

The Jacobs Institute Newsletter

A Monthly Dose of Medical Innovation

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Issue: #8

June 2016



Welcome! The Jacobs Institute newsletter is where to find the latest information on our recent and upcoming industry programs, experiential learning opportunities, and community outreach events.

Jl-Stratasys 3D Printing Partnership Launched

Jl is Designated as Stratasys 3D Printing Center of Excellence in Health Care

On April 26th, the Jacobs Institute (JI) and Stratasys, an international 3D printing and additive manufacturing solutions company, announced the designation of the JI as the first of its kind Stratasys 3D Printing Center of Excellence in Healthcare. The JI is leveraging Stratasys' printing technology to create lifelike 3D-printed vascular flow models created from actual patient CT scans that can be used to train medical personnel, test medical devices, and help physicians plan complicated endovascular procedures. Endovascular procedures use the body's blood vessels as the conduits through which medical devices are delivered to the heart or brain. Stratasys, in turn, will gain valuable clinical and engineering feedback about its printers and materials.



The JI and Stratasys held a press briefing that included an eight-person discussion panel comprised of Bill Maggio, JI CEO; Nick Hopkins, JI founder and chief scientific officer; Adnan Siddiqui, JI chief medical officer; Mike Springer, JI director of operations and entrepreneurship; Vijay Iyer, MD, PhD, FACC, FSCAI, associate professor, UB's Jacobs School of Medicine and Biomedical Sciences; Scott Rader, general manager, Medical Solutions, Stratasys; Ciprian Ionita, PhD, research assistant professor, biomedical engineering and neurosurgery, UB;

Charles F. Kreiner, Jr., president, Board of Directors, James H. Cummings Foundation. The panel was followed by live demonstrations showing the different ways that the JI and its partners use the models. Dr. Siddiqui demonstrated how the models are used to test devices and conduct research. Dr. Iyer and Dr. Rose Hansen, valve coordinator, Gates Vascular Institute, Kaleida Health, discussed how the GVI's structural heart team has used 3D-printed heart models to prepare for transcatheter valve replacements. Pam Marcucci, JI director of program development and outreach, showed how the JI uses the models to train physicians and educate students and other constituencies.



The Jacobs Institute was able to leverage generous grant support from the James H. Cummings Foundation to obtain the Stratasys Connex 3 500 printer as part of its partnership with Stratasys. The new multi-material printer will allow it to create even more lifelike models.

The JI received much press coverage on local and national news and online news. A few key links are included here:

The Buffalo News: <http://www.buffalonews.com/city-region/jacobs-institute-stratasys-partner-to-advance-medical-uses-of-3d-printing-20160425>

WIVB: <http://wivb.com/2016/04/26/partnerships-helps-jacobs-institute-be-on-the-cutting-edge-of-3d-technology>

Time Warner Cable

News: <http://www.twcnews.com/nys/buffalo/news/2016/04/26/how-3d-printing-is-dramatically-changing-local-healthcare.html>

Yahoo Finance: <http://finance.yahoo.com/news/jacobs-institute-partners-stratasys-center-123000669.html>

Jacobs Institute Exhibit at NY 'State of the State'

Showcase Economic Development in WNY

The Jacobs Institute was invited to exhibit at Governor Cuomo's State of the State address in January. The JI was asked to represent the Western New York projects funded by the Regional Economic Development Council. The focus for the exhibits, comprised of 9 other regions in NYS, was on technology and innovation. The JI was



represented by Pam Marcucci, director of program development & outreach; Allison Kupferman, manager of communications & outreach; and Karen Meess, biomedical engineer, JI/CUBRC.

The JI exhibited alongside a 43North winner, Solar City, Buffalo Manufacturing Works, and Roswell Park Cancer Institute. The WNY delegation was fortunate to be located close to the entrance for the State of the State and we had many visitors to our table. The JI expressed its gratitude for NY State funding and touted Buffalo as undergoing a technology and innovation resurgence, with the Jacobs Institute directly impacting patient lives. The JI showcased Mentice medical simulation technology, as well as 3D printed brain artery and cardiac artery models. We discussed how we use these 3D printed models for physician training, surgical

planning, and medical device testing. JI staff also talked about the Idea to Reality (i2R) Center as a proof-of-concept center that will vet ideas for endovascular devices and spark entrepreneurship.

The exhibit was a worthwhile venture. JI staff met Buffalo Mayor Byron Brown, State Senator Marc Panepinto, along with other State Legislature staff, Empire State Development staff, members of the public, the rest of the WNY delegation, and more.

Training Future Physicians

Resident Simulation Program

Elad Levy, MD, MBA, FACS, FAHA, medical director of neuroendovascular services at the GVI and chair, department of neurosurgery at the Jacobs School of Medicine and Biomedical Sciences at the University at Buffalo (UB), and Bernard Bendok, MD, MSCI, FAANS,



FACS, professor and chairman, department of neurosurgery, Mayo Clinic, along with the Jacobs Institute, held a one day Resident Simulation Program in January that was endorsed by the Congress of Neurological Surgeons (CNS) and supported with an education grant from Medtronic. Eleven neurosurgery residents came from eight residency programs around the country to carry out advanced neuroendovascular procedures and deploy medical devices in a simulated environment that is second only to a catheter laboratory. Other program faculty included Adnan Siddiqui, MD, PhD, FACS, FAHA, FAANS, chief medical officer, Jacobs Institute and vice chair and professor of neurosurgery at UB's Jacobs School of Medicine and Biomedical Sciences, Kenneth Snyder, MD, PhD, assistant professor of neurosurgery, radiology, and neurology at UB's Jacobs School of Medicine and Biomedical Sciences, and Erol Veznedaroglu, MD, FACS, FAANS, FAHA, Professor, Director, Drexel Neuroscience Institute, Robert A. Groff Chair, Drexel University for this first-ever residency course.

The course was conceived of by Dr. Levy given growing recognition that the types of neuroendovascular procedures being done today require training beyond the traditional Halsted method of "see one, do one, teach one". They require this because they are technically challenging and are done in an



environment - primary blood vessels - where mistakes can lead to catastrophic patient outcomes including death. Because of their complexity, new training methods are required to ensure that physicians performing their first procedures on patients have the skills required to do so safely and effectively.

Training methods involving simulation offer the opportunity for residents to train in a safe and realistic learning environment. There is growing evidence that simulation, whether on virtual reality simulators or on vascular models, can increase technical and procedural performance before residents are allowed to touch patients.

The Resident Simulation program at the JI was a pilot to explore the use of simulation in resident training. The program aimed to provide the

participating residents with:

- An enhanced knowledge of advanced neuroendovascular techniques, the steps involved in the procedures covered by the course, and the device decision that are made in each
- A better understanding of the circumstances under which particular endovascular treatments may be superior to open surgery
- The ability to carry out advanced cases on the endovascular simulators and 3D printed vascular flow models

The program combined interactive lectures with observation of live neuro endovascular procedures broadcast from the cath lab to the JI board room and the opportunity for the participating residents to treat stroke and aneurysm cases themselves on the Mentice endovascular simulator and the 3D printed vascular flow models under the guidance of the course faculty.

Feedback from the participants suggests that the program was successful in meeting its aims and in creating a learning methodology that can be improved and expanded. The JI looks forward to hosting more of these programs in the future.

Kicking off Summer Internship Program

A Summer Like No Other



The JI 2016 summer internship program began this week! After an amazing internship application process, it has finally come to a close. It was a competitive year. The JI received 24 applications from 13 universities. That is an increase from nine applications last year from six universities. The majority were biomedical engineers, but we also opened applications up to biology/pre-med, communications, and videography students this year. We selected 4 stellar students.

- Jacob Caldwell, biomedical engineer, University at Buffalo
- Noah Horan, biochemistry/video, SUNY Geneseo
- Adam Killeen, biomedical engineer, Purdue University
- Jillian Senko, biomedical engineer, Wentworth Institute of Technology

Ryan Hubbell, from the 2015 internship class, will also be here this summer as a Fellow through UB's Western New York Prosperity Fellowship Program, which is sponsored by the Prentice Family Foundation.

The internship will run June 1-July 29, with the final presentation taking place on Friday, July 29, 2:00pm-4:00pm across the hallway from the JI in

UB's Clinical & Translational Research Center, Room 5019 A+B. The interns will complete individual projects, participate in lunch n' learn events with various speakers, and tour other BNMC institutions including Buffalo Manufacturing Works, Unyts, and the University at Buffalo's Center of Excellence in Bioinformatics and Life Sciences.

The JI will also welcome seven high school students for a four-week internship program in the month of July. The students will participate in lunch n' learn events and tours, conduct individual research projects, and create individual TED talks.

Boot Camps Get A Boost

Buffalo Public School Students Meet Entrepreneurs

The JI has hosted Brain Boot Camp, a program designed to educate middle and high school students about heart attack and stroke, for about two years. Our goal is to educate all students in Buffalo. As such, JI staff reached out to the career and technical education office for Buffalo Public Schools.

Since then, the JI has hosted three successful boot camps for over fifty of P.S. 197 Math Science Technical Preparatory high school sophomores and middle school students with an interest in medicine and science.



The program also had an entrepreneurship component. The JI worked with 43North to have entrepreneurs talk to the students about their career paths and their start-up business models. The students found the speakers and topics interesting and asked many questions. The 43North winning companies that presented to students were Talk-It,

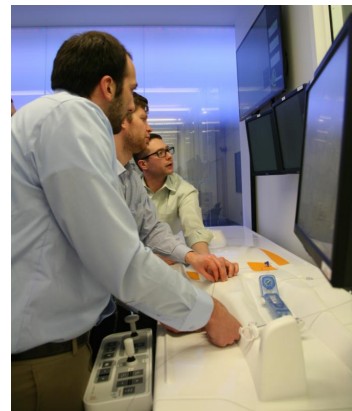
Clean Slate, and Infonaut. Infonaut did the "marshmallow challenge" with the students, breaking them into teams and giving them 10 minutes to construct the tallest tower out of raw spaghetti, masking tape, string, and one large marshmallow. The kids worked well together and there was a team of 10th grade girls who won the challenge. It was a fun, hands-on way to highlight collaboration and experimentation.



Hosting UB Medical Students

Hands-On Experience for Future Doctors

The JI also organized two programs for interested first- and second-year medical students in March together with UB's medical student neurosurgical interest group. The programs aimed to provide the students with information about neurosurgical residency programs and about the treatment of cerebrovascular disease using endovascular procedures. The programs included a dinner lecture by a fifth year resident who is doing an enfolded neuroendovascular fellowship, Dr. Hakeem Shakir, followed by hands-on simulation opportunities on the Mentice endovascular simulator and the 3D-printed vascular flow models.



Beakers N' Beer

Networking Fun

The JI hosted Beakers N' Beer on behalf of the Buffalo Niagara Medical Campus on Thursday, April 21. Well over 100 people from on and off the medical campus came to see the JI, while networking and enjoying great food and drinks. Several guests had a chance to learn about the Mentice medical simulator from past JI intern, Rick Izzo. It was a fun night and also served to tell the community a little bit more about the JI.



Clinical Training Engineer Joins JI

Staff Continues to Grow

Rhys James joined the Jacobs Institute as Clinical Training Engineer for the JI. In this role, he directly supports all of the JI's industry and physician based training programs with specific emphasis on clinical simulation (Mentice and 3D printed vascular models).

Rhys is a native of Clarence, and returns to his WNY roots after studying and working in St. Louis. He worked as a software engineer associate for Accenture, a multinational consulting services company, in their St. Louis office. In this capacity, Rhys worked on client software development and testing, specifically creating custom, multi-use web page design templates. He also tested Accenture's custom-based software to identify room for performance-based improvement. His team's clients included Boeing and the United States Postal Service.



Rhys graduated from St. Louis University's Oliver L. Parks College of Engineering, Aviation and Technology with a bachelor's and master's degree in biomedical engineering, with a graduate assistantship scholarship. His area of research was in vascular biomechanics focusing on the connection between vessel wall stability and elastin. Rhys was one of the authors in a 2015 article published in the Journal of Mechanical Behavior of Biomedical Materials.

Outside of work, Rhys enjoys playing ice hockey and traveling. He has hiked around the southernmost bend of Iceland.

Students Flock to Buffalo Niagara Medical Campus

Hands-On Experience & Career Opportunities

The JI welcomed over 100 seventh through twelfth graders and their parents to three demonstration stations as part of the 'Picture Yourself on the Buffalo Niagara Medical Campus' event organized by the Buffalo Niagara Medical Campus (BNMC) and iSciWNY in April. The event, which lasted from 9AM

to 12PM, was designed to provide students with information about careers and internship opportunities in clinical care, research, education, and entrepreneurship in the hospitals, research, and other institutions located on the campus. The JI joined Roswell Park Cancer Institute, UB's Center of Excellence in Bioinformatics and Life Sciences, Kaleida Health's Gates Vascular Institute, Hauptman-Woodward Medical Research Institute, Unyts, and the BNMC, in creating hands-on stations to teach the students about the work that we do. JI staff discussed brain anatomy, viewed a recording of an invasive surgery to remove plaque build up from a patient's carotid artery, and taught the students to coil an aneurysm on the Mentice endovascular simulator.



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. We achieve this by fostering collaborations of researchers, physicians, entrepreneurs, and the medical device industry.

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).



We invite you to **come innovate with us.**

Please visit <http://www.jacobsinstitute.com>

Sincerely,The Jacobs Institute

