

**SMC. MUSIC SESSION AT SALA MARÍA CRISTINA****SMC.2 John Granzow***Axes*

Luthiers use computer-controlled mills for the subtractive manufacture of guitar components. These machines have multiple motors stepping at variable rates to propel cutting tools in three dimensional paths with corresponding pitch contours. *Axes* is a work that brings these live robotic sounds of modern guitar-making to the concert space. For this piece, stepper motors are fixed to the neck, body and soundboard of an unassembled guitar. The motors are driven in concert as the x, y and z axes of a toolpath derived from a digital model of the instrument. The pitched and noisy motors are filtered acoustically through the guitar's components and are captured via transducers to become the source for subtractive synthesis. The actuation and vibration also make the guitar components mildly kinetic. MaxMSP is used for the additional processing and to generate nebulous quotations from the emerging guitar's future/past repertoire, producing a collage of fine motor skills, both machine and human. *Axes* is a multichannel work that can be adapted to the channel count in the space.

Duration: 8' 00"

Year of Composition: 2019

**John Granzow** is Assistant Professor of Performing Arts Technology at the University of Michigan. He teaches musical acoustics, sound synthesis, performance systems and digital fabrication. He initiated the 3D Printing for Acoustics workshop at the Centre for Computer Research in Music and Acoustics at Stanford. His instruments and installations leverage found objects, iterative CAD design, additive manufacturing and embedded sound synthesis.