Haipeng Cai

CONTACT INFORMATION

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RESEARCH INTERESTS

My primary research interests are in software engineering in general and program analysis in particular, with a focus on the security, maintenance, and evolution of software systems of highly decoupled composition (distributed systems, mobile apps, and multi-language software).

EDUCATION

The University of Notre Dame, Notre Dame, IN, USA
Ph.D. in Computer Science and Engineering, 2015
Thesis: Cost-effective Dependency Analysis for Reliable Software Evolution
Advisors: Dr. Raul Santelices and Dr. Douglas Thain
GPA: 4.0/4.0

The University of Southern Mississippi, Hattiesburg, MS, USA
M.S. in Computer Science, 2012
Thesis: A Scientific Visualization Language for Tensor Field Visualizations
GPA: 4.0/4.0

Zhejiang University, Hangzhou, China
M.E. in Computer Science and Technology, 2008
Thesis: Algorithms for Motion Tracking in Streaming Videos
GPA: 3.94/4.0

Wuhan University, Wuhan, China
B.E. in Computer Science, 2004
GPA: 90.5/100

PROFESSIONAL EXPERIENCE (*Academic*)

Washington State University, Pullman, WA, USA
Associate Professor in the School of EECS 08/2022 -
Assistant Professor in the School of EECS 08/2016 - 08/2022

- Program analysis of distributed software systems and its applications
- Cross-language code analysis and its applications
- Mobile software security, maintenance, and evolution
- Data augmentation and benchmarking for program vulnerability analysis

Virginia Tech, Blacksburg, VA, USA
Postdoctoral Associate in the Department of Computer Science 08/2015 - 08/2016
Supervisors: Dr. Barbara G. Ryder and Dr. Danfeng (Daphne) Yao

- Dynamic study of Android programming paradigms and application security
- Static inter-application dataflow analysis for collusion-attack defense
- Large-scale, parallel Android inter-application risk detection and ranking

The University of Notre Dame, South Bend, IN, USA
Research Assistant in the Department of Computer Science and Engineering 08/2012 - 08/2015

- Program dependence analysis (abstraction, approximation, prioritization, quantification)
- Change impact prediction in software evolution
- Dynamic impact analysis of common distributed programs

The University of Southern Mississippi, Hattiesburg, MS, USA
Research Assistant in the School of Computing 09/2010 - 06/2012

- Diffusion tensor MRI (DTI) visualization and its dependence of seeding resolution in 3D tractography, effect of display settings on DTI visualization, sculpturing approach to tract-of-interest (TOI) selection and manipulation
- MRI image and DTI data processing, 3D DTI tractography full pipeline maintenance

Zhejiang University, Hangzhou, Zhejiang, China
Research Assistant at the State Key Lab of CAD & Computer Graphics 09/2006 - 07/2008

- Motion tracking in streaming video via Internet, parallel video monitoring and alarming
- Moving shadow detection and texture synthesis for vision-based human-computer interaction
- 3D geometrical modeling for computer aided costume design, surface morphing and expanding

PROFESSIONAL EXPERIENCE (***Industry***)

Baidu Inc., Beijing, China
Technical Lead at the Portal Search Autotest Group 07/2009 - 08/2010

- Technical management, autotest framework design and foundation class library architecting, cross-team reconciliation, engineer recruiting and mentoring

Baidu Inc., Beijing, China
Software Development Engineer at the Portal Search Autotest Group 07/2008 - 06/2009

- Autotest system design and implementation, mock building for webpage crawler, general-purpose testing toolkit development

Hangzhou Lianzheng Info.&Tech. Co., Ltd., Hangzhou, Zhejiang, China
Software Contractor 02/2007 - 06/2007

- Independent development of hearing test and evaluation system running on an embedded medical instrument for self-service hearing diagnosis, especially for the disabled

Wellhope Info.&Tech. Co., Ltd., Shanghai, China
Software Development Engineer at the Information Security Group 03/2006 - 08/2006

- Cryptologic algorithm research and development, optimization and validation for the public key infrastructure (PKI) middleware libraries supporting e-government platform, online certificate status protocol (OCSP) platform and instant messaging (IM) component development

SNDA Entertainment Co., Ltd., Shanghai, China
Software Contractor 10/2005 - 02/2006

- Independent development of online Legend game plug-ins for remote database access and control

Hubei Tri-Ring Info.&Tech. Co., Ltd., Wuhan, Hubei, China
Software Development Engineer at Embedded Software Group 02/2005 - 10/2005

- Design and implementation of the system-level integrated software platform for commercial fiscal cash register (FCR), USB driver development for FCR

AWARDS / HONORS

1. *VCEA Junior Faculty Research Award*, 2022 (one junior faculty is selected annually from the Voiland College of Engineering and Architecture (VCEA, which consists of 8 schools/departments) to receive this award)
2. *EECS Early Career Award*, 2022 (one junior faculty is selected annually from the School of Electrical Engineering and Computer Science (EECS) to receive this award
3. *Ranked as one of the top 20 most active early-stage researchers in software engineering worldwide*, 2021 (according to the statistics based on papers published at top-quality software engineering venues)
4. *Distinguished Reviewer Award* (TOSEM), ACM Publications Board, 2020
5. *Best Graduate Research Award (two years in a row)*, USM, 2011, 2012
6. *Outstanding Technology Award*, Baidu Inc., 2009
7. *Excellent Master Thesis Award*, Zhejiang University, 2008
8. *Outstanding Postgraduate Award*, Zhejiang University, 2007

SUMMARY OF FUNDING & PUBLICATIONS

Funding Awards

- The total amount of funding I have raised as Sole/Lead PI or WSU PI is over $2.6 million.
- My total share of funding is over $2.3 million.

Research Publications

- My research is focused on program analysis and its applications to software and systems security, and I have published at top-tier venues in this focused area including 21 journal articles, 43 conference papers, and 11 extended abstracts/poster papers in total.
- Since joining WSU, I have published 15 journal articles including 10 at IEEE/ACM transactions (e.g., TOSEM, TSE, TIFS, TDSC, TOPS), which are the highest-quality journals in my field.
- Since joining WSU, I have published 32 conference papers including 13 at A* conferences (e.g., USENIX Security, FSE, ASE, ISSTA) and 12 at A conferences (e.g., ICSME, SANER)—per the CORE ranking of conferences in computer science, where A* is the highest rank (7% of 802 ranked venues), followed by A (16%).

PUBLICATIONS (students/(co-)advisees are underscored)

Google scholar statistics: h-index 19, i10-index 38, total citations 1012 (by 5/16/2022).

Manuscripts under revision/review

1. Xiaoqin Fu, Chandan Dhal, Yulei Sui, Xiapu Luo, and Haipeng Cai. 2022. GDist: A Self-Tuning Dynamic Dependence Analysis for Distributed Programs. In: *IEEE/ACM Conference on Automated Software Engineering (ASE)*. (under review).
2. Le Yu, Haoyu Wang, Xiapu Luo, Haipeng Cai, Shiyao Zhou, Kaifa Zhao, Haoran Qin, and Zilai Wang. 2022. Automatic Privacy Compliance Analysis for Android Apps. In: *IEEE/ACM Conference on Automated Software Engineering (ASE)*. (under review).
3. Hao Zhou, Xiapu Luo, Haoyu Wang, and Haipeng Cai. 2022. Uncovering Intent based Leak of Sensitive Data in Android Framework. In: *ACM Conference on Computer and Communication Security (CCS)*. (under review).
4. Song Liao, Long Cheng, Haipeng Cai, and Hongxin Hu. 2022. SkillScanner: Towards Policy-Compliant Alexa Skills Development Through Static Analysis. In: *ACM Conference on Computer and Communication Security (CCS)*. (under review).
5. Pei Liu, Yanjie Zhao, Mattia Fazzini, Haipeng Cai, John Grundy, and Li LI. 2022. An End-to-End Approach to Comprehensively Find API-Related Compatibility Issues in Android Apps. In: *ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE)*. (under submission).
6. Haoran Yang, Weile Lian, and Haipeng Cai. 2022. Multilingual Development: Issues, Challenges, and Solutions. In: *ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE)*. (under submission).
7. Wen Li, Li LI, and Haipeng Cai. 2022. On the Vulnerability Proneness of Multilingual Code. In: *ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE)*. (under submission).
8. Yu Nong, Yuzhe Ou, Michael Pradel, Feng Chen, and Haipeng Cai. 2022. Exploring Realistic Vulnerability Data Generation via Neural Code Editing. In: *ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE)*. (under submission).
9. Xiaoyu Sun, Xiao Chen, Li LI, Haipeng Cai, John Grundy, Jordan Samhi, Tegawende Bissyande, and Jacques Klein. 2021. Demystifying Hidden Sensitive Operations in Android apps. *ACM Transactions on Software Engineering and Methodology (TOSEM)*. (under review; journal-first paper).
10. Wen Li, Austin Marino, Na Meng, Li LI, Alissa Cielecki, and Haipeng Cai. 2021. How are Multilingual Systems Constructed: Characterizing Language Use and Selection in Open-Source Multilingual Software. *ACM Transactions on Software Engineering and Methodology (TOSEM)*. (under major revision; journal-first paper).
11. Yu Nong, Rainy Sharma, Wahab Hamou-Lhadj, and Haipeng Cai. 2021. Open Science in Software Security: A Case on Deep Learning-Based Vulnerability Detection. *IEEE Transactions on Software Engineering (TSE)*. (under major revision; journal-first paper).

12. John Jenkins and Haipeng Cai. 2021. Incremental Taint Analysis for Android Apps. *ACM Transactions on Software Engineering and Methodology (TOSEM)*. (under review).
13. Yanxin Zhang, Ruoxi Sun, Wei (Zach) Wang, Haipeng Cai, Ivor Tsang, and Yulei Sui. 2021. ALR: Active Learning Based Ranking for Adversarial Android Malware Generation. *IEEE Transactions on Reliability (TRE)*. (under review).
14. Xiaoqin Fu, Xiapu Luo, and Haipeng Cai. 2022. SADA: Towards Self-Adaptive Dynamic Analysis. *IEEE Transactions on Software Engineering (TSE)*. (under review).
15. Xiaoqin Fu, David Manz, and Haipeng Cai. 2022. DistMeasure: A Framework for Measuring and Understanding Distributed Software Systems via the Lens of Interprocess Communication. *IEEE Transactions on Software Engineering (TSE)*. (under review).
16. Xiaoqin Fu, Haoran Yang, Boxiang Lin, Li LI, Wahab Hamou-Lhadj, and Haipeng Cai. 2022. A Systematic Study of Compatibility Issues in Android Apps. *IEEE Transactions on Software Engineering (TSE)*. (under review).

Peer-Reviewed Journal Articles

1. Haipeng Cai and Xiaoqin Fu. 2021. D^2ABS: A Framework for Dynamic Dependence Analysis of Distributed Programs. *IEEE Transactions on Software Engineering (TSE)*. DOI: 10.1109/TSE.2021.3124795. (impact factor: 6.226; in press).
2. Yu Nong, Haipeng Cai, Pengfei Ye, Li LI, and Feng Chen. 2021. Evaluating and Comparing Memory Error Vulnerability Detectors. *Information and Software Technology (IST)* 137(106614), pp. 1–20. DOI: 10.1016/j.infsof.2021.106614. (impact factor 2.726).
3. Long Cheng, Salman Ahmed, Hans Liljestrand, Thomas Nyman, Haipeng Cai, Trent Jaeger, Nadarajah Asokan, and Danfeng Yao. 2021. Exploitation Techniques for Data-Oriented Attacks with Existing and Potential Defense Approaches. *ACM Transactions on Privacy and Security (TOPS)* 24(4), pp. 1–36. DOI: 10.1145/3462699. (impact factor: 1.974).
4. Yanjie Zhao, Li LI, Haoyu Wang, Haipeng Cai, Tegawende Bissyande, Jacques Klein, and John Grundy. 2021. On the Impact of Sample Duplication in Machine Learning based Android Malware Detection. *ACM Transactions on Software Engineering and Methodology (TOSEM)* 30(3), pp. 1–38. DOI: 10.1145/3446905. (impact factor 2.5; journal-first paper).
5. Xiaoqin Fu, Haipeng Cai, Wen Li, and Li LI. 2020. Seads: Scalable and Cost-Effective Dynamic Dependence Analysis of Distributed Systems via Reinforcement Learning. *ACM Transactions on Software Engineering and Methodology (TOSEM)* 30(1), pp. 1–45. DOI: 10.1145/3379345. (impact factor 2.5; journal-first paper, presented at ESEC/FSE 2021).
6. Haipeng Cai, Xiaoqin Fu, and Abdelwahab Hamou-Lhadj. 2020. A Study of Run-time Behavioral Evolution of Benign versus Malicious Apps in Android. *Information and Software Technology (IST)* 122(106291), pp. 1–15. DOI: 10.1016/j.infsof.2020.106291. (impact factor 2.726; journal-first paper, presented at ICSME 2020).
7. Haipeng Cai and Barbara Ryder. 2020. A Longitudinal Study of Application Structure and Behaviors in Android. *IEEE Transactions on Software Engineering (TSE)*. DOI: 10.1109/TSE.2020.2975176. (impact factor 6.11; in press, 21 pages).
8. Haipeng Cai. 2020. Assessing and Improving Malware Detection Sustainability through App Evolution Studies. *ACM Transactions on Software Engineering and Methodology (TOSEM)* 29(2), pp. 1–28. DOI: 10.1145/3371924. (impact factor 2.5; journal-first paper, presented at ESEC/FSE 2020).
9. Sazzadur Rahaman, Haipeng Cai, Omar Chowdhury, and Danfeng Yao. 2019. From Theory to Code: Identifying Logical Flaws in Cryptographic Implementations in C/C++. *IEEE Transactions on Dependable and Secure Computing (TDSC)*. DOI: 10.1109/TDSC.2021.3108031. (impact factor 6.4; in press, 14 pages).
10. Karim Elish, Haipeng Cai, Daniel Barton, Danfeng Yao, and Barbara Ryder. 2018. Identifying Mobile Inter-App Communication Risks. *IEEE Transactions on Mobile Computing (TMC)* 19(1), pp. 90–102. DOI: 10.1109/TMC.2018.2889495. (impact factor 4.8).
11. Haipeng Cai, Na Meng, Barbara Ryder, and Danfeng Yao. 2019. DroidCat: Effective Android Malware Detection and Categorization via App-Level Profiling. *IEEE Transactions on Information Forensics and Security (TIFS)* 14(6), pp. 1455–1470. DOI: 10.1109/TIFS.2018.2879302. (impact factor 6.2; journal-first paper).

12. Nasir Ali, Haipeng Cai, Abdelwahab Hamou-Lhadj, and Jameleddine Hassine. 2019. Exploiting Parts-of-Speech for Effective Automated Requirements Traceability. *Information and Software Technology (IST)* 106, pp. 126–141. DOI: 10.1016/j.infsof.2018.09.009. (impact factor 2.627; journal-first paper).
13. Haipeng Cai. 2018. Hybrid Program Dependence Approximation for Effective Dynamic Impact Prediction. *IEEE Transactions on Software Engineering (TSE)* 44(4), pp. 334–364. DOI: 10.1109/TSE.2017.2692783. (impact factor 6.11).
14. Li LI, Daoyuan Li, Tegawendé F. Bissyandé, Jacques Klein, Haipeng Cai, David Lo, and Yves Le Traon. 2017. On Locating Malicious Code in Piggybacked Android Apps. *Journal of Computer Science and Technology (JCST)* 32(6), pp. 1108–1124. DOI: 10.1007/s11390-017-1786-z. (impact factor 1.506).
15. Haipeng Cai and Raul Santelices. 2016. Method-Level Program Dependence Abstraction and Its Application to Impact Analysis. *Journal of Systems and Software (JSS)* 122, pp. 311–326. DOI: 10.1016/j.jss.2016.09.048. (impact factor: 2.450).
16. Haipeng Cai, Raul Santelices, and Douglas Thain. 2016. DiaPro: Unifying Dynamic Impact Analyses for Improved and Variable Cost-Effectiveness. *ACM Transactions on Software Engineering and Methodology (TOSEM)* 25(2), pp. 1–50. DOI: 10.1145/2894751. (impact factor 2.516).
17. Haipeng Cai, Raul Santelices, and Siyuan Jiang. 2016. Prioritizing Change Impacts via Semantic Dependence Quantification. *IEEE Transactions on Reliability (TRE)* 65(3), pp. 1114–1132. DOI: 10.1109/TR.2015.2481000. (impact factor 4.094).
18. Haipeng Cai. 2016. Parallel Rendering for Legible Illustrative Visualizations of Dense Geometries on Commodity CPUs. *International Journal of Image and Graphics (IJIG)* 16(1), pp. 1–24. DOI: 10.1142/S0219467816500029. (impact factor 0.66).
19. Haipeng Cai and Raul Santelices. 2015. A Comprehensive Study of the Predictive Accuracy of Dynamic Change-Impact Analysis. *Journal of Systems and Software (JSS)* 103, pp. 248–265. DOI: 10.1016/j.jss.2015.02.018. (impact factor: 2.450).
20. Raúl A Santelices, Yiji Zhang, Haipeng Cai, and Siyuan Jiang. 2014. Change-Effects Analysis for Evolving Software. *Advances in Computers* 93, pp. 227–285. DOI: 10.1016/B978-0-12-800162-2.00005-1. (impact factor 37.5).
21. Jian Chen, Haipeng Cai, Alexander P. Auchus, and David H. Laidlaw. 2012. Effects of Stereo and Screen Size on the Legibility of Three-dimensional Streamtube Visualizations. *IEEE Transactions on Visualization and Computer Graphics (TVCG)* 18(12), pp. 2130–2139. DOI: 10.1109/TVCG.2012.216. (impact factor 4.558).

Peer-Reviewed Conference Papers

1. Weimin Chen, Zihan Sun, Haoyu Wang, Xiapu Luo, Haipeng Cai, and Lei Wu. 2022. WASAI: Uncovering Vulnerabilities in Wasm Smart Contracts. In: *ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA)*. (12 pages, in press).
2. Hao Zhou, Shuohan Wu, Xiapu Luo, Ting Wang, Yajin Zhou, Chao Zhang, and Haipeng Cai. 2022. NCScope: Hardware-Assisted Analyzer for Native Code in Android Apps. In: *ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA)*. (12 pages, in press).
3. Pei Liu, Yanjie Zhao, Haipeng Cai, Mattia Fazzini, John Grundy, and Li LI. 2022. Automatically Detecting API-induced Compatibility Issues in Android Apps: A Comparative Analysis (Replicability Study). In: *ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA)*. (12 pages, in press).
4. Yan Zhao, Enyi Tang, Haipeng Cai, Xi Guo, Xiaoyin Wang, and Na Meng. 2022. A Lightweight Approach of Human-Like Playtest for Android Apps. In: *International Conference on Software Analysis, Evolution, and Reengineering (SANER)*. (12 pages, in press).
5. Xiaoqin Fu, Boxiang Lin, and Haipeng Cai. 2022. DistFax: A Toolkit for Measuring Interprocess Communications and Quality of Distributed Systems. In: *IEEE/ACM International Conference on Software Engineering (ICSE), Tool Demo track*. (5 pages, in press). DOI: 10.1145/3510454.3516859.
6. Wen Li, Ming Jiang, Xiapu Luo, and Haipeng Cai. 2022. PolyCruise: A Cross-Language Dynamic Information Flow Analysis. In: *31st USENIX Security Symposium (USENIX Security 22)*. (18 pages, in press).
7. Xiaoqin Fu and Haipeng Cai. 2021. FlowDist: Multi-Staged Refinement-Based Dynamic Information Flow Analysis for Distributed Software Systems. In: *30th USENIX Security Symposium (USENIX Security 21)*. USENIX Association, pages 2093–2110. ISBN: 978-1-939133-24-3. https://www.usenix.org/conference/usenixsecurity21/presentation/fu-xiaoqin.

8. Wen Li, Xiaoqin Fu, and Haipeng Cai. 2021. AndroCT: Ten Years of App Call Traces in Android. In: *IEEE/ACM Working Conference on Mining Software Repository (MSR), Data showcase track*, pages 570–574. DOI: 10.1109/MSR52588.2021.00076.
9. Md. Shariful Islam, Abdelwahab Hamou-Lhadj, Korosh Koochekian-Sabor, Mohammad Hamdaqa, and Haipeng Cai. 2021. EnHMM: On the Use of Ensemble HMMs and Stack Traces To Predict the Reassignment of Bug Report Fields. In: *International Conference on Software Analysis, Evolution, and Reengineering (SANER)*, pages 411–421. DOI: 10.1109/SANER50967.2021.00045.
10. Wen Li, Haipeng Cai, Yulei Sui, and David Manz. 2020. PCA: Memory Leak Detection using Partial Call-Path Analysis. In: *ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE), Tool Demo track*, pages 1621–1625. DOI: 10.1145/3368089.3417923.
11. Xiaoqin Fu, Haipeng Cai, and Li LI. 2020. Dads: Dynamic Slicing Continuously-Running Distributed Programs with Budget Constraints. In: *ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE), Tool Demo track*, pages 1566–1570. DOI: 10.1145/3368089.3417920.
12. Haipeng Cai, Shiv Raj Pant, and Wen Li. 2020. Towards Learning Visual Semantics. In: *ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE), Vision track*, pages 1537–1540. DOI: 10.1145/3368089.3417040.
13. Jiawei Wang, Li LI, Kui Liu, and Haipeng Cai. 2020. Exploring How Deprecated Python Library APIs are (Not) Handled. In: *ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE)*, pages 233–244. DOI: 10.1145/3368089.3409735.
14. Rui Zhou, Mohammad Hamdaqa, Haipeng Cai, and Abdelwahab Hamou-Lhadj. 2020. MobiLogLeak: A Preliminary Study on Data Leakage Caused by Poor Logging Practices. In: *IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER), Early Research Achievements track*, pages 577–581. DOI: 10.1109/SANER48275.2020.9054831.
15. Haipeng Cai. 2020. Embracing Mobile App Evolution via Continuous Ecosystem Mining and Characterization. In: *IEEE/ACM International Conference on Mobile Software Engineering and Systems (MobileSoft), Vision track*, pages 31–35. DOI: 10.1145/3387905.3388612.
16. Yu Nong and Haipeng Cai. 2020. A Preliminary Study on Open-Source Memory Vulnerability Detectors. In: *IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER), Early Research Achievements track*, pages 557–561. DOI: 10.1109/SANER48275.2020.9054851.
17. Haipeng Cai. 2020. A Reflection on the Predictive Accuracy of Dynamic Impact Analysis. In: *International Conference on Software Analysis, Evolution, and Reengineering (SANER), Reflection track*, pages 562–566. DOI: 10.1109/SANER48275.2020.9054806.
18. Xiaoqin Fu and Haipeng Cai. 2019. A Dynamic Taint Analyzer for Distributed Systems. In: *ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE), Tool Demo track*, pages 1115–1119. DOI: 10.1145/3338906.3341179.
19. Mostafa Mohammed, Haipeng Cai, and Na Meng. 2019. An Empirical Comparison between Monkey Testing and Human Testing. In: *ACM SIGPLAN/SIGBED International Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES), Work In Progress track*, pages 188–192. DOI: 10.1145/3316482.3326342.
20. Haipeng Cai, Ziyi Zhang, Li LI, and Xiaoqin Fu. 2019. A Large-Scale Study of Application Incompatibilities in Android. In: *ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA)*. (artifact evaluated), pages 216–227. DOI: 10.1145/3339065.
21. Xiaoqin Fu and Haipeng Cai. 2019. Measuring Interprocess Communications in Distributed Systems. In: *IEEE/ACM International Conference on Program Comprehension (ICPC)*, pages 323–334. DOI: 10.1109/ICPC.2019.00051.
22. Ziyi Zhang and Haipeng Cai. 2019. A Look Into Developer Intentions for App Compatibility in Android. In: *IEEE/ACM International Conference on Mobile Software Engineering and Systems (MobileSoft)*, pages 40–44. DOI: 10.1109/MOBILESoft.2019.00016.
23. Haipeng Cai and John Jenkins. 2018. Leveraging Historical Versions of Android Apps for Efficient and Precise Taint Analysis. In: *IEEE/ACM Working Conference on Mining Software Repository (MSR)*, pages 265–269. DOI: 10.1145/3196398.3196433.

24. John Jenkins and Haipeng Cai. 2018. ICC-Inspect: Supporting Runtime Inspection of Android Inter-Component Communications. In: *IEEE/ACM International Conference on Mobile Software Engineering and Systems (MobileSoft), Tool Demo track*, pages 80–83. DOI: 10.1145/3197231.3197233.
25. Malinda Dilhara, Haipeng Cai, and John Jenkins. 2018. Automated Detection and Repair of Incompatible Uses of Runtime Permissions in Android Apps. In: *IEEE/ACM International Conference on Mobile Software Engineering and Systems (MobileSoft)*, pages 67–71. DOI: 10.1145/3197231.3197255.
26. John Jenkins and Haipeng Cai. 2017. Dissecting Android Inter-Component Communications via Interactive Visual Explorations. In: *International Conference on Software Maintenance and Evolution (ICSME), New Ideas and Emerging Results track*, pages 519–523. DOI: 10.1109/ICSME.2017.74.
27. Haipeng Cai and Barbara Ryder. 2017. Artifacts for Dynamic Analysis of Android Apps. In: *International Conference on Software Maintenance and Evolution (ICSME), Artifacts track*, pages 659. DOI: 10.1109/ICSME.2017.36.
28. Haipeng Cai and Barbara Ryder. 2017. DroidFax: A Toolkit for Systematic Characterization of Android Applications. In: *International Conference on Software Maintenance and Evolution (ICSME), Tool Demo track*, pages 643–647. DOI: 10.1109/ICSME.2017.35.
29. Haipeng Cai and Barbara Ryder. 2017. Understanding Android Application Programming and Security: A Dynamic Study. In: *International Conference on Software Maintenance and Evolution (ICSME)*, pages 364–375. DOI: 10.1109/ICSME.2017.31.
30. Li LI, Daoyuan Li, Tegawende F. Bissyande, Jacques Klein, Haipeng Cai, David Lo, and Yves Le Traon. 2017. Automatically Locating Malicious Packages in Piggybacked Android Apps. In: *IEEE/ACM International Conference on Mobile Software Engineering and Systems (MobileSoft)*, pages 170–174. DOI: 10.1109/MOBILESoft.2017.6.
31. Fang Liu, Haipeng Cai, Karim Elish, Danfeng Yao, and Barbara Ryder. 2017. MR-Droid: A Scalable and Prioritized Analysis of Inter-App Communication Risks. In: *Mobile Security Technologies (MoST) Workshop at IEEE Symposium on Security and Privacy*, pages 189–198. DOI: 10.1109/SPW.2017.12.
32. Haipeng Cai and Douglas Thain. 2016. DistIA: A Cost-Effective Dynamic Impact Analysis for Distributed Programs. In: *IEEE/ACM Conference on Automated Software Engineering (ASE)*, pages 344–355. DOI: 10.1145/2970276.2970352.
33. Haipeng Cai and Raul Santelices. 2015. Abstracting Program Dependencies using the Method Dependence Graph. In: *International Conference on Software Quality, Reliability, and Security (QRS)*, pages 49–58. DOI: 10.1109/QRS.2015.18.
34. Haipeng Cai. 2015. Facilitating Information Management in Integrated Development Environments through Visual Interface Enhancements. In: *International Conference on Software Quality, Reliability, and Security Companion (QRS-C)*, pages 221–229. DOI: 10.1109/QRS-C.2015.46.
35. Haipeng Cai and Raul Santelices. 2015. A Framework for Cost-effective Dependence-based Dynamic Impact Analysis. In: *International Conference on Software Analysis, Evolution, and Reengineering (SANER)*, pages 231–240. DOI: 10.1109/SANER.2015.7081833.
36. Haipeng Cai and Raul Santelices. 2015. TracerJD: Generic Trace-based Dynamic Dependence Analysis with Fine-grained Logging. In: *International Conference on Software Analysis, Evolution, and Reengineering (SANER), Tool Demo track*, pages 489–493. DOI: 10.1109/SANER.2015.7081862.
37. Haipeng Cai, Raul Santelices, and Tianyu Xu. 2014. Estimating the Accuracy of Dynamic Change-Impact Analysis using Sensitivity Analysis. In: *International Conference on Software Security and Reliability (SERE)*, pages 48–57. DOI: 10.1109/SERE.2014.18.
38. Haipeng Cai and Raul Santelices. 2014. Diver: Precise Dynamic Impact Analysis Using Dependence-based Trace Pruning. In: *IEEE/ACM Conference on Automated Software Engineering (ASE)*, pages 343–348. DOI: 10.1145/2642937.2642950.
39. Haipeng Cai, Siyuan Jiang, Raul Santelices, Yingjie Zhang, and Yiji Zhang. 2014. SensA: Sensitivity Analysis for Quantitative Change-impact Prediction. In: *International Working Conference on Source Code Analysis and Manipulation (SCAM)*, pages 165–174. DOI: 10.1109/SCAM.2014.25.
40. Siyuan Jiang, Raul Santelices, Mark Grechanik, and Haipeng Cai. 2014. On the Accuracy of Forward Dynamic Slicing and its Effects on Software Maintenance. In: *International Working Conference on Source Code Analysis and Manipulation (SCAM)*, pages 145–154. DOI: 10.1109/SCAM.2014.23.
41. Raul Santelices, Yiji Zhang, Haipeng Cai, and Siyuan Jiang. 2013. DUA-Forensics: A Fine-Grained Dependence Analysis and Instrumentation Framework Based on Soot. In: *ACM SIGPLAN Workshop on the State Of the Art in Java Program Analysis (SOAP@PLDI)*, pages 13–18. DOI: 10.1145/2487568.2487574.

42. Raul Santelices, Yiji Zhang, Siyuan Jiang, Haipeng Cai, and Yingjie Zhang. 2013. Quantitative Program Slicing: Separating Statements by Relevance. In: *International Conference on Software Engineering (ICSE), New Ideas and Emerging Results track*, pages 1269–1272. DOI: 10.1109/ICSE.2013.6606695.
43. Haipeng Cai, Jian Chen, Alexander P. Auchus, and David H. Laidlaw. 2012. InShape: In-Situ Shape-Based Interactive Multiple-View Exploration of Diffusion MRI Visualizations. In: *International Symposium on Visual Computing (ISVC)*, pages 706–715. DOI: 10.1007/978-3-642-33191-6_70.

Peer-Reviewed Posters/Extended Abstracts/Others

1. Wen Li, Na Meng, Li LI, and Haipeng Cai. 2021. Understanding Language Selection in Multi-Language Software Projects on GitHub. In: *IEEE/ACM International Conference on Software Engineering (ICSE), Poster track*, pages 256–257. DOI: 10.1109/ICSE-Companion52605.2021.00119.
2. Xiaoqin Fu and Haipeng Cai. 2020. Scaling Application-Level Dynamic Taint Analysis to Enterprise-Scale Distributed Systems. In: *IEEE/ACM International Conference on Software Engineering (ICSE), Poster track*, pages 270–271. DOI: 10.1145/3377812.3390910.
3. Xiaoqin Fu and Haipeng Cai. 2019. On the Deterioration of Learning-Based Malware Detectors for Android. In: *IEEE/ACM International Conference on Software Engineering (ICSE), Poster track*, pages 272–273. DOI: 10.1109/ICSE-Companion.2019.00110.
4. Haipeng Cai and John Jenkins. 2018. Towards Sustainable Android Malware Detection. In: *IEEE/ACM International Conference on Software Engineering (ICSE), Poster track*, pages 350–351. DOI: 10.1145/3183440.3195004.
5. Fang Liu, Haipeng Cai, Karim Elish, Danfeng Yao, and Barbara Ryder. 2017. Prioritized Analysis of Inter-App Communication Risks. In: *ACM Conference on Data and Application Security and Privacy (CODASPY), Poster track*, pages 159–161. DOI: 10.1145/3029806.3029843.
6. Xiaoqin Fu. 2019. On the scalable dynamic taint analysis for distributed systems. In: *Proceedings of the 2019 27th ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE), Student Research Competition track*, pages 1247–1249. DOI: 10.1145/3338906.3342506.
7. Xiaoqin Fu. 2019. Towards scalable defense of information flow security for distributed systems. In: *Proceedings of the 28th ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA), Doctoral Symposium*, pages 438–442. DOI: 10.1145/3293882.3338988.
8. Raul Santelices, Haipeng Cai, Siyuan Jiang, and Yiji Zhang. 2014. Advanced Dependence Analysis for Software Testing, Debugging, and Evolution. *IEEE Reliability Magazine*, pp. 18–24.
9. Siyuan Jiang, Raul Santelices, Haipeng Cai, and Mark Grechanik. 2014. How Accurate Is Dynamic Program Slicing? An Empirical Approach to Compute Accuracy Bounds. In: *International Conference on Software Security and Reliability-Companion (SERE-C)*, pages 3–4. DOI: 10.1109/SERE-C.2014.14.
10. Jian Chen, Haipeng Cai, AlexanderP. Auchus, and DavidH. Laidlaw. 2014. "Gryphon: A Little Domain-Specific Programming Language for Diffusion MRI Visualizations". In: *Handbook of Human Centric Visualization*. Ed. by Huang, Weidong. Springer New York, pp. 41–61. ISBN: 978-1-4614-7484-5. DOI: 10.1007/978-1-4614-7485-2_2.
11. Haipeng Cai, Zhigeng Pan, and Jianping Han. 2010. *Partition video monitoring method based on multipath network video stream parallel processing*. https://patents.google.com/patent/CN101320505B/en. CN Patent App. CN101320505B (CN 200810063001.5), cited by 22 patents. http://ip.com/patent/CN101320505B.

FUNDING SUPPORT

(All PI/Co-PIs are listed for each project.)

External Funding

1. *SHF: Small: Practical Dynamic Program Reasoning Across Language Boundaries*
   Funding vehicle: National Science Foundation (NSF CISE core programs–CCF/SHF)
   Period of performance: 06/01/22–05/30/25
   Amount to WSU: $485,768
   Role: Sole PI
2. *HSAP/URAP: Assessing the Authenticity of Deep Learning Generated Software Vulnerabilities*
   Funding vehicle: Army Educational Outreach Program (AEOP)

Period of performance: 6/1/2022–8/31/2022
Amount to WSU: $12,000
Role: Sole PI

3. *Autonomic Defense of Distributed Information Security in Dynamic and Adversarial Environments*
   Funding vehicle: Office of Naval Research (ONR Cyber Security and Complex Software Systems program)
   Period of performance: 3/1/22–2/28/25
   Amount to WSU: $561,710
   Role: Sole PI

4. *Hierarchical Software Quality Assurance*
   Funding vehicle: Department of Homeland Security (DHS) Science and Technology (S&T) Directorate
   Period of performance: TBD (3 years)
   Amount to WSU: TBD (total: $4,500,000); my share: TBD (expected to be at least 500K)
   Role: WSU PI (with Prof. Izurieta@Montana State University (lead PI), Prof. Arnaoudova@WSU, Prof. Optiz@University of Montana, Mr. McBride@Idaho State University, Prof. Mirkahori@Rochester Institute of Technology)
   (Recommended)

5. *REU Supplement: Towards Self-Adaptive Dynamic Analysis of Distributed Software*
   Funding vehicle: National Science Foundation (NSF CISE/CCF)
   Period of performance: 08/01/21–07/31/22
   Amount to WSU: $16,000
   Role: Sole PI

6. *Northwest Virtual Institute for CyberSecurity Education & Research (CySER)*
   Funding vehicle: Department of Defense (DoD VICEROY program)
   Period of performance: 06/01/2021 — 06/01/2023
   Amount to WSU: $1,000,000 (total: $1,500,000); my share: $97,367
   Role: Senior Personnel (PI: Prof. Van Wie@WSU; Co-PIs: Prof. Gebremedhin@WSU, Prof. Schulz@WSU, Prof. Arnaoudova@WSU)

7. *Advancing the Knowledge about Software Vulnerability Analysis via Large-Scale Benchmarking*
   Funding vehicle: Army Research Office (ARO Computer Science core program)
   Period of performance: 2/1/2021–1/31/2024
   Amount to WSU: $569,990
   Role: Lead PI (with a subcontract of $265,697 to Co-PI Prof. Chen@UT Dallas)

8. *Countermeasures against Information Flow Attack Surfaces via Multi-Phased Tainting*
   Funding vehicle: Department of Energy via Pacific Northwest National Laboratory
   Period of performance: 3/2/20–9/30/2021
   Amount to WSU: $68,241
   Role: Sole PI

9. *Demonstrating Scalable Whole-System Code Analysis of HPC Software*
   Funding vehicle: Department of Energy via Pacific Northwest National Laboratory
   Period of performance: 08/07/19–4/30/20
   Amount to WSU: $57,487
   Role: Sole PI

10. *SHF: EAGER: Towards Self-Adaptive Dynamic Analysis of Distributed Software*
    Funding vehicle: National Science Foundation (NSF CISE core programs–CCF/SHF)
    Period of performance: 08/01/19–07/31/22

Amount to WSU: $150,000
Role: Sole PI

11. *Automatic Generation of Anti-Specifications from Exploits for Scalable Program Hardening*
Funding vehicle: DARPA (CASE seedling program)
Period of performance: 5/1/2018–9/27/2018
Amount to WSU: $20,000 (total $400,000, my share $20,000)
Role: WSU PI (with lead PI Prof. Yao@Virginia Tech and Penn State PI Prof. Tan)

Internal Funding

1. *Improving the Design of the Software Testing Course*
Funding vehicle: Department of Education Higher Education Emergency Relief Fund (HEERF) via WSU Office of Provost (Course Redesign Grant)
Period of performance: 6/1/2021–5/30/2022
Amount: $4,000
Role: PI

2. *Incremental Taint Analysis for Efficient and Precise Vetting of Evolving Android Apps*
Funding vehicle: WSU Office of Research (New Faculty Seed Grant)
Period of performance: 5/1/2017–3/20/2020
Amount: $29,998
Role: PI (9 out of 49 applications were funded)

CURRENT STUDENTS

Ph.D. Students

1. **Sanan Hasanov**, Washington State University, WA — Fall 2022 -
research on software/system security
2. **Asif Zaman**, Washington State University, WA — Fall 2022 -
research on software/system security
3. **Haoran Yang**, Washington State University, WA — Fall 2021 -
research on deep learning based program analysis and applications
4. **Yu Nong**, Washington State University, WA — Fall 2020 -
research on software vulnerability analysis benchmarking
(Passed Qualifying Exam in Fall 2021)
5. **Wen Li**, Washington State University, WA — Fall 2019 -
research on multi-language software analysis and security
(Passed Qualifying Exam in Fall 2020)
6. **Sanjeev Arora**, Washington State University, WA — Spring 2022 -
part-time student, full-time employee at Microsoft; research on distributed system security

Thesis Masters Students

1. **Pallavi Arivukkarasu**, Washington State University, WA — Spring 2021 -
study on program representation learning and its applications

(And a number of non-thesis masters students.)

Other Research Students

1. **Boxiang Lin**, REU student, Washington State University, WA — Fall 2021 - Spring 2022
research on Android application compatibility issues
(*second author as an undergrad on a top SE conference paper* (ICSE'22 tool demo))

PAST STUDENTS

Ph.D. Students

1. **Xiaoqin Fu**, Washington State University, WA — Fall 2017 - Spring 2022
research on distributed software system analysis and security
(ACM SIGSOFT travel grant, 2019; Mahmoud M.Dillsi Family Graduate Fellowship, 2020)

2. **Shiv Raj Pant**, Washington State University, WA Spring 2019 - Summer 2019
research on vision-based code semantics modeling for program understanding and search
(could not complete PhD due to severe health issues, returned to Far Western University, Nepal as an assistant professor there)

Thesis Masters Students

1. **John Jenkins**, Washington State University, WA Spring 2017 - Fall 2020
research on program understanding and security for mobile apps
(graduated, now Software Engineer at Schweitzer Engineering Laboratories)
2. **Yu Nong**, Washington State University, WA Spring 2019 - Spring 2020
research on comparing software vulnerability detectors
(graduated, now Ph.D. student at WSU)
3. **Ziyi Zhang**, Washington State University, WA Fall 2017 - Spring 2019
research on compatibility issues in Android apps
(graduated, now Ph.D. student at WSU)

(And 4 non-thesis masters students, all graduated.)

Other Research Students

1. **Megan Jung**, undergraduate researcher, Cornell University, NY Fall 2020
research on multi-language software development issues
2. **Alissa Cielecki**, REU student, Arcadia University, PA Summer 2020
research on multi-language software vulnerabilities
(graduated, now Tech Specialist at the Wharton School)
3. **Austin Marino**, REU student, Washington State University, WA Summer 2019
research on multi-language use in open-source software projects
(*second author as an undergrad on a top SE journal paper* (TOSEM'22) which is currently under major revision)
(graduated, now Software Engineer at General Motors)
4. **Brandon Campbell**, undergraduate researcher, Washington State University, WA Fall 2018
research on incremental taint analysis for mobile apps
(graduated, now Software Engineer at Capital One)
5. **Linh Nguyen**, undergraduate researcher, Washington State University, WA Fall 2017
research on prioritized precise taint analysis for mobile apps
6. **Sophya Wu**, high school student researcher, Pullman High School, WA Summer 2019
research on multi-language use in open-source software projects
(graduated, now CS undergraduate student at Columbia University)
7. **Malinda Dilhara**, remote undergraduate researcher, Sri Lanka Spring 2017 - Spring 2018
research on adapting mobile software for runtime permission models
((*first author as an undergrad on a research paper* published at MOBILESoft'18, who also presented the paper at the conference)
(graduated, now CS Ph.D. student at CU Boulder)

TEACHING EXPERIENCE

At WSU

1. Instructor, *CptS583 Software Quality*, Washington State University Fall 2018, Spring 2020-2022
2. Instructor, *CptS422 Software Engineering Principles II*, Washington State University Fall 2018-2021
3. Instructor, *CptS322 Software Engineering Principles I*, Washington State University Fall 2016, Spring 2017-2022
4. Course Designer, *CptS583 Software Quality*, Washington State University Fall 2017

Table 1: Teaching assignments and students' rating scores

Course #	Title	Semester	Enrollment	Evaluation score (out of **5**)		
				course	instructor	**overall**
CptS322	Software Engineering Principles I	Fall 2016	61	2.3	2.4	**2.3**
		Spring 2017	72	3.8	4.0	**3.9**
		Spring 2018	62	4.1	4.3	**4.2**
		Spring 2019	95	4.3	4.3	**4.3**
		Spring 2020	101	4.3	4.5	**4.4**
		Spring 2021	125	4.4	4.6	**4.5**
		Spring 2022	123	4.1	4.3	**4.2**
CptS422	Software Engineering Principles II	Fall 2018	76	3.9	4.1	**4.0**
		Fall 2019	48	3.9	4.0	**4.0**
		Fall 2020	46	4.3	4.5	**4.4**
		Fall 2021	33	4.5	4.8	**4.6**
CptS583	Software Quality	Falll 2018	6	4.3	4.3	**4.3**
		Spring 2020	28	4.9	5.0	**4.9**
		Spring 2021	32	4.7	5.0	**4.8**
		Spring 2022	12	4.6	4.4	**4.5**

Prior to WSU

1. Guest Lecturer, *CS5314 Concepts of Programming Languages*, Virginia Tech Spring 2016
2. Teaching Assistant, *CSE40613/60613 Web Programming*, Notre Dame Spring 2013
3. Guest Lecturer, *CSC333 Problem Solving in C*, USM Fall 2011
4. Teaching Assistant, *CSC333 Problem Solving in C*, USM Spring 2011
5. Guest Lecturer, *CS414 Software Design and Development*, USM Fall 2010
6. Instructor, *C/C++ Programming, Gutian Computer Training School*, Wuhan Summer 2003
7. Teacher, *Junior High School Mathematics*, Zhuwa Middle School, Hubei 01/2000 - 07/2002

MENTORING EXPERIENCE

At WSU

- **26–38 CS undergraduate students per year**, Washington State University 2016 - 2021
  mentoring on course selection, career options, graduate study pursuit, internship opportunities, and research experience opportunities as undergraduates

Prior to WSU

1. **Fang Liu**, graduate student, Virginia Tech, VA 2015
   research on prioritized risk analysis of inter-component communication risks in Android
2. **Frank Cipollone**, REU student, University of Notre Dame, IN 2014
   research on supporting program understanding via code structure visualization
3. **Tianyu Xu**, REU student, Fudan University, China 2013
   research on evaluating dynamic change impact analysis techniques
4. **Jack Magiera**, REU student, University of Notre Dame, IN 2013
   research on software repository mining to support descriptive change impact analysis
5. **12 Software Engineers**, Baidu, China 2009-2010
   development of a series of search-engine automated testing tools

PROFESSIONAL SERVICES

Journal Board Membership

1. Board of Distinguished Reviewers, ACM Transactions on Software Engineering and Methodology (TOSEM), 2019-present
2. Review Board, Automated Software Engineering (AUSE), 2021-present

3. Guest Editor, Frontiers in Computer Science (*Computer Security* section), special edition on mobile security, 2021-present
4. Guest editor, MDPI/Symmetry, Computer Science section, special edition on sustainable security for mobile apps

Conference Organizing Committee Member

1. General Co-Chair, Annual Workshop on Cyber Security in High Performance Computing (S-HPC), 2022
2. Program Co-chair, International Conference on Mobile Software Engineering and Systems (MOBILESoft), 2019 (SRC track), 2020 (SRC track), 2022 (NIER track)

Conference Program Committee Member

1. ISOC Network and Distributed System Security Symposium (NDSS), 2023
2. ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE) - Ideas, Visions and Reflections, 2022
3. International Symposium on Advanced Security on Software and Systems (ASSS 2022), collocated with EuroS&P, 2022
4. International Conference on Mobile Software Engineering and Systems (MOBILESoft), 2022 (tool track)
5. EAI International Conference on Security and Privacy in New Computing Environments (SPNCE), 2020, 2021
6. European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML-PKDD), 2020
7. IEEE/ACM International Conference on Program Comprehension (ICPC), 2019 (negative results track), 2020 (ERA track)
8. IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER), 2020 (ERA track)
9. IEEE/ACM International Conference on Automated Software Engineering (ASE), 2019
10. ACM Student Research Competition (ACM SRC), Grand Finals judge committee, 2019, 2020, 2021
11. International Workshop on Advances in Mobile App Analysis (A-Mobile), collocated with ASE, 2018, 2019, 2020, 2021
12. International Workshop on Software Security from Design to Deployment (SEAD), collocated with ESEC/FSE, 2019, 2020
13. IEEE Secure Development Conference (SecDev), 2018
14. International Conference on Software Maintenance and Evolution (ICSME), 2017 (tool track), 2018 (tool track)
15. International Conference on Software Engineering and Applications (SEA), 2017
16. International Conference on Software Engineering Advances (ICSEA), 2015, 2016, 2017, 2018, 2019
17. Third International Conference on Software Engineering (SOENG), 2017
18. Third International Conference on Software Security (ICSS), 2017
19. International Conference on Virtual Reality and Visualization (ICVRV), 2016
20. International Conference on Fundamentals and Advances in Software Systems Integration (FASSI), 2015, 2016
21. International Workshop on Program Debugging (IWPD), 2015, 2016, 2017

Conference Paper Reviewer

1. IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER), 2020

2. Annual Computer Security Applications Conference (ACSAC), 2019
3. ACM Conference on Security and Privacy in Wireless and Mobile Networks (WiSec), 2017
4. ACM Symposium on Information, Computer and Communications Security (ASIACCS), 2016
5. ACM Conference on Data and Application Security and Privacy (CODASPY), 2015
6. International Conference on Software Maintenance and Evolution (ICSME), 2015 (tool track)
7. International Computers, Software & Applications Conference (COMPSAC), 2014
8. International Workshop on Program Debugging (IWPD), 2012

Journal Article Referee (invited) Publons statistics

1. ACM Transactions on Software Engineering and Methodology (TOSEM), 2018, 2019, 2020, 2021, 2022
2. IEEE Transactions on Software Engineering (TSE), 2018, 2019, 2021, 2022
3. IEEE Transactions on Information Forensics and Security (TIFS), 2017, 2020, 2021, 2022
4. IEEE Transactions on Dependable and Secure Computing (TDSC), 2016, 2017, 2020, 2021, 2022
5. IEEE Transactions on Reliability (TRE), 2016, 2018, 2019
6. IEEE Transactions on Parallel and Distributed Systems (TPDS), 2017, 2018, 2019
7. IEEE Transactions on Network and Service Management (TNSM), 2021
8. IEEE Transactions on Knowledge and Data Engineering (TKDE), 2021
9. ACM Transactions on Sensor Networks (TOSN), 2021
10. ACM Computing Surveys (CUSR), 2021
11. ACM Digital Threats: Research and Practice (DTRAP), 2019, 2020, 2021, 2022
12. Information and Software Technology (IST), 2018
13. Automated Software Engineering (AUSE), 2020, 2021, 2022
14. Empirical Software Engineering (EMSE), 2016, 2017
15. Computers & Security (COSE), 2019, 2021, 2022
16. Journal of Computer Virology and Hacking Techniques (JICV), 2016, 2017, 2018, 2019, 2020, 2021, 2022
17. Journal of King Saud University - Computer and Information Sciences (JKSUCIS), 2018, 2020, 2021, 2022
18. Journal of Information Science and Engineering (JISE), 2018, 2020
19. Journal of Information Security and Applications (JISAS), 2020, 2021
20. Journal of Systems and Software (JSS), 2016, 2017, 2019, 2020, 2021
21. Journal of Parallel and Distributed Computing (JPDC), 2021
22. Journal of Intelligent & Fuzzy Systems (IFS), 2022
23. Journal of Computer Security (JCS), 2022
24. Frontiers of Information Technology & Electronic Engineering (FITEE), 2017
25. Human-centric Computing and Information Sciences (HCIS), 2018, 2019
26. Expert Systems with Applications (ESWA), 2018, 2019, 2020, 2021, 2022
27. Knowledge and Information Systems (KAIS), 2017
28. IEEE Access, 2018, 2019, 2020, 2021
29. Security and Communication Networks (SCN), 2020, 2021, 2022
30. Mobile Information Systems (MIS), 2020, 2021
31. IET Image Processing (IPR), 2020
32. Signal Processing Letters (SPL), 2020
33. Concurrency and Computation: Practice and Experience (CCPE), 2021
34. Wireless Communications and Mobile Computing (WCMC), 2019, 2020, 2021, 2022

35. Soft Computing (SOCO), 2021
36. Jordanian Journal of Computers and Information Technology (JJCIT), 2019, 2020
37. Chinese Journal of Electronics (CJE), 2022
38. International Journal of Automation and Computing (IJAC), 2021
39. The Journal of Supercomputing (SUPE), 2021
40. IEEE Systems Journal (ISJ), 2021, 2022
41. Wiley/Security and Privacy (SPY), 2021, 2022
42. Wiley/Computational Intelligence (COIN), 2021, 2022
43. Computational Intelligence and Neuroscience (CIN), 2022
44. Applied Computational Intelligence and Soft Computing (ACISC), 2022
45. IEEE Network Magazine, 2021
46. MDPI/Symmetry, 2019, 2020
47. MDPI/Sensors, 2019, 2020
48. MDPI/Entropy, 2019, 2020
49. MDPI/Applied Sciences, 2021
50. MDPI/Data, 2021
51. MDPI/Electronics, 2021
52. MDPI/Information, 2021

Journal Article Reviewer

1. Computers & Security (COSE), 2015
2. The Computer Journal (COMPJ), 2014
3. Software Quality Journal (SQJ), 2014
4. IEEE Transactions on Reliability (TRE), 2014
5. Science of Computer Programming (SCP), 2014
6. Journal of Object Technology (JoT), 2013
7. Software Testing, Verification and Reliability (STVR), 2013
8. Journal of Systems and Software (JSS), 2012

Proposal review

1. National Science Foundation (NSF), panelist, 2022
2. National Science Foundation (NSF), panelist, 2019, 2020
3. National Science Foundation (NSF), ad-hoc reviewer, 2020
4. Army Research Office (ARO), reviewer, 2019
5. FNR Luxembourg CORE programme, reviewer, 2018, 2019, 2020 (twice)

Graduate Student Committee

1. Chair of qualifying-exam (QE) committee for Devjeet Raj Roy (WSU Ph.D. student), 2020
2. Chair of qualifying-exam (QE) committee for Ziyi Zhang (WSU Ph.D. student), 2020
3. Chair of qualifying-exam (QE) committee for Samir Sbai (WSU Ph.D. student), 2019
4. Chair of qualifying-exam (QE) committee for Neda Zarayeneh (WSU Ph.D. student), 2018
5. Chair of qualifying-exam (QE) committee for Zhengyang Wang (WSU Ph.D. student), 2018
6. Chair of qualifying-exam (QE) committee for Sarah Fakhoury (WSU Ph.D. student), 2018
7. Chair of qualifying-exam (QE) committee for Saghan Mudbhari (WSU Ph.D. student), 2017
8. Chair of qualifying-exam (QE) committee for Kudrat Jot Kaur (WSU Ph.D. student), 2017
9. Member of qualifying-exam (QE) committee for Yu Nong (my Ph.D. student at WSU), 2021
10. Member of qualifying-exam (QE) committee for Wen Li (my Ph.D. student at WSU), 2020
11. Member of qualifying-exam (QE) committee for Iman Mirzadeh (WSU Ph.D. student), 2019

12. Member of qualifying-exam (QE) committee for Hanchao Ma (WSU Ph.D. student), 2019
13. Member of qualifying-exam (QE) committee for Xiaoqin Fu (my Ph.D. student at WSU), 2018
14. Member of qualifying-exam (QE) committee for Mohammad Omar Faruk (WSU Ph.D. student), 2018
15. Member of qualifying-exam (QE) committee for Md. Methun Kamrazzuman (WSU Ph.D. student), 2016
16. Chair of thesis (prelim) committee for Xiaoqin Fu (my Ph.D. student at WSU), 2020
17. Member of thesis (prelim) committee for Neda Zarayeneh (WSU Ph.D. student), 2019
18. Member of thesis (prelim) committee for Md. Methun Kamrazzuman (WSU Ph.D. student), graduated in 2020
19. Member of thesis (prelim) committee for Md Rakibul Islam (WSU Ph.D. student), 2018
20. Member of thesis committee for Pallavi Arivukkarasu (my Masters student at WSU)
21. Member of thesis committee for Yan Zhao (Masters student at Virginia Tech)
22. Member of thesis committee for Rui Zhou (Masters student at Concordia University, Canada), graduated in 2020
23. Member of thesis committee for John Jenkins (my Masters student at WSU), graduated in 2020
24. Member of thesis committee for Yu Nong (my Masters student at WSU), graduated in 2020
25. Member of thesis committee for Yuzhan Ma (WSU Masters student), graduated in 2017
26. Member of thesis committee for Ankita Tanwar (WSU Masters student), graduated in 2017
27. Member of thesis committee for Yongjun Chen (WSU Masters student), graduated in 2018
28. Member of thesis committee for Michael Christensen (WSU Masters student), graduated in 2020
29. Chair of advisory committee for Haoran Yang, Pengfei Ye, Mohammad Nouman Shafqat, Jingyang Ruan, Nghia Nuong, and Jianqiao Liu (non-thesis masters students at WSU)
30. Chair of advisory committee for Weile Lian, Xin Da, Yashovardhan Sharma (all non-thesis masters students at WSU), graduated in 2020
31. Chair of advisory committee for Yuzhu Feng, Ziyi Zhang (all non-thesis masters students at WSU), graduated in 2019
32. Member of advisory committee for non-thesis masters students at WSU: Many including Pilli, Eshwar; Bhavarisetty, Ramyasai; Inamdar, Deep; Xu, Tianxiang; Kondyrev, Andrei; Li, Wen-Chih; Mudassar, Zain; Shah, Dharmil Kamlesh; Deepesh Gupta; Medhi, Dipankar; Gade, Jaswanth Naidu; Ghanwat, Tejas; Lnu, Anshuman; Patil, Shruti Sunil; Doppalapudi, Nikhil Chakravarthy; Lee Hungwei; Chao Jiang; Zhou Xiaonan; Lieh-Hsuan Chen; Kuang, Xiangtian; Wang, Yun-Ting; Lei Chen; Huang, Jingyuan; Lu, Jiaxi; Luong, Nghia; Rainy Sharma; Alexander Joens; Njuguna, Jesse; Daniel Olds; Ran Chaowen; Junhao Wang; Munir, Tayyab; Basu, Sreeupa; Han, Namgyu; Nimbekar, Pradnya

Additional Services at WSU

1. Member of faculty search committee (AI/ML/Security/Systems areas), Fall 2021 – Spring 2022
2. Member of EECS Computer Science Curriculum Committee (CSCC), since Fall 2021
3. Member of faculty search committee (systems area), Fall 2018 – Spring 2019
4. Member of EECS Graduate Studies Committee (GSC), since Fall 2018
5. Course coordinator for Cpts 422, since Fall 2018
6. Course coordinator for Cpts 322, since Fall 2016

Other Services

1. Student Volunteer, IEEE VisWeek 2011
2. Interviewer, Technical Recruitment Team of the Web-Search Dept., Baidu Inc. 2009, 2010

INVITED SEMINAR TALKS

1. Cost-effective and data-driven program analysis for the reliability and security of real-world software systems
   WSU EECS Advisory Board meeting, Pullman, WA April 2022
2. Integrated program analysis for software reliability and security
   WSU EECS Advisory Board meeting, Pullman, WA September 2018
3. Program analyses for the reliability and security of evolving software
   WSU EECS CptS500 (seminar course), Pullman, WA November 2016
4. Advanced hybrid program analyses for software reliability and security
   WSU EECS Advisory Board meeting, Boise, ID October 2016
5. Cost-effective program dependence analyses for evolving and securing modern software
   School of Electrical Engineering and Computer Science, Washington State University, WA April 2016
6. Cost-effective program dependence analyses for reliable and secure software evolution
   Department of Computer Science, Missouri University of Science and Technology, MO March 2016
7. Cost-effective program dependence analyses for evolving and securing modern software
   Department of Computer Science, University of Massachusetts, Boston, MA March 2016
8. A hybrid approach to dependence approximation for dynamic impact prediction
   Department of Electrical and Computer Engineering, Virginia Tech, VA October 2015
9. Semantic dependence quantification using sensitive analysis
   Department of Computer Science, Virginia Tech, VA September 2015
10. Cost-effective dependence analysis for dynamic impact prediction
    Department of Computer Science, University of Illinois, Urbana Champaign, IL July 2015
11. Sensitivity analysis for quantitative change-impact prediction
    GrammaTech, Inc., NY June 2015

CONFERENCE PANELS & TALKS

1. Mobile Health & Covid-19 Apps (Paper session chair).
   IEEE/ACM International Conference on Mobile Software Engineering and Systems, Virtual May 2022
2. Code Summarization (Paper session chair).
   IEEE/ACM International Conference on Program Comprehension, Virtual May 2022
3. Mobile Software Engineering (Panelist).
   ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering, Virtual November 2020
4. Software Analysis (Panelist).
   ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering, Virtual November 2020
5. Towards Learning Visual Semantics.
   ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering, Virtual November 2020
6. Assessing and Improving Malware Detection Sustainability through App Evolution Studies.
   ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering, Virtual November 2020
7. A Study of Run-time Behavioral Evolution of Benign versus Malicious Apps in Android.
   International Conference on Software Maintenance and Evolution, Virtual July 2020
8. Embracing Mobile App Evolution via Continuous Ecosystem Mining and Characterization.
   International Conference on Mobile Software Engineering and Systems, Virtual July 2020
9. A Reflection on the Predictive Accuracy of Dynamic Impact Analysis.
   International Conference on Software Analysis, Evolution, and Reengineering, Virtual February 2020

10. Applied Mathematics, Computer Science, and Data Science Foundations for U.S. Department of Energy Mission Cyber Resiliency (Panel).
PNNL CENATE Cybersecurity Roundtable Event, Richland, WA August 2019
11. A large-scale study of application incompatibilities in Android.
ACM SIGSOFT International Symposium on Software Testing and Analysis, Beijing, China July 2019
12. Understanding android application programming and security: A dynamic study.
International Conference on Software Maintenance and Evolution, Shanghai, China September 2017
13. Droidfax: A toolkit for systematic characterization of android applications.
International Conference on Software Maintenance and Evolution, Shanghai, China September 2017
14. Artifacts for dynamic analysis of android apps.
International Conference on Software Maintenance and Evolution, Shanghai, China September 2017
15. Dissecting android inter-component communications via interactive visual explorations.
International Conference on Software Maintenance and Evolution, Shanghai, China September 2017
16. DistIA: a cost-effective dynamic impact analysis for distributed programs
International Conference on Automated Software Engineering, Singapore September 2016
17. Abstracting program dependencies using the method dependence graph
International Conference on Software Quality, Reliability, and Security, Vancouver, BC August 2015
18. Facilitating information management in integrated development environments through visual interface enhancements
International Conference on Software Quality, Reliability, and Security, Vancouver, BC August 2015
19. TracerJD: generic trace-based dynamic dependence analysis with fine-grained logging
International Conference on Software Analysis, Evolution, and Reengineering, Montreal, QB March 2015
20. A framework for cost-effective dependence-based dynamic impact analysis
International Conference on Software Analysis, Evolution, and Reengineering, Montreal, QB March 2015
21. SensA: sensitivity analysis for quantitative change-impact prediction
International Conference on Source Code Analysis and Manipulation, Victoria, BC September 2014
22. Estimating the accuracy of dynamic change-impact analysis using sensitivity analysis
International Conference on Software Security and Reliability, San Francisco, CA June 2014

PROFESSIONAL SOCIETY MEMBERSHIPS

1. The Institute of Electrical and Electronics Engineers (IEEE) 2014 - present
2. The Association for Computing Machinery (ACM) 2016 - present
3. ACM Special Interest Group on Software Engineering (SIGSOFT) 2016 - present

TECHNICAL SKILLS

Programming Languages professional development in C/C++ (400 KSLOC), Python (90 KSLOC), Java (100 KSLOC), Shell/Awk (50 KSLOC), and Delphi (20 KSLOC); versed in Scala, SQL, HTML, Matlab and R; experienced in SAS, JavaScript, ActionScript, PHP and XML

SDK/Frameworks skilled programming using the Soot Java optimization framework (80 KSLOC), OpenGL&GLUT (80 KSLOC), VTK (30 KSLOC); experienced in Android SDK, openMPI, Qt, MFC, and Xlib/X11

Development Environments proficient in Linux & Windows application and system/network software development, with proficiency in event-driven, parallel, and asynchronous programming paradigms

SELECTED CERTIFICATES

1. *Technical Project Management*, American Management Association (AMA), 2010
2. *Certified System Analyst*, Ministry of Information Industry of China, (pass rate 5%), 2007
3. *Certified Software Engineer*, Ministry of Information Industry of China (pass rate 15%), 2003