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## The powerhouse 'pirate' of the math classroom

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By Billy Baker, Globe Correspondent | October 1, 2007

Perhaps the most repeated story in the legend of Paul Sally - the mathematician and 74-year-old Roslindale native who is known around the University of Chicago as "Professor Pirate" - involves a man dangling from the top floor balcony of a large atrium hotel at a mathematics conference many years ago. The man had made the mistake of telling Sally that he knew who was going to receive a prestigious award, and that he wasn't telling. So Sally and one of his cronies held the man over the balcony until they got their answer.

Like many Sally stories, this one gets more apocryphal with each retelling, but is, for the most part, true. "It was only the third floor, but if we had dropped him it would have been serious," Sally said as he let out a laugh large enough to make his eye patch dance. "But I don't think about those things."

Sally, in town Thursday to give a colloquium lecture at MIT on supercuspidal representations of  $p$ -adic groups - "things the average person has no reason to understand" - has devoted much of his career to thinking about the opposite: What should the average person know about math?

In the 1980s, Sally served as the first director of the University of Chicago Mathematics Project, which created the "Chicago math" program, rooting K-6 math education in daily activities such as telling time, counting money, and reading maps. It is still used in 175,000 classrooms around the country, but he left the program after four years, "because I can't stand education bureaucrats," and went on to create programs that emphasize what he thinks is one of the main keys to math education: teaching the teachers how to teach.

He's built a program for teachers in the Chicago public schools and in 2002 created a similar program for Massachusetts teachers through the Harvard Extension School.

Teaching, according to Sally, is all about getting students to comprehend the problem. He often asks his students not to solve a problem but to understand it enough to be able to explain it to someone else. If students can't understand it, then he says teachers must have alternatives.

"The key at almost every level is knowing enough optional strategies so that if a person doesn't get it, you have a place to go," he says. "You need to be able to change tracks, to have a dozen different ways to teach the same thing."

To understand Sally, you first have to look at Sally. He is, as James Arthur, a University of Toronto professor and the former head of the American Mathematical Society, points out, "impressive looking," despite everything that's happened to his body. Sally is 6 feet 3 inches tall and likes it that way. Two years ago, when he lost his second leg to complications from diabetes (he's been a Type 1 diabetic since he was a teenager, and lost his first leg 10 years ago), the doctors suggested he might want to go a bit shorter - say, 5-foot-8 - to lower his center of gravity and make it easier for him to amble on two prosthetic legs. Sally, in his typical salty language, told the doctors where they could go.

And then there's the eye patch, which has become his trademark since he lost his left eye from diabetes complications 25 years ago.

When you wrap all this in with his famously outsized sense of humor, you create one of the more magnetic personalities in high-level mathematics, as evidenced by the dozen mathematicians who seemed to cling to Sally wherever he went on Thursday.

Sally has, by all accounts, had an unconventional journey to the upper pinnacles of the mathematical world. His early numerical life was built around 2's and 3's on the basketball court - he starred at Boston College High School - and it wasn't until he was nearly 30 that he found his step in the mathematics.

"I was very late by the standards of this field," he says. "Mathematicians are supposed to do their best work at 21. When I was that age, I was still dribbling a basketball down Dorchester Avenue."

After graduating from BC, Sally ambled around town, driving a red cab in Brookline, loading furniture in Downtown Crossing, teaching at BC High, playing hoops in "every gym in the city," until, in 1957, he claims he sneaked in the door with the first class of graduate students at Brandeis University. That's where he met his wife, Judy Sally, who recently retired as a math professor at Northwestern University - "When you're at Brandeis, and you meet an Irish lass named Judith Flanagan Donovan, it's all over," he says. After finishing his doctorate, he made his way to the University of Chicago. He was awarded tenure in 1969, and has been there ever since.

Though he's technically a research mathematician - he's done important work in reductive groups, an algebraic concept - Sally's passion has always been standing at the blackboard. He loves his students and, by all accounts, they adore him.

"He's unique because he's this big powerful man, but his hallmark is that he nurtures people," said Phil Kutzko, a math professor at the University of Iowa and an old buddy of Sally's (he held the guy's other leg in the hotel balcony incident). "The jokes are funny, but the reason his students and colleagues love him is that he's been there for people."

Some of his students have created a Web page featuring some favorite Sallyisms - "Your only excuse for missing the test is if you're dead and your funeral is that day" - and his policies, which include inviting the entire class to stomp on any cellphone that dares to ring during his lectures.

While his health has repeatedly betrayed him - the macular degeneration in his right eye is now so bad that he's legally blind - Sally, whose accent retains a strong trace of Roslindale, says he has no plans of slowing down.

"I'll keep teaching as long as I can find the blackboard," he says. ■

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