



IIE PICNIC FALL 2014

San Jose State University: Institute of Industrial Engineers

January 2015

Welcome!

This is first official newsletter of San Jose State University's Institute of Industrial Engineers (IIE). The goal of this newsletter is to further inform our members of updates and opportunities within IIE and the Industrial and Systems Engineering (ISE) department. If there is a topic you would like to see in future newsletters, please email kelli.sum@sjsu.edu. In addition, visit our new website at www.sjsuiie.com. Thank you!

Following Content in Issue 1:

- Overview of senior projects
- Description of ISE 115 (Computer Integrated Manufacturing)
- Introduction of new ISE faculty
- Preview of an ISE student's internship experience
- Reflection on previous events in Fall 2014 semester

T-Shirt Design Contest Winner!

In mid-November, IIE members voted online for their favorite T-shirt design of the annual IIE T-shirt. The decision was close between four designs, but the winning design was created by Gabrielle Santiago. Thank you to those who submitted designs! The shirts have arrived and are available for pick-up in the IIE club room (ENGR 208). Each shirt costs \$10 and can be ordered by emailing the ISE president at nikideleon94@gmail.com.



Logo on the front of the T-shirt



Front of the T-shirt



Back of the T-shirt

In the Classroom

Overview of Senior Projects

As part of their graduation requirements, each ISE senior takes part in senior projects. The senior project class is split up into two parts, 195A and 195B, respectively. The 195A class gives students a taste of the 195B class, with emphasis on student projects only toward the latter end of the semester. The 195B class, on the other hand, is primarily project based and students begin working on their projects as early as the first week of the semester. Typically the 195A section is offered in the fall and the 195B section is offered in the spring. This year, however, both 195 sections are offered simultaneously. To give upcoming seniors and underclassmen a brief idea of the kinds of projects they might be working on, we have profiled the 195B class projects for the Fall 2014 semester. These four projects have either been completed or maybe continued by other students currently in the 195B class. The projects were conducted with a team of two to three people working on each project.

Bed Turnaround Time

Students worked with Kaiser Santa Clara to help minimize Bed Turnaround Time, which is the amount of time needed to get used rooms/beds clean and ready for new patients. Students analyzed the bed demand in comparison to the turnaround time and the existing staffing model, which includes factors such as the location assigned, the number of staff members, etc.

Multidisciplinary Rounding

For this project, students worked with Kaiser San Jose to try and implement multidisciplinary bedside rounds with the care team and patients in order to improve patient experience, hospital flow, and general care team coordination. Students analyzed the times for rounding and the roles of each of the three key players, that is, the doctor, the patient care coordinator, and the nurse.

Kitchen Staffing Models

In this project, students worked with Santa Clara Valley Medical Center to develop new staffing models for their kitchen, which is being moved from its current location to a new services building. New models are needed as the new kitchen is completely revamped from the old one, meaning the layout and the processes also change. Students helped analyze the current staff versus new needs, the different job roles and its corresponding rotation within each of the jobs, and also used simulation to model delivery with correct staffing.

Forms Inventory Analysis

Santa Clara Valley Medical Center uses an Electronic Health Record to keep an inventory of patient documents. Using an electronic record is important, as SCVMC is required to provide patient information, gain patient consent, and also document activities related to patient care. However, the inventory must be updated and revised due to conversion to electronic documentation. Students helped analyze their form inventory, determining the quantities of forms to store, which forms need to be stored in hard copy form, and more.

All in all, this is a short summary of the four projects that occurred during the fall semester. Each semester the projects vary so what is offered this semester may or may not be offered the following semester. Although brief, we hope that this gives students a better insight as they look forward to their senior year.

ISE 115 Computer Integrated Manufacturing

ISE 115 or Computer Integrated Manufacturing (CIM), taught by Dr. Hee-Man Bae during the spring semester, utilizes the CIM lab located in ENGR 194. Dr. Bae is a part-time instructor for the ISE department in his 13th year. He has a bachelor's & master's degree in Industrial Engineering, and obtained a PhD in operations research in 1975.

The CIM lab has seen improvements over the past summer. The ISE department has recently added a 6-axis robot, allowing the system to handle even more complex tasks. The entire manufacturing system has also improved communication between the robots and conveyors. Dr. Bae has also added input pallet rollers so interfacing with the system (i.e. introducing new pallets) is improved. The CIM system has also added more vision cameras to give the system more points in which it can recognize pallet barcodes or individual objects. Lastly, sensors have been added to replace the plexiglass enclosure the Selective Compliance Assembly Robot Arm (SCARA) robot previously had for safety. Overall, the added components have increased the CIM lab's overall flexibility in handling various manufacturing tasks.

*Still curious about upper division ISE courses or ISE major? If you are a freshman or sophomore ISE student, sign up for the **IIE Peer Mentoring Program** to be matched up with a senior or junior ISE student as a mentorship to discuss and answer any questions or concerns you may have about the ISE major or required courses. It is a great opportunity to hear from someone with experience in the same major! Email nikideleong4@gmail.com if interested!*

Welcome SJSU ISE's New Faculty!

Dr. Ayca Erdogan



1. Describe your educational background.

I received my undergraduate and master's degrees in Industrial Engineering from Istanbul Technical University. Then I received my PhD in Operations Research from North Carolina State University.

2. Describe your work prior to obtaining your position at SJSU.

After obtaining my PhD, I worked more than 2 years as a postdoctoral research fellow at Stanford University School of Medicine. I also worked as a Visiting Assistant Professor for a semester at University of Southern California's Epstein Department of Industrial and Systems Engineering.

3. Describe the projects you have worked on in the past.

During my master's degree, I worked on analyzing the risk management strategies of the suppliers of the companies. It involved preparing surveys and statistical analysis of data. It was conducted right after a big earthquake in Turkey and also during a financial crisis. So, different risk areas were included to investigate how companies manage their risk. My PhD research involved developing stochastic optimization algorithms for scheduling customer appointments (or patients) for systems when there is uncertainty in arrival and demand, as well as uncertainty in service durations. The objective was to minimize customer waiting while competing

criteria of minimizing the server idle time and overtime.

My postdoc work was quite different than the previous ISE related projects I worked on. I applied statistical analysis and simulation techniques to model lung cancer progression of individuals with different risk levels due to their smoking behavior. The objective was to find the optimum screening age limits for heavy smokers to minimize lung cancer related deaths.

4. Describe the project(s) you are currently working on.

I am still working on projects that are a continuation of my PhD work and postdoctoral work. I am interested in applying stochastic programming methods to improve service systems performance. I am also interested in modeling chronic disease behavior -using available data- to develop decision making rules.

Dr. Dan Nathan-Roberts



1. Describe your educational background.

Dr. Nathan-Roberts received his bachelor's degree in Mechanical Engineering from University of Rochester. He received his master's and Ph.D. in Industrial and Operations Engineering from University of Michigan.

2. What is your current research?

Dr. Nathan-Roberts focuses on patient-centered healthcare outside of the hospital setting. He considers simple activities, such as biking to work or shopping at a local farmer's market, as integral parts of an overall healthcare plan. Therefore, his research is about applying ergonomics to the design of the home environment to increase non-hospital health care. He aims to answer the question, "How can we improve health overall by making the whole system more attractive to users"?

3. What advice would you give to current engineering students?

Dr. Nathan-Roberts believes graduates will endure a transition from a student, whose time may not be highly valued, to an engineer, whose time will most likely become a premium asset. The graduates will possess incredible skills offer to a community and industry. Therefore, majority of the time that you commit to your passions now will be of great importance further on.

4. Why did you choose to teach at SJSU?

Dr. Nathan-Roberts believes the impact that SJSU students have is profound in the area. In addition, the Human Factors program at SJSU is incredibly strong. He enjoys teaching students that are going to make a difference in the industry. As a native to the Bay Area, he feels a sense of pride giving back to the community by teaching in the same area he grew up in.

5. What are your interests or hobbies?

In Dr. Nathan-Roberts's spare time, he enjoys cooking, spending time with family and friends, and traveling.

Thank you to Dr. Erdogan and Dr. Nathan-Roberts for answering our questions! SJSU IIE would like to give you a warm welcome to the SJSU community.

An ISE Student's Internship Experience

Rebecca Mantecon is currently a final year graduate student in Industrial and Systems Engineering (ISE) with a specialization in Healthcare. She got her bachelor's degree in Industrial Engineering (IE) from SJSU and was also an officer in the Institute of Industrial Engineers (IIE) Club. She is currently a teaching associate for the undergraduate senior project courses along with Dr. Freund. Her project experiences and leadership background was the reason why we chose her as a candidate for this interview.

Could you briefly describe what your job description or what your internship was about, where it took place?

Healthcare Systems Engineering Institute (HSyE)—Northeastern University—Boston, MA

What made you choose this particular internship in comparison to other offers you may have received?

This internship offered an educational base for healthcare systems engineering and exposure to engineering in healthcare.

Did your prior experiences/projects inform your decision to be a part of this internship?

Yes, my Master's specialty area is in Healthcare and Dr. Freund introduced me to Dr. Benneyan, the institute's founder, and they both thought it would be a good fit for me

Did any of your previous project/work experience carry over into this internship?

A project that I started for a Graduate class and morphed into a senior project for ISE 195 B, Patient Flow at Santa Clara Valley Medical Center (SCVMC), gave me some insight into my main project on Emergency Department (ED) Admits because I was familiar with the general flow from the ED to being admitted to the hospital.

What was the first surprising moment or fact you came across during your first few weeks of your internship?

The size of their institute was much smaller than I anticipated, but their network of hospitals, other associates from outside the institute, and work-to-date were impressive

Why do you think Healthcare has emerged as a popular field for Industrial Engineers?

There are many techniques that have not yet been applied successfully to the healthcare

field. There are many challenges within healthcare that could use the help of such ISE techniques.

What were some projects that you worked on during the course of your internship? If you only worked on one project, could please describe it?

The main project I worked on was patient flow through the hospital starting at the ED. ED admits were analyzed through their admit units for length of stay, arrival times, and more. A few of the secondary projects I was involved in were about Chronic Obstructive Pulmonary Disease (COPD) and how Multi-Disciplinary Rounding (MDR) affects patient care, infusion chair usage/ optimization at a cancer center, and facility location optimization for a home dialysis company.

What type of setbacks or challenges did you come across and how did you resolve them?

One major setback was the data collection for the COPD project because HSyE and the hospital were still defining metrics on which they would measure progress or success. The other challenge of only working there for the summer was starting a project or only hearing the beginning of the project and not getting to help much outside of project definition.

What was one particular area or skill that you felt if you had more experience in you might have been able to solve any problems that were present?

If I had more clinical experience, the MDR/COPD project would have been a bit easier to understand and defining metrics would have been easier. For the network optimization project, I felt I needed more experience in both supply chain and operations research, both of which courses I am currently taking at the Graduate level.

What specific IE tools and or concepts were you able to apply in your work?

Statistical analysis helped me organize the large data set for patient flow from the ED through the hospital. Project management and teamwork skills also helped for all the interns to be able to structure, plan and execute projects.

Did you learn new ways to use these tools or concepts that were previously unknown to you?

Being surrounded by others working on healthcare projects and research really helped me to think in the same way. It was second nature for everyone to apply IE techniques to healthcare related problems, so just seeing how the different methods can be applied solidified things I had only previously heard about.

Were there any aspects that you did not enjoy as a part of the internship?

Having to work in only Boston area hospitals was the main negative aspect. By this I mean that I was not able to help my "local" hospitals, but had new contacts to work with and may not be in touch with our site connections in the future.

What advice and or recommendations would you make to upcoming IE who would like to get into healthcare?

Explore your options, see how else you can apply IE knowledge, and do what you want to be doing.

If you were offered a fulltime position from the organization or company where you did your internship, would you accept the offer and why? If the answer is no, then why not?

I would not accept because it is a very small organization on the other side of the country. But if a similar opportunity arose in the Bay Area, I would be more likely to accept.

If there are any other elements or specific experiences that were a part of your internship that you would like to share in order to summarize your internship, please state them here.

They are always looking for summer interns, especially now that their organization is expanding. I would definitely suggest this opportunity for anyone considering working in the healthcare field!

Thank you to Rebecca for sharing your internship experience!

If you have an internship experience you would like to share on an upcoming IIE newsletter issue, please email kelli.sum@sjsu.edu.

IIE Events of Fall Semester 2014



IIE Events of Fall Semester 2014



We wish you the best in the year of 2015! Please visit www.sjsuiie.com for information about upcoming events. Good luck with the new semester!

-IIE Officers