

Frank Mueller

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A Brief Resume

A.1 Educational Background

2000	Habilitation	Humboldt University Berlin, Berlin, Germany. Major: Computer Science.
1994	Ph.D.	Florida State University, Tallahassee, Florida. Major: Computer Science.
1991	M.S.	Florida State University, Tallahassee, Florida. Major: Computer Science.
1987	B.S.	Technical University Berlin, Berlin, Germany. Major: Computer Science.

A.2 Professional Experience

2010 – present	Professor, North Carolina State University, Raleigh, NC.
2014 – 2015	Humboldt Research Award / Sabbatical, Zuse Institute, Berlin, Germany.
2004 – 2010	Associate Professor, North Carolina State University, Raleigh, NC.
2007 – 2008	Humboldt Fellowship / Sabbatical, Zuse Institute, Berlin, Germany.
2001 – 2004	Assistant Professor, North Carolina State University, Raleigh, NC.
2001 (Jan–Jul)	Computer Scientist, Lawrence Livermore National Laboratory, Livermore, CA.
1995 – 2000	Assistant Professor, Humboldt University Berlin, Berlin, Germany.
1994 – 1995	Research Associate (Post-doc), Florida State / Florida A&M University, Tallahassee, FL.
1991 – 1994	Research Assistant, Dept. of Computer Science, Florida State University, Tallahassee, FL.
1989 – 1991	Teaching Assistant, Dept. of Computer Science, Florida State University, Tallahassee, FL.
1987 – 1989	Research Assistant, Technical University Berlin, Berlin, Germany.
Summer 1985	Internship, Siemens AG, Berlin, Germany.
1983 – 1987	Programmer, SRC Datentechnik Berlin, Berlin, Germany.

A.3 Scholarly and Creative Activities

Publications	Career Total (NCSU+HUB)	1/1/17-12/31/17 Total	Total moving PTR Period	Submitted
edited books	11	1	5	
ref. journals	38	3	12	
ref. conferences	127	4	40	5
ref. workshops	53	1	7	
other refereed	23	2	5	
technical reports	37	0	5	
Talks/Presentations	Career Total (NCSU+HUB)	1/1/17-12/31/17 Total	Total moving PTR Period	
panels	3	0	0	
invited	94	0	29	
Funding	Career Total (NCSU+HUB)	1/1/17-12/31/17 Total	Total moving PTR Period	Pending
Grants	\$12.4M	\$2.4M	\$9.1M	\$2.5M
Cash Gifts	\$160k	\$20k	\$147k	
Other Gifts	\$104k	\$3k	\$20k	
Grants+Gifts	\$12.7M	\$2.4M	\$9.3M	
Mentoring	Career Total (NCSU+HUB)	1/1/17-12/31/17 Total	Total moving PTR Period	In Progress
PhD chair/co	17	2	5	9
MS chair/co	53	2	16	0
PhD committee	35	2	29	6
MS committee	27	0	9	0
graduate (I.S.)	62	5	31	1
undergrad (I.S.)	4	1	2	1
faculty mentored	8	5	8	5
Courses taught	Career Total (NCSU+HUB)	1/1/17-12/31/17 Total	Total moving PTR Period	
reg. graduate	23	1	8	1
small graduate	9	1	3	
reg. undergrad	4		1	
Courses created/revised	Career Total (NCSU+HUB)	1/1/17-12/31/17 Total	Total moving PTR Period	
graduate	18	2	11	1
undergrad	2	1	1	
Other	Career Total (NCSU+HUB)	1/1/17-12/31/17 Total	Total moving PTR Period	
software packages	9	1	3	
major awards	15	3	8	

A.4 Membership in Professional Organizations

- 2016– IEEE Fellow.
- 2011– Distinguished Member, Association of Computing Machinery (ACM).
- 2007– Member, IFIP 10.2 WG on Embedded Systems
- 2006–2015 Senior Member, Institute of Electrical and Electronics Engineers (IEEE).
- 2006–2011 Senior Member, Association of Computing Machinery (ACM).
- 2003– ACM Special Interest Group on Embedded Systems (SIGBED).
- 1995 Consultant on POSIX Threads, LogWare GmbH, Berlin, Germany.
- 1994–2006 Member, Association of Computing Machinery (ACM).
- 1994– ACM Special Interest Group on Programming Languages (SIGPLAN).
- 1994– Institute of Electrical and Electronics Engineers, Computer Society (IEEE-CS).
- 1993–1995 Participation in POSIX Standardization Efforts (Threads and Embedded System Profiles)

A.5 Scholarly and Professional Honors

2017	Outstanding Paper Award at the Euromicro Conference on Real-Time Systems (ECRTS)
2016	IEEE Fellow
2014/2015	Humboldt Research Award (Humboldt Foundation)
2012	Golden Core Member Award, IEEE-CS
2011	Distinguished Member Award, Association of Computing Machinery (ACM)
2010	NVIDIA Research Award
2009	Google Research Award
2007/2008	Humboldt Research Fellowship (Humboldt Foundation)
2007	Gelato (IP) ² Award, Innovative Project on Itanium Processors
2007	Best Paper Award at the International Parallel and Distributed Processing Symposium (IPDPS)
2006	IBM Faculty Award
2003	NSF CAREER Award
2003	Best Student Paper Award at the IEEE Real-Time Systems Symposium (RTSS)
2002	Best Paper Award at the International Parallel and Distributed Processing Symposium (IPDPS)
2002	Faculty Research and Professional Development Award, North Carolina State University
1999-2000	Adviser of Best Master's Thesis at Humboldt-University Berlin in Computer Science
1989-1991	Fulbright-Stipend and Stipend by the Federation of German-American Clubs

A.6 Professional Service on Campus

2017-	Member, RPT (Reappointment, Promotion and Tenure) committee.
2015–2016	Chair, Systems search committee.
2011–2014	Member of Search Committee / Won Application for Chancellor's Faculty Excellence Program (cluster hiring)
2010–2012	Graduate Program Oversight Committee.
2010–2011	Member, Faculty search committee.
2005–2006, 2008–2014, 2015–	Lead, Systems/Arch/DB focus group.
2006–2007, 2014	Lead, Systems search committee.
2004–2005	Lead, Systems/Arch focus group.
2004–2006	Member, Graduate students admissions committee.
2004–2005	Co-chair, HPC/Grids/PL faculty search committee.
2003–2004	Member, IT staff search committee.
2003–2004	Member, Faculty search committee.
2002–2003	Member, Operating Systems faculty search committee.

A.7 Professional Service off Campus

- member of several grant review panels (NSF and others, see Section A.5)
- member of several professional boards (see Section A.4)
- chair of venues (general/PC chair of several conferences/workshops) (see Section A.4)
- member/chair of various steering committees (conferences/workshops) (see Section A.4)
- member of numerous program committees (conferences/workshop) (see Section A.4)
- reviewer of numerous journal articles (see Section A.4)

I Teaching and Mentoring of Undergraduate and Graduate Students

A Teaching Effectiveness

Courses Taught

1. North Carolina State University:
 - (a) CSC 801: Seminar on Quantum Computing (Spring 2018)
 - (b) CSC 246: Concepts and Facilities of Operating Systems for Computer Scientists (Fall 2003, Fall 2004, Fall 2016)
 - (c) CSC 501: Operating Systems Principles (Fall 2001, Spring 2002, Spring 2006, Spring 2007, Fall 2008, Spring 2010, Spring 2011, Spring 2012, Fall 2015, Fall 2016)
 - (d) CSC 548: Parallel Systems (Fall 2006, Fall 2009, Fall 2012, Fall 2013, Spring 2016)
 - (e) CSC 591C: Cluster Computing (Spring 2003)
 - (f) CSC 714: Real Time Computer Systems (Fall 2002, Spring 2004, Fall 2005, Spring 2009, Fall 2011, Spring 2014, Spring 2017)
 - (g) CSC 766: Code Optimization for Scalar and Parallel Programs (Fall 2010)
 - (h) CSC 512: Compiler Construction (Spring 2013)

Student Evaluations

Computer Science students rate the effectiveness of their instructors each semester on a five point scale where 1 is poor and 5 is outstanding.

<i>Semester</i>	<i>Course</i>	<i>This course was intellectually challenging and stimulating (12)</i>	<i>The instructor was prepared for class (5)</i>	<i>This course improved my knowledge of the subject (13)</i>	<i>Overall, this course was excellent (14)</i>	<i>Overall, the instructor was an effective teacher (9)</i>
Fall 17 98 students	CSC 548 <i>Dept. Avg.</i>	N/A <i>N/A</i>	5.0 4.4	5.0 4.3	4.9 4.2	4.9 4.2
Spring 17 8 students	CSC 714 <i>Dept. Avg.</i>	N/A <i>N/A</i>	5.0 4.2	5.0 4.2	5.0 4.0	4.6 4.0
Fall 16 98 students	CSC 246 <i>Dept. Avg.</i>	N/A <i>N/A</i>	3.4 4.4	3.7 4.3	2.8 3.9	2.8 4.1
Spring 16 28 students	CSC 548 <i>Dept. Avg.</i>	N/A <i>N/A</i>	4.7 4.2	4.5 4.3	4.2 4.0	4.5 4.1
Fall 15 48 students	CSC 501 <i>Dept. Avg.</i>	N/A <i>N/A</i>	4.6 4.3	4.7 4.3	4.5 4.0	4.5 4.1
Spring 14 13 students	CSC 714 <i>Dept. Avg.</i>	N/A <i>N/A</i>	4.8 4.3	4.9 4.4	4.8 4.2	4.8 4.2
Fall 13 51 students	CSC 548 <i>Dept. Avg.</i>	N/A <i>N/A</i>	4.6 4.3	4.6 4.3	4.4 4.1	4.4 4.1
Spring 13 18+8 DE students	CSC 512 <i>Dept. Avg.</i>	N/A <i>N/A</i>	4.4/4.1 4.4/4.1	4.8/4.0 4.4/3.7	4.2/4.0 4.2/3.8	4.2/3.6 4.2/3.7
Fall 12 31 students	CSC 548 <i>Dept. Avg.</i>	N/A <i>N/A</i>	4.4 4.4	4.3 4.5	4.3 4.2	4.6 4.3
Spring 12 70 students	CSC 501 <i>Dept. Avg.</i>	N/A <i>N/A</i>	4.5 4.3	4.6 4.4	4.5 4.1	4.3 4.2
Fall 11 8 students	CSC 714 <i>Dept. Avg.</i>	N/A <i>N/A</i>	4.7 4.4	4.8 4.4	4.7 4.1	4.8 4.2
Spring 11 49 students	CSC 501 <i>Dept. Avg.</i>	4.6 4.3	4.6 4.3	4.5 4.3	4.3 4.1	4.2 4.1

Fall 10	CSC 766	4.7	4.5	4.8	4.5	4.5
8 students	<i>Dept. Avg.</i>	4.2	4.3	4.3	4.1	4.1

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<i>Semester</i>	<i>Course</i>	<i>Difficulty of Course</i>	<i>Fairness Grading</i>	<i>Course Effectiveness</i>	<i>Recommend Instructor</i>	<i>Instructor Effectiveness</i>
Spring 10 70 students	CSC 501 <i>Dept. Avg.</i>	4.7 4.2	4.3 4.3	4.7 4.3	4.5 4.1	4.2 4.1
Fall 09 25 students	CSC 548 <i>Dept. Avg.</i>	4.7 4.4	4.7 4.4	4.6 4.5	4.6 4.2	4.7 4.3
Spring 09 21 students	CSC 714 <i>Dept. Avg.</i>	4.6 4.2	4.8 4.3	4.6 4.3	4.5 4.0	4.6 4.1
Fall 08 91 students	CSC 501 <i>Dept. Avg.</i>	4.8 4.3	4.6 4.5	4.7 4.4	4.6 4.2	4.4 4.3
Spring 07 21 students	CSC 501 <i>Dept. Avg.</i>	4.8 4.0	4.8 4.2	4.7 4.1	4.4 3.7	4.3 3.9
Fall 06 36 students	CSC 548 <i>Dept. Avg.</i>	4.33 3.90	4.0 4.16	4.5 4.1	3.33 3.62	4.17 3.93
Spring 06 36 students	CSC 501 <i>Dept. Avg.</i>	4.41 3.71	4.09 4.11	3.88 3.62	4.00 3.94	4.03 3.82
Fall 05 15 students	CSC 714 <i>Dept. Avg.</i>	3.84 3.71	4.53 4.11	4.26 3.62	4.74 3.93	4.47 3.82
Spring 05 15 students	CSC 791 <i>Dept. Avg.</i>	4.07 3.73	4.69 4.07	4.07 3.59	4.36 3.89	4.29 3.78
Fall 04 51 students	CSC 246 <i>Dept. Avg.</i>	3.82 3.72	4.14 4.09	3.68 3.62	3.95 3.93	3.82 3.83
Spring 04 13 students	CSC 714 <i>Dept. Avg.</i>	3.55 3.73	4.55 4.07	4.27 3.59	4.55 3.91	4.45 3.80
Fall 03 51 students	CSC 246-2 <i>Dept. Avg.</i>	4.03 3.56	4.20 4.03	3.17 3.58	3.20 3.91	3.27 3.79
Fall 03 65 students	CSC 246-1 <i>Dept. Avg.</i>	4.07 3.56	3.52 4.03	2.61 3.58	2.39 3.91	2.64 3.79
Spring 03 13 students	CSC 591C <i>Dept. Avg.</i>	3.64 3.65	4.45 4.06	3.90 3.57	4.40 3.87	4.10 3.73
Fall 02 25 students	CSC 714 <i>Dept. Avg.</i>	4.12 3.69	4.56 4.00	4.12 3.63	4.62 3.92	4.06 3.82
Spring 02 36 students	CSC 501 <i>Dept. Avg.</i>	4.57 3.68	3.79 3.99	3.69 3.54	3.46 3.83	3.77 3.69
Fall 01 62 students	CSC 501 <i>Dept. Avg.</i>	4.35 3.64	4.64 4.14	4.16 3.65	4.41 3.96	4.05 3.81

Peer Evaluations

Peer evaluations for teaching were conducted as follows:

Fall 2017 CSC 548 by Drs. Shen and Freeh
 Fall 2009 CSC 548 by Drs. Reeves and Freeh
 Spring 2007 CSC 501 by Drs. Reeves and Rouskas
 Fall 2003 CSC 246 by Drs. Davis and Healey
 Spring 2002 CSC 246 by Drs. Healey and Reeves

The peer evaluations are attached.

B Instructional Development

- 2017 CSC 548: *Parallel Systems*
Novel curricular material on cloud computing, big data, and machine learning plus a project on TensorFlow.
- 2017 ARC cluster enhancement: purchase and installation of new server nodes (2) and compute nodes (17) with a completely revamped software stack featuring the latest industrial-grade supercomputing and Cloud software stack combined with Infiniband networking and GPUs plus NVME and SSD devices, power monitoring, and container-based virtualization.
- 2017 CSC 714: *Real Time Computer Systems*
Novel IoT slides and experimentation environments for IoT (Nordic Semi) plus an ARM Toppers kernel used in an industrial automotive setting with real-time kernel modifications as exercises plus application programming. New slides on mixed criticality.
- 2016 CSC 246: *Undergraduate Concepts and Facilities of Operating Systems for Computer Scientists*
Redesign of hands-on programming exercises with novel programming assignments, updates to various slides, e.g., on VMs/docker containers, big data/map-reduce etc.
- 2016 CSC 548: *Parallel Systems*
Novel projects developed for Cloud Computing with Map-Reduce and Spark.
- 2015 CSC 501: *Graduate Operating Systems Principles*
Redesign of projects and development of new projects to target GPUs.
- 2014 CSC 714: *Real Time Computer Systems*
Novel experimentation environment in an industrial automotive setting (AUTOSAR OSEK).
- 2013 CSC 548: *Parallel Systems*
Novel projects developed for CUDA and OpenACC.
- 2013 CSC 512: *Compiler Construction*
Novel projects developed, slides corrected and revamped.
- 2012 CSC 548: *Parallel Systems*
Novel project developed for AWS/EC2 Cloud services.
- 2011 CSC 714: *Real Time Computer Systems*
Novel multicore real-time scheduling and resource handling material added.
- 2011 Short Course: *Introduction to Parallel Programming with Single and Multiple GPUs*
Newly developed one-day short course that provides an introduction to code development for GPUs using instructional lectures and hands-on experience for CSC majors and especially non-majors.
- 2003,2010 CSC 766: *Code Optimization for Scalar and Parallel Programs*
Redesign of a graduate curriculum on Compiler Backends with an emphasis on scalar and parallel optimizations, including new slides, increases emphasis on parallelism and accelerators (graphics processing units), 30% of the material from research papers, novel programming assignments and incorporation of updated compiler architectures.
- 2009 CSC 548: *Parallel Systems*
Redesign of projects and development of new projects to target the Nvidia GPU / CUDA and IBM Cell BE SDKs. Curricula updates to include accelerating architectures (GPU/Cell) programming and performance analysis in projects and teaching.
- 2009 CSC 714: *Real Time Computer Systems*
Novel multicore real-time scheduling and resource handling material added. Novel programming assignments, incorporation of state-of-the-art embedded hardware with Google G1 phones and Android programming, including instruction slides and projects.
- 2007,2010,2015 CSC 501: *Graduate Operating Systems Principles*
Redesign of projects and development of new projects to target the Nvidia GPU / CUDA SDK, redesign of CUDA material, addition of DHT complex for distributed systems. Curricula updates to include transactional memory, accelerating architectures (GPU/Cell) programming, security and peer-to-peer distributed technologies in projects and teaching.
- 2008,2013 Nvidia GPU Cluster: OS lab augmentation with a 18-node Nvidia GPU cluster as well as workstation upgrades to multi-core; replaced by 10 more up-to-date GPU workstations.
- 2011 ARC cluster: purchase and installation of an 108-node AMD-based cluster with Infiniband and GPUs in each

node plus an industrial-grade supercomputing software stack, upgraded with newer generation GPUs, power monitoring, and SSDs over the years.

- 2007 CSC 501: *Graduate Operating Systems Principles*
Redesign of projects and development of new projects to target the Cell BE architecture.
- 2006 Cell BE / Sony PS3 Cluster: purchase and installation of an 8-node Cell BE (Sony PS3) node cluster.
- 2006 OS lab: purchase and installation of 18 workstations to upgrade the graduate OS lab.
- 2006 CSC 548: *Parallel Systems*
Redesign based on the prior material of Cluster Computing with a novel emphasis on multi-core architectures, thread-level parallelism, transactional memory, fault tolerance and virtualization techniques.
- 2005 CSC 791A: *Code Optimization for Scalar and Parallel Programs*
Completely novel design of a graduate curriculum on Compiler Backends with an emphasis on scalar and parallel optimizations, including new textbooks, 50% of the material from research papers, a new set of slides, novel programming assignments and incorporation of state-of-the-art compiler architectures.
- 2003–2004 CSC 246: *Undergraduate Concepts and Facilities of Operating Systems for Computer Scientists*
Complete redesign of the undergraduate curriculum on Operating Systems, including a new textbook, increased hands-on programming exercises with novel programming assignments, a new set of slides.
- 2003 CSC 591C: *Cluster Computing*
Completely novel design of a graduate curriculum on Cluster Computing with a systems emphasis, including new textbooks, 50% of the material from research papers, a new set of slides, novel programming assignments, incorporation of state-of-the-art clusters with our OS cluster, which was heavily used in class projects.
- 2002 CSC 714: *Real Time Computer Systems*
Complete redesign of the graduate curriculum on Real-Time Systems, including a new textbook, 50% of the material from research papers, a new set of slides, novel programming assignments, incorporation of state-of-the-art embedded hardware with a Microsoft Donation, with an embedded 8-bit processor and an open-source kernel, all of which were heavily used in class projects.
- 2001–2003 OS lab: *Graduate Operating Systems Teaching Laboratory*
Purchase and installation of an OS lab (in excess of \$80,000) with a cluster of state-of-the-art dual processor workstations, high-speed interconnects, RAID storage, end-user terminals and embedded computing devices. Permits cluster computing experiments for parallel executions and embedded system testbed operations.
- 2001–2002 CSC 501: *Graduate Operating Systems Principles*
Complete redesign of the graduate curriculum on Operating Systems, including a new textbook, 50% of the material from research papers, a new set of slides, novel programming assignments, incorporation of instructional software from Connectix for industrial-strength training with full-fledged operating system kernels.

C Mentoring Activities

Students mentored whose committee I served on are listed in Section D. The remaining mentoring activities are as follows.

Graduate Independent Studies at North Carolina State University:

Student	Semester
Abide Haque	Spring 2018
Sarthak Kukreti	Spring 2017
Junjie Shen	Spring 2016
Harsh Khetawat	Spring 2016
Anwasha Das	Fall 2015
Tao Wang	Fall 2015
Yasaswini Gownivaripalli	Spring 2014
Xing Pan	Spring 2014
Parvesh Jain	Spring 2014
Saransh Gupta	Spring 2014
Vishwanathan Chandru	Spring 2014
Xiaoqing Luo	Fall 2013
Parvesh Jain	Fall 2013
Saransh Gupta	Fall 2013
Sandeep Reddy Kandula	Spring 2013
Ajay Saini	Spring 2013
Onkar Patil	Spring 2013
Subramanian Ramachandran	Spring 2013
Shrinivas Anand Panchamukhi	Fall 2012
Arash Rezaei	Summer 2011
Shamina Abmed	Fall 2010
Jana Traue	Fall 2010
Kishor Kharbas	Spring 2010
Vivek Deshpande	Spring 2010
Rahul Ramasubramanian	Spring 2010
Donghoon Kim	Fall 2009
Kemal K.C.	Fall 2009
Kemal K.C.	Summer 2009
Manav Vasavada	Fall 2008
Balasubramanya Bhat	Fall 2008
Sundeep Budanur Ramanna	Fall 2008
Suraj Kasi Satyanarayana	Fall 2008
Chi Sung An	Fall 2008
Michael Creech	Spring 2008
Vinod Chavva	Spring 2008
Sohan Shetty	Spring 2008
Raghuveer Raghavendra	Spring 2008
Vijaya Kumar	Spring 2008
Shubhraprakash Das	Spring 2008
Harsha Girish	Fall 2007
Vivek Thakkar	Fall 2006
Prasun Ratn	Fall 2006
Arun Nagarajan	Summer 2006

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Student	Semester
Gopi Rao	Fall 2005
Nachiket Deshpande	Fall 2005
Jyothish Varma	Fall 2004
Dinesh Dasarathan	Spring 2004
Prashanth Ganesan	Spring 2003
Adinarayanan Venkatachalam	Spring 2003
Shakar Ananthanarayanan	Spring 2003
Ajit Warriar	Spring 2003
Sangram Kadam	Spring 2003
Gautam Gopinathan	Fall 2003
Archana Lopelli	Fall 2002
Seema Jethani	Fall 2002
Naveenkumar Muguda	Fall 2002
Mary Spry	Fall 2002
Raj Nagarajan	Spring 2002 – Spring 2003
Palash Kasodan	Spring 2002 – Fall 2002
Ahmet Bilgin	Spring 2002
Ruhuyiy Mahalati	Spring 2002
Sangeeta Bhagwanani	Spring 2002
Ajay Dudani	Spring 2002
Peng Xu	Fall 2001 – Spring 2002
Manish Hirlekar	Fall 2001
Jin Lee	Fall 2001

Undergraduate Independent Studies / Senior or Honors Projects at North Carolina State University:

Student	Semester
Spencer Moore	Fall 2015 – Spring 2016
Rachana Doshi	Spring 2002 – Summer 2003
Kyung Chul Lee	Spring 2002

D Advising Activities

Theses Directed

1. North Carolina State University:

MS:

2016–2017 Harsh Khwetawat

2016–2017 Sarthak Kukreti

2016–2017 Harsh Khetawat

2014–2015 Yasaswini Gownivaripalli, “Hybrid Cache, Bank, and Controller Aware Coloring for Multicore Real-Time Systems”

2014–2015 Vishwanathan Chandru, “Analysis of Memory Performance and Execution Models for Large-Scale Manycores”

2014–2015 Saransh Gupta, “ScalaMemAnalysis-MultiLevel: A Compositional Approach to Multi-level Cache Analysis of Compressed Memory Traces”

2013–2015 Xiaoqing Luo, “ScalaIOExtrap: Elastic I/O Tracing and Extrapolation”

2013–2014 Subramanian Ramachandran, “Distributed Job Allocation for Large-Scale Many-cores”

2013–2014 Ajay Saini, “Affinity-Aware Checkpoint Restart”

2013–2014 Onkar Patil, “Efficient and Lightweight Inter-process Collective Operations for Massive Multi-core

Architectures”

- 2012–2014 Nishanth Balasubramanian, “ScalaMemAnalysis: A Compositional Approach to Cache Analysis of Compressed Memory Traces”
- 2012–2014 Mahesh Lagadapati, “Benchmark Generation and Simulation at Extreme Scale”
- 2012–2014 Shrinivas Anand Panchamukhi, “Providing Task Isolation via TLB Coloring”
- 2011–2013 Srinath Krishna Ananthakrishnan, “Customized Scalable Tracing with in-situ Data Analysis”
- 2011–2013 Karthik Yagna, “Collective Communication for Multi-core NOC Interconnects”
- 2011–2013 Chandan Apsangi, “Scalable Locks with Backoff Suspension for Manycore Systems”
- 2010–2011 Vivek Deshpande, “Automatic Generation of Complete Communication Skeletons from Traces”
- 2010–2011 Kishor Kharbas, “Failure Detection and Partial Redundancy in HPC”
- 2010–2011 Shobit Mishra, “Design and Implementation of Process Migration and Cloning in BLCR”
- 2010–2010 Rahul Ramasubramanian, “Exploring Virtualization Platforms for ARM-based Mobile Android Devices”
- 2010–2011 Sharmina Ahmed, “A Benchmark Suite to Assess Software Routing Capabilities of Advanced Architectures”
- 2008–2010 Manav Vasavada, “Innovative schemes to support Incremental Checkpointing”
- 2008–2010 Sundeep Budanur Ramanna, “Memory Trace Compression and Replay for SPMD Systems using Extended PRSDs”
- 2008–2010 Karthik Vijayakumar, “Probabilistic Communication and I/O Tracing with Deterministic Replay at Scale”
- 2008–2010 Balasubramanya Bhat, “Making DRAM Refresh Predictable”
- 2007–2010 Raghuvveer Raghavendra, “Providing predictability for high end embedded systems”
- 2007–2008 Harsha Girish, “Remote Data Collection and Analysis using Mobile Agents and Service-Oriented Architectures”
- 2006–2008 Vivek Thakkar, “Dynamic Page Migration on ccNUMA Platforms Guided by Hardware Tracing”
- 2006–2008 Prasun Ratn, “Preserving Time in Large-Scale Communication Traces”
- 2006–2008 Arun Nagarajan, “Proactive Fault Tolerance for HPC with Xen Virtualization”
- 2005–2006 Jyothish Varma, “Scalable, Fault-Tolerant Membership for Group Communication on HPC Systems”
- 2005–2007 Ravi Ramaseshan, “Trace-Based Dependence Analysis for Speculative Loop Optimizations”
- 2004–2006 Michael Noeth, “Scalable Compression and Replay of Communication Traces in Massively Parallel Environments”
- 2003 Jaydeep Marathe, “METRIC: Tracking Memory Bottlenecks via Binary Rewriting”
- 2003 Nirmal Desai, “Scalable Distributed Concurrency Protocol with Priority Support”
- 2003 Anita Nagarajan, “Cache Coherence Simulation with ccSIM vs. Hardware Performance Counters”
- 2003 Kaustubh Patil, “Compositional Static Cache Analysis using Module-Level Abstraction”
- 2003 Kiran Seth, “Frequency-aware Static Timing Analysis for Power-aware Embedded Architectures”
- 2003–2005 Nikola Vouk, “Buddy Threading in Distributed Applications on Simultaneous Multi-Threading Processors”
- 2003–2004 Anubhav Dhoot, “Hybrid online/offline optimization of Application Binaries”

PhD:

- 2018– Harsh Khwetawat
- 2017– Utsab Ray
- 2016– Onkar Patil
- 2015– Anvesha Das
- 2015– Hang Xu
- 2015– Tao Wang
- 2013– Xing Pan
- 2013–2017 Tao Qian

- 2013– Neha Gholkar
- 2012–2017 Amir Bahmani, “Scalable Communication Tracing via Clustering”
- 2011–2016 Arash Rezaei, “Fault Resilience for Next Generation HPC Systems”
- 2011–2016 Yang Liu, “Server-side Log Data Analytics for I/O Workload Characterization and Coordination on Large Shared Storage Systems” (co-advised with Xiaosong Ma)
- 2011–2015 James Elliott, “Resilient Iterative Linear Solvers Running Through Errors”
- 2010–2015 David Fiala, “Transparent Resilience Across the Entire Software Stack for High-Performance Computing Applications”
- 2008–2012 Chris Zimmer, “Bringing Efficiency and Predictability to Massive Multi-core NoC Architectures”
- 2008–2012 Yongpeng Zhang, “Exploiting Data-Parallelism in GPUs”
- 2008–2012 Xing Wu, “Scalable Communication Tracing for Performance Analysis of Parallel Applications”
- 2008–2012 Abhik Sarkar, “Predictable Task Migration Support and Static Task Partitioning for Scalable Multicore Real-Time Systems”
- 2005–2009 Chao Wang, “Transparent Fault Tolerance for Job Healing in HPC Environments”
- 2003–2007 Jaydeep Marathe, “Trace Based Performance Characterization and Optimization”
- 2002–2008 Harini Ramprasad, “Analytical Bounding Data Cache Behavior for Real-Time Systems”
- 2002–2008 Sibin Mohan, “Exploiting Hardware/Software Interactions for Analyzing Embedded Systems”
- 2001–2005 Yifan Zhu, “Dynamic Voltage Scaling with Feedback EDF Scheduling for Real-Time Embedded Systems”
2. Humboldt University Berlin:
- pre-MS Thesis (20-40 pages):*
- 2000 Peter Weisse, “Träge Release-Konsistenz”
- 2000 Niklas Hahn, “Dynamische Speicherverwaltung in einem verteilten System mit gemeinsamen Speicher”
- 1998 Sebastian Unger, “Transforming Irreducible Regions of Control Flow into Reducible Regions by Optimized Node Splitting”
- 1998 Daniel Schulz, “POSIX Threads Debugger”
- 1998 Claus Wagner, “Bewertung von Algorithmen zum gegenseitigen Ausschluß”
- MS Thesis (40-100 pages):*
- 2002 Peter Weisse, “Träge Release-Konsistenz”
- 2001 Niklas Hahn, “Effiziente dynamische Verwaltung von gemeinsam genutztem Speicher in einem verteilten System”
- 2000 Thomas Röblitz, “Kommunikation in verteilten Systemen mit gemeinsamem Speicher”
- 1999 Daniel Schulz, “Thread Debug Interface – TDI” (honored as “**best master’s thesis**” in Computer Science at the Humboldt University Berlin during the academic years of 1999 and 2000)
- 1999 Oliver Bühn, “Planbarkeitsanalyse von Ada-tasks in Echtzeitsystemen” (main adviser for Technische Fachhochschule Berlin)
- 1999 Karla Müller, “Design and Implementation of a Flexible Report Generating Tool”
- 1999 Claus Wagner, “Algorithmen zum gegenseitigen Ausschluß in verteilten Systemen”

Graduate Research Assistants

2017– Utsab Ray
2017–2017 Sarthak Kukreti
2017– Harsh Khetawat
2016– Onkar Patil
2015– Tyler Stocksdale
2015– Anwasha Das
2015– Hang Xu
2015– Tao Wang
2014–2015 Yayaswini Gownivaripalli
2014–2015 Vishwanathan Chandru
2014–2015 Saransh Gupta
2014–2015 Xiaoqing Luo
2013– Xing Pan
2013–2017 Tao Qian
2013– Neha Gholkar
2013–2017 Amir Bahmani
2013–2014 Nishanth Balasubramanian
2013–2014 Mahesh Lagadapati
2013–2014 Shrinivas Anand Panchamukhi
2013–2014 Sandeep Kandula
2013–2014 Onkar Patil
2013–2014 Subramanian Ramachandran
2013–2014 Ajay Saini
2013 Stephen DeGuglielmo
2012–2013 Srinath Krishna Ananthakrishnan
2012–2013 Karthik Yagna
2012–2013 Chandan Apsangi
2011–2013 James Elliott
2011–2016 Arash Rezaei
2011–2015 David Fiala
2011–2011 Sharmina Ahmed
2010–2011 Vivek Deshpande
2010–2011 Kishor Kharbas
2010–2011 Shobit Mishra
2010–2010 Rahul Ramasubramanian
2010–2012 Xing Wu
2009–2010 Sundeep Budanur Ramanna
2009–2010 Balasubramanya Bhat
2008–2010 Manav Vasavada
2008–2010 Karthik Vijayakumar
2008–2012 Yongpeng Zhang
2008–2012 Abhik Sarkar
2008–2012 Chris Zimmer
2008–2009 Raghuv eer Raghavendra
2007–2008 Vivek Thakkar
2006–2008 Prasun Ratn

2006–2008 Arun Nagarajan
2006–2008 Ravi Ramaseshan
2005–2009 Chao Wang
2005–2006 Jyothish Varma
2005–2005 Nikola Vouk
2005–2006 Tao Yang
2005–2006 K.C. Lee
2004–2006 Michael Noeth
2003–2004 Anubhav Dhoot
2003–2008 Harini Ramprasad
2003–2008 Sibin Mohan
2002–2003 Kiran Seth
2002–2003 Nirmal Desai
2002–2007 Jaydeep Marathe
2001–2005 Yifan Zhu

Committee Membership

Graduate Committees at Humboldt University Berlin (HUB), Technische Fachhochschule Berlin (TFH), North Carolina State University (NCSU) and University of North Carolina at Chapel Hill (UNC Chapel Hill), ETH Zurich, TU Dresden.

Student	Degree	Date	Chair	Member	University
Harsh Khetawat	Ph.D.	est. 2022	X		NCSU
Utsab Ray	Ph.D.	est. 2021	X		NCSU
Onkar Patil	Ph.D.	est. 2020	X		NCSU
Tyler Stocksdale	Ph.D.	est. 2020	X		NCSU
Anwasha Das	Ph.D.	est. 2018	X		NCSU
Hang Xu	Ph.D.	est. 2020	X		NCSU
Tao Wang	Ph.D.	est. 2020	X		NCSU
Xing Pan	Ph.D.	est. 2018	X		NCSU
Tao Qian	Ph.D.	5/2017	X		NCSU
Neha Gholkar	Ph.D.	est. 2018	X		NCSU
Amir Bahmani	Ph.D.	5/2017	X		NCSU
James Elliott	Ph.D.	10/2015	X		NCSU
Arash Rezaei	Ph.D.	3/2016	X		NCSU
Yang Liu	Ph.D.	3/2016	X		NCSU
David Fiala	Ph.D.	6/2015	X		NCSU
Chris Zimmer	Ph.D.	12/2012	X		NCSU
Xing Wu	Ph.D.	12/2012	X		NCSU
Yongpeng Zhang	Ph.D.	9/2012	X		NCSU
Abhik Sarkar	Ph.D.	5/2012	X		NCSU
Chao Wang	Ph.D.	6/2009	X		NCSU
Sibin Mohan	Ph.D.	8/2008	X		NCSU
Harini Ramprasad	Ph.D.	8/2008	X		NCSU
Jaydeep Marathe	Ph.D.	5/2007	X		NCSU
Yifan Zhu	Ph.D.	8/2005	X		NCSU
Harsh Khetawat	M.S.	11/2017	X		NCSU
Sarthak Kukreti	M.S.	8/2017	X		NCSU
Yasaswini Gownivaripalli	M.S.	6/2015	X		NCSU
Saransh Gupta	M.S.	8/2015	X		NCSU
Vishwanathan Chandru	M.S.	8/2015	X		NCSU
Xiaoqing Luo	M.S.	6/2015	X		NCSU
Shrinivas Panchamukhi	M.S.	7/2014	X		NCSU
Subramanian Ramachandran	M.S.	6/2014	X		NCSU
Onkar Patil	M.S.	6/2014	X		NCSU
Nishanth Balasubramanian	M.S.	6/2014	X		NCSU
Ajay Saini	M.S.	5/2014	X		NCSU
Mahesh Lagadapati	M.S.	5/2014	X		NCSU
Srinath Ananthakrishnan	M.S.	5/2013	X		NCSU
Karthik Yagna	M.S.	5/2013	X		NCSU
Chandan Apsangi	M.S.	5/2013	X		NCSU
Vivek Deshpande	M.S.	8/2011	X		NCSU
Kishor Kharbas	M.S.	8/2011	X		NCSU
Shobit Mishra	M.S.	8/2011	X		NCSU
Rahul Ramasubramanian	M.S.	6/2011	X		NCSU
Sharmina Ahmed	M.S.	6/2011	X		NCSU
Manav Vasavada	M.S.	8/2010	X		NCSU
Sundeep Budanur Ramanna	M.S.	8/2010	X		NCSU
Karthik Vijayakumar	M.S.	8/2010	X		NCSU
Balasubramanya Bhat	M.S.	6/2010	X		NCSU

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Student	Degree	Date	Chair	Member	University
Raghuveer Raghavendra	M.S	1/2010	X		NCSU
Harsha Girish	M.S.	7/2008	X		NCSU
Vivek Thakkar	M.S.	8/2008	X		NCSU
Prasun Ratn	M.S.	8/2008	X		NCSU
Arun Nagarajan	M.S.	4/2008	X		NCSU
Ravi Ramaseshan	M.S.	6/2007	X		NCSU
Jyothish Varma	M.S.	5/2006	X		NCSU
Michael Noeth	M.S.	8/2006	X		NCSU
Nikola Vouk	M.S.	4/2005	X		NCSU
Anubhav Dhoot	M.S.	7/2004	X		NCSU
Kiran Seth	M.S.	12/2003	X		NCSU
Kaustubh Patil	M.S.	8/2003	X		NCSU
Anita Nagarajan	M.S.	8/2003	X		NCSU
Jaydeep Marathe	M.S.	6/2003	X		NCSU
Nirmit Desai	M.S.	6/2003	X		NCSU
Peter Weisse	M.S.	2001	X		HUB
Niklas Hahn	M.S.	2001	X		HUB
Thomas Röblitz	M.S.	2000	X		HUB
Claus Wagner	M.S.	1999	X		HUB
Karla Müller	M.S.	1999	X		HUB
Oliver Bühn	M.S.	1999	X		TFH
Daniel Schulz	M.S.	1999	X		HUB

Student	Degree	Date	Chair	Member	University
Namhoon Jim (UNC Chapel Hill w/ Anderson)	Ph.D.			X	UNC Chapel Hill
Abhinav Agrawal (ECE w/ Tuck)	Ph.D.	2017		X	NCSU
Liang Han (ECE w/ Tuck)	Ph.D.			X	NCSU
Jeshurun Chisholm (UNC Chapel Hill w/ Anderson)	Ph.D.			X	UNC Chapel Hill
Corey Tessler (Wayne State w/ Nathan Fisher)	Ph.D.	2017		X	WSU
Guoyang Chen (CSC w/ Shen)	Ph.D.	2016		X	NCSU
Martin Hoffmann (FAU Erlangen w/ Daniel Lohmann)	Ph.D.	2016		X	FAU
Andreas Hoffie (MAE w/ Tarek Echekki)	Ph.D.	2015		X	NCSU
Bjoern Doebel (TU Dresden w/ Hermann Haertig)	Ph.D.	2014		X	TUD
Zoltan Majo (ETH w/ Thomas Gross)	Ph.D.	2014		X	ETH
Jianhua Zhang (ECE w/ Chakraborty)	Ph.D.	2016		X	NCSU
Hiep Nguyen (CSC w/ Gu)	Ph.D.	2014		X	NCSU
Chin-Jung Hsu (CSC w/ Watson)	Ph.D.			X	NCSU
David Moye (CSC w/ William)	Ph.D.			X	NCSU
Shireesh Bhat (CSC w/ Samatova)	Ph.D.			X	NCSU
Eric Schendel (CSC w/ Samatova)	Ph.D.	2014		X	NCSU
Avik Juneja (ECE w/ Dean)	Ph.D.			X	NCSU
Sriram Lakshminarasimhan (CSC w/ Samatova)	Ph.D.	2013		X	NCSU
Sajid Reza (ECE, w/ Byrd)	Ph.D.	2012		X	NCSU
Feng Ji (CSC w/ Ma)	Ph.D.	2013		X	NCSU
Yongmin Tang (CSC w/ Gu)	Ph.D.			X	NCSU
Yi Yang (ECE w/ Zhou)	Ph.D.	2013		X	NCSU
Ping Xiang (ECE w/ Zhou)	Ph.D.	2014		X	NCSU
Andreas Hoeffie (Aerospace Eng. w/ Echekki)	Ph.D.			X	NCSU
Liang Han (ECE w/ Tuck)	Ph.D.			X	NCSU
Sang Hoon Lee (ECE w/ Tuck)	Ph.D.	2012		X	NCSU
Jonathan Jenkins (CSC w/ Samatova)	Ph.D.			X	NCSU
Deepa Srinivasan (CSC w/ Jiang)	Ph.D.			X	NCSU
Zhi Wang (CSC w/ Jiang)	Ph.D.			X	NCSU
Siddhartha Shivshankar (ECE w/ Dean)	Ph.D.			X	NCSU
Xin Cai (ECE w/ Geringer)	Ph.D.			X	NCSU
Joshua Hursey (U. of Indiana w/ Lumsdaine)	Ph.D.	2010		X	U. of Indiana
Zhen Yoan (EE w/ Viniotis)	Ph.D.			X	NCSU
Ajit Chakrapani (CSC w/ Rhee)	Ph.D.			X	NCSU
Geza Geleji (CSC w/ Perros)	Ph.D.			X	NCSU
Ahmed Azab (CSC w/ Ning)	Ph.D.			X	NCSU
Young-Hyun Oh (CSC w/ Ning)	Ph.D.			X	NCSU
Zach Jorgensen (CSC w/ Yu)	Ph.D.			X	NCSU

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Student	Degree	Date	Chair	Member	University
John Calandrino (UNC Chapel Hill w/ Anderson)	Ph.D.	2009		X	UNC Chapel Hill
Tod Gamblin (UNC Chapel Hill w/ Fowler)	Ph.D.	2009		X	UNC Chapel Hill
Heshan Lin (CSC w/ Ma)	Ph.D.	2009		X	NCSU
Zhe Zhang (CSC w/ Ma)	Ph.D.	2009		X	NCSU
Jiangtian Li (CSC w/ Ma)	Ph.D.	2008		X	NCSU
Aravindh Anantaraman (ECE w/ Rotenberg)	Ph.D.	2006		X	NCSU
Ali Mahmoud (ECE w/ Rotenberg)	Ph.D.	2006		X	NCSU
Qingzhong Zhao (Physics w/ Bernholc)	Ph.D.	2004		X	NCSU
Erin Parker (UNC Chapel Hill w/ Chatterjee)	Ph.D.	2004		X	UNC Chapel Hill
Shanil Puri (CSC w/ Shen)	M.S.	2016		X	NCSU
Sethuraman Subbiah (CSC w/ Gu)	M.S.	2012		X	NCSU
Benjamin Clay (CSC w/ Ma)	M.S.			X	NCSU
Amev Deshpande (CSC w/ Ma)	M.S.	2010		X	NCSU
Divya Dinakar (CSC w/ Ma)	M.S.			X	NCSU
Sachidananda Su Ghattadahalli (ECE, w/ Dean)	M.S.			X	NCSU
Vamso Sripathi (CSC w/ Kumar+Ma)	M.S.			X	NCSU
Siarhei Liakh (CSC w/ Jiang)	M.S.	2010		X	NCSU
Kunsheng Chen (CSC w/ Freeh)	M.S.	2009		X	NCSU
Subash Sachidananda (ECE w/ Dean)	M.S.	2009		X	NCSU
Prachi Gauriar (CSC w/ Xu)	M.S.	2006		X	NCSU
Sreerama Sreepathi (CSC w/ Kumar+Ma)	M.S.	2006		X	NCSU
Nandini Kappiah (CSC w/ Freeh)	M.S.	2005		X	NCSU
Mark Femal (CSC w/ Freeh)	M.S.	2005		X	NCSU
Daniel Smith (CSC w/ Freeh)	M.S.	2005		X	NCSU
Sudhagar Thirumoolan (ECE, co w/ Dean)	M.S.	2004	X	X	NCSU
Adarsh Seetharam (ECE, w/ Dean)	M.S.	2004		X	NCSU
Ramnath Venugoplan (ECE, w/ Dean)	M.S.	2003		X	NCSU
Gautam Gopinathan (ECE, w/ Byrd)	M.S.	2003		X	NCSU
Vasanth Asokan (ECE, co w/ Dean)	M.S.	2003	X	X	NCSU
Sunil Vangar (ECE, w/ Dean)	M.S.	2003		X	NCSU
Aravindh Anantaraman (ECE w/ Rotenberg)	M.S.	2003		X	NCSU
Anuradha Vaidyanathan (ECE, w/ Byrd)	M.S.	2002		X	NCSU
Warren D'mello (CSC w/ Geringer)	M.S.	2002		X	NCSU
Diana Popova	M.S.	1999		X	HUB
Axel Kühn	M.S.	1998		X	HUB
Matthias Tief	M.S.	1998		X	HUB
Matthias Adelberger	M.S.	1996		X	HUB

II Scholarship in the Realms of Faculty Responsibility

A Scholarly Accomplishments

A.1 Publications

Acceptance rates are reported for venues when available. Citations represent the non-self citations determined by the web service Google Scholar (based on an incomplete online search) and are reported for ten or more citations. The true number of citations may be higher since Google Scholar appears to not have access to the ACM and IEEE publication databases and since Google Scholar removes references that cannot be found online anymore after some time (implying that citation counts can not only go up but also down over time).

Books / Book Chapters

1. M. Caccamo and F. Mueller, editors. *Proceedings of the IEEE Real-Time Systems Symposium*. IEEE Computer Press, pages 1–376, 2017.
2. X. Shen, J. Tuck, and F. Mueller, editors. *Languages and Compilers for Parallel Computing*, volume 9519 of *Lecture Notes in Computer Science*. Springer, January 2016.
3. C. Zimmer, B. Bhat, F. Mueller, and S. Mohan. Reliable and scalable communication for the power grid. In Siddhartha Kumar Khaitan, James D. McCalley, and Chen Ching Liu, editors, *Cyber Physical Systems Approach to Smart Electric Power Grid*, pages 195–217, January 2015.
4. C. Zimmer, B. Bhat, F. Mueller, and S. Mohan. Intrusion detection for cps real-time controllers. In Siddhartha Kumar Khaitan, James D. McCalley, and Chen Ching Liu, editors, *Cyber Physical Systems Approach to Smart Electric Power Grid*, pages 195–217, January 2015.
5. Chao Wang, Sudharshan S. Vazhkudai, Xiaosong Ma, and Frank Mueller. Transparent fault tolerance for job input data in hpc environments. In Albert Y. Zomaya and Samee U. Khan, editors, *Handbook on Data Centers*, page (accepted). Springer, 2014.
6. C. Phillips and F. Mueller. Special issue: Best papers: International parallel and distributed processing symposium (ipdps) 2010. *Performance Evaluation of Supercomputers*, 73(7):897–1028, July 2013. DOI [http://dx.doi.org/10.1016/S0743-7315\(13\)00083-X](http://dx.doi.org/10.1016/S0743-7315(13)00083-X).
7. S. Brandt and F. Mueller, editors. *Proceedings of the IEEE Real-Time Embedded Technology and Applications Symposium*. IEEE Computer Press, pages 1–260, 2007.
8. F. Mueller and U. Kremer, editors. *Proceedings of the 2003 Conference on Languages, Compilers, and Tools for Embedded Systems*. ACM, pages isbn 1–58113–647–1, 2003.
9. F. Mueller, editor. *High-Level Parallel Programming Models and Supportive Environments*, volume 2026 of *Lecture Notes in Computer Science*. Springer, pages 1–137, 2001.
10. J. Rolim, F. Mueller, A. Zomaya, F. Ercal, F. Ercal, S. Olariu, B. Ravindran, J. Gustafsson, H. Takada, R. Olsson, L. Kale, P. Backman, M. Haines, H. ElGindy, D. Coaromel, S. Chaumette, G. Fox, Y. Pan, K. Li, T. Yang, G. Chiola, G. Conte, L. Mancini, D. Mery, B. Sanders, D. Bhatt, and V. Parsanna, editors. *Parallel and Distributed Processing*, volume 1586 of *Lecture Notes in Computer Science*. Springer, pages 1–1443, 1999. Workshop Proceedings of IPPS/SPDP’99.
11. F. Mueller and A. Bestravros, editors. *Languages, Compilers, and Tools for Embedded Systems*, volume 1474 of *Lecture Notes in Computer Science*. Springer, pages 1–260, 1998.

Refereed Journals

1. Anwesha Das, Arun Iyengar, and Frank Mueller. Keyvalueserve: Design and performance analysis of a multi-tenant data grid as a cloud service. *Concurrency and Computation: Practice and Experience*, pages e4424–n/a, 2018. e4424 cpe.4424, URL <http://dx.doi.org/10.1002/cpe.4424>, DOI 10.1002/cpe.4424.
2. A. Rezaei, F. Mueller, P. Hargrove, and E. Roman. Dino: Divergent node cloning for sustained redundancy in hpc. *Journal of Parallel Distributed Computing*, 109(C):250–262, July 2017. DOI 10.1016/j.jpdc.2017.06.010.

3. Amir Bahmani and Frank Mueller. Scalable communication event tracing via clustering. *Journal of Parallel Distributed Computing*, 109(7):230–244, July 2017. DOI 10.1016/j.jpdc.2017.06.008.
4. Amir Bahmani and Frank Mueller. Efficient clustering for ultra-scale application tracing. *Journal of Parallel Distributed Computing*, 98(12):25–39, December 2016. DOI DOI 10.1016/j.jpdc.2016.08.001.
5. James Elliott, Mark Hoemmen, and Frank Mueller. Exploiting data representation for fault tolerance. *Journal of Computational Science*, 14:51–60, May 2016.
6. L. Luo, J. R. Edwards, H. Luo, and F. Mueller. A fine-grained block ILU scheme on regular structures for GPGPU. *Computer & Fluids*, 119:149–161, September 2015.
7. M. Shekhar, H. Ramaprasad, and F. Mueller. Architecture aware semi partitioned real-time scheduling on multicore platforms. *Real-Time Systems*, 51(3), February 2015.
8. Y. Xia, L. Luo, H. Luo, J. Edwards, and F. Mueller. Openacc acceleration of an unstructured cfd solver based on a reconstructed discontinuous galerkin method for compressible flows. *International Journal for Numerical Methods in Fluids*, February 2015. DOI <http://dx.doi.org/10.1002/flid.4009>.
9. C. Zimmer and F. Mueller. Nocmsg: A scalable message passing abstraction for network-on-chips. *ACM Transactions on Architecture and Code Optimization*, 12(1), February 2015. DOI 10.1145/2701426.
10. X. Wu, F. Mueller, and S. Pakin. A methodology for automatic generation of communication executable specifications from parallel mpi applications. *ACM Transactions on Parallel Computing*, 1(1), September 2014. DOI 10.1145/2660249.
11. A. Sarkar, F. Mueller, and H. Ramaprasad. Static task partitioning for locked caches in multi-core real-time systems. *ACM Transactions on Embedded Computing Systems*, 14(1):4:1–4:30, January 2015.
12. Y. Zhang and F. Mueller. Auto-generation and auto-tuning of 3d stencil codes on homogeneous and heterogeneous gpu clusters. *IEEE Transactions on Parallel and Distributed Systems*, 24(3):417–427, March 2013. DOI DOI 10.1109/TPDS.2012.160.
13. X. Wu and F. Mueller. Scalaextrap: Trace-based communication extrapolation for spmd programs. *ACM Transactions on Programming Languages and Systems*, 34(1), April 2012. DOI DOI 10.1145/2160910.2160914.
14. C. Wang, F. Mueller, C. Engelmann, and S. Scott. Proactive process-level live migration and back migration in hpc environments. *Journal of Parallel Distributed Computing*, 72(2):254–267, February 2012. DOI 10.1016/j.jpdc.2011.10.009.
15. S. Ramanna, F. Mueller, and T. Gamblin. Memory trace compression and replay for spmd systems using extended prsds. *The Computer Journal*, pages 206–217, February 2012. DOI 10.1093/comjnl/bxr071.
16. B. Bhat and F. Mueller. Making dram refresh predictable. *Real-Time Systems*, 47(5):430–453, September 2011.
17. Y. Zhang, F. Mueller, Xiaohui Cui, and Thomas Potok. Large-scale multi-dimensional document clustering on gpu clusters. *Journal of Parallel Distributed Computing*, 71(2):211–224, 2011.
18. J. Marathe, V. Thakkar, and F. Mueller. Feedback-directed page placement for ccNUMA via hardware-generated memory traces. *Journal of Parallel Distributed Computing*, 70(12):1204–1219, 2010.
19. H. Ramaprasad and F. Mueller. Tightening the bounds on feasible preemptions. *ACM Transactions on Embedded Computing Systems*, 10(2):DOI 10.1145/1880050.1880063, December 2010.
20. S. Mohan, F. Mueller W. Hawkins, M. Root, D. Whalley, and C. Healy. Parametric timing analysis and its application to dynamic voltage scaling. *ACM Transactions on Embedded Computing Systems*, 10(2), December 2010. DOI DOI 10.1145/1880050.1880061.
21. M. Noeth, F. Mueller, M. Schulz, and B. R. de Supinski. Scalatrace: Scalable compression and replay of communication traces in high performance computing. *Journal of Parallel Distributed Computing*, 69(8):969–710, August 2009.
22. R. Wilhelm, J. Engblom, A. Ermedahl, N. Holsti, S. Thesing, D. Whalley, G. Bernat, C. Ferdinand, R. Heckmann, T. Mitra, F. Mueller, I. Puaut, P. Puschner, J. Staschulat, and P. Stenstrom. The worst-case execution time problem — overview of methods and survey of tools. *ACM Transactions on Embedded Computing Systems*, 7(3):1–53, April 2008. 115 citations.
23. Y. Zhu and F. Mueller. Exploiting synchronous and asynchronous dvs for feedback edf scheduling on an embedded platform. *ACM Transactions on Embedded Computing Systems*, 7(1):1–26, December 2007.
24. J. Marathe, F. Mueller, T. Mohan, S. A. McKee, B. R. de Supinski, and A. Yoo. Source-code correlated cache coherence characterization of openmp benchmarks. *IEEE Transactions on Parallel and Distributed Systems*, 18(6):818–834, June 2007.
25. J. Marathe, F. Mueller, T. Mohan, S. A. McKee, B. R. de Supinski, and A. Yoo. Metric: Memory tracing via dynamic binary rewriting to identify cache inefficiencies. *ACM Transactions on Programming Languages and Systems*, 29(2):1–36, April 2007. 31 citations.
26. J. Marathe, F. Mueller, and B. R. de Supinski. Analysis of cache coherence bottlenecks with hybrid hardware/software techniques. *ACM Transactions on Architecture and Code Optimization*, 3(4):390–423, December 2006.
27. W. Zhao, W. Krehling, D. Whalley, C. Healy, and F. Mueller. Improving wcet by applying worst-case path optimizations. *Real-Time Systems*, 34(2):129–152, October 2006.

28. K. Seth, A. Anantaraman, F. Mueller, and E. Rotenberg. Fast: Frequency-aware static timing analysis. *ACM Transactions on Embedded Computing Systems*, 5(1):200–226, February 2006. 59 citations.
29. W. Zhao, D. Whalley, C. Healy, and F. Mueller. Improving wcet by applying a wc code positioning optimization. *ACM Transactions on Architecture and Code Optimization*, 2(4):335–365, December 2005.
30. Y. Zhu and F. Mueller. Feedback edf scheduling of real-time tasks exploiting dynamic voltage scaling. *Real-Time Systems*, 31(1-3):33–63, December 2005. 108 citations.
31. N. Desai and F. Mueller. Scalable hierarchical locking for distributed systems. *Journal of Parallel Distributed Computing*, 64(6):708–724, June 2004.
32. J. Vetter and F. Mueller. Communication characteristics of large-scale scientific applications for contemporary cluster architectures. *Journal of Parallel Distributed Computing*, 63(9):853–865, September 2003. 118 citations.
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2. Neha Gholkar, Frank Mueller, and Barry Rountree. A power-aware cost model for hpc procurement. In *Workshop on High-Performance, Power-Aware Computing*, May 2016.
3. Amir Bahmani, Alex B. Sibley, Mahmoud Parsian, Kouros Owzar, and Frank Mueller. Sparkscore: Leveraging apache spark for distributed genomic inference. In *Workshop on High Performance Computational Biology*, May 2016.
4. X. Luo, F. Mueller, P. Carns, J. Jenkins, R. Latham, R. Ross, and S. Snyder. Hpc i/o trace extrapolation. In *Workshop on Extreme-Scale Programming Tools*, November 2015. DOI 10.1145/2832106.2832108.

5. James Elliott, Mark Hoemmen, and Frank Mueller. Exploiting data representation for fault tolerance. In *Workshop on Latest Advances in Scalable Algorithms for Large-Scale Systems*, November 2014.
6. Mahesh Lagadapati, Frank Mueller, and Christian Engelmann. Tools for simulation and benchmark generation at exascale. In *Parallel Tools Workshop*, September 2013.
7. A. Rezaei and F. Mueller. Sustained resilience via live process cloning. In *Workshop on Dependable Parallel, Distributed and Network-Centric Systems*, May 2013.
8. K. Ferreira, K. Pedretti, P. G. Bridges, R. Brightwell, D. Fiala, and F. Mueller. Evaluating operating system vulnerability to memory errors. In *Workshop on Runtime and Operating Systems for Supercomputers*, June 2012. DOI DOI 10.1145/2318916.2318930.
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10. D. Fiala, K. Ferreira, F. Mueller, and C. Engelmann. A tunable, software-based dram error detection and correction library for hpc. In *Workshop on Resiliency in High Performance Computing (Resilience) in Clusters, Clouds, and Grids*, September 2011. DOI DOI 10.1007/978-3-642-29740-3_29.
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13. Y. Zhang, F. Mueller, Xiaohui Cui, and Thomas Potok. A programming model for massive data parallelism with data dependencies. In *Workshop on Exploiting Parallelism using GPUs and other Hardware-Assisted Methods*, September 2009.
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16. F. Mueller. Cyber-physical aspects of energy systems for the 21st century: A perspective from the nsf erc freedm project. In *Workshop on New Research Directions for Future Cyber-Physical Energy Systems*, June 2009.
17. Y. Zhang, F. Mueller, Xiaohui Cui, and Thomas Potok. Gpu-accelerated text mining. In *Workshop on Exploiting Parallelism using GPUs and other Hardware-Assisted Methods*, March 2009.
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2. Onkar Patil, Saurabh Hukerikar, Frank Mueller, and Christian Engelmann. Exploring use-cases for non-volatile memories in support of hpc resilience. In *SC Poster Session*, November 2017.
3. Anwesha Das, Frank Mueller, Paul Hargrove, and Eric Roman. Pin-pointing node failures in hpc systems. In *SC Poster Session*, November 2016.
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5. K. Yagna and F. Mueller. Highly efficient and predictable group communication over multi-core nocs. In *Work in Progress at IEEE Real-Time Embedded Technology and Applications Symposium*, April 2013.
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9. Y. Zhang, X. Wu, and F. Mueller. Matcloud: Accelerating matlab services via a gpu cloud, September 2010.
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17. S. Mohan and F. Mueller. Checker mode: A hybrid scheme for timing analysis of modern processor pipelines involving hardware/software interactions. In *Work in Progress at IEEE Real-Time Embedded Technology and Applications Symposium*, pages 40–43, April 2007.
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2. James Elliott, Mark Hoemmen, and Frank Mueller. Model driven analysis of faulty ieee-754 scalars. Technical Report TR 2015-9, Dept. of Computer Science, North Carolina State University, November 2015.
3. M. Shekhar, H. Ramaprasad, and F. Mueller. Semi-partitioned scheduling for resource-sharing hard-real-time tasks. Technical Report TR 2014-8, Dept. of Computer Science, North Carolina State University, 2014.
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40. T. Qian. *End-to-end Predictability for Distributed Real-Time Systems*. PhD thesis, North Carolina State University, May 2017.
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80. J. Varma. Scalable, fault-tolerant membership for MPI tasks on hpc systems. Master's thesis, North Carolina State University, March 2006.
81. Y. Zhu. *Dynamic Voltage Scaling with Feedback EDF Scheduling for Real-Time Embedded Systems*. PhD thesis, North Carolina State University, August 2005.

82. N. Vouk. Buddy threading in distributed applications on simultaneous multi-threading processors. Master's thesis, North Carolina State University, April 2005.
83. A. Dhoot. Hybrid online/offline optimization of application binaries. Master's thesis, North Carolina State University, July 2004.
84. K. Seth. Frequency-aware static timing analysis for power-aware embedded architectures. Master's thesis, Dept. of CS, North Carolina State University, December 2003.
85. K. Patil. Compositional static cache analysis using module-level abstraction. Master's thesis, Dept. of CS, North Carolina State University, August 2003.
86. A. Nagarajan. Analyzing memory performance bottlenecks in openmp programs on smp architectures using ccsim. Master's thesis, North Carolina State University, August 2003.
87. J. Marathe. Metric: Tracking memory bottlenecks via binary rewriting. Master's thesis, North Carolina State University, July 2003.
88. N. Desai. Scalable distributed concurrency protocol with priority support. Master's thesis, North Carolina State University, June 2003.
89. F. Mueller. Efficient analysis of temporal properties for real-time systems. Habilitation, Humboldt University Berlin, September 2000.
90. C. Wagner. Algorithmen zum gegenseitigen Ausschluß in verteilten Systemen. Master's thesis, Humboldt University Berlin, Germany, December 1999.
91. F. Mueller. *Static Cache Simulation and its Applications*. PhD thesis, Dept. of CS, Florida State University, July 1994.
92. F. Mueller. Avoiding unconditional jumps by code replication. Master's thesis, Dept. of CS, Florida State University, April 1991.

A.2 Invited and Contributed Research Presentations

1. “GPU Supercomputing on Campus: More Parallelism Than You Can Handle?”, Research Computing Series at the Hill Library, NCSU, invited talk, Feb 14, 2018
2. “Synergy Between Predictability and Security”, moderator of break-out session, Dagstuhl, Germany, invited talked, Nov 2-4, 2016
3. “Time-Based Intrusion Detection in Cyber-Physical Systems”, Dagstuhl, Germany, invited talked, Nov 1, 2016
4. “Mini-Ckpts: Surviving OS Failures in Persistent Memory and Ptune: Power Tuning HPC Jobs”, Clusters, Clouds, and Data for Scientific Computing (CCDSC), Lyon, France, Oct 4, 2016
5. “Chips Center and HPC in Computer Science”, NC State University, Germany, Sep 19, 2016
6. “The Basics of Programming a Quantum Computer”, Zuse Institute Berlin, Germany, Jun 28, 2016
7. “Surviving OS Failures in Persistent Memory”, Friedrich-Alexander-University Erlangen-Nürnberg, Erlangen, Germany, Apr 4, 2016
8. “Surviving OS Failures in Persistent Memory”, Sandia National Laboratories, Albuquerque, NM, Mar 7, 2016
9. “Surviving OS Failures in Persistent Memory”, NetApp, Durham, NC, Nov 13, 2015
10. “Surviving OS Failures in Persistent Memory”, Samsung, Santa Clara, CA, Oct 29, 2015
11. “On the Implications of Large-Scale Manycores and NoCs for Exascale”, Lawrence Berkeley National Laboratory, Berkeley, CA, Oct 28, 2015
12. “On the Implications of Large-Scale Manycores and NoCs for Exascale”, Oak Ridge National Laboratory, Berkeley, CA, Aug 11, 2015
13. “Auto-tuning and Language Abstractions for GPUs”, Imperial College, London, U.K., May 15, 2015
14. “Predictability for Uni- and Multi-Core Real-Time/Cyber-Physical Systems”, Friedrich-Alexander-University (FAU) Erlangen-Nuremberg, Germany, Mar 26, 2015
15. “Auto-tuning and Language Abstractions for GPUs”, Zuse Institute Berlin, Germany, Mar 16, 2015
16. “Auto-tuning and Language Abstractions for GPUs”, ETH Zurich, Switzerland, Mar 2, 2015
17. “Predictability for Uni- and Multi-Core Real-Time/Cyber-Physical Systems”, University of Braunschweig, Germany, Jan 23, 2015
18. “Elastic and Scalable Communication Tracing, Benchmark Generation and Simulation”, RTHW Aachen University, Aachen, Germany, Jan 19, 2015
19. “Advances in HPC Resilience”, SPPEXA Workshop on System Software for Exascale Computing, Dresden, Germany, Dec 8, 2014
20. “ScalaTrace and Friends: Scalable Tracing, Benchmark Generation, Analysis and Simulation of Communication”, invited to Birds of Feathers “Performance Analysis and Simulation of MPI Applications and Runtimes at Exascale”, Supercomputing’14, Nov 18, 2014
21. “On Determining a Viable Path to Resilience at Exascale”, Clusters, Clouds, and Data for Scientific Computing (CCDSC), Lyon, France, Sep 3, 2014
22. “Predictability for Uni- and Multi-Core Real-Time/Cyber-Physical Systems”, CISTER - Research Centre in Real-Time Computing and Embedded Computing Systems (CISTER), Porto, Portugal, Sep 1, 2014
23. “Elastic and Scalable Communication Tracing, Benchmark Generation and Simulation”, PNNL, Pasco, WA, May 14, 2014

24. "GPU Acceleration of CFD Codes and Optimizing for GPU Memory Hierarchies", AFOSR-BRI Workshop, Blacksburg, VA, Feb 7, 2014
25. "Fault-Tolerance in Exascale", SPPEXA Workshop on System Software for Exascale Computing, Dec 11, 2013
26. "Fault Tolerance for Exascale Computing", Workshop on Modeling and Simulation of Exascale Systems and Applications, Seattle, WA, Sep 18, 2013
27. "A System's View of Analyzing Big Data", Laboratory for Analytic Sciences (LAS), NCSU, Jul, 2013
28. "On Determining a Viable Path to Resilience at Exascale", keynote at PDSEC'13 workshop, in conjunction with IPDPS'13, Boston, May 24, 2013.
29. "On Determining a Viable Path to Resilience at Exascale", Oak Ridge National Lab, Oak Ridge, TN, Apr 9, 2013.
30. "On Determining a Viable Path to Resilience at Exascale", International Workshop on Extreme Scale Parallel Architectures and Systems, in conjunction with HiPEAC'13, Berlin, Germany, Jan 23, 2013.
31. "On Determining a Viable Path to Resilience at Exascale", Zuse Institute Berlin, Germany, Jul 3, 2012.
32. "On Determining a Viable Path to Resilience at Exascale", Salishan Conference on High Speed Computing, Lincoln, OR, Apr 24, 2012.
33. "Extrapolation and Generation of Benchmarks from Application Traces", HLRS Stuttgart, Germany, Feb 10, 2012.
34. "Extrapolation and Generation of Benchmarks from Application Traces", HEC-FSIO Workshop panel, Washington D.C., Aug 8, 2011.
35. "Extrapolation of and Code Generation from Communication Traces", CScADS Tools Workshop, Tahoe City, CA, Aug 1, 2011.
36. "ScalaExtrap: Trace-Based Communication Extrapolation for SPMD Programs", Tsinghua University, Beijing, China, Dec 13, 2010.
37. "ScalaExtrap: Trace-Based Communication Extrapolation for SPMD Programs", ICT, Beijing, China, Dec 13, 2010.
38. "Challenges and Opportunities of HPC-based Distributed Systems", ICPADS'10, Shanghai, China, panel, Dec 8-10, 2010.
39. "Uni- and Multi-Core Real-Time Systems Considerations for CPS", NSF CPS Summer School, Georgia Tech, invited talk, June 23-24, 2010.
40. "ScalaTrace: Ultra-scalable tracing, analysis and modeling of HPC codes", PARA'10, Iceland, invited talked, Jun 6-9, 2010.
41. "ScalaTrace: Ultra-scalable tracing, analysis and modeling of HPC codes", Dagstuhl, Germany, invited talked, May 2-7, 2010.
42. "Data Mining on GPU Clusters", Portland State University, invited talk, November 16, 2009.
43. "Challenges and Solutions for Transparent Resilience in HPC", HP-CAST (HP Consortium for Advanced Scientific and Technical Computing users group), invited talk, November 13, 2009.
44. "ScalaTrace: Ultra-scalable tracing, analysis and modeling of HPC codes", LACSS (Los Alamos Computer Science Symposium), Workshop on Performance Analysis of Extreme-Scale Systems and Applications, October 14, 2009.
45. "Transparent Process-level Fault Tolerance for MPI: Challenges and Solutions", LACSS (Los Alamos Computer Science Symposium), Workshop on HPC Resiliency, October 14, 2009.
46. "ScalaTrace: Scalable Compression and Timed Replay of Communication Traces", Lawrence Berkeley National Laboratory, CA, Apr 15, 2009.
47. "ScalaTrace: Scalable Compression and Timed Replay of Communication Traces", Oak Ridge National Laboratory, TN, Jan 7, 2009.

48. "ScalaTrace: Scalable Compression and Timed Replay of Communication Traces", Florida State University, FL, Dec 23, 2008.
49. "Shared-Memory Tuning via Hardware-assisted Memory Tracing", North Carolina State University, Dept. of ECE, Sep 12, 2008.
50. "Extreme Computing Systems", NCSU Alumni, NC, Aug 28, 2008.
51. "ScalaTrace: Scalable Compression and Timed Replay of Communication Traces", IBM T.J. Watson, NY, Aug 22, 2008.
52. "ScalaTrace: Scalable Compression and Replay of Communication Traces", Zuse Institute Berlin, Germany, May 29, 2008.
53. "Shared-Memory Tuning via Hardware-assisted Memory Tracing", FZ Juelich, Germany, December 13, 2007.
54. "Fault Tolerance via Virtualization for High-Performance Computing", TU Dresden, Germany, November 7, 2007.
55. "Shared-Memory Tuning via Hardware-assisted Memory Tracing", U. of Karlsruhe, Germany, October 29, 2007.
56. "ScalaTrace: Scalable Compression and Replay of Communication Traces", TU Dresden, Germany, October 16, 2007.
57. "DVSleak: Combining Leakage Reduction and Voltage Scaling in Feedback EDF Scheduling", TU Cottbus, Germany, September 25, 2007.
58. "ScalaTrace: Scalable Compression and Replay of Communication Traces", Dagstuhl, Germany, Jul 22, 2007 at a seminar titled "Code Instrumentation and Modeling for Parallel Performance Analysis".
59. "Hardware-assisted Memory Tracing and its Benefits for Performance Tuning within the Memory Hierarchy of Shared-Memory HPC Systems", Zuse Institute Berlin, Germany, June 21, 2007.
60. "Hardware-assisted Memory Tracing and its Benefits for Performance Tuning within the Memory Hierarchy of Shared-Memory HPC Systems", Virginia Tech, August 25, 2006.
61. "Can Timing Analysis Increase the Acceptance of Real-Time Scheduling Results?", UNC Chapel Hill, April 21, 2006; Boston University, May 31, 2006.
62. "Win-win partnership of academia and industry", IEEE Real-Time Technology and Applications Symposium/Embedded Systems Conference joint panel, April 6, 2006.
63. "Hardware Profile-guided Automatic Page Placement for ccNUMA Systems", Lawrence Livermore National Laboratory, April 5, 2006.
64. "Alleviating Memory Bottlenecks in SMPs", Distinguished Alumni Lecture Series, Florida State University, October 28, 2005.
65. "A Hybrid Hardware/Software Approach to Efficiently Determine Cache Coherence Bottlenecks", Lawrence Livermore National Laboratory, March 9, 2005.
66. "Power Awareness and Timing Safety for Embedded Systems", IEEE Embedded Systems SIG, November 17, 2004.
67. "Detailed Cache Coherence Characterization for OpenMP Benchmarks", HP Labs, July 22, 2004.
68. "Detailed Cache Coherence Characterization for OpenMP Benchmarks", Lawrence Livermore National Laboratory, July 21, 2004.
69. "METRIC and ccSIM: Tracking Down Inefficiencies in the Memory Hierarchy via Binary Rewriting", Oak Ridge National Laboratory, September 24, 2003.
70. "Systems Research at NCSU" (with Vincent Freeh), presented to Sun Microsystems, June 19, 2003.
71. "METRIC: Tracking Down Inefficiencies in the Memory Hierarchy via Binary Rewriting", Lawrence Livermore National Laboratory, March 25, 2003.

72. "Scalable Distributed Concurrency Services for Hierarchical Locking", Oak Ridge National Laboratory, August 29, 2002.
73. "SPAN: Shared-Memory Performance Analysis", Lawrence Livermore National Laboratory, July 29, 2002.
74. "Shared-Memory Performance Analysis", Intel Research, July 22, 2002.
75. "Partial Data Traces", Duke University, February 27, 2002.
76. "Research Topics in Embedded Systems", presented to nVidia, April 5, 2002.
77. "Research Topics in Embedded Systems", presented to nVidia, December 7, 2001.
78. "Research Topics in Embedded Systems", presented to IBM, October 29, 2001.
79. "Research Topics in Embedded Systems", presented to Mitsubishi, October 1, 2001.
80. "Research Topics in Embedded Systems", presented to Ericsson, November 5, 2001.
81. "Research Topics in Embedded Systems", presented to Semiconductor Research Cooperation (SRC), October 10, 2001.
82. "Control-flow Optimization by Code Replication", Humboldt University Berlin, May 31, 2001.
83. "Performance Analysis of Large Clusters", Humboldt University Berlin, May 29, 2001.
84. "Transitive Closures in Code Optimizations", University of San Francisco, April 6, 2001.
85. "Efficient Analysis of Temporal Properties for Real-Time Systems", UNC Chapel Hill, September 21, 2001.
86. "Efficient Analysis of Temporal Properties for Real-Time Systems", University of York, August, 2001.
87. "Efficient Analysis of Temporal Properties for Real-Time Systems", Oregon Graduate Institute, April 17, 2001.
88. "Efficient Analysis of Temporal Properties for Real-Time Systems", North Carolina State University, March 27, 2001.
89. "Efficient Analysis of Temporal Properties for Real-Time Systems", University of Pittsburgh, March 26, 2001.
90. "PlayDoh, Epic, ... And What's Next?", Dagstuhl, Germany, September 21, 2000 at a seminar titled "Code Optimization: Trends, Challenges and Perspectives".
91. "Realistic Timing Analysis of Real-Time Systems – A Formal Framework, Supporting Protocols, and an Implementation", University of California at Davis, March 24, 2000, repeated at Computer Science Colloquium, Humboldt University Berlin, May 18, 2000.
92. "On the Design and Implementation of DSM-Threads", Keynote in Workshop on Parallel Computing for Irregular Applications (WPCIA'00) in conjunction with High-Performance Computer Architecture (HPCA-6), Toulouse, France, January 8, 2000.
93. "The Design of DSM-Threads", Free University Berlin, Germany, Computer Science Colloquium, August 9, 1998.
94. "Timing Analysis for Set-Associative Instruction Caches", University of the Saarland, Saarbruecken, Germany, Department of Computer Science, invited by Prof. Wilhelm under DFG-SFB 124 "Special Research Project for VLSI and Parallelism", December 12, 1996.
95. "Timing Analysis for Real-Time Systems", Daimler-Chrysler Research Berlin, September 24, 1996; repeated at Tag der Informatik, Humboldt University Berlin, November 7, 1996.

A.3 By Invitation-Only Meetings

- Dagstuhl, Germany, Oct 30-Nov 4, 2016, seminar titled “Adaptive Isolation for Predictability and Security”.
- Workshop on Clusters, Clouds, and Data for Scientific Computing (CCDSC), Lyon, France, Oct 3-6, 2016.
- Dagstuhl, Germany, Aug 16-21, 2015, seminar titled “Power-Bounded HPC Performance Optimization”.
- Dagstuhl, Germany, Sep 28-Oct 1, 2014, seminar titled “Resilience in Exascale Computing”.
- Workshop on Clusters, Clouds, and Data for Scientific Computing (CCDSC), Lyon, France, Sep 2-5, 2014.
- Workshop on Modeling and Simulation of Exascale Systems and Applications, Seattle, WA, Sep 18-19, 2013.
- Salishan Conference on High Speed Computing, Lincoln, OR, Apr 23-27, 2012.
- HEC-FSIO Workshop, Washington D.C., Aug 8-10, 2011.
- CScADS Tools Workshop, Tahoe City, CA, Aug 1-4, 2011.
- Dagstuhl, Germany, May 2-7, 2010, seminar titled “Program Development for Extreme-Scale Computing”.
- Planning Workshop on “New Research Directions for Future Cyber-Physical Energy Systems”, Baltimore, MD, June 2009 (session moderator).
- Dagstuhl, Germany, May 3-8, 2009, seminar titled “Fault Tolerance in High-Performance Computing and Grids”.
- Google Faculty Summit, July 2008
- Dagstuhl, Germany, Jul 22, 2007, seminar titled “Code Instrumentation and Modeling for Parallel Performance Analysis”.
- ARO Planning Workshop on Embedded Systems and Network Security (ESNS’07), Feb 2007 (Co-chair), February 2007
- Microsoft Faculty Summit, July 2005
- Organized 1st “RTP Embedded Systems Faculty Meeting” between UNC Chapel Hill, Duke and NCSU, November, 2004.
- Microsoft Faculty Summit, July 2003
- CRA/NITRD Workshop on the Road Map for the Revitalization of High End Computing, white paper accepted and invited for participation, June 2003, Washington, D.C.
- Dagstuhl, Germany, September 21, 2000, seminar titled “Code Optimisation: Trends, Challenges and Perspectives”.

A.4 Appointment to Professional Boards

- Boards:
 - IEEE TCRTS (IEEE Technical Committee on Real-Time Systems): Chair of the Conference Planning Subcommittee, 2018-
 - IEEE TCRTS (IEEE Technical Committee on Real-Time Systems): Member of the executive committee, 2016-2018
 - TPDS (IEEE Transactions on Parallel and Distributed Systems): Member of the editorial board, 2010-2017 (2 terms)
 - Journal of Embedded Computing (JEC) by Cambridge International Science Publishing: Member of the editorial board

- SIGBED (ACM Special Interest Group on Embedded Systems): Member of the SIGBED Executive Committee (founding member), 2003-2005
- Elected chair of the LCTES steering committee for 2003-2006 (ACM SIGPLAN Conference on Language, Compiler, and Tool Support for Embedded Systems)
- Journal of Parallel and Distributed Computing (JPDC): Guest editor (2x)
- ACM Transactions of Embedded Computing Systems (TECS): Guest editor
- EURASIP Journal on Embedded Systems: Guest editor
- Working Groups/Committees:
 - 2017 IEEE CS Fellows Evaluation Committee
 - European Network of Excellence ARTIST (Advanced Real Time Systems), Member of the International Working Group on Timing Validation (founding member) /MP
- General and PC Chair / Co-Chair:
 - RTSS'17 (IEEE Real-Time Systems Symposium), General chair
 - LCPC'15, (International Workshop on Languages and Compilers for Parallel Computing), Co-chair
 - Dagstuhl'14 (Seminar on Resilience in Exascale Computing), Co-chair
 - CPASG'11 (Workshop on Cyber Physical Applications in Smart Grids)
 - Dagstuhl'09 (Seminar on Fault Tolerance in High-Performance Computing and Grids), Co-chair
 - RTAS'08 (IEEE Real-Time Embedded Technology and Applications Symposium), General co-Chair
 - ESNS'07 (ARO Planning Workshop on Embedded Systems and Network Security), Co-chair
 - WCET'06 (Workshop on Worst-case Execution Time (WCET) Analysis (w/ ECRTS'06), Chair
 - CRTES'06 (Workshop on Research Directions for Security and Networking in Critical Real-Time and Embedded Systems (w/ RTAS'06), Co-Chair
 - HiPC'04 (International Conference on High-Performance Computing), Program Vice (Track) Chair for Applications and Supportive Environments, April 2001), Chair
 - CTCES'03 (Workshop on Compilers and Tools for Constrained Embedded Systems), Co-Chair
 - LCTES'03 (ACM SIGPLAN Conference on Language, Compiler, and Tool Support for Embedded Systems 2003), General Chair
 - MSP'02 (ACM SIGPLAN Workshop on Memory System Performance, June 2002), General Chair
 - HIPS'01 (IEEE Workshop on High-Level Parallel Programming Models
 - HIPS'99 (IEEE Workshop on High-Level Parallel Programming Models and Supportive Environments, April 1999), Co-Chair
 - PLRTIA'98 (IEEE Workshop on Programming Languages for Real-Time Industrial Applications), Co-Chair
 - LCTES'98 (ACM SIGPLAN Workshop on Language, Compiler, and Tool Support for Embedded Systems 1998), Co-Chair
- PC Chair:
 - Cluster'16 (IEEE International Conference on Cluster Computing), PC Vice chair for Architecture, Network/Communications, and Management track
 - RTSS'16 (IEEE Real-Time Systems Symposium), PC chair
 - SC'15 (International Conference for High Performance Computing, Networking, Storage, and Analysis), PC track chair
 - RTAS'14 (IEEE Real-Time Embedded Technology and Applications Symposium), Industrial track chair
 - Cluster'12 (IEEE International Conference on Cluster Computing), PC Vice chair for Tools, Systems Software, and Middleware track

- IPDPS’11 (IEEE International Parallel & Distributed Processing Symposium), PC chair
 - Cluster’10 (IEEE International Conference on Cluster Computing), PC Vice chair for Tools, Systems Software, and Middleware track
 - PACT’09 (Parallel Architectures and Compilation Techniques), PC co-chair
 - IPDPS’09 (IEEE International Parallel & Distributed Processing Symposium), PC Vice chair for software track
 - RTAS’07 (IEEE Real-Time Embedded Technology and Applications Symposium), PC co-Chair
 - RTAS’06 (IEEE Real-Time and Embedded Technology and Applications Symposium), PC Track Chair
 - HiPC’04 (International Conference on High-Performance Computing, December 2004), Program vice chair (applications)
 - PLRTIA’98 (IEEE Workshop on Programming Languages for Real-Time Industrial Applications, December 1998), PC co-chair
- Program Committee Member:
 - EMPIRe’17, (Extending MPI for Resilience workshop)
 - LCPC’17,’16, (International Workshop on Languages and Compilers for Parallel Computing)
 - HPPAC’16 (Workshop on High-Performance, Power-Aware Computing)
 - VarSys’16 (Workshop on Variability in Parallel and Distributed Systems)
 - PACT’17 (Parallel Architectures and Compilation Techniques) “External Review Committee”
 - PACT’15 (Parallel Architectures and Compilation Techniques)
 - IPDPS’18,’17,’15 (IEEE International Parallel & Distributed Processing Symposium)
 - ICAC’14 (International Conference on Autonomic Computing)
 - EuroPar’14
 - ccGrid’15,’14 (IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing)
 - PPOPP’18,’14,’12 (ACM Principles & Practice of Parallel Programming) “External Review Committee”
 - PMAM’13 (Workshop on Programming Models and Applications for Multicores and Manycores)
 - AsHES’13 (Workshop on Accelerators and Hybrid Exascale Systems)
 - RTLW’12 (Real-Time Linux Workshop)
 - Cluster’12 (IEEE International Conference on Cluster Computing)
 - EuroSys’12 (European Conference on Computer Systems)
 - PPOPP’15,’12 (ACM Principles & Practice of Parallel Programming)
 - WEA-CPS’10 (Workshop on Energy-Aware Design and Analysis of Cyber-Physical Systems)
 - HIPEAC’10, (International Conference on High-Performance Architectures and Compilers) “External Review Committee”
 - Resilience’10 (Workshop on Resiliency in HPC)
 - ICDCS’13,10 (International Conference on Distributed Computing Systems)
 - ECRTS’15,’14,’12,’11,10,09,08,06,05,04,03,02,01,00 (European Conference on Real-Time Systems)
 - RTAS’17,’16,’14,’12,’11,10,09,07,06,05 (IEEE Real-Time Embedded Technology and Applications Symposium)
 - CASES’13,12,’11,10,09,03 (International Conference on Compilers, Architecture, and Synthesis for Embedded Systems)
 - Resilience’09 (Workshop on Resiliency in Petascale HPC)
 - CPS-SEC’09 (First Workshop on Cyber-physical Systems Security)
 - SSS’09 (Symposium on Stabilization, Safety, and Security of Distributed Systems)
 - NAS’09 (IEEE International Conference on Networking, Architecture, and Storage)
 - PLDI’09 (ACM SIGPLAN Conference on Programming Language Design), “External Review Committee”

- LCTES'17,'16,'14,'13,12,'11,'09,08,07,06,05 (ACM SIGPLAN Conference on Language, Compiler, and Tool Support for Embedded Systems)
- DIPES'08 (IFIP Working Conference on Distributed and Parallel Embedded Systems)
- ISPA'12,'08 (International Symposium on Parallel and Distributed Processing and Applications)
- Resilience'08 (Workshop on Resiliency in HPC)
- PPABS'08 (Workshop on Parallel Programming on Accelerator-Based Systems)
- RTSS'16,'14,'13,12,'08,06,05,02 (IEEE Real-Time Systems Symposium)
- ICPP'12,'11,08,07,05 (International Conference on Parallel Processing)
- HPCVirt'07 (Workshop on System-level Virtualization for High Performance Computing)
- SC'16,'15,'14,'13,12,11,07 (International Conference for High Performance Computing, Networking, Storage, and Analysis)
- SC'17 (International Conference for High Performance Computing, Networking, Storage, and Analysis) "Workshops PC"
- SC'08 (International Conference for High Performance Computing, Networking, Storage, and Analysis) "Tutorial PC"
- ICS'17,'15,'14,'12,'07 (ACM International Conference on Supercomputing)
- HIPEAC'07 (International Conference on High-Performance Architectures and Compilers)
- HAPCW'06,05 (Availability and Performance Computing Workshop)
- CGO'13,06 (International Symposium on Code Generation and Optimization)
- ICPADS'06 (International Conference on Parallel and Distributed Systems)
- RTCSA'06 (IEEE Intl. Conference on Embedded and Real-Time Computing Systems and Applications)
- CRTES'06 (Workshop on Research Directions for Security and Networking in Critical Real-Time and Embedded Systems (w/ RTAS'06))
- WCET'06 (Workshop on Worst-case Execution Time (WCET) Analysis (w/ ECRTS'06))
- HPCCom'11,06 (International Conference on High Performance Computing and Communications)
- HCSP-CPS'06 (National Workshop on High Confidence Software Platforms for Cyber-Physical Systems: Research Needs and Roadmap)
- EMSOFT'18,05,04 (International Conference on Embedded Software)
- IFDWSN'05 (Workshop on Information Fusion and Dissemination in Wireless Sensor Networks)
- PARC'04 (Workshop on Power-Aware Real-Time Computing)
- ARTC'04 (Workshop on Architectures for Real-Time Computing)
- ERTSI'04 (Workshop on Embedded Real-Time Systems Implementation)
- HIPS'04,03,02,01,00 (WS on High-Level Parallel Programming Models and Supportive Environments)
- CAES'03 (Workshop on Constraint-Aware Embedded Software)
- Scopes'03 (International Workshop on Software and Compilers for Embedded Systems)
- DSM'03 (WS on Distributed Shared Memory on Clusters)
- LCTES'02/Scopes'02 (ACM Conference on Language, Compiler, and
- MSP'02 (ACM SIGPLAN Workshop on Memory System Performance)
- ISORC'02 (IEEE International Symposium on Object-Oriented Real-Time Distributed Computing)
- WPDRTS'02 (Workshop on Parallel and Distributed Real-Time Systems)
- DSM'02/WSDSM'02 (WS on Software Distributed Shared Memory)
- RTSP'00,99,98,97 (WS on Runtime Systems for Parallel Processing)
- CIC'00 (International Conference on Communications in Computing)
- DOCS'00 (Conference on Distributed Objects in Computational Science)

- DSM'01 (WS on Distributed Shared Memory on Clusters)
- PADDA'01 (WS on Performance-Oriented Program Development for Distributed Architectures)
- LCTES'01,99 (ACM WS on Language, Compiler, and Tool Support for Embedded Systems) Tool Support for Embedded Systems)
- LCTRTS'97 (ACM WS on Language, Compiler, and Tool Support for Real-Time Systems)
- Steering Committee Member:
 - IPDPS'13,12,'11 (IEEE International Parallel & Distributed Processing Symposium)
 - PACT'12,11,'10,'09 (Parallel Architectures and Compilation Techniques)
 - TC-RTS'09,08,07 (IEEE Technical Committee on Real-Time Systems)
 - HIPS'00-'18 (WS on High-Level Parallel Programming Models and Supportive Environments)
 - LCTES'09,08,07,06,05,04,03,02 (ACM Conference on Language, Compiler, and Tool Support for Embedded Systems)
 - MSP'05,04 (ACM SIGPLAN Workshop on Memory System Performance)
 - LCTES'01,00,99 (ACM WS on Language, Compiler, and Tool Support for Embedded Systems)
- Local Chair:
 - PPOPP'09 (ACM Principles & Practice of Parallel Programming)
 - PLDI'02 (ACM SIGPLAN Conference on Programming Language Design and Implementation), Berlin, Germany
- Publicity Chair / Vice Chair:
 - PACT'02 (International Conference on Parallel Architectures and Compilation Techniques), Charlottesville, Virginia
 - CASES'02 (International Conference on Compilers, Architecture, and Synthesis for Embedded Systems)

A.5 External Reviews

- Funding Agencies:
 - NSF panelist, 2018
 - IEEE CS Fellows Committee, 2017/18
 - IEEE CS Fellows Committee, 2016/17
 - NSF panelist, 2016
 - NSF review (outside of panel function), 2015
 - NSF panelist, 2014
 - NSF review (outside of panel function), 2014
 - NSF review (outside of panel function), 2012
 - NSF panelist, 2012
 - NSF panelist, 2011
 - Austrian Science Fund (NSF equivalent of Austria), project report review, 2010
 - Belgium FWO reviewer (outside of panel function), 2010
 - NSF panelist, 2010
 - DOE panelist, 2009
 - NASA review (outside of panel function), 2007

- NSF panelist, 2007
 - DOE review (outside of panel function), 2006
 - NSF panelist, 2006
 - Austrian Science Fund (NSF equivalent of Austria), 2006
 - NSF panelist, 2005
 - NSF review (outside of panel function), 2004
 - NSF panelist, 2003
 - NSF review (outside of panel function), 2002
 - NSF panelist, 2002
 - ARTES (A network for real-time research and graduate education in Sweden) by the Swedish Foundation for Strategic Research, 2000
- Journals:
 - IEEE Computer
 - CACM (Communications of the ACM)
 - TOPLAS (ACM Transactions on Programming Languages and Systems)
 - TSE (ACM Transactions on Software Engineering)
 - ToCS (ACM Transactions on Computer Systems)
 - TECS (ACM Transactions on Embedded Computer Systems)
 - TACO (ACM Transactions on Architecture and Code Optimization)
 - TPDS (IEEE Transactions on Parallel and Distributed Systems)
 - TC (IEEE Transactions on Computers)
 - TSMC (IEEE Transactions on Systems, Man, and Cybernetics)
 - TCAD (IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems)
 - DT (IEEE Design & Test of Computers)
 - Proceedings of the IEEE
 - JPDC (Journal on Parallel and Distributed Computing)
 - SP&E (Software - Practice and Experience)
 - RTS (Real-Time Systems Journal)
 - I+ST (Information and Software Technology, Elsevier)
 - IEE Software (British IEE Proceedings, Software)
 - PCJ (Parallel Computing Journal)
 - JPC (Journal of Systems Architecture)
 - MICPRO (Journal of Microprocessors and Microsystems)
 - IJHPC (Int'l Journal of High Performance Computing)
 - LITES (Leibniz Transactions on Embedded Systems)
 - Conferences and Workshops:
 - see also all venues where served as a PC member
 - ICS'09,'10 (ACM International Conference on Supercomputing)
 - MASCOTS'06 (IEEE International Symposium on Measurement and Simulation of Computer and Telecommunication Systems)
 - PLDI'06,05,03,'02 (ACM SIGPLAN Conference on Programming Language Design)
 - IISWC'05 (IEEE International Symposium on Workload Characterization)

- Micro'05 (IEEE/ACM International Symposium on Microarchitecture)
- Performance'05
- EuroPar'05
- LCTES'04,01,99 (WS on Language, Compiler, and Tool Support for Embedded Systems)
- DSN'04 (International Conference on Dependable Systems and Networks) and Implementation)
- ECRTS'02,01,00 (European Conference on Real-Time Systems)
- RTSS'02 (IEEE Real-Time Systems Symposium)
- HIPS'01,00 (WS on High-Level Parallel Programming Models and Supportive Environments)
- RTAS'01 (IEEE Real-Time Technology and Applications Symposium)
- DOCS'00 (Conference on Distributed Objects in Computational Science)
- CIC'00 (International Conference on Communications in Computing)
- RTSPP'00,99,98,97 (WS on Runtime Systems for Parallel Processing)
- HICSS'00 (Hawaii International Conference on System Sciences, Minitrack on Compilers and Tools in Embedded Systems)
- RTSS'99 (Real-Time Systems Symposium)
- PoDC'99 (Principles of Distributed Programming)
- PPOPP'99 (ACM Principles & Practice of Parallel Programming)
- IPPS'98 (International Parallel Processing Symposium)
- LCTRTS'97 (WS on Language, Compiler, and Tool Support for Real-Time Systems)

B Research Project Record



Sponsored Project Activity for Frank Mueller since January 1, 2017

External Funding						
2012-1281	SHF: Small: Scalable Trace-Based Tools for In-Situ Data Analysis of HPC Applications (ScalaJack)	Mueller, Frank	Computer Science	National Science Foundation (NSF)	\$457,395	06/01/2012 through 05/31/2017
2012-2099	CPS: Breakthrough: Collaborative Research: Bringing the Multicore Revolution to Safety-Critical Cyber-Physical Systems	Mueller, Frank	Computer Science	National Science Foundation (NSF)	\$225,000	02/01/2013 through 01/31/2018
2013-1668	Collaborative Research: CPS: Synergy: Distributed Asynchronous Algorithms and Software Systems for Wide-Area Monitoring of Power Systems	Chakraborty, Aranya Mueller, Frank	Electrical and Computer Engineering	National Science Foundation (NSF)	\$400,000	10/01/2013 through 09/30/2018
2013-1741	Hobbes: OS and Runtime Support for Application Composition	Mueller, Frank	Computer Science	Sandia National Laboratories (Prime - US Dept. of Energy (DOE) - Advanced Scientific Computing Research (ASCR))	\$300,000	10/24/2013 through 09/30/2017
2015-1568	SHF: Small: Improving Memory Performance on Fused Architectures through Compiler and Runtime Innovations	Shen, Xipeng Mueller, Frank	Computer Science	National Science Foundation (NSF)	\$470,000	08/01/2015 through 07/31/2018
2016-2276	A Deep-Learning Approach Towards Auto-Tuning CFD Codes	Mueller, Frank Edwards, Jack R. Luo, Hong	Computer Science	Virginia Polytechnic Institute and State University (aka Virginia Tech) (Prime - US Air Force - Office of Scientific Research (AFOSR))	\$90,000	06/01/2017 through 02/14/2018
2017-0256	Failure Prediction with Exact Localization	Mueller, Frank	Computer Science	Lawrence Berkeley National Laboratory - University of California - Berkeley (Prime - US Dept. of Energy (DOE))	\$84,684	10/18/2016 through 03/31/2018
2017-0443	HPC Power Modeling and Active Control	Mueller, Frank	Computer Science	Lawrence Livermore National Laboratory (Prime - US Dept. of Energy (DOE))	\$253,217	10/25/2016 through 09/30/2019
2017-0759	Large-Scale Automatic Analysis of the OAI Magnetic	Mueller, Frank	Computer Science	UNC - UNC Chapel Hill (Prime - National	\$85,352	08/15/2017 through

	Resonance Image Dataset			Institutes of Health (NIH)		07/31/2022
2017-2873	Student Travel Grant for RTSS'17 Ph.D. Student Poster Forum on Real-Time Aspects of Internet of Things and Cyber-Physical Systems	Mueller, Frank	Computer Science	National Science Foundation (NSF)	\$15,000	09/01/2017 through 08/31/2018
2018-1440	Auto-Tuned Per-Loop Compilation	Mueller, Frank	Computer Science	Lawrence Livermore National Laboratory (Prime - US Dept. of Energy (DOE))	\$50,000	01/24/2018 through 01/31/2019
Total external funding: \$2,430,648						

Internal Funding						
Total internal funding: \$0						

Pending Proposals (including pre-proposals)						
2017-2983	Collaboration on Software Systems for Power Control	Mueller, Frank	Computer Science	ABB, Inc	\$0	
2018-0749	Enhanced System Security for Robotic Surgical Devices	Mueller, Frank	Computer Science	Intuitive Surgical, Inc.	\$50,000	
2018-1081	CRI Preliminary: II-EN: Infrastructure Enhancement for Advanced Research on Computing with Heterogeneous Architectures at Scale (ARCHAS)	Mueller, Frank Gu, Xiaohui Shen, Xipeng Freeh, Vincent W. Vouk, Mladen A.	Computer Science	National Science Foundation (NSF)	\$1,000,000	
2018-1246	SHF: Small: Exploiting Persistent Data in HPC (ExPerD)	Mueller, Frank	Computer Science	National Science Foundation (NSF)	\$500,000	
2018-1258	SaTC: CORE: Small: Enhanced Security and Reliability for Embedded Control Systems	Mueller, Frank	Computer Science	National Science Foundation (NSF)	\$500,000	
2018-1259	CSR: Small: Real-Time Preditable Computing for Massively Parallel Platforms	Mueller, Frank	Computer Science	National Science Foundation (NSF)	\$500,000	
Total of pending proposals: \$2,550,000						

Non-funded Projects						
2017-1199	CRI Pre-Proposal: II-EN: ChaCha --- An Infrastructure for Systems Research on Computing with Heterogeneous Architectures at Scale	Mueller, Frank Freeh, Vincent W.	Computer Science	National Science Foundation (NSF)	\$1,000,000	

		Gu, Xiaohui Shen, Xipeng Vouk, Mladen A.			
2017-1875	CSR: Small: Real-Time Preditable Computing for Massively Parallel Platforms	Mueller, Frank	Computer Science	National Science Foundation (NSF)	\$500,000
2017-2043	CRISP Type 2: Collaborative Research: Creating Infrastructures of Networked Microgrids with Inter-dependent Middleware and Communication Backbones	Chakraborty, Aranya Duel-Hallen, Alexandra Mueller, Frank Warsing, Donald P.	Electrical and Computer Engineering	National Science Foundation (NSF)	\$1,698,772
2017-2292	CPS: Medium: Collaborative Research: Establishing End-to-end Predictability, Reliability, and Security for Remote-Controlled Robotics Exemplified by Telesurgery	Mueller, Frank	Computer Science	National Science Foundation (NSF)	\$250,000
Total of non-funded proposals: \$3,448,772					

Miscellaneous Activities					
Total miscellaneous activity funding: \$0					

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Ongoing Research Activities

1. *Auto-Tuned Per-Loop Compilation*. PI, funded by Lawrence Livermore National Laboratory through a DOE grant at **\$50,000** from 1/18 to 1/19.

This project proposes to investigate the viability to separately compile major loops in an auto-tuning effort.

2. *Large-scale automatic analysis of the OAI magnetic resonance image dataset (MedImg)*. co-PI, funded by NIH at **\$331,603** from 8/17 to 7/22.

The goal of this proposal is to optimize and to openly provide to the osteoarthritis community a new technology to rapidly and automatically measure cartilage thickness, appearance and changes on magnetic resonance images of the knee for huge image databases.

3. *Student Travel Grant for RTSS'17 Ph.D. Student Poster Forum on Real-Time Aspects of Internet of Things and Cyber-Physical Systems*. co-PI, funded by NSF at **\$15,000** from 9/17 to 8/18.

This grant is to provide support for student travel awards for the RTSS'17 conference under general chair Frank Mueller.

4. *A Deep-Learning Approach Towards Auto-Tuning CFD Codes*, PI, with co-PIs Jack Edwards and Hong Luo, funded by AFRL at **\$90,000** from 6/17 to 2/18 via a subcontract from VT (PI Wuchun Feng)

This proposal seeks to study, analyze, and synthesis deep-learning approaches for heterogeneous computing devices that expose the various parameters as “knobs” that can be tuned via deep learning to optimize for the metric of interest, whether it be performance, power, or energy efficiency.

5. *PowerCap: HPC Power Modeling and Active Control*. PI, funded by Lawrence Livermore National Laboratory through a DOE grant at **\$386,279** from 10/16 to 9/19.

The objective of this work is to establish systematic support for power considerations as a first-order objective for HPC system.

6. *Failure Prediction with Exact Localization*, PI, funded by DOE/LBNL at **\$84,684** from 10/16-8/17, no-cost extensions to 3/18.

The objective of this work is to assess the potential of machine learning techniques for pin-pointing failures before they happen with high true positive and low false positive rates.

7. *CPS: Synergy: Collaborative Research: Distributed Asynchronous Algorithms and Software Systems for Wide-Area Monitoring of Power Systems*, co-PI, funded by NSF at **\$400,000** from 10/13-9/16, PI Aranya Chakraborty (NCSU), co-PIs Rakesh B Bobba (UIUC), Nitin Vaidya (UIUC), Yufeng Xin (RENCI), no-cost extension to 9/18.

The objective of this NSF-CPS Synergy proposal is to develop a distributed algorithmic framework, supported by a highly fault-tolerant software system, for executing critical transmission-level operations of the North American power grid using gigantic volumes of Synchrophasor data.

8. *Improving Memory Performance on Fused Architectures through Compiler and Runtime Innovations*, co-PI, funded by NSF at **\$470,000** from 8/15-7/18, PI Xipeng Shen (NCSU).

The objective of this work is to understand these novel implications of fused architectures by studying their effects, qualifying their causes and quantifying the impacts on performance and energy efficiency. We propose to advance the state-of-the-art by creating spheres of isolation between CPU and GPU execution via novel systems mechanisms and compiler transformations that reduce cross-boundary contention with respect to shared hardware resources. This synergy between systems and compiler techniques has the potential to significantly improve performance and power guarantees for co-scheduling program fragments on fused architectures.

Past Research Activities

- 2015-2017 *SHF: Small: Scalable Trace-Based Tools for In-Situ Data Analysis of HPC Applications (ScalaJack)*. PI, funded by NSF at **\$457,395** from 6/12 to 5/15, no-cost extensions to 5/17.

This work creates a framework that allows application developers to focus on data analysis that drives customized data extraction combined with on-the-fly analysis specifically geared to their individual problems.

- 2013-2018 *CPS: Breakthrough: Collaborative Research: Bringing the Multicore Revolution to Safety-Critical Cyber-Physical Systems*. co-PI, funded by NSF at **\$225,000** from 2/13 to 1/16 (full funding at a total of \$675,000 with James Anderson, UNC Chapel Hill), no-cost extensions to 1/18.
This research aims at resolving this multicore “predictability problem.” It will develop methods that enable to share hardware resources to be allocated and provide predictability, including support for real-time operating systems, middleware, and associated analysis tools.
- 2013-2017 *Hobbes: OS and Runtime Support for Application Composition*, co-PI, funded by DOE/SNL/ORNL at **\$300,000** from 10/13-10/16 with PI Ron Brightwell and other co-PIs, co-cost extension to 9/17.
The objective is to develop resilience methods for the operating and runtime system stack for future exascale platforms.
- 2010-2016 *RESYST: Resilience via Synergistic Redundancy and Fault Tolerance for High-End Computing*. PI, funded by NSF at **\$376,219** from 10/10 to 9/13, no-cost extensions to 9/16.
The objective of this work is to develop a synergistic approach by combining C/R-based fault tolerance with redundancy in HEC installations to achieve high levels of resilience.
- 2013-2016 *Resilience for Global Address Spaces*, PI, funded by DOE/LBNL at **\$203,393** from 9/13-8/16.
The objective is to develop and integrate into Global Address Spaces a set of advanced techniques to reduce the checkpoint/restart (C/R) overhead.
- 2013-2015 *Pico-kernel Adaptive and Scalable Operating Systems Phase II (PICASO2)*, co-PI, funded by Securboracion/AFRO at **\$250,000** from 6/13-5/15.
The objective is to design and evaluate novel system and program abstractions for combined performance and scalability paving the path into a future of operating system supporting a massive number of cores on a single chip.
- 2012-2015 *Co-Design of Hardware / Software for Predicting MAV Aerodynamics*, co-PI, funded by AFRL at **\$666,667** from 9/12 to 10/15 (full funding at a total of \$6,004,922 / \$1,999,995 for NCSU with PI Wuchun Feng and co-PI’s Danesh Tafti, Chris Roy, Eric de Sturler, and Adrian Sandu - Virginia Tech; Jack Edwards, Hong Luo, and Frank Mueller - North Carolina State University).
We seek to formalize the co-design process for the n-body computational motif and adapt and apply it to the structured/unstructured grid motifs found in computational fluid dynamics (CFD) in support of aerodynamic predictions for micro air vehicles (MAVs).
- 2009-2014 *CSR: Medium: Collaborative Research: Providing Predictable Timing for Task Migration in Embedded Multi-Core Environments (TiME-ME)*. PI, funded by NSF-CNS at **\$390,000** from 9/09 to 8/14 (full funding at a total of \$1,030,000 with Yuan Xue, Penn State University, and Harini Ramaprasad, Southern Illinois University). Radar is missing \$195,000.
This work aims at initiating a novel research direction investigating the benefits of interactions between hardware and software for embedded multicores with respect to timing predictability.
- 2009-2014 *Collaborative Research: Automatic Extraction of Parallel I/O Benchmarks from HEC Applications*. co-PI (with Xiaosong Ma), funded by NSF-CCF at **\$499,999** from 9/09 to 9/12, no-cost extensions to 8/14 (full funding at a total of \$995,973 with Kai Shen, University of Rochester, and Marianne Winslett, University of Illinois at Urbana-Champaign)
To keep up with the growing scale and complexity of HEC applications, this project develops automated generation of parallel I/O benchmarks, analogous to the SPEC and NAS benchmarks for computation.
- 2013 *Application Skeleton Generation for Exascale HPC Simulation* PI, funded by Oak Ridge National Laboratory at **\$60,000** from 01/13 to 8/13.
The objective of this work is to complement ORNL’s xSim simulator with benchmark generation capabilities. ScalaBenchGen from NCSU will be extended to auto-generate source code suitable for evaluation under xSim.
- 2012 *Operating and Runtime System Resilience on the Path to Exascale*. PI, funded by Sandia National Laboratory at **\$55,448** from 01/12 to 12/12.
This project develops and evaluates advanced mechanisms to protect the operating and runtime systems and thereby increase resilience to failures.
- 2012 *Operating System Mechanisms For Many-Core Systems (PICASO)*. PI, funded by AFOSR, subcontract from Securboracion, Inc. at **\$33,333** from 04/12 to 10/12.
The objective of this work is to design and evaluate novel system and program abstractions for combined performance and scalability paving the path into a future of operating system supporting a massive number of

- cores on a single chip.
- 2011 *PARMA: Massive Parallelism Parallelism for the Masses*. PI, funded by NVIDIA at **\$10,000** from 01/11 to 12/11, NCSU complementing ETF award at **\$60,000**. Radar is not listing this source of funding. The objective of this work is to enrich the curriculum with programming techniques for massive multicores, such as found in graphics processing units (GPUs). This effort reflects current trends in computer architecture and requires novel educational paradigms to prepare students for this challenge and associated changes in the design and implementation of algorithms.
- 2011 *A Benchmark Suite to Assess Soft Routing Capabilities of Advanced Architectures*. PI, funded by Cisco at **\$44,676** from 01/11 to 12/11. Radar is not listing this source of funding. The objective of this work is to define metrics and create a benchmark suite that automatically derives quantitative measurements to allow different architectures to be compared as to their suitability for soft routing.
- 2010-2013 *ARC: A Root Cluster for Research into Scalable Computer Systems*. PI, funded by NSF at **\$549,999** from 3/10 to 2/13. This project creates a mid-size computational infrastructure, called ARC (A Root Cluster), that directly supports research into scalability for system-level software solutions by giving users administrator rights.
- 2007-2011 *Checker: CSR-EHS: Collaborative Research: Hybrid Timing Analysis via Multi-Mode Execution*. PI (with Yuan Xie, Penn State U.), funded by NSF-CNS grant at **\$140,000** from 08/07 to 07/09, no-cost extensions to 7/11 (full funding of NCSU and PSU: \$260,000). This work contributes a fundamentally new approach to bounding the WCET.
- 2008-2011 *ERC for FREEDM: NSF Engineering Research Center for Future Renewable Electric Energy Delivery and Management (FREEDM) Systems*. Co-PI (with Bruce McMillin, U. Missouri, main PI Alex Huang, NCSU), funded by NSF at **\$99,032** for Y1+Y2 from 09/08 to 08/11 (full funding of NCSU, FSU, ASU, MS&TU: \$18,500,000 over 5 years + \$10,000,000 from industry). Radar is not listing this source of funding. This work defines the system management requirements for the Distributed Grid Intelligence (DGI) within the Intelligent Energy/Fault Management (IEM/IFM).
- 2009-2012 *BLCR Support for Job Pause, Live Migration and Incremental Checkpointing*. PI, funded by Lawrence Berkeley National Laboratory at **\$122,000** from 2/09 to 01/12. This work provides functionality for the Berkeley Lab Checkpoint/Restart (BLCR) Linux module to support advanced fault-tolerant capabilities, which are of specific value in the context of large-scale computational science codes running on high-end clusters.
- 2010-2011 *Developing and Evaluating Advanced Methods for Resilience at Scale*. PI, funded by Sandia National Laboratory at **\$49,999** from 02/10 to 06/11. Radar is not listing this source of funding. The objective of the proposed work is to alleviate scalability limitations of current fault tolerant practices on petascale installations resilience mechanisms of HPC jobs in redundant computing.
- 2008-2011 *Reliability, Availability and Serviceability (RAS) for Petascale High-End Computing and Beyond*. PI (with lead-PI Stephen Scott, Oak Ridge National Laboratory), funded by DOE Office of Science at **\$150,000** from 06/08 to 05/11 (full funding of NCSU, ORNL, and LaTech: \$1,950,000). Radar is missing \$50,000. This project aims at providing high-level RAS for next-generation supercomputers to improve their resiliency (and ultimately efficiency) by performing research and development in novel high availability and fault tolerance system software solutions.
- 2008-2010 *Developing a Methodology for Deeply Embedded Security in Real-Time Systems*. Co-PI (with Peng Ning et al.), funded by Army Research Office at about **\$140,000** (\$70,000 per year) from 08/08 to 07/10. Radar is not listing this source of funding. This work develops a methodology to integrate timing-based security into real-time systems at multiple levels, study the cost and benefits of each technique and hybrids, and transfer this knowledge to selected embedded application areas.
- 2003-2010 *CAREER: Exploiting Binary Rewriting to Analyze and Alleviate CAREER: Exploiting Binary Rewriting to Analyze and Alleviate*. PI, funded by NSF CAREER award at **\$400,000** from 06/03 to 05/08, no-cost extensions to 05/10, and NCSU COE/CSC cost sharing at **\$35,000**. This proposal addresses problems in exploiting the memory bandwidth of existing architectures for scientific applications by employing techniques of binary rewriting to analyze and optimize an executable dynamically.
- 2009-2010 *Teaching Embedded Systems with Android / the Google G1 Phone*. PI, funded as Google Research Award at **\$25,000** from 04/09-03/10. This work assesses the suitability of the Android SDK and the Google G1 phone for teaching purposes.

- 2009-2010 *Data Streaming on GPU Clusters*. PI, funded by Oak Ridge National Laboratory at **\$16,000** from 08/09 to 01/10.
This work seeks to assess the viability of data streaming on clusters composed of graphics processing units (GPUs).
- 2009 *Mining Text using GPU Clusters*. PI, funded by Oak Ridge National Laboratory at **\$17,003** from 10/08 to 07/09.
This work seeks to assess the viability of text mining on clusters composed of graphics processing units (GPUs).
- 2004-2009 *Scal-A: Detecting and Alleviating Sources of Scalability Problems*. PI (with David Lowenthal, University of Georgia), funded by NSF-CNS grant at **\$231,652** from 09/04 to 08/07, no-cost extensions to 8/09 (full funding of NCSU and UGA: \$395,804).
This project investigates methods to provide the ability for scientific programmers to inquire about scalability problems and correlate this information back to source code.
- 2004-2008 *ROSES: Runtime/Operating System Synergy to Exploit Simultaneous Multithreading*. Co-PI (with Vincent Freeh), funded by NSF-CNS grant at **\$380,000** from 08/04 to 07/07, no-cost extension to 7/08
This project exploits simultaneous multithreading in the operating system context with applications to high-performance computing.
- 2003-2008 *SPARTA: Static Parametric Timing Analysis to Support Dynamic Decisions in Embedded Systems*. PI, funded by NSF CCR-EHS grant at **\$130,000** from 9/03-8/06, no-cost extension to 8/08 (full ITR funding at \$390,000 with David Whalley, Florida State University, and Christopher Healy, Furman University)
This project develops novel approaches for statically assessing the execution time of real-time tasks. It also studies opportunities for energy-conscious computing in embedded systems.
- 2007-2008 *Reliability, Availability and Serviceability for Peta-Scale High-Performance Computing and Distributed Systems*. Humboldt Research Fellowship Recipient, funded by the Humboldt Foundation, Germany, at **\$55,000** from 07/07-06/08, partial additional support by Zuse Institute Berlin at **\$15,000** through funds by the Humboldt Foundation, Germany. Radar is not listing this source of funding.
- 2005-2009 *MOLAR: Modular Linux and Adaptive Runtime Support for HEC OS/R*. PI (with lead-PI Stephen Scott, Oak Ridge National Laboratory), funded by DOE Office of Science at **\$93,708** from 02/05 to 01/08, no-cost extension to 1/09, and NCSU COE/CSC cost sharing at **\$18,000** (full funding of NCSU, ORNL, LaTech and OSU: \$1,200,000).
This project investigates methods to enhance Linux for high-end computing, specifically in the areas of high availability and scalability.
- 2007 *Online Data Reconstruction for Supercomputers*. funded by ORNL at **\$15,000** from 1/07-6/07.
This work seeks to build online recovery mechanisms for transient supercomputer job data. With the proposed on-demand data reconstruction, staged input files that are unavailable due to I/O node failures in a parallel file system are transparently patched from source copies using the recovery metadata.
- 2006-2007 *ARO Workshop on Security of Embedded Systems and Networks*. Co-PI (w/ Peng Ning), funded by ARO at **\$21,000** from 9/06-9/07.
Embedded systems and networks are used heavily in critical defense applications. Malicious or accidental failures in embedded systems can have dire consequences. The integrity of embedded infrastructures, such as configuration and code, is of utmost importance. Embedded systems and networks often have to operate autonomously in a changing environment. Unauthorized or unverified updates to the infrastructure of an embedded system can compromise its integrity. New techniques are needed that allow updates to the infrastructure of an embedded system without violating its integrity. This workshop intends to bring researchers that have expertise in a variety of techniques for ensuring the security and integrity of mission-critical embedded systems and networks.
- 2006-2007 *Prefetching Guided by Cross-Instruction Dynamic Access Patterns on the Power5*. PI, funded by IBM (Faculty Award) at **\$20,000** from 9/06-8/07.
With processor speeds growing much faster than memory, a large fraction of application execution time is increasingly spent waiting for the memory system to deliver data. In this proposal, we present a data prefetching scheme to ameliorate this problem using hardware support to efficiently identify predictable references to scalars and non-scalars that may benefit from prefetching.
- 2003-2007 *Virtual Simple Architecture (VISA): Exceeding the Complexity Limit in Safe Real-Time Systems*. Co-PI (with PI Rotenberg), funded by NSF CCR-CSA grant at **\$275,000** from 8/03-7/06, no-cost extension to 7/07.

- VISA provides a general framework for safe operation on unsafe processors, setting up new opportunities for exploiting higher performance in embedded systems.
- 2002-2006 *Reducing Frequency via Speculation and Fall-Back Recovery*. PI (with co-PI Rotenberg), funded by NSF CCR-EHS grant at **\$300,000** from 07/02 to 06/05, no-cost extension to 6/06.
The main objective of this proposed work is to reduce power consumption for embedded systems by accurately predicting computational budgets and to determine processor frequencies for a dual-frequency microarchitecture custom design.
- 2004-2006 *Xstim: Cross-Platform Performance Estimation for Parallel Applications*. Co-PI (with Xiaosong Ma and Jiawei Han, University of Illinois at Urbana-Champaign), funded by NSF-CNS grant at **\$76,566** from 08/04 to 07/05, no-cost extension to 7/06 (full funding of NCSU and UTUC: \$100,000).
This project investigates an observation-based execution time estimation approach for resource planning and usage estimation in the grid environment for application and resource scheduling.
- 2004 *DyPAT: Dynamic Performance Analysis and Tuning*. PI, funded by Lawrence Livermore National Laboratory through a DOE ASC grant at **\$76,885** from 05/04 to 12/04.
This project analyzes problems with the OpenMP component of scientific applications, specifically ASCI benchmarks, to investigate more efficient OpenMP alternatives and to subsequently tune applications.
- 2002-2003 *SPAN: Shared-Memory Performance Analysis*. PI, funded by Lawrence Livermore National Laboratory through a DOE ASCI grant at **\$76,999** from 01/02 to 02/03.
This project investigates performance analysis support for parallelized scientific applications exploiting clusters of shared-memory processors.
- 2002-2003 *Performance Analysis and Optimization for Scientific Applications*. PI, funded by the North Carolina State University through the FR&PD program at **\$9,994** from 7/02 to 6/03. Radar is not listing this source of funding.
This project investigates optimization support based on program analysis for parallelized scientific applications in modern clusters of workstations.
- 2000-2003 *Scalable and Predictable Distributed Concurrency Services in Middleware*.
This project investigates distributed protocols for arbitration of accesses to shared resources following multi-level locking and transaction protocols.
- 1995–2000 *DSM-Threads: Distributed Shared Memory for POSIX Threads*. PI, funded by a Research Exchange Grant, DAAD (German Academic Exchange Office), to continue the collaboration with the ENS Lyon, France, on distributed systems; funding declined since PI had already left Europe (**\$5,000**)
This project investigated methods to support a shared programming model on a distributed architecture through middleware support. The resulting prototype is unique in its support for per-node multi-threading, fully decentralized protocols and utilization of asynchronous communication. Results of this project include a code distribution and numerous publications and theses.
- 1991–2000 *Timing Analysis for Real-Time Systems*. PI, funded by Deutsche Telekom Grant on “Ada-Multitasking” (**\$150,000**)
This project investigated methods for statically analyzing real-time tasks to determine their worst-case execution times. The resulting tools are the enabling technology to perform schedulability analysis of mission- and time-critical applications in general. The developed prototype is unique in its versatility and efficiency in the research field and has been widely cited.
- 1991–1995 *GNARL: Gnu Ada Runtime Library*.
This project developed a runtime system for the Ada programming languages. Initial efforts targeted the Verdix/Sun Ada compiler while later efforts resulted in the runtime system for the Gnu Ada Translator (GNAT) in collaboration with New York University. The resulting code distribution is highly regarded in academic and industrial environments and is one of the most widely used Ada compilers today.
- 1991–1998 *Design and Implementation of a User Library for POSIX Threads*.
This project investigated portable methods to provide multi-threading on top of operating systems. The resulting code distribution was the first one to adhere to the industrial POSIX standard and is still widely used. Later efforts resulted in an open interface for multi-threaded debugging by extending GDB, which has also been released as a code distributed.
- 1989–2000 *Code Optimizations for Control-Flow Enhancements*.
This project investigated opportunities for program optimizations based on control-flow transformations of (a) jumps, (b) branches and (c) irreducible regions of code. Our methods were adopted commercially in SunPro’s

compilers and, as an MIT prototype, in GCC.

Other Funding

- 2017 *Intel*, 1 Xeon Phi KNL Ninja for an estimated total market value of \$5,000.
- 2016 *Intel*, 1 Xeon Phi KNL Ninja for an estimated total market value of \$5,000.
- 2016 *AMD*, 1 Dell Inspiron 3656 with HSA software stack for an estimated total market value of \$600.
- 2016 *Samsung*, 4 1.6TB PM1725 solid state drives for an estimated total market value of \$8,000.
- 2016 *Nordic Semiconductor*, 60 development platforms for an estimated total market value of \$2000.
- 2016 *Nvidia Donation*, 1 Titan X and 2 GTX 1080 for an estimated total market value of \$2,800.
- 2015 *Nvidia Donation*, 2 GeForce Titan X for an estimated total market value of \$2,000.
- 2014 *Nvidia Donation*, 2 Tegra Jetson TK1 for an estimated total market value of \$1,000.
- 2013 *Nvidia Donation*, 2 Kepler K20, 1 Kepler K40, 5 780 GTX for an estimated total market value of \$15,000.
- 2013 *Samsung Donation*, 2 Galaxy S4 8-core smartphones for an estimated total market value of \$1,100.
- 2012 *Nvidia Donation*, 1 Kepler K20, 1 Kepler 680 GTX and 18 480 GTX cards for an estimated total market value of \$5,968.
- 2012 *HP Donation*, 3 NVIDIA M2070 GPUs for an estimated total market value of \$3,600.
- 2011 *Google Donation*, 4 Nexus One smartphones for an estimated total market value of \$2,000.
- 2011 *Nvidia Donation*, 4 Fermi Tesla C2050 and 60 480 GTX cards for an estimated total market value of \$40,000.
- 2010 *Freescale Donation*, 1 8-core PowerPC system for an estimated total market value of \$5,000.
- 2010 *Nvidia Donation*, 5 Fermi Tesla C2050 cards for an estimated total market value of \$12,500.
- 2009 *ARM Donation*, multi-core boards and software development tools for an estimated total market value of **\$27,500**.
- 2009 *Google Donation*, 5 Google G1 Android 3G phones for an estimated total market value of **\$2,000**.
- 2008 *Nvidia Donation*, 18 GeForce GTX 280 cards, 2 GeForce 9800 GX2 cards for an estimated total market value of **\$10,000**.
- 2007 *Helwett Packard's University Relations Department / Gelato Federation Donation*, 2 Intel Itanium Montecito Multi-Core SMP servers, total market value of **\$42,508**.
- 2007 *Nvidia Donation*, 1 GeForce 8800 GTX card for an estimated total market value of **\$600**.
- 2006 *Renesas Donation*, 2 M16C cards with built-in ZigBee 802.14.5 functionality for an estimated total market value of **\$400**.
- 2005 *Renesas Donation*, 3 M16C62P starter kits plus, 2 SKPCOMMS daughter cards and 2 ZigBee 802.14.5 daughter cards for an estimated total market value of **\$600**.
- 2004 *Microsoft Donation*, 2 Fujitsu Tablet PCs and 4 Compaq Ipaq H5555 with a total market value of over **\$6,600**.
- 2002 Donation from IBM for real-time / embedded research on a PowerPC 405LP board with a market value of **\$1,000**.
- 2002 *Microsoft Donation*, 4 Compaq Ipaq H3975 handheld computers with Cisco wireless 802.11b with a total market value of over **\$4,000**.
- 2002 *Xilinx Development Support*, Xilinx, Inc., Hardware and software for FPGA development (Xilinx ISE 4.2i Foundation and MicroBlaze MDK 2.2), total market value **\$3,000**.
- 2001 *Connectix Donation*, 100 copies of VirtualPC with a total market value of **\$20,000**.
- 2000 *Infrastructure Grant*, Humboldt University Berlin (**\$40,000**), written in conjunction with Dr. A. Polze for a number of faculty members.

Funding Sources not Listed by Radar

Grants from federal/state agencies (U.S. and beyond) and industry amount to more than RADAR shows. Items missing from the RADAR list are explicitly marked as such in the list above on a per-grant basis above. Radar omits several grant resources. Examples are:

- Grants awarded at Humboldt University prior to joining NCSU are not listed.
- Awards not paid through NCSU are not listed, including the Humboldt Foundation fellowship for the 2007/2008 sabbatical and Humboldt Foundation research grant for the 2014/2015 sabbatical.
- Awarded grants with annual installments: Only installments to date are reflected in Radar, *i.e.*, future installments that are already committed in the award letters are excluded by Radar, including DOE RAS, NSF TiME-ME.
- Awards are not listed: Awards made internally within NCSU with both NCSU-internal and external sources are not reflected, including: NSF ERC FREEDM, ARO funding through SOSI, NCSU FR&PD and any cost sharing.

C Participation in Centers, Consortia, Institutes

- 2009- Member, Center for Open Software Engineering (COSE)
- 2009- Member, Secure Open Systems Initiative (SOSI)
- 2008- Member, NSF Engineering Research Center for Future Renewable Electric Energy Delivery and Management (FREEDM) Systems
- 2007- Adjunct Associate Professor, Computer Science, UNC Chapel Hill, NC
- 2006- Research Associate, Renaissance Computing Institute (RENCI), Chapel Hill, NC
- 2002- Member, Center for High Performance Simulations (CHiPS), NCSU
- 2001- Member, Center for Efficient, Secure and Reliable Computing / formerly Center for Embedded Systems Research (CESR), NCSU

III Extension and Engagement with Constituencies outside the University

A Accomplishments

- ongoing see "Appointment to Professional Boards" for organization of professional venues
- 2009 NPR Feature on PS3 Clusters, see <http://moss.csc.ncsu.edu/~mueller/cluster/ps3/>
- 2009 Triangle Business Journal article on Google phones in the curriculum, see <http://moss.csc.ncsu.edu/~mueller/g1/>
- 2000 RoboVision: Lego Mindstorms Programming Contest for College Students (supervised Humboldt University team)

B Program Impacts

N/A

IV Technological and Managerial Innovation

A Knowledge and Technology Transfer

- 2010– Code distribution of ScalaMem, a Memory Trace & Compression Library
- 2007– Code distribution of ScalaTrace, an MPI Trace & Compression Library
- 2007– Code distribution of a Worst-Case Execution Time Analysis Tool
- 2005– Code distribution of a Feedback EDF-DVS Real-Time Scheduling Simulator
- 2002 LegoSim: Simulation of Embedded Kernels over Pthreads, software distribution and journal publication.
- 1998– Code distribution of TDI-GDB, a debugger with portable multi-threading support (see project “Design and Implementation of a User Library for POSIX Threads”)
- 1993– Code distribution of GNAT/GNARL (see project “Gnu Ada Runtime Library”)
- 1995 Knowledge transfer on Pthreads to industry
- 1991– Code distribution of FSU Pthreads (see project “Design and Implementation of a User Library for POSIX Threads”)

B Program Impacts

N/A

V Service to the University and Professional Societies

See Section A.4 for service to professional societies.

University Service

- 2017- Member, RPT (Reappointment, Promotion and Tenure) committee.
- 2015-2016 Lead, Systems search committee.
- 2014 Lead, Systems search committee.
- 2011–2014 Member of Search Committee and Winning Application of Chancellor’s Faculty Excellence Program for cluster hiring
- 2010–2012 Graduate Program Oversight Committee.
- 2010–2011 Member, Faculty search committee.
- 2005–2006,2008–2014,2015– Lead, Systems/Arch/DB focus group.
- 2006–2007 Lead, Systems search committee.
- 2004–2005 Lead, Systems/Arch focus group.
- 2004–2006 Member, Graduate students admissions committee.
- 2004–2005 Co-chair, HPC/Grids/PL faculty search committee.
- 2003–2004 Member, IT staff search committee.
- 2003–2004 Member, Faculty search committee.
- 2002–2003 Member, Operating Systems faculty search committee.
- 2002 Member, Budget assessment committee for research proposals.
- 2001–2002 Co-chair, Operating Systems faculty search committee.