JIE LI

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RESEARCH INTERESTS

My research focuses on **High-Performance Computing (HPC)**, **Systems Security**, and **AI Infrastructure**. I address critical inefficiencies and security vulnerabilities in modern computing environments through AI-driven system monitoring, proactive cyber-defense, and hardware-software co-design. By bridging systems research with machine learning, I build secure, autonomous, and energy-efficient architectures to support heterogeneous paradigms, including Generative AI and hybrid quantum-classical workflows.

EDUCATION

- **Ph.D.**, Computer Science, Texas Tech University, Lubbock, Texas   May 2024
    - Dissertation: *Optimizing High-Performance Computing Systems: Insights from System Monitoring, Workload Management, and Scheduling Strategies*
    - GPA: 4.0/4.0 | Advisor: Prof. Yong Chen

- **M.S.**, Computer Science, Texas Tech University, Lubbock, Texas   August 2019
    - Thesis: *PIMS: A Lightweight Processing-in-Memory Accelerator for Stencil Computations*
    - GPA: 4.0/4.0 | Advisor: Prof. Yong Chen

- **B.A.**, Architecture, Huaqiao University, Xiamen, China   May 2012
    - *Introduced to programming through computational design and parametric modeling coursework.*

RESEARCH AND PROFESSIONAL EXPERIENCE

- **Post-doctoral Researcher**, Texas Tech University   June 2024 – present
    - Lead research in high-performance computing, focusing on distributed architectures, operational integrity (security), energy-aware, resource management, data management, and AI applications.
    - Technical lead of the Data-Intensive Scalable Computing Laboratory (DISCL, https://discl.cs.ttu.edu/) and the NSF Cloud and Autonomic Computing Center (CAC IUCRC, https://nsfcac.org/), organizing Semi-Annual Industry Advisory Board Meetings and coordinating collaborative activities.
    - Co-PI on competitive research proposals, including the "SHIELD" NSF proposal that designs layered defense mechanisms for open-science cyberinfrastructure.
    - Co-designed and built the NSF REPACSS cluster (total award: $12.25M, https://www.repacss.org/) from the ground up; continue contributing to its operation and performance optimization.
    - Supervise graduate and undergraduate researchers, providing mentorship in systems design, experimentation, and publication.

- **Research Assistant**, Texas Tech University   September 2019 – May 2024
    - Conducted original research in HPC, parallel and distributed systems, and computer architecture.
    - Published 15 peer-reviewed papers in premium international venues including ICPP, MemSys, BigData, CLUSTER, ISC, and CLOUD, with typical acceptance rate of around 20-25%.

- Mentored graduate and undergraduate students (eight in total) on research projects, including supervising a master's thesis that resulted in a CLOUD'23 publication.
- Developed and maintained research software such as the MonSTer HPC monitoring framework, the Disaggregation-Aware Scheduler, and xBGAS simulation tools. The MonSTer framework was adopted by Dell's Omnia project (https://github.com/dell/omnia).

- **Graduate Student Intern**, Lawrence Berkeley National Laboratory   Summers 2021, 2022, 2023
  Mentored by Brandon Cook and Georgios Michelogiannakis in John Shalf's group
  - Designed and implemented data pipelines to integrate and analyze HPC telemetry (LDMS, DCGM, Slurm) from NERSC supercomputers.
  - Applied deep learning methods (e.g., convolutional neural networks) to classify and predict HPC job behavior from time-series data.
  - Authored publications in top venues such as ISC and CLUSTER based on independent research conducted during internships.
  - Led the development of the open-source Disaggregation-Aware Scheduler, a simulation framework for job scheduling in memory-disaggregated systems, used in multiple publications and collaborations.

GRANTS AND FUNDING

*I expect to carry an **NSF sub-award of $300,000 - $500,000** with me to continue my current research projects based on the agreement with my current supervisor.*

- **Category II: REPACSS – Empowering Scientific Discovery through Renewable Energy Powered Advanced Computing Systems and Services**
  Role: *Contributor to Proposal Development (with PI Dr. Yong Chen and Co-PI Dr. Alan Sill).* Assisted in proposal writing, including sections on data center monitoring and remote control.
  Submitted: 2023   **Status: Funded**   **Sponsor:** National Science Foundation   **Total Award:** $12,250,000

- **CICI:UCSS:SHIELD – Strengthening High-Performance Infrastructure with Enhanced Layered Defense**
  Role: *Co-Principal Investigator (with PI Dr. Yong Chen).* Contributed to the project vision and technical approach for enhancing cybersecurity in HPC environments.
  Submitted: 2025   **Status:** Unfunded   **Sponsor:** National Science Foundation   **Total Requested:** $600,000

- **Frameworks: DAVinci – An Integrated Data Collection, Automation, and Visualization Framework for HPC Systems**
  Role: *Lead Contributor (with PI Dr. Yong Chen and Co-PI Dr. Alan Sill).* Led the development of the proposal's core framework design and research methodology.
  Submitted: 2020   **Status:** Unfunded   **Sponsor:** National Science Foundation   **Total Requested:** $1,000,000

PUBLICATIONS

[16] Chenxu Niu, Wei Zhang, **Jie Li**, Yongjian Zhao, Tongyang Wang, Xi Wang, and Yong Chen. TokenPowerBench: Benchmarking the Power Consumption of LLM Inference. Accepted for presentation at *the 40th Annual AAAI Conference on Artificial Intelligence (AAAI'26)*. (Acceptance Rate: 4,167/23,680=17.6%)

[15] **Jie Li**, George Michelogiannakis, Samuel Maloney, Brandon Cook, Estela Suarez, John Shalf, and Yong Chen. Job Scheduling in High Performance Computing Systems with Disaggregated Memory Resources. In *2024*

IEEE International Conference on Cluster Computing (CLUSTER'24), pages 297–309. IEEE, 2024c. doi: 10.1109/CLUSTER59578.2024.00033

[14] **Jie Li**, George Michelogiannakis, Brandon Cook, John Shalf, and Yong Chen. Scheduling and Allocation of Disaggregated Memory Resources in HPC Systems. In *2024 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW)*, pages 1202–1203. IEEE, 2024b. doi: 10.1109/IPDPSW63119.2024.00206

[13] **Jie Li**, John D Leidel, Brian Page, and Yong Chen. Towards Cycle-accurate Simulation of xBGAS. In *2024 International Conference on Computing, Networking and Communications (ICNC'24)*, pages 468–472. IEEE, 2024a. doi: 10.1109/ICNC59896.2024.10556078

[12] Tommy Dang, Ngan VT Nguyen, **Jie Li**, Alan Sill, and Yong Chen. Spiro: Order-Preserving Visualization in High Performance Computing Monitoring. In *International Symposium on Visual Computing(ISVC'24)*, pages 109–120. Springer, 2023

[11] **Jie Li**, Rui Wang, Ghazanfar Ali, Tommy Dang, Alan Sill, and Yong Chen. Workload Failure Prediction for Data Centers. In *2023 IEEE 16th International Conference on Cloud Computing (CLOUD'23)*, pages 479–485, 2023b. doi: 10.1109/CLOUD60044.2023.00064

[10] Cristiano E. Caon, **Jie Li**, and Yong Chen. Effective Management of Time Series Data. In *2023 IEEE 16th International Conference on Cloud Computing (CLOUD'23)*, pages 408–414, 2023. doi: 10.1109/CLOUD60044.2023.00055

[9] **Jie Li**, George Michelogiannakis, Brandon Cook, Dulanya Cooray, and Yong Chen. Analyzing Resource Utilization in an HPC System: A Case Study of NERSC's Perlmutter. In *International Conference on High Performance Computing (ISC'23)*, pages 297–316. Springer, 2023a. doi: 10.1007/978-3-031-32041-5_16. (Acceptance Rate: 21/78=26.9%)

[8] Tommy Dang, Ngan VT Nguyen, **Jie Li**, Alan Sill, Jon Hass, and Yong Chen. JobViewer: Graph-based Visualization for Monitoring High-Performance Computing System. In *2022 IEEE/ACM International Conference on Big Data Computing, Applications and Technologies (BDCAT'22)*, pages 110–119. IEEE, 2022. doi: 10.1109/BDCAT56447.2022.00021

[7] Tommy Dang, Ngan Nguyen, Jon Hass, **Jie Li**, Yong Chen, and Alan Sill. The Gap between Visualization Research and Visualization Software in High-Performance Computing Center. *The Gap between Visualization Research and Visualization Software (VisGap'21))*, 2021. doi: 10.2312/visgap.20211089

[6] Xi Wang, Antonino Tumeo, John D Leidel, **Jie Li**, and Yong Chen. HAM: Hotspot-Aware Manager for Improving Communications With 3D-Stacked Memory. *IEEE Transactions on Computers (IEEE Trans Comput)*, 70(6): 833–848, 2021. doi: 10.1109/TC.2021.3066982

[5] **Jie Li**, Ghazanfar Ali, Ngan Nguyen, Jon Hass, Alan Sill, Tommy Dang, and Yong Chen. MonSTer: An Out-of-the-Box Monitoring Tool for High Performance Computing Systems. In *2020 IEEE International Conference on Cluster Computing (CLUSTER'20)*, pages 119–129. IEEE, 2020. doi: 10.1109/CLUSTER49012.2020.00022. (Acceptance Rate: 27/132=20.5%)

[4] Ngan Nguyen, Jon Hass, Yong Chen, **Jie Li**, Alan Sill, and Tommy Dang. Radarviewer: Visualizing the Dynamics of Multivariate Data. In *Practice and Experience in Advanced Research Computing (PEARC'20)*, pages 555–556. 2020. doi: 10.1145/3311790.3404538

[3] Vung Pham, Ngan Nguyen, **Jie Li**, Jon Hass, Yong Chen, and Tommy Dang. MTSAD: Multivariate Time Series Abnormality Detection and Visualization. In *2019 IEEE International Conference on Big Data (BigData'19)*, pages 3267–3276. IEEE, 2019. doi: 10.1109/BigData47090.2019.9006559

[2] **Jie Li**, Xi Wang, Antonino Tumeo, Brody Williams, John D Leidel, and Yong Chen. PIMS: A Lightweight

Processing-in-Memory Accelerator for Stencil Computations. In *Proceedings of the International Symposium on Memory Systems (MemSys'19)*, pages 41–52, 2019. doi: 10.1145/3357526.3357550

[1] Xi Wang, Antonino Tumeo, John D Leidel, **Jie Li**, and Yong Chen. MAC: Memory access coalescer for 3D-stacked memory. In *Proceedings of the 48th International Conference on Parallel Processing (ICPP'19)*, pages 1–10, 2019. doi: 10.1145/3337821.3337867. (Acceptance Rate: 106/405=26.2%)

PUBLICATIONS UNDER SUBMISSION/RE-SUBMISSION

[4] **Jie Li**, Xi Wang, Brody Williams, John Leidel, Jieran Cui, Yongjian Zhao, Chenxu Niu, and Yong Chen. PRISM: A Hardware-software Co-Design for the Partitioned Global Address Space Model.

[3] **Jie Li**, Cook, Brandon and Chen, Yong. ARcode: HPC Application Recognition Through Image-encoded Monitoring Data.

[2] **Jie Li**, Chenxu Niu, Tongyang Wang and Chen, Yong. Power, Performance, and Parallelism: Tuning CPU Frequency and Scale for Energy-Efficient HPC Execution

[1] Batuhan Sencer, Chenxu Niu, **Jie Li** and Yong Chen. Slimming Models, Saving Watts: Understanding and Modeling the Impact of Knowledge Distillation on GPU Clusters

OPEN-SOURCE SOFTWARE

- **MonSTer**: https://github.com/nsfcac/MonSTer. An "out-of-the-box" monitoring tool for high-performance computing platforms. Presented in CLUSTER'20 and adopted by the Dell Omnia project.

- **Disaggregation-Aware Scheduler**: https://github.com/artlands/DisaggregationAwareScheduler. Simulator for exploring job scheduling strategies in HPC systems with disaggregated memory. Used in CLUSTER'24 and IPDPSW'24 publications.

- **xBGAS REV-CPU**: https://github.com/artlands/rev-xbgas. Cycle-accurate simulation extension for xBGAS architecture, based on the REV-CPU framework. Developed in collaboration with Tactical Computing Laboratories (TCL); presented in ICNC'24.

- **xBGAS Runtime**: https://github.com/artlands/rev-xbgas-runtime. Lightweight runtime system supporting global address space extensions for RISC-V-based xBGAS simulation. Developed in collaboration with TCL.

PRESENTATIONS

Unless noted otherwise, all presentations were delivered by Jie Li.

[9] "Integrated Data Collection and Visualization Framework for Data Centers based on Telemetry Model," by J. Li, P. Roemsri, T. Dang, Y. Chen, and A. Sill. Fall 2024 NSF CAC Industry Advisory Board Conference, Lubbock, TX, USA, December 16, 2024

[8] "Towards Cycle-Accurate Simulation of xBGAS," by J.Li and Y. Chen. Latch-Up 2024, Cambridge, MA, USA, April 19, 2024

[7] "Workload Failure Prediction for Data Centers," by J. Li, R. Wang, G. Ali, T. Dang, A. Sill, and Y. Chen. The 16th IEEE International Conference on Cloud Computing (CLOUD'23), Chicago, IL, July 6, 2023

[6] "Integrated Data Collection and Visualization Framework for Data Centers based on Telemetry Model," by J. Li, N. Ngan VT, G. Ali, T. Dang, Y. Chen, and A. Sill. Spring 2023 NSF CAC Industry Advisory Board Conference, Tucson, AZ, USA, May 25, 2023

[5] "Integrated Data Collection and Visualization Framework for Data Centers based on Telemetry Model," by J. Li, N. Ngan VT, G. Ali, C. Caon, T. Dang, Y. Chen, and A. Sill. Fall 2022 NSF CAC Industry Advisory Board Conference, Denton, TX, USA, November 11, 2022

[4] "Integrated Data Collection and Visualization Framework for Data Centers based on Telemetry Model," by J. Li, N. Ngan VT, G. Ali, T. Dang, Y. Chen, and A. Sill. Spring 2021 NSF CAC Industry Advisory Board Conference, Lubbock, TX, USA, May 7, 2021.

[3] "Advanced Visualization and Data Analysis of HPC Cluster and User Application Behavior," by J. Li, N. Ngan VT, G. Ali, T. Dang, Y. Chen, and A. Sill. The 33rd ACM/IEEE International Conference for High Performance Computing, Networking, Storage, and Analysis (SC'21), November 2021

[2] "MonSTer: An Out-of-the-Box Monitoring Tool for High Performance Computing Systems," by J. Li, G. Ali, N. Ngan VT, J. Hass, A. Sill, T. Dang, and Y. Chen. The 22nd IEEE International Conference on Cluster Computing (CLUSTER'20), 2020.

[1] "PIMS: A Lightweight Processing-In-Memory Accelerator for Stencil Computations," by J. Li, X. Wang, A. Tumeo, B. Williams, J. D. Leidel, and Y. Chen. The 5th International Symposium on Memory Systems (MemSys'19), October 2019

REFEREED POSTERS/POSTER PAPERS

[3] **J. Li**, B. Cook, G. Michelogiannakis, Y. Chen. A Holistic View of Memory Utilization on Perlmutter. In the 34th International Conference for High Performance Computing, Networking, Storage and Analysis (SC'22), 2022.

[2] **J. Li**, B. Cook, Y. Chen. Detecting and Identifying Applications by Job Signatures. In the 33rd International Conference for High Performance Computing, Networking, Storage and Analysis (SC'21), 2021

[1] X. Wang, **J. Li**, A. Tumeo, J. D. Leidel, Y. Chen. Memory Hotspot Optimizations for 3D-Stacked Memory. The 28th International Conference on Parallel Architectures and Compilation Techniques (PACT'19), 2019.

NON-REFEREED POSTERS

[8] M. Side, B. Williams, **J. Li**, J. Leidel, and Y. Chen. A Secure Global Address Space Extension for HPC. In the Fall 2024 NSF CAC Industry Advisory Board Conference, Lubbock, TX, USA, November 16th, 2024.

[7] Y. Zhao, **J. Li**, B. Williams, J. Leidel, and Y. Chen. xBGAS subset communication and benchmarking. In the Fall 2024 NSF CAC Industry Advisory Board Conference, Lubbock, TX, USA, November 16th, 2024.

[6] M. Side, B. Williams, **J. Li**, J. Leidel, and Y. Chen. A Secure Global Address Space Extension for HPC. In the Fall 2024 Departmental Research Showcase held in conjunction with the TTU WCOE Computer Science Board Meeting, Lubbock, TX, USA, October 17th, 2024.

[5] **J. Li**, G. Michelogiannakis, B. Cook, and Y. Chen. Job Scheduling in HPC Systems with Disaggregated Memory. In the Fall 2023 NSF CAC Industry Advisory Board Conference, Lubbock, TX, USA, November 20th, 2023.

[4] **J. Li**, G. Michelogiannakis, B. Cook, and Y. Chen. A Holistic View of Memory Utilization on Perlmutter. In the Fall 2022 NSF CAC Industry Advisory Board Conference, Denton, TX, USA, November 11th, 2022.

[3] **J. Li**, B. Cook, and Y. Chen. HPC Application Recognition Through Image-encoded Monitoring Data. In the Spring 2022 NSF CAC Industry Advisory Board Conference, Lubbock, TX, USA, April 21st, 2022.

[2] **J. Li**, R. Wang, G. Ali, and Y. Chen. Predicting Abnormal Workloads in HPC Systems. In the Spring 2021 NSF CAC Industry Advisory Board Conference, Lubbock, TX, USA, May 7th, 2021.

[1] **J. Li**, H. Nguyen, A. Sill, T. Dang and Y. Chen. Behavior Based Job Classification and Characterization on HPC Systems. In the Fall 2021 NSF CAC Industry Advisory Board Conference, Tucson, AZ, USA, November 11th, 2021.

MENTORING & TEACHING EXPERIENCE

Undergraduate Students (including REU Participants)

- **Yusheng Han** and **Zachary Kay** – *Running HPC Applications on the RedRaider Cluster and Analyzing Performance Behaviors*, Independent Study (CS4000). — Spring 2022

- **Casey Root** – *Monitoring Queue Status via SLURM REST API*, Independent Study (CS4000). — Spring 2021

Graduate Students

- **Rupak Kadel (Ph.D. Student)** – *Improving and Optimizing the High-performance Computing Monitoring System for Anomaly and Intrusion Detection.* — Fall 2025, Ongoing

- **William Dunlap (Ph.D. Student)** – *Exploring the Integration of High-performance Computing and Quantum Computing.* — Fall 2025, Ongoing

- **Cristiano Caon (M.S.)** – *Investigating Data Volume Reduction and Query Optimization in Time Series Databases*, Independent Study (CS7000) and Master's thesis. Outcomes include a conference publication in *CLOUD'23*. — Fall 2022

- **Aniruddh Sanjaysinh Chavda (M.S.)** and **Huyen Nguyen (Ph.D.)** – *Usage Behavior Analysis with Clustering Job Accounting Data*, project in *Advanced Operating Systems (CS5379).* — Spring 2021

- **Ruonan Wu (M.S.)** – *Job Accounting Data Analysis for the Quanah Cluster*, project in *Advanced Operating Systems (CS5379).* — Spring 2021

- **Ashhrita Puradamane Balachandra (M.S.)** – *Improving Query Performance of InfluxDB*, project in *Advanced Operating Systems (CS5379).* — Spring 2020

Graduate Students – Teaching and Instruction

- Delivered four invited lectures and designed programming projects for *Parallel Processing (CS5379, 27 students)*. Topics included job scheduling, compilation and job submission, and OpenMP. — Fall 2025

AWARDS AND HONORS

- Best Poster Award, NSF Cloud and Autonomic Computing Industry Advisory Board Conference — 2022
- Summer Thesis/Dissertation Research Award ($2300), Lubbock, Texas — 2019

PROFESSIONAL SERVICE

Program Committee
- AAAI Conference on Artificial Intelligence (AAAI) — 2026

Journal Reviewer
- IEEE Computer Architecture Letters (CAL) — 2025

- The Journal of Supercomputing   2023

Conference Reviewer
- IEEE International Symposium on Circuits and Systems (ISCAS)   2026
- IEEE International Conference on Big Data (BigData)   2022, 2023, 2025
- IEEE/ACM International Symposium on Cluster, Cloud and Internet Computing (CCGrid)   2024

Conference Sub-reviewer
- IEEE International Parallel and Distributed Processing Symposium   2023
- IEEE International Conference on Distributed Computing Systems   2022
- The International Conference for High-Performance Computing, Networking, Storage, and Analysis   2022
- International Parallel Data Systems Workshop   2022
- IEEE International Conference on Smart Data Services   2020

Conference Volunteer
- Student volunteer of ACM/IEEE SC'21, St. Louis, Missouri   2021
- Student volunteer of ACM/IEEE SC'19, Denver, Colorado   2019