LEHIGH UNIVERSITY

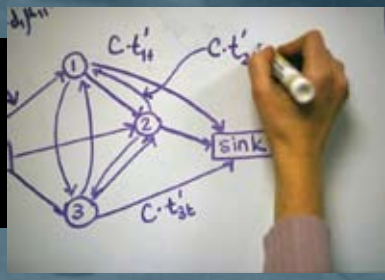
Industrial and Systems Engineering

Celebrating 60 Years

George Kane, former IE Professor, Department Chair, and Associate Dean.







Inside this issue...

Chair's Message
Dr. Tamás Terlaky

George N. and Soteria Kledaras '87 Endowed Chair and Professor of Industrial and Systems Engineering

In our September 2008 newsletter, I wrote that the previous academic year "was an exceptionally busy time for everyone at the Department of Industrial and Systems Engineering." I am pleased to offer you the new edition of the ISE newsletter that demonstrates the high level of continuous, productive activity in the department. Faculty, staff, and students are not only busy, but are producing spectacular results in teaching, research, and in other areas. I cannot resist mentioning that this is a special year when the department reaches the age of 60. This milestone allows us to recall the department's great history, celebrate current achievements, overcome challenges on the road ahead, and lay the foundation of continuing success.

In our previous newsletter, we announced that our Communications Specialist, Jane Kline, has decided to further her career in the industry. Jane was a great asset to ISE, and we wish her continued success in the new chapter of her professional life. We made swift actions to fill the hole that Jane left behind. Kathy Rambo and Rita Frey, in the department office, worked tirelessly to maintain and organize all the activities as planned. A search started immediately to fill the Communications Specialist position. It is my pleasure to inform you that our search was successful. Amanda Fabrizio has accepted this position and started on December 1, 2008. Amanda jumped in a running car and switched into high gear. You may see in this newsletter the results of her activities in this short period of time. This includes an article about the Spencer C. Schantz lecture, the progress in developing the ISE Web page, the collection of the distinguished achievements and successes of our faculty, students, and staff, and the good progress made to organize the ISE 60th Anniversary Celebration.

The department has also started the search for a new, tenure track, faculty member. The Search Committee, chaired by Professor Bob Storer, has broadly advertised the position, conducted about 60 pre-interviews at the INFORMS annual conference, reviewed more than 180 applications, and after identifying the top candidates, is conducting on-site interviews in February. It was everyone's pleasure to have an exceptionally strong pool of highly talented applicants interested in joining our department. The results of the search will be announced in the next edition of our newsletter.

In this newsletter you will see several success stories. Please review those announcements and you will be assured that the ISE department's faculty, staff, and students work hard, and their hard work leads to measurable results and successes. In this note, I want to highlight Kathy Rambo and Rita Frey's exceptional service. In December 2008, they were both awarded the Tradition of Excellence Team Award, which recognizes staff members' character, job performance, and team-focused contributions to a department. We are fortunate to have such exceptional, dedicated staff, and also caring, devoted faculty. In this case, Professor Mikell Groover took the initiative and time to write a very strong nomination letter that convinced the award selection committee to recognize Kathy and Rita.

The ISE department is involved in Lehigh's and the P.C. Rossin College of Engineering and Applied Science's strategic initiatives. With Professor Storer and Professor Larry Snyder, we have developed a proposal to establish a third focus area of the institutional health-care initiative. This plan will emphasize and properly represent hospital care, systems aspects, insurance industry organizations, treatment planning, security, and medical information systems. Dean S. David Wu and the College of Engineering's Research Advisory Board have chosen me to lead a committee in the development of the college's strategy on the area of computational engineering/high performance computing. The highly successful college retreat on January 9, 2009, included a break-out session where over 30 faculty members from every engineering department reviewed the available computing infrastructure on campus and discussed opportunities for research collaboration and other strategic projects. Naturally, the ISE faculty and students will significantly contribute to, and benefit from, the computational engineering initiative.

The major theme of this newsletter is the 60th anniversary of the department. Being one of the first IE programs in the United States, the Industrial Engineering program at Lehigh began awarding degrees in the 1920s. The Department of Industrial Engineering as an independent academic department was established 60 years ago, in the 1948-1949 academic year. To celebrate our rich history, countless achievements, and to recognize the department's educational and research programs that continue to impact the community, a special 60th Anniversary Celebration is planned for Thursday, April 16, 2009. Please save the date in your calendar. Faculty, staff, students, your friends and classmates are looking forward to meeting you at this event. You will find details about the event in this newsletter, and updates will be presented on the ISE Web site. Highlights of the celebration include: an Open House of the Mohler Lab; a lecture by John McGlade '76, '80G, President, CEO, and Chairman of Air Products and Chemicals, Inc., as part of the Spencer C. Schantz Distinguished Lecture Series; a panel discussion about the ISE industry; and, a banquet dinner with an awards ceremony.

The lab renovation plans discussed in the previous newsletter are progressing well. Current plans include an attractive state-of-the-art computer lab, relocation of the COR@L research lab to the first floor, and an enhanced main lobby to the Mohler Lab. The plans will be showcased at the 60th Anniversary Celebration.

As you may see from this newsletter, the ISE department is moving forward. Your support, suggestions, or just simple observations are critical for making informed decisions about this department. Therefore, I would like to hear your memories, opinions, ideas, suggestions, or anything else you may want to share with me. Please call me at 610-758-4050, or send me an e-mail at terlaky@lehigh.edu.

I am looking forward to meeting you in person at the April 16th anniversary celebration.

All the best,

Dr. Tamás Terlaky

Industrial and Systems Engineering

1949 60th Year 2009

Dear Friends,

The faculty, staff, and students of Lehigh University's Industrial and Systems Engineering Department are thrilled to announce that this academic year marks its 60th anniversary. We would like to invite you back to campus to reminisce about your time at Lehigh and to see what new and exciting changes are currently happening.

What's more, the University's "2009 Academic Symposium: A Tradition of Excellence," highlighting outstanding examples of Lehigh undergraduate and graduate student research and creative work, as well as noted speakers from Princeton, Yale, UCLA, and UC-Berkeley, takes place the same day and offers further opportunities to enhance the Lehigh experience.

For more information and to RSVP, please visit our Web site at www.lehigh.edu/ise/anniversary60.html. If you have any more questions, please contact Communications Specialist Amanda Fabrizio at 610-758-2986 or at Amanda.Fabrizio@lehigh.edu. We hope to see you in April.

Best Wishes,

Dr. Tamás Terlaky
Chair of the Department of Industrial and Systems Engineering and
George N. and Soteria Kledaras '87 Endowed Chair Professor

Schedule of Events
60th Anniversary Celebration
Thursday, April 16th, 2009

- **Open House**
  1:00pm-2:30pm Harold S. Mohler Laboratory
  (Home of ISE Department)

- **Panel Discussion**
  3:00pm-4:30pm Sinclair Auditorium
  A discussion of the Past, Present, and Future of the ISE Field led by a panel of industry and academic leaders.

- **Spencer C. Schantz Distinguished Lecture**
  5:00pm-6:00pm Sinclair Auditorium
  John McGlade '76, '80G, President, CEO, and Chairman of Air Products and Chemicals, Inc.
  "A Good Idea Is Not Enough"

- **Banquet Dinner and Awards Ceremony**
  6:30pm-10:00pm Wood Dining Room
  Mountaintop Campus
  Highlights from the 60 years of the department, an awards ceremony, and recognition of the 35th Anniversary of the Enterprise Systems Center founded and led by Emory Zimmers.

Registration: $35 per person for the full-day experience including a gala dinner.

Please RSVP no later than March 27, 2009.
Online registration is available at
http://www.lehigh.edu/ise/anniversary60.html.

Timeline Highlights

Lehigh University has offered undergraduate degrees in Industrial Engineering since the mid-1920s and master's degrees since the mid-1930s.

1940
In the 1948-1949 academic year, the Industrial Engineering Department was established.

1950
In 1957, the Manufacturing Processes Laboratory started to provide a more experimental approach to the instruction of production methods.

1960
The department initiated a Ph.D. program, and the first two Ph.D.'s were awarded in October 1969.

1970
A 1973 grant from Bell Labs gives rise to the beginnings of the Enterprise Systems Center.

1980
In January 1988, the department moved from Packard Laboratory into its current location, the Harold S. Mohler Laboratory.

1990
The Industrial Engineering Department's name was changed to Industrial and Manufacturing Systems Engineering in 1994 to encompass its new program offerings.

2000
In August 2001, the department name changed again to its current title to reflect a broadening scope of departmental activities.
The Center for Value Chain Research (CVCR) was established in December 2002, and The Computational Optimization Research Lab at Lehigh (COR@L) was founded in September 2004.

2009 and forward – Celebrating 60 years of the department and renovations of the Robotics Lab into a state-of-the-art computer lab.
The ISE department continues to provide high-quality academic instruction in industrial and systems engineering through research, technology, and credited faculty.

Lido (Lee) Iacocca '45

Iacocca was President of the Chrysler Corporation and is credited with saving Chrysler from bankruptcy. He assisted in the development of the K-car series and the first minivan. Iacocca assisted in fundraising efforts to purchase the current Mountaintop Campus from Bethlehem Steel and jointly started the Iacocca Institute, an organization dedicated to increasing the global competitiveness of American organizations.

Harold S. Mohler '48

Mohler was appointed President and CEO of the Hershey Food Corporation in 1965. His occupancy as Chairman lasted from 1974-1984. In 1986, Lehigh purchased the B'rith Shalom synagogue and community center. The board of trustees named the building in Mohler's honor out of appreciation for his leadership and support to the ISE Department and Lehigh.

John McGlade '76, '80G

McGlade is President, CEO, and chairman of the board of Air Products and Chemicals, Inc. He also serves on the board of directors of the American Chemistry Council, as a member of the Society of Chemistry Industry executive committee and the SteelStax leadership team, and as a member of the board of trustees at Lehigh.

Looking Back on Yesterday…

Lehigh University has offered undergraduate degrees in Industrial Engineering since the mid-1920s and master's degrees since the mid-1930s. During those early years, the IE curriculum was administered by the Mechanical Engineering department. It wasn't until the 1948-1949 academic year that the Industrial Engineering department was established. The primary purpose of the department is to provide high-quality academic instruction in industrial engineering, both at the undergraduate and graduate level. Numerous students have graduated from the department and have made a significant impact in several industries, including manufacturing, health care, business, and finance.

In the mid-1950s, the department was heavily oriented in its curriculum towards work measurement, motion analysis, incentives, and production methods. These were the important topics in industrial engineering at that time. In 1957, the Manufacturing Processes Laboratory started to provide a more experimental approach to the instruction of production methods. Around the same time, the department installed Lehigh's digital computer. For several years, the IE department administered the university's Computer Center. It finally became a university-managed operation in 1968.

As the profession of industrial engineering was evolving and growing during the 1960s, the curriculum of the department was changing as well. Coursework in operations research, statistics, and data processing was added to the curriculum. Also during that decade, the department initiated a Ph.D. program, and the first two Ph.D.'s were awarded in October 1969. Around that time, research had begun to be a significant part of the operations of the department.

Further curriculum development occurred in the 1970s. The field of information systems was becoming an important part of industrial engineering at Lehigh. In manufacturing, coursework in computer-aided manufacturing and automation was added. Three new laboratories began operations: the Computer-Aided Manufacturing Lab, the Information Systems Lab, and the Work Systems Lab. The seeds of the Enterprise System Center (ESC) were planted in 1973. In January 1988, the department moved from Packard Laboratory into its current location, the Harold S. Mohler Laboratory. The Manufacturing Processing Lab morphed into the Manufacturing Technology Lab. The Automation and Robotics Lab, which originally started in the Manufacturing Lab, became a separate laboratory in the department's new building.

In the 1990s, the Industrial Engineering department's name was changed to encompass the new programs that were being added. In 1994, the name was changed to Industrial and Manufacturing Systems Engineering. That name was changed once again in August 2001 to Industrial and Systems Engineering to reflect a broadening scope of the departmental activities in the past decade and to further develop research and educational areas in Manufacturing Systems and Processes, Operations Research and Logistics, and Information and Systems Engineering. Along with these changes, The Center for Value Chain Research (CVCR) was established in December 2002, and The Computational Optimization Research Lab at Lehigh (COR@L) was founded in September 2004.

The renovation of the robotics lab into a state-of-the-art computer lab is in the immediate future. As the ISE department moves forward with the new programs, expanding faculty and staff, and with exceptional, talented students, it has a bright future ahead.

Additional ISE alums will be highlighted in upcoming editions of the newsletter. Please contact Amanda Fabrizio at 610-758-2986 or amf208@lehigh.edu if you have highlights to share. For more information about distinguished graduates from the ISE or the other engineering departments, please check out the Lehigh University Engineering Heritage Initiative at *www.lehigh.edu/heritage*.

Warren V. (Pete) Musser '49

Musser was chairman of the board and CEO of Safeguard Scientifics, Inc. from 1953-2001. During that time he helped form several Fortune 500 companies, including QVC, Comcast, Novell Inc., and more.
He was chairperson for the Philadelphia area "Preserving the Vision Campaign" for the university, an honorary member on the board of trustees, as well as the vice chair for Lehigh's national campaign committee.

Ronald Ulrich '67

Ulrich is chairman and Chief Investment Officer of Equinox Capital Management, LLC, which he founded following 15 years with Morgan Stanley. There, he was a managing director of Morgan Stanley Group, Inc. He co-founded Morgan Stanley Asset Management in 1975.
He joined the board of trustees in 1993, and was named Chairman of the Board from 1996-2002. He regularly supports the Zoellner Arts Center and has established two endowed chairs in the music department, the Ronald J. Ulrich Endowed Chair in Orchestral Studies and the Ronald J. Ulrich Endowed Chair in Choral Arts. He has also supported the Ulrich Sports Complex and the endowment of the head football coach, and contributed to the renovations of the Cundey Varsity House and the wrestling arena in Lower Grace Hall. Ulrich has also provided funding for the Upper Grace Hall, the Ulrich Student Center, and Bethlehem's South Side.

Edwin Gott '29

Gott was named President and Chief Administrative Officer in 1967 of the U.S. Steel Corporation. While living in Pittsburgh, he met fellow Lehigh alum John Biedler '34, who was vice chair of Dravo Corporation. They were not only mutual suppliers and customers, but became lifelong friends.
After Gott's death, Biedler and his wife, Dorothy, donated the Edwin Gott Lounge to the Mohler Laboratory in 1988.

Hans J. Baer '47

Baer is a native of Zurich, Switzerland, and was Managing Director, President of the Management Committee, Chairman of Baer Holding Ltd., and finally Chairman of Bank Julius Baer & Co. Ltd. Baer is currently an honorary trustee of the board of trustees and the Asa Packer Society. He established the Hans J. Baer '47 Endowed Chair in International Finance, as well as the Hans J. Baer International Scholarship Fund and also was lead donor for the Baer International Centre, which provides services to international students.

Spencer C. Schantz '55

Schantz joined U.S. Controls Corporation in 1969 and shortly thereafter became the CEO and President.
Schantz and his wife, Jerelyn, established the Spencer C. Schantz Distinguished Lecture Series to bring a valuable educational experience to the faculty, students, and friends of the ISE Department at Lehigh.

Centers at ISE

Center for Value Chain Research (CVCR)

The CVCR is a joint venture between Lehigh University's P.C. Rossin College of Engineering and Applied Science and the College of Business and Economics. The Center provides a unique, multi-disciplinary approach to research, offering exciting new opportunities for innovation by integrating analytical and quantitative engineering approaches with process-driven and field-based business research.

Center for Engineering Logistics and Distribution (CELDi)

CELDi is a multi-university, multi-disciplinary National Science Foundation-sponsored Industry/University Cooperative Research Center (I/UCRC). Research endeavors are driven and sponsored by representatives from a broad range of member organizations, including manufacturing, maintenance, distribution, transportation, information technology, and consulting.

Computational Optimization Research at Lehigh (COR@L)

COR@L aims at promoting and conducting graduate-level research, primarily in the areas that lie at the interface of optimization and high-performance computing. Research conducted at the COR@L Lab in recent years has focused on cutting-edge optimization theory and development of several open source optimization software. The lab brings together faculty and graduate students aimed at establishing a multi-disciplinary research agenda. Research findings are disseminated through refereed publications, national and international conferences, and scholarly presentations.

Enterprise Systems Center Celebrates 35 Years

By: H. Robert Gustafson, Doug Sunday, and Dr. Emory Zimmers

The Enterprise Systems Center (ESC) has been a regional and national center of excellence in systems technology and experiential learning for the past 35 years. Since its start, ESC has completed more than 500 research and development projects with industry partners, and with over a thousand student participants. Team participation provides students with a level of work experience representative of what they will encounter in their career paths. The ESC engages students, professors, and industry specialists to work in interdisciplinary teams helping companies use technology tools to grow and compete globally.

In 1973, operations began when Dr. Emory Zimmers received a computer graphics terminal from Bell Labs. This grant, along with several mini-computer systems from Western Electric's Allentown Works, marked the birth of today's ESC. In those days it was known as the Computer-Aided Manufacturing (CAM) Laboratory. These early efforts established the ESC at the forefront of computer and systems technology and began a tradition of industry-led technological leadership. In the next stage of growth, funding from the National Science Foundation and a major partnership with IBM accompanied the creation of the Computer-Integrated Manufacturing Laboratory (CIM Lab) in 1985. This was concurrent with the IE department's move to the Harold S. Mohler Laboratory and an expansion of facilities for student instruction, research, and projects with industry.

The organization became the Enterprise Systems Center in 1995, reflecting the broader shift to an overall systems approach to business operations. In 1998, the mainframes started to be replaced with other distributed platforms and ESC developed the learning "Collaboratory," aimed at promoting further cooperation among academic, industry, and government partners. The mission was to discover more effective ways to teach and learn in a collaborative environment dedicated to the application of advanced technologies.

From 1995 through the present day, ESC has leveraged its industry relationships and experiential learning success, adding new synergistic centers and programs. The PA Department of Community and Economic Development (DCED) funded the Pennsylvania Agile Manufacturing Program through the ESC in 1995. The ongoing goal is to improve the competitiveness and growth of PA manufacturing companies by implementing agile business practices. In 2005, Dr. Zimmers became site director of the National Science Foundation's Center for Engineering Logistics and Distribution (CELDi). In 2006, Lehigh was invited to be a founding member of the National Coalition for Manufacturing Innovation (NCMI). ESC established the Enterprise Leadership Institute in 2007 that incubated Lehigh University's Engineering Leadership minor and Lehigh's chapter of the National Society of Leadership and Success.

Today the Center brings together engineering and leadership curricula with real company project work, which is a unique competitive advantage. ESC and its predecessors have thrived for 35 years by maintaining industry-led programs while providing leadership in systems technology and experiential learning. Industry partners value the special skills and expertise, education, and extra-pair-of-hands provided to their organizations. Students gain the perspective and confidence required to excel following graduation.

Daniel Smith '71

Smith is currently President of Sycamore Networks, Inc., a company that develops and markets a range of optical networking products that allow network service providers to transform the capacity created by their fiber-optic networks into bandwidth for the delivery of high-speed data services.
In September 2007, he was appointed President of Lehigh's board of trustees and established the Daniel E. '39 and Patricia M. Smith Endowed Chair of the Center for Optical Technologies at Lehigh, in honor of his parents. He provided for the creation of the Smith Family Laboratory for Optical Technologies, an optoelectronics cleanroom and epitaxial growth facility.

Dennis E. Singleton III '66

Singleton started out at the Trammel Crow Company before starting his own real estate business in 1987. He serves as vice chairman of a public real estate investment trust called Spieker Properties, Inc.
Singleton established the Dennis E. Singleton III '66 Endowed Scholarship Fund and has also provided significant support for marketing and outreach. He is a member of both the Asa Packer Society and the Tower Society. In September 2007, Singleton was appointed as co-vice chair of Lehigh University's board of trustees.

ISE Faculty

Keith Gardiner

Dr. Keith Gardiner was invited to deliver an after-dinner talk on "Globalization – A Vision of a New World" at the Second Manufacturing Education Leadership Forum in November 2008 at Farmingdale State College (SUNY). This event was sponsored by the Society of Manufacturing Engineers and the National Center for Manufacturing Education (SME/NCME). The group aims to prepare a "Curricula 2015" document to complement a sequence of SME volumes published in the 1990s on "Manufacturing Education for the 21st Century." Keith is currently planning the 2009 STEM Conference. Volunteers who wish to present their papers or assist with the conference should contact Keith at 610-758-5070 or kgØ3@lehigh.edu.

Larry Snyder

Dr. Larry Snyder was a panelist at the Forum on Medical and Public Health Preparedness for Catastrophic Events at the Institute of Medicine (National Academies), in Washington, D.C. He also presented a talk at the INFORMS conference in October and at the University of Florida Supply Chain Management Workshop in February. Two of Snyder's Ph.D. students gave talks at the Manufacturing and Services Operations Management (MSOM) society's conference in June. Larry was also a speaker at Tepper School of Business at Carnegie Mellon University in October and at the Industrial Engineering Department at Penn State University in February. He gave a seminar on Multi-Echelon Inventory Management for the Enterprise-Wide Optimization (EWO) consortium at Carnegie Mellon and Lehigh in November. Larry was awarded three research grants totaling $62,250 from the Pennsylvania Infrastructure and Technology Alliance (PITA), as matching funds for research with Air Products and Chemicals. He was also awarded research funding from Air Products totaling $25,000.

Tamás Terlaky

Dr. Tamás Terlaky is the George N. and Soteria Kledaras '87 Endowed Chair Professor. Dean S. David Wu and the College of Engineering's Research Advisory Board have chosen him to lead a committee to develop the college's strategy on the area of computational engineering/high performance computing (HPC). The highly successful college retreat on January 9, 2009, included a breakout session where over 30 faculty members from every engineering department reviewed the available computing infrastructure on campus and discussed opportunities for research collaboration and other strategic projects. The usage of the HPC task force will be used by 10 departments around campus along with ISE, including mathematics, civil and environmental engineering, chemical engineering, physics, and chemistry.

Aurélie Thiele

Dr. Aurélie Thiele was given two grants this past 2008 for her research. "Robust Portfolio Management with Uncertain Compounded Rates of Return" is funded by the National Science Foundation for a total of $200,000. Thiele's other project, "Data-Driven Adaptive Forecasting and Inventory Control," with Dr. Kevin Taaffe of Clemson University, is being funded by the National Science Foundation's Center for Engineering Logistics and Distribution (CELDi). The grant total is $100,000. The amount awarded to Lehigh University is $45,000. She also presented at the annual INFORMS meeting in October 2008 with her talk entitled, "A Log-Robust Optimization Approach to Portfolio Management." Aurélie and Lehigh Ph.D. student Ban Kawas have submitted another paper for publication called, "Short Sales in Log-Robust Portfolio Management."

Mussa Mgwatu Shares Manufacturing Experience at STEM Conference

Mussa Mgwatu presented a paper at the Science, Technology, Engineering, and Mathematics (STEM) conference on November 15, 2008. Mgwatu's presentation focused on the status of metal manufacturing industries in Tanzania and identified some of the factors affecting their capacity. He proposed various strategies that could create enhanced and sustainable environments for the Tanzanian manufacturing industries to possess the competitive edge and hence achieve superior financial performance. The STEM conference series was initiated by the Lehigh Valley Engineering Council with collaboration from Lehigh Academic Outreach in 2006 as a vehicle for enhancing technological vitality across the community.

Mgwatu is currently a Fulbright Visiting Researcher for the ISE department. He is an Assistant Lecturer in the Department of Design and Production Engineering at the University of Dar es Salaam in Tanzania, where he is in the process of receiving his Ph.D. He obtained a Bachelor of Science degree in Mechanical Engineering from University of Dar es Salaam, Tanzania, in 1992. Under the Canadian Commonwealth Scholarship and Fellowship Plan he received his masters degree in Mechanical Engineering in 1996 at the University of Ottawa, Canada. From 1997-1998 he was a Swedish Institute Visiting Researcher in the Department of Materials Processing at Royal Institute of Technology, in Stockholm, Sweden. Mussa spent six months at Recklinghausen College in Germany between 2004 and 2005 attending advanced professional training in computer-aided design and manufacturing (CAD/CAM). Mgwatu has research interests in metal machining analysis, manufacturing systems planning and scheduling, and logistics and supply chain management.

Thank you to our additional faculty who have given their undying support and talent throughout the years.

JOHN W. ADAMS - PROFESSOR EMERITUS OF ISE
Research/Professional Interests: Applications of Probability and Statistics; Teaching of Probability and Statistics; Quality Engineering Program.

PIETRO L. BELOTTI - VISITING ASSISTANT PROFESSOR OF ISE
Research Interests: Mixed-Integer Nonlinear Programming; Network Design; Relaxation Methods for Linear Programming; Robust Optimization.

JITAMITRA DESAI - VISITING ASSISTANT PROFESSOR OF ISE
Research Interests: Theory: Global Optimization; Convex/Nonconvex Analysis; Mixed-Integer Nonlinear Programming; Polynomial Optimization; Semidefinite Programming; Decision Analysis. Applications: Cluster Analysis, Risk Management; Design Optimization; Location Theory.

MIKELL P. GROOVER - PROFESSOR OF ISE, DIRECTOR OF THE MANUFACTURING TECHNOLOGY LABORATORY
Research/Professional Interests: Manufacturing Engineering; Manufacturing Processes; Production Systems; Automation; Material Handling.

NICHOLAS G. ODREY - PROFESSOR OF ISE, DIRECTOR OF THE AUTOMATION AND ROBOTICS LABORATORY
Research/Professional Interests: Intelligent Control of Production Systems; Control Architectures for Production Systems; System Integration; Flexible Automation; Production Engineering; Measurement and Inspection Systems, Cellular Manufacturing.

EUGENE V. PEREVALOV - ASSOCIATE PROFESSOR OF ISE
Research/Professional Interests: Dynamic Optimization; Financial Engineering; Wireless Communication Systems; E-Commerce.

LOUIS J. PLEBANI - ASSOCIATE PROFESSOR OF ISE
Research/Professional Interests: Process Control Systems; Mathematical Modeling; Simulation.

IMRE PÓLIK - VISITING ASSISTANT PROFESSOR OF ISE
Research/Professional Interests: Conic Optimization; Duality Theory; Complexity Analysis, Polynomial Time Algorithms; Reinforcement Learning High Performance Computing, Adaptive Methods in Optimization Algorithms.

TED K. RALPHS – ASSOCIATE PROFESSOR OF ISE
Research/Professional Interests: Discrete Optimization; Combinatorial Optimization; Logistics Problems; Routing and Packing Problems; Electronic Auctions; Graphs and Network Flows; Design and Analysis of Algorithms; Parallel Algorithms; Computational Biology.

ROBERT H. STORER - PROFESSOR OF ISE, CO-DIRECTOR OF THE INTEGRATED BUSINESS AND ENGINEERING HONORS PROGRAM (IBE), GRADUATE ADVISOR PH.D. PROGRAM
Research/Professional Interests: Heuristics; Logistics; Combinatorial Optimization; Operations Research; Applied Statistics and Statistical Modeling; Simulation; Financial Models.

GREGORY L. TONKAY - ASSOCIATE PROFESSOR OF ISE, DIRECTOR OF THE ELECTRONICS MANUFACTURING LABORATORY, ASSOCIATE CHAIRMAN OF THE DEPARTMENT OF ISE
Research/Professional Interests: Automation; Electronics Manufacturing; Computer Control of Manufacturing Systems; Robotics.

GEORGE R. WILSON - ASSOCIATE PROFESSOR OF ISE, GRADUATE ADVISOR MASTERS PROGRAMS
Research/Professional Interests: Applied Stochastic Processes; Optimization; Production Planning and Control; Modeling and Analysis of Logistic Systems.

S. DAVID WU - LEE IACOCCA PROFESSOR OF ISE, DEAN OF THE P.C. ROSSIN COLLEGE OF ENGINEERING AND APPLIED SCIENCE
Research/Professional Interests: Supply Chain Analysis: Technology Forecasting; High-Tech Supply Chains; Capacity and Demand Management. Distributed and Game Theoretic Decision Processes: Auction and Bidding: Combinatorial, Multi-Attribute, and Sequential Auctions; Game-Theoretic Modeling; Bargaining Theory. Optimization: Stochastic Programming; Discrete Optimization.

EMORY W. ZIMMERS JR. - PROFESSOR OF ISE, DIRECTOR OF THE ENTERPRISE SYSTEMS CENTER, AND DIRECTOR OF CELDI
Research/Professional Interests: Computer Applications in Industrial Systems; Application of Traditional Industrial Engineering Techniques; Leadership; Entrepreneurship; Student-Run Companies; Agility; Enterprise Systems; Multi-Media Distance Learning.

Doctorate Students Recognized for High Achievements

ISE Ph.D. student Ban Kawas was named a finalist at the annual IBM Ph.D. Fellowship Competition. The winner will be announced in February 2009. The IBM Ph.D. Fellowship Award is a worldwide competitive program that recognizes extraordinary Ph.D. students in many areas of study and disciplines, which include computer science, engineering, math, business, management, and more. Recipients are selected based on their overall potential for research excellence, the degree to which their technical interests align with those of IBM, and their progress to date.

Ban, an international student from Jordan, recently passed her doctorate general exam for Lehigh in December 2008. Her research on a talk called "A Log-Robust Optimization Approach to Portfolio Management" was presented at the INFORMS annual meeting in Washington, D.C., this past October, and will be published in the OR Spectrum. Her work is currently being funded by a grant from the National Science Foundation. Ban and Dr. Aurélie Thiele have submitted another paper for publication called, "*Short Sales in Log-Robust Portfolio Management*."

ISE Ph.D. student Julio Goez Gutierrez has accepted the Givens Associate Internship at the Mathematics and Computer Science Division of Argonne National Laboratory in Chicago, Illinois. During the summer of 2009, Julio will be working on a project on Computational Noise in Simulation-based Optimization Problems.

The Mathematics and Computer Science (MCS) Division at Argonne National Laboratory, a key laboratory of the U.S. Department of Energy, is developing innovative techniques in numerical computing and computational mathematics. The Givens Associate positions are intended to encourage graduate students who are beginning careers in numerical analysis or computational mathematics. Givens Associates will work actively with MCS scientists designing, analyzing, and implementing numerical and visualization methods.

Student Presentations Plug into the Health Field

If you know anyone who has arthritis, you know how difficult it can be to perform certain tasks, especially with your hands. This includes everyday activity such as plugging electronics into sockets. Seven Lehigh seniors of the IBE Capstone Project course presented their answer to this problem with the MPlug. This team was one out of several senior teams that presented their projects at the end of the 2008 Fall Semester.

"The presentation is the final exam for this course," said teaching assistant Daniel Scansaroli. "They work with real startup companies to develop a comprehensive business and technical solution for a product that will be introduced to the marketplace."

A normal household appliance plug, such as for a lamp, has a small plug that may cause difficulty gripping and plugging in and out of the outlet for someone with arthritis. The MPlug team designed a larger plastic handle so it would be easier to grab for someone with arthritis. The team used magnets to connect the plug to the outlet so it could generate an electrical current. The larger handle and the magnets made it easier for someone with arthritis to plug in and unplug household objects.

The team was graded not only by their professors and peers, but by a panel of experts from the field. The team was graded on their overall communication of the project, problem and solution identification, business context, and the ability to discuss the strengths and weaknesses of the project.

"As a former student in the program, teaching IBE has allowed me to see the value of the program from an entirely different angle," comments Jeremy Walsh, a teaching assistant for the course. "Helping the teams incorporate the program's teachings into their own projects has been a challenge. As we always say, 'there is no one right answer, ever.' Conveying the process to each student, understanding their individual concerns, and working to bring each of them along for a ride is sometimes difficult."

Other projects in the past years have helped to solve problems for organizations in numerous industries on both the business and technical side. Some of these projects included an in-shoe pressure sensing system for diabetic patients suffering from neuropathy, an automated blending system for large kitchens, a hedging/investment program for companies who want to save on gas prices, and new applications for existing technology companies using RFID, ceramic filters, and magnetic motors.

"The main concept that I learned from this project is that you really just need to get out into the marketplace to find your answers," said Jason Ackerman '09, a member of the MPlug team. "It also taught me that you need to be able to justify and defend everything you say."

First-Year Students are Making a Splash in the Lab

The Introduction to Engineering Practice course (Engineering 5), led by Dr. Keith Gardiner, is in the process of building a hovercraft in the Mohler Lab. The ultimate goal of this project is to build a full working hovercraft in the next two years. Students constructed different parts of the hover craft, including the thrust duct, hull, and rudders. The students will continue to build the hovercraft over the 2009 Spring Semester.

ISE Students create Golf Course Simulation

Twelve students from the Integrated Learning Experience (ILE) class designed and created a potential golf course for Lehigh's Goodman Campus. Two ISE students, Brendan Van Ackeren '09 and Allison Grese '09, created the computerized simulation of the golf course. The goal of the simulation was to determine the various logistics of the course layout.

"The group consisted of business students, civil and industrial engineers. Our goal was to analyze the costs and projected usage of various course designs to identify a course that could be self-sustaining while appealing to our target market," mentions Van Ackeren, who was also named to the 11th Annual Football Championship Subdivision Athletics Directors Association Academic All-Star Team. "Based on our projections and pricing strategy, our recommended course, which consisted of 9 holes and 3 basic learning holes for beginner golfers, appeared to have enough revenue to cover its annual costs."

The ILE course is designed for students from various majors to do research projects. This class allows students to get real-world, team-oriented learning experiences and to apply economic analysis in evaluating the costs and benefits of newly proposed or renovations and expansions of existing athletic facilities.

"What I gained out of this was practical application of the simulation program. I took a simulation class last spring, but it wasn't necessarily real-life because all the numbers, etc. were given to you," said Grese, from Mount Airy, MD. "We had to build the simulation entirely from scratch with our own knowledge and assumptions about the game of golf."

Students Receive Doctorates

Congratulations to the following students who earned their doctorate in 2007 and 2008:

- Kumar Abhishek defended his dissertation called, "Topics in Mixed Integer Nonlinear Programming," in April 2008. He is currently working as a Senior Analyst in the Enterprise Optimization group for United Airlines in Chicago.
- Manisra Baramichai defended her dissertation entitled, "Supplier Partnership Establishment under Uncertainties for Agile Organizations," in September 2007.
- Julie Drzymalski defended her dissertation called, "A Synchronized Supply Chain for a Multi-Echelon, Multi-Stage System," in April 2008. She accepted a position as an assistant professor at Western New England College in Springfield, Massachusetts.
- Wasu Glankwamdee defended his dissertation called, "Topics in Branch and Bound on Computational Grids," in July 2008. He is currently a research fellow for the Singapore-MIT Alliance in Singapore.
- Laksana Kamonkan defended her dissertation called, "Designing Menus of Extended Warranty Contracts Under Technological Change and Competition," in June 2007. She is currently working for DTAC, a telecommunications company in Thailand.
- Pinar Keles defended her dissertation called, "Evaluating Portfolios of Multi-stage Investment Projects with Approximate Dynamic Programming," in September 2007. She is currently a CDP Engineer for IT Decision Services at Air Products and Chemicals, Inc. in Trexlertown.
- Gokhan Metan defended his dissertation called, "Robust and Adaptive Inventory Management: Theory and Algorithms," in April 2008. He is now an Operations Research Analyst for American Airlines in Fort Worth, Texas.
- Hyong-Mo Jeon defended his dissertation called, "Location-Inventory Models with Supply Disruptions," in May 2008. He is currently a research professor at Korea University.
- Ying Rong defended his dissertation titled, "Studying the Impact of Supply Uncertainty on Multi-Echelon Supply Chains," in July 2008. He is currently a post-doc in the Department of Industrial Engineering and Operations Research at UC Berkeley.
- Amanda Schmitt defended her dissertation called, "Strategic Inventory Management for Supply Chains Subject to Supply Uncertainty," in December 2007. She is currently a post-doc in the Center for Transportation and Logistics at MIT.
- Yan Xu defended his dissertation called, "Scalable Algorithms for Parallel Tree Search," in October 2007. He is currently working at the SAS Institute in North Carolina developing optimization software.

Seniors Highlight their OPC Course

Students in Dr. Keith Gardiner's Organizational Planning and Control (OPC) course were asked to write their thoughts in a one-page news release. Students were asked to discuss their experience about the class and what they felt was appealing to them. The class focused on current events relating to the environment, economy, foreign affairs, and other present topics. By discussing these topics in class, students learned how companies large and small, and other projects, function. As part of this project, students got creative in designing and writing their press releases.

"This course teaches valuable project management skills," states Kaila Deutsch in her article. "It also encourages students to take an active role in understanding what's going on in their world."

IBE/ISE Student takes a lead in Campus-Wide Food Drive

IBE/ISE student Jim Paolino '09, along with the Junior Inter-Fraternity Council and the Junior Pan-Hellenic Council, organized a successful campus-wide food drive during the 2008 holiday season. Students, faculty, and staff were encouraged to drop off nonperishable items in buildings across the university.

The sinking economy is a regular on the front page across the country and around the world. Unfortunately, due to this crisis, donations for nonprofits have slimmed down drastically. This included the South Bethlehem Neighborhood Center, which was in desperate need of food to fill its pantry. Luckily, with the help of Lehigh University and the general community, its pantry was filled for the holiday season.

"Their pantry is the size of this office," said Paolino, referring to ISE's department office in the Mohler Lab. "After we dropped off the food to the neighborhood center, it was filled."

2008 Spencer C. Schantz Distinguished Lecture Series: Dr. Cynthia Barnhart

Weary travelers often wonder, typically aloud and in line at the check-in gate, why airlines have issues with scheduling or overbooking during busy periods. Even with state-of-the-art technology at their disposal, why do horror stories about runway delays and cancelled connections still seem so common?

To answer these questions, Dr. Cynthia Barnhart, Associate Dean at the Massachusetts Institute of Technology (MIT), gave two lectures for the Spencer C. Schantz Lecture Series for the Industrial and Systems Engineering Department at Lehigh University on December 4th and 5th.

On December 4th, Dr. Barnhart gave a Technical Talk to the Industrial and Systems Engineering Department. The talk, entitled "Optimization Approaches to Airline Industry Challenges: Aircraft Schedule Planning and Operations," was attended by about 50 ISE students and faculty, and provided an overview of the historical accomplishments in airline schedule planning and operations control. This included flight schedule design, fleet assignments, aircraft maintenance routing, and crew scheduling.

On December 5th, Dr. Barnhart gave a public talk to Lehigh University's students, faculty, and staff in the Sinclair Auditorium. In this talk, she focused on the analysis of airline delays, and the impact that airports, airline scheduling practices, passenger load levels, and weather have in influencing the amount and frequency of delays experienced by passengers. Dr. Barnhart spoke to over 100 attendees from the P.C. Rossin College of Engineering and Applied Science and other departments of the university. "This is my first time on Lehigh's campus," said Barnhart. "I am very impressed with the faculty and students and their commitment to research and education."

To read more about this event and Dr. Barnhart, please visit *http://www3.lehigh.edu/News/RCEASnews_story.asp?iNewsID=3044.*

Special thanks to Dr. Mikell Groover, ISE, and Ilhan Citak, Lehigh Library Special Collections, for furnishing us with photos of the past.

Senior ISE student named to the Academic All-Star Team

Photo credit: Specialty Photography

Brendan Van Ackeren '09 was named to the 11th Annual Football Championship Subdivision Athletics Directors Association Academic All-Star Team. He is one of 43 students to be chosen for the team and the only student named from the Patriot League.

"I am honored to be recognized among such a select group of student athletes," said team captain Van Ackeren. "I think that it is just a testament to the quality of the educators and coaches we have here at Lehigh."

Student nominees were required to have at least a 3.20 GPA in undergraduate study and have been a starter or key player with legitimate athletic credentials. Each nominee must have reached his second year of athletic and academic standing, have completed a minimum of one full academic year at the nominated institution, and have participated in 50 percent of the games played at his designated position.

"Time management is the usual cliché, but it has been the key to allowing me to manage everything that I have going on," replies Van Ackeren about balancing athletics, academics, and community service. "Football provided me with a good structure because there are certain windows of time that you know must be delegated to each aspect of your life. I have also worked hard to prioritize my commitments and determine which of my activities need the bulk of my time and attention at any given time."

Van Ackeren is a native of Bethlehem, PA, and a graduate of Liberty High School. He has been on the Dean's list since starting at Lehigh and is a member of Career Services Peer Educators, Student Athlete Mentor Organization, the C.O.A.C.H. program, and the Student Athlete Executive Committee. As part of the Integrated Learning Experience class this past fall, Van Ackeren, along with ISE senior Allison Grese, created a computerized simulation of a potential golf course on Lehigh's Goodman Campus. After graduation, Van Ackeren will be a consultant for PricewaterhouseCoopers in their Advisory branch and will be working at the company headquarters in New York City.

"Lehigh University has given me such a positive experience," replies Van Ackeren. "I want to thank all of my teammates, coaches, and professors for helping me throughout my college career."

In Memory of Technician and Friend Gilbert Zambelli

By: Dr. Mikell Groover

The ISE Department sadly announces the passing of Gil Zambelli, a Laboratory Technician in the Manufacturing Technology Lab. Gil passed away at the age of 80 after a long illness on January 3, 2009. Gil was a member of the Industrial Engineering family starting in 1963 and retired in 1993. Before coming to Lehigh, Gil was a machinist at Bethlehem Steel and was hired by the IE Department as a machining technician. During his years at Lehigh, in the lab he witnessed the introduction of several new technologies including numerical control, industrial robotics, and material handling. He was not only a capable technician, but a mentor to students and friends and to all who knew him.

"I knew Mr. Zambelli since I was 16 years old. He was not only a teacher but a very good friend," said Ed Force II, Mohler Lab building manager and lab technician. "He taught me the balance between teaching and being safe during lab. He has been and always will be remembered as a mentor to me. I have learned more skills from him than I can think of."

"I have many fond memories of Gil which I will always treasure. He was a great guy to have around and always managed to make me laugh," said Kathy Rambo, ISE Department Coordinator. "One of my favorite memories was his Art Carney from the *Honeymooners* impression. Considering that he was an avid golfer, the 'Hello Ball' only seems appropriate. He will be truly missed by his many friends at Lehigh."

Amanda Fabrizio joins ISE Department

The ISE Department is pleased to announce the addition of Amanda Fabrizio as the new Communications Specialist as of December 1, 2008. She will be working closely with faculty, staff, students, and alumni on department newsletters and related activities as well as the department's Web site. Her major thrust will be coordinating and planning the department's 60th anniversary celebration, which will be taking place this April.

Amanda comes to us from outside of Philadelphia in Plymouth Meeting, PA, where she graduated from Plymouth-Whitemarsh High School in 2003. She earned a BA in Communications from DeSales University in 2007 with a focus in PR, event coordination, fundraising, and marketing. As a student, she was the 2007 Senior Class Gift Committee Chair, raising over $4,400 with a class participation of 44%, which represents the largest senior class gift campaign and gift in recent DeSales history. Prior to joining Lehigh, she worked as an HR/Marketing Representative for a counseling center in Bethlehem from July 2007 to November 2008.

Amanda is one of the Young Adult Leaders for Notre Dame of Bethlehem's FIAT Youth Ministry and enjoys spending time with family and friends, reading, and knitting. She is also an avid Philadelphia sports fan.

"I am very excited to be working on the ISE team," mentions Amanda. "I am looking forward to working with the faculty, staff, and students of the department. I am ecstatic about this position."

We are very fortunate to have Amanda's help and enthusiasm as we begin this new semester and wish her many rewarding years at Lehigh.

ISE Staff Members Awarded the 2008 Tradition of Excellence Award

Graduate Coordinator Rita Frey and Department Coordinator Kathy Rambo were both awarded the 2008 Tradition of Excellence Award on Monday, December 22nd, 2008. Both staff members were nominated by Dr. Mikell Groover.

"It was a great surprise to be nominated for this award and an honor to actually receive it," comments Rita, a staff member at Lehigh for the past 19 years. "I appreciate Mikell for taking the time out of his schedule to make this happen. I also want to thank the selection committee for their choice."

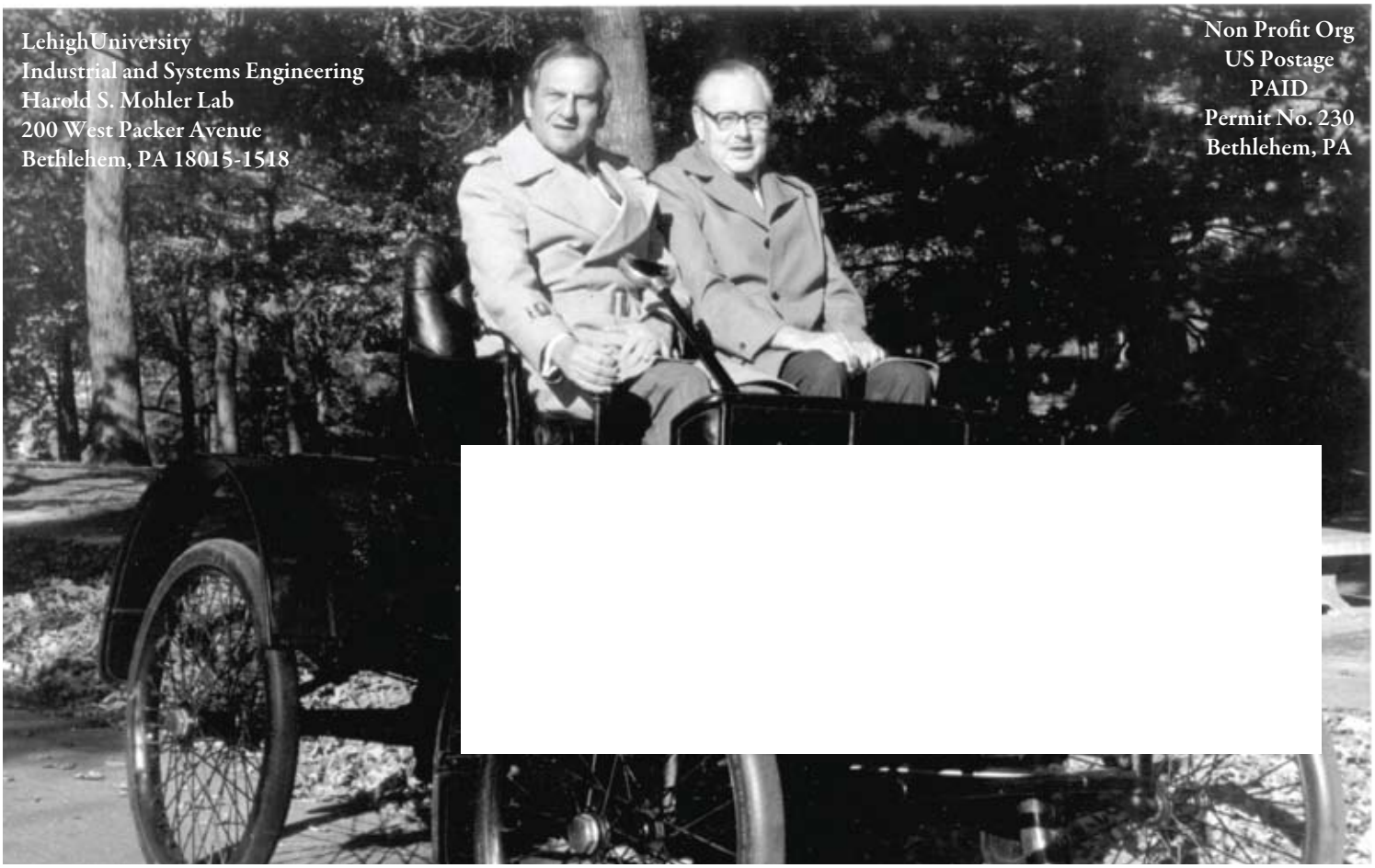
Rita and Kathy were judged by the Tradition of Excellence committee on their character, job performance, and team-focused contribution. The award is given to an individual or team that demonstrates outstanding behaviors or produces exceptional results, either within a single department or across the university.

"I nominated Kathy and Rita last spring because they are great support staff people," said Mikell. "The major project that made me want to nominate them was when we were conducting our search last Fall and Spring for a visiting assistant professor. I was chair of the search committee, and Kathy and Rita were very supportive of the process. Search committees require a lot of staff support (scheduling, arrangements, hotel stays, reimbursements, etc.). I thought they went above and beyond the call of duty. This award provided the perfect vehicle to give them recognition."

"I was really surprised to receive the award," said Kathy, a 30-year staff member. "It's very nice to be acknowledged for the little things that you do. I thanked Mikell for his thoughtfulness in nominating us and told him it was an awesome start to the holidays!"

LehighUniversity
Industrial and Systems Engineering
Harold S. Mohler Lab
200 West Packer Avenue
Bethlehem, PA 18015-1518

Non Profit Org
US Postage
PAID
Permit No. 230
Bethlehem, PA



Lee Iacocca '45 and Lehigh's 10th President, Willard Deming Lewis, driving the Packer 1.

Development of ISE

As the ISE Department continues to work hard for continuous improvement, an ongoing excellence in all aspects of educating our students, and the performance of cutting-edge research, support from our alumni and friends is greatly needed. Your generous gift to the department will have a lasting impact on today's students and for generations to come. If you would like to make your gift, please see below or visit https://giving.lehigh.edu/engineering/, and under Gift Designation, highlight "Industrial and Systems Engineering."

Supporting the Industrial and Systems Engineering Department

Thank you for your support. Please complete the form below, and send it along with your check made payable to Lehigh University to the:

P.C. Rossin College of Engineering and Applied Science
Lehigh University, Packard Laboratory
Attn: Anne Bork
19 Memorial Drive West
Bethlehem, PA 18015

Name:_____

Address:_____

Phone:_____ E-mail:_____

I/We wish to make a gift in the amount of $_____ to the Industrial and Systems Engineering Department.

Payment Options

If you would like to make your gift with a credit card, please visit https://giving.lehigh.edu/engineering/, and under Gift Designation, highlight "Industrial and Systems Engineering."

__ I have enclosed a check made payable to Lehigh University.
__ My/my spouse's company will match my/our gift to the extent of $_____.
__ I have included the ISE Department in my will. Please contact me at (____) _____.