

Christopher A. Metzler

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Research Interests

Machine learning, statistical signal processing, and computational imaging

Education

PhD, Rice University, Electrical and Computer Engineering, 2015-2019. 4.00/4.33 GPA
Advisors: Richard Baraniuk and Ashok Veeraraghavan
MS, Rice University, Electrical and Computer Engineering, 2013-2014.
Thesis: Denoising-based Approximate Message Passing for Compressed Sensing
Advisor: Richard Baraniuk
BS, Rice University, Electrical and Computer Engineering, 2009-2013. 3.89/4.33 GPA
Magna cum Laude

Awards and Honors

ICCP 2017 Runner-up Best Paper
ICIP 2015 “Top 10%” Paper
Ken Kennedy Institute High Performance Computing Fellowship Recipient 2017
NSF GRF Fellowship Recipient 2015
NDSEG Fellowship Recipient 2014
Texas Instruments Fellowship Recipient 2013
Tau Beta Pi Engineering Honor Society
Eta Kappa Nu IEEE Honor Society
National Merit Scholar Finalist

Academic and Industrial Experience

Rice University, Houston, TX (Fall 2013-Present)

Research assistant in the Machine Learning, Digital Signal Processing, and Computational Imaging labs.

Naval Research Laboratory, Washington, DC (Summer 2017)

Graduate intern (NREIP program) in Applied Optics branch

- Developed algorithms for time-gated holographic imaging through fog and water

Ball Aerospace and Technologies Corp., Westminster, CO (Summers 2015 & 2016)

RF engineering intern in Mission Systems group

- Implemented radar tracking algorithms
- Developed a test system for spread spectrum antenna arrays and used this system to calibrate an adaptive beamformer

ViaSat, Carlsbad, CA (Summer 2013)

Engineering intern

- Removed communication bottlenecks to double maximum throughput of satellite downlink receiver

National Instruments, Austin, TX (Summer 2012)

Hardware engineering intern in Conditioned Measurements group

- Implemented FPGA control and signal recovery algorithms for random demodulator (compressive-sensing-based wideband receiver)

Technical University Braunschweig, Braunschweig, Germany (Summer 2011)

Research intern (RISE program)

- Debugged memory controller for Morpheus heterogeneous processing architecture

Journal Publications

Metzler, C., Maleki, A., and Baraniuk, R. "From denoising to compressed sensing." *IEEE Transactions on Information Theory*. 2016.

Conference Publications

Metzler, C., Mousavi, A., and Baraniuk, R. "Learned D-AMP: Principled neural-network-based compressive image recovery." *Neural Information Processing Systems (NIPS)*. 2017.

Metzler, C., Sharma, M., et al. "Coherent inverse scattering via transmission matrices: Efficient phase retrieval algorithms and a public dataset." *IEEE International Conference on Computational Photography (ICCP)*. 2017.

Metzler, C., Maleki, A., and Baraniuk, R. "BM3D-prGAMP: Compressive phase retrieval based on BM3D denoising." *IEEE International Conference on Image Processing (ICIP)*. 2016.

Metzler, C., Maleki, A., and Baraniuk, R. "Optimal recovery from compressive measurements via denoising-based approximate message passing." *IEEE International Conference on Sampling Theory and Applications (SampTA)*. 2015.

Wood, S., Fontenla, E., Metzler, C., Chiu, W., Baraniuk, R. "Iterative reconstruction from limited angle, limited view projections for cryo-electron tomography." *IEEE 49th Asilomar Conference on Signals, Systems and Computers*. 2015.

Wood, S., Fontenla, E., Metzler, C., Chiu, W., Baraniuk, R. "Dynamic model generation for application of compressed sensing to cryo-electron tomography reconstruction." *IEEE Signal Processing and Signal Processing Education Workshop (SP/SPE)*. 2015.

Metzler, C., Maleki, A., and Baraniuk, R. "BM3D-AMP: A new image recovery algorithm based on BM3D denoising." *IEEE International Conference on Image Processing (ICIP)*. 2015.

Talks

"Unrolling: A principled method to develop deep neural networks." Talk at Rice Geo-Mathematical Imaging Group Project Review 2017.

"Coherent Inverse Scattering via Transmission Matrices: Efficient Phase Retrieval Algorithms and a Public Dataset." Talk at ICCP 2017.

"BM3D-prGAMP: Compressive phase retrieval based on BM3D denoising." Talk at ICME MM-SPARSE Workshop 2016.

“Connecting Bayesian and Denoising-based Compressed Sensing.” Invited talk at Asilomar 2015

“BM3D-AMP: A new image recovery algorithm based on BM3D denoising.” Talk at ICIP 2015

Teaching Experience

TA, Rice University

-Fundamentals of Electrical Engineering II (Spring 2015)

-Advanced VLSI (Fall 2013)

Grader, Rice University

-Introduction to Deep Learning, (Fall 2017)

-Fundamentals of Electrical Engineering II (Spring 2016)

-Signals and Systems (Fall 2015)

-Signals and Systems (Fall 2014)

Course Assistant, Rice University

-Signals and Systems (Fall 2011)

-Fundamentals of Electrical Engineering I and II (Fall 2010/Spring 2011)

Professional Service

Journal Reviewer: *IEEE Transactions on Image Processing*, *Signal Processing*, and *Computational Imaging*; *IEEE Sensors Journal*; *SIAM Journal on Imaging Sciences*; *Elsevier Digital Signal Processing*, and *Elsevier Signal Processing: Image Communication*.

Rice ECE GSA Professional Development Chair 2017-2018

Rice ECE GSA Social Chair 2016-2017

Rice Community Service Committee Member 2014-2015

Rice IEEE

- Vice President 2012-2013

- Treasurer 2011-2012

Rice Society of Automotive Engineers 2009-2013

Technical Skills

CPU: Matlab, Python, TensorFlow, C, C++, and R

GPU: TensorFlow, Matlab

FPGA: System Generator, ModelSim, VHDL, Verilog, Labview FPGA, and AutoESL

Lab: RF measurements in anechoic chambers, circuit assembly and test experience

References

Richard Baraniuk

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