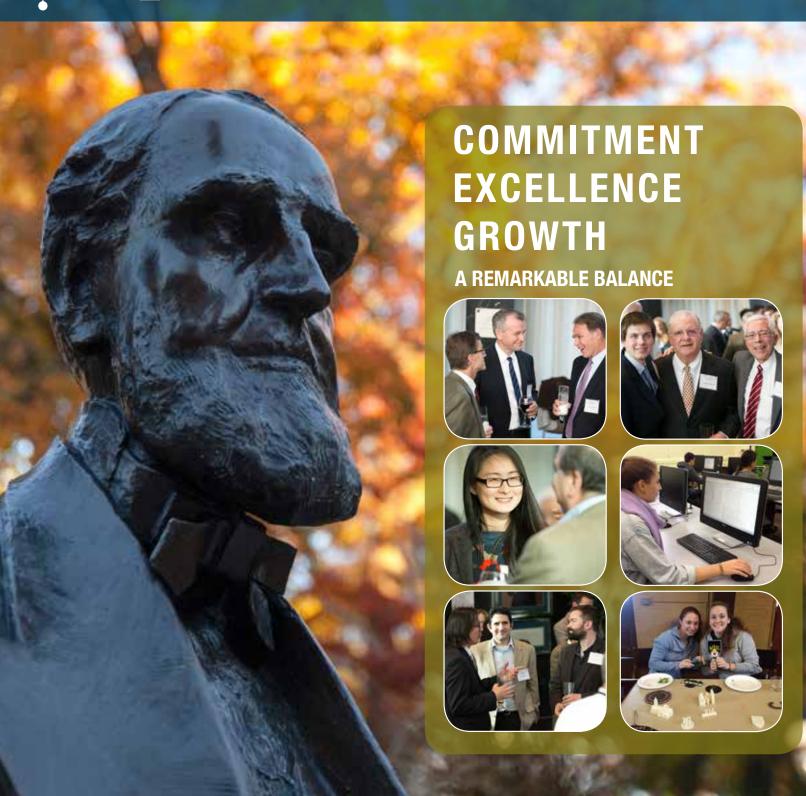


INDUSTRIAL AND SYSTEMS ENGINEERING

NEWSLETTER 2014





A few Class of 2014 ISE students pose for the camera after their walking ceremony.

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ISE Department Newsletter Fall 2014

Department Chair Dr. Tamás Terlaky

Associate Chair Dr. George Wilson

Editor Abby Barlok

Designer Julie Scheller

Photographer Christopher Elston Photography

ISE Advisory Council Anthony Hillman '01 – Advisory Council Chair Raymond Glemser '83

Richard Holtz '67 Raymond Hoving '69 Keith Krenz '79 Ravi Kulasekaran '88G

Barry Levine '81

Sunil Misser '88G Deborah Nagel '98

Scott Nestler '89

Raymond Pressburger '05 Charles Searight '73

George Snow '81

Raymond Trakimas '76

ISE Department Staff

Edwin Force II Mohler Lab Building Manager and Lab Technician ewf0@lehigh.edu

Rita Frey Graduate Coordinator rrf0@lehigh.edu

Kathy Rambo Coordinator kgr0@lehigh.edu

Linda Wismer HSE Coordinator liw511@lehigh.edu

Industrial and Systems Engineering Department Lehigh University 200 West Packer Avenue Bethlehem, PA 18015 610-758-4050 www.lehigh.edu/ise



Dr. Tamás Terlaky Terlaky@lehigh.edu 610-758-4050 Dear Friends,

I'd like to welcome you to the 2014 edition of the ISE department's newsletter. I trust that you have had a splendid summer surrounding yourself with friends and family on your vacations. As always, the ISE department did not disappoint this year. We had a very active 2013-2014 term that I'd like to share with you.

As you know, this year was our first year with the revamped Industrial and Systems Engineering (ISE) undergraduate degree. I'd like to give a special thanks to Associate Chair, George Wilson for being an influential part of the success of this program. Students are receiving the program well and are appreciating the flexibility with courses.

In October 2013, we had our ABET accreditation review. We were praised for our program, our facilities and for our dedicated faculty, staff and very loyal students and alumni. We had a very positive outcome. Associate Dean Gregory Tonkay and Associate Chairman George Wilson worked extremely hard preparing for this visit.

I am excited to report that for the third year, the Enterprise Systems Center and the department were selected as one of the three finalists of the UPS George D. Smith Prize at the Institute for Operations Research and the Management Sciences (INFORMS) Analytics

Conference. We are extremely pleased with this prestigious honor. We were in good company. The other two finalists were the Leaders for Global Operations (LGO) Program of MIT and the Sauder's Centre for Operations Excellence (COE) of the University of British Columbia.

Along with great success comes loss. Last August we lost one of our professors, Nicholas Odrey. Nick was with the department for 30 years. Not only did we lose a great professor, but we lost a friend as well. If you didn't have the honor of knowing Nick, please see page 14.

We also say goodbye to Hisham Abu-Nabaa. Hisham has left his post as Director of the Healthcare System Engineering Master's Program to pursue an opportunity at Sidra Medical Research Center, Qatar, where he has been appointed the Director of Research Data Management. We are actively looking for a replacement for the HSE Director position in Fall 2014.

This edition of the newsletter is dedicated to the involvement and kindness of our alumni and friends. I humbly ask you to please support the department. On page 22, you will see how our ISE Advanced Technology Renewal Endowment is allowing our students and faculty to have the best technology/facilities for their success in our courses and with their research.

As you read through our newsletter, you will see that we continue to expand and work toward constant academic and research excellence. Last August we welcomed Boris Defourny as an Assistant Professor and Abby Barlok as the Communications Specialist. This year, we welcome Alexander "Sasha" Stolyar as The Timothy J. Wilmott Endowed Faculty Chair Professor and Martin Takacs as an Assistant Professor in the department. I'd also like to congratulate Katya Scheinberg on becoming a Full Professor and for her appointment as The Harvey E. Wagner Endowed Faculty Chair Professor.

Your support, suggestions, or observations are critical for making informed decisions about our department. Please feel free to send me your memories, opinions, ideas, or anything else you may want to share with me.

I am looking forward to seeing and hearing from you soon.

/ day [-

Lehigh University Industrial and Systems Engineering Department

Spencer C. Schantz Distinguished Lecture Series presents

Dr. Radhika Kulkarni

VP, Advanced Analytics R&D, SAS Institute Inc, Cary, NC

Public Lecture Succeeding with Business Analytics - Key Challenges

Big Data, Analytics, Data-driven decisions, predictive modeling, machine learning and so on. All these terms have become ubiquitous in our daily lives. We hear about applications of neural networks or logistic regression in multiple industries even on our daily commute to work. Does this mean that we have overcome all the challenges in successful applications of analytics to solving complex business problems? Far from it! Finding the right method or algorithm to solve a problem is often not the most challenging aspect. The bigger problems facing an Analytics group include

- Data: Availability of the right kind of data
- Process: Implementing the solution in operational systems
- People: Bridging the talent gap resulting from lack of analytical training

This presentation will describe some of these challenges in the context of specific business problems. Addressing them will be important as opportunities for automated large scale modeling continue to grow in areas such as digital marketing, event stream processing involving sensor data, large scale forecasting in many diverse industries and many other applications.

4:00 pm, Tuesday, September 30th Sinclair Auditorium

Technical Talk

Big Data and Big Analytics – Opportunities for Inter-disciplinary Innovation

Data volumes continue to increase at a rapid pace along with a need to solve complex business problems based on insight gained from hybrid sources of data. At the same time, computing power and access to multiprocessor hardware configurations enables us to solve increasingly complex problems which were intractable before. Often, solutions to the most challenging problems require the invention and combination of many new techniques and algorithms which span multiple analytical disciplines such as forecasting, estimation, predictive modeling, data mining and optimization.

This presentation will provide several examples that describe some of these innovations in various industries as well as discuss trends and upcoming challenges for future research.

4:00 p.m., Wednesday, October 1st Mohler Lab Room 453



Dr. Radhika Kulkarni is Vice

President of Advanced Analytics R&D at SAS Institute Inc. She oversees software development in many analytical areas including Statistics, Operations Research, Econometrics, Forecasting and Data Mining. Her Division is also responsible for providing key components of business analytics solutions in several areas including Finance, Retail, Marketing, Hospitality and Supply Chain. Kulkarni is an active member in the Institute for Operations Research and Management Science (INFORMS) and serves on the Advisory Board of the Institute for Advanced Analytics at North Carolina State University, The Center for Hospitality Research at Cornell University and the Marketing Analytics and Data Mining Board at Oklahoma State University.

Radhika Kulkarni has a Master's in Mathematics from the Indian Institute of Technology, New Delhi and a Master's and Ph.D in Operations Research from Cornell University.

For more information visit: www.lehigh.edu/ise





...the recognition from INFORMS reflects the department's emphases on providing students with a strong foundation in analytical techniques and on cultivating close ties with industry.

INFORMS UPS George D. Smith Prize

For the third year in a row, the Enterprise Systems Center (ESC) and the ISE Department have received one of the top honors in the field of operations research.

The ESC-ISE team was recently selected as one of the three finalists for the UPS George D. Smith Prize awarded by the Institute for Operations Research and the Management Sciences (INFORMS). The other two finalists were the Leaders for Global Operations (LGO) Program of MIT and the Sauder's Centre for Operations Excellence (COE) of the University of British Columbia.

Operations researchers use sophisticated analytical techniques to help organizations solve increasingly complex problems. The ESC has completed more than 1,000 research projects with 400 industry partners since it was established as a research center in the P.C. Rossin College of Engineering and Applied Science almost four decades ago. More than 3,000 graduate and undergraduate students have participated in these projects, working in interdisciplinary teams with faculty and industry mentors to help companies solve real-world operations problems.

Tamás Terlaky, chair of the ISE department, said the recognition from INFORMS reflects the department's emphases on providing students with a strong foundation in analytical techniques and on cultivating close ties with industry.

The UPS George D. Smith Prize, offered for the third time this year, was established to strengthen ties between industry and the schools of higher education that graduate young practitioners of operations research. INFORMS awards the prize to an academic department or program for preparing students in an effective and innovative manner to be good practitioners of operations research, management science, or analytics.

The UPS George D. Smith Prize is named for the late CEO of the United Parcel Service, who was a champion of operations research at a leading Fortune 500 corporation.

Emory Zimmers, Director of the Enterprise Systems Center and Professor of Industrial and Systems Engineering commented that "close collaboration between the Department and Center continues to strengthen our overall educational mission. It was gratifying that the Smith Prize judges found significance in the Center's utilization of experienced mentors, faculty and business partners supporting student learning. This is being accomplished in very realistic work settings as well as simultaneously providing a significant economic value for our industry clients."

While MIT was chosen from among the three finalists to receive the Smith Prize, the Lehigh team received unique recognition for being the only program to be selected as a finalist three years in a row. Besides Lehigh, last year's finalists were MIT and the Naval Postgraduate School.

Spencer Schantz Lecture Series & Banquet



Dr. Brenda Dietrich

IBM Fellow and VP, CTO for Business Analytics, IBM SWG Industrial and Systems Engineering 2014 Distinguished Lecturer

Dr. Brenda Dietrich's technical talk, entitled *Business Analytics: Making Operations Research Ubiquitous*, addressed the domain from an Operations Research perspective. The motivation and objectives of business users of analytics were explored and trends in data availability were discussed. During her public lecture, entitled *Cognitive Computing: Behind and Beyond Jeopardy!*, Dietrich discussed both the creation of the first Watson computer and the near term opportunities for cognitive computing.

Brenda describes her 28- year role in research at IBM to be "fairly rare." "It's rare not to change jobs," she says. Dietrich admits "I was a graduate student at Cornell University and then I came to IBM. I always thought that I'd work for a couple of years and then go teach somewhere. I still think one day I will." When asked what she would teach, Dietrich explains, "Most likely methods in analytics research in organizations."

Dietrich recently became a key player with *The Watson Group*. Right now, her team is working on a software tool that works on large collections of literature in a small realm, enabling domain specific search and exploration. "It's a document retrieval tool that makes it much easier to discover connections in specific information." Another tool being developed in her group, Dietrich explains "takes paragraphs written by a specific person and analyzes it to understand characteristics associated with the vocabulary used - not the meaning of the words, but the characteristics that are associated with the choice of words - like openness, extroversion, etc." This type of understanding of individuals could be very valuable in almost any industry, including but not limited to: eldercare, the pharmaceutical industry, call centers, etc. "Imagine having this sort of information so that you could market to a specific person based on their particular likes and dislikes. This type of tool is priceless."

Dietrich credits IBM to be "one of the largest recipients of my experimentation with data and analytics."

Brenda has four children - two daughters and two sons (ages 15, 22, 26 and 29). She holds more than a dozen patents, has co-authored numerous publications, and frequently speaks on analytics at conferences. She holds a BS in Mathematics from UNC and an MS and Ph.D. in OR/IE from Cornell.

The annual ISE banquet was held on Thursday, April 17th. The banquet celebrates the department's students, faculty, and alumni for their accomplishments. For the fourth time in a row, Professor Robert Storer won the Faculty Member of the Year Award, which is voted on by the department's students.

Dr. J. Michael Harrison'66 received the Distinguished Alumni Award in Academia at the 2014 ISE Banquet while Everett Van Hoesen'55 received the Distinguished Alumni Award in Industry.









Dr. J. Michael Harrison receives his Distinguished Alumni Award from Tamàs Terlaky.



Everett Van Hoesen introduces his grandson, Michael Van Hoesen, to his good friend, Professor Emory Zimmers.



Hisham Abu-Nabaa presents Dr. Terry Theman with his award for HSE Student of the Year.



Everett Van Hoesen collects his Distinguished Alumni Award from Tamàs Terlaky.

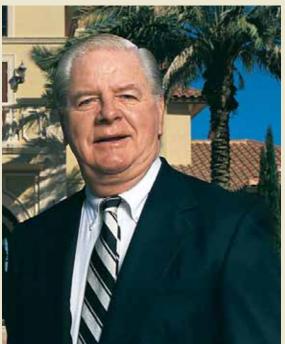


George Wilson, and Tamàs Terlaky present Sean Byrne with the ISE Junior of the Year Award.



Professor Bob Storer and several of his students after winning the Faculty Member of the Year Award.





J. Michael Harrison'66 Distinguished Alumni Award in Academia

J. Michael Harrison took quite a leap of faith when he decided to enroll at Lehigh University. "I had never been in Pennsylvania before I came to Lehigh. My father, an auditor for the Department of Defense, did some work at Lehigh, was impressed by the university and recommended it, so I took the chance." While attending Lehigh, Harrison belonged to the Sigma Phi fraternity, the IE Honorary Society, and Tau Beta Pi. When he graduated with an IE degree, he decided to extend his education by pursing a master's degree in IE at Stanford University. "My decision to attend grad school was influenced by the Vietnam War. I didn't want to enlist, and I was increasingly drawn toward academic pursuits." He eventually completed a Ph.D. in Operations Research at Stanford, and then joined the faculty of Stanford's Graduate School of Business, where he taught for 43 years, retiring in September of 2013 as the Adams Distinguished Professor of Management. When asked what he found to be most rewarding about teaching, he replied, "I loved working with the students, organizing course materials, and book writing." Although Harrison has officially retired, he is still in his office three days a week. As for future plans, Harrison says that he wants to write a new book. "It will take me 7 years to write it. I like to work at a leisurely pace."

Asked about the undergraduate classes that he had found most valuable, Harrison mentioned engineering economy and capital budgeting. He then added, "every kid should also try to absorb as much math as he/she can tolerate."

"I was very pleased to receive the Distinguished Alumni Award in Academia," Harrison said. "It felt like coming home victorious!"

Everett Van Hoesen '55 Distinguished Alumni Award in Industry

Upon graduation from Lehigh University, Everett began a 30-year career with IBM starting in manufacturing and then advancing to General Management as Division and Group President. Everett played a major role in building the first prototypes of the IBM personal computer (IBM-PC), which was later fully developed under his leadership. This led to the launch of personal computing, which by now has become a part of everybody's life in one way or another. To learn more about Everett and his family, turn to page 14.

Student Check-In

We checked-in with three of our students to find out their favorite memories, personal mentors and future plans.

Robert Rodgers

Spring 2015 Major: Healthcare Systems Engineering

What are your plans for this summer/next year?

This summer I am taking a supply chain management elective at Lehigh. I will continue to work as a Senior Improvement

Advisor for Shepherd Center, a top 10 rehabilitation hospital.



Who influences you the most in the HSE program and the ISE Department?

Hisham Nabaa more than influences me. He pushed me into the areas that are trending. He does a great job of introducing me to professionals in these areas. As for ISE, Professor Storer is a huge influence. He makes engineering interesting and fun! Our HSE advisory board is influential. When I interact with them and they are eager to engage the student base, it is a great synergy.

What is your favorite part about the HSE program?

The best part of the HSE program is that it is online from a reputable institution. I am able to work, learn and ultimately further my career.

What are you most excited about next year?

I am excited to finish out my last two courses and graduate, in addition to attending conferences with my cohorts (as we've done in past years). I will also enjoy cheering for the students as they present and compete in contests at these conferences.

What part of your HSE education has strongly influenced your professional career?

I would say our professors of practice, Stuart Paxton and Jeff Fetterman. They teach in a very open style where you can take radical positions on a topic and see how it sticks to real health care professionals and not worry that an outlandish idea may jeopardize your job.

Jillian Sloand

 $Spring\,2014$

Major: IBE - Industrial Engineering

What are your plans after graduation?

To pursue a Master of Engineering degree in Industrial & Systems Engineering from Lehigh.



Who was your mentor in the department?

Professor Storer was my official adviser and Professor Thiele was my independent study adviser, but I often sought out both of them for career and class advice.

What is your favorite memory from the department? The end-of-the-year ISE Department Banquet.

What are you looking forward to in the next year?

Continuing more in-depth studies within the Industrial and Systems Engineering Department to further learn about which particular areas of ISE interest me the most. Then, I can make a more informed decision when I choose my career path.

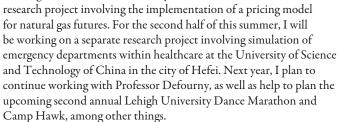
Sean Byrne

Spring 2016

Major: Industrial & Systems Engineering, Mathematics

What are your plans for this summer/next year?

For the first half of this summer, I worked at Lehigh with Professor Defourny on a



Who influences you the most in the ISE department?

Probably the friends I've made as a student in the department. It's great to learn and study among students who share your interests. Also, the professors I've gotten to work with, particularly Professor Thiele and Professor Defourny, because they've helped introduce me to some interesting areas of research within the ISE department.

What is your favorite part about the department?

My favorite part about the department so far has probably been getting to be a part of the ISE council. We were able to help plan various events within the department and I got to know some of the people who help make the department run smoothly. If you want to get involved, there are plenty of great things you'll find within the department.

What are you most excited about next year?

I'm excited to delve into some of the higher-level courses that the ISE department offers, as I'll have a chance to continue to learn what areas I might like to direct my career towards in the future. I'm also ready to experience some leadership roles on-campus this year that I haven't had a chance to get exposed to in the past.



ISE Welcomes Two New Professors





Dr. Alexander (Sasha) Stolyar joins the ISE Department in August 2014 as The Timothy J. Wilmott Endowed Faculty Chair Professor.

Alexander was a Distinguished Member of Technical Staff at Bell Labs Research (Murray Hill, New Jersey). His research interests are in stochastic processes, queueing theory, and stochastic modeling of communication and service systems.

He received his Ph.D. in Mathematics from the Institute of Control Science, USSR Academy of Science, Moscow, 1989, and was a research scientist at the Institute of Control Science in 1989-1991. From 1992 to 1998 he was working on stochastic models in telecommunications at Motorola and AT&T Research. He joined Bell Labs in 1998, where he worked on stochastic networks and resource allocation problems in a variety of applications, including service systems, wireless communications, network clouds.

Alexander received INFORMS Applied Probability Society 2004 Best Publication award, SIGMETRICS'96 Best Paper award. He currently serves on editorial boards of Advances in Applied Probability and Queueing Systems.



Dr. Martin Takacs

Dr. Martin Takacs joins the ISE Department this Fall as an Assistant Professor and will teach operations research, optimization, computing and analytics classes.

Martin completed his Ph.D. in Operations Research from the School of Mathematics, University of Edinburgh, United Kingdom. Martin has been very active in developing collaborators around the world and as such has had opportunity to work with several leading young researchers in the field during his extended academic visits to the University of Chicago/ Toyota Technological Institute, the Simons Institute in Berkeley and Singapore.

Martin has worked in the "hot" area of Big Data, optimization and machine learning. Martin has great expertise in high performance computing and the ability to develop theoretical methods for big data and then implement them in practice. Martin has an impressive publication record. His results delivered him two significant prize recognitions. He has received the 2nd Prize in IMA's Leslie Fox Paper Competition, and was selected to be one of the finalists in the 2012 Best Student Paper competition of the INFORMS Computing Society.

Faculty Updates

Katya Scheinberg has been promoted to Full Professor, and also has been appointed as the Harvey E. Wagner Endowed Faculty Chair



Aurelie Thiele is going to spend her sabbatical year 2014-15 at MIT to pursue new avenues in her recently established research line – healthcare finance.





Bob Storer received the 2014 ISE Faculty Member of the Year Award.

5. David Wu has stepped down from his position of Dean of the P.C. Rossin College of Engineering and Applied Science and has accepted a new position as Provost and Executive Vice President at George Mason University. After 27 years as a Lehigh engineering professor, research director, and dean, David retired from Lehigh and became Dean Emeritus.





Stuart Paxton has been named as Interim Director for the Healthcare Systems Engineering Master's Program



Staff Update

Rita Frey, Graduate Coordinator, and Kathy Rambo, Coordinator, received Tradition of Excellence awards for their hard work and dedication to the ISE Department.

Remembering Nicholas G. Odrey



He was a teacher who cared about his students inside and outside of the classroom, who balanced the relationship between professor and friend beautifully.

ISE Professor, Nicholas G. Odrey, passed away in August 2013. He was 71.

If you didn't know Nick, you could have learned a lot about the kind of man and professor he was by the speeches that were given at his memorial service. The following is an excerpt from Lehigh Alum, Gena Levengood's speech:

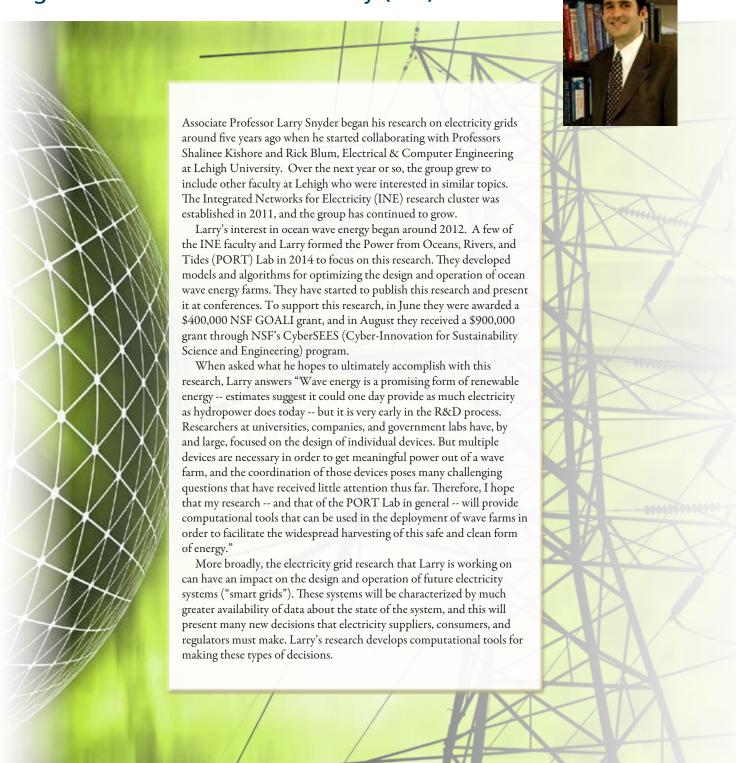
As Scott Adams, author of Dilbert, one of Professor Odrey's favorite comic strips said: "You don't have to be a "person of influence" to be influential. In fact, the most influential people in my life are probably not even aware of the things they've taught me." There is nothing a student appreciates more than the ability to connect with a faculty member. Whether that relationship comes from a classroom setting, advising academic schedules, or reaching out on an unexpected level and joking around the department, it can make all the difference in the world.

Dr. Odrey was a professor at Lehigh University for thirty years also serving as the advisor to several Masters' and PhD candidates. Former students of his from Jordan, China, Taiwan, Turkey, and India (to name a few) reached out expressing their genuine appreciation of his encouragement, love, and support. He connected with his students on an intellectual level with his unique style of teaching, having them engage in discussions with one another. This support persisted with Alpha Pi Mu, the industrial engineering national honors society, where he inspired students to continue their education, outside of the classroom and down the road.

Alpha Pi Mu was established to provide an inspiration for young students, a common ground on which they could exchange ideas, and experiences which would help their future professional development. The goals of the society are that the students and faculty could interact, to encourage an activity that will advance the best interest of Industrial Engineering, to create a closer student-faculty relationship by bringing together the needs and thoughts of both, and to benefit its members by promoting professional welfare and development for all. Without a doubt, Dr. Odrey was that bridge between the students and faculty, and by the way – he was the only advisor the club ever had since Lehigh chartered this chapter more than 30 years ago!

He was a teacher who cared about his students inside and outside of the classroom, who balanced the relationship between professor and friend beautifully. He will be truly missed by all those whose lives he touched.

Larry Snyder— Integrated Networks for Electricity (INE) Cluster



ISE Legacies

For decades, the department sees legacies of families come through Mohler Lab. Fathers and sons, mothers and daughters, and vice versa, brothers, sisters, cousins, aunts, uncles, grandchildren, you name it, we see the same last names appear over and over again. This clearly shows what the department and Lehigh have meant to these families.

This section of the newsletter will now be dedicated to ISE legacy families and the impact that the department and Lehigh have made on their lives.

The Van Hoesen Family

It's no secret what a major theme is amongst the Van Hoesen Family. Besides a connection through blood, most of the members also share a strong bond as Lehigh alumni.

To understand the complexity of their ties to Lehigh, all one has to do is watch Rick Van Hoesen draw a chart to try to explain it.

First, you have Everett Van Hoesen, who graduated in 1955 as an IE major. Everett's son, Rick, was also an IE graduate in 1977. Rick's brother, Mark, graduated in 1978 with a Business degree. Mark's sister, Kim, too graduated as an IE in 1983.

Jill, Rick's wife, was a Business/Accounting major at Lehigh. She graduated in 1977. Rick and Jill's daughter, Lauren, graduated in 2005 with a Liberal Arts/French degree.

Mark's daughter, Kendyl, was an Architecture major
She married Sean Kenny, who majored in Mechanical Engineering in
2003. Mark's daughter, Kellan, attended Lehigh and majored in Art/
Public Relations in 2005.

To add even more numbers of Van Hoesen's at Lehigh, another one of Everett's grandchildren is considering Lehigh as well.

The origin started with Everett Van Hoesen, who was recently award the ISE Distinguished Alumni Award, at the annual ISE Banquet, for his extraordinary contributions to the industrial engineering industry.

Everett "Van" admits he chose Lehigh "because of its reputation for engineering." After enrolling in the Chemical Engineering degree, Everett changed his major to IE after one semester. "I didn't want to be specialized," Everett explains. While attending Lehigh, Everett worked several jobs to afford his education, which included being a newspaper delivery driver, a janitor, milkman and postal worker. His wife, Alice, attended Cedar Crest College simultaneously. Upon graduation, Van began a 30-year career with IBM starting in manufacturing and advancing to General Management as Division and Group President. Van launched IBM's first direct marketing efforts, including catalogues and 800 numbers and IBM's first distribution through wholesalers and retail stores. Van played a major role in building the first prototypes of the IBM personal computer leading to IBM's commitment to and launching of the IBM PC. Van retired from IBM in 1985.



Everett Van Hoesen, along with his granddaughter, Kendyl, his daughter, Kim, and his son, Rick, stop to get their picture taken at the ISE department annual banquet.

After high school, Rick Van Hoesen contemplated two schools; Rensselaer Polytechnic Institute and Lehigh. "I originally chose RPI and during my orientation (a month before classes started) the speaker said: "don't go downtown in groups of less than 5. That's when I decided to choose Lehigh." Rick remembers "the same professors were there for me as were for my father, which was pretty incredible." When asked what class he would suggest taking, Rick quickly says, "Intro to Basic Finance Concepts."

Rick is presently the CFO at Atlantis Computing.

Kim Van Hoesen (now Kim Hinkle) remembers her father, Van, sitting her down and educating her on Lehigh. She chose Lehigh too and graduated in four years "without any summer school," she brags. "What I learned from Lehigh is how to teach myself. If someone says that you can't do something, Lehigh taught me that that is a great motivator to overcome." Kim previously worked for TIE Communications installing bar code systems for product lines. She now is presently a realtor.

The Van Hoesen family has made quite a presence at Lehigh and continues to do so as more and more members follow in the rest of their family's footsteps. The Van Hoesens truly exemplify the definition of a Lehigh legacy and we are proud to feature them in this newsletter edition.



IMRT Workshop

The ISE Department held an Intensity Modulated Radiation Therapy Workshop May 10-11, 2014. The main theme of the workshop was to explore the interplay between the applied mathematics and radiation therapy treatment planning and support, with the emphasis on optimization models and methods.

This was a follow-up workshop to the 2011 event held at Banff International Research Station. Focuses, such as "Functional Imaging in Treatment Planning, Incorporating Liver Functionality in Radiation Therapy Treatment Planning, and A Novel Sampling Algorithm to Reduce IMRT Optimization Time" were some of the topics that were examined throughout the workshop. By hosting this workshop at Lehigh University, we continue fostering collaboration between professionals working in the area and applied mathematicians.

To learn more about this workshop, visit http://coral.ie.lehigh.edu/~imrt/.



MOPTA 2014 Conference Held at Lehigh

The department hosted the annual Modeling and Optimization Theory and Application (MOPTA) conference for the sixth year in a row in August. Chaired this year by Boris Defourny, the three-day conference brought together a diverse group of people from both discrete and continuous optimization, working on both theoretical and applied aspects.

The conference had 98 contributed talks, both from the academic and industrial fields, and offered a wide selection of topics along with the traditional MOPTA-AIMMS modeling competition.

MOPTA had eight plenary speakers this year: Miguel Anjos (Ecole Polytechnique Montreal), Gerard Cornuejols (Carnegie Mellon University), Darinka Dentcheva (Stevens Institute of Technology), Phillip Gill (University of San Diego), Vahab Mirrokni (Google), Asu Ozdaglar (MIT), Warren Powell (Princeton University) and Andreas Wachter (Northwestern University).



ISE and Healthcare Systems Engineering students at the US Food and Drug Administration (FDA)

Over the past two decades opioid abuse has escalated within the United States. The misuse of opioids and painkillers has severe effects on users, doctors, and prescribers alike. Solutions to this problem could include: drug development of abuse deterrent formulations, opioid labeling, prescriber and patient education, innovative technological packaging, and encouraging the development of products that treat or prevent abuse and potential overdose. Recently a team integrated by ISE students Onur Babat (Ph.D.), Han Gao (HSE), Kyle Katase (ISE), Tiantian Yang (HSE), Peiran Zhao (HSE), and advised by professors Hisham A. Nabaa, and Luis F. Zuluaga, took on the task of studying the current innovative packaging and storing technologies that have the potential to prevent abuse. In particular, the students

produced a a clear review of the different available or potential technologies to help reduce opioid abuse.

Furthermore, the students reached key conclusions about the development of packaging technologies to deter opioid abuse by analyzing the information obtained from the review. The quality of the results draw the interest of the US Food and Drug Administration (FDA) who set-up an invited presentation of the student's results to the members of the Opioid Task Force and the Office of Surveillance and Epidemiology at the FDA headquarters near Washington, D.C. Also, the students were invited to submit the report of their findings to a public docket (FDA-2014-N-0233-0001 at http://www.regulations.gov/).

Healthcare Systems Engineering Innovations in Healthcare



Q & A with Hisham Abu-Nabaa

Hisham Abu-Nabaa has left his post as Director of the Healthcare Systems Engineering Master's Program to pursue an opportunity at Sidra Medical Research Center, which is based in Qatar. At Sidra, he has been appointed as Director of Research Data Management.

Where do you see HSE going?

In May 2014, the release of the President's Council of Advisors on Science and Technology (PCAST) report to President Obama brought focus to systems engineering as a tool to solve the inefficiencies within healthcare as a system as well as healthcare as an industry. The report emphasizes the critical role systems engineering can play in improving the delivery of safe, efficient, cost-effective healthcare. The report capitalizes on why Lehigh established the HSE program 3 years ago. As more and more people become aware of healthcare systems engineering, our graduates will be pioneers of this field with a number of years of experience under their belt. In addition, having our students deal with healthcare problems and complexity from a multidisciplinary approach gives them an added value that does not exist in other healthcare educational disciplines.

What advice do you have?

To get exposed to as many of the subsystems of healthcare as possible, including and not limited to the provider, payer, regulatory and others, to maximize the benefits of our signature Capstone project by having a real world problem to model and solve.



Film Screening – "Escape Fire"

Industrial and Systems Engineering along with Healthcare Systems Engineering held a public film screening and discussion on April 2, 2014 at the Wood Dining Room on Lehigh's Mountaintop Campus. The film, *Escape Fire*, examines the powerful forces maintaining the status quo, a medical industry designed for quick fixes rather than prevention, for profit-driven care rather than patient-driven care. After decades of resistance, a movement to bring innovative high-touch, low-cost methods of prevention and healing into our high-tech, costly system is finally gaining ground.

This event was a great opportunity for current and prospective HSE students, healthcare industry professionals and faculty to gather and view this documentary which tackles the issue of our broken medical system. After the film, discussion and comments were exchanged.

Innovations in Healthcare Delivery Systems

Healthcare Systems Engineering, in collaboration with Lehigh Valley Business Coalition on Healthcare, presented a free public symposium entitled "Innovations in Healthcare Delivery Systems" at Mountaintop Campus on the evening of April 23, 2014. The need for professionals in the healthcare field is strong and growing due to the aging population and national crisis of rapidly increasing healthcare costs. The Healthcare Systems Engineering (HSE) and Industrial & Systems Engineering (ISE) symposium discussed the challenges in the field and how the HSE master's degree program can help solve these problems.

Lehigh Valley healthcare professionals along with Lehigh University and local college healthcare students gathered to listen to two panels comprised of area healthcare leaders. Andrew Bloschichak, M.D., MBA - Senior Medical Director, Provider Strategy and Integration, Highmark, Inc., Donna Sabol, RN, MSN, - Vice President and Chief Quality Officer, St. Luke's University Health Network, Denise Harr, M.D - Medical Director at Capital BlueCross and Mark Wendling, M.D. - Family Physician, Lehigh Valley Health Network were on the first panel, *Quality of Healthcare Delivery*.

The second panel, *Informatics and Technology in Healthcare Delivery*, was comprised of Deb Halkins - Director, Management Engineering, Lehigh Valley Hospital and Health Network, Tom Huntzinger - Vice President, Emerson, Reid & Company, Henry F. Korth - Professor of Computer Science and Engineering, Lehigh University, Dale Lucht - Senior Executive, Lehigh Valley Hospital and Health Network and Mostafa Wali - Senior Director, Risk Management Center of Excellence, Global Pharmacovigilance & Epidemiology Sanofi.



Lehigh University HSE Program and Easton Hospital collaborate to commit to 30-minutes-or-less service pledge

Easton Hospital recently unveiled \$1.2 million in emergency department renovations.

It emphasized a pledge that emergency patients can expect to be attended to by health care providers within 30 minutes of walking through the doors.

Hospital officials say the cosmetic changes to the 283-bed hospital in Wilson Borough are a reflection of the culture change that managers have driven over the past several months.

"For many patients, the emergency department is the first connection to Easton Hospital," said Chief Executive Officer John Zidansek. "This is not just a renovation. It's a commitment we make as a team that the level of service we provide at the emergency department is a level above -- that it would exceed the level of the patients' expectations."

A stronger focus on patient experience includes examining metrics every day -- such as how quickly patients see a provider, their length of stay -- and requiring a call to discharged patients within 72 hours of their departure, Vadyak said.

The 30-minutes-or-less emergency room service pledge was the result of hospital leaders scrutinizing several processes — a practice that will continue through the summer with help from a Lehigh University

graduate program, said Dr. David Ligor, chairman of the department of emergency medicine.

Graduate students will observe staff and programs in several areas and make recommendations on becoming even more efficient and patient-friendly, Ligor said.

"The May 2014 PCAST report, *Better Health Care and Lower Costs: Accelerating Improvement Through Systems Engineering*, released to President Obama, points out the need for a rethinking of healthcare practices to potentially improve care and lower costs. Our Lehigh University Healthcare Systems Engineering students are doing just that. They are currently involved in a project at Easton Hospital that incorporates analyzing data and examining complex systems, with the aim of improving the efficiency and productivity of the Easton Hospital Emergency Room," states Linda Wismer, Coordinator of the Healthcare Systems Engineering program at Lehigh University.

Aykut Bulut

Aykut Bulut, Ph.D. was shocked to win the ISE department's Ph.D. candidate of the year award. "I was surprised because I found out like everybody else when my name was announced at the ceremony. It felt great being recognized for my effort and hard work."

A native from Turkey, Aykut studied Industrial Engineering (BS and MS) at Middle East Technical University (in Turkey). Three years ago, Aykut decided to attend Lehigh because of "its strong ISE department. The research focus of the department matches with my research interests," admits Aykut.

When asked about his research, Aykut is eager to explain: "My research is about computational optimization (mostly discrete optimization problems). I work on theory and also implement algorithms to develop software that solves these problems." Aykut did some work on the complexity of inverse optimization problem that determines the complexity class of the inverse problem. He further explains: "We are starting a new project about discrete second order conic optimization problems that produces open source software to solve the problem. It will be fine-tuned for most of the problems a practitioner will encounter and flexible enough for researchers to explore their own ideas."

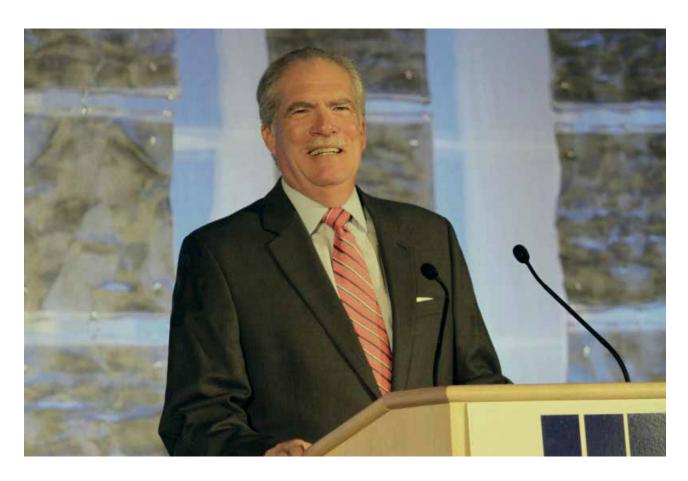
Aykut has found the environment at Lehigh to be fruitful with many opportunities that enhance the pursuit of his goals. Through his research, Aykut, along with his advisor Professor Ted Ralphs, have developed some software that visualizes the well-known graph theory algorithms. "Our purpose was using it as a teaching guide in two of the courses offered in ISE, Algorithms in System Engineering and Graphs and Network Flows," explains Aykut.

As for future plans, Aykut would like to eventually get a job that will have a similar environment as Lehigh's ISE department. "I want to have a job where I can see the benefits of my work in the community or in an organization, balancing the theory and practice.

Along with his research, Aykut has been a teaching assistant for several ISE classes. He also volunteers as a system administrator in COR@L (Computational Optimization Research At Lehigh) Lab.



I want to have a job where I can see the benefits of my work in the community or in an organization, balancing the theory and practice.



John E. McGlade '76, '80G

It is said that a leader must be equipped with a set of competencies necessary to perform his/her role. We decided to have a question and answer session with one of the greatest leaders that came from the ISE department, John E. McGlade.

John E. McGlade received an IE undergraduate degree from Lehigh in 1976 and an M.B.A. in 1980. He joined Air Products and Chemicals in 1976 as a participant in the company's Career Development Program. He subsequently held various positions within the Industrial Gases Division, was named general manager of the Chemical and Process Industries Division in 1994; vice president of the Division in 1996; and vice president and general manager, Chemical and Process Industries, and Energy Systems in 1998. He was appointed vice president and general manager of the Performance Materials Division in 2001 and vice president, Chemicals Group business divisions in early 2003. Later that year, Mr. McGlade was named group vice president, Chemicals Group. John was president and chief executive officer of Air Products October 2007 - July 2014. John currently serves on the board of directors of the American Chemistry Council and is a member of the Society of Chemical Industry executive committee, and a member of

the SteelStacks leadership team. John is a member of the Board of Trustees at Lehigh and he and his wife Brenda have generously donated to the renovations of Mohler Lab.

Which one would you say is the most important ability a leader should have? Which one would you say is the least important ability a leader can have?

John: The most important ability(ies) are humility, being a great listener, empathy and integrity. The worst ability is having an ego.

What are the biggest challenges facing leaders today?

John: They are constantly on stage and have to always walk the talk. It is hard to regain credibility once lost. They must be role models for the next generations of leaders.

John E. McGlade

continued

What are a few resources you would recommend to someone looking to gain insight into becoming a better leader?

John: There are tremendous resources available in print and on the internet, courses such as the Leadership Minor at Lehigh and internships whether in private, public, not-for-profit or different organizations that allow people to try, test, develop and perfect their foundational leadership skills. I also highly recommend some of Jim Collins' work; he provides some great fundamental thoughts on the subject.

What advice would you give someone going into a leadership position for the first time?

John: Spend time listening, engaging with your team. Do not think (or entertain the notion) that you know more. Don't solve the problem; draw out your team members. Engage them in developing the solutions.

What qualities do you look for when hiring an employee or recent graduate?

John: Presence, communication skills, humility, integrity, natural curiosity and a willingness to do what it takes. I am not interested in having an individual that acts or emotes that it is all about them. I am looking for someone who engages with others to achieve results.

Can you name a person who has had a tremendous impact on you? Maybe someone who has been a mentor to you? Why and how did this person impact your life?

John: It is very hard to name one individual. I have been fortunate to have teachers, professors, managers, and colleagues over the years that have helped me shape my career. I have been equally privileged to have a family that provided tremendous counsel, support and assistance throughout the years.

You received an IE undergraduate degree and graduate degree at Lehigh. What classes/coursework/ internships do you feel are important to take to prepare present students for the professional field? What helped with your climb in becoming the chief executive officer of Air Products?

John: Lehigh provides a great education in the fundamentals of your curriculum, as do many schools. I think the key differentiator for the school and a wonderful benefit for students are the project courses with external entities, the multi-disciplined curriculums like the Enterprise Systems and Mountain Top Campus experience and the Leadership Minor experience to name a few. Don't waste these opportunities, they will provide tremendous value as you pursue your career.

In your time on Lehigh's board and as a member of one of the subcommittees, what specifically did/do you enjoy about your role?

John: I thoroughly enjoyed being a trustee from many perspectives. First, it was an opportunity to give back to the university and share some of my business experiences. Second, I particularly enjoyed being part of the early days of the CEC, and the potential that holds for driving greater diversity and therefore creativity across the university. It was always refreshing and rewarding to interact and engage with the students and facility; to see their passion and energy around tackling today's challenges.

Why do you feel it is important to give back to Lehigh and the ISE department?

John: I am a firm believer that giving back is something all should do in whatever way they are comfortable and capable. It has been my experience that for any individual to achieve their potential they cannot do it without the support of others, family, communities, institutions and many others. You simply cannot ignore that support.

You have donated to the renovations of Mohler Lab. Why did you choose this specific area?
John: Emory Zimmers

What does it mean to you being a Lehigh/ISE alumni?

John: An honor and a privilege to have been and continue to be part of such a great university and community. I also must say I can't wait for Yankee Stadium and the 150th meeting of Lehigh and Lafayette: Go Lehigh!

There is significant change at Lehigh at the moment, with an Interim President and an Interim Dean of the PC Rossin College of Engineering. Do you have any thoughts on how Lehigh can best navigate through these changes?

John: I am not that close to the changes but am confident that the outcome will be exceptional. That optimism is what makes me feel that Lehigh will continue to become stronger and well recognized for what we do, while retaining the tremendous values that where established so many years ago by Asa Packer!

Anything else you would like to add?

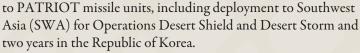
John: To thank President Gast and Dean David Wu for their tremendous leadership over the past year.

ISE welcomes new Advisory Council Member

Scott Nestler '89

Scott is presently a new member of Lehigh's Industrial and Systems Engineering Department Advisory Council.

Born and raised in Harrisburg, Pennsylvania, Dr. Scott T. Nestler graduated from Lehigh University with a BS in Civil Engineering in 1989, and was commissioned as a United States Army officer. He spent eight years assigned



In 1997 he became an Operations Research / Systems Analyst, and earned a MS in Applied Mathematics (Operations Research) in 1999 from the Naval Postgraduate School in Monterey, CA. He taught in the Mathematical Sciences department at West Point and worked as a Force Structure Analyst, at Headquarters, Department of the Army. After completing a PhD in Management Science and Finance in 2007, in the Decision, Operations, and Information Technologies Department, R.H. Smith School of Business, University of Maryland, he put his studies into action back at West Point as a Research Analyst in the Operations Research Center (ORCEN), Department of Systems Engineering; and as the Director of the Center for Data Analysis and Statistics (CDAS). In 2009, he deployed overseas as Chief of Strategic Assessments for Multi-National Force -Iraq (MNF-I). From 2010-2012, Dr. Nestler was an Assistant Professor in the Operations Research Department at the Naval Postgraduate School. In 2013, he graduated from the U.S. Army War College in Carlisle, PA, with a Master of Strategic Studies degree. Most recently, he has served at the Center for Army Analysis, but will be retiring from the Army and transitioning to the private sector in 2015.



A Roundtable Discussion With Advisory Council Members - Anthony Hillman, Keith Krenz and Ray Glemser

Anthony Hillman, Advisory Council Chair



Ray Glemser, Chair-Elect



Keith Krenz, past Advisory Council Chair

...discussing the details of the new ISE Advanced Computing Technology Endowment

Can you explain what the endowment is?

Anthony - The endowment is designed to provide current and future students in ISE with the tools necessary to successfully learn with the greatest technology (computers, robotics, and high-computational servers).

Keith- The endowment is designed to create a perpetual funding source for the ISE Department primarily regarding the maintenance and upgrading of its computational equipment and systems. Such financial support does not come from the University via annual operating budgets.

What will be the educational impact?

Ray - Up-to-date computational equipment and systems provide ISE students with the tools they need to gain practical insights into engineering concepts, especially those ideas that require big data and computational intensity.

How will this endowment affect our future?

Anthony - It will provide the necessary resources to ensure our students educational tools are always available to them, and are renewed to keep those tools sharp.

Keith - Since I graduated from Lehigh in 1979 I have seen the analytical and computational intensity of the ISE discipline rapidly grow. As a result, the ISE Department has had to respond in-kind in order to meet ISE undergraduate and graduate educational needs. I do not see this analytical and computational trend slowing. Therefore, the endowment will become a key resource for the ISE Department to continue its nationally recognized performance of producing top-notch, highly sought-after and respected graduates.

Why would a donor want to get involved?

Keith - At least three reasons. First, as I look back, my Lehigh ISE experience has had a significant impact on my life. This is one way for me to give directly back to the Department. Second, this is a rare opportunity for alumni, like myself, to precisely direct our donations with certainty regarding their ultimate use and impact. Finally, this is an area of funding not covered by the annual University operating budget. This "funding gap" is up-to the ISE Department to fill. Historically, the Department has cobbled together the necessary minimum funds on its own. However, given ISE analytical and computation trends, the Department must develop a reliable corresponding funding source.

Why is there such a need for something like this?

Anthony - Through this fund, the ISE department will be able to renew technologies based on their educational needs -- rather than depending upon the university who doesn't have a clear visibility into the unique aspects and needs of the ISE department.

What's the goal?

Ray - The initial goal is to capitalize the endowment with \$750,000 as a source of funding for the annual maintenance of ISE computational equipment and systems.



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 a gift, please visit mylehigh.lehigh.edu. After you enter into mylehigh, click the "Donate" box and highlight the P.C. Rossin College of Engineering and Applied Science. In the "If Other or Student club" box, please enter the ISE department.

If you are also celebrating a reunion year, you can still designate your gift to the department. If you have any questions, please contact the ISE Department at 610-758-4050 or terlaky@lehigh.edu.

Reasons to Give to ISE

From Lehigh's earliest history to the present day, the generosity of alumni, parents and friends has been vitally important, supporting what is already excellent about the university and contributing to new initiatives that expand our impact on higher education and our service to the nation and the world. Gifts have an impact on every aspect of our academic mission, our research programs and our campus life.

Designating your gift to ISE has a lasting impact on future industrial engineer leaders. Below are some of the top reasons why you should designate your gift to ISE.

1. Lab and Classroom Preservation

With the newly renovated labs we currently have in Mohler Lab, gifts that enable us to maintain these prime learning and research facilities are extremely important. Keeping the computers, audio-visual equipment, classroom furniture and the manufacturing and robotics lab machines up-to-date is crucial to providing a stimulating educational experience for students.

2. Guest Speakers and Professors

Guest speakers and professors from both industry and academia provide new learning experiences for the ISE

department students. They provide a valuable educational experience and input about industrial engineering and the world for faculty, students and friends of the department.

3. Research and Program Development

Cutting-edge research that is done by our faculty and students helps shape our future. Research in our department includes simulation, optimization of healthcare systems and processes, supply chain management, financial optimization, data mining, optimization and high-performance computing. The development of innovative programs, such as Healthcare Systems Engineering, is critical to providing the best education for current and future generations of IEs and ISEs.

4. Asa Packer Society and Capital Campaigns

All gifts that are designated to ISE are counted towards the Asa Packer Society and the Lehigh Capital Campaigns.

5. ISE Legacy

Beginning the tradition and leaving your legacy to the ISE department is priceless. Designating your gift to the ISE department will leave your lasting legacy for current and future generations of students that will develop into tomorrow's leaders.

www.mylehigh.lehigh.edu

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Industrial and Systems Engineering Department Lehigh University 200 West Packer Avenue Bethlehem, PA 18015 610-758-4050 www.lehigh.edu/ise