Bellevue, WA, U.S.A.  
Speech and Dialog Research Group  
*Research Intern* May 2019 to Aug 2019  
Supervisor: Dr. Dimitrios Dimitriadis

- Worked on speaker identification and diarization in meeting scenarios.
- Proposed a novel algorithm for continuous speaker identification based on memory-augmented neural networks.

**Czech Technical University in Prague**, Prague, Czech Republic  
Biomedical Data and Signal Processing Group (BioDat)  
*Research Intern* Mar 2016 to Jun 2016  
Supervisor: Assoc. Prof. Lenka Lhotska

- Developed an algorithm for automatic sleep staging from polysomnographic signals, motivated by ideas used in speech recognition.

**National Technical University of Athens**, Athens, Greece  
Computer Vision, Speech Communication and Signal Processing Group (CVSP)  
*Undergraduate Research Assistant* Feb 2015 to Mar 2016  
Supervisor: Prof. Petros Maragos

- Explored the Teager-Kaiser energy operator for energy estimation in speech signals.
- Developed a system for single-microphone distant speech recognition, comparing various acoustic feature sets, with an emphasis on those based on the AM-FM speech model.

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| SOFTWARE SKILLS                      | <b>Programming Languages:</b><br>Python, UNIX shell scripting, MATLAB, C, R<br><br><b>Tools &amp; Libraries:</b><br>Tensorflow, PyTorch, Kaldi, OpenFST, SRILM, L <sup>A</sup> T <sub>E</sub> X  |
| GRADUATE COURSEWORK                  | Multimodal Probabilistic Learning of Human Communication, Advanced Natural Language Processing, Law and Intellectual Property, Computational Social Sciences, Mathematics of High-Dimensional Data, Machine Learning Theory, Deep Learning, Machine Learning from Signals, Pattern Recognition, Statistics, Probability, Random Processes  |
| TEACHING EXPERIENCE                  | <b>University of Southern California</b> , Los Angeles, CA, U.S.A.<br><i>Teaching Assistant</i> Spring 2019, 2020 & 2021<br>Speech Recognition and Processing for Multimedia<br><br><b>Society of Astronomy and Space</b> , Volos, Greece<br><i>Teaching Assistant</i> Summer 2011 & 2012<br>Preparation for the International Olympiad on Astronomy and Astrophysics  |
| MENTEES                              | <b>Anirudh Sreeam</b> (M.Sc. student; USC) Feb 2021 to present<br><b>Jake Palmieri</b> (undergrad student; USC) Oct 2020 to present<br><b>Venkata Krishna Naveen Tadala</b> (M.Sc. student; USC) Oct 2018 to Dec 2019  |
| HONORS AND AWARDS                    | <b>Phi Kappa Phi</b><br>Member (academic honor society)<br><br><b>Annenberg Ph.D. Fellowship</b> Aug 2016 to Aug 2020<br>University of Southern California<br><br><b>Gerontelis Graduate Studies Scholarship</b> Apr 2020<br>Gerontelis Foundation<br><br><b>Travel Grant</b> Sep 2018<br>International Speech Communication Association (ISCA)<br><br><b>Honorable Mention</b> Sep 2010<br>4th International Olympiad on Astronomy and Astrophysics   |
| JOURNAL PUBLICATIONS                 | 1. <b>N. Flemotomos</b> , V.R. Martinez, Z. Chen, T.A. Creed, D.C. Atkins, and S. Narayanan, “Automated Quality Assessment of Cognitive Behavioral Therapy Sessions Through Highly Contextualized Language Representations” ( <i>under review</i> ).<br><br>2. <b>N. Flemotomos</b> , V.R. Martinez, Z. Chen, K. Singla, V. Ardulov, R. Peri, J. Gibson, M.J. Tanana, P. Georgiou, J. Van Epps, S.P. Lord, T. Hirsch., Z.E. Imel, D.C. Atkins, and S. Narayanan. ““Am I A Good Therapist?” Automated Evaluation Of Psychotherapy Skills Using Speech And Language Technologies” ( <i>under review</i> ).<br><br>3. S.B. Goldberg, <b>N. Flemotomos</b> , V.R. Martinez, M. Tanana, P. Kuo, B.T. Pace, J.L. Villatte, P. Georgiou, J. Van Epps, Z.E. Imel, S. Narayanan, and D.C. Atkins. “Machine Learning and Natural Language Processing in Psychotherapy Research: Alliance as Example Use Case”, <i>Journal of Counseling Psychology</i> , 2020. |
| PEER REVIEWED CONFERENCE PROCEEDINGS | 1. <b>N. Flemotomos</b> , P. Georgiou, and S. Narayanan. “Linguistically Aided Speaker Diarization Using Speaker Role Information”, <i>Odyssey</i> , 2020.<br><b>Best Student Paper Nominee</b><br><br>2. <b>N. Flemotomos</b> , and D. Dimitriadis. “A Memory Augmented Architecture for Continuous Speaker Identification in Meetings”, <i>ICASSP</i> , 2020.  |

3. T.J. Park, M. Kumar, **N. Flemotomos**, M. Pal, R. Peri, R. Lahiri, P. Georgiou, and S. Narayanan. "The Second DIHARD Challenge: System Description for USC-SAIL Team", *Interspeech*, 2019
4. V.R. Martinez, **N. Flemotomos**, V. Ardulov, K. Somandepalli, S.B. Goldberg, Z.E. Imel, D.C. Atkins, and S. Narayanan. "Identifying Therapist and Client Personae for Therapeutic Alliance Estimation", *Interspeech*, 2019.
5. **N. Flemotomos**, P. Georgiou, D.C. Atkins, and S. Narayanan, "Role Specific Lattice Rescoring for Speaker Role Recognition from Speech Recognition Outputs", *ICASSP*, 2019.
6. **N. Flemotomos**, Z. Chen, D.C. Atkins, and S. Narayanan, "Role Annotated Speech Recognition for Conversational Interactions", *SLT*, 2018.
7. **N. Flemotomos**, P. Papadopoulos, J. Gibson, and S. Narayanan, "Combined Speaker Clustering and Role Recognition in Conversational Speech", *Interspeech*, 2018.
8. **N. Flemotomos**, V.R. Martinez, J. Gibson, D.C. Atkins, T.A. Creed, and S. Narayanan, "Language Features for Automated Evaluation of Cognitive Behavior Psychotherapy Sessions", *Interspeech*, 2018.
9. K. Singla, Z. Chen, **N. Flemotomos**, J. Gibson, D. Can, D.C. Atkins, and S. Narayanan, "Using Prosodic and Lexical Information for Learning Utterance-level Behaviors in Psychotherapy", *Interspeech*, 2018.

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| REVIEWER                         | <b>Journals:</b><br>Cogent Psychology, Behavior Research Methods  |                      |
|                                  | <b>Conferences:</b><br>Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) |                      |
| SERVICE AND<br>VOLUNTARY<br>WORK | <b>USC Behavioral Science Society</b><br>Student executive board member   | Dec 2020 to present  |
|                                  | <b>Hellenic Student Association of USC</b><br>Student volunteer and board member                                      | Jan 2018 to May 2019 |
|                                  | <b>IEEE Engineering in Medicine &amp; Biology Society NTUA Student Chapter</b><br>President                           | Sep 2014 to Jun 2015 |
|                                  | Student volunteer   | Sep 2013 to Jun 2014 |
|                                  | <b>7th International Olympiad on Astronomy and Astrophysics</b><br>Student volunteer                                  | Aug 2014             |
|                                  | <b>Greek Astronomy Magazine 'Ouranos' ('Sky')</b><br>Member of the writing team                                       | Sep 2012 to Mar 2015 |
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