

# Maria Koutsogiannaki

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Dr, Koutsogiannaki has a strong research and engineering background on signal processing and artificial intelligence with many years of industrial (3+) and research (13+) experience in highly prestigious research centers and institutes (SHERPA.AI, Samsung research center UK, Basque center of cognition brain and language, Institute of computer science FORTH Hellas). She is the main inventor of two patents and she has several distinctions in her assets (Bikaintek fellowship, Marie Sklodowska Curie actions “Seal of Excellence”, Manassaki Bequest Fellowship). Currently she is working as an Artificial Intelligence Engineer at SHERPA.AI on innovative projects of machine learning and natural language processing using deep neural network architectures.

*Deep Neural Networks, Machine Learning, Natural Language Processing, Speech and Audio Processing, Speech modifications, Biomedical applications, Statistical Signal Processing*

## EDUCATION

09/2011 - 04/2016	<b>PhD in Computer Science.</b> Signal processing, speech and audio transformations, machine learning Computer science department, University of Crete Institute of computer science - foundation for research & technology Hellas (FORTH). Grade: Excellent
02/2008 - 10/2010	<b>MSc on Telecommunications and Networks.</b> Wireless networks, signal processing, speech analysis Computer science department, University of Crete Institute of computer science - foundation for research & technology Hellas (FORTH). Grade: Very Good
06/2000 - 05/2007	<b>School of Electrical and Computer Engineering (5 years program).</b> Optimisation algorithms for mobile ad-hoc networks (JAVA) National Technical University of Athens. Grade: Very Good
06/2000	<b>High School Graduation</b> Grade: Excellent, Rank: 1 <sup>st</sup>

## DISSERTATIONS

2016	<b>Doctoral dissertation:</b> “Intelligibility Enhancement of casual speech based on clear Speech Properties”
2010	<b>MSc thesis:</b> “Voice tremor detection using adaptive quasi-harmonic models”
2007	<b>MEng thesis:</b> “Enhanced end-to-end TDMA for wireless ad-hoc networks”

## RESEARCH EXPERIENCE

### *Artificial Intelligence Researcher at SHERPA.AI (09.2019 - today)*

- Development of natural language processing solutions in short time using recent advances in deep neural network technology (Tensorflow, python, pytorch). The solutions involved:
  - the development of a complete dialogue system that succeeded in overcoming the company's traditional natural language processing system
  - an aspect-based sentiment analyser for identifying user's preferences from online reviews achieving more reliable than human classification outcomes
  - a data-to-text generator that manages to generate text from a table with high linguistic diversity and accuracy
- Responsible for designing, implementing and delivering machine learning solutions and leading the team for accomplishing high quality outcomes while ensuring the on-time delivery of the project
- State-of-the-art machine learning techniques in python (regression, classification etc.)
- Technical writing (internal scientific reports, project writing)

### *Postdoctoral Researcher at the Basque Center of Cognition Brain and Language BCBL (07/2017 - 09/2019)*

- Research on human cognition involving the proposal, design and implementation of projects on listening effort, language optimisation using auditory feedback and other cognition tasks.
- Providing strong scientific (in maths, speech, phonetics) and engineering support (real-time speech modifications for altering auditory feedback, hardware configuration for combining EEG and eye-tracker techniques for the first time at the research center) to the team. Results are expected to have a broad impact on experimental psychology (two journals in process). Programming of tasks has been performed on several platforms (python, psychopy, matlab etc).
- Signal processing analysis of biological data and statistical analysis using R.
- Collaborating with the research assistants to ensure the collection of high quality experimental data and the compliance with the experimental guidances and institution's protocols.
- Technical writing achieving the “Marie Curie Seal of Excellence” distinction for proposing a high quality interdisciplinary project at the European Commission Individual Fellowships Calls.
- Teaching and supervision.
- Dissemination talks

### *Researcher at Samsung Research Center United Kingdom SRUK (01/2016 - 06/2017)*

- Senior Researcher on speech and audio technologies. Developing deep neural network architectures for audio enhancement and specifically for audio denoising (CNN architectures on Keras, Tensorflow, Python).
- Researcher on speech technologies. Main inventor of a real-time intelligibility enhancement algorithm for noisy environments. The proposed algorithm succeeded in all internal trial evaluations and is integrated to the Samsung S8 mobile 's intelligibility enhancement system (*Matlab, C*)

### **Research fellow during MSc and PhD studies**

- Independent research contractor at Toshiba research laboratory (07/2014 - 12/2014) working on intelligibility enhancement based on naturally-inspired spectral filtering. The novel outcome has been patented.
- Researcher on telecommunications and network laboratory and on the signal processing laboratory of the institute of computer science ICS-FORTH (02/2008 - 07/2014). My research has focused on signal processing (analysis and decomposition) using adaptive-quasi harmonic models, partially funded under the EU framework 7 future and engineering technologies (FET) program LISTA (the listener-talker) and resulted in various scientific publications.

### **INDUSTRIAL AND INTELLECTUAL PROPERTY**

28 February 2017	GR patent application GR20170100085 (filling). Main patent contributor (70%). Intelligibility algorithm is included in S8 Samsung Galaxy smartphone
30 April 2015	UK patent application (published) GB2537924 "A Speech Processing System and Method"

### **AWARDS / GRANTS / FELLOWSHIPS**

Basque Country	Bikaintek Fellowship 2019-2021
European Commission	<i>Marie Skłodowska-Curie Actions Seal of Excellence</i> for the quality of the project submitted to the MSCA Individual Fellowships, 2018 Erasmus Training agreement Fellowship, University of the Basque Country, 2012
University of Crete	Best Student Poster Award on summer school <u>SPCC2015</u> reviewed by researchers from Google, Toshiba and IBM (2 <sup>nd</sup> position), July 2015 Maria Michail Manassaki Bequest Fellowship award Manassaki (rewarding excellence of exceptional PhD candidate of the Computer Science Department). Grant: 4000 Euros Code-school award on web applications "An administration system for record management and promotion of Greek olive-oil in worldwide markets", December 2014 – CakePHP, MySQL, Bootstrap

### **LIFELONG TRAINING**

01 - 03/07/2020	DL4NLP - Deep Learning for Natural Language Processing
11 - 18/07/2019	9th Lisbon Machine Learning School LxMLS, Lisbon
20 - 22/06/2018	First International Workshop on Predictive Processing, San Sebastian, Donosti
02 - 04/05/2018	BrainHack Donostia 2018
23 - 27/09/2017	Enrich European Training Network, University of the Basque Country Summer
25 - 29/07/2016	School on Speech Processing (SPCC2016), University of Crete, Heraklion
27 - 31/07/2015	Summer school on Speech processing (SPCC2015) , University of Crete, Heraklion, Greece (participation and organisation)
04 - 08/08/2015	Code-school for developing dynamic web-applications, University of Crete, Heraklion, Greece
12 - 16/07/2014	Summer school on Speech processing (SPCC2014) , University of Crete, Heraklion, Greece (participation and organisation)

2 - 27/07/2012	The 8th International Summer Workshop on Multimodal Interfaces, eNTERFACE 2012, July 2-27, 2012, Metz, France. <u>P8 Project</u> on Active Speech Modifications
02/2012 - 07/2012	Erasmus Program – Training agreement on Speech signal processing algorithm development, Signal processing laboratory – AHOLAB, University of Basque Country (UPV/EHU), Bilbao, Spain
16 - 20/01/2012	IEEE signal processing society winter school on Speech and Audio processing for Immersive Environments and Future Interfaces, Foundation for Research and Technology Hellas (FORTH), Heraklion, Crete, Greece

## TEACHING EXPERIENCE

### Invited lectures/talks

- Natural language processing using deep neural networks, University of Crete (March 2021)
- Speech modifications inspired by natural speech. Enrich European Training Network “Human and computational speech modifications”, the Hague, Holland (September 2018)
- Voice Pathology Detection using Sinusoidal Models, Philosophy and Social Studies Department, University of Crete, Rethymnon, Crete, Greece (March 2013)

### Teaching

Master of Cognitive Neuroscience of Language, University of Basque Country (2017 - 2019)

- Scientific basics (statistical processing using R)
- Supervision of two master students

Computer Science Department, University of Crete (2008 - 2016)

- Teaching and Laboratory Assistant on undergraduate and master program: Speech processing, Signals and Systems, Digital Signal Processing, Probability theory, Calculus, Discrete Mathematics, Computer organization, Digital design
- Hands-on session lecture on MSc and PhD students during summer school “Speech Processing Courses in Crete” (SPCC2015)
- Mentoring of 2 Master students and 4 undergraduate students

Institute of Education and Training, Heraklion, Crete, Greece (09/2009 - 02/2010)

- Instructor of programming language C and basic platforms of Windows

## OTHERS

**Invited reviewer** (since 2016): JASA (H-index:158), ICASSP (H5-index:79), Interspeech (H5- index:67), IEEE signal processing letters (H5-index:57), IEEE Transactions on Audio, Speech & Language Processing (H5-index:42), Computer Speech & Language (H5-index:58), Eusipco (H5-index:26)

### Dissemination – public talks

- “Ciencia y Tecnología en femenino” (in Spanish): Basque Technological Park, Donostia, 2018
- “Dilseixa: Understanding speech in real life communication situation”, BRAIN awareness week (in Spanish), Basque Science Museum, Donostia, 2018
- “Be careful how you speak” (in Greek): School Research day, University of Crete, 2015

## LANGUAGES

Greek:	Native
English:	Fluent (Certificate of Proficiency in English-Michigan)
Spanish:	Intermediate (B2 – Cervantes)
German:	Elementary (B1-Zertifikat Goethe-Institut)
Basque:	Elementary (A2)

## **PUBLICATIONS**

### **Scientific Report**

1. Koutsogiannaki M., Stylianou Y., Petkov P. GB2537924 - A speech processing system and method. Patents and Designs Journal. 25 - 1, Intellectual Property Office UK, 2018.

### **Peer-reviewed Journals**

1. Godoy M., Koutsogiannaki M., Stylianou Y., "Approaching speech intelligibility enhancement with inspiration from Lombard and Clear speaking styles", *Computer Speech & Language*, vol. 28(2), pages 629-647, 2014
2. Vergados D.J., Vergados D.D., Koutsogiannaki M., "Capacity Optimization in TDMA Ad-Hoc Networks", *Wireless Personal Communications*, vol. 62(3), pages 687-713, 2010

### **Peer-reviewed Conference proceedings**

3. Koutsogiannaki M., Francois H., Choo K. and Oh E., "Real-time modulation enhancement of temporal envelopes for increasing speech intelligibility", *INTERSPEECH 2017*, Stockholm Sweden.
4. Koutsogiannaki M. and Stylianou Y., "Modulation enhancement of temporal envelopes for increasing speech intelligibility in noise", *INTERSPEECH 2016*, San Francisco USA, pages 2508-2510.
5. Koutsogiannaki M., Petkov P. and Stylianou Y., "Intelligibility enhancement of Casual speech for reverberant environments inspired by Clear speech properties", *INTERSPEECH 2015 Dresden Germany*, pages 65-69.
6. Koutsogiannaki M., Simantiraki O., Degottex G. and Stylianou Y., "The importance of phase on voice quality assessment", *INTERSPEECH 2014*, Singapore, pages 1653-1657.
7. Koutsogiannaki M. and Stylianou Y., "Simple and artefact-free spectral modifications for enhancing the intelligibility of Casual speech", *ICASSP 2014*, Florence Italy, pages 4648-4652.
8. Godoy E., Koutsogiannaki M. and Stylianou Y., "Assessing the intelligibility impact of vowel space expansion via clear speech-inspired frequency warping", *INTERSPEECH 2013*, Vancouver Kanada, pages 1169-1173.
9. Koutsogiannaki M., Pettinato M., Mayo C., Kandia V. and Stylianou Y., "Can modified casual speech reach the intelligibility of clear speech?", *INTERSPEECH 2012*, Portland USA, pages 579-582.
10. Koutsogiannaki M., Pantazis Y., Stylianou Y. and Dejonckere P., "Tremor in speakers with spasmodic dysphonia", *7<sup>th</sup> International Workshop on Models and Analysis of Vocal Emissions for Biomedical Applications, MAVEBA 2011*, Florence Italy, pages 139-142.
11. Pantazis Y., Koutsogiannaki M. and Stylianou Y., "A novel method for the extraction of vocal tremor", *6<sup>th</sup> International Workshop on Models and Analysis of Vocal Emissions for Biomedical Applications, MAVEBA 2009*, Florence Italy, pages 107-110.
12. Leonidis A., Baryannis G., Fafoutis X., Korozi M., Gazoni N., Dimitriou M., Koutsogiannaki M., Boutsika A., Papadakis M., Papagiannakis H., Tesseris G., Voskakis E., Bikakis A., Antoniou G., "AlertMe: A Semantics-Based Context-Aware Notification System", *COMPSAC 2009* vol. 2, pages 200-205.
13. Vergados D.J., Koutsogiannaki M., Vergados D.D, Loumos V., Pantazis N.A., "Enhanced End-to-End TDMA for wireless ad-hoc networks", *ISCC 2007*, Aveiro Portugal.

### **Works submitted in international conferences**

1. Listening effort of natural speaking styles, *Speech in Noise workshop (SPIN)*, Toulouse, 2020
2. Optimization in non-native speech sound production, *The Eleventh Annual Society for the Neurobiology of Language Conference (SNL)*, Helsinki, 2019