

U.S.-Pakistan Centers for Advanced Studies in **Energy**

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Energizer

Third USPCAS-E cohort arrives in U.S.

The third cohort of USPCAS-E scholars from Pakistan arrived in January. They are currently midway through their studies at Arizona State University (ASU) and Oregon State University (OSU.) Each cohort was welcomed with receptions after acclimatizing to their new residences for the semester. They are starting on their professional development workshops and in the coming weeks they will be participating in Dr. Clark Miller's policy workshop, wrapping up Kenneth Mulligan's entrepreneurship class, completing research at their various labs and will soon receive their certificates of completion.

28 scholars are at ASU and 6 are at OSU. This cohort is comprised of 21 men and 13 women. This is the largest number of female participants in the program so far. This is significant as the promotion of gender equality for engineers is a key aspect of the program.

The cohort will return to Pakistan to complete their studies at the National University of Science and Technology (NUST) and the University of Engineering and Technology (UET) in May 2017.



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Message from the Project Director

USPCAS-E is making great strides in governance, curriculum reform, applied research, sustainability as well as in the scholar exchange program this year. The third cohort of exchange scholars have arrived and USPCAS-E is actively engaging these enterprising scholars in become Pakistan's future. As evidenced by our recent workshop and the composition of the most recent cohort, gender equality has been key. The efforts thus far in 2017 have fostered our relationships with our partners as well as brought the U.S. and Pakistan people closer together.

-Dr. Sayfe Kiaei, Project Director, USPCAS-E



USPCAS-E participates in Pakistan’s largest renewable energy exhibition

Solar Pakistan: 6th International Renewable Energy Exhibition and Conference

USPCAS-E participated in the 6th Annual Renewable Energy Exhibition and Conference that took place in Lahore, Pakistan in March. The exhibition is one of Pakistan’s largest energy events that brings together the energy industry, decision makers and stakeholders to discuss solutions to control the ever-increasing energy deficit in Pakistan.

ASU staff, students and faculty from the National University of Sciences and Technology (NUST) and the University of Engineering and Technology (UET) Peshawar briefed visitors about various initiatives that USPCAS-E is undertaking to help Pakistani universities focus on applied research relevant to

Pakistan’s energy needs, help produce skilled graduates in the energy field and serve as a bridge between the government, industry and academia.

While visiting the USPCAS-E booth at the exhibition, Chaudhry Sher Ali Khan, Pakistan’s Provincial Minister for Energy, Mines and Mineral Development appreciated the efforts that USPCAS-E is making in the field of energy and energy research.



Chaudhry Sher Ali Khan, Pakistan’s Provincial Minister for Energy visiting the USPCAS-E booth. Photographer: Hassan Zulfiqar /USPCAS-E

USPCAS-E Scholars visit Pakistan’s energy industry

As part of their graduate energy engineering program, students from UET Peshawar recently visited the Pakistan Council of Renewable Energy Technologies (PCRET) and the National Power Control Center (NPCC) in Islamabad. During the visit to NPCC, the scholars learned

about the transmission and distribution network in Pakistan and more importantly, how NPCC maintains a balance between energy generation and energy load at a minimal cost. Similarly, during their visit to PCRET, students were briefed about the fabrication process of crystal silicon

and the manufacturing and testing process for solar photovoltaic panels.

These industry visits are a part of the USPCAS-E program and directly relate to the students’ coursework.



“The visit introduced us to all kinds of alternative/ green energy resources. Solar, wind, biogas, micro-hydro, etcetera - which are renewable, pollution-free and green. In short this visit broadened up my vision about the energy resources.” Ali Asad, UET

UET students visit the Pakistan Council of Renewable Energy Technologies (PCRET). Photographer:Hassan ZulfiqarASU/USPCAS-E

USPCAS-E scholars envision an energy-independent Pakistan

Profiles and perspectives from Night of the Open Door

Improving the energy grid in Pakistan is, without exception, the priority for a cohort of Pakistani graduate scholars studying engineering at Arizona State University this semester.

Participants in the U.S. - Pakistan Centers for Advanced Studies In Energy (USPCAS-E) program, the students recently demonstrated renewable energy concepts during Arizona State University’s Night of the Open Door – an event during which Phoenix-area residents visit the ASU campus, meet faculty, students, and explore research projects.

Toy solar car races at the US-PCASE-E exhibit attracted many young guests and their parents, giving the engineering students an opportunity to explain the importance of developing renewable sources of power. They also handed out LED light-up fans that, when they spin, spelled out, “Renewable Energy: I’m a big fan.”

Anam Zahara, Southern Punjab

A NUST graduate with a BE in telecommunications engineering, Anam Zahara from Southern Punjab is now working on a masters degree in energy policy, with a focus on electrical engineering, through the program.

“We have many rolling blackouts in my area of the country,” she explains. Her vision is to integrate her telecommunications and electrical engineering education so she can “be a part of the process that improves Pakistan’s energy infrastructure.”

Education is a priority in Zahara’s family – both parents are teachers, two sisters are medical doctors and another has a master’s degree in agriculture.

“One thing I’ve learned here is that time is money,” she says with a smile. “It’s important to be punctual for class.”

Usman Salahuddin, Karachi

For Usman Salahuddin from Karachi, the decision to pursue an advanced degree in energy systems was born of frustration. With a BS in Chemical Engineering from NUST, Salahuddin found himself literally powerless on the job almost daily in the fertilizer industry.

“There was not enough gas to feed the furnace, so we’d have to shut down the factory,” he explains. “It taught me that we cannot rely on fossil fuels. We must develop renewable, technologies that can be safely implemented for industry.”

His attraction to the USPCAS-E program was heightened by the opportunity to focus on entrepreneurship. “This program not only makes us researchers, it also emphasizes becoming entrepreneurs,” Salahuddin says.

Ussama Khalid Barki, Sialkot

“Physics is about making theories,” proclaims Ussama Khalid Barki, who holds a physics degree from NUST. “Engineering is about execution.”



Hatif Bin Abdul Majeed showing the ASU/Tempe community that the visiting scholars are big fans of renewable energy during the Night of the Open Door outreach event. Photographer: Erika Gronek/ASU/USPCAS-E

Noting that his country is struggling, Barki says it’s time for action, not theories.

Now pursuing a master’s degree in energy systems engineering with an interest in developing technologies for rechargeable, solar powered batteries, Barki, says he is inspired by energy researchers at ASU. Barki says he would like to continue conferring with ASU faculty once he returns home and works toward his doctorate. “I have a new perspective,” he declares. “Scientists explore space, but engineers build the telescopes.”

“I believe small start-up companies will contribute significantly to solving my country’s energy problems.”

Usman Salahuddin, Karachi



(Above and below) USPCAS-E scholars visiting the Arizona Renaissance Festival. Photo credit: Erika Gronek ASU/USPCAS-E



Farah Akram, Karachi

Farah Akram, who has a power electronics degree from NUST, did not let her poor sense of direction and fear of animals thwart her aspirations to pursue a masters degree in electrical power engineering. “The ASU Campus is so big that I got completely lost on my first day,” she says, explaining that her campus at NUST was small in comparison “But everyone was so helpful, and eventually I found my way,” noting with a laugh that she’s been able to avoid stray cats and dogs.

The majority of Akram’s family is in business and she, who describes herself as “extremely organized,” is the only engineer. “Our family is passionate about education,” she says. “Engineering made the most sense for me.”

Cultural Exchange

Unanimously, the students declared the Arizona Renaissance Festival their favorite cultural experience to date. They donned crowns along with other festival-goers and enjoyed the jousting knights, circus performers, musicians and the marketplace.

Actually, marketplaces of all sorts are of interest to the students. “We love shopping,” declares Zahara, who says

she’s particularly enjoyed Arizona Mills and Tempe Marketplace – both accessible via public transportation.

But more important than shopping and festivals are the opportunities to collaborate with other students.

“I feel so welcome – faculty has been extremely supportive,” says Akram. “This has been an unimaginable, new experience.”

“The cultural exchange has helped me learn how to socialize with people who are different,” says Barki. “One day on a trip via the Light Rail, a group of elderly ladies got on – so we stood up and gave them our seats. Everyone clapped. It was definitely a notable moment.”



Farah Akram greeting members of the Tempe community who were curious about the USAID project. Photographer: Erika Gronek ASU/USPCAS-E



Noor Muhammad educating members of the Tempe community about Pakistan’s energy problems. Photographer: Erika Gronek ASU/USPCAS-E

Salahuddin notes that the learning exchange extends well beyond American customs and culture. “We are not just meeting American students – there are students from five different countries working on one of my lab projects,” he says. “Exposure to these new, wide-ranging perspectives will be incorporated into the problem-solving processes we use when we return home.”

ASU Holds second virtual seminar for Pakistani universities

Hydrogen Economy: Problems and Prospects

Arizona State University organized the second of a series of virtual seminars for Pakistani energy engineering students and faculty. Delivered by ASU Professor A.M. Kannan, the seminar focused on the impor-

tance and relevance of switching towards a hydrogen economy, its performance as an automotive fuel alternative and the challenges being faced with this transition. The workshop also explored the benefits and disadvantages

of fossil fuels and highlighted the available opportunities in sustainable energy devices that are exemplified by solar power and hydrogen fuel cells.

USPCAS-E scholars inspired by Wozniak visit

Steve Wozniak, visited the ASU campus in February and told several hundred students to create products they “desperately want” and that “motivation is more important than knowledge.”

The Apple co-founder and personal computer pioneer came to ASU as a nod to National Entrepreneur Week and gave an impromptu talk to about 400 students in a courtyard outside an engineering building on the Tempe campus.

USPCAS-E scholar, Saddam Ali Khan was lucky enough to meet him. Inspired by Wozniak’s talk Khan reflected that, “the fastest way to summit the mountains of your dreams is to follow in the footprints of those already at the peak”

Haider Saif Agha said, “Hearing him (Wozniak) made me realize that passion and dedication pay off at the end. He talked about his hard work and his products like (they were) his babies that he nurtured and gave to the world.” Haider realized, “that passion is what drives you to success. It doesn’t matter which country you’re from, how many resources you have or how badly the odds are stacked against you. Passion is king.”

The scholars of USPCAS-E have passion for their work and their studies. Wozniak’s visit was certainly a highlight in their academic journey.



Saddam Ali Khan (above) and Haider Saif Agha (below) meet computer industry icon and Apple co-founder Steve Wozniak. Photo credit: ASU/USPCAS-E



News from Oregon

Visiting scholars at Oregon State University successfully completed a Toastmaster Speechcraft program hosted by OSU’s School of Mechanical, Industrial and Manufacturing Engineering Toastmaster Chapter.

As part of the program, each scholar worked with the group to develop public speaking skills and presented four speeches to develop different aspects of public speaking. They celebrated the completion of the program with pizza and a bowling party with OSU graduate students and faculty at the Student Union.

When they return to Pakistan, the group hopes to continue to engage with Toastmasters through a chapter in Islamabad.



OSU scholars hosted a party with faculty, staff and students to celebrate Pakistan Resolution Day. The scholars presented a speech on the history of the day, provided information about Pakistani geography and culture, and provided a green and white Pakistani flag cake to share with the group. Photo credit: OSU/USPCAS-E

Postcards from the Ledge:

Hoover Dam Excursion for Pakistani Scholars Bridges Knowledge, Culture

27 Pakistani engineering scholars US-PCAS-E at Arizona State University have engaged in an educational adventure over spring break. Spring break offered a respite from their classes and lab work, and brought the chance to see one of the greatest achievements in hydroelectric power first hand.

The scholars kicked off their journey by first visiting one of nature's greatest engineering wonders, the Grand Canyon, followed by a wonder of humanity's electrical and civil engineering ingenuity at Hoover Dam.

"The sheer brilliance that the engineers displayed in an era when such a mega-structure was a rarity, is a sight to behold. It solved the water distribution problems for seven different states and shaped the landscape of California into what it is today," said Haider Saif Agha from National University of Sciences and Technology (NUST), Islamabad.

Learning about a pinnacle of clean energy was key for these scholars because many of them are studying photovoltaic, wind and hydroelectric energy options. The USPCAS-E project has set out to explore renewable energy as a means for resolving the energy crisis happening in Pakistan today - leaving the country with blackouts that last 6-16 hours a day.

"The main purpose of building Hoover Dam was (for) flood control, irrigation and power production. I was fascinated to see

how the states of California, Nevada, Arizona, Utah, New Mexico, Colorado and Wyoming resolved the water conflict for mutual benefit," said Asfand Yar Ali, of University of Engineering and Technology, Lahore. "I see in the comparison with Pakistan's Kalabagh Dam" "...which helps Pakistan with the flood control, which has been a big issue since 2010. We are facing minor and major floods every year in monsoon. Similarly, the dam will help Pakistan rejuvenate its agriculture and overcome energy crisis."

"Big dams in Pakistan are normally earth and rock fill dams, so there is a need to build concrete arc dams like Hoover Dam in Pakistan that are more impressive, efficient and modern." - Muhammad Ahsan Amjed, NUST.

"The construction of the dam really reminds me of one of the most primordial characteristics of human beings, that is, we are tool builders in this universe. We build tools to harness the potential of nature to expand our horizons, to reach the 'adjacent possible' and Hoover Dam is surely a way to prove it in a tangible form. I learned that we can also solve all of our country's energy problems by just mixing innovation and engineering in the right proportions." - Usman Salahuddin, NUST.

The scholars also visited the California Science Center during their break. "My favorite part was the free earthquake simulator. I learned about the how certain buildings are made in case of an earthquake. The lesson that I learned is that Pakistan is in dire need

of these types of services and technologies because it will ultimately help the younger generation." - Atoofa Zainab, NUST.

Inspiring the Heart and the Sharing of Cultures

"I have honestly no words to define my experience I had on spring break. It was both fun and a learning experience," said Farah Akram of NUST. "The places we visited showed us the new face of the world. The views of the Grand Canyon, innovative construction of Hoover Dam, fun and virtual reality based rides of Universal Studios, well-demonstrated learning in California Science Center and playful time in Santa Monica let us live the most beautiful time of our lives."

"Something that really impacted my heart was the celebration of diversity in America. America celebrates its diversity, be it in L.A., Tempe, Las Vegas or any other city. I was impacted by views on tolerance, freedom of speech, action." - Haider Saif Agha, NUST.

"If you really want to understand the culture and people of any particular area, you will have to travel across that region in order to better understand their traditions, their peculiarities, cultural idiosyncrasies, (and the) subtle differences in their way of living. Such excursions help us renew our perspective about our research, our lives and our goals." - Muhammad Ahsan Amjed, NUST.

