

# Stanford

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## Mojtaba Jafaritadi

Postdoctoral Scholar, Molecular Imaging Program at Stanford

### Bio

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#### BIO

I am a scientist with a strong academic and technical backgrounds and diverse experiences in signal processing, image processing, and artificial intelligence. I earned my B.Sc. degree in Biomedical Engineering (EE major) in 2012, followed by an M.Sc. in Biomedical Imaging (image/signal processing major) from Åbo Akademi BioImaging Master's Degree Program. Later, I obtained a Ph.D. degree in Medical Physics and Engineering (Machine Learning and Health Sensing Major) from the University of Turku, Finland, in 2018, building a solid foundation in the field of computer science, health technology and medical imaging. I currently serve as an Adjunct Professor of Health AI within the Faculty of Medicine at the University of Turku, Finland. My current research interests encompass a wide range of topics, including generative AI for multi-dimensional medical image data, applied machine learning and deep learning, privacy-preserving ML, and bioinstrumentation. This diverse repertoire enables me to approach projects comprehensively and deliver high-quality results.

My career journey has been enriched with valuable roles and positions. Prior to joining Stanford University, I served as a Principal Lecturer in Artificial Intelligence at Turku University of Applied Sciences (TUAS), where I honed my skills in teaching and mentoring. As a Senior Researcher at the University of Turku, I contributed to groundbreaking health sensing and machine learning research projects and explored novel aspects of biosignal processing and medical imaging for a range of applications. Additionally, I had the privilege of working as a Research Scientist at Precordior Oy, where I applied my expertise in health sensing using smartphones.

As I continue my journey in the field of biomedical engineering and artificial intelligence, my goal remains to contribute significantly to scientific advancements and to make a positive impact on human health and well-being. I am eager to embrace new challenges, collaborate with exceptional minds, and further my exploration of innovative technologies and methodologies to push the boundaries of scientific understanding.

#### HONORS AND AWARDS

- Stanford Cancer Innovation Award, Stanford Cancer Institute (2022-2023)
- Postdoctoral Fellowship, Finnish Cultural Foundation (Postdoc Pool) (2022-2023)
- Postdoctoral Fellowship (PET/MRI Motion Estimation and Correction), Ulla Tuominen Foundation (Postdoc Pool) (2021-2022)
- Postdoctoral Grant (MEMS-Based Head Motion Tracking PET/MRI), Turku University Central Hospital Education and Research Foundation (2020)
- Smartphone Motion Processing for Atrial Fibrillation Detection, Finnish Foundation for Science and Technology (2018)
- Wearable Motion Processing System for Detecting Heart Arrhythmia Using MEMS Sensors, Nokia Foundation Awards (2017)
- Smartphone Motion Processing for Atrial Fibrillation Detection, Finnish Foundation for Science and Technology (2017)
- Wearable Motion Processing System for Detecting Heart Arrhythmia Using MEMS Sensors, Nokia Foundation Awards (2016)
- Doctoral Studies Scholarships, Faculty of Medicine, University of Turku (2015-2017)
- IEEE Young Trainee Grant, IEEE NSS/MIC (2016)

- Young Researcher award, University of Turku Foundation (2015)

## PROFESSIONAL EDUCATION

- Ph.D., University of Turku , Medical Physics and Engineering (2018)
- M.Sc., Åbo Akademi University , Biomedical Imaging (2014)
- B.Sc., Iran , Biomedical Engineering (2012)

## STANFORD ADVISORS

- Craig Levin, Postdoctoral Faculty Sponsor

## PATENTS

- Tero Koivisto, Mojtaba JAFARI TADI, Mikko Päkkälä, Juuso Blomster, Juhani Airaksinen, Antti Saraste. "United States Patent US20210338108A1 Apparatus for producing information indicative of cardiac abnormality", Precordior Oy, Nov 4, 2021
- Mojtaba Jafaritadi, Juhani Airaksinen, Tero Koivisto, Mikko Päkkälä, Tuomas Valtonen. "United States Patent US20180303382A1 Method and apparatus for producing information indicative of cardiac condition", Precordior Oy, Oct 25, 2018

## LINKS

- Google Scholar: <https://scholar.google.fi/citations?user=HTVV-SoAAAAJ&hl=en>
- Research Gate: <https://www.researchgate.net/profile/Mojtaba-Jafari-Tadi>
- LinkedIn: <https://www.linkedin.com/in/mojtaba-jafari-tadi-65b1a451/>

## Research & Scholarship

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### RESEARCH INTERESTS

- Data Sciences
- Technology and Education

### CURRENT RESEARCH AND SCHOLARLY INTERESTS

Dr. Jafaritadi is working on signal processing and machine learning applications in cancer, cardiac, and brain PET imaging. His research focuses on generative AI for image correction, image-to-image translation, and image denoising. He is also interested in working on data- and device-driven motion tracking and correction systems for PET imaging using deep neural networks.

### PROJECTS

- MEMS-based Head Motion Tracking for Brain PET/MRI
- Direct Normalization Correction for a Brain PET Insert Using Generative Deep Learning - Molecular Imaging Program (July 1, 2021 - March 31, 2023)
- Self-normalization Correction for a 1-mm Resolution Breast PET Panel - Molecular Imaging Program (6/1/2021 - 10/30/2023)
- Direct Attenuation and Scatter Correction of Brain PET Data - Molecular Imaging Program (February 1, 2023 - August 31, 2023)
- Multi-Tracer Synthetic PET Data Generation in Prostate Cancer Imaging - Stanford Cancer Institute (October 1, 2022 - September 30, 2023)
- Generative Denoising Deep Learning for Image Enhancement in Cardiac PET Imaging - Molecular Imaging Program (October 1, 2021 - February 28, 2023)

### LAB AFFILIATIONS

- Craig Levin, Molecular Imaging Instrumentation Laboratory (4/1/2021)

## Publications

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### PUBLICATIONS

- **Effect of respiratory motion correction and CT-based attenuation correction on dual-gated cardiac PET image quality and quantification** *JOURNAL OF NUCLEAR CARDIOLOGY*  
Schultz, J., Siekkinen, R., Tadi, M., Teras, M., Klen, R., Lehtonen, E., Saraste, A., Teuho, J.  
2021
- **Learning to Denoise Gated Cardiac PET Images Using Convolutional Neural Networks** *IEEE ACCESS*  
Gambin, J., Tadi, M., Teuho, J., Klen, R., Knuuti, J., Koskinen, J., Saraste, A., Lehtonen, E.  
2021; 9: 145886-145899
- **A novel dual gating approach using joint inertial sensors: implications for cardiac PET imaging** *PHYSICS IN MEDICINE AND BIOLOGY*  
Tadi, M., Teuho, J., Lehtonen, E., Saraste, A., Pankaala, M., Koivisto, T., Teras, M.  
2017; 62 (20): 8080–8101
- **Gyrocardiography: A New Non-invasive Monitoring Method for the Assessment of Cardiac Mechanics and the Estimation of Hemodynamic Variables** *SCIENTIFIC REPORTS*  
Tadi, M., Lehtonen, E., Saraste, A., Tuominen, J., Koskinen, J., Teras, M., Airaksinen, J., Pankaala, M., Koivisto, T.  
2017; 7: 6823
- **Adaptive Weight Aggregation in Federated Learning for Brain Tumor Segmentation**  
Khan, M., Jafaritadi, M., Alhoniemi, E., Kontio, E., Khan, S. A., Crimi, A., Bakas, S.  
SPRINGER INTERNATIONAL PUBLISHING AG. 2022: 455-469
- **A Respiratory Motion Estimation Method Based on Inertial Measurement Units for Gated Positron Emission Tomography** *SENSORS*  
Lehtonen, E., Teuho, J., Koskinen, J., Tadi, M., Klen, R., Siekkinen, R., Gambin, J., Vasankari, T., Saraste, A.  
2021; 21 (12)
- **Classification of Atrial Fibrillation and Acute Decompensated Heart Failure Using Smartphone Mechanocardiography: A Multilabel Learning Approach** *IEEE SENSORS JOURNAL*  
Mehrang, S., Lahdenoja, O., Kaisti, M., Tadi, M., Hurnanen, T., Airola, A., Knuutila, T., Jaakkola, J., Jaakkola, S., Vasankari, T., Kiviniemi, T., Airaksinen, J., Koivisto, et al  
2020; 20 (14): 7957–68
- **Investigating the estimation of cardiac time intervals using gyrocardiography** *PHYSIOLOGICAL MEASUREMENT*  
Dehkordi, P., Tavakolian, K., Tadi, M., Zakeri, V., Khosrow-khavar, F.  
2020; 41 (5): 055004
- **A Computational Framework for Data Fusion in MEMS-Based Cardiac and Respiratory Gating.** *Sensors (Basel, Switzerland)*  
Jafari Tadi, M., Lehtonen, E., Teuho, J., Koskinen, J., Schultz, J., Siekkinen, R., Koivisto, T., Päkkälä, M., Teräs, M., Klén, R.  
2019; 19 (19)
- **Comprehensive Analysis of Cardiogenic Vibrations for Automated Detection of Atrial Fibrillation Using Smartphone Mechanocardiograms** *IEEE SENSORS JOURNAL*  
Tadi, M., Mehrang, S., Kaisti, M., Lahdenoja, O., Hurnanen, T., Jaakkola, J., Jaakkola, S., Vasankari, T., Kiviniemi, T., Airaksinen, J., Knuutila, T., Lehtonen, E., Koivisto, et al  
2019; 19 (6): 2230–42
- **Reliability of Self-Applied Smartphone Mechanocardiography for Atrial Fibrillation Detection** *IEEE ACCESS*  
Mehrang, S., Tadi, M., Hurnanen, T., Knuutila, T., Lahdenoja, O., Jaakkola, J., Jaakkola, S., Vasankari, T., Kiviniemi, T., Airaksinen, J., Koivisto, T., Pankaala, M.  
2019; 7: 146801–12
- **Stand-Alone Heartbeat Detection in Multidimensional Mechanocardiograms** *IEEE SENSORS JOURNAL*  
Kaisti, M., Tadi, M., Landenoja, O., Hurnanen, T., Saraste, A., Pankaala, M., Koivisto, T.  
2019; 19 (1): 234–42
- **Multiclass Classifier based Cardiovascular Condition Detection Using Smartphone Mechanocardiography** *SCIENTIFIC REPORTS*  
Iftikhar, Z., Landenoja, O., Tadi, M., Hurnanen, T., Vasankari, T., Kiviniemi, T., Airaksinen, J., Koivisto, T., Pankaala, M.

2018; 8: 9344

- **A Miniaturized Low Power Biomedical Sensor Node for Clinical Research and Long Term Monitoring of Cardiovascular Signals**  
Tuominen, J., Lehtonen, E., Tadi, M., Koskinen, J., Pankaala, M., Koivisto, T., IEEE  
IEEE.2017
- **A real-time approach for heart rate monitoring using a Hilbert transform in seismocardiograms *PHYSIOLOGICAL MEASUREMENT***  
Tadi, M., Lehtonen, E., Hurnanen, T., Koskinen, J., Eriksson, J., Pankaala, M., Teras, M., Koivisto, T.  
2016; 37 (11): 1885–1909