Chryssalenia Koumpouzi

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Profile

Postdoctoral Researcher at Computational BioMedicine Lab, FORTH, currently working on signal processing and analysis for biomedical applications. Interested in computational approaches for biology and neuroscience directed towards understanding complex underlying mechanisms.

Research Interests

Biomedical Engineering
Computational Neuroscience
Data Analytics / Statistical Learning
Explainable AI (XAI)

Technical Skills

Programming : MATLAB, R, Python, C/C++, HTML, PHP
Other Tools: MySQL, Microsoft Office, LaTeX, Weka

Experience

Postdoctoral Researcher **April 2023-Present**
Computational BioMedicine Lab, Foundation for Research and Technology - Hellas (FORTH)

Research Assistant **June 2019-May 2022**
Department of Electrical & Computer Engineering, Rutgers, The State University of New Jersey

ORAU Journeyman Fellow **Sep 2018-May 2019**
U.S. Army Research Laboratory

Instructor **May 2018-Jul 2018**
Department of Electrical & Computer Engineering, Rutgers, The State University of New Jersey
- "Probability and Random Processes" (undergraduate)

Teaching Assistant **Jan 2014-May 2018**
Department of Electrical & Computer Engineering, Rutgers, The State University of New Jersey
- "Digital Logic Design Lab" (undergraduate)
- "Linear Signals and Systems Lab" (undergraduate)
- "Principles of Electrical Engineering Lab" (undergraduate)
- "Probability and Random Processes" (undergraduate)

Computer Engineering & Informatics Department, University of Patras
- "Digital Communications" (undergraduate)
- "Stochastic Signals & Communications" (undergraduate/graduate)

Education

Ph.D. (GPA: 3.786/4) **2015-2022**
Department of Electrical & Computer Engineering (ECE), Rutgers, The State University of New Jersey, USA

M. Sc. (GPA: 8.4/10) **2014-2015**
Interdepartmental Graduate Program: Communications & Signal Processing Systems (CSPS), University of Patras, Greece

Study Abroad - Erasmus Lifelong Learning Program **Sep.2010- Feb.2011**
Computer Science and Technology Department (CSTD), Universitá Degli Studi di Milano, Italy

B.Sc. & M. Eng. (GPA: 7/10) **2006-2014**
Computer Engineering and Informatics Department (CEID), University of Patras, Greece

Languages

English (Excellent/Fluent)
Greek (Native)
Italian (Fluent)
French (Good)

Publications

C. Koumpouzi, M. Pediaditis, E. Spanakis, V. Sakkalis - " High-Accuracy Open-Source Respiration Rate Estimation from ECG and PPG for Wearables ", IEEE Journal of Biomedical and Health Informatics, (in review)

M. Spanakis, E. Tzamali, G. Tzedakis, **C. Koumpouzi**, M. Pediaditis, A. Tsatsakis, V. Sakkalis - "AI Models and Tools for the Assessment of Drug-Herb Interactions ", MDPI Pharmaceuticals, (in review)

M. Kasher, F. T. Dagefu, J. Choi, **C. Koumpouzi**, P. Spasojević, - "Low Probability of Detection Communication via Polarization Diversity: An Experimental Study ", USNC-URSI NRSM, 2024

C. Koumpouzi, F. T. Dagefu, J. Choi, J. Kong, P. Spasojević, - "Exploiting Polarization Diversity to Improve Cyclostationary-Based LPD Properties of CDMA ", IEEE Wireless Communication Letters, 2022

J. Kong, F. T. Dagefu, J. Choi, P. Spasojević, **C. Koumpouzi**, - "Covert Communications in Low-VHF/Microwave Heterogeneous Networks", IEEE Wireless Communications and Networking Conference, 2022.

C. Koumpouzi, P. Spasojević, F. T. Dagefu, J. Kong, - "On the Communication Performance of LPD QS-CDMA with Reduced Cyclostationary Characteristics", Asilomar Conference on Signals, Systems, and Computers 2021.

C. Koumpouzi, P. Spasojević, F. T. Dagefu - "Improved LPD Characteristics for QS-DS-CDMA Employing Randomization Techniques", IEEE Transactions on Information Forensics and Security, 2021.

Z. Tang, P. Spasojević, **C. Koumpouzi**, F. T. Dagefu - "Simultaneous Synchronization and Detection in Loosely Synchronized Tiny Packet Networks", 40th IEEE Sarnoff Symposium, September 2019.

C. Koumpouzi, P. Spasojević, F. T. Dagefu - "Performance Analysis of Signal Pattern Reducing Techniques for Low probability of Detection", 90th Vehicular Technology Conference (VTC)- fall 2019, Honolulu 2019.

C. Koumpouzi, P. Spasojević, F. T. Dagefu - "Low Probability of Detection QS-MC-DS-CDMA for low VHF", International Conference on Military Communications and Information Systems (ICMCIS) 2019, May 2019.

C. Koumpouzi, E. Soljanin - "Urns & Balls and Network Anonymity", AWIMS - Advancing Women's Impact in Mathematics Symposium, April 2018, Worcester Polytechnic Institute (poster).

A. Dimas, D. S. Kalogerias, **C. Koumpouzi**, A. P. Petropulu - "Parameter Estimation For Hierarchical Channel Profiling", IEEE Global Conference on Signal and Information Processing (GlobalSIP), 2017.

Sample Projects

- ▷ Vital Sign Extraction from the Photoplethysmogram (PPG) and Electrocardiogram (ECG).
- ▷ Decoding of Visual Stimuli in Mouse Primary Visual Cortex (V1).
- ▷ Randomization Techniques for Quasi-Synchronous CDMA to enhance Low Probability of Detection in the Presence of a Watchful Adversary Employing Cyclic Spectral Analysis (**Ph.D. Dissertation**).
- ▷ Hidden Markov Model-based Wi-Fi Channel Parameter Estimation via Multivariate Time Series Segmentation based on Received Signal Strength Measurements.
- ▷ Urns & Balls and Network Anonymity - Mix Delays as (Partial) Collection Completion Times.
- ▷ Packetization of LDPC Coded Data to Avoid Stopping Sets in Belief Propagation Decoding.
- ▷ Maximum Likelihood and Maximum A Posteriori Estimation of 8-PSK under Different Source Distributions.
- ▷ Avoiding Pilot Contamination in Massive MIMO using Blind Subspace Tracking Techniques (**M.Sc. Thesis**).
- ▷ Implementation of Energy-Efficient Distributed Beamforming Techniques for Cognitive Radio Networks (**M.Eng. Thesis**).
- ▷ Spectral Density Estimation with Classic Periodogram and Welch-Bartlett's Method.
- ▷ System Identification with optimal Wiener filtering and Adaptive LMS filtering.
- ▷ Simulation of Adaptive Equalizer for Sparse Channels using (1) Least Squares (LS) Estimator, (2) GenieAided LS (GA-LS) Estimator, and (3) Orthogonal Matching Pursuit (OMP).