

IOE News

FALL 2005

The Newsletter of the
Department of Industrial and
Operations Engineering

Financial Engineering in IOE

A financial engineer is an individual who uses quantitative methods, particularly advanced mathematical modeling and computer technology, to develop methodologies, products and services for use in the operations and analyses of financial markets and financial management.

An irreverent, but perhaps more accurate, description has been offered by an anonymous business school professor: "A financial engineer is what a MBA concentrating in finance would be if he or she had a strong enough mathematical background so we could teach the finance courses the way they should be taught."

The fall term of 1997 saw the initiation of an IOE master's degree concentration in Financial Engineering. Master's degree students in IOE, many of whom come from undergraduate programs in Industrial Engineering, Operations Research or related engineering or mathematical disciplines, were immediately attracted to this opportunity. Not the least of the reasons were the obvious job opportunities in the financial industry at all ends of the spectrum - investment banks, trading firms, risk management specialty companies, information systems groups, etc.

By 2000, this popular course of study subsequently grew into a stand-alone Rackham

master's degree in Financial Engineering (FE). Although now administered by Interpro (the office responsible for all professional master's degrees in the College of Engineering) it is actually a multi-college program, with over 40 participating faculty from LS&A and the Ross Business School as well as CoE. However, because of their nature and content, almost all of the CoE courses in the FE program's core are offered by IOE. Currently over 130 students are enrolled in the FE program. An active FE Club provides the opportunity for students to interact outside of the classroom for social as well as professional activities. Over 140 alumni are now working in organizations throughout the world. For more information on the FE program, please visit the website at <http://interpro.engin.umich.edu/fep/>.

Since many of the FE teaching faculty come from IOE, the program has spawned an associated research concentration in the IOE PhD program. In particular, professors Jussi Keppo, Volodymyr Babich, Goker Aydin and Romesh Saigal and their students have embarked on a variety of research projects related to financial engineering which are described on the following pages.

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PhD student Pierre-Yves Brunet, professors Volodymyr Babich, Romesh Saigal, Jussi Keppo and Goker Aydin meet to discuss their research efforts in financial engineering.

Financial Engineering Research

Vulnerable Options in Supply Chains: Effects of Supplier Competition (V. Babich)

Concerned with the risk of supplier default, many firms choose to diversify their orders among multiple suppliers. The discrepancy in production lead-times among suppliers furnishes a firm with a valuable option to defer ordering decisions until uncertainty has been partially resolved. The suppliers also have an option to defer their pricing decisions. Using a single-period, multi-stage model of a two-echelon supply chain with competing risky suppliers and a single retailer, this paper studies how the supplier default risk and default correlation affect deferment option value, retailer procurement and production decisions, supplier pricing decisions, and channel profits.

$$c = S_0 N(d_1)$$
$$p = K e^{-rT}$$

Employment Protection and Labor Market Demand (J. Keppo, T. Maul)

Why do certain European countries have unemployment rates twice that of the U.S.? Laws in some European countries make it hard for companies to dismiss workers. For example, firms must wait months before firing workers. Industries such as telecom and biotech, which have high uncertainty for the demands of their products, risk being forced to pay workers to produce nothing when demand is low. Being stuck with “excess capacity” of workers is a liability which results in fewer workers being hired. This research considers demand for a company’s product to be a random process, and optimizes when to hire or lay off workers using stochastic control methods. By calibrating the model with industry and country data, the model can explain country and industry specific employment levels.

$$c = S_0 N$$
$$p = K e$$

where

$$\frac{(r + \sigma^2 / 2)T}{\sqrt{T}}$$
$$- \frac{\sigma^2 / 2)T}{\sqrt{T}} =$$

Managing Risk in Global Manufacturing (R. Saigal)

This research involves understanding and managing the risks that a manufacturing enterprise takes as it goes global. Besides other effects, like currency fluctuations etc., global events also lead to a disruption of the supply or the demand. To manage the latter risks, an enterprise can create a supply chain consisting of a supplier and a wholesaler. But a better way is to have a market where processes can be traded. Such a market for manufacturing processes does not currently exist. Research is continuing in defining what form this market will take and what processes are amenable to trading in such markets.

Pre-IPO Operational and Financial Decisions (V. Babich, M. J. Sobel)

Many owners of growing privately held firms make operational and financial decisions in an effort to maximize the expected present value of the proceeds from an initial public offering (IPO). We ask: When is the right time to make an IPO? How should operational and financial decisions be coordinated to increase the likelihood of a successful IPO? Financial and operational decisions in this problem are linked because adequate financial capital is crucial for operational decisions to be feasible and operational decisions affect the firm’s access to financial resources. The IPO event is treated as a stopping time in an infinite-horizon discounted Markov decision process. Unlike traditional stopping-time models, at every stage the model includes other decisions such as production, sales, and loan size.

$$\frac{S_0 / K) + (T}{- /$$

Designing Resilient Supply Chains: Diversification vs. Dedicated Supplier Procurement Strategies (V. Babich)

As many examples from industry practice illustrate, not only do unreliable supply chains hinder a firm’s ability to compete, but they also can cause a firm’s ultimate demise. Therefore, tools that allow a firm to handle default risk more effectively, especially in the highly dynamic and uncertain environments, are extremely valuable. This research will help to answer the following questions: What operational and financial controls can managers employ to mitigate the effects of default risk in supply chains? How effective are these controls and how is performance affected by the competition among firms, asymmetric information, and dynamic environment? What are the side effects of risk-management policies on the firms incentives and the competition?

$$\frac{-d_2) - S_0 N(-d_2)}{(S_0 / K) + (r \cdot \sigma \sqrt{T})}$$

Does the Market Risk Requirement Affect Bank Behavior? (J. Keppo, L. Kofman)

Banking supports almost all other industries in the US. For this reason, the government has established rules and regulations aimed at preventing major crises in the banking industry. Two currently used regulations are the “credit risk requirement” which addresses the risk of loss due to borrowers’ bankruptcies, and the “market risk requirement” which addresses the risks that a bank faces when it invests its assets in financial markets. This project shows that in some cases the market risk requirement actually increases the bankruptcy probability for some US commercial banks. This result shows one major problem in current bank regulation policy and, further, it suggests a simpler and more efficient regulation.

Competition and Diversification Effects in Supply Chains with Supplier Default Risk (V. Babich, A. N. Burnetas, P. H. Ritchken)

We study the effects of credit risk in a supply chain where one retailer deals with competing risky suppliers who may default during their production lead-times. The suppliers, who compete for business with the retailer by establishing wholesale prices, are leaders in a Stackelberg game with the retailer. The retailer, facing uncertain future demand, chooses order quantities while weighing the benefits of procuring from the cheapest supplier against the advantages of reducing credit risk through diversification. We show that the retailer prefers suppliers with highly correlated default events. In contrast the suppliers and the channel prefer defaults that are negatively correlated.

$$\frac{(r + \sigma^2 / 2) T}{\sqrt{T} - \sigma^2 / 2)}$$

Risk, Financing and the Optimal Number of Suppliers (V. Babich, G. Aydin, P.-Y. Brunet, J. Keppo, R. Saigal)

In countries where monetary institutions are scarce, trade credit (supplier loans) might be the only recourse for financing a firm’s operations. In countries with developed financial markets, firms can access various sources of short-term financing, including bank loans and trade credit. We study how financial constraints, trade credit and bank loan terms, wholesale and retail prices, and fixed costs affect supplier selection.

$$\frac{(r - \sigma^2 / 2) T}{m} = d_1 -$$

Chair's Message

Welcome to our fall issue of IOE News.

Our plan for the next several issues is to focus on particular teaching and research areas of the department. We start with a relatively new area, Financial Engineering (FE). For many alums it may be easiest to think of FE as an outgrowth of the traditional courses in engineering economy. You will notice from the articles that the FE focus in IOE is on engineering financial systems and risk management in supply chains. In future issues we plan to cover the areas of quality engineering, operations research, production/distribution/logistics, ergonomics, and engineering management.

Also profiled in this issue is Professor Nadine Sarter who joined the department last year from OSU as a member of our cognitive ergonomics group. Her research interests include the design and evaluation of multimodal interfaces, human error management, and the design of decision support systems in application domains such as aviation, military operations, and the modern car cockpit. We're also pleased to report that her football loyalties have shifted from red to blue!

I mentioned in the last newsletter our search to fill additional faculty positions and I am pleased to announce that we were successful in hiring two new associate professors, both with Michigan ties. Professor Judy Jin, from the University of Arizona, joined us as a member of our Quality Engineering group. Her interests are primarily in the areas of industrial statistics and quality engineering. Her recent research focuses on data



fusion for complex systems modeling. Professor Mark Van Oyen, from Loyola University and Northwestern University, joined our Production/Distribution/Logistics area. His interests center on the use of worker cross-training, flexible machines and other mechanisms to create agile operations that enhance supply chain performance. Both Judy and Mark are UM alums who bring strong research programs. Be sure to watch for their profiles in the next newsletter.

We also experienced some losses during the year. Professor James Bean became Dean of the Lundquist College of Business at the University of Oregon. Professor Mark Lewis moved to colder pastures at Cornell. Professor Steve Pollock "retired." Even in his emeritus status, however, Steve continues to teach a couple of courses and to serve as Engineering Global Leadership (EGL) Program Director. Our saddest loss occurred in November 2004 when former Graduate Student Advisor Fran Bourdas passed away. Her "former students" are organizing contributions for a memorial for her. Contributions are also being collected for the Crawford Entrepreneurship Award in honor of Andy Crawford, an alum who established our entrepreneurship course. Details appear on page 7.

Our superb staff continue to do an outstanding job of supporting all of our education, research, and outreach activities. We were twice blessed this year when the College of Engineering recognized two IOE staff members with the highly competitive Excellence in Staff Service Awards. Please join me in congratulating Tina Blay, department secretary, and Randy Rabourn, director

of continuing education, on their awards.

Our faculty are engaged in exciting and innovative research which will be featured in future issues. We have metrics in place to measure and monitor teaching performance and our students and alumni continue to praise the outstanding teaching they experience in IOE. This excellence, breadth and depth across teaching and research is one of the reasons that US News annually ranks both our graduate and undergraduate programs as #2 in the nation. I am also pleased that we are now able to formally recognize outstanding teaching in IOE with the recently established *Jon R. and Beverly S. Holt Award for Excellence in Teaching*. The Holts' establishment of the award and the first recipient, Professor Amy Cohn, will be featured in the next newsletter.

As many of you know, engineering programs are periodically reviewed by ABET, Inc., the recognized accreditor for university programs in engineering. The objective of the review is to make an assessment of undergraduate programs—to judge their standards and practices in educating qualified engineers. Our undergraduate program successfully completed the ABET review this fall, and I'd like to thank all of the alumni, faculty, staff, and students who participated in this exercise. While the preparation requires a considerable amount of effort, the focus is aligned with our goal of continuous improvement of our undergraduate program.

As alumni, you play a key role in this continuous improvement. You provide feedback on your experiences and education from the valuable perspective

Continued on page 8

Alumni in Finance

IOE Degree Opens Doors

By Eric Metz
BSE IOE '01, MSE IOE '03

Financial markets have always interested me. My undergrad studies in Industrial and Operations Engineering propelled that interest, as I began to readily submerge myself in coursework related to financial engineering. It was about that time that I discovered the Engineering Global Leadership Program, which would allow me to bridge my engineering education to the financial markets and all of its moving parts together.

I was a member of the Engineering Global Leadership Program, in conjunction with the Tauber Manufacturing Institute. I graduated BSE IOE in December of 2001 and MSE IOE in May of 2003. At that time I had a very difficult decision to make between continuing my education and entering industry. I was enrolled in the Financial Engineering Doctorate Program,

working with Jussi Keppo. Concurrently, the firm that I had recently done an internship with, The Chicago Trading Company, had offered me a position to return as a full time em-

ployee. I vacillated many times, but was drawn to the chaotic environment of floor trading that I had experienced the summer prior to my graduation.

I began as a trading assistant on the floors of the Chicago Mercantile

Exchange (CME). I later traded Eurodollar Options on the floor, once I became familiar with all of the intricacies of derivatives trading that are difficult to learn in a classroom environment. I was a floor trader until October of 2004, when I switched my career path into a more global and macro based hedge fund.

My current job entails an immense amount of analysis and theory. The education that I had is used each and everyday, but in a different form. Rather than proving the mathematical models that we all did in school, I am now trying to manipulate and change their form, as assumptions in the marketplace are constantly being evaluated. Trading Derivatives is something that is much broader than the Black-Scholes Model that is the foundation for the Options Pricing Model. I can see portions of many courses in my everyday work.

Since starting my recent position at an equity based hedge fund, I have been a part of projects that have involved one or more of the following real applications: Game Theory, Bayesian Decision

Analysis, Time Series Modeling, and Statistical Quality Control. I would have never imagined that the degree I was pursuing three years ago would encompass so much of my current work.

I am not certain where the next step

in my career lies, but I have learned that with the continuing evolution of the financial marketplace the need for financial engineers will not be dissipating any time soon. I am extremely thankful that I was able to learn from and study with some of the industry's greatest minds that are embedded in the Financial Engineering Program.

Eric Metz is a derivatives trader in Global Equities at Ronin Capital LLC in Chicago, Illinois. He actively trades and manages a derivatives portfolio consisting of 1000 equities, researching and analyzing the volatility and stock performance patterns of each individual equity in his given sector. He has aided in the development of dozens of proprietary technological tools that Ronin's traders rely on to make quick confident decisions.

Prior to joining Ronin in October of 2004, he was a derivatives trader in Eurodollar Derivatives for the Chicago Trading Company LLC on the floor of the Chicago Mercantile Exchange. While at CTC he formulated continuous risk analyses allowing teams to better mitigate the firm's exposure to certain risk parameters, and analyzed risk and volatility exposure of the Firm's complex derivative positions.

He received his BSE IOE in December 2001 and his MSE IOE in May 2003.

...with the continuing evolution of the financial marketplace, the need for financial engineers will not be dissipating anytime soon.

-Eric Metz

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Bartscht Receives 2004 Alumni Merit Award



Stephen Director, Robert J. Vlasic Dean of Engineering, congratulates Karl Bartscht, 2004 IOE Alumni Merit Award winner.

Karl G. Bartscht serves as managing director of Epsilon Health Group, LLC. A pioneer in health care consulting, he has planned, designed and managed health care systems for over 30 years.

Mr. Bartscht founded Epsilon Health Group to improve the performance of health care providers. His current focus is the development of a decision model, named Rx Minimizer, for reducing the utilization and cost of prescription drugs. He is also directing efforts toward realizing the benefits of Internet use by health care managers.

Earlier in his career, in 1969, Mr. Bartscht founded Chi Systems, Inc. There he managed an array of health care programs and services, including a leading consulting firm, and directed projects involving the planning and analysis of inpatient, ambulatory and long-term care, specialized programs and facilities, and business plan development. He founded International Health Care Management, Inc., a Chi affiliate that managed nursing homes and

assisted-living facilities. The company grew to include 17 long-term care units with more than 2,500 beds and a \$60-million annual budget.

Published widely in the areas of health care planning and operations, Mr. Bartscht is active on the advisory boards of several national organizations and federal agencies. He serves on the Advisory Council to the Dean of the School of Public Health at the University of Michigan, and is a fellow and past chairman of the American Association of Healthcare Consultants. He is a diplomate of the American College of Healthcare Executives. In 1993, he endowed the Karl and Josephine Bartscht Scholarship at the College. The Chi Systems Classroom is a mainstay of the Department of Industrial and Operations Engineering.

Mr. Bartscht earned his bachelor's and master's degrees in industrial engineering in 1962 at the University of Michigan.

Faculty News

Jeff Liker received double awards for his book "The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer." He was selected by the IIE Board of Trustees to receive the IIE/Joint Publishers Book-of-the-Year Award for 2005 and he also received a Shingo Prize for Excellence in Manufacturing for 2005.

Katta Murty received the Edelman Finalist Award 2004 for the project on developing a decision support system to make daily operational decisions at Hong Kong International Terminals optimally. Details can be seen from their paper in *Interfaces*, Vol. 35, No. 1, Jan-Feb 2005, 61-75.

Murty continues his work on a series of web books in an easy to read self-learning style with an industrial engineering and operations research focus. *Computational and Algorithmic LA and n-dimensional Geometry (Freshman, Sophomore level)* and *Optimization Models for Decision Making: Volume 1 (Junior level)* are available at <http://ioe.engin.umich.edu/people/fac/books/murty>. Currently in development is *Optimization Models for Decision Making: Volume 2 (Masters level)* which will emphasize intelligent modeling. Professor Murty asks that alumni assist him in this effort to develop and publicize these web books. He welcomes feedback regarding the books and contributions of interesting exercises that can be included in these books under your name. Contact him at murty@engin.umich.edu.

Amy Cohn received the new Sloan Industry Studies Fellowship, awarded on the basis of exceptional promise and involvement in forefront research.

As many of you know, Fran Bourdas, former Graduate Student Advisor in the IOE Department passed away in November 2004. Many of you will remember Fran for her pink sports car, or maybe a pair of her red framed glasses. If not, you will most certainly remember her compassion for each and every student that walked through her door. We may have come from different places, but once we got to Ann Arbor, we were all Fran's kids!

Since hearing of Fran's passing, many stories have been told via emails and personal conversations. I'm sure that all of you have your own special memories of Fran, and I ask that you share these memories through the alumni webpage.

Although Fran retired in 2001, she had such a positive effect on so many people that her impact will be visible for a long time. In that regard, writing on behalf of "her students," I would like to ask your support in creating a memorial. Current plans are to place a tree/marker on the north campus diag or an engraved bench around the reflecting pool. Any additional money collected would go toward support of student activities. We feel a memorial initiated by her former students would put a smile on her face (that we all remember) and a proud beam in her eye. Contributions should be sent to the department c/o Nancy Murray, and should state for "Fran's Memorial." Please join us in giving a little back to someone who gave so much to each of us.

With warmest memories of Fran,
Scott E. Grasman (BSE '94, MSE '95, PhD '00)
grasman@umich.edu



Entrepreneurship Award

Have you made the transition from engineering to business? If so, you followed a similar path as many of your IOE classmates. Do you know that over 50% of program graduates pursue business careers and many get their MBA from top programs in the country including Michigan, Stanford, University of Chicago, Darden, Kellogg, MIT and Harvard?

The IOE curriculum through classes such as IOE 422 Entrepreneurship provides a terrific foundation for graduates to be successful in their business careers. In fact, Larry Page, founder of Google, was a student in the Entrepreneurship class.

A group of alumni recently established the *Andrew S. Crawford Award for Entrepreneurship Excellence* to be awarded to the top student each semester in the Entrepreneurship class. The award honors Andy Crawford (IOE '64) who developed the first Entrepreneurship course at the Engineering College and taught it for 15 years. The Award is intended to recognize engineering students who have an interest in business and will also include a financial prize. A donor has already agreed to match all contributions. If you are interested in supporting the *Crawford Award*, please contact Mike O'Connell IOE '93 at mike@pavilionwinery.com.

New Faculty

Nadine Sarter Joins IOE Faculty

Ever been to a busy restaurant and been handed a device that will vibrate to let you know when your table is ready? Someday your car or computer may be sending you a message in much the same way.

The use of vibrotactile cues, and their integration with visual and auditory signals, is central to the research being done by new IOE faculty member Nadine Sarter.

She is using factors, smaller lightweight versions of the restaurant device, to create tactile signals and patterns that can be used to alert and inform, provide a spatial frame of reference, and support navigational guidance. “In the modern airplane cockpit, for example, too much information is presented visually. If the pilot looks away for a moment, he could miss a critical change or event. There are also many auditory cues on the flight deck, and pilots have to talk to air traffic control and the flight crew; so the auditory channel is maxed out as well.” To address this data overload problem, Sarter has been investigating the use of tactile cues and



Associate Professor Nadine Sarter

the design of multimodal interfaces since 1996. She first applied her ideas in the aviation domain but has since developed multimodal interfaces for other environments, including the military and the automotive industry. She started her career in the maritime domain but “Ships are too slow for me,” she laughs.

In addition to the development of multimodal interfaces (including sight, sound, touch and smell) in support of both human-computer interaction and computer-mediated collaborative work, Sarter’s research interests include the design of decision support systems that support trust calibration and adaptive function allocation between humans and machines and the analysis and modeling of human error and error management in complex event-driven domains.

A cognitive ergonomist, Sarter holds a master’s degree in Applied and Experimental Psychology from the University of Hamburg in Germany and a PhD in Industrial and Systems Engineering from Ohio State University where she worked with David Woods in the area of Cognitive Systems Engineering. In 1996, she joined the faculty of the University of Illinois and then returned to Ohio State in 1999 to rejoin

her husband, psychology professor Martin Sarter. Both Sarters joined the Michigan family in the fall of 2004.

Coming from Columbus to Ann Arbor would seem to involve a shift in football loyalty. For Sarter, who grew up in Germany, American sports presented a broader challenge. She had to learn the rules of football and baseball so that she would not be “out in left field” when sports references were used by her colleagues.

We in IOE are glad to have her on our team.

Chairs Message

continued from page 4

of an established career. Many of you contribute time and effort and directly participate in departmental activities. Your support enhances the educational experience of our students when you guest lecture in classes, visit campus and meet with groups of students, host plant tours, or help them network at conferences, professional meetings and recruiting activities. Finally, your financial gifts help keep the program strong and allow us to sponsor leading-edge activities. There are many avenues for you to get involved including the organization of the IOE Alumni Society described on page 9.

As always, this is your newsletter and we enjoy hearing from you. Please send your comments, suggestions, news items, etc. to seiford@umich.edu.

Happy Holidays and Go Blue!

Lawrence M. Seiford

Staff Excellence

Two IOE Staff Members Receive Excellence in Staff Service Awards



Dennis Blay

Tina Blay (left) and Randy Rabourn (right) receive congratulations from IOE chair Larry Seiford (center).

IOE staff members Tina Blay and Randy Rabourn were recognized for their outstanding service by the College of Engineering at a program and reception on May 5, 2005.

Tina Blay began her excellent service in IOE in March of 2002. As department secretary, she is the first person people see when they enter the department, and she is always welcoming, accommodating and eager to show the department at its best. She goes out of her way to assist everyone and constantly looks for opportunities to help,

connecting with students and staff on a personal level. Tina brings a special blend of organization, commitment and friendliness to IOE.

Randy Rabourn has been a vital force in the Center for Ergonomics for twenty years. Demonstrating sharp organization skills and marketing savvy, he has supervised an average of 20 continuing-education events each year that have attracted a total of more than 34,000 attendees. Randy's efforts have built strong relationships with other institutions and he goes out of his way to

involve faculty and students in continuing-education programs, allowing students to cultivate relationships and enhance their professional development.

Alumni

IOE Alumni Organizes

In December of 2004, Don Chaffin and Jack Muckstadt wrote to fellow PhD alumni seeking support for an IOE PhD Alumni initiative. Response was immediate and gratifying. A total of \$5,700 was raised and used to support PhD student travel to conferences in 2005. In all, eleven PhD students received travel grants to attend nine different conferences.

Meanwhile an IOE Alumni Society is forming which will incorporate BS, MS, and PhD alumni of IOE. A planning meeting will be held in late January or February of 2006. If you are interested in taking a leadership role in creating an active IOE Alumni Society and planning for an alumni event in fall of 2006, please contact Nancy Murray at nmurray@umich.edu or (734) 764-5657.

Student Honors

2005 MLK Spirit Award

Damon Williams was recognized by the North Campus community for exemplifying the leadership and vision of the Rev. Dr. Martin Luther King, Jr.

NSF Fellowships Awarded

Thomas Ferris and Casey Diekman received NSF Graduate Research Fellowships for 2006.

IIE Scholar

Kristi Schmidt has been awarded the IIE Gilbreth Memorial Fellowship for 2006.

STIET Fellowships

Emily Gray was awarded a STIET Fellowship for 2006. Current STIET fellows Blake Nicholson and Pierre-Yves Brunet received renewals for 2006.

CoE Recognizes IOE Students

IOE Graduate Distinguished Achievement Award

Marissa Ebersole

IOE Undergraduate Distinguished Achievement Award

Kristen Neubauer

IOE Graduate Distinguished Leadership Award

Cristina Pomales-Garcia

Kristi Schmidt

Sarah Womack

IOE Undergraduate Distinguished Leadership Award

Justina Chiang

Megan DeFauw

Kristen Neubauer

Marian Sarah Parker Prize - Undergraduate

Kristen Neubauer

IOE Student Awards

Accenture Scholarship

Cassie Walls

Karan Pandya

Wyeth Allen Scholarship

Justina Chiang

Stephanie Fidler

Goldberg Scholarship

Megan DeFauw

Hancock Scholarship

Megan DeFauw

Kristen Neubauer

Pedro Vaz

Clyde Johnson Scholarship

Sarah Francisco

Elsa Mersereau

Myun Lee Scholarship

Baylee Miller

Jin Wei (Jane) Ni

Rasch Scholarship

Kristin Neubauer

2005 Student Instructor Awards

Jing Li received the 2005 Outstanding Student Instructor Award sponsored by the American Society for Engineering Education.

Cristina Pomales-Garcia received the GSI Teaching Award from the Society of Women Engineers.

Prize Endowed

Professor Katta Murty has endowed the Katta Murty Optimization Prize for the best research paper on optimization by an IOE graduate student. The first competition will be held in the fall of 2006.



IOE students celebrate the end of classes with a picnic sponsored by Alpha Pi Mu.

How can you...

- ...make a difference for IOE students?
- ...keep IOE on the leading edge?

Your tax-deductible gift to IOE will provide opportunities for students and keep our program strong. Designate your support to:

IOE Special Gift Fund

Your gift enables us to develop programs that help to support student organizations, sponsor seminars and outside speakers, initiate student research efforts, pursue special recruiting programs, and many other activities to enrich the department.

IOE Undergraduate Scholarship Fund

Your gift enables us to make awards to undergraduates who have financial need, are outstanding students, or have exemplified exceptional leadership and character.

IOE Graduate Fellowship Fund

Your gift enables us to make awards to graduate students based on financial need, outstanding scholarship, teaching and/or research.

Please use the form below to make your gift today.

Name(s) as you would like them to appear in donor listings

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Business Phone

Email

Please check if you would like your gift to remain anonymous

Please designate my gift to IOE for:

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IOE Undergraduate Scholarship Fund

IOE Graduate Fellowship Fund

(Undesignated gifts will be placed in the IOE Special Gift Fund)

Enclosed is my gift of:

\$500

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\$100

Other _____

Enclosed is my (or my spouse's) employer matching gift form

My check is made payable to: University of Michigan-IOE

Charge my gift of \$_____ to my:

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MasterCard

Discover

AMEX

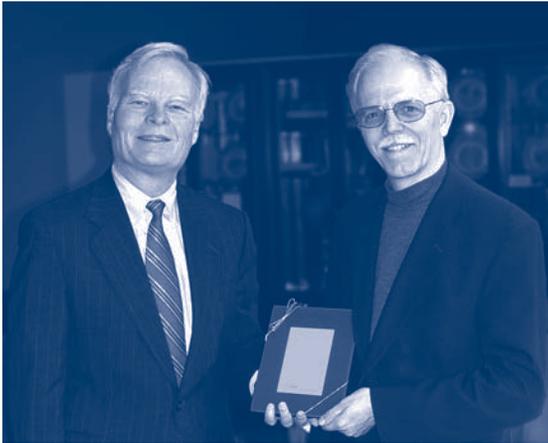
Account Number

Expiration Date

Signature (for credit card gift)

Credit card gifts are deductible only in the year the bank processes the transaction. To be processed by year end, these gifts must reach us by Dec. 19. If you wish to make a gift by credit card after Dec. 19, please call (734) 647-7785 9a.m.-4p.m. EST.

Send to: Nancy Murray
1883 IOE Building
1205 Beal Avenue
Ann Arbor, MI 48109-2117



Larry Seiford congratulates Tom Magnanti following the 2005 Wilbert Steffy Distinguished Lecture.

Dr. Thomas L. Magnanti, Institute Professor and Dean of Engineering at the Massachusetts Institute of Technology, delivered the 2005 Wilbert Steffy Distinguished Lecture on April 14, 2005. His talk, "Engineering Exuberance," summarized some emerging themes in engineering innovations, and the evolving role of Operation Research and Systems Engineering. The Lectureship

was established by an endowment from Doris Steffy in memory of her husband to bring a distinguished individual in Industrial and Operations Engineering to lecture to the faculty, students, staff and public and to promote intellectual exchange between UM researchers and other internationally recognized leaders.

Stay Connected

Visit the IOE Website and look up friends and former classmates. Update your personal information at [http://ioe.engin.umich.edu/alumni/albumlist.php](http://ioe.engin.umich.edu/alumni/alumni/albumlist.php).

Has your address changed? Do you have an item you would like included in a future IOE News?

Send your information to nmurray@umich.edu, or by mail to:

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