Curriculum Vitae - Hang Liu

Assistant Professor
Rutgers University - New Brunswick
Piscataway, NJ 08854

202-531-0109
hang.liu@rutgers.edu
Personal Homepage

EDUCATION

2011 - 2017 **Ph.D.** in **High-Performance Computing**
Department of Electrical & Computer Engineering
The George Washington University
Adviser: H. Howie Huang

2007 - 2011 **B.E.** in **Software Engineering**
School of Software Engineering
Huazhong University of Science & Technology

EXPERIENCES

2024 - Present **Associate Undergraduate Director**
Department of Electrical & Computer Engineering
Rutgers University - New Brunswick

2023 - Present **Assistant Professor**
Department of Electrical & Computer Engineering
Rutgers University - New Brunswick

2022 - 2025 **Presidential Fellow** **Assistant Professor**
Department of Electrical & Computer Engineering
Stevens Institute of Technology
Terminated due to moving to Rutgers

2019 - 2022 **Assistant Professor**, Department of Electrical & Computer Engineering
Stevens Institute of Technology

Summer 2019&2021 **Visiting Faculty**
Lawrence Berkeley National Laboratory
Host: Sherry X. Li & Aydin Buluc

2017 - 2019 **Assistant Professor**, Department of Electrical & Computer Engineering
University of Massachusetts Lowell

Summer 2014 **Research Intern**
NEC Laboratories at America
Mentor: Cheng-Hong Li

HONORS & AWARDS

2023 IEEE Senior Member
2022

	IEEE CS TCHPC Early Career Researchers Award for Excellence in High Performance Computing (One of the most prestigious awards for junior researchers in HPC)
2022 - 2025	Presidential Fellow (2 awardees across the entire institute)
2022	3rd Prize at the 2022 Ansary Entrepreneurship Competition (Senior Design, Role: Advisor)
2022	Early Career Award for Research Excellence (2 awardees for the entire institute)
2021	NSF CAREER Award
2021	ECE Outstanding Research Award
2021&2019	Lawrence Berkeley National Laboratory SRP Fellowship
2020	One of the Best Papers in VLDB'20
2020	Excellent Teaching Evaluation Award
2019	NSF CRII Award
2019&2018	Champion of Graph Challenge Competition
2018	Best Dissertation Award, Electrical & Computer Engineering at GWU
2017	ICT Express Best Reviewer
2016	Phillip/Temofel Sprawcew Endowment Scholarship
2015	No. 1 Most Energy Efficient Graph Traversal at GreenGraph 500 (small graph category)

MEDIA COVERAGE

July.2022	Interviewed by Dr. Marina Kraeva for SC22 Mini-series: ECP Past Participants
May.2022	Quoted by a CNET article on AI and chip design
Nov.2021	Quoted by a Lifewire article on fundamental value of data

RESEARCH - PUBLICATIONS & PATENTS

Patent

2024 **Hang Liu** and Santosh Pandey. "ACCELERATING MICROARCHITECTURE SIMULATION WITH MACHINE LEARNING" (RU Docket 2024-101). U.S. Provisional Application 63/539,950 on April 15, 2024.

Book Chapters

2018 Da Yan and **Hang Liu**. Parallel Graph Processing. In Encyclopedia of Big Data Technologies, *Springer*, 2018.

Journal Articles

2024 Huan, Chengying, Yongchao Liu, Heng Zhang, Shiyang Chen, Shuaiwen Leon Song, Yanjun Wu, and **Hang Liu***. "TeGraph+: Scalable Temporal Graph Processing Enabling Flexible Edge Modifications." IEEE Transactions on Parallel and Distributed Systems 2024.

2024 Huan, Chengying, Yongchao Liu, Heng Zhang, Shuaiwen Song, Santosh Pandey, Shiyang Chen, Xiangfei Fang, Yue Jin, Baptiste Lepers, Yanjun Wu, and **Hang Liu***. "TEA+: A Novel Temporal Graph Random Walk Engine With Hybrid Storage Architecture." ACM Transactions on Architecture and Code Optimization. 2024

2023 **Hang Liu**, Wang, Shilong, Anil Gaihre, and Hengyong Yu. "EZLDA: Efficient and Scalable LDA on GPUs." IEEE Access 2023.

2022

Yuede Ji, **Hang Liu**, Yang Hu and H. Howie Huang. iSpan: Parallel Identification of Strongly Connected Components with Spanning Trees. In *ACM Transaction on Parallel Computing* (**TOPC**), 2022.

2021 Anil Gaihre, Xiaoye S. Li, and **Hang Liu**. GSOFA: Scalable Sparse LU Symbolic Factorization on GPUs. In *IEEE Transactions on Parallel and Distributed Systems* (**TPDS**), 2021.

2021 Santosh Pandey, Zhibin Wang, Sheng Zhong, Chen Tian, Lingda Li, Adolfy Hoise, Xiaoye S. Li, Caiwen Ding, Dong Li, Bolong Zheng and **Hang Liu**. TRUST: Triangle Counting on GPUs. In *IEEE Transactions on Parallel and Distributed Systems* (**TPDS**), 2021.

2020 Xu Xiang, **Hang Liu**, Tian Lan, Suresh Subramaniam, Howie Huang. Optimizing Job Reliability Through Contention-Free, Distributed Checkpoint Scheduling. In *IEEE Transactions on Network and Service Management* (**TNSM**), 2020.

2017 Yunjie Zhao, Yiren Jian, Zhichao Liu, **Hang Liu**, Qin Liu, Chanyou Chen, Zhangyong Li, Lu Wang, H. Howie Huang, and Chen Zeng. Network Analysis Reveals the Recognition Mechanism for Dimer Formation of Bulb-type Lectins. *Scientific Reports, volume 7*. Nature Publishing Group. 2017.

2016 Rajat Mittal, Jung Hee Seo, Vijay Vedula, Young J Choi, **Hang Liu**, H. Howie Huang, Saurabh Jain, Laurent Younes, Theodore Abraham, and Richard T George. Computational Modeling of Cardiac Hemodynamics: Current Status and Future Outlook. In *Journal of Computational Physics (JCP)*. 305 (2016): 1065-1082.

Refereed Conference Proceedings

2024 Santosh Pandey, Amir Yazdanbakhsh, and **Hang Liu***. "TAO: Re-Thinking DL-based Microarchitecture Simulation." In *Proceedings of the ACM on Measurement and Analysis of Computing Systems (**SIGMETRICS**)*, 2024. (Acceptance rate = 10.7%).

2023 Shiyang Chen, Da Zheng, Caiwen Ding, Chengying Huan, Yuede Ji and **Hang Liu***. "Tango: rethinking quantization for graph neural network training on GPUs" In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (**SC**)*. ACM, 2023. (Acceptance rate = 23.9%).

2023 Wang Feng, Shiyang Chen, **Hang Liu** and Yuede Ji. "PeeK: A Prune-Centric Approach for K Shortest Path Computation." In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (**SC**)*. ACM, 2023. (Acceptance rate = 23.9%).

2023 Chengying Huan, Shuaiwen Leon Song, Santosh Pandey, **Hang Liu***, Yongchao Liu, Baptiste Lepers, Charles He, Kang Chen, Jinlei Jiang and Yongwei Wu. "TEA: A General-Purpose Temporal Graph Random Walk Engine." In *Proceedings of the European Conference on Computer Systems (**Eurosys**)*. ACM, 2023. (Acceptance rate = 16.2%).

2022 Santosh Pandey, Lingda Li, Thomas FLynn, Adolfy Hoisie and **Hang Liu***. "Scaling Deep Learning-based Microarchitecture Simulation on GPUs." In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (**SC**)*. IEEE, 2022. (Acceptance rate = 25.3%).

2022 Chengying Huan, Shuaiwen Leon Song, Yongchao Liu, Heng Zhang, **Hang Liu***, Charles He, Kang Chen, Jinlei Jiang, and Yongwei Wu. "T-GCN: A Sampling Based Streaming Graph Neural Network System With Hybrid Architecture." In *30th International Conference on Parallel Architectures and Compilation Techniques (**PACT**)*. IEEE, 2022.

2022

Heng Zhang, Lingda Li, **Hang Liu**, Donglin Zhuang, Rui Liu, Chengying Huan, Shuang Song, Dingwen Tao, Yongchao Liu, Charles He, Yanjun Wu, Shuaiwen Leon Song. "Bring Orders into Uncertainty: Enabling Efficient Uncertain Graph Processing via Novel Path Sampling on Multi-Accelerator Systems." In *Proceedings of the 36th ACM International Conference on Supercomputing (**ICS**)*, 2022. (Acceptance rate = 23.6%).

2022 Lingda Li, Santosh Pandey, Thomas Flynn, **Hang Liu**, Noel Wheeler, and Adolfy Hoisie. "SimNet: Accurate and High-Performance Computer Architecture Simulation using Deep Learning." In *Proceedings of the ACM on Measurement and Analysis of Computing Systems (**SIGMETRICS**)*, 2022. (Acceptance rate = 16.7%).

2022 Shaoyi Huang, Dongkuan Xu, Ian En-Hsu Yen, Yijue Wang, Sung-En Chang, Bingbing Li, Shiyang Chen, Mimi Xie, Sanguthevar Rajasekaran, **Hang Liu**, Caiwen Ding. "Sparse Progressive Distillation: Resolving Overfitting under Pretrain-and-Finetune Paradigm." In *Proceeding of 60th Annual Meeting of the Association for Computational Linguistics (**ACL**), main conference*, 2022.

2022 Hongwu Peng, Shaoyi Huang, Shiyang Chen, Bingbing Li, Tong Geng, Ang Li, Weiwen Jiang, Wujie Wen, Jinbo Bi, **Hang Liu** and Caiwen Ding. "A Length Adaptive Algorithm-Hardware Co-design of Transformer on FPGA Through Sparse Attention and Dynamic Pipelining." In *Proceedings of ACM/EDAC/IEEE Design Automation Conference (**DAC**)*, 2022.

2022 Chengying Huan, **Hang Liu**, Mengxing Liu, Yongchao Liu, Changhua He, Kang Chen, Jinlei Jiang, Yongwei Wu and Shuaiwen Leon Song. "TeGraph: A Novel General-Purpose Temporal Graph Computing Engine." In *Proceedings of 2022 IEEE 38th International Conference on Data Engineering (**ICDE**)*. ACM, 2022.

2021 Shiyang Chen, Shaoyi Huang, Santosh Pandey, Bingbing Li, Guang Gao, Long Zheng, Caiwen Ding and **Hang Liu***. E.T.: Rethinking Transformer Models on GPUs. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (**SC**)*. ACM, 2021. (Acceptance rate = 25.9%).

2021 Anil Gaihre, Da Zheng, Scott Weitze, Lingda Li, Caiwen Ding, Shuaiwen Song and **Hang Liu***. Dr. Top-*k*: Delegate Centric Top-k Computation on GPUs. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (**SC**)*. ACM, 2021. (Acceptance rate = 25.9%).

2021 Yijue Wang, Chenghong Wang, Zigeng Wang, Shanglin Zhou, **Hang Liu**, Jinbo Bi, Caiwen Ding, Sanguthevar Rajasekaran. Against Membership Inference Attack: Pruning is All You Need. In *Proceedings of the International Joint Conferences on Artificial Intelligence (**IJCAI**)*. 2021.

2021 Geng Yuan, Payman Behnam, Zhengang Li, Ali Shafiee, Sheng Lin, Xiaolong Ma, **Hang Liu**, Xuehai Qian, Mahdi Bojnordi, Yanzhi Wang, and Caiwen Ding. FORMS: Fine-grained Polarized ReRAM-based In-situ Computation for Mixed-signal DNN Accelerator. In *Proceedings of the 46th International Symposium on Computer Architecture (**ISCA**)*, 2021 (Acceptance rate = 20%).

2021 Hongwu Peng, Shiyang Chen, Zhepeng Wang, Junhuan Yang, Scott A. Weitze, Tong Geng, Ang Li, Jinbo Bi, Minghu Song, Weiwen Jiang, **Hang Liu** and Caiwen Ding. Optimizing FPGA-based Accelerator Design for Large-Scale Molecular Similarity Search (Special Session Paper). *In IEEE/ACM International Conference On Computer Aided Design (**ICCAD**)* 2021 Nov 1 (pp. 1-7). IEEE.

2021 Zhen Xie, Wenqian Dong, Jiawen Liu, **Hang Liu** and Dong Li. Tahoe: Tree Structure-Aware High Performance Inference Engine for Decision Tree Ensemble on GPU. In *Pro-*

*ceedings of the European Conference on Computer Systems (**Eurosys**).* ACM, 2021.

2020 Santosh Pandey, Lingda Li, Adolfy Hoisie, Xiaoye S. Li and **Hang Liu**. C-SAW: A Framework for Graph Sampling and Random Walk on GPUs. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (**SC**).* IEEE, 2020. (Acceptance rate = 25.1%).

2020 Bolong Zheng, Xi Zhao, Lianggui Weng, Nguyen Quoc Viet Hung, **Hang Liu** and Christian S. Jensen. PM-LSH: A Fast and Accurate LSH Framework for High-Dimensional Approximate NN Search. In *Proceedings of the VLDB Endowment (**VLDB**).* 2020. **One of the best papers in VLDB '20**.

2020 Bingbing Li, Zhenglun Kong, Tianyun Zhang, Ji Li, Zhengang Li, **Hang Liu**, Caiwen Ding. Efficient Transformer-based Large Scale Language Representations using Hardware-friendly Block Structured Pruning. In *Proceedings of ACL Empirical Methods in Natural Language Processing (**EMNLP**)*, 2020.

2020 Md Hafizul Islam Chowdhuryy, **Hang Liu**, Fan Yao, BranchSpec: Information Leakage Attacks Exploiting Speculative Branch Instruction Executions. In *Proceedings of the 38th IEEE International Conference on Computer Design (**ICCD**)*, 2020.

2020 Linnan Wang, Wei Wu, Junyu Zhang, **Hang Liu**, George Bosilca, Maurice Herlihy, and Rodrigo Fonseca. FFT-based Gradient Sparsification for the Distributed Training of Deep Neural Networks. In *Proceedings of the 29th International Symposium on High-Performance Parallel and Distributed Computing (**HPDC**)*, pp. 113-124. 2020. (Acceptance rate = 22%).

2020 Runbin Shi, Yuhao Ding, Xuechao Wei, He Li, **Hang Liu**, Hayden So, and Caiwen Ding. FTDL: A Tailored FPGA-Overlay for Deep Learning with High Scalability. In *ACM/EDAC/IEEE Design Automation Conference (**DAC**)*, 2020.

2020 Bingbing Li, Santosh Pandey, Haowen Fang, Yanjun Lyv, Ji Li, Jieyang Chen, Mimi Xie, Lipeng Wan, **Hang Liu**, and Caiwen Ding. FTRANS: Energy-Efficient Acceleration of Transformers using FPGA. In *Proceedings of the ACM/IEEE International Symposium on Low Power Electronics and Design (**ISLPED**)*, pp. 175-180. 2020.

2020 Shilong Wang, Da Li, Hengyong Yu and **Hang Liu**. ELDA: Efficient LDA on GPUs (short paper) In *In Proceedings of the 25th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (**PPoPP**).* 2020.

2020 Runbin Shi, Yuhao Ding, Xuechao Wei, **Hang Liu**, So Hayden, and Caiwen Ding. FTDL: An FPGA-Tailored Architecture for Deep Learning Applications (short paper). In *Proceedings of the 2020 ACM/SIGDA International Symposium on Field-Programmable Gate Arrays (**FPGA**).* ACM, 2020.

2020 Yuede Ji, **Hang Liu**, Howie Huang. SwarmGraph: Analyzing Large-Scale In-Memory Graphs on GPUs. In the IEEE International Conference on High Performance Computing and Communications (**HPCC**), 2020.

2019 Santosh Pandey, Xiaoye S. Li, Aydin Buluc, Jiejun Xu and **Hang Liu**. H-INDEX: Hash-Indexing for Parallel Triangle Counting on GPUs. In *GraphChallenge.* 2019. **Awarded Champion**.

2019 Daniel Giger and **Hang Liu***. An Efficient Parallel Algorithm for Dominator Detection (ACM Undergraduate Poster Competition). In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (**SC**).* 2019.

2019

Hang Liu and H. Howie Huang. SIMD-X: Programming and Processing of Graph Algorithms on GPUs. In *Proceedings of the 2019 USENIX Conference on Usenix Annual Technical Conference (**USENIX ATC**)*. USENIX Association. 2019. (Acceptance rate = 19.9%).

2019 Anil Gaihre, Zhenlin Wu and **Hang Liu***. XBFS: eXploring Dynamic Optimizations for Breadth-First Search on GPUs. In *proceedings of the 28th international symposium on High-performance parallel and distributed computing (**HPDC**)*. ACM. 2019. (Acceptance rate = 21%).

2019 Bibek Bhattarai, **Hang Liu** and H. Howie Huang. CECI: Compact Embedding Cluster Index for Scalable Subgraph Matching. In *Proceedings of ACM SIGMOD International Conference on Management of Data (**SIGMOD**)*. ACM, 2019. (Acceptance rate = 20%).

2019 Eric Finnerty, Zach Sherer, Yan Luo and **Hang Liu***. Dr. BFS: Data Centric Breadth-First Search on FPGAs. In *56th ACM/ESDA/IEEE Design Automation Conference (**DAC**)*. IEEE. 2019.

2019 Hao Jin, Chen Xu, Yan Luo, Peilong Li, **Hang Liu** and Chunyang Hu. A Blockchain based Approach for Secure and Privacy-Preserving Medical Data Sharing. In *IFIP Networking Conference (**IFIP Networking**)*. IEEE. 2019. (WIP)

2019 Jialing Zhang, **Hang Liu** and Seung Woo Son. Efficient Encoding and Reconstruction of HPC Datasets for Checkpoint/Restart. In *35th Symposium on Mass Storage Systems and Technologies (**MSST**)* (pp. 1-12). IEEE. 2019.

2019 Zach Sherer, Eric Finnerty, Yan Luo and **Hang Liu***. Software and Hardware Co-Optimized BFS on FPGAs. In *Proceedings of the ACM/SIGDA International Symposium on Field Programmable Gate Arrays (**FPGA**)*. ACM, 2019.

2018 Anil Gaihre, Yan Luo and **Hang Liu**. Do Bitcoin Users Really Care About Anonymity: An Analysis of the Bitcoin Transaction Graph. In *Proceedings of IEEE International Conference on Big Data (**BigData**)*. IEEE, 2018.

2018 **Hang Liu**, Yang Hu and H. Howie Huang. High-Performance Triangle Counting on GPUs. In *GraphChallenge*. 2018. **Awarded Champion**.

2018 Yang Hu, **Hang Liu** and H. Howie Huang. TriCore: Parallel Triangle Counting on GPUs. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (**SC**)*. IEEE, 2018. (Acceptance rate = 27%).

2018 Yuede Ji, **Hang Liu** and H. Howie Huang. iSpan: Parallel Identification of Strongly Connected Components with Spanning Trees. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (**SC**)*. IEEE, 2018. (Acceptance rate = 27%).

2018 Nai Xia, Tian Chen, Yan Luo, **Hang Liu** and Xiaoliang Wang. UKSM: Swift Memory Deduplication via Hierarchical and Adaptive Memory Region Distilling. In *16th USENIX Conference on File and Storage Technologies (**USENIX FAST**)*. 2018. (Acceptance rate = 17%).

2017 Aekyeung Moon, Jaeyoung Kim, Jialing Zhang, **Hang Liu** and SeungWoo Son. Understanding the Impact of Lossy Compressions on IoT Smart Farm Analytics. In *IEEE BigData Workshop on Big Data Analytics for Internet of Things*, 2017.

2017 **Hang Liu** and H. Howie Huang. Graphene: Fine-Grained IO Management for Graph Computing. In *15th USENIX Conference on File and Storage Technologies (**USENIX FAST**)*. 2017. (Acceptance rate = 23%).

2016 **Hang Liu**, H. Howie Huang, and Yang Hu. iBFS: Concurrent Breadth-First Search on GPUs. In *Proceedings of ACM SIGMOD International Conference on Management of Data (**SIGMOD**)*. ACM, 2016. (Acceptance rate = 20%).

2015 **Hang Liu** and H. Howie Huang. Enterprise: Breadth-First Graph Traversal on GPUs. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (**SC**)*. ACM, 2015. (Acceptance rate = 22%).

2014 Yu Xiang, **Hang Liu**, Tian Lan, H. Howie Huang, and Suresh Subramaniam. Optimizing Job Reliability via Contention-free, Distributed Scheduling of VM Checkpointing. In *Proceedings of the 2014 ACM SIGCOMM workshop on Distributed cloud computing (**DCC**)*. ACM, 2014.

2014 H. Howie Huang and **Hang Liu**. Big Data Machine Learning and Graph Analytics: Current State and Future Challenges. In *International Conference on Big Data (**BigData**)*. IEEE, 2014.

2013 **Hang Liu**, Jung-Hee Seo, Rajat Mittal, and H. Howie Huang. GPU-Accelerated Scalable Solver for Banded Linear Systems. In *International Conference on Cluster Computing (**CLUSTER**)*. IEEE, 2013.

2012 **Hang Liu**, Jung-Hee Seo, Rajat Mittal, and H. Howie Huang. Matrix Decomposition Based Conjugate Gradient Solver for Poisson Equation (short paper). In *Proceedings of International Conference for High Performance Computing, Networking, Storage and Analysis (**SC**)*. IEEE, 2012.

RESEARCH - GRANTS

Total = $ ∼8.6 million, My share = $ ∼3.05 million.

NSF *Collaborative Research: CyberTraining: Implementation: Medium: Interactive and Integrated Training for Building High-Performance Ethical AI*

- Role: Site PI (Lead PI: Feng Chen, UT Dallas);
- Total: $999,994. Rutgers share: $250,000;
- Sponsor: National Science Foundation;
- 2024.10 - 2028.9.

NSF *Collaborative Research: Frameworks: hpcGPT: Enhancing Computing Center User Support with HPC-enriched Generative AI*

- Role: Co-PI (PI: Zhao Zhang);
- Total: $2,996,103. Rutgers is the lead with share = $1,199,126; Personal share: $402,518;
- Sponsor: National Science Foundation;
- 2024.8 - 2027.7.

DOE *PaperCopilot: An LLM-based Research Paper Writing Assistant*

- Role: Sole PI;
- Total: $49,999;
- Sponsor: Department of Energy (Lawrence Livermore National Laboratory);
- Period: 2024.01 - 2024.08.

NSF *ExpandQISE: Track 1: Analog quantum simulation of non-Markovian dynamics of multi-qubit systems*

- Role: Sub Award (PI: Yusui Chen);
- Total: $650,000; Personal share: $195,000 (30%);

- Sponsor: National Science Foundation;
- 2023.9 - 2026.8.

NSF *CICI: TCR: Prompt, Reliable, and Safe Security Update for Cyberinfrastructure*

- Role: Sub Award (PI: Jun Xu);
- Total: $1,200,000; Personal share: $300,000 (25%);
- Sponsor: National Science Foundation;
- 2023.9 - 2026.8.

NSF *Collaborative Research: SHF: Medium: Co-optimizing Spectral Algorithms and Systems for High-Performance Graph Learning*

- Role: Co-PI (PI: Zhuo Feng);
- Total: $1,200,000; Personal share: $400,000;
- Sponsor: National Science Foundation;
- 2022.5 - 2026.4.

NSF *CAREER: A Framework for Graph Sampling and Random Walk on GPUs*

- Role: Sole PI;
- Total: $584,001;
- Sponsor: National Science Foundation (#2046102);
- 2021.1 - 2025.12.

NSF *CRII: SHF: Expediting Subgraph Matching on GPUs*

- Role: Sole PI;
- Total: $190,000;
- Sponsor: National Science Foundation (#2000722);
- Period: 2019.09 - 2022.01.

DOE *GPU Accelerated Symbolic Factorization for SuperLU*

- Role: Sole PI;
- Total: $320,000;
- Sponsor: Department of Energy (Lawrence Berkeley National Laboratory);
- Period: 2019.09 - 2023.08.

Air Force *Real-Time Image Stitching on FPGAs*

- Role: Hang Liu (PI), Kevin Lu and Min Song;
- Total: $224,999;
- My share: $179,999;
- Sponsor: Air Force (Circle Optics);
- Period: 2022.06 - 2023.08.

DOE *SIMNET: Deep Learning Accelerated Microarchitectural Simulator*

- Role: Sole PI;
- Total: $174,581;
- Sponsor: Department of Energy (Brookhaven National Laboratory);
- Period: 2020.06 - 2022.08.

LittleLights *Knowledge Graph Assisted Scalable Adaptive Learning for LittleLights.AI*

- Role: Sole PI;
- Total: $50,725;
- Sponsor: LittleLights.AI (Industry);
- Period: 2018.08 - 2019.08.

Amazon *Graph Mining at Extreme Scale*

- Role: Sole PI;
- Total: $68,000 (cloud credit);
- Sponsor: Amazon AWS;
- Period: 2018.07 - 2019.07.

Intel *Real-Time Deep Learning on FPGAs*

- Role: Sole PI;
- Total: Stratix 10 FPGA (worth $10,000);
- Sponsor: Amazon AWS;
- Period: 2019.07.

Nvidia *Expediting Asynchronous Graph Analytics on GPUs*

- Role: Sole PI;
- Total: Quadro P6000 GPU (worth $4,500);
- Sponsor: Nvidia;
- Period: 2018.07.

Nvidia *Expediting Graph Mining on GPUs*

- Role: Sole PI;
- Total: Titan Xp GPU (worth $1,200);
- Sponsor: Nvidia;
- Period: 2017.10.

Xilinx *Expediting Transformer Models on FPGAs*

- Role: Sole PI;
- Total: Two Xilinx Alveo U280 FPGAs (worth $17,146.92);
- Sponsor: Xilinx;
- Period: 2021.10.

RESEARCH - Invited Talks

June.2024 TAO: Rethinking DL-based microarchitecture simulation
ACM on Measurement and Analysis of Computing Systems (SIGMETRICS), 2024.

April.2024 CASS Tutorial on: "GPU Programming in CUDA"
Rutgers CASS Tutorial Series (2024)

Mar.2024 Learning Dynamic Temporal Graphs at Scale
Minisymposium on large scale graph analytics, 2024 SIAM Conference on Parallel Processing for Scientific Computing (SIAM PP24)

Feb.2024 Learning Big Data at Extreme Scale
Computer Science Department Seminar at University of Delaware

Jan.2024 Learning Big Data at Extreme Scale
Brookhaven National Laboratory

Dec.2023 **Keynote Speaker: High-Performance BigData Analytics**
The workshop on Graph Techniques for Adversarial Activity Analytics 2023

Oct.2023 High-Performance BigData Analytics
Bytedance US Infra Lab

Sept.2023

	High-Performance BigData Analytics *Stevens Institute of Technology*
Dec.2022	High-Performance BigData Analytics *Virginia Tech*
Oct.2022	High-Performance BigData Analytics *Rutgers, The State University of New Jersey*
Aug.2022	Presenting the Overview of High-Performance Data Analytics Lab to NJ Secretary of Education for Higher Education (Dr. Brian Bridges) *Stevens Institute of Technology*
Dec.2021	Hardware and Software Co-designed Data Analytics *Jilin University, China*
Dec.2021	E.T.: Rethinking Transformer Models on GPUs *Stevens Institute of Technology*
Nov.2021	High-Performance Frameworks for Graph Sampling and Random Walk on GPUs *Stevens Institute of Technology*
Jan.2021	My NSF CAREER Proposal Writing Experience *Stevens Institute of Technology*
Dec.2020	How to Write a Technical Paper for ECE Student Professional Development Workshop *Stevens Institute of Technology*
Oct.2020	High-Performance Graph Sampling and Random Walk on GPUs *Brookhaven National Laboratory*
July.2019	SIMD-X: Programming and Processing of Graph Algorithms on GPUs *USENIX ATC, Renton, WA*
July.2019	Hardware Accelerated Data Science *Lawrence Berkeley National Laboratory, Berkeley, CA*
June.2019	Dr. BFS: Data Centric Breadth-First Search on FPGAs *DAC, Las Vegas, NV*
June.2019	Hardware Accelerated Data Analytics *Samsung Research Forum, San Jose, CA*
June.2019	Hardware Accelerated Graph Computing, Mining and Learning *HRL Laboratories, Malibu, CA*
April.2019	Graph Computing: System, Application and Future Directions *Massachusetts Institute of Technology, Cambridge, MA*
Mar.2019	Hardware Accelerated Data Analytics *Stevens Institute of Technology, Hoboken, NJ*
July.2018	High-Performance Graph Computing on GPUs *Nvidia Research, Westford, MA*
Feb.2018	Novel Techniques for Graph Algorithm Acceleration *Brown University, Providence, RI*
Feb.2017	Novel Techniques for Graph Algorithm Acceleration *University of Massachusetts Lowell, Lowell, MA*

Feb.2017 Novel Techniques for Graph Algorithm Acceleration
University of North Carolina Charlotte, Charlotte, NC

Jan.2017 Novel Techniques for Graph Algorithm Acceleration
Clemson University, Clemson, SC

Feb.2017 Graphene: Fine-Grained IO Management for Graph Computing
USENIX FAST, San Jose, CA

July.2016 iBFS: Concurrent Breadth-First Search on GPUs
SIGMOD, San Francisco, CA

Nov.2015 Enterprise: Breadth-First Graph Traversal on GPUs
SC, Austin, TX

TEACHING

2024 Fall 14:332:452: Software Engineering
Rutgers, The State of New Jersey (evaluation: ??/5)

2024 Spring 14:332:312: Discrete Mathematics
Rutgers, The State of New Jersey (evaluation: 4.82/5)

2023 Fall 14:332:445/519: Recent Advancements in High-Performance Computing (HPC)
Rutgers, The State of New Jersey (evaluation: 4.83/5)

2023 Spring 14:332:322: Principles Of Communication Systems
Rutgers, The State of New Jersey (evaluation: 4.82/5)

2022 Fall CPE 360-A: Computational Data Structure and Algorithms
Stevens Institute of Technology (evaluation: 4.16/5)

2022 Spring CPE 517-A: Digital and Computer Systems Architecture
Stevens Institute of Technology (evaluation: 4.6/5)
Excellent teaching evaluation award

2021 Fall CPE 517-A: Digital and Computer Systems Architecture
Stevens Institute of Technology (evaluation: 4.4/5)

2021 Spring CPE 517-A: Digital and Computer Systems Architecture
Stevens Institute of Technology (evaluation: 4.46/5)

2020 Fall CPE 360-A: Computational Data Structure and Algorithms
Stevens Institute of Technology (evaluation: 4.83/5)
Excellent teaching evaluation award

2020 Spring CPE 517-A: Digital and Computer Systems Architecture
Stevens Institute of Technology (evaluation: 4.13/5)

2019 Fall CPE 517-A: Digital and Computer Systems Architecture
Stevens Institute of Technology (evaluation: 3.70/5)

2019 Spring EECE 7110: High-Performance Computing on GPUs
University of Massachusetts Lowell

2018 Fall EECE4810/EECE5730: Opearting Systems
University of Massachusetts Lowell

2018 Spring

EECE 7110: High-Performance Computing on GPUs
University of Massachusetts Lowell

STUDENT ADVISING & MENTORING

PostDoc

2022 Chengying Huan (2022.10 - Present)
Research Topic: Temporal and Dynamic Graph Learning at Extreme Scale

PhD Students

2018 Anil Gaihre (2018.01 - 2023.12)
Dissertation Topic: High-Performance Data Analytics Systems
First Employment: Nvidia Inc

2018 Shilong Wang (2016.08 - 2023.12)
Dissertation Topic: GPU Accelerated Latent Dirichlet Allocation
First Employment: Cadence Inc

2019 Santosh Pandey (2019.01- Present)
Dissertation Topic: Machine Learning Expedited Computer Architecture Simulation

Shiyang Chen (2019.08 - Present)
Dissertation Topic: Re-thinking Machine Learning Models on Emerging Accelerators

2022 Lang Zhu (2022.08 - Present)
Dissertation Topic: Reconfigurable High-Performance Computing Systems

2023 Haoshen Yang (2023.08 - Present)
Dissertation Topic: High-Performance Graph Learning Systems

2024 Pinhuan Wang (2024.08 - Present)
Dissertation Topic: Scalable Graph Learning and Deep Learning

2024 Haolin Jiang (2024.08 - Present)
Dissertation Topic: High-Performance Data Mining System

2024 Zhiqiu Xia (2024.08 - Present)
Dissertation Topic: Machine Learning Assisted Microarchitecture Simulation

2024 Abhishek Saini (2024.08 - Present)
Dissertation Topic: High-Performance Large Language Models

Master Students

2020 Zehui Xie (2020.01 - 2020.12) *Outstanding Master's Research Project Award*

Yufeng Liu (2020.01 - 2020.12)

Neel Haria, *Intern at Jabil* (2020.05 - 2020.12)

Ghaith Arar, *Intern at Jabil* (2020.05 - 2020.12)

Yupeng Cao & Yunxiang Yang (2020.01 - 2020.12)
ECE Honors Summer Research Program 3rd Place

Scott Weitze (2020.09-2021.07)
Published a paper at SC'21

2021 Runbang Hu (2021.09-2022.05)

2022 Lang Zhu (2022.03 - 2022.05)

Kanika Yadav (Graph algorithms for code analysis)

2024 Jianku Jiang (2023.09 - present)
Won the Puri Memorial Scholarship

Undergraduate Students

2018 Daniel Giger (2018.07 - 2019.08)
Topic: An Efficient Parallel Algorithm for Dominator Detection
Selected to Participate ACM Undergraduate Poster Competition

2020 Jared Kantor & Chris Waldt (2020.05 - 2020.12)
Topic: 5G Phased Array Calibration
Advanced to the Semi-Final in Senior Design & Secure Internship and Jobs at Jabil

Shivam Sheth (2020.07 - 2021.05)
Topic: Graph Computing Assisted Latency Critical Job Scheduling on Supercomputers
Published a paper at HPCC '23

2021 Jie Dai, *Intern at Jabil* (2021.06 - present)

Abdullah Hyder (2021.09 - present)

Grant Simmons (2021.09 - present)

Pridhvi Myneni (2021.09 - present)

2022 Christian O'Connell (2022.03 - 2022.05)

Justin Young (2022.03 - 2022.05)

Matthew Jaworski (2022.05 - present)

Kamen Kresnitchki (2022.05 - present)

2023 Janet Hamrani (2023.1 - present)
Topics: GPU-accelerated equirectangular projection
Won the 1st place award for the research scholarship program

2024 Roshan Patel, Viral Patel (2024.1 - present)
Capstone team 30: Document Image Analysis with Machine Learning
Capstone project

2024 Vraj Panchal, Oliver Rzepecki, Ryan Elizondo-Fallas, and Isaiah Pajaro (2024.1 - present)
Topics: Autonomous Parking Lot Navigation for Self-Driving Model Car
Rutgers Honors College Capstone Project
Won 13th place in ECE Capstone Competition@Rutgers

K-12 Students

2021 Gabriela Romanelli (2021.3 - 2021.9)
Affiliation: HTHS at Hudson County
Topics: Python-based web crawling and analysis

2023 Aiden Jia (2023.6 - present)
Affiliation: MKA
Topics: LLM prompt engineering

Chris Lee (2023.7 - present)
Affiliation: Montgomery High School, Montgomery NJ
Topics: Subgraph matching optimizations

Defense/Proposal Committee

Aug.2021	Proposal Committee for Ali Aghdaei
Aug.2021	Proposal Committee for Ying Zhang
Dec.2021	Defense Committee for Fangzhou Wang
Dec.2021	Proposal Committee for Yuandong Cyrus Liu
April.2022	Proposal Committee for Yifan Wang
June.2022	Proposal Committee for Xuting Tang
Nov.2022	Defense Committee for Yifan Wang
Dec.2022	Defense Committee for Xuting Tang
Dec.2022	Proposal Committee for Xianbang Chen
Mar.2023	Qualify Exam Committee for Chuanneng Sun
May.2023	Proposal Committee for Anil Gaihre
June.2023	Proposal Committee for Miao Yin
July.2023	Defense Committee for Miao Yin
Aug.2023	Defense Committee for Changpeng Lu
April.2024	Qualify Exam Committee for Jinqi Xiao
June.2024	Qualify Exam Committee for Yu Gong

Student Mentoring via Professional Community

Sept.2023	SC '23 student mentoring for Lance Fletcher (TAMU)
	SC '23 student mentoring for Akshaya Bali (BU)
	SC '23 student mentoring for BBuddhi Ashan (UTSA)

PROFESSIONAL SERVICES

Journal Editorship

2021-Now	Associate Editor: Journal of BigData: Theory and Practice;
2023-Now	Associate Editor: Frontiers in High Performance Computing;

Conference Organizer

2024	Co-Chair for System and Network track in the IEEE Cloud Summit 2023 Conference
2023	Program Co-Chair: The workshop on Graph Techniques for Adversarial Activity Analytics 2023 (GTA^3 2023)
2022	Session chair for Graph Algorithms at SC '22
2022	Program Co-Chair: The workshop on Graph Techniques for Adversarial Activity Analytics 2022 (GTA^3 2022)

2021 Program Co-Chair: The workshop on Graph Techniques for Adversarial Activity Analytics 2021 (GTA^3 2021)

2021 Session chair for High performance Graph Algorithms at SC '21

2021 Session chair for Cloud and Distributed Computing Exhibition Forum

2019 Session chair for Session 4: Scalable Graph Processing at HPDC '19

Award Committee

2023 Committee for IEEE CS TCHPC Early Career Researchers Award for Excellence in High Performance Computing – 2023

Technical Program Committee

2024 The IEEE International Parallel & Distributed Processing Symposium (*IPDPS*)

2023 The International Conference for High Performance Computing, Networking, Storage, and Analysis (*SC*)

2023 IEEE International Conference on Computer Design (*ICCD*)

2023 The International Conference for Parallel Processing (*ICPP*)

2023 The ACM International Symposium on High-Performance Parallel and Distributed Computing (*HPDC*)

2023 The IEEE International Parallel & Distributed Processing Symposium (*IPDPS* Program Committee Chair's Team)

2022 IEEE International Conference on Big Data (*BigData*)

2022 The International Conference for High Performance Computing, Networking, Storage, and Analysis (*SC*)

2022 The ACM Symposium on Principles and Practice of Parallel Programming (*PPoPP*)

2021 Best Paper Selection Committee at SC '21

2022 The IEEE International Parallel & Distributed Processing Symposium (*IPDPS*)

2022 The ACM International Symposium on High-Performance Parallel and Distributed Computing (*HPDC*)

2021 The International Conference for High Performance Computing, Networking, Storage, and Analysis (*SC*)

2021 The IEEE International Parallel & Distributed Processing Symposium (*IPDPS*)

2021 The ACM International Symposium on High-Performance Parallel and Distributed Computing (*HPDC*)

2020 The International Conference for High Performance Computing, Networking, Storage, and Analysis (*SC*)

2020 The IEEE International Parallel & Distributed Processing Symposium (*IPDPS*)

2020 ACM International Symposium on High-Performance Parallel and Distributed Computing (*HPDC*)

2020 The IEEE International Conference on Distributed Computing Systems (*ICDCS*)

2020 SIAM Workshop on Combinatorial Scientific Computing (*CSC*)

2019 IEEE International Conference on Big Data (*BigData*)

2019 The ACM International Symposium on High-Performance Parallel and Distributed Computing (*HPDC*)

2018 The ACM International Symposium on High-Performance Parallel and Distributed Computing (*HPDC*)

2018 The IEEE International Parallel *&* Distributed Processing Symposium (*IPDPS*)

Journal Reviewer

2023 IEEE TC, IEEE TPDS

2022 IEEE TC, IEEE TPDS, IEEE TCAD, IEEE ToCC

2021 IEEE TC, IEEE TPDS, IEEE TCAD, IEEE ToCC

2020 IEEE TC, IEEE TPDS, IEEE TCAD, IEEE ToCC, IEEE TSC

2019 IEEE TC, IEEE TPDS, IEEE TOPC, IEEE TM, Elsevier Neurocomputing, IEEE TPPNA

2018 IEEE TC, IEEE TPDS, IEEE TOPC

2017 IEEE TC, IEEE TPDS

Panelist

Mar.2023 National Science Foundation (NSF)

June.2022 National Science Foundation (NSF)

Mar.2022 National Science Foundation (NSF)

Mar.2022 National Science Foundation (NSF)

Feb.2021 National Science Foundation (NSF)

Jan.2021 National Science Foundation (NSF)

June.2020 National Science Foundation (NSF)

April.2020 National Science Foundation (NSF)

April.2019 National Science Foundation (NSF)

April.2018 National Science Foundation (NSF)

INTERNAL SERVICES

2024 Department Faculty Search Committee

2023 Computer Engineering Subcommittee@Rutgers

2023 ECE Paul Panayotatos Scholarship Subcommittee@Rutgers

2023 Rutgers ECE Marshals for SOE Convocation

2023 Rutgers ECE Capstone Judge Committee

2023 Rutgers ECE Outreach Committee

2023 Rutgers ECE ABET Committee

2023 Rutgers ECE Admissions and Fellowships Committee

2023 SES Dean's Faculty Advisory Council (FAC)

2022	Undergraduate recruitment and orientation committee
2022	Graduate recruitment and orientation committee
2022	Research computing committee, *The HPC infrastructure construction at Stevens Institute of Technology*
2022	Chair of Department Award Committee, *Department of Electrical & Computer Engineering, Stevens Institute of Technology*
2021	Strategic Planning Committee, *Department of Electrical & Computer Engineering, Stevens Institute of Technology*
2020 - 2021	Graduate Student Recruitment Committee, *Department of Electrical & Computer Engineering, Stevens Institute of Technology*
2019 - 2021	Master Student Advisor, *Department of Computer Science, Stevens Institute of Technology*
2020 - 2021	Faculty candidate interview, *CS/ECE, Stevens Institute of Technology*