

TEACHING STATEMENT

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Teaching Philosophy

Teaching at the graduate and undergraduate levels is one of the responsibilities I enjoy most and carry out very well. My goal as an instructor is to present relevant material as clearly as possible. Over the years I have learned not to rush through my syllabus simply to cover all the topics. Instead, I focus on the learning outcomes, handling student difficulties by asking questions and waiting for questions to be asked, and assigning numerous in-class activities to make sure that the fundamental concepts are well understood.

I teach primarily through a hands-on approach. Not with a view to disseminate what I know, but with a view to help students learn the concepts well. As their instructor I facilitate student learning by offering alternative methods in the classroom. Most students in computer science and computer engineering learn more by doing hands-on activities rather than a classroom format. Consequently much of my efforts in the courses I teach are directed towards the development of hands-on laboratory or recitation experiences that are tightly integrated with the lectures. Before testing the students, I expose them to concepts three times: once in the lecture via examples, a second time via pencil and paper exercises, and a third time via a laboratory or programming project. I have successfully used this paradigm in both undergraduate and graduate courses. The innovation is in the pedagogy, which facilitates student learning. This paradigm was also integrated into the textbook I wrote on assembly language and computer architecture. I help students achieve their goals by providing them with the skills they need and the opportunities to practice those skills.

In 1994 I was put in charge of the undergraduate curriculum in our department. Since that time I have primarily focused my attention on instruction and computing laboratories for course development. Together with Professor Charles Wright, I wrote several successful proposals for instructional equipment. The computer science department was pressed for space (and still is) and so these proposals all went through computer engineering. We decided this was the best way to benefit students in both computer science and computer engineering.

For many years, I was in charge of teaching the frontier courses in our discipline. Teaching at the freshman level poses challenges not encountered at the higher levels due to the diversity of students' backgrounds, the sheer size of the lecture sections (in excess of 150 students), and the administrative demands placed on the instructor. The motivation I have provided for students to stay in our discipline and the enthusiasm they have shown has been the reward for this effort. There has also been the benefit of learning new technologies for lecturing and course management. These include the use of computer demonstrations of programming concepts, computer-assisted homework submissions and grading, and the dissemination of course material through the World Wide Web.

In the senior-level undergraduate and graduate courses, besides providing students with the professional and research skills, I emphasize communication skills through oral presentations and written reports for class sizes that are relatively small (about 20 to 30). I teach students that learning to disseminate their ideas through oral and written means is the key to success in almost all employment areas.

I have always stepped in for the department and developed and taught many courses that were not in my immediate area of research. I have developed 19 courses during the last 21 years. Many of the courses had to be developed from scratch. It has been my belief that anyone with a Ph.D. in computer science ought to be able to teach any course at the undergraduate level with some effort. As for graduate courses, it takes a lot more effort but I have done that as well. Unusual circumstances in our department and a sudden exodus of faculty in the mid 1980s forced our department to make adjustments and I volunteered to step in and meet the challenge.

Courses Taught

Courses taught at the undergraduate level include beginning programming, discrete mathematics, design and analysis of algorithms, assembly language and computer architecture, operating systems, programming languages, and parallel computing. Courses taught at the graduate level include high-performance computing, computer architecture, artificial intelligence, and theory. In addition I have also taught graduate seminar courses.

Course Evaluations

Evaluations and feedback received from students indicate that my teaching is considered excellent. Compared to departmental peer teaching, my ratings are generally far above average. A comment frequently made is that “he’s one of the best instructors I’ve had at ISU.”

Mentoring

I have actively participated in mentoring high school students and beginning undergraduate students in the Women in Science and Engineering Program (WSE) and Research Careers for Minority Scholars (RCMS) Program held at Iowa State during the summers. This activity was done jointly with the late Prof. Charles Wright.

Each student spent between 6 to 8 weeks working every day in the summer. We conducted formal classes in the mornings, explaining aspects of computers, programming in C/C++, and application software in the Mac Lab in Coover Hall. In the afternoons we conducted laboratory sessions to reinforce the concepts taught. Each student had to eventually work on a major project that culminated in a written report and a Poster presentation at the end of the internship.

Depending on the strengths and interests of the students, our approach was to prepare a custom training program for each student so that they got the most out of their internship experience and hopefully the motivation to pursue baccalaureate and masters degrees. This took up a lot more of our time but we felt that the rewards were worth the effort we put into it.

The WSE internship was coordinated by Mary Ann Evans and the RCMS internship was coordinated by Loren Zachary.

The names of students I mentored are listed below:

Summer 1993

Corine Hegland	WSE
Jolynne Roorda	WSE
Kris Fretz	WSE
Stacy Pschenica	WSE
William Ortega	RCMS

Summer 1994

Jennifer Cho	WSE
Julee Dunekacke	WSE
Andrea Dekoter	WSE
Lea Boldt	WSE
Gretchen Vogel	WSE
Ana Torres	RCMS
Lew Hill	RCMS

Summer 1995

Brooke Nixon	WSE
Alison Smith	WSE
Kelly Wisebrod	WSE
Jana Navratilova	Student from Czech Republic admitted by Dean Betsy Hoffman
Hana Smidova	Student from Czech Republic admitted by Dean Betsy Hoffman

(Jana and Hana had poor knowledge of English and we had to arrange several break-out sessions tailored specifically for them.)

Lew Hill	RCMS (who also assisted us with the WSE mentees) who continued as a mentee in Fall 1995 and Spring 1996. Lew went on to complete a Masters degree and is currently doing his Ph.D.
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Summer 1996

Michelle Aiken	WSE
Jennifer Remmers	WSE
Julie Reed	WSE

Summer 1997

Jennifer Broussard	WSE
Robin Li	WSE

Krishna Rao High school student from St. Paul, Minnesota (Harvard graduate)

Summer 1999

Eknath Vittal High school student, graduated from University of Illinois, Urbana

2002-03

PFF (Preparing Future Faculty) Mentor to Jun Zhang

2003-04

Faculty mentor to Dirk Reiners