



Florida Tomorrow | College of Engineering



UF | **FLORIDA
TOMORROW**
THE CAMPAIGN FOR THE UNIVERSITY OF FLORIDA



From the Dean

We see a world of incredible opportunities and enormous challenges ahead of us. Our most intricate problems — energy, the environment, health, economic prosperity — require scientific and engineering breakthroughs implemented in a practical way.

At the College of Engineering, our vision of the future addresses these issues by focusing on three aspects: creating new engineering knowledge to address societal problems, educating the next generation of engineers and proactively engaging with industry, government and other stakeholders to impact the real world. We aspire to the highest level of global preeminence so that our college will become a strong magnet for the most talented students and faculty from all over the world.

The societal problems mentioned above do not fall neatly into academic disciplines. Indeed, they require combinations of disciplines for solutions to be meaningful and effective. For example, by combining advances in neuroscience with engineering expertise, we may be able to find solutions to diseases such as epilepsy. And the energy challenge can only be met by a multi-disciplinary approach combining mechanical, nuclear, materials, chemical and agricultural engineering with appropriate business and regulatory policy changes. New business creation is at the heart of economic growth and prosperity. Entrepreneurial activities fueled by technological advances will create the Intel and Microsoft of tomorrow. We firmly believe we should educate our students to have a deep commitment to the highest ideals of truth, goodness and beauty so that technology improves the human condition.

Undergraduate education, graduate education and research should not be separate. Rather, we are driven to fully integrate these three facets of our daily academic activities. Thriving research laboratories inspire young undergraduate students with a thirst for advanced knowledge. Outstanding faculty with international research reputations attract the brightest graduate students. Highly talented graduate students enrich the undergraduate experience.

We have enormous aspirations to realize the vision outlined above. We know our students, faculty and staff are entirely dedicated to achieving the highest levels of excellence. We live in an era of fierce global competition for talented students and faculty and require ever-improving facilities to conduct our educational and research activities. We seek your support, which is absolutely critical in accelerating our progress toward reaching our goals.

Sincerely,

Pramod P. Khargonekar

Dean, College of Engineering

Florida Tomorrow

... and the College of Engineering

The Promise of Tomorrow

The University of Florida holds the promise of the future: *Florida Tomorrow* — a place, a belief, a day. *Florida Tomorrow* is filled with possibilities. *Florida Tomorrow* is for dreamers and doers, for optimists and pragmatists, for scholars and entrepreneurs, all of whom are nurtured at Florida's flagship university: the University of Florida, the foundation of the Gator Nation.

What is *Florida Tomorrow*? Here at the College of Engineering, we believe it's an opportunity, one filled with promise and hope. It's that belief that feeds the university's capital campaign to raise more than \$1 billion.

The *Florida Tomorrow* campaign will shape the university, certainly. But its ripple effect will also touch the state of Florida, the nation and the entire world. *Florida Tomorrow* is pioneering research and spirited academic programs. It's a fertile environment for inquiry, teaching and learning. It's being at the forefront to address the challenges facing all of us, both today and tomorrow.

College of Engineering *Florida Tomorrow Campaign Goals*

Faculty Support	\$36 million
Student Support	\$9.5 million
Programs and Research	\$14.5 million
Campus Enhancement	\$20 million
TOTAL	\$80 million





Samesha Barnes and Eugene Goldberg



Florida Tomorrow is a place ...

where every student has a chance to change the world.

Student and Teacher

Samesha Barnes looked at the caller ID and saw a familiar name. She couldn't bring herself to answer the phone.

Barnes majored in chemical engineering, graduated from Georgia Tech and worked for a Fortune 100 company. Now she's a materials science and engineering Ph.D. student working for Eugene Goldberg, the Genzyme Professor of Biomaterials in Materials Science & Engineering — an opportunity reserved for a select few.

The cell phone was ringing, but Barnes wasn't ready to talk to Goldberg.

"I didn't want him to think of me in a negative light," Barnes says. "But as a strong, intelligent, independent Ph.D. candidate who could handle problems on her own."

Many graduate students suffer setbacks, Goldberg says. But Barnes had family and financial concerns to deal with, too. The pressure would've made an average person buckle. Instead, Barnes answered Goldberg.

"There was so much concern in his voice," Barnes says. "Everyone rallied behind me. That's what reminded me that I was part of a family, and all of these people want to see me succeed."

Goldberg — who holds more than 50 U.S. patents and numerous foreign patents — began his career in industry. He was founding director of the Xerox Chemistry Research Laboratory, and his group was instrumental in developing Xerox copy technology. Half a century later, he spends his time shaping the minds of the next generation of innovators.

"He is a great match for me, by being supportive and not hovering," Barnes says. "He is very soft spoken, kind and gentle but is very serious about what he does."

Graduate school was supposed to be a steppingstone for Barnes. She wanted to master the technology she was using to develop photo paper at Hewlett-Packard. But at UF, Barnes discovered within herself a talent for research and a passion for teaching.

She studies injectable gel implants — to treat spinal cord injuries — in Goldberg's Biomaterials Center. The injuries damage a person's central nervous system, which does not repair itself without intervention. Barnes is using an enzyme-laden gel to slowly deliver therapeutic agents, with the hope of allowing nerves to reconnect.

"I found out through a series of events that I could be effective in another area," Barnes says. "I could actually improve people's quality of life."

Barnes spent several semesters teaching introductory chemistry. She was one of four graduate students competitively selected for a Gator Engineering pilot program in freshmen retention, which created several classes for engineering students only, then paired them with aspiring faculty members like Barnes.

"She's got drive. She will succeed," Goldberg says. "And that makes her kinda special."



Florida Tomorrow is a day ...

when children dream of becoming engineers.

Team Effort

Elena Briz learned early in her college career to rely on fellow engineering students.

“It’s easier to do engineering if you have that study network and support group,” she says. “They understand why we study as hard as we study.”

As part of one of the most rigorous and demanding programs at the University of Florida, student engineers invest heavily in each other. That tradition of teamwork is one of the reasons Gator Engineering graduates are so prepared for the workforce.

“In high school you can succeed on your own, but in college it’s important to share ideas and leverage each other’s experience and knowledge,” says Joel Howell, a College of Engineering alumnus now working for Harris Corp. in Washington.

The college has several summer programs to help incoming freshmen form lasting ties and develop study habits. New students take the equivalent of 30 hours of course credit in six weeks, but receive only four official credits. They review calculus and chemistry and learn to use engineering-specific software. They visit engineering firms throughout the state, get their hands dirty and master the art of time management. Both Howell and Briz were part of one of the programs.

“It gives you a name and a face in a university that’s so big you can easily get lost,” says Briz, who left her close-knit Cuban-American family in Miami when she moved to Gainesville.

After a summer in one of the programs, students enter the fall semester ready to tackle university life. Throughout the first year students participate in study halls, tutoring and personalized academic advising.

Stephen Roberts, an assistant director of student affairs for the college, helps coordinate the intense summer programs.

“At UF, we get the best of the best,” Roberts says. “But in engineering, early preparation is critical — especially with the transition from high school to college.”

One unusual component is that freshmen are expected to make career contacts.

“When you finish that first year and look back, you realize you know all the administrators,” Howell says. “You have a greater understanding of how the university works. You have a peer group of intelligent, motivated students you can call on, and you have contacts in the industry.”

Many students who go through the programs come back as mentors.

“I decided it would be a great way to give back to a program that’s given me so much,” Briz says. “It’s amazing to see them working together, keeping each other up and staying motivated to do their work.”

Elena Briz





Greg Sawyer



Florida Tomorrow is a belief ... that no problem is too big to solve.

Science of Friction

Friction fascinates Greg Sawyer. Consider the simple blink. Each one — about every six seconds for humans — causes friction when the eyelid slides against the eyeball. That friction causes irritation. When tears alone won't stop the burn, eye drops usually do.

This is tribology — the study of friction, wear and lubrication. Whenever objects rub against each other — like gears in a tractor, satellite antennas and knee replacements — it's science in motion. The materials, whatever they might be, will eventually wear out and break.

That's where Sawyer comes in. A Gator Engineering mechanical engineering associate professor, he's one of the world's top tribologists. His one-of-a-kind Tribology Laboratory is a place where engineers make materials work better and last longer. For instance, Gator Engineers are strengthening Teflon — a naturally lubricious and relatively fragile material — by incorporating nanotechnology into tribology research.

"People often don't know about the field of tribology until they try and do something new — and then they encounter problems," Sawyer says.

His group's work combines the latest advances in nano-scale science and technology to understand fundamental mechanisms behind friction and create effective solutions to real-world problems.

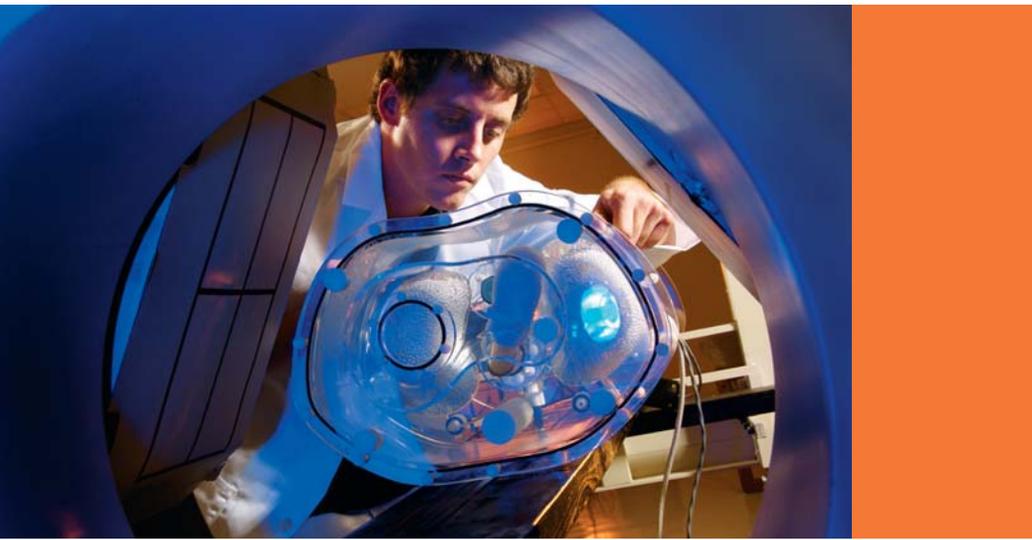
Research in the lab has caught the attention of the defense industry, which regularly turns to Sawyer to develop reliable technology for such things as ensuring spy satellite antennas open in the cold vacuum of space.

Oftentimes, adding extra lubrication isn't the best answer for friction, Sawyer says. Sometimes it's impractical or even impossible. Researchers in Sawyer's lab engineer materials to operate beyond the limits of traditional fluid lubrication.

"Liquid lubrication works great," Sawyer says. "Oil is great, but it's messy and it's a contaminant and it's not environmentally friendly. There's a huge push to get away from oil. There are a lot of applications where the use of oil is precluded — space being one."

Studying and controlling friction and wear is the foundation for the lab. Researchers develop everything from traditional machine parts to novel ultra-low wearing nanocomposites, and then evaluate them with instruments built in the lab. But what they're really interested in is the resistance to move one thing past another. To that end, UF's tribologists are developing materials to operate in space and the bearing surfaces of the knee, eye and even the lining of blood vessels to keep stents in place.

"I think of this as the golden age of the field because we've learned a lot about a few things," Sawyer says, "but we have so much still to do and so much still to learn."



Our Vision of Tomorrow

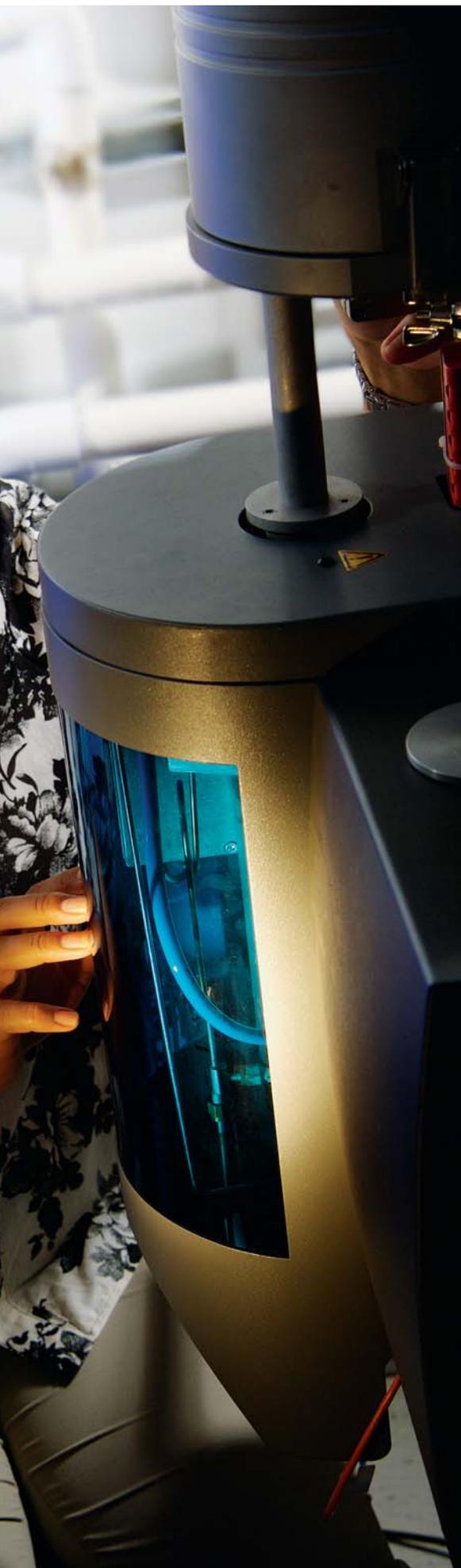
How will you change tomorrow?

Florida Tomorrow stirs in the hearts of today's Gator Engineering students. They are the teachers, the scientists, the entrepreneurs, the doctors and the leaders. They are the dreamers; they are the problem-solvers; they are the innovators.

These men and women will find solutions for our most intricate problems of energy, environment, health and economic prosperity. They will create new medical devices that extend and enhance our lives. They will take what they learn in the classroom into their labs; then quickly bring their inventions to the marketplace. They will push the limits of technology to make the world safer and healthier for generations to come. Like the thousands of alumni spanning a hundred years, their success will be built upon a solid Gator Engineering foundation.

A degree from the University of Florida's College of Engineering offers more than academic lessons alone. Our students collaborate with industry to solve real-world problems. They are surrounded by the world's best minds and inspired to immerse themselves in research, develop technologies and embark on business ventures. They are empowered by the generosity of Gator Engineering investors. Because of these philanthropists, we can use tangible rewards to attract and keep the very best faculty. Because of their contributions, we can enhance our undergraduate experience with instant access to industry and state-of-the-art research and teaching facilities. Because of their gifts, in our lifetime we will see products, devices and technologies emerge from UF and change the world. *Florida Tomorrow* depends on the heart of today's Gator Engineering supporters.







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