# Franz Franchetti

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## Appointments

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| 2008– | **Assistant Research Professor**<br>Department of Electrical and Computer Engineering<br>Carnegie Mellon University, USA |
| 2005–2008 | **Systems Scientist (Special Faculty)**<br>Department of Electrical and Computer Engineering<br>Carnegie Mellon University, USA |
| 2004–2005 | **Postdoctoral Research Associate,** SPIRAL<br>Erwin Schrödinger Fellowship J2322, funded by the<br>Austrian Science Fund FWF, Advisor: M. Püschel<br>Department of Electrical and Computer Engineering<br>Carnegie Mellon University, USA |
| 2003 | **Postdoctoral Research Associate,** Advanced Scientific Computing Team<br>AURORA Project 5, principal investigator C. W. Ueberhuber<br>Institute for Applied Mathematics and Numerical Analysis<br>Vienna University of Technology, Austria |
| 2000–2003 | **Research Assistant,** Advanced Scientific Computing Team<br>AURORA Project 5, principal investigator C. W. Ueberhuber<br>Institute for Applied Mathematics and Numerical Analysis<br>Vienna University of Technology, Austria |
| 1997–2003 | **Part-time system administrator**, Vienna University of Technology, Austria |
| 1994–2002 | **Part-time system administrator**, Zentraplan GmbH, Wr. Neustadt, Austria |

## Business Involvement

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| 2009 | **SpiralGen, Inc.**<br>CTO and Co-Founder<br>Pittsburgh, USA |

## Education

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| 2003 | **Dr. techn. (Ph.D.)** in Computational Mathematics, with distinction<br>Vienna University of Technology |
| 2000 | **Dipl.-Ing. (M.Sc.)** in Technical Mathematics, with distinction<br>Concentration: *Mathematical Computer Sciences*<br>Vienna University of Technology |
| 1994 | **HTL Matura** (Engineering High School Diploma), with distinction<br>theoretical and practical training in Mechanical Engineering and Automation<br>grants **Master Craftsman Certificate** and **Business License** in related trades<br>recognized as *less than 3 years of university education* by the European Union<br>HTBLuVA Wiener Neustadt (high school with post-secondary engineering focus) |

## Awards

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| 2010 | HPC Challenge Class II Award (Most Productive System)<br>Member of the winning team, led by Gheorghe Almasi (IBM Research) |
| 2009 | Best Paper Award, High Performance Embedded Computing (HPEC) 2009<br>together with D. McFarlin and M. Püschel |
| 2009 | Best Paper Award, Conference on Domain Specific Languages (DSLWC) 2009<br>together with D. McFarlin, F. de Mesmay, and M. Püschel |
| 2008 | Best Paper Award, High Performance Embedded Computing (HPEC) 2008<br>together with Y. Voronenko and M. Püschel |
| 2008 | City of Wiener Neustadt Culture Prize (awarded in Science)<br>Young Scientist Category (*Förderpreis*), 2 awarded in 2008 |
| 2006 | Gordon Bell Prize (Peak Performance Award)<br>Member of the winning team, led by Francois Gygi (UC Davis) |
| 2006 | Best Paper Award<br>International Symposium on Parallel and Distributed Processing and Applications (ISPA) 2006; 2 awarded, chosen out of 80 accepted papers |
| 2005 | Gordon Bell Prize Finalist<br>Member of the team led by Francois Gygi (UC Davis) |
| 2003 | City of Wr. Neustadt Outstanding Ph.D. Thesis Award |
| 2001 | City of Wr. Neustadt Outstanding M.Sc. Thesis Award |
| 2001 | Austrian Computer Society Award (*OCG-Förderpreis*)<br>2 awarded in 2001, for outstanding Masters Thesis in Computer Science |
| 1999 | Siemens Innovation Award (*Innovationspreis*) |

## Fellowships

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| 2004–2005 | Erwin Schrödinger Fellowship<br>*Advanced Code Generation in Digital Signal Processing*<br>funded by the Austrian Science Fund FWF<br>enables post-doctoral research abroad at top institutions (invitation required)<br>2 two-year awards in 2003 in the Faculty of Technical Sciences and CS, TU Vienna |
| 2002 | Lower Austria's award for excellent collegiate performance (*Top-Stipendium*) |
| 1998, 2000 | Research fellowships, AURORA Project 5 (Advanced Scientific Computing Team)<br>funded by the Austrian Science Fund FWF |
| 1998, 1999 | Vienna University of Technology annual award for student achievement<br>(*Leistungsstipendium)* |
| 1997–2000 | Member of the Siemens Student Fellowship Program (*Studentenkreis*)<br>for selected, highly qualified students in Engineering and Sciences |

## Funding

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| 2011 | *Application-Specific Logic in Memory (Year 3)*<br>F. Franchetti (PI), J. C. Hoe, L. Pileggi<br>SRC (C2S2) |
| 2011 | *Spiral: Code Synthesis for Higher-Level Application Domain Specific Code Patterns*<br>Intel EGC grant |

2011 *HotBench: An Optimization Workbench for Hotspots*
NSF SHF Small

2011 *Zero Knowledge Control in Smart Grids*
SRC SGRC Seed Project

2010 *PACT 2010 Student Travel Grants*
F. Franchetti (as PACT Finance Chair)
NSF

2010 *Spiral for SCC*
F. Franchetti
Intel early equipment access grant

2010 *Pushing the Limits to Computing: Managing Resources in a Reliable and Efficient Way in Large-Scale Electric Power Grids*
M. Ilic (PI), F. Franchetti, G. Hug, and R. Negi
SRC ERI (CMU SGRC)

2010 *Application-Specific Logic in Memory (Year 2)*
F. Franchetti (PI), J. C. Hoe, L. Pileggi, Mark Horowitz
SRC (C2S2)

2010 *Automatic Program Generation for High Performance Data Dependent Applications*
J. Moura (PI) and F. Franchetti
ONR

2010 *Generating IPP Library Functionality for Larrabee Using SPIRAL (Renewal)*
F. Franchetti
Intel Grant

2010 *Nvidia Professor Partnership*
F. Franchetti
Nvidia Grant

2009 *Generating IPP Library Functionality for Larrabee Using SPIRAL (Renewal)*
F. Franchetti and M. Püschel
Intel Grant

2009 *A Computing Framework for Distributed Decision Making to Ensure Robustness of Complex Man-Made Network Systems: The Case of the Electric Power Networks*
R. Negi, F. Franchetti, M. Ilic, and O. Mengshoel
NSF CPS

2009 *Application-Specific Logic in Memory*
F. Franchetti (PI, J. C. Hoe, L. Pileggi, Mark Horowitz
SRC (C2S2)

2009 *From SPIRAL to Silicon: Synthesis of Ultra-High-Performance SAR in End-of-Roadmap CMOS*
J. C. Hoe (PI), F. Franchetti, L. Pileggi
SRC (C2S2)

2009 *Computer Generation of Multicore Software for Software-Defined Radio*
J. M. F. Moura (SpiralGen, Inc.), F. Franchetti, and M. Püschel (CMU)
ONR STTR

2009 *Automatic Program Generation for Data-Dependent Applications*
J. M. F. Moura, F. Franchetti, and M. Püschel
ONR

2008 *Generating IPP Library Functionality for Larrabee Using SPIRAL*
F. Franchetti and M. Püschel
Intel Grant

2007 *FFT Generation for the Cell Processor*
F. Franchetti and M. Püschel
Mercury Computer Systems Inc.

2007 *Intelligent HW-SW Compilers for Signal Processing Applications (Phase II)*
J. Moura (PI), F. Franchetti, J. Hoe, J. Johnson, D. Padua, M. Püschel, M. Veloso
DARPA DSO

2007 *Program Generation for Parallel Platforms*
M. Püschel (PI) and F. Franchetti
NSF, CPA

2006 *Towards Production Quality Library Generation Using Spiral*
J. M. F Moura, M. Püschel, and F. Franchetti
Intel Equipment Grant

2006 *Spiral: Automatic Performance Tuning Using Chapel*
H. P. Zima (PI) and F. Franchetti
JPL SURP

# Publications

## Book Chapters

1. M. Püschel, F. Franchetti, Y. Voronenko: *Spiral.* Encyclopedia of Parallel Computing, D. A. Padua (Editor).

2. F. Franchetti, M. Püschel: *Fast Fourier Transform.* Encyclopedia of Parallel Computing, D. A. Padua (Editor).

## Journal Papers

1. T. Cui, F. Franchetti: *A Real Time Probabilistic Monitoring System for Distribution Networks Leveraging Commodity Multicores. Submitted for publication.*

2. Q. Li, T. Cui, R. Negi, F. Franchetti, M. D. Ilic: *An Information-theoretic Approach to PMU Placement in Electric Power Systems. Submitted for publication.*

3. Q. Li, T. Cui, R. Negi, F. Franchetti, M. D. Ilic: *On-line Decentralized Charging of Plug-In Electric Vehicles in Power Systems. Submitted for publication.*

4. P. A. Milder, F. Franchetti, J. C. Hoe, and M. Püschel: *Computer Generation of Hardware for Linear Digital Signal Processing Transforms.* In *ACM Transactions on Design Automation of Electronic Systems, to appear.*

5. W. Yu, T. Chen, F. Franchetti, and J. C. Hoe: *High Performance Stereo Vision Designed for Massively Data Parallel Platforms.* In *IEEE Transactions on Circuits and Systems for Video Technology (T-CSVT)*, 20(11):1509–1519, Nov. 2010.

6. F. Franchetti , Y. Voronenko, S. Chellappa, J. M. F. Moura, and M. Püschel: *Discrete Fourier Transform on Multicores: Algorithms and Automatic Implementation.* In *IEEE Signal Processing Magazine, special issue on "Signal Processing on Platforms with Multiple Cores"*, Vol. 26, No. 6, pp. 90–102, 2009.

7. B. R. de Supinski, M. Schulz, V. V. Bulatov, W. Cabot, B. Chan, A. W. Cook, E. W. Draeger, J. N. Glosli, J. A. Greenough, K. Henderson, A. Kubota, S. Louis, B. J. Miller, M. V. Patel, T. E. Spelce, F. H. Streitz, P. L. Williams, R. K. Yates, A. Yoo, G. Almasi, G. Bhanot, A. Gara, J. A. Gunnels, M. Gupta, J. Moreira, J. Sexton, B. Walkup, C. Archer, F. Gygi, T. C. Germann, K. Kadau, P. S. Lomdahl, W. McLendon, B. Hendrickson, F. Franchetti, S. Kral, J. Lorenz, C. W. Ueberhuber, E. Chow, Ü. Çatalyürek: *BlueGene/L Applications: Parallelism on a Massive Scale.* In *International Journal of High Performance Computing Applications*, Vol. 22, No. 1, 2008, pages 33–51.

8. J. Lorenz, S. Kral, F. Franchetti, C. W. Ueberhuber: *Vectorization Techniques for the Blue Gene/L Double FPU.* In *IBM Journal of Research and Development*, Vol. 49, No. 2/3, 2005, pages 437-446.

9. F. Franchetti, S. Kral, J. Lorenz, C. W. Ueberhuber: *Efficient Utilization of SIMD Extensions.* In *Proceedings of the IEEE Special Issue on "Program Generation, Optimization, and Adaptation,"* Vol. 93, No. 2, 2005, pages 409-425.

10. M. Püschel, J. Moura, J. Johnson, D. Padua, M. Veloso, B. Singer, J. Xiong, F. Franchetti, A. Gacic, Y. Voronenko, K. Chen, R. W. Johnson, N. Rizzolo: *SPIRAL: Code Generation for DSP Transforms.* In *Proceedings of the IEEE Special Issue on "Program Generation, Optimization, and Adaptation,"* Vol. 93, No. 2, 2005, pages 232-275.

## Conference Papers (Fully Reviewed)

1. Q. Yu, D. F. Jones, N. Lawrence, D. McFarlin, P. A. Milder, B. Moore, A. Sidelnik, F. Franchetti, M. J. Garzaran, J. C. Hoe, J. Johnson, J, M. F. Moura, D. A. Padua, and M. Püschel: *The Data Pump Architecture for Algorithm-Specific DSP Processor/Program Co-Design. Submitted for publication.*

2. T. Cui, F. Franchetti: *A Multi-Core High Performance Computing Framework for Probabilistic Solutions of Distribution Systems.* In *Proceedings of IEEE PES General Meeting,* 2012, *to appear.*

3. Q. Zhu, C. R. Berger, E. L. Turner, L. Pileggi, F. Franchetti: *Polar Format Synthetic Aperture Radar in Energy Efficient Application-Specific Logic-in-Memory.* In *Proceedings of International Conference on Acoustics, Speech, and Signal Processing (ICASSP),* 2012, *to appear.*

4. W. Yu, F. Franchetti, J. C. Hoe, T. Chen: *Highly Efficient Performance Portable Tracking of Evolving Surfaces.* In *Proceedings of the 26th International Parallel and Distributed Processing Symposium (IPDPS),* 2012, *to appear.*

5. T. Cui and F. Franchetti: *A Multi-core High Performance Computing Framework for Distribution Power Flow.* In *Proceedings 43rd North American Power Symposium (NAPS), 2011.*

6. D. McFarlin, V. Arbatov, F. Franchetti, and M. Püschel: *Automatic SIMD Vectorization of Fast Fourier Transforms for the Larrabee and AVX Instruction Sets.* In *Proceedings International Conference on Supercomputing (ICS)*, 2011.

7. T. Cui and F. Franchetti: *Autotuning a Random Walk Boolean Satisfiability Solver.* In *Proceedings The Sixth International Workshop on Automatic Performance Tuning (iWAPT)*, 2011.

8. C. R. Berger, V. Arbatov, Y. Voronenko, F. Franchetti, M. Püschel: *Real-Time Software Implementation of an IEEE 802.11a Baseband Receiver on Intel Multicore.* In *Proceedings International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2011.

9. T. Henretty, K. Stock, L.-N. Pouchet, F. Franchetti, J. Ramanujam, and P. Sadayappan: *Data Layout Transformation for Stencil Computations on Short SIMD Architectures.* In *Proceedings of International Conference on Compiler Construction (CC)*, 2011.

10. Y. Voronenko, V. Arbatov, C. Berger, R. Peng, M. Püschel, and F. Franchetti: *Computer Generation of Platform-Adapted Physical Layer Software.* In *Proceedings Software Defined Radio (SDR)*, 2010.

11. W. Yu, F. Franchetti, J. C. Hoe, Y.-J. Chang, T. Chen: *Fast Bilateral Filtering By Adapting Block Size.* In *Proceedings IEEE International Conference on Image Processing (ICIP)*, pp. 3281–3284, 2010.

12. W. Yu, F. Franchetti, J. C. Hoe, T. Chen: *Fast And Robust Active Contours For Image Segmentation.* In *Proceedings IEEE International Conference on Image Processing (ICIP)*, pp. 641–644, 2010.

13. P. A. Milder, F. Franchetti, J. C. Hoe, and M. Püschel: *Automatically Generated Hardware Implementations of the Discrete Fourier Transform With Non-Power-of-Two Problem Size. In Proceedings International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2010.

14. F. de Mesmay, S. Chellappa, F. Franchetti and M. Püschel: *Computer Generation of Efficient Software Viterbi Decoders.* In *Proceedings International Conference on High Performance Embedded Architectures & Compilers (HiPEAC),* Lecture Notes in Computer Science, Springer, Vol. 5952, pp. 353–368, 2010.

15. S. Chellappa, F. Franchetti, and M. Püschel: *Computer Generation of Fast FFTs for the Cell Broadband Engine.* In *Proceedings of International Conference on Supercomputing (ICS), 2009.*

16. F. Franchetti, F. de Mesmay, D. McFarlin, and M. Püschel: *Operator Language: A Program Generation Framework for Fast Kernels.* In *Proceedings of IFIP Working Conference on Domain Specific Languages (DSL WC), 2009. Best Paper Award.*

17. F. Franchetti and M. Püschel: *Generating High-Performance Pruned FFT Implementations.* In *Proceedings International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2009.

18. D. McFarlin, F. Franchetti, J. M. F. Moura, and M. Püschel: *High Performance Synthetic Aperture Radar Image Formation On Commodity Architectures.* In *Proceedings SPIE Conference on Defense, Security, and Sensing*, 2009.

19. S. Chellappa, F. Franchetti , and M. Püschel: *FFT Program Generation for the Cell BE.* In *Proceedings of the International Workshop on State-of-the-Art in Scientific and Parallel Computing (PARA), 2008.*

20. P. A. Milder, F. Franchetti, J. C. Hoe, and M. Püschel: *Formal Datapath Representation and Manipulation for Implementing DSP Transforms.* In *Proceedings of Design Automation Conference (DAC), 2008. Best Paper Finalist.*

21. F. Franchetti and M. Püschel: *Generating SIMD Vectorized Permutations.* In *Proceedings of International Conference on Compiler Construction (CC)*, Lecture Notes in Computer Science, volume 4959, pages 116–131, 2008.

22. S. Chellappa, F. Franchetti, and M. Püschel: *How To Write Fast Numerical Code: A Small Introduction.* In *Proceedings of the Generative and Transformational Techniques in Software Engineering (GTTSE) 2007.*

23. P. D'Alberto, F. Franchetti, P. A. Milder, A. Sandryhaila, J. C. Hoe, J. M. F. Moura, and M. Püschel: *Generating FPGA Accelerated DFT Libraries.* In *Proceedings of Field-Programmable Custom Computing Machines (FCCM)*, 2007.

24. F. Franchetti and M. Püschel: *SIMD Vectorization of Non-Two-Power Sized FFTs.* In *Proceedings of International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2007.

25. P. D'Alberto, M. Püschel, and F. Franchetti: *Performance/Energy Optimization of DSP Transforms on the XScale Processor.* In *Proceedings of International Conference on High Performance Embedded Architectures and Compilers (HiPEAC)*, 2007.

26. A. Bonelli, F. Franchetti, J. Lorenz, M. Püschel, C. W. Ueberhuber: *Automatic Performance Optimization of the Discrete Fourier Transform on Distributed Memory Computers.* In *Proceedings of ISPA 06. Lecture Notes in Computer Science, Volume 4330, 2006, pages 818–832. Best Paper Award.*

27. F. Franchetti, Y. Voronenko, and M. Püschel: *FFT Program Generation for Shared Memory: SMP and Multicore.* In *Proceedings of Supercomputing*, 2006.

28. F. Gygi, E. W. Draeger, M. Schulz, B. R. de Supinski, J. A. Gunnels, V. Austel, J. C. Sexton, F. Franchetti, S. Kral, C. W. Ueberhuber, J. Lorenz *Large-Scale Electronic Structure Calculations of High-Z Metals on the BlueGene/L Platform.* In *Proceedings of Supercomputing*, 2006. *Winner of the 2006 Gordon Bell Prize (Peak Performance Award).*

29. S. Han, F. Franchetti, and M. Püschel: *Program Generation for the All-Pairs Shortest Path Problem.* In *Proceedings of The Fifteenth International Conference on Parallel Architectures and Compilation Techniques (PACT)*, 2006, pages 222-232.

30. F. Franchetti, Y. Voronenko, M. Püschel: *A Rewriting System for the Vectorization of Signal Transforms.* In *Proceedings of High Performance Computing for Computational Science (VECPAR) 2006*, LNCS 4395, pages 363–377.

31. F. Gygi, E. Draeger, B. R. de Supinski, R. K. Yates, F. Franchetti, S. Kral, J. Lorenz, C. W. Ueberhuber, J. Gunnels, J. Sexton: *Large-Scale First-Principles Molecular Dynamics Simulations on the BlueGene/L Platform using the Qbox Code.* In *Proceedings of Supercomputing 2005. Gordon Bell Prize 2005 Finalist.*

32. F. Franchetti, Y. Voronenko, M. Püschel: *Loop Merging for Signal Transforms.* In *Proceedings of Programming Language Design and Implementation (PLDI) 2005*, pp 315–326.

33. T. Pipatsrisawat, A. Gacic, F. Franchetti, M. Püschel, J. Moura: *Performance Analysis of the Filtered Backprojection Image Reconstruction Algorithms.* In *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2005)*, Vol. 5, 2005, pp. 153–156.

34. F. Franchetti, S. Kral, J. Lorenz, M. Püschel, C. W. Ueberhuber: *Automatically Tuned FFTs for BlueGene/L's Double FPU.* In *Proceedings of High Performance Computing for Computational Science (VECPAR) 2004*, LNCS 3402, pp. 23-36.

35. S. Kral, F. Franchetti, J. Lorenz, C. W. Ueberhuber: *FFT Compiler Techniques.* In *Proceedings of International Conference on Compiler Construction (CC2004)*, LNCS 2985, pp 217–231.

36. S. Kral, F. Franchetti, J. Lorenz, C. W. Ueberhuber: *SIMD Vectorization of Straight Line Code.* In *Proceedings of the Euro-Par 03 Conference on Parallel and Distributed Computing*, 2003, LNCS 2790, pp 251–260.

37. T. Fahringer, F. Franchetti, M. Geissler, G. Madsen, H. Moritsch, R. Prodan: *On Using* Zenturio *for Performance and Parameter Studies on Clusters and Grids.* In *Proceedings of the 11th Euromicro Conference on Parallel Distributed and Network based Processing (Euro PDP 2003)*, IEEE Comput. Soc. Press, Los Alamitos, USA, 2003, pp. 185–192.

38. F. Franchetti, M. Püschel: *Short Vector Code Generation and Adaptation for DSP Algorithms.* In *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2003)*, Vol. 2, pages 537-540.

39. F. Franchetti, M. Püschel: *Short Vector Code Generation for the Discrete Fourier Transform.* In *Proceedings of the 17th International Parallel and Distributed Processing Symposium (IPDPS '03)*, pages 58-67.

40. F. Franchetti, M. Püschel: *A SIMD Vectorizing Compiler for Digital Signal Processing Algorithms.* In *Proceedings of International Parallel and Distributed Processing Symposium (IPDPS 2002)*, IEEE Comp. Society Press, Los Alamitos, pp. 20–26.

41. F. Franchetti, H. Karner, S. Kral, C. W. Ueberhuber: *Architecture Independent Short Vector FFTs.* In *Proceedings of the International Conerence on Acoustics, Speech, and Signal Processing (ICASSP 2001)*, IEEE Comput. Soc. Press, Los Alamitos, USA, 2001, Vol. 2, pp. 1109–1112.

## Other Conference Papers, Extended Abstracts, and Posters

1. B. Akin, P. Milder, F. Franchetti, J. C. Hoe: *Algorithm and Architecture Optimization for Large Size Two Dimensional Discrete Fourier Transform.* In *20th ACM/SIGDA International Symposium on Field-Programmable Gate Arrays (FPGA),* 2012, Poster.

2. C. Angelopoulos, F. Franchetti, and M. Püschel: *Automatic Generation of FFT Libraries for GPUs. Submitted for publication.*

3. F. Franchetti, Y. Voronenko, G. Almasi: *Automatic Generation of the HPC Challenges Global FFT Benchmark for BlueGene/P. Submitted for publication.*

4. Q. Zhu, E. L. Turner, C. R. Berger, L. Pileggi, and F. Franchetti: *Application-Specific Logic-in-Memory for Polar Format Synthetic Aperture Radar.* In *Proceedings of the High Performance Embedded Computing (HPEC)*, MIT Lincoln Laboratory, 2011. *Best paper session.*

5. Wei Yu, F. Franchetti, J. C. Hoe, J. M. F. Moura, T. Chen: *Performance Portable Tracking of Evolving Surfaces.* In *Proceedings of the High Performance Embedded Computing (HPEC)*, MIT Lincoln Laboratory, 2011. *Best paper session.*

6. T. Cui and F. Franchetti: *A Multi-core High Performance Computing Framework for Distribution Power Flow.* In *Proceedings 43rd North American Power Symposium (NAPS)*, 2011.

7. T. Cui and F. Franchetti: *A Monte Carlo Framework for Probabilistic Distribution Power Flow.* Seventh Annual CMU Conference on the Electricity Industry, 2011, Poster.

8. C. Angelopoulos, F. Franchetti, and M. Püschel: *DFT Transform on the Fermi (GTX480): Automatic Program Generation.* NVIDIA Research Summit at the GPU Technology Conference, 2010, Poster (Abstract reviewed).

9. D. McFarlin, F. Franchetti, and M. Püschel: *Automatic SIMD Vectorization of Fast Fourier Transforms for the Larrabee and AVX Instruction Sets.* In *Proceedings of the 15th Workshop on Compilers for Parallel Computing (CPC), 2010.*

10. L. Meng, J. R. Johnson, F. Franchetti, Y. Voronenko, M. Moreno Maza, Y. Xie: *Spiral-Generated Modular FFTs.* In *Proceedings 4th International Workshop on Parallel Symbolic Computation (PASCO), 2010, pages 169–170.*

11. S. Chellappa, F. Franchetti, and M. Püschel: *High Performance Linear Transform Program Generation for the Cell BE.* In *Proceedings of the 2009 High Performance Embedded Computing (HPEC), MIT Lincoln Laboratory.*

12. D. McFarlin, F. Franchetti, and M. Püschel: *Automatic Generation of Vectorized Fast Fourier Transform Libraries for the Larrabee and AVX Instruction Set Extension.* In *Proceedings of the 2009 High Performance Embedded Computing (HPEC), MIT Lincoln Laboratory. Best paper award.*

13. S. Chellappa, F. Franchetti, and M. Püschel: *FFT Program Generation for the Cell BE.* In *Proceedings of the 14th Workshop on Compilers for Parallel Computing (CPC), 2009.*

14. S. Chellappa, F. Franchetti, and M Püschel: *Automatic Linear Transform Program Generation for the Cell BE.* Supercomputing (SC), 2008, Poster (Abstract reviewed).

15. F. Franchetti, D. McFarlin, F. de Mesmay, H. Shen, T. Wlodarczyk, S. Chellappa, M. Telgarsky, P. A. Milder, Y. Voronenko, Q. Yu, J. C. Hoe, J. M. F. Moura, and M. Püschel: *Program Generation with Spiral: Beyond Transforms.* In *Proceedings of the 2008 High Performance Embedded Computing (HPEC)*, MIT Lincoln Laboratory.

16. Y. Voronenko, F. Franchetti, F. de Mesmay, and M. Püschel: *Generating High-Performance General Size Linear Transform Libraries Using Spiral.* In *Proceedings of the 2008 High Performance Embedded Computing (HPEC)*, MIT Lincoln Laboratory. *Best paper award.*

17. P. A. Milder, F. Franchetti, J. C. Hoe, and M. Püschel: *Linear Transforms: From Math to Efficient Hardware.* In *Proceedings of Design Automation Conference (DAC) High-Level Synthesis Workshop, 2008.*

18. F. de Mesmay, F. Franchetti, Y. Voronenko, and M. Püschel: *Automatic Generation of Multithreaded Vectorized Adaptive Libraries for Matrix Multiplication.* In *Proceedings 5th International Workshop on Parallel Matrix Algorithms and Applications (PMAA), 2008.*

19. Y. Voronenko, F. Franchetti, F. de Mesmay, and M. Püschel: *System Demonstration of Spiral: Generator for High-Performance Linear Transform Libraries.* In *Proc. 12th International Conference on Algebraic Methodology and Software Technology (AMAST), 2008.*

20. F. Franchetti, Y. Voronenko, P. A. Milder, S. Chellappa, M. Telgarsky, H. Shen, P. D'Alberto, F. de Mesmay, J. C. Hoe, J. M. F. Moura, M. Püschel: *Domain-Specific Library Generation for Parallel Software and Hardware Platforms.* In *Proceedings of the NSF Next Generation Software (NGS) Workshop 2008.*

21. Peter A. Milder, Franz Franchetti, James C. Hoe, and Markus P̈schel: *FFT Compiler: From Math to Efficient Hardware.* In *IEEE International High Level Design Validation and Test Workshop (HLDVT), November 2007.* Invited short paper.

22. F. Franchetti, Y. Voronenko, and M. Püschel: *FFT Program Generation for Shared Memory: SMP and Multicore.* Proceedings of *13th Workshop on Compilers for Parallel Computing (CPC)*, 2007.

23. P. A. Milder, F. Franchetti, J. C. Hoe, and M. Püschel: *Fast Fourier Transform on FPGA: Design Choices and Evaluation.* In *Proceedings of FPGA 07.*

24. P. D'Alberto, P. Milder, F. Franchetti, J. C. Hoe, M. Püschel, and J. M. F. Moura: *Discrete Fourier Transform Compiler for FPGA and CPU/FPGA Partitioned Implementations.* In *Proceedings of the 2006 High Performance Embedded Computing (HPEC)*, MIT Lincoln Laboratory, on CD-ROM.

25. F. Franchetti, A. Bonelli, E. Chuangsuwanich, Y. J. Lee, J. Lorenz, T. Peter, H. Shen, M. Telgarsky, Y. Voronenko, M. Püschel, J. M. F. Moura, C. W. Ueberhuber: *Parallelism in Spiral.* In *Proceedings of Workshop on Programming Models for Ubiquitous Parallelism (PMUP)*, 2006, pages 28–32.

26. F. Franchetti, Y. Voronenko, M. Püschel: *Spiral: Generating Signal Processing Kernels for New Commodity Architectures.* In *Proceedings of EDGE Workshop 2006*, pages D-49–D-50.

27. F. Franchetti: *Top Performance in Signal Processing.* International Workshop on "Numerical and Symbolic Scientific Computing," 2003.

28. F. Franchetti: *A Portable Short Vector Version of* FFTW. In *Proc. Fourth IMACS Symposium on Mathematical Modelling (MATHMOD 2003)*, Vienna University of Technology, Vol. 2, pp. 1539–1548.

29. F. Franchetti, F. Kaltenberger, C. W. Ueberhuber: *FFT Kernels with FMA Utilization.* In *Proceedings of the APLIMAT 2002 Conference*, Department of Mathematics, Slovak University of Technology, Bratislava, pp. 333–339.

30. F. Franchetti, M. Püschel, J. M. F. Moura, C. W. Ueberhuber: *Short Vector SIMD Code Generation for DSP Algorithms.* In *Proceedings of the 2002 High Performance Embedded Computing (HPEC 2002)*, MIT Lincoln Laboratory, on CD-ROM.

### Theses

1. F. Franchetti: *Performance Portable Short Vector Transforms.* Ph.D. Thesis Computational Mathematics, Vienna University of Technology 2003 (Ref.: Prof. Dr. C. W. Ueberhuber, 223 pages.)

2. F. Franchetti: *Short Vector FFTs.* Diploma Thesis Technical Mathematics, Vienna University of Technology 2000 (Ref.: Prof. Dr. C. W. Ueberhuber, 148 pages.)

## Presentations

### Seminars and Workshops

| | |
|---|---|
| 21 September 2011 | *Spiral: Automatic Generation of Industry Strength Performance Libraries*<br>Invited speaker at High Performance Embedded Computing (HPEC) Workshop<br>Lexington, USA |
| 15 September 2011 | *Spiral: Automating High Quality Software Production*<br>Invited Talk at Qualcomm Research, Santa Clara, USA |
| 12 September 2011 | *Towards Automating Black Belt Programming*<br>Invited Talk at IBM T. J. Watson Research Center, Yorktown Heights, USA |
| 8 August 2011 | *Black Belt Autotuning Beyond FFT and DGEMM*<br>CScADS Autotuning Workshop, Tahoe City, USA |
| 9 June 2011 | *Leveraging Emerging Computer Architectures in Smart Grids*<br>Invited speaker at the Second DAC Workshop on<br>Smart Grid and Design Automation, San Diego, USA |
| 2 June 2011 | *Towards Automating Black Belt Programming*<br>Key note talk at The Sixth International Workshop on<br>Automatic PerformanceTuning (iWAPT), Singapore |
| 24 May 2011 | *Spiral: Computer Generation of Performance Libraries*<br>Invited speaker at DARPA Workshop on Program Synthesis for<br>Rapid Software Development, Chicago, USA |
| 31 May 2011 | *Spiral: Generating Efficient Programs for Emerging Parallel Platforms*<br>Invited talk at National University of Singapore, Singapore |
| 13 April 2011 | *Spiral: Generating Efficient Programs for Emerging Parallel Platforms*<br>Invited Talk at University of Tennessee, Knoxville<br>Knoxville, USA |
| 12 April 2011 | *Spiral: Generating Efficient Programs for Emerging Parallel Platforms*<br>Invited Talk at Oak Ridge National Laboratory<br>Oak Ridge, USA |
| 31 March 2011 | *Spiral: Generating Efficient Programs for Emerging Parallel Platforms*<br>Invited Talk at Vienna University of Technology<br>Vienna, Austria |
| 9 March 2011 | *Trends in High-Performance Computing for Power Grid Applications*<br>Invited Talk at 7th Annual CMU Conference on the Electricity Industry 2011<br>Pittsburgh, USA |
| 8 March 2011 | *CMU Vision for The Newly Formed SRC Smart Grid Research Center*<br>7th Annual CMU Conference on the Electricity Industry 2011, Pittsburgh, USA |
| 3 March 2011 | *Spiral: Generating Efficient Programs for Emerging Parallel Platforms* |

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| | Invited talk at Intel Research, Hudson, USA |
| 24 February 2011 | *Spiral: Generating Efficient Programs for Emerging Parallel Platforms*<br>Invited talk at Nvidia Research, Sunnyvale, USA |
| 21 February 2011 | *Spiral: Generating Efficient Programs for Emerging Parallel Platforms*<br>Invited talk at University of Illinois at Urbana-Champaign, Urbana, USA |
| 14 February 2011 | *Spiral: Generating Efficient Programs for Emerging Parallel Platforms*<br>Invited talk at Massachusetts Institute of Technology, Cambridge, USA |
| 31 January 2011 | *Spiral: Program Generation for Linear Transforms and Beyond*<br>Invited talk at Translucent Analytics, Inc., remote presentation |
| 9 August 2010 | *The C of My Dreams*<br>Presentation at CScADS Autotuning Panel on "Languages and Compilers for Linear Algebra Libraries", Snowbird, USA |
| 8 July 2010 | *Automatic SIMD Vectorization of Fast Fourier Transforms for the Larrabee and AVX ISAs*, Invited speaker at CPC'10, Vienna, Austria |
| 23 June 2010 | *Trends in High-Performance Computing for Power Grid Applications*<br>FERC Workshop on *Improving Market and Planning Efficiency through Improved Software*, Washington, USA |
| 15 March 2010 | *Spiral: Program Generation for Linear Transforms and Beyond*<br>Invited talk at Georgia Institute of Technology, Atlanta, USA |
| 5 March 2010 | *Spiral: Program Generation for Linear Transforms and Beyond*<br>Invited talk at Argonne National Laboratory (ANL), Chicago, USA |
| 8 February 2010 | *SpiralGen: Computer Generation of Performance Libraries*<br>Invited talk at Microsoft Corporation, Redmond, USA |
| 16 December 2009 | *Spiral: Computer Generation of Performance Libraries*<br>Invited talk at Pittsburgh Supercomputing Center, Pittsburgh, USA |
| 22 October 2009 | *Spiral: Computer Generation of Performance Libraries*<br>Invited remote presentation, Software-Intensive Systems Producibility (SISPI) together with M. Püschel |
| 21 October 2009 | *Spiral: Program Generation for Linear Transforms and Beyond*<br>Invited talk at Mercury Computer Systems Inc., Boston, USA |
| 18 September 2009 | *Spiral: Computer Generation of Performance Libraries*<br>Invited talk at OSD workshop, GMU, Fairfax, USA |
| 8 September 2009 | *Spiral: Program Generation for Linear Transforms and Beyond*<br>Invited talk at Lawrence Livermore National Laboratory (LLNL), Livermore, USA |
| 25 August 2009 | *Spiral: Program Generation for Linear Transforms and Beyond*<br>Invited talk at Information Science & Technology Institute<br>Los Alamos National Laboratory (LANL), Los Alamos, USA |
| 10 August 2009 | *Big Questions in Autotuning*<br>Presentation at CScADS Autotuning Panel on Big Questions, North Tahoe, USA |
| 7 July 2009 | *SpiralGen: Computer Generation of Performance Libraries*<br>Invited presentation at The Technology Collaborative, together with Y. Voronenko<br>Pittsburgh, USA |
| 6 May 2009 | *Spiral: Generating Software and Hardware Implementations for Linear Transforms*<br>Invited talk at University of Delaware ECE Seminar, Newark, USA |

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| 24 April 2009 | *Spiral: Beyond Transforms*<br>Invited talk at Industrial Technology Research Institute (ITRI), Hsinchu, Taiwan |
| 23 January 2009 | *Spiral: Teaching Computers to Write Fast Libraries*<br>Invited talk at The MathWorks, Natick, USA |
| 8 January 2009 | *FFT Program Generation for the Cell BE*<br>Invited talk at CPC'09, Zurich, Switzerland. |
| 17 November 2008 | *Spiral: Generating Parallel Software for Linear Transforms (And Beyond)*<br>Invited talk at SC'08 Workshop"Bridging Multicore's Programmability Gap"<br>Austin, USA |
| 16 October 2008 | *Generating Efficient Programs for Emerging Parallel Platforms*<br>Guest Lecture, "Trends in ECE" by M. Savvides, Carnegie Mellon University |
| 10 October 2008 | *Spiral: Generating Software and Hardware Implementations for Linear Transforms*<br>Invited talk at UC Berkeley, Berkeley, USA |
| 19 August 2008 | *Parallelism in Spiral*<br>Invited remote presentation, AMD Research, Seattle, USA |
| 6 August 2008 | *Meet Stevephanie, the Computer. Spiral: Automatic Library Generation*<br>Invited talk at UW MSR Institute 2008, Semiahmoo, USA |
| 25 July 2008 | *Spiral: Automating Library Development*<br>Invited talk at Vanu Inc., together with J. M. F. Moura, Cambridge, USA |
| 18 June 2008 | *Generating Efficient Programs for Emerging Parallel Platforms*<br>Research Faculty Candidate Talk, Carnegie Mellon University, USA |
| 27 May 2008 | *Spiral: Generating Software and Hardware Implementations for Linear Transforms*<br>Invited talk at Ohio State University, Columbus, USA |
| 13 April 2008 | *Domain-Specific Library Generation for Parallel Software and Hardware Platforms*<br>The NSF Next Generation Software (NSFNGS) Workshop 2008, Miami, USA |
| 14 March 2008 | *Spiral: Tackling Parallelism*<br>Invited talk at the workshop "Algorithms and Optimizations Targeting Multi-Core Architectures," co-located with SIAM PP08, Atlanta, USA |
| 14 February 2008 | *Spiral: Tackling Parallelism*<br>Invited short presentation at "Future of Concurrency" workshop, Pittsburgh, USA |
| 4 September 2007 | *Parallelism in Spiral*<br>Invited speaker at Dagstuhl Seminar No. 07361:<br>"Programming Models for Ubiquitous Parallelism"<br>Schloss Dagstuhl, Germany |
| 27 August 2007 | *Spiral: Automatic Performance Tuning Using Chapel*<br>JPL SURP progress report, together with H. P. Zima<br>JPL, Pasadena, USA |
| 25 July 2007 | *Can We Teach Computers To Write Fast Libraries?*<br>Invited talk at IBM T. J. Watson Research Center, Yorktown Heights, USA<br>together with Markus Püschel |
| 9 July 2007 | *Parallelism in Spiral*<br>Invited talk at SciDAC CScADS Summer Workshop on<br>Automatic Tuning for Petascale Systems, Snowbird, USA |
| 20 June 2007 | *Spiral: Tackling Parallelism* |

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| | Invited talk at International AURORA Conference on Scientific Computing 2007<br>Vienna, Austria |
| 6 April 2007 | *Spiral: Generating Software and Hardware Implementations for Linear Transforms*<br>Invited talk at Cray Inc., Seattle, USA |
| 5 April 2007 | *Accelerators: GPUs and FPGAs (Data Parallel Compilation Panel)*<br>Presentation at Intel, Inc., Santa Clara, USA |
| 2 February 2007 | *Joint Runtime/Energy Optimization And Hardware/Software Partitioning Of Linear Transforms*<br>Invited speaker at UCLA Workshop on<br>Power-Constrained Multimedia Systems, Los Angeles, USA |
| 1 February 2007 | *Spiral: Generating Parallel Transforms*<br>Invited talk at Center for Advanced Computing Research (CACR),<br>Caltech, Pasadena, USA |
| 31 January 2007 | *Generating Software and Hardware Implementations for Linear Transforms*<br>Invited talk at Lawrence Livermore National Laboratory, Livermore, USA |
| 29 November 2006 | *Generating Parallel Transforms Using Spiral*<br>Invited talk at Mercury Computer Systems Inc., Boston, USA |
| 20 September 2006 | *Generating Parallel Transforms Using Spiral*<br>Invited talk at Microsoft Research, Seattle, USA<br>together with Markus Püschel |
| 20 September 2005 | *Formal Vectorization of Digital Signal Processing Transforms*<br>Faculty candidate talk at Carnegie Mellon University, USA |
| 8 March 2005 | *Scheduling in SPIRAL*<br>Invited speaker at Dagstuhl Seminar No. 05101:<br>"Scheduling for Parallel Architectures: Theory, Applications, Challenges"<br>Schloss Dagstuhl, Germany |
| 29 October 2004 | *SPIRAL: Automatic Performance Tuning on the BlueGene/L Supercomputer*<br>Invited speaker, BlueGene/L and QCDOC Workshop<br>Brookhaven National Laboratory, USA |
| 5 June 2004 | *High-Performance Computing on BlueGene/L*<br>Invited speaker at the AURORA Plenary Meeting<br>Strobl, Austria |
| 14 October 2003 | *FFTs on BG/L–Status and Methods*<br>Invited speaker, The Blue Gene/L Applications,<br>Algorithms, and Architectures Workshop, Reno, USA |
| 18 September 2003 | *The Current Status of BG/L Supercomputers*<br>Invited talk at Carnegie Mellon University, USA |
| 17 June 2003 | *Top Performance in Signal Processing*<br>Invited speaker at the International Workshop on<br>Numerical and Symbolic Scientific Computing, St. Wolfgang, Austria |
| 2 June 2003 | *Code-Optimierung für FFTs und BLAS* (in German)<br>Invited speaker, Kolloquium über Parallelverarbeitung<br>Research Center Jülich, Germany |
| 19 March 2003 | *FFTs for Blue Gene/L*<br>Invited speaker at the LLNL CASC BlueGene/L Workshop |

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| | Lawrence Livermore National Laboratory, USA |
| 14 August 2002 | *FFTs on BG/L Machines*<br>Invited speaker, The Blue Gene/L Applications,<br>Algorithms, and Architectures Workshop, Lake Tahoe, USA |
| 8 August 2002 | *Self-Adaptive DSP Software*<br>Invited speaker, The First Self Adapting Numerical Software (SANS) Summit<br>Innovative Computing Lab, UTK Knoxville, USA |
| 29 April 2002 | *High-Performance FFT Software*<br>Invited talk, IBM T. J. Watson Research Center, Yorktown, USA |
| 18 March 2002 | *High-Performance FFT Software*<br>Invited talk, Numerical Harmonic Analysis Group (NuHAG)<br>Vienna University, Austria |
| 5 August 2001 | *A SIMD Vectorization of FFTW*<br>Invited talk at Vanu Inc., Cambridge, USA |

## Conferences

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| 22 September 2011 | *Performance Portable Tracking of Evolving Surfaces*<br>High Performance Embedded Computing Workshop (HPEC)<br>Lexington, USA |
| 2 June 2011 | *Autotuning a Random Walk Boolean Satisfiability Solver*<br>6th International Workshop on Automatic PerformanceTuning (iWAPT), Singapore |
| 27 January 2010 | *Computer Generation of Efficient Software Viterbi Decoders*<br>International Conference on High-Performance Embedded Architectures and Compilers<br>Pisa, Italy |
| 17 July 2009 | *Operator Language: A Program Generation Framework for Fast Kernels*<br>Working Conference on Domain Specific Languages (DSLWC) 2009, Oxford, UK |
| 21 April 2009 | *Generating High Performance Pruned FFT Implementations*<br>IEEE International Conference on Acoustics, Speech,<br>and Signal Processing 2009 (ICASSP 09), Taipei, Taiwan |
| 25 September 2008 | *Program Generation with Spiral: Beyond Transforms*<br>Poster Precis, HPEC'08, Boston, USA |
| 3 April 2008 | *Generating SIMD Vectorized Permutations*<br>International Conference on Compiler Construction 2008 (CC'08)<br>Budapest, Hungary |
| 19 April 2007 | *SIMD Vectorization of Non-Two-Power Sized FFTs*<br>IEEE International Conference on Acoustics, Speech,<br>and Signal Processing 2007 (ICASSP 07), Honolulu, USA |
| 16 November 2006 | *FFT Program Generation for Shared Memory: SMP and Multicore*<br>Supercomputing 2006<br>Tampa, USA |
| 16 September 2006 | *Parallelism in Spiral*<br>Workshop on Programming Models for Ubiquitous Parallelism (PMUP)<br>Seattle, USA |
| 11 July 2006 | *A Rewriting System for the Vectorization of Signal Transforms*<br>7th International Meeting on High Performance Computing for |

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| | Computational Science (VECPAR 06), Rio de Janeiro, Brasil |
| 28 June 2004 | *Automatically Optimized FFT Codes for the BlueGene/L Supercomputer*<br>6th International Meeting on High Performance Computing for<br>Computational Science (VECPAR 04), Valencia, Spain |
| 28 April 2004 | *A Self-Adapting Distributed Memory Package for Fast Signal Transforms*<br>International Parallel and Distributed<br>Processing Symposium 2004 (IPDPS 04), Santa Fe, USA |
| 29 August 2003 | *SIMD Vectorization of Straight-Line Code*<br>International Conference on Parallel and Distributed Computing (EuroPAR 03)<br>Klagenfurt, Austria |
| 24 April 2003 | *Short Vector Code Generation for the Discrete Fourier Transform*<br>International Parallel and Distributed<br>Processing Symposium 2003 (IPDPS 03), Nice, France |
| 7 February 2003 | *A Portable Short Vector Version of FFTW*<br>Fourth International Symposium on Mathematical<br>Modelling (MATHMOD 03), 2003, Vienna, Austria |
| 16 April 2002 | *A SIMD Vectorizing Compiler for Digital Signal Processing Algorithms*<br>International Parallel and Distributed<br>Processing Symposium 2002 (IPDPS 02), Ft. Lauderdale, USA |
| 17 May 2001 | *Performance Tools of the AURORA Project*<br>Ptools 2001 Annual Meeting, Dan Diego, USA |
| 10 May 2001 | *Architecture Independent Short Vector FFTs*<br>IEEE International Conference on Acoustics, Speech,<br>and Signal Processing 2001 (ICASSP 01), Salt Lake City, USA |

## Teaching

### Carnegie Mellon University, USA

**Advisor of ECE PhD students**

| | |
|---|---|
| 2012– | D. Piao (CMU East Coast advisor; together with O. Mengshoel) |
| 2011– | R. Veras |
| 2010–2011 | D. McFarlin (together with M. Püschel) |
| 2010– | B. Akin (together with J. C. Hoe) |
| | Q. Zhu (together with L. Pileggi) |
| | P. Sundararajan (CMU East Coast advisor; together with O. Mengshoel) |
| 2009– | T. Cui |
| | W. Yu (together with J. C. Hoe, graduated 7/2011) |
| | C. Angelopoulos (together with M. Püschel) |

**Committee member of ECE PhD students**

| | |
|---|---|
| 2009– | P. Milder (Advisor: Hoe) |
| | F. de Mesmay (Advisor: Püschel) |
| | M. Telgarsky (Advisor: Moura) |
| 2008– | S. Chellappa (Advisor: Püschel) |

**External Committee member of MS students**

| | |
|---|---|
| 2009– | M. Andrews (Advisor: J. Johnson), Drexel University |

**Academic Advisor of ECE MS students**

| | |
|---|---|
| 2012 | W. Zhang, P. Cho |
| 2011 | H. Leung, R. Krithivasan |
| 2010 | P. De Wagter, C. Tischuk |
| 2009 | H. Liang, S. Mehra, R. Khemka |
| 2008 | Y.-C. Cheng, U. Prabhu |

**Faculty Mentor of ECE undergraduate students**

| | |
|---|---|
| 2011 | M. Andrews, B. Duff, D. Gianforte, S. Kodangattil, J. Wang |
| 2010 | K. Su, A. Liu, S. Kodangattil, A. Israel, M. C. Hayashi |
| 2009 | H.S. Kim, K. M. Shah, R. Krithivasan, P. Y. Cho, S. N. Luminais, Y. Gupta |

**Research with PostDocs and graduate students of ECE faculty**

| | |
|---|---|
| 2011 | S. Maliki (UIUC PhD student; advisor: D. Padua) |
| 2011– | A. Sandryhaila (PostDoc) |
| 2010– | P. Milder (PostDoc) |
| 2009– | C. Berger (PostDoc) |
| 2008– | *as Assistant Research Professor* (new students since 2008)<br>S. Cvijic (Advisor: Ilic)<br>W. Yu (Advisor: Hoe, Chen)<br>A. Berger (Advisor: Püschel) |
| 2005– | *as Systems Scientist* (new students since 2005)<br>P. Milder, Q. Yu (PostDoc) (Advisor: Hoe),<br>K. Anderson, P. D'Alberto (PostDoc), M. Telgarsky (Advisor: Moura),<br>S. Chellappa, F. Mesmay, D. McFarlin, Y. Voronenko (Advisor: Püschel) |
| 2004–2005 | *as post-doctoral researcher*<br>A. Gacic (Advisor: Moura, Püschel)<br>A. Samborskiy, O. Dobzinski, E. Rankin (Advisor: Püschel) |

**Research with ECE master students**

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| 2011 | X. Li: *SAT on the Intel SCC*<br>P. Patki: *Implementation of Magic Memory for Sparse Matrices* |

**Research with undergraduate students**

| | |
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| 2011 | *Summer research and international students*<br>H. Zhang: *Optimization of Correlation on GPUs*<br>C. Thoma: *A Zero Knowledge Building Thermostat* (SRC Research Intern)<br>T. Graf: *Sparse Matrix-Matrix Multiplication* (IAESTE intern) |
| 2010 | *Advising honors project*<br>E. L. Turner: *Performance/accuracy trade-off in synthetic aperture radar*<br>A. X. Zhu: *Logic-in-memory for sparse matrix matrix multiplication*<br>R. Chandra: *How to write fast code in OpenCL*<br>K. Lim: *Logic-in-memory: 2D and 3D CAT scans*<br><br>*Advising IAESTE and visiting undergraduate students*<br>R. Veras: *The fastest DGEMM possible in Spiral*<br>M. M. Gonçalves: *Graph algorithms in sparse linear algebra formulation* |
| 2009 | *Advising IAESTE and visiting international students*<br>D. Pickem: *SPIRAL for the G80 GPU*<br>P. Nabais: *Program Generation for Boolean Satisfiability*<br><br>*Advising ECE undergraduate research* |

J. Ni: *High-performance computing in aeronautics*

2008 — *Co-advising IAESTE students, together with M. Püschel*
D. Pickem: *SPIRAL and Embedded Processors*
S. Cvijic: *Code Generation for Sparse Linear Matrix-Vector Multiplication*

2007–2008 — *Co-advising visiting master student, together with M. Püschel*
H. Shen: *SPIRAL and Coding in JPEG2000*

2007 — *Co-advising honors project, together with M. Püschel*
D. Borel: *SPIRAL for GPUs*

*Co-advising IAESTE students, together with M. Püschel*
L. Dzinevski: *SPIRAL and JPEG2000*
T. Wlodarczyk: *SPIRAL and SAR imaging*

2006 — *Co-advising honors project, together with J. Moura*
K. Anderson: *A Model for DFT Computation on the Cell Processor*

*Co-advising IAESTE students, together with J. Moura and M. Püschel*
H. Shen: *SPIRAL for GPUs*
T. Peter: *SPIRAL for the Cell BE's SPU*

*Co-advising summer students, together with J. Moura and M. Püschel*
E. Chuangsuwanich: *SPIRAL for the Cell BE*
Y. J. Lee: *SPIRAL for the Sandblaster DSP*

2004, 2005 — *Co-advising student projects under supervision of M. Püschel*
E. Chan: *Scheduling and Performance Modeling for DSP Algorithms*
L. Tei: *SPIRAL for VLIW*
T. Pipatsrisawat: *Fast Implementation of the Backprojection Algorithm*
C. Wegrzyn: *SPIRAL's Term Rewriting System*
J. Lee: *SPIRAL's Network Interface*
W. Jung: *Fast Fingerprint Recognition Using SPIRAL*
S. Han: *Fast Implementation of the All Pairs Shortest Path Algorithm*

**Lectures**

2008 — Guest instructor for three lectures of
*How to Write Fast Code (18-645)* by M. Püschel

2005 — Guest instructor for two lectures of
*Algorithms and Computation in Signal Processing (18-799B)* by M. Püschel

## Drexel University, USA

2005 — Guest instructor for two lectures of
*Program Generation and Optimization (CS 680)* by J. R. Johnson

## Vienna University of Technology, Austria

2002, 2003 — *Co-advising master theses under supervision of C. W. Ueberhuber*
J. Lorenz: *Reduced Communication FFTs*
F. Kaltenberger: *Abstract Algorithms for Multidimensional Discrete Fourier Transforms*
A. Bonelli: *Communication Efficiency of Parallel 3D FFTs*
M. Weinschenk: Thesis, FH Wiener Neustadt

2001, 2002 — Teaching assistant "Introduction to computer science"
Teaching assistant "Numerical analysis lab"

2001 Teaching assistant "Numerical analysis II"

## Professional Activities

### Committees

Graduate Admissions Committee (GAC), ECE Department, Carnegie Mellon University, since 2011

Graduate Studies Committee (GSC), ECE Department, Carnegie Mellon University, 2007–2011

Faculty Senator, ECE Department, Carnegie Mellon University, since 2011

Thrust Leader, Thrust 4 (Security), Carnegie Mellon SRC Smart Grid Research Center (SGRC)

Study member, DARPA ISAT study on Program Synthesis, 2011

Program Committee, Special Session: Auto-Tuning for Multicore and GPU (ATMG)

Program Committee, 2012 IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS), 2012

Program Committee, International Conference on Parallel Computing (ParCo), 2011

Program Committee, Workshop on Exploitation of Hardware Accelerators (WEHA), 2011

Program Committee, High Performance Embedded Architectures & Compilers (HiPEAC), 2011

Program Committee, The Fifth International Workshop on Automatic Performance Tuning (iWAPT), 2010

Program Committee, Workshop on Exploitation of Hardware Accelerators (WEHA), 2010

Finance chair, Parallel Architectures and Compilation Techniques (PACT), 2010

Program Committee, Parallel Architectures and Compilation Techniques (PACT), 2010

Publicity chair, Fifteenth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2010

Program Committee, 23rd International Conference on Supercomputing (ICS), 2009

Publicity co-chair, 23rd International Conference on Supercomputing (ICS), 2009

Program Committee, SMART'09: 3rd Workshop on Statistical and Machine learning approaches to ARchitectures and compilaTion

Program Committee, 13th International Workshop on High-Level Parallel Programming Models and Supportive Environments (HIPS) 2008, Miami, Florida

Program Committee, The Seventeenth International Conference on Parallel Architectures and Compilation Techniques (PACT) 2008, Toronto, Canada

### Review Activities

NSF Review Panel

Ohio Supercomputer Center Grant Review

Proceedings of the IEEE, Special Issue on "Program Generation, Optimization, and Platform Adaptation"

IEEE Embedded Systems Letters (ESL)

IEEE Transactions on CAD of Integrated Circuits and Systems (TCAD)

IEEE Signal Processing Letters (SPL)

IEEE Transactions on Image Processing (TIP)

IEEE Transactions on Signal Processing (TSP)

IEEE Micro

ACM Transactions on Mathematical Software (TOMS)

ACM Transactions on Architecture and Code Optimization (TACO)

Springer Journal of "Signal, Image and Video Processing"
Special Issue of the Parallel Processing Letters
Information Processing Letters (IPL)
IEE Proceedings – Vision, Image and Signal Processing
Parallel Computing (PARCO)
Scientific Programming Special Issue of "Scientific Programming on Cell B.E. Processor"
Journal of Computers & Electrical Engineering (COMPELECENG)
Journal of Parallel and Distributed Computing (JPDC)
IBM Journal of Research and Development
Journal of "Software: Practice and Experience"
Journal of Computer Science and Technology (JCST)
Transactions on Computers (TC)

International Parallel and Distributed Processing Symposium (IPDPS) 2002
IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2002
The Fifteenth Annual ACM Symposium on Parallelism in Algorithms and Architectures 2003
The 31st Annual International Symposium on Computer Architecture (ISCA) 2004
IEEE International Conference on Image Processing (ICIP) 2005, 2006
Workshop on Languages and Compilers for Parallel Computing (LCPC) 2007
ACM SIGPLAN 2008 Workshop on Partial Evaluation and Program Manipulation (PEPM) 2008
The 13th International Workshop on High-Level Parallel Programming Models and Supportive Environments (HIPS) 2008
International Conference on High Performance Computing (HiPC 2008)
ACM International Conference on Computing Frontiers (CF) 2008
The 2008 European Signal Processing Conference (EUSIPCO) 2008
The 17th International Conference on Parallel Architectures and Compilation Techniques (PACT) 2008
International Conference on Compiler Construction (CC 2009)
ACM International Conference on Supercomputing (ICS) 2009
3rd Workshop on Statistical and Machine learning approaches to Architectures and compilaTion (SMART) 2009
The 17th European Signal Processing Conference (EUSIPCO) 2009
The International Conference on Parallel Processing (ICPP) 2009
IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS) 2010
IEEE International Symposium on High-Performance Computer Architecture Conference (HPCA) 2010
IEEE International Symposium on Circuits and Systems (ISCAS) 2012
IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS) 2012

## Memberships

Los Alamos Institute for Reliable High Performance Information Technology (IRHPIT)
Participating Guest, Lawrence Livermore National Laboratory (2003–2007)
Center for Sensed Critical Infrastructure Research (CenSCIR), ICES, Carnegie Mellon University
Electric Energy Systems Group (EESG), Carnegie Mellon University
Computer Architecture Lab at Carnegie Mellon (CALCM), Carnegie Mellon University
Center for Circuits and System Solutions (C2S2), Carnegie Mellon University

Member, Institute of Electrical and Electronics Engineers (IEEE)

Member, Association for Computing Machinery (ACM)

Western Pennsylvania chapter chair, Austrian Scientists in North America (ASCINA)

## Other

Native language German, fluent in English

Playing electric guitar since 1993; on stage in various local rock bands, blues jams, and the ECE Rock Band; stage manager and technician at the yearly Austrian 1,200+ guests newcomer rock festival SCHMU (www.schmu.at) from 1993–2004