Sreeraman Rajan

CONTACT INFORMATION

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EDUCATION

Ph.D., Electrical and Computer Engineering, *2004*
University of New Brunswick, Fredericton, New Brunswick, Canada

- Dissertation: *Wavelet based segmentation and classification of the first two heart sounds in a PCG signal*

M.Sc., Electrical Engineering, *1992*
Tulane University, New Orleans, Louisiana, U.S.A

- Thesis: *Study of Bursting Phenomenon in Adaptive Least Mean Square Filters*

Orientation Training, Nuclear Science and Engineering, *1987*
Training School, Bhabha Atomic Research Center, Mumbai, Maharashtra, India

B.Sc.(Eng.), Electrical Engineering, *1986*
Bharathiyar University, Coimbatore, TamilNadu, India

- Thesis: *Automatic Control of Car*
- Graduated with 1^{st} Class Distinction, Second rank in the University

RESEARCH EXPERIENCE

Associate Professor, Canada Research Chair (Tier II) *July 2015 – Present*
Department of System and Computer Engineering,
Carleton University, Ottawa, Ontario, Canada

- Research in the multi-sensor, multi-modal sensor systems, sensor data processing and sensor data analytics for defence, safety, security and biomedical areas.

Adjunct Assistant Professor *April 2015 – April 2018*
Department of Electrical Engineering and Computer Engineering,
The Royal Military College, Kingston, Ontario, Canada

- Research in various aspects of signal processing for electronic warfare and electronic warfare systems

Adjunct Professor *April 2010 – Present*
School of Electrical Engineering and Computer Science,
University of Ottawa, Ottawa, Ontario, Canada

- Research in the area of physiological signal processing, design of instrumentation and signal processing for non-invasive medical devices
  - ◇ Collaborative Research in Oscillometric blood pressure measurement and measurement modalities with Profs. Groza, Dajani and Bolic.
  - ◇ Co-supervision of students: 1 postdoctoral fellow and guided master's and doctoral students in their thesis projects.
  - ◇ Research in uncertainties in sensing, especially when measurement set is small; provided bootstrap-based methodology to derive confidence intervals for blood pressure estimation using oscillometric blood pressure measurement.

RESEARCH EXPERIENCE (CONT.)

- ◇ Research in novel signal processing methodologies for extracting heart rate, breathing rate from oscillometric blood pressure measurements.
- ◇ Signal analysis of pulse morphology for pressure estimation, feature extraction for pressure estimation using computational intelligent methods such as neural networks, fuzzy networks.
- ◇ Modelling and non-linear signal processing of physiological signals.

- Research in non-contact detection and estimation of physiological parameters
  - ◇ Radar-based detection and estimation of heart beat and breathing leading to classification of "liveliness" of victims in a disaster zone for triage purposes.
  - ◇ Stand-off detection of life through rubble, wall using multi-modal sensing.

Defence Scientist *December 2004 – June 2015*
Defence Research & Development Canada, Ottawa, Ontario, Canada

Research in the area of Communication and Radar Electronic Warfare:

- Principal investigator for a $500,000 grant for research in Compressive Sensing-based Electronic Warfare Receiver.

- Technical Authority for Automatic Modulation Recognition:
  - ◇ Cyclostationarity-based features for Modulation Recognition.
  - ◇ Recognition of single and multi-carrier modulation.
  - ◇ Recognition of LTE signals.

- Signal Processing Expertise
  - ◇ Emitter geolocation algorithm research (AOA, TDOA, FDOA, joint TDOA/FDOA).
  - ◇ Detection of signals using filter bank, polyphase filter bank and order static-based detection approaches.
  - ◇ Direction finding using wideband co-planar compact antennas.
  - ◇ Novel long range geolocation using multi-platform co-operative receivers.

- Systems engineering Leader
  - ◇ Successfully led several military field trials demonstrating research achievements in RF emitter geolocation.
  - ◇ Successfully field tested and recommended procurement of high-performance Direction Finding systems.
  - ◇ Successfully led the analysis of mutual coupling in wideband compact co-planar antennas in two-channel Butler Matrix Direction Finding Systems.
  - ◇ Redesigned the front end signal conditioning and analog-digital conversion card for direction finding system and obtained > 20 dB improvement.

- Sensor Expertise
  - ◇ Investigated the Butler-Matrix based direction finding sensor design.
  - ◇ Investigated the design and performance of wide-band direction finding using co-planar compact antenna for tactical direction finding.
  - ◇ Investigated and developed specification for multi-platform co-operative sensing for geolocation of emitters.
  - ◇ Investigated and proposed solutions for calibration of sensors for tactical direction finding.
  - ◇ Currently investigation compressive sensing idea for Electronic Warfare sensor/receiver design.

RESEARCH EXPERIENCE (CONT.)

Scientific Officer *August 1987 – August 1990*
Reactor Control Division,
Bhabha Atomic Research Center, Mumbai, Maharashtra, India

- Researched and designed computer based systems for control, protection and regulation systems for nuclear research and power reactors.
  - ◇ Designed, tested and installed single board computer-based trip system for KAMINI research reactor
  - ◇ Studied, simulated and conducted reliability analysis using common mode fault analysis technique
  - ◇ Designed, tested and installed a microprocessor-based pneumatic carrier facility for 100 MWe research reactor for irradiating and studying half-lives of fast decaying isotopes
  - ◇ Designed, developed, tested and installed the analog sensing and conditioning card, digital input/output cards for a digital comparator system for safety systems of nuclear power reactors
  - ◇ Analyzed and tested the control and regulation system for KAMINI research reactor
  - ◇ Conducted initial research for zonal control of 500 MWe nuclear power reactors

Visiting Research Associate *August 2007 to April 2008*
Siemens Corporate Research, Princeton, New Jersey, U.S.A

- Member of the "Tricorder Project" team. Researched and developed a heart murmur detection system using electronic stethescope
  - ◇ Responsible for providing a state of the art solution for detecting and analyzing various components of heart sound signal. Developed a novel wavelet/neural network based solution for detecting, analyzing and classifying the heart sound signals.
  - ◇ Produced a technical report detailing the proposed solution and state of the art techniques
  - ◇ The work led to a patent application and formation of a startup, Zargis Medicals Inc

Research Assistant *September 1995 to August 1998*
Department of Electrical and Computer Engineering,
textbf University of New Brunswick, Fredericton, New Brunswick, Canada

- Conducted research and analysis in the areas of signal processing, pattern classification and neural networks
  - ◇ Enhanced an existing dynamic recurrent neural network tool in C programming language
  - ◇ Developed a hierarchical methodology for pattern classification approach
  - ◇ Developed strategies for improving accuracy in classification systems
  - ◇ Developed an automatic classification system for carcinogens in a pap smear
  - ◇ Developed novel wavelet-based segmentation methodology for heart sound signals without the need for accompanying ECG signals
  - ◇ Developed a knowledge-based unsupervised classification system for heart sound signals

Research Assistant *September 1995 to August 1998*
Department of Electrical and Computer Engineering,
University of Colorado at Denver, Denver, Colorado, U.S.A.

- Conducted research and analysis on adaptive filtering and two-dimensional signal processing
  - ◇ Researched and analyzed various types of adaptive filters including polynomial filters
  - ◇ Researched on flow measurement techniques for MicroMotion Inc and proposed an adaptive solution for precise flow measurement for Coriolis flow meters

Research Experience (cont.)

- ◇ Researched on adaptive notch filtering techniques
- ◇ Researched on two-dimensional filters and studied periodic shift-variant systems

Research Assistant *September 1990 to May 1992*
Department of Electrical Engineering,
Tulane University, New Orleans, Louisiana, U.S.A

- Conducted research and analysis on adaptive filtering

Industry Experience

Signal Processing Specialist *August 2003 – December 2004*
Biopeak Corporation, Ottawa, Ontario, Canada

- Research and development in non-invasive medical devices for physiological signal monitoring
  - ◇ Researched into state of the art in blood glucose and hydration monitoring
  - ◇ Developed models for developing signal processing algorithm for hydration
  - ◇ Developed algorithm for multi-model sensor approach for blood glucose monitoring

DSP Algorithm Specialist/Optics Engineer *September 2000 – May 2003*
Ceyba Corp, Ottawa, Ontario, Canada

- Research and development in ultra long haul and long haul fiber optical communication systems
  - ◇ Lead multidisciplinary teams for dynamic gain equalization and channel monitoring of the system
  - ◇ Researched,developed and tested solutions for gain equalization and channel monitoring
  - ◇ Researched, developed and tested solutions for optical switches for the system
  - ◇ Hired and mentored graduate and undergraduate summer students
  - ◇ Provided expertise in the power control of EDFA amplifiers and power control strategy for the system

Module Algorithm Specialist *September 1999 – August 2000*
JDS Uniphase, Ottawa, Ontario, Canada

- Research and development of algorithms for modules and testing of optical switches
  - ◇ Researched and developed algorithm for dynamic gain equalization module
  - ◇ Developed algorithms for optical channel monitor
  - ◇ Tested and conducted failure analysis on returned optical switches
  - ◇ Conducted study on emerging competitive optical switch technologies

Teaching Experience

Instructor – Vedic Mathematics *Fall 2010, Spring 2011*
Ottawa Chapter of Association of Bright Children of Ontario, Ottawa,Ontario, Canada

- Instructed elementary and high school students in Vedic Mathematics.
- Developed course material for Vedic Mathematics

Teaching Experience (cont.)

Teaching Assistant – Electrical and Computer Engineering *1995–1998*
University of New Brunswick, Fredericton, New Brunswick, Canada

- Teaching assistant for two senior-level undergraduate electrical engineering courses: *Digital Signal Processing I* and *Digital Signal Processing II.*
- Co-delivered the graduate-level course: *Random Processes* with Prof. R. Doraiswami.
- Supervised weekly two lab sessions in every semester (Controls Lab, Signals Lab, Electrical Engineering Lab for non-Engineering majors).
- Responsible for grading the quizzes, midterm, and lab reports.
- Responsible for guiding undergraduate students in their thesis projects.

Facilitator *1993 – 1994*
Center for Women and Hispanic Students Welfare, **University of Colorado at Denver**, Denver, Colorado, U.S.A

- Instructor for remedial courses given by Electrical Engineering Faculty.
- Courses taught include:
  - ◇ *Signals and Systems*
  - ◇ *Electronics*

Instructor – Electrical and Computer Engineering *1995–1998*
University of Colorado at Denver, Denver, Colorado, U.S.A

- Independently structured and delivered senior level *Communications Lab*: 2 credits.
- Independently delivered one lab for juniors *Electronics I, 1 credit* and one lab for seniors *Electronics II, 1 credit.*
- Taught graduate level *Digital Signal Processing* whenever the professor was away.

Teaching Assistant – Electrical Engineering *1990-1992*
Department of Electrical Engineering, Tulane University, New Orleans, Louisiana, U.S.A.

- Instructed basic electrical engineering lab for compulsory first-year engineering course.
- Instructed independently *Machines Lab* for non-electrical engineering, Engineering students
- Facilitated remedial courses for Mechanical Engineering undergraduate students in *Machines*
- Instructed junior *Electronic Circuits Lab* and sophmore *Networks Lab*

Student Supervision

Completed

- 1 M.Sc. (Co-supervision with Prof. Y. M. M. Antar, Department of Electrical and Computer Engineering, Royal Military College, Kingston, Ontario, Canada)
  - Capt. Simon Henault (M.Sc), Analysis and Optimization of a Compact Array of Wire Elements for Wideband Direction Finding in Tactical Electronic Warfare, May 2006-2008. (Co-Supervised with Prof. Y.M.M.Antar)

STUDENT SUPERVISION (CONT.)

- 1 PostDoc Fellow (Co-supervision with Profs. H. Dajani, M. Bolic and V. Z. Groza, School of Electrical Engineering and Computer Science, University of Ottawa, Ottawa, Ontario, Canada
  - Dr. Soojeong Lee, Uncertainty in Blood Pressure Measurements, 2010-2012.
- 1 Ph.D. (Co-supervision with Prof. M. Bolic, School of Electrical Engineering and Computer Science, University of Ottawa, Ottawa, Ontario, Canada
  - Mr. Mohamed Mabrouk, Thesis topic: Signal Processing of UWB Radar Return Signals For Human Detection Behind Walls, 2012-2014
- 2 PostDoc Fellows (Co-supervision with Prof. M. Bolic, School of Electrical Engineering and Computer Science, University of Ottawa, Ontario, Canada
  - Dr. Mohamad Forouzanfar, Heart and Breathing rate estimation using Doppler-based radar, May 2014-Jan 2015.
  - Dr. Isar Nejadgholi, Classification of activities using Doppler-based radar, July 2015-June 2016.
- Contributing actively to the co-supervision of the following students:
  - Mr. Mohamad Forouzanfar (PhD), Computational Intelligence Algorithms for Blood Pressure Monitoring (co-supervision Prof. V. Z. Groza and Prof. H. R. Dajani), 2009-2014
  - Mr. Silu Chen (M.A.Sc.), Robust Blood Pressure Measurement, (co-supervision Prof. V. Z. Groza and Prof. M. Bolic), 2008-2010
  - Dr. Saif Ahmad (Post Doc), Pulse Rate Variability (co-supervision Prof. V. Z. Groza and Prof. M. Bolic), 2009
  - Mr. Majid Mafi (M.A.Sc.), Blood Pressure Estimation Using Oscillometric Pulse Morphology (co-supervision Prof. M. Bolic and Prof. V. Z. Groza), 2010-2012

Undergraduate Students

- Co-supervised the following undergraduate students with Prof. A. D. C. Chan, Systems and Computer Engineering Department, Carleton University, Ottawa, Canada
  - Mr. Daanish Khan and Mr. Dragan Trifkovic, Thesis: Biological Signal Processing using an FPGA. 2007-2008. **Honorable Mention in Innovate Canada 2008 Alterra Design Competition for "FPGA-based Heart Rate Estimator"**
  - Ms. Wen-Yi Que, Mr. Ahmer Gulzar, Mr. Gurtej Sandhu, Mr. Denis Kutman, Thesis: FPGA-based Implementation of Efficient Four-Quadrant Arctangent Functions, 2006-2007.

AWARDS AND RECOGNITION

Awards and Recognition

- Canada Research Chair (Tier II), NSERC, Canada, 2015
- Outstanding Contribution Award, from Defence Research and Development Canada, Ottawa, 2013
- IEEE MGA Achievement Award, 2012
- Queen Elizabeth II Diamond Jubilee Award, 2012
- Outstanding Volunteer Award, IEEE Ottawa Section, 2012
- Competent Leader, Toastmasters Inc., 2012
- IEEE MGA Best Large Section Award, 2011

Awards and Recognitions (cont.)

- IEEE Engineering in Medicine and Biology Society Best Chapter Award, 2011
- Competent Communicator, Toastmasters Inc., 2011
- IEEE Canada Best Large Section Award, 2011
- IEEE Ottawa Best Chapter Award for IEEE Ottawa Engineering in Medicine and Biology Society Chapter, 2010
- IEEE Ottawa Best Chapter Award for IEEE Ottawa Engineering in Medicine and Biology Society Chapter, 2008
- Wally Reed GOLD Best Paper Award, 2008
- Recognition Award for successful DRDC Workshop in IEEE CCECE 2006
- Best Mentor Award, Dalhousie University Co-op Program, 2002
- Second Rank, Bharathiyar University, 1987
- Government of India Merit Scholarship, 1982-1986

Grants

- 2015-2019 Canada Research Chair (Tier II) Sensor Systems: $500,000
- 2012-2015 Principal Investigator: Fugitive Signal Interceptor: Compressive Sensing-based EW receiver, DRDC Technology Investment Fund $500,000
- 2013-2015 Lead Investigator: Scoping Study for Integrating Communication and Radar Electronic Warfare on Royal Canadian Air Force Assets, Royal Canadian Air Force, Canada $50,000
- August 2014-March 2015 Co-Principal Investigator: Research of Doppler radar-based Life Sign Monitoring System Technology, Correctional Services Canada, $98,850

Professional Affiliations

- 2006-Present: Senior Member, Institute of Electrical and Electronics Engineer
- 2006-Present: IEEE Engineering and Medicine Society: Member
- 2013-Present: IEEE Instrumentation and Measurement Technology, Society: Member
- 2007-Present: IEEE Communication Society: Member
- 2007: IEEE Computational Intelligence Society: Member
- 2005-2006: Member, Association of Old Crows
- 1990-2006: Member, Institute of Electrical and Electronics Engineer
- 08/1990-2005: IEEE Signal Processing Society: Member
- 08/1990-2004: Institute of Electrical and Electronics Engineers (IEEE) Student Member
- 04/1991-Present: ETA KAPPA NU Honor Society Member

Professional Services

- 2016 Member, Technical Program Committee, Electrical Power and Energy Conference (EPEC)
- 2015 Member, Technical Program Committee, IEEE International Symposium on Innovations in Intelligent Systems and Applications (INISTA)
- 2015 Member, Technical Program Committee, Second International Symposium on Signal Processing and Intelligent Recognition Systems (SIRS2015)

PROFESSIONAL SERVICES (CONT.)

- 2015 Member, IEEE MGA Strategic Development and Environmental Assessment Committee
- 2015 Member, IEEE MGA Admissions and Advancement Committee
- 2015 Co-Chair, Patronage Committee, IEEE Integrated Management (IM 2015)
- 2015 Co-Chair, Student Travel Grants, IEEE Integrated Management (IM 2015)
- 2015 Co-Chair, Sponsorship and Industry Liaison, Canadian Workshop on Information Theory
- 2015 Member, Advisory Board, IEEE International Humanitarian Technology Conference (IHTC 2015)
- 2015 Member, Finance Committee, IEEE International Humanitarian Technology Conference (IHTC 2015)
- 2014-2015, Organizing Committee Member, Canadian Tracking and Fusion Workshop
- 2015 Co-Chair, Industry/Government Liaison and Sponsorships, IEEE Canadian Workshop on Information Theory
- 2013-2015 Chair, IEEE Canada Eastern Area
- 2013-2014 Member, IEEE Canada Nomination Committee
- 2013-2014 Chair, IEEE Ottawa Section Nomination Committee
- 2015 Member, IEEE Ottawa Section Nomination Committee
- 2012, Member, Technical Program Committee, IEEE Vehicular Technology Conference
- 2011-present Member, IEEE Canada Board
- 2011-2012 Chair, IEEE Ottawa Section
- 2009-2010 Chair, IEEE Ottawa Section AGM
- 2009-2010 Vice Chair, IEEE Ottawa Section
- 2007-2008 Treasurer, IEEE Ottawa Section
- 2007-present Member, IEEE Ottawa Section Awards Committee
- 2007-present Chair, IEEE Ottawa Chapter of Engineering in Medicine and Biology Society
- 2009-present Chair, IEEE Ottawa Section Senior Member Committee
- 2009-present Steering Committee Member, IEEE Midwest Symposium on Circuits and Systems
- 2005-2006 Vice Chair, IEEE Ottawa Chapter of Engineering in Medicine and Biology Society
- 2014, Industry and Sponsorship Liaison Chair, IEEE Queen's Biennial Symposium
- 2013 Associate General Chair, IEEE Radar Conference
- 2013 Member, Technical Program Committee, Canadian Engineering in Medicine and Biology Society Conference
- 2013 Co-Chair, Partnership Program, IEEE Radar Conference

PROFESSIONAL SERVICES (CONT.)

- 2013 Technical Program Committee Member, International Conference on Computational Intelligence and Virtual Environment for Measurement Systems and Applications
- 2012 Track Chair, IEEE International Workshop on High-Performance Chips, Package and Systems
- 2012 Co-Chair, Local Arrangements, IEEE International Conference on Communications
- 2012 Member, Executive Committee, IEEE International Conference on Communications
- 2012 Co-Chair, Bioengineering circuits and systems, IEEE Midwest Symposium on Circuits and Systems
- 2011 Member, Technical Program Committee, IEEE International Conference on Communications
- 2010 Member, Steering Committee, IEEE Symposium on Medical Measurements and Applications
- 2010 Co-ordinator, Biomed/Optoelectronics Technical Streams of IEEE NewFoundland Electrical and Computer Engineering Conference
- 2010 Member, Technical Program Committee, IEEE Global Communications Conference
- 2010 Co-Chair, Local Arrangements, IEEE Vehicular Technology Conference-Fall
- 2010 Member, Technical Program Committee, IEEE Vehicular Technology Conference-Spring
- 2009 Co-Chair, Signal and Multi-media Processing Symposium, IEEE Canadian Conference on Electrical and Computer Engineering
- 2009 Member, Program Committee, IEEE Conference on Computational Intelligence for Security and Defense Applications
- 2008-2010 Member, Steering Committee, Technical Organizing Committee, IEEE Workshop on Adverse Response to Monitoring
- 2008 Judge, IEEE Eastern Ontario Student Oral Paper Competition
- 2008 Session Chair, 24th IEEE Biennial Queen's Symposium on Communications
- 2008 Session Chair for Standards and Medical Applications II, IEEE Symposium on Medical Measurements and Applications
- 2008 Member, Steering Committee, IEEE Symposium on Medical Measurements and Applications
- 2008 Co-Chair, Signal and Multi-media Processing Symposium, IEEE Canadian Conference on Electrical and Computer Engineering
- 2007 Co-Chair, DSP Track-III, IEEE MidWest Symposium on Circuits and Systems
- 2007 Member, Organizing Committee, IEEE Workshop on Blood Pressure Measurements and Standardization Seminar

PROFESSIONAL SERVICES (CONT.)

- 2007 Judge, IEEE Eastern Ontario Student Oral Paper Competition
- 2007 Member, Organizing Committee, IEEE FPGA Workshop, Ottawa
- 2007 Member, Review Panel Committee for DSP track, IEEE MidWest Symposium on Circuits and Systems
- 2006 Member, Organizing Committee, IEEE Canadian Conference on Electrical and Computer Engineering
- 2006 Track Chair and Organizer, DRDC Workshop, IEEE Canadian Conference on Electrical and Computer Engineering
- 2006 Sessions Chair, DSP Track-III, IEEE Canadian Conference on Electrical and Computer Engineering

External Examiner

- 2012 Master's Thesis of Mr. Jonathan J. Edwards, Thesis Title: Covert Channels in Ad Hoc Networking: An Analysis using the Optimized Link State Routing Protocol, Thesis Supervisors: Prof. Richard Yu and Dr. Peter Mason, Department of Systems and Computer Engineering, Carleton University, Ottawa, Ontario, Canada, April 2012.
- 2012 Master's Thesis of Mr. Emil Poliakov, Thesis Title:Virtual Receiving Array Method for Direction of Arrival Estimation Using Direct Data Domain Techniques and Signal Cyclostationarity, Thesis Supervisors: Prof. Yahia M. Antar and Dr. Chen Wu, Department of Electrical Engineering, Royal Military College, Kingston, Ontario, Canada, April 2012.

Journal Reviewer

- Reviewer for Annals of Biomedical Engineering, IEEE Transactions on Circuits and Systems-II, IEEE Transactions on Aerospace and Electronics, IEEE Transactions on Instrumentation and Measurements, IEEE Transactions on Wireless Communication, IEEE Transactions on Biomedical Engineering, IEEE Reviews on Biomedical Engineering, EURASIP Journal on Wireless Communications, Digital Signal Processing, Canadian Journal of Electrical and Computer Engineering, Journal of System Architecture, IET Signal Processing, IET Microwave, Antennas and Propagation.

Conference Reviewer

- Regular Reviewer for IEEE GlobeCom, IEEE ICC, IEEE VTC (Fall and Spring), IEEE WCNC, IEEE LISA, IEEE CCECE, IEEE ISCAS, IEEE MWSCAS, International Conf on Sig. Processing and Communications, IEEE MeMeA, Itherm Conference, IEEE NECEC and WCSP

Grants and Proposals Assessor

- Reviewer for NSERC : Strategic Projects Proposals, CREATE Proposals and DISCOVERY grants
- Applied Research Proposals for Royal Military College, Kingston, Ontario, Canada
- Internal University Grant proposals of University of Western Ontario, London, Ontario, Canada
- Reviewer for Atlantic Canada Opportunities Agencies

JOURNAL ARTICLES

1. M. Niu, S. Salari, I-M. Kim, F. Chan and **S. Rajan**, "Recovery Probability Analysis for Sparse Signals via OMP," accepted for publication in *IEEE Transactions on Aerospace and Electronics Systems*.

2. X. Jiang, W-J. Zeng, H. C. So, **S. Rajan** and T. Kirubarajan, "Robust Matched Filtering in l_p Space," accepted for publication in *IEEE Transactions on Signal Processing*.

3. B. Li, Y. Shen, **S. Rajan** and T. Kirubarajan, "Sparse Signal Recovery from Noisy Measurements using Generalized OMP Algorithm: New Theoretical Results," *Signal Processing*, Vol. 117, December 2015, 270-278.

4. M. Forouzanfar, H.R. Dajani, V. Z. Groza, M. Bolic, **S. Rajan** and I. Batkin, "Oscillometric Blood Pressure Estimation: Past, Present and Future," invited paper accepted for publication in *IEEE Reviews in Biomedical Engineering*.

5. S. Lee, **S. Rajan**, C-H. Park, J-H Chang, H. R. Dajani and V. Z. Groza, "Estimated Confidence Interval from Single Blood Pressure Measurement based on Algorithmic Fusion," *Computers in Biology and Medicine*, Vol. 62, Issue C, July, 2015, pp. 154-163.

6. B. R. Jackson, **S. Rajan**, B. Liao and S. Wang, "Direction of Arrival Estimation using Directive Antennas in Uniform Circular Arrays," *IEEE Transactions on Antennas and Propagation*, Vol. 63, No. 2, February 2015, pp. 736-747.

7. M. Forouzanfar, H. Dajani, V. Z. Groza, M. Bolic, **S. Rajan**, I. Batkin, "Ratio-Independent Blood Pressure Estimation by Modeling the Oscillometric Waveform Envelope," *IEEE Transactions on Instrumentation and Measurement Technology*, Vol. 63, Issue 10, October, 2014, pp. 2501-2503.

8. S. Lee, J-H. Chang, S. W. Nam, C. Lim, **S. Rajan**, H. R. Dajani, V. Z. Groza, "Oscillometric Blood Pressure Estimation based on Maximum Amplitude Algorithm Employing Gaussian Mixture Regression," *IEEE Transactions on Instrumentation and Measurement Technology*, Vol. 62, No. 12, December 2013, pp. 3387-3389.

9. Q. Zhang, O. A. Dobre, Y. A. Eldemerdash, **S. Rajan** and R. Inkol, "Second-Order Cyclostationarity of BT-SCLD Signals: Theoretical Developments and Applications to Signal Classification and Blind Parameter Estimation," *IEEE Transactions on Wireless Communications*, Vol. 12, No. 4, April, 2013, pp. 1501-1511.

10. S. Henault, Y. M. M. Antar, **S. Rajan**, R. Inkol and S. Wang, "Effects of Mutual Coupling on the Accuracy of Adcock Direction Finding Systems," *IEEE Transactions on Aerospace and Electronic Systems*, Vol. 48, issue 4, 2012, pp.2990-3005.

11. O. A. Dobre, M. Oner, **S. Rajan** and R. Inkol, "Cyclostationarity-based Algorithms for QAM Signal Identification," *IEEE Communication Letters*, Vol. 16, No. 1, January 2012, pp. 12-14.

12. S. Lee, M. Bolic, V. Z. Groza, H. R. Dajani, **S. Rajan**, "Confidence Interval Estimation for Oscillometric Blood Pressure Measurements Using Bootstrap Approaches," *IEEE Transactions on Instrumentation and Measurement Technology*, Vol. 60, No. 10, October 2011, pp. 3405-3415.

13. M. Forouzanfar, H. R. Dajani, V.Z. Groza, M. Bolic and **S. Rajan**, "Feature-based Neural Network Approach for Oscillometric Blood Pressure Estimation," *IEEE Transactions on Instrumentation and Measurement Technology*, Vol. 60, No. 8, August 2011, pp. 2786-2795.

14. S. Chen, M. Bolic, V. Groza, H. Dajani and **S. Rajan**, "Extraction of Breathing Signal and Suppression of its Effects in Oscillometric Blood Pressure Measurement," *IEEE Transactions on Instrumentation and Measurement Technology*, Vol. 60, No. 5, May 2011, pp. 1741-1750.

15. A Punchihewa, Q. Zhang, O. Dobre, C. Spooner, **S. Rajan** and R. Inkol, "On the Cyclostationarity of OFDM and Single Carrier Linearly Digitally Modulated Signals in the Time Dispersive Channels: Theoretical Developments and Application," *IEEE Transactions on Wireless Communications*, Vol 9, No. 8, August 2010, pp2588-2599.

16. S. Ahmad, M. Bolic, H. Dajani, V. Groza, I. Batkin and **S. Rajan**,"Measurement of Heart Rate Variability Using an Oscillometric Blood Pressure Monitor," *IEEE Transactions on Instrumentation and Measurement Technology*, Vol. 59, No. 10, October. 2010, pp. 2575-2590.

17. S. Wang, R. Inkol, **S. Rajan** and F. Patenaude, "Detection of Narrowband Signals through the FFT and Poly-phase FFT Filter Banks: Non-Coherent vs Coherent Integration," *IEEE Transactions on Instrumentation and Measurement Technology*, Vol. 59, No. 5, May 2010, pp. 1424-1438.

18. S. Henault, Y. M. M. Antar, **S. Rajan**, R. Inkol and S. Wang, "The Multiple Antenna Induced Emf Method for the Precise Calculation of the Coupling Matrix in a Receiving Antenna Array," *Progress in Electromagnetics Research M*, Vol. 8, pp. 103-118, 2009.

19. O. Dobre, **S. Rajan** and R. Inkol, "Joint Signal Detection and Classification based on First-Order Cyclostationarity for Cognitive Radios," *Special Issue of EURASIP Journal on Advances in Signal Processing -Dynamic Spectrum Access for Wireless Networking*, Vol 2009 (article ID 656719).

20. S. Wang, R. Inkol, **S. Rajan** and F. Patenaude, "On the Performance Gain of the FFT Filter Bank-based Summation and Majority CFAR Detectors," *IEEE Transactions on Instrumentation and Measurement*, Vol. 58, No. 5, May 2009, pp. 1778-1788.

21. **S. Rajan**, S. Wang and R. Inkol, "An Error Reduction Technique for Four-quadrant Arctangent Approximations," *IET Signal Processing*, Vol. 2, No. 2, pp. 133-138, June 2007.

22. **S. Rajan**, S. Wang and R. Inkol and A. Joyal, "Efficient Approximations for the Arctangent Function," *IEEE Signal Processing Magazine*, DSP Tips and Tricks Column, pp. 108-111, May 2006.

23. **S. Rajan**, K. S. Joo, T. Bose, "Analysis of 2-D State Space Periodically Shift Variant Discrete System," *Circuits, Systems and Signal Processing*, pages 395-413, Vol. 15, No. 3, 1996.

Chapter in Books

1. **S. Rajan**, S.Wang, R. Inkol and A. Joyal, "Efficient approximations for the arctangent function," Chapter 18 in Streamlining Digital Signal Processing: A Tricks of the Trade Guidebook, IEEE Press, Edited by Richard G. Lyons, 2007.

CONFERENCE PAPERS

1. Y. T. Chan, F. Chan, **S. Rajan**, B. H. Lee, "Direct Estimation of Time Difference of Arrival from Compressive Sensing Measurements," accepted in *3rd International Workshop on Compressed Sensing Theory and its Applications to Radar, Sonar and Remote Sensing*, 2015.

2. M. Mabrouk, **S. Rajan**, M. Bolic, I. Batkin, H. R. Dajani and V. Z. Groza, "Model of Human Breathing Reflected Signal Received by PN-UWB Radar," *IEEE International Conference on Engineering in Medicine and Biology*, 2014.

3. M. Mabrouk, **S. Rajan**, M. Bolic, I. Batkin, H. R. Dajani and V. Z. Groza, "Detection of Human Targets Behind the Wall Based on Singular Value Decomposition and Skewness Variations," *IEEE Radar Conference*, 2014.

4. C. Wu, **S. Rajan**, A. Young and C. O'Regan, "RF/Microwave System High-Fidelity Modelling and Simulation: Application to Airborne Multi-channel Receiver System for Angle of Arrival Estimation," *SPIE Defense and Security Symposium*, 2014.

5. S. Wang, B. R. Jackson, **S. Rajan**, F. Patenaude, "Iterative Maximum Likelihood Received Strength (RSS) Algorithm for Geolocation of Emitters," *IEEE Military Conference (MilCom)*, 2013.

6. J-F. Rivest, **S. Rajan**, "Morphological Detectors for Radar ELINT Applications," *IEEE International Conference on Instrumentation and Measurement Technology*, 2013

7. C. Wu, **S. Rajan**, "Study on Fast Fourier Sampling/Sparse Fast Fourier Transform Method for Ultra-wide Digital Receiver Design," *SPIE Sympoisum on Wireless Sensing, Localization and Processing*, 2013.

8. M. Majid, **S. Rajan**, M. Bolic, H.R. Dajani, and V. Z. Groza, "Blood Pressure Estimation Using Maximum Slope of Oscillometric Pulses," *IEEE International Conference on Engineering in Medicine and Biology*, 2012.

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