SACRAMENTO STATE

University Awards for Research, Scholarship & Creative Activity

Early-Career Faculty
Kimberly Mulligan, Ph. D.
Associate Professor of Biological Sciences

Jun Dai, Ph. D.
Associate Professor of Computer Science

Award Ceremony & Lecture

October 14, 2022 • 11 am
Riverview Hall, Elderberry/Beetle Room

Program

Welcome
Dr. Sadaf Ashtari, Professor of Information Systems and Business Analytics and Chair of the Research and Creative Activity Subcommittee

Dr. Carlos Nevarez ,Provost and Vice President, Academic Affairs (Interim)

Dr. Tasha Souza, Vice Provost, Faculty Success

Presentation of Award Recipient for Early-Career Faculty
Dr. Kelly McDonald, Professor of Biological Sciences, College of Natural Sciences & Mathematics

Early-Career Faculty Award Lecture
Identifying risk factors of neurodevelopmental disorders in fruit flies

Dr. Kimberly Mulligan, Associate Professor of Biological Sciences

Presentation of Award Recipient for Early-Career Faculty
Dr. Kevan Shafizadeh, Dean of Engineering & Computer Science

Early-Career Faculty Award Lecture
Facing the Cyber World: What Mindset Should We Have?

Dr. Jun Dai, Associate Professor of Computer Science

This event is co-hosted by the Faculty Senate Research and Creative Activity (RCA) Subcommittee and the Offices of Research, Innovation, and Economic Development.

For more information about this award program, please visit csus.edu/research

Award History*

University Award for Research, Scholarship & Creative Activity for Early-Career Faculty

This award was established in 1989 and is given each year to recognize a colleague in the first ten years of their faculty appointment who has made significant contributions to his or her discipline through scholarly activity, research and publication, or creative and artistic endeavors.

2020-2021
Rodolfo Barniol Duran
Physics & Astronomy

2019-2020
Arturo Baiocchi
Social Work

2018-2019
Sharon Furtak
Psychology

2017–2018
Robert Crawford
Biological Sciences

2016–2017
Brendan Lindsay
History

2015–2016
Nikolaos Lazaridis
History

2014–2015
Caroline Turner
Education

University Award for Research, Scholarship & Creative Activity for Senior Faculty

This award was established in 1961 and is given annually to a faculty member who, over many years, has made significant contributions of a discipline through scholarly, activity research, publication and creative and artistic endeavors.

2020-2021
Hakan Ozcelik
Management & Organizations

2019-2020
Mona Siegel
History

2018-2019
Barbara Carle
World Languages & Literatures

2017–2018
Maureen Smith
Kinesiology and Health Science

2016–2017
Jamie Kneitel
Biological Sciences
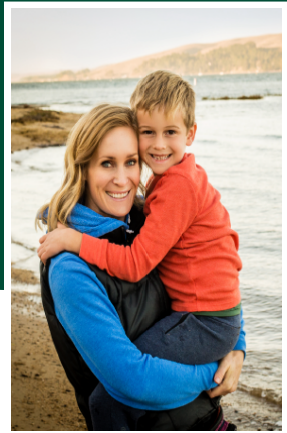
2015–2016
Rafael Escamilla
Physical Therapy

2014–2015
Douglas Rice
English

*The full list of award recipients can be found online at csus.edu/research

Kimberly Mulligan, Ph. D.
Associate Professor of Biological Science

Using fruit flies to identify risk factors for neurodevelopmental disorders

Abstract

Dr. Mulligan's research involves identifying factors that cause or increase the severity of neurodevelopmental and neuropsychiatric disorders. For this research, she has developed a research program using the fruit fly, Drosophila melanogaster, as a model organism because flies are relatively simple for new research students to work with, and they also share a surprising amount of homology with mammals.

In fact, fruit flies have genes that are related to about 75% of disease-causing genes in humans, including risk genes for neurodevelopmental and neuropsychiatric disorders. Many genes that disrupt the way neurons (brain cells) develop in humans exist in fruit flies and similarly impact fruit fly neuron development. Thus, while neurodevelopmental and neuropsychiatric disorders are uniquely human conditions, the genes responsible for these conditions impair many of the same developmental processes in fruit fly brains.

Dr. Mulligan is particularly interested in how brain development is affected by the combined impact of genetic mutations and environmental factors, like exposures to environmental chemicals or changes in the gut microbiome. Some of the most recent research from her lab has shown how developmental exposure to bisphenol A (BPA), a chemical used to make plastics, impairs multiple aspects of brain development in a manner that is dependent on the genetic background of the fly. In addition, her lab's research examining the gut-brain axis has drawn important connections between a common autism risk gene and changes in gut physiology and the gut microbiome.

Biography

Dr. Kimberly Mulligan earned her Ph.D. in developmental biology from Stanford University in 2008. While deep into her research on how cells communicate with one another starting at fertilization to develop into a functional organism composed of millions, billions or even trillions of cells, she was faced with the overwhelming trauma of loss. Her best friend and roommate in graduate school took her own life during the fourth year of their program after a long battle with bipolar disorder. Part of Dr. Mulligan's grief process involved poring over the scientific literature to learn everything she could about bipolar disorder. She realized that there was a severe deficit of information on the molecular causes of many neurodevelopmental and neuropsychiatric disorders and resolved to dedicate her research career to that area of study. After graduating from her Ph.D. program, she went on to conduct postdoctoral research at UCSF in the field of molecular neurodevelopment and neuropsychiatry and she continues her research in this area to this day.

Having been born and raised in Sacramento, Dr. Mulligan was thrilled to join the Sacramento State family as a tenure-track faculty in 2015 and is currently an Associate Professor in the Department of Biological Sciences. As a faculty member, she has prioritized giving as many students as possible research opportunities in her lab. Because she is dedicated to advancing equity and inclusion in STEM, Dr. Mulligan has focused on fostering a supportive culture in her lab and recruiting students who have been historically underrepresented in the field. In her seven years at Sac State, Dr. Mulligan has mentored 84 students in her research program—8 master's students and 76 undergraduates. Many of those students have received prominent awards for their research efforts and 47 of them have been co-authors with Dr. Mulligan on research papers published in journals, like Neurotoxicology, the Journal of Biological Chemistry, and International Journal of Molecular Sciences. Dr. Mulligan has been awarded 23 research awards—including the prestigious National Institutes of Health SCORE Award—to support her research objectives.

Dr. Mulligan is grateful to have the opportunity to work with such amazing, talented students—who she contends teach her more than she could ever teach them. She also thanks her family for their incredible support—especially her children, Emmett and Ellie, who are kind enough to share their mom with her students.

Jun Dai, Ph. D.

Associate Professor of Computer Science

Facing the Cyber World: What Mindset Should We Have?
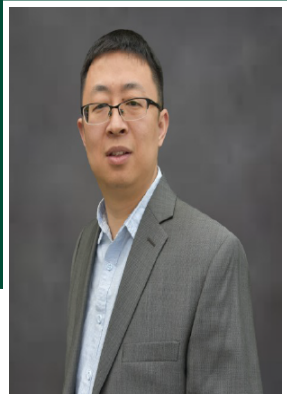
Abstract

We are living in a fascinating era in which the cyber world is seamlessly integrated with our physical world. Based on the computing, sensing, and networking technologies embedded into everyday objects, physical "things" are becoming intelligent and cyber-connected via the ubiquitous Internet. This is truly amazing, enabling a lot of great benefits to our life, such as autonomous driving, smart homes, smart cities, and wearable health monitoring. However, risks come along with these benefits. Cybersecurity breaches are observed here and there all the time. There can be negative financial or social consequences, or even dangers to life and safety (e.g., a high-speed car halted all of a sudden on a highway).

Dr. Dai's research, scholarship and creative activities mainly contribute to mitigating such cyber threats. This includes cybersecurity problem discovery/ solving and cybersecurity education. Examples of Dr. Dai's works include the "zero-day attack path" concept which was developed to detect unknown attacks by the system logs, similarly to capturing a thief by tracking down their footprint, and the world's first Intelligent Tutoring System named "SecTutor," built by Dr. Dai and his collaborators to share their research findings about how to write computer programs securely.

In addition to cybersecurity research and development, Dr. Dai also makes huge endeavors to apply research and curriculum development outcomes to help students build a correct mindset when contributing to the development of cyber infrastructure, and help the general public hold a correct mindset when accessing and consuming resources and services through cyber utilities. With the efforts by Dr. Dai and his colleagues, Sacramento State became the first to bring the prestigious National Security Agency GenCyber cybersecurity camps to Northern California, and also the first Predominantly Undergraduate Institution member of the National Cybersecurity Teacher Academy (the first national certificate program for high school teachers in the United States). These activities contribute to national workforce development initiatives, building a professional teacher community to learn, develop and deliver security content in the K-12 environment, and stimulating K-12 student interest in studying security and entering the field.

Biography

Dr. Jun Dai is an Associate Professor in Department of Computer Science and the Director of the Center for Information Assurance and Security (CIAS) at California State University, Sacramento (Sacramento State). He joined Sacramento State in Fall 2014 after receiving his Ph.D. degree in Information Sciences and Technology (with a research focus in Cybersecurity) from The Pennsylvania State University. Dr. Dai received his B.S. degree in Information Security and M.S. degree in Network Control from the University of Science and Technology of China, in 2007 and 2010 respectively.

Dr. Dai's research interests mainly lie in Network and Distributed System Security, Intrusion Detection, Secure Programming and Cybersecurity Education. He has published papers in cybersecurity/ education conferences or journals such as IEEE Transactions on Information Forensics and Security (TIFS), European Symposium on Research in Computer Security (ESORICS), and IEEE Conference on Communications and Network Security (CNS). His work on zero-day attack path detection won Best Runner-up Paper in the 2016 CNS conference.

As a PI/co-PI/sub-awardee, he has secured a total of approximately $2 millions grants from federal agencies such as the National Science Foundation (NSF) and National Security Agency (NSA) to support his research and education projects. He also advises the Cyber Defense Club at Sacramento State, and coaches student teams to participate in cybersecurity competitions such as the Collegiate Cyber Defense Competition and CyberForce.

His team was ranked No. 1, winning the title of "Local Laboratory Winner" in Lawrence Livermore National Lab, during the 2019 CyberForce Competition sponsored by the US Department of Energy.

Thank you to the 2021-22 Research and Creative Activity Subcommittee for their work in selecting these two outstanding faculty recipients

Sadaf Ashtari, Information Systems and Business Analytics, College of Business (Chair)

Johannes Bauer, Chemistry, College of Natural Sciences and Mathematics

David Giguere, Psychology, College of Social Sciences & Interdisciplinary Studies

Abhijeet Shirsat, Recreation, Parks, and Tourism Administration, College of Health and Human Resources

Atousa Yazdani, Electrical Engineering, College of Engineering and Computer Science

Nickolas Lazaridis, History, College of Arts & Letters

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