

# XULONG TANG

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## EDUCATION

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- 2014 - Present** **Pennsylvania State University**, Ph.D. Candidate in Computer Science and Engineering  
Advisors: Dr. Mahmut Taylan Kandemir, Dr. Chita R. Das
- 2014 Spring** **College of William and Mary**, Ph.D. Candidate in Computer Science  
Transfer to Pennsylvania State University in 2014 fall  
Advisor: Dr. Xipeng Shen
- 2010 - 2013** **University of Science and Technology of China**, M.S. in Computer Science  
Advisor: Dr. Hong An
- 2006 - 2010** **Harbin Institute of Technology**, B.S. in Computer Science  
Advisor: Dr. Chunqi Sun

## RESEARCH EXPERIENCE

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- 2014 - present** **Pennsylvania State University**  
*Research Assistant*  
Advisor: Dr. Mahmut Taylan Kandemir, Dr. Chita R. Das
- Optimize GPU dynamic parallelism for irregular applications
  - Investigate compiler-assisted optimizations for computation assignment and data access on manycore platforms
- 2017 Fall** **Advanced Micro Devices (AMD Research)**  
*Research Intern*  
Mentor: Bradford M. Beckmann, Sooraj Puthoor
- Participate in the project of prototyping the next generation GPUs. Explore efficient runtime task management on GPUs
  - Reduce oversubscribing of command queues in GPUs
- 2015 Summer** **SAMSUNG Research America (SRA)**  
*Research Intern*  
Mentor: Liangjun Zhang
- Model the memory hierarchy of high-performance, low-power mobile GPUs
- 2014 Spring** **College of William and Mary. *Compilers and Adaptive Programming Systems Lab***  
*Research Assistant*  
Advisor: Dr. Xipeng Shen
- Investigate the reasons of performance degradation on integrated CPU-GPU processors
- 2010 - 2013** **ICT of Chinese Academy of Science, Beijing**  
*Research Assistant*  
Advisor: Dr. Dongrui Fan
- Build a two-layer video codec benchmark suite
  - Redesign x264 codec into a fine-grain pipelined version to achieve task-level parallelism
- 2010 - 2011** **University of Science and Technology of China (USTC)**  
*Research Assistant*  
Advisor: Dr. Hong An
- Propose adaptive scheduling based on characterization of dynamic GPU behaviors

## PUBLICATIONS

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[C1]. **Xulong Tang**, Mahmut Taylan Kandemir, Mustafa Karakoy, Meena Arunachalam “Co-Optimizing Memory-Level Parallelism and Cache-Level Parallelism”, *In proceedings of 40th annual ACM SIGPLAN conference on Programming Language Design and Implementation*. Acceptance Ratio:  $76/274 = 27.7\%$   
(PLDI 2019)

[C2]. **Xulong Tang**, Ashutosh Pattnaik, Onur Kayiran, Adwait Jog, Mahmut Taylan Kandemir, Chita Das “Quantifying Data Locality in Dynamic Parallelism in GPUs”, *In proceedings of 2019 ACM International Conference on Measurement and Modeling of Computer Systems*. Acceptance Ratio:  $6/67 = 8.9\%$   
(SIGMETRICS 2019)

[C3]. **Xulong Tang**, Mahmut Taylan Kandemir, Hui Zhao , Myoungsoo Jung, Mustafa Karakoy, “Computing with Near Data”, *In proceedings of 2019 ACM International Conference on Measurement and Modeling of Computer Systems*. Acceptance Ratio:  $6/67 = 8.9\%$   
(SIGMETRICS 2019)

[C4]. Ashutosh Pattnaik, **Xulong Tang**, Onur Kayiran, Adwait Jog, Asit Mishra, Mahmut T. Kandemir, Anand Sivasubramaniam, Chita R. Das “Opportunistic Computing in GPU Architectures”, *In proceedings of 46th International Symposium on Computer Architecture*. Acceptance Ratio:  $62/365 = 16.9\%$   
(ISCA 2019)

[C5]. Jihyun Ryoo, Orhan Kislal, **Xulong Tang**, Mahmut T. Kandemir, “Quantifying and Optimizing Data Access Parallelism on Manycores”, *In proceedings of 26th IEEE International Symposium on the Modeling, Analysis, and Simulation of Computer and Telecommunication Systems*.  
(MASCOTS 2018)

[C6]. Orhan Kislal, Jagadish B. Kotra, **Xulong Tang**, Mahmut T. Kandemir, Myoungsoo Jung, “Enhancing Computation-to-Core Assignment with Physical Location Information”, *In proceedings of 39th annual ACM SIGPLAN conference on Programming Language Design and Implementation*. Acceptance Ratio:  $55/254 = 22.4\%$   
(PLDI 2018)

[C7]. Sooraj Puthoor, **Xulong Tang**, Joseph Gross, Bradford M Beckmann, “Oversubscribed Command Queues in GPUs.”, *In proceedings of the 11th Workshop on General Purpose GPUs in conjunction with PPOPP 2018*.  
(PPoPP 2018)

[C8]. **Xulong Tang**, Orhan Kislal, Mahmut Kandemir, Mustafa Karakoy, “Data Movement Aware Computation Partitioning”, *In proceedings of The 50th Annual IEEE/ACM International Symposium on Microarchitecture*. Acceptance Ratio:  $61/327 = 18.6\%$   
(MICRO 2017)

[C9]. Akbar Sharifi, Wei Ding, Diana Guttman, Hui Zhao, **Xulong Tang**, Mahmut Kandemir, Chita Das, “DEMM: a Dynamic Energy-saving mechanism for Multicore”, *In proceedings of The 25th IEEE International Symposium on the Modeling, Analysis, and Simulation of Computer and Telecommunication Systems*. Acceptance Ratio:  $26/84 = 30.9\%$   
(MASCOTS 2017)

[C10]. Orhan Kislal, Jagadish Kotra, **Xulong Tang**, Mahmut Taylan Kandemir, Myoungsoo Jung, “POSTER: Location-Aware Computation Mapping for Manycore Processors”, *In proceedings of The 26th International Conference on Parallel Architectures and Compilation Techniques*.  
(PACT 2017)

[C11]. **Xulong Tang** , Ashutosh Pattnaik, Huaipan Jiang, Onur Kayiran, Adwait Jog, Sreepathi Pai, Mohamed Ibrahim, Mahmut Kandemir, Chita Das, “Controlled Kernel Launch for Dynamic Parallelism in GPUs”, *In Proceedings of 23th International Symposium on High-Performance Computer Architecture*. Acceptance Ratio:  $50/224 = 22.3\%$   
(HPCA 2017)

[C12]. **Xulong Tang** , Mahmut Kandemir, Praveen Yedlapalli, Jagadish Kotra, “Improving Bank-Level Parallelism for Irregular Applications”, *In Proceedings of 49th Annual IEEE/ACM International Symposium on Microar-*

chitecture. Acceptance Ratio:  $61/283 = 21.6\%$

**(MICRO 2016) Best Paper Nomination.**

[C13]. Ashutosh Pattnaik, **Xulong Tang**, Adwait Jog, Onur Kayiran, Asit K. Mishra, Mahmut T. Kandemir, Onur Mutlu, Chita R. Das, “Scheduling Techniques for GPU Architectures with Processing-In-Memory Capabilities”, *In Proceedings of 25th International Conference on Parallel Architectures and Compilation Techniques*. Acceptance Ratio:  $31/139 = 22.3\%$

**(PACT 2016)**

[C14]. Onur Kayiran, Adwait Jog, Ashutosh Pattnaik, Rachata Ausavarungnirun, **Xulong Tang**, Mahmut T. Kandemir, Gabriel H. Loh, Onur Mutlu, Chita R. Das, “ $\mu$ C-States: Fine-grained GPU Datapath Power Management”, *In Proceedings of 25th International Conference on Parallel Architectures and Compilation Techniques*. Acceptance Ratio:  $31/139 = 22.3\%$

**(PACT 2016)**

[C15]. Wei Ding, **Xulong Tang**, Mahmut Taylan Kandemir, Yuanrui Zhang, Emre Kultursay “Optimizing Off-Chip Accesses in Manycores”, *In Proceedings of 36th annual ACM SIGPLAN conference on Programming Language Design and Implementation*. Acceptance Ratio:  $58/303 = 19.1\%$

**(PLDI 2015)**

[C16]. Mahmut Taylan Kandemir, Hui Zhao, **Xulong Tang**, Mustafa Karaky, “Memory Row Reuse Distance and its Role in Optimizing Application Performance”, *In Proceedings of ACM International Conference on Measurement and Modeling of Computer Systems*. Acceptance Ratio:  $32/239 = 13.3\%$

**(SIGMETRICS 2015)**

[C17]. **Xulong Tang**, Hong An, Gongjin Sun, Dongrui Fan, “A Video Coding Benchmark Suite for Evaluation of Processor Capability”, *In Proceedings of 14th IEEE/ACIS International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing*.

**(SNPD 2013)**

[C18]. Gu Liu, Hong An, Xiaoqiang Li, Wei Zhou, Xuechao Wei, **Xulong Tang**, “FlexBFS: A Parallelism-aware Implementation of Breadth-First Search on GPU”, *Accepted as a poster by 17th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming*.

**(PPoPP 2012)**

## TEACHING

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<b>2018 Fall</b>	Co-instructor of CMPEN 431 - Introduction to Computer Architecture - at Penn State
<b>2016 Spring</b>	Guest Lecture, CSE 521 - Design and Implementation of Compilers - at Penn State
<b>2015 Spring</b>	Teaching Assistant of CMPEN 431 - Introduction to Computer Architecture - at Penn State
<b>2014 Fall</b>	Teaching Assistant of CMPEN 431 - Introduction to Computer Architecture - at Penn State
<b>2014 Spring</b>	Teaching Assistant of CS 210 - Introduction to Python - at College of William and Mary
<b>2011 Summer</b>	Teaching Assistant of Introduction to Computer System - at USTC

## TALKS

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- Quantifying and Optimizing Data Access Parallelism on Manycores. *MASCOTS 2018*
- Scheduling in the Cloud. *MASCOTS 2018*
- Enhancing Computation-to-Core Assignment with Physical Location Information. *PLDI 2018*
- Data Movement Aware Computation Partitioning. *MICRO 2017*
- DEMM: a Dynamic Energy-saving mechanism for Multicore. *MASCOTS 2017*
- Controlled Kernel Launch for Dynamic Parallelism in GPUs. *HPCA 2017*
- Improving Bank-Level Parallelism for Irregular Applications. *MICRO 2016*
- Memory Row Reuse Distance and its Role in Optimizing Application Performance. *SIGMETRICS 2015*

## AWARDS AND HONORS

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<b>2018</b>	NSF Travel Grants / PLDI'39
<b>2017</b>	NSF Travel Grants / MICRO'50 NSF Travel Grants / HPCA'23
<b>2016</b>	<b>Best Paper Nomination of MICRO'49</b> NSF Travel Grants / MICRO'49
<b>2015</b>	NSF Travel Grants / PLDI'36

## PERFESSIONAL SERVICES

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<b>Program</b>	Artifact Evaluation Committee of PPOPP'19
<b>Committee</b>	Artifact Evaluation Committee of PPOPP'18
<b>Journal</b>	Transactions on Parallel and Distributed Systems (TPDS)
<b>Reviewer</b>	International Journal of Computational Science and Engineering (IJCSE) Electronics and Telecommunications Research Institute Journal (ETRIJ) Advances in Science Technology and Engineering Systems Journal (ASTESJ) IEEE Access Journal
<b>Conference</b>	2015 (PLDI, IPDPS, PPOPP)
<b>Reviewer</b>	2016 (ISCA, MICRO, HPCA, ASPLOS) 2017 (ISCA, MICRO, HPCA, ASPLOS, PACT, PPOPP, IPDPS) 2018 (PACT, ICS, HPCA, ASPLOS, MICRO)
<b>Other</b>	Submission chair of AIM 2017 workshop
<b>Activities</b>	

## REFERENCES

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### **Mahmut Taylan Kandemir**

Professor  
Pennsylvania State University  
**Emails:** mtk2@psu.edu  
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### **John (Jack) Sampson**

Assistant Professor  
Pennsylvania State University  
**Emails:** jms1257@psu.edu  
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### **Bradford M. Beckmann**

Principal Member of Technical Staff  
Advanced Micro Devices, Inc.  
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### **Chita R. Das**

Distinguished Professor, Department Head  
Pennsylvania State University  
**Emails:** cxd12@psu.edu  
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### **Xipeng Shen**

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North Carolina State University  
**Emails:** xshen5@ncsu.edu  
**Tel:** (919) 513-7577