GOODMAN, NATHAN A.

The University of Oklahoma
Professor
School of Electrical & Computer Engineering
110 W. Boyd Street
Norman, Oklahoma 73019

Director of Research
Advanced Radar Research Center
3190 Monitor Avenue
Norman, Oklahoma 73019

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EDUCATION

Ph.D., Electrical Engineering
The University of Kansas, 2002
Topic: SAR and MTI Processing of Sparse Satellite Clusters

M.S., Electrical Engineering
The University of Kansas, 1997

B.S., Electrical Engineering, with Distinction
The University of Kansas, 1995

EXPERIENCE

Director of Research, 2015–Present
The Advanced Radar Research Center, The University of Oklahoma, Norman, OK

Professor, 2016–Present
School of ECE, The University of Oklahoma, Norman, OK

Associate Professor, 2012–2016
School of ECE, The University of Oklahoma, Norman, OK

Associate Director, 2012–2014
The Advanced Radar Research Center, The University of Oklahoma, Norman, OK

Associate Professor, 2009–2011
Department of ECE, The University of Arizona, Tucson, AZ

Visiting Senior Research Engineer, October 2009 – June 2010
Sensors and Electromagnetic Applications Laboratory, Georgia Tech Research Institute

Assistant Professor, 2002–2009
Department of ECE, The University of Arizona, Tucson, AZ

Graduate Research Assistant, 1998–2002
The University of Kansas, Center for Research, Inc., Lawrence, KS

Graduate Teaching Assistant, 2000
The University of Kansas, Lawrence, KS

RF Systems Engineer, 1996–1998
Raytheon Systems Company/Texas Instruments Systems Group, Dallas, TX

Graduate Research Assistant, 1995–1996
The University of Kansas, Center for Research, Inc., Lawrence, KS

Graduate Teaching Assistant, 1995
The University of Kansas, Lawrence, KS

Undergraduate Research Assistant, 1994–1995
The University of Kansas, Center for Research, Inc., Lawrence, KS

Test Engineer, 1993
DNB Engineering, Fullerton, CA

PROFESSIONAL MEMBERSHIPS, COMMITTEES, AND SERVICE

(* = current membership)

*Institute of Electrical and Electronics Engineers

Senior Member, 2007 - Present
Member, 1996-1998, 2002-2007
Student Member, 1994-1996, 1998-2002

*IEEE Aerospace and Electronic Systems Society

*IEEE Signal Processing Society

IEEE Geoscience and Remote Sensing Society

IEEE Antennas and Propagation Society

Member, IEEE Aerospace & Electronic Systems Society Radar Systems Panel, 2015 – Present

Lecturer, NATO Lecture Series on *Cognition and Radar Sensing*, 2015 – 2017

Co-Chair, NATO SET-227 Research Task Group on Cognitive Radar, 2015 – Present

Guest Editor, IET *Radar, Sonar & Navigation*, Special Issue on Cognitive Radar

Associate Editor, Radar Systems Technical Area, *IEEE Trans. Aerospace & Electronic Systems*, 2012 – Present

Deputy Editor-in-Chief, Elsevier *Digital Signal Processing*, 2010 – 2011

Editorial Board, Elsevier *Digital Signal Processing*, 2011 – 2012

General Co-Chair, 2018 IEEE Radar Conference (RadarConf '18)

Finance Chair, 2012 Sensor Array and Multichannel Signal Processing Workshop (SAM '12)

Technical Co-Chair, 2011 IEEE Radar Conference (RadarCon '11)

Technical Program/Review Committees (Conferences)

IEEE Radar Conference, 2009 – 2018
2015 IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP 2015)
3rd International Workshop on Compressed Sensing Theory and its Applications to Radar, Sonar and Remote Sensing (CoSeRa 2015)
2014 International Conference on Acoustics, Speech, and Signal Processing (ICASSP)
2013 International Conference on Acoustics, Speech, and Signal Processing (ICASSP)
IEEE 9th Sensor Array and Multichannel Signal Processing Workshop (SAM 2016)
IEEE 7th Sensor Array and Multichannel Signal Processing Workshop (SAM 2012)
Third International Workshop on Cognitive Information Processing, 2012

Second Cognitive Information Processing Workshop, 2010
2007 International Waveform Diversity & Design Conference

Student Involvement Chair, 2006 International Waveform Diversity and Design Conference

Reviewer, *Radio Science, IEEE Signal Processing Letters, IEEE T-GRS, IEEE T-AES, IEEE T-SP*, *IEEE JSTSP*, *IEEE Ant. & Wireless Prop. Letters*, *EURASIP JASP*, *IET Radar, Sonar & Navigation*, *Applied Optics, Optics Express, Elsevier DSP*

Technical Track Co-Chair, "Emerging Technology," 2017 IEEE Radar Conference

Technical Track Chair, "Civil/Security Radar Applications," 2015 IEEE Intl. Radar Conference

Technical Track Chair, "Applications," 2014 IEEE Radar Conference

Session Co-Chair, "Target Clutter: Target and Clutter Signatures", 2017 Intl. Conference on Radar Systems

Session Co-Chair, "SAR 1," 2017 IEEE Radar Conference

Session Co-Chair, "Imaging Radar," 2017 IEEE Radar Conference

Session Co-Chair, "Antennas and RF Front Ends," 2016 IEEE Radar Conference

Session Co-Chair, "Cognitive/Multi-Mission Radar," 2015 IEEE Intl. Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP 2015)

Session Co-Chair, "Cognitive Radar," 2015 IEEE Intl. Radar Conference

Session Co-Chair, "Civilian and Commercial Radar," 2014 IEEE Radar Conference

Session Co-Chair, "Compressive Sensing for Urban Radar," IEEE 8th Sensor Array and Multichannel Signal Processing Workshop (SAM 2014)

Session Co-Chair, "Optical and RF Systems," 10th International Conference on Sampling Theory and Applications (SampTA 2013)

Session Chair, "Sparsity and Compressed Sensing," 2013 IEEE Radar Conference

Session Chair, "Compressive Sensing I," SPIE Defense, Security, and Sensing 2012

Session Co-Chair, "Compressive Sensing for Radar," IEEE 7th Sensor Array and Multichannel Signal Processing Workshop (SAM 2012)

Session Co-Chair, "Compressive Sensing," 2011 IEEE Radar Conference

Session Co-Chair, "Reconfigurable SAR Systems," 2002 IEEE International Geoscience and Remote Sensing Symposium

Tau Beta Pi

Eta Kappa Nu

Radar Innovations Laboratory, Building Committee, The University of Oklahoma, 2011 – 2014

Chair, Faculty Search Committee, The University of Oklahoma, ECE, 2017-18

Department Head Search Committee, The University of Arizona, ECE, 2011

Engineering Dean Search Committee, The University of Kansas, 2001-2002

Faculty Search Committee, The University of Kansas, 1994

HONORS AND AWARDS

Best Paper Award, 2008 Army Science Conference, (Sensors and Information Processing Category), Orlando, FL, awarded for "Generalized Adaptive Radar Signal Processing."

Senior Member, IEEE

Interactive Session Prize Paper Award, 2001 IEEE International Geoscience and Remote Sensing Symposium, Sydney, Australia, awarded for "The information content of multiple receive aperture SAR systems."

Madison A. and Lila Self Graduate Fellowship, The University of Kansas

Summerfield Scholarship, The University of Kansas

GRANTS AND CONTRACTS

Federally Funded:

Title: *Technologies for Next-Generation Conformal and Reconfigurable Radar Systems*
PIs: Nathan Goodman, Jessica Ruyle, Hjalti Sigmarsson, Mark Yeary, Jorge Salazar-Cerreno, Caleb Fulton, Robert Palmer
Role: Lead Principal Investigator
Sponsor: Office of Naval Research (ONR)
Dates: 2/1/2018 – 1/31/2020
Responsibility: 19%
Total Award Amount: $3,531,820

Title: *Multi-Band Mobile Bistatic Data Collection Systems and Analysis*
PIs: Nathan Goodman, Mark Yeary, and Caleb Fulton
Role: Lead Principal Investigator
Sponsor: AFRL/RYM
Dates: 4/5/2017 – 7/14/2020
Responsibility: 55%
Total Award Amount: $2,135,845

Title: *Testing and Algorithm Development for a Nyquist-Folding Broadband Receiver*
PIs: Nathan Goodman
Role: Principal Investigator
Sponsor: Honeywell FM&T, Kansas City Plant
Dates: 4/22/2016 – 9/01/2017
Responsibility: 100%
Total Award Amount: $226,260

Title: *Center for Surveillance Research I/UCRC Planning Grant*
PIs: Nathan Goodman
Role: Principal Investigator
Sponsor: National Science Foundation
Dates: 9/15/2015 – 8/31/2016
Responsibility: 100%
Total Award Amount: $14,545

Title: *MoBiDC Design and Demonstration, Phase II*
PIs: Nathan Goodman, Mark Yeary, and Caleb Fulton
Role: Lead Principal Investigator
Sponsor: AFRL (via DEC – prime contractor)
Dates: 4/13/2015 – 7/30/2016
Responsibility: 50%
Total Award Amount: $649,978

Title: *Mobile Bistatic Radar Design and Demonstration*
PIs: Nathan Goodman, Mark Yeary, and Caleb Fulton
Role: Lead Principal Investigator
Sponsor: AFRL (via DEC – prime contractor)
Dates: 9/24/2014 – 2/23/2015
Responsibility: 45%
Total Award Amount: $199,989

Title: *Adaptive Exploitation of High-Frame-Rate Radar Imagery for Detection and Tracking of Dismounts*
PIs: Nathan Goodman, Yan (Rockee) Zhang, and Mark Yeary
Role: Lead Principal Investigator
Sponsor: DARPA
Dates: 1/24/2013 – 3/31/2014
Responsibility: 65%
Total Award Amount: $171,818

Title: *Advanced Digital Radar Techniques for the Next Generation of Synthetic Aperture Radar (SAR) and Student Training*
PIs: Victoria Snowden, Mark Yeary, Jessica Ruyle, Nathan Goodman, and Caleb Fulton
Role: Co-Investigator
Sponsor: NASA
Dates: 12/26/2012 – 12/25/2015
Responsibility: 20%
Total Award Amount: $750,000

Title: *Knowledge Enhanced Compressive Measurement*
PIs: Nathan Goodman, Amit Ashok, Ali Bilgin, Michael Gehm, Michael Marcellin, William Ryan, Bane Vasic
Role: Lead Principal Investigator
Sponsor: DARPA
Dates: 9/21/10 – 11/20/14
Responsibility: 32.5% (Responsibility for OU sub-contract: 100%)
Total Award Amount: $3,603,312 (Amount sub-contracted to OU: $759,133)

Title: *Advances in Cognitive Radar*
PIs: Nathan Goodman
Role: Principal Investigator
Sponsor: Office of Naval Research (ONR)
Dates: 01/01/09 – 09/30/12
Responsibility: 100%
Total Award Amount: $358,373

Title: *STTR: Three-Dimensional Radar Imaging of Ballistic Targets: Generalized Theory of Space-Time Adaptive Processing, Phase II*
PIs: Nathan Goodman
Role: Principal Investigator
Sponsor: Missile Defense Agency (via TSC – prime contractor)
Dates: 10/02/07 – 10/02/09
Responsibility: 100%
Total Award Amount: $257,764

Title: *Cognitive Radar*
PIs: Nathan Goodman
Role: Principal Investigator
Sponsor: AFOSR
Dates: 3/1/07 – 11/30/09
Responsibility: 100%
Total Award Amount: $336,336

Title: *Large Area Coverage Optical Search while Track and Engage (LACOSTE)*
PIs: Nathan Goodman
Role: Principal Investigator
Sponsor: DARPA (via Lockheed Martin – prime contractor)
Dates: 7/15/06 – 12/31/07
Responsibility: 100%
Total Award Amount: $150,000

Title: *STTR: Three-Dimensional Radar Imaging of Ballistic Targets: Generalized Theory of Space-Time Adaptive Processing, Phase I*
PIs: Nathan Goodman
Role: Principal Investigator
Sponsor: Missile Defense Agency (via TSC – prime contractor)
Dates: 8/15/06 – 2/15/07
Responsibility: 100%
Total Award Amount: $36,350

Title: *Conformal Antenna Arrays for Reduced-Dimension Spread-Spectrum Communication*
PIs: Nathan Goodman and Kathleen Melde
Role: Principal Investigator
Sponsor: NSF Connection One IUCRC Circuits and Systems Research Center
Dates: 12/16/05 – 8/31/06
Responsibility: 75%
Total Award Amount: $31,455
(Note: Center is sponsored by NSF but largely funded by industry)

Title: *Signal Processing and Formation Design for Distributed Space-Based Radar*
PIs: Nathan Goodman
Role: Principal Investigator
Sponsor: Air Force Research Laboratory (AFRL)
Dates: 1/23/2004 – 7/22/2005
Responsibility: 100%
Total Award Amount: $147,291

Title: *Knowledge-Aided, SAR-Based Covariance Estimation*
PIs: Nathan Goodman
Role: Principal Investigator
Sponsor: Defense Advanced Research Projects Agency (DARPA)
Dates: 4/5/2004 – 8/4/2004
Responsibility: 100%
Total Award Amount: $20,000

Industry Funded:

Title: *Increased Imaging Area for SAR Wide-Area Surveillance*
PIs: Nathan Goodman
Role: Principal Investigator
Sponsor: Raytheon Co., Tucson, AZ
Dates: 11/14/2011 – 8/31/2013
Responsibility: 100%
Total Award Amount: $80,000

Title: *Real-Beam Superresolution*
PIs: Pitu Mirchandani, Nathan Goodman
Role: Co-Investigator
Sponsor: Waveband Corp.
Dates: 1/1/2005 – 12/31/2005
Responsibility: 16%
Total Award Amount: $225,000

Title: *Direction Finding Research and Technology*
PIs: Nathan Goodman
Role: Principal Investigator
Sponsor: Rincon Research Corp.
Dates: 1/1/2005 – 12/31/2005
Responsibility: 100%
Total Award Amount: $23,292

Title: *STAP/SAR Research*
PIs: Nathan Goodman
Role: Principal Investigator
Sponsor: Raytheon Co., Tucson, AZ
Dates: 6/23/2003 – 12/31/2003
Responsibility: 100%
Total Award Amount: $31,364

PUBLICATIONS

Refereed Journal Papers:

D. Lucking and **N.A. Goodman**, "Resource allocation for dynamic parameter estimation in parallel channels," in preparation.

J. Lievsay and **N.A. Goodman**, "Modeling 3D passive STAP with heterogeneous clutter and pulse diversity waveform effects," accepted to *IEEE Trans. Aerospace and Electronic Systems*.

Y. Gu and **N.A. Goodman**, "Information-theoretic compressive sensing kernel optimization and Bayesian Cramer-Rao bound for time delay estimation," *IEEE Trans. Signal Processing*, vol. 65, no. 17, pp. 4525-4537, September 1, 2017.

H.S. Kim, **N.A. Goodman**, C. Lee, and S. Yang, "Improved Waveform Design for Radar Target Classification," *Electronics Letters*, vol. 53, no. 13, pp. 879-881, June 22, 2017.

H.S. Kim, **N.A. Goodman**, J.H. Bae, and C. Lee, "Classification waveform optimization for MIMO radar," *IEICE Communications Express*, vol. 6, no. 8, pp. 501-506, August 2017.

Z. Shi, C. Zhou, **N.A. Goodman**, and Y. Gu, "Source estimation using coprime array: a sparse reconstruction perspective," *IEEE Sensors Journal*, vol. 17, no. 3, pp. 755-765, February 1, 2017.

F. Liu, M.W. Marcellin, **N.A. Goodman**, and A. Bilgin, "Compressive Sampling for Detection of Frequency-Hopping Spread Spectrum Signals," *IEEE Trans. Signal Processing*, vol. 64, no. 21, pp. 5513-5524, November 1, 2016.

Z. Dunn, M. Yeary, C. Fulton, and **N.A. Goodman**, "Wideband digital predistortion of solid-state radar amplifiers," *IEEE Trans. Aerospace and Electronic Systems*, vol. 52, no. 5, pp. 2452-2466, October 2016.

L. Potter and **N.A. Goodman**, "Pitfalls and possibilities of radar compressive sensing" *Applied Optics*, vol. 54, no. 8, pp. C1 – C13, March 10, 2015. (INVITED)

Y. Gu, **N.A. Goodman**, and A. Ashok, "Radar target profiling and recognition based on TSI-optimized compressive sensing kernel," *IEEE Trans. Signal Processing*, vol. 62, no. 12, pp. 3194-3207, June 15, 2014.

Y. Gu, **N.A. Goodman**, S. Hong, and Y. Li, "Robust adaptive beamforming based on interference covariance matrix sparse reconstruction," *Signal Processing*, vol. 96, pp. 375-381, March 2014.

R.A. Romero and **N.A. Goodman**, "Cognitive radar network: cooperative adaptive beamsteering for integrated search-and-track application," *IEEE Trans. Aerospace and Electronic Systems*, vol. 49, no. 2, pp. 915-931, April 2013.

S. Uttam, **N.A. Goodman**, and M.A. Neifeld, "Feature-specific difference imaging," *IEEE Trans. Image Processing*, vol. 21, no. 2, pp. 638-652, February 2012.

R.A. Romero, J.H. Bae, and **N.A. Goodman**, "Theory and application of SNR- and MI-based matched illumination waveforms," *IEEE Trans. on Aerospace and Electronic Systems*, vol. 47, no. 2, pp. 912-927, April 2011.

H.S. Kim and **N.A. Goodman**, "Power control strategy for distributed multiple-hypothesis detection," *IEEE Trans. on Signal Processing*, vol. 58, no. 7, pp. 3751-3764, July 2010.

S. Uttam and **N.A. Goodman**, "Superresolution of coherent sources in real-beam data," *IEEE Trans. on Aerospace and Electronic Systems*, vol. 46, no. 3, pp. 1557-1566, July 2010.

R. Romero and **N.A. Goodman**, "Waveform design in signal-dependent interference and application to target recognition with multiple transmissions," *IET Radar, Sonar, and Navigation*, vol. 3, no. 4, pp. 328 – 340, August 2009. (INVITED)

W. Wu, C. Cooper, and **N.A. Goodman**, "Switched-element direction finding," *IEEE Trans. on Aerospace and Electronic Systems*, vol. 45, no. 3, pp. 1209 – 1217, July 2009.

S. Uttam, **N.A. Goodman**, M.A. Neifeld, C. Kim, R. John, J. Kim, and D. Brady, "Optically multiplexed imaging with superposition space tracking," *Optics Express*, vol. 17, no. 3, pp. 1691 – 1713, Feb. 2, 2009.

Peng Jin, **N.A. Goodman**, and K.L. Melde, "Exploiting directional antennas for reduced-dimension space-time RAKE receiving," *IEEE Trans. Vehicular Technology*, vol. 57, no. 6, pp. 3880-3885, Nov. 2008.

D.P. Bruyere and **N.A. Goodman**, "Adaptive detection and diversity order in multistatic radar," *IEEE Trans. on Aerospace and Electronic Systems*, vol. 44, no. 4, pp. 1615-1623, Oct. 2008.

N.A. Goodman, P.R. Venkata, and M.A. Neifeld, "Adaptive waveform design and sequential hypothesis testing for target recognition with active sensors," *IEEE J. Selected Topics in Signal Processing*, vol. 1, no. 1, pp. 105-113, June 2007.

N.A. Goodman, "MIMO channel rank via the aperture-bandwidth product," *IEEE Trans. Wireless Communications*, vol. 6, no. 6, pp. 2246-2254, June 2007.

N.A. Goodman and D. Bruyere, "Optimum and decentralized detection for multistatic airborne radar," *IEEE Trans. Aerospace and Electronic Systems*, vol. 43, no. 2, pp. 806-813, April 2007.

N.A. Goodman and J.M. Stiles, "On clutter rank observed by arbitrary arrays," *IEEE Trans. Signal Processing*, vol. 55, no. 1, pp. 178-186, January 2007.

N.A. Goodman and K.L. Melde, "The impact of antenna directivity on small-scale fading in indoor environments," *IEEE Trans. Antennas and Propagation*, vol. 54, no. 12, pp. 3771-3777, December 2006

P.R. Gurram and **N.A. Goodman**, "Spectral-domain covariance estimation with a priori knowledge," *IEEE Trans. Aerospace and Electronic Systems*, vol. 42, no. 3, pp. 1010-1020, July 2006.

N.A. Goodman and J. Stiles, "Resolution and synthetic aperture characterization of sparse radar arrays", *IEEE Trans. Aerospace and Electronics Systems*, vol. 39, no. 3, pp. 921-935, July 2003.

N.A. Goodman, S. Lin, D. Rajakrishna, and J. Stiles, "Processing of multiple-receiver, spaceborne arrays for wide-area SAR," *IEEE Trans. Geoscience and Remote Sensing*, vol. 40, no. 4, pp. 841-852, April 2002.

Book Chapters:

Y. Gu, **N.A. Goodman**, and Y.D. Zhang, "Adaptive beamforming via sparsity-based reconstruction of covariance matrix," in preparation for *Compressed Sensing in Radar Signal Processing*, Cambridge University Press.

N.A. Goodman, "Foundations of cognitive radar for next-generation radar systems," in *Academic Press Library in Signal Processing Volume 7*, Elsevier Ltd., 2018, pp. 153-195.

N.A. Goodman, Y. Gu, and J. Bae, "Measurement Kernel Design for HRR Imaging of Urban Objects," in *Compressive Sensing for Urban Radar*, CRC Press, 2014, pp. 197-229.

N.A. Goodman, "Adaptive Waveform Design for Radar Target Classification," in *Waveform Design and Diversity for Advanced Radar Systems*, IET Publishing, 2012, pp. 377-412.

N.A. Goodman, P. Venkata, and R. Romero, "Iterative Technique for System Identification with Adaptive Signal Design," in *Principles of Waveform Diversity and Design*, SciTech Publishing, 2010, pp. 939-945.

N.A. Goodman, J.H. Bae, and R. Romero, "Waveform Design for Target Class Discrimination with Closed-Loop Radar," in *Principles of Waveform Diversity and Design*, SciTech Publishing, 2010, pp. 1102-1108.

Conference Papers:

D. Lucking and **N.A. Goodman**, "Resource allocation for multi-variate dynamic Gaussian estimation," submitted to 2018 IEEE Radar Conference.

J.R. Lievsay and **N.A. Goodman**, "Passive radar large clutter discrete removal," submitted to 2018 IEEE Radar Conference.

Y. Gu and **N.A. Goodman**, "Information-theoretic compressive measurement for frequency hopping pattern recognition," submitted to 2018 IEEE Radar Conference.

T. Brumble and **N.A. Goodman**, "Reverse backprojection method for simulation of passive bistatic SAR data," submitted to 2018 IEEE Radar Conference.

F. Uysal, J.C. Martin, and **N.A. Goodman**, "Single channel RF signal recovery for Nyquist folding receiver," accepted to 2017 International Radar Conference.

J. Park, R. Bhalla, R. Vela, S. Gabert, P. Sotirelis, **N. Goodman**, and K. Kim, "Efficient bistatic EM scattering data representations," in *Proc. 2017 Tri-Service Radar Symposium*.

B. Sun, M. Yeary, F. Uysal, **N. Goodman**, C. Fulton, and R. Rincon, "Digital radar implementation with amplitude predistortion," in *Proc. 2017 IEEE Radar Conference*, pp. 1691-1696, Seattle, WA, May 8 – 12, 2017.

Y. Gu, Y. Zhang, and **N.A. Goodman**, "Optimized compressive sensing-based direction-of-arrival estimation in massive MIMO," in *Proc. 2017 Intl. Conference on Acoustics, Speech, and Signal Processing* (ICASSP), pp. 3181-3185, New Orleans, LA, March 5 – 9, 2017.

H. Griffiths, A. Charlish, and **N.A. Goodman**, "Challenge problems in cognitive radar," in *Proc. 50th Asilomar Conf. on Signals, Systems and Computers*, Pacific Grove, CA, Nov. 6 – 9, 2016.

F. Uysal and **N.A. Goodman**, "The effect of moving target on range-Doppler map and backprojection algorithm for focusing," in *Proc. 2016 IEEE Radar Conference*, pp. 1-5, Philadelphia, May 2 – 6, 2016.

J.R. Lievsay and **N.A. Goodman**, "Multi-transmitter clutter modeling for passive STAP," in *Proc. 2016 IEEE Radar Conference*, pp. 1-6, Philadelphia, May 2 – 6, 2016.

Y. Gu, C. Zhou, **N.A. Goodman**, W.Z. Song, Z. Shi, "Coprime array adaptive beamforming based on compressive sensing virtual array signal," in *Proc. 2016 IEEE Intl. Conference on Acoustics, Speech, and Signal Processing* (ICASSP), pp. 2981 – 2985, Shanghai, China, March 20 – 25, 2016.

J. Bae and **N.A. Goodman**, "Target recognition with high-fidelity target signatures and adaptive waveforms in MIMO radar," in *Proc. 2015 IEEE 6th Intl. Workshop on Computational Advances in Multi-Sensor Adaptive Processing* (CAMSAP), pp. 285 – 288, Cancun, Dec. 13 – 16, 2015.

N.A. Goodman, "Angle-dependent range sidelobes of MIMO waveforms," in *Proc. 2015 IEEE International Radar Conference*, pp. 1756 – 1760, Washington DC., May 11 – 15, 2015. (INVITED)

F. Uysal, M. Yeary, **N.A. Goodman**, R.F. Rincon, and B. Osmanoglu, "Waveform design for wideband beampattern and beamforming," in *Proc. 2015 IEEE International Radar Conference*, pp. 1062 – 1066, Washington DC., May 11 – 15, 2015.

Z. Dunn, M. Yeary, C. Fulton, and **N.A. Goodman**, "Memory polynomial model for digital predistortion of broadband solid-state radar amplifiers," in *Proc. 2015 IEEE International Radar Conference*, pp. 1482 – 1486, Washington DC., May 11 – 15, 2015.

C. Zhou, Z. Shi, Y. Gu, and **N.A. Goodman**, "DOA estimation by covariance matrix sparse reconstruction of coprime array," in *Proc. 2015 IEEE Intl. Conference on Acoustics, Speech, and Signal Processing* (ICASSP), pp. 2369 – 2373, Brisbane, Australia, April 19 – 24, 2015.

N.A. Goodman, "Waveform design for radar target recognition with GMM-based classifier," in *Proc. NATO SET-204 Specialists' Meeting on Waveform Diversity*, Berlin, Sept. 29 – 30, 2014.

Y. Gu and **N.A. Goodman**, "Time domain CS kernel design for mitigation of wall reflections in urban radar," in *Proc. 2014 8th IEEE Sensor Array and Multichannel Signal Processing Workshop*, pp. 493 – 496, A Coruna, Spain, June 22 – 25, 2014. (INVITED)

Y. Gu and **N.A. Goodman**, "Compressive sensing kernel optimization for time delay estimation," in *Proc. 2014 IEEE Radar Conference*, pp. 1209 – 1213, Cincinnati, OH, May 19 – 23, 2014.

K. Windham and **N.A. Goodman**, "Preliminary results on subsampling effects on range migration correction in SAR imaging," in *Proc. 2014 IEEE Radar Conference*, pp. 1418 – 1423, Cincinnati, OH, May 19 – 23, 2014.

F. Liu, M.W. Marcellin, **N.A. Goodman**, and A. Bilgin, "Compressive sensing of direct sequence spread spectrum signals," in *Proc. SPIE Defense, Security, and Sensing: Compressive Sensing III*, Baltimore, May 5 – 9, 2014.

F. Liu, M.W. Marcellin, **N.A. Goodman**, and A. Bilgin, "Compressive detection of multiple frequency-hopping spread spectrum signals," in *Proc. 2014 Data Compression Conference*, pg. 415, Snowbird, UT, March 26 – 28, 2014.

J. Bae and **N.A. Goodman**, "Adaptive PRF selection technique for multiple targets in track-before-detect," in *Proc. 5th International Workshop on Computational Advances in Multi-Sensor Adaptive Processing* (CAMSAP 2013), St. Martin, pp. 448-451, Dec. 2013. (INVITED)

F. Liu, M. Marcellin, **N.A. Goodman**, and A. Bilgin, "Spread spectrum signal detection from compressive measurements," in *Proc. 2013 International Telemetering Conference* (ITC/USA 2013), Las Vegas, October 2013.

N.A. Goodman, "Compressive Radar," *in Proc. 2013 Computational Optical Sensing and Imaging* (COSI), June 2013. (INVITED)

N.A. Goodman, "Measurement constraints in compressive RF systems," in *Proc. 2013 International Conference on Sampling Theory and Applications*, Bremen, July 2013. (INVITED)

Y. Gu and **N.A. Goodman**, "Compressed sensing kernel design for radar range profiling," in *Proc. 2013 IEEE Radar Conference*, Ottawa, pp. 1-5, April 29 – May 3, 2013.

F. Liu, A. Bilgin, **N.A. Goodman**, and M.W. Marcellin, "Compressive detection of frequency-hopping spread spectrum signals," *SPIE Defense, Security, and Sensing: Compressive Sensing II*, Baltimore, April 29 – May 3, 2013.

B.R. Pollock and **N.A. Goodman**, "Structured de-chirp for compressive sampling of LFM waveforms," in *Proc. 7th IEEE Sensor Array and Multichannel Signal Processing Workshop*, pp. 37-40, Hoboken, June 2012. (INVITED)

B.R. Pollock and **N.A. Goodman**, "Detection performance of multibranch and multichannel compressive receivers," in *Proc. 7th IEEE Sensor Array and Multichannel Signal Processing Workshop*, pp. 341-344, Hoboken, June 2012. (INVITED)

B. Pollock and **N.A. Goodman**, "An examination of the effects of sub-Nyquist sampling on SNR," *SPIE Defense, Security, and Sensing: Compressive Sensing*, Baltimore, April 2012.

F. Liu, Y. Kim, **N.A. Goodman**, A. Ashok, A. Bilgin, "Compressive sensing of frequency-hopping spread spectrum signals," *SPIE Defense, Security, and Sensing: Compressive Sensing*, Baltimore, April 2012.

J. Bae and **N.A. Goodman**, "Widely separated MIMO radar with adaptive waveform for target classification," in *Proc. 4th International Workshop on Computational Advances in Multi-Sensor Adaptive Processing* (CAMSAP 2011), pp. 21-24, San Juan, Dec. 2011. (INVITED)

B. Pollock and **N.A. Goodman**, "Detection performance of compressively sampled radar signals," in *Proc. 2011 IEEE Radar Conference*, pp. 1117-1122, Kansas City, May 2011.

R. Romero and **N.A. Goodman**, "Adaptive beamsteering for search-and-track application with cognitive radar network," in *Proc. 2011 IEEE Radar Conference*, pp. 1091-1095, Kansas City, May 2011.

J.H. Bae and **N.A. Goodman**, "Automatic target recognition with unknown orientation and adaptive waveforms," in *Proc. 2011 IEEE Radar Conference*, pp. 1000-1005, Kansas City, May 2011.

K.M. Jagiello, W.E. Ryan, M.W. Marcellin, and **N.A. Goodman**, "Compressed sensing using Reed-Solomon and Q-ary LDPC codes," in *Proc. 2010 International Telemetering Conference*, San Diego, Oct. 2010. [Cd]

C.M. Kenyon and **N.A. Goodman**, "Range-Doppler ambiguity mitigation via closed-loop, adaptive PRF selection," in *Proc. 2010 International Conference on Electromagnetics in Advanced Applications* (ICEAA), pp. 608-611, Sydney, Australia, Sept. 2010. (INVITED)

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ADDITIONAL PRESENTATIONS/SEMINARS

Z. Dunn, M. Yeary, C. Fulton, **N.A. Goodman**, and Rafael Rincon, "Effects of cross-correlated waveforms on polarimetric scattering parameter recovery," AMS Radar Meteorology Conference, Norman, OK. Poster #78, September, 14-18, 2015.

N.A. Goodman, "Recent Activities and Research in Cognitive Radar," 2015 IEEE Military Radar Summit, Washington DC, February 2015.

N.A. Goodman, "Cognitive Radar Research & Potential Contributions," SET-227 Research Task Group Kickoff Meeting, February 2015.

N.A. Goodman, "Challenges in RF Compressive Sensing," OSA Compressive Sensing Incubator Meeting, Washington DC, April 2014.

N.A. Goodman, "Compressive Radar: System Considerations and Potential Applications," Raytheon North Texas Brownbag Seminar, November 2013.

N.A. Goodman, "Task-Specific Waveforms and Compressive Sampling for Radar," to Sandia ISR Systems Engineering and Decision Support, February 2013.

N.A. Goodman, "Fully Adaptive Waveforms and Sampling for Cognitive Radar," to cognitive radar working group, Dayton, OH, January 2013.

N.A. Goodman, "Radar Compressive Sensing: Performance, Constraints, and Applications," to JASON advisory group study on Compressed Sensing, June 2012.

N.A. Goodman, "Foundations of Cognitive Radar and Information-Optimal Sensing," to Georgia Tech Research Institute, Sensors & Electromagnetic Applications Laboratory (GTRI-SEAL), November 2009.

N.A. Goodman, "Foundations of Cognitive Radar and Information-Optimal Sensing," to Air Force Research Laboratory (AFRL), Sensors Directorate, Dayton, OH, Dec. 2008.

P. Mountcastle, **N.A. Goodman**, and C.J. Morgan, "Generalized Adaptive Radar Signal Processing," 2008 Missile Defense Sensors, Environments, and Applications (MD-SEA), Monterey, CA, Oct. 2008. (Classified)

N.A. Goodman, "Foundations of Cognitive Radar," to Dept. of ESE, Washington Univ. St. Louis, St. Louis, MO, June 2008.

N.A. Goodman, "Foundations of Cognitive Radar," to Radiology Research Group, University of Arizona, Tucson, AZ, March 2008.

D. Bruyere and **N.A. Goodman**, "Performance of multistatic space-time adaptive processing," Raytheon RF Symposium, Dallas, TX, April 2006.

P. Jin, **N.A. Goodman**, and K.L. Melde, "Conformal antenna arrays for reduced-dimension spread-spectrum communication," Connection One Semi-Annual Meeting, Phoenix, AZ, Jan. 2006.

N.A. Goodman, "SAR-based covariance estimation for STAP," *3rd Annual KASSPER Workshop*, Clearwater, Florida, April 2004.

N.A. Goodman, "LDPC Codes with Application to Multi-Antenna Communication Systems – Part II: MIMO Channels and the Aperture-Bandwidth Product," to General Dynamics, Scottsdale, AZ, Oct. 2003.

N.A. Goodman, "SAR and MTI Processing of Sparse Satellite Cluters," to AFRL-VS, Kirtland AFB, Albuquerque, NM, Aug. 2002.

N.A. Goodman, "SAR and MTI Processing of Sparse Satellite Clusters," to IEEE AESS and GRSS Atlanta Section Meeting, November 2001.

CONTINUING EDUCATION

"National Effective Teaching Institute," 2004 Annual Conference of the ASEE, June 17-19, 2004.

"Adaptive Array Processing and STAP: Theory, Applications, and Advanced Techniques," 2001 IEEE Radar Conference Tutorial, May 3, 2001

"Best Practices in Teaching: Preparing for the Professoriate," University of Kansas, Center for Teaching Excellence, May 2001

"STAP-I: Basics, Limitations, and Tradeoffs," 2000 IEEE Radar Conference Tutorial, May 11, 2000

"Principles of Radar", Raytheon TI Systems Training Course, 1998

"Principles of Pulse Doppler Radar: High, Medium, and Low PRF," Georgia Institute of Technology Continuing Education, April 1-3, 1997

"Radar Signal Processing," Texas Instruments Learning Institute, October 9-11, 1996