Piya Pal

2305 A. V. Williams Building
University of Maryland, College Park, MD 20742

Tel: 626-379-0118
E-mail: ppal@ece.umd.edu
http://www.ece.umd.edu/faculty/pal

Professional Appointments

- **University of Maryland, College Park** Jan. 2014 - Present
  Assistant Professor of Electrical and Computer Engineering

- **California Institute of Technology** July 2013 - Nov. 2013
  Postdoctoral Scholar in Electrical Engineering
  Advisor: Prof. P. P. Vaidyanathan

Education

- **California Institute of Technology** Sep. 2007 - June 2013
  Ph.D. in Electrical Engineering
  Advisor: Prof. P. P. Vaidyanathan

- **California Institute of Technology** 2007 - 2008
  M.S. in Electrical Engineering

- **Indian Institute of Technology - Kharagpur** 2003 - 2007
  B. Tech in Electronics and Electrical Communication Engineering

Internship

- **Microsoft Research, Redmond, USA** June - Oct. 2012
  Mentor: Dr. Henrique Malvar
  Worked on the problem of dereverberation of speech in noisy environment.
- **Undergraduate Summer Intern** May-July, 2006
  Advisor: Dr. Urbashi Mitra University of Southern California, CA.
  Worked on algorithms for Channel Estimation in multi-hop sensor networks employing both encode-and-forward and amplify-and-forward schemes for joint sensing and communication.

Honors And Awards

- *2014 Charles and Ellen Wilts Prize, Caltech* 2014
  Awarded to outstanding Ph.D Thesis in Electrical Engineering.
- *Winner of Everhart Lecture Series, Caltech* 2013
  (one of three lecturers selected across all disciplines at Caltech) Pasadena, CA.
- *Best Student Paper Award* January 2011
  IEEE DSP Workshop Sedona, Az.
- *Best Student Paper Award (third position),* Nov. 2011
  45^{th} Asilomar Conference on Signals, Systems and Computers Pacific Grove, CA.
- *Atwood Fellowship* 2007-2008
  Caltech

- *Sarat Memorial Prize for securing highest GPA among graduating women students* 2007
  Indian Institute of Technology-Kharagpur, India

Research Interests

- Statistical Signal Processing.
- Sparse Sampling, representation and reconstruction.
- Optimization.
- Array Processing with applications in smart wireless devices and tracking systems.

Teaching

- **University of Maryland, College Park**: Instructor for the following courses:
  1. ENEE 425, Digital Signal Processing, Spring Semester, 2014: Undergraduate Elective.
  2. ENEE 630, Advanced Digital Signal Processing, Fall Semester, 2014: Graduate Core Course.
- **California Institute of Technology**: Teaching Assistant for the following courses:
  1. Signals and Systems, EE 111 2008-2012.
  2. Digital Signal Processing, EE 112ab 2009-2012.
  3. Multirate Signal Processing, EE 128ab 2010, 2012.
  4. Applications of Convex Optimization in Signal Processing and Communications, EE 150 2012.

Professional Activities

- Co-organizer of special session on "Sparse Estimation and Learning in Multi-Channel and Array Systems" at 48th Asilomar Conference on Signals, Systems and Computers, 2014.
- Co-session Chair for the session titled "Information theoretic Signal Processing" at 46th Asilomar Conference on Signals, Systems and Computers, 2012.
- Member of Technical Program Committee for IEEE SAM 2014, ICASSP 2013-2014 (Reviewer).
- **Journal Reviewing**: IEEE Transactions on Signal Processing, IEEE Transactions on Information Theory, IEEE Signal Processing Letters, IEEE Transactions on Circuits and Systems, IEEE Transactions on Aerospace and Electronic Systems, EURASIP Journal on Signal Processing.
- **Conference Reviewing**: ICASSP 2013-2014, SAM 2014, CAMSAP 2014, EUSIPCO 2014, PODC 2014.

Invited Talks

- *Pushing the Limits of Sparse Recovery - Interplay of Structured Sampling and Correlation Awareness*: University of California, Riverside (Feb. 2013), Johns Hopkins University (Feb. 2013), MIT (March 2013), University of Texas at Austin (March 2013), Washington University, St Louis (March 2013), Cornell University (April 2013), University Of Maryland, College Park (April 2013), USC (April 2013), University of Minnesota, (April 2013).

Publication List of Dr. Piya Pal

Publication: Book Chapter

- P. P. Vaidyanathan and Piya Pal, "Coprime sampling and arrays in one and multiple dimensions", Chapter 5 in *Multiscale Signal Analysis and Modeling*, Edited by X. A. Shen and A. I. Zayed, Springer, 2012.

Journal Publications

1. Piya Pal, and P. P. Vaidyanathan, "A Grid-Less Approach to Underdetermined Direction of Arrival Estimation Via Low Rank Matrix Denoising", IEEE Signal Processing Letters, vol. 21, no. 6, pp. 737-741, June 2014.
2. Piya Pal and P. P. Vaidyanathan, "Multiple Level Nested Array: An efficient geometry for 2qth order cumulant based array processing", IEEE Transactions on Signal Processing, vol.60, no.3, pp.1253-1269, March 2012.
3. Piya Pal and P. P. Vaidyanathan, "Nested Arrays in Two Dimensions, Part I: Geometrical Considerations", IEEE Trans. on Signal Processing, vol. 60, no. 9, pp. 4694-4705, Sept. 2012.
4. Piya Pal and P. P. Vaidyanathan, "Nested Arrays in Two Dimensions, Part II: Application to Two Dimensional Array Processing", IEEE Trans. on Signal Processing, vol. 60, no. 9, pp. 4706-4718, Sept. 2012.
5. P. P. Vaidyanathan and Piya Pal, "Sparse Sensing With Co-Prime Samplers and Arrays", IEEE Trans. on Signal Processing, vol. 59, pp. 573–586, Feb. 2011.
6. Piya Pal and P. P. Vaidyanathan, "Coprimality of Certain Families of Integer Matrices", IEEE Trans. on Signal Processing, vol. 59, pp. 1481–1490, April 2011.
7. P. P. Vaidyanathan and Piya Pal, "Theory of sparse coprime sensing in multiple dimensions", IEEE Transactions on Signal Processing, Vol. 59, No. 8, Aug. 2011.
8. P. P. Vaidyanathan and Piya Pal, "A General Approach to Coprime Pairs of Matrices, Based on Minors", IEEE Transactions on Signal Processing, vol. 59, No. 8, Aug. 2011.
9. P. P. Vaidyanathan and Piya Pal, "Generating New Commuting Coprime Matrix Pairs From Known Pairs", Signal Processing Letters, IEEE , vol.18, no.5, pp. 303-306, May 2011.
10. P. P. Vaidyanathan and Piya Pal, "System Identification With Sparse Coprime Sensing", Signal Processing Letters, IEEE , vol.17, no.10, pp. 823-826, Oct. 2010
11. Piya Pal and P. P. Vaidyanathan, "Nested arrays: a novel approach to array processing with enhanced degrees of freedom", IEEE Trans. on Signal Processing, vol. 58, pp. 4167–4181, August 2010.
12. Piya Pal and P. P. Vaidyanathan, "Pushing the Limits of Sparse Support Recovery Using Correlation Information", under review.
13. Qi Cheng, Piya Pal, Masashi Tsuji and Yingbo Hua, "Detecting More Sources than Sensors Using Outer-Products of Array Output", under review.

Conference Publications

1. Piya Pal and P. P. Vaidyanathan, "Soft-Thresholding for Spectrum Sensing with Coprime Samplers", invited paper at IEEE SAM, 2014, Spain, June 22-25, 2014.
2. Piya Pal and P. P. Vaidyanathan, "Parameter Identifiability in Sparse Bayesian Learning", ICASSP, Florence, Italy, May 4-9, 2014.
3. Piya Pal and P. P. Vaidyanathan, "Conditions for Identifiability in Sparse Spatial Spectrum Sensing", Invited paper at EUSIPCO, Marrakech, Sep. 2013.
4. Piya Pal and P. P. Vaidyanathan, "Correlation Aware Sparse Support Recovery: Gaussian Sources", presented at ICASSP, Vancouver, May 2013.

5. Piya Pal and P. P. Vaidyanathan, "Correlation Aware Techniques for Sparse Support Recovery", IEEE Statistical Signal Processing Workshop (SSP), 2012, pp.53-56, 5-8 Aug. 2012.
6. Piya Pal and P. P. Vaidyanathan, "On Application of LASSO for Sparse Support Recovery With Imperfect Correlation Awareness", 46th Asilomar Conference on Signals, Systems and Computers, 2012, Nov. 4-7, 2012.
7. Piya Pal and P. P. Vaidyanathan, "Non-Uniform Linear Arrays for Improved Identifiability in Cumulant Based DOA Estimation", 45th Asilomar Conference on Signals, Systems and Computers, 2011 (**Winner of the 3rd Prize in Best Student Paper Award Contest, November, 2011**).
8. Piya Pal and P. P. Vaidyanathan, "Coprime sampling and the MUSIC algorithm", IEEE DSP Workshop, Sedona, AZ, January 2011 (**Winner of Best Student Paper Award**).
9. Piya Pal and P. P. Vaidyanathan, "Two Dimensional Nested Arrays on Lattices", ICASSP, May, Prague, 2011.
10. Piya Pal and P. P. Vaidyanathan, "A novel array structure for directions-of-arrival estimation with increased degrees of freedom", Proc. ICASSP., Dallas, March 2010.
11. Piya Pal and P. P. Vaidyanathan, "Beamforming using passive nested arrays of sensors", Proc. IEEE Int. Symp. Circuits and Systems, Paris, May-June 2010.
12. Piya Pal and P. P. Vaidyanathan, "Efficient Frequency Invariant Beamforming using Virtual Arrays", 44th Asilomar Conf. on Signals, Systems and Computers, 2010.
13. Piya Pal and P.P. Vaidyanathan, "A novel autofocusing approach for estimating directions-of-arrival of wideband signals", 43rd Asilomar Conf. on Signals, Systems and Computers, pp.1663-1667, Nov. 2009.
14. Piya Pal and P. P. Vaidyanathan, "Frequency invariant MVDR Beamforming without filters and implementation using MIMO radar", Proc. ICASSP, Taipei, April 2009. (**finalist for Best Student Paper Award**).
15. P. P. Vaidyanathan, Piya Pal, and Chun-Yang Chen, "MIMO radar with broad band waveforms: smearing filter banks and 2D virtual arrays", Proc. 42nd Asilomar Conference on Signals, Systems, and Computers, Monterey, CA, Oct. 2008.
16. P. P. Vaidyanathan and Piya Pal, "MIMO radar, SIMO radar, and IFIR radar: a comparison", Proc. 43rd Asilomar Conference on Signals, Systems, and Computers, Monterey, CA, Nov. 2009.
17. P. P. Vaidyanathan and Piya Pal, "Sparse sensing with coprime arrays", Proc. 44th Asilomar Conference on Signals, Systems, and Computers, Monterey, CA, Nov. 2010.
18. P. P. Vaidyanathan and Piya Pal, "Sparse coprime sensing with multidimensional lattice arrays", 14th IEEE DSP workshop, Sedona, AZ, Jan. 2011.
19. P. P. Vaidyanathan and Piya Pal, "Adjugate pairs of sparse arrays for sampling two-dimensional signals", Proc. IEEE Int. Conf. Acoust. Speech, and Signal Proc., Prague, Czech Republic, May 2011.
20. P. P. Vaidyanathan and Piya Pal, "Coprime sampling for system stabilization with FIR multirate controllers", Proc. 45th Asilomar Conference on Signals, Systems, and Computers, Monterey, CA, Nov. 2011.
21. P. P. Vaidyanathan and Piya Pal, "Direct-MUSIC on sparse arrays", IEEE Intl. Conf. on Signal Proc. and Comm., Bangalore, India, July 2012.
22. P. P. Vaidyanathan and Piya Pal, "Role of bandwidth in the quality of inversion of linear multirate systems with noise", Proc. 46th Asilomar Conference on Signals, Systems, and Computers, Monterey, CA, Nov. 2012.