

Curriculum Vitae

Peter G. Vouras

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Professional:

National Institute of Standards and Technology (NIST)
Communications Technology Lab (CTL), Wireless Networks Division, Gaithersburg, MD
November 2016 – present

Position: Electronics Engineer engaged in channel sounder research

- **Samurai Synthetic Aperture Team:** Led the technical development of the NIST synthetic aperture channel sounder (also known as Samurai). Samurai is a wideband, high resolution synthetic aperture capable of characterizing 5G and millimeter wave wireless channels with unprecedented precision. Samurai has now successfully transitioned to other NIST measurement programs.
- **CTL Innovator Series:** Invited speaker for talk on “The Role of the Antenna in Channel Sounding”

Naval Research Laboratory, Radar Division, Washington, D.C.
March 1996 – October 2016

NRL is the corporate research laboratory of the U.S. Navy and engages in a broad range of basic and applied radar research.

Surveillance Technology Branch, Advanced Signal Processing Section

Position: Principal Investigator (PI) of 6.1 Basic Research Effort

- PI of 3-year basic research effort with \$1.2m budget.
- Responsible for conducting and directing basic research into the use of nonlinear adaptive beamforming techniques for phased array radars.

Position: Team Lead for DARPA ReACT Project

- Provide guidance to team members to create high fidelity MATLAB simulation of advanced radar beamforming concepts.

Position: Co-Principal Investigator of DARPA Adaptive Radar Countermeasures Project

- Co-PI of 3 year DARPA effort to develop advanced technology for electronic warfare.
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Service:

IEEE Synthetic Aperture Technical Working Group

- Proposed and successfully won approval by the IEEE Signal Processing Society to create an officially recognized Technical Working Group (TWG) dedicated to open research questions related to synthetic apertures. Chair monthly group meetings which include distinguished researchers from the fields of remote sensing, channel sounding, and radar. Visit <https://signalprocessingsociety.org/community-involvement/synthetic-aperture-technical-working-group/synthetic-aperture-twg>

ICASSP 2021 Special Session on “Imaging and Sensing with Synthetic Apertures

- Proposed and co-organized special session
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Education:

The Johns Hopkins University, Homewood Campus, Baltimore, MD
M.S.E., Electrical and Computer Engineering, 2001

Thesis: “A Parallel QR-Based Algorithm for Computing the Pseudoinverse with Applications to Adaptive Nulling”

George Mason University, Fairfax, VA
B.S., Electrical and Computer Engineering, 1992

University of Virginia, Charlottesville, VA
B.A., Economics, 1989

University of Virginia, Charlottesville, VA
B.A., Foreign Affairs, 1989

Publications (full text downloads of unclassified manuscripts available at www.vouras.com):

Journal Papers

1. "Robust Transmit Nulling in Wideband Arrays", P. Vouras and T. Tran, *IEEE Transactions on Signal Processing*, Vol. 62, No. 14, July 15, 2014
2. "Wideband Synthetic Aperture Millimeter-Wave Spatial Channel Measurements with Uncertainties", P. Vouras, D. Guven, J. Quimby, B. Jamroz, A. Weiss, R. Leonhardt, J. Kast, R. Jones, D. Williams, K. Remley, *IEEE Transactions on Microwave Theory and Techniques*, under review

Selected Conference Papers

1. "Frequency Invariant Beampatterns for Wideband Synthetic Aperture Channel Sounders", P. Vouras, J. Quimby, B. Jamroz, A. Weiss, R. Leonhardt, D. Williams, K. Remley, *21st IEEE International Workshop on Signal Processing Advances in Wireless Communications*, Virtual Conference, May 26-29, 2020
2. "Gradient-Based Solution of Maximum Likelihood Angle Estimation for Virtual Array Measurements", P. Vouras, A. Weiss, M. Becker, B. Jamroz, J. Quimby, D. Williams, K. Remley, *2018 IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, Anaheim, CA., November 26-29, 2020
3. "Configuration and Control of a Millimeter-Wave Synthetic Aperture Measurement System with Uncertainties", A. Weiss, J. Quimby, R. Leonhardt, B. Jamroz, D. Williams, K. Remley, P. Vouras, A. Elsherbeni, *95th ARFTG Microwave Measurement Conference*, Virtual Conference, August 6, 2020
4. "Toward a Recommended Practice for Verifying Millimeter-Wave Wireless Channel Sounders", D. Michelson, J. Quimby, P. Vouras, *2020 IEEE International Symposium on Antennas and Propagation*, Montreal, Canada, July 5-10, 2020
5. "Large-Signal Network Analysis for Over-the-Air Test of Up-Converting and Down-Converting Phased Arrays", A. Weiss, D. Williams, J. Quimby, R. Leonhardt, T. Choi, Z. Cheng, K. Remley, A. Molisch, B. Jamroz, J. Rezac, P. Vouras, C. Zhang, *2019 IEEE MTT-S International Microwave Symposium*, Boston, MA., June 2-7, 2019
6. "Millimeter-Wave Radio Channels vs Synthetic Beamwidth", R. Sun, C. Gentile, J. Senic, P. Vouras, P. Papazian, N. Golmie, K. Remley, *IEEE Communications Magazine*, Vol. 56, Issue 12, December 2018
7. "Millimeter-Wave Channel Measurement and Modeling: A NIST Perspective," C. Gentile, P. Papazian, N. Golmie, K. Remley, P. Vouras, J. Senic, J. Wang, D. Caudill, C. Lai, R. Sun, J. Chuang, *IEEE Communications Magazine*, Vol. 56, Issue 12, December 2018
8. "Multipath Mitigation Techniques for Nonlinear Adaptive Beamforming", P. Vouras, *Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA., November 6-9, 2016
9. "Fully Adaptive Space-Time Processing on Nested Arrays", P. Vouras, *IEEE Radar Conference*, Arlington, VA., May 11-15, 2015
10. "Sample Support Requirements for Nonlinear Adaptive Beamforming", P. Vouras, *Conference on Information Sciences and Systems*, Baltimore, MD., March 18-20, 2015
11. "Multirate Processing Using Nested Sampling", P. Vouras, *Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA., November 2-5, 2014
12. "Monopulse Angle Estimation Using Nested Arrays (U)", P. Vouras, *Tri-Service Radar Symposium*, Springfield, VA., July 21-25, 2014
13. "Space-Time Adaptive Processing on Nested Arrays (U)", P. Vouras, *Tri-Service Radar Symposium*, Springfield, VA., July 21-25, 2014
14. "Foreign Radar Development Programs: Cognitive Systems, Multistatic, and Networked Sensors", R. Blasberg and P. Vouras, *Journal of Intelligence Community Research and Development*, June 9, 2014
15. "Radar Electronic Protection Using Nested Arrays (U)", P. Vouras, *Tri-Service Radar Symposium*, Orlando, FL., June 17-21, 2013
16. "Multistage Adaptive Pulse Compression", P. Vouras, *IEEE Radar Conference*, Ottawa, Canada, April 29-May 3, 2013
17. "Impact of Environmental Scattering on Transmit Nulling Performance", P. Vouras, *IEEE Radar Conference*, Ottawa, Canada, April 29-May 3, 2012
18. "Measured Transmit Nulling Performance in Wideband Arrays", P. Vouras and J. de Graaf, *IEEE Radar Conference*, Atlanta, GA., May 7-11, 2012
19. "Algebraic Construction of MIMO Radar Waveforms", P. Vouras, *Waveform Diversity and Design Conference*, Kauai, HI., January 22-27, 2012
20. "Array Architectures for Wideband Transmit Nulling", P. Vouras and J. de Graaf, *Waveform Diversity and Design Conference*, Kauai, HI., January 22-27, 2012
21. "Robust Transmit Nulling in Phased Array Antennas", P. Vouras and J. de Graaf, *Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA., November 6-9, 2011
22. "Novel Applications of Radar Transmit Nulling (U)", P. Vouras, *Tri-Service Radar Symposium*, Monterey, CA., June 27-30, 2011
23. "Adaptive Transmit Nulling Using Waveform Embedded Dithers", P. Vouras, *IEEE Radar Conference*, Kansas City, MO., May 23-27, 2011
24. "Near Real-Time Adaptive Radar Processing Using Analog Dithers", P. Vouras, *IEEE Radar Conference*, Pasadena, CA., May 4-8, 2009
25. "Rational Canonical Form of Polyphase Matrices With Applications to Designing Paraunitary Filter Banks", P. Vouras, T. Tran, and M. Ching, *International Conference on Acoustics, Speech, and Signal Processing*, Taipei,

Taiwan, April 19-24 2009

26. "Design of Pointwise-in-Frequency Paraunitary Filter Banks", P. Vouras and T. Tran, *Conference on Information Sciences and Systems*, Baltimore, MD., March 18-20, 2009
27. "Factorization of Paraunitary Polyphase Matrices Using Subspace Projections", P. Vouras and T. Tran, *Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA., October 26-29, 2008
28. "Application of Adaptive Beamforming Techniques to HF Radar", P. Vouras and B. Freburger, *IEEE Radar Conference*, Rome, Italy, May 26-30, 2008
29. "Signal Adapted Filter Bank Design Using Markov Parameters", P. Vouras and T. Tran, *Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA., November 4-7, 2007
30. "High Performance Parallel Implementation of Adaptive Beamforming Using Sinusoidal Dithers", P. Vouras, *Eleventh Annual Workshop on High Performance Embedded Computing*, Lexington, MA., September 18-20, 2007
31. "Paraunitary Filter Bank Design Using Derivative Constraints", P. Vouras and T. Tran, *International Conference on Acoustics, Speech, and Signal Processing*, Honolulu, HI., April 15-20, 2007
32. "Discrete-Time Dithering Technique for Designing Time-Varying Signal Adapted Filter Banks", P. Vouras and T. Tran, *Conference on Information Sciences and Systems*, Baltimore, MD., March 14-16, 2007
33. "Wideband Adaptive Beamforming Using Linear Phase Filterbanks", P. Vouras and T. Tran, *Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA., October 29 - November 1, 2006
34. "Detection of Targets in Bandlimited and Spatially Correlated Clutter", P. Vouras, *IEEE International Radar Conference*, Verona, N.Y., April 24-27, 2006
35. "Design of FIR Paraunitary Approximations to Principal Component Filter Banks", P. Vouras and T. Tran, *Conference on Information Sciences and Systems*, Princeton, N.J., March 22-24, 2006
36. "Principal Component Filter Bank for Band Partitioned Sidelobe Cancellation", P. Vouras and T. Tran, *IEEE International Radar Conference*, Arlington, VA., May 9-12, 2005
37. "Hybrid QR Factorization Algorithm for High Performance Computing Architectures", P. Vouras and G. G. L. Meyer, *Sixth Annual Workshop on High Performance Embedded Computing*, Lexington, MA., September 24-26, 2002
38. "A Comparison of Aegis Signal Processing Implementations on Multiprocessor Servers and Embedded Systems", P. Vouras, *Tri-Service Radar Symposium*, Monterey, CA., June 24-27, 2002
39. "Advanced Radar Signal Processing on General-Purpose Commercial Multiprocessor Systems", P. Vouras, *Fourth Annual Workshop on High Performance Embedded Computing*, Lexington, MA., September 20-22, 2000
40. "Automatic Parallelization and Locality Optimization of Beamforming Algorithms", A. Hartono, N. Vasilache, C. Bastoul, A. Leung, B. Meister, R. Lethin, P. Vouras, *Fourteenth Annual Workshop on High Performance Embedded Computing*, Lexington, MA., September 15-16, 2010

Patents

1. "Sparse Space-Time Adaptive Array Architecture", U.S. patent serial number 62/055,961, September 26, 2014