Matthew Nokleby

4941 Chicago Ave.
Minneapolis, MN 55417
469.426.6608

matthew.nokleby@target.com
http://docnok.github.io

RESEARCH INTERESTS	Machine Learning, Information theory, Statistical signal processing, Wireless Networks, Game and decision theory
EDUCATION	**Rice University**, Houston, Texas USA

Ph.D., Electrical and Computer Engineering, December 2012
Thesis Title: "Cooperative Strategies for Near-Optimal Computation in Wireless Networks"
Advisor: Behnaam Aazhang

Brigham Young University, Provo, Utah USA

M.S., Electrical and Computer Engineering, August 2008
Thesis Title: "Satisficing Theory and Non-cooperative Games"
Advisors: Wynn Stirling and A. Lee Swindlehurst

B.S., Electrical and Computer Engineering *(cum laude)*, August 2006

POSITIONS HELD	Director of AI Science, Target Corporation, 2019 – present

Lead AI Scientist, Target Corporation, 2018 – 2019
Assistant Professor, Department of ECE, Wayne State University, 2015 – 2018
Post-doctoral Associate, Information Initiative at Duke (iiD), Duke University, 2013 – 2015
Visiting Researcher, Boston University, Visiting Researcher, March 2012
Visiting Researcher, Duke University, April – August 2011
Research Assistant, Center for Multimedia Communications, Rice University, 2008 – 2012
Research Assistant, Brigham Young University, 2005-2008

PROFESSIONAL SERVICE	Served on Technical Program Committee, IEEE Information Theory Workshop, 2016, IEEE Globecom 2015. Organizing an invited session for the Asilomar Conference on Signals, Systems, and Computers, 2018.

Reviewed for the following journals: IEEE Transactions on Information Theory, IEEE Journal of Special Topics in Communication, IEEE Journal of Selected Topics in Signal Processing, IEEE Transactions on Vehicular Technology, IEEE Transactions on Communications, IEEE Communications Letters, IEEE Transactions on Signal Processing, IEEE Wireless Communications Letters, EURASIP Journal on Wireless Communications and Networking.

DEPARTMENTAL SERVICE	IEEE Student Branch Faculty Mentor, 2015–2018.
INVITED TALKS	"How to Train Your Fine-grained Classifier," presented at the University of Minnesota, Dec. 2019.

"Bits through Sensors: Bounds on Classification and Learning Performance via Information Content," presented at the Michigan Institute for Data Science (MIDAS), University of Michigan, Dec. 2017.

"Distributed Approaches to Mirror Descent for Stochastic Learning over Rate-limited Networks," presented at the DIMACS Seminar on Distributed Learning and Optimization, Aug. 2017.

"Information-theoretic Performance Limits in Machine Learning," presented at University of Illinois-Chicago, Michigan State University, Wayne State University, and the University of Toronto, 2016-

2017.

"Rate-distortion Bounds on the ell-1 Bayes Risk," presented at Laboratory of Decision and Information Sciences (LIDS), MIT, Sept. 2015.

"Cooperative Computation in Wireless Networks," presented at the Banff International Research Station (BIRS) Workshop on Algebraic Structure in Network Information Theory, Aug. 2011.

AWARDS	Best Dissertation Award, Rice ECE Department, 2012
	Texas Instruments Distinguished Fellowship, 2008–2012
	AUVSI Student UAV competition, 2nd place, 2006
	Nokia/BYU Research Seminar, 2nd place, 2006

JOURNAL PUBLICATIONS	I. Jindal, **M. Nokleby**, D. Pressel, X. Chen, "A Nonlinear, Noise-aware, Quasi-clustering Approach to Learning Deep CNNs from Noisy Labels," CVPR Workshop on Uncertainty and Robustness in Deep Learning, Long Beach, CA, Jun. 2019.
	I. Jindal, **M. Nokleby**, D. Pressel, and B. Lester, "An Effective Label Noise Modelfor DNN Text Classification," Conference of the North American Chapterof the Association for Computational Linguistics, Minneapolis, MN, Jun. 2019.
	N. Ferdinand, S. Draper, H. Al-Lawati, **M. Nokleby**, "Anytime Minibatch: Exploiting Stragglers in Online Distributed Optimization," International Conference on Learning Representations, New Orleans, LA, May 2019.
	M. Nokleby and W. Bajwa, "Stochastic Optimization from Distributed, Streaming Data in Rate-limited Networks," IEEE Transactions on Signal and Information Processing over Networks, Mar. 2019.
	I. Jindal and **M. Nokleby**, "Classification and Representation via Separable Subspaces: Performance Limits and Algorithms," submitted to IEEE Journal on Selected Topics in Signal Processing, Dec. 2017.
	N. Michelusi, **M. Nokleby**, U. Mitra, R. Calderbank, "Multiscale Spectrum Sensing in 5G Cognitive Networks," submitted to IEEE Transactions on Signal Processing, May 2017.
	M. Nokleby and Waheed U. Bajwa, "Stochastic Optimization from Distributed, Streaming Data in Rate-limited Networks," submitted to IEEE Transactions on Signal and Information Processing over Networks, Apr. 2017.
	M. Nokleby, A. Beirami, R. Calderbank, "Rate-Distortion Bounds on Bayes Risk in Supervised Learning," submitted to IEEE Transactions on Information Theory, Mar. 2016.
	N. Ferdinand, B. Kurkoski, **M. Nokleby**, B. Aazhang, "Low-Dimensional Shaping for High-Dimensional Lattice Codes," IEEE Transactions on Wireless Communications, Nov. 2016.
	M. Nokleby, B. Aazhang, "Cooperative Compute-and-Forward," IEEE Transactions on Wireless Communications, Jan. 2016.
	M. Nokleby, M. R. D. Rodrigues, R. Calderbank, "Discrimination on the Grassmann Manifold: Fundamental Limits of Subspace Classifiers," IEEE Transactions on Information Theory, April 2015.

N. S. Ferdinand, **M. Nokleby**, B. Aazhang, "Low-Density Lattice Codes for Relay Channels," IEEE Transactions on Wireless Communications, April 2015.

M. Nokleby, W. U. Bajwa, R. Calderbank, B. Aazhang, "Toward Resource-Optimal Consensus over the Wireless Medium," IEEE Journal of Special Topics in Signal Processing, April 2013.

M. Nokleby, W. Stirling, "Attitude Adaptation in Satisficing Games," IEEE Transactions on Systems, Man, and Cybernetics, Part B, vol. 39, no. 6, December 2009.

M. Nokleby, A. L. Swindlehurst, "Bargaining and the MISO Interference Channel," EURASIP Journal on Advances in Signal Processing, vol. 2009.

W. C. Stirling, **M. S. Nokleby**, "Satisficing Coordination and Social Welfare for Robotic Societies," International Journal of Social Robotics, vol. 1, no. 1, January 2009.

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<td>Conference Publications</td>
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I. Jindal, T. Z. Qin, X. Chen, **M. Nokleby**, and J. Ye, "A Unified Neural Network Approach for Estimating Travel Time and Distance for a Taxi Trip," submitted to the Internaional Conference on Machine Learning and Data Mining (MLDM), 2018.

I. Jindal, T. Z. Qin, X. Chen, **M. Nokleby**, and J. Ye, "Deep Reinforcement Learning for Optimizing Carpooling Policies," submitted to the International Conference on Machine Learning and Data Mining (MLDM), 2018.

I. Jindal, **M. Nokleby**, and X. Chen. "A Nonlinear, Noise-aware, Quasi-clustering Approach to Learning Deep CNNs from Noisy Labels," submitted to IEEE International Conference on Computer Vision and Pattern Recognition (CVPR), 2018.

M. Nokleby and W. U. Bajwa, "Distributed Mirror Descent for Stochastic Learning over Rate-limited Networks," IEEE CAMSAP, Dec. 2017.

I. Jindal, **M. Nokleby**, "Fast and Compact Kronecker-structured Dictionary Learning for Image Classification," Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, November 2017.

N. Michelusi, **M. Nokleby**, U. Mitra, R. Calderbank, "Multi-scale Spectrum Sensing in Mm-Wave Cognitive Networks," Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, November 2017.

I. Jindal, **M. Nokleby**, "Performance Limits on the Classification of Kronecker-Structured Models," IEEE Symposium on Information Theory, Aachen, Germany, June 2017.

N. Michelusi, **M. Nokleby**, U. Mitra, R. Calderbank, "Multi-scale Spectrum Sensing in Small-Cell mm-Wave Cognitive Wireless Networks ," IEEE International Conference on Communications, Paris, France, May 2017.

I. Jindal, **M. Nokleby**, X. Chen, "Learning Deep Networks from Noisy Labels with Dropout Regularization," IEEE International Conference on Data Mining, Barcelona, Spain, Dec. 2016.

M. Nokleby, A. Beirami, R. Calderbank, "Rate-Distortion Bounds on Bayes Risk for Supervised Learning," IEEE Symposium on Information Theory, Barcelona, Spain, July 2016.

N. Ferdinand, **M. Nokleby**, B. Aazhang, "Voronoi Constellations for High-Dimensional Lattice Codes," IEEE Symposium on Information Theory, Barcelona, Spain, July 2016.

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N. Michelusi, **M. Nokleby**, U. Mitra, R. Calderbank, "Dynamic Spectrum Estimation with Minimal Overhead via Multiscale Information Exchange," IEEE GLOBECOM, San Diego, CA, Dec. 2015.

M. Nokleby, A. Beirami, R. Calderbank, "A Rate-distortion Framework for Supervised Learning," IEEE Machine Learning for Signal Processing Workshop, Boston, MA, Sept. 2015.

N. Ferdinand, **M. Nokleby**, B. Kurkoski, B. Aazhang, "MMSE Scaling Enhances Performance in Practical Lattice Codes," Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, November 2014.

M. Nokleby, M. R. D. Rodrigues, R. Calderbank, "Discrimination on the Grassmann Manifold: Fundamental Limits of Subspace Classifiers,"IEEE International Symposium on Information Theory, Honolulu, Hawaii, July 2014.

M. Nokleby, M. R. D. Rodrigues, R. Calderbank, "Information-Theoretic Criteria for the Design of Compressive Subspace Classifiers," IEEE International Conference on Acoustics, Speech, and Signal Processing, Florence, Italy, May 2014.

M. Nokleby, W. U. Bajwa, "Resource Tradeoffs in Distributed Subspace Tracking over the Wireless Medium,"' IEEE Global Conference on Signal and Information Processing, Austin, TX, December 2013.

M. Nokleby M. R. D. Rodrigues, R. Calderbank, "Information-theoretic Limits on the Classifcation of Gaussian Mixtures: Classifcation on the Grassmann Manifold," IEEE Information Theory Workshop, Seville, Spain, September 2013.

M. Nokleby, B. Nazer, "Amplify-and-Compute: Function Computation in Layered Networks," IEEE International Symposium on Information Theory, Istanbul, Turkey, July 2013.

N. S. Ferdinand, **M. Nokleby**, B. Aazhang, "Low-Density Lattice Codes for the Relay Channel," IEEE International Conference on Communications, Budapest, Hungary, June 2013.

M. Nokleby, W. U. Bajwa, R. Calderbank, B. Aazhang, "Toward Resource-Optimal Averaging Consensus over the Wireless Medium," Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, November 2012.

M. Nokleby, B. Nazer, B. Aazhang, "Relay Computation: Managing Interference with Structure and Cooperation," Allerton Conference, Monticello, IL, October 2012.

M. Nokleby, B. Nazer, B. Aazhang, N. Devroye, "Relays that Cooperate to Compute," International Symposium on Wireless Communication Systems, Paris, France, August 2012.

M. Nokleby, W. U. Bajwa, R. Calderbank, B. Aazhang, "Hierarchical Averaging over Wireless Sensor Networks," International Conference on Acoustics, Speech, and Signal Processing, Kyoto, Japan, March 2012.

M. Nokleby, B. Aazhang, "Unchaining from the Channel: Cooperative Computation over Multiple-access Channels," IEEE Information Theory Workshop, Paraty, Brazil, October 2011.

M. Nokleby, W. U. Bajwa, R. Calderbank, B. Aazhang, "Gossiping in Groups: Distributed Averaging over the Wireless Medium," Allerton Conference, Monticello, IL, September 2011.

M. Nokleby, B. Aazhang, "Cooperative Computation in Wireless Networks," IEEE International Symposium on Information Theory, St. Petersburg, Russia, July 2011.

M. Nokleby, B. Aazhang, "Lattice Coding over the Relay Channel," IEEE International Conference on Communications, Kyoto, Japan, June 2011.

M. Nokleby, B. Aazhang, "User Cooperation for Energy-efficient Cellular Communications," IEEE International Conference on Communications, Cape Town, South Africa, May 2010.

M. Nokleby, A. L. Swindlehurst, "Bargaining and Multi-user Detection in MIMO Interference Networks," International Conference on Computer Communications and Networks, St. Thomas, US Virgin Islands, Aug. 2008.

M. Nokleby, A. L. Swindlehurst, Y. Rong, Y. Hua, "Cooperative Power Scheduling for Wireless MIMO Networks," IEEE GLOBECOM, Washington, DC, Nov. 2007.

M. S. Nokleby, W. C. Stirling, "Attitude Adaptation in Satisficing Games," IEEE Symposium on Foundations of Computational Intelligence, Honolulu, HI, Apr. 2007.

W. Stirling, R. Frost, **M. Nokleby**, Y. Luo, "Multicriterion Decision Making with Dependent Preferences," IEEE Symposium on Computational Intelligence in Multicriteria Decision Making, Honolulu, HI, Apr. 2007.

M. S. Nokleby, W. C. Stirling, "Satisficing Learning Dynamics in the Stag Hunt," IEEE Mountain Workshop on Adaptive and Learning Systems, Logan, UT, Jul. 2006.

M. S. Nokleby, W. C. Stirling, "The Stag Hunt: A Vehicle for Evolutionary Cooperation," IEEE World Congress on Computational Intelligence, Vancouver, BC, Jul. 2006.

J. C. Hill, **M. S. Nokleby**, J. K. Archibald, R. L. Frost, W. C. Stirling, "Cooperative Graph Search by a System of Autonomous Agents," IEEE International Conference on Systems, Man, and Cybernetics, Oct. 2005.

BOOK CHAPTERS	M. Rodrigues, **M. Nokleby**, F. Renna, R. Calderbank, "Compressive Classification: Where Wireless Communications Meets Machine Learning," in *Compressed Sensing and its Applications*, Springer, 2015.
	M. Nokleby, G. Middleton, B. Aazhang, "Cross-Layer Cooperative Communication in Wireless Networks," in Jerry Gibson (Ed.) *Mobile Communications Handbook* , CRC Press, Boca Raton, FL., 2011.
COMPUTER SKILLS	Operating systems: Unix/Linux, Mac, Windows Languages: Python, C/C++, MATLAB, Java, Assembly, Verilog, PHP, HTML, LaTeX
HOBBIES / PERSONAL	Amateur musician: Play cello and electric bass, have written a few "classical" compositions. Distance runner: Completed one marathon, four half marathons, and many shorter races.