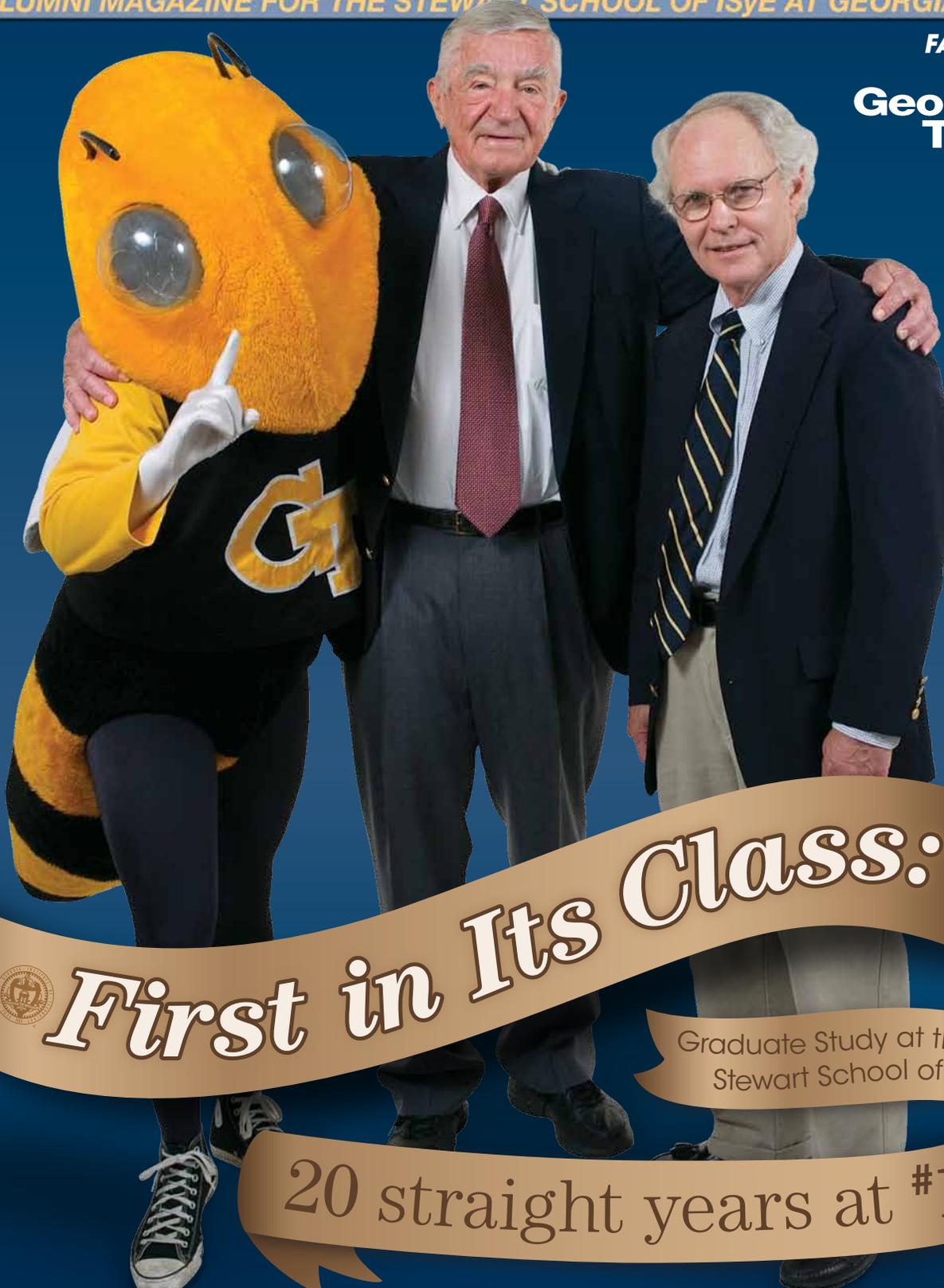


Industrial & Systems ENGINEERING

THE ALUMNI MAGAZINE FOR THE STEWART SCHOOL OF ISyE AT GEORGIA TECH

FALL 2010

Georgia
Tech 

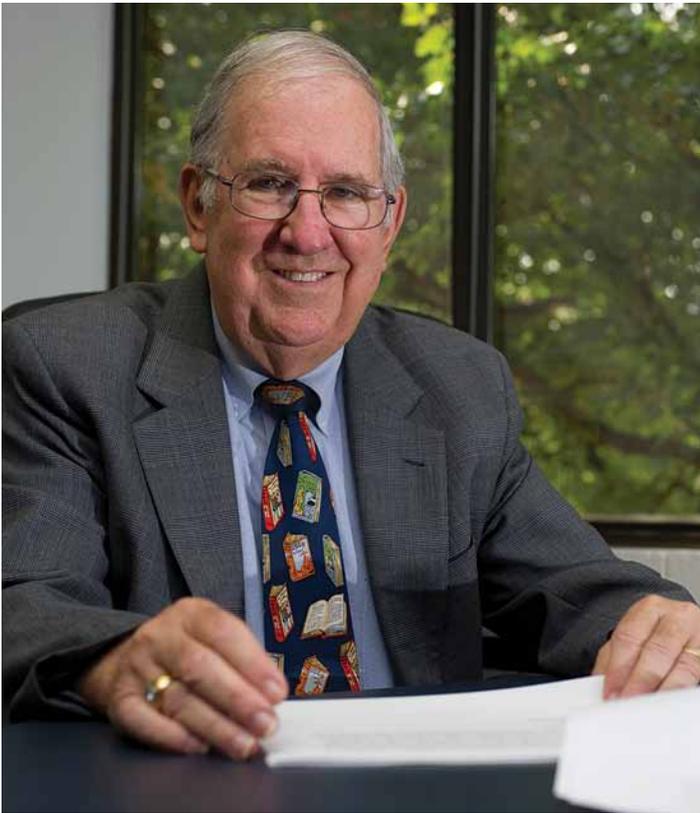


 *First in Its Class:*

Graduate Study at the
Stewart School of ISyE

20 straight years at #1

FROM THE CHAIR



It's good to be back at ISyE, albeit on a temporary basis as interim school chair; and I am delighted to be able to write the chair's letter that accompanies this issue.

The cover story in this issue focuses on the graduate program and celebrates what I believe is a marvelous achievement. While there is no shortage of surveys assessing and comparing academic programs, it remains that the results published annually by *U.S. News & World Report* probably constitute the most visible source of such rankings and certainly the source most often mentioned. That our graduate program is ranked first again this year is great news; that this is the twentieth straight year that it has been ranked number one by *U.S. News* is simply remarkable. The feature article, "First in Its Class," describes some attributes that form the underpinnings of a great graduate program and, in that regard, underscores how the program in ISyE measures up in comparison to others. I think you will find the piece interesting, informative, and maybe even a little surprising.

As many of you know by now, Chip White recently decided to step down as chair to take on a new challenge. For a year or so, he will be in Abu Dhabi serving as the founding department chair of the new industrial systems engineering program at Khalifa University of Science, Technology, and Research (KUSTAR). To assist in helping Abu Dhabi move from an oil-based economy to more of a knowledge-

based economy, Georgia Tech is helping KUSTAR set up three new engineering programs—aerospace engineering, biomedical engineering, and industrial and systems engineering.

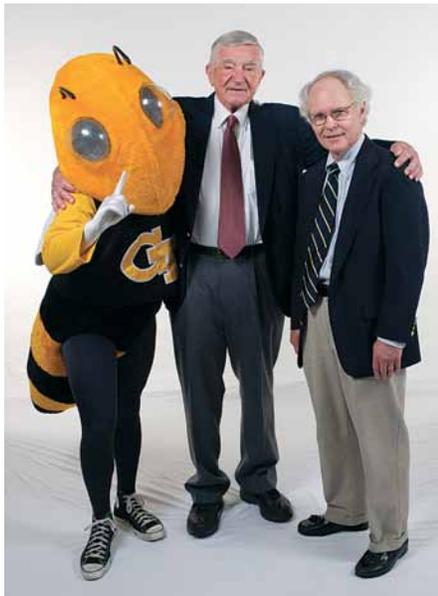
A search committee to select a new school chair has been set up to produce a short list for the dean's consideration. The committee is being led by Professor Vigor Yang, chair of the Daniel G. Guggenheim School of Aerospace Engineering. Other members of the committee are Chris Lofgren, president of Schneider National and a PhD graduate of ISyE; Gregory Abowd, George Professor and director of Health Systems Institute; eight ISyE faculty members; our development officer, Nancy Sandlin; an undergraduate student; a graduate student; and a staff member. This position is one that I think will be attractive to almost anyone in our discipline, and I am confident this committee will generate a list of excellent candidates.

For those of you who were around here from 1978 to 1989, I was the school director when you were here. I was then appointed to be the head of the Manufacturing Research Center, and John Jarvis became director. I then moved on to the position of special assistant to the president (Pat Crecine) in 1990 and from there to provost and vice president of academic affairs in 1991. I held that position until 2001, retiring in 2002. Shortly after retiring, I was asked by the new dean of engineering to serve as interim chair of Biomedical Engineering, which is a joint department between the Emory University School of Medicine and Georgia Tech. I held that position for almost a year and then went to our campus in Metz, France, to teach two industrial engineering courses to students in our study abroad program. I next stepped into full retirement and moved to Lake Oconee, where we built a house, bought a boat (nicknamed "Grandkids' Bait"... and it works), played some golf, and did a lot of reading.

Now I am back. The School is doing well. The faculty size is down somewhat, but the total number of full-time ISyE faculty members is forty-nine. In addition, there are two faculty members who are working in either the dean's office or in the president's office. There are also four others who have joint appointments with ISyE and other units on campus. Current enrollment numbers include 1,183 undergraduates, 231 master's students, and 171 PhD students.

These are challenging economic times, and we are all feeling the crunch. State budget reductions have had a significant impact on our ability to have an appropriate number of faculty members for the size of our mission. Nevertheless, our research program continues to place ISyE at the top of similar programs in the country. We are committed to doing our part. Please let me know how you think we are doing.

Michael Thomas



COVER STORY

6-19 *First in Its Class*

**20 Straight Years at #1:
Graduate Study at the
Stewart School of ISyE**

On the cover: Buzz flew in to celebrate ISyE's twenty consecutive years as the top graduate program. Together in the studio for the first time, Buzz had fun posing with William "Bill" Hines (MS IE 1958, PhD IE 1964), ISyE's graduate program chair from 1968 to 1996, and Bill's successor, R. Gary Parker, ISyE associate chair for graduate studies and professor.

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Thomas Returns to ISyE as Interim Chair

Michael “Mike” Thomas, former school chair and professor in the H. Milton Stewart School of Industrial and Systems Engineering (ISyE) and former provost of Georgia Tech, was appointed interim school chair for ISyE. Thomas, who served as ISyE’s third school chair from 1978 to 1989, fills the position being vacated by Chelsea C. “Chip” White III.

“I am grateful that Mike Thomas has agreed to take on the responsibility of leading the H. Milton Stewart School of Industrial and Systems Engineering as interim school chair in order to assure a smooth transition through the upcoming search for a new school chair,” said Don Giddens, dean of the College of Engineering. “I know that his faculty colleagues will work closely with him to ensure that we maintain and build upon the momentum ISyE has established. We are incredibly fortunate to have a person of this caliber step into this position.”

Thomas has extensive knowledge of ISyE teaching and research initiatives and has a good rapport with the faculty, staff, and students in ISyE and across campus. “When Mike was ISyE school chair, he brought in and retained key faculty members and placed an emphasis on developing a strong research program that helped propel the Stewart School to the role of national prominence it maintains today,” said White. “We are delighted to have him back with us.”

Thomas also strengthened connections with ISyE alumni. His efforts brought ISyE its first endowed chair, the A. Russell Chandler III Chair, which he later used to attract George Nemhauser, one of the premier operations research faculty in the United States, to Georgia Tech. Thomas also recruited ISyE’s second endowed chair, the Coca-Cola Chair, held then and now by Ellis Johnson. And it was during his tenure that the ISyE Alumni Advisory Board was formed to help guide the Stewart School.

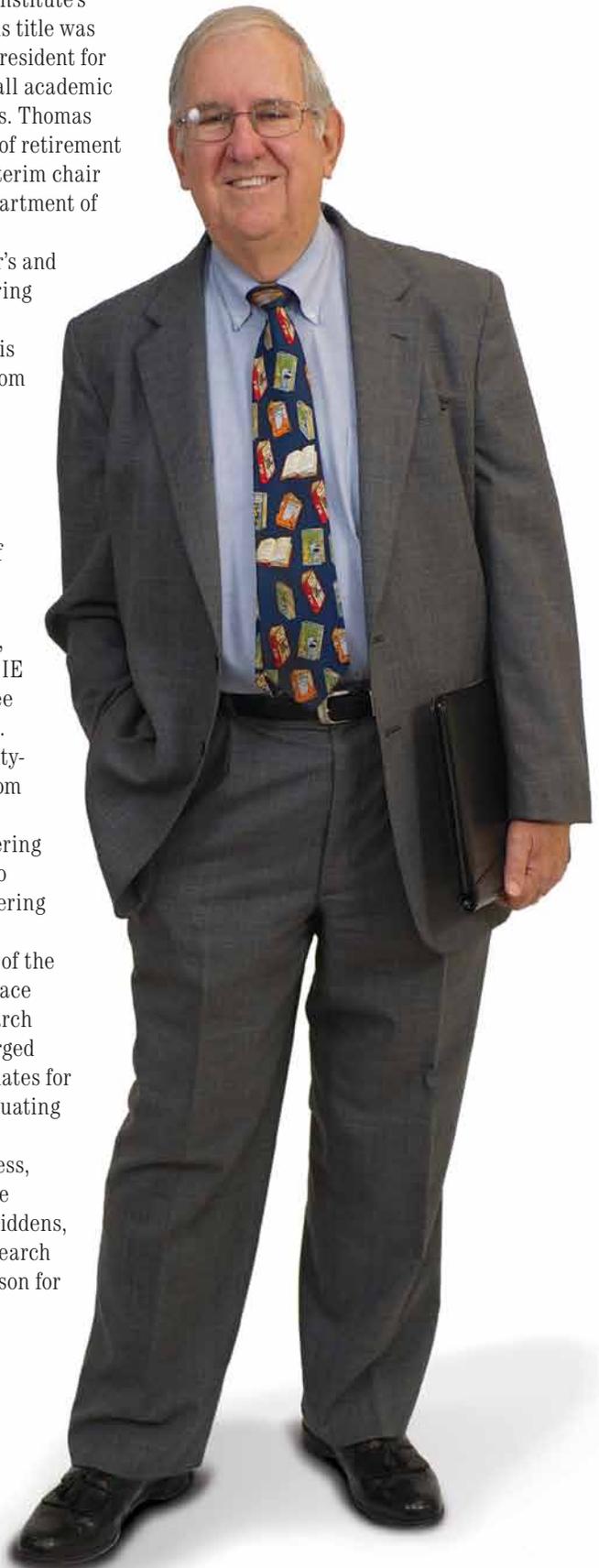
In 1990, Thomas joined the president’s office at Georgia Tech as acting executive vice president, overseeing Tech’s academic restructuring, which resulted in the formation of three new colleges and numerous new degree programs. In addition, he helped to oversee the implementation of many of the new degree programs; created new promotion, tenure, and reappointment

standards; and managed the Institute’s budgeting process. In 1996, his title was changed to provost and vice president for academic affairs, overseeing all academic and most administrative areas. Thomas retired in 2002, but came out of retirement soon thereafter to serve as interim chair of the Wallace H. Coulter Department of Biomedical Engineering.

Thomas received a bachelor’s and master’s in chemical engineering from the University of Texas-Austin. In 1965, he received his PhD in operations research from Johns Hopkins University. He has served as president of the Operations Research Society of America (now INFORMS) and was elected as a fellow of INFORMS and the Institute of Industrial Engineers (IIE).

Mike and his wife Pat have five children: Michelle Barber, Kevin Gue (MS OR 1992, PhD IE 1995), Teresa Genoway, Kathee Pappa, and Rebecca MacLean. The Thomases also have twenty-two grandchildren, one of whom graduated from Tech with a degree in mechanical engineering this past May and another who began the mechanical engineering program this fall.

Professor Vigor Yang, chair of the Guggenheim School of Aerospace Engineering, is chairing a search committee that has been charged with actively soliciting candidates for the school chair position, evaluating qualifications, and through a screening and interview process, recommending finalists for the position. According to Dean Giddens, this will be an international search to select the best possible person for this important position.



Parting Thoughts

By Chelsea "Chip" C. White III

I have been asked to share with you parting thoughts on having been chair of the Stewart School for the five-year period ending June 30, 2010. The thought that immediately comes to mind is how uniquely remarkable ISyE is as an academic unit in higher education in the United States and throughout the world.

Rankings are not necessarily accurate indicators of quality. However, having both our graduate and undergraduate programs consistently ranked first by *U.S. News & World Report* in industrial and manufacturing engineering is a source of great pride to us all. That our graduate program has been ranked first for twenty consecutive years is simply extraordinary. To paraphrase an external review of ISyE written three years ago: *ISyE is the nation's flagship academic unit in industrial engineering and operations research and plays a leading role in shaping the strategic directions of the discipline.* Such recognition does not come without significant investments in time, effort, and money by Georgia Tech as an institution and the School's alumni, faculty, staff, students, and friends over a long period of time. Let me thank all of you for your many contributions that have made ISyE the premier academic unit that it is.

Over the last five years, we strived to ensure continued and increased strength of the School's foundation disciplines (optimization, stochastics and simulation, and statistics) and to broaden the School's applied research horizons through continued support of supply chain and logistics initiatives, efforts to revive traditional strengths in health, and new initiatives in health and humanitarian logistics, sustainability and natural systems, and systems informatics and control. ISyE also expanded its international activities beyond those in Singapore to include programs in Shanghai and Latin America. During this period, the faculty strove hard to continuously improve the quality of incoming students and faculty, the mentoring process for junior faculty, and the evaluation processes for faculty reappointment, promotion, and tenure.

In 2006, ISyE received a \$20 million commitment from H. Milton and Carolyn J. Stewart that enabled, and will continue to enable, ISyE to have greater impact on its academic and research communities and on challenges of economic and societal importance. Overall, ISyE foundation accounts more than doubled from endowment gifts and commitments during the last five years, helping to ensure the School's financial stability and health during the economic downturn and providing resources to help ISyE increase its dominance among its academic peers in the future.

Let me end by expressing my appreciation for being given the opportunity to have served as ISyE chair and for the chance it gave me to get to know so many of the fine people—alumni, faculty, staff, students, and friends—who have contributed to ISyE.



Chelsea "Chip" White, the Schneider National Chair in Transportation and Logistics and former H. Milton and Carolyn J. Stewart Chair of Georgia Tech's H. Milton Stewart School of Industrial and Systems Engineering, will be spending next year in Abu Dhabi helping to launch an industrial and systems engineering department at Khalifa University of Science, Technology, and Research (KUSTAR). In his new role, White will help establish the curriculum for KUSTAR's systems engineering program and recruit systems engineering faculty members. He will also be providing leadership for the Logistics Institute, as well as support in the enrollment of personnel. He will be based at the university's Abu Dhabi campus.

Abu Dhabi, the richest and largest of the seven city-states in the United Arab Emirates, approached Georgia Tech to help them build the educational base Abu Dhabi needs to reduce its economy's dependence on oil. White is not the only Georgia Tech professor at KUSTAR; professors in Tech's biomedical engineering and aerospace engineering schools will also be spending the 2010-2011 school year helping KUSTAR build curricula and recruit faculty.

New Chair, Members for the Stewart School of ISyE Advisory Board



Ed Rogers, Board Chair



Charlene Zalesky



John A. White III

Five distinguished alumni have joined the H. Milton Stewart School of Industrial and Systems Engineering (ISyE) advisory board for the 2010 to 2014 term. **David Bailey** (IE 1969), **Robert Martin** (IE 1969), **Phillip Scott** (IE 1969), **John A. White III** (IE 1992), and **Charlene Zalesky** (IE 1977) bring diverse professional and community leadership skills to the board, which has as its mission to serve as a sounding body for the school chair in an advisory capacity as well as assist with the School's development goals. **Ed Rogers** (IE 1982, MS IL 2002), who joined the advisory board in 2007, has been selected to serve as the board's new chair.

The new board members bring decades of experience in their respective areas of expertise. Retiring from BASF after thirty-three years, **David Bailey** consults much of the year, assisting manufacturing sites in finding and applying effective business process solutions for their planning and supply issues in complex local and global environments. **Robert Martin**

has more than thirty years of financial, general management, and consulting experience, both in the United States and internationally. He is currently a partner with the Interlochen Group, a boutique financial advisory firm, which does interim chief financial officer and financial project work. In 1983, **Phillip Scott** helped found and then served as a chief operating officer for Paging Network, which became the largest paging company in the United States. Scott returned to Atlanta in 1993, where he purchased Southern Ideal Door, a company he continues to own and operate. **John A. White III**, who has more than twenty years consulting experience, is the president of Fortna, a leading provider of supply chain solutions. At Fortna, White is responsible for U.S. and Canadian operations and personnel as well as participating in all strategic matters for the firm outside of North America. **Charlene Zalesky** has fifteen years experience as an internal and external consultant in healthcare, manufacturing,

banking, and public water service industries. Consulting with companies such as Clorox, Citibank, Kaiser Foundation Health Plan of Northern California and East Bay Municipal Utility District, Zalesky's work has focused on traditional industrial engineering applications of work simplification, cost-benefit analysis, facility design, staffing, project management and organizational development.

Ed Rogers has served on the board since 2007 and will remain on the board as the new chair. He has twenty-eight years of experience in industrial engineering, management consulting, program management, business process redesign, operations improvement, and strategic planning. He is a global strategy manager with UPS's corporate strategy group and is responsible for global scenario planning, enterprise strategic planning, and the company's sustainability strategy.



David Bailey



Robert Martin



Phillip Scott

'Learning from Others' through the Distinguished Lecture Series

Since 2008, ISyE's Distinguished Lecture Series has featured nationally renowned speakers who have made a significant contribution to society through research areas of interest to ISyE faculty, students, and alumni. The series provides a forum for students, faculty, staff, and alumni from the Georgia Tech community to interact with the distinguished lecturer.

In September 2010, the Distinguished Lecture Series presented **Bradley Efron**, PhD, Max Stein Professor of Statistics and Biostatistics at Stanford University, who is a member of the U.S. National Academy of Sciences and the recipient of the 2005 National Medal of Science. Efron's lecture, titled "Learning from the Experience of Others," explored what we can learn about player A's batting ability from observing the batting averages of players B, C, and D. In his presentation, Efron presented several statistical examples that demonstrate how this works in practice and indicated some of the surprising theoretical ideas involved.

The 2009 speaker was **Lawrence Wein**, PhD, Paul Holden Professor of Management Science at the Stanford Graduate School of Business. In his lecture, "Operations Research and Homeland Security: From Models to Implementation," Wein addressed topics related to his research in public health and homeland security,

including the preparedness for a bioterror anthrax attack, infection control for a pandemic influenza, and the use of biometrics in preventing terrorists from entering the country. During the presentation, he also drew lessons about policy implementations from these and other homeland security examples.

William Pulleyblank, PhD, vice president of the Center for Business Optimization at IBM Business Consulting Services, leveraged his technical background when he spoke in 2008 on "Computing, Business, and Operations Research: The Next Challenges." In his lecture, he identified and discussed five technical problems that must be solved to enable companies to meet business challenges of the future. In particular, he enumerated the requirements for operational systems to match the sophistication of long-term planning systems and instructed how to adapt these capabilities to the emerging networked business world.

For those unable to attend these impressive lectures or those who wish to see them again, videos are available online through the SMARTech repository at www.smartech.gatech.edu. For more information on upcoming lectures, visit www.isye.gatech.edu/news-events/dls or contact communications@isye.gatech.edu.

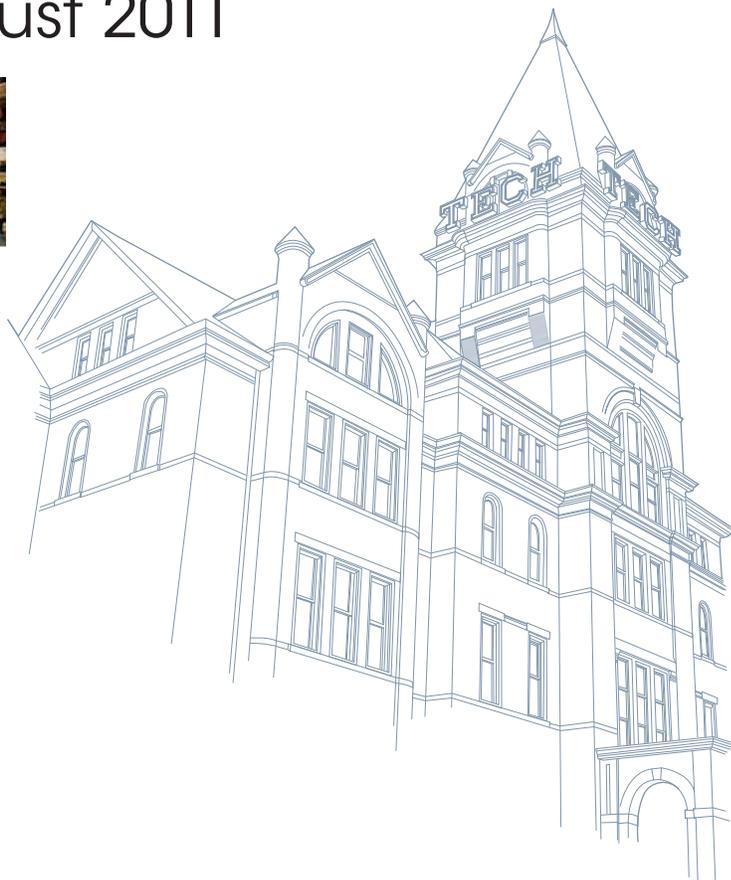
Professional Supply Chain Engineering Degree Launches August 2011



The Stewart School of ISyE is now offering a one-year professional master's in supply chain engineering. The new degree program is designed to meet the growing demand for supply chain professionals in global businesses and to leverage ISyE's outstanding supply chain engineering faculty and its Supply Chain & Logistics Institute.

Students will go through the program's courses together, creating strong connections and networks. The innovative curriculum is true to ISyE's traditions and standards, and adaptable to international students and global university partners. Students will gain a meaningful global experience and will expand their world view through new courses, capstone industry projects, and study abroad opportunities, which in turn will expand their career opportunities. The inaugural class will begin in August 2011.

Visit www.sce.gatech.edu for more information on joining this class or contact Harvey Donaldson, associate chair of industry and international programs, at harvey.donaldson@isye.gatech.edu.





First in Its Class:

Graduate Study at the
Stewart School of ISyE

20 straight years at #1

by R. Gary Parker and Dave Goldsman

In the spring of 1991, George H. W. Bush was president of the United States, the Atlanta Braves were on their way to playing the Minnesota Twins in the World Series, Georgia Tech was the defending NCAA national champion in football, and Barack Obama had just graduated from Harvard Law School. Also that spring, *U.S. News & World Report* published its 1992 edition ranking America's best graduate programs, and in the specialty category of industrial/manufacturing engineering, the School of Industrial and Systems Engineering (ISyE) was ranked first.

Now, three U.S. presidents later and with the Braves and Yellow Jackets facing decidedly uphill battles to return to the World Series and National Championship games, respectively, few would question that, over the two decades that have elapsed, much has changed relative to the profile just described—with one notable exception.

In its 2011 edition, published in spring 2010, *U.S. News* again named ISyE the top-ranked graduate program of its kind. But far more remarkable is that this outcome is unchanged from those earned in *every single year* following the 1992 edition—a string of twenty consecutive number one rankings! Putting this in perspective, consider that the two-year-old daughter of a young father who entered the ISyE graduate program in the fall of 1991, might well now be a member of the incoming fall 2010 ISyE doctoral class, a program that has been ranked first in every single year spanning the matriculation classes of father and daughter.

We believe that this achievement is more than a little bit remarkable and, to our knowledge, would appear to be unmatched by any academic program at the department level or higher in any other Georgia college or university, public or private. That said, what most of us really believe is that the School has become something more noteworthy than one simply housing an academic program that has won a rating competition for twenty years running. As genuinely proud of that feat as we are, it is our view that the graduate program in the School has become something larger—arguably, something *unique* among academic programs of its genre. This is a bold assertion and one that deserves scrutiny. To that end, we think there is a story here regarding how such a claim of uniqueness is made and, if justified, how it has been earned and what is required to sustain it; about what it means and frankly, what it doesn't mean. This article is that story.



ISyE Professors Shabbir Ahmed and George Nemhauser observe Juan Pablo Vielma (PhD 2009), visiting professor at University of Pittsburg, working on a research result in discrete optimization.

The Stewart School Graduate Program

First of all, in the two-decade span forming the backdrop here, we had a name change. In 2006, through the great generosity of alumnus H. Milton Stewart Jr., we became the H. Milton Stewart School of Industrial and Systems Engineering, which we often shorten to the Stewart School. This is neither a small nor casual thing; at this time, there are only four endowed schools in Georgia Tech's College of

Engineering, and within the overall population of academic programs forming our *U.S. News* specialty, there are presently only five (counting the Stewart School).

In fall 1991, there were four designated master's degree programs (the first four listed below); now there are eight:

Master of Science in Industrial Engineering (MS IE)

Master of Science in Operations Research (MS OR)

Master of Science in Statistics (MS S)

Master of Science in Health Systems (MS HS)

Master of Science in Quantitative and Computational Finance (MS QCF)

Master of Science in Computational Science and Engineering (MS CSE)

Master of Science in International Logistics (MS IL)

Master of Science in Supply Chain Engineering (MS SCE)

The School offered a single doctorate in 1991, the PhD in Industrial Engineering. A doctoral student entering in fall 2010 now has five options to consider:

PhD in Industrial Engineering (PhD IE)

PhD in Operations Research (PhD OR)

PhD in Algorithms, Combinatorics, and Optimization (PhD ACO)

PhD in Computational Science and Engineering (PhD CSE)

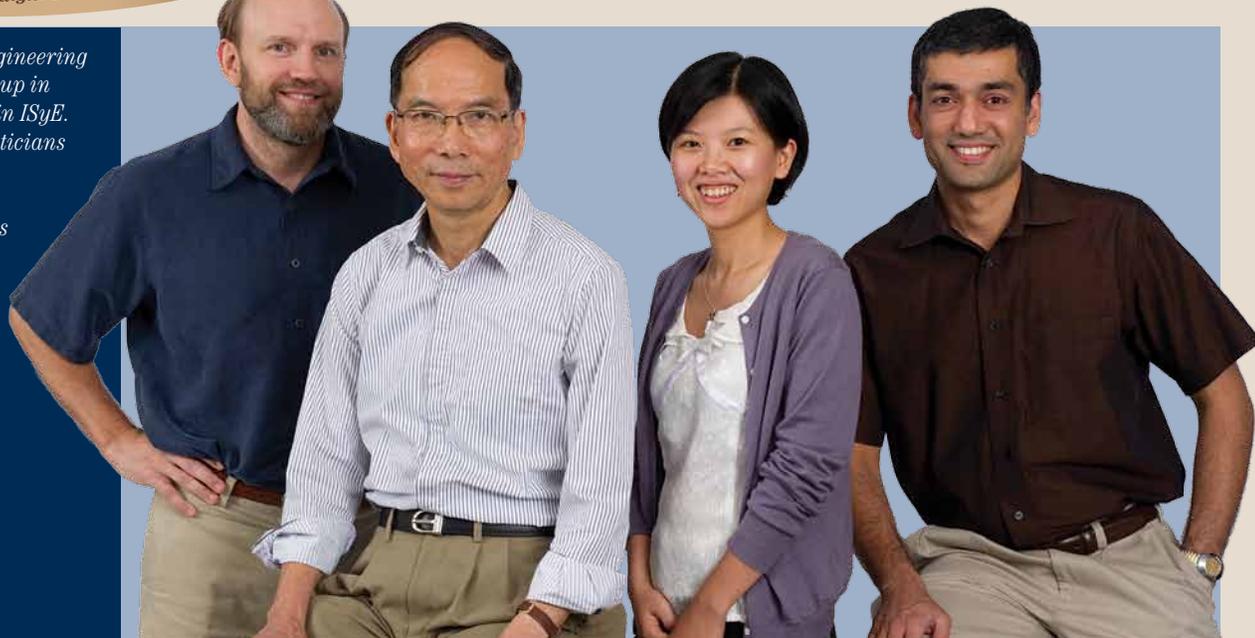
PhD in Bioinformatics (PhD BINF)

The Stewart School presently enrolls on the order of 250 to 300 master's students whereas the number of doctoral students generally varies between 175 and 200; an all-time maximum of 210 PhD students was reached in fall 2003. The most popular master's degree choices tend to be the MS IE, MS OR, and the MS QCF, whereas the vast majority of doctoral students currently pursue one of the first three options above, that is, PhD IE, PhD OR, or PhD ACO. Backgrounds of entering students vary for both master's and PhD degrees, but the prevailing disciplines are engineering (industrial, mechanical, and electrical tend to dominate), mathematics, and statistics. Though far from a hard rule, it is typically the case that the IE PhD program is most attractive to students with engineering or statistics backgrounds,¹ while OR and especially ACO tend to attract large numbers of mathematics majors. Note that many



¹ PhD students pursuing work in the discipline of statistics function essentially as if it were a stand-alone PhD (like the five listed above); however, at the present time, the discipline is treated as one of four specializations in the Industrial Engineering PhD, e.g., a doctoral student in statistics is awarded, upon graduation, the PhD in Industrial Engineering.

Arguably the top engineering statistics faculty group in the country resides in ISyE. Pictured here: Statisticians Paul Kvam, Jeff Wu, Rutgers Assistant Professor of Statistics Ying Hung (PhD 2008), and Roshan Joseph Vengazhiyil.



PhD students are admitted directly after their bachelor's degrees are earned, a practice that is common with many doctoral programs, certainly ones in the highest rank, and most certainly among our competitors. This attribute underscores the independence we, as do our peers, associate between the missions of the master's and doctoral programs.

The Ranking Process

The reputational rankings of academic discipline specialties that are produced in each annual issue of the *U.S. News* graduate rankings derive from scores assigned to institutions' academic programs within a discipline, e.g., mechanical engineering within a college of engineering, discrete mathematics within a department of mathematics, finance within a college of business, etc. The scores are typically submitted by heads or chairs of the corresponding program specialties across the country, e.g., chairs of electrical engineering programs score only other electrical engineering programs, etc.² For specialties in engineering, the maximum score a program can achieve is 5, and from these ballots, an average is produced upon which the rankings are based. In the 2011 edition, ISyE earned an average of 4.9, with the next-highest rated program earning a score of 4.6. With a difference of 0.3, no other engineering specialty produced a ranking with a larger gap between its top and next-ranked programs.

But, upon what basis do deans and department or school chairs form assessments regarding the quality of a graduate program? In fact, for programs at tier-one research institutions, the answer to this question is not ambiguous. When top research universities align themselves in terms of the quality and reputation of their respective graduate programs in engineering and the sciences especially, there

is no question that any serious analysis ultimately focuses squarely upon the quality and stature of their respective faculties and their PhD programs. Indeed, the *U.S. News* graduate ranking considers only programs that award the doctorate as the terminal degree, which currently numbers seventy-four programs for industrial/manufacturing engineering.

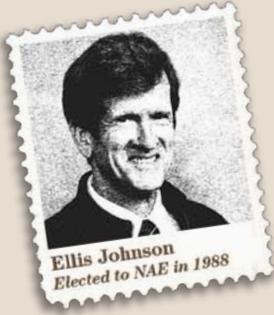
Focusing attention on the quality and stature of a graduate program's faculty is self-evident; however, the fact that we also share that focus on doctoral study follows because it is the dominant driver in attracting the best faculty members. A highly regarded faculty attracts subsequent generations of top graduate students at all levels but particularly doctoral students which, in turn, continues the advancement of a graduate program's overall reputation. It's a simple recipe but one that top programs, and ones looking to climb in the rankings, pursue.

How then, at a more-detailed level, would one assess the quality and stature of a graduate program; what attributes, if valued with high marks, would honest observers agree validate a program's right to be called "top-notch" and that if achieved in a dominant way, would place a program among the elite? If there is a short list of such measures, then it must surely include:

- A supporting faculty, distinguished by the inclusion of more than one or two members with unassailable world-class scholarly standing and reputations;
- An ability to legitimately compete for and consistently attract its fair share of the best doctoral students; and
- A superior record of placement among program graduates.

These three attributes will impress nobody as being revelatory—a greater shock would be if any of the three were not listed. Of course, the heavy lifting ultimately involves actually creating a program that scores well relative to each of these attributes, well enough so as to distinguish one's program as a leader among one's *true* competitors. It's important to note that the competition

² *U.S. News* rankings of the colleges and schools in which specialties reside (College of Engineering, School of Law, College of Business, etc.) follow from a more-sophisticated model that quantifies various factors such as admissions data, placement rates, standardized test scores, research funding, and the like.



at the very top level of distinction is severe, and every year we have a genuine fight on our hands to attract the best students (particularly PhD applicants) to the program. If this sounds inconsistent with what one might expect from a program riding a twenty-year streak ranked as number one, and in addition,

one enjoying a 0.3 gap over the second-ranked program, then you are encouraged to read on.

In what follows, we take a look at the three essentially inseparable ingredients listed above, those that, when achieved, form the underpinnings of first-class graduate programs. We will examine some of the metrics that tend to legitimately establish a program and, naturally, we will pay attention to how the Stewart School is doing.

Faculty

A strong program begins with faculty, and we believe that ours is exceptional; in some areas of research, we consider it to be world class. Without doubt, the latter accolade is often overused and probably employed too liberally. That said, we are content to let others render their own judgment regarding the stature of this faculty; we're confident in what those assessments will reveal. Top faculty attract other top faculty, ones who share high standards of scholarship and who will generally insist that the bar for academic program creation, hiring and promotion decisions, and admissions standards be kept high. Such faculty members are, without question, the lifeblood of the recruiting process regarding the very best graduate applicants. This is especially true in the case of elite PhD applicants, who are precisely the students sought after by only the most elite programs.

It is important to note that the reference to "most elite," appearing in the last line above, is not at all a casual one. The quality of our graduate specializations and the complexion of academic backgrounds exhibited by our faculty and applicants is quite varied and, in that regard, creates a profile of recruitment competition that is not only very stiff but programmatically broad. That is, graduate programs like ours, particularly at the doctoral level, are not confined to recruiting competitions among engineering programs but also top-notch PhD programs in disciplines such as mathematics, applied mathematics, operations research, statistics, computer science, and economics.

For example, if we are recruiting a top applicant for the PhD in OR or ACO, we will certainly know that our stiffest competition will be drawn from the OR programs at MIT, Cornell, and Columbia, the highly regarded doctoral programs in applied mathematics at UCLA and Brown, or maybe theoretical computer science at Carnegie Mellon. A top PhD applicant in statistics might also be considering PhD programs in the statistics departments at the likes of the University of Chicago, the University of Wisconsin-Madison, California-Berkeley, or Harvard. The point is this: the league in which we now play is fundamentally a multidimensional one and moreover, one that attracts stout competition across disciplinary boundaries rarely

observed in academic programs of our genre. And, to further underscore the earlier claim of our inherent uniqueness within this genre, we have reached a point where we compete at a high level across this broad expanse of disciplines. This is not a small thing.

Throughout the twenty-year span underlying this piece, the number of tenure-track faculty members affiliated with ISyE has varied between fifty and sixty. In that regard, it is a profound understatement to say that the size of the Stewart School faculty is large. At full strength, our faculty is routinely twice the size of the next largest, similarly constituted program faculty in the country. At least as sobering, we are virtually four to five times as large as the average faculty size of twelve (median eleven), measured across all current, ABET-approved programs under consideration for the *U.S. News* rankings.

While being large does tend to attract notice and permits some light-hearted boasting, the attribute itself implies little in terms of academic distinction. True, by their sheer size, large faculties can create many courses and programs; they can generate lots of journal publications; they will see their members travel far and wide to all sorts of conferences and symposia; and they will also tend to have large populations of graduate students, i.e., lots of faculty need access to lots of doctoral students in particular. Still, none of this activity speaks directly to the creation of high academic quality and standing. In fact, the peer programs with whom we compete year in and year out—those doctoral programs that legitimately constitute the biggest



Three faculty members have won four Lanchester Prizes. George Nemhauser, left, has won it twice. Bill Cook, right, and Ellis Johnson, not pictured, have won once.

challenges to us in what is a very difficult and severe competition for the best and the brightest—are not among the largest and they most certainly do not have terribly large doctoral student populations.

So, is there a reasonably short list of viable indices that if fully realized would legitimize claims of "world class" status for a faculty? Conceding that there could be a little room for some debate about the composition of this list, the bet here is that most non-parochial sentiment will probably settle on measures that include the following: recognition earned

Four faculty members have been invited to give plenary or semi-plenary talks at the prestigious International Congress of Mathematicians which convenes only once every four years. They are: (L to R) Alex Shaprio, Robin Thomas, Bill Cook, and Arkadi Nemirovski.



through the accumulation of scholarly and professional prizes and awards of the highest rank; editorships and associate editorships of the most prestigious journals; leadership roles in the most highly regarded professional societies; elections to prestigious memberships; and elite invitations to address the most scholarly and highly regarded conferences and symposia.

Of course, it is easy to “dust up” some ambiguity regarding all of these attributes in order to argue cases for achievement, i.e., what qualifies as a highly regarded prize for scholarship, an elite invitation, prestigious memberships, etc.? Like baseball, where the tactic seems to have been perfected (e.g., most walks drawn by a Hawaiian-born right-handed first-baseman batting against left-handed pitchers with the bases loaded and with two outs), it is no challenge to create a competition where one’s program is guaranteed to stand alone, to be identified as unique. However, amongst many of the very top programs, there is often much agreement regarding viable indicators that support claims of genuine distinction. Important are achievements with few boundaries, ones that invite the broadest set of competitors, and ones from a variety of fields and disciplines. Awards

and honors given infrequently as well as ones typically not shared are also noteworthy.

Following, we summarize some of the accomplishments of the Stewart School faculty with regard to the attributes indicated above. Readers interested in broader coverage are directed to the 2009 ISyE Graduate Study and Research Viewbook (the online version can be found at www.isye.gatech.edu).

Honors/Awards/Prizes

Below are several faculty honors, awards, and prizes generally identified with recognition for achievement in research and scholarship. Those listed tend to attract particular attention and are among achievements deemed most noteworthy in the fields represented by the School’s faculty. Faculties that measure well on these accolades facilitate the elevation of their doctoral programs from the levels of “good” or “solid” to “distinguished” and ultimately, “world class.”

- **National Academy of Engineering.** More than 2,000 peer-elected members from academia, government, and business who are among the world’s most accomplished

Table 1: Faculty Honors, Awards, and Prizes

Award/School	CAL	COL	COR	GT	M	MIT	NU	PSU	S	TAMU	VT
NAE	3	1	2	5	2	7	0	0	9	1	2
Fulkerson	1	1	3	3	0	1	0	0	0	0	0
Dantzig	0	0	2	2	0	0	0	0	0	0	0
von Neumann	2	2	1	2	0	0	0	0	5	0	0
Erlang	0	2	0	2	1	2	0	0	1	0	0
Lanchester	1	4	1	4	0	2	0	0	2	0	1
Baker	0	0	0	2	2	0	0	1	0	4	2
COPSS	0	0	0	1	0	0	0	0	0	0	0
Lagrange	0	0	1	0	0	0	0	0	0	0	0
Totals	7	10	10	21	5	12	0	1	17	5	5

CAL (Berkeley), COL (Columbia), COR (Cornell), GT (Georgia Tech), M (Michigan), MIT, NU (Northwestern), PSU (Penn State), S (Stanford), TAMU (Texas A&M), VT (Virginia Tech)

engineers. The Stewart School has five NAE members, and no other academic unit at Georgia Tech has more; electrical and computer engineering also has five. Tech has twenty-seven NAE members total. ISyE faculty member George Nemhauser was the first Tech NAE member elected while on the Tech faculty.

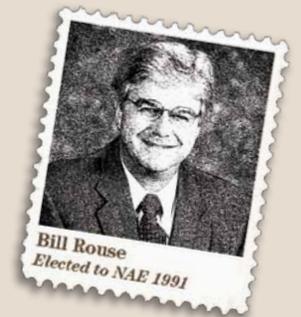
- **Fulkerson Prize.** Given for the outstanding paper in discrete mathematics; sponsored by the Mathematical Programming Society (MPS) and the American Mathematical Society (AMS), the award is given every three years.
- **Dantzig Prize.** Sponsored by the Society for Industrial and Applied Mathematics (SIAM) and the Mathematical Programming Society, the award is for original research that impacts the field of mathematical programming; the prize is given every three years.
- **John von Neumann Theory Prize.** Awarded annually to a scholar who has made fundamental, sustained contributions to theory in operations research and the management sciences; sponsored by the Institute for Operations Research and the Management Sciences (INFORMS).
- **Erlang Award.** (Sponsored by the Applied Probability Society of INFORMS) Awarded every two years, for outstanding contributions to the field of applied probability by an individual under the age of 35.
- **Lanchester Prize.** Given annually for the best contribution to operations research and the management sciences published in English; sponsored by INFORMS.
- **Baker Award.** Sponsored by the Institute of Industrial Engineers (IIE) and given annually in recognition of outstanding research in the profession.
- **Committee of Presidents of Statistical Societies (COPSS) Presidents Award.** Presented annually to one individual under the age of 40, this award recognizes outstanding contributions to the statistics profession. The award is sponsored by the American Statistical Association (ASA), the Institute of Mathematical Statistics (IMS), the Statistical Society of Canada, and the International Biometric Society.
- **Lagrange Prize.** Awarded for outstanding work in continuous optimization. Sponsored jointly by the MPS and SIAM, the award is given every three years.

In Table 1 (and subsequent tables), cell entries represent a count of the honors and awards identified above that have been won by faculty members from ISyE as well as various other programs of note. How did we choose these programs? To make matters easy in this regard, and honestly, to aid in mitigating possible contention, we have simply included the programs listed in the latest *U.S. News* rankings

Award/School	CAL	COL	COR	GT	M	MIT	NU	PSU	S	TAMU	VT
INFORMS	6	6	5	13	6	11	2	0	14	2	1
IIE	1	0	1	10	4	0	0	8	0	13	9
SIAM	1	0	3	3	0	0	1	0	0	0	0
IMS	1	1	6	4	1	1	1	0	4	0	0
ASA	1	0	2	5	1	1	1	0	1	0	0
Totals	10	7	17	35	12	13	5	8	19	15	10

that earned a rating of at least 4.0. This produces nine programs. Then, we add to this list Columbia University (IEOR Department) and MIT (Operations Research Center), two very similar programs in terms of student recruitment for OR. In the tables, the programs (columns) are listed alphabetically from left to right.

Note that the tables accompanying this story include awards to faculty with clearly stated joint or courtesy appointments in the indicated programs, including ISyE. Related to this, numbers for certain institutions' IE/OR programs may be combined with those from affiliated departments at the same institution whose faculty clearly work in conjunction with IE/OR to compete for and attract students targeted by IE/OR. Common might be faculty in an institution's business school (e.g., supply chain management), mathematics department (e.g., optimization and/or stochastics), mechanical (e.g., manufacturing) or civil engineering (e.g., transportation), etc. The entries also include awards to living faculty who have retired from a specific program in which they won the award, e.g., emeriti. Against this backdrop, we have earnestly attempted to be thorough and accurate in compiling data that appears in the tables. That said, we take full responsibility for any miscalculations or oversights. Finally, we provide total values for all tabular columns but we do so with the acknowledgement that such a calculation needs to be examined with care, i.e., all awards are not created equal. Still, the raw magnitude of these sums does tend to expose and/or underscore clear distinctions in the level of activity among the various programs.



Fellows

The distinction of fellow in a professional society is typically highly regarded and indicates achievement over a lengthy career span. Focusing on organizations most relevant and/or natural for programs in industrial engineering (IIE), operations research (INFORMS), and the mathematical sciences (SIAM, ASA, IMS), a current summary for faculties of the academic programs in the adopted list is given in Table 2.

Table 3: Prestigious Talks

Award/School	CAL	COL	COR	GT	M	MIT	NU	PSU	S	TAMU	VT
ICM	0	0	3	4	0	1	1	0	1	0	0
IIS Lectures	0	0	0	1	0	0	0	0	0	0	0
Block	0	0	0	1	0	1	0	0	0	0	0
OMEGA RHO	1	0	0	1	0	4	0	0	2	0	0
ISMP	3	2	7	8	0	2	1	0	3	0	0
von Neumann	1	0	0	0	0	0	0	0	1	0	0
Wald	0	0	1	0	0	0	0	0	0	0	0
Medallion	0	2	2	3	1	0	0	0	2	0	0
Morse	0	0	0	1	0	2	0	0	1	0	0
Totals	5	4	13	19	1	10	2	0	10	0	0

Invited Scholarly Addresses

Faculty members from ISyE have represented the School and the Institute exceptionally well by attracting prestigious invitations to deliver addresses and lectures extended by internationally recognized bodies. These invitations represent distinct honors. Some highly regarded ones are indicated below:

- Plenary and semi-plenary addresses at the International Congress of Mathematicians (ICM), held once every four years. Very few plenary invitations are extended at any congress. To our knowledge, ISyE faculty member Arkadi Nemirovski is the only sitting faculty member at Georgia Tech to have ever been invited for an ICM plenary talk.
- P.C. Mahalanobis Memorial Lecture at the famed Indian Institute of Statistics
- The Block Community Lecture for 2003 by SIAM
- Lecturer for the OMEGA RHO Distinguished Lecture Series at INFORMS
- Plenary invitations and invited semi-plenary presentations at the tri-annual International Symposium on Mathematical Programming (ISMP)
- von Neumann Lecture (SIAM)
- Wald Memorial Lectures (IMS)
- Medallion Lectures (IMS)
- Phillip McCord Morse Lectureship (INFORMS)

Young Faculty Recognition

One of the most noteworthy—and indeed prized—honors that is reserved specifically for younger members of a faculty and, accordingly, speaks to a sense of research potential or promise, is the National Science Foundation CAREER Award (or its predecessor, the Presidential Young Investigator Award). Remarkably, nineteen sitting faculty members (over one-third of our total) in ISyE have won this award.

Professional Visibility

Scholarly journals that have been or are presently edited by current Stewart School faculty members or recent emeriti include:

- *Operations Research* (two faculty)
 - *Mathematical Programming Computation*
 - *Operations Research Letters*
 - *Mathematics of Operations Research* (two area editors)
 - *Queueing Systems*
 - *Mathematical Programming: Series A and B*
 - *Institute of Electrical and Electronic Engineers (IEEE) (parts A and C)*
 - *IIE Transactions on Quality and Reliability*
 - *Statistical Sinica*
- Similarly, some highly visible and particularly relevant professional societies have had ISyE faculty serving in the capacity of president:
- Operations Research Society of America (now INFORMS) (three faculty)
 - Mathematical Programming Society
 - Institute of Industrial Engineers (two faculty)
 - IEEE Systems, Man, and Cybernetics Society
 - International Chinese Statistical Association

Attracting Graduate Students

The Stewart School attracts some extremely talented graduate students; some are even better than that. Admission to our graduate program is very competitive in general, but exceptionally so for PhD admission. Nearly 350 applicants were considered for fall 2010 PhD admission, but only fifty-seven were extended offers of admission. We now attract applicants from all over the world and from some of the finest institutions both in the United States and abroad. When admitted applicants turn us down, they almost always opt for offers from programs at other prestigious schools. The competition for top-notch PhD students, especially those in the elite class, is very tough, and if we are to be genuinely honest, we still lose more than we win against our competitor programs, a claim that to some, and in light of our long-running high ranking, might seem at odds with expectations. Shortly, we will address why it isn't.

A formal application, whether master's or PhD, consists of the following:

- Transcripts of prior academic work
- Scores on the Graduate Record Examination (GRE)
- Three letters of recommendation

We also ask for a statement of purpose, which can be helpful in directing an applicant's evaluation for possible funding and/or assisting in deciding if the applicant is actually applying for the program constituting the best fit for his/her background and interests. Of the two levels, PhD applications (most anyway) will take far more time to evaluate, which certainly makes sense because our funding—whether in the form of a teaching or research assistantship—goes only to PhD students, who are engaged in research and will be with us for about five years on average, i.e., we need to be right (with fairly high probability) on these decisions.

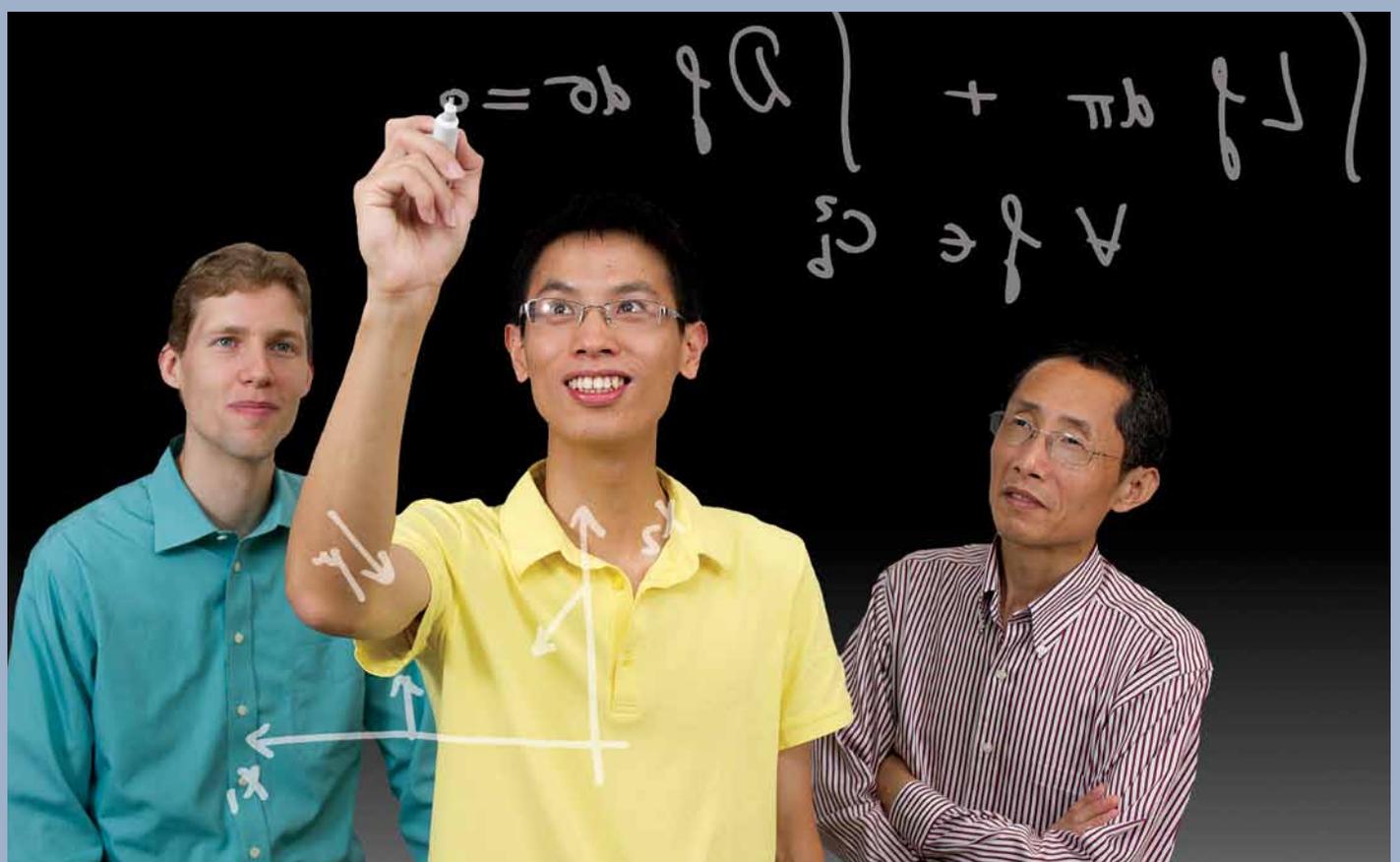
Transcripts

In judging an application for PhD study, a candidate's prior scholastic performance is certainly relevant. However, this appraisal can often be quite problematic and requires more than a routine check of an earned GPA. A popular reaction is to be dismissive of standardized test scores, such as the GRE (discussed next), accompanied by the ready claim that an applicant's transcript tells the "real story," that it covers work over a lengthy span, reflects hard work, tenacity, drive, etc. and should therefore be dominant in

admission decisions. While this position may well hold some merit, it can too often be gratuitous if not simply inaccurate. Plainly put, transcripts can sometimes border on artificial—a harsh indictment but one that stems from at least two sources: ubiquitous grade inflation and/or lack of rigor in some academic programs. It is not at all uncommon to see transcripts from programs, especially in the United States, exhibiting no blemishes (e.g., straight As). Yet from historical evidence (that has taken us time to form and has been learned the hard way), we know with near certainty that the applicant is simply not well-prepared for a rigorous PhD program and will likely need some degree of remediation. Needless to say, this can often make transcript evaluation very tricky.

GRE Performance

We take an applicant's GRE performance seriously; there is a reason it's called a standardized test. Do we worship high scores or will high scores wash out an otherwise unacceptable scholastic record? No and no. But, if the exam was only a perfunctory exercise with limited effect on an application, we would not require applicants to pay for the test. The GRE that is required is the so-called general exam, which consists of three parts: verbal, quantitative, and analytical writing. The first two parts have maximum scores of 800, while the third ranges from 0 to 6 in increments of 0.5. The general exam is taken by graduate applicants across a broad span of disciplines, from poetry majors to astrophysicists. Especially on the quantitative (mathematics) portion, we expect applicants to a highly



Stochastics Professors Ton Dieker and Jim Dai observe the work of their PhD student, Xuefeng Gao.

competitive doctoral program like ours to do well, no different than what our peers expect of their applicants. So, having high scores on the GRE, particularly the quantitative portion, is not sufficient for admission, but it's not far from necessary in a program at our level. Of the fifty-seven admitted PhD applicants for fall 2010, fifty-two submitted maximum scores of 800 on the quantitative portion of the GRE; the average score for all admitted students was 799. In fact, the relevance of GRE performance is apparently not lost on *U.S. News*; the quantitative score is the only scholastic factor in the *U.S. News* rankings of colleges of engineering.

Letters

In the course of evaluating graduate applications, credible letters of recommendation can play an important role; at the doctoral level, they can have a great deal of impact and are sometimes decisive. In the latter case, we look for letters from highly regarded people, preferably academics,

this span of twenty-five years, I would identify a small number of my former students who stood out as particularly distinguished: two took PhDs at MIT (names), one is currently in her third year at Cornell (name), one just graduated from Columbia (name) and a second will start this fall (name), one graduated from Stanford (name), and another from Berkeley (name). Without reservation, I am most comfortable placing George Burdell squarely in this very talented group.

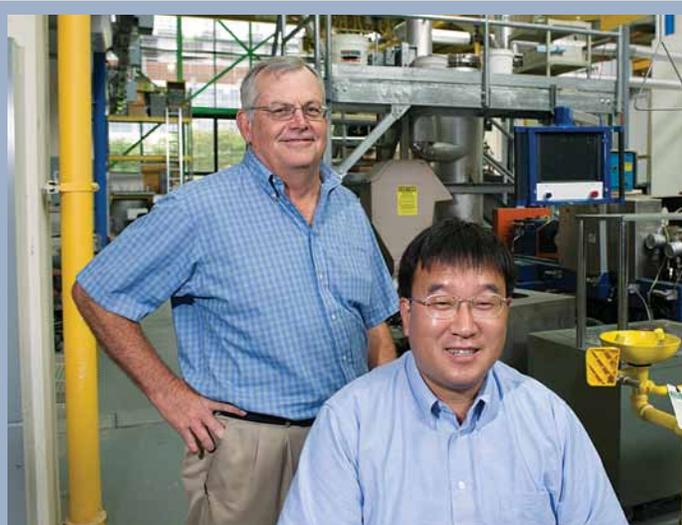
Now, this language is powerful because it is bold and specific; just this single paragraph is enough for us to get the picture on applicant Burdell. Whether he comes to ISyE or goes elsewhere, there are some expectations set for Mr. Burdell that are pretty blunt, expectations that derive from the credibility that was referred to earlier. In short, the language of this reference letter writer sends a message that is about as clear as we can expect. Does it guarantee that young Burdell will do as well as the writer's former students that were named? Of course it does not. It does, however, offer us a level of assurance from a highly regarded individual who understands quality and who might not want to be "called on it" if his/her assessment proves faulty.

Today's Students

We attract PhD students from a variety of academic backgrounds and from institutions and programs all over the world, from large public universities to small and prestigious private colleges. In many cases, applicants are products of the finest institutions in their home countries. Of course, our aim is to be able to recruit our share of the best of these. In this regard, a revealing indicator of a program's stature and presence emerges by examining the quality of applicants' alternative choices, whether or not they select ISyE. Specifically, when applicants do turn us down, it is in our interest to learn where they chose to go, and so we just ask: "Hey, we're sorry you turned us down, where are you going?" In the fall 2010 recruitment class, applicants to whom we made offers but who opted for PhD programs elsewhere reported their choices of universities to be Berkeley, Carnegie Mellon, Chicago, Columbia, Cornell, Duke, Maryland, Michigan, MIT, North Carolina-Chapel Hill, Northwestern, Penn, UCLA, and Wisconsin. In some cases, we lost more than one student and always, some students simply do not respond to our question regarding their choice. Note that discipline choices at these other universities include, in addition to industrial engineering and operations research programs, ones in mathematics, statistics, computer science, and business.

Many of the alternative choices shown above constitute a list of "usual suspects" in our annual competition for top PhD students. When applicants choose to decline our admission offer, the reasons given are myriad, some entirely valid and quite fair-minded, others less so with some plainly nonsensical. For example, a few generally sound reasons a PhD applicant turns us down:

Economics will be helpful in my planned research and the econ department at the University of x is much stronger.



Professors Leon McGinnis and Jan Shi lead strong teaching and research efforts in modern manufacturing systems.

who are willing to put their own reputations on the line by attesting to an applicant's potential for not just surviving but excelling in a highly competitive PhD program and to be open to stating otherwise. We need to hear that an applicant exhibits genuine intellectual talent and curiosity and has a serious chance to make fundamental contributions in solving hard research problems. Particularly meaningful is if a letter writer can rank an applicant at the level of others he/she has written letters for and who have gone on to top-ranked PhD programs. To illustrate, consider a letter for an applicant named George P. Burdell:

I have been a faculty member for twenty-five years, during which I have held positions at X and currently Y, where I hold the thus-and-so chair. The programs at both X and Y attract some exceptionally strong students, many of whom routinely go on for doctoral study at top graduate programs in engineering, mathematics, mathematical sciences, and computer science. During



Several Stewart School faculty are actively engaged in teaching and research in applied probability and simulation, including (L to R) Robert Foley, Dave Goldsman, Hayriye Ayhan, Christos Alexopoulos, and Sigrún Andradóttir.

After much thought, I have concluded that I will likely be more comfortable in a smaller program.

I was made a much better financial offer at x.

The best researcher in the world doing work in Internet security modeling and analysis offered me an RA to work under her direction.

On the other hand, some reasons are a little more contrived. A few examples (all real) illustrate what we sometimes have to put up with.

It's very important for me to be able to snow ski nearby.

Reality: If this applicant watched the Weather Channel or even glanced at the Farmer's Almanac, he/she would have noticed that "nearby" snow skiing will be tough in Atlanta.

I really don't want to go to school in a big city.

Reality: Metropolitan Atlanta did not grow to five and a half million residents while this person was completing his/her application. Interestingly, it is not uncommon to discover that this same genre of applicant also applied to places such as NYU, Columbia, the University of Chicago, etc.

I'm going to x because they have a stronger program in supply chain logistics.

Reality: This program must be on Mars because the best program in supply chain logistics on planet Earth is arguably right here in the Stewart School.

My boyfriend wants to study journalism and Georgia Tech doesn't have a program in that.

Reality: This is the so-called "two-body" claim and it is used quite often. Often it is little more than a convenient smokescreen.

The Halo Effect

At the end of the day, one of the most difficult hurdles that we face in high-stakes recruitment of PhD students is overcoming the so-called "halo effect," which describes the phenomenon whereby an applicant's selection process is heavily influenced by the "name" of the university housing the competing academic program. Now, we need to be fair. We don't lose top applicants to second- or third-rate programs that happen to be at world-class institutions. Even so, it is pretty disappointing when a top applicant, one to whom we have made a great offer, and importantly, one for whom ours is simply the best academic and research environment for his/her work, opts to go elsewhere for what are clearly reasons motivated by an overriding need for perceived institutional status.

There is very little we can do to combat the halo effect. But what about our ranking you ask; twenty straight years at number one has to carry much weight with any applicant, correct? Surprisingly, not really—especially not for doctoral applicants. While these applicants are not dismissive of the achievement, it just doesn't relate to some of them. The run of lofty rankings in *U.S. News* is the source of great pride to us, make no mistake about that. However, those rankings are in the category of industrial and manufacturing engineering. This is much more relevant, meaningful, and (hopefully) influential in the recruitment of applicants coming from engineering cultures. But, even there, we are too often, in our opinion, likely to lose an applicant from a traditional industrial engineering program when he/she gets that alternative offer from a program at a "famous" institution.

In any event, for mathematics, computer science, or even statistics majors, those rankings may be respected in a vague, sort of disconnected sense but they are not taken so seriously in their decision making. These applicants come from academic cultures and have mentors in those cultures, where being number one in industrial engineering just doesn't resonate with them. Typically, these applicants are most attracted to the PhD in operations research or ACO, and as indicated earlier, there are no explicit rankings for

Table 4: Student Awards and Honors

Award/School	CAL	COL	COR	GT	M	MIT	NU	PSU	S	TAMU	VT
Tucker Prize	0	0	1	0	0	3	0	0	2	0	0
Dantzig	0	0	0	1	1	4	0	0	3	0	0
Nicholson	1	4	1	2	1	6	0	0	11	0	0
Pritsker	1	0	0	2	0	0	1	0	0	0	3
Opt Society	0	0	0	1	0	1	0	0	0	0	0
Qual/Reliab	0	0	0	3	2	0	1	0	0	2	0
Computing	0	1	0	1	0	0	0	0	0	0	0
Transportation	0	2	0	3	0	7	1	0	1	0	0
Goldstein	1	1	4	2	0	1	0	0	0	0	0
Totals	3	8	6	15	4	22	3	0	17	2	3

those disciplines. If there were, would ISyE be number one? Well, maybe we would, but maybe not. For sure, we would hope to be very highly ranked, but equally certain is that the highest-ranked handful of academic programs in OR would look very different than the top group under the IE category in *U.S. News*. You might want to return to those tables that were produced earlier and take a look at the entries that exist for programs at Cornell, MIT, Columbia, et al.

Do we feel frustrated by the halo effect? Well, maybe a little. Do we obsess over it? No, not really. There is no way—at least in the near term—that Georgia Tech is going to overcome the institutional reputation of an MIT or a Stanford and the like. And, honesty compels us to acknowledge that when graduates go looking for faculty positions, the doors at the country’s most famous institutions are indeed likely to be more easily opened for holders of diplomas from institutions of similar stature, a specific academic program’s reputation notwithstanding. This is borne out by pretty hard evidence and is a fact of life in this business. So our job is clear: we simply have to look for ways to overcome the downside effect of this phenomenon, and then we cross our fingers and hope that we are dealing with mature applicants. It is very helpful to have our most highly regarded faculty engage elite applicants directly and hook them on their research activity—that is, to recruit them directly. This can be an ego thing to be sure but, like it or not, the very best applicants truly get excited when genuine, world-class faculty approach them and show a special interest in inviting them to engage in joint research.

Also very effective is to be able to create financial packages that include generous, named fellowships as part of the offers. Besides the obvious relief of the recipient’s financial burden as a doctoral student, such awards carry formal prestige. The latter attribute is actually quite relevant, i.e., being labeled a “thus and so Fellow” is very important to all applicants but especially to those of the first rank. Of course, being able to make highly attractive financial offers, while an obvious strategy, is not easy within the set of academic programs comprising our stiffest competition for the very best applicants. Those programs are small and most are private, which means that they play

by very different institutional rules and, more crucially, often have access to financial resources (e.g., endowments) substantially greater than those available to public, state-assisted institutions.

Finally, a very helpful strategy, though one that takes years to form, is to actively cultivate, build, and sustain relationships with key faculty at top feeder institutions and programs around the world. Once successful students who we attract report back that ISyE is an exceptional place in which to earn the PhD, then that pipeline can work wonders in the recruitment of the great applicants from those programs. It is very influential when a highly regarded and trusted mentor to an elite applicant counsels that despite offers from other renowned institutions’ programs, the doctoral program in ISyE is the best option for them, i.e., we are helped enormously if that faculty mentor can say, “If I were you, I’d choose ISyE at Georgia Tech.”



Graduate Students “Getting Out”

The Stewart School now awards approximately 200 master’s degrees and on the order of twenty-five to thirty doctorates annually. The majority of master’s graduates earn the MS IE, with the MS QCF and MS OR degrees following in popularity. Master’s degree holders tend to take industry positions that, more or less, parallel those sought by undergraduates but obviously, at higher levels befitting the value of their advanced degree. Positions in manufacturing, logistics, consulting, health, finance, and the like are most prevalent. A very small number will seek to continue for the PhD, either in ISyE or elsewhere.

In the twenty years since the first number one ranking was published, more than 400 doctorates have been awarded by the School. Viewed in total, the breakdown regarding where first positions are sought has traditionally revealed that graduates holding the PhD seek positions inside and outside academe in roughly equal proportion. At a finer level of detail, however, the distribution of initial positions varies somewhat, with graduates in some disciplines (e.g., optimization, stochastics, statistics) favoring college and university positions while others (e.g., supply chain engineering, economic decision analysis) might be more likely to seek nonacademic employment.

Student Awards and Honors

As in the case of assessing faculty acclaim and stature vis-à-vis honors and awards, the same exercise can be undertaken with regard to PhD students. The most celebrated of achievements by doctoral students (before and after graduation) are ones conveyed on the basis of scholarly work in the form of prizes for dissertations and papers as well as prestigious postdoctoral fellowships. Ones deemed particularly noteworthy are identified below. Then, displayed in the same fashion as for faculty honors and awards, we provide in Table 4 a summary of how the students from the various programs, including the Stewart School, have performed.

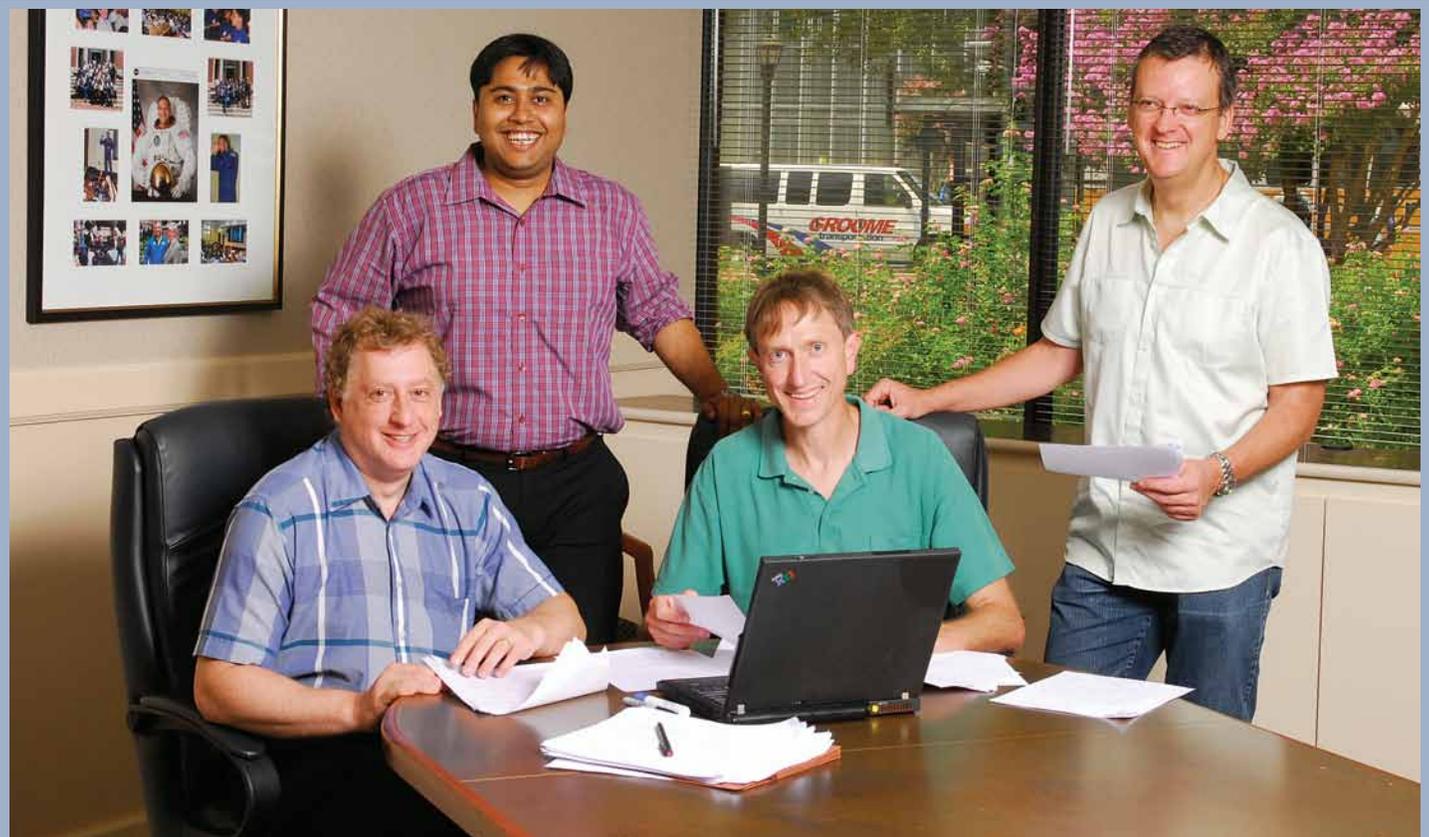
- Tucker Prize (MPS)
- George B. Dantzig Dissertation Award (INFORMS)
- George Nicholson Student Paper Competition (INFORMS)
- Pritsker Doctoral Dissertation Award (IIE)
- Optimization Society Student Paper Prize (INFORMS)
- Quality Statistics and Reliability Best Student Paper (INFORMS)
- Computing Society Student Paper Award (INFORMS)
- Transportation Science and Logistics Society Dissertation Prize (INFORMS)
- Goldstine Fellowship in Mathematical Sciences (IBM Research)

Placement

At the end of the day, however, a major indicator of a PhD program's standing is where it places its graduates; arguably, this is the ultimate test, the gold standard. Accordingly, the best evidence corroborating claims that a doctoral program is world class is to be able to demonstrate that its best graduates are regularly competing for positions at world-class programs—top academic programs in tier-one research universities and at prestigious research labs. University placement has essentially become the “coin of the realm” amongst PhD programs in terms of placement metrics. This does not suggest whatsoever that we pay no attention to non-academic positions taken by our doctoral students. However, achievement in the latter context is typically ambiguous and very hard to calibrate with stature often taking years to be realized or authenticated.

A fundamental question that the most highly recruited PhD applicants (i.e., ones who have top-notch options) almost always ask is: “Where do you place your graduates?” This is a totally legitimate question, and responding to it constitutes a sobering “moment of truth” for programs; it's not something that can be spun, particularly when asked by the most talented and highly sought recruits. It is not a challenge to know the academic pecking order; when a claim is made that graduates of one's program join the faculties at elite places, the veracity of the claim is pretty easy to calibrate.

So, how are we doing? Well, in the broad, high-level sense, the answer is that we are doing pretty well—in recent years, very well. That said, we do have some work to do.



ISyE boasts one of the world's top faculties in mathematical optimization. Active members of the group include (L to R) Craig Tovey, Santanu Dey, Anton Klegwegt, and Renato Monteiro.



We believe in a number of areas we have a faculty that is second to none; we also believe that our very best PhD students are as strong as anybody's, at any program. What remains is that improving our record of placement on top academic program faculties must continue to be a major focus.

To underscore the claim that we are doing quite well

presently, let us look at a few of the positions landed by doctoral graduates from the School. In fact, since the number twenty has played a prominent role in this article let us simply consider positions of some doctoral graduates during that span of twenty years. Included are initial appointments as well as current positions at the following universities, which we list alphabetically (in some cases, we have multiple appointments): Berkeley, Carnegie Mellon, Chicago, University of Chile, Cornell, Duke, Florida, Harvard, Illinois Urbana-Champaign, Michigan, Middle East Technical University (METU), Minnesota, National Taiwan University, NYU, North Carolina-Chapel Hill, Northwestern, Mt. Holyoke, Penn State, Rutgers, Seoul National University, Southern California, Texas, Texas A&M, U.S. Military Academy, Virginia Tech, Virginia, University of Waterloo, and Wisconsin-Madison.

Whatever else one might debate regarding the profile of the placements indicated above, we must certainly agree that included are positions at noteworthy academic institutions including some of the most respected public universities in the country (e.g., Berkeley, Virginia, North Carolina, Michigan, Wisconsin-Madison, Illinois), as well as prestigious private institutions (e.g., Harvard, Cornell, Duke, Northwestern, Mt. Holyoke, Carnegie Mellon, Southern California). We also see representation on the faculties at some of the world's most highly regarded business schools (e.g., Chicago, Indian School of Business, NYU) as well as placement on the faculties of some of the finest institutions abroad (e.g., University of Chile, METU (Turkey), Waterloo (Canada), National Taiwan, Seoul National (Korea)).

But equally (and in a sense, more so) interesting is that beyond recognizing the quality of the institutions indicated, it is noteworthy to also examine the variety of positions where our graduates are found at these institutions. This is a key point in underscoring what makes ISyE genuinely different than most programs in engineering and certainly

different from many others in the *U.S. News* rankings. As one should expect, positions in industrial engineering and operations research are evident and well represented in our placements, but so, too, are ones in stand-alone statistics departments, ones in mathematics, and others in business schools. And, crucial in making the point, these latter positions are serious ones at exceptional places. For example, the University of Waterloo is a well-known Canadian institution where the famous Department of Combinatorics and Optimization within the Faculty of Mathematics, stands as one of the best known and most highly regarded programs in discrete and combinatorial mathematics in the entire world. The statistics departments at Harvard and Wisconsin-Madison are extremely strong with long-established reputations. The same accolades are applicable for the business schools at Chicago, Carnegie Mellon, and NYU. Think about this: how many other programs, residing in a college of engineering, are as broad as ours and yet so strong that its graduates could compete

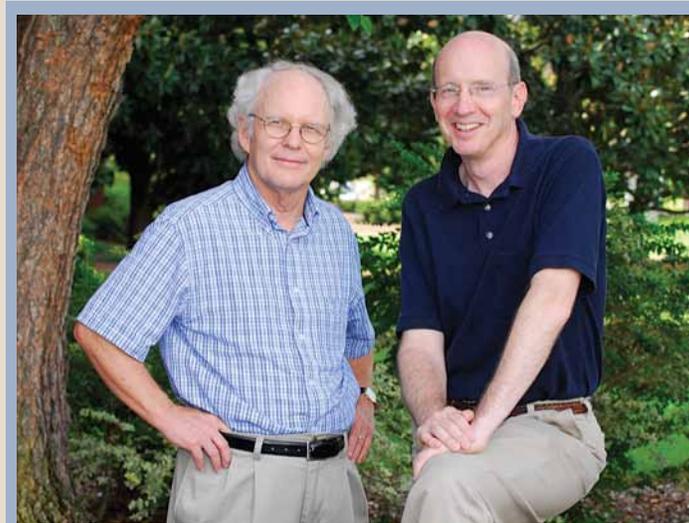
for and earn positions—and lofty ones at that—at such an array of institutions and programs?

A skeptic might ask if the sample profiled above is the result of some judicious “cherry-picking,” an attempt perhaps to mask a harder fact that many of our doctoral graduates don't compete so well. The answer is no, but in fact this is not really a good question. Certainly, we have highlighted some of the very best success stories, but this deserves no apology; this is, after all, an article that celebrates what this graduate program has established at the highest

level, not what it does that is common.

Would we like to have more graduates on the faculty at the likes of Harvard, Cornell, and Berkeley? Do we aim to see more of our graduates compete for faculty positions at MIT, Columbia, and Stanford? Absolutely, and understand that this is what we define as a fundamental part of our mission for this graduate program. But also know this: we are competing in the big leagues, and our real peers are tough customers. The ISyE graduate program is no shrinking violet, and we intend to stay where we are in those rankings. But we know, and we need for you to know, that we compete in a much broader domain than any other program of our sort.

And, here's the thing: if representatives from any school out there are writing a similar article about their program, you can probably bet that they are bragging about placing their graduates on the Stewart School faculty.



About the authors: R. Gary Parker is the associate chair for graduate studies and professor at ISyE, and Dave Goldsman is a professor at ISyE.



ISyE has nineteen faculty members who have received a National Science Foundation CAREER Award or its predecessor, the Presidential Young Investigator Award. Pictured, L to R, front to back: Ozlem Ergun, Kwok-Leung Tsui, Shijie Deng, Ming Yuan, Nicoleta Serban, Yajun Mei, Hayriye Ayhan, Pinar Keskinocak, Jim Dai, Julie Swann, Craig Tovey, John Bartholdi III, and Eva Lee. Not pictured: Shabbir Ahmed, Nagi Gebrael, Seong-Hee Kim, Anton Kleywegt, Jack Lohmann, and Roshan Joseph Vengazhijil.

Opportunities to Support ISyE Students and Faculty

Support for ISyE can take many forms, from outright gifts made during a lifetime to more complex estate arrangements.

Student Support: ISyE has long served as a beacon to exceptionally bright and highly motivated students. This tradition continues unabated, and ISyE's commitment to its students has never been more evident.

Graduate Fellowships: Georgia Tech's mission of distinction in teaching, learning, and research is significantly advanced by its graduate students. They are wellsprings of new ideas, and because they have the opportunity and the freedom to work closely with faculty, they play a crucial role as intellectual bridge-builders. To help ISyE attract the world's brightest and most promising graduate students, increased fellowship support is essential. The competition, particularly at the PhD level, is intense, and an endowment providing regular fellowship funds will enhance the School's attractiveness to those graduate students who display superior academic achievement and a potential to contribute to the academic and professional communities.

Faculty Support: The cornerstone of a great program is a great faculty. Teacher-scholars are the backbone of Georgia Tech—men and women eminent in their chosen fields, capable of developing new knowledge through research and transmitting knowledge through teaching. To maintain and improve the quality of its academic programs, ISyE is seeking permanent endowments in the following areas:

Faculty Chairs: An endowed chair is the most prestigious honor any educator can earn. Funding for endowed chairs provides the resources to attract and retain preeminent teacher-scholars in specific academic areas. The chair holders draw outstanding students, stimulate innovative research, mentor early- and mid-career faculty, and aggressively seek leveraged funding from government and industry sources.

Early-Career Jr. Professorships and Professorships: Endowed awards and professorships given to the most promising faculty members provide a major incentive to attract and retain those men and women who will become tomorrow's leading teacher-scholars. Grants are awarded for a term of up to five years, providing support to encourage innovation in teaching and research, thereby nurturing the professional advancement of the named faculty member.

Besides the support mentioned above, there are many other opportunities to support ISyE (some include undergraduate student scholarships, program enrichment, and international initiatives). To discuss giving opportunities, contact Nancy Sandlin at nsandlin@isye.gatech.edu.



“It is important for Georgia Tech to continue to offer fellowships that are on par with, or better than, those of its competitors in order to entice the best students. As someone who was offered fellowships by other leading programs, I am glad that Georgia Tech was willing and able to match these offers when trying to lure me to come aboard.”

—Dimitri Papageorgiou, ISyE graduate fellow



Quality faculty members, like George Nemhauser, A. Russell Chandler III Chair and Institute Professor, and Ellis Johnson (seated), Coca-Cola Chair and Professor, help the Stewart School attract the best and brightest faculty as well as talented and curious graduate students.



Emile Simon, MS IL 2009, leads a global project focused on a new approach to the product demand planning process as a means of achieving inventory reduction.

Executive Master's Program Helps Find the Right Balance at MercaSID

by Gary Goettling

In these difficult economic times, any innovation that aims to improve a company's efficiency while saving money is bound to be given serious consideration. At MercaSID S.A., a seventy-three-year-old food products company based in Santo Domingo, Dominican Republic, Emile Simon's approach to inventory management is proving right on target.

Simon, a logistics manager at MercaSID, is a 2009 graduate of Georgia Tech's Executive Master's in International Logistics & Supply Chain Strategy program (EMIL-SCS). The eighteen-month, residence-based program prepares executives to manage a multitude of global logistics and supply chain issues. Working either individually or as a team, EMIL-SCS participants develop a solution to a real-world problem instead of writing the traditional master's thesis. Simon chose to focus on a new approach to the product demand planning process as a means of achieving inventory reduction.

A producer of cooking oils and other agricultural-based products, MercaSID is also a major Caribbean distributor for consumer-product giants, including Unilever, Kimberly-Clark, Kellogg, and Clorox. Its inventory is massive—too much so, Simon thought—resulting not only in excessive financial and warehousing costs but also in less-than-optimal customer service.

The key is to strike a closer balance between demand and inventory while

maintaining as high an order fill rate as possible.

"We needed to understand the demand side better," said Simon. "We had a lot of the right information, but we weren't using it properly."

His approach is comprised of two parts. The first involves data collection—basic number crunching—to come up with the projected demand for each product category, and then determine demand estimates for individual products. That information subsequently undergoes a value assessment by representatives of the company's sales, marketing, and operations departments.

The group arrives at a consensus on final product forecasts, which are used to determine the number of any given item to be maintained in inventory. This final number does not necessarily match the analytical forecast provided by a computer program, because it takes into account factors including market information, market situation, and the company's marketing plans.

"This process has helped us streamline our inventories and improve our service levels as well," Simon noted.

The results so far are impressive. While maintaining or exceeding a 90 percent fill rate level across all product categories, inventory was reduced 15 percent last year and an additional 5 percent in the first half of 2010. Further reductions are likely when MercaSID's suppliers are brought fully

into the planning process, probably next year, Simon said.

"We did get some supplier collaboration in the first phases of this new process, but we know we can take it further," he said. "That's going to be a little more difficult because it involves the participation and buy-in of other companies, not just ourselves." Simon expects MercaSID's finance department to become more active in the process as it evolves.

Buy-in within MercaSID itself was also crucial for the project's success, Simon added, pointing out that many people have to believe in the process for it to work. "It has taken discipline, but we did a lot of consensus building about how the process should take place," he explained. "After we proposed something, we didn't take it to the next level until all sides of the team—marketing, sales—were in agreement that that's the way we should go."

"We've had a thousand percent support from the highest levels of the company, and that's made a lot of difference too," he added.

Simon's experience is not uncommon among EMIL-SCS graduates. "It's the only program of its kind," said Greg Andrews, managing director of the EMIL-SCS program. Students, typically sponsored by their employers, participate in five two-week semesters spread out over eighteen months. The first semester is an "academic boot camp" held at Tech, where

students are exposed to the “concepts of industrial engineering as applied to supply chains,” Andrews said. Subsequent semesters are spent traveling to countries in Europe, Asia, and the Americas for a combination of academic study, practical application, and real-world problem solving.

“The 2009 class that Emile Simon is a part of had seven global projects with a combined savings of about \$250 million if implemented,” Andrews continued. “That’s a pretty good payback.”

In a fast-moving consumer goods company, finding the right balance between customer service and the cost of doing business makes the difference between success and failure, noted Renato Cantarelli, MercaSID’s vice president of operations. “Key to achieving this balance is to have a robust yet simple demand planning process where sales, marketing, procurement, manufacturing, and distribution are integrated, along with a consolidated operational plan. This was Emile’s project—to conceptualize and implement our demand planning process. Now, after more than one

year in operation, this process is fully operational and is well accepted by all levels of our organization. Furthermore, it is delivering the benefits we expected from the outset.

“The knowledge Emile brought with him from his experience at Georgia Tech was fundamental for him to successfully finish his project and for the business to accrue the benefits. It was money and time well spent—we are very happy!”

Gary Goettling is a freelance writer who writes for Georgia Tech’s Research Horizons and other alumni publications.

ISyE Undergraduate Program Maintains Top Ranking in *U.S. News & World Report*

The Stewart School of Industrial and Systems Engineering’s (ISyE) undergraduate program maintained its top ranking in the 2011 edition of *America’s Best Colleges* by *U.S. News & World Report* released in August. This issue marks the sixteenth year that ISyE has ranked as the foremost program of its kind in the nation at the undergraduate level within the industrial/manufacturing engineering category.

Georgia Tech maintains its seventh-place rank among public universities in the 2011 edition. Tech has ranked in the top ten of public universities for more than a decade.

Georgia Tech’s College of Engineering moved up one spot in the undergraduate rankings to fourth for engineering programs at universities where the highest degree is a PhD.

While the Stewart School maintained its top ranking, Aerospace Engineering ranked second in its discipline. Mechanical Engineering moved up one spot to join Biomedical Engineering and Civil Engineering for a third-place ranking. Electrical and Environmental Engineering both ranked fifth among their peers.

For the first time, *U.S. News & World Report* polled high school guidance counselors. Georgia Tech ranked second among public institutions, tied with the University of North Carolina-Chapel Hill and the University of Michigan. In rankings including both public and private universities, Georgia Tech tied for twenty-second with Boston College, Emory University, Rice University, University of North Carolina-Chapel Hill, University of Southern California, University of Michigan, and Washington University-St. Louis.



EMIL-SCS Celebrates Tenth Anniversary

In 1998, Georgia Tech gathered a group of industry advisors to design a master’s program that addressed their supply chain education needs. The result was the Executive Master’s in International Logistics, now the Executive Master’s in International Logistics & Supply Chain Strategy (EMIL-SCS).

This fall, EMIL-SCS celebrates its tenth anniversary by hosting the International Logistics & Supply Chain Strategy Summit. The invitation-only alumni event will reflect on lessons learned during the program’s first decade and will look forward to trends and challenges that will shape its second.

EMIL-SCS is a unique eighteen-month master’s program that keeps key employees at work while teaching them practical techniques for improving supply chain performance. It is the first advanced degree offered that combines the growing field of global logistics and supply chain strategy with sound principles of business management. EMIL-SCS blends top-notch engineering faculty, world-class management faculty, and the best industry practices to create a unique educational opportunity that offers executive students the framework and tools necessary to affect change and drive positive bottom-line results within their corporate supply chain networks.

UPS Project Takes Top Honors in Senior Design Competition

by Gary Goettling

The first place team from the spring 2010 Senior Design competition, from left to right, back row: Anish Bhatt, Zoheb Virani, and faculty advisor Alex Shapiro; middle row: Ryan Smith, Rathin Ramesh, Ian Yancey, and Nik Reddy; and front row: Nupur Patel and Justin Chmielewski.

The Georgia Tech students who devised a way to turn a \$330,000 annual expenditure into potential yearly savings of \$1.8 million received an A from United Parcel Service (UPS)—and top honors in the Senior Design competition.

Senior Design is the final course undergraduates take in the Stewart School of Industrial and Systems Engineering. Students are grouped into teams and select a major systems-design challenge from a number of possibilities submitted by companies or nonprofit organizations.

The course provides students with an opportunity to apply their classroom education toward solving real-world problems in a collaborative environment. The participating companies and organizations benefit from “a fresh set of eyes and new approaches to some very perplexing problems,” said Ed Rogers, global strategy manager for UPS corporate strategy. “The best teams typically demonstrate an enthusiastic inquisitiveness, excellent analytical skills, and creative yet realistically implementable solutions.”

At the end of the semester, an ISyE faculty committee has the difficult task of naming the team that developed the best solution for their project. This past spring, the Senior Design competition produced four finalists. The winning team, working with faculty advisor Alex Shapiro, had redesigned UPS’s warranty program, wherein UPS collects warranty monies from manufacturers for vehicle components that fail during the warranty period.

“UPS is considered an authorized repair dealer by the manufacturers, and so they allow UPS to complete warranty repairs and then file a warranty claim against the failure,” said Vic Mariano, systems manager for UPS corporate automotive engineering. “We work closely with our vehicle manufacturers to build a reliable vehicle that will only need work as part of normal maintenance schedules, but when parts fail prematurely, we want to be able to collect the warranty amount due to UPS.”

Employing sophisticated data analysis and computer modeling techniques, the students completely revamped the process and introduced efficiencies that could produce significant savings.

“We are very pleased with their results,” said Mariano. “They took a different approach that we had not considered and gave UPS a real deliverable that we can use in our operations.”



Under the guidance of faculty advisor Craig Tovey, another finalist team tackled process improvement at Burger King restaurants. A group comprised of Jennifer LaPerre, Matthew Powers, Jared Trammell Sears, Stephen Spicher, Patrick Sugar, and Kristen Vila addressed three areas: determining the optimal number of point-of-sale units, eliminating excessive labor hours, and reducing customer wait time at drive-through windows. The team’s solution included a stochastic model, a labor-scheduling program, and a series of simulations, representing a potential annual savings of \$6 million.

A Senior Design project for Radiant Systems Field Services, a global point-of-sale products manufacturer, produced a recommendation for a facility layout redesign and an inventory management tool for the company’s field services division. Using intensive data collection, simulation, labor optimization analysis, and sensitivity analysis, the team devised a plan that could save the company \$1.28 million over three years. Xiaoming Huo served as faculty advisor to team members Dillon Blakes, Josh Click, Ian Craig, Randy Darnowsky, Joel Feyereisen, Kristina Kaylen, Jesse Kent, and Mackenzie Weber.

The fourth finalist team got on the right track with a project to improve the locomotive fueling policy at Norfolk Southern Railway. Their simulation-based optimization model could save the railroad \$8 million annually, while additional recommendations could boost the total savings to \$29 million each year. Team members David Chen, Susan Curry, Aldren Lobo, Yatong Lu, Tom Minderman, Matthew Thornton, and Sheng-Bo Zhu completed the project under the auspices of faculty advisor Shabbir Ahmed.

“It’s fun working with, and in some ways, mentoring these soon-to-be ISyE grads,” said UPS’s Rogers, himself a Georgia Tech ISyE graduate. “The problems we give them are far more complex than anything they’ve learned in class. Helping them realize that it’s okay to question the ‘givens’ and that there’s often no single right answer—but instead a best answer for a range of future conditions—makes it all worthwhile.”

Gary Goettling is a freelance writer who writes for Georgia Tech’s Research Horizons and other alumni publications.



New Georgia Tech Panama Logistics Innovation & Research Center Launched

Georgia Tech celebrated the inauguration ceremonies for the Georgia Tech Panama Logistics Innovation & Research Center in Panama City on September 7, 2010. The center is the latest addition to the Georgia Tech Supply Chain & Logistics Institute’s (SCL) logistics innovation network of centers that focus on improving country-level logistics performance and increasing trade competitiveness.

The center was established under an agreement with Panama’s Minister of Commerce and Industry and the National Secretariat of Science, Technology, and Innovation. SCL has established and will operate the Georgia Tech Panama Logistics Innovation & Research Center. The center has three core thrusts—applied research, education, and competitiveness—and two primary objectives—to improve the logistics performance of Panama and to establish Panama as the trade hub of the Americas.

The Panama center is expected to serve as a springboard for logistics innovation, education, and research throughout the Americas, according to Jaymie Forrest, SCL managing director.

The center will establish education programs to increase human capital in logistics with both formal degree programs and through executive education; develop repositories and models to support trade analytics; develop performance, integration, and visibility systems; facilitate stronger industry and infrastructure linkages to improve Panama’s competitiveness; provide leadership for the development of a national logistics strategy and a National Logistics Council; and provide innovation for logistics leading to new logistics services and jobs.

Holding a vision of Panama as a logistics, education, and research hub, Dario Solis, PhD, has been tapped as the center’s managing director.

Solis sees this as “a historical opportunity for the

country of Panama to develop its huge potential and to become a dominant player in global trade.” He believes this opportunity can generate the resources necessary to improve the quality of life for all Panamanians.

Paying close attention to the center’s development is Panamanian President Ricardo Martinelli and Georgia Tech President G. P. “Bud” Peterson, both of whom spoke at the center’s opening program.

“Panama is a natural place for a trade hub,” said Don Ratliff, SCL executive director. “It is well suited for free enterprise growth with convenient air and sea transportation to the rest of Latin America, has an outstanding financial district, and good commercial development infrastructure.”

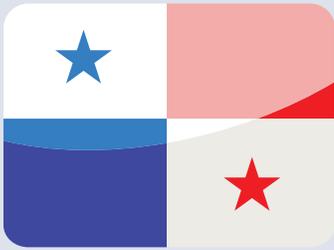
And there’s the canal, presently undergoing a multi-billion-dollar expansion. When completed in 2014, the waterway’s capacity will be doubled and will allow much bigger cargo ships.

“Panama possesses an entrepreneurial spirit and a vision for becoming the trade hub of the Americas,” explained Forrest. “Panama is poised for growth and development to provide logistics support services.”

A bilingual workforce is another plus, she added, along with Panama’s Colon Free Zone, a manufacturing, warehousing, and re-export center that is the second-largest free-trade zone in the world after Hong Kong.

But for all of Panama’s hard assets, it lacks the high level of integration necessary for trade-hub status. There is a lack of logistics services and supporting infrastructure such as public warehousing, temperature controlled facilities, logistics technology and the human capital experienced in supply chain operations. This is a good opportunity for Georgia Tech to transfer knowledge and apply value.

A value assessment to determine infrastructure



improvement priorities will be one of the center's top orders of business. Ongoing improvements in logistics and the application of relevant new technologies will ensure Panama's competitiveness and build its stature as a trade hub.

Besides the immense economic advantages for Panama to become a world-class trade hub, there is also expected to be new opportunities for U.S. companies to leverage Panama as a distribution hub for Latin America.

"We (the United States) manufacture more products by value than any other country in the world," said Ratliff. "Many of these products are exportable, but they're made by small- and medium-size enterprises that simply don't have the capabilities to export to small countries." Nor is it economically worthwhile for these companies to develop and maintain individual trade relationships with separate Latin American countries representing markets of just four or five million people each, he added.

Typically, government-sponsored trade assistance is limited to marketing and does not address logistics needs, transportation, value-added product-support services, and a host of key elements that constitute the practical demands of international trade. The Panama center will be designed to meet these needs while providing, in effect, a single point of access for these smaller markets.

"If we're going to increase exports, which everyone believes is a good idea, then we have to make it so that exporting to many small countries is equivalent to exporting to one large country," Ratliff explained.

As the largest research group in the world focused on supply chain and logistics, SCL is the ideal partner for Panama's trade-hub development. In recent years, SCL has leveraged its traditional expertise to embrace issues surrounding international trade.

SCL founded The Logistics Institute (TLI) Asia-Pacific in 1998 at the request of the government to improve logistics education. Based in Singapore, the center supports Singapore's Asian trade hub with research, education, and consulting expertise in global logistics and supply chain management. The experience from TLI Asia-Pacific offers a template for Panama in many ways.

In 2009, SCL established the Trade Innovation & Productivity Center in Costa Rica to support the increase of trade, improve logistics performance, and support the country's strategic initiatives. In particular, this center is focused on food exports and preparing for the challenges of traceability to meet the forthcoming U.S. food safety regulations.

SCL's emerging leadership role in international trade also dovetails with Georgia Tech's twenty-five-year strategic plan, which calls for leveraging Tech's global engagement as a means of securing a larger international footprint. Logistics was identified as one of four high-potential industry sectors warranting particular emphasis in research and industry partnerships. The other sectors are energy, healthcare, and transportation.

For more information visit www.panama.gatech.edu.

SCL Designs Company-Specific Executive Education Program: Coca-Cola Mexico Implements New Strategy for Bottlers

by Gary Goetting

Supplying the world's most popular soft drink to its second-largest consumer market is a huge job. Coca-Cola Mexico's sixty-three bottling plants supply 358 distribution centers, from which 28,500 vehicles fan out across the country along 11,000 distribution routes, traveling 237 million kilometers to 1.4 million customers at small family stores and other outlets.

It involves a highly efficient logistics and distribution model, but revisions and continuing education are necessary to keep up with changing business conditions. For help with these, Coca-Cola turned to the Georgia Tech Supply Chain & Logistics Institute's Executive Education Program offered by the Stewart School of Industrial and Systems Engineering (ISyE).

"Our portfolio is growing, and we are trying to reach more customers by expanding our line of beverages," according to Salvador Cárdenas Escareño, Coca-Cola's commercial leadership supply chain senior manager. "That's why we need to revisit our current service models—to make sure that our portfolio is in place and perfectly executed through our different distribution channels, one store at a time."

The Executive Education Program is "a comprehensive curriculum in supply chain and logistics operation management and technology," according to Jaymie Forrest, SCL managing director. Participants receive a certificate upon completion of the intensive series. In addition to the traditional program model conducted on the Georgia Tech campus, online programs are available. Most recently, Georgia Tech has begun to offer a focused curriculum tailored to a specific company's needs and problems.

These customized programs "respond to the unique needs of companies and provide them with specific and in-depth knowledge of supply chain engineering and management," Forrest explained.

One of the first customized programs was developed for Coca-Cola Mexico and selected Central American bottlers and was held over four weeks spanning late 2008 and early 2009. Another four-week program involving Coca-Cola Mexico was held later in 2009. Aspects of these programs were assembled into a new program held this summer for Coca-Cola bottlers in Spain and Portugal.

The education program for Coca-Cola Mexico teaches supply chain management for beverage delivery in conjunction with the implementation of a specific delivery framework that was developed by an outside consulting firm expressly for The Coca-Cola Company and its bottlers.

"We decided to hire an institution that leads in the thinking and development of value-chain processes to defragment the consultant's development process and put it in an educational program for high-potential executives of our bottling system," Cárdenas said. "The Georgia Institute of Technology leads all this thinking on what we were

looking for in the demand-driven value-chain execution."

The bilingual, 120-hour program is based in the concepts of demand-driven supply networks as a way to innovate service delivery models.

"We cover the fundamentals of demand sensing, demand shaping, and demand response while using the Blue Ocean Strategy framework to find new ways to compete in the market via differentiated service delivery models," said Maria Rey, SCL senior lecturer. "The program has different tracks where students understand the strategic imperative to innovate their service delivery strategies, a competencies track to acquire new knowledge and tools to lead the process, and an applied knowledge track for their experimental projects."

The projects, where students solve a business problem that's specific to their company, is a key part of the program, which is structured around four on-site residences that enable participants to build their innovation experiments progressively.

Classes and projects are held typically at a local university or executive education facility. The faculty is drawn from Georgia Tech and local universities. Guest speakers provide perspectives on different industries and geographies on topics such as segmentation, innovation, and project management.

"It's a two-way learning process, for program attendees and for the faculty involved," Rey noted.

Most important from Coca-Cola Mexico's point of view, the program has a significant bottom-line payoff.

"We trained and certified fifty-five high-potential executives around the new delivery system," Cárdenas said, "and we have the opportunity to experiment with twenty new service models touching more than 10,000 customers.

"It helped us to change our bottlers' mindset to what we're looking for: execute the picture of success one perfect store at a time. Now the RTM [route-to-market] is part of the processes within their organizations," he added.

Designing and delivering customized education programs may be one of the most important capabilities of universities now and in the future, said Rey. "Customized executive education sits at the crossroads of consulting and education. Program designers must understand the needs of the client company and translate a solution for those needs in ways of teaching content and real-life projects that corporate attendees can execute."

"At the Supply Chain & Logistics Institute, we believe we have a good competency in designing customized executive education programs, and we look forward to creating value for more firms."

Contact info@isye.gatech.edu for more information on custom programs.

FACULTY NEWS

Christos Alexopoulos, ISyE associate professor, and **Dave Goldsman**, ISyE professor, received the *IIE Transactions'* Best Paper Prize in Operations Engineering and Analysis for their paper "Area Variance Estimators for Simulation Using Folded Standardized Time Series." Alexopoulos and Goldsman co-authored the paper with their former doctoral student, **Claudia Antonini**, and James R. Wilson, professor at North Carolina State University.

John Bartholdi, Manhattan Associates Chair in Supply Chain Management and research director for SCL, presented the opening and closing keynote addresses at the Operations Research Society of South Africa Conference in September 2009. He also holds the honorary title of "Extraordinary Professor of Operations Research" at the University of Stellenbosch.

Leslie Griffin Callahan Jr., former ISyE professor and professor emeritus, was posthumously inducted into the Army's Operations Research Systems Analysis Hall of Fame at a ceremony in October. Callahan joined the Georgia Tech faculty in 1969 and retired in 1985.

Stephen Cross, director of the Georgia Tech Research Institute and ISyE professor, has been selected as Georgia Tech's

executive vice president for research, the first to hold this newly created position.

Santanu Dey, assistant professor, received the IBM Faculty Award for 2009.

Ton Dieker, assistant professor, spent the month of May at the University of Cambridge where he was a visiting fellow of the Isaac Newton Institute for Mathematical Sciences, a national and international visitor research institute.

Pinar Keskinocak, ISyE professor and co-director of the Center for Health and Humanitarian Logistics, was appointed Health Systems Institute associate director for research. She was also named the Harold R. and Mary Anne Nash Professor in Industrial and Systems Engineering.

Yajun Mei, assistant professor, has received the prestigious National Science Foundation (NSF) CAREER award. The NSF recognized Mei for his exemplary work in sequential analysis and decentralized network.

Nicoleta Serban, assistant professor, has received the prestigious National Science Foundation (NSF) CAREER award. The NSF recognized Serban for her innovative proposal and work in statistical modeling of service distribution equity.

Alex Shapiro, ISyE professor, was an invited speaker at the renowned International Congress of Mathematicians (ICM) held in Hyderabad, India, August 19 to 27, 2010. Convening once every four years, the ICM is the largest meeting of mathematicians from around the world. Professor Shapiro joins ISyE professors Arkadi Nemirovski, William Cook, and courtesy-appointed Professor Robin Thomas from the School of Mathematics, as among the few to receive this exceptionally prestigious honor. He is also *Operations Research's* new area editor for Optimization.

C. F. Jeff Wu, Coca-Cola Chair in Engineering Statistics, was elected INFORMS Fellow for his work developing statistical methodologies and novel applications to engineering and for leadership making statistical methods and thinking popular in engineering.

Ming Yuan, associate professor, has been named winner of the 2008-2009 National Science Foundation (NSF) CAREER Award. Yuan received this award for his exemplary work in sparse modeling and estimation with high-dimensional data.

Bert Zwart, adjunct professor of ISyE, is the new area editor in Stochastic Models for *Operations Research*.

In Memory

Cecil Gray Johnson, ISyE Professor Emeritus, died peacefully on Sunday, October 25, 2009, and was buried with military honors on Friday, October 30, 2009, at Arlington Memorial Park.

During World War II, Professor Johnson served in the Eighth Air Force. Based in Norwich, England, he completed twenty combat missions and served as a lead B-24 pilot. He received degrees from Georgia Tech in 1948, 1949, and 1957.

He joined the faculty at Georgia Tech in 1955. At the time of his official retirement in 1992, Professor Johnson had taught more than 10,000 students. After he retired, Professor Johnson continued to research, write, and teach in the role of Professor Emeritus and taught most recently at Worcester College of Oxford University in 2001.

Robert N. "Bob" Lehrer, the second of only six men thus far to chair Georgia Tech's School of Industrial and Systems Engineering (ISyE), passed away on Monday, January 25, 2010. He was 88.

Originally from Sandusky, Ohio, Lehrer served in the military during World War II and taught at both Purdue and Oregon State

universities before joining the Georgia Tech faculty in 1950.

Frank F. "Colonel" Groseclose, ISyE's first school chair (1946 to 1966), hired Lehrer, who became one of fifteen faculty in the school at that time. Groseclose soon put Lehrer in charge of the graduate program; however, the PhD program was slow in starting, and in 1957, Lehrer left for Northwestern University to establish a doctoral program in industrial engineering. Four years later, Lehrer moved his family to Mexico for one year at the request of the United Nations Educational, Social, and Cultural Organization (UNESCO). As his year began to wind down, and with ISyE's PhD program now up and running, Groseclose asked Lehrer to return to the School as associate director, which he did in 1963. Groseclose handed Lehrer the chair's reins in 1966. He served in that role until 1978.

During his tenure as chair, Lehrer is credited with modernizing the industrial engineering program and with adding the word "Systems" to the School's name, reflecting in full the School's philosophy.

1950s

Ray Anderson, IE 1956, and Interface, the company he founded, received the River Guardian Award from Upper Chattahoochee Riverkeeper (UCR) in September. Under Anderson's leadership, Interface became the first industrial firm committed to sustainable practice. Also, Georgia Tech will receive UCR's first River Sustainability Award for the school's investment in water and energy efficiency.

Richard Guthman Jr., IE 1956, is the recipient of the 2010 Dean Griffin Community Service Award, a Gold & White Honor, presented for positively impacting the quality of life of others while serving as a role model in the process.

1960s

Walter E. Gilbert, IE 1966, has served as CEO of a nonprofit Christian adoption agency in Thomasville, Georgia, for fifteen years. An active Rotarian for the past twenty years, Gilbert received the Paul Harris award for his work in obtaining international grants to assist the poor in various capacities. He and his wife, Jane, Greek Goddess and Sigma Chi Sweetheart of 1966, have been married for forty-three years and have two children.

Bill George, IE 1964, launched the website www.billgeorge.org to coincide with the publication of his latest book, *7 Lessons for Leading in Crisis*. Described on the author's website as "the must read survival kit for anyone in a leadership position," the book offers advice such as "don't be Atlas; get the world off your shoulders," and "get ready for the long haul." George, the former chair and CEO of Medtronic, is a professor of management practice at Harvard Business School as well as the author of three best-selling books. Last year, he was awarded an honorary doctorate from Georgia Tech.

J. E. "Eddie" Hicks, IE 1963, has just completed a two-year term as chairman of the board of the Worldwide Vending Association (WVA).

Robert D. Martin, IE 1969, was inducted into the Georgia Tech College of Engineering Academy of Distinguished Engineering Alumni.

Stephen M. Mitchell, IE 1965, MS IE 1967, was inducted into the Georgia Tech College of Engineering Academy of Distinguished Engineering Alumni.

Willis J. Potts Jr., IE 1969, was elected by the University System of Georgia Board of Regents to serve a one-year term as the board's chair through June 30, 2011. Potts is the recipient of the 2010 Dean Griffin Community Service Award, a Gold & White honor, presented for positively impacting the quality of life of others while serving as a role model in the process. Also, he received the Technical Association of the Pulp and Paper Industry's 2010 Herman L. Joachim Distinguished Service Award during the 2010 PaperCon Conference in Atlanta. The award recognizes an individual for service that has significantly contributed to the advancement of TAPPI.

Wayne Robertson, IE 1969, was selected as a member of the LEED faculty by the U.S. Green Building council. Robertson is president of Energy Ace Inc., a sustainability consulting firm located in Decatur, Georgia.

G. Thomas Smith, IE 1962, a real estate attorney with Smith, Sauer & DeMaria in Pensacola, Florida, was invited to become a member of the Attorney Law Institute. He recently was elected president of Attorneys' Title Fund Insurance Inc.

Albert A. "Dirty Al" Ward, IE 1963, has changed his work status to part time after a successful forty-five year career in Control Systems Engineering. Ward is a registered professional engineer in control systems engineering and lives in Baton Rouge, Louisiana, where he works as a supervising principal control systems engineer.

1970s

Tom Akins, IE 1974, retired on March 31, 2010, after thirty-four years of working for his alma mater, Georgia Tech. Akins, who participated in the co-op program while a student at Tech, headed the program for the past twenty years as executive director of

the Division of Professional Practice. With Akins at its helm, the division expanded its services to include undergraduate internships and study abroad opportunities for students. Starting in July, Akins will be working on a part-time basis to oversee planning for the co-op program's centennial in the 2012 academic year. Former co-op students with ideas for the celebration or interest in volunteering may e-mail Akins at tom.akins@dopp.gatech.edu.

Gregory G. Dess, IE 1971, received an honorary doctorate from the University of Bern in Switzerland in December. He is the Andrew R. Cecil endowed chair in applied ethics at the University of Texas in Dallas. He and his wife, Margie, and daughter, Taylor, live in Frisco, Texas.

Michael T. Duke (IE 1971), president and CEO of Wal-Mart Stores, was elected to the National Academy of Engineers in 2010 for his leadership and contributions to the design and implementation of innovative logistics and retail technologies.

Guy Gober, ISyE 1975, completed a bicycle ride from Savannah to San Diego to raise money for medical scholarships and prostate cancer research. Gober's son Redding joined him on the 2,500-mile trip. Gober has a urology practice in a renovated 120-year-old farmhouse in Tiger, Georgia, and is an Army Colonel, deployed to Iraq twice to serve in combat support hospitals.

H. Scott Kroell Jr., IE 1972, of Midway, Georgia, has been appointed to the state board of nursing home administrators by Gov. Sonny Perdue. Kroell is the CEO of Liberty Regional Medical Center in Hinesville. He is a fellow at the American College of Healthcare Executives, a member of the Liberty County Board of Health, and a board member for The Heritage Bank.

Mickey Smith, BS 1976, CEO of Oak Hill Hospital, has been elected to the Board of the Medical Group Management Association.

King C. "Tim" Timmons, IE 1974, has been awarded a medal of honor by the Spartanburg County Sheriff's Office for his participation in the capture of a murder suspect.

ALUMNI NEWS

1980s

E. Steve DeWeese, IE 1984, of Vienna, Virginia, led a team that wrote “Capability of the People’s Republic of China to Conduct Cyber Warfare and Computer Network Exploitation.” The report has been featured in the *Wall Street Journal*, *New York Times*, and *Washington Post*. It was written for the U.S.-China Economic and Security Review Commission and is available at www.uscc.gov. As program director at the Prospective Group in Washington, D.C., DeWeese advises State Department executives of the Bureau of Information Resource Management. His son, Jack, attends Worcester Polytechnic Institute, and his daughter, Kate, attends Thomas Jefferson High School for Science and Technology.

Antonio Dieck-Assad, PhD IE 1984, was recently named president of the University of Monterrey in Mexico.

Dave Frye, MS OR 1989, PhD 1999, recently transferred to Lockheed Martin Aeronautics in Fort Worth, Texas, where he is working on strategic modeling and analysis for the Global Sustainment of the Joint Strike Fighter.

Charles L. Harris, IE 1981, was inducted into the Georgia Tech College of Engineering Academy of Distinguished Engineering Alumni.

Ramona Marsalis Hill, ISyE 1983, was appointed the associate provost of graduate and continuing studies at Spring Hill College in Mobile, Alabama. She is responsible for creating and managing innovative degree and certificate programs responsive to the regional workforce needs for adults returning to school to secure undergraduate and graduate degrees.

Joseph C. Mello, IE 1980, received the Hill Society Award in recognition of his leadership in the healthcare industry and generous contribution to Georgia Tech and ISyE.

Thomas J. O’Brien, IE 1981, was inducted into the Georgia Tech College of Engineering Academy of Distinguished Engineering Alumni.

J. Kevin Pope, IE 1987, has been promoted to the rank of Colonel in the Army. He is attending the Army Senior Service College Fellowship Program at the University of Texas at Austin. Pope and his wife, Angelita, have a daughter, Allison, 8, and a son, Kevin, 13.

Galen Kilpatrick Smith, IE 1982, has achieved both internal and external certification from the Project Management Institute as a project management professional and IBM certified executive project manager. For 2009, her project was awarded the IBM Project of the Year.

Randy Thayer, MS IE 1980, retired from GM after thirty-six years in October 2009. He has since formed Thayer Manufacturing Consulting LLC.

Alex Wan, IE 1988, won the Atlanta City Council District 6 seat in the December 1, 2009, run-off election. Wan is the director of development for the Jerusalem House, the city’s oldest and largest provider of permanent, supportive housing for homeless or low-income individuals and families living with HIV/AIDS.

1990s

Kristin Whittington Allin, IE 1997, and her husband, Billy, are co-owners of the restaurant Cakes & Ale in Decatur, Georgia, which *Bon Appetit* named one of the ten best new restaurants in America.

Bird Blich, IE 1997, is the recipient of the 2010 Outstanding Young Alumnus/ Alumna Award, a Gold & White honor, given to a high achiever under the age of forty who has contributed to Georgia Tech, the community, and the business world.

Laticia (Taylor) Khalif, IE 1988, MS IE 1991, has relocated from the metro Atlanta area to Columbus, Ohio, where she is serving as the plant quality assurance manager for Abbott Nutrition.

Colleen Varley McCann, IE 1999, of San Francisco, completed an MBA in May at the University of California-Berkeley, with a focus on marketing and strategy. She works in inventory strategy for Gap, Inc.

Meredith Moore, ISyE 1998, was named to the *Atlanta Business Chronicle*’s “40 Under 40 Rising Stars” list in 2009. Moore was also nationally named one of “Four Under 40” by the National Association of Insurance and Financial Advisors for 2010.

Sundaram Narayanan, MS IE 1991, PhD IE 1994, has been named dean of Wright State University’s College of Engineering and Computer Science.

Brian K. Payne, IE 1996, has been promoted to partner with Accenture, a global management consulting, technology services, and outsourcing company.

Heather S. Rocker, ISyE 1998, was the recipient of the 2009 Leadership Character Award in the inspirator category. She was among the top six Georgia business, community, and education leaders recognized at the seventh annual Turknett Leadership Character Awards luncheon in February 2010. Rocker is the executive director of Women in Technology, a trustee of the Georgia Tech Alumni Association, board chair of the Atlanta Women’s Alliance, committee chair and training director at Junior League University, and state chair of the Georgia Junior Miss Scholarship Program.

2000s

Shane Bailey, IE 2002, of Acworth, Georgia, was promoted to operations support process improvement leader for Shaw Industries.

Joel Blake, IE 2008, and **Abhi Sharm**, IE 2010, launched a new website called “Two Pickles” and won the elevator pitch at the 2010 Georgia Tech Business Plan Awards. The website is an online notice board where participants can trade items they no longer need with other users.

Joey Depa, IE 2005, and brother Michael Depa, MGT 2009, started an organic fertilizer service, Boost of Nature LLC.

Porsche Hodge Page, IE 2003, of Sterling Heights, Michigan, is a senior systems engineer for General Dynamic Land Systems. In 2008, she was honored as a Modern Day Technology Leader at the Black Engineer of the Year Awards conference.

DESIGNING THE FUTURE

A STRATEGIC VISION AND PLAN

Georgia Tech President G.P. “Bud” Peterson launched Tech’s twenty-five-year strategic plan on August 31, 2010. The plan, “Designing the Future,” is the culmination of a yearlong process that brought together hundreds of members of the Tech community.

“Today, there is some amazing work being done at Georgia Tech,” said Peterson. “Teams are already working on solutions for making solar energy economical, improving environmental and economic sustainability, providing access to clean water, improving the urban infrastructure, advancing health informatics, curing diseases, and securing cyberspace. In many ways, we’re already designing the future.”

Peterson said that the shared vision outlined in the plan would help Tech improve on what already exists. He outlined five main goals, listed on the following page, and introduced ten Institute-wide initiatives, which can be found in the full report at www.gatech.edu/vision.

“Now, it’s our time. It’s our vision, and it’s up to us to make it happen. Not just for Georgia Tech, but for our state, our nation and our world,” he said. “Working together, we can do anything. This is, after all, Georgia Tech.”

Goal 1:

Be Among the Most Highly Respected Technology-Focused Learning Institutions in the World

Strategies

- Enrich the student experience
- Innovate in instruction methods, course design, and curricula
- Develop the campus and its neighborhood as a vibrant live-work-learn-play environment

Goal 4:

Expand Our Global Footprint and Influence to Ensure That We Are Graduating Good Global Citizens

Strategies

- Expand the world's footprint at Georgia Tech
- Extend and leverage Georgia Tech's impact around the globe
- Embrace and support globally engaged students

Goal 2:

Sustain and Enhance Excellence in Scholarship and Research

Strategies

- Strive to be the best in teaching, research, and application
- Lead in targeted reputational areas
- Support faculty-led initiatives for transformative interdisciplinary research
- Demonstrate relevance and vitality by investing in faculty and infrastructure

Goal 5:

Relentlessly Pursue Institutional Effectiveness

Strategies

- Continuously improve all support functions and processes
- Implement a performance-based management system
- Develop an entrepreneurial financial model reflecting best practices of both private and public institutions

Goal 3:

Ensure That Innovation, Entrepreneurship, and Public Service Are Fundamental Characteristics of Our Graduates

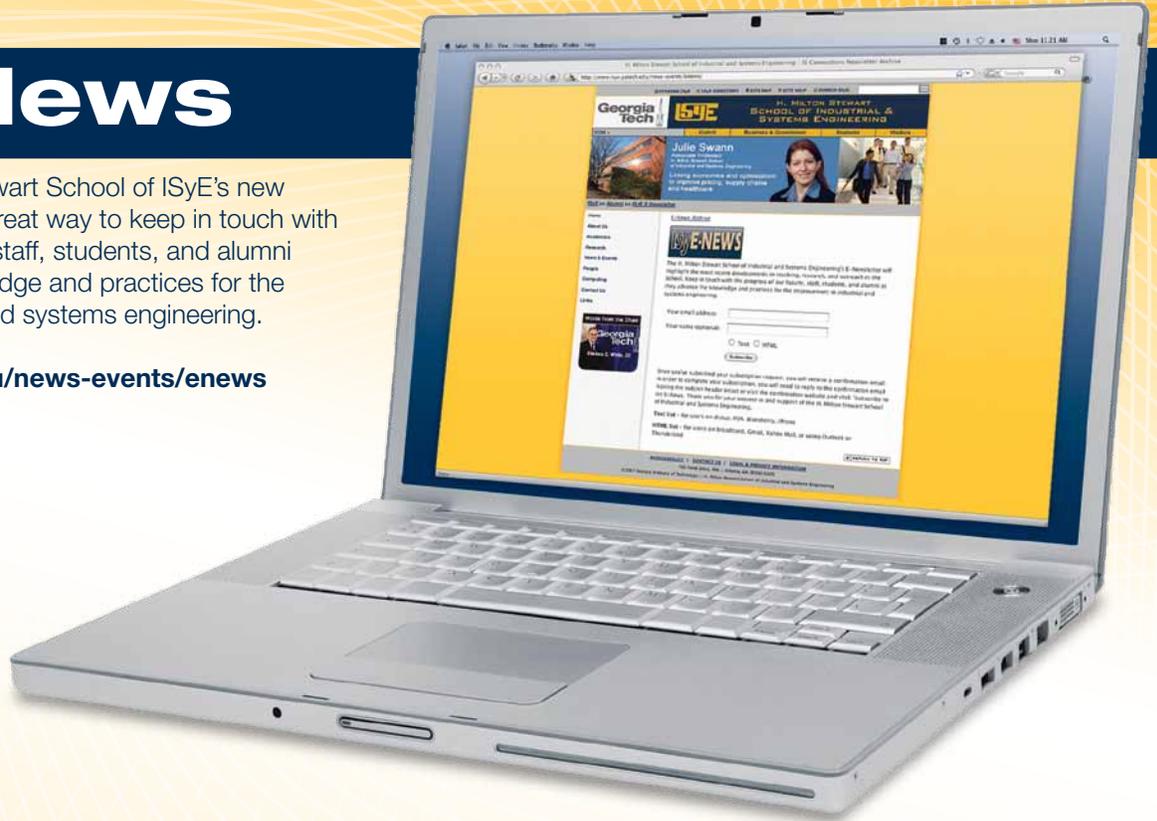
Strategies

- Establish world-class initiatives to serve Georgia Tech, the state, and other strategic national and international partners
- Innovate in how we incentivize and support commercialization
- Serve in state, national, and global leadership positions

ISyE-News

Receiving the H. Milton Stewart School of ISyE's new quarterly e-newsletter is a great way to keep in touch with the progress of our faculty, staff, students, and alumni as they advance the knowledge and practices for the improvement in industrial and systems engineering.

Visit www.isye.gatech.edu/news-events/enews to subscribe.



Stay in touch! Drop us a line.

The Alumni News section highlights promotions, awards, scholarships, fellowships, and publication of books. Let us hear from you! It's a good way to stay in touch with your classmates.

Who: _____

What: _____

Where: _____

When: _____

Submitted by _____

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or by mail to:

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Georgia Tech Celebrates 125 Years



From its beginnings in 1885, the Georgia Institute of Technology has established a tradition of excellence in technological research and education. The Institute stands among the top ranks of U.S. research universities with a clear vision for leadership in providing a cutting-edge, technological education for the twenty-first century.

Founded as the Georgia School of Technology, a narrowly focused trade school, Tech led the transformation of the agrarian South to an industrial economy. The school soon grew into a regionally recognized technological university and became the Georgia Institute of Technology in 1948. Female students were admitted in 1952, and, in 1961, Tech became the first Deep South university to admit African Americans without a court order.

There's no doubt that Georgia Tech stands out as a distinctively different kind of university, one that is eagerly encouraging and developing the revolutionary technologies of the twenty-first century. Equipped with the extremely rich resources of an outstanding student body and faculty; strong partnerships with business, industry, and government; and support from alumni and friends, Georgia Tech is poised to meet and exceed the challenges of the new millennium.





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