

Engineering ENTERPRISE

THE ALUMNI MAGAZINE FOR ISyE AT GEORGIA INSTITUTE OF TECHNOLOGY

Winter 2005

- The History of TLI
- Challenges in Today's Transportation Logistics:
A Conversation with Chris Logfren
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The Logistics Institute



by William B. Rouse

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This issue of *Engineering Enterprise* focuses on one of the “crown jewels” of the School of Industrial and Systems Engineering – The Logistics Institute (TLI). The School’s focus on logistics grew out of its rich history in material handling and warehousing, beginning in the early 1950s. TLI represents the successful weaving together of several threads that have helped ISyE achieve international renown in logistics and supply chain management.

Before the formation of TLI under John Jarvis’ leadership of ISyE, the School had several research centers, including the Material Handling Research Center founded by John White, the Production and Distribution Research Center founded by Don Ratliff and John Jarvis, and the Computational Optimization Center founded by George Nemhauser. These and other related activities came together in 1992 with the formation of TLI.


TLI has grown to the point that ISyE now has roughly two dozen faculty members who indicate their primary interests as logistics and optimization. In parallel with TLI’s rise to preeminence, industry has embraced and deployed many methodologies that TLI has pioneered. These methodologies now reflect business as usual for industry leaders such as Schneider National, UPS, and Wal-Mart, in part due to our many graduates at these companies.

One of our Ph.D. graduates, Chris Lofgren, is currently president and CEO of Schneider National. Our interview with Chris in this issue provides interesting insights into this innovative company, as well as how TLI’s endeavors support this company’s initiatives. At the recent meeting of the ISyE Advisory Board, we were very pleased to announce Schneider’s funding of the Schneider National Chair in Transportation and Logistics. Chip White holds this prestigious position. His article in this issue provides his perspective on this field.

The growth of TLI has seen numerous ambitious initiatives. More than five years ago, TLI-AP (Asia Pacific) was formed as a collaboration between Georgia Tech and the National University of Singapore. This has provided a wealth of opportunities for ISyE faculty to immerse themselves in the activities of one of the world’s leading logistics hubs – both for sea cargo and air cargo. Numerous trips to Singapore have provided important insights into one of the most successful “Asian Tigers.”

Very recently, TLI has been focused on China. Chip White has represented TLI in several Georgia Tech delegations to China. Shanghai appears to provide a natural opportunity for TLI to participate in one of the fastest growing economies in the world, where cheap labor provides a competitive advantage now, but supply chain efficiency will increasingly be needed to maintain this advantage.

In parallel with this relatively recent growth in international logistics, ISyE professor John Vande Vate founded the Executive Master’s in International Logistics (EMIL). This program will soon enroll its fourth class of logistics executives, who typically average 16-17 years of global experience. This highly successful program is serving to populate many of the world’s leading logistics organizations with Georgia Tech graduates and TLI fans.

The Logistics Institute – from its roots to its current vision – spans over five decades of industrial engineering and operations research. TLI represents a central means for ISyE to add value to the economy and society via research and education that enables efficient management of supply over the full life cycle of a wide range of products and services. We can quite justly be proud of this innovative organization. 

William B. Rouse is the H. Milton and Carolyn J. Stewart Chair and Professor in the School of Industrial and Systems Engineering at the Georgia Institute of Technology.

Old World, New Lessons

By John Vande Vate, Ph.D.

During its European Residence, EMIL Class 2005 tackled the subjects of European logistics, labor relations, and reverse logistics. By meeting with top faculty from Georgia Tech, Oxford University, and Delft University, as well as government officials and high-level executives from companies like BMW, Hewlett-Packard, and Bosch, the class walked away with a new perspective on the European supply chain. The following article, which originally appeared in www.frontlinetoday.com in November 2004, reflects some of these lessons.

GM recently waded into battle with its workers in Europe, specifically in Germany – a struggle that, on the surface, looks much like the “life-or-death” battle between Volkswagen and its German workforce. The differences between these two companies’ approaches highlight the differences between the European and U.S. business environments. At the heart of these differences is the fact that companies in Europe are more formally and

deeply integrated into the social fabric of their countries. As a consequence, they view labor more as a fixed cost than do their U.S. counterparts.

But European labor relations are now evolving under the simultaneous influences of European integration and increased wage competition not only from China and India, but also from new European Union (EU) member countries like Poland and Slovenia and EU candidates like Romania and Bulgaria. In the European auto industry, there is growing competition from Japanese imports of the sort experienced in the U.S. in the 1980s and 1990s. U.S. business may learn some valuable lessons from watching Europeans address these changes.

Both in Europe and the U.S., the buzzword of the day is “collaboration,” the sharing of risks and returns with supply chain partners. It only makes sense, then, to collaborate with your closest and most important business partner: your workforce. One way to collaborate is to improve workforce

morale and productivity by lifting some of the employment risk from workers’ shoulders. How U.S. and European businesses approach this collaboration may hold the key to future success. GM and VW’s current struggles with their European workforces offer an excellent illustration.

GM To Cut Jobs

GM employs 63,000 people and operates 11 plants in eight countries in Europe, including multiple Opel plants in Germany, a Saab plant in Sweden, and a Vauxhall plant in the United Kingdom. These European operations have posted losses each year since 1999, and GM’s share of the European auto market has dropped a full percentage point to 9.2 percent since 2001. On October 14, GM announced it would cut 12,000 jobs during the next two years – nearly 20 percent of its European workforce – with most of the cuts coming in Germany in 2005.

Workers at the oldest Opel plant in Bochum, Germany, the likely target

EMIL PROGRAM OFFERS SCHOLARSHIP

The Georgia Tech Executive Master’s in International Logistics (EMIL) program is offering the EMIL Humanitarian Scholarship to one incoming participant to the next class. The \$20,000 scholarship will be awarded on March 7, 2005, to a professional employed by a non-profit organization that offers humanitarian services on a local, national, or international basis. The successful candidate will have demonstrated career success, and possess a clear potential for leadership and a desire to fully participate in EMIL’s intense educational experience. The scholarship will be applied towards EMIL tuition for the class starting in May of 2005.

“Humanitarian organizations often have unique and complex supply chains. And, in crisis situations, peoples’ lives often depend on their efficiency,” says Dr. John Vande Vate, EMIL executive director. “By offering the EMIL Humanitarian Scholarship, Georgia Tech looks to provide humanitarian organizations with access to the latest in supply chain training and methodology.”

EMIL works with the world’s leading organizations to reduce global logistics costs and improve efficiencies by grooming their supply chain executives. EMIL sponsor organizations learn to develop supply chain management as a core competency, continuously increase their efficiencies, move from a regional to global strategy, and groom their “rising stars” by broadening their supply chain and business perspectives.

“Since beginning the EMIL program, I have learned many supply chain strategies and best practices that have helped me to more efficiently perform my job responsibilities,” says 2003 Humanitarian Scholarship winner Heidi Cerrud, procurement officer at the Regional Logistics Unit, International Federation of the Red Cross and Red Crescent Societies, Panama. “Over time, I am confident that my organization will implement many recommendations that I have made as a result of the work I completed during my tenure at EMIL.”

for more than a third of these cuts, walked off the job demanding that the company completely rule out compulsory layoffs. Despite the urgings of Opel management, union leaders and local and national politicians, these workers continued their strike for six days until members of the Works Council convinced them to return to the job.

But GM's labor challenges aren't over. Under German law, the company must come to an agreement with Opel workers before it can implement its cost-cutting plan. Klaus Franz, head of the General Works Council at Opel, stated, "We have two major targets – the first is no plant closures, the second is no forced redundancies."

Franz proposed three directions for further discussions. First, he indicated that GM management would need to participate in the belt tightening. Any savings plan would have to include executive pay cuts of "much more" than the benchmark 10 percent that Mercedes-Benz executives agreed to in a resolution with their workforce back in July. Further, he noted that while the workforce at Opel's main Rüsselsheim facility had fallen from 18,000 to 5,600 workers over the past 15 years, the size of GM Europe's managerial workforce has gone "in a different direction" over

the same period. To facilitate reductions in management, he proposed that the company revise its European restructuring which had brought its three European operations under a single regional manager based in Zürich – outside the European Union. Instead, Franz proposed GM adopt the newly created "European Corporation" or "Société Européenne" (SE) structure and operate out of Brussels instead of Zürich. By becoming a "European" company, GM's legal structure would be significantly simplified. It could combine its 100 legal European entities under one set of rules and a unified management and reporting system. This would also allow European labor unions to negotiate directly with GM management in Detroit.

VW To Reduce Labor Costs

In contrast to GM, VW's shareholder structure dictates a distinctly different approach to labor relations. The state of Lower Saxony where VW is headquartered holds 18.2 percent of Volkswagen ordinary share stock and controls two seats on the company's supervisory board. In fact, Gerhard Schroeder, the German Chancellor, was a member of the VW supervisory board when he was governor of the region. It's as if George W. Bush and Jennifer Granholm, the Governor of Michigan, held seats on GM's board and controlled 20 percent of the company's shares. As inconceivable as that scenario would be in the U.S., it is not unusual in Europe. And that helps explain why the German press felt justified in leveling what we consider a ridiculous charge that the GM shift of jobs from Germany to Poland was politically motivated because of the two countries' different responses to the war in Iraq.

VW employs more than 320,000 people worldwide, 176,000 of them in Germany. The German system reserves half of the supervisory board seats for union representatives so management is very aware of the realities of downsizing in Germany and workers must agree to any restructuring plans.


Discounting by competitors and the strength of the euro slashed VW's oper-

ating profits by 47 percent from 4.7 billion euros in 2002 to around 2.5 billion euros in 2003, and its share price fell 21 percent through Fall of 2004. Consequently, the company has stated the goal of reducing labor costs by 30 percent over the next seven years.

In contrast to GM, VW's goals are long-term and include no explicit statement about job cuts. Given its roots in the European system, the company recognizes it will have to collaborate with its employees to determine just how these savings will be realized. VW is no stranger to reductions in labor costs, but these have typically come in the form of concessions on wages and hours rather than layoffs. After a \$1.3 billion loss in 1993, the company and the union agreed to forego planned raises in exchange for cutting back to a four-day workweek, a move that reduced wages by 20 percent over the contract period.

Key Dates:

- Thursday, February 11, 2005:
All standard EMIL application material must be submitted by 5 p.m. EST. See Application Materials for details.
- February 24 - March 6, 2005:
Phone interviews with top scholarship candidates.
- Monday, March 7, 2005:
Scholarship award winner announced.
- Monday, March 14, 2005:
Scholarship recipient must submit a scholarship acceptance letter by 5 p.m. EST.

For more information go to:
www.emil.gatech.edu/scholarships
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**Perhaps the old world
can offer some new lessons
on how to profitably
collaborate with your
closest supply chain partner:
your workforce.**

The company has also been able to leverage the stark differences between the 30 euros/hour (nearly \$40/hour) average wage for autoworkers in Germany and the 6 euros/hour the company pays its workers in Slovakia in dealing with unions.

In 2000, VW announced that its upscale sport utility vehicle, the Touareg, would be built in Bratislava, Slovakia. Dr. Peter Hartz, VW's personnel chief observed, "For every car VW makes, the plants have to apply to get the assignment. If Wolfsburg [Germany] wants to get a new model, it must make an offer" that is competitive with VW plants in Spain, Mexico, Slovakia, and elsewhere. For example, to win production of the Touran, a compact minivan, for the VW plant in Wolfsburg, union representatives offered flexibility in working hours and a commitment to repair any defects in vehicles off the assembly line with unpaid hours.

The Outlook for European Workers

Whatever the results of the GM and VW negotiations with their workforces, labor in Europe faces challenges that are likely to bring dramatic changes in the coming years. The emergence of China and India as sources of inexpensive goods and destinations for manufacturing and service jobs is having a significant impact. In fact, imports from China have grown significantly faster in old Europe than in the U.S. in recent years. In addition, Europe's expansion eastward has added 10 countries to the EU with significantly lower labor costs and, as VW's situation illustrates, wage differences are a pow-

erful lever for gaining concessions from labor leaders.

France's transport union, for example, negotiated more restrictive hours of service rules for their workers than those imposed from Brussels. This agreement applies only to French companies, however, and it proved to be the "last straw," driving many French transport operators to relocate to places like the Czech Republic or Romania where driver wages are significantly lower. As a result, the country lost about 15 percent of its trucking industry.

Within Western Europe integration is untangling the political involvements that have protected European laborers in the past. The European Commission has taken Germany to court over the 44-year-old "Volkswagen law" which gives Lower Saxony undue control over the carmaker by allowing it to use its two seats on the supervisory board to block many company decisions.

At the same time, larger European companies are now listing on the U.S. stock exchanges, which means they must reveal their margins and profitability to shareholders quarterly. So tactics such as lay-offs of workers in other countries to compensate for falling revenues in Europe will be harder to justify or disguise.

These changes have brought tougher times for EU workers. Lehman Equity strategists note a three percent reduction in total payroll costs for publicly traded companies across Europe. And the transformation is just beginning. VW currently employs nearly 30 percent more people than Toyota worldwide even though it produces 10 percent fewer vehicles. That kind of labor expense just won't survive in the global marketplace.

The new EU members and candidate countries have shifted the center of Europe eastward – not only geographically and demographically, but also economically. GDP Growth in Poland, the Czech Republic, and Hungary was close to three percent in 2003 compared with a rate of 0.7 percent in Western Europe. The eastward shift is philosophical as well. As Eastern Europe rebuilds its labor market struc-


ture, it appears that it will more closely resemble the Anglo-American structure than the European model.

In the auto industry there are growing threats from Asian competitors. Although Asian carmakers command only 17.4 percent of the European auto market compared with their 25 percent share in the U.S., they are gaining share rapidly. September 2004 sales figures, for example, showed that while total European auto sales declined slightly, Toyota sales in Europe increased 2.3 percent; and Honda, Hyundai, and Mazda posted gains ranging from 12 to 30 percent. Europeans are just beginning to feel the pain of Asian competition because European Union trade policies had kept the Japanese car makers out with a complex quota system. That system was dropped at the end of 1999.

Lessons for U.S. Employers

European employment structures are distinctly different from those in the U.S. – and they will remain so. Still, in an international environment we can't ignore what is happening there. While it would be presumptuous to judge GM's strategy from this distance, the company's recent tussle with its European workers will probably speed VW on its path to labor reductions and certainly created enmity within GM. Strong medicine may be needed to fix the profitability problems in Europe, but recreating the type of confrontational labor-management relationships typical here in the U.S. – antithetical to lean and kaizen principles – is not the right prescription.

Instead, collaborative relationships with employees may prove the most effective and profitable. For example, Frank Russell Co. discovered that investing in the public companies on *Fortune's* list of the 100 best companies to work for when the list came out in 1998, and reinvesting in the new list each year, earned 10.6 percent annually compared with the S&P 500's 5.7 percent annual return over the same period.

Perhaps the old world can offer some new lessons on how to profitably collaborate with your closest supply chain partner: your workforce. 

The State of the School

School Chair Bill Rouse presented his "State of the School" address to those present at the October 2004 Alumni Assembly. The following are highlights from his speech:

Students

"Our students are amazingly accomplished. When you meet with young alumni you tend to see how quickly they rise to positions of significant responsibility within just a few years of graduating. One of the things that is clear when meeting young alumni is that you have no idea where they are going to end up in the professional world, but they'll probably be in charge."

Academic Strengths

"In the last few years statistics has become based in ISyE, as opposed to being in a separate statistics department or math. We are growing an excellent program, and the next time engineering statistics are ranked, we will probably be ranked the number one program."

Budget Woes


"Our support per student from the state has decreased by one-third in two years, and tuition has gone up by 38 percent. We're still a good deal at Tech, compared to our competing universities, but I see a more fundamental problem. This is true across the whole U.S., not just Georgia. When I was a young man, I was in a situation where the only way I could go to college was pay my own way. At that time, it was not that expensive. You could work summers and weekends and make the money. That's ceasing to be true. The students are forced to pay more and more of the portion, and they are the ones losing out."

"One third of Georgia Tech's budget comes from the state, so there is 70 percent we must get elsewhere. Fortunately ISyE hasn't had

any layoffs, and we've been very aggressively managing the budget for the last couple of years. We're increasingly finding many who can't afford it. We're into our fourth year of budget cuts, and being an IE, I couldn't help but comment to the dean that, 'This looks like a trend.'"

"I was at the National Academy of Engineering (NAE) meeting recently. We heard from the chief executive officers of Intel and then the president of Canada. There are two aspects to this problem: First – and Thomas Jefferson was the one who started this – we in the U.S. once believed that education was a public good. The individual receives education, and society is better off if people are educated. What is now emerging is the sense that education is something you buy personally for your own benefit."

State of Engineering

"Another thing discussed at the NAE meeting was a sobering fact: engineering graduates in the U.S. have peaked at about 85,000. That figure is now down in the 60,000-70,000 a year range. India and China are graduating 400,000 engineers a year each, and between those two and the other large countries, they graduate about a million engineers a year to our 60,000. In the U.S., four percent of students major in engineering. In India and China, 40 percent of the students do. If you project this for a while, this is a very significant issue. We have to be more aggressive in our efforts here, and bring more people into engineering. ISyE has been fortunate because we've been more successful in tapping the half of the population that the other engineering disciplines don't, namely females. About half of our students are female; two-thirds of those are female minority. So much talent is being developed offshore, and we aren't creating much ourselves." 

2004 Enrollment Statistics

Undergraduates: 967
Master's students: 201
Doctoral students: 197

2004 Graduation Statistics

296 B.S.
157 M.S.
24 Ph.D.

U.S. News & World Report Ranking

ISyE #1 in graduate industrial and manufacturing programs

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of

In the relatively short period of 15 years, The Logistics Institute at Georgia Tech (TLI) has developed into an internationally recognized leader in logistics research and education. In the last decade especially, the term “logistics” has jumped up the corporate ladder, traveling from the dusty basement shipping department to the penthouse board room.



TLI

 **Material Handling Research Center**
Georgia Institute of Technology

 **THE LOGISTICS INSTITUTE**
Georgia Institute of Technology
www.tli.gatech.edu

Today, Georgia Tech has the largest number of logistics-oriented engineering graduates at the bachelor's, master's, and Ph.D. level of any university in the world. More than one third of Georgia Tech's faculty in the School of Industrial and Systems Engineering are involved in logistics research. The logistics operations and technology knowledge created in TLI's research is transferred to undergraduate and graduate students through focused academic programs. TLI focuses on the four major elements of the enterprise value chain: Supply Chain Design, Transportation Planning, Supply Chain Visibility, and Supply Chain Security.

TLI has its roots deep within the School of Industrial and Systems Engineering at Georgia Tech. TLI faculty and staff see its evolution in three distinct periods, reaching back half a century: The material handling and warehousing legacy, the optimization legacy, and today's TLI, whose legacy in global supply chain management is still developing.

Birth of The Logistics Institute

Georgia Tech has always been a leader in technology-based innovation. Prior to 1992, the work of the present-day TLI was spread out over four different ISyE entities: the Material Handling Research Center, the Production Distribution Research Center, the Computational Optimization Center, and a smaller TLI dedicated solely to continuing education. Each of these had strong leaders with growing reputations, and each contained a piece of the puzzle that would ultimately become today's TLI.

In 1992, John Jarvis, then chair of ISyE, was convinced that the future of industrial engineering was closely tied to logistics. He realized that it would be much more productive to bring these four efforts together in one place, with the capacity to attract a wider range of attention, industry support, and grant monies.

"Each entity focused on some element of logistics," explains Don Ratliff, now UPS and Regents' Professor. "Our goal was to be comprehensive with end-to-end coverage in regard to logistics research, education, and industry outreach."

As Ratliff remembers, "The Logistics Institute" was chosen as the new name, "because the name seemed to best represent our comprehensive mission." Ratliff was chosen to lead TLI, with Ed Frazelle (then an ISyE faculty member and now consultant/senior lecturer) directing the professional education activities and George Nemhauser (now A. Russell Chandler III Professor) directing the research activities.

"There were many challenges, once we had all the activities under one organizational umbrella," he remembers. Each of the four entities had a different way of doing business. "We took programs and processes from each entity. It was like merging four small companies. But we were careful to preserve the entrepreneurial spirit."

Building the Puzzle

The organizations that formed TLI in 1992 already had impressive histories:

Material Handling Research Center

Since its founding in 1945, Georgia Tech's School of Industrial and Systems Engineering has had a focus on material handling and physical distribution applications. Lieutenant Colonel Frank F. Groseclose, the schools' first chair, began promoting these applications to industry in the late 1940s through continuing education activities. In March 2005, TLI will celebrate the 55th anniversary of the Material Handling Short Course (MHSC). Current MHSC program director Dale Atkins believes MHSC is "one of the longest running professional education programs in the country — perhaps the longest running logistics professional education program." Professor James Apple Sr. and the late Dr. Paul T. Eaton were among the early professors teaching the course.

By the 1960s, Apple, Eaton, and others had created a nationally recognized expertise in material handling. This reputation was part of what attracted a fresh Ohio State Ph.D. graduate, John White, to the Georgia Tech faculty in 1974. White soon assumed the leadership of the MHSC and began to expand material handling research and industry outreach activities. By 1979 White had founded the Material Handling Research Center (MHRC) as well as his own material handling consulting firm, SysteCon. Dale Atkins, then a research engineer at GTRI, soon joined MHRC as associate director, and several young Georgia Tech faculty members (Leon McGinnis, Gunter Sharp, Marc Goetschalckx, and Ronald Bohlander) became early contributors to MHRC's research activities and reputation.

In 1983 MHRC became a National Science Foundation-sponsored Industry-University Collaborative Research Center. For more than 20 years, NSF has funded and sponsored material handling and logistics research at Georgia Tech. Through the 1980s, MHRC had three other university partners (University of Arkansas, Florida Atlantic University, and the University of Cincinnati), and more than 20 member companies.

John White left MHRC in 1987 to join the National Science Foundation in Washington, D.C., and then to return to Georgia Tech as dean of Engineering from 1993-1999. Dr. White is now the Chancellor of the University of Arkansas in Fayetteville. MHRC continued under the leadership of Ira Pence until it was merged into TLI in 1992. But even today TLI still benefits from the MHRC legacy. MHRC researchers are still active on the ISyE faculty and working on TLI industry projects. Georgia Tech students, such as Jim Apple Jr. and Bruce Strahan, went on to work for SysteCon and continue as leaders in the Atlanta logistics consulting community and are still active in TLI professional education activities. MHRC consultants and industry experts, such as John Hill and Lee Hales, have maintained their relationships with Georgia Tech and TLI for more than 20 years.

"There were many challenges,

**once we had all the activities under one
organizational umbrella,"**

Production Distribution Research Center

Beginning in the late 1960s under school chair Bob Lehrer, and accelerating when Mike Thomas became chair in 1978, the growing ISyE faculty became more focused on operations research, particularly computational optimization. In 1979, John Jarvis and Don Ratliff founded a new ISyE research center to develop logistics optimization systems for the military. This center, known as the Production Distribution Research Center (PDRC), was funded primarily from the Office of Naval Research.

The work of the Production and Distribution Center was groundbreaking. The advent of powerful small computers and computer graphics software radically changed the face of logistics planning, allowing for the merger of maps for displaying logistics networks with mathematical algorithms for optimizing the networks. Says Ratliff: "When personal computers and work stations came out, for the first time, you could graphically display maps and overlay transportation networks on these computer maps. We were the first people at Georgia Tech to use these new visualization techniques in the logistics area, integrating maps and mathematics. Using small powerful computers and mapping software, we achieved many breakthroughs in large-scale network optimization."

In parallel with activities in the Production Distribution Research Center, Jarvis and Ratliff started a commercial software company, CAPS Logistics. In its early years CAPS was staffed almost entirely with Georgia Tech grad students and young alumni. The CAPS "logistics tool kit" software opened the door for shippers and manufacturers to use computer technologies previously available only to the military. Today, CAPS Logistics is a 135-person business that provides supply chain planning and design software solutions to more than 450 of the largest businesses in the world. In 1998, CAPS Logistics was acquired by the Dutch company Baan and is now a part of SSA Global.

Computational Optimization Center

ISyE faculty resources in operations research and their focus on logistical networks continued to grow significantly during the 1980s and 1990s. In 1984, George Nemhauser was recruited from Cornell University to become the A. Russell Chandler Chaired Professor in ISyE. Later, Georgia Tech alumnus and long time IBM Research Fellow, Ellis Johnson, came back to Georgia Tech as the Coca-Cola Chaired Professor in ISyE. Working together, Nemhauser and Johnson founded the Computational Optimization Center, also known as the Logistics Engineering Center, and pioneered the application of their new and innovative computational optimization algo-

rithms to the airline industry's fleet and crew scheduling needs. By the mid 1990s, the Computational Optimization Center was partnered with most of the major passenger airlines (American, Delta, United, US Airways) and information technology firms that supported the airline industry.

The development of ISyE's faculty resources in operations research and optimization has produced pioneering research and development, and it has also trained a growing network of ISyE Ph.D. graduates, who are now major industry stars in the application of information and decision technologies to global supply chains. Some of these alumni include:

- Barry Smith (Ph.D., 2004), senior vice president and chief scientist, Sabre Holdings, one of the largest information technology firms in the travel industry.
- Chris Lofgren (Ph.D., 1986), chief executive officer, Schneider National, Inc. one of the largest providers of trucking and intermodal services in the U.S.
- Jun-Sheng Li (Ph.D., 1989), chairman and chief executive officer, Transplace, Inc., a logistics technology and transportation management services provider formed in 2000 through the merger of existing logistics business units of six major trucking firms.
- Michael Trick (Ph.D., 1987), president of the Carnegie Bosch Institute for Applied Studies in International Management, a professor at Carnegie Mellon's Tepper School of Business, and a founding partner of The Sports Scheduling Group (scheduler for Major League Baseball).
- Bill Nulty (Ph.D., 1993), founding partner, Scientific Logistics, a startup in the Georgia Tech Advanced Technology Center, and formerly senior vice president, CAPS Logistics.
- Jarrod Goentzel (Ph.D., 1998), executive director, MIT-Zaragoza International Logistics Program, a new logistics academic and industry center in Zaragoza, Spain.

The Original TLI

"Not many people know this, but The Logistics Institute name was created on a train," says Dr. Edward H. Frazelle, a former ISyE faculty member who received his Ph.D. at Tech. "Somewhere between Washington, D.C. and The Greenbrier Resort [in West Virginia], I had an idea for a series of logistics seminars that could be offered through Georgia Tech's continuing education department."

Frazelle's idea had grown out of his teaching and consulting observations that "few people in key logistics positions in large companies had any formal education in logistics. My best estimate is that when we started TLI, less than ten percent of logistics professionals and managers had any formal logistics education. I attributed, and still attribute, many logistics failures to the lack of formal education in the field. We started TLI to provide formal, high quality, and reliable education for logistics professionals."

Frazelle recalls, "I remember approaching John Jarvis in 1991 with my request to break ranks with the traditional faculty career model and focus on logistics professional education.

In 1998, Don Ratliff was invited to Singapore to speak at a meeting of the Institute of Operations Research and Management Sciences (INFORMS). While there, Ratliff met informally with Singapore government officials and talked about Georgia Tech and TLI. Ratliff recalls, "While there, I didn't think much about our conversation, but after returning home, I begin receiving calls from the Singapore Embassy in Washington, asking a lot more questions about Georgia Tech and TLI." Soon there was a stream of campus visitors from the Singapore Economic Development Board (EDB). As it turned out, EDB was just beginning a major strategic initiative to attract world-class foreign universities to Singapore. Georgia Tech had been selected to join eight other world-class universities, including MIT, University of Chicago, University of Pennsylvania and John Hopkins University in Singapore. Each institution would be expected to establish an academic center of excellence focusing on a key area for future economic growth in Singapore. Georgia Tech was chosen for logistics and global supply chain management.

In November 1998, Jean-Lou Chameau, then dean of Engineering, and John Jarvis traveled to Singapore to sign a Partnership agreement with EDB and the National University of Singapore (NUS) to establish The Logistics Institute-Asia Pacific (TLI-AP). TLI-AP would be modeled after Georgia Tech's TLI, offering research, education, and industry outreach, all focused on Asia Pacific's role in global supply chains. A key element in TLI-AP's educational program would be a highly innovative Dual Master's Program (DMP), offering degrees in global logistics from both Georgia Tech and NUS.

TLI-AP began operation on the NUS campus in 1999 and moved into its new facilities in 2001.

After stepping down as ISyE Chair in 2001, John Jarvis was appointed TLI-AP Executive Director and moved to Singapore. Jarvis' arrival was the catalyst for a period of dramatic growth and accomplishment at TLI-AP. More than 75 students have now completed the DMP, including a "super" semester at Georgia Tech. These DMP graduates are highly sought after by global businesses and form an impressive group of Georgia Tech alumni in Singapore.

In October 2004, Dr. Jean-Lou Chameau, now Georgia Tech Provost, and a delegation of Georgia Tech officials, returned to Singapore to celebrate TLI-AP's fifth anniversary and to plan its next phase of growth and advancement.

I was a brand new faculty member at the time. Without the support of John Jarvis, John White, and Don Ratliff, TLI as a professional education program would never have made it."

As Dr. Jarvis remembers, Frazelle showed a strong interest and ability to work closely with industry. "John White, the dean of Engineering at Georgia Tech, and I devised a plan to keep Ed on the faculty," says Jarvis. "We encouraged Ed to create a

continuing education program for logistics professionals.” Jarvis says Frazelle selected the “institute” name in order to separate it from a research center and instead, reach out to industry. Frazelle began immediately to put together a staff including Freida Breazeal, Joene Owen, and Dale Atkins, all of whom had previously worked for MHRC. Mercy McClelland and Carole Bennett were recruited from Georgia Tech Continuing Education and TLI’s first logistics short course was offered in October 1992.

The Growth and Evolution of TLI

Bringing together the resources of these four ISyE entities in 1992 was the launching point for TLI’s rapid growth and advancement. New and expanded programs in research, industry outreach, and professional education flourished.

Professional Education

Under the new structure, Ed Frazelle continued to develop the logistics professional education curriculum; marketing TLI

to the logistics industry community and recruiting lecturers for TLI’s short courses and seminars. “At the time, logistics was just catching on as a buzzword in industry,” he says. “The demand for logistics education was nearly insatiable.” By 1995 Frazelle was spending more time managing than teaching, his real passion. In 1996, former U.S. Postal Service executive Harvey Donaldson succeeded Frazelle as director of Professional Education. Donaldson has now led TLI’s professional education and industry outreach programs for more than eight years.

By 1999, the market for logistics education had grown to include graduate degree education as well as short courses. With support from TLI, Professor John Vande Vate established a new Executive Master’s in International Logistics (EMIL) program. The first class of 24 EMIL scholars was admitted in September 2000 (see related EMIL story).

Spanning both Frazelle’s and Donaldson’s tenure, Joene Owen and Freida Breazeal have played critical roles in managing TLI’s administrative and customer service operations. When Freida Breazeal retired in 2000, Carole Bennett moved from Georgia Tech’s Continuing Education organization to become TLI’s Director of Marketing and to expand TLI’s marketing activities for all its programs. In 1999, Andy Haleblian joined TLI from CAPS Logistics to assist TLI in harnessing the power of computers and the Internet for its programs. In 2000, TLI expanded its professional education offerings to include the Logistics Management Series, an integrated four-module curriculum covering all aspects of the supply chain. LMS is directed by Ed Frazelle, and Tammy Artosky came on board to assist Ed and the TLI staff with LMS customer service.

This year more than 1,000 logistics professionals will participate in one of the 23 seminars, workshops, and conferences offered by TLI at the new Georgia Tech Hotel and Conference Center. After stepping down from TLI, Frazelle has gone on to become a very successful logistics consultant, author, and industry thought leader. He continues as one of TLI’s most popular lecturers and as the host of TLI’s first video program, the monthly “Fridays with Frazelle” live Internet broadcast, inaugurated in 2004.

Industry Research and Collaboration

One of TLI’s greatest strengths has been its relationship with the logistics industry community. TLI’s Leaders in Logistics program has been the core membership organization for involving companies in TLI activities. “UPS has been our largest financial supporter over the past 11 years, and we hope that TLI has used UPS’s investments wisely in logistics education, research, and global outreach,” says Ratliff.

Over the past decade, more than 50 companies have been members of *Leaders in Logistics*, and contributed time and resources to TLI research and professional education activities. Among TLI’s most active and longest-term industry partners are UPS, Sabre Holdings, Praxair, Manhattan Associates, Schneider National, General Motors, and Ford Motor

THE EXECUTIVE MASTER’S IN INTERNATIONAL LOGISTICS (EMIL)

With backing from then Provost Mike Thomas, Professor John Vande Vate assembled an advisory board including Mike Duke, president of Wal-Mart Stores; Frank Taylor, vice president of Ford Motor Company; Jim Kellso of Intel Corporation; Chris Lofgren, CEO of Schneider National; Koh Soo Keong, CEO of SembCorp Logistics; and two dozen leading executives from other top manufacturers, retailers, and logistics service providers to design an executive format Master’s program in Global Supply Chain Management. Georgia Tech’s Executive Master’s in International Logistics (or EMIL) program launched its first class in 2000 and has since grown to be the world’s premier international executive program in Global Supply Chain Management.

Designed around five intensive two-week residences spread over 18 months, the EMIL program combines traditional executive classroom instruction and face-to-face meetings with government and industry leaders in Asia, Europe, and North and South America. EMIL class members are typically at the vice president, director, or senior manager level in *Fortune* 500 companies or their international equivalents. The mix of industries, countries, and areas of responsibility represented in each class guarantees lively and valuable class discussions. The fact that 50 percent of the participants in each class typically already have an MBA speaks volumes about the depth and focus this program brings to a general management education.

Learn more about this exciting program
at www.emil.gatech.edu

Company. The Progress Group, an Atlanta-based consulting firm, has participated both financially and with hands-on support over TLI's entire history. "We've been blessed with tremendous support from many corporations and government agencies," says Donaldson. "In most cases there have been key individuals in the sponsoring organization who become part of the Georgia Tech logistics family."

Both Sabre Holdings and Schneider National have effectively used their relationships with TLI and ISyE to staff their technology development departments with young ISyE Ph.D. graduates. More than a dozen TLI graduate research assistants have gone on to start their careers with *Leaders in Logistics* companies. Not only has Schneider National recruited some of ISyE's most outstanding students and contributed to important TLI transportation research projects; most recently, Schneider National has established the Schneider National Chair in Transportation Logistics, now held by TLI Executive Director Chip White.

When Manhattan Associates, the supply chain software firm, moved its headquarters to Atlanta in 1998, it immediately established a close relationship with TLI: recruiting ISyE students, sending personnel to TLI professional education courses, and most significantly funding the Manhattan Associates Chair in Supply Chain Management, now held by ISyE Professor John Bartholdi.


Automotive companies, including Ford Motor Company, General Motors, and BMW, have also been strong supporters of TLI research programs. TLI is working with General Motors on the use of pricing in global supply chain optimization and with BMW on inventory management issues between BMW's global suppliers and its assembly plant in Greer, South Carolina.

Outreach and Globalization

As TLI grew along with the booming U.S. economy of the late 1990s, it was apparent to Jarvis, Ratliff, and Donaldson that TLI needed to move from a tactical focus on operational processes and systems to a more strategic focus on global supply chain issues. The first step in this evolution was the establishment of TLI's Global Logistics Program, made possible largely through a generous grant from UPS. Mokhtar "Mo" Bazaraa was selected to head the new program and joined TLI in 1999. Bazaraa, a Georgia Tech alumnus and former ISyE faculty member, left Georgia Tech in the 1980s to pursue a distinguished business career, first at Burnham Logistics and then at American Airlines. As a senior vice president of American's then subsidiary, Sabre Group, Bazaraa was an early and important TLI industry sponsor and collaborator. His return to Georgia Tech signaled the beginning of TLI global expansion. The most significant milestone in this expansion came quickly with the establishment of The Logistics Institute-Asia Pacific in Singapore (see related sidebar). Since then, TLI's network of international affiliates and collaborators has now expanded to South Africa, Latin America, and most recently, China (see page 16).

As logistics moved beyond the functional elements of transportation and warehousing to become an important element of the competitive advantage of global enterprises, TLI needed to further expand its "footprint."

As its programs and visibility grew, TLI also chose to expand its relationship with the executives who manage global supply chains. As logistics moved beyond the functional elements of transportation and warehousing to become an important element of the competitive advantage of global enterprises, TLI needed to further expand its "footprint." To lead this important expansion, TLI recruited John Langley to become TLI's director of Supply Chain Executive Programs. Langley came to Georgia Tech from the University of Tennessee College of Business where he was a chaired professor of transportation. Langley brought to TLI not only strong academic credentials, but also many industry relationships developed as a former president of the Council of Logistics Management (CLM), frequent industry speaker, and board member. Shortly after joining TLI, Langley established the Supply Chain Executive Forum to serve as TLI's primary outreach to the supply chain executive community. Today, more than 30 industry executives meet at Georgia Tech twice each year to hear presentations by logistics experts and thought leaders and to discuss global supply chain issues. According to Langley, "Supply Chain Executive Forum represents one of the most relevant and valuable opportunities for senior supply chain executives to enhance the strategic impact of their supply chain processes and activities."

The most recent addition to the TLI executive team is Chelsea C. "Chip" White III. White joined the ISyE faculty in 2001 as the ISyE (now Schneider National) chaired professor in Transportation and Logistics. He came from the University of Michigan, where he had been IE department chair and associate dean of Engineering. White brought with him the Trucking Industry Program (TIP), a Sloan Foundation Industry Program, which has significantly enhanced TLI's involvement with the transportation industry. In 2003, Chip White became executive director of TLI, with a mission to continue TLI's globalization and outreach. White's current interests focus on global supply chain and their impacts on emerging markets (see page 16). In late 2004, under White's leadership, Georgia Tech was selected to establish a new U.S. Department of Transportation sponsored Transportation Research Center, focusing on global supply chain security and productivity. 



A Conversation with Chris Lofgren

CHALLENGES

in Today's Transportation Logistics

EE: What are the important issues in transportation logistics today? What do you see as the future?

CL: One of the most interesting trends emerging today is the broadening of service offerings by transportation logistics providers. They're doing this for a couple of reasons. First, they recognize that their customers' supply chains are only getting more complex with time. Logistics providers can leverage their own cost base, expertise, and other advantages to service these customers and their supply chain needs more effectively. Also, many companies have cultural and budgetary challenges that make it tough to collaborate internally and unlock the full value of their supply chains. This is where a logistics provider can really add value. By outsourcing logistics, companies can work through and de-emphasize those issues more effectively. For this reason, the big players are getting bigger faster.

EE: As service offerings are expanding, which are most likely shared by everyone in the industry? What are the exciting new additions to the set of service offerings?

CL: Let me respond to the latter part of your question first. I think what we're starting to see is exemplified by UPS's recent acquisition of Menlo's forwarding business. Logistics providers are trying to get positioned to provide a seamless

international offering to their customers in the areas of helping customers' clear customs and arranging for the necessary, often complex services required around an international transaction. Similar transactions have been made by other large providers such as DHL, FedEx, and Exel.

EE: That suggests then, that broadening service offerings might indicate a broadening of a geographic footprint as well.

CL: I think the big players, such as UPS and FedEx are doing that. It's imperative for them because of what their competitors are doing now. They have opportunities to take advantage of a geographic expansion and turn it into a significant contributor to their largest revenue source – their parcel and air business, for example. They have assets and capabilities at play in this arena that can provide significant leverage.

You'll see a difference, however, with those companies that have been traditionally domestic players, such as Schneider. And it may also be different for those that have both domestic and international offerings, such as Exel, who are starting to broaden beyond their traditional core competence. It will be interesting. Maersk is another example with its Hudd Distribution acquisition. Maersk tried to offer more value-added services to its steamship



Christopher B. Lofgren received his Ph.D. in industrial engineering from Georgia Tech in 19xx. He is president, chief executive officer, and member of the board of directors at Schneider National Inc., based in Green Bay, Wisconsin. Schneider National, a \$2.4 billion provider of transportation and logistics solutions, is the largest truckload carrier in North America. For more information about Schneider National, visit www.schneider.com.

services to solidify its market position. And that's the really big theme here: everyone is trying to expand what they traditionally offer to create a defensible and competitive market position. The industry ultimately does shake out, however. And in many cases I think there is more clarity today, as industry players begin to understand how they can create value, where they sit in the competitive landscape and what is defensible. The industry is getting much smarter.

EE: Do you see any tendencies or trends that suggest that a generalist logistics company needs to have expertise in specific industry verticals?

CL: You're seeing that happen as well. At a minimum, there is a specific business vocabulary that is critical to separate effectively in a vertical. But more importantly, I think the operational challenges of each industry are quite different. Pharmaceuticals is a strong example of this. Protein-based pharmaceuticals require temperature controls during shipping. You'll see companies specializing in and lining up to support industry verticals. By doing so, they'll be able to leverage their ability to fulfill a niche and create better cost structures and service offerings to support these unique needs.

EE: When I hear people give the one floor elevator speech, in terms of what's going on in the industry, it is China, security, and RFID (radio frequency identification). I guess we've covered China, in terms of emerging markets in the broadened services offerings trend that you mentioned. With respect to RFID and IT, Schneider has certainly been an industry leader in applications. Do you see opportunities for further investment in IT that would help to make what you do even more efficient?

CL: Well, the investments that we're making now are in the area of trailer tracking. Again, we want to gain more visibility into where the trailers are, whether they are full or empty, and how they are being used. The industry has been working to get a viable and sustainable economic model for this for about ten years. We formed a consortium group with our trailer tracking technology vendor Qualcomm and other truckload carriers, and the technology is being rolled out right now. We'll see lots of improvements both for our customers, who now have greater predictability with freight, as well as ourselves, because we will be able to streamline operations and stop the abuse of our equipment. This kind of technology is going to create a number of very interesting opportunities – so much so that it may be too early for the industry to thoroughly understand the benefits.

EE: This consortium, it is based on Qualcomm's OmniTRACS system?

CL: Yes, but it's actually the trailer tracking system. OmniTRACS is their in-cab mobile satellite technology. This is their T2™ Untethered TrailerTracs solution. Now we have the capability to physically track a trailer location and load status. We surveyed our customers last year and found that a majority of customers reward carriers that employed this type of technology with more freight.

The industry is not that big and there can't be that many providers. They have to get some leverage if you want to have it at a cost you can get a return from.

EE: The consortium, in terms of the carriers, it includes you and others?

CL: The companies that are part of the consortium right now are Swift, Schneider National, Werner, Celadon, and Atlas World Group. The consortium recognizes that in order for there to be the requisite economics in place for Qualcomm to create a viable business, Schneider couldn't demand exclusivity and a two-year head start on the competition. The industry is not that big and there can't be that many providers. Vendors must be able to earn a return.

EE: The third item had to do with security. I want to broaden that to supply chain disruptions in general. It could be weather; it could be labor, strikes, SARS, or any major disruption that affects the viability of a supply chain. As a carrier, this affects you only as it affects your customers, perhaps, but at the same time you do have security concerns yourself.

CL: In my mind, security has more of an impact on us than on our customers. We're the ones that have to comply with customs. We're the second largest cross-border Mexican motor carrier. From an over-the-road standpoint, we're the largest cross-border provider in Canada as well. So for us the issue is – and this has been a real frustration – that the TSA wants to mandate and regulate, as opposed to getting together with those who are ultimately impacted and ask, "Is there a way that you can have both?" We always operate under the tyranny of "or," as in: it can either be this way or that way. For example, today we're able to pass customs in Canada very quickly. There are intermittent inspections of course, but we can typically comply with freight pick-up location, shipper name, trailer contents, destination, driver information, and all the other data, and as a result cross the border quite quickly.

So here's the situation we are in – if you're willing to make an investment in technology, align your processes, and ensure that customs regulations are met – you'll realize much more efficient processing through the border and beyond. That is a

win-win deal, and I think that's what has to be done here. Often, in their haste, regulators just want to put something in place regardless of whether it's truly workable. The position that we ought to inspect every container is foolishness. Particularly because more containers move into this country than do people on airplanes – and people don't have to be unloaded. So, imagine the cost of building infrastructures to unload containers for inspection or move all those containers through an x-ray scanner. Who is going to pay for that? We have to think about the interruption in terms of time-in-transit.

EE: Actually Chris, one of the things that TLI has done with funding from a variety of sources is to study the impact of new security initiatives on moving containers through ports as well as on supply chains. You're right. One hundred percent inspection would, from a trade point of view, actually drive us into a depression.

CL: We did some research early on and our statistics indicated that if we were to increase the average time to process shipments across the Canadian border by one hour, the cost for the truckload industry would be \$500 million. These costs are ultimately passed on to the consumer and don't even begin to include all of the inefficiencies that will arise, for example, from companies building up inventories to ensure they can fill an order and stay competitive.

EE: We actually calculated that. We looked at it from two different perspectives: What if the container is checked in Singapore before it sails for Los Angeles-Long Beach? If the inspection time takes long enough for that container to miss a sailing, then you have a tremendous added lead time, which means more buffer stock if you want to keep your customer service level the same. We calculated that on the basis of the percentage of containers checked. If three percent are checked, it is so much buffer stock added, if five percent it is so much more, and so forth.

CL: One of the things that would really be interesting to determine is the amount of working capital that would have to be applied to maintain the added stock, versus deploying that capital to start a company and bring jobs to an area. Security issues are a huge sea anchor on the economy.

EE: Yes. Fortune magazine, about a year ago, estimated that all of the transportation logistics and supply chain drain on the economy right now due to security issues was about \$150 billion a year. A significant percentage of our GDP growth.

CL: Now imagine the burden on the economy to overcome that and create more jobs. This has got to be done thoughtfully. In the end, it's an insurance policy. We're buying an insurance policy that we hope we'll never have to use. Frankly, if we're successful, we'll never know.

EE: Yes, just like health insurance – hopefully you never know.

CL: I don't believe this ought to be viewed as something to be regulated and taxed. Solving these issues absolutely has to be

a collaborative effort between the government, military, private corporations, and the people who are impacted. Done thoughtfully, it will create some efficiencies and still achieve the benefits. You can have both.

EE: *By the way, we have had real difficulty finding situations where, if you add security technology and end up benefiting from it in some ancillary way – such as the asset visibility – the win is as big as many vendors suggest it is. Many vendors see investment in security technology from the point of view of “buy it, and it will help your productivity.” It’s just not that clear under the current regulations, particularly the Containers Security Initiative (CSI). CSI is written in such a way that you can reduce the negative productivity impact as much as possible. The regulation needs to be written differently.*

CL: That’s true. But I believe there is a way to write it, and there is a way to get to compliance that can potentially do that.

EE: *I’m a bit surprised here, because we were thinking that supply chains were affected more than carriers and ports by these new U.S. security initiatives. It also brings into play something else that might affect you: instead of designing supply chains for just-in-time, some supply chains are being designed for resilience. A shock proof supply chain. So if things do happen that are unexpected, the supply chain can recover relatively quickly. And often it requires additional bumper stock or additional suppliers for the same components, for example, in different geographical areas, as a result, and a reduction in productivity.*

CL: That is one of the reasons that I still believe very much in the Mexican economy. Just look at the time it takes to move freight from the central part of Mexico to the Midwestern United States. Compare that with the cost of taking it from China to the Midwest. It takes a great deal of time longer in the second example. And, there are generally more people to interact with. So, you’ve got more links in the chain and more time in the chain. Both of those things create complexity and variability. Labor is the thing driving this. We are seeing the labor exchange taking place. Remember, it was always cheaper to do things in Japan, and then it was cheaper in Korea. Now it’s cheaper in China. As the Chinese economy grows and becomes more sophisticated, the Chinese standard of living will improve and the cost base will move up. There is a point where we have to ask, “If I lose an opportunity to have my product on the shelf during a critical revenue season, what is the real benefit of using cheaper labor?”


EE: *As a matter of fact, there are companies in Bangalore that are outsourcing to Indonesia and Malaysia.*

CL: That doesn’t mean that companies don’t have an obligation to find ways to manage their costs. I just think that SARS created some awareness of, “What am I doing here?” It goes back to the concept of optimization. Does it need to be optimal or does it need to be robust? Companies are realizing that supply chains are critical parts of their competitive position, as well

**I think the world of Georgia Tech,
and I know a good part of where I am
today is because of all of the people there
who did so much for me.**

as their ability to grow and maintain market share. If you’ve got a finely tuned supply chain that crumbles when there are hiccups, how optimized is it? There are more elements in the supply chain today than there were before, and the speed at which everyone is moving puts a premium on robustness – maybe over at that lab, a tenth of a percentage point.

EE: *Chris, you’ve been a terrific friend to Georgia Tech. Let me thank you.*

CL: I think the world of Georgia Tech, and I know a good part of where I am today is because of all of the people there who did so much for me. You will always have a warm place in my heart. 

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The Future of

TLI



BY DR. CHELSEA C. WHITE III

Schneider National Chair in Transportation and Logistics
Executive Director, The Logistics Institute

TLI has as its mission to serve the logistics industry, broadly defined, and its stakeholders by:

- Understanding trends and issues of current importance (benchmarking, field-based research).
- Examining operational, management, and strategic issues of importance at the firm, industry, and policy levels (knowledge creation and innovation, analytical research).
- Disseminating this information to current and future professionals by traditional master's degrees, short courses, and professional and executive education

The future of TLI is indeed a bright one, as by linking what we do to the needs of the industry, we align ourselves with a large and robust sector of growing critical importance to the economies of the region, state, and nation.

The future of TLI is indeed a bright one, as by linking what we do to the needs of the industry, we align ourselves with a large and robust sector of growing critical importance to the economies of the region, state, and nation. The U.S. logistics industry generates almost 10 percent of the nation's GDP. International trade, enabled by international logistics, generates almost 30 percent of the nation's GDP. The latter percentage continues to grow, which figures prominently into our future plans, as we will describe below.

What are the trends that help to define the directions of the logistics industry? The quick (single floor) and somewhat inaccurate elevator speech would be "security, RFID, expanded services, and China." Let me address each of these trends in more detail and then mention how TLI is responding to them.

Terrorism and Other Major Disruptive Events

As we are all aware, possible future terrorist attacks on the U.S. may make use of the freight transportation system, and such attacks may have devastating impact in terms of lives lost and economic consequences (O'Hanlon, et al., 2002). Such assessments have resulted in a variety of U.S. security initiatives that have affected the manner in which U.S. bound freight can be moved into, and within, the U.S. (for a summary of these initiatives and related research, please visit www.isye.gatech.edu/setra). It is estimated that the economic impact on U.S. supply chains due to higher shipping costs, increased travel times, increased inventories, border delays, and other changes as a direct result of the September 11, 2001, terrorist attacks in New York City and Washington, D.C., is \$150 billion per year (Bernasek, 2002). Given the size of the economic impact of security, and the impact that it can make on the pro-

ductivity of ports, carriers, and the supply chains of shippers, there is much to be done to insure that this impact is as small as possible, suggesting the importance of the involvement of all stakeholders (shippers, carriers, port operators, regulators, etc.) in formulating security policy and regulation.

Supply chain security also serves as a placeholder for a much broader range of issues associated with risk and supply chain design. Terrorism and terrorist threats are one of many types of events that fall into the category of low likelihood, potentially high impact disruptions. Other examples include extreme weather (e.g., typhoons, hurricanes), labor unrest (e.g., 1997 UPS strike, 1998 GM strike, 2002 longshoremen strike, and West Coast ports lockout), and other significantly disruptive events (e.g., 1997 Toyota brake plant fire, 1999 earthquake in Taiwan, 2000 Nokia-Ericsson supplier fire, 2003 SARS outbreak). A current “best practice” is to design just-in-time (JIT) supply chains that keep inventory low and focus on minimizing production cost. However, such supply chains are “fragile” in that their performance often does not degrade gracefully when subjected to any substantial level of uncertainty, but particularly when there is a major disruption. For example, consider the response of the Toyota production system to the 1997 brake plant fire; production lines were shut down within two hours of the outbreak of the fire.

Explicit consideration of demand uncertainty may lead to better control of “build to order,” and more generally hybrid push-pull, supply chains. Postponement, which is dependent on product design, and/or the use of multiple suppliers for the same component will tend to help increase the robustness or resilience (shock proof) of supply chains to major disruptions and promote a quick return-to-normal (a “self healing” or adaptive characteristic) once the disruptive event has passed. Of course, approaches to supply chain control require information on which to base control decisions, and information in the supply chain is our next topic.

Explicit consideration of demand uncertainty may lead to better control of “build to order,” and more generally hybrid push-pull, supply chains.

RFID and Other Real Time Information Enablers

When “trading information for inventory,” a recent mantra in the industry, we are of course aware that the information being “traded” results from data generated by sensors, transmitted by (fixed or mobile) wireless and/or wireline communications technology, and processed in order to be put into a form useful for decision support. Sensors (e.g., RFID tags, GPS and mobile communications systems, road and intersection cameras that count vehicles) are used to measure (generate data about) some aspect of a supply chain or the enabling

The firm level objective is to leverage the cost of providing one service offering in order to provide other service offerings and perhaps in doing so, differentiate the firm from its competition in a manner that attracts more market share or profit.

transportation system (e.g, inventory level, vehicle, vessel, or trailer position, speed, or direction, temperature, oil or air pressure, driver alertness, traffic congestion), and these measurements may be noise corrupted. These data require transmission, and there may be transmission errors and delays. The sensor network requires design. Further, to transform the data into a form usable for decision support, the data may require processing, and there may be processing errors and delays. In addition, the network may partially or completely fail on occasion. Finding ways to turn such data into decisions in near real-time that enhance supply chain productivity or resiliency is a major challenge for the future. Finding ways to promote the stability and optimality of supply chains that are controlled by multiple control agents, each having its unique incentive system and only partial access to overall information flow, is also a major future challenge.

Expanded Services

As many forms of manufacturing (e.g., durable goods, retail, consumer electronics) are downsizing and outsourcing, logistics firms are expanding their service offerings. The trucking or package express company that a few years ago became, in addition, a logistics provider is now offering to also design and manage customer supply chains and perhaps add value as the product moves through the supply chain. The firm level objective is to leverage the cost of providing one service offering in order to provide other service offerings and perhaps in doing so, differentiate the firm from its competition in a manner that attracts more market share or profit.

China and Other Emerging Markets –

Expanded Geographic Reach

Much of the aforementioned outsourcing is off shore, and this means supply chains with longer lead-times for the U.S. market. Longer lead times usually imply greater lead-time variability. Increased lead-time and lead-time variability implies greater logistics cost, assuming that the customer service level is kept constant, which requires the item outsourced to be manufactured inexpensively to make economic sense. Inexpensive manufacturing and emerging markets are not quite synonymous, but are almost so. Thus, the multi-national shipper that outsources its logistics function needs the multi-national

The capacity crisis involves congestion at sea and air cargo ports, sea-lanes (e.g., the Panama Canal), highways, and rail lines, and the need of more drivers and moving assets.

logistics provider. Further, we observe, the country that provides the inexpensive manufacturing capability observes its own domestic market development, fueled by the economic expansion resulting from its growing manufacturing capability. Thus, the multi-national logistics provider that initially entered, for example, China to move manufactured goods from China to the U.S. market is now finding opportunities to move goods within the Chinese domestic market.

The TLI Response

Let me now describe how TLI is responding to the above (and a few other) trends, as an indication of how TLI is adapting to the ever-changing logistics industry landscape. In terms of security, TLI hosted, in April 2004, an NSF-funded, two-day workshop that had as its objective the development of a research agenda for supply chain security and productivity. Roughly half of the attendees were academics, with the other half representing all major non-academic stakeholder groups. The final report of this workshop is posted at www.tli.gatech.edu.

This October, we co-hosted, with Schneider National, a summit on the freight capacity crisis that is currently affecting the industry and nation. Approximately 250 leaders and stakeholders in the freight transportation industry attended. The capacity crisis involves congestion at sea and air cargo ports, sea-lanes (e.g., the Panama Canal), highways, and rail lines, and the need of more drivers and moving assets. Other issues of concern were also raised, including the cost of fuel and pressing regulatory issues such as the hours of service and diesel engine emission regulations. (See the article on page 19 for more information.) The agenda, the names of the speakers and their presentations are all available at www.tli.gatech.edu. This was the second such summit we have co-hosted with Schneider (the first, last year, was on the new hours of service regulations that went into affect in January 2004), and we are delighted to have the opportunity to provide a national forum for industry-wide discussions on topics of current and critical interest to the industry.


Along with faculty at Massachusetts Institute of Technology, North Carolina A&T, and Stanford Universi-

ty, we have recently submitted a proposal to the National Science Foundation for a center to study research topics on risk and supply chain design, sensor networks and real-time control of supply chains, and decentralized supply chain collaboration. Our objective is to develop a science of supply chain systems. We have been fortunate to obtain the support of many key corporate friends and hope to be pursuing the proposed research soon.

As you may know, TLI has a sister institute in Singapore, TLI-Asia Pacific, which is a research and educational collaboration between Georgia Tech, the National University of Singapore, and the Economic Development Board of Singapore. This collaboration celebrated its fifth anniversary in October during a highly successful week of presentations and “think shops” in Singapore. As we look into the future, we see that there is much to learn and discover about logistics in emerging markets such as China, and as a result, we are in the planning stages of putting an “outpost,” similar to what we have in Singapore, in Shanghai. We envision that our efforts will result in a collaborative relationship with a small number of private multi-nationals, a Chinese government agency, a Chinese university, and TLI-Asia Pacific. We intend to keep you posted as the details of this initiative become available. Such an outpost will give us an excellent vantage point for understanding the logistics industry in China, creating knowledge helpful to shippers and carriers doing (or wanting to do) business in China, and disseminating the knowledge that we discover and create to participating firms and to current and future logistics professionals.

We should also mention that there are several other, more specific trends that we track, including:

- Regarding the third party logistics segment of the industry, the reduction in the size of contracts, and the increasing need for vertical market expertise.
- Regarding less-than-truckload, the encroachment on less-than-truckload from above by the truckload industry and, especially, from below by package express.

In summary, TLI continues to provide leadership in logistics research, education, and outreach nationally and internationally and is pursuing several new key avenues for extending this leadership. I look forward to any of your questions and comments. Thank you for your continuing support. Please visit our website to find out more about TLI: www.tli.gatech.edu. 

References

- M. E., O'Hanlon, et al., “Protecting the American Homeland.” Brookings Institution Press, Washington, D. C., 2002.
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Shippers, Transportation Carriers, and Industry Leaders Attend Freight Transportation Capacity Summit

The Logistics Institute and Schneider National Inc. hosted The Freight Transportation Capacity Summit at Georgia Tech this fall. This year's program focused on the capacity crisis facing the transportation industry. A video of the Summit, presentation materials, and a capacity white paper are posted online at www.tli.gatech.edu/tcs/archive/.

Nearly 250 transportation and logistics professionals attended the Summit. Speakers, panelists, and participants included representatives from the nation's largest shippers, truckload carriers, less-than-truckload carriers, railroads and government officials, academics, and financial analysts. Christopher Lofgren, president and chief executive officer of Schneider National Inc., delivered the keynote address on the state of the freight transportation industry and set the stage for two days of discussion. Shippers presented their transportation needs and their perceptions of service and capacity challenges. Carriers discussed

human resource infrastructure, financial and regulatory issues.


"Transportation companies are heavy users of both labor and capital. The health of our industry is dependent on these two factors," said Lofgren. "Capital spending across truckload, less-than-truckload, and rail has fallen more than 30 percent since 1998 while growth in the U.S. labor pool has not kept up with driver demand."

Investment in capital and drivers was a recurring theme at the Summit. Representatives from Union Pacific and Norfolk Southern railroads discussed the need for infrastructure improvements while over-the-road carriers called for driver compensation increases and lifestyle improvements to attract and retain truck drivers and make driving competitive with industries such as manufacturing and construction.

"This is the second year that Schneider National and The Logistics Institute at Georgia Tech have co-sponsored a Summit designed specifically to foster

discussion and promote collaboration among shippers, carriers, and other industry leaders," said Chip White, executive director of The Logistics Institute. "The transportation capacity shortage is real and is producing significant challenges for carriers, shippers, and drivers. Resolving this crisis is not the responsibility of carriers alone, but of the entire industry."

Schneider National Inc. is a premier provider of transportation, logistics, and related services. Schneider National serves more than two-thirds of the *Fortune* 500 companies, offering one of the broadest portfolios of services in the industry. Schneider Logistics, a wholly-owned subsidiary of Schneider National, provides supply chain management technology, managed services, engineering services, and freight payment.

Headquartered in Green Bay, Wis., Schneider National has a track record of providing expert transportation and logistics solutions. For more information about Schneider National, visit www.schneider.com or call (800) 558-6767. 

Supply Chain Executive Forum Targets the Executive Agenda

The theme of the Georgia Tech Supply Chain Executive Forum (SCEF) Fall 2004 meeting was "Getting SCM/Logistics on the Executive Agenda," a topic of great interest to everyone in attendance. The tone for the meeting was set by Dr. Karl Manrodt of Georgia Southern University, who reported on the preliminary results of a research project currently being conducted for the Council of Logistics Management titled: "Corporate Value of Logistics: The CEO Perspective."

Then, Dr. John Langley, professor of Supply Chain Management at Georgia Tech, and Gene Tyndall, partner at Supply Chain Executive Advisors LLC, discussed "Senior Executive Priorities for SCM and Logistics," and "What's Really on the CEO's Minds and Why," respectively.

The meeting also provided an opportunity for SCEF members to collaborate on a panel discussion central to the theme, and then a break-out session to uncover new ideas relevant to the topic. The SCEF members partici-

pating in the panel session were Jon Brdecka (Payless Shoesource), Danny Garst (Philips Consumer Electronics), Bill Turner (Hershey Foods Corporation), and Bill Waldrop (Andersen Corporation).

Founded in 2003, the SCEF provides executives from leading supply chain organizations with new and compelling ways to streamline their supply chains and to transform supply chain strategies and practices to respond to a continually-changing business world.

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WHITE NAMED SCHNEIDER NATIONAL CHAIR

Chelsea (Chip) C. White III has been named Schneider National Chair in Transportation and Logistics for the School of Industrial and Systems Engineering (ISyE) at Georgia Institute of Technology. Dr. White is also executive director of The Logistics Institute.



(L-R) Chris Lofgren, Ph.D. IE 1986, and Chip White

The Schneider National Chair Endowment Fund is funded by Schneider National, a premier provider of transportation, logistics, and related services in the United States. The chair will provide high-caliber undergraduate and graduate instruction and research at Georgia Tech. Students will have the opportunity to conduct individual projects in the logistics and supply chain management area with special emphasis on problems of carriers and shippers.

Dr. White came to Georgia Tech in 2002 from the University of Michigan, where he served as professor of Industrial and Operations Engineering and Electrical Engineering and Computer Science, as well as director of the Intelligent Transportation Systems Research Center and co-director of the University of Michigan Trucking Industry Program. He earned his Ph.D. from the University of Michigan in computer, information, and control engineering, and he additionally has served on the faculties of Southern Methodist University and the University of Virginia. Dr. White teaches courses about decision-making under uncertainty and risk.

"I am delighted to become the Schneider National Chair of Transportation and Logistics. There is a close and long standing relationship between Georgia Tech and Schneider National.

Schneider National and its excellent leadership team have made significant contributions to the trucking industry and the nation's economy," said Dr. White. "We're especially proud that Schneider National's president and chief executive officer, Dr. Chris Lofgren, is an alumnus and dear friend. I would also like to thank the ISyE development office, particularly Diane Kollar, for helping to make this happen."

"The newly created Schneider National Chair of Transportation and Logistics at Georgia Tech will bring a new level of visibility and permanence to the study of logistics engineering," says Christopher Lofgren, Ph.D., president and CEO of Schneider National. "As a Georgia Tech alumnus and a business partner through Schneider National, it is a privilege to help fund the future of an organization so ingrained in the knowledge, discovery, and advancement of supply chain management, logistics, and transportation planning."

Schneider National's commitment to this chair provides strong evidence of ISyE's track record for innovations in transportation and logistics," said Bill Rouse, ISyE School Chair and H. Milton and Carolyn J. Stewart Chair and Professor.

ALUMNI NEWS

William W. George, BIE 1964, of Boston, a senior lecturer at Harvard Business School, author, and one of "The 25 Most Influential Business People of the Last 25 Years," according to PBS Nightly News, was named to the ISyE Hall of Fame for 2004. Prior to joining Harvard this year, he served as



(L-R) David Cowan, BIE 1977, MSHS 1979, and Bill George, BIE 1964

professor of Leadership and Governance at IMD International in Lausanne, Switzerland, and executive-in-residence at Yale University's School of Management. The ISyE Hall of Fame Award is presented each year to an individual who has shown outstanding accomplishment and service to his/her chosen profession. The recipient is honored for leadership as well as the recognition he or she has brought to both Georgia Tech and to the School of Industrial and Systems Engineering.



(L-R) David Cowan and Pam Arlotto, BSHS 1980

Pam W. Arlotto, BSHS 1980; and **Michael C. Riordan, MSHS 1986**, were named to the ISyE Academy of Distinguished Alumni in 2004. The Academy honors those individuals who have earned outstanding career accomplishments and brought recognition to the School of Industrial and Systems Engineering and Georgia Tech.

Arlotto has served as a healthcare industry consultant and entrepreneur for 25 years. As president of Maestro Strategies, Inc., she combines experience in strategic planning, organization design, and process transformation with information technology expertise.

Michael Riordan is president and CEO of the University of Chicago Hospitals and Health System, one of the nation's leading healthcare facilities and the largest in Illinois, known for its care at the forefront of medicine. He joined the hospital in 2001, after serving as chief operating officer for Emory University Hospital for five years.

College of Engineering Annual Awards

Michael T. Duke, BIE 1971, president and chief executive officer of Wal-Mart Stores Division was named to Georgia Tech's College of Engineering Hall of Fame in 2004. The Hall of Fame



(L-R) Bill Rouse and Michael Duke, BIE 1971

is the highest honor that can be bestowed on alumni in the College of Engineering. Hall of Fame membership is reserved for alumni who have made sustained and meritorious engineering and/or managerial contributions during their careers.

New members of the Academy of Distinguished Engineering Alumni include: **Vernon M. Bettencourt Jr., MSOR 1976**, Chief Information Officer, Office of the Secretary of the Army, Washington, D.C.; **Mario Miguel Canahuati, BIE 1977**, Ambassador of Honduras to the United States, Washington, D.C.; and **David D. Flanagan, BIE 1976**, principal and president of Elm Street Development in McLean, Virginia.

New members of the Council of Outstanding Young Engineering Alumni include:

Eugenia Villalobos, MSIE 1999, of San Jose, Costa Rica, an investment officer for the EcoEnterprises Fund at The Nature Conservancy.

Other Alumni News

Cynthia Anderson, BIE 1981, has joined CEA Technologies, Inc., of Colorado Springs, Colorado, as a development engineer. CEA is a leading custom design manufacturer of medical devices.

Catherine Cooper, BIE 1990, is the new president and CEO of the Atlanta-based consulting firm, The Progress Group. Cooper is based out of Albuquerque, New Mexico, where she lives with her husband, Chaonki T. Abdullah, Ph.D. EE 1988, and their five-year-old twin boys.

Shaishav Dharia, MIE 1997, has been promoted to the position of vice president of Consulting at LogicTools. He was most recently director of con-

sulting for the company. Dharia, who joined LogicTools in early 2003, formerly worked as a manager at BearingPoint. LogicTools is a leading provider of supply chain planning solutions.

Gregg R. Griffin, BIE 1979, recently married Kathie Lynn Mangum, and relocated to Charleston, South Carolina, where he has been promoted to manager of Distribution Dispatch Operations for South Carolina Electric and Gas.

Shawn Montague, BIE 2002, of Windermere, Florida, has recently changed positions. He was working as an industrial engineer for the Walt Disney Company; now he is in the same position with Walt Disney World.

Stephen Necessary, BEES 1978, has been named to the Board of Directors at Blonder Tongue Laboratories, Inc. Necessary is president of Concurrent Computer Corporation's Video-on-Demand Division, located in Duluth, Georgia. Blonder Tongue is a leading U.S. designer, manufacturer, and supplier of broadband systems equipment and technical engineering services.

William R. "Bill" Ransom, BIE 1961, was inducted into the Sports Hall of Fame at the Baylor School in Chattanooga in October 2004. Ransom, who lives in Atlanta, is the number three producer at Jenny Pruitt & Associates, where he works with his wife of 28 years, Leslie H. Ransom.

J.M. Taylor, BIE 1964, has published the award-winning techno-thriller book *Flash of Emerald* and *Behind the Green Water*, a military thriller set in the Middle East. Visit Taylor's website at <http://johnmtaylor.com> or the publisher, Hard Shell Word Factory, at <http://hardshell.com>.

STUDENT NEWS

Abhyuday Mandal, Ph.D. student, won the Best Student Paper Award at the October INFORMS meeting in Denver. The competition is sponsored by the QSR (quality, statistics, reliability) Section of INFORMS. Four papers were chosen for presentation out of nearly 20 papers submitted. Mandal's presentation is based on the written

paper "SELC: Sequential Elimination of Level Combinations by Means of Modified Genetic Algorithms."

Kendra Houston, Kiesha Robinson, and **Mahdi Woodard**, students from Westlake High School in Atlanta, were chosen as semi-finalists for the Siemen's Westinghouse Math, Science, and Technology Competition. Students from **Professor Jane Ammons' IsyE** lab worked with the high school students, as well as students from Tri-Cities, Stone Mountain, and Marietta high schools.

STAFF NEWS

Gwen Brown, Administrative Assistant II in IsyE, was recently featured in a *Marietta Daily News* photo. Brown, and other members of Turner Chapel AME in Marietta, helped Mean Time Ministries serve its annual Thanksgiving dinner to the homeless.

S U M M I T

(continued from page 19)

SCEF currently has 23 member firms, representing all walks of supply chain life: manufacturers, suppliers, retailers, wholesalers, 3PLs, transport providers, and software and technology firms. It is through the process of discussion and dialogue among these member firms that priorities for supply chain improvement may be identified and addressed.

The Supply Chain Executive Forum meets twice yearly on the Georgia Tech campus. The next meeting is scheduled for April 6-7, 2005. For further information on the Supply Chain Executive Forum, please contact: Dr. C. John Langley Jr., professor of Supply Chain Management and director, Supply Chain Executive Forum, at 404-894-6523 or john.langley@isye.gatech.edu.

ALUMNI NEWS

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