



CAREER GUIDANCE

Making the Jump Into Games

Three members share advice for entering a fast-growing industry

BY ANIA MONACO

WHILE SOME industries are cutting jobs during these difficult economic times, others are growing so fast they can't find enough workers. One such field is the video-game industry. Despite occasional slumps, video- and computer-game sales have been climbing for several years, and that trend is likely to continue, according to many analysts. Game-related spending by consumers is expected to reach US \$112 billion by 2015, up from \$67 billion last year, according to a study in July by Gartner, a technology research company.

Recent sales successes have been unprecedented. Activision's *Call of Duty: Black Ops*, a first-person shooter game, this year set a record when it brought in more than \$650 million during its first five days on the market. Also this year, Microsoft's Kinect—a real-time motion-capture add-on to the Xbox 360—established a record in the first 60 days of its launch, becoming the *Guinness Book of World Records*' "Fastest-Selling Consumer Electronics Device" of all time.

Fueling the industry's growth is the popularity of smartphones, tablet computers, and other portable devices that run game apps. Mobile game sales are expected to jump from 15 percent of all games in 2010 to 20 percent in 2015, according to the Gartner report.

So, how can you get involved in this booming industry? Three IEEE members who are also game developers shared their advice with *The Institute*. IEEE Member Nicholas Peterson is founder of and senior

developer at VisionaryX, a game development studio in Schönaich, Germany. Member David Callele, a consultant on product requirements, is founder of Experience First Design, a studio in Saskatoon, Sask., Canada. Member Simon Lui founded EC2 Hong Kong, an iPhone/iPad app developer.

COMPUTER SCIENCE

Education is important for aspiring game developers, but few universities offer a major in the field. Rather, if you want to work in the game industry, "you should have a degree in any computer science or sound- or light-engineering-related field," Peterson says. "But people with backgrounds in sociology, physics, art, design, and business are also needed." He earned a bachelor's degree in computer science and then spent 20 years in the IT industry working on software development and consulting before starting his company. "Systems engineering, programming, and project management courses also helped me," he adds.

Computer science is also the path Callele took. He received bachelor's degrees in electronics and computer science and then earned a master's and a doctorate in computer science, specializing in requirements for video-game design. "A solid academic base coupled with practical experience in high-reliability software design and implementation gave me the tools I needed to enter the industry," he says. "I started out by debugging new products for middleware developers and doing technical writing—like for documenting software-development kits—which



demonstrated that I was not just technically competent but also an effective communicator."

Lui earned a Ph.D. in computer science but learned app development mostly on his own. "When I started working as an app developer in 2008, it was not such a popular area, so there were no tutorials available," he says. "I learned from the materials and application programming interface provided by Apple. Developing apps is mostly a self-taught process." But nowadays students have many more resources, he points out. Stanford University, for example, offers a free iPhone Apps development course, available through iTunes U.

Would-be game developers might want to consider an alternative to a typical four-year university, Peterson suggests. "One of the key weaknesses of our traditional education system is the difficulty of keeping up with the top-of-the-line technologies used in a growing, fast-paced industry like gaming," he says.

Private technical schools and game development academies could be another way to go. "The advantage of these schools—which usually offer one-, two-, or three-year programs highly focused on a particular area—is that students finish with a certificate or perhaps even a bachelor's degree that is specifically in game development and have usually been taught by people from industry using the most



Top: App developer Simon Lui. Bottom: Screen shot from *A Knights Dawn*, a mobile game developed by Nicholas Peterson's studio.

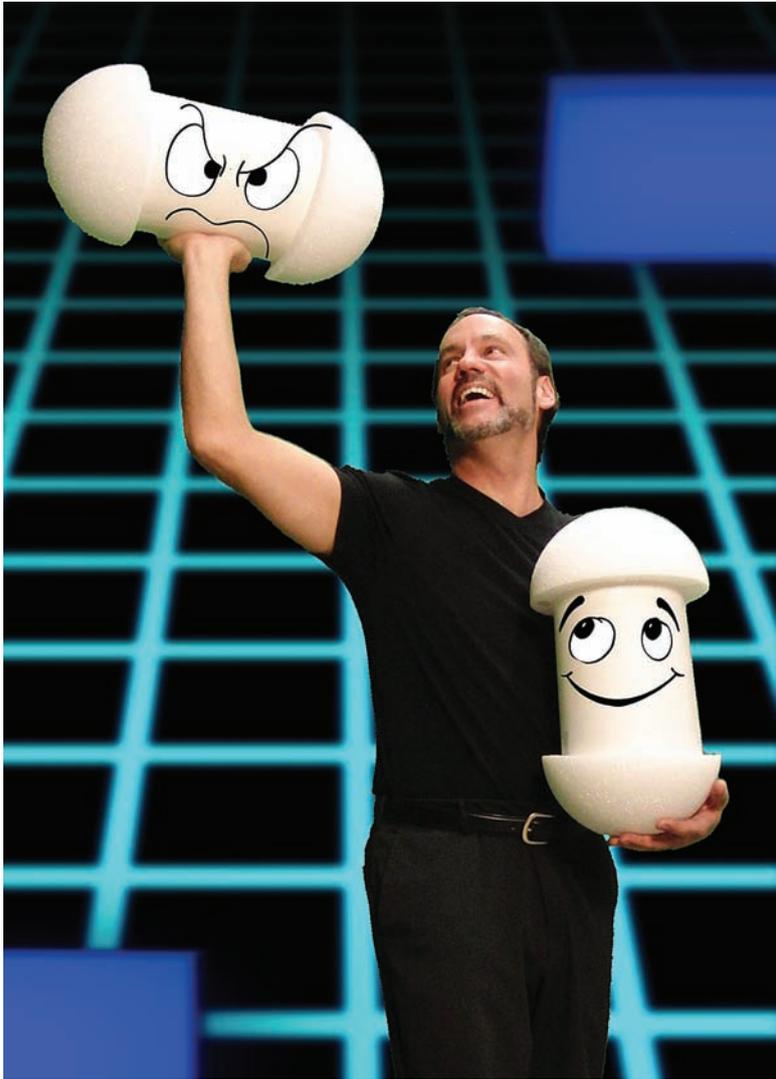
current tools," Peterson says. For example, students at the Games Academy in Berlin use the complex CryEngine, a game-development tool. The engine was created by Crytek, a video-game company that used it to develop its first-person shooter *Crysis*, hailed by gamers for its realistic graphic design.

A common drawback of such alternative schools, Peterson notes, is that they lack in-depth teaching of the more general topics also needed in the game industry, such as project management, higher mathematics, and process engineering. "And since there is no R&D tied to these schools, their knowledge base doesn't grow each year," he adds.

MATH AND MORE

What are game- and app-development companies looking for in job candidates? The short answer is a variety of technical skills, plus creativity.

TOP: MATTHEW PUGI; BOTTOM: VISIONARYX



David Callele holds two characters, *Beep* and *Bop*, from his company's upcoming game.

"Fundamentally, you must be competent—if not really good—at almost everything," Callele says. "Make sure your basics, like programming, are very solid. Game-development technology is changing rapidly, and your basics will give you what you need to be able to adapt and continue learning."

It takes a diverse team to make a game, including programmers, sound engineers, and graphics artists. "Graphics engineers and artists need to know about graphics layers, physics, lighting simulation, 2-D and 3-D representation, and their related sciences," Peterson says. "Sound engineers need to know analog-to-digital technologies."

"The greatest demand right now is for extremely talented 3-D artists and programmers," he continues. "But the pay is not anywhere as good as what one gets in the more traditional IT industry."

No matter what type of job you're

looking for, you must excel in math. "From the basics of statistics to very complex artificial intelligence algorithms, game programmers and designers need to understand and be able to use math in many forms," Peterson says.

Adds Lui, "Creativity is essential. You need to have novel ideas for games and apps before others come up with them."

One way to score points with a potential employer is to develop a game, Callele says: "A lot of people say they want to get into the game industry but are not willing to show that they can deliver." He also suggests signing up to be a beta tester for a game; companies often issue calls for volunteers. "Then demonstrate that you can be thorough by delivering a useful report to the development team," he says.

And as with most industries, experience is key. "The easiest way to get into the game industry is to apply for summer jobs or intern-

ships," Peterson says. "If you have been developing games as a hobby, great. But unless you have something amazing to show someone, no one will be very interested unless you've worked in the industry."

AREAS IN DEMAND

You're in luck, Lui says, if you're interested in developing mobile games, like those for the Apple app store. "It's very hard right now for app companies to find enough talented iOS app developers," he says. "Worldwide, there are only 43 185 people registered through Apple's iOS developer program, and many go on to start their own businesses." Hone your programming skills first and foremost, Lui tells job seekers. "You'll need a good programming background and an understanding of how to write mobile applications. And be ready to learn new things, because app markets are always changing."

There's no better time than now to get into games, Callele, Lui, and Peterson agree. "The opportunities for delivering enjoyable experiences to gamers are growing like crazy," Callele says. "Games that blend the physical and virtual worlds [like those on the Nintendo Wii and ones that use Kinect] are cool. I think we're just starting to explore what multiplayer is all about for games outside the first-person shooter and role-playing genres."

Mobile games will continue to rise in popularity, Lui says. "More and more people need games on the go—people are playing games on trains, planes, and just about everywhere."

"From a business standpoint," Peterson says, "the industry is moving more into the mainstream. With increased R&D going into new areas, games will continue to grow and grow."

BE YOUR OWN BOSS

Many are drawn to the field because game and app development offers opportunities to launch startups. Lui decided to create his own app development company after using an iPod Touch for a year and not finding the apps he needed. "I decided, if I can't find it, why don't I develop it myself?" he says.

In 2008 he unveiled his first app, *ec MTR*, to display schedules, ticket prices, and other information about Hong Kong's rail system. On the day it launched it became the best-selling travel app in the Hong Kong Apple app store. He since has developed many others, includ-

ing games, apps for digital musical instruments, and ones for signal processing research. Each of his apps sells for between US 99 cents and \$1.99. Apple and its app developers share app sale revenues in a ratio of 3 to 7, Lui explains.

Callele founded Experience First Design in 2009 because of his love of video games. "I've always been drawn to video games because I'm fascinated by what I think of as the art of making people happy," he says. "Being able to create a complete virtual reality for someone to experience is such a rush!" He cites a number of personal factors that can help you succeed: "I am blessed with a strong sense of self, confidence in my abilities, and the stamina to work long hours while maintaining my health and my perspective."

He is working on developing his company's first multiplayer games for devices "with computing capabilities at the smartphone level and greater," Callele says. Some of the games are inspired by classic video games like *Pong*. "Our version takes the gameplay to a whole new level—pun intended," he says.

Peterson founded VisionaryX last year with his son, a graphic designer, while working at Hewlett-Packard. After deciding to develop strategy and defense games, they pulled together a team that included a lead developer, a 2-D artist, and a marketing and public relations professional. They outsourced the animation and sound. Their first game, *A Knights Dawn*, was released in the Apple app store in May.

"A question I get asked frequently is, 'What kind of money does it take to start a game company?'" Peterson says. "If you want to succeed, plan on needing to pay your own and your team's way for at least one year" before seeing much of a return.

But there's a lot more to starting your own development studio than money. "From the business side, you naturally need to take courses in business management, intellectual property rights, and property law," Peterson says. "From a leadership side—and this is really a tough one—you need to understand how to lead well-qualified but extremely creative and talented individuals, as well as how to forge a successful team."

Read more in this issue to learn about the history of the game industry and how IEEE's products, services, and conferences can help you get involved.