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Summer 2015

A newsletter of the Department of Computer Science and Engineering at the University of Notre Dame

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Commencement 2015

The Department of Computer Science & Engineering (CSE) graduated 66 students on Sunday, May 17, 2015. A departmental ceremony was held in the afternoon and attended by the graduates, their families, and CSE professors. This year's faculty speaker, selected by the students, was Professor **Collin McMillan**. Professor **Kevin Bowyer**, the department's chair, served as master of ceremonies. The ceremony was organized and coordinated by seniors **Laura Cronin, Lindsey Sansone** and **Stephanie Tilden**, with the help of Administrative Assistants, **Ginny Watterson** and **Dian Wordinger**.

This year's Outstanding CPEG Senior recipient was **Matthew McGlynn** and the Outstanding CS Award recipients were **Erich Kerekes, Jason Wassel**, and **Boyoung Yoo**.

Seniors **Matthew Mahan, Andres Martin** and **Matthew Rundle** won first-place for the Advanced Database Projects Competition held in Spring of 2015, sponsored by the **Thomas Meurer Endowment Fund for Excellence**. The second-place winning teams included Seniors **Devonte' Applewhite, Laura Cronin, Alexander Hathaway, Sofyan Saputra, Ethan Swan** and **Stephanie Tilden**. The winners were students enrolled in CSE 40746: Advanced Database Projects taught by Professor **Ramzi Bualuan** and studied topics such as database design, development and management.

The Outstanding CSE Faculty Teaching Award was granted to Professor **Collin McMillan**.

Students receiving their degrees at this ceremony were **Jonathan Alvarez, Nikita Amelchenko, Devonte' Applewhite, Cody Barron, Michael Bau, Nicholas Burns, Catherine Carothers, Jonathan Cobian, Stuart Colianni, Michael Creehan, Laura Cronin, Christopher Croson, Katherine Eckart, Sean Fitzgerald, Paul Fortin, Hannah Garvey, Kelly Gawne, George Georgaklis, Caroline Gerstle, Sean Gleason, Dolff Hanke, Alexander Hathaway, Tera Joyce, Erich Kerekes, Umer Khan, Oliver Lamb, Nicholas LaRosa, Benjamin Laws, Zachary Lipp, Jodi Lo, Raymond Lu, Matthew Mahan, Nicole Mariani, Andres Martin, Michael Martinez, Conor McCarter, Daniel McCormack, Matthew McGlynn, Jillian Montalvo, Kyle Mulholland, Sean Murphy, Matthew Nulle, Michael Oduala, Nathaniel Pawelczyk, Michael Powers, Katherine Privateer, Mary Rauh, Nollan Reed, Esteban Rojas, Matthew Rundle, Lindsey Sansone, Sofyan Saputra, Joshua Schultz, Phillip Shiu, Bradley Stalcup, Ethan Swan, Daniel Tamaru, Camilla Tassi, Stephanie Tilden, Thomas Wack, Tyler Wahl, Jason Wassel, Ryan Wheeler, Alexander Yeh, Boyoung Yoo**, and **Austin Zebrowski.**

Purta and Faisal Awarded Fellowships to Attend Workshops


Rachael Purta

Ph.D. student **Rachael Purta**, advised by Dr. Aaron Striegel, has been selected to participate in the Broadening Participation Workshop this fall, which is located in Osaka, Japan this year. The workshop is co-located with the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp/ISWC 2015), and is meant to increase the number of women, minority, students from developing countries, and students with disabilities in the field of ubiquitous computing. Rachael will present a poster of her work at the September workshop.


Fazle Faisal

Ph.D. student **Fazle Faisal**, advised by Dr. Tijana Milenkovic, has been selected to participate in the NSF-sponsored Graduate Data Science Workshop to be held at the University of Washington in Seattle in August. The workshop will bring together 100 graduate students from diverse domains with Data Scientists from industry (including Amazon, Google and Microsoft) and academia to discuss and collaborate on Big Data/Data Science challenges. In addition to keynote presentations from high profile speakers, the participants will present posters covering their own research and work collaboratively to begin to solve some of the Grand Challenge problems facing Data Enabled Science & Engineering disciplines.

Bosch and D'Mello Receive Best Paper Award


Nagel Bosch


Sidney D'Mello

Grad student **Nigel Bosch**, Professor **Sidney D'Mello**, and collaborators Ryan Baker, Jaclyn Ocumpaugh, and Valerie Shute received the Best Paper Award (out of 170 submissions) for their paper "Temporal Generalizability of Face-Based Affect Detection in Noisy Classroom Environments" at the 17th International Conference on Artificial Intelligence in Education (AIED 2015) in Madrid Spain.

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Kogge Receives Gauss Award


Peter Kogge

Professor **Peter Kogge**, who has served as the Ted H. McCourtney Professor of the Department of Computer Science and Engineering at Notre Dame since 1994, will be awarded the 2015 Gauss Award award as part of the International Supercomputing Conference, which took place in Frankfurt, Germany.

Sponsored by the German Gauss Center for Supercomputing, the award recognizes the most outstanding paper in the field of scalable supercomputing. Kogge's paper, which is titled "Updating the Energy Model for Future Exascale Systems," introduces a major update to the power-performance challenges described in the 2008 DARPA Exascale report. Although that report concluded that there was no clear path to achieve a 1000x performance improvement in petascale systems, the approach outlined by Kogge in his paper re-evaluates the original underlying technology projections, chip layouts, microarchitecture approaches and system characteristics.

Wang Authors New Book


Dong Wang

Professor **Dong Wang's** new book, "Social Sensing: Building Reliable Systems on Unreliable Data", offers a look into recent advances in the emerging field of social sensing, emphasizing the key problem faced by application designers; how to extract reliable information from data collected from largely unknown and possibly unreliable sources? The book explains how a myriad of societal applications can be derived from this massive amount of data of questionable quality that is collected and shared by average individuals. The book offers theoretical foundations to support emerging data-driven cyber-physical applications, and touches on key issues such as data reliability in a highly interconnected and instrumented world. The authors share the latest research and novel ideas that leverage techniques from cyber-physical systems, sensor networks, machine learning, data mining, and information fusion to present solutions to this problem.

Chen Receives NIH Research Grant to Study Brain Metastases of Breast Cancer


Danny Chen

Professor **Danny Chen** has received a four-year NIH grant of about 1.4 million dollars from the National Cancer Institute (NCI) for the project, "(PQD-3) Spatiotemporal Molecular Interrogation of Early Metastatic Evolution In Situ." This is a joint effort with Professors Siyuan Zhang (Lead PI, the Department of Biological Sciences and Harper Cancer Research Institute), Jun Li (the Department of Applied and Computational Mathematics and Statistics), and Fang Liu (the Department of Applied and Computational Mathematics and Statistics).

The project aims to study breast cancer metastasizing to the brain, by tackling multiple roadblocks in cancer metastasis research and exploring innovative treatment avenues through the development of state-of-the-art methods and novel image processing and data analysis techniques.

CSE Seniors Stephanie Tilden and Nicholas LaRosa are McCloskey Finalists

The Sessa team, which included Notre Dame Computer Science seniors **Stephanie Tilden** and **Nicholas LaRosa**, participated in the 2015 McCloskey Business Plan Competition. The team was a McCloskey finalist and won three awards: the Vennli Award for Best Undergraduate Venture, a Plug and Play Tech Center Startup Camp Award, and the FISH Social Venture R&D Award. Sessa is an online and mobile application aimed at helping young professionals and the underprivileged invest in a way that is affordable and intuitive. The app enables users to form peer investment groups in order to share ideas, pool funds and connect with a professional adviser.

Three CSE Students Named Reilly Scholar Honorees

Huili Chen (Computer Science and Psychology) and **Camilla Tassi** (Computer Science and Music) are two of the 2016 Reilly honorees and **Waleed E. Johnson** (Computer Engineering and Art Studies) is a recipient of one of the 2015 awards. Reilly Scholars are recognized for their exemplification of the highest ideals of the dual degree program. They are honored with a cash award, a certificate for framing, recognition at the Arts and Letters Honors Convocation during Commencement Weekend, and a notice in the Commencement Program.

Armaly Awarded NSF Fellowship


Ameer Armaly

CSE grad student, **Ameer Armaly** has received the prestigious NSF GRFP multi-year fellowship. Mr. Armaly is receiving the award for his work in software engineering, and in particular program comprehension and accessibility technologies. The NSF-GRFP has a long history of supporting the nation's most-promising researchers. Beginning in 1952, it funds 2,000 graduate fellows per year across all scientific fields. Ameer is advised by Professor Collin McMillan.

CSE Students Attend "MHacks"

Eight CSE students traveled to Michigan in January and participated in "MHacks", which is a hackathon organized by the University of Michigan. The students divided into five teams which worked on a project during the weekend. Three of the students, **Shuyang Li, Maribeth Rauh**, and **Jonathan Cobian** won a $1000 grant from the Thiel Foundation for their project, "SnoozeYouLose". This app discourages oversleeping by paying a fee to a friend of your choosing if you hit the snooze alarm. **Kyle Koser** and **Zach Waterson** submitted "Whiteboard2Website", an app that uses image recognition to capture and analyze drawings and symbols on a whiteboard and build custom HTML for fast website prototyping. **Sean T. Fitzgerald** presented "DriveSafe", an app that attaches an EKG to a steering wheel and uses the heart rate of the driver to measure alertness. As the driver dozes off, the microcontroller notices and plays a tune through a mounted speaker. **Shaquille Johnson's** project, "Brownian Motion" experiments with the use of Brownian motion to design a revolutionary new way to clean a surface by vibrating it at a resonant frequency and breaking loose particles. **Travis Patterson's** app, "Smartphone Orary" has a list of buttons corresponding to a planet of the solar system. On clicking the button, it then takes the user to a screen in which it displays the planet in the background along with facts about the planet.

McMillan and Milenkovic Each Receive 2015 NSF CAREER Award


Tijana Milenkovic

Professor **Tijana Milenkovic** will develop novel network analysis approaches for studying cellular functioning and molecular causes of disease. This is the goal of her CAREER project, "Novel Algorithms for Dynamic Network Analysis in Computational Biology." Cellular function is dynamic, and Milenkovic and her team are working to develop efficient computational strategies for inference and analysis of dynamic biological networks. The goal of this study is to contribute to global health by offering novel options for therapeutic intervention. Educational activities that will grow out of this project include the development of new curriculum, career mentoring, and community outreach to K-12 students that focuses on women.


Collin McMillan

Professor **Collin McMillan's** CAREER project, "Understanding Program Comprehension for Automated Software Documentation Generation," targets the "concept assignment problem" in program comprehension. As they study the process that programmers follow when reading source code to write documentation, McMillan and his team will also be developing algorithms to mimic that process. The algorithms will then be integrated with novel natural language generation systems to create descriptions of software behavior. A key outcome of this project will be to increase workforce participation in the industry by persons with visual disabilities. It will also be used to develop an outreach program for state K-12 schools for the blind and visually impaired to prepare students for careers in software development.

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Riek Receives NSF Award on Robot Ethics


Professor Laurel Riek

Professor **Laurel Riek** received a National Science Foundation (NSF) award that was used to support a workshop on The Emerging Policy and Ethics of Human-Robot Interaction at the 10th ACM/IEEE International Conference on Human-Robot Interaction (HRI). The workshop took place in Portland, OR this past spring. Riek, a roboticist, organized the workshop with a multidisciplinary group of colleagues, including Woodrow Hartzog (Law, Samford University), AJung Moon (Mechanical Engineering, Univ. of British Columbia), Don Howard (Philosophy, Univ. of Notre Dame), and Ryan Calo (Law, Univ. of Washington).

As robots become part of our daily lives, HRI professionals from industry, research, and government must grapple with significant ethical, legal, and normative questions. Robots in human environments present new and unique challenges with regards to privacy, safety, and trust; it is critical that roboticists and designers are cognizant of these issues at the onset of their work. The workshop explored these topics across three challenge themes - Healthcare (e.g., how do we ethically design and deploy robots that work with older adults and people with disabilities?), Morphology (e.g., what are the ethics inherent in social manipulation through design?), and Autonomy (e.g., what are the ethical and legal ramifications of control hand-off?).

Dr. David Chiang Receives Google Faculty Research Award


Dr. David Chiang

Google Research recently announced the winners of its Faculty Research Awards for Winter 2015. This is Google's biannual call for research proposals on Computer Science and related topics, including systems, machine perception, structured data, robotics, and mobile devices. The grants provide both faculty and students the opportunity to work directly with Google researchers and engineers.

Dr. David Chiang received the award for Machine Translation. His proposal, titled "Learning Better Translation Models by Learning More Translation Models," addresses the fact that although most machine translation systems learn from parallel text, in many situations, parallel text is limited. The goal of the project is to learn better translation models by simultaneously learning several models at once – translation models for multiple languages, or models for translation and other tasks like transliteration or semantics.

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