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## Visualizing New Possibilities in Vascular Surgery

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## Visualizing New Possibilities in Vascular Surgery

Dr. Lombardi

Assistant Professor Joseph Lombardi, MD is helping transform the treatment of Jefferson's vascular surgery patients. Since completing a vascular fellowship in 2003 at the University of Pennsylvania, Dr. Lombardi (JMC Class of 1996) has been practicing at Jefferson, stenting blockages and grafting aneurysms. This new and exciting field is called endovascular surgery, in which therapy is directed through catheters and wires within the blood vessels. The stents, which hold open the wall of the diseased vessel, along with endovascular grafts – fabric tubes used to make a new path for blood to flow – are placed inside a diseased vessel without traditional open surgery. This minimally invasive approach allows most patients to go home the same day.

Dr. Lombardi's main research interest involves diseases of the aorta. Aortic aneurysms can occur in the chest and/or abdomen, where a "bulge" develops in the vessel wall that can rupture and result in death if left untreated. Thoracic aortic dissection is a sudden event where the lining of the aorta tears, allowing blood to flow into the middle layer of the aorta, causing a cutoff of blood flow to vital organs. Endovascular surgery has revolutionized how these maladies are currently treated, and ongoing clinical trials look to improve minimally invasive options for these complex cases. Dr. Lombardi is the Global Principal Investigator of a multinational dissection study, sponsored by COOK Inc., to treat thoracic aortic dissection. This study, pending FDA approval, will explore procedures that cover the tear and support blood flow via a stent that holds the natural wall open. "This condition has plagued surgeons for decades," says Dr. Lombardi. "Acutely, the lining of the aorta is like wet tissue paper and is extremely hard to repair with open surgery, and if successful, the mortality rate is still about 50 percent." This new procedure offers many benefits without having to cut open the aorta itself.

**"This technology is critical to the planning of all aortic reconstructions done in the entire practice."**

Dr. Lombardi is also the director of a new aortic program at Jefferson, which combines vascular, cardiothoracic and cardiology expertise to evaluate patients with aneurysms and recommend the appropriate treatment. "The program makes it possible for patients with aortic disease to be thoroughly evaluated for all minimally invasive options and advanced clinical trials." Patients that are not eligible for

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such therapies can have traditional surgical approach.

Finally, Dr. Lombardi's office is the site of an exceptional piece of new technology: a three-dimensional TeraRecon workstation. The system, obtained in the spring of 2006, compiles CT scans and MRIs to create a composite image revealing layers of muscle, organ tissue and blood vessels. When preparing to do a stent graft for an aneurysm, Dr. Lombardi can examine the patient in this virtual sense with extreme precision to know exactly what to expect during the procedure. "Eighty percent of the surgery is done at this workstation beforehand," he explains, seated at his desk and rotating the vibrant, detailed images on the screen. "This technology is critical to the planning of all aortic reconstructions done in the entire practice," he says. "The procedures are becoming so sophisticated that detailed imaging and measurements are imperative to operative success."

An animation of a TeraRecon 3D patient model can be viewed at [www.jeffersonhospital.org/aortic](http://www.jeffersonhospital.org/aortic)



Joseph Lombardi, MD, prepares for an endovascular procedure using a 3D computer model of the patient's anatomy. A custom model is generated for each patient using CT and MRI scans.

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### Jennifer Brumbaugh, MA

When the Department of Surgery hired new Webmaster Jennifer Brumbaugh in March, they gained a professional who bridges traditional academic training and modern technological savvy. In 1999, Jennifer received a master's degree in medical illustration from the Johns Hopkins School of Medicine, 1 of only 4 accredited programs in the U.S.

At Hopkins Jennifer met now-Jefferson Chair of Surgery, Charles Yeo, MD, while working on her master's thesis project, a Website for pancreatic cancer patients and their families. Upon graduating, she was hired by Johns Hopkins University and spent the next 7 years anticipating and translating patient needs into user-friendly online resources. Dr. Yeo was so pleased with her efforts that, upon his arrival in fall 2005, he asked her to manage the Department of Surgery's online presence.

Jennifer's current role draws upon not only her artistic skills (honed at the Pennsylvania Academy of Fine Arts), but also her ability to develop interactive content of interest to patients, physicians, and recruits. "My experience at Hopkins really



opened my eyes to the Web as a patient education resource and subsequently a fund-raising tool," she says, as grateful donors (many whose only connection to the hospital is the Website) continue to donate several hundred thousand dollars each year for pancreatic cancer research at Hopkins.

"Patients today are so savvy that many want access to doctors' most recent published articles and their research endeavors," Jennifer observes, "We're striving to create online resources that address a wide spectrum of needs." Keep an eye on [www.jeffersonhospital.org/surgery](http://www.jeffersonhospital.org/surgery) to see the results.

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