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APPOINTMENTS

2017- **Professor (with indefinite tenure)**
Department of Electrical and Computer Engineering
Carnegie Mellon University, USA

2016-2017 **Associate Professor**
Department of Electrical and Computer Engineering
Carnegie Mellon University, USA

2012-2016 **Associate Research Professor**
Department of Electrical and Computer Engineering
Carnegie Mellon University, USA

2008-2012 **Assistant Research Professor**
Department of Electrical and Computer Engineering
Carnegie Mellon University, USA

2005-2008 **Systems Scientist (Special Faculty)**
Department of Electrical and Computer Engineering
Carnegie Mellon University, USA

2004-2005 **Postdoctoral Research Associate,** SPIRAL
Erwin Schroedinger Fellowship J2322, funded by the
Austrian Science Fund FWF, Advisor: M. Püschel
Department of Electrical and Computer Engineering
Carnegie Mellon University, USA

2003 **Postdoctoral Research Associate,** Advanced Scientific Computing Team
AURORA Project 5, principal investigator C. W. Ueberhuber
Institute for Applied Mathematics and Numerical Analysis
Vienna University of Technology, Austria

2000-2003 **Research Assistant,** Advanced Scientific Computing Team
AURORA Project 5, principal investigator C. W. Ueberhuber
Institute for Applied Mathematics and Numerical Analysis
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

LEADERSHIP POSITIONS

2015- **Faculty Director of Information Technology Services**
Department of Electrical and Computer Engineering
Carnegie Mellon University

2009- **SpiralGen, Inc.**
CTO (since 2011) and Co-Founder
Pittsburgh, USA

EDUCATION

2003 **Dr. techn. (Ph.D.)** in Computational Mathematics, with distinction
Vienna University of Technology

2000 **Dipl.-Ing. (M.Sc.)** in Technical Mathematics, with distinction
Concentration: *Mathematical Computer Sciences*
Vienna University of Technology

1994 **HTL Matura** (Engineering High School Diploma), with distinction
theoretical and practical training in Mechanical Engineering and Automation
HTBLuVA Wiener Neustadt (high school with post-secondary engineering focus)

AWARDS

2014 Best Paper Award, High Performance Embedded Computing (HPEC) 2014
together with B. Akin and J. Hoe

2014 ACM TODAES Best Paper Award (DAC) 2014
together with P. Milder, J. Hoe, and M. Püschel

2013 Best Paper Award, High Performance Embedded Computing (HPEC) 2013
together with Q. Zhu, T. Graf, and L. Pileggi

2012 Dean's Early Career Fellowship
Carnegie Institute of Technology, Carnegie Mellon University, 4 awarded

2010 HPC Challenge Class II Award (Most Productive System)
Member of the winning team, led by Gheorghe Almasi (IBM Research)

2009 Best Paper Award, High Performance Embedded Computing (HPEC) 2009
together with D. McFarlin and M. Püschel

2009 Best Paper Award, Conference on Domain Specific Languages (DSLWC) 2009
together with D. McFarlin, F. de Mesmay, and M. Püschel

2008 Best Paper Award, High Performance Embedded Computing (HPEC) 2008
together with Y. Voronenko and M. Püschel

2008 City of Wiener Neustadt Culture Prize (awarded in Science)
Young Scientist Category (*Foerderpreis*), 2 awarded in 2008

2006 Gordon Bell Prize (Peak Performance Award)
Member of the winning team, led by Francois Gygi (UC Davis)

2006 Best Paper Award, International Symposium on Parallel and Distributed Processing and Applications (ISPA) 2006; 2 awarded, chosen out of 80 accepted papers

2005 Gordon Bell Prize Finalist
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-Foerderpreis*)
2 awarded in 2001, for outstanding Master's Thesis in Computer Science

1999 Siemens Innovation Award (*Innovationspreis*)

FELLOWSHIPS

2004-2005 Erwin Schroedinger Fellowship
Advanced Code Generation in Digital Signal Processing
funded by the Austrian Science Fund FWF
enables post-doctoral research abroad at top institutions (invitation required)
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)
funded by the Austrian Science Fund FWF

1998, 1999 Vienna University of Technology annual award for student achievement (*Leistungsstipendium)*

1997-2000 Member of the Siemens Student Fellowship Program (*Studentenkreis*) for selected, highly qualified students in Engineering and Sciences

FUNDING

2016 *Automated Code Generation for Future-Compatible, High-Performance Graph Libraries*
S. McMillan (PI) and F. Franchetti
Carnegie Mellon Software Engineering Institute (SEI)

2015 *Generating Hyper-Portable Future-Proof Computational Kernels with SPIRAL*
F. Franchetti (PI), M. Franusich, J. C. Hoe, T. M. Low, J. M. F. Moura, D. Padua
DARPA BRASS

2015 *Enhancement of FFT-Based Elastic-Visco-Plastic Code for Multiscale Simulations of Alloy Microstructure*
A. D. Rollet, F. Franchetti
DoD HPC PETTT

2015 *Spiral for Blue Waters*
F. Franchetti, M. Franusich
NSF PAID, NCSA Blue Waters

2014 *Energy Efficient High Performance through Application-Specific Processor/Program Co-Synthesis – Phase 2*
F. Franchetti (PI), J.M.F. Moura, J. C. Hoe, L. Pileggi
DARPA PERFECT

2014 *High Assurance Spiral: Scalable and Portable Domain-Specific Control System Synthesis – Phase 2*
F. Franchetti (PI), J.M.F. Moura, S. Kar, A. Platzer, M. Veloso, D. Padua, J. Johnson
DARPA HACMS

2014 *Spectral Method for Elasto-Viscoplastic Full-Field Deformation as a Test Bed for Testing New Approaches to High Performance Computing*
A.D. Rollett (PI) and F. Franchetti
DOD HPC Modernization Program

2014 *Toward a Systematic Collection and Processing of Data in Support of Dynamic Monitoring and Decision Systems (DYMONDS) Framework for Implementing Smart Grids*
M. Ilic (PI), F. Franchetti, A. Rowe
PITA

2013 *Trusted (CMOS) System-on-Chip Design with Self-Healing Piezoelectric MEMS – Phase 2*
L. Pileggi (PI), G. Fedder, F. Franchetti, G. Piazza
IARPA

2013 *Smart Grid in a Room: A Hybrid Test-Bed Facility for Cyber-Physical Systems (CPS)-Based Standards in Microgrids and Their Interactions with Utility Systems*
M. Ilic (PI), F. Franchetti, S. Kar, S. Ray
NIST

2012 CUDA Center of Excellence
K. Fatahalian (PI), R. Whittaker, I. Lane, J. Chong, G. Gibson, O. Mutlu, F. Franchetti

2012 *Energy Efficient High Performance through Application-Specific Processor/Program Co-Synthesis*
F. Franchetti (PI), J.M.F. Moura, J. C. Hoe, L. Pileggi
DARPA PERFECT

2012 *High Assurance Spiral: Scalable and Portable Domain-Specific Control System Synthesis*
F. Franchetti (PI), J.M.F. Moura, S. Kar, A. Platzer, M. Veloso, D. Padua, J. Johnson
DARPA HACMS

2012 *Trusted (CMOS) System-on-Chip Design with Self-Healing Piezoelectric MEMS*
L. Pileggi (PI), G. Fedder, F. Franchetti, G. Piazza
IARPA

2012 *Identifying and Removing Barriers to Autovectorization*
NSF EAGER

2011 *Application-Specific Logic in Memory (Year 3)*
F. Franchetti (PI), J. C. Hoe, L. Pileggi
SRC (C2S2)

2011 *Spiral: Code Synthesis for Higher-Level Application Domain Specific Code Patterns*
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

PATENTS

1. F. Franchetti, L. Pileggi, Q. Zhu, "3DIC Memory Chips Including Computationa Logic-in-Memory for Performing Accelerated Data Processing," United States Patent No. 9,286,216 B2, March 15, 2016.

2. F. Franchetti, M. Ilic. "Systems and Methods for Zero Knowledge Control of Smart Grids," United States Provisional Patent Application Filed, May 5, 2011.

PUBLICATIONS

Book Chapters

1. Q. Zhu, L. Pileggi, F. Franchetti. "A Smart Memory Accelerated Computed Tomography Parallel Backprojection." *FIP AICT 418* (pp. 21-44), 2013.

2. M. Püschel, F. Franchetti, Y. Voronenko. "Spiral." *Encyclopedia of Parallel Computing*, D. A. Padua (Editor), 2011.

3. F. Franchetti, M. Püschel. "Fast Fourier Transform." *Encyclopedia of Parallel Computing*, D. A. Padua (Editor), 2011.

Journal Papers

1. F. Franchetti, T. M. Low, S. Mitsch, J. P. Mendoza, L. Gui, A. Phaosawasdi, D. Padua, S. Kar, J. M. F. Moura, M. Franusich, J. Johnson, A. Platzer, and M. Veloso. "High-Assurance SPIRAL: End-to-End Guarantees for Robot and Car Control." *IEEE Control Systems Magazine,* 2017.

2. M . Bolten, F. Franchetti, P. Kelly, C. Lengauer, M. Mohr. "Algebraic Description and Automatic Generation of Multigrid Methods in SPIRAL." *Concurrency and Computation: Practice and Experience,* 2017.

3. B. Akin, F. Franchetti, & J. Hoe. "HAMLeT Architecture for Parallel Data Reorganization in Memory." *IEEE MICRO, 36*(1), 14-23, 2016.

4. Q. Guo, T. Chen, Y. Chen, F. Franchetti. "Accelerating Architectural Simulation Via Statistical Techniques: A Survey." In *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems,* 35(3), 433-446, 2016.

5. M. M. Sabry Aly, M. Gao, G. Hills, C.-S. Lee, G. Pitner, M. M. Shulaker, T. F. Wu, M. Asheghi, J. Bokor, F. Franchetti, K. E. Goodson, C. Kozyrakis, I. Markov, K. Olukoton, L. Pileggi, E. Pop, J. Rabaey, C. Re, H.-S. Wong, S. Mitra. "Energy-Efficient Abundant-Data Computing: The N3XT 1,000x." *Computer,* 48(12), 24-33, 2015.

6. B. Akin, F. Franchetti, J. C. Hoe. "FFTs with Near-Optimal Memory Access Through Block Data Layouts: Algorithm, Architecture and Design Automation." *Journal of Signal Processing Systems,* 2015.

7. 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,* Vol. 17, No. 2, Article 15, April 2012. *ACM TODAES Best Paper Award 2014.*

8. Q. Li, T. Cui, Y. Weng, R. Negi, F. Franchetti, M. D. Ilic. "An Information-Theoretic Approach to PMU Placement in Electric Power Systems." In *IEEE Transactions on Smart Grid,* 4(1): 446-456, 2013.

9. Q. Zhu, C. Berger, E. L. Turner, L. Pileggi, and F. Franchetti. "Local Interpolation-based Polar Format SAR: Algorithm, Hardware Implementation and Design Automation." In *The Journal of Signal Processing Systems*, Vol. 71, Issue 3, pp. 279-312, Springer, 2012.

10. 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.

11. 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.

12. 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, U. Catalyurek. "BlueGene/L Applications: Parallelism on a Massive Scale." In *International Journal of High Performance Computing Applications*, Vol. 22, No. 1, 2008, pp. 33-51.

13. 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, pp. 437-446.

14. 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, pp. 409-425.

15. 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, pp. 232-275.

Conference Papers (Fully Reviewed)

1. V. Ruzicka, F. Franchetti. "Fast and Accurate Object Detection in High Resolution 4K and 8K Video Using GPUs." IEEE High Performance Extreme Computing Conference (HPEC), 2018. *Best paper finalist.*

2. J. Zhang, T. M. Low, F. Franchetti. "High Performance Zero-Memory Overhead Direct Convolutions." International Conference on Machine Learning (ICML), 2018.

3. D. T. Popovici, T. M. Low, F. Franchetti. "Large Bandwidth-Efficient FFTs on Multicore and Multi-Socket Systems." IEEE International Parallel & Distributed Processing Symposium (IPDPS), 2018.

4. H. V. Koops, K. Garg, M. Kim, J. Li, A. Volk, F. Franchetti. "Multirotor UAV State Prediction Through Multi-microphone Side-Channel Fusion." IEEE International Conference on Multisensor Fusion and Integration for Intelligent Systems (MFI), 2017.

5. R. M. Veras, F. Franchetti. "A Scale-free Structure for Real World Networks." IEEE High Performance Extreme Computing Conference (HPEC), 2017.

6. F. Sadi, L. Pileggi, F. Franchetti. "Algorithm and Hardware Co-optimized Solution for Large SpMV Problems." IEEE High Performance Extreme Computing Conference (HPEC), 2017.

7. D. T. Popovici, F. Franchetti, T. M. Low. "Mixed Data Layout Kernels for Vectorized Complex Arithmetic." IEEE High Performance Extreme Computing Conference (HPEC), 2017.

8. T. M. Low, V. N. Rao, M. Lee, D. Popvici, F. Franchetti, S. McMillan. "First Look: Linear Algegra-based Triangle Counting Without Matrix Multiplication." IEEE High Performance Extreme Computing Conference (HPEC), 2017.

9. T. M. Low and F. Franchetti. "High Assurance Code Generation for Cyber-Physical Systems." Proceedings of the 18th IEEE International Symposium on High Assurance Systems Engineering (HASE 2017), Jan 2017.

10. J. A. Deri, F. Franchetti, J. M. F. Moura. "Big Data Computation of Taxi Movement in New York City." IEEE International Conference on Big Data (IEEE BigData) 2016.

11. J. Kepner, P. Aaltonen, D. Bader, A. Buluc, F. Franchetti, J. Gilbert, D. Hutchison, M. Kumar, A. Lumsdaine, H. Meyerhenke, S. McMillan, J. Moreira, J. D. Owens, C. Yang, M. Zalewski, T. Mattson. "Mathematical Foundations of the GraphBLAS." IEEE High Performance Extreme Computing (HPEC) 2016.

12. R. Veras, T. M. Low, F. Franchetti. "A Scale-Free Structure for Power-Law Graphs." IEEE High Performance Extreme Computing Conference (HPEC), 2016.

13. Q. Guo, T. M. Low, N. Alachiotis, B. Akin, L. Pileggi, J. C. Hoe, F. Franchetti. "Enabling Portable Energy Efficiency with Memory Accelerated Library." 48th International Symposium on Microarchitecture (MICRO), 2015.

14. T. M. Low, Q. Guo, F. Franchetti. "Optimizing Space Time Adaptive Processing Through Accelerating Memory-Bounded Operations." IEEE High Performance Extreme Computing (HPEC) 2015.

15. B. Akin, F. Franchetti, J. C. Hoe. "Data Reorganization in Memory Using 3D-stacked DRAM." 42nd International Symposium on Computer Architecture (ISCA) 2015.

16. H. E. Sumbul, K. Vaidyanathan, Q. Ahu, F. Franchetti, L. Pileggi. "A Synthesis Methodology for Application-Specific Logic-In-Memory Designs." 52nd Design Automation Conference (DAC) 2015.

17. H. V. Koops, F. Franchetti. "An Ensemble Technique for Estimating Vehicle Speed and Gear Position from Acoustic Data." In *Proceedings of the 20th International Conference on Digital Signal Processing* (DSP), 2015.

18. T. Popovici, F. Russell, K. Wilkinson, C-K. Skylaris, P. H. J. Kelly, F. Franchetti. "Generating Optimized Fourier Interpolation Routines for Density Functional Theory Using SPIRAL." 29th International Parallel & Distributed Processing Symposium (IPDPS) 2015.

19. Q. Guo, N. Alachiotis, B. Akin, F. Sadi, G. Xu, T-M. Low, L. Pileggi, J. Hoe, F. Franchetti. "3D-Stacked Memory-Side Acceleration: Accelerator and System Design." *2nd Workshop on Near Data Processing (WONDP)* in conjunction with the *47th IEEE/ACM International Symposium on Microarchitecture (MICRO-47)*, 2014.

20. B. Akin, J. Hoe, F. Franchetti. "HAMLeT: Hardware Accelerated Memory Layout Transform within 3D-stacked DRAM." *Proceedings of HPEC*, 2014. *Best paper award.*

21. F. Sadi, B. Akin, D. Popovici, J. Hoe, L. Pileggi, F. Franchetti. "Algorithm/Hardware Co-optimized SAR Image Reconstruction with 3D-stacked Logic in Memory." *Proceedings of HPEC*, 2014. *Rising Stars session.*

22. F. Franchetti, A. Sandryhaila, J. R. Johnson. "High Assurance SPIRAL." *Proceedings of SPIE*, 2014.

23. B. Akin, F. Franchetti, J. Hoe. "Understanding the Design Space of DRAM-optimized Hardware FFT Accelerators." IEEE 25th International Conference on Application-specific Systems, Architectures and Processors (ASAP), 2014, pp 248-255.

24. K. Vaidyanathan, R. Liu, E. Sumbul, Q. Zhu, F. Franchetti, L. Pileggi. "Efficient and Secure Intellectual Property (IP) Design for Split Fabrication." HOST 2014.

25. V. Zaliva, F. Franchetti. "Barometric and GPS Altitude Sensor Fusion." *ICASSP: International Conference on Acoustics, Speech and Signal Processing,* 2014.

26. B. Akin, F. Franchetti, J. C. Hoe. "FFTs with Near-Optimal Memory Access Through Block Data Layouts." *ICASSP: International Conference on Acoustics, Speech and Signal Processing,* 2014.

27. T. Cui, R. Yang, G. Hug, F. Franchetti. "Accelerated AC Contingency Calculation on Commodity Multi-core SIMD CPUs." IEEE PES General Meeting, 2014.

28. Q. Zhu, B. Akin, H. E. Sumbul, F. Sadi, J. Hoe, L. Pileggi, F. Franchetti. "A 3D-Stacked Logic-in-Memory Accelerator for Application-Specific Data Intensive Computing." *Proceedings of IEEE International 3D Systems Integration Conference* (3DIC) 2013, pages 1-7.

29. Q. Zhu, T. Graf, H. E. Sumbul, L. Pileggi, F. Franchetti. "Accelerating Sparse Matrix-Matrix Multiplication with 3D-Stacked Logic-in-Memory Hardware." *IEEE High Performance Extreme Computing Conference* (HPEC) 2013, pages 1-6. *Best paper award.*

30. T. Cui, F. Franchetti. "Power System Probabilistic and Security Analysis on Commodity High Performance Computing Systems." HiPCNA-PG 2013.

31. T. Henretty, R. Veras, L.-N. Pouchet, F. Franchetti, J. Ramanujam and P. Sadayappan. "A Stencil Compiler for Short-Vector SIMD Architectures," In *Proceedings International Conference on Supercomputing (ICS)*, 2013.

32. T. Cui, F. Franchetti. "A Quasi-Monte Carlo Approach for Radial Distribution System Probabilistic Load Flow." *IEEE Innovative Smart Grid Technology Conference.* 2013.

33. M. Kong, R. Veras, K. Stock, F. Franchetti, N.-L. Pouchet, and P. Sadayappan, "When Polyhedral Transformations Meet SIMD Code Generation." *ACM SIGPLAN PLDI,* 2013.

34. C. Thoma, T. Cui, F. Franchetti. "Privacy Preserving Smart Meter System Based Retail Level Electricity Market." In *Proceedings of the IEEE PES General Meeting,* 2013.

35. F. Franchetti, Y. Voronenko, G. Almasi: "Automatic Generation of the HPC Challenges Global FFT Benchmark for BlueGene/P." In *Proceedings of High Performance Computing for Computational Science (VECPAR) 2012.*

36. T. Cui, F. Franchetti. "Optimized Parallel Distribution Load Flow Solver on Commodity Multi-core CPU." In *Proceedings of IEEE High Performance Extreme Computing Conference.* 2012.

37. C. Thoma, T. Cui, Franz Franchetti. "Secure Multiparty Computation Based Privacy Preserving Smart Metering System." In *Proceedings of the 44th North America Power Symposium.* 2012.

38. Q. Zhu, L. Pileggi, and F. Franchetti. "Cost-Effective Smart Memory Implementation for Parallel Backprojection in Computed Tomography." *IFIP/IEEE International Conference on Very Large Scale Integration,* 111-116, 2012.

39. Q. Zhu, K. Vaidyanathan, O. Shacham, M. Horowitz, L. Pileggi, and F. Franchetti. "Design Automation Framework for Application-Specific Logic-in-Memory Blocks." *International Conference on Application-Specific Systems, Architectures and Processors (ASAP), 2012 IEEE 23rd,* 125-132, 2012.

40. B. Akin, P.A. Milder, F. Franchetti, and J. C. Hoe. "Memory Bandwidth Efficient Two-Dimensional Fast Fourier Transform Algorithm and Implementation for Large Problem Sizes." *IEEE International Symposium on Field-Programmable Custom Computing Machines (FCCM),* 188-191, 2012.

41. Q. Zhu, L. Pileggi, and F. Franchetti. "Smart Memory Synthesis for Energy-Efficient Computed Tomography Reconstruction." *SRC TECHCON,* 2012.

42. 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.

43. 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.

44. 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.

45. 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.

46. 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.

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

48. 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 of the International Conference on Acoustics, Speech, and Signal Processing* (ICASSP), 2011.

49. 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 the International Conference on Compiler Construction* (CC), 2011.

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

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

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

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

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

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

56. 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), Lecture Notes in Computer Science, Springer, Vol. 5658, pp. 385-410, 2009. *Best Paper Award*.

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

58. 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.

59. 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.

60. 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*.

61. F. Franchetti and M. Püschel. "Generating SIMD Vectorized Permutations." In *Proceedings of the International Conference on Compiler Construction (CC)*, Lecture Notes in Computer Science, vol. 4959, pp. 116-131, 2008.

62. 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.

63. 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.

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

65. 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.

66. 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,* vol. 4330, pp. 818-832, 2006. *Best Paper Award*.

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

68. 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)*.

69. 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), pp. 222-232, 2006.

70. 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), LNCS 4395, pp. 363-377, 2006.

71. 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*.

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

73. 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), vol. 5, pp. 153-156, 2005.

74. 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), LNCS 3402, pp. 23-36, 2004.

75. S. Kral, F. Franchetti, J. Lorenz, C. W. Ueberhuber. "FFT Compiler Techniques." In *Proceedings of the International Conference on Compiler Construction (*CC2004), LNCS 2985, pp 217-231, 2004.

76. 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*, LNCS 2790, pp 251-260, 2003.

77. 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 Computer Society Press, Los Alamitos, USA, pp. 185-192, 2003.

78. 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), vol. 2, pp. 537-540, 2003.

79. 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)*, pp. 58-67, 2003.

80. 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 Computer Society Press, Los Alamitos, pp. 20-26, 2002.

81. F. Franchetti, H. Karner, S. Kral, C. W. Ueberhuber. "Architecture Independent Short Vector FFTs." In *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing* (ICASSP 2001), IEEE Computer Society Press, Los Alamitos, USA, 2001, vol. 2, pp. 1109-1112.

Other Conference Papers, Technical Reports, Extended Abstracts, and Posters

1. G. Xu, T. M. Low, J. C. Hoe, F. Franchetti. "Optimizing FFT Resource Efficiency on FPGA using High-level Synthesis." IEEE High Performance Extreme Computing Conference (HPEC), 2017, Poster.

2. H. V. Koops, K. Garg, M. Kim, J. Li, A. Volk, F. Franchetti. "Prediction of Quadcopter State through Multi-Microphone Side-Channel Fusion." Technical report UU-CS-2017-001, Department of Information and Computing Sciences, Utrecht University, 2017.

3. F. Sadi, L. Pileggi, F. Franchetti. "3D DRAM Based Application-Specific Hardware Accelerator for SpMV." IEEE High Performance Extreme Computing Conference (HPEC), 2016. Poster.

4. R. Veras, D. Popovici, T. M. Low, F. Franchetti. "Hands-Off My Hands-On Optimizations." 3rd International Workshop on Programming Models for SIMD/Vector Programming (WPMVP), 2016 (held as part of PPoPP16).

5. J. Zhang, T. M. Low, Q. Guo, F. Franchetti. "A 3D-Stacked Memory Manycore Stencil Accelerator System." 3rd Workshop on Near-Data Processing. In conjunction with the 48th IEEE/ACM International Symposium on Microarchitecture (MICRO-48), 2015.

6. T. Popovici, F. Russel,, K. Wilkinson, C.-K Skylaris, P.H. J. Kelly, F. Franchetti. "Generating Optimized Fourier Interpolation Routines for Density Functional Theory Using SPIRAL." CPC: Workshop on Compilers for Parallel Computing, 2015, *oral presentation*.

7. T. Ozturk, T. Popovici, C. Stein, B. Pokharel, F. Franchetti, R. Suter, A. Rollett: "Fast Fourier Transform Based Mechanical Behavior Formulation: Optimized Implementation and Sensitivity Analysis of the Method. Multiscale Modeling of Microstructure Deformation in Material Processing (MS&T) 2014, *oral presentation*.

8. T. Ozturk, C. Stein, R. Pokharel, T. Popovici, R. Suter, F. Franchetti, A. Rollett: "Spectral Full-Field Deformation Modeling of Polycrystalline Materials." Neutron and X-Ray Studies of Advanced Materials VIII: Diffraction Limit and Beyond. 3D. Poster.

9. T. Ozturk, C. Stein, R. Pokharel, T. Popovici, F. Franchetti, R. Suter, A. Rollett: "Performance Evaluation, Algorithm Optimization and Sensitivity Analysis of the Spectral Full-Field Deformation Modeling of Polycrystalline Materials." 3rd World Congress on Integrated Computational Materials Engineering. Poster.

10. B. Duff, J. Larkin, M. Franusich, F. Franchetti. "Automatic Generation of 3-D FFTs." 2014 Rice Oil & Gas HPC Workshop. Abstract.

11. T. Cui, F. Franchetti. "A Software Performance Engineering Approach to Fast Transmission Probabilistic Load Flow." IEEE PES General Meeting, July 2013, Vancouver, Canada, Student Poster.

12. H. E. Sumbul, A. Patterson, A. Tazzoli, G. Feeder, F. Franchetti, G. Piazza, and L. Pileggi. "Trusted Split-Fabrication System-on-Chip Design Technology and Methodology." Government Applications & Critical Technology Conference (GOMACTech-13), 2013, Las Vegas, USA.

13. 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.

14. C. Angelopoulos, F. Franchetti, and M. Püschel. "Automatic Generation of FFT Libraries for GPUs." NVIDIA Research Summit at the GPU Technology Conference, 2012, Poster (Abstract reviewed).

15. 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.*

16. 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.*

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

18. 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).

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

20. D. McFarlin, F. Franchetti, 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 Computers (CPC),* 2010.

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

22. 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.

23. 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 High Performance Embedded Computing* (HPEC), MIT Lincoln Laboratory, 2009. *Best paper award.*

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

25. F. Franchetti, D. McFarlin, F. de Mesmay, H. Shen, T. Wlodarczyk, S. Chellappa, M. Telgarsky, P. 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 High Performance Embedded Computing* (HPEC), MIT Lincoln Laboratory, 2008.

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

27. 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.

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

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

30. 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.

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

32. P. A. Milder, F. Franchetti, J. C. Hoe, and M. Püschel. “Fast Fourier Transform on FPGA: Design Choices and Evaluation.” In *Proceedings of the International Symposium on Field-Programmable Gate Arrays* (FPGA), 2007.

33. 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 High Performance Embedded Computing* (HPEC), MIT Lincoln Laboratory, 2006, on CD-ROM.

34. 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), pp. 28-32, 2006.

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

36. F. Franchetti. “Top Performance in Signal Processing.” *International Workshop on Numerical and Symbolic Scientific Computing,* 2003.

37. F. Franchetti. “A Portable Short Vector Version of FFTW.” In *Proceeding of the Fourth IMACS Symposium on Mathematical Modelling* (MATHMOD 2003), Vienna University of Technology, Vol. 2, pp. 1539-1548.

38. 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.

39. 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), MIT Lincoln Laboratory, 2002, 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

2017 Nov 13	*Specialized, perhaps configurable, hardware and software are necessary to achieve high-performance, scalable data analytics* Invited Panelist, Seventh Workshop on Irregular Applications: Architectures and Algorithms (IA^3), in conjunction with Supercomputing 2017 Denver, CO
2016 July 04	*High-Performance Computing Libraries as Domain-Specific Language* Invited Seminar, Vienna University of Technology, Vienna, Austria
2016 March 16	*Formal Software Synthesis of Computational Kernels* Swanson Engineering Seminar, University of Pittsburgh, Pittsburgh, USA
2015 July 21	*Formal Software Synthesis of Computational Kernels* Sapporo Summer HPC Seminar 2015, Sapporo, Japan
2015 June 08	*SPIRAL: Formal Software Synthesis of Computational Kernels* Programming Languages Lunch Colloquia, UT Austin, Austin, USA
2015 May 27	*Formal Software Synthesis of Computational Kernels* Informatik Department Seminar, Vienna University, Vienna, Austria
2015 May 19	*Formal Synthesis of Computational Kernels* Rigorous Systems Engineering (RiSE) Seminar, IST Austria, Vienna, Austria
2015 May 18	*Formal Software Synthesis of Computational Kernels* Computer Languages Seminar, Vienna University of Technology, Vienna, Austria
2015 May 07	*Formal Synthesis of Computational Kernels* Hybrid Modeling Languages (HyML) @ Rice, Rice University, Houston, USA
2015 April 14	*Formal Software Synthesis of Computational Kernels* Dagstuhl Seminar 15161 on "Advanced Stencil-Code Engineering" Schloss Dagstuhl, Germany
2015 April 08	*Formal Software Synthesis of Computational Kernels* Faculty Candidate Seminar, Carnegie Mellon University, Pittsburgh, USA

2015 March 30	*Introduction to SGRS Multi-Layered Simulation Platform Design* The Tenth Anniversary of the Carnegie Mellon University Electricity Conference Carnegie Mellon University, Pittsburgh, USA
2015 March 18	*Code Generation for Higher Level Spectral Methods with Spiral* Invited speaker at SIAM CSE Minisymposium "Streamlining Application Performance Portability," Salt Lake City, USA
2014 September 25	*3D-Stacked Logic-in-Memory Hardware for Sparse Matrix Operations* BLIS Retreat, UT Austin, Austin, USA
2014 August 26	*Near Memory Computing: Spectral and Sparse Accelerators* Invited speaker at Multi-Agency SOC Workshop, Denver, USA
2014 August 26	*Automatic Performance Tuning: Spiral, FFTW, ATLAS & Friends* Invited speaker at Multi-Agency SOC Workshop, Denver, USA
2014 July 24	*High Assurance Spiral: Scalable and Performance Portable Domain-Specific Control System Synthesis* Invited speaker at DARPA HACMS PI meeting, Princeton, USA
2014 June 3	*3D-Stacked Logic-in-Memory Hardware for Sparse Matrix Operations* PASC'14 Conference ETH Zurich
2014 May 7	*3D-Stacked Logic-in-Memory Hardware For Sparse Matrix Operations* Invited presenter at CMU Future Memory Systems Workshop, Pittsburgh, USA
2014 Mar 18	*High Assurance Spiral: Co-Synthesizing Proof and Implementation from High-Level Specification* Invited speaker at the IFIP WG 2.11 on program generation Pittsburgh, USA
2014 Feb 20	*Spiral on 京 (K)* Invited speaker at Minisymposium "Auto-tuning Technologies for Extreme-Scale Solvers," SIAM PP 2014 Portland, USA
2013 Oct 3	*Black Belt Autotuning: Beyond FFT and DGEMM* Invited speaker at Dagstuhl Seminar No. 13401: "Automatic Application Tuning for HPC Architectures," Schloss Dagstuhl, Germany
2013 May 13	*SPIRAL: Automating High Quality Software Production* Invited speaker at Texas Instruments, Inc., Dallas, TX, USA
2013 February 27	*Automatic Generation of Massively Parallel FFTs* Invited speaker at 3rd AICS International Symposium, RIKEN Kobe, Japan
2013 January 25	*Spiral:Automatic Generation of Industry Strength Performance Libraries* Invited talk at University of Texas, Austin Austin, USA
2012 July 10	*Automatic Generation of the HPCC Global FFT for BlueGene/Q* Invited speaker at SIAM Annual Meeting, Minneapolis, USA
2012 April 30	*Spiral: Specialized FFTs at ESSL and FFTW Speed* Invited speaker at Early Science April Workshop – "Code for Q", Chicago, USA

2012 April 14	*What Could Deskside Supercomputers Do for the Power Grid?* Invited speaker at 8th Annual CMU Conference on the Electricity Industry 2012 Pittsburgh, USA
2012 April 11	*Spiral: Library Generation Through Autotuning, Rewriting, and Constraint Solving* Invited speaker at Dagstuhl Seminar No. 12152: "Software Synthesis" Schloss Dagstuhl, Germany
2012 March 8	*SPIRAL: Automating High Quality Software Production* Invited talk at Intel Science and Technology Center in Embedded Computing (ISTC-EC) Seminar, Pittsburgh, USA
2012 February 15	*Spiral: Black Belt Autotuning for Parallel Platforms* Invited speaker at SIAM PP'12 workshop "Towards Smart Auto-tuning for HPC: The State-of-the-art of Auto-tuning Technologies and Future Directions" Savannah, USA
2011 September 21	*Spiral: Automatic Generation of Industry Strength Performance Libraries* Keynote speaker at High Performance Embedded Computing (HPEC) Workshop Lexington, USA
2011 September 15	*Spiral: Automating High Quality Software Production* Invited Talk at Qualcomm Research, Santa Clara, USA
2011 September 12	*Towards Automating Black Belt Programming* Invited Talk at IBM T. J. Watson Research Center, Yorktown Heights, USA
2011 August 8	*Black Belt Autotuning Beyond FFT and DGEMM* CScADS Autotuning Workshop, Tahoe City, USA
2011 June 9	*Leveraging Emerging Computer Architectures in Smart Grids* Invited speaker at the Second DAC Workshop on Smart Grid and Design Automation, San Diego, USA
2011 June 2	*Towards Automating Black Belt Programming* Key note talk at The Sixth International Workshop on Automatic Performance Tuning (iWAPT), Singapore
2011 May 31	*Spiral: Generating Efficient Programs for Emerging Parallel Platforms* Invited talk at National University of Singapore, Singapore
2011 May 24	*Spiral: Computer Generation of Performance Libraries* Invited speaker at DARPA Workshop on Program Synthesis for Rapid Software Development, Chicago, USA
2011 April 13	*Spiral: Generating Efficient Programs for Emerging Parallel Platforms* Invited Talk at University of Tennessee, Knoxville Knoxville, USA
2011 April 12	*Spiral: Generating Efficient Programs for Emerging Parallel Platforms* Invited Talk at Oak Ridge National Laboratory Oak Ridge, USA
2011 March 31	*Spiral: Generating Efficient Programs for Emerging Parallel Platforms* Invited Talk at Vienna University of Technology, Vienna, Austria
2011 March 9	*Trends in High-Performance Computing for Power Grid Applications* Invited Talk at 7th Annual CMU Conference on the Electricity Industry 2011 Pittsburgh, USA

2011 March 8	*CMU Vision for The Newly Formed SRC Smart Grid Research Center* 7th Annual CMU Conference on the Electricity Industry 2011, Pittsburgh, USA
2011 March 4	*Spiral: Generating Efficient Programs for Emerging Parallel Platforms* Invited talk at Intel Research, Hudson, USA
2011 February 24	*Spiral: Generating Efficient Programs for Emerging Parallel Platforms* Invited talk at Nvidia Research, Sunnyvale, USA
2011 February 21	*Spiral: Generating Efficient Programs for Emerging Parallel Platforms* Invited talk at University of Illinois at Urbana-Champaign, Urbana, USA
2011 February 14	*Spiral: Generating Efficient Programs for Emerging Parallel Platforms* Invited talk at Massachusetts Institute of Technology, Cambridge, USA
2011 January 31	*Spiral: Program Generation for Linear Transforms and Beyond* Invited talk at Translucent Analytics, Inc., remote presentation
2010 August 9	*The C of My Dreams* Presentation at CScADS Autotuning Panel on "Languages and Compilers for Linear Algebra Libraries", Snowbird, USA
2010 July 8	*Automatic SIMD Vectorization of Fast Fourier Transforms for the Larrabee and AVX ISAs*, Invited speaker at CPC'10, Vienna, Austria
2010 June 23	*Trends in High-Performance Computing for Power Grid Applications* FERC Workshop on *Improving Market and Planning Efficiency through Improved Software*, Washington, USA
2010 May 11	*Automatic Generation of SIMD-Vectorized DSP Kernels* Invited speaker at Dagstuhl Seminar No. 10191: "Program Composition and Optimization: Autotuning, Scheduling, Metaprogramming and Beyond: Schloss Dagstuhl, Germany
2010 March 15	*Spiral: Program Generation for Linear Transforms and Beyond* Invited talk at Georgia Institute of Technology, Atlanta, USA
2010 March 5	*Spiral: Program Generation for Linear Transforms and Beyond* Invited talk at Argonne National Laboratory (ANL), Chicago, USA
2010 February 8	*SpiralGen: Computer Generation of Performance Libraries* Invited talk at Microsoft Corporation, Redmond, USA
2009 December 16	*Spiral: Computer Generation of Performance Libraries* Invited talk at Pittsburgh Supercomputing Center, Pittsburgh, USA
2009 October 22	*Spiral: Computer Generation of Performance Libraries* Invited remote presentation, Software-Intensive Systems Producibility (SISPI) together with M. Püschel
2009 October 21	*Spiral: Program Generation for Linear Transforms and Beyond* Invited talk at Mercury Computer Systems Inc., Boston, USA
2009 September 18	*Spiral: Computer Generation of Performance Libraries* Invited talk at OSD workshop, GMU, Fairfax, USA
2009 September 8	*Spiral: Program Generation for Linear Transforms and Beyond* Invited talk at Lawrence Livermore National Laboratory (LLNL), Livermore, USA

2009 August 25	*Spiral: Program Generation for Linear Transforms and Beyond* Invited talk at Information Science & Technology Institute Los Alamos National Laboratory (LANL), Los Alamos, USA
2009 August 10	*Big Questions in Autotuning* Presentation at CScADS Autotuning Panel on Big Questions, North Tahoe, USA
2009 July 7	*SpiralGen: Computer Generation of Performance Libraries* Invited presentation at The Technology Collaborative, together with Y. Voronenko Pittsburgh, USA
2009 May 6	*Spiral: Generating Software and Hardware Implementations for Linear Transforms* Invited talk at University of Delaware ECE Seminar, Newark, USA
2009 April 24	*Spiral: Beyond Transforms* Invited talk at Industrial Technology Research Institute (ITRI), Hsinchu, Taiwan
2009 January 23	*Spiral: Teaching Computers to Write Fast Libraries* Invited talk at The MathWorks, Natick, USA
2009 January 8	*FFT Program Generation for the Cell BE* Invited talk at CPC'09, Zurich, Switzerland.
2008 November 17	*Spiral: Generating Parallel Software for Linear Transforms (And Beyond)* Invited talk at SC'08 Workshop "Bridging Multicore's Programmability Gap" Austin, USA
2008 October 10	*Spiral: Generating Software and Hardware Implementations for Linear Transforms* Invited talk at UC Berkeley, Berkeley, USA
2008 August 19	*Parallelism in Spiral* Invited remote presentation, AMD Research, Seattle, USA
2008 August 6	*Meet Stevephanie, the Computer. Spiral: Automatic Library Generation* Invited talk at UW MSR Institute 2008, Semiahmoo, USA
2008 July 25	*Spiral: Automating Library Development* Invited talk at Vanu Inc., together with J. M. F. Moura, Cambridge, USA
2008 June 18	*Generating Efficient Programs for Emerging Parallel Platforms* Research Faculty Candidate Talk, Carnegie Mellon University, USA
2008 May 27	*Spiral: Generating Software and Hardware Implementations for Linear Transforms* Invited talk at Ohio State University, Columbus, USA
2008 April 13	*Domain-Specific Library Generation for Parallel Software and Hardware Platforms* The NSF Next Generation Software (NSFNGS) Workshop 2008, Miami, USA
2008 March 14	*Spiral: Tackling Parallelism* Invited talk at the workshop "Algorithms and Optimizations Targeting Multi-Core Architectures," co-located with SIAM PP08, Atlanta, USA
2008 February 14	*Spiral: Tackling Parallelism* Invited short presentation at "Future of Concurrency" workshop, Pittsburgh, USA

2007 September 4	*Parallelism in Spiral* Invited speaker at Dagstuhl Seminar No. 07361: "Programming Models for Ubiquitous Parallelism" Schloss Dagstuhl, Germany
2007 August 27	*Spiral: Automatic Performance Tuning Using Chapel* JPL SURP progress report, together with H. P. Zima JPL, Pasadena, USA
2007 July 25	*Can We Teach Computers To Write Fast Libraries?* Invited talk at IBM T. J. Watson Research Center, Yorktown Heights, USA together with Markus Püschel
July 9 2007	*Parallelism in Spiral* Invited talk at SciDAC CScADS Summer Workshop on Automatic Tuning for Petascale Systems, Snowbird, USA
2007 June 20	*Spiral: Tackling Parallelism* Invited talk at International AURORA Conference on Scientific Computing 2007 Vienna, Austria
2007 April 6	*Spiral: Generating Software and Hardware Implementations for Linear Transforms* Invited talk at Cray Inc., Seattle, USA
2007 April 5	*Accelerators: GPUs and FPGAs (Data Parallel Compilation Panel)* Presentation at Intel, Inc., Santa Clara, USA
2007 February 2	*Joint Runtime/Energy Optimization And Hardware/Software Partitioning Of Linear Transforms* Invited speaker at UCLA Workshop on Power-Constrained Multimedia Systems, Los Angeles, USA
2007 February 1	*Spiral: Generating Parallel Transforms* Invited talk at Center for Advanced Computing Research (CACR), Caltech, Pasadena, USA
2007 January 31	*Generating Software and Hardware Implementations for Linear Transforms* Invited talk at Lawrence Livermore National Laboratory, Livermore, USA
2006 November 29	*Generating Parallel Transforms Using Spiral* Invited talk at Mercury Computer Systems Inc., Boston, USA
2006 September 25	*Generating Parallel Transforms Using Spiral* Invited talk at Microsoft Research, Seattle, USA together with Markus Püschel
2005 September 20	*Formal Vectorization of Digital Signal Processing Transforms* Faculty candidate talk at Carnegie Mellon University, USA
2005 March 8	*Scheduling in SPIRAL* Invited speaker at Dagstuhl Seminar No. 05101: "Scheduling for Parallel Architectures: Theory, Applications, Challenges" Schloss Dagstuhl, Germany
2004 October 29	*SPIRAL: Automatic Performance Tuning on the BlueGene/L Supercomputer* Invited speaker, BlueGene/L and QCDOC Workshop Brookhaven National Laboratory, USA

2004 June 5 — *High-Performance Computing on BlueGene/L*
Invited speaker at the AURORA Plenary Meeting
Strobl, Austria

2003 October 14 — *FFTs on BG/L-Status and Methods*
Invited speaker, The Blue Gene/L Applications,
Algorithms, and Architectures Workshop, Reno, USA

2003 September 18 — *The Current Status of BG/L Supercomputers*
Invited talk at Carnegie Mellon University, USA

2003 June 17 — *Top Performance in Signal Processing*
Invited speaker at the International Workshop on
Numerical and Symbolic Scientific Computing, St.Wolfgang, Austria

2003 June 2 — *Code-Optimierung fuer FFTs und BLAS* (in German)
Invited speaker, Kolloquium ueber Parallelverarbeitung
Research Center Juelich, Germany

2003 March 19 — *FFTs for Blue Gene/L*
Invited speaker at the LLNL CASC BlueGene/L Workshop
Lawrence Livermore National Laboratory, USA

2002 August 14 — *FFTs on BG/L Machines*
Invited speaker, The Blue Gene/L Applications,
Algorithms, and Architectures Workshop, Lake Tahoe, USA

2002 August 8 — *Self-Adaptive DSP Software*
Invited speaker, The First Self Adapting Numerical Software (SANS) Summit
Innovative Computing Lab, UTK Knoxville, USA

2002 April 29 — *High-Performance FFT Software*
Invited talk, IBM T. J. Watson Research Center, Yorktown, USA

2002 March 18 — *High-Performance FFT Software*
Invited talk, Numerical Harmonic Analysis Group (NuHAG)
Vienna University, Austria

2001 August 5 — *A SIMD Vectorization of FFTW*
Invited talk at Vanu Inc., Cambridge, USA

Conferences

2012 May 22 — *Highly Efficient Performance Portable Tracking of Evolving Surfaces*
IPDPS 2012

2011 September 22 — *Performance Portable Tracking of Evolving Surfaces*
High Performance Embedded Computing Workshop (HPEC)
Lexington, USA

2011 June 2 — *Autotuning a Random Walk Boolean Satisfiability Solver*
6th International Workshop on Automatic PerformanceTuning (iWAPT),
Singapore

2010 January 27 — *Computer Generation of Efficient Software Viterbi Decoders*
International Conference on High-Performance Embedded Architectures and Compilers
Pisa, Italy

2009 July 17	*Operator Language: A Program Generation Framework for Fast Kernels* Working Conference on Domain Specific Languages (DSLWC) 2009, Oxford, UK
2009 April 21	*Generating High Performance Pruned FFT Implementations* IEEE International Conference on Acoustics, Speech, and Signal Processing 2009 (ICASSP 09), Taipei, Taiwan
2008 September 15	*Program Generation with Spiral: Beyond Transforms* Poster Precis, HPEC'08, Boston, USA
2008 April 3	*Generating SIMD Vectorized Permutations* International Conference on Compiler Construction 2008 (CC'08) Budapest, Hungary
2007 April 19	*SIMD Vectorization of Non-Two-Power Sized FFTs* IEEE International Conference on Acoustics, Speech, and Signal Processing 2007 (ICASSP 07), Honolulu, USA
2006 November 16	*FFT Program Generation for Shared Memory: SMP and Multicore* Supercomputing 2006 Tampa, USA
2006 September 16	*Parallelism in Spiral* Workshop on Programming Models for Ubiquitous Parallelism (PMUP) Seattle, USA
2006 July 11	*A Rewriting System for the Vectorization of Signal Transforms* 7th International Meeting on High Performance Computing for Computational Science (VECPAR 06), Rio de Janeiro, Brasil
2004 June 28	*Automatically Optimized FFT Codes for the BlueGene/L Supercomputer* 6th International Meeting on High Performance Computing for Computational Science (VECPAR 04), Valencia, Spain
2004 April 28	*A Self-Adapting Distributed Memory Package for Fast Signal Transforms* International Parallel and Distributed Processing Symposium 2004 (IPDPS 04), Santa Fe, USA
2003 August 29	*SIMD Vectorization of Straight-Line Code* International Conference on Parallel and Distributed Computing (EuroPAR 03) Klagenfurt, Austria
2003 April 24	*Short Vector Code Generation for the Discrete Fourier Transform* International Parallel and Distributed Processing Symposium 2003 (IPDPS 03), Nice, France
2003 February 7	*A Portable Short Vector Version of FFTW* Fourth International Symposium on Mathematical Modelling (MATHMOD 03), 2003, Vienna, Austria
2002 April 16	*A SIMD Vectorizing Compiler for Digital Signal Processing Algorithms* International Parallel and Distributed Processing Symposium 2002 (IPDPS 02), Ft. Lauderdale, USA
2001 May 17	*Performance Tools of the AURORA Project* Ptools 2001 Annual Meeting, San Diego, USA
2001 May 10	*Architecture Independent Short Vector FFTs* IEEE International Conference on Acoustics, Speech, and Signal Processing 2001 (ICASSP 01), Salt Lake City, USA

TEACHING

ECE Courses

2018 Fall	18-847: Special Topics in Computer Systems: Computing for Engineers
2018 Spring	18-213 / 15-213 / 15-513: Introduction to Computer Systems (co-instructor with Seth Goldstein and Brian Railing)
2017 Fall	18-847: Special Topics in Computer Systems: Computing for Engineers
2017 Spring	18-213 / 15-213 / 15-513: Introduction to Computer Systems (co-instructor with Seth Goldstein)
2016 Fall	18-202: Mathematical Foundations of Electrical Engineering (co-instructor with Tom Sullivan)
2016 Spring	18-213 / 15-213 / 15-513: Introduction to Computer Systems (co-instructor with Seth Goldstein)
2015 Spring	18-213 / 15-213: Introduction to Computer Systems (co-instructor with Seth Goldstein)
	18-847E: Special Topics in Computer Systems: Spiral: Formal Approaches to Hardware & Software Design & Algorithm Verification (co-instructor with J. M. F. Moura)
2014 Fall	18-202: Mathematical Foundations of Electrical Engineering (co-instructor, with J. M. F. Moura)

Guest Lectures

2016	Short Course: "Demystifying the Black Art of Autotuning and Formal Software Synthesis"
2008	Guest instructor for three lectures of *How to Write Fast Code (18-645)* by M. Püschel
2008	Guest Lecture: Generating Efficient Programs for Emerging Parallel Platforms *Trends in ECE (18-200)* by M. Savvides, Carnegie Mellon University
2005	Guest instructor for two lectures of *Algorithms and Computation in Signal Processing (18-799B)* by M. Püschel
2005	Guest instructor at Drexel University for two lectures of *Program Generation and Optimization (CS 680)* by J. R. Johnson

Advisor of ECE PostDocs

2017	D. Spampinato
2017-2018	R. Veras
2014-2015	Q. Guo
2013-2015	T.-M. Low (ECE Systems Scientist 1/1/2015; currently ECE Assistant Research Professor)

Advisor of ECE PhD students

2016-	P. Brouwer
2015-	A. Kulkarni (together with J. Kovačević)
2014-	J. Zhang
	G. Xu (together with J. Hoe)

2013-	F. Sadi (together with L. Pileggi)
2012-	T. Popovici
	V. Zaliva
2011-2017	R. Veras
2010-2011	D. McFarlin (together with M. Püschel, switched advisor in 2011)
2010-2015	B. Akin (together with J. C. Hoe)
2010-2013	Q. Zhu (together with L. Pileggi, graduated 12/2013)
2009-2013	T. Cui (graduated 11/2013)
2009-2011	W. Yu (together with J. C. Hoe, graduated 7/2011)
2009-2012	C. Angelopoulos (together with M. Püschel, graduated as M.S. in 2012)

Mentor of ECE MS students

2015-	S. Chen
	S. Mukhopadhyay

Committee member of ECE PhD students

2015-	J. Deri (Advisor: Moura)
2014-	E. Sumbul (Advisor: Pileggi)
2013-	R. Yang (Advsor: Hug)
2012-	L. Zheng (Advisor: Mengshoel)
	S. Cvijic (Advisor: Ilic)
2009-	P. Milder (Advisor: Hoe)
	F. de Mesmay (Advisor: Püschel)
	M. Telgarsky (Advisor: Moura)
2008-	S. Chellappa (Advisor: Püschel)

External Committee member of PhD students

2014	T. Grosser (Advisor: A. Cohen), INRIA, France

External Committee member of MS students

2013	LC Meng, Drexel University
2009-	M. Andrews, Drexel University

Research with PostDocs and graduate students of ECE faculty

2005-2008	*as Systems Scientist* (new students since 2005)
	P. Milder, Q. Yu (PostDoc) (Advisor: Hoe),
	K. Anderson, P. D'Alberto (PostDoc), M. Telgarsky (Advisor: Moura),
	S. Chellappa, F. Mesmay, D. McFarlin, Y. Voronenko (Advisor: Püschel)
2004-2005	*as post-doctoral researcher*
	A. Gacic (Advisor: Moura, Püschel)
	A. Samborskiy, O. Dobzinski, E. Rankin (Advisor: Püschel)

Research with ECE master students

2014	K. Kashyap: *Impact of x86 Microarchitecture generations on performance*
2011	X. Li: *SAT on the Intel SCC*
	P. Patki: *Implementation of Magic Memory for Sparse Matrices*

Research with IAESTE interns and PES visiting students

2018	L. Pfaffenwimmer (IAESTE intern)
2017	V. Ruzicka (IAESTE intern)
2016	D. Herold (IAESTE intern)
	R. Bergström (IAESTE intern
	S. Deviah (PES visiting student)

2015 M. Hrzica: (IAESTE intern)
B. Kashyn (PES visiting student)
2014 H. V. Koops: *Audio-based self-consistency for cars and robots* (IAESTE intern)
2013 C. van den Hauwe: *Symbolic execution of Spiral-generated code* (IAESTE intern)
L. Grimley (visiting student)
2012 B. Vandermissen: *Symbolic execution of Spiral-generated code* (IAESTE intern)
2011 T. Graf: *Sparse Matrix-Matrix Multiplication* (IAESTE intern)
2010 R. Veras: *The fastest DGEMM possible in Spiral* (visiting student)
M. M. Goncalves: *Graph algorithms in sparse linear algebra formulation* (IAESTE intern)
2009 P. Nabais: *Program Generation for Boolean Satisfiability* (IAESTE intern)
2008 D. Pickem: *SPIRAL for the G80 GPU* (IAESTE intern 2008; visiting M.S. student 2009)
D. Pickem: *SPIRAL and Embedded Processors* (IAESTE intern, co-advised with M. Püschel)
S. Cvijic: *Code Generation for Sparse Linear Matrix-Vector Multiplication* (IAESTE intern, co-advised with M. Püschel)
2007 L. Dzinevski: *SPIRAL and JPEG2000* (IAESTE intern, co-advised with M. Püschel)
T. Wlodarczyk: *SPIRAL and SAR imaging* (IAESTE intern, co-advised with M. Püschel)
2006 H. Shen: *SPIRAL for GPUs* (IAESTE intern, co-advised with J. Moura and M. Püschel)
T. Peter: *SPIRAL for the Cell BE's SPU* (IAESTE intern, co-advised with J. Moura and M. Püschel)

Research with undergraduate students

2016 M. Cano: *Experimental Evaluation of Intel Vector Extensions*
K. Garg: *Data Collection on UAV for Sound-based State Estimation*
S. Jin: *Memory Bandwidth and Vectorization on x86 Multicores*
B. Kim: *UAV Onboard Data Processing for State Estimation*
S. Lee: *Interpolation-based Twiddle Factors in High Level Synthesis*
J. Li: *UAV Sound Analysis for State Estimation*
T. Li: *Graph Algorithms in Functional Languages*
R. Pillai: *Accurate Physics Modeling of Cars for Security*
F. Seidel: *Performance Optimization for ARM Processors*
J. Xiao: *Accelerating FFT-based Continuum Mechanics*
C. Yang: *Interpolation-based Twiddle Factors for FPGA-based FFT Implementations*

2015 A. Cortes: *High Accuracy Power Measurement on Computer Systems*
R. Fernau: *Projective Geometry on 1980-era Atari Gaming Console* (co-advised with S. Blanton)
M. Lee: *High Accuracy Power Measurement on Computer Systems*
D. Hu: *High Accuracy Power Measurement on Computer Systems*
S. Speer: *High Accuracy Power Measurement on Computer Systems*
S. Spock: *SPIRAL Project: Software/Hardware Generation for DSP Algorithms*

2013 K. Y. Lee: *Accelerating power flow solvers with GPUs*
V. Viswanathan: *Verification through rewriting*
2012 T. Deng: *Verification of Spiral backend code generation*

2011 *Summer research and international students*
H. Zhang: *Optimization of Correlation on GPUs*
C. Thoma: *A Zero Knowledge Building Thermostat* (SRC Research Intern)

2010 *Advising honors project*
E. L. Turner: *Performance/accuracy trade-off in synthetic aperture radar*
A. X. Zhu: *Logic-in-memory for sparse matrix matrix multiplication*
R. Chandra: *How to write fast code in OpenCL*
K. Lim: *Logic-in-memory: 2D and 3D CAT scans*

2009 *Advising ECE undergraduate research*
J. Ni: *High-performance computing in aeronautics*

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*

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

2006 *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*

Teaching at 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

Memberships

Senior Member, Institute of Electrical and Electronics Engineers (IEEE)
President and Western Pennsylvania Chapter Chair, ASciNA (Austrian Scientists and Scholars in North America)
Visiting Scientist, RIKEN, Japan, 2013-Present
Los Alamos Institute for Reliable High Performance Information Technology (IRHPIT), 2009-Present
Participating Guest, Lawrence Livermore National Laboratory, 2003-2007
Co-Director, Electric Energy Systems Group, Electrical and Computer Engineering, Carnegie Mellon, 2015-Present
Scott Institute, Carnegie Mellon University
Center for Sensed Critical Infrastructure Research (CenSCIR), ICES, Carnegie Mellon University
Carnegie Mellon SRC Smart Grid Research Center (SGRC)
Computer Architecture Lab at Carnegie Mellon (CALCM), Carnegie Mellon University
Center for Circuits and System Solutions (C2S2), Carnegie Mellon University
CyLAB, Carnegie Mellon University
Member, Society for Industrial and Applied Mathematics (SIAM)
Member, Association for Computing Machinery (ACM)

Committees

Program Committee Member, International Conference on Compiler Construction (CC) 2018
Publicity Chair, International Symposium on Code Generation and Optimization (CGO) 2018
Program Committee Topic Co-Chair ("Support Tools & Environments"), Euro-Par 2018
Program Committee Member, International Workshop on Numerical Software Verification (NSV) 2018
Program Committee Member, Workshop on Programming Models for SIMD/Vector Processing (WPMVP) 2018
Program Committee Member, 4th ACM SIGPLAN International Workshop on Libraries, Languages and Compilers for Array Programming (ARRAY) 2017
Technical Program Committee Member, IEEE HPEC, 2017
Program Committee Member, 26th International Conference on Parallel Architectures and Compilation Techniques (PACT) 2017
Program Committee Member, 38th ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI) 2017
Program Committee Member, 2nd International Workshop on Post Moore's Era Supercomputing (PMES) 2017
Technical Program Committee, Seventh International Workshop on Domain-Specific Languages and High-Level Frameworks for High Performance Computing (WOLFHPC) 2017
Member, Carnegie Mellon University ECE Department Undergraduate Advising Committee (UAC) 2016
Program Committee Member, Auto-Tuning for Multicore and GPU (ATMG) 2016
Organizing Committee, BLIS (BLAS-like Library Instantiation Software) Retreat 2016
CFP Co-Chair and Technical Program Committee Member, High Performance Extreme Computing Conference (HPEC) 2016
Workshop Organizing Committee Member, Post-Moore's Era Supercomputing (PMES) Workshop 2016
Technical Program Committee, Sixth International Workshop on Domain-Specific Languages and High-Level Frameworks for High Performance Computing (WOLFHPC) 2016
Program Committee Member, Workshop on Programming Models for SIMD/Vector Processing (WPMVP) 2016
Global Topic Chair, Euro-Par 2015
CFP Co-Chair and Technical Program Committee Member, IEEE HPEC, 2015
Program Committee Member, 20th International Workshop on High-Level Parallel Programming Models and Supportive Environments (HIPS) 2015
Program Committee Member, Auto-Tuning for Multicore and GPU (ATMG) 2015
Program Committee Member, Workshop on Exascale Multi/Many Core Computing Systems (E-MuCoCos) 2015
Technical Program Committee, Fifth International Workshop on Domain-Specific Languages and High-Level Frameworks for High Performance Computing (WOLFHPC) 2015
Program Committee Member, Workshop on Programming Models for SIMD/Vector Processing (WPMVP) 2015
Organizing Committee, BLIS (BLAS-like Library Instantiation Software) Retreat 2014
Program Committee, 26th International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD) 2014
Technical Program Committee, Fourth International Workshop on Domain-Specific Languages and High-Level Frameworks for High Performance Computing (WOLFHPC) 2014
Technical Committee, 18th IEEE High Performance Extreme Computing Conference (HPEC) 2014
Technical Program Committee, 20th IEEE Int. Conference on Parallel and Distributed Systems (ICPADS-2014)
Program Committee, 7th Int. Workshop on Multi-/Manycore Computing Systems (MuCoCoS), 2014
Chair, Program Committee, 9th International Workshop on Automatic Performance Tuning (iWAPT), 2014
Program committee, IFIP International Conference on Network and Parallel Computing (NPC 2014)
External Program Committee, Parallel Architectures and Compilation Techniques (PACT) 2014
External Review Committee, Programing Design Language and Implementation (PDLI), 2014
Technical Committee, IEEE International Parallel and Distributed Processing Symposium (IPDPS), 2014
Program Committee, Special Session: Auto-Tuning for Multicore and GPU (ATMG), 2014
Program Committee, 19th International Workshop on High-Level Parallel Programming Models and Supportive Environments (HIPS) 2014
Program Committee, ACM International Conference on Supercomputing (ICS), 2014

Program Committee, Workshop on Programming Models for Vector Processing (WPMVP), 2014
Vice Chair, Program Committee, Auto-Tuning for Multicore and GPU (ATMG), 2013
Vice Chair, Program Committee, 8th International Workshop on Automatic Performance Tuning (iWAPT), 2013
Program Committee, International Conference on Parallel Computing (ParCo), 2013
Program Committee, 6th Int. Workshop on Multi-/Manycore Computing Systems (MuCoCoS), 2013
Program Committee, 10th International Conference on Parallel Processing and Applied Mathematics (PPAM), 2013
Program Committee, 27th International Parallel and Distributed Processing Symposium (IPDPS), 2013
Program Committee, 24th International Symposium on Computer Architecture & High Performance Computing (SBAC-PAD), 2012
Program Committee, The Seventh International Workshop on Automatic Performance Tuning (iWAPT), 2012
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
CIT Global Campus Integration Committee, Carnegie Mellon University, since 2014
Chair, ECE Future Computation and Communication Task Force, Carnegie Mellon University, since 2014
Thrust Leader, Thrust 4 (Security), Carnegie Mellon SRC Smart Grid Research Center (SGRC), 2011-2013
Graduate Admissions Committee (GAC), ECE Department, Carnegie Mellon University, 2011-2013
Graduate Studies Committee (GSC), ECE Department, Carnegie Mellon University, 2007-2011, 2013-2014
Faculty Senator, ECE Department, Carnegie Mellon University, 2011-2013
Study member, DARPA ISAT study on Program Synthesis, 2011
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

Reviewer, US Department of Energy's (DOE's) Exascale Computing Project (ECP), 2016
Reviewer, Transactions on Computer Systems, 2014-15
Board of Distinguished Reviewers, ACM Transactions on Architecture and Code Optimization (TACO) 2014-15
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 Internat'l 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
The Seventh International Workshop on Automatic Performance Tuning (iWAPT), 2012

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