Mostafa Karimi

Curriculum Vitae

Work Experience

2020–present **Data and applied scientist 2**, *Microsoft*.
Develop and implement novel machine learning models for speech research team.

Summer 2019 **Data scientist PhD Intern**, *Ancestry.com*.
Develop and implement **GANs and optimal transport** for document preprocessing and classical computer vision techniques for layout analysis, **US patent** pending and presented in **CVPR 2020 workshop**

Summer 2018 **Data scientist PhD Intern**, *Anadarko Petroleum Company (APC)*.
Develop and implement **deep learning** models for image/video segmentation for 3D seismic images, presented in **NeurIPS 2018 workshop.**

Education

2020 **Ph.D Program in Electrical Engineering**, *Texas A&M University*.
- Overall GPA: 4.0/4.0

2019 **M.E in Electrical Engineering**, *Texas A&M University*.
- Overall GPA: 4.0/4.0

2015 **B.S. Computer Science**, *Sharif University of Technology*.

2015 **B.S. Electrical Engineering**, *Sharif University of Technology*.

2010 **Diploma in Mathematics and Physics**.
National Organization for Development of Exceptional Talents (NODET)

Academic Experience

2015-2020 **Graduate Research Assistant**, *Genomic Signal Processing Laboratory and Center for Bioinformatics and Genomic Systems Engineering*, Texas A&M University.

2012–2015 **Undergraduate Research Assistant**, *Advanced Communication Research Institute (ACRI)*, Sharif University of Technology.

2010-2015 **Member of Talented Student**, *Sharif University Technology*.

Research Interest

- Optimization theory and machine learning
- NLP and speech processing
- Deep Learning
- Computational Biology and Drug discovery

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Awards

March 2021 Recipient of the **Association of Former students Distinguished Graduate Student Award** for Excellence in Research-Doctoral, Texas A&M University.

Dec 2020 Our paper, de novo protein design through gcWGAN featured as **cover** of Journal of Chemical Information and Modeling. .

Dec 2019 Received **NIH-funded** travel fellowships to present at the CAGI* Workshop in San Francisco.

May 2019 Our paper Genomic and Molecular Landscape of DNA Damage Repair Deficiency Across The Cancer Genome Atlas has been selected among **best of 2018 Cell Reports**.

May 2019 Our paper on pH-specific antibody-drug conjugate featured as **TAMU research bulletin news**.

Aug 2016 Received NSF award for young professionals contributing to smart and connected health at 2016 IEEE EMBS annual conference.

2015-2017 Awarded **Graduate Research Assistantship** from Texas A&M AgriLIFE Research, Center for Bioinformatics and Genomic Systems Engineering.

2010 Ranked 46th among more than 450,000 participants in the national Undergraduate University Entrance Exam.

2010-2015 Recipient of the **5-year grant** for undergraduate studies from **National Elites Foundation** of IRAN, awarded to selected members.

Jan 2013 Awarded to Participate in Winter School ITCSC-INC 2013, The Chinese University of Hong Kong (CUHK), Hong Kong.

Patents

2020 **M. Karimi**, G. Veni, Y. Yu, "Illegible Text to Readable Text: An Image-to-Image Transformation", US Patent Application 17/065,763

Reviewer

- IEEE Transactions on Computational Biology and Bioinformatics (TCBB)
- BMC Bioinformatics
- IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)
- IIE Transactions on Healthcare Systems Engineering
- ACM-BCB 2020
- ISMB/ECCB 2021

Publication

2021 Anna Cichonska, et al,"Crowdsourced mapping of unexplored target space of kinase inhibitors", **Nature Communication** 12 (1), 1-18

2021 **M. Karimi***, D. Wu*, Z. Wang and Y. Shen, "Explainable Deep Relational Networks for Predicting Compound-Protein Affinities and Contacts", **Journal of Chemical Information and Modeling** 61 (1), 46-66

2020 **M. Karimi**, G. Veni, Y. Yu, "Illegible Text to Readable Text: An Image-to-Image Transformation using Conditional Sliced Wasserstein Adversarial Networks", Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition **CVPR** Workshops 2020, pp. 552-553.

2020 K. Afrin*, A. Iquebal*, **M. Karimi***, A. Larsen*, S. Lee* and B. Mallick, "Directionally Dependent Multi-View Clustering Using Copula Model", **Plos One** 15(10): e0238996

2020 **M. Karimi***, S. Zhu*, Y. Cao*, and Y.Shen, "De Novo Protein Design of Novel Folds using Guided Conditional Generative Adversarial Networks (gcWGAN)", **Journal of Chemical Information and Modeling** 60 (12), 5667-5681

2020 **M. Karimi***, A. Hassanizadeh*, and Y.Shen, " Network-principled deep generative models for designing drug combinations as graph sets", accepted in **ISMB 2020** and published in **Bioinformatics** 36, i445-i454

2019 Y. Cao, Y. Sun, **M. Karimi**, H. Chen, O. Moronfoye, and Y. Shen, "Predicting Pathogenicity of Missense Variants with Weakly Supervised Regression", **Human Mutation** 40 (9), 1579-1592

2019 C. Savojardo, et al, "Evaluating the predictions of the protein stability change upon single amino acid substitutions for the FXN CAGI5 challenge", **Human Mutation** 40 (9), 1392-1399

2019 J. Kang , W. Sun , P. Khare , **M. Karimi** , X. Wang , Y. Shen , R. Ober, E. Ward "Engineering antibody-receptor interactions to generate higher potency antibody-drug conjugates", **Nature Biotechnology** 37 (5), 523

2019 **M. Karimi**, D. Wu, Z. Wang and Y. Shen, "DeepAffinity: Interpretable Deep Learning of Compound-Protein Affinity through Unified Recurrent and Convolutional Neural Networks",**Bioinformatics** 35 (18), 3329-3338

2019 MP Menden, et al,"Community assessment to advance computational prediction of cancer drug combinations in a pharmacogenomic screen", **Nature Communication** 10 (1), 2674

2018 **M. Karimi**, and Y. Shen, "Interconnected Cost Function Networks (iCFN): an exact algorithm for multistate protein design with substate ensembles", accepted in **ECCB 2018** and published in **Bioinformatics** 34 (17), i811-i820

2018 S. Fanning, et al, "The SERM/SERD Bazedoxifene Disrupts ESR1 Helix 12 to Overcome Acquired Hormone Resistance in Breast Cancer Cells", **eLife** 7, e37161

2018 T. Knijnenburg, et al,"Genomic and Molecular Landscape of DNA Damage Repair Deficiency Across The Cancer Genome Atlas", **Cell Reports** 23(1),239-254. e6

2017 **M. Karimi**, and Y. Shen, "Anticipating Cancer Mutations through Combinatorial Protein Design", **Proceedings of the Eighteenth Yale Workshop on Adaptive and Learning Systems**, Center for Systems Science, Department of Electrical Engineering, Yale University, pp. 19-24, June 2017

2016 M. Azghani, **M. Karimi**, and F. Marvasti, "multi-hypothesis compressed video sensing technique", **IEEE transactions on circuits and systems for video technology(TCSVT)**, vol. 26, no. 4, April 2016

Selected courses

- **Machine learning**: Deep Learning: Theory and application, Machine Learning with Network, Pattern Recognition, Probabilistic Graphical Modeling, Reinforcement learning
- **Optimization**: Linear programming, Integer programming, convex optimization
- **Algorithm**: Analysis of Algorithm, Data Structure, Advanced Programming
- **Math** & **Statistics**: Information theory, Game theory, Statistical Inference, Advanced Bayesian Modeling and Computation, Matrix Computation, Signal processing under uncertainty

Presentations

2020 **M. Karimi***, A. Hassanizadeh*, and Y.Shen, "Network-principled deep generative models for designing drug combinations as graph sets", oral talk at **ECEN Bio-seminar at Texas A&M university**, August 28, 2020, College Station, TX.

2020 **M. Karimi***, A. Hassanizadeh*, and Y.Shen, "Network-principled deep generative models for designing drug combinations as graph sets", oral talk at **ISMB 2020**, July 16, Virtual presentation.

2019 **M. Karimi*** and Y.Shen, "iCFN: an efficient exact algorithm for multistate protein design", poster presented at **CAGI* workshop**, Dec. 6, 2019, San Francisco, CA, USA.

2018 **M. Karimi**, and Y. Shen, "Interconnected Cost Function Networks (iCFN): an exact algorithm for multistate protein design", poster presentation at **Modeling of Protein Interaction (MPI)**, Nov 8, 2018, Lawrence, KS, USA.

2018 **M. Karimi**, and Y. Shen, "Deep affinity: interpretable deep learning of compound-protein affinity through unified recurrent and convolutional neural networks", poster presentation at **Winedale Workshop**, Oct 19, 2018, Winedale, TX, USA.

2018 **M. Karimi**, and Y. Shen, "Deep affinity: interpretable deep learning of compound-protein affinity through unified recurrent and convolutional neural networks", poster presentation at **Bioinformatics and Cancer Symposium**, Sep 21, 2018, College Station, TX, USA.

2018 **M. Karimi**, and Y. Shen, "Unraveling and anticipating cancer missense mutations through computational protein design", poster presentation at **TAMU DNA Day**, April 24, 2018, College Station, TX, USA.

2016 **M. Karimi**, and Y. Shen, "Interconnected Cost Function Networks (iCFN): an exact algorithm for multistate protein design", poster presentation at **ENG-LIFE**, April 14, 2017, College Station, TX, USA.

2016 **M. Karimi**, and Y. Shen, "Multiscale Computational Tools for Antibiotic Resistance Big Data: Patterns, Mechanisms, and Personalized Therapeutics", invited talk at **38th IEEE EMBC** 2016 for **NSF Award** for Young Professionals Contributing to Smart and Connected Health, August 20, 2016, Orlando, FL, USA.

Skills

- Programming Languages: C/C++, Java, R, Bash Scripting, Pyhton, Perl, Matlab
- Deep learning softwares: Tensorflow, Keras, Pytorch
- Other computer skills: AWS, PyMOL, CHARMM, Git, Latex, Microsoft Office

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