

In the name of God



Somayeh Sadat Mehrnia, PhD

Contact Information:

s.mehrnia95@gmail.com

Research Interests

- **Nanoparticle-Mediated Radiotherapy:** Engineering targeted nano-constructs (e.g., gold nanoparticle-aptamer conjugates) for enhancing the efficacy of radiation therapy in cancers such as breast cancer.
- **Computational Oncology:** Creating interpretable and biologically-grounded AI models to bridge the gap between radiological features and tumor biology for personalized medicine.

Education

Degree	Field	University/Institution	Rank/Achievement
PhD	Medical	Tarbiat Modares	Ranked 1st in National PhD
	Physics	University	Entrance Exam
Master's (MSc)	Medical	Tarbiat Modares	Ranked 1st in National Master's
	Physics	University	Entrance Exam
Bachelor's (BSc)	Physics	Yazd University	

- **Top Graduate:** Ranked 1st among PhD graduates in Medical Physics.
- **National Elite Foundation Award:** Recipient of the National Elites Foundation Award (2013).

Publications (Peer-Reviewed Journals & Preprints)

1. Landscape of 2D Deep Learning Segmentation Networks Applied to CT Scan from Lung Cancer Patients: A Systematic Review.

Somayeh Sadat Mehrnia, Zhino Safahi, Amin Mousavi, Fatemeh Panahandeh, Arezoo Farmani, Ren Yuan, Arman Rahmim, Mohammad R Salmanpour. *Journal of Imaging Informatics in Medicine*. 2025 Mar 4. doi:10.1007/s10278-025-01458-x.

2. Radiosensitization of breast cancer cells using AS1411 aptamer-conjugated gold nanoparticles.

Somayeh Sadat Mehrnia, Bijan Hashemi, Seyed Javad Mowla, Maryam Nikkhah, Azim Arbabi. *Radiation Oncology*; 2021; 16(33).

3. Enhancing the effect of 4MeV electron beam using gold nanoparticles in breast cancer cells *Physica Medica*.

Somayeh Sadat Mehrnia, Bijan Hashemi, Seyed Javad Mowla, Azim Arbabi; *Physica Medica: European Journal of Medical Physics*, 2017; (35) 18–24.

4. Effect of different frequencies of repetitive transcranial magnetic stimulation on acquisition of chemical kindled seizures in rats.

Somayeh Mongabadi (Mehrnia), Seyed Mohammad Firoozabadi, Mohammad Javan, Amir Shojaei, Javad Mirnajafi-Zadeh; *Neurological sciences*, 2013; (34) 1897–1903.

5. Electromagnetic field stimulation potentiates endogenous myelin repair by recruiting subventricular neural stem cells in an experimental model of white matter demyelination.

Mohammad Amin Sherafat, Motahareh Heibatollahi, Somayeh Mongabadi (Mehrnia), Fatemeh Moradi, Mohammad Javan, Abolhassan Ahmadiani *J Mol Neurosci*, 2012 ;48(1):144-53.

6- Radiosensitization of breast cancer cells using AS1411 aptamer-conjugated gold nanoparticles.

Bijan Hashemi, Somayeh Sadat Mehrnia, Seyed Javad Mowla, Azim Arbabi, Maryam Nikkhah. *Iranian Journal of Medical Physics 15 (Special Issue-12th. Iranian Congress)*

7-Handcrafted vs. Deep Radiomics vs. Fusion vs. Deep Learning: A Comprehensive Review of Machine Learning-Based Cancer Outcome Prediction in PET and SPECT Imaging

Somayeh Sadat Mehrnia, Mohammad R Salmanpour, Sajad Jabarzadeh Ghandilu, Zhino Safahi, Sonya Falahati, Shahram Taeb, Ghazal Mousavi, Mehdi Maghsudi, Ahmad Shariftabrizi, Ilker Hacihaliloglu, Arman Rahmim

8- Radiological and biological dictionary of radiomics features: addressing understandable AI issues in personalized breast cancer; dictionary version BM1. 0

Arman Gorji, Nima Sanati, Amir Hossein Pouria, Somayeh Sadat Mehrnia, Ilker Hacihaliloglu, Arman Rahmim, Mohammad R Salmanpour. *Physics in Medicine & Biology* 71 (2), 025008.

9- Pathobiological Dictionary Defining Pathomics and Texture Features: Addressing Understandable AI Issues in Personalized Liver Cancer; Dictionary Version LCP1. 0

Mohammad R Salmanpour, Seyed Mohammad Piri, Somayeh Sadat Mehrnia, Ahmad Shariftabrizi, Masume Allahmoradi, Venkata SK Manem, Arman Rahmim, Ilker Hacihaliloglu. *Journal of imaging informatics in medicine*, 1-29

10- Robust Semi-Supervised CT Radiomics for Lung Cancer Prognosis: Cost-Effective Learning with Limited Labels and SHAP Interpretation

Mohammad R Salmanpour, Amir Hossein Pouria, Sonia Falahati, Shahram Taeb, Somayeh Sadat Mehrnia, Mehdi Maghsudi, Ali Fathi Jouzdani, Mehrdad Oveisi, Ilker Hacihaliloglu, Arman Rahmim. in *IEEE Transactions on Biomedical Engineering*, doi: 10.1109/TBME.2026.3701855.

11- Enhancement Without Contrast: Stability-Aware Multicenter Machine Learning for Glioma MRI Imaging. Sajad Amiri, Shahram Taeb, Sara Gharibi, Setareh Dehghanfard, Somayeh Sadat Mehrnia, Mehrdad Oveisi, Ilker Hacihaliloglu, Arman Rahmim, Mohammad R Salmanpour

12- Minimal input, maximal impact: a CT-only semi-supervised learning pipeline for lung cancer survival prediction across 12 datasets. Mohammad R Salmanpour, Sonya Falahati, Amin Mousavi, Amir Hossein Pouria, Somayeh Sadat Mehrnia, Morteza Alizadeh, Arman Gorji, Zeinab Farsangi, Alireza Safarian, Mehdi Maghsudi, Arman Rahmim, Ren Yuan

Medical Imaging 2026: Computer-Aided Diagnosis

13- Semi-Supervised Multi-Sequence Glioblastoma MRI Radiogenomics for Prediction of IDH Mutation Status: Improved Robustness to Limited Labels and SHAP Interpretations

Amir Hossein Pouria, Shahram Taeb, Somayeh Sadat Mehrnia. *Int J Cur Res Sci Eng Tech* 8 (4), 426-435

Conference Proceedings & Presentations:

- ❖ **AllMetrics: A Unified Python Library for Standardized Metric Evaluation in Machine Learning.** M Alizadeh, M Oveisi, S Falahati, G Mousavi, MA Meybodi, SS Mehrnia, IHacihaliloglu, A Rahmim, MR Salmanpour. *IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD)*
- ❖ **Minimal input, maximal impact: a CT-only semi-supervised learning pipeline for lung cancer survival prediction across 12 datasets.** Mohammad R Salmanpour, Sonya Falahati, Amin Mousavi, Amir Hossein Pouria, Somayeh Sadat Mehrnia,

Morteza Alizadeh, Arman Gorji, Zeinab Farsangi, Alireza Safarian, Mehdi Maghsudi, Arman Rahmim, Ren Yuan
Publication date. Medical Imaging 2026: Computer-Aided Diagnosis.

- ❖ **LCP1. 0: a computational pathomics dictionary as a translational tool between AI researchers and clinicians in liver cancer care.** Mohammad R Salmanpour, Seyed Mohammad Piri, Somayeh Sadat Mehrnia, Arman Rahmim, Ilker Hacihaliloglu Medical Imaging 2026: Digital and Computational Pathology, Volume: 13932, Pages: 244-257:Publisher: SPIE.
- ❖ **BM1. 0: a radiomics computational dictionary bridging AI research and clinical practice in breast cancer care.**Arman Gorji, Nima Sanati, Amir Hossein Pouria, Somayeh Sadat Mehrnia, Ilker Hacihaliloglu, Arman Rahmim, Mohammad R. Salmanpour. Conference:Medical Imaging 2026: Clinical and Biomedical Imaging. Volume: 13929, Pages580-589. Publisher:SPIE.
- ❖ **Reducing Gadolinium Dependency in Neurooncology: A Multicenter Machine-Learning Driven Estimation of Brain Glioma Enhancement from Non-Contrast T1 MRI.** S Amiri, S Dehghanfard, S Gharibi, M Oveisi, SS Mehrnia, S Taeb, I Hacihaliloglu, A Rahmim, MR Salmanpour. Conference: 2025 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD)
Pages:1-2.Publisher IEEE.
- ❖ **Semi-Supervised Learning for Improved Radiomics-Based Outcome Prediction from Lymphoma PET Images.** MR Salmanpour, A Gorji, A Feiz, M Houshmand, SS Mehrnia, A Rahmim. Conference: 2025 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD), Pages:1-2:Publisher IEEE.
- ❖ **Multi-Center Semi-Supervised Prediction of Lung Cancer Survival Outcomes Via Pseudolabeling of CT Images.** MR Salmanpour, AH Pouria, S Falahati, S Taeb, SS Mehrnia, M Maghsoudi, Z Farsangi, A Safarian, M Oveisi, I Hacihaliloglu, A Rahmim, R Yuan. Publication date Conference:2025 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD).Pages:1-1. Publisher:IEEE.
- ❖ **Reducing Gadolinium Dependency in Neurooncology: A Multicenter Machine-Learning Driven Estimation of Brain Glioma Enhancement from Non-Contrast T1 MRI.** S Amiri, S Dehghanfard, S Gharibi, M Oveisi, SS Mehrnia, S Taeb, I Hacihaliloglu, A Rahmim, MR Salmanpour.Conference2025 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD);Pages:1-2, Publisher:IEEE.
- ❖ **Multi-Center Semi-Supervised Prediction of Lung Cancer Survival Outcomes Via Pseudolabeling of CT Images.** MR Salmanpour, AH Pouria, S Falahati, S Taeb,

SS Mehrnia, M Maghsoudi, Z Farsangi, A Safarian, M Oveisi, I Hacıhaliloglu, A Rahmim, R Yuan. Conference 2025 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD); Pages: 1-1, Publisher: IEEE.

- ❖ **Advanced Prediction of Glioblastoma IDH Mutation Using Semi-Supervised Pseudolabeling and Combined MRI Sequences Across Multiple Centers.** MR Salmanpour, AM Ahmadzede, S Jabarzadeh Ghandilu, S Taeb, AH Pouria, **SS Mehrnia**, M Oveisi, A Rahmim, I Hacıhaliloglu. Conference: 2025 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD); Pages: 1-2, Publisher: IEEE.
- ❖ **Radiological and Biological Dictionary of Radiomics Features: Addressing Understandable AI Issues in Personalized Breast Cancer; Dictionary Version BM1.0** Conference: 2025 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD)
- ❖ **Radiosensitization of breast cancer cells using AS1411 aptamer-conjugated gold nanoparticles**, Bijan Hashemi, **Somayeh Sadat Mehrnia**, Seyed Javad Mowla, Azim Arbabi, Maryam Nikkha, Iranian Journal of Medical Physics, Volume: 15: Special Issue-12th. Iranian Congress of Medical Physics; Pages: 57-57, Mashhad University of Medical Sciences

Book Translation

- **The Essential Physics of Medical Imaging (3rd Edition) – Volume 1** (Original by Bushberg) Translated by: Eftekhar Soleimani, Mosayeb Mobasheri, **Somayeh Sadat Mehrnia**. Publisher: Etminan Publications (2017) – Iran

Research Projects & Grants

- **Evaluation of breast cancer cell sensitivity to electron beams using gold nanoparticles conjugated with AS1411 aptamer.**

- **Principal Investigators:** Dr. Bijan Hashemi, Dr. Seyed Javad Mowla, Dr. Azim Arbabi, Dr. Maryam Nikkhah, **Somayeh Sadat Mehrnia**
 - **Grant Agency:** Iran National Science Foundation (INSF) / Researchers and Technologists Support Fund
 - **Period:** 2013–2017 (1392-1396)
-

Work Experience

- **Researcher**
 - **Institution:** Motamed Cancer Institute, National Cancer Research Center
Period: 2024–2026 (1403-1405)
-

Laboratory & Technical Skills:

Category	Techniques
Cell Culture	Basic cell culture techniques, Cancer stem cell culture (Sphere assay)
Molecular Biology	RNA extraction, cDNA synthesis, qPCR and data analysis
Nanotechnology	Gold nanoparticle (GNP) synthesis and conjugation
Radiation Biology	Clonogenic assay, MTT / MTS assay
Microscopy	Fluorescent microscopy
Animal Work	Animal care and injection, Seizure behavior assay, Repetitive Transcranial Magnetic Stimulation (rTMS) application on small animals