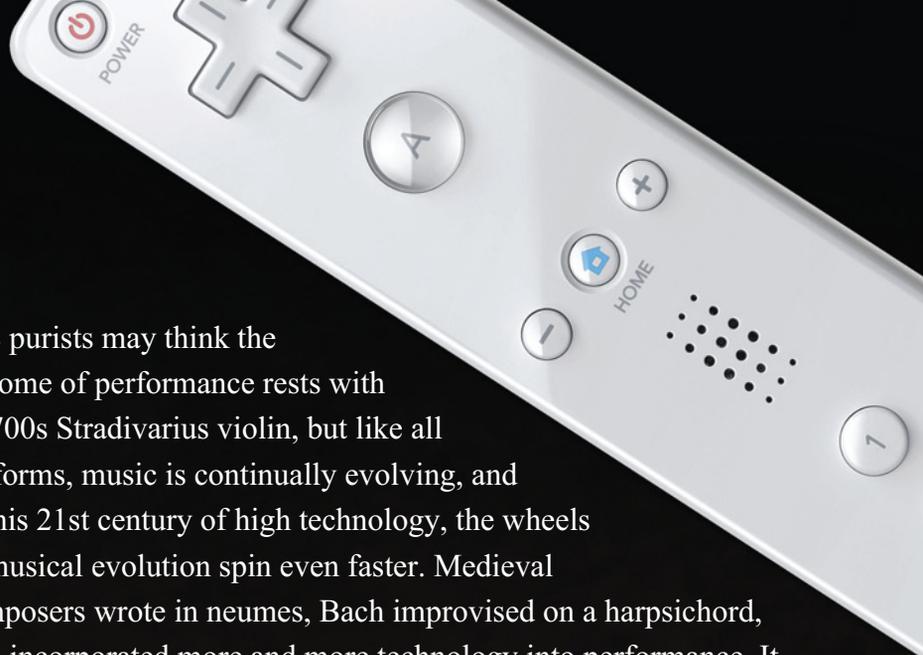


MUSIC IN A NEW DIMENSION

THE PRINCETON LAPTOP ORCHESTRA

BY NANCY PLUM PHOTOGRAPHY BY ANDREW WILKINSON





Music purists may think the epitome of performance rests with a 1700s Stradivarius violin, but like all art forms, music is continually evolving, and in this 21st century of high technology, the wheels of musical evolution spin even faster. Medieval composers wrote in neumes, Bach improvised on a harpsichord, and over the past 60 years, composers have incorporated more and more technology into performance. It was only a matter of time before technology became performance, and nowhere is this more evident than with the Princeton Laptop Orchestra (PLOrk), based at Princeton University. Considered the “grand-daddy” of laptop orchestras worldwide, PLOrk integrates human creativity, mathematics and technology, both on the ground and “in the cloud,” to create a revolutionary form of music-making.



Rebecca Fiebrink and Jeff Snyder show off some of their software and the music it has been used to create.

PRINCETON AS A LEADER IN ELECTRONIC MUSIC

The use of electronics in performance dates back to the mid-20th century, when musique concrète, championed by such composers as Olivier Messiaen and Pierre Boulez, employed phonographs and tape recorders to store and manipulate sounds. The genre known as “electronic music” produced sounds on the synthesizer, first developed by RCA in the early 1950s, and it was through this genre that Princeton University took the lead, thanks to the ground-breaking music of Milton Babbitt, J.K. Randall, Paul Lansky and others. In the 1970s, composers created ensembles of electronic and amplified instruments, and in the past few decades, computers have become partners with composers in creating musical works.

PLOrk was founded in 2005 by Princeton faculty member Dan Trueman, professor of Music at Princeton and now-retired faculty member Perry Cook of the Computer Science department. According to current director Jeffrey O. Snyder, also technical director of the electronic music studios, “electronic music had traditionally been performed by fewer than three people, and PLOrk sought to explore the possibilities of what would happen if this music were performed by a larger group.” Currently, PLOrk is

directed by Trueman, with Associate Directors Snyder and Rebecca Fiebrink, assistant professor of Computer Science.

PLOrk is offered as a University spring course cross-listed between the Departments of Music and Computer Science, with credit offered through Computer Science. The Spring 2013 catalog titles the class “Computer and Electronic Music through Programming, Performance and Composition,” with a description that “the music and sound programming language ChucK (developed at Princeton), will be used in conjunction with Max/MSP, another digital audio language, to study procedural programming, digital signal processing and synthesis, networking, and human-computer interfacing.” This may sound a bit mystifying to the average musician, but over the past seven years the PLOrk class has been a big hit, growing to as many as forty students. The current directors have scaled that number back a bit to twenty-five, dividing the class further into smaller groups for performances. According to Snyder, students come to the class with a variety of backgrounds—some “really great musicians” with no programming background and others excelling at computer skills but unable to read music. Ideally, claims Snyder, “some background

in both music and computer” works best, but even those adventurous students with no experience in either can succeed.

SO HOW DOES THIS ALL WORK?

With both technology and a student roster which changes every year, PLOrk is a fluid and continually evolving musical experience. Students in the class learn electronic and performance techniques to allow them to write software and build instruments. Students work on pieces composed before the class has begun (some by previous students and some commissioned from outside composers) as well as newly composed works. Pieces previously written can arrive fully notated, with exact instructions, or as software or “live coding” environments through which students create their own outcomes, often incorporating software “bugs” into the performance. Especially important is making the performance musical, regardless of the technology.

Audiences attending laptop orchestra concerts will notice a difference between these performances and those of full-sized orchestras in the number of performers onstage. While symphony orchestras number up to 100 players, divided into specific sections and led by a conductor, a laptop orchestra can incorporate a new set



Fiebrink and Snyder are wired in through laptops, speakers and gaming consoles.



PLOrk on stage in May 2009, with Matmos, So Percussion, and Riley Lee (photography by Lorene Lavora).

of performing tools for each concert.

According to Snyder, despite the ensemble's name, the laptop computer is not always the principal instrument. He notes that "performances employ a number of electronic instruments, including mobile phones, iPads, video game controllers, 'Wii-motes' and joysticks, as well as electronic versions of traditional instruments." Key to the performances are the omni-dimensional speakers (also created at Princeton) through which each performer can, as Trueman explained in a recent PLOrk video, "emulate the way acoustical instruments radiate sound." Each player controls his or her "acre of sound," and the laptopists in the orchestra use the computer to derive acoustical qualities which blend with other instruments and devices. A conductor can "direct" the sounds and effects, or the ensemble can play conductor-less.

A recent PLOrk video (available on YouTube) showed players using Wii devices like handbells, creating a wide range of sounds not unlike bells in rhythmic precision, but with the characteristic "blips" associated with video games. Audiences will be particularly amazed to see the same "Wii-motes" used to play video tennis and baseball using data to control sound. A *New York Times* review of PLOrk's April 2008 performance of Trueman's "Silicon/Carbon: An Anti-Concerto

Grosso" with the American Composers Orchestra described the resulting sound as "something like a shimmering moment from a John Adams orchestral score stretched out indefinitely."

THE INTERNATIONAL WORLD OF LAPTOP ORCHESTRAS

The success of PLOrk has been clear from the outset. In 2008, Trueman and Cook were awarded a grant from the MacArthur Foundation to support PLOrk, and the Laptop Orchestra was well on its way. In its less than ten-year history, PLOrk has performed in numerous prestigious venues, including Carnegie Hall, and has collaborated with such esteemed performers and ensembles as tabla virtuoso Zakir Hussain, American accordionist and composer Pauline Oliveros, experimental electronic duo Matmos, and the American Composers Orchestra.

Two years ago a professional version of PLOrk, known as Sideband, began at the University. Featuring Trueman, Fiebrink and Snyder, as well as several graduate student composers, Sideband has appeared at music festivals in Toronto, Baton Rouge and New York City. According to Snyder, the focus of Sideband is to "approach the concept of a laptop orchestra with less emphasis on pedagogy and explore how far the idea can go musically." Sideband functions

year-round with a more permanent membership than the changing roster of PLOrk and plans to release its debut album in 2013.

Laptop orchestra activity is by no means limited to Princeton University. In the past five to ten years, they have sprung up both nationwide and across the world. In the United States, these ensembles can be found at not only the usual high-tech university suspects such as Stanford, but also at Pittsburgh's Carnegie-Mellon University and the Gulf South of Louisiana. Internationally, orchestras have been established in Japan, Turkey, Germany and England, whose Royal College of Music laptop orchestra aims to make music through the "use, abuse and misuse" of technology. These diverse orchestras communicate and collaborate through symposia and conferences held worldwide.

So will the laptop orchestra take the place of the traditional symphonic ensemble? Just as technology has found a place in the visual art world, the laptop orchestra has clearly found a niche in the scholarly and performing arenas, as evidenced by the growth of ensembles and conferences worldwide. Like the myriad of fine musical ensembles in Princeton, the Princeton Laptop Orchestra is firmly ensconced in the local musical community, with the fascinating possibility of collaborations on the horizon. ■

INFORMATION ABOUT PLOrk CAN BE FOUND ON THE ORCHESTRA'S WEBSITE AT PLOrk.cs.princeton.edu AND INFORMATION ABOUT SIDEBAND CAN BE OBTAINED BY VISITING THE ENSEMBLE'S WEBSITE AT [WWW.SIDEBANDBAND.COM](http://www.sidebandband.com).