

## Engineering for the Global Good: the Agenda of the Jacobs School

In a talk to emeriti in April, **Albert P. Pisano**, Dean of the Jacobs School of Engineering, reviewed the school's ambitious agenda. He pointed out that it is now the largest engineering school in the state, with 217 faculty, 1,700 graduate students, and 6,500 undergraduates. It ranks 7<sup>th</sup> best in the U.S., 13<sup>th</sup> in the world for engineering, technology, and computer science, and 1<sup>st</sup> in the U.S. for biomedical engineering.

The aim of the school's programs is not only to provide students with an excellent preparation for entry into the high-technology job market but also to promote multidisciplinary research, in close cooperation with other campus units and industrial partners, aimed at promoting



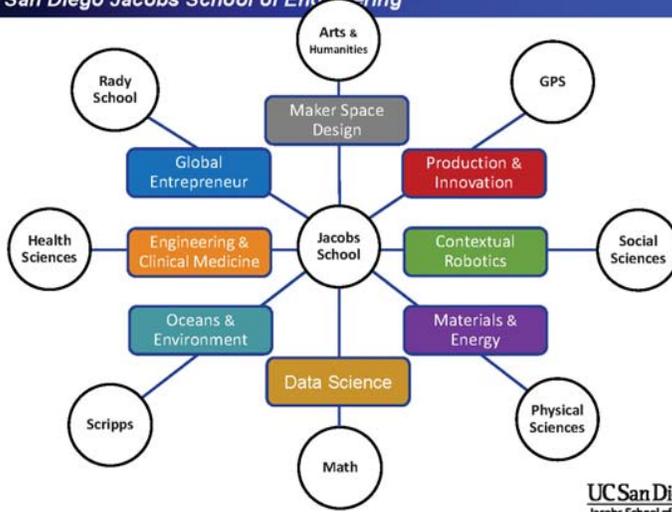
*Albert P. Pisano, Dean of the Jacobs School of Engineering*

human betterment across a wide spectrum of needs.

Dean Pisano mentioned several specific research programs that serve this goal as well as the general effort. One such effort involving "epidermal electronics" is designing a wireless-enabled stretchable sensor that can replace wired sensors in pediatric intensive care. Another has designed inexpensive sensors that can give early warning of landslides in deforested areas, notably in the Philippines. Other programs aim to address food shortages and deficits in medical care, energy, and clean water through biotechnology, informatics, nanotechnology, 3-D printing, artificial intelligence, robotics, networks and sensors, and advances in computational systems.

### One University

UC San Diego Jacobs School of Engineering



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## "Grand Challenges" in Engineering

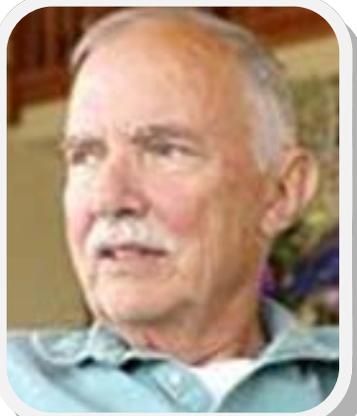
**By Lewis M. Branscomb**

*Professor Emeritus of Public Policy and Corporate Management, Harvard; Adj. Professor, IRPS and SIO*

The nature of academic engineering is evolving rapidly in two respects: the extent to which engineers work beyond their profession and their employers, and the extent to which the activities and goals of engineering are expanding beyond their traditional activities. Academic engineering is now being guided by a concern for human betterment. These trends became evident at the 50<sup>th</sup> anniversary meeting of the National Academy of Engineering last fall.

Traditionally most engineers worked in groups for private sector capital investors or government agencies, applying their technical knowledge to economic goals defined for them. Increasingly engineers are entrepreneurs using their technical knowledge for innovations. Digital technology has opened opportunities for engineers to exploit both their technical and their entrepreneurial talent.

A striking example is the "dot-com bubble" of 1997-2000 in which the inventions did not exploit new technologies, but rather used the internet for new digital ways of doing business. Traditional engineering, other than software skills, is not required. Many very large companies grew out of these digital business models in which customers need only open an internet program to order and receive a product. Successful examples are Amazon.com, which now supersedes traditional mail-order like as the Sears Roebuck Catalogue, and eBay, which sells used products from one customer to another. Many other successful companies sell information, such as Google, LinkedIn, Facebook and Twitter.



*Lewis M. Branscomb*

Relatively little new technology was needed for these new business models, and market entry for entrepreneurs was very low. Indeed many of these entrepreneurs built their application and made a beta (test) version of the software available to anyone, free of charge. Once a large number of customers had been attracted, additional services, including advertising, became the source of income. Is it not reasonable to consider digitally-based business models as much a source of entrepreneurial opportunities for engineers as the traditional process of carrying new science into new instruments and new capabilities of economic potential?

Another trend in goals and opportunities for engineers is the idea of defining an area of research and technical development focused on a specific goal. Such goals became called Grand Challenges early in the 21<sup>st</sup> century. They were usually identified by non-profit groups like the National Academy of Engineering (NAE), and funded by a government agencies or private foundations. In 2003 the NAE published a book entitled "A Century of Innovation: Twenty Engineering Achievements That Transformed our Lives". It assembled a list of 20 "Grand Challenges." Although **Charles Vest**, President of NAE, found the media response poor, the idea of Grand Challenges to focus technical activity toward societal needs became

popular. In the same year the Bill and Melinda Gates Foundation granted \$200 million for a Grand Challenge program in biomedicine, which was focused in 14 areas covering a broad range of collaborative fields. In the next year the Defense Advanced Research Projects Agency (DARPA) did the same for research on autonomous ground vehicles. This program to develop driverless vehicles was international in participation and was funded by Congress for a number of years.

Over time, engineering educators took the initiative to propose changes in the nature of engineering Grand Challenges to reach out to students and broaden the goals. A committee of three from Duke, Olin, and USC have joined with the NAE to encourage university groups to reach out to students, calling the program "Grand Challenges Scholars." This program was developed through discussions with a broad range of disciplines – engineers, scientists, business leaders, lawyers, social scientists, and humanists. It enables students from several universities to collaborate around an engineering Grand Challenge.

Since 2009, the White House, through its Office of Science and Technology (OSTP), has given priority to funding of these new Grand Challenge programs, along with the private sector. The current programs focus on goals that lead to a "sustainable, secure, healthy and joyful society." According to Duke Engineering dean **Tom Katsouleas**, the reason the new Grand Challenge programs are so important is "that they are in essence what we need to be human." Among universities whose engineering schools are planning strong roles is our own. Katsouleas told me recently that at the most recent White House conference on this new form of Grand Challenges in engineering the letter from Dean **Albert Pisano** describing his plans for the Jacobs School of Engineering was most impressive.

## America's Regulatory Leviathan

By **Jack Fisher**

*Professor Emeritus of Surgery*

In the Feb. 2007 issue of *Chronicles* (vol. VI, #3) I recounted UCSD's unplanned but timely role in the 1990s controversy over reports that medical use of silicone polymer implants would lead to an epidemic of breast cancer. That first false alarm later evolved into the further claim that autoimmune diseases like lupus and scleroderma were also being caused by these implants. Several million patients implanted with a variety of medical devices using silicone -- at least a million with breast implants -- were given cause for concern. UCSD entered the fray when rheumatologist **Michael Weisman** working in collaboration with faculty of the Division of Plastic Surgery did the first clinical study using epidemiologic methods showing that silicone was not a factor in the incidence of rheumatic disease. Since then, other studies have altogether demolished the unwarranted fears.

The entire fiasco is the focus of my new book, *Silicone on Trial: Breast implants and the Politics of Risk*. Not only do I offer reassurances that silicone -- a polymer ubiquitous in our environment since the 1940s -- is safe, but I also remind the reader that regulation is a political process and not a scientific one, even when the device is based on technology. As a result, regulatory policies too often impede scientific progress out of regard for unwarranted suspicions and fears, and this will likely continue until there are significant improvements in math and science literacy.

Regrettably, the FDA is "still relying on 20<sup>th</sup> century regulatory science to evaluate 21<sup>st</sup> century medical products," according to



**Jack Fisher**

**Margaret Hamburg**, current Commissioner of the Food and Drug Administration (FDA). Meanwhile, as a result, the cost of bringing new drugs to market has skyrocketed to over a billion dollars while myriad measures offered to fix the agency are systematically ignored by a polarized Congress.

Setting aside the plight of breast implants in the 1990s, consider the progress of a Boston team presently developing what they call a "Bionic Pancreas," a remarkable device that promises to transform the management of diabetes. Closely monitored by many, including me as well as UCSD endocrinologist **Steve Edelman** who, like my wife, is a type 1 diabetic, the device was masterminded by Boston University bioengineer **Ed Damiano**, himself the father of a young diabetic son. Two percutaneous pumps are united with a continuous glucose monitor and programmed to operate from a smartphone. The two pumps deliver alternating micro-doses of insulin (which lowers the level of glucose in blood) or glucagon (which increases the level) while maintaining blood glucose levels within a pre-set normal range. All of this occurs automatically without need for the patient's constant attention. That is

the good news, marvelous news in fact.

The bad news is that development is now in the ninth year of FDA scrutiny, and final approval that allows for widespread clinical use is not expected for another three years. No new physiologic concept is operative here, nor is the component technology novel to the FDA. The reciprocal feedback relationship between insulin and glucagon is well known, and both continuous glucose monitors and insulin pumps have long been approved for clinical use. Remarkably, the development team considers that the FDA process is "moving along very well." Why? Because that is what innovators in America have become accustomed to.

Former FDA Commissioner Andrew Eschenbach argues passionately for accelerated drug and device approvals based on safety trials alone, followed later by post-market monitoring of efficacy using the very same subjects. Former Director of the FDA Office of Biotechnology **Henry Miller** (a UCSD Med School alum, incidentally) cites proven advantages to a contrasting model: the Nationally Recognized Testing Laboratory (NRTL). For example, the non-profit Underwriter's Laboratory (UL) regularly tests and certifies twenty thousand categories of consumer products, some of them potentially hazardous to life, at a small fraction of the high cost imposed by the FDA.

In Europe, a completely different regulatory climate exists. The European Medicines Agency (EMA) maintains a close liaison with medical professionals and draws heavily from their clinical expertise. In contrast, the FDA treats drug and device manufacturers as adversaries, functioning more like a policing au-

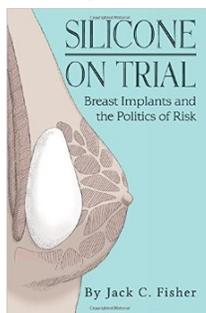
**America's Regulatory Leviathan**, cont. from pg. 3

thority. Only through its advisory committees, whose recommendations are often ignored, does the FDA maintain any link with medicine's specialty societies. Evaluation and approval of medical devices in Europe does not involve regulatory agencies directly. Instead, there are third party "notified bodies" that test and certify according to recognized standards. For a device with moderate risk like the bionic pancreas, average review and approval times are just over seven months.

In the United Kingdom, the Medical Device Directorate never found any scientific basis for re-

stricting the use of breast implants, especially for women seeking reconstruction following mastectomy for breast cancer. But in America, our FDA took fifteen years to approve a silicone gel breast implant that had been in clinical use since 1962.

*Silicone on Trial* provides the reader with both an understanding of what happened to the breast implant and a primer on regulato-



ry history which helps explain why the FDA functions as it does. The fact that entrepreneurs and regulators are predictably at odds with one another should not be a surprise to anyone; the innovator is by nature a risk taker whereas the regulator is mandated by the electorate to avoid risks. Bringing a new drug or device to market is therefore a confounding exercise in risk management. **James Madison** recognized the challenge when he wrote in 1788: "In framing a government which is to be administered by men over men, the great difficulty lies in this: you must first enable the government to control the governed; and in the next place oblige it to control itself."

## San Miguel de Allende -- An Expat Shangri-La

By **Robert Nemiroff**, *Professor Emeritus of Psychiatry*, and **Barbara Nemiroff**

High in the mountains of central Mexico in the state of Guanajuato is a town of courtyards, cobblestones and culture. Twenty-seven years ago a visit to San Miguel de Allende changed our lives. We found a haven for expats and visitors which pleased all the senses with its colonial architecture, colorful crafts, interest in music and the arts, and stimulating people. Mexicans consider it the prettiest town in Mexico. We fell in love with its warm days, cool nights (a benefit of an altitude of 6,000 feet) antique charm, reasonable prices and color, color and more color.

The town, known to Americano residents like us as SMA, was founded around 1540 and originally named for Father **Juan de San Miguel**. The name was amended in the nineteenth century to honor **Ignacio Allende**, a martyred leader of the struggle



for independence from Spain who was born there. Some years ago it celebrated its 450<sup>th</sup> birthday. When silver was discovered in the mountains, SMA found itself on the route between the mines and Mexico City. It became known as the staging and provisioning area for the mule trains which brought the silver to the coast and, eventually, Spain. As the town prospered, colonial mansions were built -- the same buildings that now house banks, restaurants, hotels and expats.

In 1810 the town played an important role in Mexico's War of Independence from Spain. Known as the "Cradle of the Revolution," SMA's local leaders, such as Allende and

Father **Hidalgo**, fought for independence. Initially, the rebellion failed; both men were captured and beheaded but the cause eventually triumphed.

**Stirling Dickinson**, an American artist, visited San Miguel in 1938. Like so many other people who followed, he fell in love with the town. He settled there after World War II, helping to found the art school, the Instituto Allende. Soon, other art and language schools followed and both Mexican and other artists, including **David Alfaro Siqueiros**, made San Miguel their home.

The current cultural scene is very rich. The annual chamber music festival held every August, features such internationally acclaimed string quartets as the Tokyo, the Emerson and the Ying. They present at least two concerts each and often stay to teach master classes. This is some of the best music we have ever heard.

There are also classes, lectures and tours throughout the year in many areas from art to yoga.

## "Dear Donors"

### Letters of Thanks to the Many Contributors to the Emeriti Chancellor's Scholarship Fund

Daily, I am reminded of the amazing opportunity afforded to me. . . Throughout high school, I was continually plagued with concern over how I would fund my college experience...My mother works as a secretary...and was never in any situation to pay for my education. . . I am presently seeking a degree in economics. My plan is to pursue a master's in education, as well as become credentialed to teach secondary school mathematics and social science.... From a student's perspective, your generosity is immensely significant. (**James Grizzle**, Marshall College).

I am currently a fourth-year studying Pharmacological Chemistry and Human Biology. It is my deepest desire to become a physician and diagnose life-threatening or debilitating illnesses before they occur. . . Like most of the recipients of this award, I grew up in a low-income environment and am a first generation college student. . . I never really felt poor. I had the love and support of my family . . . [but] my family could not support me financially. . . I intend to use every penny and resource I have been given ...to fully live my life by touching as many others as I can in positive ways. . . Thank you for your time, for your donations, and for your help. (**Sham A. Elja**, Marshall College)

I grew up in a big family. With one older brother and a younger sister in the house, and three much older half-brothers away at college ... there was no way my parents could afford to send us all to college. . . After a year here, I can say it is better than I could

have dreamed. I can focus on my education without having to worry about money, all due to this scholarship. Donors of the Emeriti Fund: you have all my thanks, for without you, I don't know where I would be. (**Ciara Dooley**, Revelle College)

I have always wanted to establish my own practice in family medicine in my hometown, San Jose . . . Being first generation Vietnamese, my own family has done all they can to assist me. With the scholarship my mother has a peace of mind that my education is affordable and that my dreams are closer in reach. . . Thank you again for making all this possible. (**Kevin Q. Dam**, Warren College)

In my mother's native country of Somalia, a destructive civil war plagued the entire region and death became frequent occurrence. . . She became a refugee. . . lured into immigrating to America because it was the land of opportunity. . . I am one of ten siblings and even though my father has worked tirelessly...the minimum wage cannot support a household of twelve . . . I knew that I must not squander the opportunity that my parents have given me... When I was notified that I was the recipient of the Chancellor's Scholarship, I was ecstatic. This year I feel closer than ever in my dream of becoming a doctor, which will put me in a position to do what I love . . . help those around me! I desperately hope that I will be able to be in your position one day to invest in the future and display the enormous generosity that you have shown. (**Abdikarin Mohamed Abdullahi**, Marshall College)

Coming from a humble background, my siblings and I are the first in our family to attend college

since both my parents emigrated from the Middle East. . . I want to pursue a research career in environmental engineering to innovate technology that utilizes renewable energy resources to redesign business models to lessen their rates of pollution, . . . I thank you in the most affectionate regards, because my studies and my life are already being so amazingly impacted . . . (**Miriam Issa**, Warren College)

I attended high school in a small town in northern California . . . I've grown enormously here . . . I've had the opportunity to advocate space exploration through the Triton Rocket Club, whose current mission is to send an exploratory vessel to outer space, a goal we are prepared to accomplish this year. I will be studying aboard in Scotland this summer. . . After graduation, I plan to pursue a graduate degree and to eventually travel to space . . . Your donation has enabled me to launch my academic career on a promising path, one that will hopefully lead to the stars. Thank you so much... (**Trevor Irwin**, Revelle College)

I applied as, and still am a General Biology major, but I am thinking of switching to Ecology, Evolution, and Behavior . . . My passion lies with animals and nature, and a career working and interacting with and helping to conserve populations is my goal... Because of your generosity, I have been given the opportunity to come to this wonderful institution, which I have absolutely fallen in love with these past few months... Thank you. (**Sarah Main**, Muir College)

**Thanks**, *cont. from page 5*

When I was about ten, my father passed away after a three-year battle with lung cancer. It was a heartbreaking moment for the entire family, but what I didn't realize at age ten was how difficult the situation must have been for my mother . . . Yet I never heard her complain. She may not have had

the opportunity to attend a university like I do, but she has inspired in me courage and strength . . . I am currently a biochemistry major. . . I am so incredibly happy to be here. Thank you very much for taking a chance on me. (**Brenda Ngo**, Warren College)

As a first-generation college student from a low-income family whose English skills are subpar,

attending UCSD was a big and important step. . . I am aiming to graduate with a degree in Bioengineering and go on to graduate school . . . The seminars we attend every week increase our awareness of all the resources we could be using to enrich our college lives. . . This scholarship helps us in so many ways . . . With appreciation and gratitude . . . (**Prior Vo**, Revelle College)

## Executive Committee Slate, 2015-2016

An E-election will be conducted in May. An email will be sent to all members who are subscribed to the Emeriti Association listserv: *Emerpost-1@ucsd.edu*. If you are a member of the UCSD Emeriti Association, and are not yet subscribed to the listserv, please let us know by email: *Emeriti@ucsd.edu*, and your email will be added. The approved slate of Officers and Members at Large will be installed at the Annual Business Luncheon, on June 3.

**Officers**

Henry Powell	President, Health Sciences
Mark Appelbaum	Vice President, Psychology, Campus
Phyllis Mirsky	Secretary/Treasurer, Libraries, Campus
Joel Dimsdale	Past President, Health Sciences

**Members at Large**

Carol Plantamura – 3 <sup>rd</sup> yr. term	Member at Large, Music, Campus
Roger Spragg – 3 <sup>rd</sup> yr. term	Member at Large, Health Sciences
Robert Knox – 2 <sup>nd</sup> yr. term	Member at Large, SIO
Joe Watson – 2 <sup>nd</sup> yr. term	Member at Large, Chemistry, Campus
Marguerite Jackson – 1 <sup>st</sup> yr. term	Member at Large, Health Sciences
Gil Williamson – 1 <sup>st</sup> yr. term	Member at Large, CSE, Campus

**Ex-Officio Members**

Sandy Lakoff	Editor, Chronicles
Jack Fisher	Historian
Suzan Cioffi	Director, UCSD Retirement Resource Center
Richard Attiyeh	CUCEA Representative
Nancy Groves	UCSD Retirement Association Representative
Maxine Bloor	Oceanids

**Retiring from the Executive Committee at the end of this year:**

Morton Printz	Member at Large, Health Sciences
Lea Rudee	Member at Large, Engineering, Campus
Dave Miller	Past President, Engineering, Campus

## Anecdote

By Sandy Lakoff

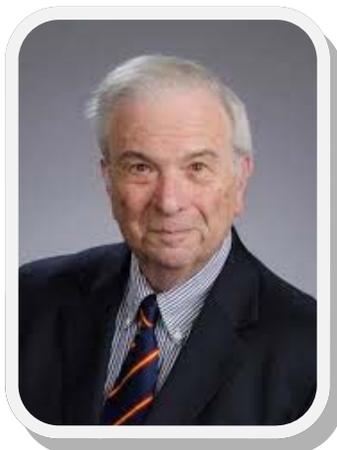
### Speaking Truth to Power

We do mellow with age.

I must have been all of 17 when a classmate and I were hauled into the high school's Vice Principal's office and dressed down for something we had written in the school newspaper. "You guys are trying to run this school!" he said indignantly. To which I brashly replied, "Well, somebody has to." I suppose they let me graduate just to get rid of me.

Fast forward to 1989. I had just returned from a meeting on arms control in Moscow between a delegation of UC faculty and American military men and diplomats and a comparable mix of Soviet counterparts. We had been astonished by the changed attitudes of the Russians in the wake of **Mikhail Gorbachev's** reforms. During a coffee break a Russian general took me aside with a translator to a picture window overlooking Red Square. "I want to tell you something," he said. "In the past, when I would return from international meetings, my daughter would berate me for doing nothing but making Cold War propaganda. Now I can look her in the eye and tell her honestly that I am working for peace." And he really was. The exchanges were frank and constructive.

After returning home, I was invited to address the Coronado Round Table, an assemblage of retired naval officers, ex-CIA agents and the like, all of whom looked like models for a Norman Rockwell painting of patriotic, God-fearing Americans. I tried my best to persuade them that the Russians were changing so much that the Cold War might be coming to



an end. The room was packed. There must have been as many as 200 in the audience -- and they were not buying my story. In the Q and A period, up rose a pint-sized spokesman I recognized as no other than **Ulysses S. Grant Sharp, Jr.**, the retired four-star admiral who had been CINCPAC -- Commander-in-Chief Pacific.

"Professor," he said, pronouncing the word as if it were a translation from the German *Dummkopf*, "intentions are one thing; capabilities are another. Intentions can change. We have to base our strategy on the enemy's capabilities." And he went on from there to put me in my place, which was about one step from leg irons and the brig.

To which I replied meekly, "Admiral, now I know how Fletcher Christian felt during the mutiny on the *Bounty* -- when Captain Bligh told him he would see him hanging from the highest yardarm in the British Navy."

\*

### The Albatross Award

Oceanographers really do have a sense of humor. Seriously. In 1952 several of them at work in Washington in the Office of Naval Research (ONR), realized there were no awards in the field. They decided to rectify the omission by

establishing a virtual entity they called the American Miscellaneous Society (AMSOC). Its mission was to "see the lighter side of heavier problems. But what trophy would they present? The two founders knew of a dusty stuffed Laysan Albatross stored here at the SIO



museum and decided it should be awarded from time to time and passed on. They gave it to themselves first since it was their idea and "knowing they might not otherwise be nominated." Among the later honorees have been **Roger Revelle**, **Teddy Bullard**, and **Walter Munk**. **Joe Reid**, who died in April after a 40-year career at SIO, won it in 1998 with a citation "for his outrageous insistence that ocean circulation models should bear some resemblance to reality." Give 'em the bird indeed! (*Thanks to Bob Knox.*)

**Past Imperfect:** In the last issue I recounted the tale of **Henry Kissinger** and his mentor **William Yandell Elliott**. One chronological detail needs correcting. Kissinger became National Security Advisor when **Richard Nixon** took office, which was of course in 1969, not 1961.

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## Chronicles

Newsletter of the UCSD Emeriti Association



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*Forward queries, changes in mailing/email address to:  
Suzan Cioffi, Director, UCSD Retirement Resource Center,  
UCSD, 9500 Gilman Drive, #0020, La Jolla, CA 92093-0020.  
Telephone: (858) 534-4724, [Emeriti@ucsd.edu](mailto:Emeriti@ucsd.edu)*

## Mark Your Calendar for Upcoming Events!



**Frank Biess, Professor of Modern History**

*"World War I and the Birth of the Modern World"*

Wednesday, May 13, 2015, 3:30 - 5:00 PM  
Ida & Cecil Green Faculty Club

### **Chancellor's Scholars Poster Session**

Wednesday, June 3 Ω 10:30 AM - 12 PM  
Seuss Room, Ida & Cecil Greene Faculty

Just prior to the  
UCSD Emeriti Association  
Annual Business Luncheon

Come see the work of the 2014  
Chancellor's Scholars Freshman Cohort!



### **UCSD Emeriti Association Annual Business Luncheon**

Wednesday, June 3 Ω 11:30 AM - 2 PM  
Ida & Cecil Greene Faculty Club

\$25 per member, Non-members: \$40

Please mail your check to:

UCSD Emeriti Association  
9500 Gilman Drive, Dept. 0020  
La Jolla, CA 92093-0020



**James H. Mckerrow**  
Dean of Skaggs School  
of Pharmacy &  
Pharmaceutical Sciences  
Topic: Tropical Diseases