

# Nikolaos (Nikos) Flemotomos

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EDUCATION	<p><b>Ph.D., Electrical Engineering</b> Aug 2022 University of Southern California, Los Angeles, CA, USA Thesis: <i>Extracting and Using Speaker Role Information in Speech Processing Applications</i></p> <p><b>M.Sc., Computer Science</b> Aug 2021 University of Southern California, Los Angeles, CA, USA GPA: 3.94/4.00</p> <p><b>M.Sc., Electrical Engineering</b> Dec 2018 University of Southern California, Los Angeles, CA, USA GPA: 4.00/4.00</p> <p><b>Diploma (5-years degree), Electrical and Computer Engineering</b> Apr 2016 National Technical University of Athens, Athens, Greece Thesis: <i>Robust Acoustic Features for Distant Speech Recognition</i> GPA: 9.34/10.00</p>
EXPERIENCE	<p><b>Apple</b>, Cambridge, MA, USA Siri – Automatic Speech Recognition <i>Machine Learning Researcher</i> Jun 2022 to present Manager: Roger Hsiao, Ph.D.</p> <ul style="list-style-type: none"><li>• Exploring machine learning algorithms and optimization techniques for acoustic modeling to improve the automatic speech recognition (ASR) technologies behind Siri. Specific sub-fields of interest include ASR confidence, joint ASR/diarization, contextual neural biasing.</li><li>• Collaborating with the production teams to quickly deploy research ideas.</li></ul> <p><b>University of Southern California</b>, Los Angeles, CA, USA Signal Analysis and Interpretation Laboratory (SAIL) <i>Graduate Research Assistant</i> May 2017 to May 2022 Supervisor: Prof. Shrikanth Narayanan</p> <ul style="list-style-type: none"><li>• Proposed methods and frameworks to extract speaker role information in structured conversational interactions and used this contextual information to improve the performance in various speech processing tasks (e.g., speaker diarization, speech recognition)</li><li>• Led a subgroup of Ph.D. students that, in collaboration with experts from the medical field, developed a real-world system which processes audio recordings of psychotherapy sessions and gives feedback to the therapist. The system was used for computer-aided therapist training.</li><li>• Published results in top-tier journals and peer-reviewed conferences.</li></ul> <p><b>Apple</b>, Los Angeles, CA, USA (home office) Siri – Automatic Speech Recognition <i>Machine Learning Engineering Intern</i> May 2021 to Aug 2021 Manager: Arnab Ghoshal, Ph.D.</p> <ul style="list-style-type: none"><li>• Explored acoustic-based speaker adaptation methods for end-to-end speech recognition.</li></ul> <p><b>Microsoft Research</b>, Bellevue, WA, USA Speech and Dialog Research Group <i>Research Intern</i> May 2019 to Aug 2019 Manager: Dimitrios Dimitriadis, Ph.D.</p> <ul style="list-style-type: none"><li>• Worked on speaker identification and diarization in meeting scenarios.</li><li>• Proposed a novel algorithm for continuous speaker identification based on memory-augmented neural networks (presented at ICASSP '20).</li></ul>

	<b>Czech Technical University in Prague</b> , Prague, Czech Republic Biomedical Data and Signal Processing Group (BioDat) <i>Research Intern</i> Supervisor: Assoc. Prof. Lenka Lhotská	Mar 2016 to Jun 2016
	<ul style="list-style-type: none"> <li>Developed an algorithm for automatic sleep staging from polysomnographic signals, motivated by ideas used in speech recognition.</li> </ul>	
	<b>National Technical University of Athens</b> , Athens, Greece Computer Vision, Speech Communication and Signal Processing Group (CVSP) <i>Undergraduate Research Assistant</i> Supervisor: Prof. Petros Maragos	Feb 2015 to Mar 2016
	<ul style="list-style-type: none"> <li>Explored the Teager-Kaiser energy operator for energy estimation in speech signals.</li> <li>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.</li> </ul>	
GRADUATE COURSEWORK	Analysis of Algorithms, 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, USA <i>Teaching Assistant</i> Speech Recognition and Processing for Multimedia	Spring 2019, 2020 & 2021
	<b>Society of Astronomy and Space</b> , Volos, Greece <i>Teaching Assistant</i> Preparation for the International Olympiad on Astronomy and Astrophysics	Summer 2011 & 2012
HONORS AND AWARDS	<b>Outstanding Research Assistant</b> University of Southern California	May 2022
	<b>Myronis Endowed Ph.D. Fellowship</b> University of Southern California	Aug 2021 to May 2022
	<b>Annenberg Ph.D. Fellowship</b> University of Southern California	Aug 2016 to Aug 2020
	<b>Phi Kappa Phi</b> Member (academic honor society)	initiation: May 2020
	<b>Gerontelis Graduate Studies Scholarship</b> Gerontelis Foundation	Apr 2020
	<b>Travel Grant</b> International Speech Communication Association (ISCA)	Sep 2018
	<b>Honorable Mention</b> 4th International Olympiad on Astronomy and Astrophysics	Sep 2010
MANUSCRIPTS SUBMITTED & IN PREPARATION	1. <b>N. Flemotomos*</b> , R. Hsiao*, P. Swietojanski*, T. Hori, D. Can, and X. Zhuang. “Optimizing Contextual Speech Recognition Using Vector Quantization for Efficient Retrieval”, <i>Transactions on Audio, Speech, and Language Processing (under review)</i> , 2025. *equal contribution	
	2. C.S. Soma, <b>N. Flemotomos</b> , S. Narayanan, and Z.E. Imel. “That didn’t feel good: The Effects of Therapist Confrontation on Client Emotional Expression during Motivational Interviewing”, <i>Psychotherapy (under review)</i> , 2025.	

JOURNAL  
PUBLICATIONS

1. C. Berkel, D. Knox, **N. Flemotomos**, V.R. Martinez, D.C. Atkins, S. Narayanan, L.A. Rodriguez, C.G. Gallo, and J.D. Smith, "A Machine Learning Approach to Improve Implementation Monitoring of Family-Based Preventive Interventions in Primary Care", *Implementation Research and Practice*, 2023.
2. B. van der Woerd, Z. Chen, **N. Flemotomos**, M. Oljaca, L.T. Sund, S. Narayanan, and M.M. Johns III. "A Machine-Learning Algorithm for the Automated Perceptual Evaluation of Dysphonia Severity", *Journal of Voice*, 2023.
3. C.S. Soma, B. Wampold, **N. Flemotomos**, R. Peri, S. Narayanan, D.C. Atkins, and Z.E. Imel. "The Silent Treatment?: Changes in Patient Emotional Expression after Silence", *Counselling and Psychotherapy Research*, 2023.
4. Z. Chen, **N. Flemotomos**, K. Singla, T.A. Creed, D.C. Atkins, and S. Narayanan, "An Automated Quality Evaluation Framework of Psychotherapy Conversations with Local Quality Estimates", *Computer Speech & Language*, 2022.
5. **N. Flemotomos**, V.R. Martinez, Z. Chen, K. Singla, V. Ardulov, R. Peri, D. Caperton, J. Gibson, M.J. Tanana, P. Georgiou, J. Van Epps, S.P. Lord, T. Hirsch., Z.E. Imel, D.C. Atkins, and S. Narayanan. "Automated Evaluation of Psychotherapy Skills Using Speech and Language Technologies", *Behavior Research Methods*, 2022.
6. **N. Flemotomos**, 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", *PLOS ONE*, 2021.
7. S.B. Goldberg, **N. Flemotomos**, 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", *Journal of Counseling Psychology*, 2020.

PEER  
REVIEWED  
CONFERENCE  
& WORKSHOP  
PROCEEDINGS

1. Z. Chen, **N. Flemotomos**, T.A. Creed, Z.E. Imel, D.C. Atkins, and S. Narayanan. "Leveraging Open Data and Task Augmentation to Automated Behavioral Coding of Psychotherapy Conversations in Low-Resource Scenarios", *Findings of EMNLP*, 2022.
2. **N. Flemotomos** and S. Narayanan. "Multimodal Clustering with Role Induced Constraints for Speaker Diarization", *Interspeech*, 2022.
3. Z. Chen, **N. Flemotomos**, V. Ardulov, T.A. Creed, Z.E. Imel, D.C. Atkins, and S. Narayanan. "Feature Fusion Strategies for End-to-End Evaluation of Cognitive Behavior Therapy Sessions", *EMBC*, 2021.
4. **N. Flemotomos**, P. Georgiou, and S. Narayanan. "Linguistically Aided Speaker Diarization Using Speaker Role Information", *Odyssey*, 2020.  
**Best Student Paper Finalist**
5. **N. Flemotomos** and D. Dimitriadis. "A Memory Augmented Architecture for Continuous Speaker Identification in Meetings", *ICASSP*, 2020.
6. 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
7. 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.
8. **N. Flemotomos**, P. Georgiou, D.C. Atkins, and S. Narayanan, "Role Specific Lattice Rescoring for Speaker Role Recognition from Speech Recognition Outputs", *ICASSP*, 2019.
9. **N. Flemotomos**, Z. Chen, D.C. Atkins, and S. Narayanan, "Role Annotated Speech Recognition for Conversational Interactions", *SLT*, 2018.

10. **N. Flemotomos**, P. Papadopoulos, J. Gibson, and S. Narayanan, “Combined Speaker Clustering and Role Recognition in Conversational Speech”, *Interspeech*, 2018.
11. **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.
12. 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.

INVITED & CAMPUS TALKS	1. <b>The Alan Turing Institute</b> , London, UK Data Science for Mental Health Interest Group <i>Automated Quality Assessment of Cognitive Behavioral Therapy Sessions Through Highly Contextualized Language Representations</i>	Mar 2022
	2. <b>Alberta Hospital Edmonton/University of Alberta</b> , Edmonton, AB, Canada Forensic Grand Rounds <i>Towards Automated Large-Scale Evaluation of Psychotherapy</i>	Sep 2021
	3. <b>University of Southern California</b> , Los Angeles, CA, USA Interaction Lab <i>Who Spoke When? and how speaker roles can help us find the answer</i>	Apr 2021

REVIEWER	<b>Journals:</b> Transactions on Audio, Speech and Language Processing; Computer Speech & Language; Behavior Research Methods; PLOS ONE; Nature Communications; npj Mental Health Research; Behaviour Research and Therapy; Administration and Policy in Mental Health and Mental Health Services Research; BMC Psychiatry; iScience; New Ideas in Psychology; Artificial Intelligence in Medicine; International Journal of Human-Computer Interaction; Applied Artificial Intelligence; Cogent Psychology  <b>Conferences:</b> Interspeech [2025]; ICASSP [2023, 2024, 2025]; EMBC [2020]
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SERVICE AND VOLUNTARY WORK	<b>USC Behavioral Science Society</b> Student executive board member	Dec 2020 to May 2022
	<b>Hellenic Student Association of USC</b> Student volunteer and board member	Jan 2018 to May 2019
	<b>IEEE Engineering in Medicine &amp; Biology Society NTUA Student Chapter</b> Chairperson Student volunteer	Sep 2014 to Jun 2015 Sep 2013 to Jun 2014