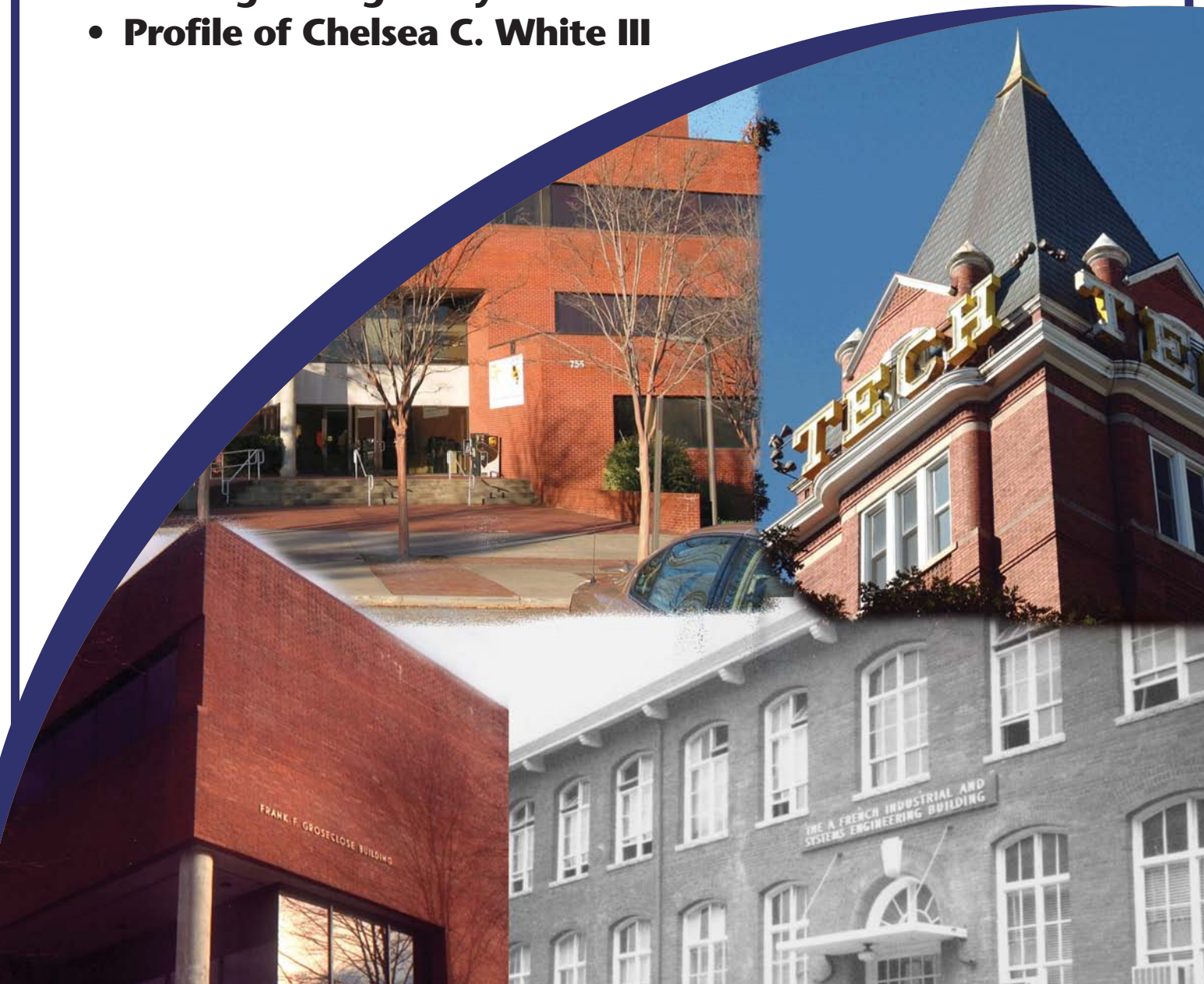


Engineering **ENTERPRISE**

THE ALUMNI MAGAZINE FOR ISyE AT GEORGIA INSTITUTE OF TECHNOLOGY

Fall 2005

- **The Roots of Industrial Engineering**
- **Leading ISyE**
- **Parting Thoughts by William B. Rouse**
- **Profile of Chelsea C. White III**



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Enterprise Transformation


by John A. Harrison

For this issue of *Engineering Enterprise*, our outgoing chair, Bill Rouse, asked me to take a look back on the first 60 years of the School of Industrial and Systems Engineering at Georgia Tech. He felt that a few comments from someone who lived part of that history would provide an interesting perspective.

I graduated in 1966—late enough to have missed the serious urgency of the WWII vets coming home to start their lives and early enough to have missed the 1980s influx of pre-Internet bubble engineers-in-training. However, the 1960s at Tech were interesting enough. We experienced the only peaceful integration of a southern college campus, the domestic turmoil of Vietnam, and women showing up in classes in ever-greater numbers. Throughout all of these eras, with their own causes and crazes, one thing has remained constant: Georgia Tech's ISyE program prepares some of the best engineers in the world.

To demonstrate how far the School has come in the last 60 years, this issue of *Engineering Enterprise* features articles on changes in the curriculum, leadership, and student body. Tech's first IE class had 15 students; today more than 1,300 major in industrial engineering. Today's workplace is now global, mobile, and virtual, and the subjects students are taught, as well as the way they are taught, reflect this reality. A faculty of three white males in 1945 has evolved into a multi-cultural faculty of 67 men and women — reflective of our student body and of our world. ISyE's growth in faculty and students is a direct result of the quality of its leadership and the demonstrated success of its alumni.

Each of the School's six chairs is profiled in this issue. These men reflect both the evolution of the School and the field of industrial and systems engineering. They have been instrumental in bringing the School to its number one ranking — and keeping it there. Each has built on the work of the leaders before him, integrating their own styles with the Tech culture. I think you'll enjoy revisiting the tenures of these tremendous leaders.

Finally, this look at our history is a celebration. We celebrate the 13,000 ISyE alumni who sweated through the toughest courses and were motivated to excel in their chosen field. We celebrate the faculty (some of them former students) who are challenged every day to inspire new classes of young minds. And we celebrate our current students who can take pride in the accomplishments of those who have gone before them, building the finest industrial and systems engineering school in the world. We are confident they will maintain that ranking through their own accomplishments and successes. So in the spirit of Frank and Lillian Gilbreth, we can all be proud that we have found the "one best way" to be an engineer at Georgia Tech, and that's to be in ISyE. 

John A. Harrison is Chair of the Advisory Board in the School of Industrial and Systems Engineering at Georgia Institute of Technology.

TLI Introduces New Online Logistics Programs

The Logistics Institute (TLI) announces the online availability of the Logistics Management Series (LMS) courses. Developed by Dr. Edward H. Frazelle, one of the world's top logistics experts, this series of courses provides logistics professionals with the same materials presented in Dr. Frazelle's LIVE versions of the course. What's the difference? Logistics professionals and managers now have the flexibility of covering the material at their own time and pace.

The LMS online courses include:

- Streaming video presentations syn-

chronized with PowerPoint slides for each course module—more than 18 hours of video presentations shot in the live class room setting

- All PowerPoint slides
- Extensive course notes
- Video clips demonstrating the operation of important logistics systems
- Photo galleries highlighting the operation of important logistics systems

For nearly 15 years, logistics professionals and managers across the supply chain have turned to TLI and Dr. Frazelle for the insight and tools to enhance operations at their companies. TLI clients include: Abbott Labs, Johnson & Johnson, AMGEN, Lego, America Online, Lexmark, Avon Products, L. L. Bean, BP, Motorola, Cargill, NASA, Caterpillar, Ocean-Spray, The Coca-Cola Company, Office Depot, Dell Computer, Payless ShoeSource, DHL, Proctor & Gamble, Eastman Kodak, Ryder, Emerson Electric, SBC, Federal Express, Siemens, Focus on the Family, Tiffany, Gap, U.S. Army, Honda, UPS, Kraft Foods, and W.W. Grainger.

LMS online is a comprehensive curriculum of online professional education programs covering key topics in logistics, supply chain management, inventory management, transportation and distribution, and warehousing and material handling. The online courses are expanded and enhanced versions of Dr. Frazelle's LIVE short courses. Online courses include:

- World-Class Warehousing and Material Handling
- World-Class Logistics and Supply Chain Strategy
- World-Class Transportation and Distribution (available Fall 2005)
- World-Class Inventory Planning and Management (available Fall 2005).



Frazelle is a founding director of The Logistics Institute (TLI) at Georgia Tech; president and CEO of Logistics Resources International; and founder of www.LogisticsVillage.com. He directs TLI's certificate program, the Logistics Management Series. As an educator, Frazelle has trained more than 20,000 professionals in the principles of world-class logistics and has assisted more than 100 corporations and governmental agencies in the United States, Canada, Europe, Japan, and South America in their pursuit of world-class logistics. He has authored, co-authored, and contributed to eight books and has written numerous articles on logistics which have appeared in various professional publications. He is a popular speaker at logistics conferences and symposiums both in the U.S. and abroad.

The Logistics Institute (TLI) was established in 1992 to coordinate all logistics-related activities on Georgia Tech's campus. It is located within the School of Industrial and Systems Engineering. TLI's Leaders in Logistics is comprised of more than 20 corporations and government agencies that partner with the Institute to fund research and educational programs. Through this partnership, TLI focuses on logistics research, education, and practice, with an emphasis on supply chain design, transportation planning, and e-commerce logistics.

For more information, visit The Logistics Institute at www.tli.gatech.edu.

This article originally appeared in the April 8, 2005 issue of Tech-LINKS. [e](#)

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EMIL Spotlight: Ford Drives Down Total Cost by Optimizing In-bound Supply Chain

Situation

At any given time, Ford Motor Company has more than 200,000 tons of in-transit, service parts freight moving from its 3,000 suppliers to 100 Ford plants. Add 300,000 individual SKUs to this network and you have a very complex, resource-intensive system.

To promote a cleaner environment, Ford is now implementing a Total Cost Management initiative which includes replacing disposable containers used in shipping parts with environmentally friendly, returnable containers. The challenge is to make this change cost-effective as well.

Robert Sims, Director of Material Flow Engineering at Ford and one of the company's first EMIL participants, addressed this issue initially by switching from truck to rail to reduce freight costs. During discussions in EMIL, however, he realized that freight represents just one isolated cost incurred in the change. The simple move to returnable containers impacts the entire in-bound supply chain: from the cost of the containers themselves, to the need for greater in-plant inventory space to store the larger rail shipments, to increases in material handling costs. At the time, Ford had no mechanism to evaluate total system cost for all of these variables within their in-bound supply chain.

Solution

The switch to returnable containers exemplified Ford's need for a total cost, in-bound logistics analy-

sis tool. EMIL provided the ideal creative environment for its development. Working closely with top faculty at Georgia Institute of Technology, three Ford Materials Planning and Logistics managers in EMIL used this scenario as the model on which to design a prototype planning tool: the In-bound Logistics Optimization System. The system finds the best combination of source, means of transport, use of intermediate facilities, and sequencing across suppliers, parts, and plants. Its analysis optimizes all the elements in the in-bound supply chain—from piece, freight, and inventory costs; to container investments, floor space, and facilities requirements; to switching, labor and equipment costs.

Results

From this specific supply chain problem, Ford developed the prototype of the industry's first planning tool to assess the entire in-bound supply chain. Prior to this system, determining the best mode and sequencing options was a matter of trial and error. Now, as Ford integrates the prototype into its corporate information systems, the company is gaining access to comprehensive data that optimizes the entire in-bound logistics system.

The In-bound Logistics Optimization System has already proven its value in helping resolve a number of supply chain issues. Ford used the system to revisit a recent move to deliver a select

group of parts to the Kentucky Truck Assembly Plant In-Line Vehicle Sequence (ILVS), and the system confirmed the company's decision to use the ILVS. The system also recommended the use of off-line picks over establishing a separate sequencing center for certain parts at the St. Louis Assembly Plant. Its analysis showed that while off-line picks did drive additional inventory, floor space, and manpower costs, the proposed sequencing center would need to save \$5 million annually to be cost-effective versus an in-house pick operation.

Ford is now starting to coordinate the use of the In-bound Logistics Optimization System with suppliers and to pass on the insights it provides. This will allow Ford and its suppliers to take costs out of the system from the point of fit on the assembly line all the way back to the supplier facility.

“Speed, responsiveness, and innovation are essential in today's dynamic business climate. Companies must have access to the latest developments and the best minds in order to remain competitive. The lessons we learned at EMIL will extend far beyond this project. By tapping the resources of leading universities like Georgia Institute of Technology, Ford is planting the seeds of tomorrow's successes.”

Robert G. Sims

Director of Material Flow Engineering
Ford Motor Company 

The Roots of

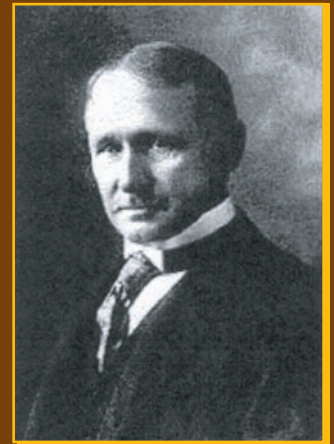
Indust Enginee

Industrial engineering grew out of the industrial age, the result of studies popularized by management pioneer Frederick Taylor and the Gilbreths, Lillian and Frank. Taylor, the Father of Scientific Management, proposed work methods designed to increase worker productivity. Frank Gilbreth was known as the Father of Time and Motion Studies. His wife Lillian was a psychologist. The couple believed, like Taylor, that there was “one best way” to accomplish a task, and their work established time and motion studies as a tool of industrial engineering. Both Taylor and the Gilbreths focused their studies on the human side of the machine. Mechanical engineering was already an established field, but the new science of industrial engineering looked at the operators of the machine.

Industrial Engineering

Frederick Taylor

Frederick Taylor is one of the most influential figures of his time. Born to a wealthy family in Philadelphia in 1856, he was accepted to study at Harvard. But his eyesight failed, and he became an industrial apprentice in the depression of 1873. He went to work as a machine shop laborer at Midvale Steel Company in 1878, and was promoted to gang-boss, foreman, and finally, chief engineer. He later earned a degree by night study from Stevens Institute of Technology and went on to become general manager of Manufacturing Investment Company, and then a consulting engineer to management.



Taylor devised the system of “scientific management,” a form of industrial engineering that established the organization of work. He developed detailed systems intended to gain maximum efficiency from both workers and machines in the factory, relying on time and motion study to find the “one best method” to achieve a goal. This sort of task-oriented optimization of work tasks is nearly ubiquitous today in menial industries, such as assembly lines and fast-food restaurants. But Taylor believed there was a human side of industrialization; that employees and management should work together to make life better for both parties.

He published “The Principles of Scientific Management” in 1911, establishing principles that became known as “Taylorism.” The main elements of Scientific Management are:

- Time Studies
- Functional or Specialized Supervision
- Standardization of Tools and Implements
- Standardization of Work Methods
- Separate Planning Function

- The Use of “Slide-Rules and Similar Time-Saving Devices”
- Instruction Cards for Workmen
- Task Allocation and Large Bonus for Successful Performance
- The Use of the “Differential Rate”
- Mnemonic Systems for Classifying Products and Implements
- A Routing System
- A Modern Costing System

Taylor’s core values were the rule of reason, improved quality, lower costs, higher wages, higher output, labor-management cooperation, experimentation, clear tasks and goals, feedback, training, mutual help and support, stress reduction, and the careful selection and development of people. He is described as “the first person to present a systematic study of interactions among job requirements, tools, methods, and human skill, to fit people to jobs both psychologically and physically, and to let data and facts do the talking rather than prejudice, opinions, or egomania.”

Unfortunately, Taylor was often misunderstood, and his work called oppressive and undemocratic. In later years, he withdrew from public life. But for better or for worse, his work

set the stage for twentieth century business management. Taylor died in 1915.

Frank and Lillian Gilbreth

The names of Frank and Lillian Moller Gilbreth are synonymous with the early history of industrial management and engineering. The couple was one of the “great husband and wife teams in science and engineering.” Together, they founded Gilbreth Inc., a Providence, Rhode Island, consulting firm that introduced innovative motion studies and efficiency techniques in the work place and at home.

Frank Gilbreth was born in 1869 in Fairfield, Maine. He was a bricklayer, a building contractor, and a management engineer, and a follower of Frederick Taylor. Despite his many successes, he never



attended college. His wife, the daughter of wealthy Californians, more than made up for Frank’s lack of scholarship. She studied psychology, education, and literature before joining with her husband in their engineering firm. Nothing Lillian accomplished was easy. She defied her father to attend college and was later denied her Ph.D. at the University of California-Berkeley over a technicality. Instead, she received her Ph.D. from Brown University.

Frank Gilbreth was most concerned with the relationship between human beings and human effort, which he applied in improving the brick-laying industry. Early on, he observed that each worker had their own technique for the task, using different motions to reach the same end. He set out to find the one best method, developing an adjustable scaffold with a shelf and a system of preparation that reduced the number of motions made in bricklaying from 18 to 4 1/2.

He left the construction business in 1912 to devote himself to scientific management. To Frank,

On October 11, 1949, Dr. Lillian Moller Gilbreth, then president of Gilbreth, Inc., of Montclair, New Jersey, spoke at the Atlanta Chapter of the Society for Advancement of Management and the Engineering Extension Division, Work Simplification Study Course, sponsored by the School of Industrial Engineering. Her speech was titled, “Now, and Then.” Below are some quotes from her speech.

“...we found that many small industries would welcome an industrial engineer with management training if they could get him to understand their problems, to come within their range of expenditure and to be adequately trained for the job. In the second place we found that many, many young men training in business administration and industrial engineering, many of the GI’s especially, would prefer to go into a very small plant rather than into a large one because they felt there was more interest and stimulus and more security.”

“Another field where there is a great deal of interest is in the field of clinical psychology and its application to industry. Now we made some experiments in that during the war. I don’t know what your experience was, but in my own case I thought it was tremendously needed by the people who came. While they were technically well trained, it didn’t seem to me they knew much either about industry or about human relations.”

“The only way we’re going to get anywhere in this work in scientific management is not only to forget any feuding there may be between various groups in industry, or between various groups in psychology, psychiatry, or education anywhere else, or any kind of engineering societies, or between engineers and anybody else—technical people and non-technical people—but to remove all these artificial boundaries. I do feel that whatever field you come from or whatever your interest is, you are a part of this whole field of scientific management...It’s hard, it’s challenging, and if it is interesting, what more can we ask?”


it was more than just a concept. He truly believed that cooperation—between engineers, educators, physiologists, psychologists, psychiatrists, economists, sociologists, statisticians, and managers—was the best way for society to work together. At the core of all this was the individual. Frank believed that comfort, happiness, service, and dignity would lead to the most effective way of accomplishment in any industry.

The Gilbreth's examined motion study and analysis in numerous fields, pioneering the use of motion pictures for studying work and workers. They originated micro-motion study, the breakdown of work into fundamental elements now known as "therbligs" (Gilbreth spelled backwards).

Frank Gilbreth died early, in 1924, but Lillian continued their work. During her 60-year career, she was a professor of management at Purdue, served on advisory committees for every United State's president from Hoover to Johnson, designed model kitchens for General Electric, taught disabled homemakers to become more independent, and served as a true pioneer of the woman's movement.

She was particularly interested in patterns of work in domestic spaces, seeing the home as a workplace and the homemaker as both worker and manager. Her goal was to increase productivity in housework, creating precious "happiness minutes"—time that could be used for leisure or creative products. She paid special attention to the kitchen, analyzing the motions in routine food-preparation tasks and reorganizing work spaces to eliminate repetitive and unproductive steps. Her ideas were widely published and incorporated into model kitchens.

The Gilbreth's were the parents of 12 children, six boys and six girls. Early in their relationships, Lillian asked Frank, "How on earth can anybody have 12 children and continue a career?" His answer: "We teach management, so we have to practice it." In the 1940s, two of the Gilbreth's children penned a best selling novel, *Cheaper By the Dozen*, which later became a movie starring Myrna Loy.

Lillian died in 1972, at the age of 93. 

The Aims and Objectives of the Curriculum in Industrial Engineering

The aims and objectives of the curriculum in Industrial Engineering are to furnish young men (sic) prepared for the field and/or job as outlined below:

The increasing magnitude and complexity of modern industrial plants has demanded the development of a branch of engineering widely recognized as Industrial Engineering. The field of the Industrial Engineer is that of the process and production expert engaged in planning, organizing, improving, managing, and operating various processes for production manufactured products of all kinds and varieties.

New problems have arisen and new techniques have been developed during recent years which are peculiar to and characteristic of Industrial Engineering. These include the analysis of a proposed product with regard to the possible steps and sequences of operations involved in its manufacture, a selection of the most efficient machines to perform these operations, the layout of the plant and shops to provide for the flow of the product from one machine to another, organization of the material supply, avoidance or elimination of bottlenecks, together with the related problems of quality and cost control, testing, inspection, and personnel relations.

Industrial Engineering coordinates men, materials, machines, and methods so as to solve problems met in the conversion, transformation, and fabrication of raw materials into the products of industry.

The successfully Industrial Engineer must possess special interests and abilities in the analysis of the human, technical, and cost problems of modern manufacturing. In addition, he must possess the personality and attributes of character which will enable him to work with and direct others in the planning and operation of manufacturing enterprises.

The Job of the Industrial Engineer

What Do Industrial Engineers Do? The Industrial (also called management of administrative) Engineer makes surveys of how industrial plants or businesses are organized and operated, and on the basis of such studies, he prepares recommendations to executives for changes in the way things are made or in the set-up of money in the conduct of business. To carry out this work, he makes use of his knowledge of the principles of business organization and administration, engineering, economics, industrial psychology, statistics, accounting, and marketing. He may examine and observe new equipment and how men work, make time and motion studies, study production records and products, or talk with management and production personnel. He tries to obtain a comprehensive view of any plant or business activity such as: planning and scheduling of production; production methods, standards equipment, cost records, and control; how materials and goods are received, packed, and shipped; the hiring, training, and management of personnel; wage payment system, relation of unions to management; the system for purchasing materials and supplies; the advertising and distribution of products; and the manner in which the business is to be established. Many Industrial Engineers, especially consultants with long training and experience, are qualified to survey and advise on all phases of a business or industrial organization. Most of them work in a particular industry, such as an electric utility or a chemical process industry, and deal with a particular broad phase of industrial engineering work, for example, plant design and construction, plant production, sales and marketing, purchasing, personnel and labor relations, wage systems, finances, or traffic management.

Who Should or Should Not Take Up Industrial Engineering? The Industrial Engineer combines the aptitudes of a mechanical engineer, accountant, and business executive. He should have an aptitude for studying such college subjects as engineering, calculus, statistics, economics, and business administration. He should have an interest in all kinds of jobs and in the machines and men who manufacture goods; he should have the ability to spot a problem in getting something made, gather all the related facts about processes and costs, stick to the facts in working out a solution, and present his conclusions or ideas in clear, concise English to business executives. He should be able to visualize in three dimensions in order to develop plans for the layout of equipment or for the successive steps in getting work done.

F. F. Groseclose, Director
School of Industrial Engineering
Georgia Institute of Technology
Atlanta, Georgia
November 22, 1949

Leading ISyE

In the 60 years since the School of Industrial Engineering was created, only five men have directed Georgia Tech's industrial engineering program: Frank Groseclose, Robert Lehrer, Michael Thomas, John Jarvis, and William Rouse. From the beginning there were signs of excellence, and for the past 15 years the program has reigned as the highest ranked industrial and manufacturing engineering program in the United States, according to *U.S. News & World Report*. *Engineering Enterprise* explores the leaders and times that shaped today's School of Industrial and Systems Engineering.

1946-1949

Subject

Credit Hours

Freshman

Inorganic Chemistry	12
Engineering Drawing	6
Composition and Rhetoric	9
Algebra	5
Trigonometry	5
Analytical Geometry	5
Social Science	9
Naval Instruction	6
Physical Training	3

Sophomore

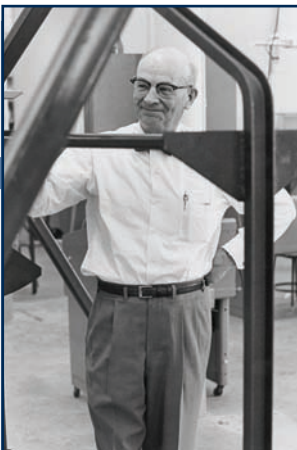
Surveying	2
Descriptive Geometry	2
Humanities	9
Calculus1	5
Pattern Laboratory	1
Foundry	1
Machine Laboratory	1
Physics1	8
Naval Instruction	6
Physical Training	3

Junior

Metallurgy	3
Principles of Economics	9
Accounting	8
Technical English	3
Organization for Production	3
Production Control	3
Motion and Time Study	3
Thermodynamics	4
Heat Power Laboratory	1
Applied Mechanics4	
Mechanics of Materials	5
Labor Problems	3
Industrial Accident Control	3

Senior

Factory Planning	3
Fluid Mechanics	4
Electrical Engineering	9
Public Speaking	3
Industrial Surveys & Reports	2
Seminar	2
Engineering Economy	3
Cost & Product Problems	3
Production Problems	3
Materials Handling	3
Machine Design	5
Legal & Ethical Phases of Engineering	3
Industrial Psychology	3
Job Evaluation & Wage Incentives	3
Personnel Management	3
Principles of Industrial Engineering	3
Design of Manufacturing Enterprises	3
Collective Bargaining	3



Frank F. Groseclose

1946-1966

Although industrial engineering at Georgia Tech first appeared in 1934 as the “Industrial Option” in the Mechanical Engineering Department’s curriculum, Frank F. Groseclose is considered the “father of industrial engineering” at the Institute. While the discipline known as industrial engineering changed significantly in the last 50 years of the twentieth

century, “the Colonel,” as everyone knew him, set Georgia Tech’s program on a course for excellence that continues to this day.

Groseclose was invited to establish the School of Industrial Engineering at the end of World War II, at the behest of Georgia Tech President Blake Van Leer. Van Leer was formerly dean of Engineering at North Carolina State University, where Groseclose had taught mechanical and industrial engineering classes before he was called to active World War II-duty in 1942. An ROTC graduate of Virginia Tech, he served in a Field Artillery Replacement Battalion at Ft. Bragg until 1942, when he was ordered to the U.S. Military Academy at West Point as an instructor in the Mechanics Department.

On July 1, 1945, one year after Van Leer assumed office, “...plans were finally executed for a separate Department of Industrial Engineering, later to be designated in the 1948 re-organizational steps as the School of Industrial Engineering,” wrote J. W. Lay, BIE 1950, in the *Georgia Tech Engineer*. The original department had 15 students and three professors, working in “two borrowed rooms in old and decrepit Swann Hall.”

Groseclose was a southern gentleman, according to retired ISyE Professor Cecil Johnson. “He had a lot of old Virginia in him...He had the ability to relax people, and he had a good feel for the human element.” Veterans were a large part of the Georgia Tech student population, and these older, battle-scarred men had little use for the traditional college indoctrination. Groseclose’s compassion and military bearing appealed to them, and “he was able to take the anger out of them,” says Johnson. He was a congenial host as well, often inviting faculty to low-key events at his home with his wife and two children.

Colonel Groseclose “was a fellow that everybody liked,” says Bob Lehrer, his successor at the helm of ISyE, in an interview with the Georgia Tech Alumni Association. “He made the program popular due to his personality. He made people feel at home, and he had an eye for students, particularly vets.”



The A. French building housed ISyE from 1949-1983.

John Jarvis describes the IE field in Groseclose's time as "old line IE—work measurement and motion and time study. There were no rankings at that time but Tech's program was recognized as one of the best." Industrial engineering in the 1940s focused on manufacturing and how factories could better produce. Material handling and physical distribution of goods were foremost in the minds of IE students and faculty. It was during this period that the Material Handling Short Course, now in its 55th year, was created, and the School began its tradition of continuing education.

The emphasis of the time was on teaching, not research, and few of the IE faculty members had a Ph.D., not even Groseclose. But they had solid engineering experience and held a pragmatic view of industrial engineering. Even then, major companies were placing an emphasis on recruiting at the IE School. Lehrer credits this to the national reputation the School acquired under Groseclose's leadership.

Part of this recognition came through his role as editor-in-chief of the *Journal of Industrial Engineering*, a role later shared by Bob Lehrer and Cecil Johnson. Production of the *Journal*, a referred publication, brought Georgia Tech's industrial engineering program to the attention of engineering schools and individuals through the country and across the world. The IE school became a clearinghouse for new developments in industrial engineering, and Georgia Tech's staff was well represented in the publication.

One thing that was missing in those early years was money. According to Johnson, "the lack of funds was always at a crisis level." This continued through Bob Lehrer's era as chair. After that, enough industrial engineering students had reached a level of success in their lives that allowed them to give back to the school.

Georgia Tech was supposed to be the last stop for Groseclose, but he agreed to teach one last year at Auburn University. Leon F. McGinnis, now ISyE Eugene C. Gwaltney Chair in Manufacturing Systems, was a freshman in one of those Auburn classes. "It was interesting to have someone who was clearly at the end of his career teaching students who were considering going into engineering," says McGinnis. "He was really good at making us think about the bigger picture of engineering, and what impact engineers have on society."

Much of Groseclose's personality remains with the School, McGinnis says. "If I think back at the faculty members who were at Georgia Tech in 1975, many of them had been hired by the Colonel. The industrial engineering program under the Colonel was a place where there were high expectations. That was true for all Georgia Tech. You were expected to work hard. Faculty and students were expected to work hard."

The School moved into the A. French Building in 1949 when the Textile School moved to the "new" Harrison Hightower Building on Hemphill Avenue. "The halls are wide and spacious and the classrooms roomy and well ventilated," wrote Professor Donald B. Wilcox in a letter to alumni. "The director's office is really a showplace with its beautiful new executive furnishings. The Don Gavan Lumber Company of Atlanta has contributed the material with which to panel the entire room in a very unusual and attractive shade of old rose, with their special impregnated lumber. This office is also air conditioned, sound proofed, and in every respect representative of the finest and best. Needless to say, we are all elated with our new facilities and hope to do an even better job of preparation and teaching and research because the new surroundings are so much more conducive to concentration and effective operation."

The lower floor of the building was shared with the Department of Building and Grounds, but "...we will have several fine laboratories there and the Colonel and the faculty are busy planning the installation of the finest and latest equipment for research and study in the field of Methods in the Rich Laboratories made possible by an initial grant to the School of Industrial Engineering of \$15,000 by the Rich Foundation."



Robert N. Lehrer

1966-1978

In the 1960s, industrial engineering was changing, like most of the world around it. It was evolving past work simplification and motion and time studies into the more modern place it occupies today. Lehrer hired “a lot of hotshot OR people,” says Leon McGinnis, who claims

to be the last person hired by Lehrer.

Bob Lehrer was originally from Sandusky, Ohio, and he started his engineering education at the University of Cincinnati. Like so many engineering professors of the time, he became a military man. During World War II, Georgia Tech was one of only five U.S. colleges feeding the U.S. Navy’s officer program. Lehrer was stationed at Purdue in 1943, and his dealings with Georgia Tech made an important impression. Colonel Groseclose hired him in 1950. At the time, there were 15 faculty in the school. He was soon put in charge of the graduate program, and Groseclose gave him free reign.

Despite his efforts, Georgia Tech was slow in starting its Ph.D. program. Looking for a new challenge, Lehrer left for Northwestern University in 1957 to establish a doctoral program in industrial engineering. It went faster than expected, and four years later he moved his family to Mexico for one year at the request of the United Nations Educational, Social, and Cultural Organization (UNESCO). As his year began to wind down, Groseclose asked him to return to the School as associate director. The Ph.D. program was now up and running. He returned to Atlanta in 1963; Groseclose handed him the reins in 1966, opting to work one year as a special assistant to President Harrison before (supposedly) retiring.

When Joe Pettit became Georgia Tech president in 1973, the Institute began to place strong emphasis on research. Lehrer began hiring mathematically and quantitatively oriented faculty members and the percentage of Ph.D.s was rising.

“Bob’s real contribution was to modernize the IE program and bring in scheduling, planning, and areas that were not just down and dirty factory improvement type programs,” Jarvis says. “He hired a lot of people. Some came in and left, but there was a core of us that stayed and really helped him build the department. He did a good job of reorienting the department. Bob was interested in good education, good teaching.”

“It was a painful transition,” remembers Lehrer. “There was a great fear that it would affect teaching.”



The Frank F. Groseclose building became ISyE's new home in 1983.

Jarvis remembers that six others were hired the same year he came. “They weren’t the old line people. In fact, they called us the ‘young Turks.’ We were trying to change things radically. Bob allowed us to do our thing. We couldn’t do everything we wanted, but we did a lot, and I know it was hard on him to make those changes, now that I’ve done it myself,” he says.

Lehrer himself believes his number one legacy is the strength of the faculty he hired. His colleagues agree. Among those hires were Jarvis, John White, Nelson Rogers, David Fyffe, and William Hines. “I could go on and on,” he admits.

The “systems” concept of engineering was part of the School from the beginning, but it was Lehrer who added the word to the School’s name, reflecting in full the School’s philosophy. “After IE was successfully applied in the factories, there was an interest in applying it to other industries,” says Johnson. Lillian Gilbreth was the one who applied and emphasized IE with the application to the physical and psychological aspects of the human, he adds. “Bob Lehrer was a student of Lillian Gilbreth and heavily influenced by her teaching. It was natural that this early base needed to be extended under the word ‘Systems.’ Systems includes everything and accommodates to the invention and use of computers.”

(For more information about Lillian Gilbreth, see article page 6.)

Lehrer turned over the chair's position in 1978, but he stayed at Georgia Tech until 1982, when "I figured I'd gone as far as I could with the program," he says. He had begun consulting with The Coca-Cola Company in the 1970s, so he was ready for a second career.



Michael E. Thomas

1978-1989

As chair of the industrial engineering program at the University of Florida, Mike Thomas tried to hire fellow Johns Hopkins alumnus John Jarvis. Instead, Jarvis chose Georgia Tech, and in 1977 he led the search committee that selected Thomas as Bob Lehrer's replacement.

Thomas is best remembered at ISyE for two things: his ability to attract and retain key faculty members and the emphasis he placed on developing a strong research program. "He pushed very hard to get an active research program with publications, with funded research, graduate students, and dissertations," says Jarvis. "There was a modest amount of funded research before he came, but nothing like what we developed after he came. He placed us firmly on the funded research program path."

Thomas came to Georgia Tech with a strong national reputation, after 13 years at Florida. He knew who was who in the professional community, and used that knowledge to both expand and nurture his own faculty.

His colleagues describe Thomas as a determined individual who listened closely to those around him before making up his mind. But once he decided on a course, he pursued it until he got where he wanted. His emphasis on research propelled the School to the role of national prominence it remains today.

"Mike's strategy was always to hire the best athlete," say McGinnis. "The people that he hired were the best IE graduates or the best OR graduates from the best programs."

"He had a knack for hiring and nurturing assistant professors who would grow with the aspirations of the school. I cannot think of anyone who has hired so many excellent people," agrees John Bartholdi, Manhattan Associates Professor of Supply Chain Management.

He also had a knack for encouraging alumni support of the School. His efforts brought ISyE its first endowed chair, the A. Russell Chandler III Chair, which he later used to attract George Nemhauser to Georgia Tech. "George was one of the premier operations research faculty in the United States," says Jarvis. "He had a tremendous reputation, and that really put us on the map with regard to oper-

ations research." Of course, it didn't hurt that Nemhauser had once been at Johns Hopkins.

Thomas also recruited ISyE's second endowed chair, the Coca-Cola Chair, held then and now by Ellis Johnson. And it was during his tenure that the Alumni Advisory Board was formed to guide the School.

Under Thomas' watch, the ISyE School moved into the four-story Groseclose Building and the attached two-story Instructional Center in 1983. These facilities included a "large materials handling lab with conveyor systems, automatic identification and sorter systems, a stacker crane, and a driverless vehicle, all of which will be computer controlled," Thomas wrote in *IENTrospect*, the School's newsletter of the time. A second lab was established in conjunction with the Center for Man-Machine Systems, led by Professor William Rouse.

It had long outgrown the French Building, and it wasn't long before the School required more than these two facilities.

In 1988, Thomas went to serve in the President's Office for a year, leaving Jarvis in command. He never returned to the ISyE chair. President Patrick Crecine had a plan to restructure the Institute, so Thomas' first role was as director of Restructuring. He became executive vice president and then provost and vice president for Academic Affairs. He spent a decade as one of the Institute's top leaders before stepping down to serve as executive director of the Center for Internet Research, Policy, and Application. He retired in 2004.

Technically John Jarvis was in the chair's office the first time the industrial manufacturing program was named number one by *U.S. News & World Report*. But Jarvis is clear: "Mike really did it. The School was voted number one while I was sitting there warming the chair up for him."



John J. Jarvis

1989-2001

John Jarvis was selected to lead ISyE for good in 1989. He continued on the path of excellence that Thomas had placed the School. He also proved to be a strong fundraiser, adept at reconnecting the School with its alumni base.

"When I was considered for this job, I reflected on the achievements of the three school heads before me," Jarvis said when he retired. "Each one had a major accomplishment: Colonel Groseclose got the school going. Bob Lehrer brought the School into the modern industrial engineering area. He embraced operations research and new technologies, and the

character of the School became more far-reading in its philosophy. Mike Thomas took us into the areas of research and graduate studies. He brought in first class researchers, and still maintained the strong undergraduate program,” he continued. “What could I possibly do? The School had just been named number one under Mike’s leadership.”

He thought about the School’s 10,000 plus alumni. “If I could connect them back to the School, get them involved, excited, energized—think of the resource we would have in those people’s time, energy, and money.”

“I’m amazed by the number of ways our alumni have contributed,” he continued. “They’ve helped redesign the curriculum. They told us our graduates must have strong communications skills, and we added a director for Workplace and Academic Communications. They told us finance is important; it’s something ought to put in the curriculum. And we did.”

During his tenure, the School raised more than \$25 million as part of The Campaign for Georgia Tech. This led to three new endowed faculty chairs, including Georgia Tech’s first-ever School Chair; the UPS Global Logistics Program; the Keck Virtual Factory; and numerous fellowships, scholarships, and endowment funds. Before the Campaign, the James C. Edenfield Executive-in-Residence program was started.

In 1992, The Logistics Institute was formed out of four ISyE sponsored organizations. The result was an internationally recognized center that has provided Georgia Tech with an entrée into corporations, governments, and education centers across the globe. Today, there is TLI-Asia Pacific, operating in Singapore, one of the world’s largest ports, at the invitation of the local government. In 1999, ISyE launched the Executive Master’s in International Logistics program for executive level supply chain professionals. It is now the world’s premier international executive program in Global Supply Chain Management. “We had a lot of great faculty in place developing new and exciting programs. I just tried to stay out of their way,” said Jarvis.

Under Jarvis’ command, the technological revolution took place, and he successfully oversaw the School’s transition to a computer-based program. By the time he departed, the School had more than 700 computers and three computer science classes, more than any other Tech program except Electrical Engineering and the College of Computing. The graduate program, already one of the nation’s largest, grew the Ph.D. program in order to accommodate all the students who wanted to come to Georgia Tech.



In July 2003, ISyE expanded into the old College of Management building.

All the while, the School retained its number one ranking with *U.S. News & World Report*.

“Jarvis was absolutely without ego,” remembers Bartholdi. “He devoted himself to taking care of the School. His biggest accomplishment was to build our endowment. But even while doing this, he was involved in every aspect of daily life here.”


Jarvis also had an active career in consulting in the transportation logistics fields. He is co-founder with Donald Ratliff, UPS and Regents’ Professor, of CAPS Logistics, a 150-person software firm providing logistics solutions to Fortune 500 companies, sold to Baan NV in 1998. CAPS Logistics, Inc. is a software development firm specializing in decision optimization software for supply chain and logistics planning and scheduling.

Jarvis stepped down from the chair’s position in 2001. But he didn’t go far. He spent the next two years as executive director of The Logistics Institute-Asia Pacific, helping that organization establish its administrative offices in Singapore.



William B. Rouse

2001-2005

Bill Rouse, a former ISyE professor, returned to Georgia Tech to chair ISyE in 2001. He resigned this summer to further his research at the Tennenbaum Institute (www.ti.gatech.edu). To read his description of the School under his leadership, please see page 14. 

PARTING THOUGHTS



By William B. Rouse

William B. Rouse was the H. Milton and Carolyn J. Stewart Chair of the School of Industrial and Systems Engineering at Georgia Tech from 2001-2005

I have found my four years

as chair of the School of Industrial and Systems Engineering to be a fascinating and immersive experience. When I began this job many people asked me if I wasn't relieved to be back in academia after having founded and run two software companies. They asked, "Isn't life simpler now?" My answer was, "I have never been busier in my whole life."

ISyE serves many constituencies. Undergraduate and graduate students are, of course, our primary constituencies. Former students—alumni—are another very important constituency. As School Chair, the faculty and staff are also key stakeholders, and the Tech leadership (Dean, Provost, and President) is central to success.

Beyond the Tech community, there are various professional constituencies (e.g., INFORMS, IIE, HFES, INCOSE) that expect ISyE to play a central role in the evolution of the profession. I have also found that industry, as well as government agencies such as the National Science Foundation and Department of Defense, looks to us for expertise and advice. The State of Georgia has similar expectations.

In light of this complicated set of stakeholders with varying interests and preferences, ISyE cannot just "do its own thing." Our long-running number one ranking carries with it an enormous responsibility to help shape the vision of the profession and lead in its realization. We cannot just serve our sub disciplines and publish our academic papers. This broad set of stakeholders expects much more from us.

New Initiatives

This realization led me to launch several initiatives during my time as Chair. This magazine, *Engineering Enterprise*, is one of these initiatives. This magazine was motivated, in part, by alumni asking ISyE to help them with life-long learning. Many alumni asked for a publication that would keep them abreast of leading-edge developments in the profession. From the feedback I have received, from alums and many without Tech affiliations, this magazine is a strong step in the right direction.

The magazine is a highly visible element of the primary theme of my term. ISyE is about the enterprise—the whole enterprise, not just the factory, warehouse, or supply chain. I elaborated this theme in an early issue of this magazine. The enterprise theme has also been manifested in the Tennenbaum Institute, which was highlighted in the last issue of this magazine. There have been more than 100 presentations across the U.S. and internationally, and many people have congratulated Tech on launching this initiative.

I also felt that we needed to better serve younger alumni—those "out" for 10 years or less. After many discussions with young alumni, we launched the Georgia Tech Business Network. GTBN now has more than 1,000 members with strong involvement of alumni from many schools

across Tech. We are helping alums to assist each other in starting and growing businesses and succeeding in leadership roles in a wide range of enterprises.

Universities are primarily a collection of human resources. Buildings, labs, and stadiums are impressive, but people accomplish the mission of the university. During my four years, our base budget decreased every year or, at best, stayed constant. Yet, we hired 10 new faculty members, thanks to strong commitments by Tech leadership.

As a result, our statistics faculty has grown from 8 to 13, with strong leadership and a compelling sense of mission. We expect to be the number one program in engineering statistics the next time ratings are compiled by the National Research Council. We have also hired five faculty members in other key areas, significantly enhancing ISyE's intellectual capital.

Emerging Challenges

These new initiatives have helped ISyE to become more capable of addressing new and emerging challenges. Examples of the complex problems ISyE is being asked to address include:

- Enterprises are outsourcing and offshoring manufacturing, services, software development, and R&D to countries with highly educated workforces who can provide low-cost, high quality work.
- Healthcare costs are out of control, due to a system based on a federation of individual entrepreneurs, each of who has little leverage in solving systemic problems and few incentives to do so.
- Information and physical security are increasing concerns, in part due to 9/11 and its aftermath but also due to viruses, spam, and identity theft, as well as our collective sense that we are under unseen attack.

Outsourcing and offshoring are elements of enterprise transformation as companies attempt to change where and how they do work to gain competitive advantage. Such decisions involve complicated tradeoffs related, in the near term, to product and service quality, supply chain efficiency, and financial risks, as well as possibilities, in the longer term, of diminished competencies and decreasing competitive advantages. We need to be able to model these types of impacts and address these tradeoffs more rigorously, at the levels of companies, markets, and economies.

The various stakeholders in the healthcare system tend to "suboptimize" their elements of the overall system to serve their interests, and perhaps their perceptions of the interests of other stakeholders. The difficulty is that they do not have sufficient perspective to optimize more globally. Further, they may not have the incentives to do so. We need to be able to model the overall healthcare system—including health research, clinical practice, medical education, patient advocacy, insurance practices, etc.—and project the impacts of alternative systemic solutions on stakeholders' interests, as well as assess tradeoffs among these interests.

The extent of our connectivity via Internet and cell phones is rather amazing. You and your organization can be connected 24x7 if you choose to be. There are risks, however. The flow of information to—and from—you is voluminous and almost invisible. Information about you and what you do can be accessed, manipulated, and exploited. This sounds threatening if you are the target, but might be a valuable capability if, for example, you are trying to track terrorists. We need statistical and logical models and tools for both defense and offense in this game so that we can assure information security and understand potential threats to physical security.

These three examples suggest a variety of specific intellectual challenges. A few illustrations include:

Design, development, and operation of complex systems usually involve multiple stakeholders and multiple attributes that reflect stakeholders' collective interests. Multifaceted, and typically highly nonlinear, criteria complicate resource allocation and, in many cases, also require incentive mechanisms to assure participation and commitment.

Real-time control of large-scale, dynamic, uncertain networked systems is not feasible using traditional approaches to optimization because the solution of the control problem has to be calculated at least as fast as the state of the network changes. New approaches to control are needed to exploit real-time information to enhance performance, safety, and security.

Gleaning useful knowledge from the enormous amount of information available online is very difficult due to the fact that almost all of this information is not relevant to any particular question. We need statistical theories and methods for dealing with very large data sets where most of the data is irrelevant to the question of interest.

Most complex systems have public sector elements and, hence, public sector stakeholders. Gaining the insights and support of these stakeholders cannot rely solely on technical arguments and presentations. Ways are needed for these stakeholders to experience alternative futures and participate in their evolution.

ISyE is well positioned to play central roles in addressing these types of challenges and, thereby, take advantage of and contribute to new and emerging national challenges.

Human Resources

One need only read Thomas Friedman's recent book, *The World Is Flat*, to know that the intellectual playing field is quickly being leveled (Friedman, 2005). Everything is connected to everything and talented people can live and work anywhere. The U.S. hold on the graduate education market is slipping, due to both increasing quality globally and tighter security policies and practices. ISyE's supply of intellectually talented recruits from China, India, and elsewhere in Asia is threatened.

"Bill Rouse is a visionary. He has advocated the promotion of areas like management and statistics into the mainstream of ISyE. In addition to successfully launching the Tennenbaum Institute and initiating ISyE research in management transformation, he should take credit for the growth of the statistics/quality program at ISyE. Without his early vision and continuing support, it would not have been possible for the statistics/quality program to flourish within ISyE and at Georgia Tech. I will miss him as a leader, colleague, and friend, and wish him the best for his new work."

Dr. Jeff Wu

Coca-Cola Chair in Engineering and Statistics

"Bill is different than any previous school chair in that he is focused on the future, 10 to 20 years from now. He is excellent at devising, articulating, and selling big technical ideas, as you can see from his success in organizing the Tennenbaum Institute.

Dr. John Bartholdi

*Manhattan Associates Professor of
Supply Chain Management
Research Director, The Logistics Institute*

"Bill made several significant contributions to ISyE and more generally to Tech while serving as the ISyE school chair. The growth of statistics group from a strong group to a world-class group and his role as champion for what now is the Tennenbaum Institute are the two most prominent contributions that come to mind. He also was especially effective in interacting with our alumni/alumnae and with industry and with government sponsors from the mission agencies."

Chelsea "Chip" White, III

*H. Milton and Carolyn H. Stewart School Chair
and Schneider National Chair of Transportation & Logistics*

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Georgia Tech has addressed this challenge in several ways (Clough, 2005). One initiative has been to create a global presence in France, then Singapore, and now China. This enables intimate involvement in the global education marketplace, partnering with institutions in these countries and learning much in the process. This initiative is certainly a work in progress, but nevertheless already an important success.

Despite this accomplishment, Tech's strategy for the future cannot simply mimic the ways in which we originally attained world-class status (Rouse & Garcia, 2004). We cannot continue to build Ph.D. programs by relying so heavily on international students. Thus, we have to create opportunities for graduate study that are attractive to U.S. students. We have to recruit the "best and brightest" of these students.

Fortunately, the types of challenges I outlined earlier are very attractive to U.S. students. I have found a wealth of students that are fascinated by the complexity of enterprise transformation, health systems, and information security, to name just a few of many interesting complex systems domains. There is also a wealth of potential research sponsors in these areas. ISyE is well positioned for this future and I am grateful for the opportunity to participate in the pursuit of these opportunities. [e](#)

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Chelsea C. White III

Named New Chair of ISyE



Chelsea (Chip) C. White III has been named chair of the School of Industrial and Systems Engineering (ISyE). White assumed his duties on July 1. He replaces William Rouse, who resigned to serve as director of the Tennenbaum Institute for Enterprise Transformation.

White will become the H. Milton and Carolyn J. Stewart School Chair and he will retain the Schneider National Chair in Logistics and Transportation. He is also executive director of The Logistics Institute and director of the Trucking Industry Program, a member of the Sloan Foundation's Industry Centers Network.

"I am very pleased that Chip White has accepted this responsibility," says College of Engineering Dean Don Giddens. "He is an outstanding scholar and academic administrator, and his vision for the future will help lead ISyE to even greater prominence."

White's current research focuses on how real-time information can improve productivity and security in the transportation and logistics sector of the economy. He teaches courses on decision making under certainty and risk. His areas of research include optimization and artificial intelligence for problem solving in transportation, logistics, and supply chain systems.

"I look forward to working with the ISyE faculty, our students, the administration, our alumni, and our sponsors to continue the ISyE tradition of excellence and leadership in research, education, and service that has made us so nationally and internationally prominent," White says.

Chelsea C. White III

H. Milton and Carolyn H. Stewart School Chair and Schneider National Chair of Transportation & Logistics School of Industrial and Systems Engineering Georgia Institute of Technology

Academic History:

Ph.D., Computer, Information, and Control Engineering, University of Michigan, 1974

Research Interests:

- Finite stochastic systems
- Knowledge-based decision support systems
- Real-time information and enabling information technology for improved logistics
- Supply chain productivity
- Risk mitigation

Faculty member:

- Georgia Institute of Technology, Executive Director, The Logistics Institute; and Director, Trucking Industry Program
- University of Virginia, Department Chair of Systems Engineering
- University of Michigan, Department Chair of Industrial and Operations Engineering; Senior Associate Dean

IEEE Accomplishments:

- Fellow
- Former president of the Systems, Man, and Cybernetics Society
- Recipient, Outstanding Contribution Award, Norbert Weiner Award, and Third Millennium Medal
- Former member of Executive Board of Council of Industrial Engineering Department Heads
- Founding Chair, TAB Committee on ITS

Board of Directors (current and former)

- CNF, Inc.
- ITS World Congress
- ITS America
- TLI-Asia Pacific
- President, ITS Michigan Board of Directors

Advisory Board Member:

- Kinetic Computer Corporation
- CenterComm Corporation

Other:

Member, International Academic Advisory Committee of the Laboratory of Complex Systems and Intelligence Science of the Chinese Academy of Sciences

Publications:

- Former Editor, *IEEE Transactions on Systems, Man, and Cybernetics*, Parts A and C
- Founding Editor, *IEEE Transactions on Intelligent Transportation Systems (ITS)*
- ITS Series book editor, Artech House Publishing Company
- Co-author (with A.P. Sage), second edition, *Optimum Systems Control* (Prentice-Hall 1977)
- Co-editor (with D.E. Brown), *Operations Research and Artificial Intelligence: Integration of Problems Solving Strategies* (Kluwer, 1990)
- Co-editor (with D.L. Belman), *Trucking in the Information Age* (Ashgate, forthcoming)

What is your perception of the School, as you take over for Bill Rouse?

My perception is that the school and all of its stakeholders—the faculty, our students, the administration, our alumni, and our sponsors—have much to be proud of. We have a tradition of unparalleled excellence and leadership in research, education, and service that has made ISyE nationally and internationally prominent. Indeed, many of our peer departments regard ISyE as the flagship academic unit in industrial and manufacturing engineering, and I agree. This prominence is due to the quality of our students and faculty, our curricula, our intellectual breadth and diversity, our international initiatives, and our relationships with our alumni and alumnae, sponsors, and the broader academic and professional communities. We are fortunate to be at Georgia Tech, an institute with an entrepreneurial culture, embedded in a scholarly culture of the highest quality. Further, Georgia Tech is very aggressive regarding international educational and research programs, which is particularly supportive of an environment for many of the topics that we study, e.g., manufacturing and logistics in emerging economies.

What do you see as the current challenges and trends for the ISyE School?

Let me discuss three important trends; there are many others. One is the revolution in sensor, communications, and computer technologies that is causing us to reexamine fundamental modeling paradigms for many of the systems that we analyze. Decision making in such areas as health care, manufacturing, logistics, and supply chains can be made increasingly in (near) real-time due to the concomitant information systems that can sense, transmit, and process data rapidly.

Another trend that affects us is globalization and with it risk mitigation due to the possibility of major disruptions (e.g., weather, labor strife, accidents, SARS, terrorism). This trend has motivated us to have significant interest in international supply chains, which almost invariably involves manufacturing and logistics in emerging economies. We have now been involved for over five years with The Logistics Institute – Asia Pacific, in partnership with the National University of Singapore and are now developing a partnership with Shanghai Jiao Tong University that includes plans to launch a Sino-U.S. Global Logistics Center soon.

Funding patterns, particularly those due to the National Science Foundation (NSF), the National Institutes of Health (NIH), and industrial sources, are important to watch and adjust to as we seek resources to support research that we deem, and the world deems, critical.


We face many challenges. The world is moving quickly, and the body of knowledge in the areas of expertise that define our intellectual span is growing rapidly. But we have

chosen our directions carefully (they match up exceedingly well with the ‘Ten Forces That Flattened the World’ according to Thomas Friedman’s new book *The World is Flat*), and as a result, we are, at least in part, setting the pace of relevant knowledge growth in these related areas. Our sister industrial and manufacturing engineering peer departments, nationally and internationally, are moving rapidly, too, and we have to work hard to stay ahead, particularly in recruiting excellent students, recruiting and retaining excellent faculty, and obtaining the resources necessary to achieve the excellence that we have all come to expect. However, given success in facing these challenges (and I’m confident that we will succeed), we have an enviable future.

Research funding is of course always a key challenge, and we need to be vigilant and adaptive as NSF reorganizes in areas of importance to us and as emphases in Federal R&D shift. One of these shifts is the NIH budget, relative to the NSF budget. Consistent with this shift is the fact that health systems is an intellectually challenging area with significant potential for societal impact. ISyE has much to contribute to health systems, and many of the faculty see it as a natural and exciting target for growth.

Other challenges are also assets. For example, a continuing challenge is to keep the quality of our students and faculty without parallel, which requires increasingly effective recruitment and retention strategies, enabled by adequate resources and a supportive, highly stimulating environment for learning and research. Recruiting excellent students is becoming more and more competitive. We have to make sure that each of our faculty is outstanding when we hire them, and we must mentor them in a way that adds as much value in the mentoring process as possible. Not only mentoring on the junior level, but at the mid-career level and to a certain extent at the more senior level.

What is the single greatest challenge you see?

We are unique in the size (number of faculty) of our school relative to the size of other industrial and manufacturing engineering programs in the United States and the world, and a challenge for us is to insure that this unique aspect is an asset. One way to meet this challenge is to have an intellectually diverse faculty who are capable of not only individual scholarly excellence but also who can create and apply knowledge as part of an interdisciplinary research team. Critical societal problems rarely observe disciplinary boundaries, and this fact motivates the need for the interdisciplinary research team. A researcher who is an effective interdisciplinary research team member is not only a superb researcher in his or her academic discipline, but can work creatively with others outside his or her discipline. The key is to keep the tension that often exists between researchers from different disciplines exciting, stimulating, and positive. 

FACULTY

Shabbir Ahmed has been named The Coca-Cola Assistant Professor of Industrial and Systems Engineering. Ahmed received a Ph.D. in Industrial Engineering from the University of Illinois at Urbana-Champaign in 2000. His research interests are in stochastic programming and computational optimization with applications in facility location, network design, capacity planning, and finance. Dr. Ahmed's honors include a CAREER award from the National Science Foundation, a Faculty Partnership Award from IBM, and a Dantzig Dissertation award from the Institute of Operations Research and Management Science.

John J. Bartholdi III, Manhattan Associates Professor of Supply Chain Management and Research Director, The Logistics Institute, was honored for his 25 years of service to Georgia Tech at the Annual Faculty/Staff Honors Luncheon.

Assistant Professor **Pinar Keskinocak** received the CETL/BP Junior Faculty Teaching Award at the Annual Faculty/Staff Honors Luncheon.

Assistant Professor **Joel Sokol** was awarded the ANAK Award at the Annual Faculty/Staff Honors Luncheon. The ANAK Society has given this award to a faculty member at Georgia Tech who has demonstrated outstanding service to the Institute and to the student body through teaching, research, advisement, and general involvement in campus life. The winner is chosen by the students.

ALUMNI

McKenney's Inc. Mechanical Contractors and Engineers received the inaugural "Co-op Employer of the Year" award from the Briarean Society, Georgia Tech's cooperative honorary society. **John M. McKenney**, BIE 1990, a former co-op student himself and now president of the firm, accepted the award for McKenney's. Three

generations of fathers and sons have run McKenney's since its founding in 1943 by the late John M. McKenney, Com 1932. **Dave McKenney**, Phys. 1960, IE 1964, is chairman and chief executive officer.

McKenney's currently has 19 Georgia Tech Cooperative Education students working with the firm, and the company has hired more than 450 co-op students since 1979. The Atlanta-based company was the mechanical contractor for Alexander Memorial Coliseum when it was completely removed for the Summer Olympic Games in 1996 and is the mechanical contractor for the new Georgia Aquarium in downtown Atlanta.

TLI RECOGNIZED FOR THIRD CONSECUTIVE YEAR

The Logistics Institute (TLI), a collaboration between ISyE and the National University of Singapore (NUS) that provides research and education programs in global logistics, has won accolades for the third consecutive year in Asia.

TLI-Asia Pacific, located on the NUS campus, was given the "Best Education Course Provider" title at the 2005 Asian Freight and Supply Chain Awards in Hong Kong. Widely regarded as the most authoritative and prestigious for the cargo industry in Asia, the awards recognize excellence in companies from Europe, North America, the Middle East, and Asia in 41 industry-specific categories.

HEALTH SYSTEMS TO OFFER PROFESSIONAL ED CLASSES

ISyE health systems faculty are launching a series of short courses designed for working professionals in the healthcare industry, from hospital administrators to consultants to mid-level managers and clinicians.

"The healthcare system in the United States is a very complex

system, suffering in terms of cost, quality of care, efficiency, and production—issues which engineers are good at solving," says Francois Sainfort, the William W. George Professor of Health Systems. "Now is a good time to start bringing engineering solutions to healthcare and to look at ways to re-engineer and redesign the system."

Georgia Tech's graduate program in health systems, founded in 1958, is top ranked in its field. Faculty members are bringing their extensive experience in consulting, research, and teaching to the classroom for the following courses, which will be taught at the new state-of-the-art Global Learning & Conference Center and organized by the Professional Education division:

- Healthcare Financial Management
- Essentials of Statistics for Health Professionals (Basic)
- Statistics for Health Professionals (Intermediate)
- Decision Analysis in Healthcare
- Healthcare System Modeling and Operations Management
- Measurement and Management of Quality of Care
- Computer Simulation on Healthcare
- Measurement and Analysis of Health Outcomes
- Informatics and Healthcare Delivery (Fundamentals)
- Human Computer Interaction and Healthcare Informatics (Informatics Design)
- Optimization in Medicine

"Through these short courses, Professional Education at Georgia Tech strives to share Georgia Tech's expertise in a variety of disciplines with leaders in business, government, and other organizations. It is our mission to provide the best educational experience possible," says Nelson C. Baker, associate vice provost for Distance Learning and Professional Education. For more information: www.emarket.gatech.edu/healthcare.

GEORGIA TECH GRAD HELPS NASA ENGINEER SAFER SHUTTLE



John Chapman. Photo courtesy of NASA.

“It’s the journey that matters,” the old maxim says, “not the destination.”

John Chapman, chief engineer for Space Shuttle Propulsion at NASA’s Marshall Space Flight Center in Huntsville, Alabama, would debate that idea. It’s vital, he says, to have your destination in mind—to know where you’re going, and why. Chapman earned his bachelor’s degree from the Industrial and Systems Engineering in 1973.

But Chapman acknowledges whether you’re road-tripping across the United States, soaring in a glider held aloft by thermal air currents or working to put the most complex machine ever created—the Space Shuttle—into Earth’s orbit, there’s nothing like the journey.

Before STS-114: Space Shuttle Return to Flight readied for launch this summer, Chapman thoroughly immersed himself in the latter of those journeys. “What’s always been most fascinating to me is the simple challenge of flight—persuading a chunk of metal anchored by gravity to fly into the sky,” Chapman says. “Look at the solutions humanity has devised over the centuries to get off the ground, to fly through the air, to escape gravity and enter space. Look at the concepts we’re developing today. Imagine the possibilities we’ll think of tomorrow.”

As a leader in the Marshall Center Office of Chief Engineers, part of the Engineering Directorate at Marshall, Chapman is adept at finding solutions, and imagining possibilities. He provides technical recommendations about flight hardware and program issues to the Shuttle Propulsion Program manager. He leads a team of engineering experts, endorsed by NASA Chief Engineer Rex Geveden at NASA Headquarters in Washington, who help solve issues associated with sending the nation’s flagship space vehicle back to orbit.

Chapman, a 25-year NASA veteran has been involved with the STS-114 since its development and has held nearly every Shuttle office-manager, deputy manager, and business manager post at Marshall; his current job is the culmination of a love affair with flight that reaches back as far as he can remember. An avid model builder even today, he quickly tired in his youth of purchasing tiny jars of model airplane paint, and inquired about bulk supplies of the real thing at a general aviation airport in his hometown of Spartanburg, South Carolina. “I was looking for model paint,” he recalls. “Somehow, I ended up with a job.”

He worked at the airport throughout his high school and college years, eventually learning about aircraft mechanics and electrical systems well enough to install hardware in private planes. He spent every spare moment—and most of his earnings—taking flying lessons. He earned his pilot’s license on July 15, 1969, the day before Apollo 11 left Earth, carrying the first humans to walk on the surface of the Moon.

Flying is integral to his life, Chapman says—over the years, he has owned a small plane and two unpowered lightweight gliders. He co-founded the Huntsville Soaring Club for glider enthusiasts, and even proposed to his wife Cindie, a


chemist in the Materials and Processes Laboratory at Marshall, while soaring high over the green hills of East Tennessee.

Between 1973 and 1978, Chapman performed engineering studies on the early development phases of the Space Shuttle, working first for Northrop Services and then for D. P. Associates, both of Huntsville. He spent the subsequent year field-testing laser-based missile guidance systems for the U.S. Army at Teledyne Brown Engineering in Huntsville, and then joined NASA as an engineer in 1980.

Writing computer programs at the Marshall Center to analyze Shuttle propulsion hardware, Chapman was once more drawn to the journey, and to a familiar destination. In 1981, NASA was preparing for STS-1, the Shuttle’s maiden space voyage. Chapman had road-tripped from South Carolina to the Florida Cape with his father 10 years earlier to watch the launch of Apollo 15, and had, with a college roommate, snagged VIP passes to the Apollo 16 launch in 1972. He convinced a group of fellow Marshall engineers that they should witness the first Shuttle launch. They borrowed an old motor home from a local car dealer and hit the road.

STS-1 climbed into history, and “carried” Chapman’s gang, as well as the rest of the country, along with it. “I’ve never forgotten that experience,” Chapman says. He also remembers well the close group of friends who made the trip with him, including two young engineers named Sandy Coleman and Jim Kennedy. Today, Coleman is manager of the External Tank Project Office at Marshall, and Kennedy is director of NASA’s Kennedy Space Center in Florida.

“We’ve all come a long way since then,” Chapman says, his words encompassing not just three individuals, but an agency and a nation. “But the journey isn’t over yet.”

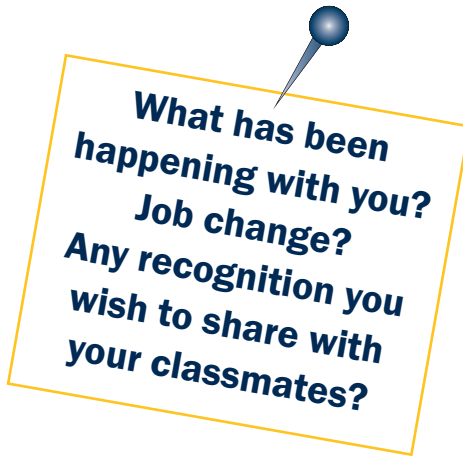
Where to next? “Pick a destination,” he says, and points to the sky. 

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