

CURRICULUM VITAE

Prof. **Sergiy A. Vorobyov**

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PERSONAL DATA

Data and place of birth: May 24, 1972; Ukraine

Citizenship: Canada

ACADEMIC POSITIONS

Full Professor	01/13 – present	Aalto University (former HUT), Espoo, Helsinki	Finland
Adjunct Professor	present	University of Alberta, Edmonton, Alberta	Canada
Full Professor	07/12 – 2014	University of Alberta, Edmonton, Alberta	Canada
Associate Professor	07/10 – 06/12	University of Alberta, Edmonton, Alberta	Canada
Reader (Associate Professor)	09/07 – 07/08	Joint Research Institute: Heriot-Watt and Edinburgh Universities, Edinburgh	UK
Assistant Professor	09/06 – 06/10	University of Alberta, Edmonton, Alberta	Canada
Senior Researcher	04/05 – 09/06	Darmstadt University of Technology, Darmstadt	Germany
Senior Researcher	04/03 – 12/04	Duisburg-Essen University, Duisburg	Germany
PDF & Researcher	04/01 – 03/05	McMaster University, Hamilton, Ontario	Canada
Research Scientist	04/99 – 03/01	Inst. Physical and Chemical Research, Wako-shi	Japan
Research Scientist	06/97 – 03/99	Kharkov National University of Radioelectronics	Ukraine

EDUCATION

Ph.D. in Systems and Data Processing (with distinction)

Kharkov National University of Radioelectronics, Kharkov, Ukraine 10/94 – 05/97

Thesis: Adaptive multilayered estimation and fault detection in nonstationary stochastic sequences

M.Sc. in Optimal Control and Data Processing (top grade in the year – 5/5)

Kharkov National University of Radioelectronics, Kharkov, Ukraine 09/89 – 07/94

Thesis: Detection of fractal properties of neuronal activity signals

P.Eng. of Alberta, Canada

since 01/09

RESEARCH AWARDS AND HONORS

IEEE Signal Processing Society's 2004 Best Paper Award for the paper titled “Robust adaptive beamforming using worst-case performance optimization: A solution to the signal mismatch problem” (co-authored with A.B. Gershman and Z.-Q. Luo) that was published in the February 2003 issue of the *IEEE Transactions on Signal Processing*

NSERC Discovery Accelerator Award, 2012, Canada

Carl Zeiss Award, 2011, Germany

Alberta Ingenuity New Faculty Award, 2007, Alberta, Canada

Highly cited paper (ISI Web of Knowledge) status for my 2003 IEEE Trans. Signal Processing paper (coauthored by A.B. Gershman and Z.-Q. Luo) on robust adaptive beamforming.

ACADEMIC FELLOWSHIPS

01/99 – 03/99 German Academic Exchange Service (DAAD) Young Scientist Fellowship, Germany

01/96 – 04/98 Outstanding Young Scientist (Cabinet of Ministers) Fellowship, Ukraine

04/96 – 03/97 Young Scientist grant (Ph.D. student), PSU071075, Soros Foundation (ISSEP)

04/95 – 03/96 Young Scientist grant (Ph.D. student), PSU061018, Soros Foundation (ISSEP)

OTHER AWARDS AND HONORS

05/89 Rank 3 in Universities' Physics Contest, Ukraine

03/88 Rank 1 in Geometry and Drawing Contest (Kharkov region), Ukraine

Appreciated Reviewer: Recognition granted by *IEEE Transactions on Signal Processing*, 2006 and 2007

RESEARCH

My interests are in: Applications of optimization, learning, and linear algebra methods in signal processing and communications; Statistical signal and array processing with applications to wireless communications, MIMO radar, data networks, and biomedical engineering; Resource allocation in communication networks; Cognitive and cooperative aspects of data processing, Estimation and detection theory; Sampling and compressive sampling of data.

PUBLICATIONS

Journal: 68 (62 published/to appear, 6 under review)

Books and book chapters: 4

Conference: 119 (115 published/accepted, 4 under review)

Journal papers

Papers published / to appear

- [J1] O. Taheri and **S. A. Vorobyov**, "Reweighted l1-norm penalized LMS for sparse channel estimation and its analysis," *Elsevier Signal Processing*, vol. 104, pp. 70-79, May 2014.
- [J2] A. Khabbazibasmenj, A. Hassanien, **S. A. Vorobyov**, M. W. Morency, "Efficient transmit beamspace design for search-free based DOA estimation in MIMO radar," *IEEE Trans. Signal Processing*, vol. 62, no. 6, pp. 1490–1500, Mar. 2014.
- [J3] H. Fang, **S. A. Vorobyov**, H. Jiang, and O. Taheri, "Permutation meets parallel compressed sensing: How to relax restricted isometry property for 2D sparse signals," *IEEE Trans. Signal Processing*, vol. 62, no. 1, pp. 196–210, Jan. 2014.
- [J4] **S. A. Vorobyov**, "Principles of minimum variance robust adaptive beamforming design," *El-*

sevier Signal Processing, **invited paper**, Special Issue: *Advances in Sensor Array Processing*, vol. 93, pp. 3264–3277, Dec. 2013 (in memory of Alex B. Gershman).

- [J5] A. Khabbazi-basmenj and **S. A. Vorobyov**, “Robust adaptive beamforming for general-rank signal model with positive semi-definite constraint via POTDC,” *IEEE Trans. Signal Processing*, vol. 61, no. 23, pp. 6103–6117, Dec. 2013.
- [J6] Z. Chen, C.-X. Wang, X. Hong, J. Thompson, **S. A. Vorobyov**, F. Zhao, and X. Ge, “Interference mitigation for cognitive radio MIMO systems based on practical precoding,” *Elsevier Physical Communication*, **invited paper**, Special Issue: *Wireless Networks Planning and Optimization*, vol. 9, pp. 308–315, Dec. 2013.
- [J7] J. Gao, **S. A. Vorobyov**, H. Jiang, J. Zhang, and M. Haardt, “Sum-rate maximization with minimum power consumption for MIMO DF two-way relaying: Part II - Network optimization,” *IEEE Trans. Signal Processing*, vol. 61, no. 14, pp. 3578–3591, July 2013.
- [J8] J. Gao, **S. A. Vorobyov**, H. Jiang, J. Zhang, and M. Haardt, “Sum-rate maximization with minimum power consumption for MIMO DF two-way relaying: Part I - Relay optimization,” *IEEE Trans. Signal Processing*, vol. 61, no. 14, pp. 3563–3577, July 2013.
- [J9] Z. Chen, **S. A. Vorobyov**, C.-X. Wang, and J. Thompson, “Pareto region characterization for rate control in MIMO interference systems and Nash bargaining,” *IEEE Trans. Automatic Control*, vol. 57, no. 12, pp. 3203–3208. Dec. 2012.
- [J10] A. Khabbazi-basmenj, F. Roemer, **S. A. Vorobyov**, and M. Haardt, “Sum-rate maximization in two-way AF MIMO relaying: Polynomial time solutions to a class of DC programming problems,” *IEEE Trans. Signal Processing*, vol. 60, no. 10, pp. 5478–5493, Oct. 2012.
- [J11] Y. Ko, M. Ardakani, and **S. A. Vorobyov**, “Power allocation strategies across N orthogonal channels at both source and relay,” *IEEE Trans. Communications*, vol. 60, no. 6, pp. 1469–1473, June 2012.
- [J12] A. Khabbazi-basmenj, **S. A. Vorobyov**, and A. Hassaniien, “Robust adaptive beamforming based on steering vector estimation with as little as possible prior information,” *IEEE Trans. Signal Processing*, vol. 60, no. 6, pp. 2974–2987, June 2012.
- [J13] A. Hassaniien, **S. A. Vorobyov**, and A. B. Gershman, “Moving target parameters estimation in non-coherent MIMO radar systems,” *IEEE Trans. Signal Processing*, vol. 60, no. 5, pp. 2354–2361, May 2012.
- [J14] Z. Chen, C.-X. Wang, X. Hong, J. Thompson, **S. A. Vorobyov**, X. Ge, H. Xiao, and F. Zhao, “Aggregate interference modeling in cognitive radio networks with power and contention control,” *IEEE Trans. Communications*, vol. 60, no. 2, pp. 456–468, Feb. 2012.
- [J15] A. Khabbazi-basmenj and **S. A. Vorobyov**, “Power allocation based on SEP minimization in two-hop decode-and-forward relay networks,” *IEEE Trans. Signal Processing*, vol. 59, no. 8, pp. 3954–3963, Aug. 2011.
- [J16] A. Hassaniien and **S. A. Vorobyov**, “Transmit energy focusing for DOA estimation in MIMO radar with colocated antennas,” *IEEE Trans. Signal Processing*, vol. 59, no. 6, pp. 2669–2682, June 2011.
- [J17] X. Gong, **S. A. Vorobyov**, and C. Tellambura, “Optimal bandwidth and power allocation for sum ergodic capacity under fading channels in cognitive radio networks,” *IEEE Trans. Signal Processing*, vol. 59, no. 4, pp. 1814–1826, Apr. 2011.
- [J18] X. Gong, **S. A. Vorobyov**, and C. Tellambura, “Joint bandwidth and power allocation with admission control in multi-user networks with and without relaying,” *IEEE Trans. Signal*

Processing, vol. 59, no. 4, pp. 1801–1813, Apr. 2011.

- [J19] O. Taheri and **S. A. Vorobyov**, “Segmented compressed sampling for analog-to-information conversion: Method and performance analysis,” *IEEE Trans. Signal Processing*, vol. 59, no. 2, pp. 554–572, Feb. 2011.
- [J20] M. F. A. Ahmed and **S. A. Vorobyov**, “Sidelobe control in collaborative beamforming via node selection,” *IEEE Trans. Signal Processing*, vol. 58, no. 8, pp. 6168–6180, Dec. 2010.
- [J21] Y. Ko, **S. A. Vorobyov**, and M. Ardakani, “How much multiuser diversity is required for energy limited multiuser systems?” *IEEE Trans. Signal Processing*, vol. 58, no. 8, pp. 4367–4378, Aug. 2010.
- [J22] J. Gao, **S. A. Vorobyov**, and H. Jiang, “Cooperative resource allocation games with spectral mask and total power constraints,” *IEEE Trans. Signal Processing*, vol. 58, no. 8, pp. 4379–4395, Aug. 2010.
- [J23] A. Hassanien and **S. A. Vorobyov**, “Phased MIMO radar: A tradeoff between phase-array and MIMO radars,” *IEEE Trans. Signal Processing*, vol. 58, no. 6, pp. 3137–3151, June 2010.
- [J24] X. Hong, Z. Chen, C.-X. Wang, **S. A. Vorobyov**, and J. Thompson, “Cognitive radio networks: Interference cancelation and management techniques,” *IEEE Vehicular Technology Magazine*, vol. 4, no. 4, pp. 76–84, Dec. 2009.
- [J25] K. T. Phan, L. Le, **S. A. Vorobyov**, and T. Le-Ngoc, “Power allocation and admission control in multi-user relay networks via convex programming: Centralized and distributed schemes,” *EURASIP Journal on Wireless Communications and Networking*, **invited paper**, Special Issue: *Optimization Techniques in Wireless Communications*, vol. 2009, Article ID 901965, 12 pages.
- [J26] K. T. Phan, H. Jiang, R. Fan, **S. A. Vorobyov**, and C. Tellambura, “Network lifetime maximization with node admission in wireless multimedia sensor networks,” *IEEE Trans. Vehicular Technology*, vol. 58, no. 7, pp. 3640–3646, Sept. 2009.
- [J27] K. T. Phan, **S. A. Vorobyov**, N. D. Sidiropoulos, and C. Tellambura, “Spectrum sharing in wireless networks via QoS-aware secondary multicast beamforming,” *IEEE Trans. Signal Processing*, vol. 57, no. 6, pp. 2323–2335, June 2009.
- [J28] K. T. Phan, T. Le-Ngoc, **S. A. Vorobyov**, and C. Tellambura, “Power allocation in wireless multiuser relay networks,” *IEEE Trans. Wireless Communications*, vol. 8, no. 2, pp. 2535–2545, May 2009.
- [J29] L. Li, **S. A. Vorobyov**, and A. B. Gershman, “Transmit antenna selection based strategies in MISO communication systems with low-rate channel state feedback,” *IEEE Trans. Wireless Communications*, vol. 8, no. 4, pp. 1660–1666, Apr. 2009.
- [J30] M. F. A. Ahmed and **S. A. Vorobyov**, “Collaborative beamforming for wireless sensor networks with Gaussian distributed sensor nodes,” *IEEE Trans. Wireless Communications*, vol. 8, no. 2, pp. 638–643, Feb. 2009.
- [J31] K. T. Phan, **S. A. Vorobyov**, and C. Tellambura, “Precoder design for space-time coded systems over correlated Rayleigh fading channels using convex optimization,” *IEEE Trans. Signal Processing*, vol. 57, no. 2, pp. 814–819, Feb. 2009.
- [J32] A. Hassanien and **S. A. Vorobyov**, “A robust adaptive dimension reduction technique with application to array processing,” *IEEE Signal Processing Letters*, vol. 16, no. 1, pp. 22–25, Jan. 2009.
- [J33] K. T. Phan, H. Jiang, C. Tellambura, **S. A. Vorobyov**, and R. Fan, “Joint medium ac-

- cess control, routing and energy distribution in multi-hop wireless networks,” *IEEE Trans. Wireless Communications*, vol. 7, no. 12, pp. 5244–5249, Dec. 2008.
- [J34] A. Hassanien, **S. A. Vorobyov**, and K. M. Wong, “Robust adaptive beamforming using sequential quadratic programming: An iterative solution to the mismatch problem,” *IEEE Signal Processing Letters*, vol. 15, pp. 733–736, 2008.
- [J35] **S. A. Vorobyov**, H. Chen, and A. B. Gershman, “On the relationship between robust minimum variance beamformers with probabilistic and worst-case distortionless response constraints,” *IEEE Trans. Signal Processing*, vol. 56, no. 11, pp. 5719–5724, Nov. 2008.
- [J36] **S. A. Vorobyov**, “Robust CDMA multiuser detectors: Probability-constrained versus the worst-case based design,” *IEEE Signal Processing Letters*, vol. 15, pp. 273–276, 2008.
- [J37] Y. Rong, **S. A. Vorobyov**, and A. B. Gershman, “Adaptive OFDM techniques with one-bit-per-subcarrier channel state feedback,” *IEEE Trans. Communications*, vol. 54, no. 11, pp. 1993–2003, Nov. 2006.
- [J38] Y. Rong, **S. A. Vorobyov**, and A. B. Gershman, “Robust linear receivers for multi-access space-time block coded MIMO systems: A probabilistically constrained approach,” *IEEE J. Selected Areas in Communications*, **invited paper**, Special Issue: *Nonlinear Optimization of Communication Systems*, vol. 24, no. 8, pp. 1560–1570, Aug. 2006.
- [J39] **S. A. Vorobyov**, “Blind unitary prewhitening with a real-valued eigendecomposition,” *Circuits, Systems and Signal Processing*, vol. 25, no. 3, pp. 421–429, June 2006.
- [J40] Y. Rong, **S. A. Vorobyov**, and A. B. Gershman, “Linear block precoding for OFDM systems based on maximization of mean cutoff rate,” *IEEE Trans. Signal Processing*, vol. 53, no. 12, pp. 4691–4696, Dec. 2005.
- [J41] **S. A. Vorobyov**, Y. Rong, N. D. Sidiropoulos, A. B. Gershman, “Robust iterative fitting of multilinear models,” *IEEE Trans. Signal Processing*, vol. 53, no. 8, pp. 2678–2689, Aug. 2005.
- [J42] Y. Rong, **S. A. Vorobyov**, A. B. Gershman, N. D. Sidiropoulos, “Blind spatial signature estimation via time-varying user power loading and parallel factor analysis,” *IEEE Trans. Signal Processing*, vol. 53, no. 5, pp. 1697–1710, May 2005.
- [J43] **S. A. Vorobyov**, A. B. Gershman and M. Wong, “Maximum likelihood direction-of-arrival estimation in unknown noise fields using sparse sensor arrays,” *IEEE Trans. Signal Processing*, vol. 53, no. 1, pp. 34–43, Jan. 2005.
- [J44] **S. A. Vorobyov**, A. B. Gershman, Z.-Q. Luo, and N. Ma, “Adaptive beamforming with joint robustness against mismatched signal steering vector and interference nonstationarity,” *IEEE Signal Processing Letters*, vol. 11, no. 2, pp. 108–111, Feb. 2004.
- [J45] **S. A. Vorobyov**, A. B. Gershman, and Z.-Q. Luo, “Robust adaptive beamforming using worst-case performance optimization: A solution to the signal mismatch problem,” *IEEE Trans. Signal Processing*, vol. 51, no. 2, pp. 313–324, Feb. 2003.
2004 (Senior) Best Paper Award by the IEEE Signal Processing Society. The number of citations places the paper in the top 1% within its field according to *Essential Science Indicator*.
- [J46] **S. A. Vorobyov** and A. Cichocki, “Blind noise reduction for multi-sensory signals using ICA and subspace filtering with application to EEG analysis,” *Biological Cybernetics*, vol. 86, no. 4, pp. 293–303, Apr. 2002.
- [J47] **S. A. Vorobyov** and A. Cichocki, “Hyper radial basis function neural networks for interference cancellation with nonlinear processing of reference signal,” *Digital Signal Processing*:

A Review Journal, vol. 11, no. 3, pp. 204–221, July 2001.

- [J48] **S. A. Vorobyov**, A. Cichocki and Ye. V. Bodyanskiy, “Adaptive noise cancellation for multi-sensory signals,” *Fluctuation and Noise Letters*, vol. 1, no. 1, pp. R13–R24, Mar. 2001.
- [J49] Ye. V. Bodyanskiy and **S. A. Vorobyov**, “Recurrent neural network detecting changes in the properties of nonlinear stochastic sequences,” *Automation and Remote Control*, vol. 61, no. 7, pp. 1113–1124, July 2000.
- [J50] Ye. V. Bodyanskiy, **S. A. Vorobyov**, and V. A. Timofeev, “Adaptive recognition of the states of dynamical object with periodic output signal,” *Pattern Recognition and Image Analysis*, vol. 9, no. 3, pp. 505–509, June 1999.
- [J51] Ye. V. Bodyanskiy, **S. A. Vorobyov**, and A. Stephan, “Algorithm for adaptive identification of dynamical parametrically nonstationary objects,” *International Journal of Computer and System Sciences*, vol. 38, no. 1, pp. 14–18, Jan. 1999.
- [J52] **S. A. Vorobyov** and Ye. V. Bodyanskiy, “On one non-parametric algorithm for smoothing parameter control in adaptive filtering,” *Engineering Simulation*, vol. 16, pp. 341–350, 1999.
- [J53] **S. A. Vorobyov**, Ye. V. Bodyanskiy and S. V. Popov, “Multi-model based adaptive control of a turbo-generator pilot plant,” *Trans. of Kharkov State Automobiles and High-Ways University*, issue 12-13, pp. 221–225, 2000.
- [J54] **S. A. Vorobyov**, A. Ya. Mogilevskiy, S. A. Ponomarenko and A. V. Shilo, “Approaches for solving ”short series” problem in detecting fractal properties of EEG and neuronal activity signals,” *Radioelectronics and Informatics*, no. 1, pp. 105–109, Jan.-Mar. 1999 (in Russian).
- [J55] **S. A. Vorobyov**, “The mechanisms of stochastic behavior in Hopfield networks,” *Trans. of Kharkov State Polytechnic University*, issue 70, pp. 123–129, 1999 (in Russian).
- [J56] **S. A. Vorobyov** and A. V. Shilo, “Recurrent normalized range method for detecting fractal structure of stochastic series and its application to EEG analysis,” *Radioelectronics and Informatics*, no. 3, pp. 162–165, July-Sept. 1998 (in Russian).
- [J57] Ye. V. Bodyanskiy, **S. A. Vorobyov**, O. V. Kostyuk and L. M. Lyubchik, ”Filtering and forecasting for trend-season time series using artificial neural networks,” *Radioelectronics and Informatics*, no. 3, pp. 74–80, July-Sept. 1998 (in Russian).
- [J58] **S. A. Vorobyov**, “Learning of artificial neural networks under stochastic conditions,” *Radioelectronics and Informatics*, no. 1, pp. 88–90, Jan.-Mar. 1998 (in Russian).
- [J59] Ye. V. Bodyanskiy, **S. A. Vorobyov**, I. P. Pliss and O. V. Churilova, “Monitoring and fault detection in adaptive forecasting process,” *Control Systems and Devices of Automatics*, issue 107, pp. 167–175, 1998 (in Russian).
- [J60] **S. A. Vorobyov**, “Non-parametric algorithm for forgetting factor control in adaptive filtering,” *Radiotechnics*, issue 104, pp. 179–182, 1997 (in Russian).
- [J61] Ye. V. Bodyanskiy, **S. A. Vorobyov**, N. S. Lamonova, and A. Stephan, “Detection of properties’ changes in stochastic sequences using artificial neural networks,” *Control Systems and Devices of Automatics*, issue 106, pp. 83–88, 1997 (in Russian).
- [J62] **S. A. Vorobyov**, “Adaptive multilayer filtering of nonstationary sequences,” *Control Systems and Devices of Automatics*, issue 104, pp. 94–98, 1997 (in Russian).

Papers under review / submission

- [J63] M. Shaghaghi and **S. A. Vorobyov**, “Finite-length and asymptotic analysis of averaged

correlogram for undersampled data,” submitted Nov. 2013.

- [J64] M. Shaghghi and **S. A. Vorobyov**, “Subspace leakage analysis and improved DOA estimation with small sample size,” submitted, July 2014.
- [J65] Y. Li, **S. A. Vorobyov**, and V. Koivunen, “Ambiguity function of the transmit beamspace-based MIMO radar,” submitted July 2014.
- [J66] J. Gao, **S. A. Vorobyov**, H. Jiang, and H. V. Poor, “Worst-case jamming on MIMO Gaussian channels,” submitted Oct. 2014.
- [J67] A. E. Geyer, R. Nikjah, **S. A. Vorobyov**, and N. C. Beaulieu, “Euclidean and space-time block codes: Relationship, optimality, performance analysis revisited,” submitted Oct. 2014.
- [J68] H. Fang, **S. A. Vorobyov**, and H. Jiang, “Performance limits of compressed sensing with correlated measurements: Information theoretic analysis,” submitted, Oct. 2014,

Books and Book Chapters

- [B1] **S. A. Vorobyov**, “Adaptive and robust beamforming,” in *Academic Press Library in Signal Processing, Vol. 3, Array and Statistical Signal Processing*, Eds. R. Chellappa and S. Theodoridis, Academic Press, 2014, pp. 503–552. (ISBN 978-0-12-411597-2)
- [B2] J. Gao, **S. A. Vorobyov**, and H. Jiang, “Game theory in multi-user wireless communications,” in *Game Theory for Wireless Communications and Networking*, Ed. Y. Zhang and M. Guizani, Auerbach Publications, CRC Press, Taylor&Francis Group, 2011, pp. 3–25. (ISBN 978-1-4398-0889-4 (hardback))
- [B3] L. B. Le, **S. A. Vorobyov**, K. T. Phan, and T. Le-Ngoc, “Recourse allocation and QoS provisioning for wireless relay networks,” in *Quality of Service Architectures for Wireless Networks: Performance Metrics and Management*, Ed. S. Adibi, R. Jain, S. Parekh, and M. Tofiqbakhsh, IGI Global (IDEA Group), 2010, pp. 125–150. (ISBN 978-1-61520-6803 (hardcover), ISBN 978-1-51520-681-0 (edook))
- [B4] **S. A. Vorobyov**, S. A. Mar’in, and O. C. Ponomarenko, *Decision Making Theory: Classic Approaches*, Kharkov: Publisher of Kharkov State Univ., 1999, 253 pages (in Russian). (ISBN 5-7763-2716-4)

Conference Papers

- [C1] Y. Li, **S. A. Vorobyov**, and Z. He, “Joint hot and cold clutter mitigation in the transmit beamspace-based MIMO radar,” *40th IEEE Inter. Conf. Acoustics, Speech, and Signal Processing, ICASSP’2015*, Brisbane, Australia, Apr. 19-24, 2015, submitted.
- [C2] M. W. Morency and **S. A. Vorobyov**, “Partially adaptive transmit beamforming for search free 2D DOA estimation in MIMO radar,” *40th IEEE Inter. Conf. Acoustics, Speech, and Signal Processing, ICASSP’2015*, Brisbane, Australia, Apr. 19-24, 2015, submitted.
- [C3] M. Shaghghi and **S. A. Vorobyov**, “Subspace leakage analysis of sample data covariance matrix,” *40th IEEE Inter. Conf. Acoustics, Speech, and Signal Processing, ICASSP’2015*, Brisbane, Australia, Apr. 19-24, 2015, submitted.
- [C4] H. Fang, **S. A. Vorobyov**, and H. Jiang, “Permutation enhanced parallel reconstruction with a linear compressive sampling device,” *40th IEEE Inter. Conf. Acoustics, Speech, and Signal Processing, ICASSP’2015*, Brisbane, Australia, Apr. 19-24, 2015, submitted.

- [C5] J. Steinwandt, **S. A. Vorobyov**, and M. Haardt, "Secrecy rate maximization for information and energy transfer in MIMO beamforming networks," *48th Annual Asilomar Conf. Signals, Systems, and Computers*, Pacific Grove, California, USA, Nov. 2-5, 2014, accepted.
- [C6] M. A. Girnyk, M. Vehkaperä, and **S. A. Vorobyov**, "On the optimal relay design for multi-antenna cognitive two-way AF relay networks," *48th Annual Asilomar Conf. Signals, Systems, and Computers*, Pacific Grove, California, USA, Nov. 2-5, 2014, accepted.
- [C7] A. Hassaniien, **S. A. Vorobyov**, Y.-S. Yoon, and J.-Y. Park, "Two-stage based design for phased-MIMO radar with improved coherent transmit processing gain," in *Proc. 15th IEEE Workshop Signal Processing Advances in Wireless Communications, SPAWC'2014*, Toronto, Canada, June 22-25, 2014, pp. 45-49.
- [C8] J. Steinwandt, **S. A. Vorobyov**, and M. Haardt, "Joint beamforming and transmit design for the non-regenerative MIMO broadcast relay channel," in *Proc. 8th IEEE Workshop Sensor Array and Multichannel Signal Processing, SAM'2014*, A Coruna, Spain, June 22-25, 2014, pp. 169-172.
- [C9] Y. Li, **S. A. Vorobyov**, and A. Hassaniien, "Robust beamforming for jammers suppression in MIMO radar," **invited paper**, in *Proc. IEEE Radar Conf.*, Cincinnati, OH, USA, May 19-23, 2014, pp. 629-634.
- [C10] J. Steinwandt, **S. A. Vorobyov**, and M. Haardt, "Secrecy rate maximization for MIMO Gaussian wiretap channels with multiple eavesdroppers via alternating matrix POTDC," in *Proc. 39th IEEE Inter. Conf. Acoustics, Speech, and Signal Processing, ICASSP'2014*, Florence, Italy, May 4-9, 2014, pp. 5686-5690.
- [C11] A. Khabbazibasmenj and **S. A. Vorobyov**, "Generalized quadratically constrained quadratic programming for signal processing," in *Proc. 39th IEEE Inter. Conf. Acoustics, Speech, and Signal Processing, ICASSP'2014*, Florence, Italy, May 4-9, 2014, pp. 7629-7633.
- [C12] Y. Li, **S. A. Vorobyov**, and V. Koivunen, "Generalized ambiguity function for the MIMO radar with correlated waveforms," in *Proc. 39th IEEE Inter. Conf. Acoustics, Speech, and Signal Processing, ICASSP'2014*, Florence, Italy, May 4-9, 2014, pp. 5302-5306.
- [C13] Y. Li, **S. A. Vorobyov**, and A. Hassaniien, "MIMO radar capability on powerful jammers suppression," in *Proc. 39th IEEE Inter. Conf. Acoustics, Speech, and Signal Processing, ICASSP'2014*, Florence, Italy, May 4-9, 2014, pp. 5277-5281.
- [C14] J. Gao, **S. A. Vorobyov**, and H. Jiang, "Efficient jamming strategies on a MIMO Gaussian channel with known target signal covariance," in *Proc. 39th IEEE Inter. Conf. Acoustics, Speech, and Signal Processing, ICASSP'2014*, Florence, Italy, May 4-9, 2014, pp. 5700-5704.
- [C15] A. Hassaniien, **S. A. Vorobyov**, Y.-S. Yoon, and J.-Y. Park, "Root-MUSIC-based source localization using transmit array interpolation in MIMO radar with arbitrary planar arrays," in *Proc. 5th IEEE Inter. Workshop Computational Advances in Multi-Sensor Adaptive Processing, CAMSAP'2013*, The Friendly Island, Saint Martin, Dec. 15-18, 2013, pp. 396-399.
- [C16] M. Shaghghi and **S. A. Vorobyov**, "Iterative root-MUSIC algorithm for DOA estimation," **invited paper**, in *Proc. 5th IEEE Inter. Workshop Computational Advances in Multi-Sensor Adaptive Processing, CAMSAP'2013*, The Friendly Island, Saint Martin, Dec. 15-18, 2013, pp. 53-56.
- [C17] J. Zhang, **S. A. Vorobyov**, A. Khabbazibasmenj, and M. Haardt, "Sum rate maximization in multi-operator two-way relay networks with a MIMO AF relay via POTDC," **invited paper**, in *Proc. 21st European Signal Processing Conf., EUSIPCO'2013*, Marrakech, Morocco, Sept. 9-13, 2013.

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- [C108] Ye. V. Bodyanskiy, **S. A. Vorobyov**, and I. P. Pliss, “Artificial neural network and learning algorithms for analysis of nonstationary multiharmonic stochastic sequences,” **invited talk**, in *Proc. Computer Modelling Conference*, Belgorod, Russia, Oct. 3-6, 1998, pp. 3–8 (in Russian).
- [C109] **S. A. Vorobyov**, T. Naumec, and T. Putyatina, “Application of neural networks for adaptive control of nonlinear objects,” in *Proc. 4th Inter. Conf. Theory and Technology of Information Broadcasting, Telecasting and Processing*, Kharkov, Ukraine, Sept. 28-30, 1998, p. 155 (in Russian).
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- [C113] **S. A. Vorobyov** and N. S. Lamonova, “Application of neural networks for fault detection,” in *Proc. Inter. Conf. Electronics and Youth in XXI Century*, Kharkov, Ukraine, Apr. 22-24, 1997, p. 243 (in Russian).
- [C114] Ye. V. Bodyanskiy, **S. A. Vorobyov**, and I. P. Pliss, “Adaptive fault detection in dynamical systems with periodic output signal,” in *Proc. 3rd Ukrainian Conf. Automatic Control, Avtomatika’1996*, Sevastopol, Ukraine, Sept. 9-14, 1996, vol. 1, pp. 58–59 (in Russian).
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- [C116] **S. A. Vorobyov** and S. A. Suharev, “Adaptive algorithm for filter forgetting factor control with application to maneuvered plane tracking,” in *Proc. 22th Conf. Gagarin’s Lectures*, Moscow, Russia, Apr. 2-6, 1996, vol. 4, pp. 41–42 (in Russian).
- [C117] **S. A. Vorobyov**, “Generalized filtering of stochastic processes,” in *Proc. 1st Inter. Conf. Theory and Technology of Information Broadcasting, Telecasting and Processing*, Tuapse, Russia, Sept. 18-21, 1995, p. 57 (in Russian).

- [C118] **S. A. Vorobyov**, “Generalized adaptive prediction of one-dimensional stochastic processes,” in *Proc. 2nd Ukrainian Conf. of Young Scientists. Mathematics*, Kyiv, Ukraine, May 16-18, 1995, vol. 1, pp. 33–40 (in Russian).
- [C119] Ye. V. Bodyanskiy and **S. A. Vorobyov**, “Adaptive forecasting of time series under structural uncertainty,” in *Proc. 1st Ukrainian Conf. Automatic Control, Avtomatika'1994*, Kyiv, Ukraine, May 18-23, 1994, vol. 1, p.49 (in Russian).

Others

- [R1] M. F. A. Ahmed and **S. A. Vorobyov**, “Simple semi-distributed lifetime maximizing strategy via power allocation in collaborative beamforming for wireless sensor networks ,” *Finished in Mar. 2011, Unpublished*, <http://arxiv.org/abs/1401.4147>, 27 pages.
- [R2] A. E. Geyer, R. Nikjah, **S. A. Vorobyov**, and N. C. Beaulieu, “Equivalent codes, optimality, and performance analysis of OSTBC: Textbook study,” *Finished in Oct. 2009, Unpublished*, <http://arxiv.org/abs/1401.3556>, 33 pages.
- [R3] **S. A. Vorobyov**, S. Cui, Y. C. Eldar, W.-K. Ma, and W. Utschick, “Editorial: Optimization techniques in wireless communications,” *EURASIP Journal on Wireless Communications and Networking*, vol. 2009, Article ID 567416, 2 pages.
- [R4] Ye. V. Bodyanskiy, **S. A. Vorobyov**, and N. S. Lamonova, “Fault detection in nonlinear dynamic systems using neural networks,” Deposited with National Scientific Technical Library of Ukraine, *Report No. 18*, Kyiv, Jan. 12, 1998, pp. 1–8 (in Russian).
- [R5] G. A. Matusovskiy, O. M. Gorodinskiy, Ye. V. Bodyanskiy, I. P. Pliss, and **S.A. Vorobyov**, “Operational approach for organizations of interaction between jurists,” *Trans. of Ukrainian Academy of Jurisprudence Sciences*, No. 1(8), pp. 200–203, 1997 (in Ukrainian).
- [R6] S. V. Yakovlev, Ye. V. Bodyanskiy, and **S. A. Vorobyov**, “On-line detection of time series properties changes for isolation of latent plundering,” *Trans. of Jurisprudence Sciences University*, No. 1, pp. 56–62, 1996 (in Ukrainian).
- [R7] **S. A. Vorobyov** and I. P. Pliss, “Adaptive diagnosis of dynamic objects with harmonic output signal,” Deposited with Ukrainian Institute of Scientific, Technical and Economic Information, *Report No. 130*, Kyiv, Nov. 18, 1996, pp. 1–14 (in Russian).
- [R8] Ye. V. Bodyanskiy and **S. A. Vorobyov**, “Adaptive algorithm for fault detection in stochastic sequences,” Deposited with National Scientific Technical Library of Ukraine, *Report No. 527*, Kyiv, Feb. 2, 1996, pp. 1–10 (in Russian).
- [R9] **S. A. Vorobyov** and Ye. V. Bodyanskiy, “On one adaptive filtering algorithm,” Deposited with National Scientific Technical Library of Ukraine, *Report No. 528*, Kyiv, Feb. 2, 1996, pp. 1–17 (in Russian).
- [R10] **S. A. Vorobyov**, “Multi-step multi-model forecasting of stochastic sequences,” Deposited with National Scientific Technical Library of Ukraine, *Report No. 1279*, Kyiv, May 26, 1995, pp. 1-10 (in Russian).
- [R11] Ye. V. Bodyanskiy and **S. A. Vorobyov**, “An approach to adaptive forecasting of time series,” Deposited with National Scientific Technical Library of Ukraine, *Report No. 1067*, Kyiv, June 3, 1994, pp. 1–17 (in Russian).

INVITED TALKS

- (1) “Advances in active MIMO sensing,” distinguished lecturer in ELLIIT Distinguished Lecture Series, Linköping University, Sweden, Oct. 13, 2014.
- (2) “Subspace leakage analysis and frequency estimation with small sample size,” invited lecturer in Mini-Workshop on Signal Processing and Big Data, Aalto University, Finland, Aug. 8, 2014.
- (3) “Advances in MIMO radar,” distinguished lecture in the State Key Laboratory of Acoustics, Chinese Academy of Sciences, Beijing, China, July 11, 2014.
- (4) “Tradeoffs in MIMO radar,” tutorial talk in Sensor Array and Multichannel Signal Processing Workshop given together with Prof. Marco Lops, A Coruna, Spain, June 22, 2014.
- (5) “Robust beamforming for jammers suppression for MIMO radar,” invited talk in a Session in Radar Conference, Cincinnati, OH, USA, May 20, 2014.
- (6) “Efficiency and security analysis in multi-user communication systems,” invited speaker in International seminars on Modern Methods in Systems Research, Kharkiv National University of Radio and Electronics, Kharkiv, Ukraine, Mar. 5, 2014.
- (7) “Iterative root-MUSIC algorithm for DOA estimation,” invited talk in a Session in Computational Advances in Multi-Sensor Adaptive Processing Workshop, The Friendly Island, Saint Martin, Dec. 16, 2013.
- (8) “Sum rate maximization in multi-operator two-way relay networks with a MIMO AF relay via POTDC,” invited talk in a Session in European Signal Processing Conference, Marrakesh, Morocco, Sept. 12, 2013.
- (9) “Modern engineering is computational engineering,” Installation Lecture at Aalto University, Espoo, Finland, Mar. 6, 2013.
- (10) “Analog-to-information conversion,” invited talk in GETA Winter School on Compressive Sensing, Ruka, Finland, Feb. 12, 2013.
- (11) “Power control for collaborative beamforming in wireless sensor networks,” invited talk in a Session in Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, California, USA, Nov. 7, 2011.
- (12) “Resource allocation games under power constraints,” NOKIA, Helsinki, Finland, NOKIA International Research Seminar speaker, Aug. 12, 2011.
- (13) “Segmented compressed sampling for analog-to-information conversion,” Aalto University, Helsinki, Finland, International Research Seminar in Signal Processing speaker, Aug. 11, 2011.
- (14) “Segmented compressed sampling for analog-to-information conversion,” Ilmenau University of Technology, Ilmenau, Germany, International Research Seminar on Mobile Communications speaker, July 14, 2011.
- (15) “Cooperative resource allocation games under spectral mask and total power constraints,” Ilmenau University of Technology, Ilmenau, Germany, International Research Seminar on Mobile Communications speaker, Dec. 15, 2010.
- (16) “Transmit energy focusing in MIMO radar aka phased-MIMO radar: beampattern analysis, SINR improvement, and direction finding,” Ilmenau University of Technology, Ilmenau, Germany, International Research Seminar on Mobile Communications speaker, Dec. 8, 2010.
- (17) “Why the phased-MIMO radar outperforms the phased-array and MIMO radars,” invited speaker in the Session on Waveform diversity in European Signal Processing Conference, Aalborg, Denmark, Aug. 26, 2010.

- (18) “Transmit energy focusing in MIMO radar aka phased-MIMO radar and its use for direction finding,” invited speaker in Aalborg University, Aalborg, Denmark, Aug. 23, 2010.
- (19) “Multi-link collaborative beamforming with sidelobe control capabilities in wireless sensor networks,” invited speaker in International seminars on Modern Methods in Systems Research, Kharkiv National University of Radio and Electronics, Kharkiv, Ukraine, Aug. 17, 2010.
- (20) “Direction finding for MIMO radar with colocated antennas using transmit beamspace preprocessing,” invited speaker in the Session on MIMO radar in CAMSAP’09 Conference, Aruba, Dutch Antilles, Dec. 15, 2009.
- (21) “Phased MIMO radar: A tradeoff between phased-array and MIMO radar,” University of Waterloo, Waterloo, Ontario, Canada, Nortel Networks Distinguished Seminar Series speaker, Dec. 11, 2009.
- (22) “Phased MIMO radar,” Darmstadt University of Technology, International Research Seminar on Communication Systems speaker, Jun. 17, 2009.
- (23) “Cooperative games in multi-user systems: Nash bargaining for overall benefits,” Kharkiv National University of Radioelectronics, Faculty of Computer Science, International Research Seminar on Computer Science speaker, Dec. 25, 2008.
- (24) “Robust estimation of parameters,” Kharkiv National University of Radioelectronics, Faculty of Computer Science, International Research Seminar on Computer Science speaker, Dec. 19, 2008.
- (25) “Robust adaptive beamforming: Evolution of approaches, analysis and comparison,” Key-note speaker in the Session on Underwater Acoustic and Signal Processing in Acoustics: Robust Array Processing in 156th Meeting of the Acoustic Society of America, Miami, Nov. 12, 2008.
- (26) “Resource allocation in wireless networks via convex optimization,” the University of Twente, Twente, Netherland, Colloquium speaker, June 16, 2008.
- (27) “Resource allocation in wireless networks,” Ilmenau University of Technology, Inmenau, Germany, International Research Seminar on Mobile Communications speaker, June 13, 2008.
- (28) “Blind unitary prewhitening,” Ilmenau University of Technology, Inmenau, Germany, International Research Seminar on Mobile Communications speaker, June 13, 2008.
- (29) “Optimization in communication networks: from convex to non-convex approaches with practical applications,” Royal Institute of Technology (KTH), Stockholm, Sweeden, International Research Seminar speaker, Oct. 18, 2007.
- (30) “Multi-linear data arrays: Algorithms and applications,” University Collage London, London, UK, Colloquium speaker, June 28, 2007.
- (31) “Robust adaptive beamforming,” Joint Reserach Institute on Signal Processing Heriot-Watt University and the University of Edinburgh, Edinburgh, Scotland, Colloquium speaker, June 4, 2007.
- (32) “Precoder design for space-time coded MIMO systems with correlated Rayleigh fading channels,” Ilmenau University of Technology, Inmenau, Germany, International Research Seminar on Mobile Communications speaker, May 24, 2007.
- (33) “Performance and capacity analysis for OSTBC MIMO systems with receive antenna selection,” Ilmenau University of Technology, Inmenau, Germany, International Research Seminar on Mobile Communications speaker, May 24, 2007.

- (34) “Robust adaptive beamforming and applications,” University of Waterloo, Waterloo, Ontario, Canada, Nortel Networks Distinguished Seminar Series speaker, Mar. 7, 2007.
- (35) “Robust adaptive beamforming,” Dresden University of Technology, Dresden, Germany, Colloquium speaker, Mar. 2, 2007.
- (36) “Adaptive OFDM techniques with one-bit-per-subcarrier channel state feedback,” McMaster University, Hamilton, Ontario, Canada, Dept. of Electrical and Computer Engineering Colloquium speaker, Nov. 16, 2006.
- (37) “Parameter estimation in linear models based on outage probability minimization,” Invited speaker in Asilomar’06 Conference, Pacific Grove, California, USA, Oct. 30, 2006.
- (38) “Robust minimum variance adaptive beamformers and multiuser MIMO receivers: From worst-case to probabilistically constrained designs,” invited speaker in the Session on Optimization in Signal Processing in ICASSP’06 Conference, Toulouse, France, May 15, 2006.
- (39) “Probabilistically-constrained estimators,” Technion, Haifa, Israel, Dept. of Electrical Engineering Colloquium speaker, Feb. 9, 2005.
- (40) “Application of ICA for automatic noise and interference cancellation in multisensory biomedical signals,” invited speaker in ICA’2000 Conference, Helsinki, Finland, Jun. 19, 2000.

TEACHING EXPERIENCE

- (1) *Convex Optimization*, Fall 2013, 2014, Instructor, Dept. of Signal Processing and Acoustics, Aalto University, Espoo, Finland (S-88.4400 graduate course, 14 participants in 2013, 11 participants in 2014).
- (2) *Convex Optimization for Engineers*, Winters 2011, 2012 Instructor, Dept. of Electrical and Computer Engineering, University of Alberta, Edmonton, AB, Canada (ECE740 graduate course, 9 participants in 2011 and 10 participants in 2012). Evaluations: 4.8 out of 5. Also taught in Ilmenau University of Technology, Germany in Summer 2011 (17 participants)
- (3) *Statistical and Adaptive Signal Processing*, Winters 2008, 2009, and 2010, Instructor, Dept. of Electrical and Computer Engineering, University of Alberta, Edmonton, AB, Canada (ECE740 graduate course, 12 participants in 2008, 12 participants in 2009, 17 participants in 2010). Evaluations: 4.8 out of 5.
- (4) *Discrete Time Signals and Systems*, Falls 2010, 2011, 2012, Instructor, Dept. of Electrical and Computer Engineering, University of Alberta, Edmonton, AB, Canada (EE338 undergraduate course, 50 participants in 2010 and 53 participants in 2011). Evaluations: 4.6 out of 5.
- (5) *Digital Communications*, Winters 2007, 2008, and 2009, Instructor, Dept. of Electrical and Computer Engineering, University of Alberta, Edmonton, AB, Canada (EE485 undergraduate course, 14 participants in 2007, 15 participants in 2008, 17 participants in 2009). Evaluations: 4.1 out of 5.
- (6) *Numerical Analysis for Electrical and Computer Engineers*, Winters 2008, 2009, 2010, 2011, and 2012 Instructor, Dept. of Electrical and Computer Engineering, University of Alberta, Edmonton, AB, Canada (EE231 undergraduate course, 79 participants in 2008, 81 participants in 2009, 80 participants in 2010, 79 participants in 2011, and 75 participants in 2012). Evaluations: 4.1 out of 5.
- (7) *Digital Signal Processing*, Fall 2007, Instructor, Dept. of Electrical, Electronic, and Computer Engineering, Heriot-Watt University, UK (graduate course, 55 participants).

- (8) *Computer Hardware*, Fall 2007, Instructor, Dept. of Electrical, Electronic, and Computer Engineering, Heriot-Watt University, UK (graduate course, 11 participants).
- (9) *Technical Communication in Computer and Electrical Engineering*, Fall 2006, Second Instructor, Dept. of Electrical and Computer Engineering, University of Alberta, Edmonton, AB, Canada (EE200 undergraduate course, 30 participants).
- (10) *MIMO Communication and Space-Time Coding*, Fall 2005, Second Instructor, Communication Systems Group, Darmstadt University of Technology, Darmstadt, Germany (graduate course in English, 17 participants).
- (11) *Advanced Algorithms for Smart Antenna Systems*, Spring 2005 and 2006 (two times), Instructor, Communication Systems Group, Darmstadt University of Technology, Darmstadt, Germany (graduate course in English, 12 participants in 2005 and 14 participants in 2006).
- (12) *Decision Making Theory*, Fall 1998, Instructor, Dept. of Artificial Intelligence and Information Systems, Kharkov National University of Radioelectronics, Kharkov, Ukraine (graduate course in Russian, 24 participants).
- (13) *Introduction to Programming*, Fall 1998, Instructor, Dept. of Electrotechnics, Kharkov State Automobiles and High-ways University, Kharkov, Ukraine (undergraduate course in Russian, about 150 participants).
- (14) *Electrotechnics and Electrical Machines*, Spring 1998, Instructor, Dept. of Electrotechnics, Kharkov State Automobiles and High-ways University, Kharkov, Ukraine (undergraduate course in Russian, 75 participants).
- (15) *Automatic Control*, Fall 1997, Instructor, Dept. of Technical Cybernetics, Kharkov National University of Radioelectronics, Kharkov, Ukraine (undergraduate course in Russian, about 79 participants).
- (16) *Real-Time Control Systems*, Spring 1997, Instructor, Dept. of Technical Cybernetics, Kharkov National University of Radioelectronics, Kharkov, Ukraine (graduate course in Russian, 22 participants).
- (17) *Exploitation of Control Systems*, Fall 1996, Second Instructor, Dept. of Technical Cybernetics, Kharkov National University of Radioelectronics, Kharkov, Ukraine (graduate course in Russian, 22 participants).

STUDENTS ADVISED

Ph.D.

- (1) **Mahdi Shaghghi**, Ph.D., 09/09 – 11/14, “Parameter Estimation in Low-Rank Models from Small Sample Size and Undersampled Data: DOA and Spectrum Estimation,” University of Alberta, Canada.
- (2) **Jie Gao**, Ph.D., 09/09 – 12/13, “Efficiency and Security Analysis in Multi-User Wireless Communication Systems: Cooperation, Competition and Malicious behavior,” (co-supervised with Dr. Hai Jiang), University of Alberta, Canada.
- (3) **Arash Khabbazibasmenj**, Ph.D., 05/09 – 07/13, “Generalized Quadratically Constrained Quadratic Programming and Its Applications in Array Processing and Cooperative Communications,” University of Alberta, Canada.
- (4) **Omid Taheri**, Ph.D., 09/07 – 11/12, “Signal Processing for Sparse Discrete Time Systems,” University of Alberta, Canada.

- (5) **Mohammed F.A. Ahmed**, Ph.D., 09/06 – 04/11, “Collaborative Beamforming for Wireless Sensor Networks,” University of Alberta, Canada.
- (6) **Zengmao Chen**, Ph.D., 11/07 – 04/11, “Interference Modelling and Management for Cognitive Radio Networks,” (co-supervised with Drs. Cheng-Xiang Wang and John Thompson), Harriot-Watt University and University of Edinburgh, U.K.
- (7) **Yue Rong**, Ph.D., 11/02 – 11/05, “Advanced Algorithms for Multi-Antenna and Multi-Carrier Communication Systems,” (co-supervised with Dr. A.B. Gershman), Darmstadt University of Technology, Germany.

M.Sc.

- (1) **Yongzhe Li**, M.Sc. 03/13 – 10/14, “Ambiguity Function of the Transmit Beamspace-Based MIMO Radar,” Aalto University, Finland.
- (2) **Hao Fang**, M.Sc. 05/11 – 06/13, “Parallel Sampling and Reconstruction with Permutation in Multidimensional Compressed Sensing,” (co-supervised with Dr. H. Jiang), University of Alberta, Canada.
- (3) **Xiaowen Gong**, M.Sc. 09/08 – 07/10, “Joint Bandwidth and Power Allocation in Wireless Communication Networks,” (co-supervised with Dr. C. Tellambura), University of Alberta, Canada.
- (4) **Jie Gao**, M.Sc. 09/07 – 08/09, “Cooperative Linear Precoding for Spectrum Sharing in Multi-User Wireless Systems: Game Theoretic Approach,” (co-supervised with Dr. H. Jiang), University of Alberta, Canada.
- (5) **Khoa T. Phan**, M.Sc. 05/06 – 05/08, “Resource Allocation in Wireless Networks via Convex Programming,” (co-supervised with Dr. C. Tellambura), University of Alberta, Canada.
- (6) **Liang Li**, M.Sc., 5/06 - 12/06, “Adaptive MIMO Systems with Low-Rate Feedback” (co-supervised with Dr. A.B. Gershman), Darmstadt University of Technology, Germany.
- (7) **Yasser Karanouh**, M.Sc., 11/05 - 11/06, “Robust Algorithms for Broadcasting with Imperfect CSI” (co-supervised with Dr. A.B. Gershman), Darmstadt University of Technology, Germany.
- (8) **Muhammad Waseem**, M.Sc., 10/05 - 9/06, “Joint Channel Estimation and Decoding in MIMO Systems” (co-supervised with Dr. A.B. Gershman), Darmstadt University of Technology, Germany.
- (9) **Yue Rong**, M.Sc., 5/02 – 10/03, “Blind Signal Spatial Signature Estimation Using PARAFAC Model” (co-supervised with Dr. A.B. Gershman), Duisburg-Essen University, Germany.

PROJECTS

- (1) “Topics on MIMO Radar”, CI, (PI is Prof. V. Koivunen); Finnish Defence Agency, Finland, (EUR), Period: 9/14 – 8/16.
- (2) “Phased-MIMO Radar”, PI; NSERC Discovery Grant - Individual, Canada, (125,000 CAD), Period: 4/12 – 3/17 (interrupted 8/14).
- (3) “Phased-MIMO Radar: Transmit Beamspace, Transmit-Receive Beamforming, Parameter Estimation, and Applications”, PI; NSERC Accelerator Supplements - Individual, Canada, (120,000 CAD), Period: 4/12 – 3/15 (interrupted 8/14).

- (4) “2D Sparse Array Optimization Algorithms for Multiple Transmit Beam and Multiple Receive Beam Radar”, PI; Samsung Thales Co., Ltd., Korea, (148,000 CAD), Period: 5/12 – 7/14.
- (5) “Robust Adaptive Beamforming for Multi-Antenna Systems”, PI; NSERC Discovery Grant - Individual, Canada, (115,000 CAD), Period: 4/07 – 3/12.
- (6) “Robust Parameter Estimation Using Stochastic Programming and Applications for Wireless Systems”, PI; Alberta Ingenuity New Faculty Award, Canada, (300,000 CAD), Period: 9/07 - 8/11.
- (7) “Intelligent Signal Processing for Ubiquitous High-Capacity, Heterogeneous, Scalable Wireless Networks”, CI (and 4 others); NSERC Strategic Project, (589,500 CAD - 20%), Period: 11/07 - 10/10.
- (8) “Space-Time Processing for Smart Antennas in Wireless Communications”, CI, (PI: Prof. A.B. Gershman); Alexander von Humboldt Foundation and German Ministry of Education and Research, joint project with Dept. of Communication Systems, Duisburg-Essen University and Fraunhofer Institute, Duisburg, Germany; Period: 3/02 –5/05.

PROFESSIONAL SOCIETIES AND SERVICE

Memberships: *IEEE Member* since 2002, elevated to the grade of *Senior Member* in 2005
EURASIP Member since 2005
Professional Engineer of Alberta, Canada since Jan. 2009.

Technical Committee Member:

Signal Processing for Communication and Networking (SPCOM) Technical Committee, IEEE Signal Processing Society (2010 -).

Sensor Array and Multi-Channel Signal Processing (SAM) Technical Committee, IEEE Signal Processing Society (2007 -2012)

Associate Editor: IEEE Trans. Signal Processing (2006 - 2010)
 IEEE Signal Processing Letters (2007 - 2009).

Leading Guest Editor: Special Issue on Optimization Techniques in Wireless Communications of EURASIP J. Wireless Communications and Networking

Organizer: Special session on Convex Optimization Techniques for Beamforming and MIMO Signal Processing, First IEEE Int. Workshop on Computational Advances in Multi-Sensor Adaptive Processing (IEEE CAMSAP’05), Dec. 13-15, Puerto Vallarta, Mexico; Special session on Global Optimization and Applications to Signal Processing and Communications, Second IEEE Int. Workshop on Computational Advances in Multi-Sensor Adaptive Processing (IEEE CAMSAP’07), Dec. 12-14 2007, Virgin Islands, USA.

Book Reviews: for Cambridge Press.

Reviewer: for IEEE Transactions on Signal Processing; IEEE Signal Processing Magazine; IEEE Journal of Selected Topics in Signal Processing; IEEE Transactions on Audio, Speech and language Processing; IEEE Signal Processing Letters; EURASIP Signal Processing; Journal of Applied Signal Processing; Digital Signal Processing; IEEE Transactions on Aerospace and Electronic Systems; IEEE Aerospace and Electronics Systems Magazine; IEEE Transactions on Communications; IEEE Transactions on Wireless Communications; IEEE Journal of Selected Areas in Communications; IEEE Communications Letters; IEEE Transactions on Multimedia; EURASIP Journal on Wireless

Communications and Networking; IEEE Transactions on Vehicular Technology; IEEE Transactions on Neural Networks; IEEE Transactions on Geoscience and Remote Sensing; IET Signal Processing; Elsevier International Journal of Electronics and Communications; Journal of the Acoustical Society of America.

Conference Program/Technical Committee Member: IEEE CAMSAP 2005, Puerto Vallarta, Mexico; IEEE IWCMC, 2007, Honolulu, Hawaii, USA; IEEE CAMSAP 2007, Virgin Islands, USA; 21st IEEE CCECE 2008, Niagara Falls, Ontario, Canada; 5th IEEE SAM 2008, Darmstadt, Germany; IEEE IWCMC 2008, Chania, Crete Island, Greece; IEEE CCECE 2009, St. Johns Island, Canada; IEEE IWCMC 2009, Leipzig, Germany; IEEE CAMSAP 2009, Aruba, Dutch Antilles; 25th Queen's Biennial Symposium on Communications, 2010, Kingston, ON, Canada; IEEE ICASSP 2011 Prague, Czech Republic; IEEE ICC 2011, Kyoto, Japan; IEEE IWCMC 2011, Istanbul, Turkey; IEEE PIMRC 2011, Toronto, ON, Canada; IEEE SPAWC 2011, San Francisco, CA, USA; IEEE GLOBECOM 2011, Asilomar 2011, Asilomar, CA, USA; 4th IEEE CAMSAP 2011, San Juan, Puerto Rico; IEEE ICC 2012, Ottawa, Canada; IEEE WCNC 2012, Paris, France; 37th IEEE ICASSP 2012, Kyoto, Japan; IEEE VTC 2012, Quebec City, Canada; IEEE SAM 2012, Hoboken, NJ, USA; IEEE SPAWC 2012, Cesme, Turkey; IEEE CWIT 2013, Toronto, Ontario, Canada; IEEE Radar Conference 2013, Ottawa, Ontario, Canada; 38th IEEE ICASSP 2013, Vancouver, British Columbia, Canada; 14th IEEE SPAWC 2013, Darmstadt, Germany; 52nd IEEE Conf. Decision and Control 2013, Florence, Italy; 21st EUSIPCO, Marrakech, Morocco, 2013; 5th IEEE CAMSAP, The Friendly Island, Saint Martin, 2013; 39th IEEE ICASSP 2014, Florence, Italy; IEEE CCECE 2014, Toronto, Canada; 22nd EUSIPCO 2014, Lisbon, Portugal; 8th IEEE SAM 2014, A Coruna, Spain; 15th IEEE SPAWC 2014, Toronto, Ontario, Canada; IEEE BlackSeaCom 2014, Kishenev, Moldova; IEEE Globecom 2014, Austin, TX, USA; IEEE ICC 2015, London, UK; 40th IEEE ICASSP 2015, Brisbane, Australia; IEEE ICUWB 2015, Montreal, Canada; IEEE Globecom 2015, San Diego, CA, USA; 3rd Intern. Workshop Compressed Sensing Theory and its Applications to Radar, Sonar and Remote Sensing 2015, Pisa, Italy; and other conferences.

Conference Session Chair: IEEE ISSPIT 2003, Darmstadt, Germany; 60th IEEE VTC 2004 Fall, Los Angeles, CA; IEEE CAMSAP 2005, Puerto Vallarta, Mexico; IEEE CAMSAP 2007, Virgin Islands, USA; IEEE ICASSP 2007 Hawaii, USA; IEEE CCECE 2008, Niagara Falls, Canada; IEEE ICASSP 2008, Las Vegas, USA; IEEE CAMSAP 2010, Aruba Island, the Netherlands; IEEE ICASSP 2011, Prague, Czech Republic; Asilomar 2011, Asilomar, CA, USA; 38th IEEE ICASSP 2013, Vancouver, British Columbia, Canada; 5th IEEE CAMSAP, The Friendly Island, Saint Martin, 2013; 39th IEEE ICASSP 2014, Florence, Italy; IEEE BlackSeaCom 2014, Kishenev, Moldova; 8th IEEE SAM 2014, A Coruna, Spain.

Reviewer for Conferences: IEEE ICASSP 2002, Orlando, FL; IEEE ICASSP 2003, Hong Kong; IEEE ISSPIT 2003, Darmstadt, Germany; IEEE ICASSP 2004, Montreal, Canada; IEEE GLOBECOM 2004, Dallas, TX; EUSIPCO 2004, Vienna, Austria; IEEE ICASSP 2005, Philadelphia, PA; IEEE SPAWC 2005, New York, NY; IEEE VTC 2005 Fall, Dallas, TX; IEEE CAMSAP 2005, Puerto Vallarta, Mexico; IEEE ICASSP 2006, Toulouse, France; IEEE ICC 2006, Istanbul, Turkey; EUSIPCO 2006, Florence, Italy; IEEE VTC 2006 Fall, Montreal, Quebec, Canada; IEEE PIMRC 2006, Helsinki, Finland; ICARCV 2006, Singapore; ISSPA 2007, Sharjah, United Arab Emirates; IEEE ICASSP 2007, Hawaii, USA; EUSIPCO 2007, Poznan, Poland; IEEE IWCMC 2007, Honolulu, Hawaii, USA; ISCIT 2008, Sydney, Australia; IEEE ICC 2008, Beijing, China; EUSIPCO 2008, Lausanne, Switzerland; IEEE IWCMC 2008, Crete Island, Greece; IEEE GLOBECOM 2008, New Orleans, LA, USA; IEEE ISCAS 2009, Taipei, Taiwan; IEEE CCECE 2009, St. Johns Island, Canada; IEEE IWCMC 2009, Leipzig, Germany; IEEE ICASSP 2009, Taipei, Taiwan; IEEE CAMSAP 2009, Aruba, Dutch Antilles; IEEE GLOBECOM 2009, Honolulu, Hawaii, USA; Queen's Bi-

ennial Symposium on Communications 2010, Kingston, ON, Canada; IEEE ICC 2010, Cape Town, South Africa; IEEE WCNC 2010, Sydney, Australia; IEEE ISCAS, 2010, Paris, France; IEEE VTC 2010, Taipei, Taiwan; IEEE ICASSP 2010, Dallas, TX, USA; IEEE SECON 2010, Boston, Massachusetts, USA; IEEE GLOBECOM, 2010, Miami, Florida, USA; IEEE ICASSP 2011, Prague, Czech Republic; IEEE ICC 2011, Kyoto, Japan; IEEE PIMRC 2011, Toronto, ON, Canada; IEEE SPAWC 2011, San Francisco, CA, USA; Asilomar 2011, Asilomar, CA, USA; 4th IEEE CAMSAP 2011, San Juan, Puerto Rico; IEEE IWCMC 2011, Istanbul, Turkey; IEEE GLOBECOM 2011, Houston, TX, USA; IEEE ICC 2012, Ottawa, Canada; IEEE WCNC 2012, Paris, France; ACC 2012, Montreal, Canada, IEEE ICC 2012, Ottawa, Canada, IEEE WCNC 2012, Paris, France, 37th IEEE ICASSP 2012, Kyoto, Japan; IEEE VTC 2012, Quebec City, Canada; IEEE SAM 2012, Hoboken, NJ, USA; IEEE SPAWC 2012, Cesme, Turkey; IEEE CWIT 2013, Toronto, Ontario, Canada; IEEE Radar Conference 2013, Ottawa, Ontario, Canada; 38th IEEE ICASSP 2013, Vancouver, British Columbia, Canada; 14th IEEE SPAWC 2013, Darmstadt, Germany; 52nd IEEE Conf. Decision and Control 2013, Florence, Italy; 21st EUSIPCO, Marrakech, Morocco, 2013; 5th IEEE CAMSAP, The Friendly Island, Saint Martin, 2013; 39th IEEE ICASSP 2014, Florence, Italy; IEEE CCECE 2014, Toronto, Canada; 22nd EUSIPCO 2014, Lisbon, Portugal; 8th IEEE SAM 2014, A Coruna, Spain; 15th IEEE SPAWC 2014, Toronto, Ontario, Canada; IEEE BlackSeaCom 2014, Kishenev, Moldova; IEEE Globecom 2014, Austin, TX, USA; IEEE ICC 2015, London, UK; IEEE ICASSP 2015, Brisbane, Australia; IEEE ICUWB 2015, Montreal, Canada; IEEE Globecom 2015, San Diego, CA, USA; CoSeRa 2015, Pisa, Italy.