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APPOINTMENTS

2021- **Associate Dean for Research**
College of Engineering
Carnegie Mellon University, USA

2021- **Director, Engineering Research Accelerator**
College of Engineering
Carnegie Mellon University, USA

2021- **Kavčić-Moura Professor of ECE**
Department of Electrical and Computer Engineering
Carnegie Mellon University, USA

2017-2021 **Professor of ECE**
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 Schrödinger 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 AND VISITING POSITIONS

2019-2024 **R-CCS Senior Visiting Scientist**, Riken, Japan

2019-2024 **Adjunct Professor of Biomedical Informatics**, Dept. of Biomedical Informatics, School of Medicine, University of Pittsburgh, Pittsburgh, USA

2019- **Honorary Consul of the Republic of Austria,** Western Pennsylvania, USA

2015-2021 **Faculty Director of Information Technology Services**
Department of Electrical and Computer Engineering, Carnegie Mellon, Pittsburgh, USA

2014-2019 **President,** Austrian Scientists and Scholars in North America (ASciNA)

2013-2019 **Visiting Scientist,** Riken, Japan

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

2024 Outstanding Short Student Paper Award, High Performance Extreme Computing (HPEC)
together with S. Rao (lead student), A. Prakash

2023 Outstanding Short Paper Award, High Performance Extreme Computing (HPEC)
together with P. Brinich, N. Zhang, A. Ebel, and J. Johnson

2021 Outstanding Student Paper Award, High Performance Extreme Computing (HPEC)
S. Mionis (lead student), J. Larkin (CMU SEI)

2020 Best Poster Award, Supercomputing (SC) 2020
together with S. Mionis (lead student), J. Larkin (CMU SEI)

2020 Outstanding Student Paper Award, High Performance Embedded Computing (HPEC) 2020 together with S. Rao (lead student), A. Kutuluru, P. Brower, S. McMillan (CMU SEI)

2018 Best Paper Finalist, High Performance Extreme Computing (HPEC) 2018
together with V. Ruzicka

2018	Student Innovation Award, High Performance Extreme Computing (HPEC) 2018 together with F. Sadi (lead student), J. Sweeney, S. McMillan, T. M. Low, J. C. Hoe, L. Pileggi
2018	MIT GraphChallenge Finalist, High Performance Extreme Computing (HPEC) 2018 together with J. Zhang, D. G. Spampinato, S. McMillan
2018	MIT GraphChallenge Finalist, High Performance Extreme Computing (HPEC) 2018 together with T. M. Low, D. G. Spampinato, A. Kutuluru, U. Sridhar, D. T. Popovici, S. McMillan
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*)

FUNDING

2025-2028 *MAGNET: MAthematics, ComputinG, and NETworking for Resource-Efficient Computational Science*
F. Franchetti (CMU PI)
(DoE Fairbanks/ORNL Base)

2025-2026 *Regional Partnership for Tungsten Carbide Process Development Through Metal 3D Printing*
F. Franchetti and S. DeVincent Wolf (CMU PIs)
(PITA)

2025-2026 *CMOS+X: Gain Cell on 40 nm Platform for Device, Compiler, and Application*
F. Franchetti (CMU PI)
(PRISM TTA)

2024-2027 *DURBAN: Enhancing Performance Portability In HPC Software with Artificial Intelligence*
F. Franchetti (CMU PI)
(DoE)

2024-2026 *COSMIC: Co-designing Scalable ML-aided in-array Computations*
T.-M. Low (CMU PI), F. Franchetti (CMU Co-PI)
(DARPA)

2024-2026 *iCMOSS Project: AI/ML enabled CMOSS/SOSA nodes for Multi-Mission, Multi-platform Mission*
A. Rowe (CMU PI), F. Franchetti (CMU Co-PI)
(Pacific Defense)

2024-2025 *EAGER: LLM Cerberus: Guarding LLMs against Hallucinating When Generating Mathematical Software*
F. Franchetti (CMU PI)
(NSF)

2023-2027 *Code Synthesis for the PRISM Architecture*
Center for PRocessing with Intelligent Storage and Memory (PRISM) – SRC JUMP 2.0
F. Franchetti (CMU PI)
(UCSD/SRC)

2022-2027 *Simulation of the Response of Structural Metals in Molten Salt Environment*
with Los Alamos National Laboratory (LANL, lead)
F. Franchetti (CMU PI), T. M. Low (CMU Co-PI)

2021-2024 *Bluestone: Program Translation and Synthesis for Extremely Heterogeneous Architectures*
F. Franchetti (PI), T. M. Low
DoE

2021-2024 *Crossroads (XRD)*
J. C. Hoe *(Carnegie Mellon University, Lead PI), F. Franchetti (CMU, PI), V. Sekar (CMU, PI), J. Sherry (CMU, PI), V. Betz (U of Toronto, PI), D. Chiou (UT Austin, PI), D. Z. Pan (UT Austin, PI)*
INTEL/VMWare

2021-2023 *NTTX for PALISADE*
F. Franchetti (PI), T. M. Low (co-PI), M. Franusich (co-PI)
DARPA DPRIVE/Duality Technologies/Trebuchet

2020-2025 *Unlocking Interactive AI Development for Rapidly Evolving Research*
P. A. Buitrago (PI), S. Sanielevici (co-PI), F. Franchetti (co-PI)
NSF

2019 *SnowWhite: High-Level Reasoning in Compilers*
F. Franchetti (PI), M. Franusich, J. C. Hoe, T. M. Low, D. Spampinato
DARPA PAPPA

2018-2023 *FFTX: A Co-Design Project for Fast Fourier Transforms (FFTs)*
F. Franchetti (PI), T. M. Low

2018-2021 *Spiral/AIML: Co-optimization for High-Performance, Data-Intensive Computing in Resource-Constrained Environments (SEI-LSI)*
S. McMillan (PI), F. Franchetti, T. M. Low, J. C. Hoe

2018 *Energy Efficient High Performance through Application-Specific Processor/Program Co-Synthesis (EXTENSION)*
F. Franchetti (PI), J. M. F. Moura, J. C. Hoe, L. Pileggi
DARPA PERFECT

2018 *Building a COTS Benchmark Baseline for Graph Analytics (SEI-LENS)*
S. McMillan (PI), F. Fanchetti
Carnegie Mellon Software Engineering Institute (SEI)

2017-2018 *Automated Code Generation for Future-Compatible, High-Performance Graph Libraries (SEI-LINE)*
S. McMillan (PI) and F. Franchetti
Carnegie Mellon Software Engineering Institute (SEI)

2017 *Enhancement of MASSIF (Micromechanical Analysis of Stress-Strain Inhomogeneities with Fourier transforms) for Multiscale Simulations of Alloy Microstructure*
A. D. Rollett (PI), F. Franchetti
ENGILITY Corporation

2016 *Smart Grid in a Room Simulator (SGRS)*
M. Ilic (PI), and F. Franchetti
NIST

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. Sadi, L. Pileggi, F. Franchetti, "High Performance Merge Sort with Scalable Parallelization and Full-Throughput Reduction," United States Patent No. 11,249,720, February 15, 2016.

2. High Performance and Scalable Multi-way Merge Sort using Advanced Comparison and Radix Pre-Sort, provisional patent No. 2019-084, filed on 20-Nov-2018. Pending.

3. 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.

4. 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. J. Kepner, P. Aaltonen, D. Bader, A. Buluc, F. Franchetti, J. Gilbert, S. Hutchison, M. Kumar, A. Lumsdaine, H. Meyerhenke, S. McMillan, J. Moreira, J. D. Owens, C. Yang, M. Zalewski, T. G. Mattson. "Introduction to GraphBLAS." In *Massive Graph Analytics* (pp. 507-524), Taylor & Francis, 2022.

2. Q. Zhu, L. Pileggi, F. Franchetti. "A Smart Memory Accelerated Computed Tomography Parallel Backprojection." In *From Algorithms to Circuits and System-on Chip Design* (VLSI-SoC 2012). A. Burg, A. Coskun, M. Guthaus, S. Katkoori, R. Reis (Editors). *IFIP Advances in Information and Communication Technology,* Vol. 418 (pp. 21-44), Springer, Berlin, Heidelberg, 2013.

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

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

Journal Papers

1. J. Rivera, F. Franchetti, M. Püschel. "Floating Point TVPI Abstract Domain." *Proceedings of the ACM on Programming Languages – PACMPL.* 8PLDI, 2024.

2. D. T. Popovici, M. D. Schatz, F. Franchetti, T. M. Low. "A Flexible Framework for Multi-Dimensional DFTs," SIAM *Journal on Scientific Computing (SISC),* Software and High-Performance Computing, 2020.

3. F. Franchetti, T. M. Low, T. Popovici, R. M. Veras, D. G. Spampinato, J. R. Johnson, M. Püschel, J. C. Hoe, J. M. F. Moura. "Spiral: Extreme Performance Portability." *Proceedings of the IEEE,* Vol. 106, No. 11, 2018. Special Issue on *From High Level Specification to High Performance Code*.

4. F. Franchetti, J. M. F. Moura, D. A. Padua, J. Dongarra. "Scanning the Issue: From High-Level Specification to High-Performance Code." *Proceedings of the IEEE,* Vol. 106, No. 11, 2018. Special Issue on *From High Level Specification to High Performance Code*.

5. 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.

6. 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.

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

8. 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.

9. 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.

10. 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.

11. 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.*

12. 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.

13. 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.

14. 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)*, Vol. 20, No. 11, pp. 1509-1519, Nov. 2010.

15. 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.

16. 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.

17. 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.

18. 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.

19. 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. M. A. H. Monil, S. Rao, H. Mankad, K. Teranishi, F. Franchetti, J. S. Vetter. “IRISX: Performance Portable Scientific Computing via Code Generation and Runtime Co-Design.” Supercomputing 2026. *To appear on ScalAH26: 17th Workshop on Latest Advances in Scalable Algorithms for Large-Scale Heterogeneous Systems at SC 26.*

2. Y. Lan, L. Tang, N. Zhang, F. Franchetti. “Double-Precision Floating-Point on AWS Trainium Using Integer Units: A First Look.” IEEE High Performance Extreme Computing Conference (HPEC), 2026. *Paper with poster.*

3. S. Rao, A. Prakash, N. Zhang, H. Mankad, F. Franchetti. “LibraryX: A Framework for Cross-Library-Call Optimization.” IEEE International Parallel and Distributed Processing Symposium (IPDPS), 2026.

4. Q. Oschatz, N. Zhang, M. Franusich, F. Franchetti. “Towards Automated Reasoning Chains for Verification of LLM-Generated Scientific Code.” In IEEE High Performance Extreme Computing Conference (HPEC), 2025.

5. S. Rao, L. Tang, F. Franchetti. “LibraryX-ASIC: A First Look.” International Parallel and Distributed Processing Symposium (IPDPS), Workshop on High-Level Parallel Programming Models and Supportive Environments (HIPS), 2025.

6. E. Tang, T. Zhang, W. Bradford, F. A. Siddique, J. C. Hoe, K. Skadron, F. Franchetti. “Hardware-Software Co-Design of Iterative Filter-Update Numerical Methods Using Processing-In-Memory.” Proceedings of the Supercomputing Workshops of The International Conference on High Performance Computing, Network, Storage, and Analysis (SC), 2025.

7. L. Tang, V. Kumar, M. Ngaw, S. Singh, D. Nadkarni, L. Tummala, K. Mai, F. Franchetti, "Towards an Algorithm-based Approach for Soft Error Tolerance using Interval Arithmetic," IEEE High Performance Extreme Computing Conference (HPEC), 2025. *Best Paper Award.*

8. Y. Lan, L. Tang, N. Zhang, Y. Eum, J. Hoe, F. Franchetti. “A RISC-V Vector Extension for Multi-word Arithmetic.” Proceedings of the Supercomputing Workshops of The International Conference on High Performance Computing, Network, Storage, and Analysis (SC), 2025

9. N. Zhang, F. Franchetti. “Code Generation for Crytographic Kernels Using Multi-Word Modular Arithmetic on GPU.” The International Symposium on Code Generation and Optimization (CGO), 2025.

10. N. Zhang, S. Fu, F. Franchett. “Towards Closing the Performance Gap for Cryptographic Kernels Between CPUs and Specialized Hardware.” IEEE/ACM International Symposium on Microarchitecture (MICRO), 2025

11. T. Zhang, F. Franchetti. “Towards an End-to-End Processing-in-DRAM Acceleration of Spectral Library Search.” TECHCON 2025. Presentation with poster.

12. K. Teranishi, H. Menon, W. F. Godoy, P. Balaprakash, D. Bau, T. Ben-Nun, A. Bathele, F. Franchetti, M. Franusich, T. Gamblin, G. Georgakoudis, T. Goldstein, A. Guha, S. Hahn, C. Iancu, Z. Jin, T. Jones, T. M. Low, H. Mankad, N. R. Miniskar, M. A. H. Monil, D. Nichols, K. Parasyris, S. Pophale, P. Valero-Lara, J. S. Vetter, S. Williams, A. Young. "Leveraging AI for Productive and Trustworthy HPC Software: Challenges and Research Directions." 1st International Workshop on Foundational Large Language Models Advances for HPC (LLM4HPC) held in conjunction with ISC High Performance 2025. arXiv 2505.08135.

13. H. Mankad, M. A. H. Monil, S. Rao, P. Colella, B. Van Straalen, F. Franchetti, J. S. Vetter. "A Performance-Portable MultiGPU Implementation of 3D Euler Equations using ProtoX and IRIS." Proceedings of the Supercomputing Workshops of The International Conference on High Performance Computing, Network, Storage, and Analysis (SC), 2024.

14. L. Tang, S. Chen, K. Harisrikanth, G. Xu, F. Franchetti, K. Mai. "A 1.19GHz 9.52Gsamples/sec Radix-8 FFT Hardware Accelerator in 28nm." Hot Chips Symposium (HCS), 2024.

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2. N. Zhang, F. Franchetti. “Semantics Lifting for Scientific Kernels.” The ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI), 2026, Poster with extended abstract. *3rd Place in ACM Student Research Competition*

3. S. Rao, M. A. H. Monil, H. Mankad, N. R. Miniskar, K. Teranishi, J. Vetter, F. Franchetti. “IRISX: A Dynamic Trade-off System for Harnessing Heterogeneity for Performance Portability.” IEEE International Parallel and Distributed Processing Symposium (IPDPS), 2025. Poster with extended abstract.

4. Z. Barbeau, H. Mankad, S. Reeve, P. Colella, F. Franchetti, J. Vetter, K. Teranishi. “A Case Study of Combining Motif-Based Performance-Portable Libraries for Particle- Particle Particle-Mesh Method.” ORNL Software and Data Expo (OSDX), 2025, Poster.

5. N. Zhang, S. Rao, M. Franusich, F. Franchetti. “Towards Semantics Lifting for Scientific Computing: A Case Study on FFT.” Theory and Practice of Static Analysis Workshop (TPSA), in conjunction with the ACM SIGPLAN Symposium on Principles of Programming Languages (POPL), 2025, Extended abstract with presentation.

6. S. Rao, A. Prakash, F. Franchetti. “Towards LibraryX: A Framework for Cross-Library Call Optimization.” IEEE High Performance Extreme Computing Conference (HPEC), 2024, Extended abstract. *Outstanding Short Student Paper Award*

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9. S. Fu, N. Zhang, F. Franchetti. “Accelerating High-Precision Number Theoretic Transforms using Intel AVX-512.” International Conference on Parallel Architectures and Compilation Techniques (PACT), 2024, Poster with extended abstract. *1st Place in ACM Student Research Competition; Best Poster Runner-up at PRISM Annual Review, Systems & Software track*.

10. Y. Eum, N. Zhang, L. Tang, F. Franchetti. “Towards a RISC-V Instruction Set Extension for Multi-word Arithmetic.” IEEE High Performance Extreme Computing Conference (HPEC), 2024, Poster with extended abstract.

11. D. B. Cousins, Y. Polyakov, A. A. Badawi, M. French, A. Schmidt, A. Jacob, B. Reynwar, K. Canida, A. Jaiswal, C. Mathew, A. Ebel, N. Neda, B. Reagen, N. Zhang, F. Franchetti, P. Brinich, J. Johnson, M. Franusich, B. Zhang, Z. Chang, M. Pedram. "TREBUCHET Fully Homomorphic Encryption Accelerator: Phase Two Performance Estimation Results." GOMACTech, 2024.

12. T. Zhang, E. Tang, F. Siddique, K. Skadron, F. Franchetti. “Towards an End-to-End Processing-in-DRAM Acceleration of Spectral Library Search.” IEEE High Performance Extreme Computing Conference (HPEC), 2024, Extended abstract with poster presentation.

13. H. Mankad, A. Rovinelli, M. Zecevic, P. McCorquodale, F. Franchetti, N. Zhang, S. Rao, R. A. Lebensohn, L. Capolungo. “EVPFFTX: A First Look at FFTX Applications in Material Science.” IEEE High Performance Extreme Computing Conference (HPEC), 2023, Poster with extended abstract.

14. P. Brinich, N. Zhang, A. Ebel, F. Franchetti, J. Johnson. “Twiddle Factor Generation for a Vectorized Number Theoretic Transform.” IEEE High Performance Extreme Computing Conference (HPEC), 2023, Extended abstract. *Outstanding Short Paper Award*

15. N. Zhang, F. Franchetti. “Generating Number Theoretic Transforms for Multi-Word Integer Data Types.” IEEE/ACM International Symposium on Code Generation and Optimization (CGO), 2023, Poster. *2nd Place in ACM Student Research Competition.*

16. D. Soni, N. Neda, N. Zhang, B. Reynwar, H. Gamil, B. Heyman, M. N. T. Moopan, A. Al Badawi, Y. Polyakov, K. Canida, M. Pedram, M. Maniatakos, D. B. Cousins, F. Franchetti, M. French, A. Schmidt, B. Reagen. “RPU: The Ring Processing Unit.” Cryptology ePrint Archive 2023.

17. D. B. Cousins, Y. Polyakov, A. Al Badawi, M. French, A. Schmidt, A. Jacob, B. Reynwar, K. Canida, A. Jaiswal, C. Mathew, H. Gamil, N. Neda, D. Soni, M. Maniatakos, B. Reagen, N. Zhang, F. Franchetti, P. Brinich, J. Johnson, P. Broderick, M. Franusich B. Zhang, Z. Cheng, M. Pedram. “TREBUCHET: Fully Homomorphic Encryption Accelerator for Deep Computation.” arXiv, 2023, Preprint.

18. Z. Gong, N. Zhu, M. Ngaw, J. Rivera, L. Tang, E. Tang, H. Mankad, F. Franchetti. “Interval Arithmetic-based FFT for Large Integer Multiplication.” IEEE High Performance Extreme Computing Conference (HPEC), 2022, Poster with extended abstract.

19. H. Mankad, S. Rao, P. Colella, B. Van Straalen, F. Franchetti. “ProtoX: A First Look.” IEEE High Performance Extreme Computing Conference (HPEC), 2022, Poster with extended abstract.

20. J. Nguyen, M. Cai, Z. Zuo, L. Tang, K. Mai, F. Franchetti. “LIMA: Hardware for FFT based Large Integer Multiplication.” IEEE High Performance Extreme Computing Conference (HPEC), 2022, Extended abstract.

21. J. Nguyen, S. Rao, J. Moreira, F. Franchetti. “Automatic Generation of Matrix-Vector Code Using SPIRAL for the Power10 ISA.” IEEE High Performance Extreme Computing Conference (HPEC), 2022, Extended abstract.

22. P. Oostema, F. Franchetti. “Approximating Manifolds and Geodesics with Curved Surfaces.” IEEE High Performance Extreme Computing Conference (HPEC), 2022, Extended abstract.

23. P. Oostema, F. Franchetti. “On Manifold Graph Embedding.” IEEE High Performance Extreme Computing Conference (HPEC), 2022, Poster.

24. E. Tang, F. Franchetti. “Magic Memory: A Programming Model For Big Data Analytics.” IEEE High Performance Extreme Computing Conference (HPEC), 2022, Poster with extended abstract.

25. N. Zhang, H. Gamil, P. Brinich, B. Reynwar, A. Al Badawi, N. Neda, D. Soni, K. Canida, Y. Polyakov, P. Broderick, M. Maniatakos, A. G. Schmidt, M. Franusich, J. Johnson, B. Reagen, D. B. Cousins, F. Franchetti. “Towards Full-Stack Acceleration for Fully Homomorphic Encryption.” IEEE High Performance Extreme Computing Conference (HPEC), 2022, Extended abstract.

26. Y. Franchetti, T. D. Nolin, F. Franchetti. “Indirect Measurement of Hepatic Drug Clearance by Fitting Dynamical Models.” arXiv, 2020, Preprint.

27. S. Mionis, F. Franchetti, J. Larkin. “Quantum Circuit Optimization with SPIRAL: A First Look.” Supercomputing (SC) 2020, Poster with extended abstract. *Best Poster Award.*

28. F. Franchetti, D. G. Spampinato, A. Kulkarni, T. M. Low, M. Franusich, D. T. Popovici, A. Canning, P. McCorquodale, B. Van Straalen, P. Colella. “FFT and Solver Libraries for Exascale: FFTX and SpectralPack.” Exascale Computing Project (ECP) Annual Meeting, 2020, Poster.

29. J. Zhang, D. Spampinato, F. Franchetti. “FESIA: A Fast and SIMD-Efficient Set Intersection Approach on Modern CPUs.” North East Database Day (NEDB) 2020, Poster.

30. Y. Franchetti, T. Nolin, F. Franchetti. “Towards Precision Medicine: Simulation Based Parameter Estimation for Drug Metabolism.” SIAM Conference on Computational Science and Engineering (CSE) 2019, Poster.

31. D. T. Popovici, M. D. Schatz, F. Franchetti, T. M. Low. “A Flexible Framework for Parallel Multi-Dimensional DFTs.” ArXiv, 2019, Technical report.

32. A. Kulkarni, D. G. Spampinato, F. Franchetti. “Design and Specification of Large-scale Simulations for GPUs using FFTX.” Supercomputing 2019 (SC’19), Poster.

33. A. Kulkarni, D. G. Spampinato, F. Franchetti. “FFTX for Micromechanical Stress-Strain Analysis.” IEEE High Performance Extreme Computing Conference (HPEC) 2019, Poster with extended abstract.

34. F. Franchetti, D. G. Spampinato, A. Kulkarni, T. M. Low, M. Franusich, D. T. Popovici, A. Canning, P. McCorquodale, B. Van Straalen, P. Colella. “FFT and Solvers for Exascale: FFTX and SpectralPACK.” Exascale Computing Project (ECP) Annual Meeting, 2019, Poster.

35. A. Kulkarni, J. Kovačević. F. Franchetti. “Algorithm Design at Scale: Porting Parallel FFT-based Fortran Simulations to GPUs.” SIAM Conference on Computational Science and Engineering (CSE) 2019. Poster.

36. A. Kulkarni, F. Franchetti, J. Kovačević. “Algorithm Design for Large Scale Parallel FFT-Based Simulations on Heterogeneous Platforms.” IEEE High Performance Extreme Computing Conference (HPEC), 2018, Poster with abstract.

37. A. Kulkarni, F. Franchetti. J. Kovacevic. “Algorithm Design for Large Scale FFT-Based Simulations on CPU-GPU Platforms.” International Conference on Parallel Processing (ICPP), 2018, Poster.

38. F. Sadi, J. Sweeney, S. McMillan, T. M. Low, J. C. Hoe, L. Pileggi, F. Franchetti. “PageRank Acceleration for Large Graphs with Scalable Hardware and Two-Step SpMV.” IEEE High Performance Extreme Computing Conference (HPEC), 2018, Poster.

39. 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.

40. 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.

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

42. 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).

43. 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.

44. 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*.

45. 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*.

46. 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.

47. 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.

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

49. 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.

50. 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.

51. 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.

52. 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).

53. 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*.

54. 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*.

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

56. 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).

57. 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.

58. 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.

59. 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.

60. 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.

61. 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.*

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

63. 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.

64. 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.*

65. 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.

66. 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.

67. 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.

68. 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.

69. 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.

70. 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.

71. 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.

72. 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.

73. 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.

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

75. 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.

76. 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.

77. 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

2026-Nov-26	*How to Compute on Quantum and AI Accelerators* Supercomputing 2026: Nagoya University Booth (Short Talk) Chicago, IL
2026-Jun-12	*SPIRAL: AI for High Performance Code* Cerebras Systems (Invited Talk) Sunnyvale, CA
2026-Jun-11	*SPIRAL: AI for Quantum and High Performance Computing* Electrical and Computer Engineering Dept., North Carolina State University Raleigh, NC
2025-Dec-05	*SPIRAL: AI for High Performance Code* JHPCN Field Workshop: "State-of-the-Art in Code Generative AI for High-Performance Computing," Nagoya University (Invited Talk) Nagoya, Japan
2025-Nov-17	*Updates from SPIRAL World* Supercomputing 2025: Nagoya University Booth (Short Talk) St. Louis, MO
2024-Nov-18	*SPIRAL: LibraryX and Communication Avoiding Convolutions* Supercomputing 2024: Nagoya University Booth (Short Talk) Atlanta, GA
2024-Sep-10	*Energy Efficient Computing:How do we do the Software?!* DOE 2024 Energy-Efficient Computing for Science Workshop Bethesda, MD
2023-Nov-14	*Updates on SPIRAL and LibraryX* Supercomputing 2023: Nagoya University Booth (Short Talk) Denver, CO
2021-Sep-27	*SPIRAL: AI for High Performance Code with a Side of FFTX* Argonne National Lab: APS Computational Seminar Virtual
2021-Aug-17	*SPIRAL: AI for High Performance Code with a Side of FFTX* Alphabet Inc. Virtual

2020 Sep 21	*SPIRAL: AI for High Performance Code with a Side of FFTX* MIT Fast Code Seminar, Massachusetts Institute of Technology Cambridge, MA
2020 Feb 19	*SPIRAL, FFTX, and Automating the Optimization of the Fast Fourier Transform* Invited Opening Keynote at Austrian High-Performance Computing Meeting Institute of Science and Technology Austria (IST Austria) Klosterneuburg, Austria
2020 Feb 14	*FFTX and SpectralPACK* SIAM Conference on Computational Science and Engineering Seattle, WA
2019 Nov 18	*FFTX and SpectralPACK* Supercomputing 2019 Denver, CO
2019 Oct 10	*SPIRAL: AI for High-Performance Code* Oak Ridge National Laboratory Oak Ridge, TN
2019 Oct 4	*HPC: Bridging ECE and DBMI* Department of Biomedical Informatics, University of Pittsburgh Pittsburgh, PA
2019 Sep 5	*FFTX and SpectralPACK* Exascale Computing Project CoPA Santa Fe, NM
2019 Aug 8	*SPIRAL's Operator Language: From Textbook Math to High Performance – With Correctness Guarantees* University of Nagoya, Japan
2019 Jun 17	*FFTX and SpectralPACK: A First Look* University of Vienna, Austria
2019 Jun 18	*SPIRAL's Operator Language: From Textbook Math to High Performance – With Correctness Guarantees* TU Vienna, Austria
2019 Apr 29	*SPIRAL's Operator Language: From Textbook Math to High Performance – With Correctness Guarantees* International Federation for Information Processing (IFIP) Working Group Salem, MA
2019 Mar 1	*FFTX and SpectralPACK: A First Look* SIAM Conference on Computational Science and Engineering Spokane, WA
2018 Nov 13	*SPIRAL, FFTX, and the Path to SpectralPACK* Supercomputing 2018 Dallas, TX
2018 Jul 27	*Formal Software Synthesis of Computational Kernels* Advanced Supercomputing Environment (ASE) Seminar University of Tokyo, Tokyo, Japan
2018 Mar 8	*SPIRAL FFT Library Generation and Autotuning* SIAM Conference on Parallel Processing for Scientific Computing Waseda University, Tokyo, Japan

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* Keynote 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
2007 July 9	*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

TEACHING

2026 Fall	18-647: Computational Problem Solving for Engineers
2025 Spring	18-647: Computational Problem Solving for Engineers
2024 Spring	18-647: Computational Problem Solving
2023 Spring	18-647: Computational Problem Solving
2021 Fall	18-202: Mathematical Foundations of Electrical Engineering (co-instructor with Carlee Joe-Wong)
2021 Spring	18-647: Computational Problem Solving
2020 Fall	18-202: Mathematical Foundations of Electrical Engineering (co-instructor with Carlee Joe-Wong)
2020 Spring	18-847-G: Special Topics in Computer Systems: Computational Problem Solving for Engineers
2019 Fall	18-202: Mathematical Foundations of Electrical Engineering (co-instructor with Linda Moya)
2019 Spring	18-613: Foundations of Computer Systems
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)

Advisor of ECE PostDocs

2021-2024	H. Mankad
2018-2019	F. Sadi
2018-2018	T. Popovici
2017-2020	D. Spampinato
2017-2018	R. Veras
2014-2015	Q. Guo
2013-2015	T.-M. Low (ECE Systems Scientist 1/1/2015; currently ECE Associate Research Professor)

Advisor of ECE PhD students

2026-	Y. Lan
2024-	Q. Oschatz
2023-	E. Quinn
2023-	T. Zhang
2021-	P. Buitrago (together with J. Moura)
2021-	N. Zhang
2019-	P. Oostema
2020-2026	E. Tang (together with J. Hoe): *Programming Models for Efficient Data Orchestration in Memory-Centric Systems*
2020-2026	L. Tang (together with K. Mai): *Design Paradigms and Tools for Modern Fourier Transform Hardware*
2019-2025	S. Rao: *LibraryX: A Framework for Cross-Library-Call Optimization*
2015-2020	A. Kulkarni (together with J. Kovačević): *An approach for large-scale three-dimensional FFT-based approximate convolutions on GPUs*
2014-2020	J. Zhang: *Accelerating the Motifs of Machine Learning Applications on Modern Processors*
2014-2023	G. Xu (together with J. Hoe): *An Approach to Generating Customized Load-Store Architectures*
2013-2018	F. Sadi (together with L. Pileggi): *Accelerating Sparse Matrix Kernels with Co-Optimized Architecture*
2012-2018	T. Popovici: *An Approach to Specifying and Automatically Optimizing Fourier Transform Based Operations*
2012-2020	V. Zaliva: *HELIX: From Math to Verified Code*
2011-2017	R. Veras: *The Automatic Generation of High-Performance Graph Analytic Code using SPIRAL*

2010-2011 D. McFarlin (together with M. Püschel, switched advisor in 2011)

2010-2015 B. Akin (together with J. C. Hoe): *A Formal Approach to Memory Access Optimization: Data Layout, Reorganization, and Near-Data Processing*

2010-2013 Q. Zhu (together with L. Pileggi, graduated 12/2013): *Application Specific Logic in Memory*

2009-2013 T. Cui (graduated 11/2013): *Power System Probabilistic and Security Analysis using Commodity High Performance Computing Systems*

2009-2011 W. Yu (together with J. C. Hoe, graduated 7/2011): *Performance Portable Tracking of Evolving Surfaces*

2009-2012 C. Angelopoulos (together with M. Püschel, graduated as M.S. in 2012): *Automatic Program Generation for GPUs*

Mentor of MS students

2026- E. Quinn
2020- S. Mionis (Computer Science Department)
2016-2019 P. Brouwer (ECE Department)

External Committee member of PhD students

2021- P. Brinich, Drexel University
2018-2019 S. Pothukuchi (Co-advised with D. Padua), UIUC, Champaign, Illinois, USA
2017 D. Spampinato (Advisor: M. Püschel), ETH Zurich, Switzerland
2015 LC Meng, Drexel University
2014 T. Grosser (Advisor: A. Cohen), INRIA, France

External Committee member of MS students

2020 P. Brinich, Drexel University
2013 LC Meng, Drexel University
2009 M. Andrews, Drexel University

Research with IAESTE interns and PES visiting students

2019 E. Offori-Addo (IAESTE intern)
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)

PROFESSIONAL ACTIVITIES

Outside Memberships

1. R-CCS Senior Visiting Scientist, Riken, Japan, 2019-Present
2. Senior Member, Institute of Electrical and Electronics Engineers (IEEE)
3. Senior Member, Association for Computing Machinery (ACM)
4. ASciNA President (2014-2019) & Western Pennsylvania Chapter Chair (2010-Present), ASciNA (Austrian Scientists & Scholars in North America)
5. Member, Austrian Computer Society (OCG)
6. Visiting Scientist, RIKEN, Japan, 2013-Present
7. Los Alamos Institute for Reliable High Performance Information Technology (IRHPIT), 2009-Present
8. Participating Guest, Lawrence Livermore National Laboratory, 2003-2007
9. Member, Society for Industrial and Applied Mathematics (SIAM)

Editorial Roles

1. Guest Editor, Proceedings of the IEEE, Special Issue on “From High Level Specification to High Performance Code,” 2018.

Outside Committee Chairs

1. Publicity Chair, International Symposium on Code Generation and Optimization (CGO) 2018
2. Program Committee Topic Co-Chair (“Support Tools & Environments”), Euro-Par 2018
3. CFP Co-Chair and Technical Program Committee Member, High Performance Extreme Computing Conference (HPEC) 2016
4. Global Topic Chair, Euro-Par 2015
5. CFP Co-Chair and Technical Program Committee Member, IEEE HPEC, 2015
6. Chair, Program Committee, 9th International Workshop on Automatic Performance Tuning (iWAPT), 2014
7. Vice Chair, Program Committee, Auto-Tuning for Multicore and GPU (ATMG), 2013
8. Vice Chair, Program Committee, 8th International Workshop on Automatic Performance Tuning (iWAPT), 2013
9. Publicity chair, Fifteenth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2010

10. Finance chair, Parallel Architectures and Compilation Techniques (PACT), 2010
11. Publicity co-chair, 23rd International Conference on Supercomputing (ICS), 2009

Carnegie Mellon Memberships, Committees, and Chairs

1. Chair, CIT Computing Committee, College of Engineering, Carnegie Mellon, 2019-Present
2. Co-Director, Electric Energy Systems Group, Electrical and Computer Engineering, Carnegie Mellon, 2015-2018
3. Scott Institute, Carnegie Mellon University
4. Center for Sensed Critical Infrastructure Research (CenSCIR), ICES, Carnegie Mellon University
5. Carnegie Mellon SRC Smart Grid Research Center (SGRC)
6. Computer Architecture Lab at Carnegie Mellon (CALCM), Carnegie Mellon University
7. Center for Circuits and System Solutions (C2S2), Carnegie Mellon University
8. CyLAB, Carnegie Mellon University
9. CIT Global Campus Integration Committee, Carnegie Mellon University, since 2014
10. Chair, ECE Future Computation and Communication Task Force, Carnegie Mellon University, since 2014
11. Thrust Leader, Thrust 4 (Security), Carnegie Mellon SRC Smart Grid Research Center (SGRC), 2011-2013
12. Graduate Admissions Committee (GAC), ECE Department, Carnegie Mellon University, 2011-2013
13. Graduate Studies Committee (GSC), ECE Department, Carnegie Mellon University, 2007-2011, 2013-2014
14. Faculty Senator, ECE Department, Carnegie Mellon University, 2011-2013

Professional Committees

1. Steering Committee Member, AgenticAI4HPC'26: The First International Workshop on Agentic AI for HPC (Workshop at Supercomputing 2026), 2026
2. Steering Committee Member, Pittsburgh Quantum Institute (PQI), 2026
3. Steering Committee Member, International Conference on High Performance Computing in Asia-Pacific Region (HPCAsia), 2026
4. Special Session Organizer, IEEE High Performance Extreme Computing Conference: SPIRAL Tutorial, 2025 and 2026.
5. Mini-symposium Co-organizer, SIAM Conference on Parallel Processing for Scientific Computing (PP22) 2022
6. Technical Committee (Algorithms Track), IEEE International Parallel and Distributed Processing Symposium (IPDPS), 2021
7. Technical Program Committee (Algorithms Track), International Conference on Parallel Processing (ICPP) 2020
8. Program Committee Member, Workshop on Programming Models for SIMD/Vector Processing (WPMVP) 2020
9. Program Committee Member, International Symposium on High-Level Parallel Programming and Applications (HLPP) 2019
10. Program Committee Member (Algorithms Track), International Conference on Parallel Processing (ICPP) 2019

11. Program Committee Member, Optimization, Modeling, Analysis, and Space Exploration (OMASE) Workshop 2019
12. Program Committee Member, Workshop on Programming Models for SIMD/Vector Processing (WPMVP) 2019
13. Program Committee Member, International Conference on Compiler Construction (CC) 2018
14. Program Committee Member, International Workshop on Numerical Software Verification (NSV) 2018
15. Program Committee Member, Workshop on Programming Models for SIMD/Vector Processing WPMVP) 2018
16. Program Committee Member, 4th ACM SIGPLAN International Workshop on Libraries, Languages and Compilers for Array Programming (ARRAY) 2017
17. Technical Program Committee Member, IEEE HPEC, 2017
18. Program Committee Member, 26th International Conference on Parallel Architectures and Compilation Techniques (PACT) 2017
19. Program Committee Member, 38th ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI) 2017
20. Program Committee Member, 2nd International Workshop on Post Moore's Era Supercomputing (PMES) 2017
21. Technical Program Committee, Seventh International Workshop on Domain-Specific Languages and High-Level Frameworks for High Performance Computing (WOLFHPC) 2017
22. Member, Carnegie Mellon University ECE Department Undergraduate Advising Committee (UAC) 2016
23. Program Committee Member, Auto-Tuning for Multicore and GPU (ATMG) 2016
24. Organizing Committee, BLIS (BLAS-like Library Instantiation Software) Retreat 2016
25. Workshop Organizing Committee Member, Post-Moore's Era Supercomputing (PMES) Workshop 2016
26. Technical Program Committee, Sixth International Workshop on Domain-Specific Languages and High-Level Frameworks for High Performance Computing (WOLFHPC) 2016
27. Program Committee Member, Workshop on Programming Models for SIMD/Vector Processing (WPMVP) 2016
28. Program Committee Member, 20th International Workshop on High-Level Parallel Programming Models and Supportive Environments (HIPS) 2015
29. Program Committee Member, Auto-Tuning for Multicore and GPU (ATMG) 2015
30. Program Committee Member, Workshop on Exascale Multi/Many Core Computing Systems (E-MuCoCos) 2015
31. Technical Program Committee, Fifth International Workshop on Domain-Specific Languages and High-Level Frameworks for High Performance Computing (WOLFHPC) 2015
32. Program Committee Member, Workshop on Programming Models for SIMD/Vector Processing (WPMVP) 2015
33. Organizing Committee, BLIS (BLAS-like Library Instantiation Software) Retreat 2014
34. Program Committee, 26th International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD) 2014
35. Technical Program Committee, Fourth International Workshop on Domain-Specific Languages and High-Level Frameworks for High Performance Computing (WOLFHPC) 2014
36. Technical Committee, 18th IEEE High Performance Extreme Computing Conference (HPEC) 2014

37. Technical Program Committee, 20th IEEE Int. Conference on Parallel and Distributed Systems (ICPADS-2014)
38. Program Committee, 7th Int. Workshop on Multi-/Manycore Computing Systems (MuCoCoS), 2014
39. Program committee, IFIP International Conference on Network and Parallel Computing (NPC 2014)
40. External Program Committee, Parallel Architectures and Compilation Techniques (PACT) 2014
41. External Review Committee, Programing Design Language and Implementation (PDLI), 2014
42. Technical Committee, IEEE International Parallel and Distributed Processing Symposium (IPDPS), 2014
43. Program Committee, Special Session: Auto-Tuning for Multicore and GPU (ATMG), 2014
44. Program Committee, 19th International Workshop on High-Level Parallel Programming Models and Supportive Environments (HIPS) 2014
45. Program Committee, ACM International Conference on Supercomputing (ICS), 2014
46. Program Committee, Workshop on Programming Models for Vector Processing (WPMVP), 2014
47. Program Committee, International Conference on Parallel Computing (ParCo), 2013
48. Program Committee, 6th Int. Workshop on Multi-/Manycore Computing Systems (MuCoCoS), 2013
49. Program Committee, 10th International Conference on Parallel Processing and Applied Mathematics (PPAM), 2013
50. Program Committee, 27th International Parallel and Distributed Processing Symposium (IPDPS), 2013
51. Program Committee, 24th International Symposium on Computer Architecture & High Performance Computing (SBAC-PAD), 2012
52. Program Committee, The Seventh International Workshop on Automatic Performance Tuning (iWAPT), 2012
53. Program Committee, Special Session: Auto-Tuning for Multicore and GPU (ATMG)
54. Program Committee, 2012 IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS), 2012
55. Study member, DARPA ISAT study on Program Synthesis, 2011
56. Program Committee, International Conference on Parallel Computing (ParCo), 2011
57. Program Committee, Workshop on Exploitation of Hardware Accelerators (WEHA), 2011
58. Program Committee, High Performance Embedded Architectures & Compilers (HiPEAC), 2011
59. Program Committee, The Fifth International Workshop on Automatic Performance Tuning (iWAPT), 2010
60. Program Committee, Workshop on Exploitation of Hardware Accelerators (WEHA), 2010
61. Program Committee, Parallel Architectures and Compilation Techniques (PACT), 2010
62. Program Committee, 23rd International Conference on Supercomputing (ICS), 2009
63. Program Committee, SMART'09: 3rd Workshop on Statistical and Machine learning approaches to ARchitectures and compilaTion
64. Program Committee, 13th International Workshop on High-Level Parallel Programming Models and Supportive Environments (HIPS) 2008, Miami, Florida
65. Program Committee, The Seventeenth International Conference on Parallel Architectures and Compilation Techniques (PACT) 2008, Toronto, Canada

Review Activities

1. Reviewer, US Department of Energy's (DOE's) Exascale Computing Project (ECP), 2016
2. Reviewer, Transactions on Computer Systems, 2014-15
3. Board of Distinguished Reviewers, ACM Transactions on Architecture and Code Optimization (TACO) 2014-15
4. NSF Review Panel
5. Ohio Supercomputer Center Grant Review
6. Proceedings of the IEEE, Special Issue on "Program Generation, Optimization, and Platform Adaptation"
7. IEEE Embedded Systems Letters (ESL)
8. IEEE Transactions on CAD of Integrated Circuits and Systems (TCAD)
9. IEEE Signal Processing Letters (SPL)
10. IEEE Transactions on Image Processing (TIP)
11. IEEE Transactions on Signal Processing (TSP)
12. IEEE Micro
13. ACM Transactions on Mathematical Software (TOMS)
14. ACM Transactions on Architecture and Code Optimization (TACO)
15. Springer Journal of "Signal, Image and Video Processing"
16. Special Issue of the Parallel Processing Letters
17. Information Processing Letters (IPL)
18. IEEE Proceedings - Vision, Image and Signal Processing
19. Parallel Computing (PARCO)
20. Scientific Programming Special Issue of "Scientific Programming on Cell B.E. Processor"
21. Journal of Computers & Electrical Engineering (COMPELECENG)
22. Journal of Parallel and Distributed Computing (JPDC)
23. IBM Journal of Research and Development
24. Journal of "Software: Practice and Experience"
25. Journal of Computer Science and Technology (JCST)
26. Transactions on Computers (TC)
27. International Parallel and Distributed Processing Symposium (IPDPS) 2002
28. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2002
29. The Fifteenth Annual ACM Symposium on Parallelism in Algorithms and Architectures 2003
30. The 31st Annual International Symposium on Computer Architecture (ISCA) 2004
31. IEEE International Conference on Image Processing (ICIP) 2005, 2006
32. Workshop on Languages and Compilers for Parallel Computing (LCPC) 2007
33. ACM SIGPLAN 2008 Workshop on Partial Evaluation and Program Manipulation (PEPM) 2008
34. The 13th Internat'l Workshop on High-Level Parallel Programming Models and Supportive Environments (HIPS) 2008
35. International Conference on High Performance Computing (HiPC 2008)
36. ACM International Conference on Computing Frontiers (CF) 2008

37. The 2008 European Signal Processing Conference (EUSIPCO) 2008
38. The 17th International Conference on Parallel Architectures and Compilation Techniques (PACT) 2008
39. International Conference on Compiler Construction (CC 2009)
40. ACM International Conference on Supercomputing (ICS) 2009
41. 3rd Workshop on Statistical and Machine learning approaches to Architectures and compilaTion (SMART) 2009
42. The 17th European Signal Processing Conference (EUSIPCO) 2009
43. The International Conference on Parallel Processing (ICPP) 2009
44. IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS) 2010
45. IEEE International Symposium on High-Performance Computer Architecture Conference (HPCA) 2010
46. IEEE International Symposium on Circuits and Systems (ISCAS) 2012
47. IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS) 2012
48. The Seventh International Workshop on Automatic Performance Tuning (iWAPT), 2012

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

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