

Nikos Tsiknakis

PHD CANDIDATE

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Education

Karolinska Insitutet, Dept. of Oncology-Pathology

Stockholm, Sweden

PHD, ARTIFICIAL INTELLIGENCE IN COMPUTATIONAL PATHOLOGY

April 2022 - 2026 (Expected)

- My PhD's research focuses on developing deep-learning models based on digital slides of H&E-stained tissue samples for improving prognosis and therapy prediction in breast cancer.
- My research is supervised by **Prof. Theodoros Foukakis**, **Dr. Balazs Acs**, **Prof. Kostas Marias** and **Prof. Johan Hartman**.

University of Patras

Patras, Greece

M.ENG IN ELECTRICAL AND COMPUTER ENGINEERING

Sep. 2014 - Jun. 2019

- Grade: 8.3/10
- Thesis: "Stereo Vision of Dual View Meteosat Images" under the supervision of **Prof. Athanassios Skodras** in collaboration with Vrije Universiteit Brussel (VUB) and the Royal Meteorological Institute of Brussels (KMI). Its central objective was the application of advanced stereo vision techniques for the estimation of cloud height based on images from the MSG-3 and MSG-1 satellites. In the context of this thesis, I focused on a) extensive review of prior work regarding image registration methods, b) implementation of several state-of-the-art image registration methods and c) review and application of Graph Cut algorithms based on the Markov Random Fields theory to extract the disparity map. Regarding the image registration, I compared the performance of two algorithmic approaches: a) one operating on the pixel domain, which is based on the maximization of the Mutual Information of the image pair and b) one operating on the low-level features of the images. In this approach, the features were extracted using the SIFT and SURF algorithms. The transformation model for registering the images was estimated using these features and the RANSAC algorithm.

Experience

Computational BioMedicine Laboratory, ICS FORTH

Heraklion, Greece

SOFTWARE ENGINEER

Sep 2019 - Now

- H2020 funded project **InSilc** in which my main responsibilities relate to the design and implementation of algorithmic approaches for the registration of intravascular ultrasound (IVUS) and optical coherence tomography (OCT) image sequences captured prior to and after percutaneous coronary intervention (stent implantation).
- H2020 funded project **SeeFar**, in which my main responsibilities relate to the development and evaluation of deep learning models for the detection and the progression of retina diseases based on retina fundus images.
- H2020 funded project **Timely**, in which my main responsibilities relate to the development of an Android application for fitness and activity data collection and the development of reinforcement learning models for exercise prescription of CAD patients.
- H2020 funded project **ProCancer-I**, working on prostate cancer and specifically on prostate zones segmentation with advanced convolutional neural network models on radiology images.
- Research on COVID-19 detection based on deep learning analysis methods of Xray and CT images. I developed a transfer-learning model for the classification of COVID-19 pneumonia, pneumonia (caused by other factors than covid) and healthy subjects. The analysis was coupled with interpretable attention maps which were evaluated by expert radiologists.
- Research on pollen grain identification on microscope images. Specifically I developed a segmentation pipeline based on watershed algorithm to extract unique pollen grain images from microscope slides, based on which I trained several deep learning models for the identification of their species.

Computational BioMedicine Laboratory, ICS FORTH

Heraklion, Greece

INTERN

Jul 2018 - Sep 2018

- Methodological approaches for the execution of systematic literature surveys.
- Review of stereo vision algorithms and initial implementations of selected such algorithms.
- Review of Machine/Deep Learning methods and experimentation with the Tensorflow/Keras frameworks.

Skills

DevOps Docker

Back-end Django, Node.js, MySQL, MongoDB REST API

Front-end Jekyll, HTML5, jQuery, SASS

Programming Python, JAVA, C

ML Frameworks Tensorflow, Keras

Tools LaTeX, Linux, Git

Languages Greek, English, German

Seminars & Workshops

June 2022	19th International Summer School BIO-X on Data Science and Engineering in Medicine and Biology , Sponsored by the NSF and co-sponsored by the IEEE EMB Society, the IEEE BRAIN, the Department of Biomedical Engineering at University of Houston, and the Technical University of Crete	Chania, Greece
Aug 2018	Drone School , Deep learning and Computer vision for drone imaging and cinematography	Icarus, CSD AUTH
Feb 2018	MedDays 2018 , Received a scholarship to attend "Mediterranean Days @ Campus SophiaTech"	Sophia Antipolis
Oct 2017	Aeroworks , Autumn School on Aerial Robotics	University of Patras
Jul 2016	ISP 2016 , 1st Interdisciplinary Summer School on Privacy	Nijmegen
Apr 2016	ECESCON 9 , 9th ECE Students Conference	TUC, Chania

Honors & Awards

2022-2026	Radiumhemmets Forskningsfonder Grants , I have been awarded several travel grants from Radiumhemmets Forskningsfonder to attend international conferences and courses abroad.	Stockholm, Sweden
June 2022	IEEE EMBS, NSF fellowship , This fellowship was awarded to me to attend the 19th NSF International Summer School on Bio-X: http://2022.biocomplexitysummerschool.org .	Chania, Greece
Oct 2020	Gold Award @ Healthcare Business Awards 2020 , Our COVID-19 X-Ray journal article [0] won the gold award as the best research paper in the Healthcare Business Awards 2020	CBML ICS FORTH
Feb 2015	Image Editor and Viewer , Best first year's python project, Introduction to Programming Course	University of Patras

Certificates

Oct 2019	Deep Learning Specialization , 2X3DAMJNRWQ4	Coursera
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Major University Projects

Feb 2018	Forensic camera model identification based on ML. , IEEE Signal Processing Society Cup 2018	IEEE
2014-19	IEEE Xtreme , Participated in several IEEE Xtreme 24-hour programming competitions and IEEE activities	University of Patras

Reviewer Assignments

Computers in Biology and Medicine	Elsevier
Medical Informatics and Decision Making	BMC
Journal of Diabetes	Wiley
Scientific Reports	Nature
Medical Physics	Wiley
Journal of Biomedical and Health Informatics	IEEE
Scientific Reports	Nature

Conference Publications

- [0] T. Foukakis, K. Wang, I. Zerdes, Y. Zhu, E. Sifakis, **N. Tsiknakis**, G. Manikis, D. Salgkakis, L. Harbers, J. Bergh, H. Johansson, N. Crosetto, J. Lehtiö, A. Matikas, and T. Hatschek, "Multiomic profiling reveals predictive molecular characteristics of response to neoadjuvant antibody-drug conjugate versus chemotherapy and dual her2 blockade in her2 positive breast cancer," vol. 200, Elsevier, 2024. doi: <https://doi.org/10.1016/j.ejca.2024.113830>.
- [0] U. Kjällquist, **N. Tsiknakis**, B. Acs, S. Margolin, M. Ekholm, L. E. Kessler, C. Lundgren, S. Garcia, E. Olsson, H. Lindman, A. Valachis, J. Hartman, T. Foukakis, and A. Matikas, "Adherence to and optimization of guidelines for risk of recurrence/prosigna testing using a machine learning model: A swedish multicenter study," vol. 9, Elsevier, 2024. doi: <https://doi.org/10.1016/j.esmoop.2024.103124>.
- [0] A. Matikas, M. Gnant, H. Johansson, M. Untch, **N. Tsiknakis**, R. Greil, S. Loibl, T. Foukakis, and J. C. Bergh, "Estimating benefit from dose dense adjuvant chemotherapy for early breast cancer in the panther randomized phase 3 trial," American Society of Clinical Oncology, 2024. doi: https://doi.org/10.1200/JCO.2024.42.16_suppl.521.

- [0] **N. Tsiknakis**, D. Salgkamis, E. Tzoras, K. Wang, X. Liu, G. Manikis, E. Sifakis, J. Bergh, K. Marias, I. Zerdes, A. Matikas, and T. Foukakis, “Deep learning prognostication through prediction of tp53 gene mutation status on breast cancer hematoxylin and eosin slides,” vol. 9, Elsevier, 2024. doi: <https://doi.org/10.1016/j.esmoop.2024.103075>.
- [0] K. Wang, Y. Zhu, I. Zerdes, E. Sifakis, G. Manikis, D. Salgkamis, **N. Tsiknakis**, L. Harbers, N. Crosetto, J. Bergh, A. Matikas, T. Hatschek, and T. Foukakis, “Multimodal learning predictor of her2-positive breast cancer therapy response in the randomized predix her2 trial,” 9_Supplement, vol. 84, AACR, 2024, PO2-07. doi: <http://doi.org/10.1158/1538-7445.SABCS23-P02-07-06>.
- [0] **N. Tsiknakis**, E. Tzoras, I. Zerdes, G. C. Manikis, B. Acs, J. Hartman, T. Hatschek, T. Foukakis, and K. Marias, “Multiresolution self-supervised feature integration via attention multiple instance learning for histopathology analysis,” in *2023 45th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*, IEEE, 2023. doi: <https://doi.org/10.1109/EMBC40787.2023.10341061>.
- [0] C. Spanakis, E. Mathioudakis, N. Kampanis, **N. Tsiknakis**, and K. Marias, “Renyi divergence and non-deterministic subsampling in rigid image registration,” in *IEEE International Conference on Imaging Systems and Techniques (IST)*, Abu Dhabi, United Arab Emirates, Dec. 2019. doi: <https://doi.org/10.1109/IST48021.2019.9010237>.

Journal Publications

- [0] A. Berto, F. Scarpa, **N. Tsiknakis**, G. Manikis, D. I. Fotiadis, K. Marias, and A. Scarpa, “Automated analysis of fundus images for the diagnosis of retinal diseases: A review,” *Research on Biomedical Engineering*, vol. 40, no. 1, pp. 225–251, 2024. doi: <https://doi.org/10.1007/s42600-023-00320-9>.
- [0] U. Kjällquist, **N. Tsiknakis**, B. Acs, S. Margolin, L. E. Kessler, S. Levy, M. Ekholm, C. Lundgren, E. Olsson, H. Lindman, A. Valachis, J. Hartman, T. Foukakis, and A. Matikas, “Adherence to and optimization of guidelines for risk of recurrence/prosigna testing using a machine learning model: A swedish multicenter study,” 2024. doi: <https://doi.org/10.21203/rs.3.rs-4110196/v1>.
- [0] F. Scarpa, A. Berto, **N. Tsiknakis**, G. Manikis, D. I. Fotiadis, K. Marias, and A. Scarpa, “Automated analysis for glaucoma screening of retinal videos acquired with smartphone-based ophthalmoscope,” *Heliyon*, vol. 10, no. 14, 2024. doi: <https://doi.org/10.1016/j.heliyon.2024.e34308>.
- [0] **N. Tsiknakis**, G. Manikis, E. Tzoras, D. Salgkamis, J. M. Vidal, K. Wang, D. Zaridis, E. Sifakis, I. Zerdes, J. Bergh, J. Hartman, B. Acs, K. Marias, and T. Foukakis, “Unveiling the power of model-agnostic multiscale analysis for enhancing artificial intelligence models in breast cancer histopathology images,” *IEEE Journal of Biomedical and Health Informatics*, 2024. doi: <https://doi.org/10.1109/JBHI.2024.3413533>.
- [0] J. M. Vidal, **N. Tsiknakis**, J. Staaf, A. Bosch, A. Ehinger, E. Nimeus, R. Salgado, Y. Bai, D. L. Rimm, and J. Hartman, “The analytical and clinical validity of ai algorithms to score tils in tnbc: Can we use different machine learning models interchangeably?” *eClinicalMedicine*, vol. 78, 2024. doi: <https://doi.org/10.1016/j.eclinm.2024.102928>.
- [0] D. I. Zaridis, E. Mylona, **N. Tsiknakis**, N. S. Tachos, G. K. Matsopoulos, K. Marias, M. Tsiknakis, and D. I. Fotiadis, “Prolesa-net: A multi-channel 3d architecture for prostate mri lesion segmentation with multi-scale channel and spatial attentions,” *Patterns*, 2024. doi: <https://doi.org/10.1016/j.patter.2024.100992>.
- [0] **N. Tsiknakis**, C. Spanakis, P. Tsoumpou, G. Karanasiou, G. Karanasiou, A. Sakellarios, G. Rigas, S. Kyriakidis, M. I. Papafaklis, S. Nikopoulos, F. Gijzen, L. Michalis, D. I. Fotiadis, and K. Marias, “Oct sequence registration before and after percutaneous coronary intervention (stent implantation),” *Biomedical Signal Processing and Control*, vol. 79, p. 104 251, 2023. doi: <https://doi.org/10.1016/j.bspc.2022.104251>.
- [0] D. I. Zaridis, E. Mylona, N. Tachos, V. C. Pezoulas, G. Grigoriadis, **N. Tsiknakis**, K. Marias, M. Tsiknakis, and D. I. Fotiadis, “Region-adaptive magnetic resonance image enhancement for improving cnn-based segmentation of the prostate and prostatic zones,” *Scientific Reports*, vol. 13, no. 1, p. 714, 2023. doi: <https://doi.org/10.1038/s41598-023-27671-8>.
- [0] **N. Tsiknakis**, E. Savvidaki, G. C. Manikis, P. Gotsiou, I. Remoundou, K. Marias, E. Alissandrakis, and N. Vidakis, “Pollen grain classification based on ensemble transfer learning on the cretan pollen dataset,” *Plants*, vol. 11, no. 7, p. 919, 2022. doi: <https://doi.org/10.3390/plants11070919>.
- [0] E. Tzoras, I. Zerdes, **N. Tsiknakis**, G. C. Manikis, A. Mezheyeuski, J. Bergh, A. Matikas, and T. Foukakis, “Dissecting tumor-immune microenvironment in breast cancer at a spatial and multiplex resolution,” *Cancers*, vol. 14, no. 8, p. 1999, 2022. doi: <https://doi.org/10.3390/cancers14081999>.

- [0] **N. Tsiknakis**, E. Savvidaki, S. Kafetzopoulos, G. Manikis, N. Vidakis, K. Marias, and E. Alissandrakis, “Segmenting 20 types of pollen grains for the cretan pollen dataset v1 (cpd-1),” *Applied Sciences*, vol. 11, no. 14, 2021, ISSN: 2076-3417. DOI: <https://doi.org/10.3390/app11146657>.
- [0] **N. Tsiknakis**, C. Spanakis, P. Tsompou, G. Karanasiou, G. Karanasiou, A. Sakellarios, G. Rigas, S. Kyriakidis, M. Papafakis, S. Nikopoulos, F. Gijzen, L. Michalis, D. I. Fotiadis, and K. Marias, “Ivus longitudinal and axial registration for atherosclerosis progression evaluation,” *Diagnostics*, vol. 11, no. 8, 2021, ISSN: 2075-4418. DOI: <https://doi.org/10.3390/diagnostics11081513>.
- [0] **N. Tsiknakis**, D. Theodoropoulos, G. Manikis, E. Ktistakis, O. Boutsora, A. Berto, F. Scarpa, A. Scarpa, D. I. Fotiadis, and K. Marias, “Deep learning for diabetic retinopathy detection and classification based on fundus images: A review,” *Computers in Biology and Medicine*, p. 104 599, 2021, ISSN: 0010-4825. DOI: <https://doi.org/10.1016/j.compbiomed.2021.104599>.
- [0] E. Trivizakis, **N. Tsiknakis**, E. E. Vassalou, G. Z. Papadakis, D. A. Spandidos, D. Sarigiannis, A. Tsatsakis, N. Papanikolaou, A. H. Karantanas, and K. Marias, “Advancing covid-19 differentiation with a robust preprocessing and integration of multi-institutional open-repository computer tomography datasets for deep learning analysis,” *Experimental and Therapeutic Medicine*, vol. 20, no. 5, 2020. DOI: <https://doi.org/10.3892/etm.2020.9210>.
- [0] **N. Tsiknakis**, E. Trivizakis, E. E. Vassalou, G. Z. Papadakis, D. A. Spandidos, A. Tsatsakis, J. Sánchez-García, R. López-González, N. Papanikolaou, A. H. Karantanas, and K. Marias, “Interpretable artificial intelligence framework for covid-19 screening on chest x-rays,” *Experimental and Therapeutic Medicine*, May 2020. DOI: <https://doi.org/10.3892/etm.2020.8797>.

Books & Chapters

- [0] E. Stamoulou, C. Spanakis, K. Nikiforaki, A. H. Karantanas, **N. Tsiknakis**, A. Matikas, T. Foukakis, and G. C. Manikis, “Using commercial and open-source tools for artificial intelligence: A case demonstration on a complete radiomics pipeline,” in *Introduction to Artificial Intelligence*, Springer, 2023, pp. 13–37.