

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 events, industry relationships, school programs, and more.

Jl Selected as Site for Upstate Revitalization Tour

Gov. Cuomo Showcases Economic Development Plan



Jl was one of three sites selected to showcase Governor Cuomo's economic development plan to revive New York on August 11. Along with Solar City and Buffalo Manufacturing Works, 90 visitors from the Governor's Upstate Revitalization Initiative conference--including Lieutenant Governor Kathy Hochul-

-visited JI to learn how we are leveraging our economic development grant.

A news story on the visit can be found here:

<http://www.twcnews.com/nys/buffalo/news/2015/08/11/buffalo-model-for-upstate-economic-development.html>

JI Impacts WNY Heart Valve Replacement Patient

3D Printing Helps Doctor Plan Surgery

JI's role as convener and collaborator means we can unite researchers and clinicians to have an impact on patient care in Western New York. On August 26, JI's potential became a reality



when a patient underwent the Gates Vascular Institute's (GVI's) first native vessel transcatheter mitral heart valve replacement by Vijay Iyer, MD, PhD, FACC, FSCAI, Director of Structural Heart Intervention for Kaleida Health. The surgery was efficacious owed to Dr. Iyer's ability to practice on and plan for the surgery using a 3D-printed plastic model of the patient's heart.

The 3D printed heart model was available to Dr. Iyer because one of JI's summer interns, Rick Izzo, had wanted to create one for his summer project. Rather than print a generic heart, Rick worked with GVI staff to find an actual, challenging surgical case that would benefit from 3D modeling and surgical planning. Rick consulted Rose Hansen, RN, PhD, Valve Coordinator for GVI's Structural Heart Program, who identified the patient who was not a candidate for open heart surgery but required a mitral heart valve replacement.

This particular case, done in this fashion, is not typically done in the United States. The first-in-human native vessel transcatheter mitral valve replacements (TMVR) were carried out in Europe in 2012 and the United States in 2013 using off-label valves approved for use in transcatheter aortic valve replacement (TAVR) procedures. TMVR faces a number of challenges

due to the complex nature of the mitral valve. Dr. Hansen said that valve visualization is complex with existing medical imaging technologies, so the 3D model allowed the team to better understand the anatomy and formation of the heart and valves.



Rick worked with Chip Ionita, PhD, from UB's Toshiba Stroke and Vascular Research Center (TSVRC) on the 8th floor of UB's Clinical and Translational Research Center (CTRC). He also worked with Stratasys, an Israeli-based company which manufactures 3D printing equipment and materials that create physical objects directly from digital data. Stratasys offered to print a multi-material 3D heart model that would serve as a more realistic replica on which Dr. Iyer could practice and hook up a flow pump to simulate an actual beating heart.

Hours before the surgery, Dr. Iyer, Dr. Hansen, Dr. Ionita, Rick, and JI staff, along with a surgeon from Italy practiced the surgery on the 3D printed heart, in the TSVRC.



Practicing on the model helped Dr.

Iyer determine his approach and anticipate complications and develop a plan to address those, as well.

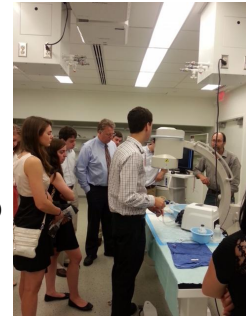
The patient underwent the minimally-invasive valve replacement surgery as well as ablation, which removes problematic heart tissue. The success of the surgical planning process using 3D modeling is evidence that UB and Kaleida, along with an industry partner such as Stratasys, can unite around the JI mission to improve treatment of vascular disease in WNY, one patient at a time. JI's strategic relationships with UB's CTRC and Kaleida Health's GVI facilitated a more informed surgical plan for a complex cardiac surgery. This translated into a better chance at improving the quality of life for the patient, who had no other surgical options available.

The JI-assembled team from the university, hospital, industry, and JI staff rallied around the patient to provide the best possible treatment in a challenging circumstance, paving the way for future cutting-edge treatments and surgical planning

From University of Rochester to Buffalo

Biomedical Engineering Students Get Hands-On Experience

On August 25, 22 undergraduate and graduate biomedical engineering students from the University of Rochester visited the Jacobs Institute. They learned more about the role that biomedical engineering plays in our medical innovation process, physician training, and more. One of our summer interns who is a University at Buffalo senior in biomedical engineering, spoke to the students and showed them one of the lab facilities which was set up just for them. The students had a hands-on learning opportunity, trying to use catheter wires to access an aneurysm in a 3D printed model of brain blood vessels. They asked about material properties of the 3D model and other ways JI uses such models. The students also practiced a surgery on the Mentice medical simulator.



Buffalo Prep Tours the JI

BNMC Brings Students Around Campus

Coordinated by the Buffalo Niagara Medical Campus, Buffalo Prep spent August 21 touring the entire campus including a visit to the JI. Students visited UB's Center for Excellence in Bioinformatics and Life Sciences, Roswell Park's Center for Genetics and Pharmacology, Hauptman-Woodward Institute, DiG and the Innovation Center before arriving at our offices.



Once here, the students learned about heart attack and stroke, the brain, medical simulation, and 3D printing use in medicine. The students also learned about the career paths of some of the diverse individuals who work in the Jacobs Institute.

Jl Engineering Clinical Immersion Program (ECIP)

Three Days of Valuable Learning for Industry Engineers

Eight industry engineers flew from California to Buffalo in mid-September to attend the JI's second three-day engineering Clinical Immersion Program. The program allows participants to better visualize the clinical environment in which their products are used, which can lead to new and better products. During the program the engineers observed neuroendovascular procedures in the catheterization labs and neurosurgical cases in the operating rooms. They also had the opportunity to watch live cases broadcast to the JI's board room. Individual participant teams also observed the stroke team respond to stroke calls in the Emergency Department (ED). Dr. Adnan Siddiqui and Dr. Kenneth Snyder provided educational sessions on neurovascular diseases, diagnostic procedures and treatments, and--together with their endovascular fellows--trained attendees to deploy devices on 3D printed vascular flow models.



According to one participant, one of the most valuable parts of the program was the direct physician interaction. He said "when physicians come to our company, they spend time with senior management and with marketing and only briefly check in with the R&D engineers. Correctly identifying user needs is one of our weaknesses as we have so little direct interaction and often rely on marketing to indirectly translate physician feedback to us."

JI continues to provide value to industry and bring them back for additional programming. The next JI engineering CIP is planned for November.

Visitors to the JI

The JI works to educate broader constituencies about vascular disease and treatments and to raise the profile of the GVI and UB by coordinating visits from physicians, government entities, industry executives, and others. Dr. Martijn Meuwissen, an interventional cardiologist from the Netherlands, spent a week at the JI in August shadowing the GVI's stroke program to learn best practices to take back to his hospital to inform patient care there.

Four New York State senators--including NY State Senate Majority Leader John Flanagan--stopped by in August to learn more about the JI's activities and to see the audio-video capabilities in action. The other



senators on the tour were Patrick Gallivan, Catherine Yang, and Michael Ranzenhofer.

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, while also contributing to local job creation.

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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