

Navid Naderi

HRL Laboratories • Malibu, CA • nn245@cornell.edu
<http://navid-naderi.com>

EDUCATION	Doctor of Philosophy (Ph.D.) , Electrical Engineering University of Southern California Advisor: Prof. Salman Avestimehr	December 2016 Los Angeles, CA
	Master of Science (M.Sc.) , Electrical and Computer Engineering Cornell University Advisor: Prof. Salman Avestimehr	January 2014 Ithaca, NY
	Bachelor of Science (B.Sc.) , Electrical Engineering Sharif University of Technology Thesis Advisor: Prof. Jamal Golestani	July 2011 Tehran, Iran

RESEARCH INTERESTS

- Multi-agent reinforcement learning with centralized training and distributed execution
- Self-supervised representation learning with limited labeled data
- Wireless resource allocation via information-theoretic and learning-based methods

PROFESSIONAL EXPERIENCE

- **Research Scientist** February 2020 - present
HRL Laboratories Malibu, CA
 - Investigated learning with limited labels using self-supervised learning, and novel decentralized multi-agent deep reinforcement learning algorithms.
- **Research Scientist** January 2017 - February 2020
Intel Labs Santa Clara, CA
 - Devised resource allocation algorithms for 5G+ wireless communication systems using multi-agent deep reinforcement learning and network information theory.
- **Graduate Research Assistant** January 2014 - December 2016
University of Southern California Los Angeles, CA
 - Studied the fundamental limits of interference management in cache-aided wireless networks, and developed a new algorithm, called ITLinQ, for spectrum sharing in wireless device-to-device (D2D) systems.
- **Wireless Networks Research Intern** June 2015 - August 2015
Bell Labs, Alcatel-Lucent Holmdel, NJ
 - Designed an algorithm for interference management in wireless networks using caches at both transmitter and receiver sides, and studied the impact of multicast groups on the per-user rates of single-server caching networks.
- **Graduate Research Assistant** January 2012 - December 2013
Cornell University Ithaca, NY
 - Formulated a novel condition for the optimality of treating interference as noise in interference channels, and identified the theoretical impact of topology on interference management in wireless networks.

COMPUTER SKILLS

- *Programming Languages*: Python (Libraries: PyTorch, TensorFlow, scikit-learn, NumPy, matplotlib, etc.), R, C++.
- *Applications*: Tableau, MATLAB, Simulink, Vensim, PSpice.

PUBLICATIONS Journal Papers and Preprints:

1. N. Naderializadeh, J. Sydir, M. Simsek, and H. Nikopour, “Resource management in wireless networks via multi-agent deep reinforcement learning,” submitted to *IEEE Transactions on Wireless Communications*, Jan. 2020.
2. P. Dong, H. Zhang, G. Y. Li, I. S. Gaspar, and N. Naderializadeh, “Deep CNN based channel estimation for mmWave massive MIMO systems,” *IEEE Journal of Selected Topics in Signal Processing*, vol. 65, no. 5, pp. 989–1000, Sep. 2019.
3. N. Naderializadeh, M. A. Maddah-Ali, and A. S. Avestimehr, “Cache-aided interference management in wireless cellular networks,” *IEEE Transactions on Communications*, vol. 67, no. 5, pp. 3376–3387, May 2019.
4. H. Yang, N. Naderializadeh, A. S. Avestimehr, and J. Lee, “Topological interference management with reconfigurable antennas,” *IEEE Transactions on Communications*, vol. 65, no. 11, pp. 4926–4939, Nov. 2017.
5. N. Naderializadeh, A. El Gamal, and A. S. Avestimehr, “Fundamental limits of non-coherent interference alignment via matroid theory,” *IEEE Transactions on Information Theory*, vol. 63, no. 10, pp. 6573–6586, Oct. 2017.
6. N. Naderializadeh, M. A. Maddah-Ali, and A. S. Avestimehr, “Fundamental limits of cache-aided interference management,” *IEEE Transactions on Information Theory*, vol. 63, no. 5, pp. 3092–3107, May 2017.
7. C. Geng, N. Naderializadeh, A. S. Avestimehr, and S. Jafar, “On the optimality of treating interference as noise,” *IEEE Transactions on Information Theory*, vol. 61, no. 4, pp. 1753–1767, April 2015.
8. N. Naderializadeh and A. S. Avestimehr, “Interference networks with no CSIT: Impact of topology,” *IEEE Transactions on Information Theory*, vol. 61, no. 2, pp. 917–938, February 2015.
9. N. Naderializadeh and A. S. Avestimehr, “ITLinQ: A new approach for spectrum sharing in device-to-device communication systems,” *IEEE Journal on Selected Areas in Communications*, vol. 32, no. 6, pp. 1139–1151, June 2014.

Conference Papers:

1. N. Naderializadeh, M. Eisen, and A. Ribeiro, “Wireless power control via counterfactual optimization of graph neural networks,” in *Proceedings of IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, May 2020 (*invited paper*).
2. N. Naderializadeh, J. Sydir, M. Simsek, and H. Nikopour, “Resource management in wireless networks via multi-agent deep reinforcement learning,” in *Proceedings of IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, May 2020.
3. N. Naderializadeh and S. M. Asghari, “Learning to code: Coded caching via deep reinforcement learning,” in *Proceedings of Asilomar Conference on Signals, Systems, and Computers*, Nov. 2019.
4. N. Naderializadeh and M. Hashemi, “Energy-aware multi-server mobile edge computing: A deep reinforcement learning approach,” in *Proceedings of Asilomar Conference on Signals, Systems, and Computers*, Nov. 2019.
5. V. Narasimha Swamy, N. Naderializadeh, V. Nallampatti Ekambaram, S. Talwar, and A. Sahai, “Monitoring under-modeled rare events for URLLC,” in *Proceedings of IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, July 2019 (*invited paper*).
6. P. Dong, H. Zhang, G. Y. Li, N. Naderializadeh, and I. S. Gaspar, “Deep CNN for wideband mmWave massive MIMO channel estimation using frequency correlation,”

in *Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, May 2019.

7. O. Orhan, H. Nikopour, J. Nam, N. Naderializadeh, and S. Talwar, “A power efficient fully digital beamforming architecture for mmWave communications,” in *Proceedings of IEEE 89th Vehicular Technology Conference (VTC)*, Apr. 2019.
8. N. Naderializadeh, H. Nikopour, O. Orhan, and S. Talwar, “Feedback-based interference management in ultra-dense networks via parallel dynamic cell selection and link scheduling,” in *Proceedings of IEEE International Conference on Communications (ICC)*, May 2018.
9. N. Naderializadeh, O. Orhan, H. Nikopour, and S. Talwar, “Ultra-dense networks in 5G: Interference management via non-orthogonal multiple access and treating interference as noise,” in *Proceedings of IEEE 86th Vehicular Technology Conference (VTC)*, Sep. 2017.
10. N. Naderializadeh, M. A. Maddah-Ali, and A. S. Avestimehr, “On the optimality of separation between caching and delivery in general cache networks,” in *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, June 2017.
11. N. Naderializadeh, M. A. Maddah-Ali, and A. S. Avestimehr, “Cache-aided interference management in wireless cellular networks,” in *Proceedings of IEEE International Conference on Communications (ICC)*, May 2017.
12. N. Naderializadeh, M. A. Maddah-Ali, and A. S. Avestimehr, “Fundamental limits of cache-aided interference management,” in *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, July 2016.
13. H. Yang, N. Naderializadeh, A. S. Avestimehr, and J. Lee, “Topological interference management with reconfigurable antennas,” in *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, July 2016.
14. A. El Gamal, N. Naderializadeh, and A. S. Avestimehr, “When does an ensemble of matrices with randomly scaled rows lose rank?,” in *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, June 2015.
15. N. Naderializadeh, A. El Gamal, and A. S. Avestimehr, “Topological interference management with just retransmission: What are the “best” topologies?,” in *Proceedings of IEEE International Conference on Communications (ICC)*, June 2015.
16. N. Naderializadeh, D. T.H. Kao, and A. S. Avestimehr, “How to utilize caching to improve spectral efficiency in device-to-device wireless networks,” in *Proceedings of 52nd Annual Allerton Conference on Communication, Control, and Computing*, October 2014 (*invited paper*).
17. N. Naderializadeh and A. S. Avestimehr, “ITLinQ: A new approach for spectrum sharing in device-to-device communication systems,” in *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, July 2014.
18. N. Naderializadeh and A. S. Avestimehr, “ITLinQ: A new approach for spectrum sharing,” in *Proceedings of IEEE International Symposium on Dynamic Spectrum Access Networks (DySPAN)*, April 2014.
19. C. Geng, N. Naderializadeh, A. S. Avestimehr, and S. Jafar, “On the optimality of treating interference as noise,” in *Proceedings of 51st Annual Allerton Conference on Communication, Control, and Computing*, October 2013.
20. N. Naderializadeh and A. S. Avestimehr, “Impact of topology on interference networks with no CSIT,” in *Proceedings of IEEE International Symposium on Information Theory (ISIT)*, July 2013.
21. O. Javidbakht, N. Naderializadeh, and S. M. Razavizadeh, “Dynamic relay selection and resource allocation in cooperative networks based on OFDM,” in *Proceedings of 11th Sustainable Wireless Technologies (European Wireless) Conference*, April 2011.

SELECTED HONORS AND AWARDS

- *Bronze Prize*, 23rd Samsung Electronics HumanTech Paper Contest, January 2017.
- *Shannon Centennial Student Competition Finalist*, Nokia Bell Labs, April 2016.
- *Ming Hsieh Institute PhD Scholar*, University of Southern California, 2015 – 2016.
- *Jacobs Scholarship*, Cornell University, August 2011.
- *Dean's Honorary Award*, Sharif University of Technology, May 2008.
- *1st rank* among more than 270,000 participants in the *nationwide entrance examination of Iranian universities*, July 2007.

PROFESSIONAL SERVICE

- **Conference Session Chair**
 - Special session on “Interplay between machine learning and resource management in wireless networks,” *21st IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, May 2020.
- **Technical Program Committee Member**
 - *21st IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, May 2020.
 - *5th International Workshop on Non-Orthogonal Multiple Access Techniques for 5G*, IEEE International Conference on Communications (ICC), May 2019.
 - *4th International Workshop on Non-Orthogonal Multiple Access Techniques for 5G*, IEEE Global Communications Conference (GlobeCom), Dec. 2018.
- **Journal Reviewer**

IEEE Trans. on Communications, IEEE Trans. on Information Theory, IEEE/ACM Trans. on Networking, IEEE Trans. on Wireless Communications, IEEE Trans. on Mobile Computing, IEEE Journal on Selected Areas in Communications, IEEE Communications Letters, EURASIP Journal on Wireless Communications and Networking.
- **Conference Reviewer**

IEEE Intl. Conf. on Communications (ICC), IEEE Intl. Symp. on Information Theory (ISIT), IEEE Global Communications Conference (GlobeCom), IEEE Wireless Communications and Networking Conference (WCNC), IEEE Information Theory Workshop (ITW), Intl. ITG Conference on Systems, Communications and Coding (SCC), Australian Communications Theory Workshop (AusCTW), Iran Workshop on Communication and Information Theory (IWCIT).

PATENTS

- N. Naderializadeh, H. Nikopour, S. Talwar, O. Orhan, B. Sadeghi, C. Cordeiro, and H. Moustafa, “Interference Mitigation in Ultra-Dense Wireless Networks,” *U.S. Patent 10,701,641*, granted Jun. 2020.
- A. S. Avestimehr and N. Naderializadeh, “Spectrum Sharing in Device-to-Device Communication Systems,” *U.S. Patent 10,200,873*, granted Feb. 2019.
- O. Orhan, E. Aryafar, B. Carlton, N. Himayat, C. Hull, N. Naderializadeh, H. Nikopour, S. Pellerano, M. Rahman, S. Talwar, and J. Zhu, “Non-Orthogonal Multiple-Access and Multi-Finger Beamforming,” *App. No. PCT/US2018/041813*, Jul. 2018.
- M. T. Galeev, O. Orhan, A. L. Amadjikpe, B. Grewell, N. Naderializadeh, H. Nikopour, S. Sudhakaran, S. Talwar, L. Xian, “Millimeter Wave (mmWave) System and Methods,” *App. No. PCT/US2018/038906*, Jun. 2018.

TEACHING EXPERIENCE

- Teaching Assistant for “Fundamentals of Wireless Communications,” Sharif University of Technology, Spring 2011.
- Teaching Assistant for “Communication Systems,” Sharif University of Technology, Fall 2010.
- Teaching Assistant for “Communications 1,” Iran University of Science and Technology, Fall 2010.
- Laboratory Teaching Assistant for “Logic Circuits and Digital Systems,” Sharif University of Technology, Spring 2010.
- Laboratory Teaching Assistant for “Analog Circuits,” Sharif University of Technology, Spring 2009.

SELECTED COURSES

University of Southern California

- Machine Learning
- Advanced Natural Language Processing
- High-Dimensional Statistics and Big Data Problems
- Analysis of Algorithms
- Network Information Theory

Cornell University

- The Structure of Information Networks
- Statistical Signal Processing and Learning
- Mathematical Programming I
- Probability
- Fundamentals of Data Compression
- Digital Communications
- Random Signals in Communications and Signal Processing

Sharif University of Technology

- Introduction to C++ Programming
- Space-Time Coding
- Principles of Wireless Communications
- Wireless LAN (802.11a) Transmitter Design
- Communication Systems