

Mathematics and Science Education

OFFICE: 188 Galbraith Hall
<http://public.sdsu.edu/CRMSE/jdpmmain.html>

Professors

Mark I. Appelbaum, *Psychology*
Ted J. Case, *Biological Sciences*
Paul M. Churchland, *Philosophy*
Michael Cole, *Communication*
Guershon Harel, *Mathematics*
Barbara Jones, *Physics*
Douglas Magde, *Chemistry and Biochemistry*
Alfred B. Manaster, *Mathematics*
Hugh B. Mehan, *Sociology*
Jeffrey Rabin, *Mathematics*
Douglas W. Smith, *Biological Sciences (Emeritus)*

Senior Lecturers (SOE)

Barbara A. Sawrey, *Chemistry and Biochemistry*
Randall J. Souviney, *Teacher Education Program*
Gabriele Wienhausen, *Biological Sciences*

Associate Professor

John Batali, *Cognitive Science*

Lecturer (SOE)

Norman A. Shenk, *Mathematics (Emeritus)*

Assistant Professor

Rafael E. Nunez, *Cognitive Science*

The Joint Doctoral Program

UCSD and San Diego State University have created this innovative program for students who already have a master's degree in biology, chemistry, mathematics, or physics. In this program, students will complement their discipline knowledge with studies of how people learn mathematics and science. The UCSD Joint Doctoral Group in Mathematics and Science Education currently consists of faculty from the Division of Biological Sciences and the Departments of Chemistry and Biochemistry, Cognitive Science, Communication, Mathematics, Philosophy, Physics, Psychology, and Sociology. The SDSU Program faculty is drawn from the Departments of Biology, Mathematical Sciences, Natural Sciences, Physics, Psychology, and the School of Education.

The program includes research, practical applications, and formal coursework. Students must commit at least four years to the program, and most students will complete the program in four to five years. An individualized course of study will be designed for each student, depending on the student's background and interests.

The graduates of this program will be able to contribute to the developing body of knowledge about human cognitive processes in mathematics and science. They will be expected to maintain a strong connection to educational practice through teaching and application of research results on learning to instructional situations.

Information regarding admission is found in the current edition of the *Bulletin of the Graduate Division* of San Diego State University.

Ph.D. Time Limit Policies

All time limits for this program start when a student first registers in this program. Students must be advanced to candidacy by the end of four years. Total university support to students in this program cannot exceed five years. Total registered time in this program cannot exceed six years. The normative time in this program is five years.

COURSES

MSED 290. Issues in Science Education Research (4)

Survey of recent literature highlighting critical issues in science education research. Specific focus on research in biology education, chemistry education, and physics education. Theoretical perspectives and research methodology (both qualitative and quantitative) used to understand learning will be discussed. *Prerequisites: admission to the Joint Doctoral Program in Mathematics and Science Education or a master's degree in biology, chemistry/biochemistry, mathematics, or physics with consent of instructor.*

MSED 295. Orientation Practicum (2-6)

This course should be taken the first year. Each practicum lasts five weeks and is designed to inform students about a faculty member's research program. Assignment as a research assistant may be used as one practicum. *Prerequisite: admission to MSED Joint Doctoral Program.*

MSED 296A. Theories and Applications of Mathematics and Science Education (4)

The course is designed to cover several major themes in mathematics and science education. It will address theories and applications of cognition, teaching and learning, and curriculum, with particular emphasis on international perspectives. This is a three-quarter sequence. *Prerequisites: admission to the Joint Doctoral Program in Mathematics and Science Education or a*

master's degree in biology, chemistry/biochemistry, mathematics, or physics with consent of instructor.

MSED 296B. Theories and Applications of Mathematics and Science Education (4)

The course is designed to cover several major themes in mathematics and science education. It will address theories and applications of cognition, teaching and learning, and curriculum, with particular emphasis on international perspectives. This is a three-quarter sequence. *Prerequisites: admission to the Joint Doctoral Program in Mathematics and Science Education or a master's degree in biology, chemistry/biochemistry, mathematics, or physics with consent of instructor. MSED 296A must be taken before MSED 296B.*

MSED 296C. Theories and Applications of Mathematics and Science Education (4)

The course is designed to cover several major themes in mathematics and science education. It will address theories and applications of cognition, teaching and learning, and curriculum, with particular emphasis on international perspectives. This is a three-quarter sequence. *Prerequisites: admission to the Joint Doctoral Program in Mathematics and Science Education or a master's degree in biology, chemistry/biochemistry, mathematics, or physics with consent of instructor. MSED 296B must be taken before MSED 296C.*

MSED 298. Research Project (2-12)

Students will work on an independent research project under the supervision of MSED faculty.

MSED 299. Reading and Research (1-12)

Students will do independent study and research in preparation of their doctoral dissertation under the supervision of MSED faculty.