Emmanouil Theodosis

Contact Information

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github.com/manosth
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Research Interests Deep learning theory, equivariant representations, representation learning, model-based autoencoders, nonlinear optimization, tropical geometry, compressive sensing

Education

Harvard University Sep 2019 - Present
PhD in Computer Science, GPA: 3.89/4.00
Relevant courses: *Mathematics of High-Dimensional Information Processing and Learning*, *Advanced Topics in the Theory of Machine Learning*, *Adaptive Methods in Machine Learning*
Thesis: "*Learning structured representations in deep learning*"
Advisor: **Demba Ba**

National Technical University of Athens Oct 2012 - Oct 2018
BSc & MSc in Electrical and Computer Engineering, GPA: 8.56/10
Relevan courses: *Speech and Natural Language Processing*, *Computer Vision*, *Patern Recognition*, *Operating Systems*, *Compilers*, *Algorithms*, *Digital Signal Processing*
Thesis: "*Tropical analysis of algorithms on graphs*"
Advisor: **Petros Maragos**

Work Experience

Amazon, USA May 2021 - Aug 2021
Applied Scientist Intern at *Amazon Web Services*
Project: "*Blind source synchronization using model-based deep learning*"
Supervisor: Karim Helwani

National Technical University of Athens, Greece Oct 2018 - Jun 2019
Research Assistant at *CVSP*
Project: "*Optimal curve fitting using tropical approximations*"
Supervisor: **Petros Maragos**

Teaching Experience

AM 231/ES 201: Decision Theory, Harvard University Spring 2023
Teaching Fellow
Instructor: **Demba Ba**

ES 157: Biological Signal Processing, Harvard University Fall 2022
Grader
Instructor: **Demba Ba**

ES 157: Biological Signal Processing, Harvard University Fall 2020
Teaching Fellow
Instructor: **Demba Ba**

Publications

Preprints

[1] **Theodosis, E.**, Helwani, K., and Ba, D. "Learning linear groups in neural networks". *In submission* (2023)

[2] Tasissa, A., **Theodosis, E.**, Tolooshams, B., and Ba, D. "Discriminative reconstruction via simultaneous dense and sparse coding". *In submission* (2022)

[3] **Theodosis, E.**, Tolooshams, B., Tankala, P., Tasissa, A., and Ba, D. "On the convergence of group-sparse autoencoders". *arXiv* (2020)

[4] **Theodosis, E.** and Maragos, P. "A robust, adaptive pruning algorithm based on tropical geometry". In *arXiv* (2019)

Workshops

[1] **Theodosis, E.** and Ba, D. "Learning unfolded networks with a cyclic group structure". In *NeurIPS Workshop on Symmetry and Geometry in Neural Representations* (2022)

Conference papers

[2] **Theodosis, E.** and Ba, D. "Learning silhouettes with group sparse autoencoders". In *International Conference on Acoustics, Speech, and Signal Processing* (2023)

[3] Maragos, P. and **Theodosis, E.** "Multivariate tropical regression and piecewise-linear surface fitting". In *International Conference on Acoustics, Speech, and Signal Processing* (2020)

[4] Retsinas, G., Filntisis, P., Efthymiou, N., **Theodosis, E.**, Zlatintsi, A., and Maragos, P. "Person identification using deep convolutional neural networks on short-term signals from wearable sensors". In *International Conference on Acoustics, Speech, and Signal Processing* (2020)

[5] **Theodosis, E.** and Maragos, P. "Tropical modeling of weighted transducer algorithms on graphs". In *International Conference on Acoustics, Speech, and Signal Processing* (2019)

[6] **Theodosis, E.** and Maragos, P. "Analysis of the Viterbi algorithm using tropical algebra and geometry". In *International Workshop on Signal Processing Advances in Wireless Communications* (2018)

Journal articles

[7] Maragos, P., Charisopoulos, V., and **Theodosis, E.** "Tropical geometry and machine learning". In *Proceedings of the IEEE*, vol. 109, no. 5, pp. 728-755, 2021.

Book chapters

[8] Maragos, P. and **Theodosis, E.** "Tropical geometry and piecewise-linear approximation of curves and surfaces on weighted lattices". In *Shape Analysis: Euclidean, Discrete and Algebraic Geometric Methods*, edited by M. Breuss, A. Bruckstein, C. Kiselman, and P. Maragos, Springer, to appear.

Honors and Awards

A. G. Leventis Scholarship 2021-2023
Awarded to Greek students of high scholastic ability who are pursuing graduate studies in the United States.

Amazon Post-internship Fellowship Aug 2021
Funding excellent applicants to extend promising parts of their internship.

Certificate of Distinction in Teaching Fall 2021
Certificate acknowledging the special contribution of Harvard graduate students who portrayed excellence while teaching.

Robert L. Wallace Prize Fellowship 2019-2021
Awarded to outstanding candidates whose research is focuses on subjects related to the study of acoustics and noise. Awarded two consecutive years.

Gerondelis Foundation Scholarship May 2020
Awarded to Greek students pursuing graduate studies in the United States.

Thomaidio Award (Publications) 2018
Awarded to undergraduate students of the National Technical University of Athens who published a research paper before their graduation.

"**The Great Moment of Education" Eurobank EFG Scholarship** Oct 2012
Achieved the highest score at the national exams in Nea Genia Ziridis.

Professional Service

Committees
IAIFI Industry Partnership Committee Jul 2022 - Present

Invited Reviewer (Journals)
Signal Processing

Invited Reviewer (Conferences)
NeurReps, EUSIPCO, ITCS, AISTATS

Tutorials
"*Deep Learning in Neuroscience*", Neurosur 2021

Mentoring Service

"MentoRes" mentoring initiative (Over 50 students) Oct 2021 - Present
Providing lightweight mentoring to underprivilleged students from Greece applying to PhD programs in the US.

Student mentoring
Vironas Ziambaras (NTUA) Spring 2023
Co-advised Masters' thesis on tropical optimal transport.

George Tsilimigkounakis (NTUA) Spring 2022
Co-advised Masters' thesis on non-convex tropical regression.

Pranay Tankala (Harvard) Spring 2020
Advised a summer project on deep clustering.

Programming Skills

Languages: Python, C, MATLAB, HTML/CSS
Other: LaTeX, Unix, Git

Languages

Greek (*Native*), English (*Fluent*), French (*Basic*)