

## Making math count

Professor Glenn Stevens on the push for new standards



Glenn Stevens

*In January's annual State of the Union address, President Bush warned that American students are continually falling behind countries such as India and China in science and mathematics achievement. The president called for increased teacher training and for more collaboration between educators and researchers in both fields.*

*At Boston University, two programs — [PROMYS](#), founded in 1989, and Focus on Math, launched in 2003 — target that concern. PROMYS, or Program in Mathematics for Young Scientists, brings high school students and teachers to campus for an intensive summer program in creative mathematics. Focus on Math, funded by the National Science Foundation, fosters a partnership among BU, the Education Development Center, Lesley University, the University of Massachusetts Lowell, and Worcester Polytechnic Institute and the school districts of Arlington, Chelsea, Lawrence, Waltham, and Watertown. BU Today talked to Glenn Stevens, a professor of mathematics and statistics in the College of Arts and Sciences and director of both programs, about the national problems and BU's solutions.*

### **BU Today: How did PROMYS begin?**

Stevens: It grew out of the fact that a couple of us here in the math department were students in a program in high school, called the Ross Program, at Ohio State University. It had a profound effect on a lot of people — students in that program are now mathematicians all around the country as a result of thinking of mathematics in that way, which was so different from math in a classroom. It's not something that's presented to you; you're asked to find it yourself, and it's just an experience unlike anything a kid can hope to have. So we wanted to start something so the program would continue to have a life.

Since then it's developed in new ways. I always believed that the principles the program was built on, and the ideas of what mathematics is, are relevant to general math education as well, and in 1991, I called Al Cuoco [of the Education Development Center] and asked him if he would be interested in working with me to extend the program to teachers. People said we wouldn't succeed because the mathematics was too hard; we're finding that the program works spectacularly well.

### **How did it expand to include local school districts?**

People could always say that the teachers who came to PROMYS and succeeded were succeeding because they were just very, very special, and so one of my missions was to test if that statement is true. I'm now convinced it's not. They are special, but when people say special they mean one in a million, and I mean one in a school. I think every school has at least one or two teachers who have these qualities, and so our goal now is to find those teachers and support them in their environment and to help them do things that will affect the teachers around them, help them get more interested in math.

We have something like 15 to 18 mathematicians, from BU and other university partners, who go into school systems one or two times a month and work with teachers on mathematics. It's a new idea — the teachers were a little nervous and the mathematicians were a little nervous, but over the last two years the barriers have pretty much been broken. I think one of the most important professional development things is to show that these groups can work together — we hope that that will have a positive impact on what goes on in math education more generally.

### **What are some of the factors that have led to this national disengagement from math and science?**

I see it as an issue of environment. The schools need to support an environment that encourages intellectual growth and to view mathematics in particular as something real that has some meaning to it. I think teachers need to be treated with more respect — when I talk about PROMYS, people always say teachers can't do that. The belief that teachers can't do significant kinds of mathematics is a sign of the problem.

You have to have high expectations of teachers, you have to have high expectations of students, and the environment has to be created where teachers see themselves as mathematicians. I don't think that kind of environment exists right now, but the people exist. They can do it.

**What's your response to the push for more Advanced Placement math classes?**

What I like is that there's an attitude of higher expectation; that's good. The danger there is that some people will misunderstand that as meaning advanced placement for some, and I hope that's not what's intended. I think that focus on the kids who are going to succeed is worth doing, but it shouldn't draw away from the larger issue.

The problem is in the details — advanced placement, to me, is not that important. Why would we want to place people in calculus? Maybe what they should be doing is more deeply doing algebra and geometry. Sometimes we push kids on to what we think of as advanced, without [their] getting the depth that they need before they get to that advanced place.

This is one of the reasons that PROMYS succeeds. These kids are doing things well beyond what any other high school kids are doing, but the topic is not advanced — it's deep. There's a big difference. Higher expectations can mean expecting kids to do things thoroughly, do things well.