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Summer 2014

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



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Commencement 2014



The Department of Computer Science & Engineering (CSE) graduated 47 students on Sunday, May 18, 2014. 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 **Douglas Thain**. Professor **Aaron Striegel**, the department's associate chair, served as master of ceremonies. The ceremony was organized and

coordinated by seniors **Elise Eiden**, **Taryn Green**, and **Christopher Groce**, with the help of Administrative Assistants, **Ginny Watterson** and **Dian Wordinger**.

This year's Outstanding CPEG Senior recipient was **Kevin McGinn** and the Outstanding CS Award recipients were **Samuel Tarin** and **Mark Riehm**.

Seniors **Gina Andrews**, **Eric Vaughn**, and **Aubrey Zielinski** won first-place for the **Advanced Database Projects Competition** held in Spring of 2014, sponsored by the **Thomas Meurer Endowment Fund for Excellence**. The second-place winning team Seniors were **Andrea Cescolini**, **Taryn Green**, and **Christopher Groce**. The third-place winning team included Seniors **Charles Jhin**, and **Paul Kennedy**. 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.

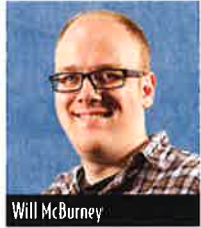
The Outstanding CSE Faculty Teaching Award was granted to Professor **Michael Niemier**.

Students receiving their degrees at this ceremony were **Gina Andrews**, **Scott Aufderheide**, **Justin Bartlett**, **Amelia Bauer**, **Matthew Brittan**, **Andrea Cescolini**, **Sean Cogan**, **Caitlin Cunningham**, **Michael Duggan**, **Elise Eiden**, **Iheanyi Ekechukwu**, **Joseph Fetsch**, **Matthew Fitzgerald**, **Jacob Flynt**, **Christine Gerardi**, **Taryn Green**, **Christopher Groce**, **Darin Habermel**, **Kevin Jacobs**, **Charles Jhin**, **Waleed Johnson**, **Paul Kennedy**, **Eli Kloswick**, **Dustin Liaw**, **Ryan Liebscher**, **John Mapelli**, **Kevin McGinn**, **Casey O'Meilia**, **John Quinn**, **Patrick Raycroft**, **Mark Riehm**, **David Schalkwijk Lopes**, **Taylor Seale**, **Ryan Shea**, **Kevin Sonnen**, **Samuel Tarin**, **Ashley Taylor**, **Nicholas Taylor**, **Eric Vaughn**, **Jeremy Vercillo**, **Luke Westby**, **Nathaniel Wickham**, **Robert Wirthman**, **Natalia Woodbine**, **Alexander Yurkowski**, **Byron Zaragoza**, and **Aubrey Zielinski**.

McMillan and McBurney Win Best Paper Award at ICSE 2014



Collin McMillan



Will McBurney

Professor **Collin McMillan** and grad student **Will McBurney** recently received the Best Paper Award at the International Conference on Program Comprehension which took place simultaneously with the International Conference on Software Engineering (ICSE 2014) in Hyderabad, India. The paper "Improving Topic Model Source Code Summarization" is about automatic documentation of method context. The goal of automatic documentation of method context is to remove humans from the loop of writing much "formulaic" documentation such as summaries for JavaDocs.

Flynn and Aloe Awarded US Patent



Robert McKeon Aloe



Patrick J. Flynn

Dr. **Robert McKeon Aloe** (CSE PhD 2010) and Professor **Patrick Flynn** have been awarded US Patent 8,760,510 entitled "Apparatus and Method for Three-dimensional Imaging Using a Static Light Screen". The patent is based on Aloe's Ph.D. research at Notre Dame, and describes a method for acquiring 3D facial images from videos of a person walking through a fixed sheet of light generated by lasers. The patented technology has potential applications in biometrics and virtual reality, and is available for license.

Kogge Appointed to National Research Council's Committee on Future Directions for NSF Advanced Computing Infrastructure



Peter Kogge

Professor **Peter Kogge** has been appointed to NRC's Committee on Future Directions for NSF Advanced Computing Infrastructure. The committee will consider how advanced computing capabilities are used to tackle a rapidly growing range of challenging science and engineering problems, many of which are compute-, communications-, and data-intensive as well.

Although the committee would not make recommendations concerning the level of federal funding for computing infrastructure, it will advise on various topics such as the contribution of high end computing to U.S. leadership, the competitiveness in basic science and engineering and expected future national-scale computing needs. The committee's study is expected to be completed by 2015.

Uhran Named 2014 ASEE Fellow



John Uhran

John J. Uhran Jr., senior associate dean emeritus and professor emeritus of computer science and engineering at the University of Notre Dame, has been named a Fellow of the American Society for Engineering Education (ASEE). The grade of Fellow is conferred upon an individual who has been an ASEE member for a minimum of 10 years and in recognition of his or her outstanding contributions to engineering or engineering technology education.

A faculty member since 1966, Uhran helped develop several laboratories at the University and published more than 90 technical papers and 30 reports. He is the co-developer of NDTRAN, a software package used to simulate large systems. Before retiring, he began a series of conferences on first Year Engineering Education (FYEE). The 6th in the series was held at Texas A & M this August. He has been actively involved in both the Institute of Electrical and Electronic Engineers and ASEE, an advisor for Tau Beta Pi and is a member of Eta Kappa Nu, Sigma Xi and Alpha Phi Omega, respectively.

He received his doctorate in electrical engineering from Purdue University in 1967. He earned his master's and bachelor's degrees, both in electrical engineering, from Purdue (1963) and Manhattan College (1957).

Riek, Gonzales, and Moosaei Win Two Best Paper Awards at IMSH 2014

Professor **Laurel Riek** and graduate students, **Maryam Moosaei** and **Michael Gonzales** won the Overall Best Paper and Best Student Paper Award at the 14th International Meeting on Simulation and Healthcare (IMSH 2014). Their paper titled "A Novel Method for Synthesizing Naturalistic Pain on Virtual Patients" discusses new animation and synthetic motion techniques for generating realistic pain cues on virtual patients. Maryam presented the paper at the IMSH conference in San Francisco.



Laurel Riek



Maryam Moosaei



Michael Gonzales

Company Co-founded by Two CSE Faculty Partners with Accelerated Rehabilitation to Advance the Development of Its Mobile App for Concussion Detection

Contact, Inc., a company which was co-founded by CSE professors **Christian Poellabauer** and **Patrick Flynn**, former ESTEEM student **Shane McQuillan**, PhD student **Nikhil Yadav**, and ND alum **Michael Soenen**, announced recently that it has entered into a collaboration with Accelerated Rehabilitation Centers, the largest physical therapist owned and managed practice in the United States. Under the arrangement, Accelerated will use the Contact mobile app for concussion screening at a number of its clients' athletic programs, thus expanding the ongoing Contact research study with the goal of further demonstrating that speech analysis can be used as a primary detection method for concussions. Accelerated Rehabilitation, which has a dedicated Concussion Management practice, is actively engaged with athletes across the Midwest who suffer concussions during their sport seasons.



Christian Poellabauer



Nikhil Yadav

Under the arrangement, Accelerated will provide access to an estimated 800 high school and college athletes that are among its expansive client base. Contact will provide a select group of Accelerated's athletic trainers with iPads that run the Contact app, and those trainers will use the app to capture baseline speech samples from the athletes. During the 2014 sports seasons, athletes will periodically provide speech samples by speaking a two-minute word script into the iPad, during training, and after a suspected concussion. Speech data will be de-identified and aggregated for researchers on the Contact team to analyze and refine the algorithms that detect the voice aberrations that signal a concussion. During this research phase, the app will not yet indicate whether it suspects a concussion; speech samples are simply collected and analyzed in order to refine the concussion-detection algorithms. A release date for the commercially available software has not yet been announced.

Rodeghero, McMillan, D'Mello Receive Distinguished Paper Award

PhD students, **Paige Rodeghero**, **Will McBurney**, and **Nigel Bosch**, along with CSE professors **Collin McMillan** and **Sidney D'Mello**, received the ACM Distinguished Paper Award this year at the International Conference on Software Engineering (ICSE 2014), Hyderabad, India. Their paper titled "Improving Automated Source Code Summarization Via an Eye-Tracking Study of Programmers" is an empirical study of how programmers write summaries of source code. The study determines what patterns programmers follow when reading source



Paige Rodeghero



Nigel Bosch

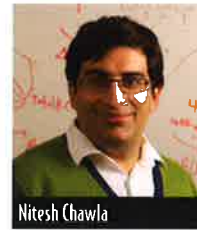
code in order to summarize it. Once the patterns are summarized, it may be possible to mimic those patterns with an algorithm. This algorithm would find the areas of code that need to be summarized, and in what order. The authors evaluate prominent conjectures about what programmers need to read, and found evidence to confirm or refute these conjectures based on the strong evidence from an eye-tracking device.

Weninger, Chawla Give TEDx Talks



Tim Weninger

The Observer reports that Computer Science and Engineering faculty **Tim Weninger** and **Nitesh Chawla** were among the nineteen speakers who delivered 12-minute monologues about issues personal to them in the 2014 TEDxUND event in the DeBartolo Performing Arts Center on Tuesday, January 21st.



Nitesh Chawla

Professor Weninger presented, "Changing the Hivemind: How Social Media Manipulation Affects Everything" and stated, "Media determines the lens through which I view the world — what can be said, who can say it, how it can be said, who can hear it." He described a study he conducted on reddit.com, an online conversation host that demonstrated the way

content is aggregated and rated. Weninger's computer program, which up-voted or down-voted the newest post every two minutes with a 50-50 chance of each result, demonstrated that if he up-voted something initially, the post is 20 percent more likely to appear on the front page, and if he down-voted something initially, it is 12 percent less likely to appear on the front page. Essentially, Weninger said, "One quarter of 1 percent of viewers determine what the rest of them see." The only way for this new communication forum to work well is for everyone to participate fully, he said. "The internet, in my opinion, is like a democracy — it only really works well if all of the people contribute."

Professor Chawla presented, "Big Data for Common Good: The Synergistic Effects of Wellness in Communities". Chawla, a computer science professor and self-proclaimed "dataologist," argued that Americans' health and wellness would improve if they tracked data about their own personal lives, such as socioeconomic status and access to grocery stores and recreational facilities. Doctors could then notice trends between personal habits and certain diseases, he said. Dr. Chawla asked, "What if my prescription when I left the physician's office would just say ... 'I know you live in a neighborhood where you may not have any access to [healthy fruits and vegetables]. Let me incentivize you. Go have a 50 percent discount on the fresh fruits and vegetables you may buy from the grocery store. That may help you?'" Tracking personal data on a large scale could revolutionize the health care industry and improve Americans' overall well-being, he said. "You can be empowered to take the right action," Chawla said.

For complete article from the Observer, see observer.com.

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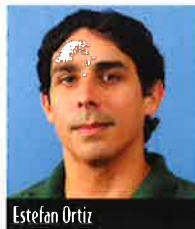
Computer Science and Engineering displays its commitment to the environment by choosing FSC certified paper for its newsletter. Please recycle it when you are finished.

Notre Dame Biometrics Researchers Help to Ensure an Honest Election in Somaliland

News.nd.edu recently reported that Professor **Kevin W. Bowyer**, and Ph.D. students, **Estefan Ortiz** and **Amanda Sgroi** are playing a critical role in assisting Somaliland, an independent state located in the Horn of Africa, to have honest elections. Bowyer's research group was asked to analyze a test set of iris images to determine if attempts at "duplicate" voter registration could be detected. Their analysis was able to find all the attempts at duplicate registrations, without falsely labeling any as duplicates that in fact were not. These results were reported to the Somaliland National Electoral Commission, along with recommendations for how to maintain and improve image quality in the full-scale national voter registration.



Dr. Kevin Bowyer



Estefan Ortiz



Amanda Sgroi

D'Mello and Bixler Win "Best Paper" Award



Robert Bixler



Sidney D'Mello

Graduate student **Robert Bixler** and **Sidney D'Mello** won the James Chen Best Student Paper Award at the 22nd. International Conference on User Modeling, Adaptation, and Personalization (UMAP 2014). Their paper "Toward Fully Automated Person-Independent Detection of Mind Wandering" discusses the use of eye gaze and contextual cues to automatically detect when a person is mind wandering during reading from a computer interface. Robert presented the paper at the UMAP conference in Aalborg, Denmark.

According to D'Mello, the next step in this research is to design computer interfaces that dynamically intervene to restore attention when mind wandering is detected. This should lead to performance improvements for everyday tasks and prevent catastrophic failures for high stakes tasks (e.g., aviation).

