FOCUS

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CREW VICTORY AT DAD VAILS

Tech's men's crew team wins gold and silver at one of the nation's largest regattas, the Dad Vails in Philadelphia, Pa. **Page 15**

GOMEZ REINVENTED

Indie rock band Gomez finds fresh sound, releasing new album *How We Operate* on a new label with a new producer. **Page 9**

Tech hosts national RoboCup competition

By Will Morgan
Contributing Writer

While every other nation grows extremely anxious over the arrival of the 2006 World Cup, the United States waits with a more oblivious anticipation. Tech, however, took a step toward changing all that by inspiring some soccer fever in a way that only a technical school truly can.

On April 20-23, Tech hosted the 2006 KUKA RoboCup U.S. Open, a competition which offers all the excitement of soccer with the added bonus that every match is played by robots. The excitement did lack the widespread rioting and general hooliganism of the actual World Cup.

Internationally, the RoboCup consists of five different competitions, four of which are soccer-based and one in which the designers create search-and-rescue robots. Many of the robots are then used outside of the competition.

However, the U.S. Open included only three of the competitions: the rescue league; the small-sized soccer tournament, in which teams of robots with the dimensions of a roll of toilet paper compete on a field a little shorter than three meters on each side; and the legged robot soccer tournament, in which teams of four Sony AIBO robots (they look like muscular, robotic chihuahuas) play against each other.

> "Many...robots...are brought by teams ...doing research, evaluating mobility and the ability to... relay commands."
>
> **Tucker Balch**
> Chair, RoboCup

Since the RoboCup held at Tech was in fact an Open, many international teams as well as teams from across the country competed.

Among the U.S. teams present were a joint team between Harvard and MIT, UPenn and Carnegie Mellon. The international roster boasted teams from Germany, Mexico and Canada.

Tech fielded two teams, both of which competed in the rescue league portion of the RoboCup. One of the teams was student-led while the other was headed by Tucker Balch, a Computer Science professor and chair of the entire RoboCup.

PHOTO COURTESY OF TUCKER BALCH

Teams of four Sony AIBO robots play against each other in the legged robot soccer tournament, one of the competitions that comprise the 2006 KUKA RoboCup United States Open recently held at Tech.

"Many of the robots, particularly those in the rescue league, are brought by teams simply doing research, evaluating mobility and the ability to effectively relay commands and information," Balch said.

For many teams the competition served as more of a practice trial for the upcoming international event rather than a decided contest for victory.

In the rescue league, the robots traverse a multiple-story, 300-square-meter arena modeled after

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Nature inspires research design

By Manu Raghavan
Contributing Writer

People today have been inundated with ridiculous notions of science fiction. Hollywood portrayals of advanced technology veer close to the impossible, with little basis in reality. Fortunately for science, researchers at Tech seem more inclined to look to Mother Nature for inspiration than to media fantasies.

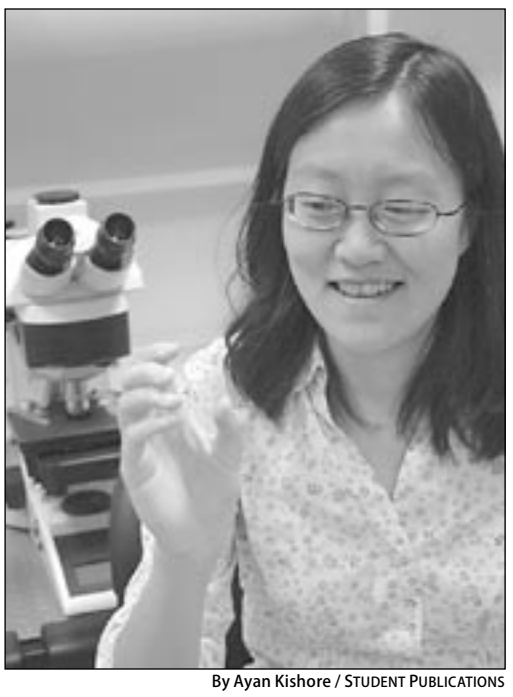
In only its third semester of existence, the recently formed Center for Biologically Inspired Design (CBID) has already attracted a fair share of attention on campus.

The center is a gathering of the many scientific and engineering minds across wide-ranging disciplines that look to nature for inspiring solutions to engineering problems.

CBID was formed to identify and extract ideas from the rich source of solutions present within existing biological systems. These ideas would then be used to replicate the intelligence and efficiency of biology in artificial engineering solutions, a process known as biomimicry.

One example of nature's genius worth mimicking in engineering designs is the optimization of computation in thoughts. The average human brain uses many hundreds of billions of neurons to process mental tasks. Natural selection has allowed a worm species (Caenorhabditis elegans, a free-living soil nematode) to do the same with a neural capacity of only 302 neurons!

How is this remarkable optimization possible? This is the question Hang Lu, a Chemical and Biomolecular Engineering professor, looks to answer using Micro-Electro-Mechanical Systems (MEMS) and microfluidic chips.



By Ayan Kishore / STUDENT PUBLICATIONS

Hang Lu displays a MEMS device, which promises to be the future of engineering biomimicry.

According to Lu, the simplicity of the worm's anatomy and genome affords researchers a great way to study and analyze its genetic makeup at the lowest levels of its workings.

"The biological problem we're interested in is neuroscience … It's about designing new gadgets to ask the right questions," Lu said, adding that understanding the worm's "computational system" will enable better construction of biosensors and artificial intelligence in the future.

Devices that use microfluidics technology have made it possible to probe test organisms at the microscopic level instead of at the macroscopic level at which experiments can currently be conducted. Lu explained, "You don't want to use a shovel to add sugar to your coffee; it's too big and it's inaccurate. Using MEMS and microfluidics is like using a teaspoon instead of a shovel."

The potential applications for this kind of multidisciplinary research are not only immediately relevant to neuroscience, but also to engineering. Lu likened her research on the nematode to the computer engineering problem of using fewer transistors on an integrated circuit to perform broader logic functions.

Encouraging coordination between faculty across disciplines as wide-ranging as biomolecular engineering, materials science and architecture in organizing CBID is part of a greater initiative by the Institute's management to do more of the same across campus.

Three students earn Goldwater Scholarship

By Jenny Zhang
Focus Editor

Few students on campus could be more different than Andrew Marin, A.J. Friend and Jonathan Diaz. Their interests run the gamut from engineering solvents to playing soccer to filmmaking, so what links them together? All three second-year students have been designated recipients of this year's prestigious Goldwater Scholarship, which supports studies in engineering, mathematics and the natural sciences. Named in honor of Arizona senator Barry M. Goldwater, the merit-based award covers expenses for tuition, fees, books and room and board up to a maximum of $7500 per year for two years.

> "One of the best things that Tech has done for me is making me think like an engineer."
>
> **Andrew Marin**
> Second-year ChemE

Andrew Marin, a Chemical Engineering major originally from Plano, Texas, came to Tech for its sterling reputation and found more than he expected. "The way I look at the world has changed," he said. "One of the best things that Tech has done for me is making me think like an engineer."

Active in Alpha Chi Sigma, the Student Advisory Board and the American Institute for Chemical Engineers, Marin also finds time for triathlons and extracurricular reading. His main interest, however, remains the subject that convinced him to move east for his studies.

"Why chemical engineering? I like the engineering aspect because of its application – it has a purpose that can affect people. And chemistry just makes sense to me. I see the world in molecules and atoms," Marin said.

Going beyond classroom material, Marin is conducting research in chemical engineering with Professors Charles Eckert and Charles Liotta. His work involves tunable solvents, substances whose physical properties can be fine-tuned to result in better reactions. Marin studies supercritical fluids, or gas-ex-

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Flicks on Fifth summer lineup

Looking for something to do this summer? Look no further than across the highway at Tech Square, where the Student Center Programs Council is once again hosting Flicks on 5th. The second annual movie fest features popular recent titles on a large, outdoor screen. Best of all, the event is free and offers complimentary popcorn. Showtimes are at 9:00 p.m.

6/7. *Mr. and Mrs. Smith*
6/14. *Walk the Line*
6/21. *Failure to Launch*
6/28. *Inside Man*
7/12. *Ice Age: The Meltdown*
7/19. *Thank You for Smoking*
7/26. *The Sentinel*

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collapsed buildings and all-purpose rubble.

Particularly applicable after Hurricane Katrina, the three arenas are designed to mimic real post-disaster situations.

The tasks get more difficult as the competition proceeds, but the basic task of the robots is the same: search for simulated victims (complete with heat, sound, motion, carbon dioxide and realistic human form) and build maps of the terrain to be relayed to rescuers.

For instance, one arena consisted of a field of different-sized pillars which the robot had to somehow get over in order to find the victim. It is similar to trying to drive a Honda Civic on the moon, if the Honda were a robot that could somehow manage to get through and over and around all the craters.

Essentially, the goal is to map the area, locate the victims, tell who they are, see if they are living, try not to kill them or upset anything around them, relay everything back home and do all of that with fewer people than anyone else. It's like training a St. Bernard on steroids, except the robots won't get sick if they are fed chocolate.

At the end of the rescue league, the German team came in first place and the team from Carnegie Mellon placed second. The team led by Balch came in third.

The student-led team from Tech did not place, but performed "very well," Balch said.

The next step for all of the teams is the annual international tournament, which will be held in Bremen, Germany, from June 14-20, right alongside the World Cup.

If the RoboCup founders have their way, however, the RoboCup may soon join the World Cup. The ultimate goal is "by the year 2050, [to] develop a team of fully autonomous humanoid robots that can win against the human world soccer champion team."

It's a lofty goal, to be sure, but one certainly attainable unless Brazil wins the World Cup again this year. If they get one more title under their belts, then it's pretty safe to say that not even the Terminator himself could defeat them.

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panded liquids, which comprise an emerging genre of tunable solvents. These new solvents could help to streamline chemical processing, which would have important implications for the food and pharmaceutical industries.

A.J. Friend shares a similar passion for his field of study. A sophomore from West Haven, Conn., Friend is majoring in discrete mathematics.

"I've always liked solving [math] problems. It's like a competition between you and the problem. You get into it and get excited about it. I was working on a problem one night and nothing I tried worked, but I still had a great time," he said.

> "The Goldwater has opened up a lot of doors, especially for undergraduate programs and graduate schools."
>
> **A.J. Friend**
> Second-year Math major

Friend became involved in mathematics research with Professor Mason Porter during his freshman year at Tech. He concentrates on network theory, which he explains as "a graph with nodes that are connected to each other by edges, used to try to understand complex systems." One such system Friend has focused on is the partisanship and power networks in the U.S. House of Representatives. Using algorithms to detect political connections, he has studied structural shifts in the organization of the Democratic and Republican parties in the House.

Friend has other interests as well. Outside the lab, he plays intramural soccer and is involved with the Tech chapter of the National Society of High School Scholars.

He will spend next fall at Penn State as part of the Mathematics Advanced Studies Semesters program.

"The Goldwater has opened up a lot of doors, especially for undergraduate programs and graduate schools," Friend said.

Physics major Jonathan Diaz likewise has extensive interests in research. The Atlanta native started out in Tech's PicoForce nanotechnology lab, studying the atomic origins of friction and other phenomena. However, finding theoretical physics more to his taste, Diaz will be working with Professor David Finkelstein in the fall.

Diaz's upcoming research topic? Fixing string theory. Present field theories, like the string theory, are built out of unbounded oscillators, but Diaz and Finkelstein hope to recast them in terms of rotators, which set limits.

"Our ultimate goal is to quantize the theory of gravity," Diaz said. "This is also the quest of the string theory, but it starts at an arbitrary point … and is ultimately untestable. We will try to fit general relativity and quantum mechanics together [in a new way] using rotators."

When not pondering the mysteries of physics, Diaz can be found working on his next film. He has just completed his first feature-length movie, titled "Disruptions," or, for the physics-literate, "Our Emotions Invariant Upon Coordinate Transformation." He is in the process of writing the screenplay for another movie.

With the support from the Goldwater Scholarship, all three students plan on continuing to graduate school and later pursuing either teaching or research, or some combination thereof.

sliver

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steel bridge
pro-gram-mer
n. an organism that turns caffeine into software
Best of Tech rocks!
mona is the best
Dead week means no classes right? So why do I have 4 projects due?
Iota Iota Nine forever
Testing, Testing...1,2,3....Mic Check....I am lame
Dear girl with the chicken purse, either shut up w/ the negative comments in abnormal psych or do the rest of us a favor and stay home
short redheads rock my sox
april is so mean!!!!!!
just joking baby!!!!
i love strawberries!!!!!
and chocolate!!!!!!
look at her, no wonder there are so many gays
I wrote down a list of all the weirdos on this campus I have a nickname for and i got over 50
Found: lost pocketknife. Contact gtg174i w/ full description to get it back
how about we not let people say nigga in the slivers anymore
See if you can catch the humor in this: the Technique staff manual says to "Right it like this..."
john m is an idiot
The Earth has a problem with its bowels seeing as Mexico and Africa are in constant turmoil.
Africas children do not need my money or your "god" they need political reform.
Chelsea Football Club is a Joke!!
Where in the World is Carmen Sandiego?
My ho is fat, real fat. Is that cool?
Southern Style Kicked!
I am the biggest fan of the Little Prince!
MGF time to see the wife more often!

See page 15 for more Slivers!