

Borman Violins

2009 Research Trip

At the beginning of this year I was afforded the rare opportunity to spend five days with a prime example of a late period, 1743 Guarneri del Gesu. It has become increasingly rare these days to have any substantial amount of time with very fine instruments so this was a wonderful opportunity and well worth the flight to Europe.

I was able to acquire not only the standard information, i.e. mechanical measurements, extensive photographs, tracings, etc. but also was able to do a full modal analysis of the instrument to study its vibrational characteristics, a complete analysis of the sound radiation from the violin, allowing me to link the one set of data with the other as well as latex castings and a complete CT scan.



Pictured is some of my equipment that I set up on top of a harpsichord. The Guarneri is being held in a device while the sound is analyzed with spectrum analysis software on the laptop to the right. This allows me to study the sound characteristics at various distances from the violin as well as a full 360-degree rotation.



3 of the violins were old; 2 Stradivarius, 1 Guarneri and one of mine. In this photo I was doing varnish touchup but most of my time this particular day was spent doing tonal adjustments on the antique instruments.



Although for the entire 5 days I studied the Guarneri I rarely left its company I did have a magnificent view of the French countryside from my workspace.

At this point, this instrument is quite possibly the most comprehensively studied instrument in the world as each of these individual pieces has been done on other instruments, (but to my knowledge never all of these components for one instrument) affording a wonderful opportunity to more fully understand what makes the great instruments great.

On my return trip from France, I stopped in Amsterdam and, as part of the second phase of density research that I have been working on over the past several years ([click here for article](#)), I was able to CT scan an additional 17 fine instruments with the help of my research partner Berend Stoel, Ph.D. and Dutch luthier Ronald deJongh which should make for a very interesting sequel to our original article.

[more>>](#)

Many musicians brought their instruments to the hospital where we did the scans and it was nice to meet the Dutch musicians. Baroque playing style is very common in the Netherlands, which has an additional advantage when scanning in that gut strings interfere much less with the image quality than metal strings.



In Amsterdam we had the task of picking up the violins that had been volunteered for the study as well as returning them afterwards. However, this gave me some time to see other parts of the Netherlands than just the inside of Leiden University Medical Center!



Pictured on the left is my co-author Berend Stoel, Ph.D. and on the right Ronald deJongh, a luthier in Amsterdam who is contributing to this phase of our density work.



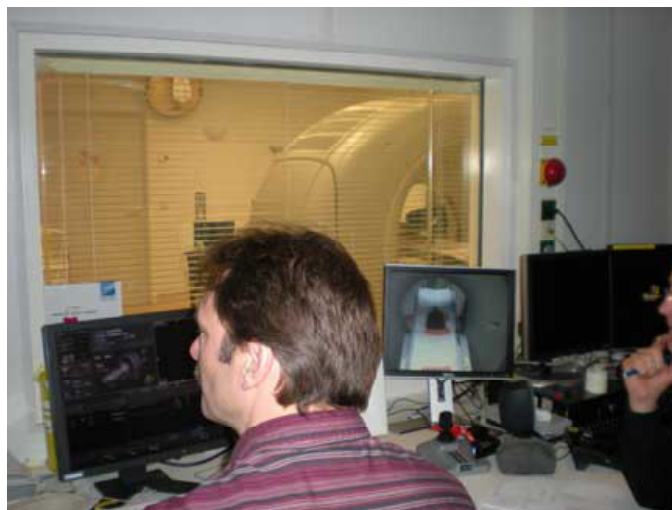
A closer view of an instrument in the scanner.



This photograph shows a violin being scanned. The violin is set upon foam pads and aligned in the scanner. The scan takes only ~15 seconds at which point the instrument is put back into its case. Preparing the data to be viewed and analyzed takes quite a bit longer but the instrument exposure is very limited.

All in all, it was a very productive trip and we are currently analyzing all the data. We are hoping to publish the second phase of our research soon.

Please visit the "What's New" page of our site for more information on this trip as well as some interesting modal animations of Stradivari violins that we've put in a new section.



The room adjacent to the actual scanner is where all the work is done. Although it's not possible to see in the photograph, one screen shows the information as it is acquired and the other is a video feed showing the instrument moving through the scanner.

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[For more about CT scanning of historic instruments click here](#)