FSU CS Newsletter

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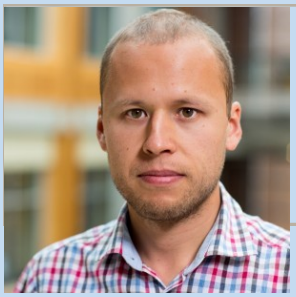
Chair's Message

"The Computer Science Department sees another exciting year in 2018-2019. Our student enrollment stays at 1,158, close to the all-time high, with 1,016 undergraduate students, 67 Master's students, and 75 doctoral students (an all-time high). We awarded 195 Bachelor's degrees (an all-time high), 48 Masters degrees, and 7 Doctorate degrees. The department welcomes its 6th National Science Foundation (NSF) CAREER award winner and 1st Army Research Office Young Investigator Program Award winner. Our faculty have also won the University Developing Scholar Award and the Transformation Through Teaching Award. Our students are winning in house awards as well as recognition in professional conferences. The external research funding continues to climb, reaching $3.7M this year, an all-time high. The department has also hired two new tenure-track assistant professors and two new specialized faculty members. I hope that you read the enclosed articles to learn more about the department and encourage you to explore the department through our new website and to visit us in person if you have the opportunity to do so."

- Xin Yuan, Chair

Welcoming Many New Faculty Faces to the Department

Growing in both numbers and quality, the Computer Science Department adds many new, and some familiar, faces



Dr. Grigory Fedyukovich is an Assistant Professor at Florida State University, USA. He completed his Ph.D. at the University of Lugano, Switzerland, under the supervision of Prof Natasha Sharygina, and then he was a postdoc at the University of Washington with Prof Rastislav Bodik and at Princeton University with Prof Aarti Gupta. His research interests are in automated software verification and synthesis, equivalence checking, and applications of relational verification to analyzing software security. He is interested in taking on new students to work on projects in mathematics and logic.

Dr. Chris Mills will serve as Teaching Faculty for FSU, as well as maintaining his current position as Chief Research Officer of i2x Solutions, LLC. Chris earned his Ph.D. in CS from FSU in Spring 2019. His doctoral research focused on software engineering, with a specific focus on applications of machine learning to software traceability. Chris has published and presented his work at ACM Transactions on Software Engineering and Methodology, The International Conference on Software Engineering, The International Conference on Software Maintenance and Evolution, and The Joint Meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering. At ICSME 2018, Chris's paper "Are Bug Reports Enough for Text Retrieval-based Bug Localization?" was selected for an ACM Distinguished Paper award.

Ann Ford Tyson is returning to FSU's Computer Science Teaching Faculty in Fall 2019. She has taught programming 1 and 2, basics of hardware, and computer literacy over her career. She is looking forward to potentially teaching other courses as well, including ethics. She was a lecturer for many years at University of Michigan, Ann Arbor, then moved to FSU to teach there for 10 years. After a few years exploring other career interests, she is delighted to be returning to FSU to teach in fall 2019. Her major teaching interests include software design, development, testing and debugging, in multiple languages. She received a B.A. in Psychology from the State University of NY at Buffalo and the M.S. degree in Computer and Communication Science from the University of Michigan.

Prior to joining FSU, **Dr. Alan Kuhnle** was a Post-Doc Fellow at the University of Florida Informatics Institute, where he worked on efficient algorithms for large-scale genomics indexing. He received his Ph.D. degree in computer science from UF in 2018, and he received his M.S. degree in mathematics from UF in 2013. His research interests include optimization, machine learning, & network science. He is interested in the design of scalable algorithms with provable performance guarantees and the application of these algorithms to problems such as misinformation containment in online social networks, image summarization, and indexing of genetic data. His works have appeared in premier conferences and journals in machine learning and data mining.

Dr. Zhang awarded $446k grant in Wireless Communication

Dr. Zhenghao Zhang awarded funding by he National Science Foundation

The title of **Dr. Zhang**'s research is "CNS Core: Small: Supporting Massive Wireless Connections in the Internet-of-Things (IoT) with Multiple Zadoff-Chu (MZC) sequences." The amount is $446,751. Zhang is the sole PI of this grant. In this project, a novel wireless communication technology for Low Power Wide Area Network will be investigated. The technology is based on modulating data on the Zadoff-Chu sequence, and is expected to outperform the existing technologies significantly in capacity and communication range.

Melina Myers wins Transformation Through Teaching Award for Inspiring Students

Ten Florida State University faculty members were honored by the Transformation Through Teaching program for their actions to foster meaning and purpose among their students. Included was our own **Melina Myers**, teaching faculty in our CS department. **Melina** was nominated by junior computer criminology major Jessica Mitchell for encouraging students to find their passion and offering valuable advice. "When I took Melina Myers' class, her teaching and guidance at office hours and her taking time to get to know me helped me find the love I have for my major and sparked a light in me. I know she is there with advice whether life or computer science related. She has helped me build my confidence in my own skills, and I know that I was taught by one of the best FSU has to offer." — *Jessica Mitchell*

Dr. Shayok Chakraborty and ISL Faculty win $2.9mil award from Institute on Aging

The National Institute on Aging has given an R01 grant to ISL Faculty Affiliates Walter Boot, Ph.D., the principal investigator, and **Shayok Chakraborty, Ph.D.**, the co-PI, along with an interdisciplinary team of FSU researchers, for their project: *The Adherence Promotion with Person-centered Technology (APPT) Project: Promoting Adherence to Enhance the Early Detection and Treatment of Cognitive Decline*. The total award is for $2.9 million.

The Institute for Successful Longevity served as a crucial resource for the formation of this interdisciplinary team. The aims of the project are to promote early detection and treatment of age-related cognitive decline and dementia. Although mobile cognitive assessments and training are available, Boot said, these are only part of the solution. People need to engage with assessment and training over a long period of time for benefits to be observed. This project will develop Artificial Intelligence (AI)-based reminder systems to help ensure long-term engagement with home-based cognitive assessment and cognitive training protocols. AI reminder systems will learn about the user and adapt based on their history and their preferences. "This project involves fundamental AI challenges such as learning from multiple sources of heterogeneous data, learning from data on-the-fly in real-time, as well as learning in the presence of weak supervision and noisy annotations," said Chakraborty. "This research will result in the development of next generation AI-based assistive aids for the elderly, with the potential to improve their health and well-being, as well as promote independent living."

The ability to detect that someone is on the cusp of cognitive decline has large implications for how dementia is studied. Treatments and interventions can be tested before large changes in brain structure and function that may be hard to reverse have occurred.

ARTICLE COURTESY: FSU'S INSTITUTE FOR SUCCESSFUL LONGEVITY

Walter Boot, left, is the principal investigator on the project, which will promote early detection and treatment of age-related cognitive decline and dementia; Shayok Chakraborty is the co-PI.

CS awarded large amount of tech fee to enhance Instructional Tech

The Computer Science Department has been awarded over $85K Technology Fee to upgrade its instructional technology infrastructure in four projects: (1) to upgrade Grads Lab computers, (2) to build CS private cloud services, (3) to upgrade the data center server switch, (4) to upgrade audio–visual technology in classrooms. The Systems Group manager, Yu Wang, and Systems Group member, Bobby Roy, developed the proposals for the four projects. The proposals were selected by the Student Technology Fee Advisory Committee, and approved by the IT Governance Council. The awards will significantly enhance the department's instructional technology resources for students and faculty.

Zhi Wang Wins Developing Scholar Award

Congratulations to **Dr. Zhi Wang** for winning the 2018-2019 competition of the Developing Scholar Award. The Developing Scholar Awards are given to mid-career, associate professor level faculty to support their research programs. Dr. Zhi Wang received his Ph.D in computer science from North Carolina State University in 2012, and his M.S and B.S from Xi'an Jiaotong University in 2002 and 1999, respectively. He joined the Department of Computer Science at FSU as an assistant professor in 2012 and was promoted to associate professor with tenure in Fall 2018. His research interest focuses on systems security and has prolifically published papers in top systems and security conferences, including IEEE S&P, ACM CCS, USENIX Security, and NDSS, USENIX ATC, and EuroSys. Dr. Wang is a recipient of the NSF CAREER award (2015).

Dr. Zhao Awarded the Army Research Office Young Investigator Program Award

Prof. Peixiang Zhao

Prof. Peixiang Zhao has been awarded a $360,000, three-year grant from the U.S. Army Research Office (ARO)'s Young Investigator Program (YIP). The Army Research Office considers its Young Investigator Program award to be "one of the most prestigious awards bestowed by the Army on outstanding scientists beginning their independent careers", the objective of which is to attract outstanding young university faculty members to pursue fundamental research in areas relevant to the Army, to support their research in these areas, and to encourage their teaching and research careers. In this project, Peixiang will work with his students to study new principles, methodologies, and algorithms for efficient and effective management and computation for large-scale information networks, which have formed a critical infrastructure of our modern networked world, and found widely varying applications in Army and beyond.

FACULTY PROMOTIONS

Congratulations to Prof. Zhenghao Zhang for being promoted to the rank of full professor and to Prof. Sonia Haiduc & Prof. Jie Yang for being promoted to the rank of associate professor with tenure, all effective in Fall 2019.

Zhenghao Zhang received his B.Eng. and M.S. degrees in electrical engineering from Zhejiang University, Hangzhou, China, in 1996 and 1999, respectively. He received his Ph.D. degree in electrical engineering from the State University of New York at Stony Brook in 2006. From 1999 to 2001, he worked in industry as an embedded system Software Engineer. From 2006 to 2007, he was a Postdoctoral Researcher in the Computer Science Department at Carnegie Mellon University. He joined the faculty in the Computer Science Department at Florida State University in Fall 2007. His research interest is mainly wireless networks.

Dr. Sonia Haiduc obtained her PhD and M.Sc. from Wayne State University in 2013 and 2009, respectively. Her research interests are in software engineering, and in particular in software maintenance and evolution, program comprehension, and software documentation. She currently advises 6 PhD students and 3 M.Sc. students, and works with several undergraduate students. Her research has been published in top journals and conferences in the field of software engineering and she is the recipient of several NSF grants. Her students are the recipients of several international research awards, such as an ACM Distinguished Paper Award and a Gold and a Silver Medal in ACM Graduate Research Competitions. She is also actively involved in the organization and review process of several conferences and journals.

Jie Yang received his Ph.D. degree in Computer Engineering from Stevens Institute of Technology in 2012. His research interests include mobile computing and cybersecurity, with an emphasis on mobile healthcare, smart-home and vehicular applications, user and device authentication, and wireless security. He has published one book and three book chapters and 90+ research papers in prestigious journals and conferences such as IEEE and ACM MobiCom/CCS/MobiSys/SenSys/UbiComp. His research is supported by the National Science Foundation (NSF) and the Army Research Office (ARO). He is the recipient of the Best Paper Award from ACM MobiCom 2011, Best Paper Runner-up Award from IEEE CNS 2013, Best Paper Award from IEEE CNS 2014, and Stevens Francis T. Boesch Award from Stevens Institute of Technology.

Dr. Whalley Awarded NSF/Intel Grant for Architecture Research

Dr. David Whalley

FSU Department of Computer Science Professor **David Whalley** has been awarded a new NSF/Intel grant for his project "Dependent ILP: Dynamic Hoisting and Eager Scheduling of Dependent Instructions." The project is a collaborative effort between FSU and a colleague from Michigan Technological University.

The aim of the project is to combine a traditional superscalar processor architecture with a dataflow style pipeline that makes efficient early fetching and dispatching of dependent instructions possible. The award includes funding for FSU in the amount of $220,000.

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Visit our website, www.cs.fsu.edu
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NSF Helps FSU Computer Science Enable Reconfigurable Infrastructure

Our department was awarded a grant of $700K from the National Science Foundation titled "II-New: A Software-Defined Reconfigurable Infrastructure for Cross-Layer Research on Computer Architecture, Network, and Storage Systems". With this award, Computer Science Professors **Weikuan Yu, Xin Yuan, and David Whalley** will acquire and develop a software-defined reconfigurable infrastructure called NoleLand. The infrastructure will feature cutting-edge manycore processors, software-defined networking, and 3D Xpoint High Bandwidth Memory devices for computer systems research. It will also test cross-layer research on performance, scalability, and resilience of large-scale systems, and develop software-defined file and storage systems for computing and data analytics applications. Furthermore, NoleLand will enable compiler and architecture co-design, and cache/memory concert for massive parallelism in GPU, software-defined networking, and HPC cluster-wide data security.

Yu and Oral Awarded NSF Grant on I/O Containerization and Disaggregation

Dr. Weikuan Yu and Dr. Sarp Oral have been awarded a grant of $500K from the National Science Foundation titled "SHF: Medium: Collaborative Research: ECC: Ephemeral Coherence Cohort for I/O Containerization and Disaggregation". In this project, Yu and Oral develop a research framework called Ephemeral Coherence Cohort (ECC) that offers an abstraction to represent the active collection of application data through containerization, insulation of I/O activities across different applications, and enabling storage disaggregation for ephemeral allocation and dynamic utilization of burst buffers. The proposed ECC framework aims to enhance a variety of mission-critical applications running on the Department of Energy and the National Science Foundation leadership computing facilities. The project represents a new collaboration between the University of Illinois Urbana Champaign and Florida State University.

Dr. Weikuan Yu is a Full Professor in the Department of Computer Science at Florida State University. His research interests include a multitude of technical areas including processor-memory architecture, big data analytics in social networks, high speed interconnects, cloud and distributed systems, storage and I/O systems.

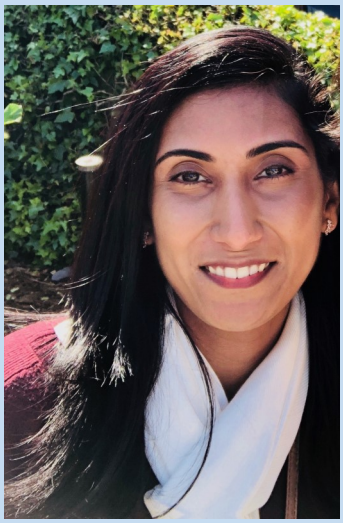
Dr. Sarp Oral is an Adjunct Professor in the Department of Computer Science at Florida State University. His research interests include a multitude of technical areas including processor-memory architecture, scalable architectures, high performance parallel I/O and storage systems, high speed interconnects, cloud and distributed systems.

Dr. Sonia Haiduc wins $495K National Science Foundation CAREER Award

FSU's Computer Science faculty member **Sonia Haiduc** was awarded the prestigious National Science Foundation CAREER Award. The award totals $494,989 over a duration of 5 years and will allow Dr. Haiduc to study and improve the use and production of programming video tutorials. The outcomes of this project have the potential to transform the way programmers and computer science students acquire knowledge from video tutorials, allowing them to easily access quality information that is easy to extract and use in their own contexts. The work under this project will allow professional programmers to leverage online documentation more efficiently and find help for their coding tasks faster, which can lead to time and effort savings and decreased software costs. The project also aims to support better learning and instruction out of the classroom, by improving access to the knowledge captured in high-quality video tutorials, and therefore supporting students in complementing their classroom learning experience. The grant will also support the organization of a Scratch summer coding camp for middle schoolers for four years starting in Summer 2020.

Dr. Sonia Haiduc joined FSU in fall 2013. She obtained her PhD and M.Sc. from Wayne State University in 2013 and 2009, respectively. Her research interests are in software engineering, and in particular in software maintenance and evolution, program comprehension, and software documentation. She advises several PhD students and M.Sc. students, and works with several undergraduate students. Her research has been published in top journals and conferences in the field of software engineering and she is the recipient of several NSF grants. Her students are the recipients of several international research awards, such as an ACM Distinguished Paper Award and a Gold and a Silver Medal in ACM Graduate Research Competitions. She is also actively involved in the organization and review process of several conferences and journals.

Dorai, Student and Faculty Member, Wins Multiple Awards



Congratulations to **Gokila Dorai**, a CS PhD student and specialized faculty member in our department for winning multiple notable awards recently.

- Inducted into Omicron Delta Kappa, the country's only national leadership honor society in recognition of leadership and exemplary character (October-2018).
- Recognized at the Graduate Student Excellence Ceremony for Golden Key Research Grant (External Award for the year 2018-2019) and other extra-curricular activities.
- People's Choice Award Winner for Arts, Graduate Women in STEM (GWIS), FSU
- Graduate Student Excellence in Visual Arts, Finalist and Honorable Mention with Cash Award
- Selected as a Speaker at Grace Hopper's Conference 2019 for one of the technical tracks
- Finalist at 2018 Three Minute Thesis presented her talk on the topic "Digital Forensic Analysis of Mobile Applications using AI".

STUDENT HIGHLIGHTS

> awards

FSU Computer Science students, Mustakimur R. Khandaker, Abu Naser, and Wenqing Liu, won the best paper award in EuroS&P 2019 (4th IEEE European Symposium on Security and Privacy), held Jun 17 -19 in Stockholm, for their paper titled “Adaptive Call-site Sensitive Control Flow Integrity”. EuroS&P is the flagship security conference in Europe. The paper was appraised for its practicality and effectiveness in defending software against control-flow hijacking attacks. The source code is available at: https://github.com/mustakcsecuet/

> scholarships

Two undergraduates and one graduate Computer Science student at FSU have been awarded the DoD Cyber Scholarship. Selected scholars receive full tuition, fees, a book allowance, and a stipend for living expense ($25K for undergraduates, $30K for graduates) in exchange for civilian service at a DoD Agency upon graduation. Application details for DoD scholarships at FSU:
http://www.sait.fsu.edu/scholarships/dod-ias/index.shtml

> conferences

Mustakimur R. Khandaker, a Ph.D. student from the CS Department, will present their paper in the prestigious 28th USENIX Security Symposium, August 14-16, 2019 in Santa Clara, California. USENIX Security is one of the top-tier conferences in the Computer Security area. The paper, titled “Origin-sensitive Control Flow Integrity” proposes a new context-sensitive CFI system that can significantly improve the security of the state-of-art CFI systems. This work is the continuation of his earlier work published in EuroS&P’19 titled “Adaptive Call-site Sensitive Control Flow Integrity”.

> papers

T. Taami, A.M. Rahmani, A. Khademzadeh, A. Ataie, Overclocked Load Scheduling in Large Clustered Reservation Systems, IJCSIS, Vol. 8, No.4, USA, 2010.

Bhattacharya S., Salman S., Gorentla Venkata M., Kundnani H., Imam N., Yu W. (2019) An Initial Implementation of Libfabric Conduit for OpenSHMEM-X. In: Pophale S., Imam N., Aderholdt F., Gorentla Venkata M. (eds) OpenSHMEM and Related Technologies. OpenSHMEM in the Era of Extreme Heterogeneity. OpenSHMEM 2018. Lecture Notes in Computer Science, vol 11283. Springer, Cham

F. Chowdhury, J. Liu, Q. Koziol, T. Kurth, S. Farrell, S. Byna, Prabhat, and W. Yu, ”Initial Characterization of I/O in Large-Scale Deep Learning Applications,” in SC’18, 3RD Joint International Workshop on Parallel Data Storage & Data Intensive Scalable Computing Systems (PDSW-DISCS 2018), 2018.

“I Know What You Did Last Summer: Your Smart Home Internet of Things and Your iPhone Forensically Ratting You Out”, Gokila Dorai (Florida State University, United States), Shiva Houshmand (Santa Clara University, United States) and Ibrahim Baggili (University of New Haven, United States) In Proceedings of the 13th International Conference on Availability, Reliability and Security (ARES) 2018, Hamburg, Germany

“Design and Implementation of a Targeted Data Extraction System for Mobile Devices”, Sudhir Aggarwal, Gokila Dorai, Umit Karabiyik, Tathagata Mukherjee, Nicholas Guerra, Manuel Hernandez, James Parsons, Khushboo Rathi, Hongmei Chi, Temilola Aderibigbe and Rodney Wilson Fifteenth IFIP WG 11.9 International Conference on Digital Forensics, Orlando, USA

“Integrating Travel and Epidemic Models for Vector Borne Disease Surveillance”, Meysam Ghaffari, Judy Wang, Anuj Chari, Ashok Srinivasan, Krishnan Viswanathan, Anuj Mubayi, Hongmei Chi, ITM 2018.

Workload-aware Subgraph Query Caching and Processing in Large Graphs; Yongjiang Liang, Peixiang Zhao; ICDE’19: The 35th IEEE International Conference on Data Engineering. Macau SAR, China. Apr. 2019

Similarity Search in Graph Databases: A Multi-layered Indexing Approach; Yongjiang Liang, Peixiang Zhao; ICDE’17: The 33rd IEEE International Conference on Data Engineering. San Diego, California. Apr. 2017

Viet Tung Hoang, David Miller, and Ni Trieu. Attacks Only Get Better: How to Break FF3 on Large Domains, to appear in EUROCRYPT 2019
C. Mills, J. Pantiuchina, E. Parra, G. Bavota, and S. Haiduc, “Are Bug Reports Enough for Text Retrieval-based Bug Localization?,” in Proceedings of the 34th IEEE International Conference on Software Maintenance and Evolution (ICSME’18), Technical Research Track, Madrid, Spain, 2018, p. to appear (12 pages). IEEE TCSE Distinguished Paper Award

E. Parra, J. Escobar-Avila, and S. Haiduc, “Automatic Tagging for Software Engineering Videos,” in Proceedings of the 26th ACM/IEEE International Conference on Program Comprehension (ICPC’18), Technical Research Track, Gothenburg, Sweden, 2018, p. to appear (12 pages).

M. Podkorytov, M. Gubanov. Hybrid.Poly: A Consolidated Interactive Analytical Polystore System, in ICDE’19. (2) M. Podkorytov, M. Gubanov. Hybrid.Poly: Performance Evaluation of Linear Algebra Analytical Extensions, in Big Data’18.

S. Soderman, A. Kola, M. Podkorytov, M. Geyer, M. Gubanov. Hybrid.AI: A Learning Search Engine for Large-scale Structured Data, in The Web Conference Companion ‘18.

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