

Computer Science Department 2018-2019 Newsletter



From left: Ph.D. student Sultan Alharthi, Professors Hamilton, Dolgov (from PACMANe Lab), and Toups at the 21st ACM Conference on Computer-Supported Cooperative Work and Social Computing in Jersey City, NJ.

The Department of Computer Science

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NMSU Receives Major Grant for NSF Scholarships in STEM Program

By Billy Huntsman. Reproduced from the NMSU News Center.



(From left) Dongwan Shin, associate professor of computer science at New Mexico Institute of Mining and Technology, College of Arts and Sciences Dean Enrico Pontelli, Huiping Cao, NMSU associate professor of computer science, Gloria Villaverde, assistant professor and division head at NMSU Alamogordo, and Joe Butler, science, engineering and math division dean at Dona Ana Community College. Photo by Billy Huntsman.

New Mexico State University has been awarded a \$3.9 million grant from the National Science Foundation to prepare students for careers in computing and provide scholarships for academically talented community college students in the computer science field who need financial help. New Mexico Institute of Mining and Technology and four community colleges to fund the NSF Scholarships in Science, Technology, Engineering and Mathematics (S-STEM) program.

Huiping Cao, NMSU associate professor of computer science, is the principal investigator for the project and College of Arts and

NMSU is the lead institution in partnership with

COMPUTER

New Mexico State University has been awarded a \$3.9 million grant from the National Science Foundation to prepare students for careers in computing and provide scholarships for academically talented community college students in the computer science field who need financial help.

NMSU is the lead institution in partnership with New Mexico Institute of Mining and Technology and four community colleges to fund the NSF Scholarships in Science, Technology, Engineering and Mathematics (S-STEM) program.

Huiping Cao, NMSU associate professor of computer science, is the principal investigator for the project and College of Arts and Sciences Dean Enrico Pontelli, Dongwan Shin, associate professor and department chair of computer science at New Mexico Tech, and Sara Hug, a research associate with the Alliance for Technology, are co-principal investigators.

"The goal of the grant is to help the students not just with financial support but develop professional skills, particularly in the area of cyber security," Pontelli said. "This is one of the most competitive and fastest growing fields in the area of computer science."

NMSU has partnered with Doña Ana Community College, the NMSU Alamogordo campus, and the NMSU Grants campus, while Tech has partnered with Eastern New Mexico University's campus in Ruidoso.

"An important aspect of this grant is to help students transition from community college to a fouryear program," Pontelli said. "So a lot of the scholarships are reserved for community college students with the understanding that, after one year in community college, they will transfer to a four-year program at either the NMSU main campus or the Tech main campus."

Pontelli said he hopes the grant will make the students who apply for the scholarships more competitive in the job market.

"There will be a rubric by which the applicants will be scored and the top students will be selected to receive scholarships," Pontelli said.

Students who are either heading into a community college program or who are heading for a fouryear program are welcome to apply.

The grant is for five years and success will be based on how many scholarship recipients have completed their computer-science degrees and are entering the workforce in a related field.

Pontelli said he expects to award around 22 scholarships a year for three cohorts of students.

"So it's not just a one-time thing," Pontelli said. "Once they are selected, they won't have to worry about getting a job while they work on their degrees."

Pontelli said he hopes the results of the five-year grant will give evidence that the program works, encouraging companies in the computer science industry to fund more scholarships for computer science students and that other industries will do the same for students in different fields.

"I see this as creating an infrastructure that will grow over time once it is proven," Pontelli said. "The good thing is NMSU has been investing a lot of effort in the area of cyber security, we have a lot of initiatives in place. A degree program in cybersecurity is going through the approval process now,

2018-2019 NMSU Computer Science Department Newsletter \$20 Million NSF Grant for SMART Grid Center Builds on NMSU Research By Minerva Baumann. Reproduced from the NMSU News Center.



(From left) Smart Grid collaborators Enrico Pontelli, dean of the College of Arts and Sciences and Regents Professor of computer science, and Satishkumar Ranade, Klipsch School of Electrical and Computer Engineering professor and department head, discuss smart grid research they began at New Mexico State University in 2014. (NMSU photo by Darren Phillips)

The sustainable electric grids of the future will be raised in New Mexico thanks to a \$20 million National Science Foundation grant based on smart grid research born at New Mexico State University over the past five years.

The grant will expand this research to include scientists across the state.

The National Science Foundation recently announced the five-year grant for New Mexico's SMART Grid Center under its Established Program to Stimulate Competitive Research (EPSCoR). The research program seeks to transform existing electricity distribution feeders into interconnected microgrids and will utilize multiple testbeds across New Mexico.

NMSU will receive \$7.3 million of the EPSCoR grant.

"I'm super excited about this," said Enrico Pontelli, NMSU dean of the College of Arts and Sciences, who partnered with the College of Engineering to initiate smart grid research at NMSU in 2014 with a \$5 million award from the NSF's Center for Research Excellence in Science and Technology (CREST). "We are very passionate about research in this area. Five years of funding to expand this research at the state level is fantastic."

The NSF EPSCoR Research Infrastructure Improvement (RII) Track 1 grant will link researchers and students

from NMSU, the University of New Mexico, New Mexico Tech and Santa Fe Community College with researchers and scientists at Sandia Laboratories and Los Alamos National Laboratory, as well as other organizations in New Mexico such as the Microgrid Systems Laboratory and Explora Museum.

The National Science Foundation recently announced the \$20 million five-year grant for New Mexico's SMART Grid Center under its Established Program to Stimulate Competitive Research (EPSCoR). NMSU will receive \$7.3 million from the grant.

Dean Enrico Pontelli will be leading the overall effort at NMSU.

Drs. Huiping Cao, Satyajayant Misra, and Son Tran from Computer Science Department will be leading three out of four projects originating from NMSU.

"The NM SMART Grid Center is a novel, interdisciplinary research center that will address pressing design, operational, data and security challenges of next-generation electric power management," said William Michener, principal investigator for the award and state director of New Mexico EPSCoR. "Through this grant, we will not only advance research areas of national importance, but train a cadre of undergraduate and graduate students in New Mexico to join the STEM workforce."

New Mexico is one of seven jurisdictions to receive one of these awards this year.

"We are very proud because this award is the result of a nice collaboration that involved the three research institutions in the state," said Pontelli. "We worked together with the state director of the EPSCoR office and we built the proposal as a collaboration where we all come together and everything is integrated."

EPSCoR is a program designed to fulfill the NSF's mandate to promote scientific progress nationwide. Through this program NSF establishes regional partnerships with government, higher education and industry to develop research and development capacity.

"Our goal is to work together to build the research basis for the technology for the future electric grid," Pontelli said. "New Mexico is the perfect state for this because we have access to any kind of energy source you can think of. We have access to oil and gas, we have access to wind, we have access to sun. We have everything in the entire spectrum and at the same time we have very diverse land configuration – we have mountains, we have desert. We have different types and sizes of communities. We need to cover all the aspects and meet the needs of the state."

Part of the research includes cybersecurity along with research about the directional relationship between power plants and customers to predict when customers need electricity to create cheaper, sustainable energy use.

While training students and developing research will build up the infrastructure for smart grid technology, ultimately, the objective would be to work with New Mexico's electric suppliers to translate the research into practice and take the technology statewide.

For Pontelli, the strength of the project is its integrated collaboration.

"Every university provides expertise for this project," Pontelli said. "We organized the research in four objectives and for each one, we have researchers from the entire state. There was no single institution that could achieve the objectives alone. We come together, work together and we strengthen the state. "My goal is if anyone wants to talk about research in smart grids they come to us. We want to be the national leaders in smart grid technology."

2018-2019 NMSU Computer Science Department Newsletter NMSU Leads Southwest Alliance in New Science Initiative By Minerva Baumann. Reproduced from Las Cruces Sun-News.



Enrico Pontelli, left, dean of NMSU's College of Arts and Sciences; Ann Gates, professor and chair of UTEP's Department of Computer Science; and Andrea Tirres, interdisciplinary network manager at UTEP's Office of Research and Sponsored Projects. NMSU and UTEP are among the handful of institutions to receive a portion of the \$9.9 million NSF INCLUDES grant. (Photo by J.R. Martinez / UTEP Communications)

New Mexico State University is among a handful of universities across the country to receive grants that represent the next major step for the National Science Foundation INCLUDES program – the development of a national network of alliances to enhance U.S. leadership in science, technology, engineering and mathematics (STEM) by broadening participation in those disciplines.

The alliance of which NMSU is part, called CAHSI INCLUDES, will create hubs throughout the country to expand the NSF's Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (INCLUDES) program, with a specific focus on promoting computer science education at primarily Hispanic-serving institutions. NMSU is the lead institution for the southwest region of the CAHSI INCLUDES alliance, which includes Arizona, New Mexico and Texas.

"The INCLUDES program started with small pilots for two years," explained Enrico Pontelli, NMSU lead for the CAHSI INCLUDES alliance. "They wanted to plant a seed to create alliances so people would come together and start aligning existing initiatives and interests. We had one of these pilots in the first year and that's what we did. We concentrated on the southwest and how to bring more institutions on board and we reached out to community colleges with great success. For example, here locally DACC, NMSU-Alamogordo, and EPCC came on board and it was great."

The Computing Alliance of Hispanic-Serving Institutions (CAHSI), which includes NMSU, University of Texas at El Paso and more than 40 other institutions, will serve as the backbone for this new alliance. The CAHSI organization has been active for more than 10 years, investigating and promoting evidence-based practices to ensure the success of students at Hispanic-Serving Institutions in the areas of computing and computational sciences.

The entire award is \$9.9 million and will allow the CAHSI INCLUDES Alliance to be developed. The award will be split among the four regions that comprise the CAHSI INCLUDES alliance – California, Southwest, Southeast, and Northeast. The CAHSI INCLUDES alliance is one of five alliances that NSF will fund through the INCLUDES program, and these alliances will coordinate their activities through a coordination hub, which will function as a backbone

organization for the entire NSF INCLUDES national network.

NMSU's award for the southwest region is \$1.3 million. The alliance's overall goal is to ensure Hispanics comprise 20 percent of graduates in computing disciplines nationally by 2030.

"The emphasis is on Hispanic students – as they are severely underrepresented in the field of computing – but we have learned quickly that once you start addressing the needs of a particular segment of the population, you end up addressing the needs of every student," said Pontelli. "The fact that NMSU was among those selected for this program means we are the face of inclusion for NSF nationwide. And what's amazing is these alliances are not just in computer science but in any NSF supported discipline."

The funding will be used for infrastructure to create opportunities for institutions in the region to share experiences, to work together through workshops, meetings and regular communications between institutions. The initiative will include summits to expose students to different types of professional development as well as bringing industry representatives to the table to talk to students about their expectations.

Pontelli explained each region in the CAHSI INCLUDES alliance will have a connector to facilitate communications among institutions. NMSU's connector is Raena Cota, who will serve as program manager for NMSU's NSF award. Cota has been involved in programs that emphasize K-12 participation in STEM and computing at NMSU for more than 8 years. She is already looking forward toward the first big event, a conference in October called HENAAC Great Minds in STEM, which she and students will attend.

"That will be the first summit for this group," Cota said. "Just bringing in the K-12 community is going to be a big thing for us because we've been doing these K-12 initiatives for more than 10 years. We'll be recruiting new students to participate in our programs, but we already have CAHSI scholars, who are undergrads and grads that have been involved in communication and outreach in the communities. We also have outstanding graduates of CAHSI. Bringing those students back who've been through the CAHSI program is a part of it but we also want to recruit students with outreach experience to help current students and other students feel comfortable in computing."

For decades, NSF and its partners have sought to create opportunities in STEM for all U.S. residents, ensuring that no matter who they are or where they come from, they have access to education and employment.

"Considering this award and the NSF Hispanic Serving Institution Resource Hub award NMSU recently received, it's obvious that the NSF is paying attention to Hispanic populations across the country. We are excited that NMSU is at the forefront of this initiative as a Hispanic-Serving Institution meeting the needs of our student population," Pontelli said.



Middle school students work on creating a computer game at a summer session hosted by the NMSU Young Women in Computing chapter. The camp is designed to increase girls' interest in computer science and related fields, and exposes middle and high school students to coding and different software platforms. Photo by Isabel Rodriguez. 2018-2019 NMSU Computer Science Department Newsletter NMSU Computer Science Professor Receives Grant to Discover Biological Patterns

By Billy Huntsman. Reproduced from the NMSU News Center

A professor in New Mexico State University's Department of Computer Science recently received a National Science Foundation grant to develop automated methods to discover molecular patterns from human and mouse genomics data.

Joe Song plans to implement these methods of data science to developmental biology.

"This grant will address a long-standing question in biology regarding how different cells, such as brain and muscle cells, carrying the same genome can have distinct biological functions," he said. "We believe that the molecular networks of our genes are wired differently to execute diverse programs across our cell types. We will develop novel data science methods to delineate how molecular networks are rewired in major cell and tissue types in humans and mice."

Song's research will be funded by the \$814,000 NSF grant, from the NSF's Advances in Biological Informatics program through its Division of Biological Infrastructure, from July 1, 2017 for three years.

He said he hopes the research will contribute to the development of software that can be used to better study molecular activities programmed by our genomes.

"The data volume of many large-scale biological projects is exploding," Song said. "Some scientists estimate that genomics data will become the single largest digital data source by 2025. It has become clear that unexplored data may contain critical signals of development, which a biologist may not know how to extract."

Software that is programmed correctly to parse through the data can discover hidden patterns more effectively than a human who can often be biased, Song said.

"This research provides me an opportunity to discover new theories about cell differentiation at the molecular level," Song said. Song's next step in the project is to develop prototype computational methods and test them on sample data sets to ensure functionality.

Song said the grant was the result of collaboration with graduate students and researchers throughout his time at NMSU.

"Coming from around the world, they contributed to preliminary results used in the proposal of this successful NSF grant," he said.

These include one of Song's former Ph.D. students, Yang Zhang, now a bioinformatics scientist in California; Dan Goldowitz at the University of British Columbia, a neurobiologist renowned for brain research, who will test hypotheses generated by Song's computational methods.

"I look forward to creating useful software for biology discovery and working with talented students and outstanding biology collaborators through this project," Song said.



of computer science at New Mexico State University. (Courtesy photo)

NMSU Ranks in Top 25 for Enrolling, Graduating Women in Computer Science

By Minerva Baumann. Reproduced from NMSU News Center.



(left to right) Angela Kearns is an NMSU senior who graduated this year with a degree in computer science and mathematics; Catalina Sanchez-Maes, Gabriella Garcia and Elena Davidson also graduated this year, and were among 50 students selected nationwide to attend a Hispanic Student Leadership Summit sponsored by Google.

Angela Kearns is a New Mexico State University senior graduating with a degree in computer science and mathematics. Last summer she interned at Nike, where she now works after graduating this year.

She is among the growing number of students who have helped NMSU to rank 22nd among four-year public universities in the United States (which includes more than 200 institutions) for enrolling and graduating women in computer science, according to a recent data analysis compiled by "The Chronicle of Higher Education."

"When I started college I was a declared math major, and I honestly knew nothing about computer science," Kearns said. "Freshman year I enrolled in an introductory computer science course, and I fell in love."

"The Chronicle" analyzes data on higher education to compare colleges on various measures and publishes its analysis in a weekly feature called "Chronicle Lists," put together by Ruth Hammond, a senior editor. In January, the list, titled "Which Colleges Are Best and Worst at Enrolling and Graduating Women in Computer Science and Engineering?" identified NMSU among the 25 best. The data is from the Integrated Postsecondary Education Data System, published by the U.S. Department of Education's National Center for Education Statistics.

Kearns is among the women that NMSU has attracted and retained to earn a degree in computer science. For many, a key program at NMSU has created an atmosphere of community that invited women in to what has long been considered a male-dominated course of study in the U.S.

Enrico Pontelli, dean of NMSU's College of Arts and Sciences and Regents professor in computer science, credits a program he spearheaded more than 12 years ago with boosting the number of women studying computer science at NMSU. The Young Women in Computing program, part of the National Science Foundation's Broadening Participation in Computing Initiative, has directly impacted more than 13,000 students.

"The program has involved many faculty members, staff members, student researchers and school teachers," Pontelli said. "We launched the program in 2006 as a response to the realization that our numbers of undergraduate women enrolled in computer science tanked to

about eight percent. "At that time, NSF had just initiated a new program, and I was able to secure a small supplement to pilot a summer camp for high school students. We were able to expand this pilot into a broader program, inclusive of both summer and academic year experiences. That funding provided us with the opportunity to explore a variety of approaches and learn what key elements make a difference. A second NSF grant, awarded in 2014, was instrumental to formalize the core principles that underlie our efforts."

Now the percentage of women in computer science at NMSU is close to 24 percent.

For Kearns, the program made the difference for her in choosing computer science over another course of study.



Group photo of middle and high school girls participating in 2018 Young Women in Computing summer camp. (Courtesy photo)

"Working with YWiC has helped me so much throughout college," Kearns said. "It's given me a support system and community within computer science. YWiC and the NMSU Computer Science Department have greatly impacted my choice in careers by first introducing me to computer science and by providing me with the support to stay in computer science. YWiC and the YWiC coordinators have pushed me to achieve things that I couldn't have even imagined."

Esperanza Medina graduated from NMSU in 2015 with a double major in mathematics and computer science and is now a software developer at Go Daddy. Esperanza was also the Star of the Department of Computer Science at the 2019 College of Arts and Sciences Starry Night. (Courtesy photo)

Catalina Sanchez-Maes was one of hundreds of fifth-grade girls impacted by her participation in an NMSU YWiC-sponsored summer camp.

"I learned that computer science has multiple applications from running software on the computer to more tangible outcomes. I also learned that it could be used in anything that interests me from making music to making a game," said Sanchez-Maes. "I absolutely loved the hands-on learning that I experienced, which led me to continue on the path of computer science."

Sanchez-Maes was one of the three NMSU students of 50 selected nationwide this spring to attend the Google Hispanic Student Leadership Summit in Austin, Texas, where she felt "connected, embraced and valued in the tech world."

Pontelli points to several principles that have made YWiC a success.

"The sense of belonging is critical, to defeat stereotypes and impostor syndrome," he said. "But the support of parents, family members, community leaders and K-12 teachers is also important to encourage the pursuit of studies in computing. YWiC pursues outreach to gain early interest, through exposure to the excitement of computing as early as fifth grade, and follows up by sustaining the interest as students move through the grades, especially at the transition points of middle to high school and high school to college. Last but not least, technical preparation offered provides these young women with competence to feel at par, or superior, to male counterparts."



Computer Science Department Welcomes New Faculty, Staff Members



Assistant Professor Bill Hamilton started at NMSU in Fall 2018. Courtesy photo.

In the 2018-2019 school year, the Computer Science Department sucessfully hired two new professors.

Bill Hamilton started at NMSU in Fall 2018. He earned his bachelor's degree from Texas A&M University. His undergraduate research led to his pursuit of a Ph.D., also at Texas A&M University, with a focus on human computer interaction, which he completed in 2018.

Bill's research areas include live media design, online communities, online education, and video game design/culture. His current research investigates how new live media forms can support participation in critical aspects of society including education, politics, work, and play.

Hamilton is interested in investigating how people share information and maintain information awareness in collaborative digital workspaces and games. He employs research methods such as qualitative ethnographic inquiry and deploying exploratory technology probes to elicit and observe new social

phenomena.

In the past, Bill has collaborated with industry researchers at Microsoft Research and Motorola Mobility.

His activities and awards include:

• Associate Chair in Games and Play Subcommittee for the ACM Conference on Human Factors in Computing Systems – 2019.

• Associate Chair for Annual Symposium on Computer-Human Interaction in Play - 2018.

• Texas A&M Association of Former Students' Distinguished Graduate Student Award for Excellence in



New Computer Science Professor Tuan Le. Photo courtesy of Singapore Management University. Courtesy photo.

Research – 2018.

• Best Paper – ACM International Conference on Interactive Experiences for Television and Online Video –2016.

Tuan Le has been hired to teach and research data science in the Computer Science Department of the College of Arts and Sciences starting in Fall 2019. The position was created thanks to the EPSCoR and will support the new Professional Master's Degree Program in Computational Data Analytics.

Le was previously a visiting assistant professor at Oakland University in Michigan. He was previously a post-doctoral researcher at Heinz College at Carnegie Mellon University in Pittsburgh, Pennsylvania.

Le obtained his Ph.D. from the Singapore Management University's School of Information Systems. He also earned his bachelor's and master's in engineering from Ho Chi Minh City University of Technology. Le's primary research interests are topic models, visualization, dimensionality reduction, embedding and generative models.



Assistant Professor Tao Wang will start at NMSU in Fall 2019. Courtesv photo.

Tao Wang has been hired as an assistant professor to teach software engineering with focuses on cybersecurity and cyber-physical systems.

He earned his Ph.D. from the University of South Florida. His research focuses on network and cyber-physical security with an emphasis on designing defense methods that can protect emerging wireless technologies from being undermined by adversaries. Specifically, his major research areas lie in access control, device authorization, attack analysis, and countermeasure design in emerging networks (e.g., IoT, 5G network).

Recently, he has been working on secure resource allocation in multiuser MIMO systems. His research is also relates to web security, specifically discovering security threats against existing external dependencies existing on the Internet.

Mari Langford has been hired as a program manager for the Computer

Science Department.

She received her bachelor's from NMSU and is currently working on a Bachelor's of Science in Computer Science.

She has worked at NMSU since 2006. In 2018, she joined the department's Interdisciplinary Center of Research Excellence in Design of Intelligent Technologies for Smartgrids (ICREDITS). Her areas of interest include smart grids, cybersecurity, and online voting systems.

Adán Delval has been hired as a program specialist for the department's



Mari Langford has been hired as a program manager for the Computer Science Department. Courtesy photo.



Adán Delval has been hired as a program specialist for the department's NM S-STEM program. Courtesy photo.

and Spanish, as well as a master's in public administration from NMSU, and he is currently working on a second master's in communication studies specializing in political communication.

Delval previously worked for four years for the Chile Pepper Institute, where he was in charge of community outreach.

Jacqueline "Jaki" Davis is the department's new administrative assistant. She recently graduated from DACC with a degree in accounting and will continue her education at NMSU, pursuing a degree in accountancy, while working as fulltime staff at CS.



Jaki Davis graduating from DACC. Courtesy photo.

Computer Science Professor Gets Promoted

The Computer Science Department at New Mexico State University is proud to announce that Shaun Cooper has been promoted to associate college professor.

Before entering the education field, Cooper served 25 years as a staff member in New Mexico State University's Information and Communication Technologies division. His last five years in the division were as chief information officer/associate vice president. In that position, he was responsible for information technology policy, as well as planning and compliance for the entire NMSU system. In that capacity, Cooper was responsible for the management of more than 100 staff members and an annual budget of more than \$16 million.

Dr. Cooper received his bachelor's in computer science from the University of New Mexico, his master's from the University of Texas – Austin, and his Ph.D. from NMSU in 2000.

He joined the Computer Science Department in 2014 after retiring and is an active participant in the New Mexico Super Computing Challenge, an



Shaun Cooper has been promoted to college associate professor. Courtesy photo.

annual STEM competition designed to get local students interested in STEM fields, while also getting local tech firms interested in NM Students.

Congratulations, Dr. Cooper!

Cooper Receives Donald C. Roush Award for Teaching Excellence

Dr. Shaun Cooper of the Computer Science Department at NMSU received one of 11 Donald C. Roush Awards for Teaching Excellence in the 2018-2019 school year.

The annual Roush awards are named for former New Mexico State University Executive Vice President Donald C. Roush in recognition of his 35 years of teaching improvement in New Mexico. The awards are given based on feedback from students, department heads, deans, and community campus directors.



The 2018-2019 Donald C. Roush Award for Teaching Excellence Award recipients pictured with NMSU Chancellor Dan Arvizu, far left. Dr. Cooper is pictured in the center back row. Photo by Josh Bachman.

Computer Science Professor Retiring After 32 Years



Professor Hing Leung is retiring from NMSU after 32 years.

Dr. Hing Leung is retiring from NMSU after 32 years of teaching.

Dr. Leung came to NMSU in 1987 and his primary research area was in theoretical computer science. Research topics he has tackled include nondeterminism, ambiguity, two-way processing, finite automata, pushdown automata, parsers, and LR(k)-grammars.

Leung obtained his Bachelor of Science degree in applied mathematics from the University of Hong Kong in 1981, and his Ph.D. in computer science from Pennsylvania State University in 1987. Between 1981 and 1983, he worked as a teaching assistant and assistant computer officer for the Computer Center of the University of Hong Kong.

Between 1991 and 1993, Leung was an Alexander von Humboldt research fellow carrying out research at the J.W. Goethe University in Frankfurt, Germany.

Many former and current computer science students submitted their thoughts on Dr. Leung and wished him well in his retirement.

"I remember how much passion you had teaching subjects like algorithms and discrete math," said Erik Draayer. "I still remember your lectures about the "leap of faith" when learning about recursive calls. You weren't afraid to push your students but were always willing to help us and I really appreciated that about you."

"Professor, you have such a great skill to gap the breach between math concepts and how they relate and apply to computer science," said grad student Miguel Guirao. "This is a skill that few educators have, and you excel in it."

"From my heart, I would like to thank you for your efforts," said a student named Saleem.

"I only took the graduate-level automata with you but it had a profound impact on how I do formal writing to this day," said Sajal Kumar. "Because of that class I can express my ideas more clearly and mathematically and I cannot thank you enough for that. You are one of the most brilliant professors I have ever had a chance to learn from. You will be missed. Thank you for everything. Hope you have a wonderful retirement.

"They say teachers teach to make a difference," said Yifan Hao. "You have definitely made a positive difference in my studies. I sincerely hope that retirement is wonderful and I wish you lots of joyous time with your family."

Despite my many naïve questions, you always answered with passion and patience," said Fabio Tardivo. "Thank you for that.

The Computer Science Department at NMSU thanks Dr. Leung for his years of dedicated research and teaching. We wish you the best, Dr. Leung!

In Memoriam: Mark Brimhall Wells

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Reproduced from Dr Wells' obituary on ladailypost.com



Mark Brimhall Wells (June 10, 1929 – October 7, 2018) was a mathematician and computer scientist. He worked at the Los Alamos National Laboratory (1951-1980; appointed Group Leader of Computer Science Research in 1968), and as Department Head of the Computer Science Department at New Mexico State University (1980-1989).

Dr. Wells received his PhD on Boolean algebra in 1961 from University of California, Berkeley. His research then focused on programming languages and algorithms of early computers and computer chess. He was a co-author of the first chess-playing computer program (Experiments in chess, Los Alamos chess). He was the author of the scientific compiler MADCAP, arguably the first paper describing some concepts behind such tools as Matlab. He was also the co-author of MODCAP, a functional language that shares the imperative and object-oriented features.

His passions included skiing, gardening, hiking, camping, chess, basketball, tennis, sailing, and the outdoors. He was instrumental in the development of the Los Alamos Ski Area (1950s and '60s) and the Los Alamos Hiking Trails (1990s).

Dr. Wells is survived by his first wife Martha Lee of Loveland, Colorado, their four daughters, four grandchildren, and seven great-grandchildren, and his best friend and surviving wife Linda Wells of Los Alamos, her daughter and their adopted son, three grandchildren, six great-grandchildren, and one great-grandchild.

Computer Science Department to Offer New Degree Programs in Fall 2019

The Department of Computer Science at New Mexico State University is excited to announce two new degree programs and several new concentrations will be available to students starting in Fall 2019.

The department will offer a new Professional Master's Degree in Computational Data Analytics in Fall 2019.

This degree program was spearheaded by NMSU Arts and Sciences Dean Enrico Pontelli; Department of Computer Science Associate Professor Huiping Cao; and Dean of NMSU's Graduate School Loui Reyes. The program is meant to give students the skills they need to succeed in the exploding "big data" industry.

"Big data" is a term used to describe the vast amounts of data being generated in the various fields of science, education, government, business, and government. In 2013, IBM estimated more than 200 terrabytes are generated every day, equivalent to more than 300 million high-definition movies.

Students in the Computational Data Analytics Professional Master's Degree Program will learn about the statistical and computational skills needed to analyze complex data sets; the tools, techniques, and methodologies that are commonly used in data management, data mining and machine learning; and will use the skills and tools they've learned to solve a real-world problem in the capstone course.

The department will also offer a Bachelor of Science in Cybersecurity starting in Fall 2020. Students enrolled in this degree plan will learn the theoretical and practical aspects of cybersecurity, with coursework in computer science, communications, engineering, information systems and criminal justice.

NMSU will be the first university in the state to offer a cybersecurity degree.

The new areas of concentration students can choose from are: Algorithms, Artificial Intelligence, Big Data and Data Science, Cybersecurity, Networking, Human Computer Interaction, and Software Development.

To learn more about the new degree programs and concentrations available to students starting in Fall 2019, contact Department Head Son Tran at <u>tson@cs.nmsu.edu</u>, Undergraduate Program director Jonathan Cook at joncook@nmsu.edu, or Graduate Program director Huiping Cao at <u>gradcs@cs.nmsu.edu</u>.

NMSU to Receive \$13.4 Million in Computer Science Grants

Throughout the 2018-2019 school year, the Computer Science Department at New Mexico State University was awarded a number of grants to fund complex, groundbreaking research, thanks to the diverse skills and interests of the Computer Science faculty, as well as their partnerships with other faculty members and researchers at NMSU and other institutions throughout the world.



NMSU College of Arts and Sciences Dean Enciro Pontelli. (Photo by Andres Leighton)



Computer Science Associate Professor Huiping Cao. Courtesy photo. The National Science Foundation Awarded NMSU \$7.3 million of its \$20-million Established Program to Stimulate Competitive Research (EPSCoR) initiative.

The grant will fund research to transform existing electricity distribution feeders into interconnected microgrids and to utilize multiple testbeds across New Mexico. College of Arts and Sciences Dean Pontelli began the research in 2014 with a partnership with the NMSU College of Engineering and a \$5-million grant from the NSF's

Center for Research Excellence in Science and Technology. Dean Pontelli will serve as the principal investigator for the EPSCoR research, and Drs. Huiping

NMSU will receive a \$4-million grant from the National Science Foundation to set up scholarships for New Mexico Students interested in science, technology, engineering, and math (STEM). The program's principal investigator is NMSU Computer Science Associate Professor Huiping Cao and includes NMSU College of Arts and Sciences Dean Enrico Pontelli; Sarah Hug, Graduate Admissions Coordinator for the Alliance for Technology, Learning, and Society at the University of Colorado in Boulder; and Dongwan Shin, associate professor and department chair of computer science at New Mexico Tech. The program will be funded between 2018 and 2023.

The university will receive \$1.3 million to lead the Southwest Alliance of the National Science Foundation's Inclusion across the Nation of Communities of Learners



Logo for the National Science Foundation. Courtesy photo.



Computer Science Department Head Son Tran. Photo by Darren Phillips.

of Underrepresented Discoverers in Engineering and Science (INCLUDES). The INCLUDES program is a national initiative to ensure Hispanics comprise 20 percent of graduates in computing disciplines nationally by 2030. NMSU received the grant as part of the Computing Alliance of Hispanic-Serving Institutions (CAHSI), which includes NMSU, the University of Texas at El Paso, and more than 40 other institutions. NMSU will lead the Southwest Alliance, which also includes Arizona and Texas. Dean of the College of Arts and Sciences Enrico Pontelli serves as NMSU's lead for CAHSI INCLUDES, with other leads from California State University - Dominguez Hills, Excelencia in Education, the Hewlett Packard Enterprise, Mentor-Net, the University of California - Merced, and UTEP.

The university will receive \$347,000 between 2018 and 2021 to conduct research to improve the use of artificial intelligence in the daily functions of power plants. The Department Of Energy awarded the grant to North Carolina State University and NMSU Computer Science Department Head Son Tran is serving as principal investigator.

The university will receive \$298,000 between 2018 and 2021 from the Department of Education to fund graduate students' education and research in artificial intelligence and cybersecurity. Computer Science Department Head Son Tran will serve as principal investigator.

The university will receive \$198,000 between 2018 and 2021 to conduct research to improve humansmart-home interaction, with the goal of reducing the number of interactions between the two as much as possible. A home automation system (HAS) is an automated system that controls a home's smart devices with the objective of improved comfort, improved energy efficiency, and reduced operational costs. Findings from this project will improve the design of future systems and guide the development of commercial HAS, which has the potential to impact future smart and connected communities. Computer Science Department Head Son Tran serves as the project's principal investigator.

Recent Publications

What Your NMSU CS Students And Faculty Members Have Been Up To

• Ferdinando Fioretto, Enrico Pontelli, William Yeoh, Rina Dechter: Accelerating exact and approximate inference for (distributed) discrete optimization with GPUs. Constraints 23(1): 1-43 (2018)

• Alessandro Dal Palù, Agostino Dovier, Andrea Formisano, Enrico Pontelli: *ASP Applications in Bio-informatics: A Short Tour*. KI 32(2-3): 157-164 (2018)

• Qixu Gong, Huiping Cao, Parth Nagarkar. *Skyline Queries Constrained by Multi-Cost Transportation Networks*. ICDE 2019.

• Parth Nagarkar and K. Selcuk Candan. PSLSH: *Efficient processing of Similarity Search Query Workloads in High-Dimensional Spaces*. CIKM 2018.

• William A. Hamilton, Nic Lupfer, Nicolas Botello, Tyler Tesch, Alex Stacy, Jeremy Merrill, Blake Williford, Frank R. Bentley, and Andruid Kerne. *Collaborative Live Media Curation: Shared Context for Participation in Online Learning*. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18). ACM, New York, NY, USA, Paper 555, 14 pages. DOI: <u>https://doi.org/10.1145/3173574.3174129</u>

• Jason Wuertz, Sultan A. Alharthi, William A. Hamilton, Scott Bateman, Carl Gutwin, Anthony Tang, Zachary Toups, and Jessica Hammer. *A Design Framework for Awareness Cues in Distributed Multiplayer Games*. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18). ACM, New York, NY, USA, Paper 243, 14 pages. DOI: <u>https://doi.org/10.1145/3173574.3173817</u>

• N. Al-sharman, I. V. Pivkina. *Generating Summaries through Selective Part of Speech Tagging*. In Proceedings of the Fourth International Conference on Engineering & MIS 2018 (ICEMIS'18), 2018 ACM, Istanbul, Turkey. DOI:10.1145/3234698.3234712.

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Recent Publications (continued)

• K. Alshammari, I. V. Pivkina. *Relationship between Time Management in Courses with Online Interactive Textbooks and Students' Performance.* In Proceedings of Frontiers in Education Conference (FIE), 2017 IEEE, Indianapolis, IN, USA, 2017, DOI:10.1109/FIE.2017.8190620.

• Sultan A. Alharthi, Nicolas Lalone, Ahmed S. Khalaf, Ruth C. Torres, Lennart E. Nacke, Igor Dolgov, Zachary O. Toups. *Practical Insights into the Design of Future Disaster Response Training Simulations*. CoRe Paper. Proceedings of the 15th ISCRAM Conference,818–830.

• Sultan A. Alharthi, Olaa Alsaedi, Zachary O. Toups, Joshua Tanenbaum, Jessica Hammer. *Playing to Wait: A Taxonomy of Idle Games*. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18). ACM, New York, NY, USA, Paper 621, 15 pages. DOI: <u>https://doi.org/10.1145/3173574.3174195</u>.

• L. M. Subramaniam and R. Vishwanathan. Attribute-based Signatures. *The Case for Automation*. In Proc. of the 15th International Conference on Security and Cryptography (SECRYPT) 2018. pp. 703-708.

• G. Eswaraiah, D. Nedza and R. Vishwanathan. *Automated Proofs of Signatures using Bilinear Pairings*. In Proc. of 16th Annual Conference on Privacy, Security and Trust (PST) 2018. pp. 1-10.

• Chuan Hu, Huiping Cao, Qixu Gong. *Sub-Gibbs Sampling: a New Strategy for Inferring LDA*. In Proc. of Intl. Conf. on Data Mining (ICDM 2017), 907-912.

• Tiep Le, Atena M. Tabakhi, Long Tran-Thanh, William Yeoh, Tran Cao Son. *Preference Elicitation with Interdependency and User Bother Cost*. AAMAS 2018: 1459-1467

• Tran Cao Son, Marcello Balduccini. *Answer Set Planning in Single- and Multi-agent Environments*. KI 32(2-3): 133-141 (2018)

• Travis Mick, Reza Tourani and Satyajayant Misra, *LASeR: Lightweight authentication and secured routing for NDN IoT in smart cities*. IEEE Internet of Things Journal (IoT).

• Reza Tourani, Satyajayant Misra, and Ray Stubbs. *TACTIC: Tag-based Access ConTrol Framework* for the Information-Centric Wireless Edge Networks. IEEE ICDCS 2018.

• Sajal Kumar, Hua Zhong, Ruby Sharma, Yiyi Li, Mingzhou Song. *Scrutinizing functional interaction networks from RNA-binding proteins to their targets in cancer*. BIBM 2018: 185-190

Computer Science Department Encourages Applicants for Future Positions

The department will start interviews for two position to begin teaching in Fall 2020. One position will specialize in software engineering and/or cybersecurity. The second will specialize in artificial intelligence. Individuals interested in being considered by the Computer Science Department should contact Department Head Son Tran at tson@cs.nmsu.edu.

Facts About CS@NMSU

Degrees Offered

- M.S. in Computer Science
 M.S. in Bioinformatics
 Ph.D. in Computer Science
 M.S. in Data Analytics
 [starting 2019]
 M.S. in CS (Bioinformatics)
 Required courses: 2, Electives: 7(6), Project/Thesis: 2.
 Ph.D. Degree Program
 Qualification exam (4 subjects), comprehensive exam, and thesis.
- Full-time faculty: 15
- Graduate students:
- ~80 (33 Ph.D.)
- Funding: ~\$8 million (2018)

Research Center and Laboratories

 Interdisciplinary Center of Research Excellence in Design of Intelligent Technologies for Smart Grids (iCREDITS)
 Bioinformatics Research Lab

- Play & Interactive Experiences for Learning (PIxL) Lab
- Knowledge Discovery and Data Mining (KDD) Research Lab
- Knowledge Representation, Logic, and Advanced Programming (KLAP) Lab
 - Networks and Systems Optimization Lab (NSOL)
 - Programming Languages, Environments, and Software Engineering

(PLEASE) Lab

Cryptography, Security, and Privacy Research (CrySPR) Lab



Local middle-schoolers attend Young Women in Computing (YWiC) at NMSU.

Where Are They Now? NMSU Grads Find Success



Reza Tourani graduated from NMSU and is now an assistant professor of computer science at Saint Louis University in Missouri. Courtesy photo.

Several former graduate students in the Department of Computer Science have graduated and moved onto positions in academia, as well as the private sector.

Reza Tourani successfully defended his Ph.D. dissertation and is now an assistant professor in the Computer Science Department of Saint Louis University in Missouri.

His dissertation was "Securing the Future Internet: Anonymity and

Access Control in Information-Centric Networking," and he was advised by Associate Professor Jay Misra.

When asked for advice to current and aspiring graduate students, Tourani said, "I would encourage them to take advantage of their time and work as hard as possible for a better future. Also, enjoy the friendly environment that the department provides, though they shouldn't take that environment for granted."

Tiep Le successfully defended his dissertation, "Preferences in Multi-Context Systems: Theory and Applications," advised by NMSU Computer Science Department Head Son Tran.

Tiep is currently an artificial intelligence software engineer at Viome, a personalized health and wellness app that delivers science-backed food recommendations based on a deep analysis of the gut microbiome.

Ben Wright is now a postdoctoral researcher at the Naval Research Lab in Washington, D.C. His dissertation is titled "Doxastic Attitudes For Reasoning Over Multi-Agent Domains" and was advised by NMSU Arts and Sciences Dean and Regents Professor of Computer Science Enrico Pontelli.



Hien Nguyen is now an assistant professor at the University of Pennsylvania in Harrisburg. Courtesy photo.

Former NMSU Computer Science Ph.D. student Hien Nguyen is now an assistant professor of computer science at Penn State in Harrisburg, Pennsylvania.

Nguyen was advised by Professor Joe Song for his dissertation. Nguyen's research interests include developing mathematical and statistical models to capture the dynamics of biological processes, particularly in cancer; association of genome, transcriptome,



Ben Wright is a graduate of NMSU's Computer Science Department and is now a postdoctoral researcher at the Naval Research Lab. Courtesy photo.

and proteome in tumors, recombination in mitochondrial genome, directional inference in biological interactions, and mathematical modeling of biological pattern formation. His dissertation is titled "Inference of Functional Dependency by Asymmetric, Optimal, and Model-Free Statistics."

Nesreen Al-sharman successfully defended her dissertation, "Automatic Text Summarizations,"



an assistant professor at Jeddah University in Saudi Arabia. Courtesy photo.

and was advised by Associate Professor Inna Pivkina. She is currently an assistant professor at Isra University in Jordan.

Olaa Alsaedi was advised by Professor Jonathan Cook and successfully defended her dissertation, "Improving Student Skills on Software Testing Techniques and Team Coordination Using A Zero-Fidelity Collaborative Simulation Game." She will be starting her new position as an assistant professor at Jeddah University in Saudi Arabia.

Manshad Muhanad successfully defend his dissertation in Spring 2019. Manshad was advised by Dr. Pontelli and is currently a Senior Lecturer in the Computer Information Systems Department at the Monfort College of Business at the University of Northern Colorado. His dissertation was titled "Exploring Distance Cooperative Learning Between Sighted and Visually Impaired Students and Teachers."

Outstanding Faculty Awards 2018-2019

These awards are voted for and given by graduate students to the faculty in the Computer Science Department.



Outstanding Graduate Faculty Award in Teaching: Huiping Cao



Assistant Professor Parth Nagarkar. Outstanding Graduate Faculty Award in Mentoring: Parth Nagarkar, Zachary Toups



Associate Professor Zachary Toups.

COMPUTERBYTES Support NMSU CS We Need You!

If you are an alumnus or alumna, current student, or just a friend of the NMSU CS Department, and you would like to support our activities and mission – thank you! There are many different ways to give back to the department.

The simplest way is to make a donation. Your donation will support students pursuing their educational dreams, through scholarships, renovation of equipment and acquisition of materials and supplies. You have also the option of supporting our faculty members, enabling them to be more effective in their research and educational efforts. In particular, we are launching a new campaign to create opportunities to help young women interested in pursuing studies in computer science.

Your donation is tax deductible and even a small contribution will make a big difference! Donations can be made using the online NMSU donations system at <u>fndforms.nmsu.edu</u>. You can also visit <u>www.cs.nmsu.edu/wp/department/support-cs-at-nmsu/</u>.

DONATION TIERS
< \$64 NMSU CS Friend \$64 – \$128 NMSU CS Supporter \$128 – \$256 Contributor \$256 – \$512 Sustainer \$512 – \$1,024 Champion >\$1 024 Hero
Donors will be acknowledged in the newsletter and on our website.

The following are some of the funds that you can contribute to:

- Young Women in Computing (Supporting outreach efforts to attract women to computing)
- Mark Nesiba Memorial Endowed Scholarship for Women in Computing (Supporting a talented undergraduate woman in Computer Science)
- Richard H. Stark Scholarship (Supporting outstanding undergraduate CS students)
- Founders' Endowment Fund (Supporting faculty in the CS department)
- General Scholarships Fund (Supporting outstanding undergraduate and graduate CS students)
- Equipment and Maintenance Fund (Supporting the CS department in renovating its infrastructure)
- Software and Educational Materials Fund (Providing students with funds to acquire software and other educational materials)
- J. Mack Adams Fund (Supporting the establishment of an endowed professorship in CS)

2018-2019 NMSU Computer Science Department Newsletter Thank You for Supporting the Computer Science Department!



Contact Us

Please join our Facebook page (facebook.com/ NMSUCS) and follow us on Twitter (twitter.com/ NMSUCS) and help us develop a community of NMSU CS Alumni and Friends. If you are in the neighborhood, please come by and visit! Or simply send us your ideas; your experience is valuable to assist with development, to help our students connect with alumni and potential employers, and to grow into a bigger and stronger department. Send your contact information, news, and suggestions to:

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