

# Room with a View

High-tech video equipment transforms the process of learning gross anatomy.

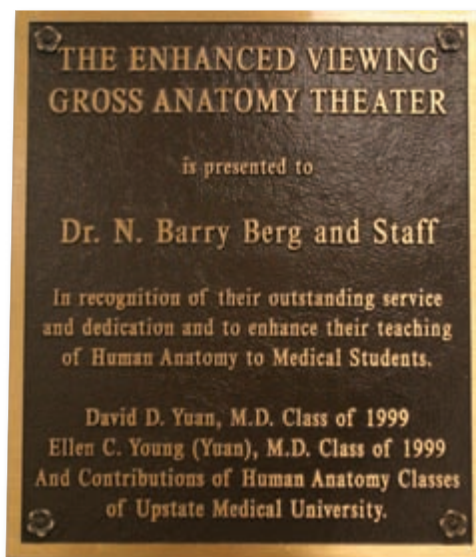
Fans of early James Bond films may recall that Bond's first villain, Dr. No, survived a gun shot wound to the left chest because of the unique medical condition *situs inversus*, in which all major visceral organs are reversed or mirrored from their normal positions. (The heart, for example, is located to the right of the thorax instead of the left.)

As this condition occurs in only one of 22,000 people, it was a unique learning opportunity when a cadaver with the condition was discovered in gross anatomy class.

"It was an 87-year-old man who had fallen off a ladder, so in addition to the *situs inversus*, he had a blood clot on the brain and a broken shoulder. It was a great learning case," says N. Barry Berg, PhD, who directs the Upstate anatomy program.

The learning opportunity may have ended with that group of students had it not been for the addition of high-definition video equipment to the lab. The ability to film the dissection of the *situs inversus* "patient" in high definition and show it on multiple large screens throughout the lab, preserves the case for future classes of medical students to come.

"Every person's body has some variation and we want the students to understand that," says Joseph W. Sanger, PhD, chair of the Department of Cell and Developmental Biology. "One in 1,200 people are walking around with just one kidney. With this type of camera, we can record the interesting variations to reinforce this concept to students."



If a student discovers something unusual or interesting in their cadaver, "we can bring it over to the camera area and display it on the monitors throughout the lab so that all students can get a good look and ask questions. It makes the class much more interactive," says Dan Jaeger, laboratory director. "In addition, the films are saved for future use."

While the opportunity to save unique cases for future generations of students is undoubtedly valuable, the principle benefit of this technology is the assistance it provides in teaching gross anatomy by providing visual guidance to the students during dissection. A high-definition video camera and six large flat-screen monitors placed strategically around the lab allow the instructor to demonstrate the dissection of a specific body part while student groups observe that demonstration

from their own station with their own cadaver. Instead of having 140 students attempting to crowd around the instructor and cadaver, the students are able to watch the demonstration live on-screen while examining the same body part on their own cadaver.

"The new system allows every student to experience one-on-one instruction and provides the entire class with an ideal viewing angle and great detail on small structures," says first-year medical student Giancarlo Rondash, who was named one of the top dissectors in Gross Anatomy last fall.

In the past, students would be given general instruction and a manual describing the procedure, and faculty would rotate among the students offering assistance. With 140 students, that can take awhile. "Instead of taking three days for a dissection because we have to go from group to group, the instruction can be done in half an hour," says Dr. Berg, providing better use of time because students have a better understanding of what they're doing.

"Before the students dissect the heart, for example, we play the video of the heart dissection on the screen, demonstrating what to look for. Then we stop and let them begin the dissection and the faculty and TAs are there to help them. Then we stop, show them the next step, and let them continue," he explains. "They know what to look for."

After the dissection, the filmed demonstration is placed on Blackboard, an e-learning site that houses lecture notes and other course materials, so students have it to refer to after hours.

## STATE OF THE ART

Six years ago, the anatomy lab underwent a major renovation, updating the space built in 1953 into a modern state-of-the-art classroom for learning about the human body. Although essentially one large room, the space is organized into five teaching modules, four containing six dissecting stations and the fifth used for demonstrations and presentations to small groups of students. The video equipment effectively brings all those spaces together into one. It began as a gift from Hansen Yuan, HS '74, former chair of the Upstate Department of Orthopedics in the name of his son and daughter-in-law, David Yuan, MD '99, and Ellen Young, MD '99. Dr. Yuan provided funds for the high-definition digital camera, the only one on the Upstate campus, and the Department of Cell and Developmental Biology followed with the purchase of six large flat-screen monitors, allowing instructors to teach a particular dissecting procedure to a large group at once.

The technology has not only expedited the process but improved the ability to learn from the dissection.

Once a year, Berg brings in two orthopedic surgeons who do hip and knee replacement on an unfixated cadaver. Previously—in order for all students to see—the procedures had to be conducted in the ninth-floor auditorium, which created issues with body fluids and sterility. Now, the procedures can be done in the anatomy lab, allowing students closer access and the opportunity to interact with the surgeons.

And it's not just gross anatomy students who are benefiting. Students in the doctorate of physical therapy and physician's assistant programs have summer programs in the anatomy lab.

"The technology allows the instructor to assist a maximum amount of students at one time," says physical therapy graduate student Maggie Reinhard, who has both taken anatomy and assisted Berg in teaching. "When working on dissections in small groups of five or six, it is incredibly difficult for the primary instructor and one teaching assistant to be present and helpful to all the groups. The use of the technology allows for

the instructor to point out things and teach the whole class and ensure that everyone in the class is able to view the dissection."

It's also altered the way courses are taught. "In anatomy, many of the lectures are purely descriptive (the anatomy of the arm or leg, for example). This can now be done in the lab using the video system allowing lecture time to be used for case studies or problem-solving activities," says Reinhard.

Clinical departments—such as orthopedics, anesthesia, and emergency medicine—are making use of that same advantage. "We've got clinical departments who now combine the didactic portion of a lesson with the lab portion by hooking up a laptop and showing a PowerPoint presentation on the screens instead of having to do that across the hall first," says Dr. Sanger.

Upstate's facilities are ahead of the curve. Recently, a contingent from the

University of Rochester paid a visit to get ideas for their own upcoming lab renovation.

And Berg believes they have only scratched the surface on how the technology might be used. "My goal is to make the lab experience increasingly interactive, so students not only know how to find structures but know how to use that information in the real world," he says. He envisions projecting live demonstrations from the anatomy lab to even larger groups in the ninth-floor auditorium, and using the technology to combine the teaching of gross anatomy and anatomic pathology as future possibilities.

"The dissection laboratory is the most unique experience medical students are going to have in at least their first two years," says Berg. "We want to maximize the experience for them and this technology gives us that capability." ■

