Hailong Jiang

／HAI-LUNG, CHIANG／

6040 Pebblebrook Ln, Apt 258.
Kent, OH. 44240, USA
937-789-3969
jianghl106@gmail.com

SUMMARY

Passionate PhD candidate in Computer Science with extensive experience in High-Performance Computing (HPC) resilience analysis and innovative code intelligence on LLM techniques. Proven track record in developing cutting-edge tools, teaching, and conducting collaborative research. Seeking a research role in HPC applications and systems, compilers, or generative AI systems starting May 2025.

EDUCATION

Ph.D. in **Computer Science** August 2018 to December 2024 (Expected)

- ***Kent State University****, Kent, OH*
- Dissertation: "Research on resilience in high-performance Computing (HPC) applications with Large Language Models"

M.S. in **IC Engineering** August 2014 to May 2017

- ***University of Chinese Academy of Science,*** *Beijing, China*
- Thesis: "The Study of Cu2ZnSnS4 films generation by sulfur-free annealing process and device application"

B.S. in **Electronic Science and technology** August 2010 to June 2014

- ***Xidian University,*** *Xi'an, China*
- Thesis: "A novel infrared object tracking algorithm"

EMPLOYMENT

Argonne National Lab February 2023 to August 2023
Mathematics Computer Science Division **Advisor: Dr. Michael Kruse**
Job Title: **Research Aide Technical**
Research topic: **translation between parallelization languages**

- Complete the metadata process in the project "EXCELLENT" which translates parallelization language to each other in the compilation,
- Engineering in a combination of Noelle and SPLENDID
- Setup experiment environment for OpenMP/CUDA decompilation

Kent State University August 2023 to present
Department of Computer Science **Advisor: Dr. Qiang Guan**
Job Title: **Research Assistant**
Research topic: **IR representation for LLMs on Program analysis**

- Develop a novel IR representation method
- Study the LLM and IR combination

Kent State University August 2018 to December 2023
Department of Computer Science
Job Title: **Research Assistant** **Advisor: Dr. Qiang Guan**
Research topic: **Program resilience analysis on High-performance computing (HPC) systems**

- Built a soft error simulation platform on LLVM
- Developed a resilience analysis platform with transformer/LLM
- Improved the resilience prediction accuracy by 30%
- Built a visualization framework to study error propagation using the control-flow graph

Kent State University May 2022 to August 2022
Biology Department **Advisor: Dr. Robert J. Clements**
Job Title: **Summer Internship**

- Developed TIE algorithm plugin based on ImageJ and FIJI
- Developed ImageJ plug-in to process biological images

Los Alamos National Lab May 2019 to August 2019
High-Performance Computing Division **Advisor: Dr. Nathan DeBardeleben**
Job Title: **Summer Internship**

- Developed FI-VIS tool based on Pin and Pinfi
- Trace and visualize error propagation in program execution at the instruction level.

TEACHING

Cloud Computing (Under/graduate) Fall 2020
Lecture Instructor
Computer Organization (Undergraduate) Fall 2022
Lecture Instructor
Advanced Digital Design (Under/graduate) Fall 2021
Lecture Instructor
Operating System (Under/graduate) Spring 2021
Teaching Assistant

ACADEMIC ACHIEVEMENT

RESEARCH TOPICS:

- **IR representation for LLMs [0]**
- **Resilience Analysis of High-performance Computing System [1-5]**
- **Implementation and Interpretation of Large Language Model on Code/NLP Analysis [0, 6]**
- **Robustness enhancement of Machine Learning models [7-11]**

PUBLICATIONS:

0. **Can Large Language Models Understand IRs?**
   Hailong Jiang, Jianfeng Zhu, Ruoming Jin, Qiang Guan **(Preprinted,** Submitted to 2025 International Conference on Machine Learning (ICML'25)**)**

1. **Investigating Resilience of Loops in HPC Programs: A Semantic Approach with LLMs**
   Hailong Jiang, Jianfeng Zhu, Bo Fang, Qiang Guan. 28th Annual IEEE High-Performance Extreme Computing Conference, 2024 (HPEC'24)

2. **HAPAA: Resilience Prediction for HPC Applications Using Transformer with Chunking and Aggregation**
   Hailong Jiang, Jianfeng Zhu, Qiang Guan. 43rd International Symposium on Reliable Distributed Systems (SRDS 2024)

3. **VISILIENCE: An Interactive Visualization Framework for Resilience Analysis using Control-Flow Graph**
   Hailong Jiang, Shaolun Ruan, Bo Fang, Qiang Guan. 2023 IEEE 28th Pacific Rim International Symposium on Dependable Computing (PRDC 2023)

4. **BatchLens: A Visualization Approach for Analyzing Batch Jobs in Cloud Computing**
   Shaolun Ruan, Yong Wang, **Hailong Jiang,** Weijia Xu, Qiang Guan . 2022 Design, Automation & Test in Europe Conference & Exhibition (DATE), 108-111

5. **Chaser: An Enhanced Fault Injection tool for tracing Soft Errors in MPI Applications**
   Qiang Guan*, Xunchao Hu, Terence Grove, Bo Fang, **Hailong Jiang**, Heng Yin, Nathan DeBardeleben. 2020 50th Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN)

6. **ResilienceVis: A Control-Flow Graph-based Visualization Framework for Resilience Analysis**
   Hailong Jiang, Qiang Guan, Bo Fang, Shaolun Ruan, Sriram Krishnamoorthy, and Nathan DeBardeleben. SELSE 2021

7. **Exploring the Digital Landscape of Antidepressant Use: Demographic Insights, Emotional Analysis, and Topic Modeling**
   Zhu J, Zhang X, Jin R, **Jiang H,** Kenne DR. JMIR Preprints. 28/05/2024:62680 DOI: 10.2196/preprints.62680

8. **Robust feature modeling for face authentication in smart device**
   A Li, X Liu, **H Jiang**. IEEE INFOCOM 2019-IEEE Conference on Computer Communications Workshops
   Jianfeng Zhu, Xinyu Zhang, Ruoming Jin, Hailong Jiang, Deric R Kenne Submitted to: Journal of Medical Internet Research
9. **Semi-supervised subspace learning for pattern classification via robust low-rank constraint**
   A Li, R An, D Chen, G Sun, X Liu, Q Wu, **H Jiang.** Mobile Networks and Applications 25, 2258-2269

10. **Cross-view feature learning via structures unlocking based on robust low-rank constraint**
    A Li, Y Ding, D Chen, G Sun, **H Jiang,** Q Wu. IEEE Access 8, 46851-46860

11. **Elastic Network-based Subspace Clustering for security Authentication**
    A Li, X Liu, **H Jiang**. 2019 Computing, Communications and IoT Applications (ComComAp), 226-230

12. **Subspace structural constraint-based discriminative feature learning via nonnegative low-rank representation**
    A Li, X Liu, Y Wang, D Chen, K Lin, G Sun, **H Jiang**. PloS one 14 (5), e0215450

13. **Numerical simulation and experimental validation of inverted planar perovskite solar cells based on NiOx hole transport layer**
    X Wei, X Wang, **H Jiang,** Y Huang, A Han, Q Gao, J Bian, Z Liu. Superlattices and Microstructures 112, 383-393

14. **Achieving composition-controlled Cu2ZnSnS4 films by a sulfur-free annealing process**
    H Jiang, X Wei, Y Huang, X Wang, A Han, X Liu, Z Liu, F Meng. Japanese Journal of Applied Physics 56 (6), 065502

15. **Liquid-based growth of polymeric carbon nitride films and their extraordinary photo electrocatalytic activity**
    X Wei, **H Jiang**, Z Liu. RSC advances 6 (84), 81372-81377

POSTERS:

1. **Study on Resilience of HPC Applications with LLMs**
   Hilong Jiang. 2024 Super Computing (SC24) Doctoral Showcase

2. **Visual Analysis on The Resilience of HPC Applications Using Control-Flow Graph**
   Hailong Jiang, Shaolun Ruan, Bo Fang, Yong Wang , Qiang Guan. 2022 Super Computing (SC22) Poster

SKILLS

Programming:	• C++/C • Python • Shell/CMake
Tools and Techs:	• LLVM/Clang • CUDA, OpenMP • TensorFlow, Anaconda • LLM/NLP/BERT • GNN, Networkx
Research Aids:	• Git • Latex • markdown
Language:	• English • Mandarin

KNOWLEDGE STACK

High-performance computing (HPC) System:	• Computer Architecture • Security/Performace/Resilience Analysis • Cloud computing • Parallelization/pipeline
Compiler (LLVM/GNU/Clang):	• Compiler optimization/analysis • Decompilation • IR code processing
Program analysis:	• Source code analysis • Data flow graph/ Control flow graph/ Program dependency graph processing and analysis • IR code/Instruction analysis
AI & ML:	• Code Intelligence • Large Language Model/ NLP • GNN/CNN

PROFESSIONAL SERVICES

ICIMP 2024	• Committee Member
BigData23	• Paper Reviewer
ISSRE23	• Reviewer for Artifact Evaluation Track
VALID 2023	• Committee Member
MONE22	• Committee Member

INTERESTS

 **(H)Marathon**  **Basketball**  **Badminton**  **Outdoors**

REFERENCE

Dr. Qiang Guan *(Ph. D. Advisor)*	Kent State University Department of Computer Science	qguan@kent.edu 330.672.2191
Dr. Xiang Lian *(Ph. D. Committee Member)*	Kent State University Department of Computer Science	xlian@kent.edu 330-672-9063
Dr. Bo Fang *(Project Collaborator)*	Pacific Northwest National Lab Scalable and Emerging Technology Group	bo.fang@pnnl.gov
Dr. Chao Chen *(Project Collaborator)*	Intel Corporation Compiler and Computing System Researcher	chao.chen@intel.com

AWARDS

Graduate Student Travel Awards Kent State University (2024)