VASILIKI (VICKY) BIKIA

Biomedical & ML Engineer

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BIO

I am a Biomedical and ML Engineer focusing on merging machine learning with healthcare to advance patient monitoring and care. I specialize in developing predictive algorithms that integrate machine learning and numerical simulations across various clinical and digital data. With a track record of 30+ scientific publications and 3 patents, I have deep expertise in research, technology innovation, and clinical study design. My leadership and communication abilities enable me to lead cross-functional teams effectively in dynamic healthcare environments. I am deeply passionate about both the theoretical underpinnings and practical applications of health technologies.

SKILLS

Programming:	`Python`, `TensorFlow`, `PyTorch`, `Pandas`, `scikit-learn`, `NumPy`, `MATLAB`
Machine learning:	supervised learning, unsupervised learning, feature engineering, hyperparameter tuning, model evaluation and validation, neural networks, transfer learning
Data & Statistics:	data imputation, normalization, dimensionality reduction, signal processing, inferential statistics
Tools & Frameworks:	Git/GitHub, Jupyter notebook, Azure, TablePlus
Soft skills:	leadership, collaboration, strong analytical and problem-solving skills, adaptability and responsiveness

EXPERIENCE

08/2022–Present **Biomedical and Machine Learning Engineer** — **Byers Center for Biodesign, Stanford University, US**

- Designing and developing the Spezi Data Pipeline tool as part of the Stanford Spezi framework, enabling researchers to uncover new insights and propel digital health innovation.
- Explored the clinical utility of smarthwatches for arrhythmias' detection in children [1].
- Collaborated with major pharmaceutical companies, integrating digital biomarker insights to enhance personalized strategies.

10/2021–09/2023 **Postdoctoral Researcher** — **LHTC, École Polytechnique Fédérale de Lausanne, CH**

- Led pioneering research in biomarkers, AI in healthcare, wearable technologies, aging, and cardiovascular mechanics.
- Engaged in collaboration with clinical partners.
- Proven leadership skills, effectively managing and guiding diverse teams comprising students and senior scientists.
- Oversaw various projects from conception to implementation, ensuring they met objectives within timelines and budgets.
- Demonstrated proficiency in scientific communication with numerous publications in top-tier journals.

01/2015–09/2016 **Co-Founder and Engineer** — **Prognosis Parkinson's Disease Support, GR**

- Co-founded Prognosis Parkinson's Support, a mobile application for early detection of Parkinson's Disease by leveraging unobtrusive data collected from sensors on smartphones and smartwatches.
- My work included: i) developing classification algorithms for disease detection using voice data, ii) performing gait patterns analysis, iii) establishing a mobile/cloud ecosystem for patients to access tailored solutions such as medication reminders, exercise routines, symptom tracking, and comprehensive data analysis.

EDUCATION

09/2017–07/2021 **Doctor of Philosophy in Bioengineering (with honors)** — **École Polytechnique Fédérale de Lausanne, CH**
Thesis: Non-invasive monitoring of key hemodynamical and cardiac parameters using physics-based modelling and AI
Supervisor: Prof. Nikolaos Stergiopulos

10/2011–06/2017 **Diploma in Electrical Engineering & Computer Science (with honors)** — **Aristotle University of Thessaloniki, GR**
Thesis: Implantable microsystem for blood pressure monitoring from the aorta using BLE protocol
Supervisor: Prof. Anastasios Delopoulos

PROJECTS

SpeziDataPipeline: Python-Based Digital Health Data Management Tool — **StanfordSpezi/SpeziDataPipeline**

Role: Lead Developer and Data Scientist | **Tools:** `Python`, `Firebase Admin SDK`

Designing and developing a tool to enhance data accessibility and analysis workflows for healthcare applications. It supports 82 HealthKit quantity types, allowing users to select, save and download data, apply filtering and statistical methods, and create visual representations.

iFLOW: Non-invasive Cardiac Output Estimation

Role: Project Lead | **Tools:** `MATLAB`

Developed an inverse problem solving algorithm using gradient-descent optimizer for non-invasive cardiac output estimation [2,3] using easily obtained clinical blood pressure data. Method validation using diverse human cohorts, establishing accuracy and reliability.

CardioML: Machine Learning Predictive Models for Aortic Biomarkers Vicbi/CardioML_ParamEstimators

Role: Project Lead | **Tools:** `TensorFlow`, `NumPy`, `Pandas`

Led the development of a pioneering machine learning pipeline to predict aortic hemodynamics, such as aortic blood pressure and flow, from standard pressure measurements [5, 8]. Conceptualized, executed and tested regression models (decision trees, random forests, gradient boosting), demonstrating practical utility in clinical settings. Collaborated with medical professionals to ensure relevance and applicability.

Non-invasive Prediction of Cardiac Contractility Vicbi/STI_Elastance_AIEstimator

Role: Project Lead | **Tools:** `Pytorch`, `TensorFlow`, `NumPy`, `Pandas`

Developed and implemented methodologies using classical and deep learning frameworks to predict cardiac stiffness [5-7] from non-invasive pressure and/or flow signals. Conducted validation using in silico data, demonstrating effectiveness and reliability.

ELASTICITYDB: Synthetic Population Dataset for Cardiovascular Analysis Vicbi/SyntheticDataGenerator

Role: Project Lead | **Tools:** `MATLAB`, `Python`

Designed and engineered a synthetic population of virtual subjects for cardiovascular studies [9]. Utilized Gaussian distributions to vary model parameters, including arterial distensibility, terminal compliance, and peripheral resistances, based on literature data. Adapted anatomical parameters to simulate varying body types.

AWARDS AND HONORS

2021 **Nomination for Best EPFL PhD Thesis, EPFL, Lausanne.**
2016 **Aristotle University of Thessaloniki Excellency Award, AUTH, Thessaloniki, Greece.**
2016 **Seeds Innovation and Technology Competition, 4th place, National Bank of Greece, Athens.**
2016 **Keynote talk, Woman in S.T.E.M, MICROSOFT – Europe Commission, Venice, Italy.**
2015 **ImagineCup (300K+competitors), Ability Award, 1st place, MICROSOFT, Redmond, WA.**
2015 **ImagineCup (300K+competitors), World Citizenship, 3rd place, MICROSOFT, Redmond, WA.**

SELECTED PUBLICATIONS AND PATENTS

[1] Zahedivash, A., Chubb, H., Giacone, H., ..., **Bikia, V.**, Aalami, O., Ling, X. B., Marco Perez, M., & Ceresnak, S. R. (2023). Utility of smart watches for identifying arrhythmias in children. *Nature Communications Medicine*, 3(1).

[2] **Bikia, V.**, Pagoulatou, S., Trachet, B., Soulis, D., Protogerou, A. D., Papaioannou, T. G., & Stergiopulos, N. (2019). Noninvasive cardiac output and central systolic pressure from cuff-pressure and pulse wave velocity. *IEEE Journal of Biomedical & Health Informatics*.

[3] **Bikia, V.**, McEniery, C. M., Roussel, E. M., Rovas, G., Pagoulatou, S., Wilkinson, I. B., & Stergiopulos, N. (2022). Validation of a Non-invasive Inverse Problem-Solving Method for Stroke Volume. *Frontiers in Physiology*, 12.

[4] **Bikia, V.**, Pagoulatou, S., & Stergiopulos, N. (2021). System & methods for real time noninvasive estimation of cardiovascular parameters.

[5] **Bikia, V.**, Papaioannou, T. G., Pagoulatou, S., Rovas, G., Oikonomou, E., Siasos, G., & Stergiopulos, N. (2020). Noninvasive estimation of aortic hemodynamics and cardiac contractility using machine learning. *Nature Scientific Reports*, 10(1).

[6] **Bikia, V.**, Adamopoulos, D., Pagoulatou, S., Rovas, G., & Stergiopulos, N. (2021). AI-based estimation of end-systolic elastance from arm-pressure and systolic time intervals. *Frontiers in Artificial Intelligence*, 4.

[7] **Bikia, V.**, Lazaroska, M., Scherrer Ma, D., Zhao, M., Rovas, G., Pagoulatou, S., & Stergiopulos, N. (2021). Estimation of left ventricular end-systolic elastance from brachial pressure waveform via deep learning. *Frontiers in Bioengineering and Biotechnology*.

[8] **Bikia, V.**, Rovas, G., & Stergiopulos, N. (2023). Cardiac output estimated from an uncalibrated radial blood pressure waveform: validation in an in-silico-generated population. *Frontiers in Bioengineering and Biotechnology*, 11.

[9] **Bikia, V.**, Rovas, G., Pagoulatou, S., & Stergiopulos, N. (2021). Determination of aortic characteristic impedance and total arterial compliance from regional pulse wave velocities using machine learning: An in-silico study. Frontiers in bioengineering and biotechnology, 9.

LANGUAGES

Greek - native, **English, French** - Full working proficiency