

# Mehran Karimzadeh | CV

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Post-doctoral fellow at Vector Institute and affiliated with Peter Munk Cardiac Centre at UHN and UCSF.

## Education

### Academic Qualifications.....

- **UCSF and Vector Institute** **San Francisco, California and Toronto, Ontario**  
*Post-doctoral fellow with Hani Goodarzi and Bo Wang* Since 2020
- **University of Toronto** **Toronto, Ontario**  
*Ph.D. in Medical Biophysics* 2016–2019
- **McGill University** **Montreal, Quebec**  
*M.Sc. in Human Genetics and Bioinformatics* 2013–2015
- **University of Tehran** **Tehran, Iran**  
*B.Sc in Biology,* 2008–2012

### Research Projects.....

- **Post-doc project I:** 'Deconvolving the epigenome by learning from the transcriptome'. Supervisors: Hani Goodarzi and Bo Wang
- **Post-doc project II:** 'Epigenome and transcriptome encyclopedia of the trans-gender breast at the single-cell resolution'. Supervisors: Simon Knott, Hani Goodarzi, and Bo Wang
- **Ph.D. project I:** 'Virtual ChIP-seq: predicting transcription factor binding sites by learning from the transcriptome'. Supervisor: Dr. Michael Hoffman
- **Ph.D. project II:** 'Epigenomics of HPV integration'. Supervisors: Dr. Michael Hoffman, Dr. Scott Bratman, and Dr. Mathieu Lupien  
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- **Ph.D. project III:** 'Methylome mappability'. Supervisors: Dr. Michael Hoffman
- **Master's project:** 'Aberration hub analysis for cancer genomics data'. Supervisor: Dr. Yasser Riazalhosseini
- **Undergraduate research project:** 'Downregulation of Wnt5a suppresses cell invasion in ovarian cancer cell line SkOv3'. Supervisor: Dr. Ghamartaj Hossein

## Publications — Peer reviewed

- Variation in genomic landscape of clear cell renal cell carcinoma across Europe. *Nature Communications*. CAGEKID Consortium (11th author among 59 authors). 2014. Contribution: Pathway analysis, curation, and summarizing data in Figures 2 and 5, Supplementary Figures 5, 6, and 10, and Supplementary Tables.  
\* Cited 121 times.

- Top considerations for creating bioinformatics software documentation. **Mehran Karimzadeh**, Michael M. Hoffman. *Briefings in Bioinformatics*. 2017.
- \* Cited 19 times.
- A general framework for interrogation of mRNA stability programs identifies RNA-binding proteins that govern cancer transcriptomes. Gabrielle Perron, Pouria Jandaghi, Shraddha Solanki, Maryam Safisamghabadi, Cristina Storoz, **Mehran Karimzadeh**, Andreas I. Papadakis, Madeleine Arseneault, Ghislaine Scelo, Rosamonde E. Banks, Jorg Tost, Mark Lathrop, Simon Tanguay, Alvis Brazma, Sidong Huang, Fadi Brimo, Hamed S. Najafabadi, and Yasser Riazalhosseini. *Cell Reports*. 2018. <https://doi.org/10.1016/j.celrep.2018.04.031>. Contribution: Statistical analysis and alternative splicing analysis of MBNL2 knockouts.
- \* Cited 22 times.
- Aberration hubs in protein interaction networks highlight actionable targets in cancer. **Mehran Karimzadeh**, Pouria Jandaghi, Hamed S. Najafabadi, Andreas Papadakis, Sebastian Trainor, Johan Rung, Mar González-Porta, Ghislaine Scelo, Nav Vasudev, Alvis Brazma, Sidong Huang, Rosamonde E. Banks, Mark Lathrop, Yasser Riazalhosseini. 2018. *Oncotarget* <https://doi.org/10.18632/oncotarget.25382>.
- \* Cited 4 times.
- Umap and Bismap: tools for genome and methylome mappability. **Mehran Karimzadeh**, Carl Ernst, Anshul Kundaje and Michael M. Hoffman. *Nucleic Acids Research*. 2018. 10.1093/nar/gky677
- \* Cited 41 times.
- Massively multiplex single-molecule oligonucleosome footprinting. Nour J. Abdulhay, Colin P. McNally, Laura J. Hsieh, Sivakanthan Kasinathan, Aidan Keith, Laurel S. Estes, **Mehran Karimzadeh**, Jason G Underwood, Hani Goodarzi, Geeta J. Narlikar, Vijay Ramani. *eLife in press* 2020.
- Early temporal dynamics of cellular responses to SARS-CoV-2 Arinjay Banerjee, Patrick Budyłowski, Daniel Richard, Hassaan Maan, Jennifer Aguiar, Nader El-Sayes, Michael R. D'Agostino, Benjamin J-M Tremblay, Sam Afkhami, **Mehran Karimzadeh**, Lily Yip, Mario A Ostrowski, Jeremy A Hirota, Robert Kozak, Terence D Capellini, Matthew S Miller, Andrew G McArthur, Bo Wang, Andrew C Doxey, Samira Mubareka, Karen Mossman. Accepted in *iScience* 2021

## Publications — submitted

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- Semi-automated genome annotation using epigenomic data and Segway. Eric G. Roberts, Mickaël Mendez, Coby Viner, **Mehran Karimzadeh**, Rachel Chan, Rachel Ancar, Davide Chicco, Jay R. Hesselberth, Anshul Kundaje, Michael M. Hoffman. *Revision requested from Nature Protocols*. 2016.
- \* Cited once.
- Virtual ChIP-seq: Predicting transcription factor binding by learning from the transcriptome. **Mehran Karimzadeh** and Michael M. Hoffman. 2018. bioRxiv
- \* Cited 14 times.
- Viral integration transforms chromatin to drive oncogenesis. **Mehran Karimzadeh**, Christopher Arlidge, Ariana Rostami, Mathieu Lupien, Scott V. Bratman, and Michael M. Hoffman. *bioRxiv*. 2020
- The molecular dynamics of a sex change at single cell resolution. Rath F\*, **Karimzadeh M.\***, Ing N., Qu Y., Martinez A., Mulligan B., Lee T.Y., Devkota S., Wang B., Goodarzi H., Ray, E.Y., Cui X., Knott S.R.V., *in review* 2021
- Multiscale interactome analysis coupled with off-target drug predictions reveals drug repurposing candidates for human coronavirus disease. Michael Sugiyama, Haotian Cui, S Redka Dar'ya, **Mehran Karimzadeh**, Edurne Rujas, Hasaan Maan, Sikander Hayat, Kyle Cheung, Rahul Misra, Joseph B McPhee, Russell D Viirre, Andrew Haller, Roberto Botelho, Raffi Karshafian, Sarah A Sabatinos, Gregory D Fairn, Seyed Ali Madani Tonekaboni, Andreas Windemuth, Jean-Philippe Julien, Vijay Shahani, Stephen S MacKinnon, Bo Wang, Costin N Antonescu. *bioRxiv* 2021

## Book Chapters

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Artificial intelligence in medicine. Xing et al. 2020. Elsevier. Chapter 7: Analytical methods and tools

for integration of biomedical data in medicine. Lin Zhang, **Mehran Karimzadeh**, Mattea Welch, Chris McIntosh, and Bo Wang. ISBN: 978-0-12-821259-2

## Funded Grants and Proposals

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- MITACS grant for re-purposing combinations of existing drugs as a potential treatment against COVID-19. *Together with Bo Wang and Cyclica Inc.* April 2020

## Honors and Awards

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- Winner of the bronze medal in National Biology Olympiad for high school students, *Tehran, Iran, Young Scholars' Club, Aug 2007*
- University of Tehran representative candidate for participation in the National Biology Olympiad for undergraduate students, *Tehran, Iran, April 2012*
- 3rd Place and Bronze Medal Winner in National Biology Olympiad for undergraduate students, *Tehran, Iran, July 2012*
- Faculty of Medicine entrance award, McGill University, *Montreal, Quebec, January 2013*
- International travel award, Faculty of Medicine, McGill University, *Montreal, Quebec, April 2013*
- CIHR travel award to attend OICR cancer genomics bioinformatics Workshop, *Toronto, Ontario, May 2014*
- MBP excellence award, *Toronto, Ontario, September 2016*
- The Frank Fletcher Memorial Fund, Faculty of Medicine, University of Toronto, 2017-2018 Academic year
- The Ontario Graduate Scholarship, Ontario Ministry of Training, Colleges, and Universities, 2017-2018 Academic year
- MBP excellence award, *Toronto, Ontario, September 2017*
- The Frank Fletcher Memorial Fund, Faculty of Medicine, University of Toronto, 2018-2019 Academic year
- The Ontario Graduate Scholarship, Ontario Ministry of Training, Colleges, and Universities, 2018-2019 Academic year
- Genome Informatics 2018 conference bursary, September 2018, London, UK
- Arshia Tabrizi Memorial Scholarship by Mowfaghian Foundation, Parya Trillium Foundation, September 2018, Toronto, Canada
- Peterborough K.M. Hunter Charitable Foundation Graduate Awards, Faculty of Medicine, University of Toronto, 2018-2019 Academic year
- The Ontario Graduate Scholarship, Ontario Ministry of Training, Colleges, and Universities, 2019-2020 Academic year
- Parya Foundation Scholarship, Parya Trillium Foundation, September 2019, Toronto, Canada
- CIHR Post-doctoral Fellowship, Canadian Institute for Health Research, June 2021, Toronto, Canada

## Technical skills

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- **Scripting Languages:** Proficient in R, Python, PyTorch, Scikit-learn, Keras, PyQT, bash, and cloud computing. Basic skills in  $\LaTeX$  and HTML.
- **Related Software Skills:** Microsoft Office (Advanced), Adobe Illustrator (Intermediate), Cytoscape (Intermediate), and Inkscape (Intermediate), MacOS and Linux network management (Intermediate)
- **Bioinformatics skills:** NGS raw file processing and data analysis (DNA-seq, RNA-seq, Bisulfite-seq, ChIP-seq, DNase-seq, and ATAC-seq, scRNA-seq, and scATAC-seq). Methylation array and cDNA array data analysis. Networks and pathways bioinformatics. Statistical modeling. Machine learning.
- **Laboratory skills:** Animal cell culture, DNA/RNA/Protein extraction and quantification (Blotting), and RNAi.

## Internships and workshops

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- Internship on Cell and Molecular Biology, *July-Sep 2010, Royan institute of biotechnology, Esfahan, Iran*
- Screening binding partners of DCC through SH2 domain in Netrin signaling pathway, *Feb-Apr 2012, McGill University, Prof. Nathalie Lamarche's lab, Montreal, QC*
- 5th Paris workshop on genomic epidemiology, *2-4 May 2013, Paris, France*
- Networks and pathways bioinformatics, *9-12 July 2013, EMBL-EBI, Hinxton, UK*
- Bioinformatics for cancer genomics, *26-30 May 2014, OICR, Toronto, ON*

## Abstracts

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- Wnt5a affects adhesion and migration of human ovarian cancer cell line SKOV-3. Heidarian Y., Hossein G., **Karimzadeh M.**. *5th international conference on Stem Cells and Cancer (ICSCC; 8–10 Nov 2014) New Delhi, India*
- Analysis of clonal evolution in colorectal cancer, Donna M. Graham, Madeleine Arseneault, Mahadeo A. Sukhai, Louis Letourneau, **Mehran Karimzadeh**, Tong Zhang, Mariam Thomas, Michael H. A. Roehrl, Eric Xueyu Chen, Monika K. Krzyzanowska, Malcolm J. Moore, Amanda Giesler, Celeste Yu, Philippe L. Bedard, Suzanne Kamel-Reid, Lillian L. Siu, Yasser Riazalhosseini. *50th Annual meeting of American Society of Clinical Oncology (ASCO 2014) Chicago, US*
- A novel approach for cancer biomarker discovery based on integration of high-throughput genomics data into protein interaction subnetworks. Mehran Karimzadeh, Yasser Riazalhosseini. **Oral and poster presentation.** CHSGM, Victoria, British Columbia, 3–6 May 2014
- A novel approach for cancer biomarker discovery based on integration of high-throughput genomics data into protein interaction subnetworks. Mehran Karimzadeh, Yasser Riazalhosseini. **Oral presentation.** Department of Human Genetics research day (June 2014), McGill University, Montreal, Quebec.
- Transcription factor expression and its effects on binding site occupancy and motif preference, Mehran Karimzadeh, Michael M. Hoffman. Cold Spring Harbor meeting on global regulation of gene expression, 15–19 March 2016
- Transcription factor expression and its effects on binding site occupancy and motif preference, Mehran Karimzadeh, Michael M. Hoffman. GLBIO/CCBC, Toronto, Ontario, Canada, 16–19 May 2016
- Virtual ChIP-seq: Prediction of transcription factor binding by learning from the transcriptome, Mehran Karimzadeh, Michael M. Hoffman. **Oral and poster presentation.** CHSGM, Quebec city, Quebec, Canada, 22–25 April 2017
- Virtual ChIP-seq: Prediction of transcription factor binding by learning from the transcriptome, Mehran Karimzadeh, Michael M. Hoffman. **Oral presentation.** Statistical methods for genetics and genomics, Dalla Lana school of public health, University of Toronto, 29 September 2017
- Virtual ChIP-seq: Prediction of transcription factor binding by learning from the transcriptome, Mehran Karimzadeh, Michael M. Hoffman. **Oral presentation.** Barbados workshop on cancer epigenomics, January 2018
- Virtual ChIP-seq: Prediction of transcription factor binding by learning from the transcriptome, Mehran Karimzadeh, Michael M. Hoffman. **Oral presentation.** Vector Institute, Toronto, Ontario, 11 May 2018
- Virtual ChIP-seq: Prediction of transcription factor binding by learning from the transcriptome, Mehran Karimzadeh, Michael M. Hoffman. **Oral presentation.** Great Lakes Genomics Conference, Toronto, Ontario, 17 May 2018
- Alternatively translated peptides in breast cancer. Yufang Liu, **Mehran Karimzadeh**, Michael Hoffman. *Medical Biophysics summer undergraduate students poster day. August 2018. Toronto, Canada.*
- Virtual ChIP-seq: Prediction of transcription factor binding by learning from the transcriptome, Mehran Karimzadeh, Michael M. Hoffman. **Lightning presentation and poster.** Genome Informatics,

London, UK, Sep 2018

- The ungracious guest; How integration of the human papilloma virus modifies the epigenome and transcriptome to promote tumourigenesis. **Mehran Karimzadeh**, Christopher Aldridge, Ariana Rostami, Scott Bratman, Mathieu Lupien, Michael M. Hoffman, speaker at TranCE Club, Toronto, Ontario, May 2019.
- The ungracious guest; How integration of the human papilloma virus modifies the epigenome and transcriptome to promote tumourigenesis. **Mehran Karimzadeh**, Christopher Aldridge, Ariana Rostami, Scott Bratman, Mathieu Lupien, Michael M. Hoffman, Invited speaker at James Leapock Memorial Symposium, Toronto, Ontario, May 2019.
- The ungracious guest; How integration of the human papilloma virus modifies the epigenome and transcriptome to promote tumourigenesis. **Mehran Karimzadeh**, Christopher Aldridge, Ariana Rostami, Scott Bratman, Mathieu Lupien, Michael M. Hoffman, poster presentation at The Canadian Epigenetics Conference, Banff, Alberta, November 2019.
- The ungracious guest; How integration of the human papilloma virus modifies the epigenome and transcriptome to promote tumourigenesis. **Mehran Karimzadeh**, Christopher Aldridge, Ariana Rostami, Scott Bratman, Mathieu Lupien, Michael M. Hoffman, poster presentation at The TFRI Ontario Node Symposium, Toronto, Ontario, December 2019.

## Volunteer and extra-curricular activities

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- Volunteer editor and writer in monthly journal of school of biology, University of Tehran [2009-2012]
- Volunteer Team guide in 3rd International Olympiad on Astronomy and Astrophysics, Nov 2010, Tehran, Iran
- Let's Talk Science Volunteer for aboriginal students science fair, March 29-30, Wendake, QC
- Journal club organizer, McGill University and Genome Quebec Innovation Centre, September 2013 – May 2014, Montreal, Quebec.
- Environmental Health and Safety committee member and student representative, McGill University and Genome Quebec Innovation Center, January 2013 – December 2014, Montreal, Quebec.
- Organizer of textbook club on machine learning, McGill University and Genome Quebec Innovation Center, January 2013 – December 2014, Montreal, Quebec.
- Teaching Assistant, Bioinformatics for R workshop organized by McGill Systems Biology program. July 2014, Montreal, Quebec.
- Sub-reviewer for ISCB GLBIO/CCBC 2016 conference, IJCAI 2016 conference, and PNAS journal.
- Reviewer for Oncotarget journal.
- Reviewer for CIBB 2018 conference
- Organizer; Department of Medical Biophysics tech talks
- Lecturer at Department of Medical Biophysics March break camp for Grade 11 students, March 2018
- Teaching assistant for the biostatistics course, Department of Medical Biophysics, University of Toronto, Fall 2018
- Teaching assistant for Genomic Methodologies (MMG3003Y) course, Department of Molecular Genetics, University of Toronto, winter and summer 2019
- Lecturer at Department of Medical Biophysics March break camp for Grade 11 students, March 2019
- Vector institute's delegate at Ontario Rising Stars in Cancer Research Program, OICR, since January 2020

## Work experience

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- Part time biology Olympiad teacher for high school students. *Several schools affiliated with NODET (National organization for development of exceptional talents) in Tehran, Karaj, and Arak, Iran.* [2009-2012]
- Research assistant in bioinformatics. *Michael Hoffman lab, Princess Margaret Cancer Centre, Toronto, ON.* [2015 — August 2016]
- Part-time bioinformatics researcher. *Collaboration with Janusz Rak and Yasser Riazalhosseini at the research institute of McGill University health centre.* [July 2015 — November 2015]

## References

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- **Hani Goodarzi** Post-doctoral fellowship supervisor  
Assistant Professor  
Department of Biochemistry & Biophysics  
Department of Urology  
Helen Diller Family Comprehensive Cancer Center  
Institute for Computational Health Sciences  
University of California, San Francisco  
Email: hani.goodarzi@ucsf.edu  
Website: goodarzilab.ucsf.edu
- **Bo Wang** Post-doctoral fellowship co-supervisor  
Assistant Professor  
Department of Medical Biophysics  
Department of Computer Science  
Vector Institute for Artificial Intelligence  
University of Toronto  
Email: bowang@vectorinstitute.ai  
Website: wanglab.ml
- **Michael Hoffman** Ph.D. supervisor  
Assistant Professor  
Department of Medical Biophysics  
Department of Computer Science  
University of Toronto  
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Website: hoffmanlab.org
- **Mathieu Lupien** Ph.D. supervisory committee member  
Associate Professor  
Department of Medical Biophysics  
University of Toronto  
Email: mlupien@uhnresearch.ca  
Website: <https://www.pmgenomics.ca/lupienlab>
- **Yasser Riazalhosseini** Master thesis supervisor  
Assistant Professor  
Department of Human Genetics  
McGill University and Genome Quebec Innovation Centre  
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- **Jacek Majewski** M.Sc. supervisory committee member  
Associate Professor, Dept. Human Genetics  
McGill University  
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Website: <http://www.genomequebec.mcgill.ca/compngen/majewskilab>