Know Your Wisconsin Mathematician

Interview with Steve Szydlik, UW-Oshkosh, by Jennifer Szydlik

Where did you grow up?

I'm from Plattsburgh, New York, a small town about 20 miles from the Canadian border. There were 45 kids in my high school graduating class.

Was there a time in your life when you discovered that mathematics was what you wanted to do?

I was always a strong mathematics student, but when I was young most of my experiences with the subject were with procedures and algorithms. It wasn't very exciting, but I was quick and accurate when I multiplied three-digit numbers together. So my enjoyment of the subject was externally generated, most often when I was praised for being "good at mathematics."

My first glimpse of the real beauty of mathematics came in high school geometry. I loved straightedge and compass constructions! But it was my upper-level mathematics courses in college where I found my passion for the discipline.

Where did you go to undergraduate school?

I graduated from Union College, a small college (2000 students) in Schenectady, New York, in 1988.

What about graduate school?

The University of Wisconsin, a *really* big school. I will be forever grateful to Dr. Peter Orlik for his support as my advisor there.

What was the influence of your family on your education?

Dad was a first-generation college student from a coal town in Pennsylvania. His family was very supportive of his education but also very poor. I don't think they knew what to make of him – he was one of the rare college students from that working-class town, and he earned a PhD in physics! My mom has a masters degree as well, and taught high school Latin for a time. Both were supportive of me and my education. Even though we were not a wealthy family, there was never any question that I was going to college. It took me a long time to understand that not all families are as committed to their children's education.

Dad was an intellectual through his whole life, and he would occasionally stymie his six kids with his questions at the dinner table. One we all still remember is "How many violin players are there in Philadelphia?" We all thought it was an absolutely ridiculous question, but it led to a long-remembered lesson on estimation and statistical thinking.

Are there any teachers who had influenced you to become a mathematician?

My professors at Union College were fantastic! Sue Niefield, Karl Zimmerman, Kimmo Rosenthal, Al Taylor – from top to bottom, the mathematics department there did a great job helping a procedurally-driven boy to experience the beauty of mathematics. They got me to a point where I was ready for graduate school.

How did you end up at UW Oshkosh?

My wife Jennifer, the best mathematics teacher I've ever seen, was hired at UW Oshkosh in 1995. I was still finishing my dissertation at the University of Wisconsin. The timing was perfect – the

following year UWO had two more positions open in the department and they took a chance on me. I feel so fortunate to be able to work in the same place as my best friend.

What have your students meant to you as a teacher and mathematician?
I love teaching at UW Oshkosh! About half of our students are first-generation college students like my dad was, and regardless of their backgrounds, when they are in my classroom, I can make a difference with them. That's a great opportunity, and also a great responsibility. It's good to feel like you do important work.

What courses do you like to teach?
My two favorite courses to teach are an upper level geometry course for mathematics majors, and a general education problem-solving course for nonmajors. In both those courses, I try to provide my students with authentic mathematical experiences: to work out examples, to collect data, to organize, to look for patterns, to conjecture, and to make logical arguments. I love the geometry course because it has an explicit logical structure, but at the same time, there's a real story to be told. As we build geometry up from its axiomatic foundations, we also uncover the story of non-Euclidean geometry. There's enough weirdness in that and in other strange geometric models to keep the course lively.

The general education problem-solving course includes lots of topics that students tend to find interesting, particularly issues involving voting, power, and representation. Many of the students have had poor experiences with mathematics in the past, and it's really gratifying when I see them have "Aha!" moments and realize that they actually can do mathematics.

How have you found that teaching of mathematics has changed over the years?
Certainly, technology plays a bigger role in teaching. I try to be very cognizant of how I use these tools, focusing on how they can help facilitate student learning. It's great to be able to draw the graph of a function quickly in Calculus II when you're trying to illustrate a point about the definite integral. And it's great to have access to GeoGebra when doing straightedge and compass constructions in hyperbolic geometry, otherwise the pencil marks on your paper become overwhelming!

More important than the changing of the technology has been my growth as an educator. Now, rather than worrying about what I'm going to *tell* my students when I go into a class, I ask myself how I want my students to *experience* the mathematical concepts that we will be discussing. I follow a traditional lecture only very rarely now, preferring to find ways to offer students authentic mathematical experiences. We learn mathematics by *doing* mathematics!

How were you involved with the MAA over the years?
Ken Price and I served as co-Coordinators for Student Activities in the Wisconsin section for about 8 years. That was a great way to get involved with the MAA and to learn about the inner workings of the section. Ken and I have also produced the mathematical game show "Face Off," at the MAA-Wisconsin Section meeting every spring since 2006. This "Jeopardy"-style show is my favorite way to contribute the mathematical community. Our approach to the game is to try to have "serious fun"; the questions are designed to challenge students in all kinds of ways. There's plenty of math, but there's a fair bit of silliness sprinkled in as well. We've been fortunate that so many of our colleagues at UWO and at other Wisconsin schools have been willing to help us produce the game, serving as scorekeepers, game hosts, and organizers. And the students are great!

What do you think is the best part of being a mathematician?
I love the "Aha!" moments. There is nothing as professionally satisfying as making a mental connection when I'm working on a mathematical idea, especially one that's new and challenging to me. It's also satisfying when I get to see one of my students having one of those moments as well. Sylvia Rimm once wrote, "The surest path to positive self-esteem is to succeed at something which one perceived would be difficult." The more experience I have in my life, the more true this seems to be.

What is the worst part of teaching mathematics?
I most dislike assessing students – assigning them grades. While I understand that grades can serve as a motivating force for students, it feels ridiculous to capture a student's level of understanding with a "B-." And those grades can be devastating. A very close second is the actual grading of assignments. Ugh.

How do you describe what you did when you are talking to somebody outside of mathematics?

I like to think of myself as a seeker of patterns. So whenever someone asks what I do, I like to give them the "Pizza Cutting Problem": If you are allowed to make *n* straight cuts in a round pizza, what is the maximum number of slices that you could create? What if you are allowed to make *n* straight cuts in a watermelon? I like this problem because it offers people an opportunity to think about mathematics the way we do: collecting data, looking for patterns, making arguments, and generalizing. This is also the problem that first got me interested in hyperplane arrangements, my graduate school specialty.

What is your advice to college students and new teachers?
The American psychologist E. Paul Torrance has a "Manifesto for Children," a copy of which is hanging on the wall in my office. I love it:

1. Don't be afraid to fall in love with something and pursue it with intensity.
2. Know, understand, take pride in, practice, develop, exploit, and enjoy your greatest strengths.
3. Learn to free yourself from the expectations of others and to walk away from the games they impose on you. Free yourself to play your own game.
4. Find a great teacher or mentor who will help you.
5. Don't waste energy trying to be well-rounded.
6. Do what you love and can do well.
7. Learn the skills of interdependence.

When I have mastered these skills, I'll move on to his "Manifesto for Adults," maybe 40 years or so from now.

Who is a Wisconsin Mathematician that you would like to know? Send suggestions for the next KYWM to Ben Collins, collinbe@uwplatt.edu .