PERSONAL INFORMATION

SURNAME	THEDORAKOPOULOS
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RESEARCH PROFILES	

CURRENT POSITION

2023 -now	**Assistant Professor** Department of Electrical and Computer Engineering, Democritus University of Thrace, Greece

PREVIOUS POSITIONS

2022-2023	**Adjunct Lecturer** Department of Electrical and Computer Engineering, Democritus University of Thrace, Greece
2019-2022	**Post-Doctoral Researcher** Dept. of Physics, University of Patras, Greece.
2020-2022	**Academic Fellow & Adjunct Lecturer** Dept. of Biomedical Engineering , West Attica University, Greece.
2011 -2022	**Senior Data Scientist, R&D** Irida Labs S.A., Greece

EDUCATION

2010 -2014	**Doctor of Philosophy** (Ph.D.) in *PATTERN RECOGNITION*, Dpt. of Physics, University of Patras, Patras, Greece *Research Field: Pattern Recognition, Machine Learning* *Thesis Title: "Pattern recognition on images and multimedia sequences with underlying manifold structures"* | Supervisor: Professor Spiros Fotopoulos
2007 -2009	**Master of Science** (M.Sc.) in *ELECTRONICS ENGINEERING AND COMPUTER SCIENCE*, Dpt. of Physics, University of Patras, Greece *Thesis Title*: "Texture segmentation using multispectral analysis and non-linear dimensionality reduction" | Advisor: Professor George Economou Summa Cum Laude, *Grade*: 8.69/10
2002-2007	**Bachelor of Science** (B.Sc.) in *PHYSICS*, Dpt. of Physics, University of Patras, Patras, Greece *Thesis Title*: "Motion detection and segmentation in Video sequences" | Advisor: Professor George Economou Magna Cum Laude, *Grade*: 7.49/10

PUBLICATIONS

- *Ilias Theodorakopoulos and D. Tsourounis, "A Geometric perspective on Feature-based Distillation," in Advancements in Knowledge Distillation: Towards New Horizons of Intelligent Systems. Cham: Springer International Publishing, 2023. 33-63. https://doi.org/10.1007/978-3-031-32095-8_2*

- P. Pappa, K. Kourelis, A. Goulioumis, M. Tsiakou, P. Plotas, A. Bertzouanis, I. Theodorakopoulos et al. "Novel Indices to Improve the Diagnostic Ability of Nocturnal Oximetry in Children with OSAS." Children 10, no. 3 (2023): 453. *https://doi.org/10.3390/children10030453*

- D. Tsourounis, I. Theodorakopoulos, E.N. Zois, & G. Economou, **Leveraging Expert Models for Training Deep Neural Networks in Scarce Data Domains: Application to Offline Handwritten Signature Verification**. (2023). *https://doi.org/10.48550/arXiv.2308.01136*

- *D. Tsourounis, I. Theodorakopoulos, E. N. Zois and G. Economou, "From Text to Signatures: Knowledge Transfer for Efficient Deep Feature Learning in Offline Signature Verification," Expert Systems with Applications 189, 2022. https://doi.org/10.1016/j.eswa.2021.116136*

- S. *Fouzas*, A-C Kentgens, O. Lagiou, B. S. Frauchiger, F. Wyler, I. Theodorakopoulos, S. Yammine, P. Latzin "Novel volumetric capnography indices measure ventilation inhomogeneity in cystic fibrosis," ERJ Open Research Jan 2022, 8 (1) 00440-2021; https://doi.org/10.1183/23120541.00440-2021 .

- I. Theodorakopoulos, F. Fotopoulou, G. Economou, "**Geometric Regularization of Local Activations for Knowledge Transfer in Convolutional Neural Networks**," Information 2021, 12, 333. https://doi.org/10.3390/info12080333 .

- V., Pothos, E. Vassalos, I. Theodorakopoulos and N. Fragoulis, "Deep Learning Inference with Dynamic Graphs on Heterogeneous Platforms," International Journal of Parallel Programming, 49, pages158–176, 2021. https://doi.org/10.1007/s10766-020-00654-2

- ES Frima, I. Theodorakopoulos, D. Gidaris et al., "Lung Function Variability in Children and Adolescents With and Without Asthma (LUV Study)," JMIR Res Protoc, Protocol for a Prospective, Nonrandomized, Clinical Trial,9(8),2020, https://doi.org/10.2196/20350.

- E. N. Zois, D. Tsourounis, I. Theodorakopoulos, A. L. Kesidis and G. Economou, "A Comprehensive Study of Sparse Representation Techniques for Offline Signature Verification," in IEEE Transactions on Biometrics, Behavior, and Identity Science. 2019. doi: 10.1109/TBIOM.2019.2897802

- S. Fouzas, I. Theodorakopoulos, E. Delgado-Eckert et al., "Breath-to-breath variability of exhaled CO_2 as a marker of lung dysmaturity in infancy," Journal of Applied Physiology, vol. 123, no. 6. pp.1563-1570, Nov., 2017

- D. Kastaniotis, F. Fotopoulou, I. Theodorakopoulos, G. Economou and S. Fotopoulos,"HEp-2 cell classification with Vector of Hierarchically Aggregated Residuals", Pattern Recognition, Vol. 65, pp 47-57, May 2017. http://dx.doi.org/10.1016/j.patcog.2016.12.013.

- D. Kastaniotis, I. Theodorakopoulos, G. Economou and S. Fotopoulos, "Gait based recognition via fusing information from Euclidean and Riemannian manifolds", Pattern Recognition Letters, Vol. 84, pp 245-251, December 2016, http://dx.doi.org/10.1016/j.patrec.2016.10.012.

- D. Kastaniotis, I. Theodorakopoulos and S. Fotopoulos,"Pose-based gait recognition with Local Gradient Descriptors and Hierarchically Aggregated Residuals",J. Electron. Imaging. Vol. 25, Issue 6, December 2016. doi:10.1117/1.

- I. Theodorakopoulos, G. Economou, S. Fotopoulos and C. Theoharatos, "**Local manifold distance based on neighborhood graph reordering**," Pattern Recognition, Volume 53, pp. 195-211, May 2016, http://dx.doi.org/10.1016/j.patcog.2015.12.006.

- D. Kastaniotis, I. Theodorakopoulos, C. Theoharatos, G. Economou and S. Fotopoulos, "A framework for gait-based recognition using Kinect," Pattern Recognition Letters, Volume 68, pp. 327-335, December 2015, http://dx.doi.org/10.1016/j.patrec.2015.06.020.

- I. Theodorakopoulos, D. Kastaniotis, G. Economou and S. Fotopoulos, "HEp-2 cells classification via sparse representation of textural features fused into dissimilarity space," Pattern Recognition, Volume 47, Issue 7, pp. 2367-2378, July 2014, http://dx.doi.org/10.1016/j.patcog.2013.09.026.

- I. Theodorakopoulos, D. Kastaniotis, G. Economou, S. Fotopoulos, "Pose-based human action recognition via sparse representation in dissimilarity space", Journal of Visual Communication and Image Representation, Volume 25, pp. 12-23, January 2014, http://dx.doi.org/10.1016/j.jvcir.2013.03.008

CONFERENCES/WORKSHOPS

- S. Fouzas, E.S. Frima, N. Karantaglis, D. Gidaris, G. Chatziparasidis, I. Theodorakopoulos, A. Bertzouanis, M. Anthracopoulos, U. Frey, E. Delgado – Eckert, European Respiratory Journal Sep 2023, 62 (suppl 67) OA1438; DOI: 10.1183/13993003.congress-2023.OA1438

- P. Busia, I. Theodorakopoulos, V. Pothos, N. Fragoulis, & P. Meloni. Dynamic Pruning for Parsimonious CNN Inference on Embedded Systems. In International Workshop on Design and Architecture for Signal and Image Processing (pp. 45-56). (2022)

- I. Theodorakopoulos and G. Economou, "Semantic Information in Gating Signals of Dynamic Convolutional Neural Networks," to appear on 12th International Conference on Information, Intelligence, Systems and Applications (IISA 2021).

- I. Theodorakopoulos, F. Fotopoulou and G. Economou, "Local Manifold Regularization for Knowledge Transfer in Convolutional Neural Networks," 2020 11th International Conference on Information, Intelligence, Systems and Applications (IISA, 2020, pp. 1-8, doi: 10.1109/IISA50023.2020.9284400.

- N. Fragoulis, I. Theodorakopoulos, V. Pothos and E. Vassalos, "Dynamic Pruning of CNN networks," 2019 10th International Conference on Information, Intelligence, Systems and Applications (IISA), PATRAS, Greece, 2019, pp. 1-5.doi: 10.1109/IISA.2019.8900711

- P. Meloni, et al., "Optimization and deployment of cnns at the edge: The aloha experience," in Proceedings of the 16th ACM International Conference on Computing Frontiers, CF '19, (New York, NY, USA), pp. 326–332, ACM, 2019.

- P. Meloni et al., "Architecture-aware design and implementation of CNN algorithms for embedded inference: the ALOHA project," 2018 30th International Conference on Microelectronics (ICM), Sousse, Tunisia, 2018, pp. 52-55.doi: 10.1109/ICM.2018.8704093

- Meloni, Paolo, et al. "ALOHA: an architectural-aware framework for deep learning at the edge." Proceedings of the Workshop on INTelligent Embedded Systems Architectures and Applications. ACM, 2018.

- D. Tsourounis, I. Theodorakopoulos, E. Zois, G. Economou and S. Fotopoulos, "Handwritten Signature Verification via Deep Sparse Coding Architecture", in proc. of 2018 IEEE Image, Video, and Multidimensional Signal Processing (IVMSP) Workshop. 10-12 June 2018, Greece.

- E. N. Zois, I. Theodorakopoulos, and G. Economou, "Offline Handwritten Signature Modeling and Verification Based on Archetypal Analysis." The IEEE International Conference on Computer Vision (ICCV). October 2017.

- E. N. Zois, I. Theodorakopoulos, D. Tsourounis et al., "Parsimonious Coding and Verification of Offline Handwritten Signatures." 2017 IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPRW). pp. 636-645. July 2017.

- I. Theodorakopoulos, D. Kastaniotis, G. Economou and S. Fotopoulos, "HEp-2 Cells Classification Using Morphological Features and a Bundle of Local Gradient Descriptors," Pattern Recognition Techniques for Indirect Immunofluorescence Images (I3A), 2014 1st Workshop on, vol., no., pp.33,36, 24-24 Aug. 2014.

- I. Theodorakopoulos, G Economou and S Fotopoulos, "Unsupervised music segmentation via multi-scale processing of compressive features' representation," in Digital Signal Processing (DSP), 2013 18th International Conference on, 2013, pp. 1-6.

- I. Theodorakopoulos, G Economou and S Fotopoulos, "Collaborative Sparse Representation in Dissimilarity Space for Classification of Visual Information," Proceedings of the 9th International Symposium on Visual Computing (ISVC), pp. 496-506, Rethymnon, Greece, July 29-31, 2013.

- I. Theodorakopoulos, G. Economou, S. Fotopoulos and A. Ifantis, "On-line signature recognition via fusion of dynamic features into dissimilarity space," in Signal Processing and Information Technology (ISSPIT), 2013 IEEE International Symposium on, 2013, pp. 440-445.

- D. Kastaniotis, I. Theodorakopoulos, G. Economou and S. Fotopoulos, "Gait-based gender recognition using pose information for real time applications," Digital Signal Processing (DSP), 2013 18th International Conference on , vol., no., pp.1,6, 1-3 July 2013.

- N.V. Politi-Stergiou, I. Theodorakopoulos, and G. Economou, "Local focus-tolerant image descriptors for classification of biological particles," Bioinformatics and Bioengineering (BIBE), 2013 IEEE 13th International Conference on , vol., no., pp.1,4, 10-13 Nov. 2013. (nominated for best student paper award)

- D. Kastaniotis, I. Theodorakopoulos, G. Economou and S. Fotopoulos, "HEp-2 cells classification using locally aggregated features mapped in the dissimilarity space," Bioinformatics and Bioengineering (BIBE), 2013 IEEE 13th International Conference on , vol., no., pp.1,4, 10-13 Nov. 2013.

- I. Theodorakopoulos, G Economou and S Fotopoulos, " Classification of Dissimilarity Data via Sparse Representation," Proceedings of the 2nd International Conference on Pattern Recognition Applications and Methods (ICPRAM), Barcelona, Spain, 15-18, February, 2013.

- F. Fotopoulou, D. Kastaniotis, I. Theodorakopoulos and G Economou, " Shape Representation via the Generalized Geodesic Median Point," Proceedings of the 2nd International Conference on Pattern Recognition Applications and Methods (ICPRAM), Barcelona, Spain, 15-18, February, 2013.

- I. Theodorakopoulos, D. Kastaniotis, G Economou and S Fotopoulos, "Hep-2 cells classification via fusion of morphological and textural features," in Bioinformatics & Bioengineering (BIBE), 2012 IEEE 12th International Conference on, 2012, pp. 689-694.

- I. Theodorakopoulos, G Economou and S Fotopoulos, "Face recognition via local sparse coding," in Computer Vision (ICCV), 2011 IEEE International Conference on, 2011, pp. 1647-1652.

- F. Fotopoulou, I Theodorakopoulos and G Economou, "Fusion in phase space for shape retrieval," in proc. EUSIPCO 2011, pp. 936-940, Barcelona, Spain, August 29 - September 2 2011

PATENTS (USPTO)

- *I. Theodorakopoulos*, V. Pothos, D. Kastaniotis and N. Fragoulis,"Parsimonious inference on convolutional neural networks",US Patent App. 15/815,171, published May 17, 2018. **Granted 2022**.

- N.Fragoulis and **I. Theodorakopoulos**. "System and a method to achieve time-aware approximated inference." US Patent App. 16/784,140, published Aug 13, 2020. **Granted 2022**.

- D. Kastaniotis, **I. Theodorakopoulos** and N. Fragoulis, "Fast, embedded, hybrid video face recognition system", US Patent App. 15/686,797, US Patent 10,509,952. **Granted 2019**.

- **I. Theodorakopoulos**, N. Fragoulis."System and a method for camera motion analysis and understanding from a video sequences", US Patent 9,508,026. **Granted 2018**.

MEMBERSHIPS & REVIEWING ACTIVITIES

2014 - now	Reviewer in (among others) the following highly-valued scientific journals: • PLOS ONE (eISSN: 1932-6203) • Neurocomputing (ISSN: 0925-2312) • Information Sciences (ISSN: 0020-0255) • Pattern Recognition (ISSN: 0031-3203) • Computer Methods and Programs in Biomedicine (ISSN: 0169-2607) • IEEE Journal of Biomedical and Health Informatics (ISSN: 2168-2194) • IEEE Transactions on Biomedical Engineering (ISSN: 1558-2531) • IEEE Transactions on Information Forensics & Security (ISSN: 1556-6013) • IEEE Transactions on Image Processing (ISSN: 1057-7149) • IEEE Transactions on Cybernetics (ISSN: 2168-2267) • IEEE Transactions on Information Forensics & Security (ISSN: 1556-6013) • IEEE Transactions on Biometrics, Behavior, and Identity Science (ISSN: 2637-6407) • IEEE Access (ISSN: 2169-3536) • Neural Computing and Applications (ISSN: 0941-0643) • Symmetry (ISSN 2073-8994) • Journal of Visual Communication and Image Representation (ISSN: 1047-3203) • European Journal of Operational Research (ISSN: 0377-2217) • Pattern Recognition Letters (ISSN: 0167-8655) • Biomedical Signal Processing and Control (ISSN: 1746-8094) • Artificial Intelligence in Medicine (ISSN: 0933-3657) • Expert Systems With Applications (ISSN: 0957-4174) • Electronics Letters (ISSN:0013-5194) • Sensors (ISSN: 1424-8220) • Computers in Biology and Medicine (ISSN: 0010-4825) Reviewer for the following highly-valued scientific conferences (among others): • 18th European Conference on Computer Vision ECCV 2024 • IEEE Winter Conference on Applications of Computer Vision (WACV 2019, 2020 & 2021, 2023) • IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR 2020 & 2021) • International Conference in Computer Vision (ICCV 2021) • Asian Conference on Computer Vision (ACCV 2021)

TEACHING ACTIVITIES

2022 - 2023	**Adjunct Lecturer** - Electric measurements, Pattern Recognition. Department of Electrical and Computer Engineering, Democritus University of Thrace, Greece
2020 - 2022	**Adjunct Lecturer** - *Biomedical Signal Processing. Biomedical Engineering Dept., University of West Attica, Athens, Greece*
2017 - 2019	*Teaching Fellow (co-teaching)* – Machine Learning and Vision (Post Grad. course), Dpt. of Physics, University of Patras, Greece.
2011-2017	*Teaching Fellow (co-teaching)* – Selected topics on Digital Signal and Image Processing (Post Grad. course), Dpt. of Physics, University of Patras, Greece.
2008-2013	*Teaching Assistant*– Computer Programming I & II, Electronics and Digital Electronics Lab., Dpt. of Physics, University of Patras, Greece.

SUPERVISION OF GRADUATE STUDENTS & POSTODOCTORAL FELLOWS

2018-2022	Co-Supervising 2 PhD Students with scholarships from the Greek S.S.F. Dept. of Physics, University of Patras, Greece.
2011 - 2018	*Co-Supervising* & consulting for a total of 15 undergraduate and master students on their theses. Dept. of Physics, University of Patras, Greece.

FELLOWSHIPS and AWARDS

2020-2022	**Academic Fellowship,** Dept. of Biomedical Engineering, West Attica University, Greece.
2020-2022	**Post-Doctoral Scholarship** funded by IKY. Physics Dept., University of Patras, Greece
20219-2021	**Research Fellowship,** Funded Research on Deep Learning methods for limited Data, Dept. of Physics, University of Patras, Greece.
2018-2020	**Research Fellowship,** funded by European Society for Paediatric Research (ESPR). Pediatrics Dept., University Hospital, University of Patras, Greece.
2021	**Highest distinction** of the Hellenic Pediatric Society (Choremeio Prize 2021) for the joint study "Fluctuation of lung function in healthy children and adolescents: the effect of age and clinical implications"
2018	**Young Investigator START-UP Awards 2018**, European Society for Paediatric Research (ESPR) for my research proposal «Derivation of respiratory rate from pulse oximetry using deep learning».
2011	PhD Scholarship funded under "Heracleitus II: Investing in knowledge society through the European Social Fund". Physics Dept., University of Patras, Greece

RESEARCH GRANTS

Project Title	Funding source	Period	Role of the PI
Safe Aorta - Clinical Decision Support System for Abdominal Aortic Aneurysm Based on Artificial Intelligence Models	"Iconic Actions in Interdisciplinary Scientific Areas with Special Interest in Connection to the Productive Web, Greece 2.0 - National Recovery and Resilience Facility - RRF"	2023-2025	Research collaborator for Univ.of West Attica
Architectures of Convolutional Neural Networks with Structural Plasticity	Greek State Scholarships Foundation (IKY)	2020-2022	Post Doctoral Scholar (Principal Investigator)
NeurAdapt. Development of a Bio-inspired, resource efficient design approach for designing Deep Learning models	funded by the EU Horizon 2020 RIA Programme, via the AI4Media Open Call #1	2022-2023	Principal Investigator (Irida Labs S.A.)
New knowledge-transfer and regularization techniques for training Convolutional Neural Networks with limited data	National and EU (ESF) funding	2020-2021	Principal Investigator
ALOHA- Software framework for runtime-Adaptive and secure deep Learning On Heterogeneous Architectures	H2020 EU funding program	2018-2021	Lead Researcher (Irida Labs S.A.)
MANTO - Innovative blind escort applications for autonomous navigation outdoor and in museums	National EPAnEK 2014-2020 Operational Programme Competitiveness-Entrepreneurship-Innovation	2018-2021	Lead Researcher (Irida Labs S.A.)
Derivation of respiratory rate from pulse oximetry using deep learning	European Society for Pediatric Research (ESPR)	2018-2020	Principal Investigator
TRAVELEYES - Implementation of a smart visual recognition software for mobile devices, for touristic applications	EU and Greek National funds through the Operational Program Competitiveness, Entrepreneurship and Innovation	2018-2020	Lead Researcher (Irida Labs S.A.)
Pattern recognition on images and multimedia sequences with underlying manifold structures (PhD Funding)	*Heracleitus II: Investing in knowledge society through the European Social Fund*	2011-2014	PhD Scholar

OTHER

Editor in Scientific Journals

2023-2024

Invited Editor of Special issue entitled **"Deep Learning for Image, Video and Signal Processing"** in the scientific journal "*Information*" (ISSN 2078-2489)

2020 – 2022

Topics Board Editor in the scientific journal Information (ISSN 2078-2489).

Invited Lectures

April 2023 - Klaipedos valstybine kolegija (VKV), Lithuania

Invited seminar (8 hours) on machine vision methods for the industry, addressed to an international audience of undergraduate students within the Blended intensive Program (BIP) «Digital Twin for the Industry».

Other Awards/Prizes

2020   **Outstanding Reviewer Award**, CVPR 2020

2014   **3d place** in Performance Evaluation of Indirect Immunofluorescence Image Analysis Systems Competition, hosted by ICPR 2014

2013   **1st place** in the 1st Biometric Recognition with Portable Devices Competition (MobBIO 2013), Hosted by ICIAR 2013