

The Jacobs Institute Newsletter

A Dose of Medical Innovation

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Welcome! The Jacobs Institute newsletter is where to find information on our recent and upcoming programs with industry, schools, and more.

This newsletter issue focuses on the many educational outreach programs that JI hosts in conjunction with various University at Buffalo (UB) programs to influence a diverse array of Western New York's high school students interested in science and medicine.



It also highlights our Summer Internship Program, which included two UB students making an impact on health care in WNY.

Science & Technology Enrichment Program (STEP)

STEP in the Jacobs Institute

On July 21, JI was proud to host approximately 25 students from UB's Science and Technology Enrichment Program (STEP) for a Brain Boot Camp. The students ranged in age from seventh to twelfth grade. The UB STEP program is designed to expose minority and disadvantaged youth to a variety of educational and enrichment activities that prepare them for college and professional careers.



Jl's Boot Camp highlights-among other things-the many career opportunities available for students interested in health care and science. We emphasize that there are opportunities aplenty, in a variety of fields that exist in the health care ecosystem on the campus. Doctors and nurses are integral. Jl lets students know that dieticians, physical and occupational therapists, hospital administrators, biomedical engineers, medical illustrators, communicators, and facility managers also keep the hospital going strong.

Students also enhanced their understanding of the different parts of the brain, what endovascular surgery is, and how it is used to treat heart attack and stroke in our community.

BEAM Program

BEAM Up in the Jl

Twenty high school girls from UB's Buffalo Engineering Awareness for Minorities (BEAM) program came to the Jl on August 7.



The girls spent time with Karen Meess, a biomedical engineer, to learn about surgical interventions to treat stroke and aneurysm, the tools designed by engineers, the devices used by surgeons, and more.

They also had the opportunity to watch a pre-recorded surgery where a surgeon opened the carotid artery in the neck and removed plaque. Karen talked the students through the surgery, explaining what the surgeon was doing step by step.

The students came from different area high schools, stopping at the Jacobs Institute during their one-week program to educate them about what's happening on the medical campus and other Buffalo locations in science, medicine, and engineering.

Camp Neuro

UB Medical School Students Coordinate Student Visitors to Jl



On July 29, JI partnered with UB medical school students to host "Camp Neuro", which is hosted in 18 cities across the U.S. by local medical school students.

The program is a lively introduction for high school students interested in exploring a career in medicine or psychology. It is a one-week summer day camp that provides an insider's view of health care careers relating to the brain. Nineteen students from WNY-area high schools came to the JI to learn about heart attack and stroke, as well as their symptoms and treatments.

From both public and private high schools, the students also saw a real human brain and learned about a few of the pathologies of the brain from the medical students. Students also tried their hands at treating a stroke and an aneurysm case on the Mentice medical simulator.

Along with watching a recorded carotid endarterectomy procedure, the group also visited laboratories upstairs in UB's Clinical and Translational Research Center. Nicola Bertolino, an MRI physicist working on the 7th floor, showed the high school students and medical school students a CT scanner and MRI machine while explaining the differences.

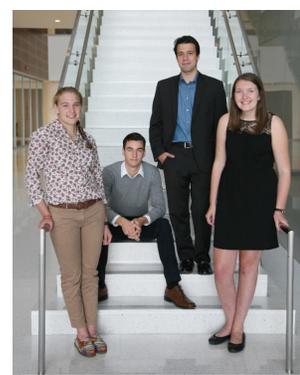
They also had the opportunity to see a Stratasys 3D printer, along with a 3D-printed heart and brain blood vessels while visiting the 8th floor's Toshiba Stroke and Vascular Research Center (TSVRC).

Finally, the area high school students had lunch and attended a career panel, featuring a neurology resident, a registered nurse, and a CT technician. This helped them to better understand the health care ecosystem of the hospital environment.

2015 Summer Internship Program

(3 e + 1 HS) JI / 8 weeks = ??

What can three engineers plus a high school student, powered by the Jacobs Institute, accomplish over eight weeks? The answer: health care innovation. The JI is proud of the way that four summer interns directly impacted patient care and medical technology.

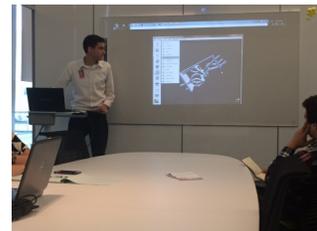


The interns' presented their final projects on July 24, before an audience of more than 60 people from the Buffalo community, including members of Dr. Lawrence Jacob's family, UB faculty, industry partners, physicians, and Gates Vascular Institute staff.

Please watch a recording of the presentations here: bit.ly/1JVWpqF

Ryan Hubbell, a Buffalo native and rising senior at UB, used specialized computer software to convert de-identified patient files into files more easily uploaded into the Mentice VIST-LAB medical simulator.

He gained hands-on experience in sophisticated computer programs, the likes of which are used by senior engineers in the medical device industry. Ultimately, Ryan's work laid the foundation for surgeons, medical school students, and industry staff to practice surgery on patient-specific cases on JI's in-house Mentice medical simulator.



Emily Ludwig, an East Amherst resident and rising junior at Case Western Reserve University, learned how to perform cardiac surgery and neurosurgery cases on the Mentice so she could work with the physicians to gain their feedback on how realistic it is compared to actual surgery. She catalogued the feedback and will share with Mentice how they could improve their product and the simulation experience. During Emily's presentation, she attempted to perform a transeptal puncture, which allowed attendees to see the Mentice in action



Rick Izzo, who graduated UB in May and is also a native Buffalonian, worked with doctors, UB researchers, and a manufacturer of 3D printers to print a 3D model of a WNY resident's heart. The printed heart will help the surgeon devise the best surgical approach for the patient's complex heart valve replacement case. The patient is unable to undergo open-heart surgery. Therefore, a minimally-invasive surgery is her only hope. A 3D version of the heart will give the surgeon a more realistic view of the patient's anatomy than a 2D image does. Now the doctor can practice his

plan for the minimally-invasive surgery on the 3D printed heart as many times as he needs to before undertaking the actual procedure.



Clearly, health care innovation by engineering students is possible when powered by and partnered with the right people. Jacobs Institute offers these strategic tools and relationships--with UB and Kaleida Health--to our summer interns. JI gives them the resources to be successful, which will ultimately benefit patients' lives.

The eight-week program lives up to its motto of "an internship unlike any other". It provides students with the opportunity to develop leadership skills, be self-directed, improve interpersonal skills, and gain hands-on experiential learning.

In addition to their ground-breaking biomedical engineering projects, the interns were also tasked with developing a more robust JI educational outreach program and assisting in finding community support for our efforts. This includes programs for school children, as well as the Summer Internship Program.



They worked with Samantha Lazar, a rising junior at Nichols School, to see how our Brain Boot Camp program for high school students could be more compelling and understandable. Samantha developed a module for Understanding Heart Attack and Stroke, to be used for the more than 400 students who are expected to visit the Jacobs Institute in the 2015/2016 school year.

This is the second year that the JI hosted a summer internship program. When JI posted a general internship in December of 2014 for this summer, ninety percent of the applications came from biomedical engineers. Applicants came from area schools, as well as some from out-of-state. It was an impressive batch of applicants from which we selected three talented biomedical engineering students. Two out of the three students were selected from University at Buffalo's strong biomedical engineering program and all were native Buffalonians. Clearly, the rigorous screening process yielded a group of interns that maximized the tools and connections that JI provided.

Clinical Immersion at the JI

The JI has continued to expand the types of clinical immersion programs that it offers to its industry partners.

The JI held its first clinical immersion program in the electrophysiology space in June. JI hosted a group of 10 senior management and 8 sales and marketing staff from a large medical device company for a two-day heart failure program.

The program included the opportunity to observe Dr. Chee Kim perform a biventricular pacing and defibrillation procedure, to work with Dr. Kim on several procedures on the Mentice endovascular simulator, and to carry out ventricular cardiac pacing and ablation procedure on models. One of the participants reported that, "Nothing was rushed. It is difficult to absorb information when it is too rushed. Everyone had a chance to get on simulators and models."

The participants also heard lectures on heart failure management and the economics around an implantable cardiac monitoring device, as well as a presentation on cardiac mapping.



They found that Dr. Kim was very accessible and said that it was "great to get his perspective and have the opportunity to bounce things off him real time given his knowledge and experience". This reinforces the value that JI provides to industry.

More recently, the JI held a 3-day training course for a group of advanced sales and R&D staff from a major medical device company. The participants found that the multidisciplinary nature of the program, which allowed company engineers to connect with sales reps, was valuable and built relationships that will continue to be important in the future.

This fall, the JI has a packed training calendar with physician proctorships and several clinical immersion programs for engineers and sales reps already booked for our industry clients.

The Jacobs Institute mission is to create the next generation of medical technology to improve the treatment of vascular diseases--such as heart attack and stroke--in Western New York and beyond.

The institute was named in memory of the late Lawrence D. Jacobs, MD. Located in the heart of the Buffalo Niagara Medical Campus (BNMC) in downtown Buffalo, the Jacobs Institute is positioned between University at Buffalo's Clinical and Translational Research Center (CTRC) and Kaleida Health's Gates Vascular Institute (GVI).



As such, the Jacobs Institute is uniquely positioned to foster collaborations of the best minds and collisions of new ideas.

We invite you to **come innovate with us, where ideas improve lives.**

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