

Nariman Farsad

PERSONAL INFORMATION	Department of Computer Science Ryerson University	nfarsad@ryerson.ca http://narimanfarsad.com/
RESEARCH INTERESTS	My current research focuses on fusion of machine learning, signal processing, and information theory over multimodal data for detection, estimation, and prediction tasks. Specially, I focus on designing algorithms that are explainable by combining model-driven and data-driven algorithms. Some of the application domains considered are biomedical sensing, AR/VR, communication networks, and robotics.	
EDUCATION	<i>Stanford University, Stanford, USA</i>	09/2015–11/2018
	Postdoctoral Fellow, working with Andrea Goldsmith	
	<i>York University, Toronto</i>	07/2015
	Ph.D., Department of Electrical Engineering and Computer Science	
EMPLOYMENT	<i>York University, Toronto</i>	06/2010
	M.Sc., Department of Computer Science and Engineering	
	<i>York University, Toronto</i>	06/2007
	B.Sc. with honors, Department of Computer Science and Engineering	
EMPLOYMENT	<i>Ryerson University, Toronto, Canada</i>	07/2020–Present
	Assistant Professor of Computer Science	
	<i>Western University, London, Canada</i>	12/2020–Present
	Adjunct Professor at School of Biomedical Engineering	
	<i>Stanford University, Stanford, USA</i>	11/2018–07/2020
RECOGNITIONS	Visiting Research Scholar (Part-Time)	
	<i>Apple Inc., Cupertino, USA</i>	11/2018–07/2020
	Senior Machine Learning and Algorithms Researcher (Technical Lead)	
	<i>Stanford University, Stanford, USA</i>	09/2015–11/2018
	Postdoctoral Researcher	
RECOGNITIONS	Senior Member of IEEE	2020
	Second Stage in the Bell Labs Prize competition	2018
	NSERC of Canada Postdoctoral Fellowship	2015–2017
	Best Demo Award at IEEE-INFOCOM	2015
	Finalist in the Bell Labs Prize competition	2014
	Second Prize at IEEE ComSoc Student Competition	2014

	Ontario Graduate Scholarship Award	2012–2014
	Queen Elizabeth II Graduate Scholarship Award	2011
RESEARCH FUNDING	PI, NSERC, Discovery Grant	2020–2025
	PI, CFI, John R. Evans Leaders Fund	2020–2025
	PI, NSERC, Launch Supplement	2020–2022
	PI, Ryerson FoS Discovery Accelerator program	2020–2022
	PI, Startup Funds	2020–2026
	Collaborator, Office of the Naval Research (ONR) grant	2018–2021
STUDENTS & POSTDOCS	<i>Salim Rezvani</i>	May 2021–Present
	Ryerson University, Toronto, Canada	
	Postdoctoral Fellow	
	<i>Saeed Akbarzadeh</i>	Starts Sep. 2021
	Ryerson University, Toronto, Canada	
	Postdoctoral Fellow (Joint Supervision with Benny Lo at Imperial College London)	
	<i>Hassan Abbasi</i>	Starts Sep. 2021
	Ryerson University, Toronto, Canada	
	Graduate Student	
	<i>Amr Sharaf</i>	Starts Sep. 2021
	Ryerson University, Toronto, Canada	
	Graduate Student	
	<i>Bahareh Salafian Esfahani</i>	Sep. 2020–Present
	Western University, London, ON, Canada	
	Graduate Student (co-supervised with Prof. Sandrine De Ribaupierre)	
	<i>Mohsin Qureshi</i>	Sep. 2020–Present
	Ryerson University, Toronto, Canada	
	Graduate Student (co-supervised with Prof. Sharareh Taghipour)	
	<i>Rohaana Ahmed</i>	Sep. 2020–Present
	Ryerson University, Toronto, Canada	
	Graduate Student	
	<i>Daniel Platnick</i>	May 2021–Present
	Ryerson University, Toronto, Canada	
	Undergraduate Student	
	<i>Farhad Mirkarimi</i>	Oct. 2020–Present
	Ryerson University, Toronto, Canada	
	Visiting Virtually from Sharif University, Tehran, Iran	
	<i>Zeshan Fayyaz</i>	Sep. 2020–Present
	Ryerson University, Toronto, Canada	
	Undergraduate Student	
	<i>Vahid Jamali</i>	Summer and Fall 2017

Stanford University, Stanford
 Co-supervising a visiting PhD student from University of Erlangen-Nuremberg,
 Germany

Bonhong Koo Summer and Fall 2017
 Stanford University, Stanford
 Co-supervising a visiting PhD student from Yonsei University, South Korea

Jonathan Griffin Spring 2017
 Stanford University, Stanford
 Co-supervised an undergraduate research course project

David Pan Summer 2016
 Stanford University, Stanford
 Co-supervised summer undergrad research project

Liam Hassen Neath Spring 2016
 Stanford University, Stanford
 Co-supervised an undergraduate research course project

EDITORIAL ACTIVITIES	<p><i>Lead Guest Editor</i> 2020–Present Journal Entropy–Initiated a Special Issue on the “Role of Signal processing and Information Theory in Modern Machine Learning”.</p>
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	<p><i>Guest Editor</i> 2020–Present Elsevier Digital Signal Processing – special issue on “Signal Processing Aspects of Molecular Communications”.</p>
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	<p><i>Area Associate Editor</i> 2015 IEEE Journal of Selected Areas of Communication – special issue on “Emerging Technologies in Communications”.</p>
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COMMITTEE MEMBERSHIPS	<p><i>Conference Chair, Data Competition</i> 2021 ACM NANOCOM Conference–Chair for the Machine Learning Data Competition at the conference</p>
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	<p><i>Conference Co-Chair, Data Competition</i> 2020 IEEE Communication Theory Workshop–Co-Chair for the Machine Learning Data Competition at the conference</p>
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	<p><i>Conference Technical Program Committee Member</i> 2015–2021 IEEE Communications Conference</p>
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	<p><i>Conference Technical Program Committee Member</i> 2015–2021 IEEE Global Communications Conference</p>
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	<p><i>Conference Technical Program Committee Member</i> 2019, 2021 IEEE Wireless Communications and Networking Conference</p>
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- BOOK CHAPTERS [B2] N. Shlezinger, **N. Farsad**, Y. Eldar, and A. Goldsmith, “Model-Based Machine Learning for Communications,” *Machine Learning in Communications*, Cambridge, in press, 2021.
- [B1] D. Burth Kurka, M. Rao, **N. Farsad**, D. Gündüz, and A. Goldsmith, “Deep Neural Networks for Joint Source-Channel Coding,” *Machine Learning in Communications*, Cambridge, in press, 2021.
- REFEREED JOURNAL [J30] S. Rezvani, A. Miri, and **N. Farsad**, “Intuitionistic Fuzzy Twin Support Vector Machines Based on Relative Density Information for Multi-Class Learning,” *IEEE Transactions on Fuzzy Systems*, Under Review, 2021.
- [J29] N. Shlezinger, **N. Farsad**, Y. Eldar, and A. Goldsmith, “Learned Factor Graphs for Inference from Stationary Time Sequences,” *IEEE Transactions on Signal Processing*, Under Review, 2021.
- [J28] M. Ş. Kuran, H. B. Yilmaz, I. Demirkol, N. Farsad and A. Goldsmith, “A Survey on Modulation Techniques in Molecular Communication via Diffusion,” *IEEE Communications Surveys & Tutorials*, vol. 23, no. 1, pp. 7-28, 2021.
- [J27] **N. Farsad**, W. Chuang, A. Goldsmith, C. Komninakis, M. Médard, C. Rose, L. Vandenberghe, E. Wesel, and R. Wesel, “Capacities and Optimal Input Distributions for Particle-Intensity Channels,” *IEEE Transactions on Molecular, Biological and Multi-Scale Communications*, vol. 6, no. 3, pp. 220-232, 2020.
- [J26] **N. Farsad**, N. Shlezinger, A. Goldsmith, and Y. Eldar, “Data-Driven Symbol Detection via Model-Based Machine Learning,” *Communications in Information and Systems*, vol. 20, no. 3, pp. 283-317, 2020.
- [J25] N. Shlezinger, **N. Farsad**, Y. Eldar, and A. Goldsmith, “ViterbiNet: A Deep Learning Based Viterbi Algorithm for Symbol Detection,” *IEEE Transactions on Wireless Communications*, 2019.
- [J24] V. Jamali, **N. Farsad**, R. Schober, and A. Goldsmith, “Diffusive Molecular Communications with Reactive Molecules: Channel Modeling and Signal Design,” *IEEE Transactions on Molecular, Biological and Multi-Scale Communications*, 2018.
- [J23] **N. Farsad**, Y. Murin, A. W. Eckford, and A. Goldsmith, “Capacity Limits of Diffusion-Based Molecular Timing Channels,” *IEEE Transactions on Molecular, Biological and Multi-Scale Communications*, 2018.
- [J22] Y. Murin, **N. Farsad**, M. Chowdhury, and A. Goldsmith, “Optimal Detection for One-Shot Transmission over Diffusion-Based Molecular Timing Channels,” *IEEE Transactions on Molecular, Biological and Multi-Scale Communications*, 2018.
- [J21] **N. Farsad**, and A. Goldsmith, “Neural Network Detection of Data Sequences in Communication Systems,” *IEEE Transactions on Signal Processing*, vol. 66, no. 21, pp. 5663–5678, 2018.

- [J20] **N. Farsad**, Y. Murin, W. Guo, C.-B. Chae, A. Eckford and A. Goldsmith, “Communication System Design and Analysis for Asynchronous Molecular Timing Channels,” *IEEE Transactions on Molecular, Biological and Multi-Scale Communications*, accepted, 2018.
- [J19] N.-R. Kim, **N. Farsad**, A. Eckford, C.-B. Chae, “An Experimentally Validated Channel Model for Molecular Communication Systems”, *IEEE Access*, accepted, 2018.
- [J18] Y. Murin, **N. Farsad**, M. Chowdhury, and A. Goldsmith, “Exploiting Diversity in Molecular Timing Channels via Order Statistics,” *IEEE Transactions on Molecular, Biological and Multi-Scale Communications*, accepted, 2018.
- [J17] **N. Farsad**, “Molecular Communication: Interconnecting Tiny NanoBio Devices,” *GetMobile: Mobile Comp. and Comm.*, vol. 22, no. 2, pp. 5–10, 2018.
- [J16] V. Jamali, A. Ahmadzadeh, **N. Farsad**, and R. Schober, “Constant-Composition Codes for Maximum Likelihood Detection without CSI in Diffusive Molecular Communications,” *IEEE Transactions on Communications*, vol. 66, no. 5, pp. 1981–1995 2018.
- [J15] V. Jamali, **N. Farsad**, R. Schober, and A. Goldsmith, “Non-Coherent Detection for Diffusive Molecular Communications,” *IEEE Transactions on Communications*, vol. 66, no. 6, pp. 2515–2531, 2018.
- [J14] W. Guo, Y. Deng, B. H. Yilmaz, **N. Farsad**, M. El Kashlan, C.-B. Chae, A. Eckford, and A. Nallanathan, “SMIET: Simultaneous Molecular Information and Energy Transfer,” *IEEE Wireless Communications*, vol. 25, no. 1, pp. 106–113, 2018.
- [J13] Y. Murin, **N. Farsad**, M. Chowdhury, and A. Goldsmith, “Time-Slotted Transmission over Molecular Timing Channels,” *Elsevier Nano Communication Networks*, vol. 12, pp. 12–24, 2017.
- [J12] **N. Farsad**, B. H. Yilmaz, A. W. Eckford, C.-B. Chae, and W. Guo, “A Comprehensive Survey of Recent Advancements in Molecular Communication,” *IEEE Communications Surveys & Tutorials*, vol. 18, no. 3, pp. 1887–1919, 2016.
- [J11] B. Koo, C. Lee, H. B. Yilmaz, **N. Farsad**, A. W. Eckford, and C.-B. Chae “Molecular MIMO: From Theory to Prototype,” *IEEE Journal on Selected Areas in Communications*, vol. 34, no. 3, pp. 600–614, 2016.
- [J10] W. Guo, T. Asyhari, **N. Farsad**, B. H. Yilmaz, A. W. Eckford, and C.-B. Chae, “Molecular Communications: Channel Model and Physical Layer Techniques,” *IEEE Wireless Communications*, vol. 23, no. 4, pp. 120–127, 2016.
- [J9] W. Guo, C. Mias, **N. Farsad**, and J.-L. Wu, “Molecular Versus Electromagnetic Wave Propagation Loss in Macro-Scale Environments,” *IEEE Transactions on Molecular, Biological, and Multi-Scale Communications*, vol. 1, no. 1, pp. 18–25, 2015.

- [J8] **N. Farsad**, A. W. Eckford, and S. Hiyama, "Design and Optimizing of On-Chip Kinesin Substrates for Molecular Communication," *IEEE Transactions on Nanotechnology*, vol. 14, no. 4, pp. 699–708, 2015.
- [J7] **N. Farsad**, N.-R. Kim, A. W. Eckford, and C.-B. Chae, "Channel and Noise Models for Nonlinear Molecular Communication Systems," *IEEE Journal on Selected Areas in Communications*, vol. 32, no. 12, pp. 2392–2401, 2014.
- [J6] **N. Farsad**, A. W. Eckford, and S. Hiyama, "A Markov Chain Channel Model for Active Transport Molecular Communication," *IEEE Transactions on Signal Processing*, vol. 62, no. 9, pp. 2424–2436, 2014.
- [J5] S. Qiu, W. Guo, M. Leeson, S. Wang, **N. Farsad**, and A. W. Eckford, "Nanoparticle Communications: from Chemical Signals in Nature to Wireless Sensor Networks," *Nanotechnology Perceptions*, vol. 10, no. 1, pp. 1–13, 2014.
- [J4] **N. Farsad**, W. Guo, and A. W. Eckford, "Tabletop Molecular Communication: Text Messages Through Chemical Signals," *PLOS ONE*, vol. 8, no. 12, 2013.
- [J3] **N. Farsad**, A. W. Eckford, S. Hiyama, and Y. Moritani, "On-Chip Molecular Communication: Analysis and Design," *IEEE Transactions on NanoBioscience*, vol. 11, no. 3, pp. 304–314, 2012.
- [J2] **N. Farsad**, and A. W. Eckford, "Resource Allocation via Linear Programming for Fractional Cooperation," *IEEE Transactions on Wireless Communications*, vol. 11, no. 5, pp. 1633–1637, 2012.
- [J1] **N. Farsad**, A. W. Eckford, S. Hiyama, and Y. Moritani, "Quick System Design of Vesicle-Based Active Transport Molecular Communication by Using a Simple Transport Model," *Nano Communication Networks*, vol. 2, no. 4, pp. 175–188, 2011.

REFEREED
CONFERENCE

- [C48] F. Mirkarimi, S. Rini and **N. Farsad**, "Neural Capacity and Optimal Input Estimation for Memoryless Channels with Continuous Alphabets," *IEEE Information Theory Workshop (ITW)*, under review, 2021.
- [C47] B. Salafian, E. Fishel, N. Shlezinger, S. de Ribaupierre, and **N. Farsad**, "Efficient Epileptic Seizure Detection Using CNN-Aided Factor Graphs," *International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, under review, 2021.
- [C46] R. Ahmed, and **N. Farsad**, "Applications for Artificial Intelligence in Next Generation Deep Space Exploration Robotics," *International Astronautical Congress*, accepted, 2021.
- [C45] R. Ahmed, and **N. Farsad**, "Multi-Rover Guidance and Navigation for Lunar and Planetary Exploration Using Reinforcement Learning," *Canadian Lunar Workshop*, accepted, 2021.
- [C44] **N. Farsad**, N. Shlezinger, A. Goldsmith, and Y. C. Eldar, "Data-Driven Symbol Detection via Model-Based Machine Learning," *IEEE Statistical Signal Processing Workshop (SSP)*, accepted, 2021.

- [C43] F. Mirkarimi, and **N. Farsad**, “Neural Computation of Capacity Region of Memoryless Multiple Access Channels,” *IEEE International Symposium on Information Theory (ISIT)*, accepted, 2021.
- [C42] D. Fathollahi, **N. Farsad**, S. A. Hashemi, and M. Mondelli, “Sparse Multi-Decoder Recursive Projection Aggregation for Reed-Muller Codes,” *IEEE International Symposium on Information Theory (ISIT)*, accepted, 2021.
- [C41] N. Shlezinger, **N. Farsad**, Y. C. Eldar, and A. Goldsmith, “Data-Driven Factor Graphs for Deep Symbol Detection,” *IEEE International Symposium on Information Theory (ISIT)*, 2020.
- [C40] Y. Liao, **N. Farsad**, N. Shlezinger, Y. C. Eldar, and A. Goldsmith, “Deep Neural Network Symbol Detection for Millimeter Wave Communications,” *IEEE Global Communications Conference (GLOBECOM)*, 2019.
- [C39] N. Shlezinger, **N. Farsad**, Y. C. Eldar, and A. Goldsmith, “ViterbiNet: Symbol Detection Using a Deep Learning Based Viterbi Algorithm,” *IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, 2019.
- [C38] **N. Farsad**, and A. Goldsmith, “Detection Over Rapidly Changing Communication Channels Using Deep Learning,” *Asilomar Conference on Signals, Systems, and Computers*, 2018.
- [C37] **N. Farsad**, and A. Goldsmith, “Neural Network Detectors for Molecular Communication Systems,” *IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, 2018.
- [C36] M. Rao, **N. Farsad**, and A. Goldsmith, “Variable Length Joint Source-Channel Coding of Text Using Deep Neural Networks,” *IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, 2018.
- [C35] **N. Farsad**, and A. Goldsmith, “Sliding Bidirectional Recurrent Neural Networks for Sequence Detection in Communication Systems,” *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2018.
- [C34] **N. Farsad**, M. Rao, and A. Goldsmith, “Deep Learning for Joint Source-Channel Coding of Text,” *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2018.
- [C33] J. W. Kwack, H. B. Yilmaz, **N. Farsad**, C.-B. Chae, and A. Goldsmith, “Two Way Molecular Communications”, *ACM International Conference on Nanoscale Computing and Communication (NANOCOM)*, 2018.
- [C32] V. Jamali, **N. Farsad**, R. Schober, and A. Goldsmith, “Diffusive Molecular Communications with Reactive Signaling,” *IEEE International Conference on Communications (ICC)*, 2018.
- [C31] **N. Farsad**, D. Pan, and A. Goldsmith, “A Novel Experimental Platform for In-Vessel Multi-Chemical Molecular Communications,” *IEEE Global Communications Conference (GLOBECOM)*, 2017.

- [C30] Y. Murin, M. Chowdhury, **N. Farsad**, and A. Goldsmith, "Diversity Gain of One-shot Communication over Molecular Timing Channels," *IEEE Global Communications Conference (GLOBECOM)*, 2017.
- [C29] C. Lee, H. B. Yilmaz, C.-B. Chae, **N. Farsad**, and A. Goldsmith, "Machine Learning based Channel Modeling for Molecular MIMO Communications," *IEEE International workshop on Signal Processing advances in Wireless Communications (SPAWC)*, 2017.
- [C28] **N. Farsad**, C. Rose, M. Medard, and A. Goldsmith, "Capacity of Molecular Channels with Imperfect Particle-Intensity Modulation and Detection," *IEEE International Symposium on Information Theory (ISIT)*, 2017.
- [C27] V. Jamali, A. Ahmadzadeh, **N. Farsad**, and R. Schober, "SCW Codes for Optimal CSI-Free Detection in Diffusive Molecular Communications," *IEEE International Symposium on Information Theory (ISIT)*, 2017.
- [C26] **N. Farsad**, Y. Murin, M. Rao, and A. Goldsmith, "On the Capacity of Diffusion-Based Molecular Timing Channels with Diversity," *Asilomar Conference on Signals, Systems, and Computers*, 2016.
- [C25] **N. Farsad**, Y. Murin, W. Guo, C.-B. Chae, A. Eckford and A. Goldsmith, "On the Impact of Time-Synchronization in Molecular Timing Channels," *IEEE Global Communications Conference (GLOBECOM)*, 2016.
- [C24] Y. Murin, **N. Farsad**, M. Chowdhury, and A. Goldsmith, "Communication over Diffusion-Based Molecular Timing Channels," *IEEE Global Communications Conference (GLOBECOM)*, 2016.
- [C23] V. Jamali, **N. Farsad**, R. Schober, and A. Goldsmith, "Non-Coherent Multiple-Symbol Detection for Diffusive Molecular Communications," *ACM International Conference on Nanoscale Computing and Communication (NanoCom)*, 2016.
- [C22] Y. Murin, **N. Farsad**, M. Chowdhury, and A. Goldsmith, "On Time-Slotted Communication over Molecular Timing Channels," *ACM International Conference on Nanoscale Computing and Communication (NanoCom)*, 2016.
- [C21] **N. Farsad**, Y. Murin, A. W. Eckford, and A. Goldsmith, "On the Capacity of Diffusion-Based Molecular Timing Channels," *IEEE International Symposium on Information Theory (ISIT)*, 2016.
- [C20] **N. Farsad**, and Andrea Goldsmith, "A Molecular Communication System Using Acids, Bases and Hydrogen Ions," *IEEE International workshop on Signal Processing advances in Wireless Communications (SPAWC)*, 2016.
- [C19] **N. Farsad**, H. B. Yilmaz, C.-B. Chae, and Andrea Goldsmith, "Energy Model for Vesicle-Based Active Transport Molecular Communication," *IEEE International Conference on Communications (ICC)*, 2016.
- [C18] **N. Farsad**, W. Guo, C.-B. Chae, and A. W. Eckford, "Stable Distributions as Noise Models for Molecular Communication," *IEEE Global Communication Conference (GLOBECOM)*, 2015.

- [C17] C. Lee, B. Koo, N.-R. Kim, H. B. Yilmaz, **N. Farsad**, A. W. Eckford, and C.-B. Chae, “Molecular MIMO with Drift,” *International Conference on Mobile Computing and Networking (MobiCom)*, 2015.
- [C16] S. Qiu, **N. Farsad**, Y. Dong, A. W. Eckford, and W. Guo, “Under-Water Molecular Signalling: a Hidden Transmitter and Absent Receivers Problem,” *IEEE International Conference on Communications (ICC)*, 2015.
- [C15] N.-R. Kim, **N. Farsad**, C.-B. Chae, and A. W. Eckford, “A Universal Channel Model for Molecular Communication Systems with Metal-Oxide Detectors,” *IEEE International Conference on Communications (ICC)*, 2015.
- [C14] L. Wang, **N. Farsad**, W. Guo, S. Magierowski, and A. W. Eckford, “Molecular Barcodes: Information Transmission via Persistent Chemical Tags,” *IEEE International Conference on Communications (ICC)*, 2015.
- [C13] C. Lee, B. Koo, N.-R. Kim, H. B. Yilmaz, **N. Farsad**, A. W. Eckford, and C.-B. Chae, “Molecular MIMO Communication Link,” *IEEE International Conference on Computer Communications (INFOCOM)*, 2015.
- [C12] N.-R. Kim, **N. Farsad**, C.-B. Chae, and A. W. Eckford, “A Realistic Channel Model for Molecular Communication with Imperfect Receivers,” *IEEE International Conference on Communications (ICC)*, 2014.
- [C11] S. Qiu, W. Guo, S. Wang, **N. Farsad**, and A. W. Eckford, “A Molecular Communication Link for Monitoring in Confined Environments,” *IEEE International Conference on Communications (ICC) Workshops*, 2014.
- [C10] **N. Farsad**, W. Guo, and A. W. Eckford, “Molecular Communication Link,” *IEEE International Conference on Computer Communications (INFOCOM)*, 2014.
- [C9] **N. Farsad**, A. W. Eckford, and S. Hiyama, “Modelling and Design of Polygon-Shaped Kinesin Substrates for Molecular Communication,” *IEEE International Conference on Nanotechnology*, 2012.
- [C8] **N. Farsad**, A. W. Eckford, and S. Hiyama, “A Mathematical Channel Optimization Formula for Active Transport Molecular Communication,” *IEEE International Conference on Communications (ICC) Workshops*, 2012.
- [C7] **N. Farsad**, A. Eckford, and S. Hiyama, “Channel design and optimization of active transport molecular communication,” *Bio-Inspired Models of Networks, Information, and Computing Systems (BIONETICS)*, 2011.
- [C6] A. Calce, **N. Farsad**, and A. W. Eckford, “An Experimental Study of Fractional Cooperation in Wireless Mesh Networks,” *IEEE Symposium on Personal Indoor Mobile Radio Communications (PIMRC)*, 2011.
- [C5] **N. Farsad**, A. Eckford, S. Hiyama, and Y. Moritani, “Information rates of active propagation in microchannel molecular communication,” in *Bio-Inspired Models of Networks, Information, and Computing Systems (BIONETICS)*, 2010.
- [C4] **N. Farsad**, A. W. Eckford, S. Hiyama, and Y. Moritani, “A Simple Mathematical Model for Information Rate of Active Transport Molecular Com-

munication,” *IEEE International Conference on Computer Communications (INFOCOM) Workshops*, 2011.

- [C3] A. W. Eckford, **N. Farsad**, S. Hiyama, and Y. Moritani, “Microchannel Molecular Communication with Nanoscale Carriers: Brownian Motion versus Active Transport,” *IEEE International Conference on Nanotechnology*, 2010.
- [C2] **N. Farsad**, and A. W. Eckford, “Resource allocation via linear programming for multi-source, multi-relay wireless networks,” *IEEE International Conference on Communications (ICC)*, 2010.
- [C1] **N. Farsad**, and A. W. Eckford, “Low-complexity cooperation with correlated sources: diversity order analysis,” *Annual Conference on Information Sciences and Systems (CISS)*, 2009.

INTELLECTUAL
PROPERTY

- [P1] **N. Farsad**, and Andrea Goldsmith, “Systems and Methods for Transmitting and Receiving Data Using Machine Learning Classification,” US Patent App. 15/896,982, 2018.

INVITED
PRESENTATIONS

- [19] **N. Farsad**, “Data-Driven Factor Graphs: Deep Learning on Small Data Sets,” Information Theory and Applications (ITA) Workshop, San Diego, CA, USA. (February 2020)
- [18] **N. Farsad** “Detection Over Rapidly Changing Communication Channels Using Deep Learning,” Asilomar Conference on Signals, Systems and Computers, (October 2018).
- [17] **N. Farsad**, “What role can machine learning play in communication system design?,” Invited by the Montreal Chapter of the IEEE Signal Processing Society, Montreal, Canada. (May 2018)
- [16] **N. Farsad**, “What role can machine learning play in communication system design?,” Information Theory and Applications (ITA) Workshop, San Diego, CA, USA. (February 2018)
- [15] **N. Farsad**, “Detection Over Unknown Channels via Machine Learning,” International Zurich Seminar on Information and Communication, Zurich, Switzerland. (February 2018)
- [14] **N. Farsad**, “Information Theoretic Limits of Molecular Communication and System Design Using Machine Learning,” IEEE Information Theory Society’s Santa Clara Valley Chapter, Stanford University. (October 2017)
- [13] **N. Farsad**, and C. Rose, “Molecular Communication: System Models, Fundamental Limits, and Experimental Implementations,” *IEEE Wireless Communications and Networking Conference*, a conference tutorial, San Francisco, CA, USA. (March 2017)
- [12] **N. Farsad**, “Molecular Communication: Theoretical Limits and Experimental Implementations”, Department of Electrical and Computer Engineering, University of British Columbia, Vancouver, British Columbia. (June 2016)

- [11] **N. Farsad**, “Capacity Limits of Diffusion-Based Molecular Timing Channels”, Canadian Biennial Symposium on Communications (BSC), Kelowna, British Columbia. (June 2016)
- [10] **N. Farsad**, “Molecular Communication: Theoretical Limits and Experimental Implementations”, School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, Georgia. (May 2016)
- [9] **N. Farsad**, “Molecular Communication: Theoretical Limits and Experimental Implementations”, Department of Electrical and Computer Engineering, Carnegie Mellon University, Pittsburgh, Pennsylvania. (May 2016)
- [8] **N. Farsad**, “Molecular Communication: Theoretical Limits and Experimental Implementations”, Department of Electrical and Computer Engineering, Boston University, Cambridge, Massachusetts. (May 2016)
- [7] **N. Farsad**, “Molecular Communication: Theoretical Limits and Experimental Implementations”, Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology, Cambridge, Massachusetts. (May 2016)
- [6] **N. Farsad**, “Molecular Communication: Theoretical Limits and Experimental Implementations”, IEEE Toronto Section and University of Toronto, Toronto, Ontario. (April 2016)
- [5] **N. Farsad**, “Molecular Communication: Theoretical Limits and Experimental Implementations”, Department of Electrical Engineering, Princeton University, Princeton, New Jersey. (April 2016)
- [4] **N. Farsad**, “Capacity Limits of Molecular Timing Channels”, Information Theory and Applications (ITA) Workshop, San Diego, California. (Feb 2016)
- [3] **N. Farsad**, “Molecular Communication using Acids and Bases”, Communications, Inference, And Computing In Molecular And Biological Systems Workshop, University of Southern California, USA. (December 2015)
- [2] **N. Farsad**, “Tabletop Molecular Communication: Theory and Practice”, School of Engineering, University of Warwick, United Kingdom. (September 2014)
- [1] **N. Farsad**, “Molecular Communication”, School of Integrated Technology, Yonsei University, South Korea. (November 2013)

INTERVIEW & MEDIA

- | | |
|---------------------------|---------------------|
| • The Economist | • Discovery Channel |
| • Forbes | • PHYS.ORG |
| • Stanford News | • Engadget |
| • Chemistry World | • Globe and Mail |
| • IEEE Spectrum | • National Post |
| • The Wall Street Journal | • Wired |
| • CTV News | • Science & Vie |
| • Gizmodo | |

CITATIONS	The following are the citations taken from Google Scholar on June 7, 2021:	
	<i>Total Citations:</i>	2,750
	<i>h-index:</i>	24
	<i>i10-index:</i>	51

TEACHING	Current Teaching,	
EXPERIENCE	<i>Ryerson University, Toronto, Canada</i>	
	Machine Learning (graduate level/senior-level undergrad course)	Fall 2021
	Artificial Intelligence (senior-level undergrad course)	Fall 2021
	Reinforcement Learning (graduate level)	Winter 2022
	Prior Teaching,	
	<i>Ryerson University, Toronto, Canada</i>	
	Machine Learning (graduate level/senior-level undergrad course)	Fall 2020
	Reinforcement Learning (graduate level/senior-level undergrad course)	Winter 2021
	<i>University of Ontario Institute of Technology, Greater Toronto Area</i>	
	Advanced Communication Networks (graduate level/senior-level undergrad course)	Winter 2015
	Signals and Random Processes (junior-level undergrad course)	Fall 2012
	Signals and Random Processes (junior-level undergrad course)	Fall 2011