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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

Assistant Professor, 2002–Present
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 Electronics Systems Society

IEEE Geoscience and Remote Sensing Society

IEEE Antennas and Propagation Society

IEEE Signal Processing Society

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*,
EURASIP JASP, *IET Radar, Sonar & Navigation*

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

Tau Beta Pi

Eta Kappa Nu

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

Faculty Search Committee, The University of Kansas, 1994

HONORS AND AWARDS

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: *STTR: Three-Dimensional Radar Imaging of Ballistic Targets: Generalized Theory of Space-Time Adaptive Processing* (Phase II contract currently under negotiation)

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: \$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*

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: *Real-Beam Superresolution*

PIs: Pitu Mirchandani, Nathan Goodman

Role: Co-Principal 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:

- N.A. Goodman**, “Frequency-domain waterfilling and finite-duration waveforms,” submitted to *IEEE Signal Processing Letters*.
- H. Kim and **N.A. Goodman**, “Source-channel power control and detection outage in distributed sensor networks,” *submitted to IEEE Trans. on Signal Processing*.
- D.P. Bruyere and **N.A. Goodman**, “Adaptive detection and diversity order in multistatic radar,” submitted to *IEEE Trans. on Aerospace and Electronic Systems*. (under revision)
- W. Wu, C. Cooper, and **N.A. Goodman**, “Switched-element direction finding,” accepted to *IEEE Trans. on Aerospace and Electronic Systems*.
- Peng Jin, **N.A. Goodman**, and K.L. Melde, “Directional antenna arrays in CDMA ST-RAKE receiving,” accepted to *IEEE Trans. Vehicular Technology*.
- 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.

Conference Papers:

- T. Butler and **N.A. Goodman**, "Multistatic target classification with adaptive waveforms," accepted to *2008 IEEE Radar Conference*.
- R. Romero and **N.A. Goodman**, "Information-theoretic matched waveform in signal-dependent interference," accepted to *2008 IEEE Radar Conference*.
- N.A. Goodman**, "Closed-loop radar with adaptively matched waveforms," *2007 International Conference on Electromagnetics in Advanced Applications*. (INVITED).
- J.H. Bae and **N.A. Goodman**, "Adaptive waveforms for target class discrimination," *2007 International Waveform Diversity and Design Conference*.
- D. Bruyere and **N.A. Goodman**, "Performance of multistatic space-time adaptive processing," in *Proc. 2006 IEEE Radar Conference*, Verona, NY, pp. 533-538, Apr. 2006.
- T.L. Teer and **N.A. Goodman**, "Multistatic SAR algorithm with image combination," in *Proc. 2006 IEEE Radar Conference*, Verona, NY, pp. 490-497, Apr. 2006.
- Phaneendra R. Venkata and **N.A. Goodman**, "Novel iterative techniques for radar target discrimination," *2006 International Waveform Diversity and Design Conference*, Lihue, HI, Jan. 2006. [Cd-Rom]
- D. Bruyere and **N.A. Goodman**, "SINR improvements in multi-sensor space-time adaptive processing," in *Proc. Second IASTED International Conference on Antennas, Radar, and Wave Propagation*, Banff, CA, July 2005.
- P. Jin, **N.A. Goodman**, and K.L. Melde, "Performance of directional antenna arrays in CDMA ST-RAKE receiving," in *Proc. 2005 IEEE Antennas and Propagation Symposium*, Wash. D.C., vol. 4A, pp. 150-153, July 2005.
- N.A. Goodman** and P.R. Gurram, "STAP training through knowledge-aided predictive modeling," in *Proc. of the 2004 IEEE Radar Conference*, Philadelphia, pp. 388 – 393, April, 2004.
- N.A. Goodman** and J.M. Stiles, "Radar satellite constellations: SAR characterization and analysis," in *Proc. of the 2003 Advanced SAR Workshop*, Montreal, Canada, June, 2003. (INVITED)
- J. Stiles and **N.A. Goodman**, "Wide area, fine resolution SAR from Multi-Aperture Radar Arrays," in *Proc. of the 2003 Advanced SAR Workshop*, Montreal, Canada, June, 2003. (INVITED)
- N.A. Goodman** and J.M. Stiles, "Synthetic aperture characterization of radar satellite constellations," in *Proc. of the 2002 IEEE International Geoscience and Remote Sensing Symposium*, Toronto, Canada, June, 2002. (INVITED)
- N.A. Goodman** and J.M. Stiles, "The information content of multiple receive aperture SAR systems," in *Proc. of the IEEE International Geoscience and Remote Sensing Symposium*, Sydney, Australia, July, 2001.
- J.M. Stiles and **N. Goodman**, "Processing of multi-aperture SAR to produce fine-resolution images of arbitrarily large extent," in *Proc. of the 2001 IEEE Radar Conference*, Atlanta, Georgia, pp. 451-456, May 2001.
- N.A. Goodman** and J.M. Stiles, "A general signal processing algorithm for MTI with multiple receive apertures," in *Proc. of the 2001 IEEE Radar Conference*, Atlanta, Georgia, pp. 315-320, May 2001.

- J.M. Stiles, **N. Goodman**, and Guruvayurappan, “Minimum mean-squared error GPR processor for resolving shallow objects,” accepted for *Proc. of the SPIE Conference on Detection and Remediation of Mines and Minelike Targets*, April 2001.
- N. Goodman** and J.M. Stiles, “An MMSE filter for range sidelobe reduction,” in *Proc. of the IEEE International Geoscience and Remote Sensing Symposium*, Honolulu, Hawaii, pp. 2365-367, July 2000.
- J.M. Stiles, **N. Goodman**, and S. Lin, “Performance and processing of SAR satellite clusters,” in *Proc. of the IEEE International Geoscience and Remote Sensing Symposium*, Honolulu, Hawaii, pp. 883-885, July 2000.
- N. Goodman**, D. Rajakrishna, and J.M. Stiles, “Wide swath, high resolution SAR using multiple receive apertures,” in *Proc. of the IEEE International Geoscience and Remote Sensing Symposium*, Hamburg, Germany, pp. 1767-1769, June 1999.
- N. Goodman**, C. Leuschen, R. Plumb, and C. Allen, “Subsurface imaging techniques applied at a ground-penetrating radar test facility,” in *Proc. of the 6th International Conference on Ground Penetrating Radar*, Sendai, Japan, pp. 395-397, October 1996.
- C. Leuschen, **N. Goodman**, C. Allen, and R. Plumb, “An interferometric technique for synthetic-aperture ground-penetrating radar,” in *Proc. of the 6th International Conference on Ground Penetrating Radar*, Sendai, Japan, pp. 405-409, October 1996.
- C. Leuschen, **N. Goodman**, C. Allen, and R. Plumb, “An interferometric technique for synthetic aperture ground penetrating radar,” in *Proc. of the 1996 International Geoscience and Remote Sensing Symposium*, Lincoln, Nebraska, pp. 2033-2035, May 1996.
- N. Goodman**, C. Leuschen, R. Plumb, and C. Allen, “Subsurface imaging using ground-penetrating radar measurements,” in *Proc. of the 1996 International Geoscience and Remote Sensing Symposium*, Lincoln, Nebraska, pp. 2036-2037, May 1996.

PRESENTATIONS

- “Closed-loop radar with adaptively matched waveforms,” *2007 International Conference on Electromagnetics in Advanced Applications*, Turin, Italy, Sept. 2007. (INVITED)
- “Adaptive waveforms for target class discrimination,” *2007 Waveform Diversity and Design Conference*, Pisa, Italy, June 2007.
- “Performance of multistatic space-time adaptive processing,” *2006 IEEE Radar Conference*, Verona, NY, Apr. 2006.
- “STAP training through knowledge-aided predictive modeling,” *2004 IEEE Radar Conference*, Philadelphia, Pennsylvania, April 2004. (POSTER)
- “SAR-based covariance estimation for STAP,” *3rd Annual KASSPER Workshop*, Clearwater, Florida, April 2004.
- “Radar Satellite Constellations: SAR Characterization and Analysis,” *2003 Advanced SAR Workshop*, Montreal, Canada, June 2003.
- “Synthetic aperture characterization of radar satellite constellations,” *IEEE International Geoscience and Remote Sensing Symposium*, Toronto, Canada, June 2002.
- “SAR and MTI Processing of Sparse Satellite Clusters,” IEEE AESS and GRSS Atlanta Section Meeting, November 2001. (INVITED)

- “The information content of multiple receive aperture SAR systems,” *IEEE International Geoscience and Remote Sensing Symposium*, Sydney, Australia, July 2001. (POSTER)
- “A general signal processing algorithm for MTI with multiple receive apertures,” *2001 IEEE Radar Conference*, Atlanta, Georgia, May 2001. (POSTER)
- “An MMSE filter for range sidelobe reduction,” *IEEE International Geoscience and Remote Sensing Symposium*, Honolulu, Hawaii, July 2000. (POSTER)
- “Performance and processing of SAR satellite clusters,” *IEEE International Geoscience and Remote Sensing Symposium*, Honolulu, Hawaii, July 2000. (POSTER)
- “Wide swath, high resolution SAR using multiple receive apertures,” *IEEE International Geoscience and Remote Sensing Symposium*, Hamburg, Germany, June 1999.

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