Message from the President

“It is my desire that this new University become one of the world’s great institutions of research; that it educate and train future generations of scientists, engineers and technologists; and that it foster, on the basis of merit and excellence, collaboration and cooperation with other great research universities and the private sector.”

(The Custodian of the Two Holy Mosques, King Abdullah Bin Abdulaziz Al Saud)

Since opening its doors to its founding students in September 2009, King Abdullah University of Science and Technology (KAUST) has become home to a growing community – drawn from over 70 countries – of exceptional faculty, talented graduate students and dedicated staff, together with their families. Set on the shores of the beautiful Red Sea, KAUST offers a unique academic-social environment for our community to work and learn, live and play.

KAUST is the embodiment of the bold vision of King Abdullah to build a research university in Saudi Arabia with global ambitions to advance science and technology through graduate education, research, and innovation; to take on the grand challenges facing humanity in the 21st century; and to build bridges from Saudi Arabia to the world – across peoples, cultures, and continents.

Enabled by an unsurpassed physical infrastructure and state-of-the-art research facilities, KAUST researchers seek to take on the grand challenges of our time – energy, water, food, and the environment – and make a difference for Saudi Arabia and the world. Our faculty and students bring their ideas and creativity, experiences and perspectives from around the world to KAUST in a collective endeavor to develop interdisciplinary approaches and innovations that leverage the interconnectedness of science and engineering.

KAUST offers its students an international faculty and rich opportunities for learning, discovery, and research augmented by an extensive global network of research and education collaborations with some of the world’s top research universities and corporations. KAUST is the place for adventurous and imaginative individuals who want to undertake scientific research and engage in a journey of intellectual and cultural discovery.

You are among the next generation of scholars and scientists, engineers and entrepreneurs. As a KAUST graduate student, you can play a part in the University’s formative years and contribute to building it as a world-class research university. Studying at KAUST is the opportunity of a lifetime to pursue significant questions in science and technology and help create a better future for humankind.

I look forward to welcoming you soon to our University community.

Choon Fong Shih | President
Message from the Associate Provost for Graduate Affairs

King Abdullah University of Science and Technology engages students, faculty, and researchers in advancing science and technology through bold and collaborative inquiry focused on issues of regional and global significance. Here, we integrate our academic, research and economic development programs to find solutions to problems of significance in such areas of energy, water, food and the environment.

We have three divisions in our academic program: Chemical and Life Sciences and Engineering; Mathematical and Computer Sciences and Engineering; and Physical Sciences and Engineering. Our eleven fields of study are housed in these divisions. As a graduate student, you will declare a degree program in one of our academic divisions. Because we emphasize interdisciplinarity at KAUST, however, you will be expected to take courses outside the boundaries of your area to fulfill your degree requirements.

The research program at King Abdullah University of Science and Technology is organized around nine Research Centers. These Research Centers conduct targeted and goal-oriented research and students team with faculty to work on Research Center projects. Currently, our research centers are Catalysis; Computational Bioscience; Geometric Modeling and Scientific Visualization; Advanced Membranes and Porous Materials; Plant Stress Genomics; Solar and Photovoltaics Engineering; Red Sea; Clean Combustion; and Water Desalination and Reuse.

Supporting our students, researchers and faculty members in our Divisions and Research Centers are our stellar core laboratories and major facilities. We have amassed the latest supercomputing, visualization, imaging and analytical equipment available and have outfitted our core laboratories with modern instrumentation vital to conducting significant research.

To push our research results and innovations to the next stage of development and to support the diversification of the national economy through innovation, we have an extensive economic development team. Our economic development specialists lead our technology transfer activities, run our on-campus research park and innovation center, establish industrial collaborations and partnerships in Saudi Arabia and across the world, manage seed fund competitions for students and faculty, and provide training in entrepreneurship to community members.

Though young as an institution, King Abdullah University of Science and Technology has much to offer students who want to surround themselves with the best minds and the best equipment to explore how scientific and technological breakthroughs can contribute to the globalized and knowledge-based economy of the twenty-first century. At KAUST, we welcome you on our mission of discovery!

Brian Moran | Associate Provost for Graduate Affairs
Degree Programs
EDUCATING PASSIONATE SCIENTISTS FOR POSITIVE CHANGE

KAUST OFFERS TWO GRADUATE DEGREE PROGRAMS

The M.S. degree can be a terminal graduate degree or may serve as a gateway to the Ph.D. program. The M.S. degree typically takes three semesters to complete. The three-semester option allows flexibility to explore, research and pursue internship opportunities, as well as a master's with thesis option. The Ph.D. typically takes three to four years after completion of a master's degree. The Ph.D. requires coursework, a research proposal and an original and independent research project that culminates in the presentation of a written dissertation.

Fields of Study
FINDING SOLUTIONS TO THE GRAND CHALLENGES IN ENERGY, WATER, FOOD AND THE ENVIRONMENT

Our degree programs are offered through three academic divisions, Chemical and Life Sciences and Engineering, Mathematical and Sciences and Engineering, and Physical Sciences and Engineering.

CHEMICAL AND LIFE SCIENCES AND ENGINEERING

The Chemical and Life Sciences and Engineering Division includes Bioscience, Chemical and Biological Engineering, Chemical Science, Environmental Science and Engineering and Marine Science. Some of these programs have specific academic tracks, and a student may choose the track that best suits his/her goals. Students are offered modules consisting of lectures, seminars and laboratory classes and they are expected to conduct independent research.

In 2011, KAUST was named Lab of the Year by leading science and technology publication, R&D Magazine.

The American Institute of Architects (AIA) and the American Library Association (ALA) selected the KAUST Library among their five recipients for the 2011 AIA/ALA Library Building Award.

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The Chemical and Life Sciences and Engineering Division boasts state-of-the-art facilities and resources, including some of the most advanced equipment in the world for genomics, proteomics, microscopy, nanofabrication and nuclear magnetic resonance studies.

BIOSCIENCE (BIOs)
The Bioscience Program plays a key role in addressing many of the global challenges being tackled by KAUST. An important research thrust of the Bioscience program is the genomics of stress-tolerant plants and how their physiology and metabolism allow them to thrive under conditions of high salinity, low water, and/or high temperatures. This research will impact our ability to grow food in arid lands and in areas plagued by water scarcity. We address the worldwide energy crisis through research on biofuels and other renewable energy sources. Another major focus of the Bioscience program is high-performance computing to create new methods for information extraction, allowing analysis and understanding of the voluminous data produced from cutting-edge biological experiments. Finally, the unique location of KAUST on the shores of the Red Sea makes it a unique ecosystem and its potential medical applications possible.

The Bioscience Program at KAUST comprises modules consisting of lectures, seminars and laboratory classes, as well as independent research. Both M.S. and Ph.D. degrees are offered. The Bioscience curriculum provides a strong introduction to the fundamentals of living matter. Each course is a self-contained module providing a complete review of the subject concerned, including Cell Biology, Biochemistry, Biophysics, Molecular Genetics, Protein Structure and Function, Synthetic Biology, Genomics, Stem Cells, and Physiology and Metabolic Engineering. Advanced courses, such as Computational Biology and Bioinformatics and the Visualization of Biological Systems, are also offered.

CHEMICAL AND BIOLOGICAL ENGINEERING (CBE)
The Chemical and Biological Engineering Program offers opportunities to develop real-world solutions to global challenges by leveraging basic discoveries in chemical and biological sciences. These include the synthesis of high-performance polymers and the development of new membranes for gas and liquid separation,
as well as the development of new materials for reducing greenhouse gases and remediating chemical and biological threats. Materials for controlled adsorption of contaminants and release of pharmaceuticals, as well as new electrodes and biomaterials, are likely to have direct social and economic impact. Development and propagation of stress-tolerant plants, discovery and scale up of alternative and renewable energy, and new methods for carbon dioxide utilization all contribute to the overall research mission of KAUST. This research is facilitated by the tremendous facilities for high-performance computing and analysis on campus.

The Chemical and Biological Engineering Program offers a choice of two tracks: Advanced Chemical Engineering and Advanced Biological Engineering. Both tracks cover a broad range of advanced chemical and biological engineering topics and will equip a student for a successful and productive career in these fields.

CHEMICAL SCIENCE (CHEMS)

The global challenges that KAUST’s research programs address are directly related to chemistry as a fundamental science. Correspondingly, the University’s Chemical Sciences Program is based on Chemistry as a core discipline, yet it promotes interactions between KAUST Research Centers, particularly the Catalysis, Membrane, Solar Energy, Red Sea Sciences and Geometric Modeling and Visualization Centers.

Students in the Chemical Science Program gain a strong background in modern chemistry by focusing on Analytical, Inorganic, Organic and Physical Chemistry, while preparing to work on highly interdisciplinary research challenges. After completing the M.S. degree, students will have acquired a sound foundation for a career in chemical research or for continuing in advanced graduate studies.

The Ph.D. program in Chemical Science emphasizes the transition from supervised to independent research. To successfully conduct research in interdisciplinary fields, the development of broad knowledge well beyond the M.S. level is required. After earning a Ph.D. degree from KAUST, a student will be capable of designing and executing independent research projects at the world’s leading institutions or in industry laboratories.

Research opportunities in the Chemical Science Program are related to KAUST’s strategic goals targeting future needs of the oil and gas industry. While covering a broad range of topics in chemistry and chemical engineering, special importance is given to catalysis research, membrane sciences and nanomaterials. Research in catalysis is focused on single-site, homogeneous, heterogeneous and biological catalysts, which are relevant to the petroleum industry, the environment, bio-based raw materials, polymers, nanotechnology, and fine chemical production. Synthesis and development of new organic and inorganic high performance membranes and thin film technology for gas and liquid separation in industrial processes are the stimulus for our work in membrane sciences. We synthesize nanomaterials that target clean energy alternatives, reduce greenhouse gas emissions, remediate chemical and biological threats or control drug delivery.

ENVIRONMENTAL SCIENCE AND ENGINEERING (ENSE)

The Environmental Science and Engineering Program focuses directly on many of KAUST’s research challenges. There is worldwide concern with the availability of clean water, and Environmental Engineering examines methods to purify and reuse water, as well as to reduce contamination of existing reserves. Research in environmental engineering allows examination of the impact of humans on our environment through resource exploitation, including over-consumption, land degradation, and pollution of both air and water. The results of such efforts may offer solutions to cleaning up excessive carbon dioxide levels, addressing ozone depletion, decontaminating the soil, and tackling some of the issues associated with climate change. KAUST is uniquely positioned to utilize high-performance computational technologies to confront these issues efficiently and effectively.

This program comprises three tracks, including Water Quality, Chemistry, and Treatment; Environmental Microbiology and Biotechnology; and Environmental Fluid Mechanics.

Students entering the program enroll in a set of core courses and then take specialty courses in one of the four major tracks. The remaining courses are technical electives. The four tracks together cover the most important areas in Environmental Science and Engineering, and the core plus specialty courses and electives will equip a student for a successful and productive career in these fields.

MARINE SCIENCE (MARSE)

The Marine Science Program focuses on the specific environment of KAUST – the Red Sea, which is one of the most complex and diverse ecosystems in the world and at the doorstep of the University, making KAUST a marine science field lab. The Red Sea is not only ecologically important for fisheries and tourism, but crucial for coastal protection as well. It is extremely fragile and endangered due to human exploitation, pollution and climate change. The reefs in the Red Sea are some of the most northern coral reefs in the world, and the high temperatures and salinity, which could cause coral diseases in other places, have led to adaptations that could lead to cures for those diseases (e.g., coral bleaching). Our goal is to develop an integrated understanding of this ecosystem, including fundamental biology at the molecular and genomic levels, symbiosis with algae and prokaryotes (Bacteria and Archaea), associated communities of fish, and the physical and chemical environment that impacts and shapes them. This understanding could have an impact on global carbon cycling, endangered species, and how we manage the harvesting of food from the oceans.

The Marine Science Program takes advantage of KAUST’s location on the Red Sea, a living laboratory with great potential for exciting science. The program offers two primary academic tracks, one focused on study of the variety of habitats of the multitude of marine life forms, and a second track focused on the interactions of the physical marine environment with atmospheric and climatic conditions. There is an intentional focus on the local Red Sea system, both as a primary study system and as a system with which general concepts from other marine systems can be compared.

Faculty members in the program have a wide range of interests, reflected in the program’s course offerings. These include marine microbiology, molecular ecology and genomics, coral reef biology and ecology, pelagic ecology, and conservation of marine resources. Other faculty members associated with the program have interests in large-scale data assimilation, geophysical fluid dynamics, and modeling air-sea interactions.

MATHEMATICAL AND COMPUTER SCIENCES AND ENGINEERING DIVISION (MCSE)

The Mathematical and Computer Sciences and Engineering Division (MCSE) is home to applied mathematics, computer science, and computational science and engineering. Much of the division’s focus lies in areas belonging to the intersections of these disciplines, each of which overlaps and interacts closely with the other two.

Each of the programs in MCSE consists of a set of essential core courses and several academic tracks, ensuring that students have a solid foundation in their discipline while also allowing them to choose a curriculum that fits their own professional goals.

MCSE takes advantage of KAUST’s “Shaheen” BlueGene massively parallel computer, one of the most powerful supercomputers hosted by any university in the world. Also at KAUST is “Cornea,” a six-wall immersive OVE, the most densely populated and powerfully illuminated advanced computation and visualization facility in the world, which permits high-resolution visualization and insinuation of simulated and observed three-dimensional, time-evolving data sets. MCSE research projects include core mathematical and computational techniques, as well as enabling technologies applied to real science and engineering problems that arise through collaborative work.

The mission of MCSE is fully aligned with KAUST’s mission to expand the frontiers of knowledge in science and engineering and to help diversify the regional economy to one of information and service based. Key to its success is to fully exploit its resources: its computational and network infrastructure, its national and international collaborations with academic and industrial partners, and its highly competitively recruited faculty and students.

APPLIED MATHEMATICS AND COMPUTATIONAL SCIENCE (AMCS)

The Applied Mathematics and Computational Science Program at KAUST prepares students for success in constructing computational solutions to mathematical problems in a variety of areas. This preparation emphasizes the fundamentals of modeling, analyzing, and computationally solving problems in many disciplines. The AMCS program offers five tracks, each of which leads to a frontier of applied and computational mathematics. These tracks are Computational Geoscience, Geometric Modeling and Scientific Visualization, Information Science, Modeling and Numerical Simulation, and Partial Differential Equations.

The Applied Mathematics and Computational Science program aligns with KAUST’s research mission directly through its Computational Science and Engineering activities, as emphasized in the Modeling and Numerical Simulation and Geometrical Modeling and Scientific Visualization tracks, among others. A key driver in contemporary scientific discovery and engineering design is the merger of large-scale data sets from observation or experimentation with large-scale simulations. The mathematics that allows these two approaches to merge in such a way that the errors inherent in each may be reduced in the combination goes under a number of rubrics, including data assimilation, inverse problems, uncertainty quantification, and sensitivity analysis. Another key driver is the merger of large-scale data sets and simulations with high-resolution visualization, so that scientists can interact in real time with their data. This merger opens up exciting possibilities like real-time...
computational steering and the engagement of the brain’s innate skill at detecting changes in imagery. Energy, food, water, and environmental research are all data rich, and most research campaigns now include a significant simulation component.

**Computer Science (CS)**

The mission of the Computer Science program is directly aligned with KAUST’s mission to expand the frontiers of knowledge in science and engineering. A key driver in contemporary scientific discovery and engineering design is the emergence of large-scale simulation, which accompanies the traditional modalities of theory and experiment. As simulation becomes relatively cheaper and experimentation becomes relatively more expensive, computation is increasingly used to narrow the parameter regimes in which experimentation is performed. Another driver is the availability of large-scale data sets from such sources as satellites, sensors, and the Internet as well as high-resolution and high-throughput experiments. The requirement for high performance stresses all aspects of computation: hardware, operating systems, languages, algorithms, etc.

Energy, food, water, and environmental research are all data rich, and most research programs now include a significant simulation component. KAUST computer scientists contribute to the Cyberinfrastructure that supports all such activities, and they collaborate in specific applied research campaigns. The Computer Science program at KAUST prepares students for success in creating and applying computational methods to a variety of areas. Course preparation emphasizes both the fundamental and enabling aspects of information technology at multiple levels: hardware and software, compute-intensive and data-intensive. Tracks of specialization in CS include: Artificial Intelligence, Computer Systems, High Performance Computing, Visual Computing, and Theoretical Computer Science. Computer Science research and education emphasizes such areas as visualization, algorithms, databases, and networks.

**Physical Sciences and Engineering Division**

The Physical Sciences and Engineering Division (PSE) includes Earth Science and Engineering, Electrical Engineering, Materials Science and Engineering and Mechanical Engineering. Some of these programs have specific academic tracks, and a student may choose the track that best suits his/her goals. Students will be offered modules consisting of lectures, seminars and laboratory classes and will conduct independent research.

PSE boasts superb facilities and resources. In particular, students have access to the latest supercomputing and visualization facilities. In addition, a state-of-the-art seismic field laboratory is available to students in the Earth Sciences and Engineering program.

The facilities of the Electrical Engineering and Materials Sciences programs include a 2,000 m² Class 1000 ceilings and multiple bays at Class 100, and state-of-the-art thin-film deposition techniques, including molecular beam epitaxy with full analysis and atomic layer deposition; thermal deposition; sputtering; plasma-enhanced chemical vapor deposition, metal oxide chemical vapor deposition; photovoltaic materials and device fabrication and testing; microscopy; focused ion beam; printing capabilities for thin-film processing; laser crystallization and spectroscopy, surface analysis and two-photon absorption; fabrication and testing of solar cells and light-emitting diodes; thin-film transistors and photodiodes; magnetic characterization; wet chemistry; high temperature processing and diffusion furnaces; local electrode atom probe; laser assisted wide angle tomographic atom probe; tools for magnetic analyses including vibrating sample and alternating gradient to a variety of anisotropies. Course preparation emphasizes both the fundamental and enabling aspects of information technology at multiple levels: hardware and software, compute-intensive and data-intensive. Tracks of specialization in CS include: Artificial Intelligence, Computer Systems, High Performance Computing, Visual Computing, and Theoretical Computer Science. Computer Science research and education emphasizes such areas as visualization, algorithms, databases, and networks.

**Earth Science and Engineering (ESE)**

The Earth Science and Engineering (ESE) program focuses on applications of modern computational methods to study geophysical problems associated with the atmosphere and/or ocean circulation, earthquakes, oil exploration, reservoir modeling, and subsurface phenomena. Students in this program receive broad training in numerical methods, mathematical modeling, and geophysics, with an option for M.S. students to participate in scientific research activities that include computational, mathematical modeling, and field-study projects. Ph.D. candidates in the program conduct original research on a topic related to earth science and engineering. The program is divided into two tracks that focus on computational analysis of (1) fluid earth systems and (2) solid earth systems. ESE students must specify one of the two tracks as their major. Students in the fluid earth systems track study fluid flow and transport processes both beneath and above the earth’s surface, including subsurface surface and atmospheric flows. Students in the solid earth systems track focus on seismology, geophysics, geodynamics and geomchanics.

**Electrical Engineering (EE)**

Boasting superb facilities and resources, the Electrical Engineering program gives students access to the latest supercomputing and visualization facilities along with superbly equipped experimental laboratories.

**Mechanical Engineering (ME)**

The Mechanical Engineering Program offers programs leading to M.S. and Ph.D. degrees in five tracks: Materials and Solids; Fluid Mechanics, Thermal Sciences and Energy; and Controls and Dynamics. Courses provide a solid foundation in each track, covering subjects such as Mechanical Behavior of Engineering Materials, Continuum Mechanics, Theoretical and Computational Fluid Mechanics, Thermodynamics, Experimental and Numerical Combustion, Control Design, Dynamic Analysis, Modeling, and Simulation.

Several features of our program make graduate school at KAUST a unique opportunity for talented and motivated students. In the ME program, research activities take advantage of KAUST’s world-class, fully staffed and easily accessible core laboratories and supercomputing facilities. Campus-wide experimental and computational facilities support the research conducted in the laboratories of individual faculty members and allow for exciting cross-disciplinary work. A tightly knit network of partnering institutions among the most respected universities in the world fosters opportunities for high-impact collaborative projects.
ERNESTO SANDOVAL
Oil Exploration for Sustainable Use

Ernesto Sandoval is from Mexico City. A keen interest in oil exploration and other energy technologies drew him to KAUST, even as construction of the university was still underway. When he saw the blueprint for a modern, state-of-the-art campus with a generous endowment for science and technology, he fell in love with the idea. He says, "I couldn’t be anything but excited.”

Ernesto works on seismic imaging in the Earth Science and Engineering program to develop methods that accurately pinpoint oil sources beneath the earth’s surface. These methods, Ernesto points out, are going to be indispensable for the environmentally friendly use of resources. "Oil is a valuable energy source. It has a bad reputation because of how it was extracted in the past, but there are sustainable technologies to remove unwanted components from natural gas and Mona and scientists at the Advanced Membranes and Porous Materials Center are in the race.”

Ernesto is eager to put the skills and knowledge he has acquired at KAUST to use and is interviewing for a position in the oil industry. Unlike other scientific research, where industrial applications may be several years down the road, he says in his field, research can move from the lab into practice within weeks. Ernesto likes facing the challenges posed by this competitive, dynamic environment. Besides his work, Ernesto is passionate about diving. According to him, the Red Sea coast off Thuwal is one of the best locations he has explored. "The coral reefs here are pristine and unexplored. The colors are amazing, and you don’t have to go too far or too deep to experience the vibrancy of life underwater.”

MONA AL-SAYDLANI
Membrane Science

Mona Al-Saydlani is a native of Jeddah, just an hour’s drive from KAUST. After completing her undergraduate degree in Chemistry at King Abdulaziz University, Mona went to the United States to earn a Master’s degree in Information Science and Technology at Indiana State University. Mona decided to return home to Saudi Arabia and to her love of “playing with chemicals” when she learned she had been accepted in KAUST’s Ph.D. program. Once on campus, she joined KAUST’s Advanced Membranes and Porous Materials Center. Mona’s main area of interest is studying cost-effective and environmentally benign methods to process natural gas. The high content of carbon dioxide in natural gas prevents it from burning efficiently. If a membrane can separate the carbon dioxide during the processing of natural gas, the efficiency of the fuel would be increased and production costs reduced. There is a push across the world to develop new membrane technologies to remove unwanted components from natural gas and Mona and scientists at the Advanced Membranes and Porous Materials Center are in the race.

Mona was an intern at Dow Chemical in Switzerland. She worked with a customer application specialist to test samples for oil and gas companies, using a Bactron Anaerobic Chamber. Mona is immersed in her lab work during the week at KAUST but makes it a point to go to the gym every day. She also likes getting together with her friends and cooking international foods. She takes the campus bus with her friends. “Many of us were new to KAUST and to the country, so we wanted to know new people. It was easy to make friends.”

AUN MELA
Beyond Silicon

Aun Mela grew up in Lahore, Pakistan. While a student at National University of Singapore (NUS), Aun went to McGill University in Canada on a student exchange. He liked McGill and had decided to apply to the graduate program there, when news about KAUST began to swirl around the corridors of NUS. Aun was impressed with KAUST’s grand scale and vision, but still had his heart set on going to McGill. However, when it was announced that NUS’s president, Choon Fong Shih, was moving to KAUST, Aun, who admired President Shih’s innovations at NUS, did not hesitate any longer. He joined KAUST’s electrical engineering program last year.

Aun works with Prof. Muhammad Hussain on graphene-based Field Effect Transistors (FET). Graphene, Aun believes, is a good alternative for transistors beyond the silicon era. A graphene switch has not yet been successfully created, but Aun hopes that, in a few years, he might begin to see it revolutionize the field of solid-state devices. Aun enjoys working with equipment and software and is thrilled with the hands-on internships he completed at Stanford and the American University in Cairo.

After a day of classes and lab work, Aun likes to relax with a round of squash. He also says KAUST’s financial support package has been a great relief, as he is not only able to cover his current living expenses but also pay off his undergraduate student loans. In Singapore, Aun tutored high school students to help pay for his education and discovered then that he enjoyed teaching. He would, eventually, love to return to Pakistan and teach in an engineering college.

AMAL ALI
Curing Multiple Sclerosis

Amal Ali grew up in Amman, the capital city of Jordan. Although neither of her parents have a background in science, they encouraged their daughter to become a scientist.

At KAUST, Amal works with Dr. Jasmeen Merzaian on the use of neural stem cells (NSCs) for the treatment of multiple sclerosis, a disease that inhibits the ability of nerve cells in the brain and spinal cord to communicate with each other. At the present time, there is no cure for the disease. Recent research has indicated that affected mice treated with NSCs show improvement, but the mechanism behind the improvement is not understood. Amal hopes that her research will shed light on the area and that a cure will be developed someday soon.

Amal appreciates the diversity in the KAUST community. She says, “Many of us were new to KAUST and to the country, so we wanted to know new people. It was easy to make friends.” She takes the campus bus with her friends to Jeddah on weekends. In her spare time away from the lab, Amal likes to read.
He says, “KAUST is a new and diverse environment, I want to be part of the future of the oil industry here.”

After completing his undergraduate studies at King Fahd University of Petroleum and Minerals in Dhahran, Abdulrahman was working at Schlumberger when he heard about KAUST. He had always planned to get a graduate degree but wanted to study in an area related to energy. When he learned that KAUST had recruited excellent faculty and that he would be able to work in a program focused on industrial applications, he jumped at the chance of enrolling. Abdulrahman now works on seismic imaging to study earthquake activity in Saudi Arabia to identify optimal locations for setting up geophones and seismic stations in the country.

The methodology of this research program is also valuable in oil exploration. Scientists create an artificial earthquake by vibrating the ground and measure the resulting echoes. In the process, an accurate assessment of what is below the surface of the earth can be made using advanced calculations. These techniques could significantly increase the accuracy of locating oil reservoirs.

Abdulrahman spends his time outside the lab relaxing with friends and running or swimming. He says, “KAUST is a new and diverse environment, and we get to set the trends. This is one of the biggest reasons I came here.”

Joanna Dommen

Joanna Dommen’s father is an electrical engineer specializing in power systems. Joanna followed in his footsteps when she went to the Birla Institute of Technology in her native India to study electrical engineering. She had been influenced by her father’s passion for his work and their constant discussions of her high school math and physics problems. Joanna heard about KAUST in her third year of college and she enthusiastically decided to apply. When news of her admission to KAUST arrived, she was thrilled to accept.

Joanna works on materials characterization and nanotechnology. She has been working on a project in collaboration with researchers from Cornell University and she went to Cornell during the summer to continue her work with them. Her project was to investigate nano-scale ionic materials (NIMs), which are organic-inorganic hybrid materials comprising an inorganic nanoparticle core surrounded by organic chains. Joanna points out that the hybrid aspect of NIMs makes them more versatile than purely organic or inorganic materials. NIMs may be useful in a variety of sustainable resource management industries such as solar energy, carbon capture, and water desalination. Joanna is very excited that the work she has done at KAUST will soon be published in the Journal of the Electrochemical Society.

Joanna thinks the cultural diversity on campus is amazing. She has also been busy learning to cook from online recipe sites. She is glad the grocery store at KAUST is well stocked with spices to support her cooking experiments. Besides her lab, the other place on campus she frequently visits is the Harbor Library. An avid reader, she says, “I read all sorts of books from nonfiction, to mystery, to journal articles, depending on my mood.”

Marie-Jean Thoraval

Marie-Jean Thoraval is from an area in the French Alps of pristine beauty and great isolation. Though Marie-Jean loved the peacefullness of his hometown, he decided early on that he also needed to see the world. His travels have taken him to Japan, China, Singapore, and now Saudi Arabia.

Marie-Jean studied at École Polytechnique and later at IMFT, Toulouse, specializing in Fluid Dynamics. In 2007, Marie-Jean went to the National University of Singapore to work with Dr. Sigurdur Thoroddsen on high-speed imaging of drops and bubbles. When Professor Thoroddsen took a position at a brand new university called KAUST, Marie-Jean jumped at the opportunity to continue working with his advisor in Saudi Arabia. Marie-Jean studies the impact of drops falling into a liquid pool, with a high-speed (one million frames per second) camera. He is fascinated by the complexity and visual beauty of this seemingly simple phenomenon. His work has impact on a number of applied fields, such as the two-phase flow of oil and gas and the functioning of inkjet printers.

Marie-Jean, who is an avid mountaineer and rock climber, spends his free time learning Arabic next. He says “It’s very nice walking around campus and learning about the diversity of Arabic culture.”

Gouda Chen

Gouda Chen is from China where he studied computer science at Sun Yat Sen University. Upon graduation, Gouda had a job offer at China Mobile and was set to join the company when he heard about KAUST. When he looked at the KAUST website, Gouda was amazed by the state-of-the-art labs, striking architecture, and supercomputing facilities. He was also excited that famous faculty like mathematician Dr. David Keyes were going to KAUST. Gouda decided to take a chance and applied to KAUST. He was thrilled to be accepted and was also pleasantly surprised to learn that 50 other students from China were also going to study at KAUST.

Gouda works with Dr. Panos Kalnis on data management and data mining. With the development of the Internet, social networking sites, and research in genetics, data sets are becoming larger and larger. The purpose of data management is to find efficient methods to help people make full use of data, whether in scientific fields or in day-to-day life.

Gouda and three of his classmates were finalists at the ACM SIGMOD programming competition and were invited to present their implementation in the US. He also spent additional time in the US completing an internship at IBM in New York. Gouda enjoyed working with an IBM team to improve the performance of a Message Passing Interface, an application that allows computers to communicate with one another and is used in computer clusters and supercomputers. He found the research environment at IBM to be similar to the environment at KAUST: very focused and collaborative. He sums up his experience, of making friends from all over the world and meeting renowned speakers at events like the Winter Enrichment Program, in one word: “unbelievable.”

Abeer Al-Shehail

Abeer Al-Shehail is from Al Khobar in the Eastern Province of Saudi Arabia. Although his family had no connection to the oil industry, he was keenly aware of the close vicinity of oil fields to his home. He says, “the discovery of oil revolutionized my country. I want to be part of the future of the oil industry here.”

After completing his undergraduate studies at King Fahd University of Petroleum and Minerals in Dhahran, Abeer was working at Schlumberger when he heard about KAUST. He had always planned to get a graduate degree but wanted to study in an area related to energy. When he learned that KAUST had recruited excellent faculty and that he would be able to work in a program focused on industrial applications, he jumped at the chance of enrolling. Abeer now works on seismic imaging to study earthquake activity in Saudi Arabia to identify optimal locations for setting up geophones and seismic stations in the country.

The methodology of this research program is also valuable in oil exploration. Scientists create an artificial earthquake by vibrating the ground and measure the resulting echoes. In the process, an accurate assessment of what is below the surface of the earth can be made using advanced calculations. These techniques could significantly increase the accuracy of locating oil reservoirs.

Abeer spends his time outside the lab relaxing with friends and running or swimming. He says, “KAUST is a new and diverse environment, and we get to set the trends. This is one of the biggest reasons I came here.”
Ray A. Bressan
Associate Director, Plant Stress Genomic and Technology Research Center; Named Professor, Molecular Biology and Plant Physiology
Dr. Bressan’s research interests include both the biotic and abiotic stress tolerance of plants. He also has a strong interest in genetics and molecular genetics and has facilitated the incorporation of genetic approaches into the physiology and biochemistry of plant stress biology. (Ph.D., Colorado State University, United States)

Mohamed Eddaoudi
Professor, Chemical Science
Dr. Eddaoudi’s research is concerned with developing new design and synthesis approaches to the construction of functional solid state materials and metal-organic materials that will address many challenging social issues, including clean energy alternatives, reducing greenhouse gas emissions, remediating chemical and biological threats, and controlled drug delivery. (Ph.D., Denis Diderot University, France)

Mohammed Croué
Professor, Environmental Science and Technology Research Center; Named Professor, Environmental Science and Technology Research Center
Dr. Croué’s research activities pertain to the design of highly selective and active molecular catalysts. In a multidisciplinary approach, organometallic synthesis, electrochemistry, and biotechnological methods are combined to deliver catalytic solutions for prospective demands of synthetic chemistry. (Ph.D., Technical University of Munich, Germany)

Jörg Eppinger
Assistant Professor, Chemical Sciences
Dr. Eppinger’s research is focused on a deeper understanding and application of nature’s catalysis toolbox for the design of highly selective and active molecular catalysts. In a multidisciplinary approach, organometallic synthesis, electrochemistry, and biotechnological methods are combined to deliver catalytic solutions for prospective demands of synthetic chemistry. (Ph.D., Technical University of Munich, Germany)

Kuo-Wei Huang
Assistant Professor, Chemical Science
Dr. Huang’s research centers on catalysis, including the physical organometallic chemistry of small molecule activations and functionalizations for renewable energy (water splitting) and carbon dioxide utilization. In addition, his interests include polymer chemistry with its applications, as well as QFT studies and modeling of transition metal catalysis. (Ph.D., Stanford University, United States)

Stein Kaartvedt
Professor, Marine Science
Dr. Kaartvedt’s research interests are in marine pelagic ecology, focusing on distribution and behavior of zooplankton and fish and their predator-prey relationships. His work is based on field studies from a wide variety of habitats, with particular focus on novel ways of using submerged, stationary echo sounders for in situ studies of individuals, populations, and marine communities. (Ph.D., University of Bergen, Norway)

Niven M. Khashab
Assistant Professor, Chemical Science; Assistant Professor, Environmental Science and Engineering
Dr. Khashab’s interests are in programmable and controllable microscale robots comprised of nanoscale parts. She is interested in bioreponsive single-wall carbon nanotubes and carbon nanodiamonds, total synthesis of biologically active heterocycles, and design and delivery of P-glycoprotein inhibitors. (Ph.D., University of Florida, United States)

Zhiping Lai
Assistant Professor, Chemical and Biological Engineering
Dr. Lai’s research is directed toward understanding and using porous materials such as zeolite, mesoporous silica, metal organic frameworks and their membranes, microporous membranes, membrane reactors, gas separations, hydrocarbon mixture separations waste-water treatments, recovery of industrial organic solvents, and chemical sensors. (Ph.D., University of Massachusetts, United States)

Ray A. Bressan
Associate Director, Plant Stress Genomic and Technology Research Center; Named Professor, Molecular Biology and Plant Physiology
Dr. Bressan’s research interests include both the biotic and abiotic stress tolerance of plants. He also has a strong interest in genetics and molecular genetics and has facilitated the incorporation of genetic approaches into the physiology and biochemistry of plant stress biology. (Ph.D., Colorado State University, United States)

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James Luynen  
Director, Red Sea Science and Engineering Research Center; Professor, Marine Science  
Dr. Luynen’s research includes observations and models of ocean currents, physical and chemical properties on appropriate spatial and temporal scales to understand the underlying processes that control their transport and distribution, with a particular emphasis in developing an integrated understanding of coral reefs, their habitats and ecology. (Ph.D., Harvard University, United States)  
Jasmine Merzaban  
Assistant Professor, Biochemistry  
Dr. Merzaban’s research interests focus on understanding and optimizing the mechanism by which immune and stem cells exit the blood circulation to “home” to specific sites within the body using biochemical, biophysical, and imaging techniques with in vivo mouse models. (Ph.D., University of British Columbia, Canada)  
Ken Minneman  
Dean, Division of Chemical and Life Sciences and Engineering; Named Professor, Bioscience  
Dr. Minneman’s research interests are in Q protein coupled receptors mediating drug and hormone action, including their drug specificity, structure, oligomerization state, signaling properties, and interactions with intracellular scaffolding proteins. (Ph.D., University of Cambridge, United Kingdom)  
Arnab Pain  
Associate Professor, Bioscience  
Dr. Pain’s research interests are in parasitism and genomics, comparative genomics, host-pathogen interactions, non-protein-coding RNAs and regulation of gene expression in parasites, and genomic diversity in pathogenic and non-pathogenic microorganisms. (Ph.D., University of Cambridge, United Kingdom)  
Ingo Pinnau  
Director, Membranes Research Center; Named Professor, Chemical Engineering  
Dr. Pinnau’s research focuses on synthesis of high-performance polymers, development of high-performance membranes for gas and liquid separations, hybrid organic/inorganic membranes, nanostructured microporous polymer membranes, thin-film technology, and membrane modifications (surface coatings/fouling resistance). (Ph.D., University of Texas at Austin, United States)  
Timothy Rasavi  
Associate Professor, Biology  
Dr. Rasavi is working to develop computational models of biological signaling, transcription regulatory networks, and regulatory pathways to integrate, model, and visualize the enormous amount of data derived from modern biological experiments. He also uses a metagenomic approach to explore microbial biodiversity in the Red Sea to discover useful microbial bioactive molecules. (Ph.D., University of Milan, Italy)  
Valentin Rodionov  
Assistant Professor, Chemical Science  
Dr. Rodionov’s research interests are broadly focused on nano- and mesoscale catalytic systems, such as micelles or colloidial particles, capable of emerging behavior. His Supramolecular and Micellar Catalysis group focuses on enzyme-like self-assembled catalysis using approaches inspired by biological evolution. (Ph.D., Scripps Research Institute, United States)  
Pascal Saikaly  
Assistant Professor, Environmental Science and Engineering  
Dr. Saikaly’s research focuses on the microbial ecology of wastewater treatment, microbial fuel cells, and membrane bioreactors. (Ph.D., University of Cincinnati, United States)  
Ulrich Stingl  
Assistant Professor, Marine Science  
Dr. Stingl focuses on combining novel cultivation techniques with modern cultivation-independent techniques like genomics and proteomics to elucidate the physiology and ecotype speciation of different members of microbial communities in the Red Sea. He is also interested in symbiotic systems with eukaryotic hosts and microbial symbionts, like termite guts and corals. (Ph.D., University of Konstanz, Germany)  
Kazuhiko Takebanke  
Assistant Professor, Chemical Science  
Dr. Takebanke’s research interests include generation of completely renewable hydrogen from photocatalytic water splitting, development of solid catalysts in the form of novel classes of oxides, (oxy)sulfides and (oxy)halides, as well as controlled surface modification with active metal centers that will lead to unprecedented rates and selectivity for various (photocatalytic) processes. (Ph.D., Tokyo Institute of Technology, Japan)  
Christian Voolstra  
Assistant Professor, Marine Science  
Dr. Voolstra’s research interests are evolutionary genomics and systems biology of coral reefs. He focuses on adaptive evolution and coral-specific genes in the mechanisms of bleaching and stress, the machineries of mutualism between corals and algae, and the role of prokaryotes in these processes. (Ph.D., University of Cologne, Germany)  
Peng Wang  
Assistant Professor, Environmental Sciences and Engineering  
Dr. Wang’s research interests are in environmental nanotechnology, particularly design, synthesis and application of novel nanomaterials for environmental remediation and in developing point of care nanosensors for contaminant detection. He is also seeking new ways to immobilize enzymes, bacterial, or cells for contaminant degradation and environmental detection. (Ph.D., University of California, Santa Barbara, United States)  
Liming Xiong  
Associate Professor, Plant Science  
Dr. Xiong’s research interests are in the mechanisms of plant response and adaptation to adverse environmental conditions, such as drought and extreme temperatures, and the development of stress-resistant crop plants. (Ph.D., University of Arizona, United States; D.Sc., Chinese Academy of Sciences, China)  
Jun Yu  
Professor, Bioscience  
Dr. Yu’s research interests are in genome sequencing, assembly and annotation, genome analysis, transcriptomics, epigenetics, single nucleotide polymorphism discovery and analysis, photosynthetic plasticity, genome sequence and structure evolution, network analysis, and systems biology. (Ph.D., New York University, United States)  
Jian-Kang Zhu  
Director, Plant Stress Genomic and Technology Research Center; Named Professor, Molecular Biology and Plant Physiology  
Dr. Zhu is interested in the molecular mechanisms underlying plant responses to harsh environments such as soil salinity, drought and cold temperatures. He is also interested in the mechanisms of gene silencing and in the role of epigenetic gene regulation in stress adaptation. (Ph.D., Purdue University, United States)  
Pierre M. Beauge  
Assistant Professor, Chemical and Life Sciences and Engineering  
Dr. Beauge’s research interests are interdisciplinary and span the synthesis, characterization, and practical applications of functional organic materials and organic-inorganic hybrids with unique structure-property relationships. A large component of research in the Beauge group will be directed towards the development and integration of polymeric materials and self-assembling systems that can address important challenges in the broad area of energy, most notably, harvesting, conversion, transport, storage, and delivery. (Ph.D., University of Florida, United States)  
Suzana Nunes  
Associate Professor, Chemical and Life Sciences and Engineering  
Dr. Nunes focuses on the development of new polymeric materials and membranes for water, energy and bioanalytical application. Her main research interests include synthesis and morphology control of copolymers, nanofiber functionalization, self-assembly for coatings and porous membranes to be used in nanofiltration, forward osmosis, and membrane reactors. (Ph.D., University of Campinas, Brazil)  
Alexander Rothenberger  
Associate Professor, Chemical Science  
Dr. Rothenberger’s research interests are in synthetic inorganic chemistry. He investigates the coordination chemistry of novel anions and develops solution-processable inorganic materials for next-generation solar cells. He uses exploratory synthesis of crystalline or amorphous porous solids to discover new materials for optical applications, water-purification and gas-separating membranes. (Ph.D., University of Cambridge, United Kingdom)  
Klaus-Viktor Peinemann  
Professor, Chemical and Life Sciences and Engineering  
Dr. Peinemann’s research focuses on nano-engineered composite materials for next generation reverse osmosis membranes. These next generation polymeric membranes are designed for life science applications. These membranes span the state of the art membrane fabrication technique with the self-assembly of molecules into complex structures. (Ph.D., University of Kiel, Germany)
Niloy J. Mitra
Assistant Professor, Computer Science

Dr. Mitra’s research interests are in geometric modeling, geometry processing, shape analysis, shape-preserving deformations, scan alignment, and visualization. Dr. Mitra works on detection of symmetry and structural regularity in three-dimensional geometry, and in application of geometry processing in architectural design and other art forms. (Ph.D., Stanford University, United States)

Mikhail Meshkov
Professor, Applied Mathematics and Computational Science

Dr. Meshkov’s research interests include the study of complex algorithms in computational models as well as the analysis of large and nondeterministic decision trees and acyclic programs with applications to combinatorial optimization, fault diagnosis, pattern recognition, machine learning, data mining and analysis of Bayesian networks, and the analysis and design of classifiers based on decision trees, reducts, decision-rule systems, and lazy learning algorithms. (Ph.D., Saratov State University, D.Sc., Moscow State University, Russia)

Helmut Pottmann
Director, Geometric Modeling and Scientific Visualization Research Center; Named Professor, Applied Mathematics and Computational Science

Dr. Pottmann’s research interests are in applied geometry and visual computing, in particular, geometric modeling, geometry processing, geometric computing for architecture and manufacturing, robot kinematics, 3D computer vision and visualization. (Ph.D., Vienna University of Technology, Austria)

Hany Ramadan
Assistant Professor, Computer Science

Dr. Ramadan’s work focuses on operating systems, concurrent programming, databases, as well as software and hardware for parallel programming. (Ph.D., University of Texas at Austin, United States)

Alyn Rockwood
Associate Director, Geometric Modeling and Scientific Visualization Research Center; Professor, Applied Mathematics

Dr. Rockwood’s research is focused on developing new modeling techniques for industrial design and animation, volume meshing for FE analysis, a new basis for image processing, and engineering applications of Clifford Algebra. (Ph.D., University of Cambridge, United Kingdom)

Ravi Samtaney
Associate Professor, Mechanical Engineering; Associate Professor, Applied Mathematics and Computational Science

Dr. Samtaney operates at the intersection of applied mathematics, physics, and engineering, from fundamental processes in fluid mechanics (shocks, turbulence, ablation, ionization, etc.) to numerical methods and large-scale computing (adaptive meshing, scalable solvers, software engineering, etc.) (Ph.D., Rutgers University, United States)

Basem Shihada
Assistant Professor, Computer Science

Dr. Shihada’s research covers a wide range of topics in broadband wired and wireless communication networks, including wireless Metropolitan Area Networks such as Institute of Electrical and Electronics Engineers IEEE 802.16 networks, Fiber-Wireless (FiW) network integration, and optical networks. (Ph.D., University of Waterloo, Canada)

Georgiy Stenchikov
Professor, Environmental Science and Applied Mathematics and Computational Science

Dr. Stenchikov’s research interests are in multi-scale modeling of environmental processes (e.g., numerical methods, global climate change, climate downscaling, atmospheric convection; assessment of anthropogenic impacts and geoengineering; air-sea interaction, evaluating environmental consequences of catastrophic events like volcanic eruptions, nuclear explosions, and forest and urban fires, and air pollution, transport of aerosols, chemically and optically active atmospheric tracers, their radiative forcing and effect on climate. (Ph.D., Moscow Physical Technical Institute, Russia)

Shuyu Sun
Assistant Professor, Applied Mathematics and Computational Science; Assistant Professor, Earth Sciences and Engineering

Dr. Sun’s research interests are in the numerical solution of partial differential equation systems with engineering applications. He has been working in the computational modeling of single-phase and multi-phase flow in reservoir engineering, and contaminant transport in groundwater, bays and estuaries. Other areas of Dr. Sun’s research work include computational angiogenesis in biomedical engineering. (Ph.D., University of Texas at Austin, United States)

Raul Tempone
Associate Professor, Applied Mathematics and Computational Science

Dr. Tempone has been working on posteriori error estimates for stochastic differential equations (SDEs). These equations have been used extensively in many areas of application, including, among others, chemistry, biology, physics as well as social sciences and finance. Dr. Tempone has pursued related research for deterministic differential equations producing novel results, namely the analysis of convergence rates of adaptive algorithms for ordinary differential equations and partial differential equations (PDEs). (Ph.D., Royal Institute of Technology [KTH], Sweden)

Antoine Vigneron
Associate Professor of Computer Science

Dr. Vigneron’s research focuses on the complexity of algorithms for motion planning, description of shape, and proximity search; applications in biology, engineering and robotics. (Ph.D., Hong Kong University of Science and Technology, China)

Ying Wu
Assistant Professor, Applied Mathematics and Computational Science

Dr. Wu focuses on Effective Medium Theory for elastic metamaterials and wave propagation in strongly scattered random elastic media; metamaterials for elastic waves; electromagnetic waves in random media. (Ph.D., Hong Kong University of Science and Technology, China)

Mohamed-Slim Alouini
Professor, Electrical Engineering

Dr. Alouini’s research interests are in the modeling, design, and performance analysis of wireless communication systems. (Ph.D., California Institute of Technology, United States)

Panos Kalnis
Associate Professor, Computer Science

Dr. Kalnis focuses on databases. Among other areas, he is interested in efficient query processing of very large datasets (e.g., data warehousing), highly distributed databases (e.g., peer-to-peer systems) and data processing that requires a lot of computational power (e.g., multi-core processors). (Ph.D., Hong Kong University of Science and Technology, China)

Aslan Kasimov
Assistant Professor, Applied Mathematics and Computational Science

Dr. Kasimov is interested in analysis and numerical solution of partial differential equations in connection with problems of compressible flow, shock and detonation dynamics, combustion, fluid dynamics, nonlinear waves, hydrodynamic instability, traffic flow and congestion phenomena, multi-phase flow, and fluid flow interaction with elastic boundaries. (Ph.D., University of Illinois, United States)

David Ketcheson
Assistant Professor, Applied Mathematics and Computational Science

Dr. Ketcheson’s research interests are in the areas of numerical analysis and hyperbolic PDEs. His work includes development of efficient time integration methods, wave propagation algorithms, and modeling of wave phenomena in heterogeneous media. (Ph.D., University of Washington, United States)

David Keyes
Dean, Mathematical and Computer Sciences and Engineering; Named Professor, Applied Mathematics and Computational Science

Dr. Keyes’ research interests include scientific computing, parallel algorithms, parallel performance analysis, computational aerodynamics, computational radiation transport, computational combustion, and optimization. (Ph.D., Harvard University, United States)

Taous-Meriem Laleg-Kirati
Assistant Professor, Applied Mathematics and Computational Science

Dr. Laleg-Kirati works on developing new signal analysis tools, cardiovascular modeling and analysis, solutions and inverse scattering theory, numerical computation of Fourier Integral Operators, and Inverse Problems. (Ph.D., INRIA, Paris-Rocquencourt and Versailles Saint Quentin en Yvelines University, France)
Fabrizio Bisetti
Assistant Professor, Mechanical Engineering
Dr. Bisetti’s research interests are in computational fluid mechanics applied to multi-physics, multi-scale complex flows including turbulent reactive flows, turbulent aerosols and flame synthesis of nanomaterials. (Ph.D., University of California, Berkeley, United States)

Victor Manuel Calo
Assistant Professor, Earth and Environmental Sciences and Engineering; Assistant Professor, Applied Mathematics and Computational Science
Dr. Calo’s research interests include the computational aspects of geometrical modeling, fluid dynamics, solid mechanics, phase separation, fluid-structure interaction, geomechanics, and high-performance computing. (Ph.D., Stanford University, United States)

Sahraoui Chaieb
Associate Professor, Mechanical Engineering
Dr. Chaieb’s research interests are in biomembranes biophysics with application in cell mechanics and drug delivery, nanomaterials for biological and renewable energy applications and nanotechnology. (Ph.D., École Normale Supérieure, France)

Suk Ho Chung
Director, Clean Combustion Research Center; Professor, Mechanical Engineering
Dr. Chung’s research interest is in fundamental combustion focused on energy, environment, and fuel issues, related to high-efficiency low-emission combustion systems of internal combustion engine, gas turbines, and boilers and burners. (Ph.D., Northwestern University, United States)

Christian Claudel
Assistant Professor, Electrical Engineering and Mechanical Engineering
Dr. Claudel’s research interests are in cyberphysical systems monitoring and participatory sensing, with emphasis on environmental applications. (Ph.D., University of California, Berkeley, United States)

Tamer El Sayed
Assistant Professor, Mechanical Engineering
Dr. El Sayed’s research interests are in the constitutive modeling of soft materials applied to traumatic brain injuries and reinforcement of structures. He is also interested in crystal plasticity, uncertainty quantification, and large scale computing. Dr. El Sayed is the principal investigator of the Computational Solid Mechanics Laboratory (CSML) at KAUST with the primary goal of formulating verified and validated massive parallel computational campaigns to advance predictive science. (Ph.D., California Institute of Technology, United States)

Aamir Farooq
Assistant Professor, Mechanical Engineering
Dr. Farooq’s research interests are in the areas of energy sciences, combustion chemistry, and laser diagnostics. He is interested in the development of new laser-based sensors and their application to energy-conversion processes of renewable and traditional energy resources. (Ph.D., Stanford University, United States)

Iain Foulds
Assistant Professor, Electrical Engineering
Dr. Foulds researches microfabricated cell arraying devices for use in automated study of cell metabolic processes. (Ph.D., Simon Fraser University, Canada)

Andrea Fratalocchi
Assistant Professor of Electrical Engineering and Applied Mathematics and Computational Science
Dr. Fratalocchi’s research focuses on linear and nonlinear waves in disordered systems, with applications in energy, medicine and materials science. (Ph.D., University of Rome, Italy)

Ibrahim Hotiel
Assistant Professor, Earth and Environmental Sciences and Engineering
Dr. Hotiel’s research interests are in the theoretical developments of advanced data assimilation methods for the estimation of the state of large dimensional nonlinear systems. He is also involved in the development of oceanic and atmospheric data assimilation systems. (Ph.D., Université Joseph Fourier, France)

Muhammad Mustafa Hussain
Assistant Professor, Electrical Engineering
Dr. Hussain’s research vision is to integrate advanced nanomaterials with nanofabrication into ultra low or no power electronics and micro-systems to build integrated nanotechnology for energy, environment, and medical applications. (Ph.D., University of Texas at Austin, United States)

Ghassan Jabbour
Professor, Electrical Engineering and Materials Science and Engineering
Dr. Jabbour’s research interests include photovoltaic materials and devices; flexible and stretchable nanotick electronics and photonics; nano and macro printed electronic, and optoelectronic materials and devices; optimization of OLEDs performance and integration; optics and materials science of thin films and nanostructures; combinatorial techniques in photonic and electronic materials discovery; photosensitive materials for optoelectronic applications; chemical and biological sensors; quantum simulations of materials. (Ph.D., University of Arizona, United States)

Sigurjón Jónsson
Associate Professor, Geophysics
Dr. Jónsson’s research focuses on the use of satellite geodesy, primarily satellite radar interferometry (InSAR) and GPS, to study areas threatened by major earthquakes or volcanic activity. He uses these crucial deformation measurements, along with modeling, to retrieve information about subsurface geophysical processes such as earthquake fault slip, post-seismic relaxation, and magma accumulation. (Ph.D., Stanford University, United States)

Jürgen Kosel
Assistant Professor, Electrical Engineering
Dr. Kosel’s research interests are in sensors for biological and technical applications, microsystems, biomedical engineering, magnetism, and materials science. (Ph.D., Vienna University of Technology, Austria)

Gilles Lubineau
Associate Professor, Mechanical Engineering
Dr. Lubineau’s research interests include virtual testing, identification, modeling, and simulation strategies for composites, especially for predicting severe mechanisms of degradation in ORP. (Ph.D./Habilitation, École Normale Supérieure de Cachan (ENS-Cachan), France)

Martin Mai
Associate Professor, Geophysics
Dr. Mai’s research interests include the physics of earthquakes and the resulting complexity of earthquake phenomena, as seen, for instance, through earthquake-source imaging, dynamic rupture modeling, and numerical simulation of the long-term evolution of faults and related earthquake characteristics. His works extends to ground-motion simulation for seismic-hazard and earthquake-engineering applications. (Ph.D., Stanford University, United States)

Aurelien Manchon
Assistant Professor, Materials Science and Engineering
Dr. Manchon’s research addresses the issue of spin transport in magnetic and non-magnetic hybrid structures, as well as its interaction with magnetization dynamics. (Ph.D., Université Joseph Fourier, France)

Boon S. Ooi
Professor, Electrical Engineering
Dr. Ooi’s research interests are in the theoretical and experimental study of semiconductor nanostructures and monolithic integration of photonic devices for fiber-optic communication, sensor, and biomedical imaging applications. (Ph.D., University of Glasgow, Scotland)

Iman S. Roqan
Assistant Professor, Materials Science and Engineering
Dr. Roqan studies optical, magnetic, and structural properties of semiconductors, to investigate the optical excitation mechanisms and to improve the quality of the grown films and their luminescence and ferromagnetic properties. She is also interested in improving the performance of optoelectronic devices and optical spectroscopy for other materials, such as biomaterials. (Ph.D., University of Strathclyde, Scotland)

Khaled Nabil Salama
Assistant Professor, Electrical Engineering
Dr. Salama’s research interests cover a variety of interdisciplinary aspects of electronic circuit design and semiconductor fabrication. (Ph.D., Stanford University, United States)

Ravi Samtaney
Assistant Professor, Mechanical Engineering
Dr. Samtaney’s research interests are in areas of alternative energy, computational fluid dynamics and plasma physics, numerical methods, and high-performance computing. (Ph.D., Rutgers University, United States)

Gerard Thomas Schuster
Professor, Geophysics
Dr. Schuster’s research interests are in seismic imaging applications in engineering, earthquake hazard mitigation, and exploration geophysics. He is the coordinator of the KAUST seismic field laboratory that consists of more than 600 channels of recording geophone stations linked by a state-of-the-art digital network. He is actively pursuing the theoretical and practical development of seismic interferometry. (Ph.D., Columbia University, United States)

Udo Schwingenschlögl
Assistant Professor, Materials Science and Engineering
Dr. Schwingenschlögl’s research interests concentrate on the electronic and structural properties of nanocrystalline systems, in particular those including surfaces and interfaces. (Ph.D., Universität Augsburg, Germany)

Atif Shamim
Assistant Professor, Electrical Engineering
Dr. Shamim’s research interests are in System-on-Chip (SoC) and 3D ceramic or organic System-on-Package (SoP) designs to realize highly miniaturized and smart wireless components/devices for wearable and implantable biomedical sensors, advanced personal communication appliances and energy harvesting modules. (Ph.D., Carleton University, Canada)

Georgiy Stenchikov
Professor, Environmental Science; Professor, Applied Mathematics and Computational Science
Dr. Stenchikov’s research interests are in multi-scale modeling of environmental processes and numerical methods; global climate change, climate downscaling, atmospheric convection; assessment of anthropogenic impacts and geoengineering, air-sea interaction, evaluating the environmental consequences of catastrophic events like volcanic eruptions, nuclear explosions, forest and urban fires; and air pollution, transport of aerosols, chemically and optically active atmospheric tracers, and their radiative forcing effect on climate. (Ph.D., Moscow Physical Technical Institute, Russia)

Shuyu Sun
Assistant Professor, Physical Sciences and Engineering
Dr. Sun’s research interests are in computational methodologies for a variety of engineering and scientific applications. His research includes the modeling and simulation of single-phase flow, multi-phase flow and reactive transport in porous media, as well as the numerical analysis of relevant algorithms. (Ph.D., University of Texas at Austin, United States)

Sigurdur Thoroddsen
Professor, Mechanical Engineering
Dr. Thoroddsen’s research interests are in experimental fluid mechanics, focusing on the use of ultra-high-speed video imaging to study the dynamics of free-surface flows. (Ph.D., University of California, San Diego, United States)
The Coastal & Marine Resources Lab facilitates Red Sea research and development, thereby taking advantage of KAUST's spectacular geographic location. It constructs and deploys modern oceanographic instrumentation; provides operational services to support research vessels for marine exploration, diving and sampling; maintains indoor and outdoor seawater facilities for culturing marine organisms.

The Imaging and Characterization Laboratory has comprehensive facilities for scanning, transmission, confocal, and Raman microscopy, magnetic and thermal measurements, and other instrumentation for materials characterization. These allow the visualization of nanostructures, devices and surfaces down to the level of individual atoms.

The Nuclear Magnetic Resonance (NMR) Laboratory comprises a suite of 10 NMR spectrometers for solution-based and solid-state samples, together with comprehensive sample preparation facilities for the study of macromolecular structures and spatial distributions, dynamics in solution, and chemical composition of small features in solid-state samples. All spectrometers are equipped with hardware for state-of-the-art multinuclear experiments, including gradient probes and the capability for multi-channel pulsing with deuterium decoupling. Cryoprobes are installed at all field strengths.

The Analytical Chemistry Core Lab has facilities for spectroscopy, chromatography and mass spectrometry, trace metals analysis, wet chemistry, and surface analysis. The state-of-the-art instrumentation and operations are controlled by a Labware LIMS system.

The Proteomics Core Lab has state-of-the-art instrumentation for the discovery and characterization of proteins implicated in important cellular processes. Focus will be on deep Proteome Analysis for the discovery of putative functional regulatory proteins.

The Nucleic Acid Synthesis (Oligo) Core Lab uses state-of-the-art instrumentation for the manufacture of DNA, RNA and a broad range of analogs of these molecules as unique reagents to facilitate the development of highly specialized biological assays for the elucidation of gene structure and function in the genome.

The Genomics Core Lab provides services vital to the study of cellular materials by focusing on genetic analysis of samples. This includes DNA sequencing and synthesis, as well as micro-array and real-time PCR analysis.

The Nanobiology Lab is part of the KAUST Electron Microscopy Facility that serves as a state-of-the-art instrumentation and techniques center for nano-characterization studies in life and materials science. These techniques include Cyto Em (examination of vitrified samples).

The Nanofabrication Laboratory comprises 2000 sq m of Class 1000 clean room space, with multiple bays at Class 100. It integrates a diversity of advanced tools for the fabrication of micro/nano-scale devices to support research in advanced materials, biotechnology, electronics and photonics, and MEMS/NEMS. Each service bay has a full complement of utilities, including high purity DI water, high purity nitrogen, reactive gases, and chilled water.

ADVANCED COMPUTATION AND VISUALIZATION FACILITY

The Visualization Lab at KAUST hosts a Mechdyne-built CAVE, creating the world's highest resolution and brightest virtual environment. This immersive visualization facility comprises 24 of the world's highest native resolution projectors (4096 x 2160 pixels each), with four illuminating each side of a cubic space; a fully-immersive stereoscopic visual environment; 100 million pixels; allows up to 8 viewers in the environment.

An Advanced Audio Studio complements the visual experience. A CORNEA cluster provides computational power to drive the displays: 96 quad-core CPUs; 768 gigabytes of RAM; 12 TB of internal hard drive capacity; dual gigabit interprocessor connectivity; 2 x 10 gigabit uplinks; 96 FX5600 GPUs; 144 GB of graphics memory; 48 TB of external storage.

A Multi-Purpose Room has an ultra high resolution (32 million pixel) digital cinema projection system, allowing stereoscopic viewing for an audience of 75. This room also provides a reconfigurable dynamic collaborative display environment for inter-disciplinary research.

CENTER FOR DEEP COMPUTING RESEARCH AND SUPERCOMPUTING FACILITIES

KAUST has partnered with IBM to establish a Supercomputing Research Center. KAUST has named its supercomputer Shaheen, after the Arabian falcon famed for its swiftness of flight. This 16-rack IBM Blue Gene/P system is equipped with 4 gigabyte memory per node and capable of 222 teraflops, making KAUST campus the site of one of the world’s fastest supercomputers in an academic environment. KAUST is targeting petaflop capability within three years.

KAUST’s advanced IT infrastructure includes ubiquitous wireless and wired connectivity, with a 40 Gbps backbone and multiple 10 Gbps connections between campus buildings. Abundant dark fiber is ready to be activated when needed. KAUST will also be connected to the IT networks across the world, eventually running at 10 Gbps directly to Internet2 and GEANT2.

At KAUST, we have several Core Labs and Major Facilities that are available to support the research of faculty, scientists and graduate students.

The Analytical Chemistry Core Lab has facilities for spectroscopy, chromatography and mass spectrometry, trace metals analysis, wet chemistry, and surface analysis. The state-of-the-art instrumentation and operations are controlled by a Labware LIMS system.

The Proteomics Core Lab has state-of-the-art instrumentation for the discovery and characterization of proteins implicated in important cellular processes. Focus will be on deep Proteome Analysis for the discovery of putative functional regulatory proteins.

The Nucleic Acid Synthesis (Oligo) Core Lab uses state-of-the-art instrumentation for the manufacture of DNA, RNA and a broad range of analogs of these molecules as unique reagents to facilitate the development of highly specialized biological assays for the elucidation of gene structure and function in the genome.

The Imaging and Characterization Laboratory has comprehensive facilities for scanning, transmission, confocal, and Raman microscopy, magnetic and thermal measurements, and other instrumentation for materials characterization. These allow the visualization of nanostructures, devices and surfaces down to the level of individual atoms.

The Coastal & Marine Resources Lab facilitates Red Sea research and development, thereby taking advantage of KAUST’s spectacular geographic location. It constructs and deploys modern oceanographic instrumentation; provides operational services to support research vessels for marine exploration, diving and sampling; maintains indoor and outdoor seawater facilities for culturing marine organisms.

The Imaging and Characterization Laboratory has comprehensive facilities for scanning, transmission, confocal, and Raman microscopy, magnetic and thermal measurements, and other instrumentation for materials characterization. These allow the visualization of nanostructures, devices and surfaces down to the level of individual atoms.

The Nuclear Magnetic Resonance (NMR) Laboratory comprises a suite of 10 NMR spectrometers for solution-based and solid-state samples, together with comprehensive sample preparation facilities for the study of macromolecular structures and spatial distributions, dynamics in solution, and chemical composition of small features in solid-state samples. All spectrometers are equipped with hardware for state-of-the-art multinuclear experiments, including gradient probes and the capability for multi-channel pulsing with deuterium decoupling. Cryoprobes are installed at all field strengths.
KAUST’S UNIQUE “MATRIX” STRUCTURE WHERE SCIENTISTS ARE UNENCUMBERED BY DEPARTMENTAL BOUNDARIES AND WORK IN RESEARCH CENTERS ON TARGETED PROBLEMS

At KAUST, our Research Centers are organized around focused programs of research. They are designed to find answers through research to challenging and pressing problems that impact both Saudi Arabia and the world. They are not permanent units and are very adaptable. If the problems that a Research Center is working on are solved, then the Research Center has done its job. Resources will then be directed to other centers and other problems rather than used to perpetuate the Center.

The idea behind the Research Centers and our unique matrix structure of programs and research centers is that bringing scientists from many disciplines together to work on significant problems rather than leaving them in their separate labs to work independently will create important synergies. The interchange of various perspectives and various approaches will lead to new insights and faster progress.

A typical Research Center at KAUST consists of 8-10 members of faculty, 40-50 graduate students, research scientists and engineers, postdoctoral researchers, visiting researchers (including resident and visiting scientists from industry) and administrative and technical staff.

The Advanced Membranes and Porous Materials Center offers an interactive multidisciplinary scientific environment for experts and students in the fields of chemical, biological, and environmental engineering, materials science, nanotechnology, and computer science to develop novel, cutting-edge technologies that provide efficient and sustainable separation processes.

The Catalysis Center develops new catalysts, new catalytic reactions, and new catalytic technologies. The center focuses on catalyst discovery and catalysis by design.

The Clean Combustion Center pursues leading solutions to global challenges arising from the combustion of fossil fuels, such as pollutant control, global warming and climate change abatement, and sustainable fuel usage.

The Computational Bioscience Center gathers experts in the fields of life and medical sciences, engineering, physics, chemistry, mathematics, and computer science to work together on experimental design, data acquisition and analysis, and development of sophisticated computational approaches to produce viable solutions for complex problems in biology and medicine.

The Geometric Modeling and Scientific Visualization Center performs fundamental and application-oriented research in a variety of areas of visual computing, such as geometric modeling and geometry processing, scientific visualization, virtual reality, rendering, simulation, computational geometry and topology, computer vision, and imaging science.

The Plant Stress Genomics Center focuses on identifying salt and drought tolerance genes and pathways in naturally drought- or salt- tolerant plants (e.g., xerophytes, resurrection plants, and halophytes) as well as in model plants such as Arabidopsis and rice.

The Red Sea Center develops an integrated understanding of coral reef ecosystems and their oceanographic context - the physical, chemical, biological and geological environment, the stresses arising from natural as well as anthropogenic factors including overfishing, pollution, coastal development, and global climate change.

The Solar and Photovoltaics Engineering Research Center focuses on renewable energy science and engineering to provide the foundation for innovation in efficient and low-cost disruptive photovoltaic (PV) foundational technologies.

The Water Desalination and Reuse Center develops methods to expand sustainable water sources while minimizing energy use, chemical use, waste residuals, environmental impact and the carbon footprint.
Life at KAUST

GRADUATE SERVICES

The Offices of Development and Support and Campus Life support graduate student success by managing the delivery of services and resources of several offices. The office works closely with the Graduate Student Council and collaborates with other KAUST offices and departments to enhance graduate students’ experiences.

GRADUATE SKILLS LAB

The Graduate Skills Lab provides resources and services to graduate students in support of their overall academic success. The Graduate Skills Lab has services to assist students with English for Special Purposes. It offers tutoring as well as course instruction, workshops, seminars and one-on-one tutoring. Graduate students may make appointments for individual consultations.

GRADUATE RESIDENCE LIFE

Graduate Residence Life serves as a resource to students throughout their residential experience at KAUST. To complement graduate students’ academic and research pursuits, the office promotes educational, cultural, and social opportunities and encourages graduate students to capitalize upon the multicultural environment in which they live at KAUST. Graduate Residence Life coordinates with other departments to provide appropriate services and resources in support of a safe and positive living experience in KAUST.

GRADUATE INVOLVEMENT AND RECREATION

Graduate Involvement and Recreation provides opportunities for graduate students to develop their leadership and intercultural skills; fosters their learning and engagement; and promotes community in support of graduate student success. Graduate Involvement and Recreation manages graduate student organizations, which provide opportunities to participate in educational, social, cultural, and recreational programs, activities, and special events with peer colleagues.

PROFESSIONAL DEVELOPMENT

Professional Development prepares graduate students to make appropriate decisions and develop lifelong career management skills and to successfully negotiate and promote themselves in the job market; promotes employment and internship opportunities worldwide; facilitates on-campus networking opportunities with employers; and informs graduate students of the latest employment trends in science and technology. Graduate students may make appointments for individual consultations.

HEALTH, WELLNESS AND COUNSELING

Health, Wellness, and Counseling supports the complete physical, emotional, mental, spiritual, social and environmental well-being of graduate students, through individual and group sessions, workshops and outside referrals. Graduate students may make appointments for health and wellness-related consultations.

ATHLETIC FACILITIES

Students have access to extensive athletic facilities, which include: swimming pools; a rock climbing wall; billiard and snooker tables; exercise facilities staffed with professional trainers; tennis courts; squash courts; racquetball and badminton courts; a bowling alley; soccer; baseball and athletic fields; basketball courts; a 9-hole grass golf course (lighted); a beach; and a seaside marina with full yacht and sailing facilities.

Exercise and wellness programs are open to students. These programs are designed to meet individual interests and goals, as well as a wide variety of fitness levels. Programs include those for weight loss, stress management, cardiovascular endurance and sports-specific conditioning.

COMMUNITY SERVICES

Shopping, services, support—all easily accessible on campus

KAUST offers a variety of community resources to help students enjoy active, healthy lives by balancing their studies with satisfying leisure opportunities. The university offers shuttle bus and taxi services to students. Complimentary bus service is also offered to the nearby cities of Jeddah and Mecca.

The Council also seeks to expand the options and opportunities for student employment after graduation.

SCHOOLS

KAUST’s commitment to quality of life for students extends to all members of their families. From early childhood centers designed to enrich and engage preschoolers to high school programs that will prepare students to take on the challenges of higher education, the KAUST Schools provide a solid foundation for a lifetime of learning and achievement.

Community and residential services are provided and include: daycare centers; home maintenance; high-speed internet; satellite television; electricity and water; refuse removal; and local telephone service.

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Admissions

APPLICATION PROCEDURE

All applications must be submitted online at http://www.kaust.edu.sa

There are seven components to the KAUST application, including:

• Statement of purpose
• Curriculum vitae (CV)
• Official university transcripts
• Three letters of recommendation
• Official TOEFL or IELTS English language proficiency score (if English is not your native language)
• Official GRE scores (GRE submission is encouraged and will enhance an application, but it is not a compulsory requirement for consideration.)
• KAUST Scholarship Essay

APPLICATION REQUIREMENTS

The applicant should complete his/her bachelor/master’s degree prior to the semester of enrollment, in a KAUST-relevant field of study, such as Engineering, Mathematics, or the Physical, Chemical and Biological Sciences.

There is no minimum GPA requirement for admission. However, most candidates will have an average cumulative GPA of 3.5 or higher on a 4.0 scale or equivalent in other international grading systems. The average GPA of admitted students is currently 3.7 on a 4.0 scale.

KAUST requires a minimum TOEFL score of 79 on the IBT (Internet Based Test) or 6.0 on the IELTS (International English Language Testing System). KAUST’s university code for the TOEFL exam is 4107. Only official TOEFL or IELTS scores will be accepted. TOEFL or IELTS scores for tests administered by an educational institution for admission to that particular institution are not acceptable.

A TOEFL or IELTS score is not required if the applicant is a native speaker of English (English is the primary language spoken in the home) or received a Bachelor's degree from a university in the United States, Canada, United Kingdom, Ireland, Australia, or New Zealand.

KAUST does not require the GRE exam for admission. However, we encourage students to take the GRE general test. A high quantitative score on the GRE will enhance a student’s application. Official test results should be sent directly from ETS. The KAUST university code is 4139. The average score on the GRE quantitative section was 780 for admitted students in the 2010 admission.

A scanned copy of an unofficial transcript should be uploaded into the online application form. Please note an original or notarized copy of each transcript is required if you are offered admission and plan to enrol at KAUST. An official transcript must be sent directly from the university in a university sealed envelope to: Graduate Affairs, Building 9, Suite 4328, King Abdullah University of Science and Technology, 4700 King Abdullah University of Science and Technology Thuwal, Jeddah 23955-6900, Kingdom of Saudi Arabia

The applicant should submit a statement of purpose with his/her application. In this statement, the applicant should describe his/her motivation for seeking admission to KAUST and his/her preparation for the program to which he/she is applying. The applicant should describe research and study interests, as well as plans for the future. Demonstrating an aptitude for academic study and research-leadership potential may enhance an applicant’s statement of purpose.

The applicant must have three letters of recommendation submitted on his/her behalf. Letters of recommendation are extremely important and should be written by professors or advisers under whom the applicant has studied (course work or research). The recommender should provide details about how he/she knows the applicant’s work, as well as comparative statements (e.g., top 1% of class, best in past five years, etc.), and insight into research ability.

ADMISSIONS DEADLINES

Please check the KAUST website (www.kaust.edu.sa) for application deadlines. Normally, the deadline is October 15 for enrollment in the semester beginning in January and it is January 15 for enrollment in the semester beginning in September.

It should be noted that most programs have no formal closing date, however some programs will fill quickly and the applicant is advised to apply and complete his/her application before April for Fall Semester enrollment. This is to ensure that there is enough time for the visa application and relocation process.

FINANCIAL SUPPORT

The KAUST Fellowship is the scholarship program of the King Abdullah University of Science and Technology (KAUST).

The benefits of the KAUST Fellowship include:

• Full tuition support
• Monthly living allowance
• Housing
• Private medical and dental coverage
• Relocation support

ADMISSIONS CONTACT

Please contact the Admissions Office if you have any questions about applying to KAUST.

admissions@kaust.edu.sa

Telephone: +966 (0)2 808 3428

Graduate Affairs,
Engineering Building (Building 9), Suite 4328
King Abdullah University of Science and Technology,
4700 King Abdullah University of Science and Technology
Thuwal 23955-6900,
Kingdom of Saudi Arabia

www.kaust.edu.sa