

CURRICULUM VITAE

Aliaksei Sandryhaila

Contact Information

Department of Electrical and Computer Engineering
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Research Interests

Signal processing, data modeling, medical image and signal analysis, image processing, fast signal transforms, algorithm optimization, filter banks, frames, wavelets, applied mathematics.

Education

Ph.D. (November 2010)

Department of Electrical and Computer Engineering, Carnegie Mellon University, Pittsburgh, PA
Thesis: *Algebraic Signal Processing: Modeling and Subband Analysis*
Advisors: Markus Püschel, Jelena Kovačević

B.S. (August 2005)

Department of Computer Science, Drexel University, Philadelphia, PA
Magna Cum Laude

Attended (2000 – 2003)

Department of Applied Mathematics and Informatics, Belarusian State University, Minsk, Belarus

Work Experience

Postdoctoral Researcher (January 2011 – Present)

Department of Electrical and Computer Engineering, Carnegie Mellon University, Pittsburgh, PA

Senior Research Scientist (October 2010 – January 2011; Consultant: February 2011 – Present)

SpiralGen, Inc., Pittsburgh, PA

Research Assistant (July 2006 – September 2010)

Department of Electrical and Computer Engineering, Carnegie Mellon University, Pittsburgh, PA

Research Assistant (June – September 2004, April 2005 – June 2006)
Department of Computer Science, Drexel University, Philadelphia, PA

Junior Software Developer (September 2004 – March 2005)
MathForum, Philadelphia, PA

Teaching Experience

Co-Instructor

Mathematical Foundations of Electrical Engineering (2011)
Department of Electrical and Computer Engineering, Carnegie Mellon University, Pittsburgh, PA

Teaching Assistant

Algebraic Signal Processing Theory (2007), *Wavelets and Multiresolution Techniques* (2008)
Department of Electrical and Computer Engineering, Carnegie Mellon University, Pittsburgh, PA

Teaching Assistant

Software Design (2005), *Computation Labs I, II* (2005), *Applied Symbolic Computation* (2006)
Department of Computer Science, Drexel University, Philadelphia, PA

Publications

Journal

- [1] A. Sandryhaila, J. Kovačević and M. Püschel, “Algebraic signal processing theory: 1-D nearest neighbor models,” *IEEE Transactions on Signal Processing*, vol. 60, no. 5, 2012.
- [2] A. Sandryhaila, S. Saba, M. Püschel and J. Kovačević, “Efficient compression of QRS complexes using Hermite expansion,” *IEEE Transactions on Signal Processing*, vol. 60, no. 2, pp. 947-955, 2012..
- [3] A. Sandryhaila, J. Kovačević and M. Püschel, “Algebraic signal processing theory: Cooley-Tukey type algorithms for polynomial transforms based on induction,” *SIAM Journal on Matrix Analysis and Applications*, vol.32, no.2, pp. 364-384, 2011.
- [4] A. Sandryhaila, A. Chebira, C. Milo, J. Kovačević and M. Püschel, “Systematic construction of real lapped tight frame transforms,” *IEEE Transactions on Signal Processing*, vol. 58, no. 5, pp. 2556-2567, 2010.

Conference (fully reviewed)

- [1] A. Sandryhaila, J. Kovačević and M. Püschel, “Compression of QRS complexes using Hermite expansion,” *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, pp. 581-584, 2011.
- [2] A. Sandryhaila, A. Chebira, J. Kovačević and M. Püschel, “A new class of seeded real lapped tight frame transforms,” *Proc. SPIE Conf. on Wavelet Applications in Signal and Image Processing*, Proceedings of SPIE, vol. 7446, pp. 74460M-74460M-8, 2009.

- [3] A. Sandryhaila, J. Kovačević and M. Püschel, “Haar filter banks for 1-D space signals,” *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, pp. 3505-3508, 2008.
- [4] D. Balcan, A. Sandryhaila, J. Gross and M. Püschel, “Alternatives to the discrete Fourier transform,” *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, pp. 3537-3540, 2008.
- [5] P. D'Alberto, P. A. Milder, A. Sandryhaila, F. Franchetti, J. C. Hoe, J. M.F. Moura, M. Püschel and J. Johnson, “Generating FPGA accelerated DFT libraries,” *Proc. IEEE Symposium on Field-Programmable Custom Computing Machines (FCCM)*, pp. 173-184, 2007.
- [6] A. Chebira, L.P. Coelho, A. Sandryhaila, S. Lin, W.G. Jenkinson, J. MacSleyne, C. Hoffman, P. Cuadra, C. Jackson, M. Püschel and J. Kovačević, “An adaptive multiresolution approach to fingerprint recognition,” *Proc. International Conference on Image Processing (ICIP)*, vol. 1, pp. I-457-I-460, 2007.

Conference (abstract reviewed)

- [1] “Image compression with nearest-neighbor transforms,” *SIAM Conf. on Imaging Science*, 2012.
- [2] “Polynomial transform decomposition using module induction,” *SIAM Annual Meeting*, 2010.
- [3] “Fast polynomial transforms via module induction,” *February Fourier Talks*, 2010.
- [4] “Algebraic signal processing theory: Wavelets for space signals,” *20 Years of Wavelets*, 2009.
- [5] “Lapped tight frame transforms,” *February Fourier Talks*, 2009.

Professional Services

Paper Refereeing

IEEE Transactions on Signal Processing
 IEEE Signal Processing Magazine
 IEEE Signal Processing Letters
 IEEE Transactions on Biomedical Engineering
 IEEE Transactions on Circuits and Systems
 EURASIP Journal on Advances in Signal Processing
 EURASIP Journal on Signal, Image, and Video Processing

IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)
 IEEE International Conference on Image Processing (ICIP)
 IEEE International Symposium on Biomedical Imaging (ISBI)
 International Symposium on Optical Engineering and Photonic Technology (OEPT).

Software Contributions

Designed, developed, and supervised the online C code generator for the SPIRAL project (<http://spiral.net/codegenerator.html>)

Co-designed and supervised an automatic online publication database generator distributed as ThePub under the GPL license (examples are available at <http://spiral.net/publications/pub-topic.html> and <http://www.ece.cmu.edu/~smart/papers.html>).

Honors and Awards

Graduate Research Scholarship, Carnegie Mellon University 2006–2010

Maple Founders' Award, Drexel University 2005

Member of the Upsilon Pi Epsilon since 2005

Milton Rosenberg Academic Scholarship, Drexel University 2004

Dean's List Distinction, Drexel University 2003, 2004, 2005

A.J.Drexel Academic Scholarship, Drexel University 2003, 2004, 2005

Winner of the Department of Applied Mathematics and Informatics Olympiad, Belarusian State University, Minsk, Belarus 2000.

Honorable Mention at the National Belarusian Mathematics Olympiad, Belarus 1999.

References

Available upon request.