• The Longer You Live, the Greater Your Mystique
• Sports + Math Add up to New Equations
• Engineering Wins on the Football Field
REAL WORLD EDUCATION FOR WORLD-CLASS EXECUTIVES

TODAY'S COMPANIES NEED TO:
• Increase supply chain efficiencies
• Move to a global supply chain strategy
• Groom their rising stars
• Expand collaborative relationships

LEARN to improve supply chain efficiencies by grooming your executives in Georgia Tech's Executive Master's in International Logistics (EMIL) Program.

EXPERIENCE real-world results by learning best practices from the world's leading experts in EMIL's five 2-week residences at key locations around the globe.

BUILD a team that can deliver measurable results by linking finance with global supply chain management.

For more information, visit http://www.emil.gatech.edu or call 404.385.2538

Georgia Tech Business Network
WWW.GTBN.ORG
Sponsored by the School of Industrial and Systems Engineering

Knowledge
Connection
Community
ISyE Becomes the H. Milton Stewart School of Industrial and Systems Engineering

by Chelsea C. White III

Right before this issue of Engineering Enterprise went to press, ISyE received a $20 million commitment from Georgia Tech alumnus H. Milton Stewart, BIE 1961, and his wife, Carolyn Stewart, to name the school the H. Milton Stewart School of Industrial and Systems Engineering. We intend to devote a large part of the next Enterprise issue to the naming, but I did want to provide our readers with information about this wonderful and, needless to say, deeply appreciated commitment.

The commitment establishes a permanent endowment, the income from which will be available for unrestricted use within ISyE. The opportunities presented by a commitment of this magnitude are nothing short of amazing. I look forward to working with our faculty, staff, and administration in determining how these funds can best be used to build upon the School’s long tradition of innovation, research, and educational excellence, and academic leadership. The highly visible U.S. News & World Report college rankings have placed ISyE in the nation’s number one slot in industrial and manufacturing engineering for 16 of the past 17 years. The Stewarts’ commitment will be instrumental in helping the school maintain and increase its national prominence.

Stewart is retired chairman and CEO of Standard Group Inc., a company he established in 1987 with his sister. He has a long history of philanthropy at Georgia Tech, and he is as generous with his time as he is with his money. Stewart is a trustee emeritus of the Georgia Tech Foundation, emeritus member and former chairman of the ISyE Advisory Board, former member of the College of Engineering Advisory Board, and a former president, trustee, and Executive Committee member of the Georgia Tech Alumni Association.

Look forward to reading more about this wonderful commitment in the next issue of Engineering Enterprise.

* * * *

Meanwhile, welcome to the Sports Issue of Engineering Enterprise. While ISyE is known internationally for its research and education capabilities in areas such as optimization, operations research, industrial engineering, statistics, and economic decision analysis, few people are aware that numerous ISyE faculty and alumni apply these tools and techniques to sports. And of course, quite a few of our alums were athletes while students in ISyE. Most have been successful in both arenas.

We hope you enjoy reading this issue and the ISyE involvement with sports that it presents, both present and past. As always, we welcome your thoughts and memories on this topic.
EMIL Takes On the Council for Supply Chain Management Professionals’ (CSCMP) Annual Conference

By Dr. John Vande Vate

Georgia Tech’s Executive Master’s in International Logistics (EMIL) program continues to expand its global profile by hosting its first Global Supply Chain Track at the Council of Supply Chain Management Professionals (CSCMP) Annual Conference.

Founded in 1963, the Council of Supply Chain Management Professionals (CSCMP) is the preeminent association for individuals involved in supply chain management. CSCMP provides educational, career development, and networking opportunities to its more than 10,000 members and to the entire profession (www.cscmp.org). Each year, the organization sponsors a three-day annual conference that includes approximately 25 concurrent speaker tracks to address topics from across the supply chain.

The 2005 event, held in San Diego, California, in October, included the Global Supply Chain Tract, organized by Georgia Tech’s EMIL Program and chaired by EMIL Executive Director John Vande Vate, Ph.D. Similar in format to EMIL’s two-week residences, the track included lectures from faculty, corporate sponsors, and alumni, who provided insights into real-world, global supply chain customer solutions and results.

EMIL is a master’s degree program that helps the world’s leading companies develop creative, global logistics solutions by grooming their supply chain executives (www.emil.gatech.edu). Over the years, EMIL has collaborated with industry leaders and institutions to provide participants with access to the most relevant information/data on the rapidly changing field of Global Supply Chain. Hosting the CSCMP Global

<table>
<thead>
<tr>
<th>Topics addressed during the Global Supply Chain Track</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong></td>
</tr>
<tr>
<td>Customer-Oriented Sales and Production Process (KOVP):</td>
</tr>
<tr>
<td>Time to Customer</td>
</tr>
<tr>
<td>RFID Case Study – The Early Learning</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Global Trade: Are Manufacturer and Retailer Supply</td>
</tr>
<tr>
<td>Chains Up to the Challenge?</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Installing a Global Sourcing Strategy</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>The Impact of Off shoring on the Global Supply Chain</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Managing Working Capital in Global Supply Chains</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Latin American Logistics Excellence</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Freight Trends: Freight Flow Trends in North America</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Supply Chain track, a first for Georgia Tech’s rapidly expanding master’s degree program, was an opportunity for EMIL to showcase what it does best—providing access to the latest in Global Supply Chain methodology, processes, and information.

**RFID: THE REAL AND INTEGRATED STORY**

**Speaker:** James R. Kellso, P.E, Technology and Manufacturing Group, Intel Corporation, EMIL Advisory Board member

**Strategy & Approach:**

“There is considerable hype and misinformation regarding the use and benefits of RFID technology in supply chain operations. While many people talk about RFID, very few companies have successfully used it, and fewer have been able to define the actual benefits of using it.” Intel Technology Journal

Given this premise, Intel chose to test an RFID solution in a high-volume, real-world production environment. The test took place at Intel’s high volume manufacturing facility in Malaysia over a four-week period. Since RFID has the potential to impact an entire supply chain (outside the confines of Intel), the test included collaboration with a major PC Original Equipment Manufacturer (OEM) with notebook PC manufacturing facilities in Malaysia. Intel’s test goals included measuring and documenting key knowledge needed for a successful RFID implementation as well as to determine the “reality” of RFID’s potential supply chain impact.

Key pre-implementation tasks included: choosing the right frequency for its system, obtaining government permits and permissions to operate UHF readers, choosing the appropriate hardware and software, recognizing the importance of good data filtering, and developing standards and processes for data sharing.

**Lessons Learned**

1. RFID must be learned in the real world
   - Work with actual tags, readers, products, environment
   - Testing in lab or other environments isn’t enough
   - Understand the true value and limitations of RFID
   - Holistic approach required
2. New types of expertise are needed
   - Ethnography
   - Collaborative supply chain conversions
   - 3-D RF characterization
   - Integrated testing
3. Expect a long-term disruptive impact on enterprise systems and architecture
   - Large data sets
   - Highly distributed information architectures
4. Structural change opportunities
   - Improve business processes
5. Getting to scale
   - Standards are critical
   - Wide range of issues and choices to be resolved

**Over the years, EMIL has collaborated with industry leaders and institutions to provide participants with access to the most relevant information/data on the rapidly changing field of Global Supply Chain.**

**Return on Investment (ROI)**

As part of the study, Intel examined three areas for potential return on investment:

1) Substitution: replacing existing barcode with RFID technology;
2) Scale Effect: installing RFID technology across a wide range of products/processes to obtain greater tracking visibility and monitoring; and,
3) Structural Effect/Intelligent Supply Chain and Services: fundamentally streamlining business processes to take advantage of RFID’s more abundant and timely data.

Of all these options, utilizing RFID to develop an “intelligent” supply chain seems to be the most likely alternative for a significant return on investment. Through this study and others, it is clear that substitution provides minimal ROI and that scaling, viewed as a wide scale substitution, and may not provide adequate payback to offset the investment.
“The Longer You Live, the Greater Your Mystique”

John S. “Johnny” Hunsinger, BIE 1954 and MSIE 1955, was a member of Georgia Tech’s football powerhouse during the early 1950s, including the 1952 national championship team. He was selected to the first national Academic All-American team, received the top academic award in the IE School his sophomore and junior year, and graduated as the Most Outstanding Senior in his class. Today, he is president of John Hunsinger & Company, a full service industrial and commercial real estate company in Atlanta. He has been highly visible in Atlanta’s real estate community since 1960, holding numerous organizational offices and receiving many accolades. He has also remained heavily involved in numerous capacities at Georgia Tech. Hunsinger was inducted into the Georgia Tech Sports Hall of Fame in 1996.

EE: When did you start playing football?

JH: I don’t remember ever not playing. I played in the neighborhood, Howell Park in southwest Atlanta. We ended up in Peeples Street Elementary School and Brown High, where we won the state title in 1949. Pepper Rodgers (future Georgia Tech football coach) and I were in the band. Pepper played the clarinet and I was known as “Hot Lips.” I played trumpet in marching band and French horn, which today is called the horn. There were about six guys on that team that went to Georgia Tech on scholarship. Two of us were Dean’s List. There was Cecil Trainer, who was a defensive starter, and there was me. Pepper was not a great student, but a great friend.

EE: Was your father a football player?

JH: My dad was, he played at Georgia Tech. My great uncle was Pup Phillips. He was a center on the 1919 team, which was (former coach) John Heisman’s last team. He got into business and coaching in Atlanta, and then ended up being athletic director of the University School for Boys, which was a private school at that time. Pup became athletic director of University School, and then he brought my dad down from the Greenville-Spartanburg, South Carolina-area to play ball with him. They won a state title, my dad got a scholarship to Georgia Tech, but he had two problems. One was academics, and the other was women. In those days if you were married you couldn’t play football. So his last season was 1929.

EE: Did you know what you were going to do to Tech?

JH: I wanted to go away. Yale, for example, was interested, and Duke. When you win a state title, you attract a lot of attention. Coach Bobby Dodd was a remarkable recruiter. If you were here in Atlanta you know about Dodd. You’re honored and thrilled when he invites you. He had us come in, showed us the campus, and then we had a little audience with him in his office. He relaxed and said: “I’m looking forward to having you here, but I’m not going to push you, because I know you’ve got a lot of things on your mind. If you’ve got any questions just give me a call. We’d love to have you.” I said, “Why aren’t you twisting my arm?” The other coaches did, but Dodd was very casual about it.
I don’t remember ever not playing. I played in the neighborhood, Howell Park in southwest Atlanta. We ended up in Peeples Street Elementary School and Brown High, where we won the state title in 1949.

EE: What made you decide on Georgia Tech?

JH: There were a number of factors, including Pup. I wanted to go into physics, and I had a good grade point average, and all the family was here, and of course, Dodd was a good recruiter. I was sort of co-chairing, with Pepper, our little group of six, and the first thing everyone wanted to know was, “How much money are we going to make when we graduate? What is the starting salary out there?” I checked Tech, Georgia, and a lot of schools. Tech was up there. (He points up). Georgia was down there. (He points down) There were exceptions, as usual. That was in the days when we didn’t have a big signing bonus. This was 1949 and 1950.

EE: You got signing bonuses in college? Do they have them now?

JH: No, but you look forward to the pros. You’ve got to understand, when I graduated from Tech, Philadelphia got me, and they offered me either $5,000 or $15,000 to sign. Well, I had the greatest degree from Georgia Tech, an industrial engineering degree, plus a master’s degree. They were offering big money for that. I would have taken a cut in pay to play pro football. If you think I was going to go out here and play with these goons for less money than I would in a protective way at school, you’re crazy.

EE: Protected you on the field, or in general?

JH: In general, and on the field. He would come up to a guy and go, “If you do that, I’ll kill you.” Officials couldn’t hear it, but he patrolled it. He ended up in the Marines and was quite popular (as Colonel “Chargin’” Charlie Beckwith). I asked him about Georgia. He said, Hunsinger, “Don’t come over here. It’s hell.” He told me a lot of details. They did a lot of scrimmaging on Monday. Everybody scrimmaged. If they lost the game on Saturday, then they would scrimmage Sunday. It was a brutal type of situation. Coach Dodd, his rule was—and this was the only team that I knew of in the South—if you played in the game on Saturday, you didn’t scrimmage Monday. I asked him about it when I was traveling with him. He said, “Hunsinger, you don’t understand. I lose more players in scrimmage than I do in the ballgame. I can’t afford to lose those guys. If they play in the game Saturday, I can check the movies.”

EE: You played four years?

JH: I had a freshman year, and we were undefeated. Then in 1951, I was held out. I played in the National Championship team in 1952, and 1953 and 1954. My last game was the Cotton Bowl. When we won the Cotton Bowl we were, I think, the first team to win all the major bowl games: Rose, Sugar, Orange, and Cotton. We won the Rose Bowl, and the game was considered the top bowl game ever played. Tech vs. California. There was a guy on that team, the captain, who picked up a fumble,
got turned around, and ran 60 yards in the wrong direction. They stopped him at about the two-yard line. He was their star. Somewhere, the Tech players picked up on it and started blocking the California players to keep them from tackling him. He finally got stopped. The score at that time was 6-0. They tried to kick and we blocked it; we got a safety, so 8-0. In the fourth quarter, California rallies, and they almost whipped us. They came back and scored, and it was 8-7.

EE: Is that your most memorable game?

JH: I still remember a Sugar Bowl when we beat Mississippi. They were undefeated. We had beaten Alabama. There is a picture on the wall there (points to picture in his vast office collection of Tech memorabilia), probably Tech’s most famous picture, us against Alabama. We beat them 7-3, and they were undefeated. So we beat Alabama, and then Mississippi. That’s how we got our national title.

EE: How was that decided then?

JH: It was pretty much the coaches. The Associated Press and United Press International had their own situation. It was not a unanimous thing; we were co-champs with some other people, just like in 1990 with Coach Bobby Ross.

EE: A lot of you guys still know each other, right?

JH: Tech is very unusual in that respect, in that we’re very close. We get together, two or three times a year, and then we get together at Touchdown Club and things like that. George Morris has always been a great leader in that area. He’d say, “Johnny, we’re getting together tonight and we expect you over there. If you don’t show up I’m going to break your arm.” Subtle talk like that.

EE: Any of the people from the 1952 team go pro?

JH: Yes, George was one. He got injured. I want to say 10 or 12 of them. None of them really stayed there or became great leaders. Lynn Hardeman was the most unusual finest back I’ve ever seen. You couldn’t knock him down from any angle. He wasn’t really big, but he was still standing. He had this marvelous balance. I would go down not because I wanted to, but because of balance.

EE: What position did you play?

JH: I played defensive end at first. The next year they switched the rules where you played both ways. That saved me. I was not great at any one position, but I could do it all. If Dodd wanted to have somebody in there that could play good defense, I was the best defensive back. If he needed somebody on offense, I was number two guy. You couldn’t substitute freely. If you started the quarter, they could pull you out and you could get back in the quarter. If they pulled you out again, you were through for the quarter. If you didn’t start the quarter, and they put you in and pulled you out, you were through. It became sort of a mechanical thing, you had to check your card.

EE: When did they stop playing both ways?

JH: It was in the late 1950s. It was wonderful for the players; not as exciting for the fans. In the college game today, you can put a guy in and out for one play. You can put him in for the
kicking game, then pull him out and get him back in. We had a coach who did nothing but keep up with who's been in and out. I liked the system, because my last game in 1954 was in Athens. Larry Morris and I were always very close. He was center linebacker, and I was fullback linebacker. We didn't have the ball much, so he and I played the whole game. I can still remember deep in the fourth quarter looking at the score; it's 7-3. We're ahead, and the Bulldogs (fans) are leaving, and we're yelling to them. That was wonderful. It was rainy, it was muddy, and we were ahead.

EE: Who else in IE played football?

JH: We had a big group in my class. IE was such an appealing degree. I changed my mind; I really didn't want to be in physics, I wanted to be an engineer. (IE School Chair Frank) Groseclose said, "Johnny, come on in. Do we have a deal for you." He was a great salesman. We were taught how to solve problems, how to make things go. It was a very pragmatic approach, which I really liked. With physics, I would have had to take a doctorate. I had good reception having a master's.

EE: In your career have you used the IE skills more, or the football skills?

JH: The football skills—they get me into a lot of areas. The longer you live, the greater your mystique. I'm much better now than I was five or ten years ago. Because we're left with fewer and fewer players, you become more and more [legendary]. I was one of the first Academic All-Americans. And you know what the players said about it? Na na na na na! We had a bunch of sarcastic players, and they were very sharp. They were very gifted. Dodd recruited...you were top someplace to get into Tech. And the tutorial help was great.

EE: You could stay at Tech on scholarship no matter how many years it took to graduate, right?

JH: I don't remember anyone falling out after five years. They all graduated pretty much, compared to nowadays. I graduated with one of the top point averages. I can't think of a better curriculum for me, because it teaches you to watch the balance and take care of your business. The IE curriculum was very practical, and the teachers all had practical experience.

EE: Which teachers do you remember most?

JH: Dr. Paul Eaton.

EE: What are your memories of him?

JH: He was hard to understand. I made a rule. I would sit in the front row. If I couldn't get in the front row, the second row; and the jocks really got on my back. But cheating is a two-way street. You can't cheat by yourself. So if you're in the first row, you don't have to worry about that. Dr. Eaton was hard to understand and I sat in the front. We became fast friends. I asked him a lot of questions.

EE: What class did you take from him?

JH: Oh gosh, you're really pushing it. I have no idea. Most of the courses in IE were very practical. We were hearing about the big money in corporations. One of the problems was that you educated yourself out of Atlanta if you went to a manufacturing plant. There were a lot of plants and textile mills. You worked around the clock, shift work.

EE: What was your first job when you graduated?

JH: I was in the service. Guided missiles and artillery. I thoroughly enjoyed it and for the first time in my life I got money. The NCAA allowed you to get $25 a month. Shortly after I graduated they did away with that one. But when I got in the service as a lieutenant, I got good money. I volunteered for the Far East and Europe, and as far away from Atlanta as I could get. But they stuck me in Washington/ Baltimore.

EE: So besides Paul Eaton, who else do you remember?

JH: Bob Lehrer. He was very methodical and very nice to students. He would hear the anguish in my voice and work with me after class. He was just a great person. Bob was as good as you could find anywhere.

EE: Did you have any classes with Groseclose?

JH: No, but I was in a lot of meetings. I was in student government and other things; I was the IE representative. I'd come in his office and he'd say, "Have a chair." We'd sit down there and talk. The other departments? We lucked out.

EE: You mentioned the service after graduation. What came next?

JH: I did the service thing for two years. I had a lot of job offers, it was 1956 or 1957. I joined Chemstrand Company of Pensacola, Florida, as an industrial engineer. They made nylon.

EE: How long did you stay there?

JH: I was there three and a half years as plant engineer. I had three patents down there. The first time I got a patent, I thought it was just wonderful. They had a special dinner and gave me a plaque and $10 and I spent half a day signing documents that said that "I, John Hunsinger, had no value in
the patent” and released all constraints. Which didn’t really bother me. The second patent I got, the same thing happened. When the third one occurred, I heard this voice back here, “Hunsinger, you’re not going to get rich doing this.”

About that time I get a phone call Neil Pope. Neil and I grew up in the same neighborhood of southwest Atlanta, and at the time, his parents and my parents were living across the street from each other. Neil had started a real estate company. He worked for Adams-Cates here, which was the really great real estate company. He decided he wanted a company that did nothing but industrial and commercial. He was a member of ANAK and ODK. His theory was if you played football, and you were a member of ANAK and ODK, you would be a success in the real estate business. He wanted to talk with me about going in the real estate business. Well, I’ve got a master’s degree, I’m making good money.

EE: When was this?
JH: It would be middle to early 1960s. I came up here and visited with Neil, and boy, he would have led us into any sort of battle. He was so enthusiastic and so full of it, he ratcheted you. And he was offering the job with no money, just commissions. And a lot of other things which my in-laws didn’t like.

EE: What had happened with your patent at that point?
JH: My third one? That’s when I decided I might want to get into the real estate business. I figured that I didn’t want to work 25-30 years for them and retire.

EE: It’s hard to get rich $10 at a time.
JH: It really is. It was a wonderful company, and I had free hospitalization and all kinds of stuff. I remember when I told my mother about it. She started cussing and then she started crying. She had gotten me where I had a degree and a good job, and I was throwing all this away to sell houses.

EE: How long did it take for your commissions to exceed your Chemstrand salary?
JH: Mid-way through the first year, it was obvious to me that I’d made the right decision. I had great partners out of Trammel Crow in Dallas, Texas. Neil was a wonderful person to me.

EE: So you did that for what, three years or so, and then started your own company?
JH: I started my own company. You couldn’t do that if you made nylon.

I think with what I knew then and what I know now, we probably have the finest pragmatic degree there is. If you want to make money and do your thing...you find the answer and you keep going.

EE: It’s amazing the number of IEs that have their own companies.
JH: Oh yeah, I think with what I knew then and what I know now, we probably have the finest pragmatic degree there is. If you want to make money and do your thing...you find the answer and you keep going.

EE: Can you give me some examples of how the real estate business has changed since 1965?
JH: It’s easier to start your own business now than it was then. You don’t need as many salesmen. Another thing you learn in IE is that the way you are doing it today may not be the way you are doing it tomorrow. You just have to see, are there other machines you can put in, are there other people you can use? If you don’t evaluate yourself constantly, then you’ll end up gone. The rules have changed where you are not restricted in doing your own development. Like this building here, we didn’t build it, we bought it. Back when I started you didn’t do that.

EE: Because you couldn’t, or you just didn’t?
JH: It was very negative. A real estate company was one that did brokerage, period. People frowned on you owning anything besides your house. You were allowed to have your house and a vacation home.

EE: So these are just social rules? They weren’t government rules?
JH: You’re right; the government could not do that. Companies like Adams-Cates had no ownership, but they had an insurance company where they got commissions and various types of other companies. They were not allowed to own property because that conflicted with their customers. But today we represent a lot of people, and I do some developing and buying and selling of properties. I sell it on the idea that it gives me an insight to their problems, where I can help them more. Because very rarely do you compete with your owners.
EE: Are there different issues in the real estate industry in Atlanta now?

JH: For example, Trammel Crow now has a brokerage company. So the developers have their own brokerage company, and a lot of them have their own loan companies. In fact, one of the things I learned in IE is never pay your loans late. I decided if it’s good never to pay them late, what if I paid mine on the 25th of each month? My lenders love me. They call me up and say, “You haven’t borrowed any money from us in a while.” Real estate today is wide open. The developers, brokers, and lenders do their thing, and no one really gets mad at each other.

EE: I notice your signs up in the mountains. How far flung are you?

JH: I will put a sign most anyplace. Speaking of signs, one of the early problems I had was that nobody could read my sign. I did it in gold and white. It was hard to read. Finally, it became obvious to me that the ones you could see easiest were red, white, and black. My nemesis’ colors. I thought, “Well, this is money. I’m not going to worry about it.” So now I do all my signs in red, white, and black.

EE: What do you think of college football know, compared to 1952?

JH: I like it today, but I would rather play the way we did than play today. It’s a specialty thing. You’ve got your left-footed kicker, you’ve somebody who can only throw long distances, or it is specialized to a point. I can remember the games where I played 60 minutes.

EE: Do you enjoy the game as much now as you did then?

JH: Oh yeah, the enjoyment of it is you see more players today. You know, Tech was one of the leaders in football back in my days. Everybody knows Heisman and the trophy, but very few people know that John Heisman was Tech’s first coach. I argue with the Athletic Association that they need to push that. Gee, we’ve had four or five coaches, and we’ve had a lot more presidents than we have had football coaches. Which is remarkable. But to start out with Heisman? You ought to wear that flag. And we won a national title. I heard a lot of Heisman stories from Pup when he was coaching. You know why Heisman left? It was a woman.

EE: Was he running to the woman or away from her?

JH: There were three people in the race. And then he moved out to one of the Pennsylvania schools (editor’s note: University of Pennsylvania), and he was always well thought of here. That was the age when coaches were not funny, and it was very serious work. I feel good about (current Coach) Chan (Gailey). I think the media is critical of him, but then again, they don’t have to prove what they say.

EE: Are you a basketball fan?

JH: I’m a Hewitt man. (Coach) Paul Hewitt is doing a remarkable job, and gets us a lot of good publicity. You know basketball players, I feel, are generally smarter than football players. I would like to do a study of athletics in the IE department. I think the IE curriculum just opens the door. It makes you feel like you can do things.
George Nemhauser, mathematician and sports fan, is one serious academic who has turned his love of the game into a business. With partners Michael Trick and Doug Bureman, Nemhauser and The Sports Scheduling Group (SSG) assist professional sports leagues and intercollegiate athletic conferences to “maximize the value of their playing schedules.” In 2005, the trio (with ISyE graduate and staffer Kelly Easton) produced its first schedule for Major League Baseball. SSG won the contract away from a husband and wife team who had been making the Major League Baseball schedule for 24 years.

Although the company is officially listed out of Pittsburgh, its Georgia Tech connections are prominent. Nemhauser is the A. Russell Chandler Chair in ISyE, a position he has held since 1985. He is a pioneer in the discipline of Operations Research and is considered an international expert in both the theory and application of Operations Research techniques. Prior to his appointment at Georgia Tech, he spent 15 years as professor of Operations Research and Industrial Engineering at Cornell University, seven of those as department chair. He also held a visiting faculty position at the University of Louvain, Belgium, where he was research director of the Center for Operations Research and Econometrics. He earned his Ph.D. from Northwestern University in 1961 and began his academic career on the faculty of Johns Hopkins University that same year.

Nemhauser is one of the world’s foremost experts on discrete optimization (a critical subject in relation to scheduling), and has published more than 100 papers and three books in the field. His book with Laurence Wolsey, *Integer Programming and Combinatorial Optimization*, received the Lanchester Prize as the best publication in operations research in 1988. He was elected to the National Academy of Engineering in 1986.

His professional experience includes work with many companies on scheduling applications, including nearly all of the major U.S. airlines (American, Delta, Northwest, United, and US Airways), Lucent Technologies, Schneider Logistics, and General Motors.

Nemhauser and Michael Trick’s experience at Georgia Tech overlapped by just two years, with Trick completing his Ph.D. in ISyE in 1987. He joined the faculty of the Tepper School at Carnegie Mellon University in 1989, where he is the Bosch
into Successful Business

Professor and president of the Carnegie Bosch Institute for Applied Studies in International Management, a research institute specializing in research support, conferences, and executive education on international management issues. He, too, has consulted extensively on supply chain design. His interest in sports scheduling predates that of Nemhauser.

Trick was leading an executive MBA class when he met Doug Bureman, now the coordinating partner of SSG and the only one who has no Georgia Tech connection. At the time, Bureman was senior vice president of Business Operations for the Pittsburgh Pirates, responsible for the team’s broadcasting, finance, public relations, marketing, stadium operations, ticketing, and spring training operations. He was also a member of the National League Schedule Committee. He recognized that Trick’s experience could be useful to that Committee.

SSC’s remaining, and only full-time employee is Kelly Easton, chief scheduler, who completed her Ph.D. in IsyE in 2005. As Nemhauser’s graduate student, she wrote her thesis on the topic of integer and constraint programming approaches to sports scheduling. Now living in Kansas, where her husband, Todd Easton, another IsyE doctoral graduate, is an assistant professor at Kansas State University, Easton can work at home while raising their two children.

Laying the Groundwork
George Nemhauser, growing up three blocks from Yankee Stadium, never dreamed that his lifelong love of sports would turn into a business. He did, however, request men’s basketball season tickets as part of his initial contract with Georgia Tech.

His 1972 book Integer Programming is dedicated “To the Knicks.”

Every member of the National Collegiate Athletics Association (NCAA) has a Faculty Athletics Representative (FAR), who serves as liaison between athletic conference activities and the President’s Office. This person’s role is to protect student-athletes’ academic interests. Nemhauser served as Georgia Tech’s FAR through December 2005. He participated in the NCAA’s rule-making cabinet, and his involvement included Atlantic Coast Conference (ACC) activities. One of his responsibilities was chair of the expansion committee when the ACC grew its member teams from nine to 12.

It was at an ACC meeting where he learned that the conference was struggling to work out its basketball schedule for the following year. “The television contract was ramping up, and they were under more pressure to get the right games at the right time,” says Nemhauser. “In scheduling of the college events, there is a trade off between what people call ‘fairness.’ What does fairness mean? There are obviously some required things, such as each team plays the same number of home games and the same number of away games. You don’t want to have too many road games in a row, or have your toughest opponents all bunched together. The coaches are very interested in a fair, balanced schedule.”

But that’s not all. “Once you start popping in those television requirements, it gets harder and harder,” he continues. The ACC, and other conferences, put these schedules together by hand for years, and the growing complexity was challenging their tactics.

Nemhauser thought he could help. “IsyE was doing research with the airlines, producing the basic algorithms that go into things like crew scheduling,” he says. “We had completed several large projects, so I offered to try my hand with basketball scheduling.”

That’s when Nemhauser turned to Michael Trick, now at Carnegie Mellon. He knew that Trick was pursuing sports scheduling through the contacts he had made with Doug Bureman. Bureman was introducing Trick to the baseball community when Nemhauser called. The partners produced their first schedule for the ACC’s 1997 basketball season.

“We did the ACC schedule, and it just changed everything for the ACC in terms of what they could deliver to television and still keep the coaches happy,” Nemhauser says.

Becoming a Team
The ACC spread the word, and the partners started getting phone calls from conferences across the country. After they became a backup scheduler for Major League Baseball, Nemhauser and Trick decided they needed to properly research their efforts. That’s when Nemhauser turned to his doctoral student, Kelly Easton. “I asked Kelly if she’d be interesting in doing her thesis in this area, and she said she’d love to. The title of her thesis is ‘Sports Scheduling,’ and it added significantly to our body of knowledge—this is tricky stuff.”

Sports Scheduling Group became an official partnership in 2002. It was a natural extension—Trick and Nemhauser had the academic credentials, and Bureman had the sports contacts and marketing experience to run the daily operation.

Producing the schedule isn’t a matter of running the numbers and collecting a check. It’s nearly impossible to meet every constraint all the time. SSC asks clients to prioritize into “hard constraints,” which are musts; and “soft constraints,” which are not deal breakers. Once a sample schedule is produced, clients often discover things they’ve left out. So the process starts again. The more teams, the more scheduling possibilities.

For example, the ACC schedule goes through at least 50 iterations during a two to three month period. “We now predominantly use constraint programming almost exclusively, which requires much more customization and programming than integer programming,” says Nemhauser. “It is frequently much faster because some of the constraints are difficult to model as linear inequalities.”
SSC has a few competitors, but Nemhauser isn’t worried too much. “I think that we have the best technology for doing this kind of work,” he says. “Technically, there is nobody as good as us,” he says. Look for SSG to grow in the near future.

**Going Major League**

The addition of the Major League Baseball schedule has had a significant impact. For nearly a quarter of a century, the husband and wife team of Henry and Holly Stephenson had annually won Major League Baseball’s contract for scheduling. The job was originally done in-house, when it belonged to Harry Simmons, a Commissioner’s Office employee, who eventually left to devote himself full-time to producing the schedule. When he left in 1981, the Stephenson era began. The couple used computers, but there was still a strong dose of the human element.

“They were not really computer savvy,” says Nemhauser. “They had a big board with all the mappings. Meanwhile, information technology was becoming more and more complicated, and we were brought in as a backup service.” Each baseball team plays 162 games, half at home, and half away. Over the years the scheduling process has had to deal with new divisions, interleague play, extended playoffs, and more and more demands from cities with scheduling conflicts.

Nemhauser says that there are more than 50 constraints the Major League Baseball schedule needs to accommodate (see box). That’s a lot of number crunching. Developing a viable schedule involves six high-performance computers running virtually nonstop for five months.

**Clients and more**

In addition to Major League Baseball and the ACC (football, men and women’s baseball, baseball), SSG clients include: Mountain West Conference (women’s volleyball), Southland Conference (men’s basketball and football), Colonial Athletic Conference (men’s and women’s basketball), and Mid-American Conference (men’s basketball).

To learn more about SSG and sports scheduling, visit www.sports-scheduling.com. The site contains a link to Michael Trick’s Guide to Sports Scheduling (mat.gsia.cmu.edu/sports/), a resource that includes, among other things, software programs with templates for scheduling your own league.

---

**General Guidelines for the Major League Baseball Schedule**

Here are just some of the requirements Major League Baseball states for the 2007 season:

- Each club plays 162 games
- Each club plays 52 series (two series per week with one three-series week)
- Each team has 13 home weekends series
- Games within each month should be reasonably balanced between teams
- Summer dates need to be reasonably balanced between teams
- Single series and four series home stands and road trips should be minimized; two and three series home stands and road trips are preferred
- No more than four series home stands or road trips should be scheduled
- No doubleheaders in original schedule
- Multiple schedule versions need to be created for comparison/what-if analysis
- Considerations must be made to the miles traveled by one team during a season. No team should travel in excess of 50,000 miles over the course of the season
- Travel (i.e., road trips) taken by each club need to be reasonable
- Minimize semi-repeaters
- Three game series are optimal (minimize number of two or four game series)
- The All Star Game and break need to be scheduled
- The All Star Game is usually scheduled for the second Tuesday in July
- No games should be scheduled from the Monday prior to and Thursday following an All Star Game
Dr. Joel Sokol:

Each March, the traffic on Joel Sokol’s website skyrockets. It is March Madness season and college basketball fans know Sokol will post his NCAA team rankings. They know his predictions have a good chance of taking them to the winner’s bracket.

Professor Sokol isn’t the only person out there making predictions—sports writers and amateur “experts” abound. But it is a good bet that few others are using logistic regression and Markov chains to reach their picks.

Sokol, an assistant professor in ISyE, received his doctorate in operations research from the Massachusetts Institute of Technology in 1999. He was first in his class when...
he graduated from Rutgers University, earning simultaneous bachelor’s degrees in applied science in engineering, mathematics, and computer science. His research interests include networks, linear programming, inverse optimization, and combinatorial optimization, as well as the application of operations research techniques to logistics, transportation, and network design problems. He is also interested in applications in biology, social logistics, and, the purpose of this article, sports modeling.

Sokol developed a love of baseball while growing up in New Jersey. His fondness for math led him to perform mathematical analyses of the game in high school. “When I was a kid I played a probability-based baseball simulation game,” he says. “When I started playing, my friends had years of experience. I needed to find my own method, which became mathematical analysis of the probabilities.”

He had started even earlier, in junior high. “We had a Commodore 64, and it had a baseball simulation game. It was written in BASIC. I was part of that generation where there was a computer in the house, but you had to program it or you couldn’t really do anything useful with it. So I learned how to program it and ended up redoing parts of the simulation to make it more accurate.”

Sokol’s interest in math and computers expanded into a career, but he continued his love of sports and looked for ways to bring the two together. Which brings us back to his webpage and his research on NCAA men’s basketball rankings. The initial research question was simple, and the data was readily available on the web. “Can we predict who is going to win games in the NCAA tournament?” he asks. “It turns out that we can. Over the past six years, the model that we’ve come up with has outperformed all the other standard ways to predict who is going to win.”

What began as a whimsical sports fan’s question proved popular with the multitudes playing office pools every March. FBI estimates place the betting industry surrounding March Madness at $3 billion. Everyone has their own system of picking the winners, but there is always room for more. Sokol is happy to share his model.

“You can say, ‘we’re going to pretend that the better team is always going to win,’ so if you’ve got the #3 ranked team against your #48, #3 goes in the bracket. Or you can use a dynamic program which takes into account probabilities of one team beating another. And sometimes you’ll get a weird situation where it is not always the best thing to choose the best team to win a certain game.”

Since his method is strictly numbers, it does not take outside or subjective factors into consideration. Some things may throw off his predictions: an injured player, a large number of seniors, or a deep-seated rivalry. Still, in the last six years, “It turns out to predict things better than the Vegas odds that do take those things into account.”

Sokol claims to have finished no worse than second since introducing his model. So many of his students e-mailed him for tips that he ended up putting his rankings on his personal website (www2.isye.gatech.edu/people/faculty/Joel_Sokol/). His fame soon spread beyond campus, thanks to curious members of the media.

His moment in the sun came in 2004, when Georgia Tech’s men’s basketball team unexpectedly made it to the Final Four. Sokol had predicted it. As the tournament progressed, the news media made regular visits to campus. Unfortunately, the model also predicted Tech’s loss to Connecticut. “I had to tell the media that the model says we’re going to lose this one. So they
went around campus and told students that a Tech professor says we’re going to lose.”

Sokol is preparing to submit this research to NCAA. You can read a summary of his research below.

Basketball isn’t the only sport that Sokol works mathematical equations on. He has developed a method that helps baseball teams find their optimum batting order. He explains: “Using a Markov chain model of batting, you can estimate how many runs the team would score given different batting orders. Other researchers have looked at how to convert the number of runs you score and allow to the number of games you win. Once you calculate the difference in runs with the improved batting order, you can go back to the formula and figure out how many extra games that team would win, and then go back and look at the standings, and predict that, say, the team could have won two extra games. Maybe they missed the playoffs by one game, and so this could have gotten them into the playoffs.”

Of course, if all the teams try it, “Then they are no better off than they were before,” says Sokol. “But if you’re the only one doing it, then you have an advantage. On the other hand, if everybody else adopts it and you don’t, you’re at a disadvantage.”

No one in Major League Baseball has, as of yet, tested his theory. “I have seen different managers put batting orders together that look more like the optimal order should be than what others have done before them.” One of his colleagues tried it with his son’s Little League team, with some success. “If the Atlanta Braves are to call me,” he says, “I wouldn’t think of it as much as a business opportunity as a way to get the ball rolling.”

Finding the optimum batting order could be a boon to the team that figured it out. “Making the playoffs is financially a big shot in the arm for baseball teams. They host at least two games in the playoffs that will probably be sold out. There is extra revenue from that, in addition to the extra television revenue from nationally televised playoff games.”

There is a scientific drawback to applying the method. Namely, scientists like controlled conditions. “The season is 162 games. So if I say on average, this change will mean that you win three more games out of those 162, it would be impossible to tell if there was a real change or if it was just random luck that something different happened. In order to test it empirically, you would have to run and get a bunch of different data points. Even if there was one team that bought into it, it would take them quite a few years to figure out if it was really helping or not. And by then, the team would have a different set of players,” he explains.

“But mathematically, it’s fairly clear.” It’s more than a hobby. “I’ve involved six undergraduates in this basketball research,” he says. “It doesn’t require funding, and the undergraduates get course credit. The ones who volunteer to do it tend to be sports fans, particularly basketball fans. It challenges them and lets them learn a little bit beyond the classroom. It works as an educational experience.”

**Beating the Seeds: Improved NCAA Basketball Rankings**

**Summary**

Recently, we have developed a method for ranking NCAA basketball teams. When used to predict the outcomes of NCAA tournament games, our method significantly outperforms all of the most commonly-used rankings, including the AP poll of sportswriters, ESPN/USA Today poll of coaches, Ratings Percentage Index (both old and new versions), Sagarin ratings, Massey rankings and probabilities, Las Vegas odds, and even the NCAA tournament seedings themselves. Like the RPI, our method requires only basic input data from daily scoreboards, and blends team performance with strength-of-schedule.

We believe that our method (called “LRMC”) could be a useful tool for the NCAA tournament selection committee, and we would be happy to provide the committee with our rankings if they are interested.

In the following, we first compare the performance of our LRMC method with the other rankings, and then describe the basic ideas behind it.

<table>
<thead>
<tr>
<th></th>
<th>AP</th>
<th>ESPN</th>
<th>Massey Rank</th>
<th>Massey Prob</th>
<th>RPI</th>
<th>Seed</th>
<th>Sagarin</th>
<th>Vegas</th>
<th>LRMC</th>
</tr>
</thead>
<tbody>
<tr>
<td>One point per game,</td>
<td>243</td>
<td>241</td>
<td>242</td>
<td>235</td>
<td>236</td>
<td>241</td>
<td>241</td>
<td>247</td>
<td>254</td>
</tr>
<tr>
<td>regardless of round</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increasing points</td>
<td>548</td>
<td>580</td>
<td>534</td>
<td>564</td>
<td>472</td>
<td>520</td>
<td>560</td>
<td>587</td>
<td>661</td>
</tr>
<tr>
<td>per round (1,2,4,8,16,32)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increasing points</td>
<td>1300</td>
<td>1280</td>
<td>1369</td>
<td>1347</td>
<td>1072</td>
<td>1174</td>
<td>1362</td>
<td>1400</td>
<td>1843</td>
</tr>
<tr>
<td>per round, plus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bonus for predicting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Total score of ranking methods, 1999-2000 through 2004-2005 seasons (378 total games).
Performance
We tested all of the ranking methods (the two polls, RPI, Sagarin ratings, Massey ratings and probabilities, Las Vegas odds and betting lines, and NCAA tournament seeds) against our LRMC method to see how well they were able to predict NCAA tournament outcomes. A more accurate ranking method should be able to predict tournament outcomes more precisely. Our tests used the last six years of NCAA tournament results, from the 1999-2000 season through the 2004-2005 season. Higher-ranked teams were predicted to beat lower-ranked teams in each case, and pre-tournament rankings were used for each method.

We tested three types of scoring systems. The first system awarded one point per game that was predicted correctly. The second awarded an increasing number of points per round, so that predicting later-round winners earned more points than first-round winners. The final scoring system added an upset-prediction bonus to the increasing system, by multiplying the points per round by the seed of the correctly-predicted winning team.

Table 1 shows that our LRMC method outperformed all of the other methods in all three scoring systems. The table lists the total number of points each method scored in the last six years; our LRMC method beats all the others handily.

To test our method against Las Vegas oddsmakers, we tracked how many times the favorite (as defined by each method, and defined by the oddsmakers) won each game. Table 2 shows these results. Keeping in mind that the Vegas oddsmakers get to update their betting line before each game to account for injuries, level of a team’s play in previous rounds of the tournament, etc., while the other methods’ rankings are frozen before the tournament starts, it is not surprising that the Vegas line beat the polls and all of the other ranking methods. However, LRMC still edged out the Vegas line in predicting individual game winners.

We should note that our LRMC method, like any other, does not remove the basic unpredictability and excitement from the tournament. It never makes perfect predictions—just (usually) better predictions than other rankings. Therefore, we believe it could be a useful tool for the selection committee, assisting in identifying teams most deserving of bids and seeds without jeopardizing the unpredictability that helps make the tournament so exciting.

Basic Ideas
The basic idea of our LRMC method is to model the behavior of a hypothetical human trying to rank the teams. This hypothetical person begins with a belief that a certain team is the best; then, after randomly picking one of the team’s games and observing the outcome, the person either decides his initial belief was correct (the team really is the best) or decides that his initial belief was wrong, and that the opponent is actually a better team. Rather than doing this just once, the person then repeats the process over and over.

Of course, a real person would get tired and stop the process at some point. However, using a mathematical model called a Markov chain, we are able to calculate what would happen if the person went on updating his beliefs forever. In the long run, certain teams would be judged to be best more often than others, and by ranking the fraction of time each team is believed to be the best, we obtain a ranking of all the teams.

The method we use for determining whether the person should stick with his current team or switch to its opponent uses a mathematical technique called logistic regression. Based on the margin of victory (or loss) and where the game was played, the logistic regression model uses thousands of games of home-and-home matchup data (from 1999-2000 through 2002-2003) to answer the question "Given that team A beat team B by x points at home (or on the road), what is the probability that team A is better than B?"

By combining the logistic regression (LR) with the Markov chain (MC), our LRMC method is able to use simple input data taken from daily scoreboards to output a ranking of teams that outperforms all of the other standard rankings.

We note that our LRMC method takes into account exactly the same two factors used by RPI: a team’s record of winning games and its strength of schedule (i.e., the quality of the teams it played against when compiling that record). The team’s performance dictates how long the hypothetical person will continue to believe a team is the best each time that team is considered, and the team’s strength-of-schedule dictates how often the person considers each team. Therefore, we can see that our method is fundamentally similar to the RPI in that it combines a team’s performance with the strength of its opponents, although the exact mathematical details are more complex.

Complete details of Drs. Sokol and Kvam’s research method are available online at http://www2.isye.gatech.edu/people/faculty/joel_Sokol/ncaa.pdf
TLI Update

By Harvey M. Donaldson, Director, The Logistics Institute (TLI)

The School of Industrial and Systems Engineering (ISyE) and The Logistics Institute (TLI) continue to expand their programs in the Asia Pacific (AP) region, focusing on three areas: (1) global supply chains emanating from Asian manufacturing plants, (2) the logistical issues of serving emerging Asian consumer markets, and (3) the growing Asian demand for supply chain engineering education.

Eight Georgia Tech faculty members recently spent a week in Asia. Their activities provide a good overview of Georgia Tech’s Asia Pacific programs:

• Vice Provost Charles Liotta and ISyE Chair Chip White were in Singapore for the annual meeting of TLI-AP’s Industry Advisory Board, showcasing the accomplishments of TLI-AP under its new executive director, Dr. Robert DeSouza, and the strong support that TLI-Asia Pacific has from Singapore.

• ISyE Associate Professor Chen Zhou and I were in Singapore for an orientation session for students entering the National University of Singapore (NUS), Nanyang Technological University, and Singapore Management University. We also hosted an alumni party for DMP graduates. More than eighty young Georgia Tech alumni are now working in logistics-related jobs in Singapore and across Asia for companies like UPS, DHL, GM, and IBM.

• TLI Executive Director Don Ratliff was in Singapore at the invitation of the Singapore Agency for Science and Technology Research (A*STAR). Don served on a panel selecting new research projects in enterprise systems for A*STAR funding.

• Dr. Jim Foley, associate dean of the College of Computing, also joined us after participating in a computer science conference at NTU, and joined us to discuss opportunities for expanding our operations in Singapore.

Later in the week, seven of us traveled to Shanghai, China, for the first Sino-U.S. Global Logistics Forum. We were joined by ISyE Professor Ellis Johnson, who was presenting his research work in airline scheduling and controlling.

The Forum, organized by Shanghai Jiao Tong University (SJTU) and Georgia Tech, inaugurated our jointly operated Shanghai-based research and education institute, the Sino-U.S. Global Logistics Institute. It focuses on China’s role in global logistics through graduate education, research, and industry outreach programs. More than 200 government officials, business executives, academic faculty and graduate students participated in the Forum, which was organized around three topics:

• The signing of a Memorandum of Understanding between SJTU and Georgia Tech to establish the new Institute.

• Eight presentations on the growth of China-U.S. trade and its impact on countries’ economies, logistics infrastructures, and educational needs.

• Two panel sessions featuring 16 manufacturing, logistics, and maritime executives from China and the U.S. discussing the challenges they face moving products from Chinese manufacturing plants to global markets.

The Georgia Tech delegation also met with SJTU faculty to plan future educational programs, including:

• A SJTU/Georgia Tech dual master’s degree program in which students could earn a Georgia Tech MSIE degree in classes taught at SJTU by Georgia Tech faculty.

• A one semester certificate program in global logistics offered on the Atlanta campus for graduate students from SJTU and other universities.

• Executive Education short courses offered by TLI faculty in Shanghai for Asian logistics managers.

• Recruitment of Chinese logistics managers into the Georgia Tech Executive Master’s in International Logistics (EMIL) program and use of SJTU resources in offering EMIL’s Asia residence.

The group also discussed proposals for research activities including:

• A research program led by the Chinese National Reform and Development Commission to study logistics infrastructure and regulatory problems.
Most engineering students find their time in the limelight after graduation, but George Godsey, BIE 2001, MSIE 2002, was already making news as an athlete and ISyE student. The former Yellow Jacket quarterback is credited with leading two of the most productive seasons in Georgia Tech history. He was named All-Atlantic Coast Conference (ACC) and Academic All-ACC, and left a trail of Tech records in his wake.
Among them:

- School record for career completion percentage (.633)
- Career pass efficiency rating of 143.64, second best in Tech history (behind Joe Hamilton) and fifth best in the ACC
- Ranks third in Tech history in virtually every other quarterback category (behind only Hamilton and Shawn Jones, both four-year starters)
- Top 20 in ACC history in career passing yards (15th) and total offense (19th)
- Two years as most Tech’s Most Valuable Player

In 2005, Godsey was in his first season as quarterback coach at the University of Central Florida (UCF). He joined UCF’s team in 2004 as the offensive graduate assistant coach, reuniting with his college coach, George O’Leary. His return to Florida was a homecoming of sorts, as he grew up in the Tampa Bay area.

Football has been part of Godsey’s life as long as he can remember. His father, John, played under the legendary Coach Bear Bryant at the University of Alabama. His brothers Gary and Greg played college ball for Notre Dame and the Air Force Academy, respectively.

Godsey wanted to be an engineer, and Georgia Tech was the right fit. But as he told Engineering Enterprise: “When I originally decided to attend Georgia Tech, I was unsure what field of engineering I was interested in. After a semester or two of general math and science classes, I decided that industrial engineering would fit my personality more than any other field. I wanted to be well-rounded in my engineering knowledge.”

In his early years at Tech, Godsey was described as “confident, but guarded.” In high school, he played for Jesuit High in Tampa. There, he completed 61.9 percent of his passes and was responsible for 36 touchdowns and 16 interceptions. An article in Athlon Sports said, “His claim to recruiting fame was being ranked as Florida’s number 83 prospect by SuperPrep magazine. No one was surprised when his top scholarship offers came from Tech, Wake Forest, and Central Florida.” But Godsey proved he was ready for the big time.

At Georgia Tech, he learned a new way to think about football. His ISyE courses provided him with critical skills that made him more productive. Of his coursework, he found statistical analysis particularly useful, and still does. “I use all the information I learned in the statistical analysis classes every day,” he says. “You can roughly use the background gathered in any of those classes in whatever field you work in.”

Godsey soon discovered that ISyE coursework and football have a lot in common. He used that discovery to drive his performance on the field. “The professors require you to think on your own, and work through situations that weren’t necessarily rehearsed,” he said. “On the game field, I used the same thought processes that I would take into any given assignment. There are situations/problems that you have to study/practice before the upcoming test/game, and the quicker you can anticipate the answer, or react to the given problem, the better the results. There are a ton of parallels between competition on the game field and competition in the classroom. The only difference is that I never got tackled by a professor if I missed a problem. On the other hand, if I missed an assignment on the football field, I paid for it physically.”

After sitting it out his sophomore year, red-shirted, Godsey became Tech’s replacement for Heisman Trophy runner-up Joe Hamilton. Hamilton was known as a “compact and lightning-quick quarterback,” while Godsey was described as “slow-footed.” But as the 2000 season played out, he proved that brains beat brawn anytime, ending Tech’s 9-3 season as the nation’s sixth-most efficient passer.

At Georgia Tech, he learned a new way to think about football. His ISyE courses provided him with critical skills that made his time on the field more productive.

Because of his red-shirted status, Godsey completed his bachelor’s in industrial engineering in 2000, in four years, before his football eligibility was complete. He used that opportunity to pursue a master’s degree, “to become more advanced in the manufacturing and logistics concentration of industrial engineering,” he says.

Before joining UCF, he continued his playing career with one season in the Arena Football League for the Tampa Bay Storm. With his help, the Storm won the Arena Bowl Championship in 2003.

As a coach, Godsey relies on his ISyE expertise to keep his players motivated. “As a coach, my responsibility is to prepare my players for the upcoming game,” he says. “I take a lot of pride in preparing these athletes with a sequential order or information that builds off of each previous topic. It makes the learning process a lot easier for the athletes, and is the most important part of my job. The skills I use are the same skills that previous coaches and professors used to teach me both in the classroom and on the football field.”

Nearly a quarter of all ISyE graduates lead their own company, either as a CEO or entrepreneur. Godsey expects to follow in that tradition. “Having only been in the coaching profession for three years, I have set plenty of short term and long term goals. Obviously, there is no sense in getting into the coaching profession unless you think you can eventually run your own team,” he adds. “Personally, I come to work with the attitude that I want to teach someone something new and I want to learn something new. I think with that attitude, eventually my professional and personal goals will come true.”
INFORMS

Georgia Tech ISyE faculty and students were well represented at the 2005 INFORMS meeting, held in San Francisco in October:

NSF Advanced Professor of Engineering Jane Ammons received the INFORMS Women in OR/MS Forum Award for her significant contributions to the advancement of women in OR/MS.

Manhattan Associates Professor John Bartholdi received the INFORMS Fellow Award. The Fellow Award is reserved for distinguished individuals who have demonstrated outstanding and exceptional accomplishments and experience in operations research and the management sciences. The contributions of a nominee is evaluated in five categories: Research, Practice, Management, Education, and Service. Accomplishments in at least one area must be truly outstanding.

Associate Professor Pinar Keskinocak was selected for the Moving Spirit Award, established to recognize outstanding volunteers who have been “moving spirits” in their chapters or subdivisions. She received the award for her work to help the Junior Faculty Interest Group Forum.

Associate Professor Eva Lee and her co-authors received the Pierskalla Best Paper Award for research excellence in HealthCare Management Science for their work, “Emergency Treatment Response and Real-Time Staff Allocation for Bioterrorism and Infectious Disease Outbreak.”

Professor Jye-Chyi (J.-C.) Lu has been elected as INFORMS 2006 Chair-elect for the 300-member Quality, Statistics, and Reliability (QSR) Cluster. He is looking forward to working with leaders in supply chain, logistics, manufacturing, and health systems clusters to promote interface research and education activities.

Ph.D. student Zhiguan Qian won the Best Student Paper in the QSR (quality, statistics, reliability) Section of INFORMS. Approximately 35 papers were submitted; four were chosen for presentation at the meeting. Qian’s presentation is based on the written paper, “Bayesian Hierarchical Modeling for the Integrating Low-accuracy and High-accuracy Experiments,” joint with Professor Jeff Wu. This is the second year in a row that an ISyE student won this award. The 2004 winner was A. Mandal, another student of Professor Wu.

Two other students from ISyE’s quality and statistics group made it to the finals with their papers in the QSR Section: M.K. Jeong, advised by J.C. Lu; and Xuelei Ni, advised by Xiaoming Huo.

OTHER NEWS

Assistant Professor Shabbir Ahmed has received a 2005 IBM Faculty Award, worth $40,000, in recognition of his leadership in the field of stochastic programming. Faculty awards are granted annually in order to strengthen IBM’s ties with universities across the globe and to foster mutual research collaboration with university faculty. The awards are competitive; there are no deliverables or conditions attached to their receipt. They may be renewed annually up to three years.

Professor Jeff Wu, Coca-Cola Chair in Engineering Statistics, is the recipient of the 2005 Jerome Sacks Award for Outstanding Cross-Disciplinary Research sponsored by the National Institute of Statistical Sciences. The award recognizes Wu’s innovative work at the interface between statistics and engineering. It was presented at the Joint Statistical Meetings in Minneapolis in August. Wu also won the Jack Youden Prize for his joint paper with Roshan Joseph Vengazhiyil.

“As engineering encounters uncertainty in design, experimentation, and product usage, statistical methods and thinking should play an important, or even central, role in engineering curriculum and practice,” said Wu. “Georgia Tech is a leader in this regard.”

Wu’s research is centered on statistical methodology and applications to engineering and life sciences, and quality and reliability engineering.

ISyE professors Roshan Joseph Vengazhiyil and Jeff Wu were awarded the Jack Youden Prize by the American Society of Quality and the American Statistical Association at the Fall Technical Conference in October. The two were honored for the Joseph-Wu paper, “Failure Amplification Method: An Information Maximization Approach..."
to Categorical Response Optimization.” The prize was given by the American Society of Quality and American Statistical Association for best paper published in Technometrics in 2004.

**DAVID GOLDSMAN RECEIVES FULLBRIGHT SCHOLAR AWARD**

Three Georgia Tech faculty members, including one from ISyE, have been awarded a Fulbright Scholar Grant to lecture and research at overseas universities during the 2005-2006 academic year.

ISyE Professor David Goldsman will teach computer simulation at Bogazici University in Bebek-Istanbul, Turkey. Goldsman, who received his Ph.D. from Cornell, cites interests in computer simulation with emphasis on statistical output analysis, applied probability and statistics, ranking and selection, time series analysis, reliability and life testing, and the application of these areas in industrial engineering.

The other Georgia Tech professors are Stuart Goldberg, assistant professor in the School of Modern Languages, and Fei-Ling Wang, associate professor in the Sam Nunn School of International Affairs.

They are three of approximately 850 U.S. faculty and professionals who will travel abroad to some 150 countries for the 2005-2006 academic year through the Fulbright Scholar Program. Established in 1946 under legislation introduced by the late Senator J. William Fulbright of Arkansas, the program’s purpose is to build mutual understanding between the people of the United States and other countries.

The Fulbright Program, the United State’s flagship international educational exchange activity, is sponsored by the U.S. Department of State, Bureau of Educational and Cultural Affairs. During its 59 years of existence, thousands of U.S. faculty and professionals have studied, taught or done research abroad, and thousands of their counterparts from other countries have engaged in similar activities in the United States. They are among more than 265,000 American and foreign university students, K-12 teachers, and university faculty and professionals who have participated in one of the several Fulbright exchange programs.

Recipients of Fulbright Scholar awards are selected on the basis of academic or professional achievement and because they have demonstrated extraordinary leadership potential in their fields. Among thousands of prominent U.S. Fulbright Scholar alumni are Milton Friedman, Nobel Laureate in Economics; James Watson, co-discoverer of the structure of DNA and Nobel Laureate in Medicine; Rita Dove, Pulitzer Prize-winning poet; and Craig Barrett, CEO of Intel Corporation.

The General Algebraic Modeling System (GAMS) is a high-level modeling system for mathematical programming problems. It consists of a language compiler and a stable of integrated high-performance solvers. GAMS is tailored for complex, large scale modeling applications, and allows you to build large maintainable models that can be adapted quickly to new situations.
Please take a minute to complete this form, and mail or fax it to the school.

Please send to:

Engineering Enterprise
School of Industrial and Systems Engineering
Georgia Institute of Technology
765 Ferst Drive, Atlanta, GA 30332-0205
or fax to 404.894.2301

Name ________________________________________________________

Degree/Year____________________________________________________

Home Address __________________________________________________

City _________________________ State _____ Zip ____________________

Home Phone ( ___ ) ___________________

Title/Company Name _____________________________________________

Business Address ________________________________________________

City _________________________ State _____ Zip ____________________

Business Phone ( ___ ) ___________________

E-mail Address __________________________________________________

Your news _____________________________________________________

____________________________________________________________

____________________________________________________________

____________________________________________________________

____________________________________________________________

____________________________________________________________

____________________________________________________________

Other IE topics you would like to read about in Engineering Enterprise __________________________

____________________________________________________________

____________________________________________________________

____________________________________________________________

____________________________________________________________

____________________________________________________________