

Roozbeh Dehghannasiri

GENERAL INFORMATION *Born:* Oct. 1987, Tehran, Iran.
Citizenship: United States
Marital Status: Single

CONTACT INFORMATION Salzman Lab
Stanford University
Beckman Center B473
Stanford, CA 94305
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ACADEMIC EXPERIENCE **Stanford University, Stanford, CA** **Aug. 2017 - present**
Postdoctoral Research Fellow (Cancer Systems Biology Scholars Program)
Department of Biochemistry
Mentor: Professor Julia Salzman
Research Topic: Statistical Discovery and Systems Biology of Gene Fusions and Cryptic Splicing Events

Texas A&M University, College Station, TX **Sep. 2016 - Aug. 2017**
Postdoctoral Research Associate
Department of Electrical and Computer Engineering, and Center for Bioinformatics and Genomic Systems Engineering
Mentor: Professor Edward R. Dougherty
Research Topic: Developing the Theory of Experimental Design and Optimal Filtering Under Uncertainty

EDUCATION **Texas A&M University, College Station, TX** **Sep. 2012 - Aug. 2016**
Doctor of Philosophy (GPA: 4/4)
Electrical and Computer Engineering
Advisor: Professor Edward R. Dougherty
Thesis title: Optimal experimental design in the context of objective-based uncertainty quantification

McMaster University, Hamilton, Canada **Sep. 2010 - Aug. 2012**
Master of Applied Science (GPA: A+/A+)
Electrical and Computer Engineering
Advisor: Professor Shahram Shirani
Thesis title: Advanced image and video interpolation techniques based on nonlocal-means filtering

University of Tehran, Tehran, Iran **Sep. 2006 - Aug. 2010**
Bachelor of Applied Science (GPA: 17.72/20)
Electrical and Computer Engineering
Advisor: Professor Ali Olfat
Thesis title: Equalization and detection of the M-PSK modulation order using adaptive and information theoretic approaches

RESEARCH INTERESTS High-Throughput Sequencing Data Analysis, Cancer Systems Biology, Biostatistics,

Computational Biology, Statistical Signal Processing, Uncertainty Quantification and Optimal Experimental Design, Pattern Recognition, Bayesian Statistics.

PATENT

Shahram Shirani and **Roozbeh Dehghannasiri**, “De-interlacing and Frame Rate Up-conversion for High Definition Applications”, *US Patent 9,294,711*, Issued March 2016.

**JOURNAL
PUBLICATIONS**

1– **R. Dehghannasiri**, D. E. Freeman, M. Jordanski, G. L. Hsieh, A. Damljanovic, E. Lehnert, and J. Salzman “Improved Detection of Gene Fusions by Applying Statistical Methods Reveals New Oncogenic RNA Cancer Drivers”, *Submitted*.

2– **R. Dehghannasiri**, L. Szabo, and J. Salzman, “Ambiguous Splice Sites Distinguish CircRNA and Linear Splicing in the Human Genome”, *Bioinformatics*, Vol. 35, No. 8, 1263-1268, 2018.

3– **R. Dehghannasiri**, M. S. Esfahani, and E. R. Dougherty, “An Experimental Design Framework for Markovian Gene Regulatory Networks Under Stationary Control Policy”, *BMC Systems Biology*, 12 (Suppl 8):137 2018.

4– **R. Dehghannasiri**, X. Qian, and E. R. Dougherty, “A Bayesian Robust Kalman Smoothing Framework for State-Space Models with Uncertain Noise Statistics”, *EURASIP Journal on Advances in Signal Processing*, Vol. 2018, No. 1, 55, 2018.

5– M. Imani, **R. Dehghannasiri**, U. Braga-Neto, and E. R. Dougherty, “Sequential Experimental Design for Optimal Structural Intervention in Gene Regulatory Networks Based on the Mean Objective Cost of Uncertainty”, *Cancer Informatics*, Vol. 17, 1-10, Jan. 2018.

6– **R. Dehghannasiri**, M. S. Esfahani, X. Qian, and E. R. Dougherty, “Optimal Bayesian Kalman Filtering with Prior Update”, *IEEE Transactions on Signal Processing*, Vol. 66, No. 8, 1982-1996, 2018.

7– **R. Dehghannasiri**, X. Qian, and E. R. Dougherty, “Intrinsically Bayesian Robust Karhunen-Löve Compression”, *Signal Processing*, Vol. 144, 311-322, 2018.

8– D. N. Mohsenizadeh*, **R. Dehghannasiri***, and E. R. Dougherty, “Optimal Objective-Based Experimental Design for Uncertain Dynamical Gene Networks with Experimental Error”, *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, Vol. 15, No. 1, 218-230, 2018. (***equally contributed**)

9– **R. Dehghannasiri**, X. Qian, and E. R. Dougherty, “Optimal Experimental Design in the Context of Canonical Expansions”, *IET Signal Processing*, Vol. 11, No. 8, 942-951, 2017.

10– **R. Dehghannasiri**, M. S. Esfahani, and E. R. Dougherty, “Intrinsically Bayesian Robust Kalman Filter: An Innovation Process Approach”, *IEEE Transactions on Signal Processing*, Vol. 65, No. 10, 2531-2546, 2017.

11– **R. Dehghannasiri**, D. Xue, P. V. Balachandran, M. R. Yousefi, L. A. Dalton, T. Lookman, and E. R. Dougherty, “Optimal Experimental Design for Materials Discovery”, *Computational Materials Science*, Vol. 129, 311-322, 2017.

12– **R. Dehghannasiri**, B.-J. Yoon, and E. R. Dougherty, “Efficient Experimental Design for Uncertainty Reduction in Gene Regulatory Networks”, *BMC Bioinformatics*, 16(Suppl 13):S2, 2015.

13– **R. Dehghannasiri**, B.-J. Yoon, and E. R. Dougherty, “Optimal Experimental Design for Gene Regulatory Networks in the Presence of Uncertainty”, *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, Vol. 12, No. 4, 938-950, 2015.

**REFEREED
CONFERENCE
PUBLICATIONS**

1– **R. Dehghannasiri**, M. Jordanski, and J. Salzman, “DEEPEST-Fusion: Pan-cancer statistical gene fusion discovery and characterization”, *RNA Society Annual Conference*, June 2019, Krakow, Poland.

2– **R. Dehghannasiri**, M. Jordanski, D. E. Freeman, G. L. Hsieh, J. M. Howard, E. Lehnert, and J. Salzman, “Towards precise and cost-effective fusion discovery: A landscape of druggable gene fusions across TCGA cancers”, *AACR Annual Meeting*, Apr. 2019, Atlanta, GA.

3– **R. Dehghannasiri**, X. Qian, and E. R. Dougherty, “Robust smoothing for state-space models with unknown noise statistics”, *IEEE Asilomar Conference on Signals, Systems, and Computers*, Nov. 2018, Pacific Grove, CA.

4– **R. Dehghannasiri**, M. S. Esfahani, X. Qian, and E. R. Dougherty, “Bayesian Kalman filtering in the presence of unknown noise statistics using factor graphs”, *IEEE Asilomar Conference on Signals, Systems, and Computers*, Nov. 2017, Pacific Grove, CA.

5– **R. Dehghannasiri**, X. Qian, and E. R. Dougherty, “An objective-based experimental design framework for signal processing in the context of canonical expansions”, *IEEE Asilomar Conference on Signals, Systems, and Computers*, Nov. 2017, Pacific Grove, CA.

6– **R. Dehghannasiri**, X. Qian, and E. R. Dougherty, “Optimal experimental design in canonical expansions with applications to signal compression”, *IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, Dec. 2016, Washington, D.C.

7– **R. Dehghannasiri**, M. S. Esfahani, and E. R. Dougherty, “A Bayesian framework for robust Kalman filtering under uncertain noise statistics”, *IEEE Asilomar Conference on Signals, Systems, and Computers*, Nov. 2016, Pacific Grove, CA.

8– **R. Dehghannasiri**, M. S. Esfahani, and E. R. Dougherty, “Inference of nonlinear ODE-based gene regulatory networks via intrinsically Bayesian robust Kalman filtering”, *ACM International Conference on Bioinformatics, Computational Biology and Biomedicine (ACM-BCB)*, Oct. 2016, Seattle, WA.

9– D. N. Mohsenizadeh*, **R. Dehghannasiri***, and E. R. Dougherty, “Optimal dynamics uncertainty reduction in gene networks in the presence of experimental error”, *IEEE-EMBS International Conference on Biomedical and Health Informatics (BHI)*, Feb. 2016, Las Vegas, NV. (***equally contributed**)

10– D. N. Mohsenizadeh, **R. Dehghannasiri**, and E. R. Dougherty, “An experimental design to reduce dynamics uncertainty in genomic networks”, *ACM International Conference on Bioinformatics, Computational Biology and Biomedicine (ACM-BCB)*, Sep. 2015, Atlanta, GA.

11– **R. Dehghannasiri**, B.-J. Yoon, and E. R. Dougherty, “Computationally efficient experimental design strategy for reducing gene network uncertainty”, *IEEE Global*

Conference on Signal and Information Processing (GlobalSIP), Dec. 2014, Atlanta, GA.

12– **R. Dehghannasiri**, “Video de-interlacing using asymmetric nonlocal-means filtering”, *IEEE Asilomar Conference on Signals, Systems, and Computers*, Nov. 2014, Pacific Grove, CA.

13– **R. Dehghannasiri**, S. M. Reza Soroushmehr, and S. Shirani, “Frame rate up-conversion using nonparametric estimator”, *IEEE International Conference on Image Processing (ICIP)*, Oct. 2014, Paris, France.

14– **R. Dehghannasiri**, B.-J. Yoon, and E. R. Dougherty, “Designing experiments for optimal reduction of uncertainty in gene regulatory networks”, *IEEE International Workshop on Genomics and Signal Processing and Statistics (GENSIPS)*, Nov. 2013, Houston, TX.

15– **R. Dehghannasiri** and S. Shirani, “A view interpolation method without explicit disparity estimation”, *IEEE International Conference on Multimedia and Expo Workshops (ICMEW)*, Jul. 2013, San Jose, CA.

16– **R. Dehghannasiri** and S. Shirani, “A novel de-interlacing method based on locally-adaptive nonlocal-means”, *IEEE Asilomar Conference on Signals, Systems, and Computers*, Nov. 2012, Pacific Grove, CA.

POSTERS

R. Dehghannasiri, M. Jordanski, and J. Salzman, “Towards precise and cost-effective fusion discovery: A landscape of druggable gene fusions across TCGA cancers”, *Systems Approaches to Cancer Biology*, Portland, OR, May 2019.

R. Dehghannasiri, M. Jordanski and J. Salzman, “Towards Precise and Cost-Effective Fusion Discovery: A Landscape of Druggable Gene Fusions Across TCGA Cancers”, *Stanford Biochemistry Retreat*, Santa Cruz, CA, October 2018.

R. Dehghannasiri and J. Salzman, “Highly sensitive and specific statistical approach for accurate detection of gene fusions and cryptic splicing events using RNA-seq”, *International Conference on Intelligent Biology and Medicine (ICIBM 2018)*, Los Angeles, CA, June 2018.

R. Dehghannasiri, M. Jordanski, R. Bierman, E. Lehnert, G. Hsieh, and J. Salzman, “Towards precise and cost-effective fusion discovery: A statistical fusion detection algorithm with a cloud-based implementation”, *6th Annual Stanford Cancer Systems Biology Symposium*, Stanford, CA, May 2018.

R. Dehghannasiri, B.-J. Yoon, and E. R. Dougherty, “Efficient experimental design for uncertainty reduction in gene regulatory networks”, *12th Annual Conference of the MidSouth Computational Biology and Bioinformatics Society (MCBIOS)*, Little Rock, AR, March 2015.

R. Dehghannasiri, B.-J. Yoon, and E. R. Dougherty, “Designing experiments for optimal reduction of uncertainty in gene regulatory networks”, *1st Texas A&M ENGLIFE Workshop*, College Station, TX, November 2013.

RESEARCH EXPERIENCE

Postdoctoral Research Associate, Salzman Lab, Department of Biochemistry, Stanford

University

Statistically-driven gene fusion detection and systems biology:

- Developing statistical methods for gene fusion detection and quantification
- Integrative computational models for systems level analysis of gene fusions
- Quantifying splice site degeneracy in eukaryotic transcriptomes
- Developing computational *de novo* methods for cryptic splice site detection

Advisor: Professor Julia Salzman **Sep. 2017 - Present**
Research Assistant, Genomic Signal Processing Lab, Texas A&M University

Worked on uncertainty analysis in dynamical models under a Bayesian framework:

- uncertainty quantification and optimal experimental design for gene regulatory networks
- Bayesian robust filtering and signal compression for uncertain signal models

Advisor: Professor Edward R. Dougherty **Aug. 2012 - Aug. 2017**

Bioinformatics Analyst, Institute for Plant Genomics and Biotechnology, Texas A&M Agrilife

Studied next gene sequencing and wrote scripts used for bioinformatic analysis.

Advisor: Professor Patricia Klein **Sep. 2012 - Aug. 2013**

Research Assistant, Multimedia Signal Processing Lab, McMaster University

Worked on different high definition image and video processing applications

Advisor: Professor Shahram Shirani **Sep. 2010 - Aug. 2012**

HONORS AND AWARDS

NCI Invited Speaker, Mathematical Oncology Meeting, Portland, OR **May 2019**

Best Paper Award at the International Conference on Intelligent Biology and Medicine (ICIBM), Los Angeles, CA **June 2018**

Second Best Poster Presentation Award at the 6th Annual Stanford CCSB Symposium **May 2018**

Stanford Cancer Systems Biology Scholars Program Fellowship **Mar. 2017**

NSF Student Travel Award **Dec. 2014, Mar. 2016, Oct. 2016**

Dwight Look College of Engineering Graduate Climate Travel Grant **Sep. 2015**

Best Paper Award at the 12th Annual MCBIOS Conference **Mar. 2015**

Dwight Look College of Engineering Travel Grant **Nov. 2013, Mar. 2015**

McMaster Outstanding Thesis Research Award **Aug. 2012**

Faculty of Engineering Scholarship as an exceptional student in term, University of Tehran **Fall 2006-Spring 2010**

Ranked 3rd among Electrical and Computer Engineering students, with focus on Telecommunications Engineering, University of Tehran **Spring 2008-Spring 2010**

Iranian Ministry of Energy Award, honored and awarded by the Iran's Minister of Energy
Sep. 2006

Ranked 168th among approximately 500000 participants in the nationwide Iranian university entrance exam in Mathematics and Physics field for B.Sc. degree
Summer 2006

TEACHING EXPERIENCE

Teaching Assistant, Computer Aided Engineering, Professor Dongmei Zhao, McMaster University
Winter 2012

Teaching Assistant, Signals & Systems, Professor Terry Todd, McMaster University
Fall 2011

Teaching Assistant, Calculus I, Professor Shahriar Heshmati, University of Tehran
Fall 2009

Teaching Assistant, Calculus I, Professor Shahriar Heshmati, University of Tehran
Fall 2008

REVIEWER

Scientific Reports, PLoS ONE, IEEE/ACM Transactions on Computational Biology and Bioinformatics, BMC Bioinformatics, IEEE Transactions on Signal Processing, Biomedical Signal Processing and Control, Diseases, IEEE Transactions on Automatic Control, Frontiers of Optoelectronics, ACM-BCB Conference, IEEE CDC Conference, IEEE BHI Conference

COMPUTER SKILLS

Programming Languages: Bash, R, Python, C/C++, Perl
Engineering Software: Matlab/Simulink

PROFESSIONAL AFFILIATIONS

American Association of Cancer Research (Associate Member)
IEEE
ACM SIGBio
McMaster Alumni Association
The Association of Former Students of Texas A&M