

BIOGRAPHICAL SKETCH

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NAME: Sadeghipour, Negar

eRA COMMONS USER NAME (credential, e.g., agency login):

POSITION TITLE: Postdoctoral Research Fellow

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Start Date MM/YYYY	Completion Date MM/YYYY	FIELD OF STUDY
Sharif University of Technology (Tehran, Iran)	BS	09/2009	06/2013	Materials Science and Engineering
Illinois Institute of Technology (Chicago, IL, USA)	PhD	08/2014	12/2018	Biomedical Engineering
Stanford University (Stanford, CA, USA)	Postdoctoral	03/2019	Present	Cancer Detection and Treatment

A. Personal Statement

My goal is to conduct basic and translational research to improve cancer treatment outcomes, while further developing and expanding my training in mathematical modeling of biological systems. During my undergraduate career at Sharif University of Technology and for one year after graduation, I was a research assistant in the Research Center for Molecular and Cellular Imaging in Tehran, Iran, where I worked with material scientists and chemists on surface modification of magnetic nanoparticles for biomedical applications such as magnetic resonance imaging and drug delivery. This gave me the opportunity to learn about nanoparticle synthesis and material characterization techniques. I was always curious to learn more about the kinetics of these imaging agents in the body, so I opted to pursue a PhD in the laboratory of Dr. Kenneth Tichauer, an expert in kinetic modeling at the Illinois Institute of Technology. I learned mathematical modeling techniques and gained hands-on experience with rodent imaging. My original work on cancer cell-surface quantification using uptake of cancer-targeted imaging agents has been published in peer-reviewed journals in my field. I am a co-author on a forthcoming book chapter about cell pharmacokinetics and I have had the opportunity to present my research at the top conferences in my field. My unique interdisciplinary training skills, which range from cell culture and *in vivo* animal imaging to mathematical model hypothesis testing, earned me my current postdoctoral position in the labs of my two mentors: Dr. Ramasamy Paulmurugan who is a cancer biology expert, and Dr. Sharon Hori who is a blood-based biomarker and mathematical modeling expert. I will work on detecting breast cancer and monitoring treatment response using imaging and circulating biomarkers.

1. **Sadeghipour N**, Rangnekar A, Folaron M, Strawbridge R, Samkoe K, Davis S, Tichauer K, "Prediction of optimal contrast times post-imaging agent administration to inform personalized fluorescence-guided surgery", *J. Biomed. Opt.* 25(11), 116005 (2020).
2. Meng B, Folaron M, Strawbridge R, **Sadeghipour N**, Samkoe K, Tichauer KM, Davis SC, "Noninvasive quantification of target availability during therapy using paired-agent fluorescence tomography", *Theranostics* 10 (24), 11230 (2020).
3. Ren S, Sun X, Wang H, Nguyen TH, **Sadeghipour N**, Xu X, Kang CS, Liu Y, Xu H, Wu N, Chen Y, Tichauer K, Minh DDL, Chong HS. Design, Synthesis, and Biological Evaluation of Polyaminocarboxylate Ligand-Based Theranostic Conjugates for Antibody-Targeted Cancer Therapy and Near-Infrared Optical Imaging. *ChemMedChem*. 2018 Dec 20;13(24):2606-2617.

4. **Sadeghipour N**, Davis SC, Tichauer KM. Correcting for targeted and control agent signal differences in paired-agent molecular imaging of cancer cell-surface receptors. *J Biomed Opt.* 2018 Jun;23(6):1-11.
5. **Sadeghipour N**, Davis SC, Tichauer KM. Generalized paired-agent kinetic model for in vivo quantification of cancer cell-surface receptors under receptor saturation conditions. *Phys Med Biol.* 2017 Jan 21;62(2):394-414.

B. Positions and Honors

Positions and Employment

2013 - 2014	Research Assistant, Research Center for Molecular and Cellular Imaging
2014 – 2018	Graduate Student Researcher, Illinois Institute of Technology
2019 - present	Postdoctoral Researcher, Stanford University

Honors and Awards

2018	Industry Selected Poster Award, World Molecular Imaging Congress, Seattle, WA USA (Sept. 12-15, 2018)
2017	Student Travel Stipend, World Molecular Imaging Congress, Philadelphia, PA USA (Sept. 13-16, 2017)
2013	Academic Excellence Award for B.S. Program, Sharif University of Technology

C. Contributions to Science

1. **Quantitative Drug Target Imaging in Cancer Mouse Models.** My graduate research contributions mainly focused on the biodistribution of cancer drugs, drug-target biomolecules, and targeted imaging agents in living subjects. I developed mathematical models for quantifying the number of cancer cell surface receptors from imaging data. I developed two original models that are compatible with a newly applied method of imaging; this imaging strategy simultaneously monitors co-administration of a targeted receptor-binding imaging agent and a non-targeted control imaging agent to account for non-specific uptake and retention. Furthermore, in collaboration with a team of chemists, I investigated the uptake and distribution of a fluorescent targeted antibody-drug conjugate for theranostic (simultaneous therapy and diagnosis) applications in cancer treatment.
 - a. Meng B, Folaron M, Strawbridge R, **Sadeghipour N**, Samkoe K, Tichauer KM, Davis SC, "Noninvasive quantification of target availability during therapy using paired-agent fluorescence tomography", *Theranostics* 10 (24), 11230 (2020).
 - b. **Sadeghipour N**, Rangnekar A, Folaron M, Strawbridge R, Samkoe K, Davis S, Tichauer K, "Prediction of optimal contrast times post-imaging agent administration to inform personalized fluorescence-guided surgery", *J. Biomed. Opt.* 25(11), 116005 (2020).
 - c. Ren S, Sun X, Wang H, Nguyen TH, **Sadeghipour N**, Xu X, Kang CS, Liu Y, Xu H, Wu N, Chen Y, Tichauer K, Minh DDL, Chong HS. Design, Synthesis, and Biological Evaluation of Polyaminocarboxylate Ligand-Based Theranostic Conjugates for Antibody-Targeted Cancer Therapy and Near-Infrared Optical Imaging. *ChemMedChem.* 2018 Dec 20;13(24):2606-2617.
 - d. **Sadeghipour N**, Davis SC, Tichauer KM. Correcting for targeted and control agent signal differences in paired-agent molecular imaging of cancer cell-surface receptors. *J Biomed Opt.* 2018 Jun;23(6):1-11.
 - e. **Sadeghipour N**, Davis SC, Tichauer KM. Generalized paired-agent kinetic model for in vivo quantification of cancer cell-surface receptors under receptor saturation conditions. *Phys Med Biol.* 2017 Jan 21;62(2):394-414.

2. Personalized Screening for Early Detection of Cancer Using Circulating Biomarkers and Imaging.

As a postdoctoral fellow, my research has provided a compelling link between blood-based tumor biomarkers and the tumor burden. Most of the time, cancer patients are unaware of their disease until it becomes symptomatic and hard to treat. A minimally invasive and cost-effective way to regularly screen individuals for cancer is to quantify cancer-related biomarkers such as proteins and nucleic acids, in easy-to-collect blood and urine samples. However, variations in patient baseline biomarker levels and the need to better understand the detection limits of endogenous biomarkers make the disease classification difficult in patients. My research has focused on designing personalized screening schedules for cancer early detection by sampling these biomarkers in the blood and urine of novel transgenic mouse models.

- a. **Sadeghipour N**, Shen K, Jiang J, Hori SS. A machine learning approach for early classification of cancer using longitudinal biomarker measurements. Early Detection Cancer Conference. Stanford, US (2019)
- b. SB Kim, SS Hori, **N Sadeghipour**, UK Sukumar, R Fujii, TF Massoud, R Paulmurugan, "Highly Sensitive Eight-Channel Light Sensing System for Biomedical Applications," Photochemical & Photobiological Sciences (2020). Inside Front Cover.

3. microRNA delivery for chemo-sensitizing cancer cells.

One of the projects that I work as a postdoctoral fellow, is to improve the outcome of cancer treatment mainly focusing on glioblastoma and triple negative breast cancer. Chemotherapeutic drugs such as doxorubicin and temozolomide are not as effective over the course of treatment due to cells becoming more resistance to therapy. My research has focused on introducing a new combination of miRNAs which are loaded in PLGA-PEG-nanoparticles for in vivo delivery purposes.

- a. Wang K, Sukumar U, **Sadeghipour N**, Massoud T, Paulmurugan R, "A Microfluidics-Based Scalable Approach to Generate Extracellular Vesicles with Enhanced Therapeutic MicroRNA Loading for Intranasal Delivery to Mouse Glioblastomas", ACS Nano, *under revision*.

Complete List of Published Work in My Bibliography:

<https://www.ncbi.nlm.nih.gov/myncbi/1XQ4cr8v6mC5U/bibliography/public/>

D. Additional Information: Research Support and/or Scholastic Performance

YEAR	COURSE TITLE	GRADE
ILLINOIS INSTITUTE OF TECHNOLOGY		
2016	Mathematical Modeling	A
2015	Reaction Kinetics for Biomedical Engineering	A
2015	Concept of Cancer Biology	A
2014	Quantitative Physiology	A
2014	Biostatistics	A
SHARIF UNIVERSITY OF TECHNOLOGY		
2012	Numerical Computation	A
2011	Principles of Polymer Engineering	A
2011	Materials Thermodynamics	A