

Graduate Education

Graduate education at the University of Florida is a complex enterprise supported by 16 colleges and 2,800 graduate faculty who guide 10,000 students through more than 200 degree programs at both the master's and doctoral levels. Most of these students are involved in graduate professional programs focused on career preparation. These graduates will contribute to the knowledge-based economy of the 21st century.

Other graduate students partner with faculty in the creation of new knowledge. These are the future scientists and scholars of the United States, who will develop new technologies, solve critical social, educational and economic problems, advance the health of our citizens, and give meaning to our existence through word, thought, image, music and movement.

Graduate education continues to grow and redefine itself at major research universities in the United States, including the University of Florida.

An examination of doctoral degree programs offered in 1955 provides an interesting contrast to the breadth and complexity of higher education in the 21st century. While many degree programs offered 50 years ago still exist, few back then could have imagined advanced studies in areas as diverse as digital arts and sciences, forensic serology and DNA, or even computer sciences. Interdisciplinary studies were virtually nonexistent a half century ago.

Fast forward to 2004 and we find more than 90 doctoral degree programs and concentrations. Graduates from UF in the class of 1955 taught the current faculties in U.S. universities and we, in turn, are teaching the future generation of scientists and scholars, who will assume our places in the academy. Who are the faculties that populate new disciplines and how did those disciplines come to be?

A partial answer lies in the work we do at the boundaries between existing disciplines, the area known as interdisciplinary studies. From these junctions new fields of inquiry are born, discoveries are made and new connections and insights are realized. The migration of knowledge toward disciplinary boundaries, coupling heretofore unrelated programs and creating synergy through the blending of different faculties, represents significant opportunities for the future.

Abundant evidence confirms that the intellectual dimensions of many pressing social issues do not fit within the current organization of departments and degree programs. Universities must craft ways to foster the interdisciplinary programs needed to educate the next generation of scientists and scholars so they are capable of addressing social, scientific and health issues that are too complicated to be solved within today's disciplinary boundaries.

The United States continues to fall behind in the number of doctoral students being educated in our institutions. Serious shortages exist in the physical sciences and engineering. Since 1998, Ph.D. production in these disciplines has decreased by more than 11 percent. As the nation's fourth most populous state, Florida has a responsibility to educate its fair share of Ph.D. students in the physical sciences and engineering.

Factors contributing to this shortage are complicated and include declining numbers of applications, particularly from international students, and high attrition rates in critical disciplines. All U.S. institutions are grappling with declining applications from international students, but, fortunately, UF is bucking the national trend in attrition rates. National doctoral attrition rates are estimated to be 40-50 percent. At UF, doctoral attrition is less than half that rate, thanks to an outstanding faculty that is committed to successfully guiding students through the complexities of graduate education.

Electrical and Computer Engineering Professor José Principe and doctoral student Rati Agrawal illustrate the important link between research and graduate education.



*Kenneth Gerhardt, Ph.D.
Interim Dean of the
Graduate School*

Research & Graduate Programs at the University of Florida

WINFRED M. PHILLIPS, D.Sc.

Vice President for Research
223 Grinter Hall
P.O. Box 115500
Gainesville, Florida 32611
(352)392-1582
wphi@ufl.edu

DIVISION OF SPONSORED RESEARCH

Thomas Walsh, Ph.D.
Director
(352) 392-1582
twalsh@ufl.edu

Program Information
(352) 392-4804

Proposal Processing
(352) 392-9267

Awards Administration
(352) 392-5991

UF RESEARCH FOUNDATION, INC.

Frank Ward
Business Manager
(352) 392-5221
fward@ufl.edu

OFFICE OF TECHNOLOGY LICENSING

David Day
Director
(352) 392-8929
dlday@ufl.edu

RESEARCH COMMUNICATIONS

Joseph M. Kays
Director
(352) 392-8229
joekays@ufl.edu

THE GRADUATE SCHOOL

Kenneth J. Gerhardt, Ph.D.
Interim Dean
(352) 392-6622
gerhardt@csd.ufl.edu

Graduate Records
(352) 392-4643

Theses and Dissertations
(352) 392-1282

Graduate Minority Programs
(352) 392-6444

Data Management
(352) 392-6623

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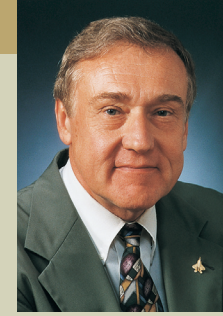


UNIVERSITY OF
FLORIDA

Office of Research & Graduate Programs
Box 115500
Gainesville, FL 32611-5500

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Research



*Win Phillips, D.Sc.
Vice President for Research*

As hurricane after hurricane churned across Florida this year, the University of Florida sent teams of experts throughout the state to help Floridians cope with this major environmental and economic disaster.

UF engineers headed directly into the storms' paths to gather data that will enable forecasters to more accurately predict hurricane winds, and help engineers and builders construct houses to more effectively withstand those winds.

A task force from UF's Institute of Food and Agricultural Sciences that included faculty and staff experts for every agricultural commodity produced in Florida assessed damage to the state's \$64 billion agriculture industry.

The College of Veterinary Medicine sent a team to South Florida to treat animals injured during the storms.

This response to adversity illustrates the faith and hope people place in institutions like UF to come up with answers to life's mysteries. Whether it's the unfathomably complex systems that drive hurricanes or the ones that drive cancer cells, research institutions like UF are uniquely equipped to address these "big picture" questions.

While hurricanes have garnered much of the publicity this year, UF scientists and engineers are pursuing countless other scientific questions every day. Most of this research is funded through public and private grants and contracts. During fiscal year 2003-04, UF received a record \$470 million in research awards.

About half of that money goes to the six colleges of the Health Science Center, where hundreds of researchers seek to understand, treat and prevent such debilitating diseases as cancer and diabetes, spinal cord injury and cleft palate.

Funding from the State of Florida and local governments rose more than 30 percent between 2002-03 and 2003-04 to \$63 million, thanks in large part to a \$10 million grant for UF's Center of Excellence for Regenerative Health Biotechnology, one of three university centers statewide funded under the Florida Technology Development Act.

Located at the university's research park near Gainesville, the center's research and education wing is completed and construction is under way on its state-of-the-art drug manufacturing plant. The plant is key, because it will provide regional companies, universities and research institutes with commercial drug development services currently absent from Florida and Southeast or available elsewhere at significant cost.

Drug makers can tap the plant's highly specialized equipment to manufacture compounds in the comparatively large quantities needed for clinical trials. The result will not only plug a crack in the region's drug development pipeline, it will also create crucial infrastructure supporting both small biomedical spinoffs and larger established companies, contributing to diversified and high-wage job opportunities.

Over the past decade, research awards to the University of Florida have risen dramatically, propelling the university into the top tier of institutions nationally. This growth is a tribute to the hard work of our faculty, university research staff and graduate students.

Florida is a state rich in opportunity and challenges. Its (usually) pleasant climate and abundant recreation opportunities make the state a destination, temporary or permanent, for millions of people. But those same pluses also come with risks. The same factors that shape our semi-tropical climate also make us prone to hurricanes. Many of our new residents are retirees, with unique needs and health challenges.

As the flagship institution in the state and one of the nation's most comprehensive universities, the University of Florida is uniquely equipped to address these opportunities and challenges.



UNIVERSITY OF
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Research & Graduate Programs



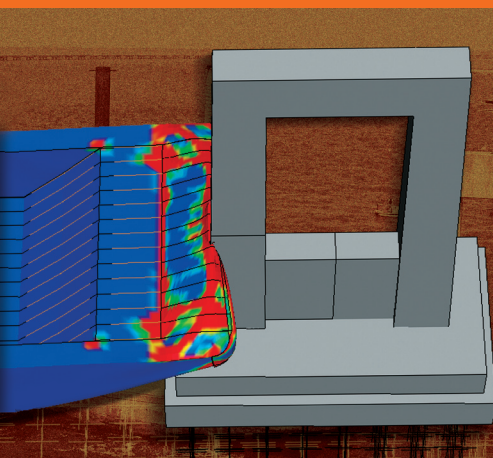
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"Graduate education and research go hand in hand. I equate graduate education with the process of learning advanced concepts and thinking autonomously using the methodology of science. You learn these skills by doing, and we call it research."

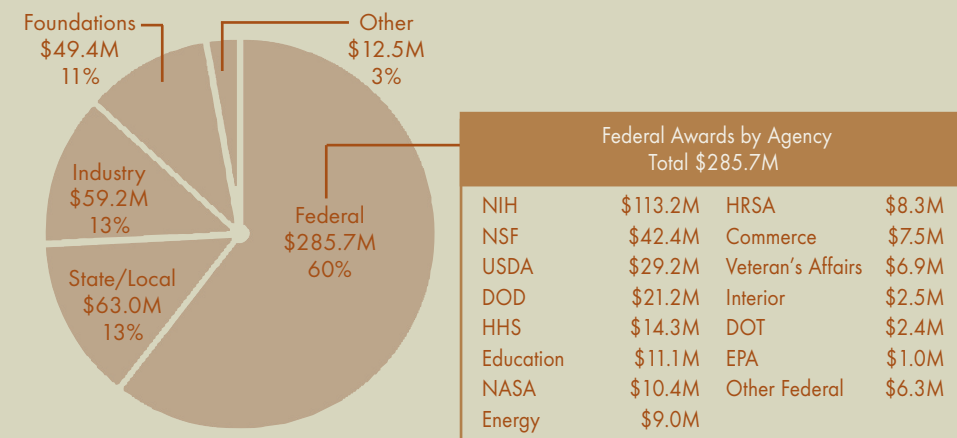
— José Principe



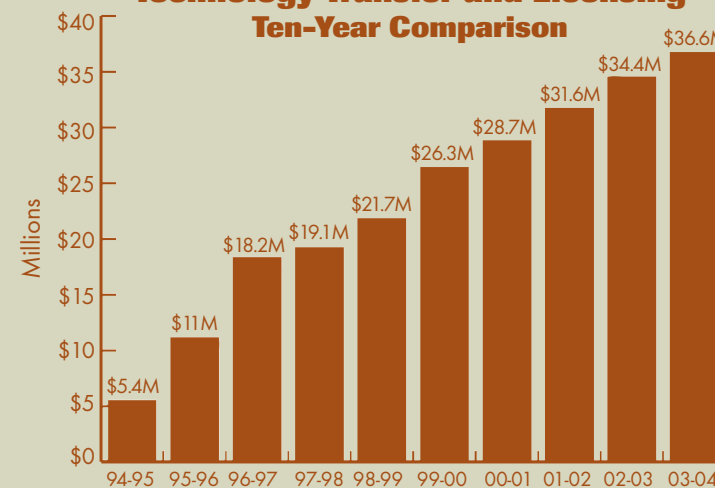
Division of Sponsored Research — Fiscal Year 2003-2004

Summary of Sponsored Research Activity	Proposals Submitted	4,336
	Grant and Contract Dollars Requested	\$636,749,633
	Awards Received	5,670
	New Awards Received	1,889
	Continuations or Supplementals	3,781
	Grant and Contract Dollars Awarded	\$445,376,250
	Gifts for Research	\$24,506,059
	Total Sponsored Research Funding	\$469,882,309
	Grant and Contract Direct Expenditures	\$367,297,741
	Recovered Indirect Cost Expenditures	\$60,699,522
	Grant and Contract Dollars Expended	\$427,997,263
	Projects Active During the Fiscal Year	6,011
	Faculty Receiving Awards	1,837
	Sponsors	886

Research Awards by Sponsor



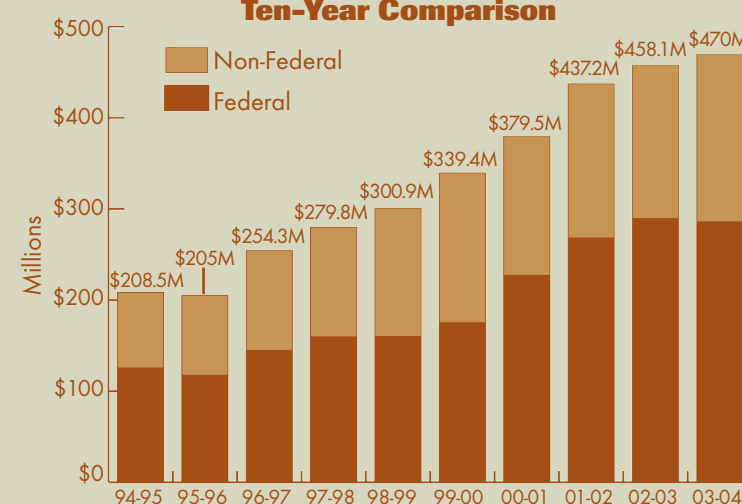
Technology Transfer and Licensing Ten-Year Comparison



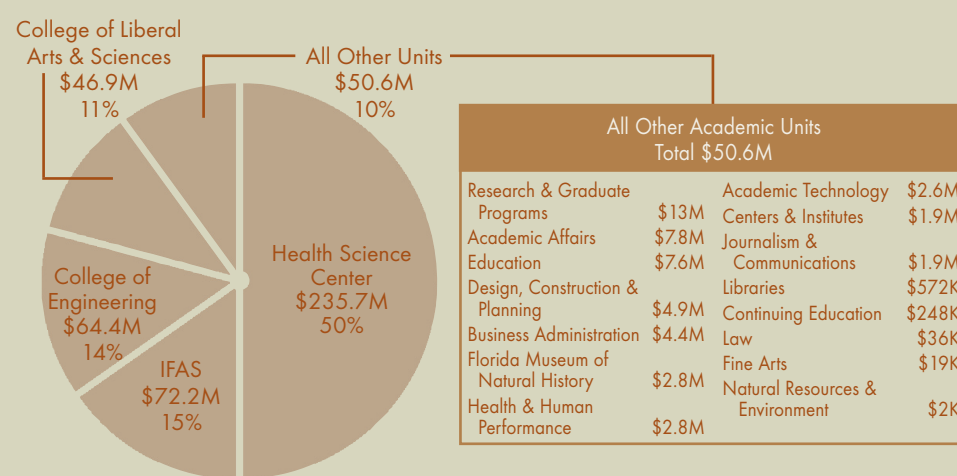
Patent and Licensing Activity

Fiscal Year	Invention Disclosures Received	U.S. Patent Applications Filed	U.S. Patents Issued	Licenses Generating Income
2003/04	278	183	53	150
2002/03	264	114	52	119
2001/02	191	185	59	100
2000/01	196	116	68	84
1999/00	166	122	52	63
1998/99	134	106	51	49
1997/98	139	68	51	58
1996/97	103	101	47	61
1995/96	90	61	34	69
1994/95	84	100	24	64

Research Awards Federal/Non-Federal Ten-Year Comparison



Research Awards by Academic Unit



Technology Transfer @ the University of Florida

Applied Genetic Technologies Corp.

Researchers at **Applied Genetic Technologies Corp.**, or AGTC — a startup based at the university's Sid Martin Biotechnology Development Incubator — are exploring medical treatment applications for the adeno-associated virus, or AAV, developed at UF as a vehicle to deliver beneficial genes to critically ill patients.

AGTC's first product is aimed at alpha-1 antitrypsin deficiency, a hereditary defect that causes early-onset emphysema in adults. Alpha-1 is the most common potentially lethal hereditary disease of American and Northern European adults.

AGTC completed one of the largest venture capital deals in Florida's young biotechnology history in November 2003 when a group led by InterWest Partners of California invested \$15.25 million in the company. In December 2004, the company entered into a major research agreement with Massachusetts-based biotech giant Genzyme. The company currently employs 14 people.

Oragenics

Oragenics, Inc. is developing a novel oral rinse for the prevention of tooth decay.

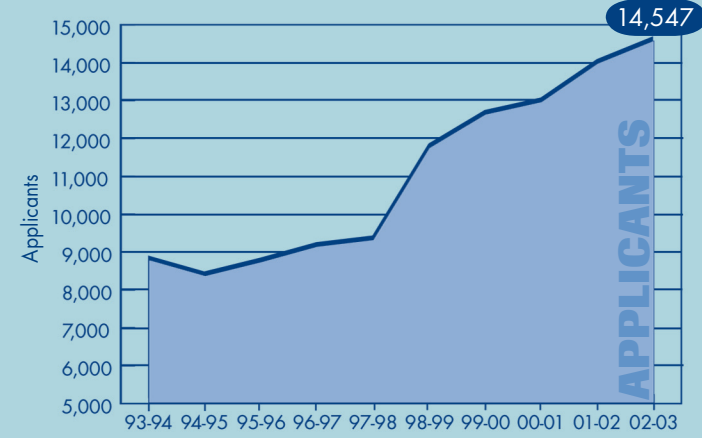
Tooth decay is caused by lactic acid produced by a bacterium in the mouth called *Streptococcus mutans*. Oragenics' Replacement Therapy employs a patented, genetically modified strain of *S. mutans* that does not produce this decay-producing acid. When applied to a person's teeth by a dentist, this engineered bacterium displaces the resident acid-producing bacterium, providing potentially life-long protection against most dental decay.

In December 2004, the Food and Drug Administration approved Oragenics' application to begin human clinical trials on Replacement Therapy. If all goes well with this safety trial and future trials on effectiveness, Oragenics anticipates the treatment could reach the market by 2009 or 2010.

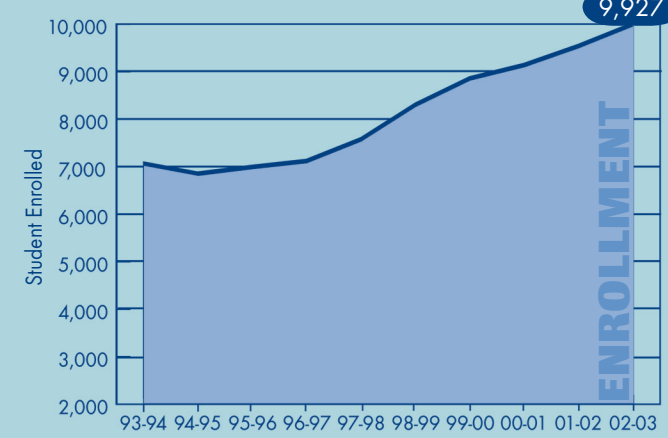
Oragenics recently outgrew UF's Sid Martin Biotechnology Incubator with 19 employees and moved into its own building nearby.

The Graduate School — Fiscal Year 2003-2004

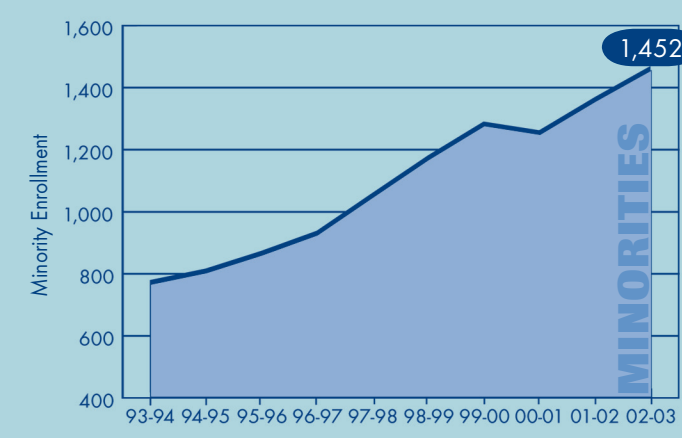
GRADUATE APPLICANTS 1994–2003



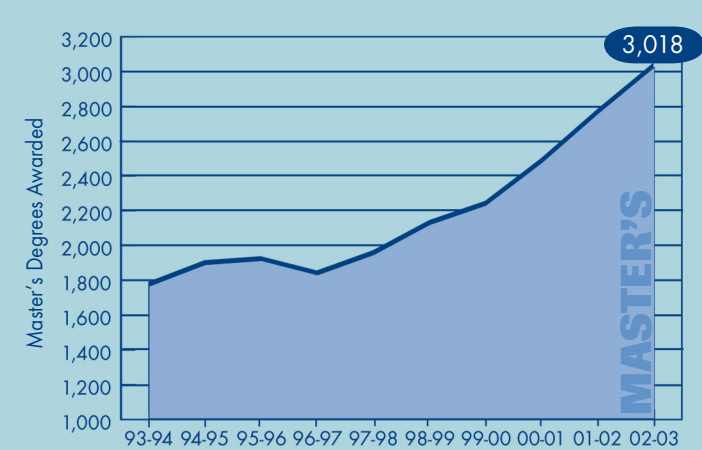
GRADUATE ENROLLMENT 1994–2003



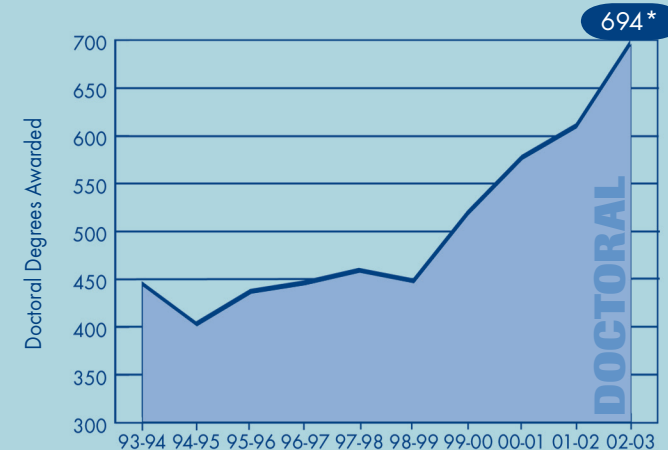
ENROLLMENT OF MINORITIES 1994–2003



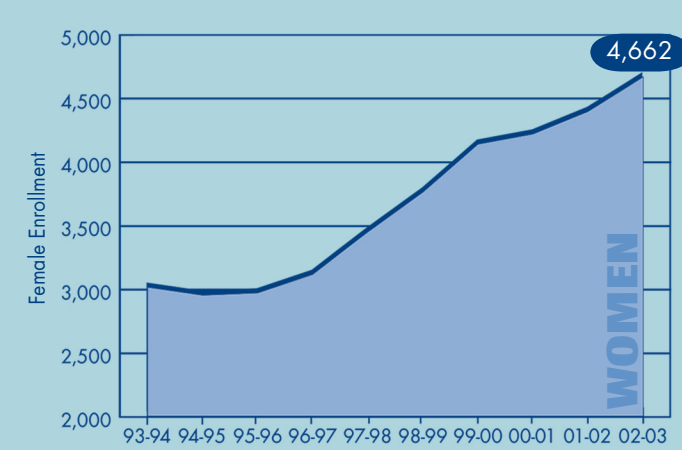
MASTER'S DEGREES AWARDED 1994–2003



DOCTORAL DEGREES AWARDED 1994–2003



ENROLLMENT OF WOMEN 1994–2003



*Includes Ph.D., Ed.D., and Au.D.

Doctoral Dissertation/Mentoring Award



Russell Bauer believes the key to success is to surround yourself with good people.

"I feel particularly fortunate to have worked with a group of outstanding young clinical psychology students," says Bauer, a professor of clinical and health psychology. "I know that I have learned as much from them as they have learned from me."

One former student credits Bauer with teaching his students to "Think outside the box," and to pose important theoretical research questions.

"Dr. Bauer is the type of mentor who provides guidance, support and leadership for his students without stifling their developing interests and pursuits," the student writes.



For years, anthropology Professor H. Russell Bernard has set aside Wednesday nights to meet with graduate students at a Gainesville pub.

"Every Wednesday, in rain, cold and swelter, he shows up at the Market Street Pub to chat about anthropology (and baseball trivia) with his students and anyone they bring along — classmates, dates or parents," a current student writes.

These informal sessions are just an extension of Bernard's commitment to teaching.

"Russ does all the things that I think an ideal mentor should do," writes one former student. "He challenges his students while also being supportive. He is invested in their success, and he gets to know his students as individuals so

that he knows what each is interested in, their skills and deficiencies, and the direction each wants to take."

Bernard, who last year was awarded the American Anthropological Association's highest award for his contributions to the field, says he learns as much from his students as they learn from him.



Agricultural and biological engineering Professor Wendy Graham believes it is extremely important for graduate advisors to create an academic environment that encourages trust, integrity and mutual respect.

"A 'safe-place' must be established where professors can admit they do not have all the answers, and students can admit that their ideas may have been wrong, or their experiments have failed," Graham says.

One former student says Graham possesses an "emotional intelligence" that allows her to tap into her graduate students' motivations and fears so that she can compassionately lead them to their goal.

"Wendy showed me how to lead a team, how to coach others and how to be a mentor," the student writes. "The lessons in leadership that I learned from her continue to inspire me today."



Psychology Professor Brian Iwata's goal is to prepare graduate student for careers in which they will make significant contributions to their chosen field of interest. He clearly is achieving that goal.

A decade ago, the American Psychological Association established the B.F. Skinner Award, given annually to the most accomplished young researcher in the field of behavior analysis.

Iwata's former students have received the award five times.

"I silently thank Brian for each contribution I have been able to make to our field," writes one former student.

Iwata believes a successful academic-research career requires mastery in the areas of research, teaching, and program development.

"My general approach to mentoring therefore involves creating an environment that provides repeated opportunities to develop a high degree of competence and independence in each of these three areas," he says.



Kenneth O encourages his graduate students to learn to communicate their research findings effectively, whether it's in the classroom or the board room.

"Good communication skills are a must for success in the engineering

world," says O, a professor of electrical and computer engineering, who requires all of his students to give weekly updates on their research and semi-annual presentations.

"The time spent in Dr. O's research group gave me a solid foundation upon which to launch my career," writes one former student. "I have the chance to work daily with engineers trained at top-tier schools like MIT, Stanford, UC Berkeley and Cal Tech. My observation is that Dr. O's group is every bit as good as those at these other schools."

O says the goal of the doctoral program should be to nurture and to transform students into researchers and scientists whom he can call colleagues.

"Seeing former students succeed and knowing that I have played a small role in it are the most satisfying part of being a professor," O says.

"Graduate education for me has been an acquisition of known facts, while research with Dr. Principe has been an experience in exploring and questioning the information within those facts."

— Rati Agrawal

