

UC San Diego Launches Institute of Engineering in Medicine to Accelerate Innovative Health Care Technologies

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The world's top engineers, physicians and scientists are joining forces to conceptualize, develop and bring to reality the future tools and treatments of 21st century health care through UC San Diego's new Institute of Engineering in Medicine. Nanoparticle bombs to kill cancer, molecular-sized bridges to repair damaged hearts, and scarless surgery techniques, are now on the frontier of medical innovations in California with the new Institute leading the way.

"As is our tradition at UC San Diego, we are bringing together diverse fields of science to catalyze innovation in unconventional ways," said Marye Anne Fox, chancellor of UC San Diego. "The goal of this new organized research unit is to improve health care delivery through new tools, technologies and medicines."

"This is an important step toward the integration of two academic and professional disciplines that increasingly share common goals," said Shu Chien, M.D., Ph.D., professor of bioengineering and medicine, and founding director of the Institute at UC San Diego. "The Institute has already attracted a large number of outstanding faculty from UC San Diego's Schools of Medicine, Pharmacy, and Jacobs School of Engineering who all share the objective of translating creative ideas into clinical medicine and products that will transform patient care."

The Institute of Engineering in Medicine will intersect broad areas of research and focus on new approaches to disease identification, genomic medicine, clinical testing and monitoring, and the discovery of new drugs and therapies.

David Brenner, M.D., vice chancellor for Health Sciences and dean of the School of Medicine at UC San Diego, sees the Institute of Engineering in Medicine as a leader in designing next-generation therapies and devices.

"The next giant leap in patient care is going to happen through the joint efforts of engineering, medicine and pharmacy specialists, applying their expertise to expand the tool box for preventing, diagnosing and treating disease and injury," said Brenner. "Even though this formalized effort is still in its formative stage, we're already seeing exciting results from these collaborations that will have a profound impact at the patient's bedside."

The UC San Diego Institute of Engineering in Medicine aligns programs that are rated among the nation's best in *U.S. News and World Report's* annual "Top Graduate Schools" ranking, with the Jacobs School of Engineering ranked 11th, its bioengineering program ranked 2nd, and the School of Medicine ranked 14th among comparable graduate programs throughout the nation. UC San Diego is one of only four universities in the nation to have both a medical school and engineering school ranked in the top 15.

"With our top-ranked engineering and medical schools and our close ties to the region's strong life sciences and technology industries, UC San Diego is uniquely positioned to make a significant contribution to the advancement of technologies to improve medicine and save lives," said Frieder Seible, dean of the UC San Diego Jacobs School of Engineering. "The ideas and applications generated by the Institute will be aided by an

entrepreneurism center that has been recognized as a national model of effectiveness, and we will strive to move medical innovations out of the university and into patient care as quickly as possible."

The von Liebig Center for Entrepreneurism and Technology Advancement and the Office of Technology Transfer and Intellectual Property Services at UC San Diego, which have helped to spin off dozens of local biotech companies, will facilitate the process of commercializing the Institute's innovations.

Among the examples of projects underway at UC San Diego:

Engineers, physicians, and scientists have identified cells that may be capable of regenerating damaged or lost heart muscle in patients with cardiovascular disease.

The Nanotechnology Center of Excellence has developed nanoparticle drug delivery systems to fight cancer. These tiny 'smart bombs' specifically target spreading cancer, delivering cancer-killing drugs, while sparing healthy tissue.

The Center for the Future of Surgery is developing visualization technologies and other minimally invasive devices to make scarless surgery a reality.

State-of-the-art stroke care is being delivered to remote sites, proving that patients can receive potentially life-saving interventions any where in the world, thanks to wireless telemedicine applications developed in collaboration with the California Institute for Telecommunications and Information Technology (Calit2)

Chien said members of the new Institute are currently examining the roles of inflammation and blood flow in the progression of several diseases.

"The Institute will further research into developing novel anti-inflammatory therapeutic approaches for cancer, cardiovascular, metabolic and neurological disorders based on controlling cellular responses to injury and disease," said Chien, director of the Whitaker Institute of Biomedical Engineering at UC San Diego. "We will also investigate therapies that promote vascular remodeling and repair, including approaches that improve or reduce blood flow, depending on what is needed to treat a disease."

UC San Diego is already attracting some of the best students in the country to obtain joint M.D.-Ph.D. degrees in medicine and engineering. To train future healthcare technologists, the Institute will integrate engineering and medical concepts in classes and labs at the undergraduate and graduate levels. Workshops and a "Distinguished Lecture Series" will also explore topics related to regenerative medicine, nanomedicine, stems cells, medical devices and instrumentation, inflammation, and a wide range of other areas.

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