The Material Handling Student Design Competition is an annual 5-week competition where groups of up to four undergraduate students from universities across the country are given the task of designing an entry that solves a fictional company’s manufacturing or distribution challenges. The entries are evaluated on product flow, equipment and space utilization and overall integration, among other things. The 2008-2009 competition involved designing a distribution center for a grocery retailer from an already existing facility.

The national second place winners for this competition were Georgia Tech’s very own undergraduate students Matthew Knepper, Natasha Jain and graduate student Chanpeng Shen. Dr. Chen Zhou was their research advisor. Knepper is a fifth year ISyE student from Ringgold, GA, who plans to join the Navy after graduation and pursue a career in Humanitarian Logistics. Jain is a fourth year ISyE student from New Dehli, India who plans to enter graduate school after graduation. They both approached Dr. Zhou separately about research and he suggested that they team up and enter the Material Handling Student Design competition. Jain recalls a little difficulty at the start of the project since they had the double task of getting to know each other while trying to focus on producing the perfect entry for the competition. Already at a disadvantage because of their small team, they spent the beginning of the semester learning about material handling and warehouse/DC design. As they got to know each other, Jain and Knepper began to recognize each other’s strengths and realize that they worked very well as a team. When it came time to assign individual projects, Knepper learned AutoCad and focused on facility design while Jain worked with the different data sets. Eventually, they enlisted graduate student, Chanpeng Shen, for both advice and to help them compete. Together they were able to produce an award winning entry.

When asked about what they learned from this experience, both Jain and Knepper responded that first and foremost, team dynamics played...
Faculty Interview: Ioannis Brilakis, COA

U/G Research: Briefly describe your current and future research endeavors?
IB: The main focus of my current research is on creating the computer vision software tools needed to track materials, equipment and personnel in construction sites, for monitoring productivity and tracking the progress of a project. I have also begun to expand the results of this research into creating a novel surveying tool based on videogrammetry that is expected to reduce the cost and time needed to spatially model a construction site.

U/G Research: How did you become involved as a mentor to undergraduate researchers?
IB: When I started my career at the University of Michigan a few years back, I was approached by the Undergraduate Research Opportunities Program (UROP) director who explained to me the benefits of undergraduate research and convinced me to start working with undergraduates. I started with one student, and 2 years later, I had a minimum of 5 UROP students working with me every semester. She was obviously right!

U/G Research: What types of projects have you mentored? How do you utilize undergraduate students in your research?
IB: In most cases, the projects for undergraduates that I mentor involve photography and miniature modeling of test subjects. Students are asked either to collect series of images of construction projects and synthesize them with my research tools into useful information, or build a photorealistic miniature replica of a site in my laboratory for real time experiments.

U/G Research: What should a student do to become involved?
IB: Knock on my door. Opportunities are always available, and help provide exposure to state-of-the-art research projects in action, while cultivating relationships with graduate students who complement my mentoring on a day-to-day basis. Students who enjoy hands-on experiences or have interest in computing are especially welcome.

U/G Research: What are the benefits to faculty of mentoring undergraduates in research?
IB: I consider those undergraduate students that work with me as my “landing zone”. They help me take a break from constantly thinking of the next step, and allow me to spend time revisiting current activities and how to explain them to others in layman’s terms. This is a critical brain exercise, as it helps “mature” certain concepts and often results in solving existing research problems or discovering new directions. Besides, Georgia Tech undergraduates have what it takes to be excellent researchers and their work has been invaluable to mine.

U/G Research: Why is undergraduate research important?
IB: For many reasons, but I will stick to one. For the research-inclined student, it is the only way to know with confidence whether graduate studies, and potentially an academic career, are of interest. Students who continue research in their graduate studies are much more focused, have goals, and clearly know where they want to be in 5 to 10 years. This is no small feat.
The Research Option: A Bridge to Graduate Study and Beyond

by Dianne Palladinao, PSY ’08

Planning to attend graduate school can be a daunting activity. It can take months, or even a year or more, to collect everything necessary to complete a successful application. Sometimes even the most qualified are not admitted due to budget constraints and factors that are based little on the application credentials. It can be frustrating for students, but participation in the Research Option at Georgia Tech gives students an added advantage. This benefit applies not only to applying to graduate school, but also to success in a graduate program and beyond. I was part of the second group of students at Georgia Tech to complete the Research Option requirements, and I have found the experience instrumental in shaping who I am today.

There are many specific ways the Research Option helped with my personal and intellectual growth while at Georgia Tech. First, the process of discovering information about different faculty members and their research interests provided opportunities to practice networking and led to quite a few strong relationships with faculty and other graduate students that I expect will continue far into our careers. This not only helped with my ability to obtain strong letters of recommendation for graduate school, but also will contribute to a strong professional network - something that is critical for emerging research scientists. Another advantage of working in a lab with current graduate students is that they have been through the admission process and have experienced varying amounts

Material Handling Competition ...cont’d from page 1

a huge role in their success. Jain learned that “everyone on your team should have the same goals and should be willing to put in as much effort into the project as you.”

Knepper and Jain went from strangers to teammates in a short period and were happy to find that they both shared the same aspirations and commitment to this competition. As a small team entering the competition, Knepper and Jain each had large amounts of responsibilities and had to be flexible when dealing with challenges. They also learned that one of the keys to their success was having the advice of a great mentor, Dr. Zhou, who is very knowledgeable about manufacturing and material handling and whose advice, according to Knepper, was “invaluable throughout the process.”

Jain and Knepper had an amazing time researching, planning, and working on their entry for this competition and for them it was easy to have fun because they enjoyed their topic. Actually, that is the most important piece of advice they would give anyone going into research. Knepper recommends that “if you’re going to do research, find something that really, really interests you and don’t be afraid to work 30 hours a week on it.” Jain agrees that “you have to really like what you do to succeed during research.”

The 2008-2009’s Material Handling Student Design Competition was a success for Georgia Tech as well as for Knepper and Jain. Not only did they win a national prize, but they also gained knowledge, experience, and friends that will follow them once they leave Georgia Tech.

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Undergraduate Research News

Faculty Interview: Ruth Uwaifo Oyelere, Econ

U/G Research: How did you become involved as a mentor to undergraduate researchers?
RO: As a graduate student at Berkeley, I was blessed to have a great mentor and so I joined the faculty at Tech in August 2006 with a personal commitment to mentor students. My initial thought was to mentor graduate students, but in 2007, I had a couple of undergraduate students who took my development economics class and came by my office to speak to me about their interest in development economic research and their strong interest to do research under my supervision. Hearing those students speak about their interests and finding out that each of them even though they were so brilliant and had so much potential had no mentor of any kind, made me realize it was my time to take action and become a mentor for undergraduate research.

U/G Research: What types of projects have you mentored? How do you utilize undergraduate students in your research? Have there been publications/presentations or contributions to proposals that have resulted from this work?
RO: I have mentored projects with undergraduates on different areas of economic research. These projects have been focused on different countries in the world. Some of the projects have been in the form of independent studies, others stemming from PURA and others as thesis. These projects include understanding declining returns to education in Venezuela (PURA), understanding the challenge of poverty in India (Independent Study), estimating the effect of farm payments on demand for illegal and legal farm workers in the U.S (PURA), factors that affect global music piracy (Thesis) and decomposing the effect of the subprime mortgage boom and bust on U.S native born, Naturalized Immigrants and other residents in the United States (PURA). These projects have all started with a research interest by the student, which I have helped to fine tune. My goal is always to reduce the student interest to questions that can be answered in a semester or two. In some cases, the interests of the student are right along the lines of my research agenda and this leads to a longer mentorship relationship as the student and I begin to work in more technical detail on the research question. For example, the work on Venezuela with Naihobe Gonzalez (now a PhD student at Columbia University) is an example of a project that has led to a presentation by Naihobe and a working paper now in the working paper series of IZA (Institute for the study of labor). I will also be presenting a paper based on this project at the GaTech School of Economics seminar series at the end of October. In addition, the working paper from this project will be presented at an international development and trade conference organized by the Atlanta Fed in December. Another example of a project that has led to presentations is the research on farm payments with (Gabby Sirow) who is a senior in ISYE and Economics. This paper has led to already two presentations by Gabby first at the Undergraduate Research Symposium last spring at Georgia Tech and next at the ACC Meeting of the Minds Undergraduate Research Conference. Gabby was selected as one of Georgia Tech’s representatives to this conference where she presented this research. We are presently working on a paper that we plan to submit for publication in the next few months.

U/G Research: How do you successfully recruit or partner with undergraduates in your work?
Mentoring Corner

New Mentoring Resources Website
Check out UROP's new and improved resources for mentors. The newly designed site provides information on general mentoring of undergraduate researchers, including a list of what the program considers to be “key” helps for newer mentors. The site also highlights resources in several categories many of which have been highlighted from mentors as key areas in which they’d appreciate more information. These areas include: motivating students, interdisciplinary and multi-disciplinary projects, external funding for undergraduate research, among other topics. The site also highlights information on writing and presentation skill building and provides a set of discipline-specific tips and ideas for developing programs in undergraduate research. The site can be found at: http://undergradresearch.gatech.edu/mentoringresources.php or by navigating to the webpage by clicking on the “Mentoring Tips and Resources” link from the main faculty page.

The Tower, GT’s Undergraduate Research Journal
Faculty mentors of undergraduate researchers are encouraged to have their students submit articles for Georgia Tech’s Undergraduate Research Journal, The Tower. The publication is to be congratulated on the publication of its inaugural print edition this October. Copies of the publication are available at the library, outside the Student Publications office in the Flag building, or at other sites on campus. Copies can also be requested by contacting the staff via Editor Chuyong Yi at editor@gttower.org. Students are encouraged not only to submit their work in either a traditional journal article form, but in two shorter forms, called dispatches and perspectives. These last two types are encouraged for students who have “works in progress” or have submitted their work to other professional publications. By submitting their work or serving as reviewers of another peer’s work, students are able to learn the ins and out of peer review before they attend graduate school.

The journal uses an online journal submission and review process supported by Georgia Tech’s library. Graduate students are also key to the journal’s success and contribute by serving as reviewers. Tower staff are supported by a Faculty Review Advisory Board and other faculty reviewers who volunteer their time to provide guidance to the students during the review process. For additional information, including submissions guidelines and information on how to become involved, visit: http://gttower.org/

Dr. Ruth Uwaifo Oyelere..cont’d from page 4

RO: I do not recruit students because I want the student to make the choice themselves that they want to work with me. This way, when I choose to work with them after letting them know my expectations, I know we have a partnership of choice. From my experience over the last three years, I find that when students take the step to ask, it works better and I can help them reach out to their goals and dreams. I always look out for certain characteristics in undergraduate students who want to work with me: ability to work hard, willingness to learn and take advice, academic excellence and a sincere passion for research. When students have these characteristics, it makes for a good partnership.

U/G Research: What should a student do to become involved?
RO: Check out the UROP website. Talk to other students involved in research. Talk to faculty you would like to work with and also talk with your undergraduate advisor.

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of time as graduate students. Their knowledge about how things work and their advice was extremely helpful as I made decisions regarding my graduate school plans. Participating in research hands-on was also the best way to confirm my passion. I knew without a shadow of a doubt that I had chosen the right career for me through my work in the lab. Others may find out that research is not for them, and that is just as valuable! I learned about the nuts and bolts of research hands-on, and was able to complete several projects from conception to publication and presentation, and I experienced both the challenges and the rewards of conducting effective scientific inquiry. I was also fortunate enough to have been awarded both a PURA salary grant and a PURA travel grant, which allowed me to get paid for the summer to do my research, and then to travel to a conference to present one of my papers. All of these activities provided a taste of what academic life would be like in the future, and the experience was invaluable to me.

The Research Option requires additional writing classes that are also very useful. My class was a small group comprised of students from all disciplines offered on campus. Since much of my work today is interdisciplinary in nature, it was valuable for me to learn about the different perspectives, cultures, requirements, and even formats of various fields, and I gained an appreciation for what types of challenges others faced when disseminating their research. I left with a strong “community” feeling toward research, which I hold today as I do work with large groups of psychologists, doctors, nurses, statisticians, economists, engineers and others. It helps me take advantage of the differences among research disciplines, rather than be frustrated by them. The class also assisted with scientific writing skills, and this led to a better quality senior thesis for all of us - many of which ended up being published in peer-reviewed journals. I am certain that all of these experiences afforded by the Research Option program were critical to my successful admission to the graduate school of my choice.

Most importantly, when all is said and done, the true test of the success of a program is whether or not it propels students into their future situations with an advantage. I can confidently say that, in my case, it passed with flying colors. When I worked as a researcher for a year before graduate schools started, and now, as I begin my years in graduate school, I have been able to hit the ground running the minute I stepped onto my new campus. I not only have the technical, theoretical, and statistical skills to be productive right away, but I also have had extensive time to think about my strengths and weaknesses as well as my interests and those things that I will leave for others to discover. I have had time to formulate many research ideas of my own, because I have spent time in the lab with experienced researchers, both faculty and graduate students, from whom I learned on a daily basis before I left my undergraduate studies. In short, through my experiences with the Research Option program at Georgia Tech, I was able to confirm my passion for research, hone the essential research skills I needed to hit the ground running in my graduate research, foster life-long contacts in my field, obtain admission to the graduate program of my choice, and, most importantly, find out more about myself and who I would like to be as a future research scientist. The Research Option was the most valuable experience I had at Georgia Tech, and I strongly recommend it for all students - if not to prepare for a future job in research, then to prepare in general for professional life.
U/G Research: What are the benefits to faculty of mentoring undergraduates in research?

RO: The benefits of mentoring undergraduates may differ across faculty and also across fields of research. For me, the benefits of mentoring undergraduates are in three areas. First, the satisfaction of watching a student grow under one’s mentorship, and become skilled in doing research is priceless. Some students come to GA Tech with dreams of a career as a researcher and helping such students start reaching out to their goals and aspirations is so satisfying to me. This semester as two of the students I mentored left for graduate school, I was really excited because I knew I played an important role in helping them achieve their dream of going to graduate school and beginning their career as researchers. Also, I find it so much easier writing letters of recommendation for students I have mentored versus students I just teach. I am able to write non-generic letters because I know these students well, which makes their applications much stronger. Second, undergraduate students may sometimes not have the technical skills to contribute directly to a faculty’s research agenda. However, they have great ideas and can help in the shaping/development of new research topics for faculty. They also may even help in providing new perspectives or extensions on faculty’s current research. Third, some undergraduates who we mentor today can become potential collaborators and contacts tomorrow. My two former mentees now enrolled in economics PhD programs may end up being my collaborators on development and labor related research topics in the future.

U/G Research: Why is undergraduate research important?

RO: In a world-class university like GA Tech where so much emphasis is placed on research, I feel it is so important to expose our undergraduate students to what we as faculty spend a good amount of our time doing. Many students get to their third and, for some, final year at Tech and realize they would like a career that involves some or a lot of research but also realize that they do not have any or adequate exposure to what research is about or doing research. For some of these students their first experience is their undergraduate thesis and for others it is limited to some term paper. Both the thesis and especially the term paper do not provide much training or exposure to the research process and its ups and downs. This is one reason I feel creating undergraduate research opportunities is very important. It provides an avenue for students, just like internships do, to get some hands on experience on a kind of career path that they might end up being interested in or choosing.

On November 19, 2009, UROP staff and students will be present to answer questions on international research opportunities and experiences. We’ll be able to outline the options students have for both formal programs and student-created experiences. Information on funding will also be available. Event will be held in the Student Success Center from 5:00-6:00pm.

UROP Makes Special Appearance at OIE Study Abroad Scholarship Symposium
News from the Director

It’s hard to believe it’s already November! It seems that each fall the semester moves more and more quickly. I wish all students and faculty best of luck on final projects and exams!

The UROP staff hope that you are enjoying the newsletter and its information. But, more importantly, are getting a glimpse at the diversity and excellence in the research our undergraduates are undertaking with their faculty mentors! We welcome ideas for future articles and suggestions for both student and mentor profiles.

Best,
Karen Harwell

PS. SAVE THE DATE--- UROP Spring Symposium and Awards, March 16, 2010

Let Your Voice Be Heard!!

UROP Facebook Page
Interested in hearing more about upcoming Undergraduate Research events, news, funding, etc.? Then join the GT Undergraduate Research Opportunities Program (UROP) Group on Facebook.

Listserv
To receive information and announcements from Georgia Tech’s Undergraduate Research Opportunities Program (UROP), join the urop-news listserv. To join: Send an e-mail to sympa@lists.gatech.edu with a subject of “subscribe urop-news”.

Student Advisory Board for Undergraduate Research (SABUR)

The Student Advisory Board for Undergraduate Research (SABUR) works toward implementing new ideas for programs and resources for students interested in research. If you’re interested in serving on this board, please email the Chair, Ramya Parthasarathy at ramyah@gatech.edu. Freshman, sophomores, and juniors are particularly encouraged to become involved!