Inventors Magazine
Cover Story



# BLOW IT OUT YOUR IPHONE

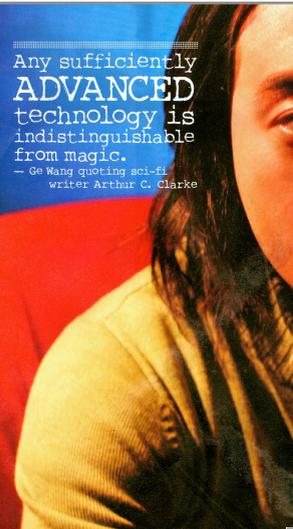## GE WANG AND HIS ENSEMBLE ARE REINVENTING WAYS TO MAKE MUSIC

BY MIKE DRUMMOND

The Stanford prof is conducting an ONGOING instrument and techno-sociology EXPERIMENT with mobile phones. Inventors of all stripes are invited to JOIN TOGETHER WITH THE BAND.

Ge Wang is an accomplished musician who has headed programs at Princeton and Stanford universities.

He knows his way around all the usual suspects – woodwinds, percussion, strings.

But his instrument of choice these days runs on AT&T's cellular data plan.

Yep, he makes music on the iPhone. No beeps and bloops or ringtone mash-ups on the phone's tiny speakers. We're talking orchestral music performed with a dozen or so iPhone musicians.

He co-founded Stanford's Mobile Phone Orchestra or MoPhO, a repertoire-based ensemble that uses the iPhone as its primary musical instrument. Players cradle the iPhones in their palms, touch the screens and blow into the microphones to

change pitch and timbre. When witnessed in concert, the swooping arm motions lend the experience a sculpted performance-art feel.

As an assistant professor at Stanford's Center for Computer Research in Music and Acoustics, Wang is doing more than tinkering with sound. He's using the iPhone's GPS and always-on Internet access to explore the boundaries of technology innovation, social interaction and, literally, global harmony.

And he isn't your typical tweed-and-elbow-patch academic. He's also an entrepreneur.

Last year he co-founded Smule, a commercial outgrowth of his scholarly work. In 2008, Smule released its first musical iPhone application, Ocarina, named after a 12,000-year-old clay wind instrument found in many ancient cultures.

Hold the iPhone like you would a real ocarina, covering the four holes that appear on screen. Blow softly into the microphone and play a melody, gently, to be sure.

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— Ge Wang quoting sci-fi writer Arthur C. Clarke

technology is as enchanting as it is ethereal. "Any sufficiently advanced technology," Wang says, quoting sci-fi writer Arthur C. Clarke, "is indistinguishable from magic."

The Ocarina app meets this definition. Beyond the enduring novelty of being able to use your iPhone as a wind instrument, you also can play to a worldwide audience in real time.

Tap the globe icon at the bottom of the screen, and up pops a picture of the planet as seen from space. Within seconds, tubular, circular graphics rise from the Earth's surface, pinpointing where someone in the world is playing the Ocarina app.

Watching the whimsical graphics and listening to disembodied soloists can trigger unexpected emotional experiences.

Tears welled in the eyes of one of my more sensitive coworkers when I showed her the Ocarina world view. My 13-year-old son remarked how well one person from central Asia was playing, then said, "He sounds sad." Not all the tunes in the Ocarina universe are musical. I heard one person perform a decent rendition of the theme from *The Sting*.

The Ocarina's musical and social properties have made it one of the more popular programs on Apple's App Store – more than one million downloads at 99 cents apiece since its release.

"If you were to tell me a year ago that over a million people were going to be blowing into their iPhones like an instrument," Wang says, "I would have found that unbelievable. I'm shocked. It's one of the best-selling apps of all time."

This sort of innovation isn't reserved for computer geniuses. Apple's software development kit, known as an SDK or devkit, allows inventors of all stripes to create applications for the iPhone. People who have never written a line of computer code in their lives are writing applications for the iPhone. School teachers, students, laid-off journalists – there are a lot of those these days – have taken their shots at developing iPhone apps.

science from Princeton, is partial to the iPhone as a musical instrument because of its relatively robust computing power, superior graphics capabilities and large, multi-touch screen.

"The iPhone has everything a computer has – memory, interaction, multi-touch and it's networked," Wang says. "The iPhone 3G is always connected to the Internet. But it's more than a computer.

"The mobile phone is probably the most ubiquitous piece of technology on the planet. It's everywhere and it's so personal. Your number goes to you. You carry the device with you," he adds. "Because of that, there are endless possibilities to change the way people do things – things they didn't realize they could do, or realize that they wanted to do."

Like, say, blow into their iPhones.

## SOUND OF MUSIC

The notion of innovations in musical instrument technology leading to innovations in artistic expression is an old and tested one, notes Roger Neill, a Los Angeles-based composer whose musical credits include work on the motion picture soundtrack for *Marie Antoinette*, the prime-time animated television show *King of the Hill* and the satirical operetta *The Beastly Bombing*.

Neill, who earned his doctorate in music composition at Harvard, cites the example of Ludwig van Beethoven and the Broadwood piano.

The pianoforte of Beethoven's childhood

was a fey and intimate-sounding instrument. Beethoven's contemporary, the Englishman John Broadwood, redesigned the classical piano into an instrument with a powerful frame, extended key range, and new expressive possibilities, fashioning the grand piano we know today.

In the middle of his career, Beethoven began receiving gifts of Broadwood pianos directly from the designer himself.

"Ludwig was Broadwood's beta tester," Neill says.

Beethoven immediately implemented the



## WHAT'S AT THE APPLE APP STORE

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|---|---|
| Total Active Apps (currently available for download) | Total Apps in U.S. App Store |
| **58,088** | **62,294** |
| Total Inactive Apps | Number of Active Publishers in the US App Store |

September 2009

new possibilities that the powerful Broadwood piano offered into his new piano sonatas and concertos, creating music that was not possible before. Works like the *Hammerklavier Sonata* and the *Emperor Concerto*, which showcased marked *dynamic* contrasts between thunderous and faint, and which used pitches that were higher and lower than the earlier instruments provided.

"Beethoven," says Neill, "was literally composing innovations in piano music faster than the inventor could keep up with him."

While the iPhone is many things, it is not a mainstream musical instrument. Then again, neither was the Moog synthesizer until Walter (now Wendy) Carlos's groundbreaking 1968 album *Switched-On Bach*.

Inventor Robert Moog developed the first commercially available electronic synthesizers, but they were complex and complicated to use.

It was Carlos, an accomplished composer and technology expert, who released the expressive musical potential of Moog's invention.

*Switched-On Bach* was a huge commercial and artistic success, and is widely regarded as the first album to use synthesizers as an alternative to an orchestra, and in turn introducing the sound of the electronic synthesizer to the mainstream public.

"It was simply beautifully crafted music that was pleasurable to listen to," says Neill. As yet, no one, not even Wang and his ensemble, have produced a seminal work of music on the iPhone.

But to judge iPhone music through the prism of conventional metrics is to miss the larger point, Neill says.

Neill recalls the time he was standing on a sidewalk when someone whipped out an iPhone and started playing the Ocarina.

"It wasn't the sound that was all that interesting," he says. "It was that you could take a phone and make an instrument out of it. That was cool – the modern urban equivalent of some primitive tribal bushman with an ocarina slung on his back."

To Neill's thinking, it's this novelty, this immediacy, this portability, this spontaneity that captures the soul of Wang's initiative.

"In one respect what he's doing with the iPhone sort of takes a step backward," says Neill. "People are playing it into the air, as opposed to an audio playback system. Sort of like any ensemble would or like around the campfire. What's fun about his approach is sort of this primal, communal idea.

"And the fact he calls it an 'ocarina' is significant," he adds. "That's a very primitive instrument. It's not only very old, but the timbre of it is very basic and pure."

The ocarina is relatively simple to model on a computer, which is just as well because mobile phones currently lack the horse-power to compute complicated sounds.

"In some respects we were fortunate," says Wang. "Because of its levels of simplicity, we didn't try to put a harpsichord or harp on it."

That simplicity makes the iPhone Ocarina more accessible – and fun – for novices and a larger customer base. The app has resonated particularly with fans of *The Legend of Zelda* video game, which has a flute-based soundtrack.

Despite the success and overwhelmingly rave reviews of the Ocarina – You Tube offers a growing roster of aspiring and accomplished Ocarina performers – Wang continues to explore the realm of what he calls "interactive sonic media."

Earlier this year Smule released the Leaf

Trombone musical app. There's no blowing involved. Users instead slide a finger along the edge of the iPhone screen to produce various horn-like sounds. Up and down graphical buttons on the other side of the screen control pitch.

While the Ocarina app allows viewers to see and hear other players, Leaf Trombone takes interactive sonic media a step further. Its "world stage" function allows listeners to judge and rank other players.

Wang likens Leaf Trombone to the video game *Rock Band*. "But in this case, it's flipped on its head," he says. "*Rock Band* is a game pretending to be instruments. In this case, we have an instrument played as a game."

He's quick to say he enjoys *Rock Band*. But it's clear he's far more fascinated with the implications of people playing, judging and ranking each other through music on

mobile devices.

But what's his end game? What does he hope to accomplish from all this global iPhone music?

An iPhone musical hierarchy?

A recording contract?

World peace?

"I think there's immense potential for mobile music," Wang says. "What that is, we don't know. But we're here to find out." ■

### WANT TO INVENT
an application for the iPhone? You don't have to be a computer programmer. Visit developer.apple.com/iphone



## MOST POPULAR APP CATEGORIES

1. **GAMES** 10,584 ACTIVE
2. **ENTERTAINMENT** 8,107 ACTIVE
3. **BOOKS** 7,725 ACTIVE
4. **UTILITIES** 4,151 ACTIVE
5. **EDUCATION** 3,776 ACTIVE

*Source: 148Apps.biz. As of July 15, 2009*
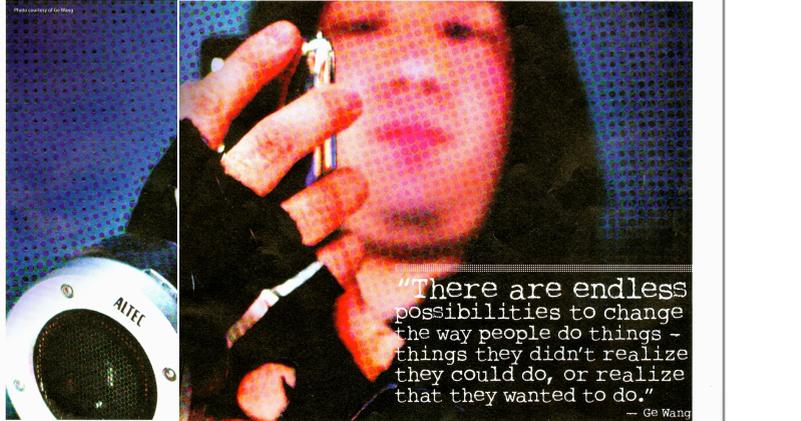


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