

## Statement of Teaching Experience and Philosophy

I have been teaching since 1974, when I was a graduate student at the University of Chicago. There I had full responsibility for a section of calculus, and I was regarded as one of the best graduate-student instructors. As evidence of this, in 1979 I was chosen to teach calculus with a computer supplement, the first time that had been done at Chicago. In 1980 I went to work in industry and did not teach until 1987. I am now on sabbatical, following my 15th year of teaching at the University of Colorado at Denver.

One clear characteristic of my teaching at CU-Denver is versatility. Tracing back through my records, I am somewhat surprised to find that I have taught no course more than four times, and that I have taught 19 different semester courses:

### Undergraduate

Calculus I  
Discrete Math I  
Discrete Math II  
Linear Algebra  
Differential Equations  
(first time Spring 2002)  
Senior Seminar  
Advanced Calculus I  
Advanced Calculus II  
Numerical Analysis I  
Numerical Analysis II

### Undergraduate/Graduate

Math Clinic I  
Math Clinic II

### Graduate

Linear Algebra  
Analysis  
Numerical Analysis I  
Numerical Analysis II  
Partial Differential Equations  
Numerical PDE (FDM/FEM)  
Numerical PDE (FDM only)

The Senior Seminar is a “capstone” course that teaches undergraduates about careers in mathematics and develops certain technical and communication skills. The Math Clinic is a course in which students work on a problem posed by an external sponsor; my two-semester clinic was sponsored by the U.S. Geological Survey and dealt with modeling of groundwater flow. The Numerical PDE course was restructured after a separate course on Finite Element Methods was developed.

In addition to courses, I have worked extensively with graduate students on an individual basis. Five students have completed Ph.D.’s under my supervision, and I was a virtual co-advisor for a sixth. I have also been the advisor of two M.S. students and one intern, and have supervised independent study projects or readings courses for ten students in addition to those whom I have advised.

My philosophy of teaching is based on the principle that what counts is what the students learn and retain, not what I do. I try to get the class to orally fill in the details of my lectures, in order to keep the students thinking. Frequent graded homework assignments, with solutions handed out, give me feedback and prevent students from falling behind. The workload is demanding, and my tests tend to be quite difficult. I believe that this makes the

students learn more and gives me a better idea of what they have learned than easier tests would.

At the same time, I try to make students feel comfortable and not intimidated. I am not reluctant to share my own fallibilities, and to tell students that they should not be discouraged when they experience the expected struggles with hard material. I also try to bring the benefits of my practical and interdisciplinary experience into the classroom; having worked in industry, and having continued to work with non-academic scientists since returning to the university, I can offer perspectives that many others cannot. A common question that I pose when starting a new topic is “Why do we care?” Typically, my answer is based on experiences with real-world problems outside the university.

Despite the computational orientation of my research, I do not worship technology for education. I believe that technology can be of great benefit when used wisely, but that there are serious dangers if it is allowed to substitute for thinking or for development of skills. Many faculty at CU-Denver have been developing online courses and web-based materials for traditional courses, and as chair from 1996 to 2001 I encouraged these efforts. (I have had little time to attempt such things myself, beyond making use of facilities such as Blackboard.) My sense is that our students still want to learn primarily in the old-fashioned ways, and that we need a balanced environment that has room for the old with the new.

The University of Colorado conducts student evaluations of instructors at the end of every course. The most-cited item is the instructor rating, on a scale of 0 to 4. An average rating in mathematics is about 3.0, and in recent years my ratings have averaged about 3.5. In view of the demanding nature of my courses, I would not expect to do much better than this. My colleague, William Briggs, who is a President’s Teaching Scholar (the University of Colorado’s highest honor for teaching), will comment on my teaching in a letter of recommendation. I have observed him many times, and feel no shame in saying that I am not the teacher that he is, but I am strongly committed to good teaching and feel that I can take pride in my performance.

I have been committed to good teaching as an administrator as well as a faculty member. Early in my tenure as department chair, I started a series of monthly “brown bag” discussions of teaching, which Dr. Briggs now organizes. These are well-attended and have enhanced the “teaching culture” of the department, being a constant reminder that teaching is important. I also made it a top priority to communicate with “client” departments and to respond positively to their needs and concerns. As examples, we recently designed a junior-level mathematics course specifically for chemistry majors, and we are currently working with the College of Engineering on possible major restructuring of the freshman/sophomore mathematics curriculum for engineering students.