DISCOVERY

UNCOVERING SCIENCE THROUGH INNOVATION

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SCIENCE
The College of Discovery
CAL POLY POMONA
From the Dean

Welcome to Discovery, the official magazine of the College of Science. Discovery’s purpose is to inform you about the accomplishments and achievements of our faculty, staff and students over the past year.

The College of Science has our core values in three main components: research, student engagement and outreach. All three of these components are woven throughout this magazine as you read articles about innovative student research, impactful community outreach and stories that show the true passion of our faculty, staff and students.

Research, whether inside or outside of the classroom, is essential to any student’s education. With nearly $14 million secured by research grants in the College in the last year alone, our students are given the opportunity to conduct their own research. This ‘learn-by-doing’ experience from some of the most respected faculty members in academia provides key collaboration with industry-leading companies.

We also take pride in our outreach efforts. With the STEM fields being an essential part of tomorrow’s work force, we engage with our students, community and faculty to reach out to the surrounding area through our collaborations with school districts, science series, discovery camps, and numerous other outreach events we host.

Not everything can be learned through a textbook. Rather, we put Cal Poly Pomona’s ‘learn-by-doing’ philosophy at the forefront of our curriculum to provide a hands-on research experience for our students. This enables them to join the workforce or higher education with industry-level experience and cutting-edge research in their chosen field.

Given the talent and caliber of faculty and students here at Cal Poly Pomona, we know you will ‘discover’ the true spirit of the College of Science. We thank you all for your generous support and backing over the years. Thank you for your ongoing help and support, which has made this initial issue of Discovery possible.

Brian Jersky, Ph.D.
Dean, College of Science
Cal Poly Pomona’s College of Science is looking to unlock children’s imaginations this summer with its Discovery Camps. In its second year, the college is offering a wealth of fun and education through three science-based camps. Some activities include computer programming, building robots to navigate and battle, designing rockets, and producing their own short films as well as 200 other planned STEM activities.

“Each camp is designed to introduce STEM literacy to students from all backgrounds and inspire the next generation of scientists and engineers,” said Dr. Steve Alas, Cal Poly Pomona’s SEES and Camp Director. “The purpose of these camps is to make science fun.”

There are four different camp options offered to students from the surrounding communities, with each promoting a different area of the STEM fields. Three camps are designed to inform and encourage future students about science, robotics and computer science. The fourth type of camp is a horse camp that is in partnership with the W.K. Kellogg Arabian Horse Center at Cal Poly Pomona.

The three science-based camps are open to students in 2nd – 7th grade. Following Cal Poly Pomona’s ‘learn-by-doing’ philosophy, campers will focus on hands on computer programming basics, scientific discovery and robotic design & behavior, while working on projects with camp counselors.

The horse camp is open to children between the ages of 10-17. More than just horse-riding, camp instructors guide campers through a curriculum comprised of basic equitation, horsemanship, grooming, tacking, nutrition, anatomy and humane education.

In addition to the activities, campers will spend time at Cal Poly Pomona’s Rain Bird BioTrek Educational Center. BioTrek, which is home to iguanas, turtles, frogs and Cal Poly Pomona’s famous caiman, is an indoor rainforest learning center, an ethnobotany garden and features a Mesozoic garden.

All campers will be introduced to a simulated tropical rainforest and the plants and animals that call this environment home. They will walk through a Mesozoic era garden, which replicates the time when dinosaurs roamed the earth, as well as an Ethnobotany garden that features a native California ecosystem.

Camps are scheduled from June 13 to Aug. 12. For more information on any of the camps, please contact Dr. Steve Alas at (909) 869-2069 or via e-mail at discovery@cpp.edu. Also visit the website at www.cpp.edu/~discovery/.

Outreach
During his four years in the computer science department at Cal Poly Pomona, Dr. Mohammad Husain, has secured more than $2 million in competitive grants, helped charter the first ever all-female computer science CPP sheCodes club, and organized a NSA summer camp called GenCyber to teach cybersecurity to high school students and teachers.

Although these achievements are impressive, Husain is personally motivated to make a difference at Cal Poly Pomona with not only his students, but to the surrounding communities as well. Through his K-12 outreach activity, he believes if more students from underrepresented groups get exposed to STEM fields early on, they will eventually join the ranks at Cal Poly Pomona for their undergraduate studies.

“Dr. Husain has been a springboard for the establishment of CPP sheCodes,” said Melanie Cabalu, president of CPP sheCodes club and senior computer science major. “We started because Dr. Husain and a few other students wanted to increase the number of women studying computer science. He’s helped us every step of the way and has connected us to incredible opportunities, the most current one being our partnership with Google. Google has partnered with us in our peer-mentoring model to bring computer science to females in surrounding high schools.”

Husain has also received industry grants from Intel, Northrop Grumman and Microsoft Corporation to support Unmanned Aerial Vehicle (UAV) and mobile application research. Using the support from Northrop Grumman, he has performed research to identify security vulnerabilities with UAV communication systems. Using the Cloud Computing platform support from Microsoft, he has designed a cloud-based mobile application. All of this has centered on developing research and real-world lab experiences for his students.

“What motivates me every moment of every day, is students,” adds Husain. “I am continually impressed by their incredible talent, desire to learn, and innovative ideas that have the potential to change the hi-tech landscape. Our students and potential future students will be the next generation computer science industry leaders.”

Husain’s teaching philosophy centers around encouraging critical thinking by assigning open-ended projects, especially in his senior division and graduate classes. His classes promote the culture of creativity and teamwork so that the students can learn how to formulate and solve a systems security research problem, and neurophysical systems.

“He really goes out of his way for his students,” adds Max Wolotsky, senior computer science major. “He cares for not only his own students, but ones that just need help. Alumni come back year after year to support him because he helped them so much in their careers and they want to give back.”
Outside of a classroom, there are few opportunities for the community to talk directly with scientists about their work. Science on Tap brings scientists from Cal Poly Pomona out of the lab and into the community to inform them on current research and answer questions concerning topical issues that may arise.

“The purpose of the event is to involve the community in the latest news in the field of science and technology,” said Dr. Douglas Durrant, Assistant Professor in Biology and the founder of Science on Tap. “It is also a way to let the public know about current research being conducted at Cal Poly Pomona.”

Science on Tap is a 45-minute presentation from a College of Science faculty member on a topic of their choice and expertise, followed by questions and discussion.

This quarterly event is held on a Wednesday from 7-8:30 p.m. in the fall, winter and spring quarters at Innovation Brew Works.

The Center for Excellence in Mathematics and Science Teaching (CEMaST) graciously offer their support and expertise to help with the success of Science on Tap.
The NASA/CSU Spaceward Bound program takes college students out of the classroom and places them in the Mojave Desert to inspire the next generation of explorers. Spaceward Bound focuses on the study of remote and extreme environments on Earth, which also serve as a close comparison for the study of the Moon, Mars, and Europa.

The expedition challenges future teachers to develop and implement real-time field research, as well as design inquiry-based lessons for K-12 classrooms. The focus is on microbial life in the Mojave Desert as it relates to astrobiology, which provides students rich exploration opportunities in subjects ranging from geology, microbiology, chemistry, physics, engineering, mathematics, and computer science.

“The primary aim of the CSU-funded effort is to utilize field experiences as a means to inspire and train future teachers in the STEM disciplines” said Dr. Rakesh Mogul, Director of NASA/CSU Spaceward Bound and Cal Poly Pomona Professor of Chemistry and Biochemistry. “There is no better way for them to kick-start their teaching and science careers than with this research opportunity.”

During the expedition students work alongside scientists and faculty from JPL, NASA Ames Research Center, Cal Poly Pomona and Baylor University, and will ultimately present their field-inspired lesson plans in a local school under the guidance of mentor teachers.

For more information on the Spaceward Bound program, contact Dr. Mogul at www.cpp.edu/~rmogul/spacewardbound/.
The classroom is filled with more than 60 eager students ready to learn about calculus. As they patiently wait at their desks for the teacher to come in, the students pull out their matching notebooks and pens. Some of these students are pretty advanced in math, while others are learning this material for the first time. They are polite, inquisitive, working to transform their lives, and in jail.

Dr. Jennifer Switkes, Associate Chair of the College of Science’s Mathematics and Statistics Department, is no stranger to this environment. She volunteers her time at the California Rehabilitation Center, a medium-security state prison, and has gone with teams to teach math in Uganda prisons with Prison Education Project.

Her journey into volunteering started after she received her math and physics degrees from Harvey Mudd College, and Ph.D. in math from Claremont Graduate University. She started teaching through a program called ‘Teach for Pomona,’ which helped bring critical STEM education to low income communities.

This program, modeled after Teach for America, kicked off her teaching career at Simon’s Middle School.

Soon after she started teaching at Citrus College as an adjunct instructor, and also taught at University of Redlands.

In the fall of 2001, Switkes came to Cal Poly Pomona and has never looked back. “I love it here, the students are amazing,” comments Switkes. She is a Provost’s Teacher-Scholar, and she serves as a McNair Scholar Research Mentor who prepares undergraduates for entrance to a Ph.D. program. She was recently the recipient of the Ames Research Award from the College of Science.

During the summer of 2012, she went on a mission trip to Uganda with her church. “I fell in love with the country and people,” said Switkes. Soon after she had the opportunity to take a sabbatical for one semester to Makerere University in Kampala, Uganda, where she taught differential equations. Her students included future math and science teachers as well as quantitative economic students.

As much as she enjoyed her time, she still wanted to give back beyond Cal Poly Pomona and serve the most underserved communities. Although she loved teaching at universities, she also saw the tremendous need to teach people in prisons.

What she found in teaching at both Norco and Uganda prisons is how appreciative the students are of learning new skills. This has deepened Switkes’ desire to show the prisoners that they are valuable and have gifts and abilities.

She partners with Prison Education Project (PEP) which helps inmates receive GED classes. The Prison Education Project works with 11 California correctional facilities, with the assistance of 600 university student and faculty volunteers.

“Teaching prisoners skills for future jobs benefits everybody,” Switkes added. “It benefits the prisoners, and it benefits society as well to have inmates who are now learning skills. They learn respect for themselves and for others.”

Switkes, teaching in a prison in Uganda
The teacher shortage in California was the subject of a recent study titled “Addressing California’s Emerging Teacher Shortage: An Analysis of Sources and Solutions,” published by the Learning Policy Institute and coauthored by Linda Darling-Hammond. The study documents the shortage is “most acute in mathematics, science, and special education” and that “California must take purposeful steps now if the state is to avoid more acute, widespread shortages of teachers.”

The Center for Excellence in Mathematics and Science Teaching (CEMaST), supported by the College of Science and funding from the CSU Chancellor’s Office, is working to address the shortage. CEMaST is supporting talented students through a Math and Science Teacher Initiative (MSTI) that includes advising, seminars, lab assistant opportunities and scholarships. One of the scholarship objectives is to support talented Math and Science majors who might not have considered the teaching profession. The support for MSTI Scholars extends beyond the completion of the credential program, by continuing through the scholar’s first two years in a teaching position.

Tackling the Teacher Shortage in Mathematics and Science

Quick Facts

105 Tenured/Tenure Track Faculty Members
According to the World Health Organization (WHO), around 300,000 people develop visceral Leishmaniasis every year. This tropical and subtropical disease is transmitted by the bite of sandflies. Around 20,000–30,000 people worldwide die each year from this disease that attacks the skin or internal organs. More than 90 percent of new cases worldwide are reported in some of the most poverty-stricken areas in six countries: Bangladesh, Brazil, Ethiopia, India, South Sudan and Sudan.

Treating this disease was not a simple process. Thirty years ago this disease required multiple doses of a treatment to eradicate the infection. Unfortunately, poverty and lack of modern medical care left those who were most vulnerable to remain untreated and ultimately die.

To address the problem, Jill Adler-Moore, Biology Professor, pioneered a new lifesaving antifungal and anti-parasitic medication called AmBisome, that required only one dose to treat Leishmaniasis. It had fewer side effects, and therefore has become the new treatment to save the lives of the ones that need it the most. Gilead has been donating millions of vials of the drug to the WHO, which credits this lifesaving drug as being one of the safest and most effective medicines to treat this significantly neglected but fatal tropical disease.

Considered the greatest discovery and academic achievement in Cal Poly Pomona history, AmBisome made its first appearance for clinical use in 1987. At that time, Adler-Moore was working with a small biotech company, Vestar Inc., developing AmBisome, when the company was notified about a toddler that had a deadly fungal infection. Though the Federal Drug Agency (FDA) had not yet approved AmBisome as a treatment drug, everyone knew the toddler would die if nothing was done. So AmBisome was given to the toddler as salvage therapy and he survived the fungal infection.

Today, AmBisome, manufactured and distributed by Gilead Sciences Inc., in
San Dimas, Calif., is being used to treat immunosuppressed patients with life-threatening fungal infections and those with the parasite infection, Leishmaniasis. In more than 50 countries, the drug has generated nearly $1 billion in sales since it was first released on the market in Sweden in 1989. Recently, AmBisome was approved for use in Iran and Egypt.

Adler-Moore has never been in the pharmaceutical industry for financial gain, since her real passion lies in developing the next generation of scientists. For more than 40 years, she has led numerous research projects and grants, industry discoveries, and holds 16 patents. But when she reflects back on her career in academia, it is her students that have made her remarkable journey worthwhile.

“My students significantly contributed to the research on AmBisome. I could not have done it without them,” said Adler-Moore. “They were the ones who tested this drug for its antimicrobial properties in test tubes and in animal models. They were the ones who saw first-hand how non-toxic it was and they knew the critical testing factors.”

Adler-Moore used her experience collaborating with the biotechnology industry to help start a new program in the Biological Sciences Department in the College of Science. The discipline, biotechnology, was introduced as a new major in 1990.

“We needed to have a biotechnology major here so that our biology students would get additional comprehensive training in engineering, business and chemistry, which are all essential for working in the biotechnology field,” said Adler-Moore.

With more than $15 million in grants secured by Adler-Moore, students have directly benefited from her relationships with the biotechnology industry, expertise and devotion to their educational pursuits. Adler-Moore also spearheads the Research Initiative for Scientific Enhancement (RISE) Program at Cal Poly Pomona. RISE, according to the NIH website, is a developmental program that seeks to increase the number of underrepresented students that complete Ph.D. degrees in the biomedical sciences. This enables Adler-Moore to directly impact her students by ensuring their success as they progress in their education.

“Behind every successful student is a team of faculty and staff cheering them on,” adds Renee E. Estephan, a Cal Poly Pomona undergraduate and former RISE student who will be entering a Ph.D. program at City of Hope in fall of 2016. “One of my biggest ‘cheerleaders’ during my time at CPP was Jill Adler-Moore. Her dedication to furthering access to research opportunities for both undergraduate and graduate students has made the Biology Department successful and well recognized within the CSU.”

Estephan adds that Adler-Moore has mentored and trained many students to become great researchers, and is forever grateful to have had someone like Adler-Moore guiding her during her journey as an undergraduate biology student at CPP.

“Adler-Moore is a mentor and friend to all her graduate students. She inspires and motivates us to reach our full potential,” adds Paulina Villanueva, a biology master’s student at Cal Poly Pomona. “She has guided me to become a better student and researcher. She pushes me to do things that I was afraid to do like the CSU Student Research Competition.”

Adler-Moore is continuing to invest in her students, and she works closely with them as they investigate new applications for AmBisome. This is creating opportunities for further advances in medical research.

When not inspiring all those whom she encounters, Adler-Moore enjoys spending time with her two grandsons who are truly the apple of her eye.
Statistics show that more than 80 percent of all companies have been successfully hacked. Hackers have effectively damaged, stolen or leaked critical information from vulnerable network systems. It is an all-out war with companies scrambling to secure their organizations.

Given that grim statistic, companies are in high demand for a product that will ensure their company’s data and information will remain secure, even under duress. Nothing is currently available to these companies, but a student at Cal Poly Pomona is in the process of creating a product that can help.

A four-year pursuit by computer science student and member of PolySec cyber security lab, Max Wolotsky, who specializes in biometric authentication security and cryptography, has turned what is a market necessary product into reality. With backing from Sandia National Laboratories, a facility that researches high-level security applications, Wolotsky believes in his groundbreaking idea, even after repeated failure. 1

Cryptography is the process of breaking down, or writing codes. Biometrics authentication security relies on biological characteristics to verify a person’s identity in order to grant them access into an electronic system. At this time, no products like this are available on the market. Some are in development, or prototype, stages, but none that are currently available for purchase.

Wolotsky, under the advisory of Dr. Mohammad Husain, is attempting to create a new biometrics system called the Coercion Resistant Authentication System (CRAS) that, through the “chill effect,” will register if a person is being coerced into doing something. If the system registers a state of duress, it will not grant access to the data or resources. Max, with his research supervisor Dr. Husain, recently received a US provisional patent on the work on the coercion resistant authentication system.

“Typically, biometrics are not very secure either,” said Wolotsky. “If the data or information is stolen once then it is gone forever. We are doing something called state-dependent biometrics, which measures your heart rate, blood pressure, and other psychological factors. You cannot lie about your physiological state of mind.”

The state-dependent system is based on what they call the “chill effect” (the feel of having shivers down your spine), which is being tested with a one-minute music clip. They are using music because it creates a dopamine release in the subject’s body. This recreates the fight-or-flight response, where a body has a physiological reaction that cannot be controlled in a threatening situation.
“When a body releases dopamine, it has a natural chemical effect that fundamentally changes your physiology,” said Wolotsky. “These things are also affected when one is being threatened. Everything would spike and change significantly and there is no amount of conscious control that one could have without it changing.”

So, with the product still being in the development stages, who would use it?

Anybody could technically use it, but it would best serve companies, or agencies, with a lot to lose in a security breach. The military, banks, or other high-security places would utilize this product because if it were to be exploited, a great number of people would be affected.

With Sandia collaborating on this project with PolySec lab, Wolotsky has all the products that he needs in order to conduct his research. He is using heart-rate-monitoring watches, a headset that monitors your brain waves, cell phones and special headphones to test his study.

After graduation, he has plans of attending graduate school. He already has offers from top computer science graduate schools like Georgia Tech and UC Irvine.

“I want an advisor that will allow me to pursue the kind of research that I find interesting,” said Wolotsky. “I love this research because I do not know if it will or can work, but the adventure and helping secure data is what keeps me motivated.”

Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy’s National Nuclear Security Administration under contract DE-AC04-94AL85000.

Why is the discovery of Einstein’s gravitational waves such a big deal? How did astronomers discover a new Ninth Planet without actually seeing it? With new discoveries and space missions planned in coming years, the interest in space and astronomy is on the rise.

Unfortunately, very few of us actually get the opportunity to see high-resolution images of space, or get the chance to learn about the wonders of space. Dr. Matthew Povich, an Assistant Professor of Physics and Astronomy at Cal Poly Pomona, is changing that through the ‘Bringing the Universe Into LA Districts (BUILD)’ program hosted by the College of Science at Cal Poly Pomona. This outreach program brings astronomy lectures and ‘star parties’ to surrounding communities.

Dr. Povich and his team of astronomy students bring high-powered telescopes to teach astronomy to the school community. Each BUILD event consists of a slideshow presentation which includes high-resolution visuals of the moon, Saturn, Jupiter, galaxies, other star clusters, and much more. Afterwards, a discussion session is available for those wanting more details about any one topic of astronomy.

A grant from the National Science Foundation’s Faculty Early Career Development (CAREER) Program, supports Dr. Povich’s work, which aims to provide additional resources and opportunities to young faculty members. This enables them to engage in innovative research. Povich is the first Cal Poly Pomona faculty member to receive the award.

This past year BUILD has held events with more than 1,000 guests at six schools: four elementary, one middle, and one high school. Ten Cal Poly Pomona undergraduate students participated in these events. For more information on the BUILD program, email mspovich@cpp.edu.

http://www.cpp.edu/~sci/physics-astronomy/
Growing up with two alcoholic parents, Micheal (Mich) Hamlin, a kinesiology exercise science major at Cal Poly Pomona, didn’t know that living homeless in a Montclair community park with his family was different. With parents struggling to provide for Mich and his two brothers, the expense of a permanent residence was out the question.

“My parents were always in and out of work,” says Mich. “When the money ran out, we were forced to live behind mechanic shops, parks, wherever we could stay to remain hidden from the authorities.”

Mich did not know that at age 10, getting up at 3 a.m. to hold up cardboard to prevent the sprinklers from soaking his younger brother and his mother was not normal. He just knew that he had a deep desire to protect his brothers from the reality they lived in.

Most of Mich’s memories started in 1st grade when his family’s transient ways became a way of life. After moving from motel to motel, the family was forced to live wherever they could, often to any place they could find. They would shower at the local gas station in the restroom to stay clean for school. In 4th grade, Mich’s family had used up all their favors and were forced to the streets.

“The first time we slept on the streets was in a cement area where the trash bins go,” adds Mich. “We would roll the trash bins away from the wall to create a barrier so we had some protection from being seen.”

During 5th and 6th grade, Mich’s parents started having fights that escalated with his mom leaving her husband and taking the boys with her. They moved into a church shelter, then with a family friend. Unfortunately, this only lasted a few months, with his mom and brothers forced to return to their father.

By the time Mich went to middle school, he was hopeful his life had turned a corner. A nurse at his school not only got a caseworker involved in Mich’s life, but she took it upon herself to take care of his basic needs.

“My older brother and I would go to school early and the nurse would let us shower at the school,” adds Mich. “She would take our clothes and wash them while we were showering, and give us loaner clothes.”
In mid-February, Mich’s dad made an unexpected visit to the boys’ elementary school. He informed them that their mother had passed away on February 9.

After the death of Mich’s mom, his dad started to slip away more into drugs and alcohol. When he did visit his sons, he would often ask them for money and food as he was living on the streets.

Still living with his foster family, Mich started at Montclair High School. “My favorite part of high school was running in PE,” adds Mich. A friend saw his running potential and encouraged him to try out for the cross country team.

The cross country/track coach believed in more than Mich’s running abilities. She saw a student with numerous obstacles, but one with a desire for more in life.

“The Montclair High School track coach, Karen Wester, became my mentor,” said Mich. “She not only encouraged me to excel in academics, she would spend time with me talking about life. She became my main support system.”

This relationship came at a pivotal point in Mich’s life. During his sophomore year, Mich’s dad disappeared. The truth later came out that his dad was arrested on a past domestic abuse charge. By this point, his dad was pretty far into his addiction.

Once Mich started his junior year, his social worker encouraged him to apply for college. The social worker explained that because he had good grades, all he needed to do was to take the SAT and ACT.

“I applied to USC and UCLA just as a whim but mostly focused in on colleges that had foster/youth programs,” added Mich. “After interviewing with Cal Poly Pomona’s Renaissance Scholars, I knew that I wanted to go here. I was mesmerized by the beautiful campus since the first time I stepped foot on it, and thought I had a chance to continue my running career.”

After his admittance into the Renaissance Program, Mich felt ill prepared for college. A lifetime of mediocre study habits, and no family to support his new venture into college, he struggled. “Since none of my friends went to college, I had no peers to share my experience with,” adds Mich. “I was academically behind, and had to start in remedial classes.”

Then came the Summer Bridge - EOP (Education Opportunity Program). “This program turned college around for me,” said Mich. “I was not only shown study habits to succeed in classes with this program, I was shown how to organize my life to be a successful student. Mostly it helped me realize that if I was going to excel in college, I had to buckle down and work.”

He went on to earn a 3.5 GPA or higher for the rest of his college career. He credits the EOP tutorial services, TRIO (now RAMP program), and the Renaissance Scholar programs with assisting in his success.

In addition to his academic success, Mich was determined to make the track and field team. Brian Swanson, CPP’s Director of Intercollegiate Athletics, saw potential in Mich and encouraged him to try out.

After training his first year with the track program, he made the team in his second year.

Not only has Mich successfully navigated the rigor of being a student-athlete, he has beaten the odds. According to the National Center on Family Homelessness, less than 50 percent of foster youth graduate from high school, with only three percent graduating from college. What he has accomplished makes him all that more remarkable, plus he is a student athlete.

Mich’s long-term goals are not limited to just a bachelor’s degree; he plans to continue on to graduate school to pursue a doctoral degree in physical therapy. “I want to not only help society in my career; I want to be able to give back to all the people that helped me along the way,” said Mich.

His final words to any child with insurmountable odds in their life is to think about what they want their future to look like. “Where you want to be and what needs to be accomplished to get there,” adds Mich. “In the end all of the countless hours of hard work, blood, sweat and tears, will be worth it. Nothing is sweeter or more rewarding than success.”

Thanks, Mich, we could not agree more.
When college students travel on a whim, they typically choose someplace exotic like Hawaii or Cabo San Lucas. They may even take a quick trip to Las Vegas, but they tend to stay fairly close to home. Not the case for this student, who decided to not only travel far, but chose a remote destination. Raymond Ng, a second-year geology graduate student at Cal Poly Pomona, has been traveling all throughout his time in college, but the destination for his latest trip would surprise many people. Ng, along with a few of his friends, decided to head to Moshi, Tanzania, to summit the highest mountain on the African continent, Mt. Kilimanjaro, which stands at an impressive 19,341 ft.

“We chose to hike the Lemosho route, which is a seven-day round trip hike,” said Ng. “It allowed for a five-day hike to the summit and a two-day hike back down the mountain.”

While in the process of hiking to the summit of Kilimanjaro, Ng experienced mental fatigue and physical exhaustion, but there was one thing that kept him going each and every day. “My favorite part of the trip was watching the sun rise over the African horizon,” said Ng. “I thought about giving up many times during the final hike to the summit, but watching the sun peak on the horizon gave me the energy to keep going.”

Africa is only one of the many places that Ng has visited over the years. Ng has been to parts of Asia, Mexico, Peru and the Grand Canyon. Traveling is an escape for Ng, but it also serves another purpose. “I believe that it is important to experience new things and expand who you are,” said Ng. “When traveling, you realize just how insignificant you are. That feeling is what is driving my motivation to make something of myself and make a great impact on the world.”
Joy is the first word that comes to mind when talking with third-year computer science major Paul Chiou. He has an infectious personality combined with a wickedly dry sense of humor, and spends his day confined to a wheelchair.

Although Chiou’s journey has been filled with significant detours and curves, he remains enthusiastic about life and remains passionate about learning. Most would crumble under his challenges, but he handles his life with a positive demeanor.

On October 27, 2000, Chiou, a sophomore in high school at the time, was riding his bike home when he was hit by a car. His injury left him as a complete C3-4 quadriplegic.

“After the accident, I was in the hospital for eight months,” said Chiou. “Most of that time was at a rehabilitation hospital learning to adapt to my new life.”

Chiou spends most of his time dealing with his life-altering spinal cord injury, but is committed to not letting it define or limit his abilities. The damage to his spinal cord leaves Chiou with no movement or sensation below the middle of his neck. This not only severely confines his mobility and breathing, it challenges every task in his life.

“I have always dreamed about being a computer science major,” adds Chiou. “I looked up to my aunt, my role model, who has a Master’s Degree in Computer Science. I was introduced to computer science through her, and I learned that I love working with computers.”

After his accident his passion for computers grew even more since it became his only source of independence. Chiou has credited computer programming with expanding his horizons. He believes computers have the ability to make lives easier, and ultimately improve quality of life.

Chiou spent 10 years accomplishing enough credits to transfer to Cal Poly Pomona. Once he was admitted into CPP, he initially started as a computer information system (CIS) major. Although he was almost done with CIS, he made a last minute decision to switch to computer science.

“I knew how to utilize numerous computer software systems, but after I became exposed to computer programming, I had my eyes opened,” adds Chiou. “I realized similarly, instead of using the tool to build something, I can actually build the tool from scratch.”

He is also a firm believer in CPP’s ‘learn by doing’ philosophy. As a computer science major, he was able to go more in-depth in topics such as data structures and algorithm analysis. It did take some time for Chiou to adapt to the new curriculum, but his computer science professors were very helpful and knowledgeable with hands-on projects.

Chiou’s long-term goal is to create more mainstream technology that allows people with disabilities the ability to excel in spite of their limitations. The current system he uses to assimilate information from class lectures and work on a computer was all modified by his family for him.

He wants this technology to be not only more widespread, but also affordable. He believes his degree in computer science would allow the opportunity to create this equipment.
Receiving a computer science degree is no small feat. Being an industry leader and wanting to encourage other females to pursue computer science is courageous. Nicolette Yadegar is doing just that. A 2013 computer science alumna and a software engineer at Microsoft is hoping to pave a path for others wanting to follow in her footsteps.

“As a female in a male-dominated industry, it's easy to feel like an outsider,” comments Yadegar. “When it is, I tell myself that I have two choices - I can be upset that I have to work twice as hard just to prove myself, or I can work twice as hard and move forward in the hopes that the people who follow in my footsteps will have an easier path.”

Yadegar appreciates companies, like Microsoft, who work to address unconscious bias in the industry. “At Microsoft I am on the rapid prototyping team working with the latest Microsoft technology to develop IoT (which stands for ‘Internet of Things’) projects that enhance employee productivity,” adds Yadegar.

“I'm currently working with embedded systems, sensors, and Azure Machine Learning,” says Yadegar. “My main focus is on designing and building resilient, extensible, fault-tolerant services.”

What advice does she have for anybody wanting to pursue a career in the high-tech industry?

“I think everyone who decides to pursue this career should be ready and willing to be a lifelong learner,” says Yadegar. “It is an incredibly fast-paced industry, with standards and practices changing every few years.”

She credits Cal Poly Pomona with laying the successful foundation for her career. The necessary skills and theory she learned as a computer science major prepared her for when she joined the workforce.

“I have never heard of a student body, especially that of a computer science department, that is so diverse,” adds Yadegar. “I also admire that they are always trying to do more to improve, and continuously ask for and listen to student feedback.”

Inspiring the next generation of female computer science majors, Yadegar currently visits Cal Poly Pomona to inspire, teach and encourage other students.
Keith Soon Kim, Bachelor’s of Science in Mathematics, 1962
Cal Poly Pomona

He went on to earn his Master’s in electrical engineering from UCLA.

Keith Kim’s lifetime giving to Cal Poly Pomona is $75,000 supporting scholarships for students in the College of Science. He has also made a major bequest to the University.

He and his father fund a merit-based scholarship for students in the STEM field. The scholarship is a $500 sum awarded annually at the Cal Poly Pomona College of Science Annual Scholarship Recognition Program.

Cal Poly Pomona Chemistry alumna Stella Hartono will soon be graduating with a Ph.D. in immunology and a medical degree from Minnesota’s internationally renowned Mayo Medical School. The prestigious program is known for its rigorous curriculum and less than 2% selective admittance. Hartono was chosen from more than 800 applicants that applied to pursue this dual degree program. She was selected as one of six to pursue this medical degree.

Although this hard fought journey is almost done for Hartono, it did not come without its valleys, detours and challenges. Hartono was born in Indonesia and came to the U.S. in 1994. She was unsure of what she wanted to study in college, so she started at Mt. SAC for a year before transferring to Cal State Fullerton for accounting.

“I initially started pursuing a business degree since I was running a side business to support me and my daughter,” adds Hartono. “I quickly realized that this was not what I wanted to do for a career and decided to change to a science major.”

Unfortunately, Hartono had people along the way telling her that she could not study those majors because she was a female. Never letting what others think about her affect her decision or discourage her, Hartono fought her detractors and came to Cal Poly Pomona for chemistry.

“I always loved conducting research and answering the unknown,” said Hartono. “I never considered myself a good book learner, so Cal Poly Pomona’s ‘learn-by-doing’ philosophy really helped me build a solid foundation in basic sciences which propelled me to do well in both graduate and medical school.”

“I took all of the requisite classes required for medical school at Cal Poly Pomona, which really prepared me for medical school,” said Hartono. “The chemistry department, including the Chemistry and Biochemistry Chair Dr. Lisa Alex, has an amazing faculty that is committed to teaching and willing to go the extra mile for their students.”

Why Give to Cal Poly Pomona?

“The educational and campus life experiences I had as a student at Cal Poly Pomona are some of the most memorable of my life,” said Kim. “I made lifelong friendships and developed a solid educational foundation for my life’s work. Cal Poly Pomona is and always will be in my heart.”

Involvement at Cal Poly Pomona

Kim serves as a member of the Cal Poly Pomona University Educational Trust and President’s Council. He was also named a Cal Poly Pomona Distinguished Alumnus in 2005.
DEPARTMENT CHAIRS

Dr. Craig LaMunyon
Biology – Chair and Professor

Dr. Laurie Riggs
CEMaST Director

Dr. Lisa Alex
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