drugs of the future:
Envisioning the Cures of Tomorrow
Drugs of the Future
School of Pharmacy researchers envision the next generation of drugs.

In Their Own Words
Five new scholarships to help students achieve their dreams.

Teaching Students to Read
Two faculty members prepare students to be tomorrow’s savvy health professionals.

Drugs of the Future
School of Pharmacy researchers are designing and developing new drugs while others are finding novel ways to deliver them to cellular targets. Wei-Chiang Shen, Ph.D., John A. Biles Professor in Pharmaceutical Sciences, portrayed on the cover, is one of the scientists featured in the cover story.
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THROUGHOUT MY CAREER, I HAVE WONDERED IF I’D EVER SEE pharmacy practiced the way it should be. When I finished my clinical training and my residency, I was sure that the clinical role of the pharmacist was just around the corner. I considered the excellent training that pharmacy students received—knowledge and clinical experience that prepared them to manage medications and wondered if all of that would be put to good use as part of the health-care continuum in my lifetime. I also considered my research colleagues and whether their work would be recognized and supported as they delved into therapeutic development, design, targeting and delivery.

Back in those times, I had great concerns as to whether the profession of pharmacy would be able to overcome the tides to push it back as a profession that was primarily dispensing in nature—behind high counters and divorced from the management of medication therapy. Similarly, back in those times, I questioned whether pharmacy school research programs would be adequately valued and supported as they focused their efforts on drug discovery and delivery to prevent, delay and treat disease.

“These are the best of times for pharmacy schools and the pharmacy professions.”

Today, I am very optimistic about pharmacy schools and the professions for which we prepare our students. At the USC School of Pharmacy and at sister schools across the nation, we are finally being recognized and included. Our educational paradigms are preparing students for clinical roles in an evolving health-care system that demands the pharmacist’s expertise in medication therapy management. The ACPE requires pharmacy schools to provide increased hours in experiential training, more students are opting for residency training to better prepare them for clinical roles and the scope of practice for the profession is expanding to include medication therapy management as a standard of care.

In research projects, where collaborative efforts are heralded, pharmacy schools are being called upon as the experts in drug development, design, targeting and delivery. From translational projects to stem cell endeavors, scientists at the USC School of Pharmacy, as well as pharmacy schools nationwide, are being included as pivotal members of teams seeking therapeutic options for the future. Clinical Translational Science Institutes around the country are recognizing the essential role that the pharmaceutical scientist must play in these new centers.

These are the best of times for pharmacy schools and the pharmacy professions. The unique expertise we bring is recognized and in high demand. The high counters are becoming more of a distant memory as we emerge as key players on the team that brings about optimal patient outcomes. Likewise, as our scientists at pharmacy schools identify new therapeutic options, their participation in today’s scientific community is sought after and greatly valued.

In 2007, the USC School of Pharmacy along with colleagues around the country took a few big steps forward. I’m eager for 2008 and the new territory we will walk.

R. Pete Vanderveen, Ph.D., B.C.P.P., R.Ph.
Dean, USC School of Pharmacy
Imagine taking a pill that would nullify your risk for cancer or prevent you from becoming an alcoholic. Imagine wearing a monitor that tells you precisely when it’s the best time to begin your drug therapy. How about convicts being able to medicate away the aggression that started all their troubles?

Sound like a regimen out of a futuristic comic book? Not for researchers at the USC School of Pharmacy, where these and other incredible drugs are on the horizon they see from the top of their laboratory benches.

"Drugs of the future are not the same as the drugs we think about now," says Sarah Hamm-Alvarez, Ph.D., chair of the department of pharmacology and pharmaceutical sciences and the Gavin S. Herbert Professor in Pharmaceutical Sciences. "They will not just be small molecules we take in pill form, not just the inhalers or chemical agents that we’re used to taking to treat an illness. The drugs of the future will differ in every way, from development and design to their targeting and delivery."

The new drugs, she says, will home in on a particular biologic issue—the genetic trigger of a disease, for instance, or the enzymes responsible for a protein’s action—and will change the actual biology. The difference is due to what she calls “a paradigm shift” in pharmacy research over the past 10-15 years, where drug developers have become experts not only in the art of pharmacology, but also molecular biology and computational chemistry and a host of other disciplines.

“To be successful in this environment, the breadth of knowledge and simple scope of things an individual researcher is asked to do has increased..."
There is now an expectation that you’ll initiate something and go a significant way to show its efficacy. That means understanding what contributes to disease and how to intervene within a cell to disrupt transitions to the diseased state.”

**NEW TYPES OF DEVELOPMENT**

Many drugs of the future will be designed specifically through a targeted process using modern tools in drug discovery and computational chemistry. This is especially true when there is an urgent need to develop drugs in a short period of time for the next infectious agents or in an epidemic. That is the work of associate professors Nouri Neamati, Ph.D., and Ian Haworth, Ph.D., who use computers to try to match chemical compounds with the biological processes—such as proteins in selected pathways they hope to affect. Called molecular modeling in the early 1980’s, the ideal goal of this state-of-the-art approach would be to potentially link the best drugs with a disease in a particular patient—using various algorithms to predict what will work.

“It’s the new frontier,” says Neamati. “We try to find the signatures for inhibiting a particular protein, then we search for that signature within the compounds in pharmacological space. Ideally we can validate our predictions in test tubes and know that this is the compound with all the perfect features—plus it’s safe.”

Neamati has used computational chemistry to search for a number of promising new drugs. He identified a drug-binding site in the HIV viral enzyme called integrase that is critical for HIV replication, and is targeting this enzyme with drugs that have the potential to reduce the viral load in HIV-infected individuals. He has also developed a new agent, SC144, which causes up-regulation of IL24—a very potent anti-cancer protein. SC144 is being evaluated in mouse models with the goal of being tried out for colon cancer patients.

His “holy grail,” as he puts it, is to design orally-active anti-cancer drugs selective for one target or one pharmacological pathway. “If you look at many of the cancer drugs, they’re used by injection, which means a trip to the hospital and a lot of patient inconvenience,” says Neamati. “If all the HIV drugs are oral drugs, why can’t we make cancer drugs oral, so you could just take it at home and not disrupt your life? I think that’s the future of cancer drugs, which translates to better quality of life for patients.”

While Neamati focuses on small molecule design—finding compounds that will fit or “dock” into active sites in proteins and enzymes—Haworth works on figuring out biomolecular interfaces between two larger molecules, such as proteins interacting with DNA or RNA.

**IAN HAWORTH, Ph.D., associate professor**

“It’s allowing the chemist to only synthesize molecules that at least have a chance of being successful.”
Using computers to ferret through the known properties of thousands of compounds and then trying to match that up with desired properties for specific disease processes, Neamati and Haworth hope to hit pharmaceutical pay dirt: a match that results in a viable drug. “It’s allowing the chemist to only synthesize molecules that at least have a chance of being successful,” says Haworth.

Haworth sees an even larger role for computational chemistry in creating drugs of the future: targeting specific drugs for specific diseases in specific individuals.

“There’s a lot of talk of personalized medicine, but I’m not sure it will happen the way people think, mainly for economic reasons,” says Haworth. “Drug companies may not make medicines for individuals or even small groups, because it would just be too expensive.”

Instead, Haworth sees potential in “whole cell simulation,” where the computer will be able to look beyond single molecule interactions and instead simulate all the interactions of a compound given all the variables of a particular cell. “Currently we can understand what the drug is hitting in the cell, and there’s a good sense that you can design a drug for a particular target and knock out the action of a particular protein and have an effect on a disease. But the trouble is that doesn’t always work the same in all patients—you get massively different outcomes.”

So the goal for computation 25 years out, according to Haworth, “is to have a computer model of a cell or at least part of a cell. Then, you can simulate putting the drug in the cell on the computer and watch what happens. If two patients both have disease X, for example, but one has much more active metabolism of glucose…which drug do we give and how much? We’ll have a very good possibility of picking the best therapy for that patient.”

In addition to computer aided modeling, technology is bringing a whole new focus to drug development: specific molecular targets that could potentially alter the course of a disease—or even a mental state.
Jean Shih, Ph.D., University Professor and the Boyd P. and Elsie D. Welin Professor of Pharmacology and Pharmaceutical Sciences, has won international acclaim for her study of how the brain enzyme monoamine oxidase (MAO) affects behaviors.

MAO influences many different neurotransmitters (chemicals that help nerve cells communicate), including serotonin, dopamine, and norepinephrine. Shih has worked on understanding how genes affect production of MAO—she tracked down two genes on the X chromosome that control the production of two different forms of MAO—MAO-A and MAO-B.

Using that genetic information, Shih created the perfect model for testing new drugs: MAO “knock-out mice” where the neurotransmitter function has been genetically engineered to create low levels of MAO. Not only are the mice much more aggressive than those with plenty of the enzyme, but the mice help us “see what compounds induce the various behaviors and what compounds can rescue this behavior,” says Shih.

Shih is testing ketanserine, a serotonin inhibitor that has been shown to reduce the aggressive behavior, and has hopes that “we will find it has other effects, because we know aggression, drug addiction, alcohol abuse and obesity all have overlapping molecular mechanisms.”

Understanding targets in the brain will also lead to better therapies for such addictions as alcohol and nicotine, suggests Ron Alkana, Pharm.D., Ph.D., professor of pharmacology and pharmaceutical sciences. Alkana, and his colleague Daryl Davies, Ph.D., have been investigating the neurochemical systems that serve as targets for alcohol in the brain—with an emphasis on identifying molecular sites and mechanisms of alcohol action on neurotransmitter receptor proteins.

“For a long time, people thought alcohol just acted by dissolving in the lipid membrane,” he says. “Now we know there are specific protein targets and even specific pockets within the proteins where alcohol acts.” Alkana is working to determine the actual molecular structure of these pockets and then plans on developing drugs to go into the pockets and block the actions of alcohol. “You could drink and not get the effects leading to dependence, and that could help create a drug that could provide new approaches for the prevention and therapy of alcohol-related problems.”

Another example of targeted therapeutics comes from the lab of researcher Bangyan Stiles, Ph.D., assistant professor, who is using knockout mice to target new therapies towards cancer and diabetes. A major focus of contemporary pharmacology is the dissection of molecular pathways that determine cell state, often referred to as signal transduction pathways. She focuses on pathways that control proliferation, differentiation and transformation to a cancerous state.

Stiles is studying the role of lipid phosphatase PTEN—a tumor suppressor—and its signaling...
PTEN plays a role in tumor development, tissue regeneration as well as glucose and lipid metabolism. The knockout mice carry deletion of PTEN, allowing Stiles to study tissue regeneration as well as the link between energy metabolism and tumorigenesis. “Cancer relies on enhanced and altered metabolic processes to supply its energy needs,” says Stiles. “If we can find out how PTEN regulates metabolism to block cancer progression, then we can develop anti-cancer drugs that target metabolism, ‘starve the cancer cells’, thus effectively stopping the growth of the disease.”

REVISISING EXISTING THERAPIES
Not all drugs of the future will come from entirely new sources. Researchers like Clay Wang, Ph.D., assistant professor of pharmaceutical sciences, are mining current therapies for extended potential. Wang has developed a unique method for trying to get more antibiotics and antifungals out of current sources, the bacteria and fungi that produce them.

“Probably 40% of current drugs in the market are naturally derived,” he notes. “The biggest difference between now and 50 years ago is that we actually start by looking at the gene first.”

When he started sequencing the genomes of the bacteria and fungi that make many antibiotics, “we realized they were making more drugs than we had previously isolated.” The organism that makes penicillin, for example, has the potential to produce about 41 different drugs, but “the genes are turned off. So now we try to upregulate or downregulate the genes to create the new drugs.”

Each of the antibiotics is made from specific enzymes. “It’s like different cars each made by different tools,” he explains. To bring out the newer drugs, Wang has developed a biosynthetic method with “garden variety e coli” that mimics the “tools.”

“I’m trying to build a general factory, so you can put in any one of the bacteria or fungi and make any of the antibiotics or antifungals you want from them.”

In some cases, the new drugs will simply be more effective ways of delivering drugs that exist now. Wei-Chiang Shen, Ph.D., the John A. Biles Professor of Pharmaceutical Sciences, is working on new ways to deliver protein molecules, like insulin and growth hormones, into the bloodstream. Traditionally such large molecules have to be injected—they are digested and broken down by the gastrointestinal tract and thus never make it to the cells if taken orally.

“Injection means low patient compliance and that makes the disease worse,” says Shen. So he has developed two new delivery systems. One system attaches proteins to transferrin, a blood plasma protein that is used to deliver iron ions to cells. “Known as the ‘Trojan horse method’, the proteins piggyback across the epithelium and are released into the bloodstream,” he says. To date the process is difficult and costly, and he’s working on a recombinant technology that combines the transferrin and insulin into one single protein. “Once we perfect the technology, we can hook any protein molecule to it,” he notes.

The other delivery system is a lipidization of the protein/peptide, linking the protein to a fat-soluble molecule. “Once you link a lipid to a protein you can change the physical properties, you create a molecule
that has both water and lipid solubility,” he notes. “Not only does this change delivery options, but it can change tremendously the behavior of the drug, like prolonged plasma half-life, targeting to tissue and increased absorption. So proteins/peptides could be taken in a capsule.”

Whichever protein/peptide delivery system ends up working the best, Shen says, an incredible side benefit will be that it could “also be applied to gene therapy. Both protein and gene delivery have poor absorption. Both require a very low dose to achieve a therapeutic effect. It could have enormous possibility.”

THE FUTURE IS NOW
Creating these possibilities will take researchers with a new attitude, says Hamm-Alvarez. “This old perception of scientists sitting in the lab doing science is really a thing of the past,” she says. “All of these scientists are the ones who are involved in the shifting of paradigms. Designing tomorrow’s drugs today means you have to be innovative, entrepreneurial and willing to take risks.”

To learn more about research at the School of Pharmacy, visit http://www.usc.edu/schools/pharmacy/research/.

“All of these scientists are the ones who are involved in the shifting of paradigms...”
In Their Own Words...

SCHOOL ANNOUNCES NEW SCHOLARSHIPS

A wife carries on a husband’s legacy….a professor wants to support the students he so respects and admires…..a community pharmacist wants to do something for a student in the profession that she has enjoyed for over 30 years...parents want to thank the USC School of Pharmacy for the excellent opportunities it has provided their daughter....an alum wants to give back and contribute to the future of a deserving student.

These are the recent donors who have made new scholarship gifts to the School of Pharmacy. While each has a specific reason and idea behind the gift, a common thread is found in their words: the desire to help USC School of Pharmacy students achieve their dreams.

Here, in their own words, is a roundup of scholarship news from the donors, themselves.

JOYCE AND HAROLD WASHINGTON ENDOWED SCHOLARSHIP

Joyce Washington set up this scholarship as a natural way to honor her late husband, Harold Washington, Pharm.D. (‘65).

“My husband was always a great supporter of the School and mentor to pharmacy students. He always contributed to the School and believed strongly in the high standards of the profession. Given this, it was only fitting to continue his legacy through a permanent means, a scholarship to support the future of the profession.”

The Joyce and Harold Washington Endowed Scholarship will be awarded to a level four student of African American heritage who exhibits professionalism, motivation, leadership initiative and personal achievement. Further, the student should be active in both school and community.

“The pharmacy profession made it possible for Harold to attain his personal professional goals and to also make life-long friendships along the way. Scholarship support will also help others accomplish their dreams,” says Joyce Washington.
Parents are typically grateful to schools and teachers who help show their children the way. Usually they express this appreciation with a card or a small gift, but I.R. and Kumud Patel decided to say “thank you” by establishing a scholarship.

“This scholarship is a thank you for what USC has done for our daughter Sheena, a level three Pharm.D. student. We are very proud of Sheena’s personal and academic growth and we feel USC has done so much for her. So, as parents, and for me as a pharmacist as well, we hope this scholarship will assist other young people,” said I.R. Patel, R.Ph., owner of the Bi-Rite Pharmacy in La Habra.

When Sheena was looking at pharmacy schools, she also wanted a program with joint and dual degree options. Both she and her parents were impressed with the many offerings that USC had and Sheena has subsequently also gained admission to the MS in Regulatory Science program at the School. Sheena is the current president of Phi Delta Chi fraternity.

“We are so impressed with the opportunities at USC and how the faculty has encouraged our daughter to become involved in activities beyond academics. We want to leave behind this legacy —this way the School will not only continue all that is does but will also be able to go that extra mile for today’s young people,” says Patel.

SHANA MELAMED SCHOLARSHIP

Shana Melamed, Pharm.D., is very straight-forward when she explains why she decided to establish an annual scholarship, “I’ve been a pharmacist for over thirty years, why not do something for someone else.”

While she was personally educated abroad, Melamed knew all about USC. When Dave Dyck, United Pharmacists Network Inc. and a friend of the School of Pharmacy, made a scholarship suggestion to her she “liked the idea of helping a student today”. She quickly made the decision to set up the scholarship.

“The scholarship allows me to contribute to ‘growing’ more pharmacists,” she says.

Melamed recognizes pharmacy as a tremendous profession and is very pleased that both her son and daughter-in-law are also pharmacists. As the owner of Rox San Pharmacy in the heart of Beverly Hills, Melamed is a dedicated compounding pharmacist, offering specialty formulations to meet customized patient health-care needs.

The annual scholarship will be awarded to a student interested in community pharmacy with a focus on compounding. Melamed has found a very impactful way to do “something for someone else”.

KUMUD AND I.R. PATEL FAMILY ENDOWED SCHOLARSHIP

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I.R. Patel is an active member of the Indian Pharmacists Association whose 2007 Annual Conference and Trade Expo featured Dean Vanderveen as the keynote speaker.
Since the day she graduated, Dolly Harris, Pharm.D. (’77), envisioned setting up a scholarship at the School of Pharmacy. “I wanted to leave a legacy that would support deserving students,” she says.

Harris sees the USC School of Pharmacy program as innovative and progressive and hopes that the scholarship will remove financial obstacles that might stand in the way of a future student. To Harris, USC is a paragon in pharmacy education and she is committed to supporting it.

“I feel very fortunate to have graduated from the School of Pharmacy and want to make the same opportunity available to others. In fact, I’ve specified that this scholarship will be awarded to a deserving African American male,” says Harris, who is a pharmacist inspector for the California State Board of Pharmacy and current president of the USC Pharmacy Alumni Association.

Harris hopes that students who receive the scholarship will become future donors, setting up scholarships of their own. As she puts it, “This scholarship has provided me with a unique opportunity to contribute not only to students and the USC School of Pharmacy but to California as well as the nation through financial participation in preparing tomorrow’s leaders.”

To Michael Wincor, Pharm.D. (’78), associate professor of clinical pharmacy and past president of the Pharmacy Alumni Association, setting up an endowed scholarship was a very personal act.

“I was grateful for the many opportunities made available to me by USC and the School of Pharmacy. Further, I wanted to make a contribution that would continue giving forever, supporting the outstanding students of the School.”

Wincor, on the School’s faculty since 1983, knows the students who will benefit from his largesse well. In addition to teaching, he is the faculty advisor to two major student organizations, APhA-ASP and CPhA-ASP. “I’ve been extremely impressed with the excellence, energy, creativity and success of our students over the years.”

The scholarship will be awarded each year to a Pharm.D. student who has demonstrated excellence in both academic and professional activities. In Wincor’s own words, “This scholarship will support our students—who are the substance of the School and the future of our profession.”

For more information on scholarships, contact Mary Wackerman at (323) 442-1360 or mwacker@usc.edu.
Dean Vanderveen speaks at the 4th National Conference on Pharmacy Education in Taiwan.

DEAN ESTABLISHES Collaborations in Asia

Dean Vanderveen presented an overview of accreditation requirements at US pharmacy schools to an audience of pharmacy educators held at the University of Taiwan in Taipei at the end of June.

The audience at the conference consisted of hundreds of educators, including many deans, from Taiwan, China, Japan, Korea, Thailand, the Philippines and Australia who are looking for ways to enhance their curriculums with an eye toward the US Pharm.D. model. Of particular interest to many educators throughout Asia are the clinical pharmacy programs that American students follow as part of their training to become pharmacists.

Vanderveen gave the audience an overview of how pharmacists are educated generally in the US and specifically at the USC School of Pharmacy. “This was a unique opportunity to share what we’ve learned in the US about accreditation and the value of clinical training in pharmacy education. They were very interested in the USC School of Pharmacy because of our 50 years of experience with offering the Pharm.D.,” says Vanderveen.

Also, while in Taiwan, Vanderveen spoke to the faculty and administration of the Chia Nan University of Pharmacy and Science. Chia Nan is the largest private pharmacy school in Taiwan counting over 40% of all practicing pharmacists in the country among the school’s alumni.

Vanderveen signed an affiliation agreement with the president of Chia Nan University, Chao-Hsiun Wang. The agreement specifies that the USC School of Pharmacy will work with Chia Nan as they move toward a more clinical curriculum and that the two schools will engage in both faculty and student exchange programs. President Wang is the father of School of Pharmacy Assistant Professor Clay C. C. Wang.

Vanderveen’s Asian visit also included meetings at Beijing Pharmaceuticals Group Ltd., National Taiwan University and the School of Pharmacy dean at Peking University.
Today’s health environment requires savvy professionals who know how to keep up with the overwhelming amount of information, how to understand what an article really says, how to apply the results of an article to patient care, and how to translate the information to patients.

Teaching Students to Read...

Steven Chen, Pharm.D., is a clinical pharmacist in primary care. Jeff McCombs, Ph.D., is a health economist whose research looks into patient outcomes and cost effectiveness.

Both are associate professors at the USC School of Pharmacy who team teach “Pharmacy Literature Analysis and Drug Information”. The required course is taught to level 2 Pharm.D. students. Dr. McCombs pushes the students to evaluate literature while Dr. Chen guides them towards applying the results of published trials to the care of patients.

Most students in the course have already been out in the field as interns, learning first hand how important it is to be able to explain recent research findings to patients. Their interest in the course is evident at a break during the 3-hour session, when a throng of students gathers around McCombs for questions and further discussion.

“My goal is to get students into the details of the article. I want them to dissect the tables associated with an article’s findings, understanding the data and enable them to come up with their own conclusions,” says McCombs.

The students get it and quickly recognize the value of the skills that McCombs is teaching.

“Learning how to assess research papers to better understand what a paper tells you and what it doesn’t tell you is what this course is all about,” says student Carlos Davila. “Researchers have some leeway—allowing them to sometimes skew results toward their own point of view.”

Davila is leaning toward a career in community pharmacy, an environment where patients will look to him for insights into

Noushin Lavian, Pharm.D. candidate 2010, discusses a study with Professor Jeff McCombs.
research findings. Steven Chen, who manages medication therapy for patients with chronic diseases in area safety-net clinics, knows how important it is for pharmacy students to graduate with the skills to keep up with the overwhelming amount of literature, analyze study results through an evidence-based management approach, and be able to translate the articles to the care of patients.

“Pharmacists are drug therapy experts. This course prepares our students to fulfill that role on the health-care team, both for other health professionals and for the public,” explains Chen.

The course is part of the Pharm.D. pharmaceutical economics sequence that teaches students how to read literature and how to maintain professional competence throughout their careers. Dealing with the abundance of information available today, the professors show students how to strategically approach literature, evaluate sources and review it in a timely manner. Further, the class looks at medical ethics, identifying studies contracted by a drug company, for example, and the impact that may have on the study findings.

“As a pharmacist, we’ll be required to keep up to date on current research. This class teaches us how to use our own judgment in determining if a claim is valid—less valid—or needs more research,” notes student Thao Vi Le. “Ultimately, I think this course will help me guide my patients.”

The course further shows students the importance of analyzing risk, based on study findings. “In today’s consumer press, headlines scare the public. For example, the press may correctly report that a new drug increases the risk of an adverse event by 50%. The consumer doesn’t understand that this is a 50% increase in the likelihood of a rare event. Assume that the risk of an adverse event is 1% if you don’t use a new drug. Using the drug would increase your risk to 1.5%—a 50% increase. News reporters love scary headlines even if they’re misleading,” says McCombs.

Chen believes that pharmacists have to be able to unravel this kind of reporting to confused patients. Further, he wants his students to be able to identify and learn to rely upon evidence-based literature, studies that have been constructed to produce sound findings.

“Students need to learn how to quickly identify the studies with credibility. There’s a great deal of clinically useless research out there; we want our students to know how to find research that follows appropriate protocols that produce reliable results,” says Chen.

“Students need to learn how to quickly identify the studies with credibility. There’s a great deal of clinically useless research out there; we want our students to know how to find research that follows appropriate protocols that produce reliable results”
HOMECOMING WEEKEND 2007

The School of Pharmacy had a slate of Homecoming activities culminating with the Trojans beating the Beavers. The weekend got off to a driving start with the 3rd Annual Alumni & Friends Golf Outing held at Brookside Golf Course in Pasadena.


left: Carol Gumpert, Norm Gumpert, Pharm.D. ('70), Karl Ishibashi, Pharm.D. ('73), Jim Roache, Pharm.D. ('70), and Tom McCarthy, Pharm.D. ('70), revving up for the game at the Homecoming Picnic.

right: Dean Vanderveen and the youngest Trojan cheerleader, Cara Tao, daughter of Glen Tao, Pharm.D. ('84), and Debbie Tao, Pharm.D. ('87).
Picnic revelers included Pamela Shigemitsu, Pharm.D. ('01), Layla Rakei, Pharm.D. candidate 2008, Hooman Milani, Pharm.D. ('02)/MBA ('06), Christine Castro, Jose Castro, II, Pharm.D. ('01), Steven Cao, and Alexander Cao, Pharm.D. ('01).

Left: Nicole Tavares, Pharm.D. candidate 2009, played in the golf tournament as did Gale Bensussen, member of the Board of Councilors, and Garrett Ow, Pharm.D. candidate 2008.

Right: Board of Councilor Tim Siu, MD, and George Sheu, Pharm.D. ('58), are Trojan-ready for the game.

Left: A. J. Caffentzis, group vice president, business management retail, AmerisourceBergen, holds the flag for a putting teammate as fellow golfer, Brad Trom, R.Ph., vice president of pharmacy operations-west region at Albertsons/Sav-on and a member of the Board of Councilors, watches.

Right: Rite Aid participants on the links included Amer Jawich, Pharm.D., district manager, John Acosta, Pharm.D., district manager, and Conrad Bio, Pharm.D., director of professional recruitment and college relations.
According to David Bruhn, the tide is changing and more and more people are willing to leave LA for the right opportunity in other cities.

He did, when he started working for Eli Lilly and Company in Indianapolis right after graduating from USC with a Pharm.D./MBA in 2002.

“I did an internship at Lilly while I was at the School of Pharmacy and they made me an offer in the fall of my last year,” says Bruhn who also got his undergraduate degree from USC in biomedical engineering.

Bruhn always knew he wanted to work in industry so the Pharm.D./MBA was made-to-order for him. To further enhance his understanding of the pharmaceutical industry while he was in school, he took many of his electives in pharmaceutical economics and policy, such as pharmaceutical commercialization and drug development.

The Pharm.D./MBA is a dual-degree program of the School of Pharmacy and the Marshall School of Business. The five-year curriculum requires that students spend their second year in the program at the Marshall School. When Bruhn was in the program, he also took some courses at night.

“Having the dual degree enabled me to hit the ground running when I joined Lilly,” says Bruhn who is the outcomes liaison team leader for neuroscience in the US Medical Division Global Health Outcomes Function of Lilly.

In his position, Bruhn manages a field group of people who meet with “big payer” customers, such as government and managed care companies, helping them understand the financial impact of adding a Lilly product to their formularies. Bruhn represents Lilly neuroscience products, over a $4 billion category at the company.

“My job is multi-faceted. While I work with the big payers, helping them understand the financial impact of a certain product, I also advocate for the patient by making sure that the right drugs are available to them. I critically review clinical trials, evaluating impact and figuring out the best formulary models and designs for given patient populations.”

Bruhn is enthusiastic when he talks about his work and acknowledges the role his education has played in allowing him to find this perfect position. He credits the Pharm.D./MBA degree with qualifying him for his current more technical position while also being able to discuss sales and marketing priorities. In many respects, his role exists at the intersection of business and science.

“I’m a translator. For some, I tell them the clinical value of a certain product. For others, I explain the economic value,” Bruhn says.

As for Indianapolis, Bruhn says he, his wife and two young daughters have found a great community in Indianapolis with young families just like them. In fact, they missed Indianapolis a great deal when David was assigned to a six-month project in South Korea earlier this year.

“Our experience in Korea was amazing. I really appreciate working for a big company like Lilly that presents so many opportunities,” says Bruhn. “But we’re always also glad to get back to Trojan territory and visit with our families and friends.”
After Vaishali Patel received her BS in pharmacology from Stonybrook University in New York, she worked for two years as a basic science researcher.

“I knew I didn’t want to do research as a career and was happy when I was accepted at USC in the Pharm.D./MBA program. However, once I started school, I realized the MBA was not right for me but I did want to go into industry,” says Patel. 

Once Patel was introduced to pharmaceutical economics and policy courses, she realized that the health outcomes field was where she wanted to focus her career. So, after completing her Pharm.D. in 2002, she started an MS program in pharmaceutical economics and policy. This program is collaboratively offered by the School of Pharmacy, School of Policy, Planning and Development, Department of Economics and the Department of Preventive Medicine.

During this time, she was awarded a fellowship by AstraZeneca which included a summer and one semester at the company. “At AstraZeneca, I worked as an analyst and learned to be strategic in my thinking, really applying the concepts I learned during my masters program,” says Patel.

While in the Pharm.D. program, Patel started the student chapter of the American Managed Cared Pharmacists at USC. She started this chapter along with classmates Juliana Setyawan, Pharm.D. (’02), and Ann Nakahira, Pharm.D. (’02). Her interest in managed care provided her with a sound foundation for her current position, senior manager of global health economics at Amgen. Patel is responsible for the dermatology indications of the drug, Enbrel.

“Pharm.D.’s bring great clinical knowledge to industry. Coupled with my MS degree, I’m able to offer my group cost effectiveness modeling, evaluation of patient outcomes in clinical trials and an assessment of claims research in an attempt to understand how health care dollars are actually spent,” says Patel. “Understanding managed care has been a real plus.”

Patel spends a good deal of her time writing for publication and presenting her work at meetings around the country. She generates new information that plays a role in the decision-making process of companies and payers nationwide. Her work provides these groups with the facts they need to make formulary and reimbursement decisions.

“I produce a great deal of information,” she says. However, right now, she’s not generating as much information, having just had her first child, a little girl name Annika.

“I always suggest to Pharm.D. students to try to do a rotation in the managed care field. It just might open a whole new career path,” says Patel.
Mel Baron, Pharm.D., associate professor of clinical pharmacy, believes that knowledge is a powerful tool in achieving positive health outcomes and he knows that people have to understand you to get a message.

So when he set out to educate people living in the neighborhoods around both USC campuses, he decided to use a fotonovela format. The fotonovela, a photo comic-book punctuated with soap opera themes, is a medium familiar to the Latino community.

“We held focus groups in the area to identify the best way to teach people about health. The fotonovela ranked high as a way to communicate to our USC neighbors,” says Baron who is an associate professor at the School of Pharmacy. “So far, we’ve produced two fotonovelas—one on diabetes and one on the importance of folic acid intake to prevent birth defects.”

These first two projects were met with tremendous success, distributed to the community through clinics, Good Neighbor Pharmacies and health fairs. Further, clinics and health officials around the country learned about them and requested copies for their communities.

Funding for these projects has come from multiple sources, beginning with seed money from the USC Good Neighbors Campaign. Like all GNC projects, this money is augmented with support from foundations, local clinics, pharmacies and corporations.

“Currently, we’re in production on two new themes—depression and pediatric asthma. Again, these fotonovelas will dispel myths and encourage people to seek professional treatment,” says Baron. “This is a medium that really speaks to the community.”

The fotonovelas are produced in both Spanish and in English. Baron and his team research perceptions of topics at hand, identifying the myths that pose barriers to adherence to treatment. The characters in the fotonovelas are everyday people trying to avoid or face up to their health needs. Ultimately, myths are dispelled, sound health information rises to the surface and the characters find the way.

“We use the foibles of we human beings to get our message across and it works. People relate to our characters,” says Baron whose team has also stages readings of the fotonovelas at health fairs.

In the depression story, the characters confront the stigmas associated with mental illness, stopping them from seeking the care they need to treat their disease. “In many Latino communities, depression is rarely discussed and dealt with,” says Baron.

The depression projection has been awarded a $20,000 grant from Eli Lilly and $25,000 from Takeda Pharmaceuticals in addition to a GNC grant. The pediatric asthma project has been awarded a $50,000 grant from QueensCare, an organization that provides accessible health care for uninsured residents of Los Angeles.

The pediatric asthma project addresses the myths that surround the disease, pointing out the importance of diagnosis and vigilant care of children with asthma. The story will strongly focus on the seriousness of asthma and the effectiveness of treatment. The fotonovela will be completed in 2008.

“The fotonovelas has emerged as a unique way for USC to communicate with the community,” says Baron. “And communication is one of our strongest tools to help people achieve optimal health.”

For more information about Dr. Baron’s fotonovela projects, E-mail him at mbaron@usc.edu.
The Titus Family Department at the School of Pharmacy has been awarded five grants, from industry, the CDC and the NIH, led by associate professor Jason Doctor, Ph.D., department chair Kathleen Johnson, Pharm.D., MPH, Ph.D., and professor Mike Nichol, Ph.D.

Jason Doctor’s $505,779 grant from the National Institutes of Health is developing a laboratory-error detection system that is more accurate than lab experts in identifying errors in clinical laboratory data. His proposal is timely, given the recent Institute of Medicine Study that claims medical errors cost the US between $17 and $29 billion a year. These errors are in part due to clinical laboratory analysis which contributes 70 million errors each year.

“Ultimately, our study will develop an error-detection method that labs can use in daily practice. By reducing these errors, we’ll put a system in place that saves lives and substantial health-care dollars,” explains Doctor who is the sole primary investigator on the project.

Doctor is also leading a $168,000 research project for the Centers for Disease Control that examines ways to help public health officials do disease surveillance. Using a computational approach, this work points to ways to predict disease outbreaks, thereby allowing for appropriate preparedness prior to the occurrence.

Mike Nichol, the QSAD Centurion Professor in Pharmaceutical Sciences, is leading two projects that are both supported by Pfizer, including HEART (Healthy Employee Adherence Research Trial), which evaluates the impact of cardiovascular intervention programs, and a retrospective study evaluating the effect of Medicare’s Part D Prescription Drug Benefit on Medicaid-Medicare dually eligible beneficiaries. The combined total for both grants is $378,819.

“HEART project is notable because we’re using a prospective randomized design to determine whether a combination of telephone messaging and educational materials is more effective than educational materials alone in encouraging medication adherence. Our focus on employees of relatively large U.S. firms will provide insight into behavioral effects on one of the largest insured populations in the country. Our other project looks at the effect of Medicare Part D on patients who are also eligible for Medicaid,” says Nichol. “This study will help develop models that predict future benefit structures and their consequences particularly among those who have dual eligibility.”

Dual eligibility provides an opportunity for patients to switch from one coverage to the other, resulting in profound effects on the cost structures of these programs. Nichol’s work will help identify predictive factors that can be used to better plan for future growth of these benefit structures.

Kathleen Johnson, the William A. and Josephine A. Heeres Chair in Community Pharmacy, is the primary investigator on a $693,000 grant from Wyeth Pharmaceuticals. Johnson’s work focuses on hemophilia and will examine treatment patterns, barriers to care and cost effectiveness of treatment courses. The study will draw patients from six treatment centers around the country, including two in California, and one each in Massachusetts, Texas, Colorado and Indiana.

“Our goal is to design a framework that indicates which interventions will produce targeted outcomes that improve quality of life and health outcomes for the patient,” explains Johnson, who chairs the Titus Family Department of Clinical Pharmacy and Pharmaceutical Economics & Policy. “Hemophilia is a disease that significantly impacts quality of life for patients. This study will identify the factors that can be modified to help these patients live fuller lives.”

School of Pharmacy researchers delve into impact and cost effectiveness of interventions in health-care systems.
California State Senator Gilbert Cedillo presented a resolution from the State Legislature commending the USC School of Pharmacy on the Senate floor on August 28 in Sacramento.

The resolution, co-sponsored by Assembly member Kevin de Leon, recognizes the school’s Titus Family Department of Clinical Pharmacy and Pharmaceutical Economics & Policy for exemplary work in eight safety-net clinics serving the neediest neighborhoods in Los Angeles.

The School’s community pharmacy work was previously honored with the 2007 Pinnacle Award, presented by the American Pharmacists Association Foundation, last summer in Washington, D.C.

Receiving the proclamation in Sacramento was Dean R. Pete Vanderveen; department chair Kathleen Johnson, holder of the William A. and Josephine A. Heeres Endowed Chair in Community Pharmacy; professor Mel Baron; and clinical pharmacist Marie Martinez.

The resolution applauded the School’s success in delivering clinical pharmacy services to homeless and low-income patients in Los Angeles. These services primarily care for patients with chronic diseases, most frequently diabetes, high cholesterol and hypertension, and have demonstrated significant improvements in patient outcomes directly attributed to pharmacist interventions.

Further, the resolution points to the program as a national model to improve health outcomes while saving precious health care dollars. By achieving improved disease control, the school’s work in the clinics has reduced medical costs by keeping patients out of emergency rooms and hospitals generally.

By implementing various pharmacy programs, the School’s work in the clinics also has produced drug cost savings.

While in Sacramento, the School of Pharmacy delegation met with elected officials to discuss the role of the clinical pharmacist in today’s health care environment and pharmacy policy issues.

In addition to meeting personally with the resolution sponsors, the group met with Assembly members Mervyn Dymally and Alan Nakanishi. The group also briefed staff from the offices of Senator Alex Padilla, Senator Mark Ridley-Thomas, Assembly member Karen Bass and Secretary of Health and Human Services Kimberley Belshe.
Titus Family Department
OF CLINICAL PHARMACY AND
PHARMACEUTICAL ECONOMICS & POLICY

FACULTY UPDATES

Mel Baron, Pharm.D., honored by the Board of Pharmacy with a certificate commemorating 50 years of active service to the pharmacy profession; awarded $32,300 from USC Good Neighbors Campaign, $20,000 from Eli Lilly and $25,000 from Takeda Pharmaceuticals for a fotonovela on depression; awarded $50,000 from QueensCare for a fotonovela on pediatric asthma.

Steven Chen, Pharm.D., featured in USA TODAY, front page of the Money section, October 1.

Jennifer Cupo-Abbott, Pharm.D., recognized as an American Society of Health System Pharmacists (ASHP) Fellow for excellence in pharmacy practice.

Shetal Desai, Pharm.D., recently joined the faculty as an assistant professor of clinical pharmacy.

Jason Doctor, Ph.D., awarded $505,779 from NIH for “Detecting errors in blood labs using Bayesian networks” project.

Jeff Goad, Pharm.D., MPH, named president elect for 2008 and president for 2009, CPhA.


Joel Hay, Ph.D., presented “Comparison of Asthma Costs and Utilization across Drug Therapies in a Managed Care Organization”, International Society of Pharmaceutics and Outcomes Research (ISPOR) 10th Annual European Congress in Dublin, Ireland, in October.

Kathleen Johnson, Pharm.D., Ph.D., MPH, William A. and Josephine A. Heeres Chair in Community Pharmacy, awarded $7,950 from USC Good Neighbors Campaign for “FUENTE Initiative”; appointed USC representative on California Health Benefits Review Program Task Force; presented “Opportunities for Colleges of Pharmacy to Reduce Health Disparities,” AACP/Board of Pharmacy meeting, October 4; co-authored op-ed, “Why shouldn’t pharmacists be prescribers?” in LA Times, October 22; awarded a Zumberge Interdisciplinary grant (up to $10,000) with colleagues from the Keck School of Medicine and the School of Dentistry.

Stan Louie, Pharm.D., received a $125,000 Whittier Foundation grant, with colleagues from the Keck School, to study the development of dimethylcelebrex for the treatment of glioma; awarded two Zumberge Interdisciplinary grants (each up to $10,000); with colleagues from the Keck School, entitled “Pilot Study: Angiotensin(1-7) Mediated Recovery from Radiation Exposure; the second grant to support the USC Center for the Study and Treatment of Bone-Related Disorders with colleagues from the department of chemistry and the School of Dentistry.

May Mak, Pharm.D., certified as a geriatric pharmacist by the Commission for Certification in Geriatric Pharmacy.

Edith Mirzaian, Pharm.D., certified in travel health by the International Society of Travel Medicine.

Tien Ng, Pharm.D., presented “The Cardio-Renal Axis in Heart Failure and Emerging Therapies” at CSHP Seminar in October; co-authored “Business Practice Model for Clinical Pharmacy Services in Inpatient Setting” in the book, How to Develop a Business Plan for Pharmacy Services; new preceptor for Heart Failure Training Program of the American College of Clinical Pharmacy; awarded $10,000 Titus Fund grant, designed to jump start research of junior faculty, to support his research in cardiovascular disease.

Mike Nichol, Ph.D., QSAD Centurion Professor in Pharmaceutical Sciences, received $303,819 from Pfizer for “Healthy Employee Adherence Research Trial (HEART); received $75,000 from Pfizer for a retrospective study to evaluate the impact of Medicare Part D prescription drug benefit on Medicaid-Medicare dually eligible beneficiaries; presented multiple topics at Society for Medical Decision Making conference in Pittsburgh in October; promoted to professor of pharmaceutical economics and policy.

Susie Park, Pharm.D., presented “Serotonin Transporter Gene Polymorphism of HCV Patients” at ACCP Annual Meeting, October 16; spoke about “Preparing for the NAPLEX and CPJE Exams” at CSHP Seminar in October.

Frances Richmond, Ph.D., named special professoriate, Titus Family Department of Clinical Pharmacy and Pharmaceutical Economics & Policy; featured in the October issue of The Scientist in the article, “For the Hottest Jobs, Go Regulatory”.

Mike Rudolph, Pharm.D., and Michael Wincor, Pharm.D., participated in a Hollywood Roundtable, sponsored by the Office of National Drug Control Policy, designed to educate television writers about prescription and OTC drugs, held at USC in August.

Raffi Svdjian, Pharm. D., and Mike Rudolph, Pharm. D., presented “Student Ownership 101: Teaching the Business of Community Pharmacy” at the NCPhA 109th annual convention.

Fred Weissman, Pharm.D., J.D., granted $2,500 from Allergan Foundation in support of the pharmaceutical development and commercialization course.

Bradley R. Williams, Pharm.D., guest editor for the California Pharmacist, August 2007 issue.

Annie Wong-Beringer, Pharm.D., elected a Fellow of the American College of Clinical Pharmacy.
neamati awarded $1.1 million for cancer research

Neamati’s work focuses on attacking tumor cells and the blood vessels that nurture them.

Nouri Neamati, Ph.D., associate professor of pharmacology and pharmaceutical sciences, has been awarded a National Institutes of Health RO1 grant of $1.1 million to study drug design, delivery and imaging pertaining to cancer drugs.

Neamati’s work features a novel drug system that delivers anti-tumor effects to both tumor cells and the blood vessels that feed them. His hypothesis has its greatest potential in highly metastatic tumors, such as non-small cell lung cancer.

“Since this project examines solid tumors that express integrin on the cell surface, our findings should also apply to other cancers, including brain, breast, prostate, ovary and colon,” says Neamati whose research is also supported by the American Association for Cancer Research, the Department of Defense and the American Lung Association.

Neamati works at the interface between the traditional laboratory and the computer lab. His expertise in computational drug design allows his lab to evaluate hundreds of thousands of compounds in the search for the right structure to do the job at hand.

His research has surfaced a number of compounds that have distinctively different structure and function qualities than known anti-cancer agents. This provides promise in lung cancer since many of the currently available chemo drugs are not effective against it.

“Our idea is to develop AV38, our highly selective integrin antagonist, as a novel anti-tumor agent for non-small cell lung cancer alone and in combination with currently used chemotherapy. We hypothesize that combining our targeted therapy with conventional therapy will increase efficacy without added toxicity to patients,” explains Neamati.

The research also calls for monitoring the effects of the agents through advanced imaging techniques.

“There are currently several agents that work to eliminate the integrin protein in cancer that have moved into pre-clinical and clinical trials. However, none of these studies are including non-small cell lung cancer. Our work fills this gap,” says Neamati.

Non-small cell lung cancer actually comprises 85% of all lung cancer cases. Currently, lung cancer is the leading cancer killer, ending the lives of over 160,000 Americans each year.

Neamati’s research also has support from the Louise Pfeiffer Research Foundation, Susan Komen Breast Cancer Foundation, the Whittier Foundation, the American Association of Cancer Research and the UniversityWide AIDS Research Program.

JUST IN

Nouri Neamati has been named editor-in-chief of the new international journal, Current Molecular Pharmacology, to be published both online and in print. First issue is slated for January 2008.
JEAN C. SHIH NAMED AMERICAN ASSOCIATION for the advancement of science fellow

Five leading scientists at USC, including Provost C. L. Max Nikias, have been named Fellows of the American Association for the Advancement of Science in recognition of outstanding contributions in science and engineering.

Jean C. Shih, Ph.D., School of Pharmacy professor and the sole HSC faculty member named, was recognized in the neuroscience category “for distinguished contributions to the field of molecular neuropharmacology, particularly for contributing to the present knowledge on monoamine oxidases and their roles in behavior”.

Shih, a University Professor and the Boyd P. and Elsie D. Welin Professor of Pharmacology and Pharmaceutical Sciences, has won international acclaim for her study of how the brain enzyme monoamine oxidase (MAO) affects behavior. Her laboratory was the first to clone the human MAO A and B genes and to unravel the structure, functions and regulations of these genes.

MAO has profound effects on behavior and influences neurotransmitters crucial to emotion, such as serotonin, dopamine and norepinephrine. For example, Shih’s work has showed that mice lacking both MAO genes display relentless aggression. Her findings have therapeutic applications for depression, anxiety and aggression as well as Parkinson’s and Alzheimer’s disease.

Shih, who has previously won two MERIT Awards from the National Institutes of Health, has had over thirty years of consecutive NIH funding for her work.

Joining Professor Shih and Provost Nikias as AAAS fellows are Maja Mataric, Viterbi School of Engineering, and Douglas Capone and Howard Taylor, both from the College. The USC awardees will be among 471 scientists honored at the Fellows Forum of the 2008 AAAS Annual Meeting in Boston in February.

The tradition of AAAS fellows began in 1874. Members are considered for the rank of fellow if nominated by the steering group of their respective sections, by three fellows or by the association’s chief executive officer. The AAAS Council votes on the final list.

The American Association for the Advancement of Science is the world’s largest general scientific society and publisher of the prestigious journal Science.

moving targets SCORES A BULL’S EYE

by Ann Lee

The sixth annual “Moving Targets” Symposium was held August 24 at the Westin Hotel in Pasadena. The program was entitled “Stem Cell Technology” and featured experts from around the globe.

Hosted by graduate students in the USC Student Chapter of the American Association of Pharmaceutical Scientist (USC-AAPS), the program was funded by AAPS, USC School of Pharmacy, Pfizer-La Jolla and Allergan.

Dr. Martin Pera, foundation director of the Broad Institute for Integrative Biology and Stem Cell Research at the Keck School of Medicine, kicked off the program with an overview on the promises and challenges of human embryonic stem cell research. He was followed by Dr. Qilong Ying, professor at the Broad Institute, presenting his findings on embryonic stem cell self-renewal, and Dr. Tiziano Barberi, head of the Laboratory of Stem Cells and Development at the Beckman Research Institute of The City of Hope, speaking on targeted differentiation of stem cells.

Dr. Roberta Diaz Brinton, the R. Pete Vanderveen Endowed Chair in Therapeutic Discovery and Development at the School of Pharmacy, discussed the applications of neural stem cells to treat age-related degeneration. She was followed by Dr. Jeffery Rosen who presented his work on the stem cell etiology of breast cancer. The lecture series wrapped up with keynote speaker, Dr. Michael
school of pharmacy hosts reception for researchers at annual meeting

The Department of Pharmacology and Pharmaceutical Sciences had a significant presence of both faculty and students at this year’s annual meeting of the American Association of Pharmaceutical Scientists held in San Diego in November.

Among the School’s presenters at the meeting was Jiansong Xie, Ph.D., a research associate in the lab of Sarah Hamm-Alvarez, Ph.D., Gavin S. Herbert Professor of Pharmaceutical Sciences. Xie offered a talk entitled “Intracellular delivery of adenoviral knob-conjugated quantum dots into primary rabbit lacrimal acini”.

Dikran Toroser, Ph.D., a research assistant professor working with Raj Sohal, Ph.D., Timothy M. Chan Professor in Complementary Therapeutics, presented a poster, “Carbonylation of mitochondrial proteins in Drosophila melanogaster during aging”. Liya Xu, a Ph.D. student in the lab of Daryl Davies, Ph.D., associate professor, presented, “Cysteine scanning of transmembrane domain 10 of the human dipeptide transporter: implications for substrate transport” as a poster. Jennifer Links, a former student of Ian Haworth, Ph.D., associate professor, offered the poster entitled “Role of the intracellular loop linking transmembrane domains 6 and 7 in substrate transport by the human dipeptide transporter”.

The Department of Pharmacology and Pharmaceutical Sciences hosted a reception at the meeting, attended by faculty, students, guests, alumni and colleagues from around the country.

faculty

James Adams, Ph.D., quoted in LA Times about the effects of ketamine, September 10; spoke about herb-drug interactions to School’s Chinese American Pharmacy Students Association, October 16; spoke about Chumash healing at Malibu Creek Visitor Center and at CA Indian Conference in October; quoted about the history of zombies on the CBS News, October 29; presented “Herbs and Surgery” at Huntington Memorial Hospital, November 2.

Ron Alkana, Ph.D., and Daryl Davies, Ph.D., presented two papers at Neuroscience 2007, the annual meeting of the Society for Neuroscience held in San Diego in November.

Roberta Diaz Brinton, Ph.D., R. Pete Vanderveen Endowed Chair in Therapeutic Discovery and Development, awarded $150,000 from the Kenneth T. and Eileen L. Norris Foundation to support her work at the Norris Foundation Laboratory for Neuroscience Research; awarded $28,500 from USC Good Neighbors Campaign and $25,000 from the Kenneth T. and Eileen L. Norris Foundation for “Expanding Stars” program; attended NIH Blueprint Workshop on Neuroplasticity in August; presented at First Annual Alzheimer’s Disease Translational Research Investigators’ meeting in September.

Enrique Cadenas, Ph.D., Charles Krown/Pharmacy Alumni Professor in Pharmaceutical Sciences, with colleagues from the Viterbi School of Engineering, biological sciences at the College, Davis School of Gerontology, and the Keck School of Medicine, awarded a Zumberge Interdisciplinary Award (large grant up to $50,000) to support the cardiovascular research core at USC.

Roger Clemens, Dr.PH, commented on antioxidants on ABC News, August 20; quoted in Indianapolis Star about human bacteria profiles, August 27; interviewed by KABC-TV News on detox diets, September 26; commented on dietary changes for patients with arthritis on KABC-TV.

Sarah Hamm-Alvarez, Ph.D., Gavin S. Herbert Professor in Pharmaceutical Sciences, hosted international conference for TFOs at Taormina, Sicily, in September; keynote speaker at 3rd Annual Galenos Networking.

Nouri Neamati, Ph.D., awarded $1.1 million NIH grant to study design and delivery of anti-tumor drugs; spoke at Chulalongkorn University in Bangkok, Thailand, in September.

Jean Shih, Ph.D., University Professor and Boyd P. and Elsie D. Welin Professor in Pharmacology and Pharmaceutical Sciences, awarded $220,000 from NIH and $80,000 from the National Science Council of Taiwan, both supporting monoamine oxidase (MAO) research; named AAAS fellow.

Bangyan Stiles, Ph.D., awarded $175,000 R21 grant from NIH for “The role of Pten in β-cell regeneration” project.

Walter Wolf, Ph.D., Distinguished Professor, presented the Taplin Lecture, “Pharmacological Kinetic Imaging”, at the 32nd Annual Western Regional Society of Nuclear Medicine Meeting in October.
Daryl Davies, Ph.D., associate professor of pharmacology and pharmaceutical sciences, has been studying pharmacotherapeutic strategies for the treatment of alcoholism and alcohol abuse for over a decade. Along with collaborator Ron Alkana, Ph.D., Pharm.D., Davies is searching to better understand the molecular targets on which alcohol acts on the central nervous system.

While Davies’s work is very technical, he welcomes undergraduate researchers to join his team. And, unlike the typical idea of what young students might do in a busy lab, like wash bottles, Davies sees the experience as a way to begin the training of the next generation of scientists. As such, “I treat my students as junior colleagues,” says Davies.

This semester, Davies has six undergraduate assistants working in his lab. Each works between 12 and 20 hours per week, pursuing a specific project as part of their experience. Three of the students are part of the Undergraduate Research Program, funded by the Office of the Vice Provost for Academic Affairs.

Michael Manzur, a senior in the Undergraduate Research Program, is happy to be back in the lab, having also spent the summer of 2006 working with Davies. “I’m working on my own experiments here. I’m very interested in research, so this really gives me an opportunity to do actual research,” says Mazur who hopes to go to medical school.

Among Manzur’s lab colleagues is Tiffanie Nham, also a senior, who is working in the lab through a Rose Hills Fellowship. Nham has been working in the lab since last summer, investigating sites of alcohol action in receptors. Her work aims to contribute to a better understanding of the molecular mechanisms through which alcohol influences neural processes.

Other undergraduates working in the Davies lab include Adrienne Mar, who is also a TAP student. (TAP is the School’s pre-pharmacy program for undergraduate students.) Elaine Wong, Nihal Patel and Anuj Aggarwal round out this year’s undergraduate roster in the lab.

According to Davies, the undergraduates are introduced to all aspects of a research career while working in the lab. This includes conceptualizing the project, designing and performing experiments, collecting and analyzing data, and writing up the findings. Through all these steps, the students also learn problem solving skills, proper laboratory technique and ethical responsibility.

West, chief scientific officer of Advanced Cell Technology, sharing recent advancements made by his company in the development of stem cell therapeutics.

The lectures were followed by the annual “Moving Targets” Student Poster Competition. This year’s first place went to Lifei Liu, a Graduate Fellow in Dr Robeta Brinton’s lab, for her work on neural stem cells. Second place went to Liya Xu, a Ph.D. student in neuroscience at USC, for her work in alcohol research. Tied for third place were Omar Khalid, a Ph.D. student at Keck for his work in prostate cancer, and Vivian Galicia, a Ph.D. student in Dr. Bangyan Stiles’s lab for her cancer research.
Jun Yamasaki, Pharm.D. (’56), a pharmacist for the past 50 years, recognized with certificates from the American Pharmacists Association and California & Nevada State Boards of Pharmacy. He is also a member of the USC Alumni Half Century Trojans and life member of USC Pharmacy Alumni Association.

James H. Roache, Pharm.D. (’70), founder of Advanced Medical Sales (AMS), has named Michael J. Roache, B.A. (’02), his son, the company’s new president and CEO. Both James and Michael are USC Presidential Associates and members of QSAD Centurion.

David Fong, Pharm.D. (’82), was named vice president of development and managed care at United Pharmacists Network, Inc. (UPN). He has been elected to serve a three-year term on the QSAD Centurion Board of Directors.


Scott Evans, Pharm.D. (’98), coordinated the California Society of Health-System Pharmacists (CSHP) Seminar 2007 that took place at the Palm Springs Convention Center on October 18-21.

Kathryn Naeve, B.S. (’42), passed away on June 23 following a brief illness.

Ernest Smith Browne, Pharm.D. (’58), passed away on July 5 from lymphoma.

Ronald Lawrence Singer, Pharm.D. (’62), passed away in Tucson, Arizona, on September 4 following a short illness. Dr. Singer was a pharmacist manager with Walgreens.

Norman Jack Kaplan, Pharm.D. (’65), passed away on July 9. Dr. Kaplan was a trusted and caring pharmacist and his family owned Knollwood Pharmacy, a cornerstone of the community in Granada Hills.

Melvin Orchen, Pharm.D. (’66), passed away on June 29 due to pancreatic cancer. He served in the U.S. Army and then as a hospital pharmacist, working in Southern California for fifty years.

William Robert Jackson, Jr., Pharm.D. (’69), passed away on August 9 after a long illness. Dr. Jackson worked as a community pharmacist for over 36 years.

Anthony (Tony) D’Altorio, Pharm.D. (’69), passed away on October 8 from pancreatic cancer. A member of QSAD Centurion, Dr. D’Altorio owned Bushard’s Pharmacy in Laguna Beach for over 20 years. Among other family members, he is survived by his brother, David D’Altorio, Pharm.D. (’77).

Soo Hyun Park, Pharm.D. (’70), passed away in August.

Nicholas Sean Bonnes, Sr., Pharm.D. (’73), passed away on March 31.

David Russell Austin, Pharm.D. (’85), passed away in Temecula on May 30.

Stephen P. Morrow, Ph.D. (’92), passed away on August 9. He was a pharmaceutical consultant to the licensing and certification branch of the California Department of Health Services and was a mental health commissioner for San Bernardino County’s 3rd District.

No, this is not a USC graduation…

…but it is a shot of five USC School of Pharmacy alums attending graduation where all of them teach—Loma Linda University School of Pharmacy.
ON THE MOVE

Julie Dopheide, Pharm.D., associate professor and a board certified psychiatric pharmacist, led the USC team, Brainpharmers, in the “Walk for the Mind of America”, a 5K fundraiser sponsored by the National Alliance of Mentally Ill (NAMI). The USC team raised over $700 for educational programs and local support for those dealing with mental illness.

On Parents Weekend in October, the School set up screening booths outside of the UPC Pharmacy and parents were lined for a blood pressure check, a quick test for diabetes or osteoporosis, and even a body fat analysis.

ON THE STREET

APSA Operation Immunization directors, Nik Ferrarella and Dong Dao, both Pharm.D. candidates 2010, worked with CVS on this billboard that promotes immunization to the community. Displayed on Vernon Avenue in the heart of Los Angeles, the billboard warns that last year flu and pneumonia caused over 35,000 people to die and encourages the public to talk to a pharmacist about a flu shot. Featured in the billboard is Sergio Gonzalez, Pharm.D. candidate 2009.

Dr. Dopheide participated in the NAMI walk with Nazeli Paronian and Jacquelyn Manougian, both Pharm.D. candidates 2011.

LOOKING AFTER THE PARENTS

left: Dara Siassi, Pharm.D. candidate 2009, does a diabetes test on a visiting parent.
right: Dr. Bill Gong, associate professor, supervises Olga Gurfinkel, Pharm.D. candidate 2010, as she does a body fat analysis on USC parent, Wayne Marker, in for the weekend from North Carolina.

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STUDENTS HIT THE LINKS

At the 5th Annual GNP/ICP Scholarship Golf Classic held last June, students joined supporters for a day on the links. Proceeds from the annual event provide scholarships for students interested in community pharmacy practice.

left: (back row) David Breslow, Pharm.D. (’71), Garrett Ow, Walter Cathey, Pharm.D. (’62), Nazia Rashid and Dave Dyck; (front row) Leah Movsessian and Anna Chaparyan. All students in the photo are Pharm.D. candidates 2008.

Career Day 2007

Over twenty-seven companies exhibited at the School’s annual Career Day held on October 9. Hundreds of students had an opportunity to discuss future opportunities in various employment settings. The next event for employer-student dialogue is slated for February 2 at Interview Day. For more information, contact Cheryl Stanovich at (323) 442-1738 or stanovic@usc.edu.
Class of 2011 gathers on the Health Sciences Campus Quad for annual White Coat Ceremony.

The USC School of Pharmacy held their annual White Coat Ceremony on the Health Sciences Campus Quad on the afternoon of August 23.

The School welcomed 191 students to the Pharm.D. program, their first step in preparing for a career in pharmacy. During the ceremony, each student was “coated” by either a faculty member or a member of the QSAD Centurion Board of Directors. QSAD Centurion and Albertsons/ Sav-on sponsor the annual event.

After a welcome by Dean Vanderveen, Associate Professor Mel Baron delivered the keynote address. Dr. Baron inspired the new students with wise words from Dr. Seuss.

Annie Wong-Beringer, associate professor and vice chair of the Titus Family Department of Clinical Pharmacy and Pharmaceutical Economics & Policy, administered the “Oath of a Pharmacist” to the new students.

Associate Dean Fred Weissman offered closing remarks.

WHAT DOES THE CLASS OF 2011 LOOK LIKE?

- 191 Students
- 69% Female; 31% Male
- Average Age: 24
- Under-represented Minorities: 9.5%
- Average GPA: 3.46
- Bachelor’s Degree: 98%

Student Updates

**Vivain Galicia**, Ph.D. student working with Professor Bangyan Stiles, awarded third place in Poster Presentation at “Moving Targets” Symposium in August.

The team of **Deron Johnson** and **Tatyana Shipillon**, both Pharm.D. candidates 2008, won the clinical skills statewide competition at the California Society of Health-System Pharmacists seminar held in Palm Springs in October.

**Lifei Liu**, graduate fellow working with Professor Roberta Brinton, won first place in the “Moving Targets” Poster Presentation in August.


**Christina Phan**, Pharm.D. candidate 2008, received the 2007 Student Leadership Award from CSHP.

**Maya Popova**, Ph.D. student working with Professor Daryl Davies, won a 3-year Ruth L. Kirschstein National Research Service Award (NRSA) from the National Institute of Alcohol Abuse and Alcoholism, $40,972 per year.

**Liya Xu**, Ph.D. student working with Professor Daryl Davies, awarded second place in the Poster Presentation at “Moving Targets” in August.

**USC APhA-ASP Chapter** featured in APhA Student Pharmacist Connection in “Chapter Spotlight” section, fall issue.

**USC National Community Pharmacy Association Chapter** won Chapter of the Year at NCPA Annual Convention, October 14.
USC captures chapter of the year...again

THE USC STUDENT CHAPTER OF THE NATIONAL COMMUNITY PHARMACISTS ASSOCIATION (NCPA) HAS WON THE DARGAVEL CHAPTER OF THE YEAR AWARD FOR THE THIRD YEAR IN A ROW

The award was presented at the 109th Annual Convention of the NCPA on October 14 in Anaheim. Accepting the award was Leah Movssesian and Hadi Ale-Ali, both Pharm.D. candidates 2008 and co-presidents of the group during the 2006-07 academic year, the period that was considered for the honor. Movssian is also the NCPA National Student President.

The honor acknowledges the group’s community outreach activities, focusing on screening and education events at clinics, independent pharmacy locations and health fairs. Members screened and educated thousands of Southern Californians last year on topics including hypertension, diabetes, body fat analysis, osteoporosis and nutrition.

In addition to outreach events, the group encourages students to consider a career in community pharmacy, exposing them to this career option through site visits and an ongoing speaker series, “Recipe to Developing and Owning Your Own Pharmacy.” This program introduces students to a wide range of community pharmacy topics, including compounding, diabetes care, women’s health issues and homeopathy.

The group further extended their reach by producing an instructional DVD on compounding pharmacy practices designed to introduce level one students to this professional niche. Additionally, the chapter is active on the political front, educating elected officials about pharmacy issues.

Over twenty members of the chapter were present at the Awards Ceremony along with faculty advisor, Dr. Jeffrey Goad, associate professor of clinical pharmacy. Co-presidents for the current academic year are Yousuf Rahyab and Harut Kagoyan, both Pharm.D. candidates 2010.

ON THE GO WITH SCHOOL OF PHARMACY

The School of Pharmacy currently has six fellows in various settings throughout the community. Pursuing the Regulatory Science and Drug Development Fellowship at Allergan are Lee Ming Boo, Pharm.D. (’04), and David Truong, Pharm.D. (’07). Renard DuBois, Pharm.D. (’04), and JunQing Oian, Pharm.D., are also doing fellowships at Allergan.

Nicholas Mordwinkin, Pharm.D., is the HIV/AIDS Pharmacotherapy Fellow, working under the supervision of Professor Stan Louie. Holding the Anti-Infective Pharmacotherapy Fellowship, overseen by Professor Annie Wong-Beringer, is Heather Owens, Pharm.D.

Martin Solberg, senior director of global regulatory affairs at Allergan and a member of the School’s Board of Councilors, joins Professor Frances Richmond (front, center), Matt Moran, Allergan, and Professor Bill Gong in congratulating Rick Khuu, Pharm.D. (’06), upon the completion of his Allergan Fellowship in Regulatory Science and Drug Development. Khuu was a 2006-2007 fellow.
Scholarships have played an immense role in my education. The Bubars are saying to me, we notice your hard work and we want to help you attain your goal of someday owning your own pharmacy. I am so grateful and touched by their support. I can’t wait until I’m able to do the same—positively influencing a student and providing financial support. Scholarships really do change lives.

—LEAH MOVSESSIAN, Pharm.D. candidate 2008

To learn how you can help, contact Mary Wackerman at 323.442.1360 or mwacker@usc.edu. www.usc.edu/pharmacy
save the date...

Drugs, Mind and Brain Conference
Hotel Martino, Costa Rica
Information: 323.442.2403 or pharmce@usc.edu

QSAD Winter Retreat
Ojai Valley Inn & Spa, Ojai
Information: 323.442.1360 or mwacker@usc.edu

February 2 (2008) | Saturday
Interview Day
HSC— USC School of Pharmacy
Information: 323.442.1381 or carr@usc.edu

Alumni/Senior Awards Banquet
Ritz-Carlton Huntington Hotel & Spa, Pasadena
Information: 323.442.1381 or carr@usc.edu

May 16 (2008) | Friday
School of Pharmacy Satellite Commencement
HSC Quad

August 4 - 8 (2008) | Monday-Friday
51st Annual Postgraduate Refresher Course
Hyatt Regency, Maui, Hawaii
Information: 323.442.2403 or pharmce@usc.edu