ISE rolls into Nashville for the Institute of Industrial Engineers (IIE) Annual Conference with their engineering skills in tune.
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Dear Alumni and Friends of ISE,

The 2015-16 academic year holds great promise for our profession and the Edward P. Fitts Department of Industrial and Systems Engineering. We continue to grow and the fall semester finds 95 new undergraduate students and 75 new graduate students. ISE continues to draw the best and brightest, with a median incoming grade point average of 3.5.

The highlight of the semester was being named the #2 IE program in the nation by Best-Engineering-Colleges.com. Using data that includes measures of student, faculty and alumni excellence, ISE was recognized as a special place for industrial engineering. This and the US News & World Report both have ISE highly ranked.

Our faculty and students have garnered additional recognitions. Professor Jingyan Dong received the NAMRI/SME Outstanding Paper for his work in nano-scale manufacturing while Dopaco Distinguished Professor Richard Wysk was named a Distinguished Visiting Fellow of the Royal Academy of Engineering in the United Kingdom where he spent time at the University of Bath. Additionally, Amelia Hardee received an NC State Undergraduate Research Grant Award from the Office of Undergraduate Research.

While we proudly celebrate these accolades, the ISE family mourns the loss of Fred Gant (BSIE 1955). Fred and his wife Beverly have generously supported student scholarships for many years, enabling outstanding students to complete their IE degrees while reducing their debt. His remarkable career and passion for industrial engineering is chronicled in this issue of inGear. We will miss Fred, but I am confident he would have delighted in the recent accomplishments of our students and faculty.

Please enjoy reading more about the impressive achievements of our students, faculty and alumni in this edition of inGear.

Sincerely,

Paul H. Cohen, Ph.D.
ISE Department Head and Edgar S. Woolard Distinguished Professor

NEW LINKEDIN ALUMNI GROUP

Our alumni asked so we delivered. We have launched a NEW private LinkedIn ISE alumni group. This is an alumni-only private group that will allow you to network and communicate with fellow ISE alumni. It will also allow you to keep up with all that is going on in the department in one convenient place. Getting access to the new group is simple. Go to:

https://www.linkedin.com/grp/home?gid=8285397

and click the “JOIN” button in the upper right-hand corner of the page. That’s it! We look forward to connecting with you there.
To compete in the global marketplace, companies must always have productivity and efficiency on their minds. So it comes as no surprise that even in this difficult job market, industrial engineers (IEs) are in high demand. In fact, there are more companies coming to NC State looking for IEs than there are students to fill those jobs.

Each summer IIE holds its annual conference to showcase leading research and practical applications in the areas of engineering management, operations research, process industries, supply chain and logistics, and work systems. This year ISE faculty and students descended on the Music City to present their solutions to some of the most challenging productivity and efficiency issues in the industry.

During the four-day conference in Nashville, ISE’s team of researchers presented their findings at over 20 sessions. They spoke on a wide range of topics including improving healthcare methods, refining advanced manufacturing techniques and developing the next generation of medical devices. But the researchers were not just there to teach; they were there to learn as well. The conference was an opportunity for students to discover how others are providing industry solutions and case studies to solve some of the biggest challenges facing IEs today.

**ISE AWARDS**

On the first morning of the conference, doctoral students competed against fellow scholars from around the country in the IIE Doctoral Colloquium Poster Competition. Following up on
her performance as a finalist at the INFORMS Conference last November, Ph.D. candidate Karen Hicklin finished second for her paper Analyzing the Mode of Delivery Decision through Simulation and a Markov Decision Process to Identify Optimal Policies for Stopping a Trial of Labor (see Awards and Honors, page 22). “It is a tremendous honor to be recognized at the doctoral colloquium for our work to promote women’s and children’s health,” said Hicklin. “I enjoy being part of a process that can potentially have a significant impact in how C-sections are administered and plan to continue to make contributions to the field.”

The following day, ISE alumna Yuanhui Zhang placed third in the IIE Pritzker Outstanding Dissertation Competition. Dr. Zhang’s dissertation titled, Robust Optimal Control for Medical Treatment Decisions, focuses on developing quantitative models and methods for making medical decisions about glycemic control for patients with type 2 diabetes (see Awards and Honors, page 22). “She used these models to answer important open research questions about how to design ideal individualized treatment protocols for optimal control of blood glucose over the course of a patient’s lifetime,” said her advisor and former ISE faculty member Brian Denton.

At an early morning breakfast hosted by the ISE Department, both Drs. Rohan Shirwaiker and David Kaber were recognized for receiving faculty awards from IIE. Dr. Shirwaiker received the 2015 Manufacturing and Design Division Outstanding Young Investigator Award and Dr. Kaber received IIE Fellow Status.
ISE RANKED #2
DEPARTMENT IN THE COUNTRY

In their 2015 list of the Top 25 industrial engineering schools in the nation, Best-Engineering-Colleges.com ranked NC State second out of the possible 200 schools that offer industrial engineering degree programs. In the same rankings, the College of Engineering ranked #10 in the nation out of 1,871.

The rankings have been compiled from the most recent data available from the schools and the U.S. Department of Education. The data they used is both public and unbiased. Unlike other rankings, Best-Engineering-Colleges.com use only quantitative measures to determine their lists.

The ranking algorithm is based on 61 academic, financial, and organizational factors and metrics, as well as faculty profiles, student retention rates, and alumni job prospects. This includes the present student body enrollment, past ranking history of the specific college, and its current trend. While a new system, this is consistent with out high ranking in US News & World Report.

To see the full list of the Top 25 schools, go to http://best-engineering-colleges.com/industrial-engineering.
5 Questions with ... KUN HUANG

In the short time since his graduation, Kun Huang has already made his mark working for such internet giants as Google and Facebook as well as Macy’s Department Store. As a data scientist, he specializes in optimizing the delivery, performance and pricing of consumer advertising. Huang received his Ph.D. in Industrial Engineering from NC State in 2011.

What’s the single most important experience or understanding you gained in the ISE department?
The most important lesson I learned while at NC State was that finding the right problem was as important, if not, more important than coming up with the solution. This understanding has served me well throughout my career. Solving problems is great, but solving the right problems has allowed me to be part of significant and effective change.

What’s the most pressing issue facing society that engineers should be working harder to solve?
One of the most pressing issues facing engineers today is to create powerful tools and platforms that are easy and more friendly to use and don’t require complicated technical skills to understand. Amazon, Google and Facebook have revolutionized their industries by simplifying the customer experience. This allows people to utilize their creativity and imagination to invent new things.

What would you like to achieve in your career? What are you most proud of so far?
I am proud that I have maintained the balance between my work and personal life even through the difficult times in my life. I take photos and make paper models which helps me relax and stay creative and organized.

What’s the best book you have read?
The Art of War by Sun Tzu. The war strategies and wisdom in the book can also be applied to your career and life. My favorite quote is: “The Commander stands for the virtues of wisdom, sincerity, benevolence, courage and strictness.” I think it summarizes well what define a good leader.

What advice do you have for current ISE students?
Be bold; break things. Failure is never the end but a gas station along your highway. Coming out of your comfort zone can help you learn new skills, make new friends, and stay inspired.
ISE Adjunct Professor Nancy Currie explains how NASA’s cowboy attitude led to the Columbia disaster.

Along with firefighters, pirates and superheroes, astronauts always rank high on the “what do you want to be when you grow up?” list. These professions also share another common trait, high risk. With all due respect to superheroes, being an astronaut is the most risky profession in the world. Although many of the dangers are well-known, one in particular may be a surprise.
At her keynote address at the 2015 IIE Annual Conference, ISE adjunct professor and former astronaut Nancy Currie explained how NASA’s attitude toward addressing potential dangers was a major factor leading to the Columbia Shuttle disaster in 2003. Dr. Currie serves as a principal engineer at the NASA Engineering and Safety Center (NESC). She is part of the team assigned to changing NASA’s mentality from “good enough” to one of safety and risk assessment. The teams at NASA believed that most of the risk occurred during the launch of the vehicles and conditioned themselves into believing that after launch, 98% of the risk was gone. However, that is far from reality.

There have been three fatal accidents in the U.S. concerning space flight: Apollo 1 (1967), Challenger (1986) and Columbia (2003). Columbia was the accident that changed everything. It changed how NASA operated both systematically and operationally and it cut short the possibility of any launches for the next several years. NASA’s missions were restricted to building and finishing the International Space Station. Any flights launched were test flights and only contained the smallest number of essential crew.

Dr. Currie explained that as an organization, they became a victim of their own success. After going through thousands of hours of training, human space flight seemed so easy. They simply stopped concentrating on their past failures and focused only on their successes. “Why do we learn from our past?” asked Dr. Currie. “In order to create preventative measures, we must learn from our history or else it will certainly repeat itself.”

One of the biggest issues that NASA faced was their “Out of Family” mentality. “Out of Family means that something may not work the way intended,” explained Dr. Currie. “But it works okay and that was good enough.” It was this mindset that eventually lead to the destruction of Columbia. As Dr. Currie states, “We have found time and time again that it’s at the interface of these complex systems where the majority of the problems occurred.”

Walking hand in hand with the “Out of Family” mentality is the idea that many individuals felt as though they could not speak up when they had reason to prevent a launch. This is why the NESC encourages proactive involvement, working to strengthen systems engineering while integrating systems safety. They needed to create a system by which everyone could speak up without hesitation.

The importance of safety is at the forefront of all of these projects and thanks to Dr. Currie and the others at the NESC, NASA continues to remind itself of failures and to stay vigilant in the environment and culture of the exploration of space.

To watch Dr. Currie’s keynote address, go to: go.ncsu.edu/CurrieKeynote
DID WE MISS YOU?

If we do not have you on the map, please send your address to ise-socialmedia@ncsu.edu and we will get you added right away.
After a successful career as a pharmaceutical executive that grew from his NC State industrial engineering degree, Fred Gant turned his sights to his alma mater.

“If there are things that need to be done in engineering, I’m here to do it,” Gant’s wife, Beverly Gant, recalls him saying.

In 1996, Fred and Beverly Gant established the Allen F. and Beverly Gant Scholarship for students in the Fitts Department of Industrial and Systems Engineering. To date, the scholarship has assisted 36 ISE students with their education.

Gant, who passed away in March, was a member of the inaugural class to receive the ISE Distinguished Engineering Alumnus Award in 1996 and was named a Distinguished Engineering Alumnus by the College of Engineering in 1998.

A native of Greensboro, Gant graduated from Xavier Military Academy of New York. Beverly Gant remembers that it was his uncle Romeo LeFort who encouraged him to leave New York City and come to Raleigh to study. LeFort was the assistant dean of students at NC State and a father figure to Gant.

“Fred realized that although he grew up in the city, he was on the same footing as the young men who were coming off the farms,” Beverly Gant recalled. “None of them had any money, so they all worked together to get through.”

After graduating from NC State in 1955 with a Bachelor of Science in industrial engineering, Gant held managerial positions with E.R. Squibb Pharmaceutical Co., U.S. Vitamin and Miles Laboratories Inc. before moving into corporate executive positions with Merck and Pfizer Pharmaceuticals. In 1980, he was named vice president of Key Pharmaceuticals in Miami, Fla., and served on the Board of Directors of Key Pharmaceuticals of Puerto Rico, Inc. He also held

By Brent Lancaster
Associate Director of Communication
College of Engineering
ISE Distinguished Alumnus Allen “Fred” Gant and his wife Beverly created the first ISE departmental scholarship in 1996.

The senior vice presidency and sat on the Board of Directors of Granutec, a drug company in Wilson.

After retiring from Granutec, Gant felt a call to be somewhere meaningful where he could help. In 2001, he came out of retirement to serve as CEO of NC State pharmaceutical start up BioMarck as the company developed a treatment for chronic obstructive pulmonary disease.

As a member of the NC State Engineering Foundation Board of Directors, he led a committee through the exhaustive process of selecting a professional investment team with a proven track record of success to manage the endowment and other assets of the College of Engineering. He also chaired the Foundation's Development Committee, helping set a new standard for personal giving to the College by his fellow board members.

Fred and Beverly Gant met at an advertising party in New Jersey, where he returned after graduation to start work with U.S. Vitamin. The couple would stay in New York until 1980, when they moved to Miami. In 1987, they returned home to Raleigh.

As an engineering student, Gant always appreciated the fact that there were professors who would make time to spend with students, that they made an effort to always be there. Gant paid that donation to student success forward to ISE students over the years.

The Gants were keenly interested in helping build a better future for young people who would otherwise not have many opportunities. “Fred always rooted for the underdog,” Beverly said of his motivation for establishing scholarships for ISE students. “Fred especially liked to see young people who had the drive, the intelligence and the desire promoted and rewarded.”

ISE Distinguished Alumnus Allen “Fred” Gant and his wife Beverly created the first ISE departmental scholarship in 1996.
You apply for a job, get interviewed, accept an offer and start working. **What next?**

by **ZUBIN AJMERA**

Zubin Ajmera graduated from NC State with his MIE degree in 2014. Since graduation, he has been a Consultant with Mu Sigma and is now a Corporate Programs Senior Analyst with Procurement Advisors. Follow his industrial engineering based blog at: [http://www.industrialinside.com/](http://www.industrialinside.com/)
As an industrial engineer (IE), there will be several tasks you’ll be performing in your job or internship. I’ll share the 7 most common ones today which almost every IE (or specialization roles in either logistics and supply chain, manufacturing, consulting, etc.) performs. The good thing about these job assignments is that they require little technical knowledge from your end (at least for the first few months) and focus heavily on orienting you to the overall company structure and your job type in detail. Let’s have a look at each.

#1 - Training

This will be one of the most important things you do right after joining the company. When I joined Mu Sigma, a data analytics consulting firm, the training lasted almost five weeks and included assignments, sessions and projects. Your training will consist of assignments based on your profile and work requirements.

**Mentorship**

Most likely, you will be assigned a mentor. This may or may not be your manager. For example, at my current company employees are responsible for training new hires. The size and culture of the company will play a role in how training is handled. The role of the mentor is to provide you with information about your job. This will include:

- Explaining job responsibilities and assignments
- Demonstrating tools and software
- Providing an overview of company policies
- Assessing your skills and analytical abilities

#2 - Data Collection

Much of your work will involve gathering data from various resources. These are known as time and motion studies and consist of:

- Plant facility: data on number of departments, number of employees, plant size and space
- Production lines: number of products made, timings of shifts, and understanding the exact process of the system
- Company information: who you’ll be working with (senior management, project directors), their roles and duties
- Work information: type of projects, whether you’ll work in a team, and getting detailed data on your tasks for future

#3 - Meeting Senior Management

We touched upon this in point #2. Apart from project managers and the upper management team, you will also meet with the HR department. This includes information on your work schedule, payroll, company policies, and benefits (if any). The meetings with project directors and managers will provide things such as:

- Management structure and portfolio: How it works, who handles what, and people’s titles
- Current scenario: What the company looks like today, future plans, and future expectations
- Problems/Solutions: The type of problems, solutions on hand, and plans to design it
- Opportunities: Cost savings (how can the company achieve it), and strategic planning and execution

#4 - Working on a Group Project

Most likely, you’ll work in a group that is under the direction of 3 - 5 people. For simplicity, I have broken this down into the different phases of the project.

**Initial Analysis and Overview**

Let’s say you work in a manufacturing facility. The project could be improving the downtime of a nail polish production line (downtime being the total amount of time the production line is not working). Your tasks might include data collection of various factors from different resources like:

- Recording the number of bottles produced per hour/day/week/month
- Understanding the total time it takes to produce a bottle
- Considering how other parts like bottle caps and labels factor into each stage of the process

Let’s say you work in a consulting firm and Macy’s is one of their clients. The project might be evaluating and providing revised guidelines to open up a new store in New York. Your tasks could include:
Preparing the complete current documentation for the client in detail

Analyzing different factors, i.e., where sales are coming from, what sells more, what type of promos/discounts are working, which days generate the highest sales, which categories (shirts, t-shirts, jeans, etc.) are the largest sellers

Doing a thorough cost analysis and determining if there are any opportunities for savings

Group Meetings and Discussions
You will be meeting with people connected to the project on a continuous basis. This includes managers, directors, project executives and part-time employees. As long as they can contribute and provide useful data, they will be involved. Here, you will discuss:

- What you have learned so far?
- What is the project’s status?
- Are there any possible improvements?
- What should be the next steps?

These meetings allow constant interaction with team members and timely delivery of the project.

Final Deliverable
At the conclusion of the project, you will submit a final report detailing the work performed and all results. In most cases, you will share your insights and explain what was accomplished. In other cases, the project may be performed on a continual basis or your part is just one step and someone else will be handling the project going forward.

#5 - Data Analysis & Visualization
This type of work starts after the training and your initial project. I would estimate it begins 2 - 4 months after your first day. The majority of this analysis will come from working with several analytical tools. You will use a combination of some basic IE and company specific tools and software. The good news is that you will receive training on how to use the software before you actually start your analysis. For the most part, this will involve:

- Extracting information
- Viewing numbers and figures
- Representing what you learned in the form of charts and graphs
- Providing recommendations and areas that needs improvement

You’d have heard that industrial engineers “crunch data” and analyze complex systems. That’s what we’re talking about here.

#6 - Completing Timely Tasks
This is a further extension of #5. Based on your role, you will have certain assignments that have to be completed on a regular basis: weekly, monthly and so on. You can divide these assignments into mini-tasks which are more or less your daily activities as discussed above. From here on, you will be doing either or both of the following:

- Scheduling and completing similar tasks which you have done so far
- Taking on new projects/issues and working accordingly as they come

#7 - Results: Reporting to Manager
Although your interaction with your manager will occur regularly, there will be specific meetings and discussions to review your projects and their results. This occurs semi-annually or even quarterly. This further lays out the road for the next steps and assessment of your work so far with the company.

Conclusion
These seven tasks are the most common things you may encounter as a new industrial engineer. Of course, there will be many other responsibilities depending on your job, title, company, location, etc.
Discover how assistant research professor Harvey West turned his love for “breaking things” into a satisfying career

Dr. Harvey West just knew from the start that he wanted to be an engineer. Fueled by his passion for math and science, he came to Raleigh from nearby Greensboro to seek a degree at NC State. “It was the only university I applied to,” recalled Dr. West.

He started out in nuclear engineering but after taking an intro to materials science class switched his major to materials science. “There was that ‘AHA!’ moment during class where I just knew this is what I wanted to do,” said Dr. West. “I wanted to study metals and composites.” In 1979, he received his undergraduate degree and began working on his Master’s. Upon his graduation in 1982, he started his career with a local engineering firm, S&ME.

But after a year Dr. West decided to pursue his passion for teaching and returned to NC State to get his doctorate degree, which he received in 1989. He became a lecturer in the Department of Materials Science and Engineering before moving on to Materials Analytical Services where he worked until 1997. That is when Dr. Tom Culbreth, ISE professor, long-time friend and clogging mate, asked Dr. West if he would like to start a furniture testing lab at NC State.

In the beginning, the testing lab was set up in a small, windowless room in a building on Hillsborough Street. This was not exactly the most ideal situation. So in 2007, when they asked Dr. West if he’d like to bring the lab back onto campus, he did not hesitate.

The testing lab, which has come a long way since its start in 1997, performs a wide variety of tests against BIFMA safety and performance standards. It is one of the few facilities that still performs these services for furniture companies all over the country. Students in the ISE Department played a role in building the custom machines that test the furniture.

One of the biggest reasons Harvey loves working in the ISE Department is the diversity and variety of projects. Another reason he loves it here? “I get to break things for a living,” he states, laughing.

Outside of testing furniture, analyzing materials and breaking things, Dr. West enjoys another one of his lifelong passions, creating music. “My grandfather owned a music store and tried to teach me how to play the trumpet when I was in elementary school,” recalled Dr. West. “It didn’t go so well.” But at the age of 16, he borrowed a banjo from his grandfather’s store and hasn’t put it down since.

Dr. West plays at the Busy Bee Cafe in downtown Raleigh some Monday nights. He also plays with his band, The Couchtones, which includes ISE Lab Manager Dan Leonard. In case you haven’t had the chance to hear the group, which combines bluegrass and Irish dance tunes, you may be able to catch them playing in his lab in Daniels Hall. While Dr. West enjoys almost any genre of music, he is most inspired by the great bluegrass bands such as the New Grass Revival, the Seldom Scene, and Hot Rize.
ISE “SEEN”

It’s an exciting time to be part of ISE, and these photos prove it. Have you been seen?

Proudly flying the NC State flag at IIE Annual Conference (Nashville)

Katie Basinger and Julianne Spencer being awesome at IIE Annual Conference

1st year engineering students driving the simulator at ISE Open House

Paul Cohen, Rohan Shirwaiker, David Kaber and Louis Martin-Vega at IIE

Graduate student David Cornejo presenting at IIE Annual Conference

Pegah, Karen and Mona at IIE Annual Conference

David Kaber in Thailand

Anita Vila-Parrish presents research in Italy at World Engineering Education Forum
The Engineering Oval is the new home of the ISE Department and NC State's vision for 21st century engineering education at NC State's Centennial Campus.

...it is the realization of NC State's vision for 21st Century engineering education.

Jason Low prepares for Rethink Robotics video with Ismail and Arunava at ISE

Hannah Wetmore takes over @NCStateEngr Instagram account at NC State

Students design and build MOD robots at ISE summer camp

Students learn to program Baxter robot at ISE summer camp
Caterpillar plans to increase its production in its Sanford location by 17% per week. They discovered that the method for creating the weekly build schedule is inefficient. It currently takes 190 minutes to create the schedule in Excel.

The ISE student team will create an automated scheduling tool using VBA and form controls. The tool will seek to reduce the scheduler’s processing time by 95%.

EMC orders raw materials from overseas that can arrive well before they are needed for production. They store these materials in an off-site storage facility. EMC estimates that they recycle 30 tons of packaging materials per month.

The ISE student team plans to reduce the amount of waste in the packaging operations at EMC’s Apex facility. At the same time, they look to reduce the cost on packaging materials.

Flanders produces almost half a million air filters per year. They currently buy the filter’s metal frame, called a header, from an outside supplier. Flanders estimates they can save $500,000 a year by installing an in-house production line.

The ISE student team plans to determine which sizes are viable for in-house production. Their goal is to develop layout, work flow, material handling and storage for the new production line.

Lenovo distribution center has plans to take on more responsibilities. The current layout of the Customer Solution Center (CSC) is taking up too much space and has become inefficient as the facility’s demands have increased.

The ISE student team plans to create a flexible work area to accommodate for fluctuating demand. Their goal is to reduce the footprint of CSC work area by at least 10% as well as increase capacity by 20%.
This fall the ISE Department had the pleasure of working with six local companies on seven Senior Design Projects. These projects are an opportunity for companies to utilize student resources and have new concepts and fresh ideas injected into their real-world projects. This sponsorship is rewarding for both the project sponsor and the student team. ISE would like to thank this semester’s sponsors for their participation in the program.

**novozymes**

**Location:** Franklinton, NC  
**Sponsors:** Travis Edwards, Randal Holmes and Emily Hon  
**ISE Team Members:** Ryan Bishop, Thomas Martin, Timothy Moody and Christopher Sippel

Novozymes have three production lines. One uses newer technologies that can operate at a faster and cheaper rate. They currently use a deterministic calculation to compute various production scenarios. This process has many steps that are stochastic in nature which makes their calculation risky.

The ISE Student team plans to create a simulation model to capture the random nature of the process to deliver key statistics.

**TRIVANTAGE**

**Location:** Mebane, NC  
**Sponsors:** Dan Fouratt, Chong Kim and Craig Yokeley  
**ISE Team Members:** Tyler Melvin, Rachel Oneyear, Kristin Teague and Paul Whitley

Trivantage’s current packaging and shipping is inefficient and does not factor in the variety of orders. They want to streamline the process and increase its profit margin by 30%.

The ISE student team has three solutions to the problem. They plan to change the multiple branch shipment logic, standardize the logic in choosing box size and review Trivantage’s discount freight program.

**TRIVANTAGE**

**Location:** Mebane, NC  
**Sponsors:** Dan Fouratt and Craig Yokeley  
**ISE Team Members:** Jonathan Addison, Zach Bouren, Charles Copeland and Cam Simmons

Trivantage’s current return rate for orders is above the industry average of 1%. They want to reduce their return rate to less than 1% which reduces costs and improves their customer satisfaction.

The ISE student team plans to use multivariate analysis to discover trends in Trivantage’s return data. They want to find the underlying reasons for the high quantity problems, then develop solutions to solve these problems.

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**THANK YOU SPONSORS!**
The Engineering Online Program at NC State is designed for working professionals, allowing you to earn a master’s degree in engineering without coming to campus. Industrial engineering courses offered by Engineering Online are identical to on-campus courses in terms of content, requirements and academic rigor. They are taught by the same thought leaders who teach in our resident education degree programs.

A career in any engineering-related field is an ongoing investment governed by self-guided learning. The fundamentals you learn as an engineering student or on the jobsite will always be with you, but the technology and resources you use will change continuously. An online Master of Industrial Engineering degree can help you hone your existing skills, learn new competencies, and expand your career options!

engineeringonline.ncsu.edu
The ISE Department receives valuable input from its Advisory Board. The board maintains and fosters relationships with students, faculty, the Dean of the College of Engineering, the community and alumni. The Advisory Board assists the department head in achieving department goals and provides counsel and advice from its unique perspective. Board members are typically engaged in other ways, such as helping to connect the department with industry stakeholders. The Advisory Board meets each semester.

The following distinguished alumni and friends of the ISE Department currently serve on the Board:

**Dr. Leslie Alexandre**  
Director, Research Development and Collaborations at Georgia Regents University Cancer Center  
Board Member at Arbovax, Inc.

**Dr. Tony Atala**  
Director of the Wake Forest Institute for Regenerative Medicine  
W.H. Boyce Professor and Chair of the Department of Urology at Wake Forest University

**Larry Bowman**  
BSIE, North Carolina State University 1973  
ISE Distinguished Alumni 2008  
Principal with Bowman Investments, LLC

**Edward Fitts (Chair)**  
BSIE, North Carolina State University 1961  
ISE Distinguished Alumni 2006  
Founder and CEO of Dopaco, Inc. (Retired)

**Dr. Leon McGinnis**  
Ph.D., North Carolina State University 1975  
ISE Distinguished Alumni 2006  
Professor Emeritus in the H. Milton Stewart School of Industrial and Systems Engineering at Georgia Tech

**Joe Pleasant, Jr.**  
BSIE, North Carolina State University 1972  
ISE Distinguished Alumni 2010  
Chief Information Officer and Senior Vice President of Premier, Inc. (Retired)

As the article in this issue of InGear describes, the website Best-Engineering-Colleges.com ranked NC State ISE second nationally among U.S. universities offering Industrial Engineering degrees. Only Georgia Tech ranks higher. It is a distinction that we are very proud to have earned.

We are delighted, but not surprised. In contrast to other national rankings criteria, Best-Engineering-Colleges.com focused on quantifiable information related to those areas where NC State clearly stands out – our world-class teaching and research faculty, a student enrollment that continues to rank among the highest-achieving in the nation and a track record for post-graduate employment that is second to none. As engineers who work with empirical data, it’s gratifying to know that this ranking can be seen as an objective evaluation of our merits.

We are also very proud that in the same report, the NC State College of Engineering was ranked No. 1 in the state of North Carolina and No. 10 in the nation overall. Engineering continues to be one of the University’s leading programs, and the rest of the country is taking notice.

**Ed Fitts**, BSIE 1961  
ISE Advisory Board Chair

**Empirical Evidence of ISE’s Outstanding Reputation**

Among the priorities for our Department that the ISE Advisory Board has long deemed most important are the quality of our faculty, our ability to attract and retain the best students and creating the best possible career opportunities for our graduates. It has also been our hope that as we pursue these goals the Department’s national ranking would rise and that is exactly what has happened.

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We are also very proud that in the same report, the NC State College of Engineering was ranked No. 1 in the state of North Carolina and No. 10 in the nation overall. Engineering continues to be one of the University’s leading programs, and the rest of the country is taking notice.
Karen Hicklin, Ph.D. student, placed second in the Institute of Industrial Engineers (IIE) Doctoral Colloquium Poster Competition for her paper Analyzing the Mode of Delivery Decision through Simulation and a Markov Decision Process to Identify Optimal Policies for Stopping a Trial of Labor. The competition was part of the events held during the 2015 IIE National Conference in Nashville, Tenn.

Hicklin works under the supervision of Dr. Julie Ivy in the area of health systems engineering. The research focuses on creating a standardized system doctors can use to determine when it is most appropriate to perform a cesarean section (C-section).

Yuanhui Zhang, alumna, placed third in the IIE Pritzker Outstanding Dissertation Competition. The contest was sponsored by the Pritzker Corporation which recognizes outstanding industrial engineering research. Dr. Zhang’s dissertation entitled, Robust Optimal Control for Medical Treatment Decisions, focuses on developing quantitative models and methods for making medical decisions about glycemic control for patients with type 2 diabetes.

Over the course of her Ph.D. thesis research, Yuanhui presented her work at many conferences including several INFORMS conferences and the Annual Society for Medical Decision Making Conference.

Jingyan Dong, associate professor, along with his research team of Yiwei Han and Chuang Wei, received the NAMRI/SME Outstanding Paper Award for their paper entitled, Droplet Formation and Settlement of Phase-Change Ink in High Resolution Electrohydrodynamic (EHD) 3D Printing.

Dr. Dong’s research focuses on the EHD printing process for phase-change wax material to achieve high resolution sub 10-μm 3D structures. He has used Finite Element Analysis (FEA) to develop the model for droplet formation and droplet settlement.
Richard Wysk, Dopaco Distinguished Professor, was selected as a Distinguished Visiting Fellow at the prestigious Royal Academy of Engineering. Dr. Vimal Dhokia, visiting researcher from the University of Bath (England), nominated Wysk for the appointment to the Royal Academy of Engineering.

Wysk visited the University of Bath as part of this Fellowship for a month during the summer. He helped develop new research initiatives related to the emergence of hybrid manufacturing, combining the benefits of 3D printing with traditional subtractive machining processes.

Amelia Hardee, senior, received an NC State Undergraduate Research Grant Award from the Office of Undergraduate Research at NC State University. This gives Hardee the opportunity to present her research at the 2015 State of NC Undergraduate Research and Creativity Symposium (11-2015), the NC State Undergraduate Research Symposium (04-2016) and the 2016 NC State Summer Undergraduate Research Symposium (08-2016).

She is working under the supervision of Dr. Rohan Shirwaiker on the 3D-printing of scaffolds to be used for regrowing human tissue.

Human Factors and Ergonomics Team, was awarded a Certificate of Appreciation from the Foundation of Professional Ergonomics (FPE). The certificate was presented to the team for being a runner-up for the 2015 Dieter W. Jahns Student Practitioner Award.

The team was recognized for a study that was a part of the Research Practicum course (ISE796). The study was conducted by Ph.D. students Carl Pankok, Maryam Zahabi, Wenjuan Zhang, and Inchul Choi as well as MIE student Yi-Fan Liao. It focused on the effect of interruption task similarity and complexity on performance in a mock industrial assembly operation.
A HIGHER GEAR

A look at some of the numbers that shape the Edward P. Fitts Department of Industrial and Systems Engineering at NC State

13 PARK and BEN FRANKLIN SCHOLARS in the ISE department with two more coming next year.

5 VARSITY ATHLETES currently in ISE.

2 RANKED IE SCHOOL in the COUNTRY.
ISE was recently ranked as the second best IE department by best-engineering-colleges.com.

1 RANKED INDUSTRIAL ENGINEERING SCHOOL in NC
ISE was recently ranked as the best IE department by best-engineering-colleges.com.

3.5 MEDIAN GPA of the incoming class.
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