

Below are listed some of these interests which are projects already underway, or have been brewing for some time.

Physical Modeling: seeking to harness contemporary computing power and architectures to render 3D mesh models of instruments in real-time. By employing digital waveguide mesh methods the 'volumetric resolution' can be adjusted to maximize computer resource usage and to achieve the most realistic result. The joy of physical modeling however, is that once a model is constructed, its parameters (size, shape, material) can be extended to give 'extra-natural' choices in timber as well as being able to control the time evolution of that sound beyond the natural articulation of the instrument. The artistic choices involving physical models (as they represent actual objects) also adds a potentially interesting component for the composer to translate her creative vision into music. Exploring technical methods of realizing dense physical models in real time seems to lend itself to an object oriented and potentially a distributed computing environment.

Mobile Interactive Systems: the need of the performer/composer to take his art to venue, necessitates the design and building of the right machine. Powerful desktops work well, but are cumbersome to move. Laptops are becoming the standard but often still lack the computing power to run simultaneous instances of more complex synthesis algorithms in real-time (and what about the accompanying projections?). A solution is a rack mounted dual processor machine (and the option to modularly expand to more processors through distributed computing and network protocols). It is contained in a shock resistant gig case (available commercially), and is fitted with state of the art multi-channel I/O, gigabit network card, and a cooling system. This ensures that it can be transported anywhere, connect to anything and run cool in the performance venues.

Controller Design and Implementation: consolidating the sensor signal conditioning/gesture interpretation structure and the synthesis engine on a single DSP chip that can be mounted on the controller, therefore bypassing the need for a computer (in the laptop/desktop sense).

Music, New Media, and the Web: an increasing interest in exploring web-based media as itself being comprised of artistic tools. More than just web programming, it consists of programs and applications for artistic purposes (live streaming media, web based interactivity for music performance or education, Internet2 collaboration, etc.). Programming languages for web applications and their functionality continue to evolve rapidly and offer some fascinating potential for expression, connectivity, and learning. Many of the new web oriented programming languages have direct support for audio and/or audio data transfer protocols like MIDI and especially for the more versatile OSC. In fact the line between applications like Max/MSP and these languages becomes more blurred every day. (Max/MSP now supports Javascript) Examples include: php, XML, Processing, Action and Java Scripts. It would be possible to develop an audio Action Script toolbox for Flash, for example, which would allow interactive manipulation of advanced synthesis algorithms through the graphical Flash interface. It might be interesting to port the PeRColate collection for this purpose. Similar functionality is already possible with Processing. I am interested, in fact, in developing a course around this topic.

Cultural Research: a continued passion for exploring the use of traditional instruments both in performing with computers and as objects of synthesis. I am particularly interested exploring the idea that techniques like physical modeling are not only compelling methods of sound synthesis, but also important forms of cultural documentation. I intend to start this exploration with Louisiana instruments: tuba, accordion, violin, triangle, and rubboard.

Community Outreach: a more long-term goal is to seek ways of transferring this amazing art and technology to underserved communities.

Open Source Solutions on the MAC: maximize the use of open source software on the macintosh computer using fink, DarwinPorts, and native compilation, with a specific emphasis on music and new media software.