

## Know Your Wisconsin Mathematician

Interview with Sr. Barbara Reynolds, Cardinal Stritch University,  
by Benjamin V.C. Collins

*Where did you grow up?*

Actually, my dad worked for the federal government (for the Army, then for the Veterans Administration), so we moved around a lot. On my 14<sup>th</sup> birthday, we moved into my 15<sup>th</sup> house. We were in Germany for a while when I was a small child; we also spend time in Texas, Arkansas, Indiana, and Maryland. I went to high school in Maryland, and college at Saint Louis University in St. Louis, Missouri. After college, I spent a year with the Teacher Corps working in Tampa, Florida, and two years with the Peace Corps in Ghana, West Africa. I moved to Milwaukee following graduate school to enter the Sisters of the Divine Savior (Salvatorians) in 1979, and have been here ever since. I think of Milwaukee as home now.



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

When I was in 8<sup>th</sup> grade, we moved and I started in a new school in mid-October. My mathematics teacher, Mr. Meyers at Perryville High School in Perryville Maryland, entertained all of my questions, and encouraged me to keep asking questions. That was the year that I decided that I would study mathematics. I had no idea then exactly what studying mathematics would entail or where it would lead me, but I knew that mathematics allowed me to ask questions and to pursue answers that made sense.

*Where did you go to undergraduate school?*

I went to Saint Louis University. I applied to SLU partly because my parents had both studied there, and I had relatives in St. Louis. The deciding factor was that SLU offered me a combination of scholarship and student loan that made it affordable. The mathematics faculty at SLU encouraged my interests in mathematics, and I was able to work part-time as a student in the academic computing center on campus. I completed my AB in Mathematics in 1971.

Working as a computer operator and scientific programmer in the late 1960s allowed me to use what I was learning in mathematics classes in practical ways. When we were working on a program to draw maps using data from the 1970 census, we used the “winding number theorem” from topology to find the interiors of particular regions on the maps. Eventually, I realized that I wanted to work more with people and less with machines. So a year after I graduated, I applied to a Teacher Corps program that was based in Tampa Florida. As a Teacher Corps Intern, I was taking courses for an MA in Mathematics and Education at the University of South Florida, while I was teaching 7<sup>th</sup> grade mathematics about three-quarter time at Dowdell Junior High School. By the end of that school year, I realized that I really wanted to teach mathematics. Then I served in the Peace Corps for two years as a Secondary School Mathematics Teacher in Ghana, West Africa.

*And what about graduate school?*

When I was finishing my second year in Ghana, I realized that it was time for me to return home to the United States, but did not know how to begin to look for a teaching job from so far away. (It was 1975, and email and the internet were not yet widely available.) So I wrote to Dr. Raymond Freese, my undergraduate advisor at Saint Louis University asking for advice. My letter must have arrived on his desk at the right time, because he immediately responded with an offer of a Teaching Fellowship and invited me to consider graduate studies in mathematics at SLU. Being a practical person, I reasoned that a Teaching Fellowship was a job, and I could decide later about applying to graduate school. So I accepted the Fellowship, and applied to the graduate

program during my first year of graduate course work. Four years later in 1979, I completed my Ph.D. in Mathematics. My thesis explored the idea of conic sections in the taxicab metric.

*What was the influence of your family on your education?*

Well, both of my parents have college degrees, and it was pretty much assumed that I too would go to college. We had an extensive library at home. Dad was a physician, and had a large medical library. My parents gave us books for Christmas and birthdays, selecting books in areas to entice us to read. I come from a large family, and my siblings have diverse interests, so we had a rather eclectic library with books on many topics, and I read a lot. We were always encouraged to pursue our interests, and to learn as much as we could in different situations.

I was sick a lot in 6<sup>th</sup> grade, and that was probably a pivotal year in my education. I missed more days of school that year than I attended – but my parents arranged for me to keep up with my class work by having my teacher send work home with one of my brothers. I guess you could say that I was home-schooled that year, or that I did 6<sup>th</sup> grade as an independent study. Either way, I learned that learning was my responsibility – whether I was able to be in class or not, and this has shaped my approach to my studies ever since.

*You come from an era when there were far fewer opportunities for women in mathematics. Were there any obstacles you had to overcome? Were there people who were particularly encouraging to you as a woman?*

I am frequently asked this question, but I have to say that I was largely unaware of any obstacles. I just followed my interests. As an undergraduate, I resisted that suggestion that I would be a teacher because I was a woman doing mathematics. I was working as a scientific programmer and statistical consultant at the academic computing center on campus, so I knew that there were many opportunities for mathematics majors beyond teaching high school. I guess I experienced more opportunities than obstacles.

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

My dad frequently presented us with puzzles and problems that involved mathematical and scientific reasoning. Mr. Meyer, my 8<sup>th</sup> grade mathematics teacher, is the first teacher who aroused my interest in mathematics. Dr. Freese, my undergraduate advisor, affirmed that I could major in mathematics without committing myself to being a high school teacher.

*How did you end up at Cardinal Stritch?*

While I was in graduate school in St. Louis, I met several Sisters of the Divine Savior (Salvatorian Sisters), and became friends with them. The Salvatorians are an international congregation, with our General Motherhouse in Rome, and our Provincial Offices in the United States are in Milwaukee. Gradually I realized that I wanted to be a Salvatorian Sister myself. So as I was nearing the end of my studies at Saint Louis University, I began applying to colleges and universities in the Milwaukee area. It happened that there was an opening in the Mathematics Department at Cardinal Stritch College (now Cardinal Stritch University) at that time, and I was a good fit.

The year I came to Cardinal Stritch, we were starting some new courses in Computer Science and the department was being renamed as the Department of Mathematics & Computer Science. My work as a computer operator and scientific programmer along with my masters-level course work in Education, and my Ph.D. in mathematics with a dissertation in Geometry was a unique combination that made me a particularly good fit at Cardinal Stritch.

Perhaps the more relevant question is why have I stayed at Cardinal Stritch University for over 30 years. Basically, Stritch has encouraged and supported my development as a person, as a mathematician, and as a teacher of mathematics. Professionally, Stritch has been the right place for me to grow and develop professionally.

*You have spent a lot of time on cooperative learning in the mathematics classroom. Why, and what do you hope to accomplish?*

As I prepare to teach, I spend a lot of time thinking about how I actually learned each particular topic. I can't really think of very many things that I learned directly from a lecture – even a good

lecture. However, a good lecture sometimes did pique my curiosity, and that would direct me to further reading and study. Most of the time, I attribute my own learning to reading and thinking about a topic, and then discussing ideas with peers. So I try to engage students in conversations about mathematical topics. For several years I taught computer programming, and I observed that students in the computer lab often engaged in discussions about hard programming tasks. When computer algebra systems (such as Maple) and graphing tools (such as the TI graphing calculators and computer graphics packages) became available, I looked for ways to engage students in activities that used these tools to help them think about challenging mathematical ideas. In the early 1990s, I got involved in one of the so-called calculus reform projects. This gave me a network of other mathematics faculty who were using technology and cooperative learning in their teaching, and we exchanged lots of ideas about what worked and what didn't. I am always looking for ways to better engage students in thinking about hard ideas, and keeping them engaged in working on challenging problems. Technology and cooperative learning help to do this.

*What courses do you like to teach?*

I've enjoyed teaching calculus, geometry, discrete mathematics, abstract algebra, mathematical modeling. I've also had a lot of fun teaching computer programming and data structures. Perhaps the common theme here is that I like engaging students in problem situations, and teaching them strategies for thinking about how to work on problems that they haven't yet solved. Once we've solved a problem, we tend to say that it is an "easy" problem, but a problem that we haven't yet solved is hard or challenging. So I enjoy helping students learn strategies for working on challenging problems until we develop enough insight into the problem situation to make the problems seem easy.

*Over the years, did you find that teaching of mathematics changed?*

Well, these days I find myself teaching things that I didn't learn in graduate school. We have different tools – computers, graphing calculators, and the internet, among others – and so the things we need to know have evolved over time. So it is important to think about what today's student need to know as they go into the world beyond our classrooms. When I first started teaching, we used slide rules; even then I needed to caution students against reaching for a tool without thinking about why they were using it. I recall one student telling me that " $2 \times 3 = 5.99$ , SRA" (that is, to slide rule accuracy). Today we don't use slide rules, but there are new questions. For example, what does a computer or calculator graph of a function tell me about a function and do I need to zoom-in or zoom-out to answer a particular question.

*How were you involved with the MAA over the years?*

I guess it all starts with professional networking. In 1985 I spent a summer at the University of Notre Dame studying with the Clavius Group, an international group of mathematicians who meet every summer to share their work in mathematics. Then, in the mid-1980s I got involved in the Institute for Retraining in Computer Science (IFRICS), a faculty development program to help faculty like myself who had strong backgrounds in mathematics prepare to teach courses in computer science. The network of people I met through IFRICS led to my involvement about five years later in one of the calculus reform projects (C<sup>4</sup>L, which stands for Calculus, Concepts, Computers, and Cooperative Learning), and Project CLUME (Cooperative Learning in Undergraduate Mathematics Education). Involvement with C<sup>4</sup>L, and CLUME in particular led to my being involved with others who were looking for effective ways of integrating technology and cooperative learning into their teaching of mathematics. All of these groups gave me a strong network of colleagues, so that attending the Joint Mathematics Meetings is just a lot of fun! I didn't have Project Next, but I did have Clavius, IFRICS, C<sup>4</sup>L, and CLUME, and I knew a lot of people at the Joint Mathematics Meetings.

In the mid-1990s, several of us (a group of seven) co-authored a book, *Cooperative Learning in Collegiate Mathematics: A Practical Guide*; then a few years later a somewhat larger group (almost 20) from CLUME co-authored *Cooperative Learning in Collegiate Mathematics: Issues that Matter & Strategies that Work*. Both of these books sold well, and someone invited me to serve as a member of the MAA Notes Editorial Board; after two terms on the Notes Editorial Board, I became Editor of Notes.

As you see, one thing simply led to another: My interests in teaching effectively led to my work with various groups, which led to being involved in several networks of colleagues with similar interests, all of which is well served by the MAA.

*What do you think is the best part of being a mathematician and a teacher?*

Seriously, I get to spend a lot of time thinking about interesting problems, and engaging students in thinking about some interesting problems.

*What was the worst part of teaching mathematics?*

I'm not sure that there is a worst part. Like everyone else, I do have occasional bad days, but on the whole, I like what I do, the people I get to work with, and the places that teaching mathematics has taken me.

*How would you describe what you do when you were talking to somebody outside of mathematics?*

Like all of us in the mathematics profession, I can be a little cautious about admitting that I'm a mathematician as that can be such a conversation stopper. Before I get too deep into a conversation, I try to find out something about the person or persons I'm talking to so that I can connect what I say to their worlds. It is easier for others to be interested in our world if they sense that we are also genuinely interested in their worlds.

*What are you most proud of?*

In April 2008 the students of Cardinal Stritch University surprised me by naming me the Educator of the Year. I deeply appreciate their recognition of my commitment to excellence in teaching and concern for them as students. A little more than a year later in November 2009, my colleagues recognized me a Distinguished Scholar. So in two consecutive years, I was recognized for both sides of my work – the teaching and the scholarship which supports that teaching.

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| Who is a Wisconsin Mathematician that you would like to know? Send suggestions for the next KYWM to Ben Collins, <a href="mailto:collinbe@uwplatt.edu">collinbe@uwplatt.edu</a> . |
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