

INDUSTRIAL BLUEPRINT

MARCH 2013

BROUGHT TO YOU BY ALPHA PI MU AND IIE

FROM THE EDITOR

Hello IOE,

March is almost over and the weather might be getting warmer soon (maybe). Finals are quickly approaching and final projects are well underway. March Madness is in full

swing, so good luck to your brackets (if they haven't been busted yet). The March issue of the Blueprint is a pretty long one, filled with good content.

Enjoy,

Jonathan Morof

Top Ten Things to Do on North Campus

By Jenette Kuo

Although many of us only come to North Campus to go to class, North Campus actually has some pretty interesting places to check out. Next time you're on North Campus and you have some free time:

- 1) Check out the Wave Field: It was created by Maya Lin who also designed the Vietnam Veterans Memorial in Washington D.C.
- 2) Listen to the Grand Carillon (the bells in the Bell Tower): The Lurie Bell Tower has one of only 23 grand carillon in the world.
- 3) Go inside the Dude Gallery: The Gallery features temporary exhibits that range from art from Michigan Students to art from Michigan prisoners
- 4) Relax by the pond outside of the Music School (Fun fact: It was designed to look like a grand piano.)
- 5) Learn about Michigan's astronauts inside the FXB: Several alumni have become astronauts and Apollo 15 was an all-Michigan flight as all three astronauts were Michigan grads.
- 6) Get lost in G.G. Brown (Be sure to check out the Structural Engineering Lab if you can find it....)
- 7) Climb the glass staircase in the BBB (or CSE)
- 8) Check out the art all over North Campus: The Order of Spheres dome over the Wind Tunnel is a pretty neat example!
- 9) Watch a show in Stamps: This can range from performances by the University Symphony Orchestra to student hosted events like the Mr. Engineer pageant.
- 10) Check out the library....that is, the Computer and Video game archive.

INSIDE THIS ISSUE:

NORTH CAMPUS TO DO LIST TOP 10 TOP TEN 1

IOE 425 AND MATH 425 REVIEWS 2

LOOKING BACK AND ENGR 100 AND NORTH CAMPUS TOUR GUIDING 3

BUILDING RELATIONSHIPS IN THE IOE DEPARTMENT 4

CHEPS AND ENGINEERING STUDENT AMBASSADOR PROGRAMS 5

STUDY ABROAD EXPERIENCE IN TROYES, FRANCE 6-7

GRAD SCHOOL VS. JOB AND MECC 8

MATH 425: INTRODUCTION TO PROBABILITY

BY: MICHAEL HU

As IOE students, we all have to take probability and statistics courses like IOE 265 and IOE 366. While these classes provide students with an introduction to probability, their main focus is on statistics. One course that I highly recommend to students that are interested in further exploring the field of probability is Math 425: Introduction to Probability.

There is clear overlap of material between Math 425 and some IOE courses. For example, Math 425 begins with the basic results and methods of discrete and continuous probability theory. It then moves on to conditional probability, independent events, random variables, joint distributions, expectations, variance, and covariance. Ultimately, the course material culminates with the Law of Large Numbers and the Central Limit Theorem. Although this material may sound

nearly identical to what we learned in IOE 265, it is taught from another perspective, which I found extremely beneficial.

While in IOE courses we are usually just given formulas and asked to complete computations, Math 425 is more focused on the theory and foundations of probability. Thus, topics like change of variables are covered in a more detailed fashion, and more emphasis is placed on proofs such as the proof of the Central Limit Theorem. Furthermore, depending on the instructor, the course may also briefly cover more advanced topics such as Monte Carlo simulations and Jensen's and Markov's inequalities.

If you are interested in taking a course that is not very difficult, and that will help you develop a more rigorous foundation in probability, which will in turn improve your understanding of statistics, I highly recommend considering Math 425.

INTERESTED IN LEAN MANUFACTURING? TAKE IOE 425

BY: JUSTINA NAGORKA

If you are a junior or especially a senior, you will soon be faced with the need to complete your IOE technical electives. If you are looking for an introduction to lean manufacturing, IOE 425 just might be the perfect course for you.

IOE 425 is formally called Lean Manufacturing and Services and is taught by various guest lecturers. The course introduces the theories and practices of lean manufacturing and its applications throughout the business world and beyond. Although it is only a half semester course, many topics are covered. More specifically, the course includes

review of the philosophies, systems, and practices utilized by world-class manufacturing and services organizations focusing on "lean management", including material and information flow, in-process quality assurance, standardized work, continuous improvement, visual management, value stream mapping, and 5S Methodology.

Furthermore, practical examples and in-class exercises bring these concepts to life. Having recently taken this class, I can honestly say that it is worth the time and effort. Moreover, the topics covered are quite interesting. Therefore, if you have the opportunity to take the course, I strongly recommend it.

ENGINEERING 100-900 DESIGN FOR ENERGY SUSTAINABILITY

BY: DAVID KLIPPEL

Just like a lot of other freshman in engineering, I had no idea what Engineering 100 class I wanted to take. Not knowing what area of engineering I wanted to study was a big contributor to being indecisive. Nothing sounded too interesting to me, and I ended up picking a class based on schedule convenience. The class turned out to be a good decision.

During my freshman year I decided to take Design for Energy Sustainability as my Engineering 100 class. This class was offered only for the winter semester and was taught by Professor Thompson. The course revolved around exploring options for sustainable energy systems. In the labs we dealt with fuel and solar cells to understand the concept behind those systems. I was expecting a lot of environmental engineers, but much to my surprise, a lot of the students in the class were IOE majors. And rightfully so, a lot of the class involved concepts learned in IOE 201. Problems involved concepts such as calculating pre-

sent or future value for potential investments in fuel or solar cells and comparing that to the price of paying for energy from DTE. On top of the problems being very similar to what you see very early on in IOE 201, the main project involved consulting with small or local businesses to evaluate possible ways they could efficiently save money and cut down on energy usage.

The class peaked my interest in pursuing Industrial and Operations Engineering as a major. I found that the projects involving cash flow were really interesting. On top of that, consulting with the start-up was a great experience and I feel like I learned a lot from it. Our specific project was to evaluate the most cost and energy effective way of drying algae. After taking the class I can say that I am glad that Design for Energy Sustainability happened to be the only class that could fit in my schedule.

NORTH CAMPUS TOUR GUIDING

BY: ALEX KEYSER

Being a North Campus tour guide has been a unique and ultimately very fun experience. I am responsible for navigating groups consisting of both prospective students and their parents around the maze that is North Campus. I work with a great group of fellow students pursuing a diverse range of majors as

“I HIGHLY RECOMMEND BECOMING A TOUR GUIDE TO ANY STUDENT THAT IS PASSIONATE ABOUT OUR UNIVERSITY AND INTERESTED IN LEARNING MORE ABOUT NORTH CAMPUS AS A WHOLE.”

well as the engineering admissions staff. I have learned how to effectively answer almost any question about the university, developed better speaking skills and most importantly mastered a route through G.G. Brown (which I never thought would be possible).

Getting to know north campus was a huge perk and something that I had failed to do prior to the summer of 2012. It's embarrassing to admit, but before my

junior year I found myself unable to locate any building on North, other than the IOE building or Pierpont, without use of my handy dining hall issued map. Shadowing the other tour guides was the best thing I could have done to eliminate this issue. Tagging along as they gave tours acquainted me with the majority of the buildings on North Campus and gave me insight into the programs that dwell within each. Now, instead of vaguely knowing the demands of each Engineering concentration, I have a greater understanding of the applications of each along with current research.

I highly recommend becoming a tour guide to any student that is passionate about our university and interested in learning more about North Campus as a whole. I have increased my public speaking skills 100 fold. There is also an added bonus of knowing countless random facts like the whereabouts of our moon rock, the current percentage of females in engineering or the real reason both escalators in the dude go up.

BUILDING RELATIONSHIPS IN THE IOE DEPARTMENT

BY: PAUL REGIER

It is safe to say that every IOE student has heard how important networking is. Many people think about networking as solely being directed towards recruiters and professionals in order to pursue specific professional opportunities. This aspect of networking is very important, don't get me wrong, but there is another subset of networking that I believe is just as important. The building of relationships within the IOE department is a crucial form of networking that every IOE student must take advantage of while at the University of Michigan.

A great first step to accomplish this is to build strong relationships with your fellow IOE classmates. You realize very quickly that you are constantly surrounded by the same core group of students once you declare IOE. You are not only taking the same IOE classes with them, but do not be surprised to notice that the majority of your classmates in NERS 211, MSE 220, and many other Non-IOE Engineering Technical Electives are also IOE's! Due to this, I highly recommend getting on a first name basis with the majority of your IOE graduating class. It is also beneficial to form a strong, close-knit friend group of IOE's, and I would recommend doing this for many reasons. Not only would this friend group be helpful when it comes to homework, team projects, and studying for exams, but I have found that

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some of my closest friends are my IOE classmates. You will find that the IOE department is made up of many outgoing, down-to-earth, motivated individuals that are fun to be around in and outside of the classroom.

Building relationships with your GSI's and professors would be the next major step to take in strengthening your IOE experience. I would recommend going to office hours and getting to know as many instructors as possible on both an academic and personal level. Not only are these connections beneficial for showing your interest in the subject matter and for improving your participation in the course material, but it gives you the opportunity to gain insight on the instructor's past and current life experiences. Look to the GSI's to gain insight on internships, research, graduate school application and lifestyle, and on-campus organizations. On a similar note, I have had some great conversations with professors related to research, course recommendations, and academic and professional guidance. I have been nothing but impressed with the faculty in the IOE department, and I would definitely recommend building strong relationships with them over the course of your studies.

Networking around the IOE department has been one of the most beneficial and enjoyable experiences of my undergraduate career. I have experienced academic, professional, and personal growth from the interactions that I have had, and I am sure you will experience similar benefits if you do the same.

CENTER FOR HEALTHCARE ENGINEERING AND PATIENT SAFETY

BY: BILLY POZEHL

Many students in Industrial and Operations Engineering are unfamiliar with the Center for Healthcare Engineering and Patient Safety (CHEPS); however, the Center provides multi-disciplinary project opportunities that would interest almost any IOE student. CHEPS was founded in 2011 “to improve the safety and quality of healthcare delivery through a multi-disciplinary, systems engineering-based approach.” Dr. Jim Bagian serves as the Center Director and Amy Cohn serves as the Associate Director. In addition to the Directors, the Center has numerous students working on CHEPS projects. For students interested in healthcare, CHEPS is an invaluable resource for knowledge, experience, and networking.

Some of the projects currently managed at CHEPS include the development of a tool to automate the resident scheduling process in the Pediatric Emergency Medicine department, development of a tool to simulate the likelihood of training certification for cardiothoracic transplant residents based on deterministic call schedules and stochastic transplant arrivals, and the development of a telemedicine program that employs artificial intelligence

and machine-learning to provide optimal care. These projects and more offer great chances for undergraduate students to gain research experience and provide meaningful contributions to activities at UMHS.

CHEPS also sponsors a Masters Concentration in Healthcare Engineering and Patient Safety. For this concentration, students are required to complete all the normal requirements for a Masters in IOE plus several more including a three-semester schedule, first-semester seminar, and an intensive year-long project working to solve a real problem in healthcare with a multi-disciplinary team. For those students interested in graduate education and careers in healthcare, the concentration offers the education and experience needed to quickly achieve a position in which you can have tremendous impact.

For more information about CHEPS, send an email to CHEPSadmin@umich.edu or visit the Center’s website at http://sitemaker.umich.edu/cheps/about_cheps.

ENGINEERING STUDENT AMBASSADOR PROGRAM

BY: GILLI MIZRAHI

Are you looking to get more involved on campus? Would you like to gain valuable experience networking with CoE alumni at fancy events, being a leader in a student organization, and even giving Segway tours to CoE donors and alumni? Look no further because between March 18 and March 27 you can apply to be an Engineering Student Ambassador for the Fall 2013-Winter 2014 school year.

The Engineering Student Ambassador Program brings together students and alumni to provide a solid connection to current student experiences. Ambassadors engage alumni by hosting, mingling, providing information and sharing the Wolverine experience at luncheons, dinners, programs and events throughout the year. Ambassadors often engage with donors and their families by acting as guides and College representatives during visits to campus. The program offers a prestigious opportunity to represent the diverse experiences of the College of Engineering to alumni. In doing so you will sharpen your communication and public

speaking skills, expand your leadership skills, network with alumni and get to know Michigan faculty, staff and fellow campus leaders.

Why is this important? Michigan Engineering remains distinguished by its special combination of scholarship, resources and varied real-world experiences. Alumni help support the College of Engineering by providing resources for financial assistance and incentives, exceptional equipment and labs, and opportunities for students to participate on team projects such as the Solar Car, Concrete Canoe and MRacing teams. Alumni continue to build Michigan Engineering’s strength and reputation, and help students to discover the breadth and depth of opportunities at Michigan Engineering through their contributions and volunteerism.

If you are interested in applying please check out the following URL to find the link to the application: <http://mconnex.engin.umich.edu/alumni-groups/alumni-board/student-ambassadors/>

UTT STUDY ABROAD

BY: KUNAL SHANGHANI

The idea of studying abroad always seemed far-fetched to me, especially in high school. I had done my share of traveling growing up (and loved every minute of it), traveling to a variety of places ranging from around the United States to Singapore to Switzerland, but the thought of going to a foreign country and actually living and doing schoolwork there seemed unreal to me. For that reason, I always wrote it off as something I wouldn't do...until freshman orienta-

“THERE WERE A LOT OF CULTURAL DIFFERENCES THAT YOU REALLY BEGAN TO NOTICE THE LONGER YOU STAYED THERE.”

tion. This was when the idea started to seem like a real possibility for me, when I was presented with all the different places and programs to study abroad. After that, I decided that I would definitely capitalize on the opportunity to study abroad.

I came upon the program Project Management at the University of Technology of Troyes (UTT) in France. After seeing the UTT program, I knew it was too good to pass up. Two classes would give me engineering credits and pre-planned weekend trips for a very reasonable price. It was almost too good to be true. I applied immediately and was accepted just as quick. I was going to France for the summer, and as it turns out, I was not going to regret it, even a little bit.

To begin, there was an enormous par-

ty for all the students at the university. This was the first chance to really get to know the people. Following that, we had a day at the lake, which was gorgeous. The next weekend was the adventure weekend in Evian (southern France), which is where people really began to bond and interact. This is the point from which the foundations for a lot of great friendships were formed. Subsequent trips included a trip around the Champagne-Ardenne Region, a weekend in Paris, a free weekend where many of us went to Amsterdam, and then the free week where many people did their own thing (a group of us went to Madrid, Barcelona, Nice and Monaco). Needless to say, each weekend was special and unique in some way, and each one saw people growing closer and closer together.

Classes were all taught in English, and they were on the topics of Project Management and French Civilization. For the most part they were interesting, albeit long (2 and 3 hours at a time, respectively), but they were informative and the professors were pretty awesome. Both turned out to be very group-oriented in the end and this presented no problems as everyone grew close. The classroom environment was light and not too serious or strict, so that relieved any stress people may have. Overall, the classes were great and educational.

There were a lot of cultural differences that you really began to notice the longer you stayed there. The ones that stick with me were the ones that were harder to adjust to, although there were a few things that would benefit our culture to adopt from theirs. I'll start with the former. Everything is closed for lunch, and did not open

for dinner until 7pm, and then closed by 9pm or 10pm every night; finally, nothing is open on Sundays. However, the trains in Europe are amazing and widespread. They are not too expensive and they get you where you need to be in a timely fashion. This is something the United States could really use. Also, people in Europe take a lot of time to relax and enjoy each other's company, whereas in the United States people are going full speed all the time. It was really nice to just be able to sit and relax without the pressure of needing to get something done or be somewhere immediately. As a whole, there was nothing too outrageously different between the two cultures, but there were smaller things that took some getting used to.

The host environment in Troyes, France was much quainter than that of a modern city, such as Paris. In Paris, it is almost like being back in the United States. In Troyes, it was much more laid back, as it is in a more rural area of France. Places closed by 10pm on weeknights and were not open on Sunday, and there were the French equivalent of "siestas" where businesses closed for lunch. English was also not as widespread throughout Troyes. Usually if you wanted to go somewhere, it was best to take along a friend who could speak conversational French. Otherwise you would probably end up with at least one weird look while you were out. People took their time, and this even extended to the UTT on the outskirts of town. The professors were very relaxed, lenient, and approachable. The students loved Americans and were just looking to make friends. On campus, people were willing to speak French or English, which was helpful.

I cannot possibly fit all the stories and experiences from this study abroad into a short

paper about my trip. There were so many priceless and meaningful opportunities presented to me over the course of this trip; how often do you get the chance to watch World Cup matches on a big screen with the Eiffel Tower dominating the background? I connected with people I never would have expected to, on levels I never would have guessed. Because of this trip I have stories to tell and friends who shared these same, awesome experiences. Some-

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thing that really stuck with me that was said at orientation and turned out to be so very true: you will come back and share all your amazing stories and experiences, and everyone will be happy to hear about them, but when it's all said and done, the only people that really, truly understand are the people who were there, sharing them with you. If I had the chance to go back and do it all over again, I would not change a thing. This trip was one of the best experiences of my life, and I would not have spent my summer any other way.

GOING TO GRAD SCHOOL VS. GETTING A JOB

BY CAITLIN STUCKEY

As many of us are preparing for the end of the semester and what comes next, a question many students face is, “Do I want to go to graduate school or do I want to get a job?” By the time senior year comes, some people have the mindset that they are done with school (Please no more all-nighters and problem sets!) whereas others have found a particular area of study which fascinates them to the point that they are excited about more school. Still, others are on the fence.

How do you come to the right conclusion? Not by reading this article. Even though I am going to list some common pros and cons for each, this decision is hugely personal and should be made by you based on many factors of which only you can understand and weigh. If you are unsure I urge you to get information from both sides. Talk with current grad students, faculty, business people, or an advisor with industry experience to get both sides of the story. Also talk with family and friends if you are really bothered and need to bounce ideas around. Then think hard about what you want understanding that either way you are looking at 1-5 years of your life. Finally, take a deep breath. Everything will work out in the end.

In comparing the two options I have compiled a simple pro and con list. I hope this helps in your decision process, either way congratulations on coming this far and good luck in the future!

	<u>Pros</u>	<u>Cons</u>
Graduate School	<ul style="list-style-type: none">• Further your education and expand skill set• Higher salary after school• Still be a student• Job market is still not very good• Research opportunities• Want to become a Professor	<ul style="list-style-type: none">• \$\$\$\$ (unless you have funding or scholarships)• Huge time commitment• Don't make a lot of \$\$\$ during school• Difficult to get funding• May enter workforce “over qualified”
Job	<ul style="list-style-type: none">• Established work schedule with free nights• Make \$\$\$, and are able to pay off debt• Learn valuable skills and experience• Some employers will pay for or help pay for a graduate degree after working for a set amount of time	<ul style="list-style-type: none">• You have major responsibilities• Most jobs require you to be at work for a specific amount of time• Might have to relocate• New people and places

MICHIGAN ENGINEERING CONSULTING CLUB

BY: KEVIN PAPAK

There are many students in IOE who still have no idea what they want to do. You've had a lot of ideas including supply chain, operations, and consulting. That's okay, believe me because like me, many others were like you. I do, however, have one simple recommendation. Join the Michigan Engineering Consulting Club.

I say this for several reasons. Whether you want to go into consulting or not, MECC offers the unique opportunity to work with real companies to solve real problems by applying the skills and knowledge that you have learned in your courses so far at the University of Michigan. There are 8 projects each semester and usually a couple of them are extremely IOE based. I am currently working with a company that recycles used cell phones and we are helping to improve their process flow by using time studies to try to understand the factors that could be adding variance to their process. I am getting hands-on experience in both a consulting and operations environment. This is a great way to help you figure out what you want to do in the future.

Another reason I say you should join is because other companies love it. Being able to put MECC on your resume and talk about the real-world work you have done is invaluable. I have literally talked about it in every single one of my interviews and the interviewer always seems impressed. Companies love hearing that you worked for a real company and came up with real deliverables throughout the semester while following a timeline. MECC also gives you the opportunity to take a leadership role and become a project manager, senior project advisor, or a member of the executive board.

My point is that there really is no reason not to try to join MECC. It will help you understand many different job roles, including jobs outside consulting. It has greatly influenced what I want to do when I graduate. Also, whether you are interested in consulting or not, it looks great on your resume and will help you grow as an individual and professional.