Ioannis (Yannis) Pantazis

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Appointments & Education

Principal Researcher (May 2022 – Now). Institute of Applied and Computational Mathematics, Foundation for Research and Technology - Hellas (IACM/FORTH)

Research Interests: Deep Learning, Machine Learning, Information Theory, Applied Probability, Signal Processing, Speech Processing, Statistical Inference, Uncertainty Quantification

Assistant Researcher (Feb. 2018 – Apr. 2022). Institute of Applied and Computational Mathematics, Foundation for Research and Technology - Hellas (IACM/FORTH)

Research Interests: Applied Probability, Stochastic Modelling, Machine Learning, Deep Learning, Signal Processing, Speech Processing, Statistical Inference, Uncertainty Quantification

Postdoctoral Research Associate (Jul. 2015 – Dec. 2017). Computer Science Department, University of Crete

Title: Next Generation Causal Analysis Inspired by the Induction of Biological Pathways from Cytometry Data
Supervisor: Ioannis Tsamardinos
Field: Dynamical Systems, Sparse Inference, Systems Biology

Postdoctoral Research Associate (Jun. 2014 – Jun. 2015). Dep. of Mathematics and Statistics, Univ. of Massachusetts, Amherst

Title: Mathematical Foundations for Uncertainty Quantification in Materials Design
Supervisor: Markos Katsoulakis
Field: Applied Mathematics, Probability Theory, Stochastic Processes

Greek Army (Sep. 2013 – May 2014). Serving at the Information Technology and Research Office

Postdoctoral Research Associate (Sep. 2010 – Aug. 2013). Dep. of Mathematics and Statistics, Univ. of Massachusetts, Amherst

Title: Hierarchical Stochastic Algorithms for Materials Engineering
Supervisor: Markos Katsoulakis
Field: Computational Mathematics, Applied Probability, Stochastic Processes

Ph.D. (Sep. 2006 – Jul. 2010). Computer Science Department, University of Crete

Title: Decomposition of AM-FM Signals with Applications in Speech Processing
Supervisor: Yannis Stylianou
Field: Speech Processing, Speech Analysis/Synthesis, Signal Processing

M.Sc. (Sep. 2004 – Sep. 2006). Computer Science Department, University of Crete

Title: Detection of Discontinuities in Concatenative Speech Synthesis
Supervisor: Yannis Stylianou
Field: Speech Processing, Pattern Recognition

B.Sc. (Sep. 2000 – Sep. 2004). Computer Science Department, University of Crete

Publications

Journals

20. "(f, Γ)-Divergences: Interpolating between f-Divergences and Integral Probability Metrics", J. Birrell, P. Dupuis, M. A. Katsoulakis, Y. Pantazis and L. Rey-Bellet, Journal of Machine Learning Research, 2022
19. "Optimizing variational representations of divergences and accelerating their statistical estimation", J. Birrell, M. A. Katsoulakis and Y. Pantazis, IEEE Trans. on Information Theory, 2022
18. "Cumulant GAN", Y. Pantazis, D. Paul, M. Fasoulakis, Y. Stylianou and M. Katsoulakis, IEEE Trans. on Neural Networks and Learning Systems, 2022
17. "Learning Biologically-Interpretable Latent Representations for Gene Expression Data", I. Karagiannaki, K. Gourlia, V. Lagani, Y. Pantazis and I. Tsamardinos, Springer Machine Learning, 2022
16. "GAN-Based Training of Semi-Interpretable Generators for Biological Data Interpolation and Augmentation", A. Tsourtis, G. Papoutsoglou and Y. Pantazis, Applied Sciences, 2022
15. "Predictive modeling approaches in laser-based material processing", M.-Ch. Velli, G. D. Tsibidis, A. Mimidis, E. Skoulas, Y. Pantazis, E. Stratakis, Journal of Applied Physics, 2020
14. "Quantifying the structure of strong gravitational lens potentials with uncertainty-aware deep neural networks", G. Vernardos, G. Tsagkatakis and Y. Pantazis, Monthly Notices of the Royal Astronomical Society, 2020
13. "Sensitivity Analysis for Rare Events based on Renyi Divergence", P. Dupuis, M.A. Katsoulakis, Y. Pantazis and L. Rey-Bellet, Annals of Applied Probability, 2020
12. "A Unified Approach for Sparse Dynamical System Inference from Temporal Measurements", Y. Pantazis and I. Tsamardinos, Bioinformatics, 2019
11. "Gaussian Asymptotic Limits for the α-transformation in the Analysis of Compositional Data", Y. Pantazis, M. Tsagris and A. Wood, Sankhya A, 2019
10. "Summary Results of the 2014-2015 DARPA Chikungunya Challenge", S.Y. Del Valle, B.H. McMahon, J. Asher, R. Hatchett, J. Lega, H.E. Brown, M. Leany, Y. Pantazis, D.J. Roberts, S. Moore, A.T. Peterson, L.E. Escobar, H. Qiao, N.W. Hengartner, H. Mukundan, BMC Infectious Diseases, 2018
9. "ISAP: MATLAB Package for Sensitivity Analysis of High-Dimensional Stochastic Chemical Networks", W. Hu, Y. Pantazis and M. Katsoulakis, Journal of Statistical Software, 2018
8. "Path-space Information Bounds for Uncertainty Quantification and Sensitivity Analysis of Stochastic Dynamics", P. Dupuis, M.A. Katsoulakis, Y. Pantazis and P. Plechac, SIAM J. on Uncertainty Quantification, 2016
7. "Parametric Sensitivity Analysis for Stochastic Molecular Systems using Information Theoretic Metrics" A. Tsourtis, Y. Pantazis, M.A. Katsoulakis and E. Harmandaris, Journal of Chemical Physics , 2015
6. "Strategies for Parametric Sensitivity Analysis in Large-scale Reaction Networks", G. Arampatzis, M.A. Katsoulakis and Y. Pantazis, PLoS ONE , 2015
5. "Measuring the Irreversibility of Numerical Schemes for Reversible Stochastic Differential Equations", M.A. Katsoulakis, Y. Pantazis and L. Rey-Bellet, ESAIM: Mathematical Modelling and Numerical Analysis, 2014
4. "Parametric Sensitivity Analysis for Biochemical Reaction Networks based on Pathwise Information Theory", Y. Pantazis, M.A. Katsoulakis and D.G. Vlachos, BMC Bioinformatics, 2013

3. "A Relative Entropy Rate Method for Path Space Sensitivity Analysis of Stationary Complex Stochastic Dynamics", Y. Pantazis and M.A. Katsoulakis, Journal of Chemical Physics, 138, 054115, 2013

2. "Adaptive AM-FM Signal Decomposition with Application to Speech Analysis", Y. Pantazis, O. Rosec and Y. Stylianou, IEEE Trans. on Audio, Speech and Language Processing, pg. 290–300, 2011

1b. "Reply to the "Comments for 'Iterative Estimation of Sinusoidal Signal Parameters""', Y. Pantazis, O. Rosec and Y. Stylianou, IEEE Signal Processing Letters , pg. 1024–1026, 2010

1. "Iterative Estimation of Sinusoidal Signal Parameters", Y. Pantazis, O. Rosec and Y. Stylianou, IEEE Signal Processing Letters, pg. 461–464, 2010

Conferences

35. "The effect of masking noise on listeners' spectral tilt preferences", O. Simantiraki, Y. Pantazis and M. Cooke, INTERSPEECH, 2023

34. "Function-space regularized Rényi divergences", J. Birrell, Y. Pantazis, P. Dupuis, L. Rey-Bellet and M. Katsoulakis, International Conference on Learning Representations (ICLR), 2023

33. "Efficiency evaluation and comparisons of solar cell technologies based on measurements from the Arabian peninsula", Y. Pantazis, E. Kalligiannaki, Y. Kamarianakis, K. Kotsovos, I. Gereige, M. Abdullah, A. Jamal, A. Tzavaras and T. Katsaounis, EuroSun, 2022

32. "KNN-based ensembles for day-ahead solar power output forecasting", Y. Kamarianakis, Y. Pantazis, E. Kalligiannaki, T. Katsaounis, K. Kotsovos, I. Gereige, M. Abdullah, A. Jamal and A. Tzavaras, EuroSun, 2022

31. "Performance evaluation and comparison of solar cell technologies based on historical data", Y. Pantazis, E. Kalligiannaki, Y. Kamarianakis, K. Kotsovos, I. Gereige, M. Abdullah, A. Tzavaras and T. Katsaounis, 8th World Conference on Photovoltaic Energy Conversion, 2022

30. "Day-ahead forecasting of solar irradiance: KNN-based ensembles", Y. Kamarianakis, Y. Pantazis, E. Kalligiannaki, K. Kotsovos, I. Gereige, M. Abdullah, A. Tzavaras and T. Katsaounis, 8th World Conference on Photovoltaic Energy Conversion, 2022

29. "Forward Looking Best-Response Multiplicative Weights Update Method for Bilinear Zero-sum Games", M. Fasoulakis, E. Markakis, Y. Pantazis and K. Varsos, AISTATS, 2022

28. "A Universal Multi-Speaker Multi-Style Text-to-Speech via Disentangled Representation Learning based on Rényi Divergence Minimization", D. Paul, S. Mukherjee, Y. Pantazis and Y. Stylianou, INTERSPEECH, 2021

27. "Efficient Discrimination between Biological Populations via Neural-based Estimation of Rényi Divergence", A. Tsourtis, G. Papoutsoglou and Y. Pantazis, 4th Int. Conf. on UNCECOMP, 2021

26. "Latent Feature Representations for Human Gene Expression Data Improve Phenotypic Predictions", Y. Pantazis, C. Tselas, K. Lakiotaki, V. Lagani and I. Tsamardinos, IEEE Int. Conf. on BioInformatics and BioMedicine (BIBM), 2020

25. "Enhancing Speech Intelligibility in Text-To-Speech Synthesis using Speaking Style Conversion", D. Paul, M. Shifas PV, Y. Pantazis and Y. Stylianou, INTERSPEECH, 2020

24. "Speaker Conditional WaveRNN: Towards Universal Neural Vocoder for Unseen Speaker and Recording Conditions", D. Paul, Y. Pantazis and Y. Stylianou, INTERSPEECH, 2020

23. "Pathway Activity Score Learning for Dimensionality Reduction of Gene Expression Data", I. Karagiannaki, Y. Pantazis, E. Chatzaki and I. Tsamardinos, 23rd Int. Conf. on Discovery Science, 2020

22. "Effects of Spectral Tilt on Listeners Preference and Intelligibility", O. Simantiraki, M. Cooke and Y. Pantazis, ICASSP, 2020

21. "Towards a robust and accurate screening tool for dyslexia with data augmentation using GANs", T. Asvestopoulou, V. Manousaki, A. Psistakis, E. Nikolli, V. Andreadakis, I. Aslanides, Y. Pantazis, I. Smyrnakis and M. Papadopouli, IEEE Int. Conf. on BioInformatics and BioEngineering (BIBE), 2019
20. "Speech Enhancement for Noise-Robust Speech Synthesis using Wasserstein GAN", N. Adiga, Y. Pantazis, V. Tsiaras and Y. Stylianou, INTERSPEECH, 2019
19. "Non-parallel Voice Conversion using Weighted Generative Adversarial Networks", D. Paul, Y. Pantazis and Y. Stylianou, INTERSPEECH, 2019
18. "An information system for the detection of water leaks in municipal water networks", P. Prastacos, M. Diamandakis, M. Kosmadakis, I. Dafermos, Y. Kamarianakis and Y. Pantazis, AGILE, 2019
17. "Training Generative Adversarial Networks with Weights", Y. Pantazis, D. Paul, M. Fasoulakis and Y. Stylianou, EUSIPCO, 2019
16. "Connections between Reassigned Spectrum and Least Squares Estimation for Sinusoidal Models", Y. Pantazis, V. Tsiaras and Y. Stylianou, EUSIPCO, 2019
15. "Pathwise Sensitivity Analysis in Transient Regimes", G. Arampatzis, M. Katsoulakis, Y. Pantazis, RMMC Proceedings , 2015
14. "An extension of the adaptive Quasi-Harmonic Model", G.P. Kafentzis, Y. Pantazis, O. Rosec and Y. Stylianou, ICASSP , 2012
13. "Tremor in Speakers with Spasmodic Dysphonia", M. Koutsogiannaki, Y. Pantazis, Y. Stylianou and P. Dejonckere, MAVEBA, 2011
12. "Fast Least-Squares Solution for Sinusoidal, Harmonic and Quasi-Harmonic Models", G. Tzedakis, Y. Pantazis, O. Rosec and Y. Stylianou, INTERSPEECH, 2010
11. "Analysis/Synthesis of Speech based on an Adaptive Quasi-Harmonic plus Noise Model", Y. Pantazis, G. Tzedakis, O. Rosec and Y. Stylianou, ICASSP , 2010
10. "On the Robustness of the Quasi-Harmonic Model of Speech", Y. Pantazis, O. Rosec and Y. Stylianou, ICASSP , 2010
9. "A Novel Method for the Extraction of Vocal Tremor", Y. Pantazis, M. Koutsogiannaki and Y. Stylianou, MAVEBA, 2009
8. "AM-FM Estimation for Speech Based on a Time-Varying Sinusoidal Model", Y. Pantazis, O. Rosec and Y. Stylianou, Interspeech , 2009
7. "Chirp Rate Estimation of Speech based on a Time-Varying Quasi-Harmonic Model", Y. Pantazis, O. Rosec and Y. Stylianou, ICASSP , 2009
6. "On the Properties of a Time-Varying Quasi-Harmonic Model of Speech", Y. Pantazis and Y. Stylianou, Interspeech , 2008
5. "On the Estimation of the Speech Harmonic Model", Y. Pantazis, O. Rosec and Y. Stylianou, ISCA, 2008
4. "Improving the Modeling of the Noise Part in the Harmonic Plus Noise Model of Speech", Y. Pantazis and Y. Stylianou, ICASSP , 2008
3. "On the Detection of Discontinuities in Concatenative Speech Synthesis", Y. Pantazis and Y. Stylianou, WNSP'07
2. "Discontinuity Detection in Concatenated Speech Synthesis Based on Nonlinear Speech Analysis", Y. Pantazis Y. Stylianou and E. Klabbers, INTERSPEECH, 2005
1. "Non Linear Speech Features for the Objective Detection of Discontinuities in Concatenative Speech Synthesis", Y. Pantazis and Y. Stylianou, WNSP'05

Under Review, Preprints and Reports

3. "Inference of Stochastic Dynamical Systems from Cross-Sectional Population Data", A. Tsourtis, Y. Pantazis and I. Tsamardinos (preprint: https://arxiv.org/abs/2012.05055)
2. "Enumerating Multiple Equivalent Lasso Solutions", Y. Pantazis, V. Lagani, P. Charonyktakis and I. Tsamardinos (preprint: http://arxiv.org/abs/1710.04995)
1. "GMM-Based Multimodal Biometric Verification", Y. Stylianou, Y. Pantazis, F. Calderero, P. Larroy, F. Severin, S. Schimke, R. Bonal, F. Matta, and A. Valsamakis, ENTERFACE'05 (report), 2005

Funded Grants

6. "STOMA: Towards real-time, enhanced text-to-speech synthesis on the device" (2022-2024), *ELIDEK* (Principal Investigator; Budget: €198,000)
5. "Characterising population dynamics with applications in biological data" (2020-2021), *ESPA - Ministry of Development* (Principal Investigator; Budget: €46,000)
4. "EPIRROH: Information system for monitoring the leaks in municipal water systems" (2017-2019), *INTERREG V Cyprus-Greece* (Co-investigator)
3. "ENRICH: Enriched communication across the lifespan" (2017-2020), *Horizon 2020, MSCA-ETN-2020* (Partner)
2. "Algorithmic development and testing of integrative causal analysis" (2016), *HPC-ARIS*
1. "Mathematical foundations for uncertainty quantification in materials design" (2013-2016), *Department of Energy*

Teaching Experience

Instructor: Introduction to Deep Generative Models (HY673 - Graduate), CSD, UOC, 2023

- https://www.csd.uoc.gr/~hy673/

Instructor: Ordinary Differential Equations for Scientists and Engineering (MATH331), UMass, Amherst, 2015

Teaching Assistant (CSD, UoC): Digital Signal Processing (2004 – 2008), Introduction to Applied Mathematics (2005 – 2010), Digital Speech Processing (Graduate, 2006 – 2010) and Statistical Signal Processing (Graduate, 2009)

Instructor: Digital Image Processing Lab, ATEI Heraklion, 2005 – 2006

Supervisor or Co-supervisor

Postdoc: Olina Simantiraki (IACM, FORTH, 2022-now), Anastasios Tsourtis (IACM, FORTH, 2020-2021), Georgios Papoutsoglou (IACM, FORTH, 2020-2021)

PhD: Michael Raptakis (IACM, FORTH, 2022-now), Dipjyoti Paul (CSD, UoC, 2018-now), Weilong Hu (Math & Stat, UMass, Amhesrt, 2014-2015), Anastasios Tsourtis (Applied Math, UoC, 2014-2015)

MSc: Georgios Tzedakis (CSD, UoC, 2009-2010), Maria Koutsogiannaki (CSD, UoC, 2009-2010), Christos Tselas (CSD, UoC, 2016-2017), Shyam Krishna Khadka (CSD, UoC, 2016-2017), Myrto Krana (CSD, UoC, 2017-2018), Ioulia Karagiannaki (CSD, UoC, 2018-2020), Aikaterini Papadaki (Physics, UoC, 2020), Anastasios Listas (CSD, UoC, 2020-now), Michael Raptakis (CSD, UoC, 2020-2022)

BSc: Elias-Marios Sarris (Physics, UoC, 2020-2021), Aikaterini Lefkaditi (Mathematics, UoC, 2020-2021), Elias Georgoulis (Physics, UoC, 2021-2022), Maria-Eleni Papadaki (Mathematics, UoC, 2021-2022)

Internship: Christina Velonaki (IACM, FORTH, 2018), Iro Mananedaki (IACM, FORTH, 2019), Anastasios Listas (IACM, FORTH, 2020), Elisavet Karanikola (IACM, FORTH, 2020), Georgios Xanthopoulos (IACM, FORTH, 2021), Maria-Eleni Papadaki (IACM, FORTH, 2021)

Scholarships & Awards

1st place in CTTSO's Challenge on "Algorithmic Identification of Material Mixtures from Raman Spectra", 2016

1st Honorable Mention (bronze medal) in DARPA's Forecasting Chikungunya Challenge, 2015

– http://www.math.umass.edu/sites/www.math.umass.edu/files/newsletters/63307finalrev.pdf

ICS-FORTH, Ph.D. research assistantship (partially funded from Orange Labs), 2007 – 2010

Ericsson Awards of Excellence in Telecommunications, 2005

CSD-UOC, EPEAEK scholarship, 2004 – 2006

ICS-FORTH, B.Sc. research assistantship, 2003

Talks & Posters

"Function-space Regularized Divergences for Machine Learning Applications", ICERM Workshop on Optimal Transport in Data Science, Providence. 2023

"(f, Γ)-Divergences: Interpolating between f-Divergences and Integral Probability Metrics", NeurIPS, New Orleans. 2022

"Efficiency Evaluation and Comparisons of Solar Cell Technologies Based on Measurements from the Arabian Peninsula", EuroSun, Kassel. 2022

"Neural-based Estimation of Rényi Divergence Applied for the Detection of Rare Biological Sub-Populations", UNCECOMP, virtual. 2021

"Which Divergence to Apply in Generative Adversarial Modelling?", SIAM MS, virtual. 2021

"Latent Feature Representations for Gene Expression Data Improve Phenotypic Predictions", BIBM, virtual. 2020

"Uncovering Conspiracy Theories: How to Deal with Latent Confounders in Dynamical Systems", SIAM DS, Snowbird. 2019

"A Unified Approach for Sparse Inference of Dynamical Systems from Temporal Measurements", CECAM Workshop, Lausanne. 2019

"Sparse Inference of Dynamical Systems with Application in Natural Sciences", YSC, Heraklion. 2018

"Tutorial on Generative Adversarial Networks (GANs)", SPCC, Heraklion. 2018

"Latent Feature Space Construction for Gene Expression Data with Improved Predictive Power on Newly-seen Datasets", HBio Conference, Heraklion. 2017

"Information-theoretic Uncertainty and Sensitivity Bounds for Stochastic Dynamics and Rare Events", Scaling Cascades in Complex Systems, Berlin. 2017

"Sensitivity Analysis, Uncertainty Quantification and Inference in Stochastic Dynamics", Workshop on UQ, Los Angeles. 2016

"Pathwise Information-theoretic Metrics for Parametric Sensitivity Analysis of Stochastic Reaction Networks", Workshop on Reaction Network Theory, Copenhagen. 2015

"Modeling Stochastic Dynamics for Biochemical Reaction Networks", CAUSALPATH Workshop, Heraklion. 2015

"Pathwise Sensitivity Analysis of Complex Stochastic Dynamics Based on Relative Entropy Rate", SIAM MS, Philadelphia. 2013

"Information-based parametric sensitivity analysis for stationary complex stochastic dynamics", SIAM CSE, Boston. 2013

"Applying Path-wise Relative Entropy in Numerical SDEs and in Sensitivity Analysis", Non-equilibrium StatMech Workshop, Banff, 2012

"Controlled-Error Langevin Approximations of Surface Diffusion Processes", ICIAM, Vancouver, 2011

"Controlled-error Approximations of Surface Diffusion with Application to Pattern Formation", Coarse-Graining Workshop, Heraklion, 2011

"Controlled-Error Semi-discretization of Mesoscopic Stochastic Equations for Surface Diffusion", FoCM, Budapest, 2011

"A Novel Method for the Extraction of Vocal Tremor", MAVEBA, Florence, 2009

"On the Properties of a Time-Varying Quasi-Harmonic Model of Speech", INTERSPEECH, Brisbane, 2008

"On the Estimation of the Speech Harmonic Model", ISCA - ITRW, Aalborg, 2008

"Non Linear Speech Features Combined with Fisher's Linear Discriminant for the Objective Detection of Discontinuities in Concatenative Speech Synthesis", INTERSPEECH, Lisbon, 2005

Editorial & Scientific Activities

As a Reviewer

SIAM Journal of Uncertainty Quantification; IEEE Transactions on Audio, Speech and Language Processing; IEEE Signal Processing Letters; IEEE Transactions on Intelligent Transportation Systems; AIP Chaos; MDPI Signals

ICASSP 2020–2023; EUSIPCO 2020–2022; IberSPEECH 2018–2022; AISTATS 2022

In Committees

Speech Processing Courses in Crete - SPCC (2018 – now)

FORTH's Gender Equality Committee (2021 – now)

Chair of IACM's Scientific Council (2022 – now)

Research Impact Metrics (from Google Scholar - 1/6/2023)

Total citations: **972**

h-index: **19**

i10-index: **27**