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

- 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

- 2021 *Bluestone: Program Translation and Synthesis for Extremely Heterogeneous Architectures*
F. Franchetti (PI), T. M. Low
DoE
- 2019 *SnowWhite: High-Level Reasoning in Compilers*
F. Franchetti (PI), M. Franusich, J. C. Hoe, T. M. Low, D. Spampinato
DARPA PAPP
- 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. Franchetti
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," attorney docket 8350.0089, filed in Nov-2019. Notice of Allowance received Oct-2021. Patent to be issued around Jan-2022.
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 Computational 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. 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.
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. 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.
2. 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*.
3. 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*.
4. 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.
5. 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.
6. B. Akin, F. Franchetti, & J. Hoe. "HAMLeT Architecture for Parallel Data Reorganization in Memory." *IEEE MICRO*, 36(1), 14-23, 2016.

7. 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.
8. 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.
9. 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.
10. 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*.
11. 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.
12. 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.
13. 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.
14. 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.
15. 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.
16. 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.
17. 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.
18. 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. J. Rivera, F. Franchetti, M. Püschel. "A Compiler for Sound Floating-Point Computations using Affine Arithmetic." International Symposium on Code Generation and Optimization (CGO), 2022, *to appear*.
2. S. Mionis, F. Franchetti, J. Larkin. "Optimized Quantum Circuit Generation with SPIRAL." IEEE High Performance Extreme Computing Conference (HPEC), 2021. *Outstanding Student Paper Award*.
3. P. Oostema, F. Franchetti. "Leveraging High Dimensional Spatial Graph Embedding as a Heuristic for Graph Algorithms." IEEE Workshop on Parallel / Distributed Combinatorics and Optimization (PDCO), 2021.
4. N. Kitai, D. Takahashi, F. Franchetti, T. Katagiri, S. Ohshima, T. Nagai. "An Auto-tuning with Adaptation of A64 Scalable Vector Extension for SPIRAL." International Workshop on Automatic Performance Tuning (iWAPT), 2021.
5. N. Kitai, D. Takahashi, F. Franchetti, T. Katagiri, S. Ohshima, T. Nagai. "Adaptation of A64 Scalable Vector Extension for Spiral." SIGHPC High Performance Computing Conference (HPCC), Japan, 2021.
6. J. Rivera, F. Franchetti, M. Püschel. "An Interval Compiler for Sound Floating Point Computations." International Symposium on Code Generation and Optimization (CGO), 2021.
7. S. Rao, A. Kutuluru, P. Brouwer, S. McMillan, F. Franchetti. "GBTLX: A First Look." IEEE High Performance Extreme Computing Conference (HPEC), 2020.
8. V. Zaliva, I. Zaichuk, F. Franchetti. "Verified Translation Between Purely Functional and Imperative Domain Specific Languages in HELIX." 12th Working Conference on Verified Software: Theories, Tools, and Experiments (VSTTE), 2020.
9. J. Zhang, Y. Lu, D. G. Spampinato, F. Franchetti. "515: FESIA: A Fast and Efficient Set Intersection Approach on Modern CPUs." IEEE International Conference on Data Engineering (ICDE), 2020.
10. A. Kulkarni, J. Kovacevic, F. Franchetti. "Massive Scaling of MASSIF: Algorithm Development and Analysis for Simulation on GPUs." Proceedings of the Platform for Advanced Scientific Computing (PASC), 2020. Association for Computing Machinery, New York, NY, USA, Article 13, 1–10.
11. D. Takahashi, F. Franchetti. "FFTE on SVE: SPIRAL-Generated Kernels." International Conference on High Performance Computing in Asia-Pacific Region (HPCAsia), January 2020, pp. 114-122.
12. F. Sadi, J. Sweeney, T. M. Low, J. C. Hoe, L. Pileggi, F. Franchetti. "Efficient SpMV Operation for Large and Highly Sparse Matrices Using Scalable Multi-way Merge Parallelization." IEEE/ACM International Symposium on Microarchitecture (MICRO), 2019.
13. F. Franchetti, D. G. Spampinato, A. Kulkarni, D. T. Popovici, T. M. Low, M. Fransich, A. Canning, P. McCorquodale, B. Van Straalen, P. Colella. "FFTX and SpectralPack: A First Look." IEEE International Conference on High Performance Computing, Data, and Analytics (HiPC), 2018.
14. V. Zaliva, F. Franchetti. "HELIX: A Case Study of a Formal Verification of High Performance Program Generation." Workshop on Functional High Performance Computing (FHPC), 2018.
15. 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*.

16. 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. *Student Innovation Award*.
17. J. Zhang, D. G. Spampinato, S. McMillan, F. Franchetti. "Preliminary Exploration on Large-Scale Triangle Counting in Shared-Memory Multicore System." IEEE High Performance Extreme Computing Conference (HPEC), 2018. *MIT GraphChallenge Finalist*.
18. T. M. Low, D. G. Spampinato, A. Kutuluru, U. Sridhar, D. T. Popovici, F. Franchetti, S. McMillan. "Linear Algebraic Formulation of Edge-centric K-truss Algorithms with Adjacency Matrices." IEEE High Performance Extreme Computing Conference (HPEC), 2018. *MIT GraphChallenge Finalist*.
19. J. Zhang, F. Franchetti, T. M. Low. "High Performance Zero-Memory Overhead Direct Convolutions." International Conference on Machine Learning (ICML), 2018.
20. 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.
21. 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.
22. R. M. Veras, F. Franchetti. "A Scale-free Structure for Real World Networks." IEEE High Performance Extreme Computing Conference (HPEC), 2017.
23. F. Sadi, L. Pileggi, F. Franchetti. "Algorithm and Hardware Co-optimized Solution for Large SpMV Problems." IEEE High Performance Extreme Computing Conference (HPEC), 2017.
24. D. T. Popovici, F. Franchetti, T. M. Low. "Mixed Data Layout Kernels for Vectorized Complex Arithmetic." IEEE High Performance Extreme Computing Conference (HPEC), 2017.
25. T. M. Low, V. N. Rao, M. Lee, D. Popvici, F. Franchetti, S. McMillan. "First Look: Linear Algebra-based Triangle Counting Without Matrix Multiplication." IEEE High Performance Extreme Computing Conference (HPEC), 2017.
26. 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.
27. 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.
28. 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.
29. R. Veras, T. M. Low, F. Franchetti. "A Scale-Free Structure for Power-Law Graphs." IEEE High Performance Extreme Computing Conference (HPEC), 2016.
30. 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.
31. T. M. Low, Q. Guo, F. Franchetti. "Optimizing Space Time Adaptive Processing Through Accelerating Memory-Bounded Operations." IEEE High Performance Extreme Computing (HPEC) 2015.
32. B. Akin, F. Franchetti, J. C. Hoe. "Data Reorganization in Memory Using 3D-stacked DRAM." 42nd International Symposium on Computer Architecture (ISCA) 2015.

33. 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.
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52. 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

- | | |
|-------------|--|
| 2021-Sep-27 | <i>SPIRAL: AI for High Performance Code with a Side of FFTX</i>
Argonne National Lab: APS Computational Seminar
Virtual |
| 2021-Aug-17 | <i>SPIRAL: AI for High Performance Code with a Side of FFTX</i>
Alphabet Inc.
Virtual |
| 2020 Sep 21 | <i>SPIRAL: AI for High Performance Code with a Side of FFTX</i>
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 (IA³), 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 Stevephannie, 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 PPO8, 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

TEACHING

- 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- 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 Assistant Research Professor)

Advisor of ECE PhD students

2020- E. Tang
2020- L. Tang (with Ken Mai)

2019- S. Rao
2019- P. Oostema

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- G. Xu (together with J. Hoe)

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

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: <i>Audio-based self-consistency for cars and robots</i> (IAESTE intern)
2013	C. van den Hauwe: <i>Symbolic execution of Spiral-generated code</i> (IAESTE intern)
	L. Grimley (visiting student)
2012	B. Vandermissen: <i>Symbolic execution of Spiral-generated code</i> (IAESTE intern)
2011	T. Graf: <i>Sparse Matrix-Matrix Multiplication</i> (IAESTE intern)
2010	R. Veras: <i>The fastest DGEMM possible in Spiral</i> (visiting student)
	M. M. Goncalves: <i>Graph algorithms in sparse linear algebra formulation</i> (IAESTE intern)
2009	P. Nabais: <i>Program Generation for Boolean Satisfiability</i> (IAESTE intern)
2008	D. Pickem: <i>SPIRAL for the G80 GPU</i> (IAESTE intern 2008; visiting M.S. student 2009)
	D. Pickem: <i>SPIRAL and Embedded Processors</i> (IAESTE intern, co-advised with M. Püschel)
	S. Cvijic: <i>Code Generation for Sparse Linear Matrix-Vector Multiplication</i> (IAESTE intern, co-advised with M. Püschel)
2007	L. Dzinevski: <i>SPIRAL and JPEG2000</i> (IAESTE intern, co-advised with M. Püschel)
	T. Wlodarczyk: <i>SPIRAL and SAR imaging</i> (IAESTE intern, co-advised with M. Püschel)
2006	H. Shen: <i>SPIRAL for GPUs</i> (IAESTE intern, co-advised with J. Moura and M. Püschel)
	T. Peter: <i>SPIRAL for the Cell BE's SPU</i> (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. Mini-symposium Co-organizer, SIAM Conference on Parallel Processing for Scientific Computing (PP22) 2022
2. Technical Committee (Algorithms Track), IEEE International Parallel and Distributed Processing Symposium (IPDPS), 2021
3. Technical Program Committee (Algorithms Track), International Conference on Parallel Processing (ICPP) 2020
4. Program Committee Member, Workshop on Programming Models for SIMD/Vector Processing (WPMVP) 2020
5. Program Committee Member, International Symposium on High-Level Parallel Programming and Applications (HLPP) 2019
6. Program Committee Member (Algorithms Track), International Conference on Parallel Processing (ICPP) 2019
7. Program Committee Member, Optimization, Modeling, Analysis, and Space Exploration (OMASE) Workshop 2019
8. Program Committee Member, Workshop on Programming Models for SIMD/Vector Processing (WPMVP) 2019
9. Program Committee Member, International Conference on Compiler Construction (CC) 2018
10. Program Committee Member, International Workshop on Numerical Software Verification (NSV) 2018
11. Program Committee Member, Workshop on Programming Models for SIMD/Vector Processing (WPMVP) 2018
12. Program Committee Member, 4th ACM SIGPLAN International Workshop on Libraries, Languages and Compilers for Array Programming (ARRAY) 2017
13. Technical Program Committee Member, IEEE HPEC, 2017
14. Program Committee Member, 26th International Conference on Parallel Architectures and Compilation Techniques (PACT) 2017
15. Program Committee Member, 38th ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI) 2017
16. Program Committee Member, 2nd International Workshop on Post Moore's Era Supercomputing (PMES) 2017
17. Technical Program Committee, Seventh International Workshop on Domain-Specific Languages and High-Level Frameworks for High Performance Computing (WOLFHPC) 2017
18. Member, Carnegie Mellon University ECE Department Undergraduate Advising Committee (UAC) 2016
19. Program Committee Member, Auto-Tuning for Multicore and GPU (ATMG) 2016
20. Organizing Committee, BLIS (BLAS-like Library Instantiation Software) Retreat 2016
21. Workshop Organizing Committee Member, Post-Moore's Era Supercomputing (PMES) Workshop 2016
22. Technical Program Committee, Sixth International Workshop on Domain-Specific Languages and High-Level Frameworks for High Performance Computing (WOLFHPC) 2016

23. Program Committee Member, Workshop on Programming Models for SIMD/Vector Processing (WPMVP) 2016
24. Program Committee Member, 20th International Workshop on High-Level Parallel Programming Models and Supportive Environments (HIPS) 2015
25. Program Committee Member, Auto-Tuning for Multicore and GPU (ATMG) 2015
26. Program Committee Member, Workshop on Exascale Multi/Many Core Computing Systems (E-MuCoCos) 2015
27. Technical Program Committee, Fifth International Workshop on Domain-Specific Languages and High-Level Frameworks for High Performance Computing (WOLFHPC) 2015
28. Program Committee Member, Workshop on Programming Models for SIMD/Vector Processing (WPMVP) 2015
29. Organizing Committee, BLIS (BLAS-like Library Instantiation Software) Retreat 2014
30. Program Committee, 26th International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD) 2014
31. Technical Program Committee, Fourth International Workshop on Domain-Specific Languages and High-Level Frameworks for High Performance Computing (WOLFHPC) 2014
32. Technical Committee, 18th IEEE High Performance Extreme Computing Conference (HPEC) 2014
33. Technical Program Committee, 20th IEEE Int. Conference on Parallel and Distributed Systems (ICPADS-2014)
34. Program Committee, 7th Int. Workshop on Multi-/Manycore Computing Systems (MuCoCoS), 2014
35. Program committee, IFIP International Conference on Network and Parallel Computing (NPC 2014)
36. External Program Committee, Parallel Architectures and Compilation Techniques (PACT) 2014
37. External Review Committee, Programming Design Language and Implementation (PDLI), 2014
38. Technical Committee, IEEE International Parallel and Distributed Processing Symposium (IPDPS), 2014
39. Program Committee, Special Session: Auto-Tuning for Multicore and GPU (ATMG), 2014
40. Program Committee, 19th International Workshop on High-Level Parallel Programming Models and Supportive Environments (HIPS) 2014
41. Program Committee, ACM International Conference on Supercomputing (ICS), 2014
42. Program Committee, Workshop on Programming Models for Vector Processing (WPMVP), 2014
43. Program Committee, International Conference on Parallel Computing (ParCo), 2013
44. Program Committee, 6th Int. Workshop on Multi-/Manycore Computing Systems (MuCoCoS), 2013
45. Program Committee, 10th International Conference on Parallel Processing and Applied Mathematics (PPAM), 2013
46. Program Committee, 27th International Parallel and Distributed Processing Symposium (IPDPS), 2013
47. Program Committee, 24th International Symposium on Computer Architecture & High Performance Computing (SBAC-PAD), 2012
48. Program Committee, The Seventh International Workshop on Automatic Performance Tuning (iWAPT), 2012
49. Program Committee, Special Session: Auto-Tuning for Multicore and GPU (ATMG)
50. Program Committee, 2012 IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS), 2012
51. Study member, DARPA ISAT study on Program Synthesis, 2011
52. Program Committee, International Conference on Parallel Computing (ParCo), 2011

53. Program Committee, Workshop on Exploitation of Hardware Accelerators (WEHA), 2011
54. Program Committee, High Performance Embedded Architectures & Compilers (HiPEAC), 2011
55. Program Committee, The Fifth International Workshop on Automatic Performance Tuning (IWAPT), 2010
56. Program Committee, Workshop on Exploitation of Hardware Accelerators (WEHA), 2010
57. Program Committee, Parallel Architectures and Compilation Techniques (PACT), 2010
58. Program Committee, 23rd International Conference on Supercomputing (ICS), 2009
59. Program Committee, SMART'09: 3rd Workshop on Statistical and Machine learning approaches to ARchitectures and compilaTion
60. Program Committee, 13th International Workshop on High-Level Parallel Programming Models and Supportive Environments (HIPS) 2008, Miami, Florida
61. 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
<i>Advanced Code Generation in Digital Signal Processing</i>
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 (<i>Top-Stipendium</i>) |
| 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
(<i>Leistungsstipendium</i>) |

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