About This Issue

This issue's first article is an interview with composer and Csound inventor Barry Vercoe. Mr. Vercoe founded the MIT Experimental Music Studio 25 years ago, and is one of the founding faculty members of the much more widely known MIT Media Laboratory. In the interview, he reflects on the composers, aesthetics, and tools in the studio's early years, and offers some thoughts on the artist's role in technological advancement today.

Heinrich Taube, author of the Common Music compositional environment (see *Computer Music Journal* 21[1]), has recently trained his sights on music-theoretical analysis. His article in this issue describes his Music Theory Workbench (MTW) software, which is intended to facilitate classroom teaching and individual practice. The initial software release is geared toward analyzing chorales in the style of J. S. Bach, which remain a cornerstone of theory instruction nearly 250 years after Bach's death. The software identifies and classifies triads and sevenths, inversions, nonharmonic tones, tonal centers, cadences, harmonic functions, and stylistic anomalies.

As regular readers of this journal know well, digital waveguides offer efficient physical models of musical instruments. For real-time sound synthesis, waveguides can be implemented in special-purpose hardware. Such hardware might process signals using conventional 16-bit pulse-code modulation (PCM). However, Eric Wallin, Ronald Williams, and Maximo Salinas propose using delta-sigma, single-bit, oversampled filters and modulators that are implemented in reconfigurable hardware. Their article argues that a PCM approach underutilizes the hardware, whereas a delta-sigma approach can simplify the filters and improve the synthesized sound's frequency resolution.

Although this journal often focuses on the use of digital signal processing (DSP) for synthesizing instrumental sounds from scratch, DSP is of course equally useful for transforming pre-existing instrumental sounds, whether in composition or in performance. One performance application lies in processing the sound of solid-body electric stringed instruments to approximate the warm resonance of a natural hollow body. The electric cello, for example, is more portable than its acoustic counterpart, and can be used in situations where microphones would pose problems; but it lacks the acoustic cello's rich sound. The article by Andy Wong, S. H. Leung, and W. H. Lau presents a solution to this problem. Their technology filters an electric cello in real time, imposing spectra derived from recordings of an acoustic cello. A pitch tracker allows the system to choose different spectra according to the notes played.

Our final article is a survey of research in genetic techniques for algorithmic composition. Various researchers have experimented with genetic algorithms and genetic programming to create pitches and rhythms—venturing, for example, to construct four-part harmony in the style (once again) of Bach chorales. Abundant opportunity for further investigation remains, including composers' applications of genetic techniques to other musical parameters, and on larger scales.

As usual, the issue continues with numerous reviews of concerts, conferences, books, and compact discs, and concludes by announcing recent products of interest to the computer music community.

Front cover: An image-processed extract from the output of Heinrich Taube's music-analysis software, centering on two tritone-related major triads in J. S. Bach's *Chorale* no. 262, "Ach Gott, vom Himmel sieh' darein." The outer frame, which is intended to be vaguely suggestive of genetic imagery, was derived from another chorale illustrated in Mr. Taube's article.

Back cover: The visual patching environment Max has been rejuvenated by faster microprocessors, which permit real-time audio signal processing in such Max offshoots as MSP. This illustration depicts part of an MSP patch in a program called fLOW, announced in this issue's Products of Interest section.