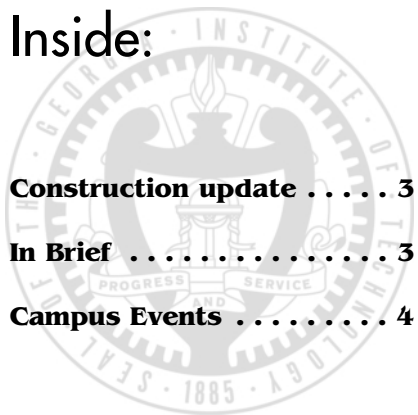


Inside:

Construction update 3
In Brief 3
Campus Events 4



THE WHISTLE

FACULTY/STAFF NEWSPAPER

VOLUME 29, NUMBER 12 • MARCH 22, 2004

THE GEORGIA INSTITUTE OF TECHNOLOGY



Elizabeth Campell
Institute Communications
and Public Affairs

Model behavior:

Robots move toward the mainstream

When most people think of robots, they envision Hollywood images of robots with super-human powers — often times humanoids with superior intelligence and strength. The reality, however, is quite different from these fantastic visions.

"Humans are very robust systems and very adaptable. I don't see creating robots that compete with humans; better to create robots that complement and work with humans, not replace them," says Ron Arkin, Regents' professor in the College of Computing and director of the Mobile Robot Laboratory.

Over the next 10 years, he said, people will see more robots in their daily lives, and personal robots will become mainstream for household tasks and entertainment. While robotic lawn mowers and vacuum cleaners already exist today, they will become better, more reliable and more prevalent. Entertainment robots, such as the Sony AIBO dog and tour guides, will be more visible as well.

The military will also use more robotic systems. Examples of robotic systems already in use by the military are cruise missiles and unmanned aerial vehicles. Although the U.S. Department of Defense has funded much of robotics research, many of the advances gained are applicable for non-military use as well. The long-term goal is for robots to perform such dangerous jobs as disposing of hazardous waste, handling explosives

and clearing mines.

Arkin and Tucker Balch, assistant professor in the College of Computing and a founder of the BORG Lab, are scientists creating the next generation of intelligent robots.

From soccer to military missions

A growing trend in robotics is designing teams of robots to work together to accomplish tasks ranging from playing soccer to completing military missions. Arkin and Balch envision teams of robots designed for specialized tasks — each with its own strengths and weaknesses — working together to solve problems. Designing these systems presents many interesting research challenges.

"A great challenge to robots on a soccer team is what to communicate and when. If the individual agents communicate all the time about everything, it creates a cacophony of noise. So, our research is focused on what to communicate when, to have the most effective system," says Balch.

In 2003, Balch led a student team competing in the Robocup American Open Soccer Competition. This has an excellent real-world application because the robotic soccer players must think in real-time in an adversarial environment and model opponents' strategy. Advances resulting from this type of adversarial competition can translate to potential military application — an example of robotic research going from non-military to military.

The Mobile Robot Laboratory specializes in blending reasoning with reflexive behavioral responses. This team's approach is unique in that they design robotic systems to react and plan.

"Some of our robots operate on what I call the principle of 'just do it'"

Robotics continued, page 2

Work on campus construction projects continues

Michael Hagearty
Institute Communications
and Public Affairs

Project update, page 3

If there is a constant at Georgia Tech, it has to be campus construction. Over the past decade, faculty, staff and students have seen unabated growth and renovation, slowly transforming the campus into the technological university of the 21st century.

From academics to research to athletics, that growth has left no aspect of the Institute untouched. In fact, it's a safe bet that the buildings, labs and fields occupied by current freshmen are quite different from students closing in on graduation.

That progress isn't expected to

slow any time soon. Hardhats have already begun to appear in the area that will be the future home of the Klaus Advanced Computing Building, and October's announcement of an anonymous \$36 million donation for a nanotechnology research complex ensures that Tech will continue to boast some of the nation's best facilities.

With the excitement surrounding the opening of Technology Square beginning to wane, it is worthwhile to check on the status of some of the other projects currently under way.

Dean's Special Lecture in Chemistry



photo by Nicole Cappello

Alan Heeger, co-winner of the 2000 Nobel Prize in chemistry and professor at the University of California at Santa Barbara, spoke to a standing-room crowd at the Boggs Building last week. Heeger shared his research on detecting sequences on DNA and how it could one day be used to foil counterfeiters, fight bio-terrorism and treat genetic disorders.

Heeger won the Nobel Prize for his 1976 discovery of conductive polymers. He shared the prize with Alan MacDiarmid of the University of Pennsylvania and Hideki Shirakawa of the University of Tsukuba in Tokyo.

INNOVATIONS@GEORGIATECH

This is the latest article in an ongoing series focused on the research currently under way at Tech. A complete archive of stories with multimedia is available at www.innovations.gatech.edu

“QUOTE— UNQUOTE”

“If they do (institute major changes), I think that would create more problems, to tell you the truth. That would really be a kind of knee-jerk reaction to what is happening at two schools. To penalize 117 Division I schools because of what one school supposedly did is a little overboard.”

—Georgia Tech Athletics Director Dave Braine, on rumors that the NCAA, which oversees collegiate athletics, might implement stricter guidelines for recruiting high school athletes.
(Atlanta Journal-Constitution)

Robotics, cont'd from page 1

— you don't think about it, you just react and do it,” Arkin said. “But in many cases, we feel that's inadequate to achieve the type of high-level performance robotic systems that we'd like to have. So we have to create the ability for the robot to deliberate and to make plans effectively. It's our lab's contention that both of these components are necessary.”

This lab group also develops user-centered robotic systems and is concerned with creating hardware and software to be used in the real world — that doesn't require a Ph.D. to operate.

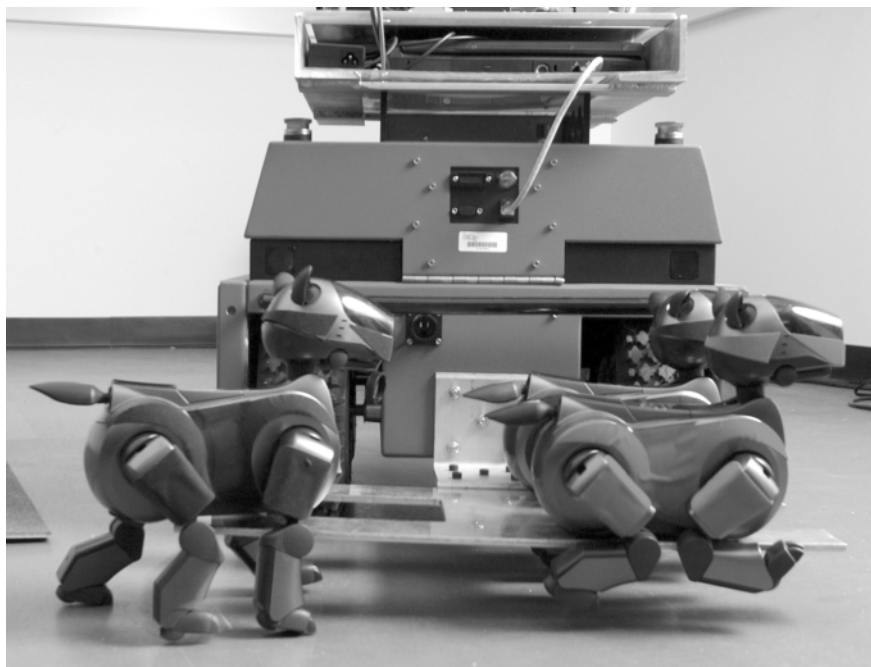
The Mobile Robot Lab frequently conducts usability studies for the military. In response to the changing nature of war as seen recently in Afghanistan and Iraq, the federal government is now investing heavily in the development of robotic systems for urban environments. The lab assists with some of its unclassified research.

Animals as biological models

Computer science has a long tradition of borrowing from nature, and using biological models for technology is called biomimetics. As part of his research, Balch likes to look to nature for successful examples and sees biology as a library of possible solutions. Balch studies ants to get ideas of how a large colony works together for the good of the whole.

“Nature can provide inspiration for new, efficient ways of doing things,” he said. “For example, with social insects like ants, an individual ant doesn't exhibit much intelligence, but a colony of thousands of ants is adaptive and acts with great intelligence.”

In the mid-1990s Arkin worked on a project whose research team created models based on praying mantis behavior for visual and motor control systems using a behavioral-control model called schema theory, which provides a common language for biologists and roboticists. The team



photos by Nicole Cappelletto

Balch and Frank Delleart, assistant professor in the College of Computing and co-founder of the BORG Lab, are studying ways to use robots for search and recovery missions at disaster sites. In a demonstration, the large ATRV-Mini robot transports two Sony AIBO robots to a disaster site.

imported the praying mantis-based application into a six-legged robot — a hexapod — resulting in realistic behavior by the hexapod depending on whether it saw prey, a predator or a mate. If the hexapod saw a predator, he remained motionless, but he moved toward the prey if no predators were present — similar to how a real praying mantis behaves.

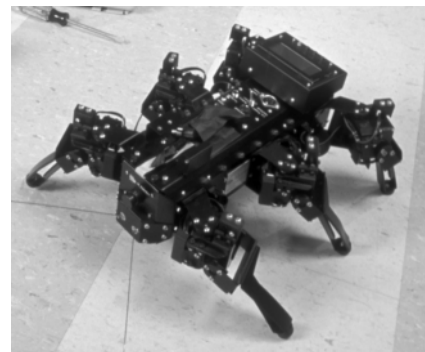
Future challenges

Reliability has been and continues to be the biggest obstacle to robots today.

“Our goal is to have robots operate reliably day in and day out, much like a car does, but today's robots aren't there yet,” says Balch. “Reliability is a great challenge in the sense that it's currently the biggest impediment to success in robots.”

Long-term challenges facing robotics range from the seemingly simple to the incredibly complex. One ongoing difficulty is getting robots to reliably perceive the world around them with sensors. For example, robots see above-ground obstacles easily but other obstacles, such as a hole, poorly. Shadows sometimes cause problems as well. Limited perception is a chronic challenge to designing robotic systems to explore and operate in the outside world where lighting and terrain vary considerably.

Another long-term goal is representing human-level intelligence, so that computers or



Arkin's six-legged Hermes II Hexapod robot.

robots can truly think, learn, anticipate, plan and act intelligently.

“We are chinking away at this problem step by step, but we haven't discovered the holy grail of intelligence. I think robotics holds the most promise as the domain where we might find this. Computers are a disembodied intelligence with a screen and a keyboard, whereas robots face the same challenges that we do in that they have to understand and get around in the world. So, I think we'll first see real human-level intelligence evolve in the context of robotic systems,” says Balch.

With plenty of room for improvements, roboticists see a future full of exciting discoveries. Arkin says robotics is currently at the toddler stage, not even at adolescence yet. So, for those bright young students who like math and science and dream of one day creating robots like the ones they see in the movies, the future is bright.

For more information...

BORG Lab

borg.cc.gatech.edu

Mobile Robot Laboratory

www.cc.gatech.edu/ai/robot-lab

Robotics@Georgia Tech

www.robotics.gatech.edu



THE WHISTLE

Editor: Michael Hagearty

Published by Institute Communications and Public Affairs.

Publication is weekly throughout the academic year and biweekly throughout the summer.

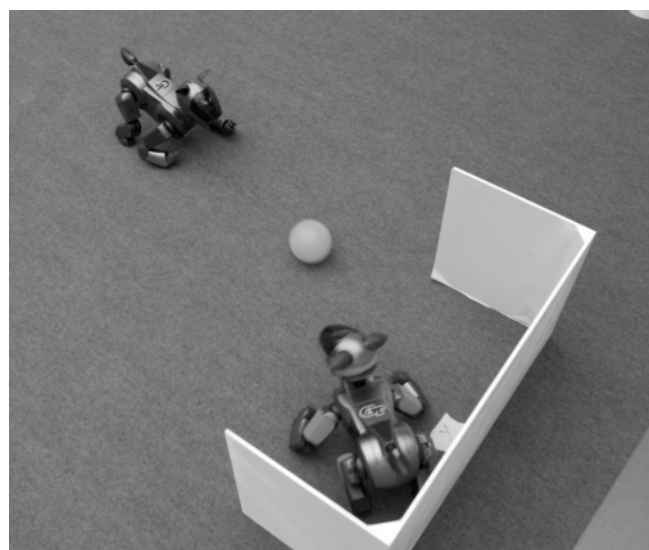
Archived issues of The Whistle can be accessed electronically through the Georgia Tech Web page, or directly at www.whistle.gatech.edu.

Calendar submissions e-mailed to michael.hagearty@icpa.gatech.edu, or faxed to Michael at 404-894-7214 must be sent at least 10 days prior to desired publication date. Classified submissions are on a first come, first serve basis. For more information, call 404-894-8324.

Copies/5,900

Institute Communications and Public Affairs
Wardlaw Center
177 North Avenue
Atlanta, Georgia 30332-0181

Georgia Tech is a unit of the University System of Georgia.



Balch and his students participated in last year's Robocup American Open, in which teams of robot dogs compete — autonomously — against one another. At the inaugural event, the Georgia Tech team finished second, behind host sponsor Carnegie Mellon University.

Campus Recreation Center



Gary Phillips, project manager for the Campus Recreation Center (CRC), has reported good progress on the second phase of construction, which includes a huge fitness center, leisure pool and a parking deck.

Still, the project is a long way from completion.

"They are still pretty much working on everything," Phillips said. "As you can see driving by, they are working on the metal and glass skin [of the facility]."

When completed, the 14,000-square-foot

fitness area will have all the amenities of modern exercise clubs, including a cardio-theater, free weights and stretching area. The leisure pool will have lap lanes, a water slide and a hot tub, while the 500-space parking deck — located between CRC and the intramural fields — will be accessible from Ferst Drive as well as Tech Parkway.

"The project is scheduled for September completion, but the contractor is hoping to beat this and have it open for the start of fall semester," he said.

Graduate and family housing



Less than one year from now, seven new buildings will house graduate students and their families, complete with amenities consistent with those enjoyed by students on the other side of Tenth Street. The new housing complex will include almost 400 apartments, a dedicated parking deck and an on-site daycare center.

With some of the buildings starting to come out of the ground and a tight construction area, Tom Suermann, manager of the capital projects program, said the biggest concerns are weather and the timely delivery of materials.

Some of the shops have already opened; others will be finished later this month. The seven-month renovation and expansion of the former bookstore mall is nearing the end of its first phase, giving students new dining options, meeting rooms and study space in what Student Center Director Rich Steele called "the social crossroads for the campus." At right, Burdell's General Store provides patrons with Georgia Tech apparel, bestselling books and sundries.



Student Center Commons

IN BRIEF:

Chancellor to speak at Women in Engineering banquet

Industry representatives, faculty and staff members, and family and friends will gather this week to celebrate the stellar academic achievements of women engineering students at Tech, and to encourage the continued pursuit of excellence. The Excellence Awards Banquet recognizes more than 400 Georgia Tech undergraduates who maintain a grade point average of 3.35 or higher.

In the 50 years since Tech opened its doors to women, the College of Engineering can now boast more female graduates than any university in the country. Mimi Philobos, director of Women in Engineering (WIE) Programs and organizer of the event, said, "This celebration underscores the unique role women play in Georgia Tech's mission and in the future of this nation."

The keynote speaker will be Thomas Meredith, chancellor of the University System of Georgia. During the banquet, several faculty awards — voted on by women students in engineering — will be presented to those who through their excellence in teaching, caring and motivation made a difference in the students' lives.

NSF ADVANCE conference open to faculty and administrators

Georgia Tech is hosting a National Conference for NSF ADVANCE April 19-21 at the Global Learning and Conference Center. With a goal of increasing the participation of women in the scientific and engineering workforce, this year's ADVANCE conference will include participants from all NSF ADVANCE Institutional Transformation grant-funded institutions. Speakers include NSF ADVANCE Program Director Alice Hogan, President Wayne Clough, Provost Jean-Lou Chameau, as well as representatives from Tech and other ADVANCE institutions.

Faculty and administrators are invited to participate in this year's conference, with fees to be paid by the Office of the Provost. Register at www.pe.gatech.edu, keyword NSF. To complete registration click "Register Now, Pay Later."

For more information about Tech's NSF ADVANCE Program, visit www.advance.gatech.edu.

Pre-retirement sessions available on DVD

The Office of Human Resources has announced that as of April 1, individuals who were not able to attend the recent pre-retirement information sessions can visit the Library, where DVDs of the proceedings will be available for viewing or check out.

Each DVD will cover one of the two sessions. The first dealt with social security benefits and Georgia Tech benefits, while the second session dealt with Teachers Retirement System benefits and optional or supplemental benefits.

Copies of the programs will also be available for sale. Anyone interested in purchasing an individual copy should contact Becky Bardwell, video productions manager for the Georgia Tech Cable Network, via e-mail at rb173@mail.gatech.edu.

CAMPUS EVENTS

Arts & Culture

Mar. 23-25

The Ferst Center for the Arts hosts the Off-Broadway play “The Exonerated,” dealing with innocent survivors of death row. The 8 p.m. performances star Lynn Redgrave and Eric Roberts. For tickets, call 894-9600.

Mar. 26

The bookstore welcomes Architecture Associate Professor Betty Dowling, who will be signing copies of her new book, “Timeless Architecture: Homes of Distinction by Harrison Design Associates,” at 7 p.m. For more information, visit <http://gatech.bkstore.com>.

Mar. 31

The Georgia Tech Orchestra and Jazz Ensemble will perform a concert in honor of the 60th anniversary of D-Day, at 8 p.m. in the Ferst Center for the Arts. The evening will be a benefit for the families of U.S. troops killed in Afghanistan and Iraq. For tickets, call 894-9600.

Apr. 1

The School of Literature, Communication and Culture hosts a McEver Poetry Reading featuring former U.S. Poet Laureate Billy Collins at 7 p.m. in the LeCraw Auditorium. For more information, visit www.iac.gatech.edu/poetry.html.

Brown Bags/Conferences/Lectures

Mar. 23

The School of Aerospace Engineering's Distinguished Lecture Series welcomes Dean Borgman, chairman of Sikorsky Aircraft, presenting “Straight Up is the Way to Go” at 11 a.m. in room 442, Guggenheim Building. For more information, e-mail connie.irish@aerospace.gatech.edu.

Mar. 23

Camille Cooper will be the keynote speaker for Women's Awareness Month, at 7 p.m. in the Student Center Ballroom, on the beauty myth in mass media. For more information, visit www.womenscenter.gatech.edu.

Mar. 24

The School of Chemical and Biomolecular Engineering presents the 20th Annual Ashton Cary Lecture with featured speaker Gregory Stephanopoulos, professor of biotechnology and chemical engineering at MIT, on “Chemical and Biological Engineering: A New Dimension to a Successful Paradigm” at 4 p.m. in room L1255, ES&T Building. For more information, call Brenda Mattox at 894-2848.

Mar. 30

The School of Materials Science and Engineering's Institute-wide Seminar Series welcomes Professor Russell Dupuis on “Growth of InAlGaN-Based Devices by Metalorganic Chemical Vapor Deposition,” at 4 p.m. in room 183, Love Building. For more information, call 894-6886.

Mar. 31

The School of Psychology's Colloquium Series welcomes Oscar Ybarra, associate professor at the University of Michigan, on “Socializing is Good for Your Wits,” at 3:30 p.m. in room 250, Coon Building. For more information, e-mail christopher.herzog@psych.gatech.edu.

Mar. 31

The College of Management's IMPACT Speaker Series welcomes Jimmy Yancey, chairman of Synovis Financial, at 4:30 p.m. in the LeCraw Auditorium.

Miscellaneous

Mar. 25

Ulester Douglas, director of training for Men Stopping Violence, will be the featured speaker for Take Back the Night, raising awareness of sexual assault and violence, at 8 p.m. by the Campanile.

Mar. 26

The GT Women's Forum will hold a Bake, Book and Yard Sale from 10 a.m. - 2 p.m. in front of the Student Center. To donate books, baked goods or small household items, e-mail kristin.turgeon@mirc.gatech.edu.

Apr. 1

The deadline for students to apply for the President's Undergraduate Research Award. Application is available online. For more information, visit www.undergradresearch.gatech.edu/institute-wide.htm.

C L A S S I F I E D S

AUTOMOBILES

1985 S10 Blazer. V6, 5-speed, 4WD, \$2,700 OBO. E-mail rob.muzio@gttri.gatech.edu or call 770-528-7108.

1991 Isuzu Trooper. 132K miles. 4WD, Maroon w/ gray interior. \$2,000. Call Rick at 404-550-6011.

1992 Honda Prelude. 5-speed, 119K miles, silver, clean condition, 120K-mile major service done, needs 2 tires, \$3,987. Call Glen at 894-3418.

1993 Mercury Cougar XR7. Burgundy with gray interior, 155K miles, good condition, 2 door, automatic, 3.8L V6, power everything, keyless entry, tinted windows, cruise, airbag, very clean. \$1,900. Call 770-649-1819.

1994 Lincoln Towncar, signature series. Completely loaded. Excellent condition. 143K miles, \$3,500. Call Theresa Lummus, 706-663-2306.

1996 Ford Contour. 140K miles, \$1,000 as is. Call Robin, 894-1953.

1996 Nissan Maxima SE. Excellent condition, 4-speed auto transmission, a/c, extra clean, CD player, power moon roof, white 4-door, keyless entry, alarm, cruise, \$6,500 OBO. E-mail amananu@bellsouth.net or call 678-291-0928.

1999 Suzuki Grand Vitara. Excellent condition and maintenance record, 2004 inspection, 4WD, \$8,950. Call 404-814-9154.

2001 Ford F150 SD, 5.4 liter V8, 4-door, hunter green, lariat, loaded, K&N filter, Flowmaster, 6CD changer, 23K miles, warranty expires 7/04. \$20,000 firm. E-mail d.senn@gttri.gatech.edu or call 770-528-7011.

FURNITURE

Wrought iron coffee table and two end tables. Charcoal gray/black with some silver accent, \$75. Antique footstool, burgundy needle point, 1920s, \$50 firm. Call 894-1711 or e-mail nicole.pamplin@facilities.gatech.edu.

Bedroom set, maple finish, queen headboard, 7-drawer dresser w/large mirror, 2 night stands w/ 2 drawers each. Lots of storage. Good condition. \$300. Call 385-4901.

Moving sale: kitchen table with 4 chairs, \$130. Queen-size futon with solid wood frame, \$130. Solid wood TV stand, \$140. See www.prism.gatech.edu/~gte689e for pictures. Call 404-423-0917 or e-mail jh341@mail.gatech.edu.

Steel-bunked futon, couch/bed on bottom, twin mattress capable on top. Red, sturdy, great condition, wonderful design. \$130. Call 404-894-2753.

Queen size oak waterbed frame, headboard, and mattress with matching chest and dresser with mirror, \$500. Call 385-0042 or e-mail chris.hamlin@oit.gatech.edu.

White solid maple baby bed and mattress by Simmons, \$145. White chest of 4 drawers, contemporary style, \$75. White tubular twin bed, no mattress, \$45. Solid wood port-a-crib with mattress, \$45. Call 770-923-1048.

REAL ESTATE/ROOMMATES

3BR/2BA home for sale. Clairmont/Briarcliff area. Brick ranch home with finished basement, work bench area, screened porch, expansive decks around inground pool. Call 894-9945 or e-mail karen.fore@oit.gatech.edu.

For rent: duplex in Home Park, adjacent to campus, 2BR/1BA, hardwoods throughout, fireplace, central heat and air, \$875/month. Available April 15. Call Kathy, 404-876-3062.

2BR/2.5BA townhouse in Cumberland/Smyrna, 12 miles from GT, on CCT. Corner unit, fireplace, laundry & storage. 1747 Nappa Valley Court, off Spring Road. \$800/month. Call 770-428-4836.

4BR/3.5BA home for sale in Morningside. 15 minutes to Tech, 4.5 years old. Fourth bedroom/bath:

perfect teen, au pair or home office suite. \$489,900. Call 404-333-9329.

Fully furnished downtown 1BR condo for sale. www.thewilliamoliver.com. All utilities (cable, DSL, gas, electric) paid with association fee. 10-year tax abatement. Contact Mark Camp, 404-786-5400. FMLS# 858944.

SPORTS/FITNESS/RECREATION

Health Rider, with timer and spot to add on weights, \$75. Ab Doer, in the box, never opened, \$50. E-mail nicole.pamplin@facilities.gatech.edu or call 894-1711.

MISCELLANEOUS

Wanted: dirt bike or trail bike, year does not matter. Call Daniel at 770-565-3242 or e-mail dhoff86@att.net.

Wedding veil. White, edged with diamonds, paid \$200, will sell for \$100. Call 894-1711 or e-mail nicole.pamplin@facilities.gatech.edu

Knight in shining armor! Six-feet tall, free standing, made of gold brushed tin. Eclectic must-have for creative decor or unique collectors. \$350 OBO. E-mail lp109@mail.gatech.edu or call 404-271-4266.

Ads will run for a maximum of three issues. The Whistle reserves the right to edit ads longer than 30 words.