

Curriculum Development and Teaching

The E&EE faculty members are active in curriculum development, the integration of technology in the classroom, and scholarly and creative research activities.

- Dr. Jean-Pierre R. Bayard has received several internal and external grants to support his efforts in pedagogy innovation. He regularly teaches a section of Introduction to Circuit Analysis, ENGR 17, on cable TV through the CSUS Distance and Distributed Education Program.

Dr. Bayard was selected as a National Institute of Science Education Fellow during the spring 1999 semester and spent a year at the University of Wisconsin, Madison working with colleagues from a variety of disciplines and institutions across the United States. During the fellowship, Dr. Bayard and his colleagues focused on the impact of technology on science, mathematics and engineering education.

Dr. Bayard served as the Session Chair for an NSF Workshop on “Improving Undergraduate Education in Mathematics and Physical Sciences through the use of technology” during summer 1999. From 2000 – 2002 Dr. Bayard and his colleagues presented invited workshops at the IEEE Frontiers in Education Conference (FIE) at Boston (2002), Reno (2001), and Kansas City (2000) on the role of computers in enhancing student learning and the integration of technology in the classroom. He has made several presentations on his work at forums on campus such as the CSUS Conference on Teaching and Learning.

Dr. Bayard serves as a faculty mentor for CSUS faculty interested in the applications of technology in the classroom, a program administered through the CSUS Center for Teaching and Learning. He has developed a CD under contract with McGraw Hill Publishing Company to accompany a text on “Electric Circuits” by Alexander and Sadiku.

- Dr. John Balachandra teaches several courses in the areas of Electric Power Engineering, and Power Electronics. In recent years he has been teaching ENGR 120, the Probability and Random Processes, and EEE 244, a graduate course on numerical analysis. Dr. Balachandra has been the Director of the Applied Research and Design Center (ARDC) in the College for three years. He has been successful in attracting externally sponsored research grants to support his scholarly activities.

- Dr. Ronald Becker is singularly responsible for keeping the CpE laboratory classes up to date and on the cutting edge. His classes are fast-paced and informative, and he strives continuously to update the contents of his courses. The Introduction to Logic Design, CpE/EEE 064, laboratory manual is continually updated thanks to his efforts. He has designed and implemented several training boards for use in CpE/EEE 64; presently we are using the third version of this course based on a Xilinx PLD. He inspires students to complete hands-on projects in several courses such as CpE 166 and CpE 187. He introduced the Rabbit 2000 module in CpE 187 and plans to integrate it into the curriculum, so that several classes can use it.
- Dr. Cynthia Colinge led the way to include EEE 166 (Physical Electronics) as a required course in the E&EE curriculum besides developing and offering elective courses in her specialty area of semiconductor devices and fabrication.

Dr. Colinge has excelled as a researcher and a scholar and is proof that meaningful research can be conducted in the CSU environment despite the heavy teaching loads. She received significant monetary and equipment grants and supported several graduate and undergraduate students during the past five years. During the past five year period she published 22 journal and conference papers, presented 5 invited talks, co-authored a textbook and submitted an application for a patent. This is an incredible record, when viewed in the context of the broad spectrum of courses that she taught during the same period. Several students have commented on Dr. Colinge's involvement in research activities and the unique perspectives that she brings to the classroom as a result of her work as an internationally acclaimed scholar and researcher in semiconductor materials. The E&EE Department is fortunate to have someone of her caliber and energy in its ranks.

- Dr. Steven de Haas has a broad teaching repertoire in Electronics, Circuits, Signals & Systems, Controls and Digital Logic. In recent years he has been teaching the Introductory Circuit Analysis Course (ENGR 17) and EEE 184 (Feedback Control Systems). He also served as the course coordinator for ENGR 17 in 2001-02.

Dr. de Haas developed and taught EEE 96A, Introduction to Engineering, that was well received the only time it was offered. The interest from that course led to the development of ENGR 1, Introduction to Engineering, a 1-unit, hands-on laboratory course. This course is offered to qualified high school students through the Accelerated College Entrance Program at CSUS. In addition, he has developed modules for use in the Circuits and Electronics Courses using multimedia techniques. As a laboratory instructor he, along with

Dr. Simes, worked on integrating GPIB in the Electronics laboratory in the early 1990's.

- Dr. Turan Gonen is an effective teacher who teaches a broad spectrum of graduate and undergraduate courses in the areas of Power Systems Distribution, Power System Economics and Reliability.

Dr. Gonen is a prolific author who published five textbooks in Power Engineering and Management. His books are widely used at universities around the world. At CSUS Prof. Gonen developed graduate courses in power engineering on the analysis of faulted power systems and power systems economics and dispatch, as well as an undergraduate course on electric power distribution. He published articles on "Electric Distribution Systems" that appeared in the 1996 and 2000 editions of the McGraw Hill Encyclopedia of Science and Technology.

- Dr. Mahlon Heller has taught a wide range of graduate and undergraduate courses in E&EE including Robotics, Machine Vision, Signals and Systems, Statistical Signal Processing, Neural Networks and Electronics Senior Project. In particular, Dr. Heller took a leadership role in providing E&EE students in the electronics area with an outstanding Design/Senior Project experience. He also revamped the Robotics laboratory and enhanced student interest in the area with interesting projects (for example, the project on MOBOTS). He continues to teach graduate courses in his research area and, more recently, the research methodology course, EEE 201, to help orient Masters degree students towards a thesis or project. Students appreciate the vast practical experience that he brings into the classroom.
- Dr. Preetham B. Kumar has been primarily responsible for the Digital Signal Processing, RF/Wireless Communication areas since he joined the faculty in the fall 1999 semester. This includes an undergraduate elective lecture and laboratory in the Signal Processing area, and five graduate lecture courses in the areas of Signal Processing, RF and Microwave Communications. He developed experimental courses in Wireless Communications (EEE 296B) and DSP Laboratory (EEE 196B) that have since been converted to permanent courses in the curriculum. Of these, the course on Wireless Communications is offered via the CSUS DDE (Distance and Distributed Education) program on Cable TV. He was the PI of an externally funded laboratory equipment proposal from HP that helped establish a dedicated DSP lab at CSUS.

Dr. Kumar has received several grants and equipment donations from industry and is actively involved in supervising graduate and undergraduate student research projects. In March 2002, two of his students presented papers at the 16th annual CSUS research competition, including 'Accelerated Computer Algorithm for Simulation of Electromagnetic Field Interaction with Biological System' by Ambarish M. Bhavsar and 'Conformal Antenna Array (CAA) System for Microwave Hypothermia Treatment of Tumors' by Rohit M. Tulpule. Mr. Tulpule's presentation was selected for presentation at the CSUS system-wide competition at Long Beach, May 2002.

- Dr. Milica Markovic, our newest hire, joined the Department in the spring 2003 semester. Prior to that she was working for Spectrian Corporation on multicarrier power amplifiers. Her work involves RF hybrid circuits, digital and analog circuit design. This experience, coupled with her post-doctoral research in mixed signal design, makes her an extremely versatile faculty member in the RF Integrated Circuit Design area. She has demonstrated the ability to translate theory to practice and this will be invaluable in the classroom setting at CSUS.
- Dr. Miroslav Markovic has been teaching a range of courses in the Electric Power Engineering area, including Power Systems Analysis Lecture and Lab, Electromechanical Energy Conversion Lecture and Lab, Relay protection and substation design. He has developed laboratory manuals for EEE 131 and EEE 143 and has helped organize the Power Engineering Laboratory. Dr. Markovic was the founder of the Electric Power Educational Institute (EPEI) at CSUS.
- Dr. Charles Nelson has taught a broad array of courses in Electromagnetics and Communications in over three decades at CSUS until his retirement in 2002-03. They include Applied Electromagnetism, Digital Communication Systems Design, Modern Communication Systems, Communication Systems Lab, Applied Wave Propagation, Microwave Devices & Circuits, Communications Circuit Design, Engineering Circuits Workshop and the Traveling Waves Lab. Dr. Nelson is clearly an effective instructor, as evidenced by the positive student comments in his file. It is indeed remarkable given the enrollments, breadth and diversity of the classes that he has taught. He retains his passion for teaching, striving to constantly update the material and presentation in his classes. Dr. Nelson has an inimitable teaching style that relates very well with our students and he has the knack for presenting even the most abstract material whether it is in Electromagnetics or Communication Systems, with solid practical examples that students can readily comprehend.

- Dr. Thomas Matthews has been primarily responsible for the Electronics area since he joined the faculty in 1999. He has redesigned the two laboratory rooms that are used extensively in the EEE Department, the Electronics Instructional Lab in RVR 3017 and the Projects Lab in RVR 3013, with grants from the Agilent Corporation and the Strategic Workforce Initiative funds from the State of California. These labs are described in more detail in the next section on instructional facilities. He has developed a course assessment plan for EEE108L and continues to refine the course assessment plan for EEE108.

Dr. Matthews initiated the participation of CSUS in a design competition sponsored by National Semiconductor (The NATCAR Competition) and advised student teams.

Dr. Matthews also serves as the liaison to the MOSIS service. (The name stands for MOS Implementation Service, referring to the type of circuitry fabricated.) CSUS students can have their own designs built onto an integrated circuit (a chip) through this fabrication service. He obtained National Science Foundation funding to cover the costs of this service enabling students to submit their chip designs for fabrication in the Analog IC Design Course. Dr. Matthews assumed the role of MOSIS liaison from Dr. Ramesh, who had served in that capacity before Dr. Matthews was hired.

- Dr. John Oldenburg has pioneered the use of virtual instrumentation in our laboratories using LabVIEW and has successfully incorporated it into EEE/BME 120, an instrumentation course for graduate students in Biomedical Engineering. The University discontinued the graduate program in Biomedical Engineering in 1998. EEE/BME 120 has since been changed completely to a course on Analog/Digital Electronics for the Computer Engineering majors (EEE 102/102L), and Dr. Oldenburg has been pivotal in developing the material for the lecture and laboratory.

One of the other courses taught by Dr. Oldenburg Transmission, Lines and Fields (EEE 161) is an important foundation course for anyone interested in new and emerging areas such as wireless communications. Yet, several students have difficulty grasping the concepts in this course. Dr. Oldenburg has been very successful in bridging the gaps and has successfully introduced advanced applications software such as MATLAB in this course. He has coordinated other sections of the course when taught by part-time faculty members. Besides these courses, Dr. Oldenburg has also taught courses in the Electronics area (EEE 108 and EEE 109 lab).

Dr. Oldenburg is also very active in working with graduate students on their theses and projects.

- Dr. S. K. Ramesh has been serving as the Department Chair since 1994. Despite his administrative and professional responsibilities, he has been very active in the classroom and in curriculum development. Dr. Ramesh developed the Optical Engineering Curriculum at CSUS. This includes three undergraduate courses in Optical Engineering and two graduate courses in Lasers and Fiber Optics. He established an Optical Engineering Laboratory with support from the NSF, the University and private industry. All courses have been offered at least once a year since their inception in 1988. A detailed description of the courses and the Optical Engineering Curriculum may be found on his Web site at www.ecs.csus.edu/eee/bios/ramesh.html.

Beginning with the fall 2001 semester, Dr. Ramesh has been teaching a graduate class on Fiber Optic Communications through the CSUS Distance and Distributed Education Program. The class is broadcast on Cable TV and is complemented with a comprehensive Web-based supplement on WebCT. He also developed and taught two new courses during the fall 1998 semester: EEE 110: Analog IC Design, and EEE 111: Analog IC Design Lab. These courses are now an integral part of the Department's elective offerings in the Analog/Digital Electronics area (Area 1).

In August 1998 Dr. Ramesh received a MOSIS grant (funded by NSF and DARPA) allowing students in EEE 110 to submit their designs for fabrication. This grant allowed students in teams of two to submit chips for design utilizing the 2 μm Tiny Chip process. As a result, students in E&EE were able to complete their designs from concept to chip fabrication and testing. In the EEE 111 lab he developed a set of design experiments dealing with basic CMOS operation, CMOS OPAMP Characteristics, Comparators, and A/D Converters. The students in this lab were required to work independently utilizing LabVIEW and PSPICE. Using WebCT he also created an online supplement for EEE 110 that the students used as a reference and for communication regarding their projects, chip design, homework etc.

Dr. Ramesh teamed with Dr. de Haas and other ECS faculty to offer the successful ENGR 001 course to qualified high school students and also pioneered and offered a nationally-recognized, high school teachers workshop since 1999 to promote engineering education in the K-12 pipeline. Details may be found at the IEEE Web site on www.ieee.org/eab/fcc.

Additional responsibilities include supervision of graduate thesis work and undergraduate research in optical engineering.

- Dr. James G. Simes has taught a wide range of courses in Electrical Engineering over the years. They include Circuits, Networks, Electronics, Linear Systems and Feedback Control Systems.

Dr. Simes arranged and cosponsored an NSF supported workshop (Undergraduate Faculty Enhancement Program) on GPIB for educators from other Universities in 1992. As an early pioneer in the use and integration of GPIB in the laboratory, Dr. Simes' efforts are primarily responsible for the excellent condition of our Electronics and Networks Laboratories today. He has received campus awards for lab development, most recently in 1998, to convert our GPIB lab from BASIC to C.

During the 2002-03 academic year, Dr. Simes redesigned the laboratory courses that accompany EEE 117 (Electric Networks), and EEE 108 (Electronics) and revised and rewrote the laboratory manuals for those courses. This change was necessary due to the curriculum change involving EEE 117 and EEE 108. Based on the assessment results the Department decided to require EEE 117 as a prerequisite to EEE 108 effective with the spring 2002 semester.

- The spectrum of areas covered by Dr. Warren Smith's classes include, Biomedical Engineering, Communications and Signal Processing, Rehabilitation Engineering, Assistive Technology for the Disabled, Probability and Random Signals, Virtual Instrumentation, and Information Theory & Coding. Dr. Smith has successfully experimented with different teaching styles in his efforts to improve students' comprehension of the material. The "presentation style" in particular, puts the onus of responsibility squarely on the shoulders of the student, while also increasing the stress levels of some of the students. Dr. Smith managed to find a happy medium between the presentation format and the traditional lecture/discussion format to not only alleviate the student's concerns but also ensure that they really understood and felt comfortable with the material. Dr. Smith is committed to his students, actively solicits their input, and makes appropriate changes in the format and delivery of his courses to ensure student success.

Dr. Smith works closely with graduate and undergraduate students in Electrical Engineering on Masters Projects/Theses supervision and Senior Projects, respectively.

- Dr. Suresh Vadhva is primarily responsible for the Senior Project classes in Computer Engineering. In these classes Dr. Vadhva has incorporated several tenets of practical engineering projects from industry, emphasizing design reviews, team work, student presentations and demonstrations. A unique feature of these classes is the final project presentation and demonstration before an audience of practicing engineers from industry and student peers. Dr. Vadhva sets high standards for his students, is demanding but very fair in his requirements, and continues to contribute to the success of his students.

Dr. Vadhva has attended several short courses and seminars to keep updated in the rapidly changing field of computer engineering including the Network-Interop conference in 2002 and 2003. During the summer of 1997, Dr. Vadhva served as a faculty intern at INTEL Folsom. As a result of his experience he has successfully introduced several concepts from computer architecture and digital design into the curriculum.

When Prof. Stoffers retired from the faculty, Dr. Vadhva took over as the Course Coordinator for EEE 174, Introduction to Microprocessors. He helped create and implement a comprehensive course embedded assessment plan in EEE 174.

- Dr. Yousif teaches a broad spectrum of graduate and undergraduate courses in the areas of Random Processes, Controls, Electrical power, and Linear Systems. He motivates his students to learn the material by providing several examples. This is especially important in some of the more abstract courses that Prof. Yousif has been teaching over the years.

Dr. Yousif regularly attends meetings of the IEEE Power Society. He has served as a member and reviewer on several IEEE PES Committees. In addition he co-authored a paper that was presented at the IEEE Power Tech Conference in Budapest, Hungary, in 1999. He has published an article on "Electric Power Educational Resources" that appeared in the 1996 IEEE Transactions on Power Systems. Besides serving as a reviewer for IEEE, he has also attended an NSF sponsored short course on "Power Electronics" at the University of Minnesota in 1997.