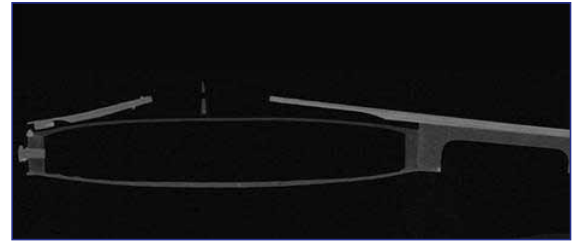


MDCT Scanner Helps Unlock Secrets of Rare Violins

When science and art come together, the possibilities for creating “sweet music” are endless. So a year ago when noted American luthier, or violin maker, Terry Borman of Borman Violins inquired about using Northwestern’s MDCT scanner to help reveal what went into the design of some of the world’s rarest violins, Northwestern Radiology didn’t hesitate to offer the department’s technical expertise.

“It seemed like a great opportunity for radiology and radiologists to contribute to both the arts and sciences,” explains Dr. Yaghmai, medical director of CT. “While I personally don’t have any connections to violins, I do have an interest in art and exploring different applications of CT technology.” In fact, in the past the department has assisted with the scanning of ancient artifacts owned by Chicago’s Field Museum.

Northwestern Radiology’s participation in this project led to the first-time scanning of five rare Italian violins made in the 17th and 18th centuries. The goal: to gather data that might assist 21st-century violin makers in replicating the sound quality of these fine instruments. These multimillion-dollar violins made by revered master luthiers Antonio Stradivari and Andrea Guarneri—whose violins have stood the test of time and become the gold standard against which all modern violins are compared—came to Northwestern Memorial Hospital by way of the Stradivari Society of Chicago. The organization makes it possible for promising young musicians from around the globe to play these exceptional and priceless instruments, launch their professional careers, and achieve excellence in the field of classical music.



Top: This CT image shows a “sagittal” view of a rare violin. **Left:** This transparent view of a violin box came from adjusting volume rendering parameters, allowing for an “inside” look at the violin’s sound post and bass bar.

Dr. Yaghmai requested the participation of several department members he thought might be interested in assisting with this unusual application for CT scanning, including his then research fellow, Mauricio Galizia, MD. Indeed Dr. Galizia, now a cardiovascular imaging fellow at Northwestern, had a keen interest. A talented and skilled violinist, Dr. Galizia took up violin at age 12 and even performed professionally with several orchestras in his native Brazil.

“One day Dr. Yaghmai called me, saying there was something ‘different’ going on with the CT scanner. When I arrived at the scanner, I was surprised to find these magnificent violins being scanned!” recalls Dr. Galizia. “To be so close to these famous and ancient instruments was astonishing. What at first only seems to be a box of wood is, in fact, full of art and history. I could think only of all the famous musicians who had played them.”

Initially the project’s scope was simply to acquire data to help characterize the design and construction details of the violins. But the CT scanner’s ability to virtually “deconstruct” the components of the rare instruments without harming them prompted Drs. Yaghmai and Galizia to share results from the study. At the most recent RSNA meeting, they presented an educa-

tional exhibit that was written in collaboration with Borman as well as a former body imaging fellow, Lakshmi Ananthkrishnan, MD, also an accomplished violinist.

Northwestern’s MDCT scanner proved particularly useful in distinguishing design features such as the arch and thickness of various violin sections and the use of different types of materials that went into shaping the rare instruments, according to Dr. Yaghmai. Northwestern’s radiology experts also used the dual energy technology to further analyze the violins’ construction details—the first such application for the MDCT. From mapping wood density to violin design, the scanner provided data that Borman and his fellow luthiers can now take into account when creating today’s instruments. This collaboration also demonstrated that medical technology has many applications, including helping to bring the past and future closer together.

“There was nothing intrinsically peculiar from the 17th century that made these violins possible, apart from good skills and detailed work,” says Dr. Galizia, who served as first author on the exhibit. “It is completely possible to build a violin today that is as good as a classical one. In a certain way, I think radiology can help the modern makers to communicate with the past.”