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# A Conversation with George Sethares

George Sethares  
*Bridgewater State College*

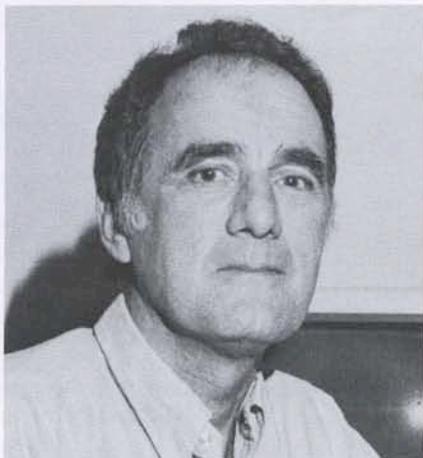
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## George Sethares



Robert Ward

**A** Cape Cod native and lifelong resident of Massachusetts, George Sethares followed an indirect route to become Professor of Mathematics and Computer Science at Bridgewater. Having majored in Music Education at Boston University, he taught music in public schools for a number of years before returning to graduate school in mathematics. He received his Ph.D. from Harvard and spent a number of years engaged in research at Hanscom Air Force Base before applying for a Bridgewater faculty position. When Sethares arrived at Bridgewater in 1973, the college was offering only one course in computer science. In the years that followed, Sethares helped develop a minor and ultimately a major in Computer Science. At the same time, he and colleague Robert Bent co-authored 5 computer textbooks, which are used extensively on campuses throughout the United States. Besides his work as teacher and author, Sethares is active in the Bridgewater chapter of BAND (Bridgewater Area for Nuclear Disarmament) and recently travelled to China to help establish an exchange program with Shanxi University.

**Q.** Is a strong aptitude in mathematics a requirement for a Computer Science major?

**A.** Not at all. I've had students who are average in math but fantastic in computing. They're different fields of study. A mathematician likes modelling, he likes to ask "if this is true or these things are true, then what follows?" For example, if we say that there are things called numbers that have certain simple properties, the consequences are tremendous. We can develop all of calculus. With mathematics, you have to make some assumptions in the beginning or you can't do anything. You are on solid ground only in the sense that if your basic assumptions are true, then all the rest will follow. The computer scientist, unlike the mathematician, is dealing with a concrete and very powerful system. The student of computer science is interested in that whole system, how it works, what can be done with it, much as the biologist might be interested in the ecosystem or the student of politics in a system of government. Computer Science is much less abstract than mathematics because you're dealing with a system that exists and you're trying to see how it works and what it can do whereas a mathematician is dealing with something that may not exist at all.

**Q.** What developments do you foresee in the teaching of Computer Science as an academic discipline?

**A.** To describe the field of Computer Science is very difficult because it's still new and evolving. In mathematics we can explain with some assurance what constitutes an educated person—we must be knowledgeable in certain areas, understand certain things. But in computer science, the curriculum is constantly changing. The Association of Computing Machinery, which purposes college curricula, is constantly modifying its recommendations. For example, we used to teach switching theory at the machine level; now we're placing much more emphasis on the theoretical level.

**Q.** Should every educated person be able to write computer programs?

**A.** It's certainly not essential. A great many programs are available for home use — for word processing and for keeping track of household finances, and new ones will certainly continue to be written. You don't have to know what the inside of a washing machine looks like to have it wash your clothes. Still, there's something satisfying about understanding how things work. Understanding a little bit about programming certainly gives you a better idea of what the computer can do.

**Q.** You've been active in the movement for nuclear disarmament. Are you optimistic that we will succeed in controlling nuclear weapons?

**A.** It's hard to say. For the first time in history, technology is running ahead of our ability to handle it. In the past, people were always ahead of technology. Babbage had the idea of making a computer over one hundred years ago — his invention had memory and all the features of modern computers, but he couldn't build it because the technology just wasn't there. Even if you go back two thousand years to Archimedes, people had concepts but they didn't have the tools. Now we have the tools, more than we can handle. Today, technologically, it's possible to do almost anything you can conceive of doing. It's the computer which is really responsible for this change. Einstein said that nuclear weapons had changed everything, but it's the computer that makes it possible to guide missiles so that they can land in a precise, designated spot on the other side of the world. The computer is probably the most powerful tool that's ever been introduced.

**Q.** Could you comment on your trip to China and the link that has been established between Bridgewater State College and Shanxi University?

**A.** Although I only spent 11 days in China, I was deeply moved by the country and the people; in fact it is safe to state that the trip changed me in many ways. I will never think of things in quite the same way. As to the exchange program with Shanxi University, it is a program that definitely benefits Bridgewater State College since a number of Chinese students are now studying at the college and bringing their very different cultural background to the campus.

**Q.** How developed is computer technology at Shanxi University?

**A.** Their machinery is ten to twelve years behind what we have at Bridgewater. They simply do not have the resources to match the level of our technology. This will change, however, as a result of the exchange; the Chinese students at Bridgewater will return home and bring back the knowledge that will help advance the state of their technology.

**Q.** How would you describe the government of China's commitment to computerization?

**A.** They are definitely interested in learning about the latest advances in western computer technology and coming into the twentieth century. But they are also very conscious about advancing the state of computerization their way, not our way, not the Russian way, their way; whatever way that is. That's a good feeling. □