

# Math

## Warshauer's aim is to 'kindle excitement'

by SUSAN HANSON  
Staff Writer

For 10 years now, Dr. Max Warshauer has taught mathematics at Southwest Texas State University. During this time, he has worked on research in quadratic forms, computer science, and mathematics education. He has attended the Institute for Retraining in Computer Science, and he has served as a consultant at Microelectronics and Computer Technology Corporation in Austin. What has given him the greatest intellectual satisfaction?

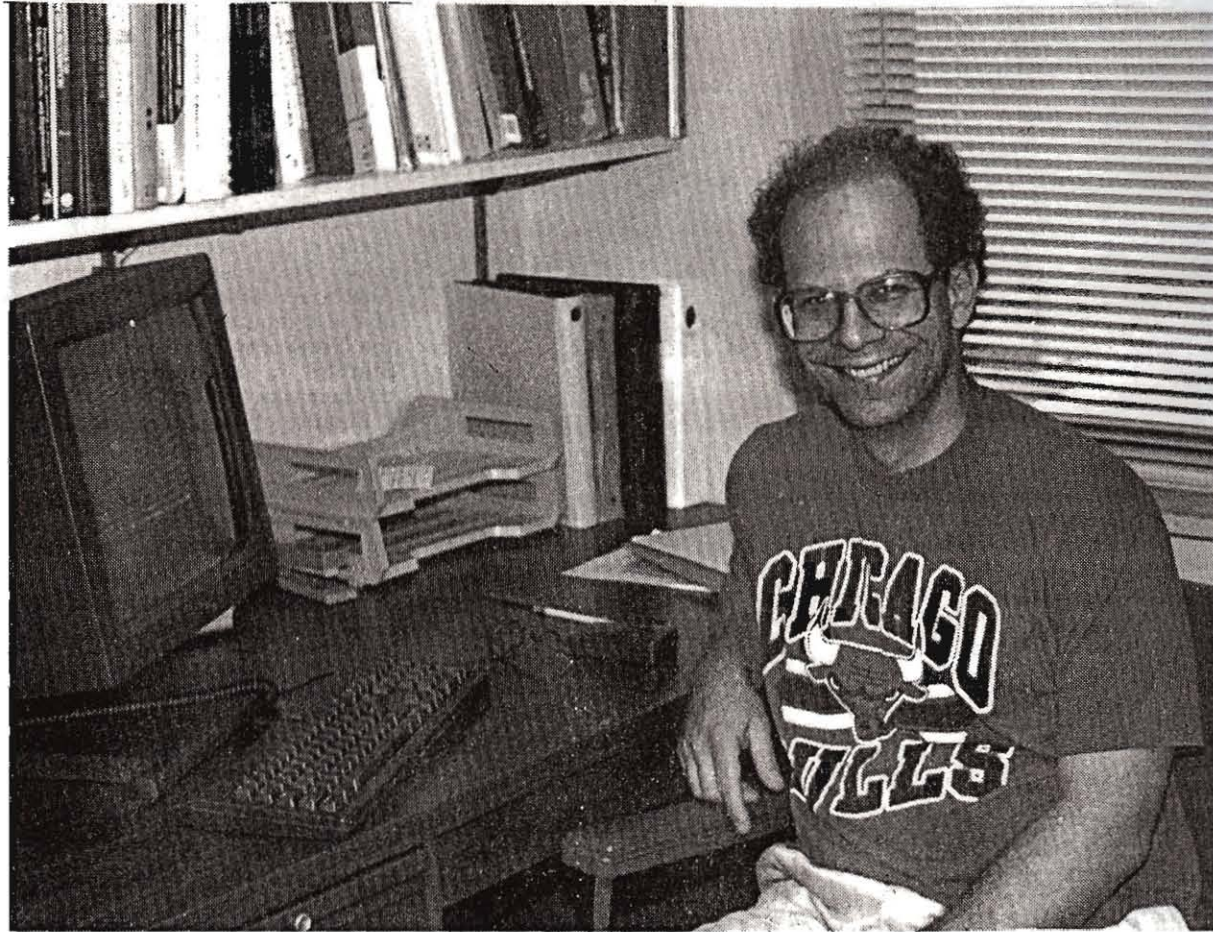
None of these, Warshauer admits. "When I was in the 10th, 11th, and 12th grades in high school," he says, "I attended a special summer mathematics program at Ohio State University. As I look back now more than 20 years later, having graduated from the University of Chicago with a B.A. in mathematics in 1973 and from Louisiana State University with my Ph.D. in 1979, I can say that this experience was not only the most exciting period of learning in my life, it was the beginning of a lifelong pursuit of knowledge and learning in mathematics and the sciences.

"I can still hear Arnold Ross telling us, 'Think deeply of simple things,' and recall the sleepless nights as I struggled to grasp the notion of a mathematical proof and to complete problem sets that challenged and inspired each participant in the program--many of whom went on to get their Ph.D. in mathematics. It amazes me how much energy I had then.

"It has always been in the back of my mind," Warshauer says, "that nothing was ever as fun, as challenging, or as truly rewarding as the days I spent at Ohio State." Warshauer's dream, he says, has been to create a similar program at Southwest Texas State, a program that would "teach a new generation of high school students to think mathematically, to question, to explore, and to reason carefully, rigorously, and precisely." This summer Warshauer's dream is coming true.

Set for June 4-29, the SWT Honors Math Camp has been designed by Warshauer; Dr. Don Hazlewood, chairman of the Department of Mathematics; and Dr. Ron Brown, director of the SWT Honors Program. "The camp is for students from the 10th through the 12th grades," Warshauer says, "so even if you've graduated high school, you can participate. In addition, we're going to have a few college juniors participating."

Thirteen high school students and



DR. MAX WARSHAUER

four college students, approximately half of whom are from San Marcos, will be taking part in the program this year. All will be living in a dormitory on campus and attending classes five days a week.

"The courses themselves don't require any background," Warshauer says, "but they're at college level. The idea is really to teach students to think mathematically. The same principles are used in all different fields of mathematics."

What is involved in "thinking mathematically"? "In many subjects, there might be disagreement on what you can assume," Warshauer says, "but in mathematics, we begin with definitions that are agreed on and understood. The logic is very precise and thought out.

"Mathematics is a very social kind of endeavor," he adds. "What we're trying to do is give proofs that other people can understand."

How does one construct a mathematical proof? "It's really a matter of filling in steps," Warshauer says. "To me, the biggest difference between this and other methods is the preciseness and rigor of the argu-

ment."

Students will have an opportunity to learn this process firsthand during the summer math camp. "You don't learn mathematical reasoning by talking about it or hearing, 'This is how other people do it,'" Warshauer says.

Using the Ohio State program as its model, the SWT Honors Math Camp will offer a course in number theory, as well as a computer-based course using the Boyer-Moore proof checker. Each class will meet for one hour a day, Monday through Friday.

Describing it as "one of the oldest branches of mathematics," Warshauer says that the course in number theory will focus on the properties of integers, primes, prime factorization, Euclid's algorithm, Diophantine equations, modular arithmetic, and public key encryption or the creation of codes.

"The properties of integers may seem very simple," Warshauer admits, "but there are many unsolved problems. The subject matter is elementary, but very challenging.

"Carl F. Gauss, one of the all-time

great mathematicians, remarked, 'Mathematics is the queen of the sciences, but arithmetic (number theory) is the queen of mathematics,'" says Warshauer, who will be teaching the course. "If one learns to 'think deeply of simple things,' then anything is possible."

The other mathematics course the students will take is "Logic: Induction and Recursion," taught by Dr. Don Hazlewood. In this course, Warshauer says, participants will learn to use a computer to check their arguments. More specifically, they will use the Boyer-Moore proof checker as well as Mathematica, which he describes as a "program for doing symbolic computations with a computer."

The final course on the schedule is an honors seminar which will meet three hours a week. "Ron (Brown) will introduce the students to college life and the resources available at the university," Warshauer says. "In general, it will help students think about their future and set goals for themselves."

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