



- PROSPECTIVE STUDENTS
- CURRENT STUDENTS
- ALUMNI, PARENTS & FRIENDS
- CORPORATE & COMMUNITY PARTNERS

Home > News > Engineering Magazine > Issues > Spring 2005 > Coloring Sound

- NEWS
- Cornell Engineering Magazine
- Issues
- Spring 2005

- ACADEMIC PROGRAMS
- RESEARCH
- OUR FACULTY
- EXPLORE THE COLLEGE
- DIVERSITY
- STUDENT SERVICES
- EVENT CALENDAR

COLORING SOUND

A melody of staccato piano notes sings out from the speakers of Victor K. Wong's desktop computer. But it is not a melody made by Bach, or Liberace, or even Alicia Keys. It is the melody of color.

Wong, a Cornell University graduate student from Hong Kong who lost his sight in a road accident at age seven, is helping to develop innovative software that translates color into sound.

He helped develop the software in the School of Electrical and Computer Engineering (ECE) with undergraduate engineering student Ankur Moitra and research associate James Ferwerda from the Program of Computer Graphics.

The inspiration for using image-to-sound software came in early 2004 when Wong realized his problems in reading color-scaled weather maps of Earth's upper atmosphere—a task that is a necessary part of his doctoral work in Professor Mike Kelley's ECE research group.

As a scientist, Wong needs to know more than just the general shape of an image. He needs to explore minute fluctuations and discern the numerical values of the pixels so that he can create mathematical models that match the image. "Color is an extra dimension," explains Wong.



Engineering graduate student Victor Kai-Chu Wong uses software he helped develop with undergraduate Ankur Moitra, left, and research associate James Ferwerda, right, that translates colors into sounds.

At first, the team tried everything from having Kelley verbally describe the maps to Wong to attempting to print the maps in Braille. When none of those methods provided the detail and resolution Wong needed, he and Ferwerda began investigating software.

Moitra later became their project programmer. Over the summer of 2004, he wrote a Java computer code that could translate images into sound, and in August he unveiled a rudimentary software program capable of converting pixels of various colors into piano notes of various tones.

Wong test-drove the software by exploring a color photograph of a parrot. He used a rectangular Wacom tablet and stylus—a computer input device used as an alternative to the mouse—which gives an absolute reference to the computer screen, with the bottom left-hand corner of the tablet always corresponding to the bottom left-hand corner of the screen.

As Wong guided the stylus about the tablet, piano notes began to sing out. The full range of keys on a piano was employed, allowing color resolution in 88 gradations, ranging from blue for the lowest notes to red for the highest.

Wong, Moitra, and Ferwerda are still working to develop software that can effectively pick out the important boundaries in an image so that it can be printed.

"It is also important that there is no time delay between notes," says Moitra. "That is something we need to improve. Otherwise the image will become shifted and distorted in Victor's mind."

One of the major issues facing the project is funding. "The initial work was done on a shoestring as a side project to grants Kelley and I have received," says Ferwerda, who is preparing a proposal to the National Science Foundation to extend this work and explore other ideas for making images and other technical content accessible to blind scientists and engineers.

Says Wong: "Tackling complex color images is only one problem out of many that blind scientists are facing. But I think this is a pretty important idea."

—*Thomas Oberst*
Cornell News Service

[< Prev](#) | [Back to Top](#) | [Next >](#)

