CURRICULUM VITAE

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2. Home Address:

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3. Education:

B.A. Carleton College, 1964
M.S. UCLA, 1967
Ph.D. UCLA, 1971
Dissertation topic: "Experimental Development of Preferred Orientation of Mica During Recrystallization"

4. Professional Appointments:

1964	(June-Sept)	Tectonophysics Summer Field Assistant, Shell Development Co.
1968-69		Research Assistant, Institute of Geophysics, UCLA
1969-70		Acting Instructor, Department of Geology, UCLA
1970-76		Assistant Professor, Brown University, Department of Geological Sciences
1976-89		Associate Professor, Brown University, Department of Geological Sciences
1976-77	(Sept-Jan)	Visiting Fellow, Australian National University, Research School of Earth Sciences
1977	(Jan-June)	Geologist, U.S. Geological Survey, Office of Earthquake Studies
1984	(April-May)	Visiting Professor, Texas A&M University, Center for Tectonophysics
1989-2005		Professor, Brown University, Department of Geological Sciences
2005-		Emeritus Professor and Research Professor, Brown University, Department of Geological Sciences
1990	(Sept.-Oct.)	Visiting Professor, Harvard University
1990	(Aug, Oct.-Dec.)	Geophysicist, GS-15, United States Geological Survey Office of Earthquakes, Volcanoes, and Eng. Geol.
1997-1998		Adjunct Professor, South Dakota School of Mines and Technology, Department of Geology and Geological Engineering

5. Completed Research

a. Books authored or edited

Tullis, T. E. (editor) , 1986, *Special Issue on Friction and Faulting,* Pure and Applied Geophysics, 124, 234 p.

b. Chapters in Books

Sbar, M. L., Engelder, T. and Tullis, T. E., 1978, Near-surface in situ stress measurements along the 1857 break of the San Andreas Fault, in Stress and Strain Measurements Related to Earthquake Prediction, USGS Open File Report 79-370, 485-499.

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c. Refereed Journal Articles

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c. Refereed Journal Articles Accepted

e. Book Reviews

Tullis, T. E., 1976, Review of Structural Geology by Hobbs, Means and Williams, Earth Science Reviews, 13, 99-100.

f. and h. Abstracts of Papers Presented at Meetings

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Shelton, G. L. and Tullis, T. E., 1980, Faulting at high temperature and pressure, Eos Trans. AGU, 61, 376.

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Tullis, T. E. and N.M. Beeler, Multiscale Simulation of Earthquakes at Parkfield, California, Using Rate and State Friction and Fast Multipoles, *ACES Workshop, May 11-16, 2008*, Cairns, Australia, 2008.

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Li, Q., R. Carpick, D. Goldsby, and T. E. Tullis (2009), Probing the mechanisms of rock friction at the nanometer scale with atomic force microscopy, *Eos Trans. AGU, Fall Meet. Suppl*, *90*, T14B-08.

g. Invited Lectures

February 1980-	"Stress Measurements on the Palmdale Uplift", MIT
November 1982 -	"Mechanics and Processes of Deformation" at National Association of Geology Teachers Symposium on Teaching of Structural Geology and Tectonics
April 1983 -	"The History of Experimental Rock Deformation for the Past 50 Years", Carleton College Symposium on Revolution in the Earth Sciences, 1932-1982
November 1983 -	"Rock Friction and Earthquakes", Cornell University
April 1984 -	"Constitutive Behavior of Rock Friction", Texas A&M University
February 1985 -	"Slip and Time Evolution of Laboratory Friction and Fault Instability Mechanics", Harvard University
May 1985 -	"Constitutive Behavior and Stability of Frictional Sliding of Granite", 5th Ewing Symposium on Earthquake Source Mechanics, Arden House, Harriman, NY
October 1985 -	"Rock Friction and Earthquakes", SUNY at StonyBrook
April 1986 -	"Rock Friction and Earthquakes", SUNY Albany
November 1986 -	"Rock Friction Constitutive Behavior from Laboratory Experiments and its Implications for an Earthquake Prediction Field Monitoring Program", U. S. Geological Survey, Conference on Intermediate -Term Earthquake Prediction
December 1987 -	"Progress and Problems in Understanding Rock Friction" at American Geophysical Union Fall Meeting
February 1989 -	"Rock Friction and Earthquake Prediction", Brown Faculty Colloquium
August 1989 -	"The Science of Understanding Earth Processes", New England Association of Chemistry Teachers 51st Summer Conference
September 1989 -	"Rock Friction and Earthquakes", Yale University
October 1989 -	"Rock Friction and Surface Chemistry", Physical Chemistry Group, Brown University
February 1990 -	"Rock Friction and Earthquakes", University of Connecticut
March 1990 -	"Strain and Geodetic Changes Predicted from Fault Models that use Laboratory-based Constitutive Laws", NSF/USGS Workshop on Crustal Deformation Measurement and Earthquake Mechanics

April 1990 -	"Rock Friction and Earthquakes", Dept. of Terrestrial Magnetism, Carnegie Institution of Washington
May 1990 -	"Rock Friction and Surface Chemistry", Tribology group at NASA's Lewis Research Lab, Cleveland, OH.
June 1990 -	"Origin of the Evolution Effect in Rock Friction", Symposium at MIT in honor of Bill Brace.
November 1990 -	Invited to participate as a member of the U.S. delegation to "The 7th Joint Meeting of the U.S.-Japan Panel on Earthquake Prediction Technology" in Tsukuba, Japan and to give a paper there.
November 1990 -	Invitation and transportation to Tokyo, Japan to present a paper, "Three dimensional modeling of strike slip earthquakes using laboratory-based rate- and state-dependent constitutive laws" at the International Symposium on Earthquake Source Physics and Earthquake Precursors.
January 1991 -	Invited to present a keynote lecture on "Mechanics of Distributed Deformation" at a symposium/workshop on "Mechanics of Lithospheric Deformation: Initiation, Evolution and Destruction of Continental Margins", sponsored by Ocean Studies board and Board on Earth Science of the National Academy of Sciences, Irvine, California, Jan 14-17.
May, 1992 -	Lecture on Geology to students at Alternative Learning Project, Providence
September 1992 -	"The Processes Involved in Rock Friction and Earthquakes", Cornell Univ.
April, 1993-	"Saint Andrew meets Jerry Lee Lewis", Review Club.
June, 1993 -	Invited to present a paper, "The Effect of Pore Fluid Chemistry on the Friction of Quartz Gouge," at a meeting on "The Mechanical Involvement of Fluids in Faulting" sponsored by the U. S. Geological Survey, June 6-10, Tenaya Lodge, Fish Camp, California.
June, 1993-	Invited to present a paper, "What Instability Modeling of Parkfield Earthquakes Suggests About Their Predictability," at the Fifth Annual IRIS (Incorporated Research Institutions in Seismology) Workshop, June 10-14, Waikoloa, Hawaii,
December, 1993-	Invited to present a paper, "The beginning of earthquake rupture in Parkfield models," at a special session on "The Beginning of Earthquake Rupture" at the Fall AGU Meeting, December 6-10, 1994, San Francisco, California.
May, 1994-	Invited to present a paper, "What determines the maximum strength of crustal earthquakes and what are the implications of this for the strength of the crust?," at a special session on "What Do We Know About the Strength of the Crust Anyway?" at the Spring AGU Meeting, May 23-27, 1994, Baltimore Maryland.
February, 1995-	Invited to present a paper on the general area of experimental rock mechanics and its implications for earthquake prediction at a colloquium on "Earthquake Prediction: The Scientific Challenge" sponsored by the U. S. National Academy of Sciences, February 10-11, Irvine, California.
April 14, 1995 -	"Rock Friction and Earthquake Mechanics," Department of Earth, Atmospheric and Planetary Sciences Lecture Series, MIT
April 1980-1997 -	Lead annual seminar discussion on Earth Sciences in a chemistry class at Moses Brown School.

October 3, 1997	"Rock Friction and Earthquakes", Dept. of Geology and Geological Engineering, South Dakota School of Mines and Technology
March 6, 1998	"The Roughness of Natural Faults", Dept. of Geology and Geological Engineering, South Dakota School of Mines and Technology
November 8, 1998	"Earthquakes in the Azores", Portuguese American Federation Annual Congress
February 4, 1999	"The Cassandra of Earthquake Prediction: Is She Attainable or Desirable?" Brown University 101 Forum
February 25, 1999	"Rock Friction and Earthquakes", Brown University, Department of Geological Sciences Colloquium Series
March 3, 1999	"Rock Friction and Earthquakes", Kyoto University, Kyoto, Japan
March 4, 1999	"Rock Friction - Observations and Processes", Geological Survey of Japan, Tsukuba, Japan
March 5, 1999	"The Implications of Rock Friction for Earthquake Mechanics and Prediction", Geological Survey of Japan, Tsukuba, Japan
March 5, 1999	"Measurements and Significance of Fault-Surface Roughness", Geological Survey of Japan, Tsukuba, Japan
April 23, 1999	"Rock Friction and Earthquakes", California Institute of Technology
August 2, 1999	"Using Microsoft FrontPage to Make Web Pages", Sheridan Center Seminar, Brown University
August 9, 1999	"What processes cause time-dependent increases in strength of frictional surfaces?", Third Gordon Conference on Rock Deformation
Sept. 30, 1999	"Rock Friction and Earthquakes," Pomona College
May 23, 2000	"The Origin of State Evolution in Friction: Using Normal Displacement Measurements to Test the Area-Change Explanation," Harvard University
May 27, 2002	"Rock Friction and Earthquake Mechanics," University of Padova, Italy.
July 18, 2002	"Extreme Frictional Weakening of Quartz Rocks at Intermediate slip Speeds," KECK Workshop on Earthquake Mechanics, University of California, Santa Barbara
June 9, 2004	"Laboratory and Numerical Experiments on Coseismic Friction and Earthquakes," USGS in Menlo Park
November 7, 2005	"Simulation of Earthquakes at Parkfield California, Using Rate and State Friction and Fast Multipoles," Kavli Institute For Theoretical Physics, University of California, Santa Barbara KITP
November 14, 2005	"What May be Responsible for the Evolution Effect in Rate and State Rock Friction," Kavli Institute For Theoretical Physics, University of California, Santa Barbara KITP
February 8, 2006	"Rock Friction at Coseismic Slip Rates," California Institute of Technology
April 5, 2007	"Rock Friction at Seismic Slip Rates, Fault and Rock Mechanics (FARM), and the Southern California Earthquake Center (SCEC)," Brown University
June 10, 2008	"Shear Localization and Particle Sizes in Experimental and Natural Fault Zones," SCEC Workshop on The Structure and Formation of Fault Zones, and their Role in Earthquake Mechanics
March 22, 2010	"What We Can Learn From Earthquake Simulations," Istituto Nazionale di Geofisica e Vulcanologia, Rome, Italy

6. Research in Progress

Papers In Preparation

Titone, B., K. Sayre, G. Di Toro, D. Goldsby, and T.E. Tullis, The role of water in the frictional weakening of quartz at rapid slip rates, *Geophys. Res., Lett.*

Tullis, T.E., Evaluating the origin of the friction evolution effect using fault-normal displacements, *Geophys. Res., Lett.*

Scruggs. V. J., and T. E. Tullis, Friction of bare albite surfaces: comparison to granite*, J. Geophys. Res.*

Scruggs. V. J., and T. E. Tullis, Frictional behavior of muscovite, talc and biotite: a comparative study, *Pure Appl. Geophys.*

Scruggs, V. J, and Tullis, T.E., Evolution of friction and velocity dependence with large displacement in albite gouge faults: comparison with granite gouge faults, *J. Geophys. Res.*

Hadizadeh, J., T.E. Tullis, D. L. Goldsby, and A. I. Konkachbaev, Particle size-driven shear localization and cataclastic foliation in simulated granite gouge, *J. Geophys. Res.*

Goldsby, D. L, and T.E. Tullis, Flash heating and extremely low strength of crustal rocks during earthquakes, *Science.*

Fuping Yuan, Vikas Prakash, and Terry Tullis, Origin of pulverized rocks during earthquake fault rupture, *J. Geophys. Res.*

Kohli, A.H., D.L. Goldsby, G. Hirth, T.E. Tullis (2010), Flash weakening in serpentinite at near-seismic slip rates.

Description of my research

My research program studies the mechanics of stable and unstable fault slip, with applications to understanding and helping to predict earthquakes. The principal focus of this research is a combined experimental and theoretical study of the constitutive behavior for rock friction in order to understand both the fundamental operative processes and the mechanics of earthquake instabilities. The program includes field and laboratory study of the surface topography of natural fault surfaces in order to learn how to scale laboratory friction experimental results to natural earthquakes. I am also engaged in numerical modeling of the stress and slip velocity distribution during a characteristic earthquake cycle in the region surrounding a fault with realistic constitutive behavior, in order to determine expected precursory phenomena that could be measured in a field-monitoring program for earthquake prediction. I have finished a project to evaluate a new approach to predict earthquakes that is based on a controversial method of identifying foreshocks. Although we found that the method was invalid and the apparent triggering due to random chance, the work has opened up some new opportunities for following up with a study of other earthquake prediction methods. A graduate student and I have also completed a study of the validity of a new method that some Chinese have claimed is successful in predicting earthquakes.

The experimental work by my group in the past several years has concerned: 1) testing whether previously proposed constitutive relations adequately describe rock friction in laboratory experiments, 2) experimentally determining the values of the constitutive parameters in these relations, and 3) testing whether theories of instability that employ these constitutive relations

agree with observations of stability behavior in the experimental setting. We have found that the stability theories work well and we are able to understand quantitatively the transition from stick-slip to stable sliding in the laboratory. However, the constitutive descriptions only describe the behavior over more limited ranges of velocity than we have studied experimentally or are important in nature, and thus they represent only a partial description of constitutive behavior. Consequently we are attempting to measure the frictional response at intermediate slip velocities with and without pore fluid and are building equipment to slide at higher rates in the future. With pore fluid shear heating can cause the pore pressure to rise and thus the shear resistance to fall. Without pore fluid, shear melting can occur – this is expected during earthquakes, but it does not occur at the rates we can now attain. Both processes could be important in allowing dynamic stress drops during earthquakes to be larger than static stress drops and can be important in affecting the magnitude of accelerations at the earthquake source and consequently the magnitude of the damage-causing strong ground motions.

To do the laboratory friction measurements I have designed and built a unique high-pressure rotary shear gas apparatus – for the past 30 years I have been using and improving this machine. I am now modifying it so that we can slide at seismic slip rates of 1 meter per second. To do this at 100 MPa normal stress requires 80 horsepower, and the current electric motor and hydraulic power supply can only deliver 10 HP – this is what presently limits us to only intermediate slip rates. Consequently, I have purchased a 100 HP motorcycle engine and I am partway through designing a way to adapt this to the rotary shear apparatus so we can slide at seismic slip rates and investigate the new processes that are expected to occur at these more rapid rates. I have also nearly finished building the sample assembly parts that incorporate an internal furnace so we can do experiments in rotary shear at both high pressure and elevated ambient temperature – the most complex of the parts have already been constructed by our machinist.

The constitutive relations we presently use to describe the frictional response are primarily derived empirically from experimental data and are not based upon an understanding of the micromechanical processes that operate during frictional sliding. This is an unsatisfactory situation, both from the point of view of gaining a true understanding of the observed phenomena and that of applying laboratory observations to natural faults. One of the principal difficulties is that the processes that cause frictional resistance in rocks are not really known. Various possible processes have been proposed, in part by analogy with friction in metals, but the relative importance of these for rocks is unknown. One of the major continuing efforts I am engaged in is to try to understand the processes that operate and the implications these have for the constitutive behavior, both in the laboratory and on natural faults. This is an important problem, but a difficult one. The difficulties arise in part because it is hard to make observations of the samples on the scale at which the frictional resistance occurs. One of the important processes in frictional resistance is probably adhesion acting across very small areas of contact. In order to understand the role played by adhesion, I have been investigating the effect of chemical environment on frictional behavior, since recent advances in understanding intermolecular and surface forces suggest that different chemical environments should show different tendencies for attraction and repulsion between surfaces. I am also investigating the quantitative role played by small changes in the thickness of the fault zone and whether these may demonstrate that time-dependent indentation creep is responsible for the changes in friction that occur with time and velocity. This

part of my planned research involves fundamental materials science and also has important practical applications for understanding the earth.

I also initiated a series of indentation experiments on quartz in a variety of chemical environments in order to determine whether the time dependencies observed in rock friction could be due to plastic flow of contact points. More work on this has been conducted at Oak Ridge National Laboratory with Dr. David Goldsby, an Associate Professor, Research at Brown.

In the last few years I have been conducting research on numerical modeling of fault behavior using constitutive descriptions of fault zone materials obtained from laboratory experiments. This is not only interesting in helping to understand the behavior of faults, it can be of value in determining the extent to which earthquake prediction can be aided by accurate constitutive descriptions. With the availability of increased computer power it is becoming more feasible to study realistic three dimensional models. I have made three dimensional instability models of the series of characteristic earthquakes that occur at Parkfield, California, and have made videos of these models to aid in understanding their complex behavior. This was intended to evaluate whether the model of Parkfield earthquakes could be predicted by existing arrays of field instruments in the presence of earth noise, something that does not seem possible. This numerical modeling of earthquakes suggests that although accelerating slip probably occurs at the earthquake hypocenter prior to the main earthquake, its magnitude may be too small to detect from the ground surface by most measurement methods. However, foreshocks are likely to occur as part of the accelerating slip process and, if they can be identified, they could form the basis for predicting the earthquake. I am interested in working with NASA to determine whether the space-based geodetic methods of GPS and INSAR might be able to detect the small displacements of the Earth's surface that we expect will precede some earthquakes.

I have become involved with a group of other scientists who are interested in trying to understand earthquakes through a combination of simulations of earthquakes and analysis of a wide variety of observations made of the earth that are relevant to earthquake occurrence and prediction. This group was intitally called GEM (General Earthquake Models) and I was the cochairman of the GEM Committee on Simulations. As part of this GEM effort I have attended eight workshops and have taken the lead in applying some advanced computation methods (Fast Multipoles) to this earthquake modeling effort so that we should be able to make much more realistic models using parallel processing on large supercomputers. My results so far on using this method suggest that it is possible to make models with enough elements that we can properly represent a continuum and can simulate microearthquakes as well as major ones in the same model. As part of this the GEM group received a 3-year, $2.2 million grant from NASA that allowed us to make some substantial progress solving these problems. As my part of this I have completed the programming and the code improvement that involves converting the earthquake code to run in parallel using MPI. Documentation on this is publicly available at http://www.servogrid.org/slide/GEM/PARK/ as one of the computer codes on the web site set up by our group. A subsequent evolution of this group into QuakeSim (http://quakesim.jpl.nasa.gov/) has provided a framework for continued efforts and obtaining grants.

I am a participant in the ACES group (APEC Cooperation in Earthquake Simulation), having been invited to become the US Group leader for Working Group 1, Microscopic Simulation. My laboratory experiments provide important constraints on the discrete particle modeling that the people in this group are doing and I am glad to be able to help pull together this international group of scientist who are trying to understand the deformation of granular fault gouge from a fundamental point of view.

I originated and was the first chair of the Fault and Rock Mechanics focus group in the Southern California Earthquake Center (SCEC2), and as a consequence a member of the SCEC planning committee that defines the research program and reviews proposals. I was also selected as one of the two at-large Board Members of SCEC. This provides a valuable opportunity for interdisciplinary collaboration in trying to understand earthquake processes, but also takes considerable time and effort.

I am now the Chair of the Earthquake Forecasting and Predictability focus group of SCEC3. In this capacity I have taken on the leadership of a collaboration of about ten groups who are comparing the behavior and results from their Earthquake Simulators which are earthquake codes designed to generate synthetic sequences of earthquakes. We are comparing the different simulators to determine if they give similar or different results and are also comparing their output with the limited data available on real earthquake. The purpose is to determine whether they give sufficiently realistic behavior that they can be used as one part of the effort to understand the probabilities of occurrence of earthquakes, starting in California. The simulations offer the opportunity to generate sequences of earthquakes that are much longer than the historic record.

I am also returning to investigate the implications of the measurements that we made 10 years ago of fault surface roughness and the degree to which opposing fault surfaces are mated. The fact that fault surfaces are mated before an earthquake, but have some roughness in the slip direction has two important implications. First, as slip occurs, dilatancy will occur as the surfaces become unmated. This will cause a suction on the pore fluid that will either reduce the pore pressure causing dilatancy hardening or will tend to counteract any increase in the pore pressure caused by shear heating and pore fluid expansion. Thus the dilatancy may make one proposed dynamic weakening mechanism, thermal pressurization, ineffective. Secondly, the differing roughness of natural faults as compared with flat experimental sliding surfaces may mean that the laboratory characterization of friction evolution with slip in terms of an approximately exponential decay of resistance with slip may not hold for natural faults. If this proves to be true, it suggests major modifications in how we simulate earthquakes and could help us understand better how a large range of sizes of earthquakes can exist.

The combination of experimental, field, and modeling studies makes for a program of understanding deformation of the earth that is intellectually stimulating and of practical value. Although the problems are not easy ones and they will not be solved in a short time, they are important research objectives and provide valuable opportunities for training of students.

Although the emphasis of my research in the next several years will remain on understanding the mechanics of fault behavior, there are a variety of other problems that I hope

to work on. I designed and built the unique rotary deformation apparatus in my lab because it enables us to conduct experiments on a variety of problems that cannot be approached in any other way. In addition to allowing us to conduct the high displacement friction experiments now underway, the apparatus will allow doing simple shear experiments to large strain on ductile samples by using an internal furnace.

7. Service

University:

1971-73	Committee on Women Faculty (Secretary, 1972-73)
1973-74	Acting MRL representative from Geological Sciences
1978	Faculty Member, Brown University Himalayan Expedition (May-June)
1978-82	Freshman Advisor
1980-81	Alternate Member, Affirmative Acting Monitoring Committee
1980	Lectured in Continuing College courses on September 30 and October 14; Lectured to Alumni group in Fairfield County, CT on Brown's Himalayan Expedition
1981	Alternate Member, Affirmative Action Monitoring Committee; Lectured in Continuing College course series on March 28 in Menlo Park, California on Earthquakes; Faculty lecturer on Brown Tours Program, Salmon River Rafting Trip, August 3-9; Member Faculty Policy Group and Grievance Subcommittee; Scholarship Advisory Committee
1982-83	Member Faculty Policy Group and Chairman of Grievance Subcommittee; Alternate member, Affirmative Action Monitoring Committee
1984-85	CAP Freshman Advisor
1985-86	Acting Faculty Secretary to Phi Beta Kappa
1987	Faculty lecturer on Brown Travelers Program, Alaska Wilderness and Glacier Expedition, July 21 - August 2
1987-88	CAP Freshman Advisor
1988-89	Committee on Academic Computing; CAP Freshman Advisor
1989-90	Committee on Academic Computing; CAP Freshman Advisor
1989	Lectured on Teaching Earth Science in Brown's Institute of Secondary Education
1990	Lectured to Seattle Brown Club
1990	Faculty lecturer on Brown Travelers Program, Alaska's Inside Passage and Klondike Expedition, June 15-28
1990-91	On sabbatical leave
1991-92	Committee on Academic Computing; CAP Freshman Advisor
1992	Faculty lecturer on Brown Travelers Program, Voyage to Antarctica, January 5-18
1992-93	Committee on Academic Computing; CAP Freshman Advisor
1992-93	Continuing Education Committee of Board of Governors of the Associated Alumni of Brown University
1992	Invited to give presentation to Wayland Collegium on how to teach laboratory science

1992	Invited to give presentation on methods of teaching science to Sheridan Seminar Series of the Center for the Advancement of College Teaching
1993-94	Committee on Academic Computing; CAP Freshman Advisor
1994-95	CAP Freshman Advisor; Faculty lecturer on Brown Travelers Program, Mexico's Copper Canyon, October 1- 8; Lecture on "Earthquake Prediction" to Pembroke Club; Commencement Forum on "Science and Society: Are Any of Us Ready for Earthquake Prediction"
1995-96	CAP Freshman Advisor; Faculty Library Committee; Volunteer participant on Brown University's Petra Southern Temple Archeological Excavation - conducted Ground Penetrating Radar survey
1996-97	Faculty Library Committee; Materials Research Council
1997-98	On sabbatical leave
1998-99	MacMillan Oversight Committee (appointed by the Provost); Technology Review Committee (*ad hoc* committee appointed by the Provost); Search Committee for Academic Technology Consultant for Academic and User Services division of CIS
1999-2000	MacMillan Oversight Committee (appointed by the Provost); Technology Review Committee (*ad hoc* committee appointed by the Provost)
2000-01	Chair, Faculty Advisory Committee on Computing
	Chair, Screening Committee for Vice President for Computing and Information Services
	Member, Search Committee for Vice President for Computing and Information Services
	Board Member, Brown Faculty Club
	CAP Freshman Advisor
	MacMillan Oversight Committee (appointed by the Provost)
2001-02	Chair, Faculty Advisory Committee on Computing
	Search Committee for Vice President for Computing and Information Services
	Board Member, Brown Faculty Club
	CAP Freshman Advisor
	MacMillan Oversight Committee (appointed by the Provost)
	Faculty lecturer on Brown Travelers Program, Iceland and Greenland, July 15-29
	Faculty Advisory Committee on Alumni Continuing Education
2002-03	Chair, Faculty Advisory Committee on Computing
	Board Member, Brown Faculty Club
	CAP Freshman Advisor
	MacMillan Oversight Committee (appointed by the Provost)
	Faculty lecturer on Brown Travelers Program, Galapagos, June 27 - July 8
	Faculty Advisory Committee on Alumni Continuing Education
2003-04	President of the Board of Managers, Brown Faculty Club
	CAP Freshman Advisor

MacMillan Oversight Committee (appointed by the Provost)
Faculty Advisory Committee on Alumni Continuing Education

Departmental Committee Assignments:

1970-76	Departmental Library Representative; Thin Section Equipment Representative; Participated in Departmental Fall Field Trip
1971-75	Excess Government Personal Property Representative
1972-73	Undergraduate Program; Graduate Policy; Advisory Committee on Merit Raises
1975-76	Graduate Policy (Chairman); Admissions and Awards
1977-78	Physical Facilities (Chairman); Graduate Program; Capital Funds; Advisory Committee on Merit Raises
1978-79	Capital Funds; Graduate Program; Physical Facilities (Chairman)
1979-80	Capital Funds; Physical Facilities (Chairman)
1980-81	New Building (Chairman); Physical Facilities; Participated in Undergraduate Geology Spring Field Trip to Texas, March 29 - April 2
1981-82	New Building (Chairman); Merit Raises; Participated in Departmental Fall Field Trip
1982-1983	New Building (Chairman); Physical Facilities (Chairman); Committee for Planning NE Section, Geological Society of America Meeting at Brown in Spring of 1984; Participated in Departmental Fall Field Trip
1984-85	Undergraduate Field Trips (Chairman); Physical Facilities; Departmental Technician Supervisor
1985-86	Computer; Chairman's Advisory Committee; Merit Raises; Committee on Committees; Departmental Technician Supervisor
1986-87	Computer (Chairman); Supervisor of Departmental Technician and of Departmental Machinist
1987-88	Computer; Supervisor of Departmental Technician, Departmental Computer Coordinator, and of Departmental Machinist
1988-89	Computer; Supervisor of Departmental Machinist and of Departmental Computer Coordinator; Participated in Departmental Fall Field Trip
1989-90	Computer; Supervisor of Departmental Machinist and of Departmental Computer Coordinator; Seismology Search Committee; Participated in Departmental Fall Field Trip
1990-91	On sabbatical leave
1991-92	Computer (Chairman); Field Trip (Chairman); Supervisor of Departmental Machinist
1992-93	Computer (Chairman); Undergraduate Program; Supervisor of Departmental Machinist; Supervisor of Departmental Computer Coordinator
1993-94	Computer (Chairman); Undergraduate Program; Supervisor of Departmental Machinist; Supervisor of Departmental Computer Coordinator

1994-95	New Building (Chairman); Physical Facilities (Chairman); Supervisor of Departmental Machinist
1995-96	New Building (Chairman); Physical Facilities (Chairman); Supervisor of Departmental Machinist
1996-97	New Building (Chairman); Physical Facilities (Chairman); Supervisor of Departmental Machinist; Outside Lectures (Fall to organize Spring Lectures)
1997-98	On sabbatical leave
1998-99	MacMillan Oversight Committee; Physical Facilities (Chairman); Supervisor of Departmental Machinist; Computer Committee
1999-2000	MacMillan Oversight Committee; Physical Facilities (Chairman); Supervisor of Departmental Machinist; Departmental Field Trip Committee Chairman and sole member
2000-01	MacMillan Oversight Committee; Physical Facilities (Chairman); Supervisor of Departmental Machinist
2001-02	MacMillan Oversight Committee; Physical Facilities (Chairman); Supervisor of Departmental Machinist
2002-03	MacMillan Oversight Committee; Physical Facilities (Chairman); Supervisor of Departmental Machinist
2002-03	MacMillan Oversight Committee; Physical Facilities (Chairman); Supervisor of Departmental Machinist

Profession:

Member: American Association for the Advancement of Science
American Geophysical Union

External Review Committee, Department of Geology, University of Minnesota, Duluth, 1975
American Geophysical Union, Tectonophysics Meeting Chairman, 1977, 1978.
Panel for review of NATO Post-doctoral Fellowship applications, 1978.
American Geophysical Union, Tectonophysics Section Nominating Committee, 1979.
Panel for review of NSF Women in Science Program Grant Applications, 1980.
Review Panel for Research Proposals submitted to U.S. Geological Survey Earthquake Hazards Reduction Program:
April 21-24, 1982;
April 20-23, 1983;
April 29-May 2, 1984;
May 7-10, 1986;
May 5-8, 1987;
April 30-May 3, 1988;
August 19-20, 1992.

U.S. National Committee for Rock Mechanics, Commission on Physical Sciences, Mathematics, and Resources, National Research Council, July, 1982-June, 1985; Chairman, Nominating Committee, 1985.
Review Panel for Proposals Submitted to NSF Science and Technology Centers Program in the area of Geophysics, April 11-13, 1988

Geological Society of America, Structural Geology Division, Committee on Career Contribution Award; Chairman, 1988-89.

Chairman of Site Visit Team for Site Visits to two Proposed Science and Technology Centers:
Harvard-MIT Center for Global Earth Structure and Dynamics, July 18-19, 1988
Cal Tech Center for Earthquake Physics and Tectonics, July 21-22, 1988

"Workshop on Continental Margins", Nov. 21-23, 1988, sponsored by the Ocean Studies Board of the National Research Council; invited participant.

American Geophysical Union Steering Committee on Deformation of Earth Materials

New England Association of Chemistry Teachers 51st Summer Conference: lectured on "The Science of Understanding Earth Processes", August 1989

Judge at North Kingston Science Fair, January 29, 1990.

Member of planning committee for initiative on Continental Margins, sponsored by the Ocean Studies Board of the National Research Council; committee meetings May 10-11, and Oct. 9, 1990, Washington D.C.

Meeting to evaluate Science Plan for the National Earthquake Hazards Reduction Program, August 7-8, 1990.

Chairman of working group at NRC-NAS Symposium on "Mechanics of Lithospheric Deformation", Jan 14-17, 1991, Irvine, California.

Organize special session at American Geophysical Union Meeting, Dec. 1991, on "Strength of the Earth."

Participate as a U.S. member of "The 7th Joint Meeting of the U.S.-Japan Panel on Earthquake Prediction Technology" in Tsukuba, Japan, November 14-16, 1990.

Invited participant and Chairman of session on modeling, meeting convened by U.S. Geological Survey to review Parkfield Earthquake Prediction Experiment, June 28 - July 1, 1992

Invited to testify before Parkfield Prediction Experiment Working Group Meeting, December 5, 1992.

Member, Steering Committee on Physical Properties of Earth Materials, American Geophysical Union, 1990-1995

Chairman of Federal Budget Panel of the American Geophysical Union, 1991-93

Member, Committee on Public Affairs, American Geophysical Union, 1992-96

Member, Committee on Mineral and Rock Physics, American Geophysical Union, 1993-95

Member, Steering Committee for San Andreas Fault Zone Drilling Project, 1993-

Member, Site Selection Committee for San Andreas Fault Zone Drilling Project, 1993-

Invited participant in meeting on "Continental Scientific Drilling" in Potsdam, Germany, August 30 - September 1, 1993

Editor, Pure and Applied Geophysics, 1993-2002

Chairman, Committee on Public Affairs, American Geophysical Union, 1994-96

Invited Chairman of Panel Discussion on the Parkfield Earthquake Prediction Experiment, Fall AGU Meeting, 5:30 PM, Thursday Dec. 8, 1994.

Organizer and Chairman of first Gordon Conference on "Rock Deformation," Tilton School, NH, August 13-18, 1995.

Invited to participate in planning processes to define the Five-Year Plan, 1997-2002, for the U.S. Geological Survey Earthquake Hazards Program; Meetings in St Louis, MO, Nov. 14-15, 1996 and in San Diego, CA, January 30-31, 1997.

Co-chair of the Simulation Committee of GEM (General Earthquake Models) Group, 1999-

Participant in PBO (Plate Boundary Observatory) workshop, Snowbird, Oct. 3 - 4, 1999.

USA Working Group Leader for the Microscopic Simulation Working Group (WG1) of ACES (APEC Cooperation for Earthquake Simulation - an international effort of Australia, China, Japan, and the USA)

Organizer and chairman of ACES WG1 sessions at Second ACES Workshop, Tokyo and Hakone, Oct. 15-20, 2000.

Participant in PBO (Plate Boundary Observatory) workshop, Palm Springs, Oct. 29 - Nov. 1, 2000.

Participant and speaker at ACES Workshop on Earthquake Mechanics, Maui, July 30 – Aug. 1, 2001.

Participant in 5th Gordon Conference on Rock Deformation, Il Ciocco, Italy, May 18-24, 2002.

Organizer and chairman of ACES WG1 sessions at Third ACES Workshop, Maui, May , 2002.

Participant and speaker at KECK Workshop on Earthquake Mechanics, Santa Barbara, July 17-20, 2002.

Chairman of Disciplinary Committee on Fault and Rock Mechanics of the Southern California Earthquake Center (SCEC) and member of SCEC Planning Committee, Sept. 2001 – Dec. 2006.

Chairman of Disciplinary Committee on Earthquake Forecasting and Predictability of SCEC and member of SCEC Planning Committee, Jan. 2007 –

Member at-large of Board of Directors of SCEC, Sept. 2002 – Jan. 2007.

Organized SCEC Workshop to Plan Collaborative Activities Involving Fault and Rock Mechanics, September 7-8, 2002.

Organized SCEC Workshop on Constitutive Relations for Coseismic Slip, September 10-11, 2003.

Organized 4 SCEC Workshops on Earthquake Simulators, November 3-6, 2007, June 9, 2008. June 1, 2009, and July 20, 2010.

Co-organizer of Special Sessions on Earthquake Simulators, Fall 2008 AGU Annual Meeting.

General Secretary of the American Geophysical Union, 2001 - July 1, 2002 – June 30, 2006.

Member of Geophysics Program Panel, NSF, March 2007-September, 2009.

Chair, National Earthquake Prediction Evaluation Council, July 2009-

Member, Scientific Earthquake Studies Advisory Committee (for USGS), July 2009-

Review 10-12 proposals each year for the Geology and the Geophysics Programs of NSF, for the Basic Energy Sciences Program of DOE, and for NASA. I also review a similar number of papers for a variety of journals.

Review 35 proposals per year for the Southern California Earthquake Center.

8. Honors and Grants

Honors

Phi Beta Kappa, 1964
Sigma Xi, 1964
National Science Foundation Graduate Fellowship, 1964-68
Alfred P. Sloan Research Fellowship, 1973-75
U. S. National Committee for Rock Mechanics Annual Award for 1990 for Outstanding Basic Research in Rock Mechanics for the paper "Roughness and Wear During Brittle Faulting," J. Geophys. Res., 93, 15268-15278, by W. L. Power, T. E. Tullis, and J. D. Weeks.
Editors' Citation for Excellence in Refereeing, American Geophysical Union, 1998.
Fellow, American Geophysical Union, 2002

Research Grants

ARPA

1970-71	$10,000	X-Ray generator and goniometer
1971-72	$28,000	Experimental and observational study of preferred orientations in deformed micaceous rocks (100% equipment: Hot-creep tester, recorder, x-ray electronics, saw)

MRL/NSF

1972-73	$5,000	Orienting mechanics in hot worked mica aggregates
1972-74	$5,000	Solid state processes affecting creep

NSF

1972-76	$19,900	Relationship between finite strain and preferred orientation in slate
1976-77	$20,600	Construction of a modified hot creep tester (with Jan Tullis)
1976-80	$225,300	Research initiation and support in Tectonophysics
1977-80	$65,000	Experiments for understanding upper mantle deformation
1978-79	$14,900	Microcomputer system for rock deformation equipment and related computing (with Jan Tullis)
1981-82	$85,000	Rock Friction Constitutive Experiments as Related to Theory of Earthquake Instability (with James Rice and John Weeks)
1981-83	$55,200	Mechanics of Fold-and-Thrust Belts and Accretionary Wedge Investigated Using Rigid-Plastic Numerical Models (extension of grant originally made to William Chapple, extension was jointly with E.M. Parmentier)
1982-84	$200,000	Rock Friction Constitutive Experiments as Related to Theory of Earthquake Instability (with John Weeks)
1984-87	$300,000	Rock Friction Constitutive Experiments as Related to Theory of Earthquake Instability (with John Weeks)

1985-86	$45,000	Quantitative Measurements of Fault Surfaces: Implications for Stability of Fault Slippage and Earthquake Mechanics.
1986-88	$120,000	Quantitative Measurements of Fault Surfaces: Implications for Stability of Fault Slippage and Earthquake Mechanics.
1988-89	$117,575	A Departmental Research Computer Network: Shared Resources and Economics of Scale (with E. M. Parmentier, J. Imbrie, and P. H. Schultz)
1988-91	$241,000	Rock Friction Constitutive Experiments as Related to Theory of Earthquake Instability (with John Weeks)
1991-93	$91,761	Origin of Aseismic Slip on Oceanic Transform Faults
1992-93	$39,500	Supplement to Rock Friction Constitutive Experiments as Related to Theory of Earthquake Instability (with John Weeks)
1993-94	$80,817	Supplement to Rock Friction Constitutive Experiments as Related to Theory of Earthquake Instability (with John Weeks)
1993-97	$86,973	Development of High Temperature Capability for Rotary Direct Shear Rock Deformation (with John Weeks)
1994-1998	$310,000	Rock Friction Constitutive Experiments as Related to Theory of Earthquake Instability (with John Weeks)
1998-1999	$117,000	Understanding Processes of Rock Friction Relevant to Earthquake Mechanics (with David Goldsby)
1999-2001	$240,000	Laboratory Experiments on Rock Friction Focused on Understanding Earthquake Mechanics (with David Goldsby)
2001-2004	$390,000	Laboratory Experiments on Rock Friction Focused on Understanding Earthquake Mechanics (with David Goldsby)
2003-2006	$216,872	Experimental study of the role of pore fluid pressure in earthquake nucleation (with David Goldsby)
2004-2007	$450,128	Laboratory Experiments on Rock Friction Focused on Understanding Earthquake Mechanics (with David Goldsby)
2007-2010	$260,000	Collaborative Research: Laboratory Investigations of the Origin of Fault Zone Pulverization
2008-2011	$308,352	Collaborative Research: Laboratory Experiments on Rock Friction, Nanoindentation, and Atomic Force Microscopy, Focused on Understanding Earthquake Mechanics (with David Goldsby)
2009-2012	$391,011	Collaborative Research: Fast Multipole Algorithms for Geophysical Stress Modeling and Their Use in Large-scale Simulation of Earthquake Occurrence

USGS-EHRP

1975-76	$39,068	An experimental study of the rheology of granitic rocks (with Jan Tullis and Richard Yund)
1980-81	$35,561	An experimental study of the rheology of crustal rocks (with Jan Tullis)
1982-83	$75,000	Experiments on Rock Friction Constitutive Laws Applied to Earthquake Instability Analysis (with John Weeks)

1983-84	$80,000	Experiments on Rock Friction Constitutive Laws Applied to Earthquake Instability Analysis (with John Weeks)
1984-85	$107,480	Experiments on Rock Friction Constitutive Laws Applied to Earthquake Instability Analysis (with John Weeks)
1985-86	$117,278	Experiments on Rock Friction Constitutive Laws Applied to Earthquake Instability Analysis (with John Weeks)
1986-87	$108,878	Experiments on Rock Friction Constitutive Laws Applied to Earthquake Instability Analysis (with John Weeks)
1987-88	$115,228	Experiments on Rock Friction Constitutive Laws Applied to Earthquake Instability Analysis (with John Weeks)
1988-89	$135,840	Experiments on Rock Friction Constitutive Laws Applied to Earthquake Instability Analysis (with John Weeks)
1989-90	$130,000	Experiments on Rock Friction Constitutive Laws Applied to Earthquake Instability Analysis (with John Weeks)
1989-90	$28,000	Fault Instability Model for the Loma Prieta Earthquake
1990-91	$168,779	Experiments on Rock Friction Constitutive Laws Applied to Earthquake Instability Analysis (with John Weeks)
1991-92	$148,500	Experiments on Rock Friction Constitutive Laws Applied to Earthquake Instability Analysis (with John Weeks)
1992-93	$183,066	Experiments on Rock Friction Constitutive Laws Applied to Earthquake Instability Analysis (with John Weeks)
1993-94	$133,675	Experiments on Rock Friction Constitutive Laws Applied to Earthquake Instability Analysis (with John Weeks)
1994-95	$147,000	Experiments on Rock Friction Constitutive Laws Applied to Earthquake Instability Analysis (with John Weeks)
1997-98	$89,000	Laboratory Experiments on Rock Friction Focused on Understanding Earthquakes
1997-98	$55,000	Identifying Foreshocks by Their Sensitivity to Remote Triggering
1998-1999	$85,000	Laboratory Experiments on Rock Friction Focused on Understanding Earthquake Mechanics (with David Goldsby)
1999-2000	$80,000	Laboratory Experiments on Rock Friction Focused on Understanding Earthquake Mechanics (with David Goldsby)
2000-2001	$80,000	Experiments to Understand Dynamic Friction During Earthquakes (with David Goldsby)
2001-2002	$80,000	Experiments to Understand Dynamic Friction During Earthquakes (with David Goldsby)
2002-2003	$80,000	Experiments to Understand Dynamic Friction During Earthquakes (with David Goldsby)
2003-2004	$85,000	Experiments to Understand Dynamic Friction During Earthquakes (with David Goldsby)
2004-2005	$92,508	Experiments to Understand Dynamic Friction During Earthquakes (with David Goldsby)
2005-2006	$90,000	Experiments to Understand Dynamic Friction During Earthquakes (with David Goldsby)
2006-2007	$60,000	Experiments to Understand Dynamic Friction During Earthquakes (with David Goldsby)

2007-2008	$80,000	Experiments to Understand Dynamic Friction During Earthquakes (with David Goldsby)
2008-2009	$107,116	Experiments to Understand Dynamic Friction During Earthquakes (with David Goldsby)
2009-2010	$120,396	Experiments to Understand Dynamic Friction During Earthquakes (with David Goldsby)
2010-2011	$125,356	Experiments to Understand Dynamic Friction During Earthquakes (with David Goldsby)

CRDF (U.S Civilian Research & Development Foundation)

2000-2002	$5,000	Investigation of Impulsive Energy Release During Dilatant Strain of Heterogeneous Solids Exposed to Weak Vibrations (with Batyr Tsebekovich Manzikov, Scientific Station IVTRAN, Russian Academy of Sciences, Bishkek, Kyrgyzstan - $41,000 total)
2002-2004	$9,000	Investigation of Vibration Effects and Tidal Wave Asymmetry in Loaded Terrestrial Materials (with Batyr Tsebekovich Manzikov, Scientific Station IVTRAN, Russian Academy of Sciences, Bishkek, Kyrgyzstan - $121,021 total)

NASA

2002-2004	$246,000	Numerical Simulations of Active Tectonic Processes: Increasing Interoperability and Performance (Multi-Institutional, total is $2,208,000)
2004-2010	$30,000	QuakeSim: Enabling Model Interactions in Solid Earth Science Sensor Webs

Southern California Research Center

2002-2003	$24,000	D_c and Fracture Energy due to Friction and Shear Melting During Dynamic Earthquake Rupture (with Nick Beeler)
2002-2003	$20,000	Workshop to Plan Collaborative Activities Involving Fault and Rock Mechanics (with Jim Dieterich and Chris Marone)
2003-2004	$20,000	Laboratory Experiments on Fault Shear Resistance Relevant to Coseismic Earthquake Slip (with David Goldsby)
2003-2004	$10,000	Workshop on Constitutive Relations for Coseismic Slip (with Ruth Harris)
2003-2004	$40,000	Pilot Studies to Determine the Feasibility of Using New Experimental Techniques to Measure Sliding Resistance at Seismic Slip Rates (with Vikas Prakash and David Goldsby)
2004-2005	$23,000	Laboratory Experiments on Fault Shear Resistance Relevant to Coseismic Earthquake Slip (with David Goldsby)
2004-2005	$40,000	Pilot Studies to Determine the Feasibility of Using New Experimental Techniques to Measure Sliding Resistance at Seismic Slip Rates (with Vikas Prakash and David Goldsby)

2004-2005	$14,700	Experimental and numerical studies of dynamic rupture propagation in a large laboratory rock sample
2004-2005	$10,000	Workshop on the Science, Status, and Future Needs of Experimental Rock Deformation
2005-2006	$22,000	Laboratory Experiments on Fault Shear Resistance Relevant to Coseismic Earthquake Slip (with David Goldsby)
2005-2006	$40,000	Pilot Studies to Determine the Feasibility of Using New Experimental Techniques to Measure Sliding Resistance at Seismic Slip Rates (with Vikas Prakash and David Goldsby)
2005-2006	$10,000	Quasi-Dynamic Parallel Numerical Modeling of Earthquake Interactions Over a Wide Magnitude Range Using Rate and State Friction and Fast Multipoles
2006-2007	$28,000	Laboratory Experiments on Fault Shear Resistance Relevant to Coseismic Earthquake Slip (with David Goldsby)
2006-2007	$10,000	Quasi-Dynamic Parallel Numerical Modeling of Earthquake Interactions Over a Wide Magnitude Range Using Rate and State Friction and Fast Multipoles
2007-2008	$25,000	Laboratory Experiments on Fault Shear Resistance Relevant to Coseismic Earthquake Slip (with David Goldsby)
2007-2008	$25,000	Experiments on the Origin of Pulverized Rock
2007-2008	$15,000	Quasi-Dynamic Parallel Numerical Modeling of Earthquake Interactions Over a Wide Magnitude Range Using Rate and State Friction and Fast Multipoles
2007-2008	$15,000	Constructing constitutive relations for use in earthquake simulation and rupture modeling using lab and theoretical constraints (with David Goldsby)
2008-2009	$25,000	Laboratory Experiments on Fault Shear Resistance Relevant to Coseismic Earthquake Slip (with David Goldsby)
2008-2009	$15,000	Quasi-Dynamic Parallel Numerical Modeling of Earthquake Interactions Over a Wide Magnitude Range Using Rate and State Friction and Fast Multipoles
2008-2009	$10,000	Constructing constitutive relations for use in earthquake simulation and rupture modeling using lab and theoretical constraints (with David Goldsby)
2008-2009	$5,000	A Collaborative Project: Comparison and Validation of Earthquake Simulators
2008-2009	$10,000	Workshop on Earthquake Simulators
2009-2010	$25,000	Laboratory Experiments on Fault Shear Resistance Relevant to Coseismic Earthquake Slip (with David Goldsby)
2009-2010	$15,000	Quasi-Dynamic Parallel Numerical Modeling of Earthquake Interactions Over a Wide Magnitude Range Using Rate and State Friction and Fast Multipoles
2009-2010	$15,000	Implications of Hydrothermal Laboratory Faulting Experiments for the Depth of the Stable-Unstable Transition, Slip-Length Scaling, and Seismic Hazard
2009-2010	$20,000	A Collaborative Project: Comparison and Validation of Earthquake

		Simulators
2009-2010	$10,000	Workshop on Earthquake Simulators
2010-2011	$27,000	Laboratory Experiments on Fault Shear Resistance Relevant to Coseismic Earthquake Slip (with David Goldsby)
2010-2011	$15,000	Quasi-Dynamic Parallel Numerical Modeling of Earthquake Interactions Over a Wide Magnitude Range Using Rate and State Friction and Fast Multipoles
2010-2011	$17,000	Implications of Hydrothermal Laboratory Faulting Experiments for the Depth of the Stable-Unstable Transition, Slip-Length Scaling, and Seismic Hazard
2010-2011	$19,000	A Collaborative Project: Comparison, Verification, and Validation of Earthquake Simulators
2010-2011	$10,000	Workshop on Earthquake Simulators

9. Teaching

1970-71
Geol. Sci. 45, Sem. I, enrollment 14
Modes of Thought - "Continental Drift", Sem. II, enrollment 20
Geol. Sci. 253, Sem. II, enrollment 4

1971-72
Geol. Sci. 251 (with W. M. Chapple), Sem. I, enrollment 6
Modes of Thought - "Continental Drift", Sem. I, enrollment 20
Independent Study of Ann Craig on Continental Drift, Sem. I
Geol. Sci. 45, Sem. II, enrollment 16
Geol. Sci. 250 (with W. M. Chapple), Sem. II, enrollment 7

1972-73
Geol. Sci. 251 (with W. M. Chapple), Sem. I, enrollment 9
Modes of Thought - "Continental Drift", Sem. I, enrollment 20
Geol. Sci. 45, Sem. II, enrollment 17
Geol. Sci. 252 (with W. M. Chapple), Sem. II, enrollment 4
Geol. Sci. 191-192, Undergraduate Senior research of W. M. Bruner, "Experimental and Theoretical Study of Residual Stress and Strain in Rocks", Sem. I and II

1973-74
Geol. Sci. 251 (with W. M. Chapple), Sem. I, enrollment 9
Geol. Sci. 250 (with W. M. Chapple), Sem. II, enrollment 7
Modes of Thought - "Continental Drift", Sem. I, enrollment 20

1974-75
Geol. Sci. 251 (with W. M. Chapple), Sem. I, enrollment 7
Modes of Thought - "Continental Drift", Sem. I, enrollment 20

1975-76
Geol. Sci. 251 (with W. M. Chapple), Sem. I, enrollment 11
Modes of Thought - "Continental Drift", Sem. I, enrollment 17

Geol. Sci. 45, Sem. II, enrollment 22
Geol. Sci. 161 (with W. M. Chapple), Sem. II, enrollment 18

1976-77
On sabbatical leave

1977-78
Geol. Sci. 2, Sem. I, enrollment 35
Geol. Sci. 251 (with E. M. Parmentier), Sem. I, enrollment 8
Geol. Sci. 45 (with E. M. Parmentier), Sem. II, enrollment 20

1978-79
Geol. Sci. 2, Sem. I, enrollment 52
Geol. Sci. 251 (with E. M. Parmentier), Sem. I, enrollment 5
Special Themes ST/OS33 - "Plate Tectonics", Sem. I, enrollment 14
Geol. Sci. 45, Sem. II, enrollment 12

1979-80
Geol. Sci. 2, Sem. I, enrollment 54
Geol. Sci. 251 (with E. M. Parmentier), Sem. I, enrollment 6
Geol. Sci. 45 (with J. A. Tullis), Sem. II, enrollment 26

1980-81
Geol. Sci. 2, Sem. I, enrollment 84
Geol. Sci. 251 (with E. M. Parmentier), Sem. I, enrollment 11
Geol. Sci. 45 (with J. A. Tullis), Sem. II, enrollment 26
Geol. Sci. 285 (with J. R. Rice, E. M. Parmentier, and D. W. Forsyth), Sem. II, enrollment 5

1981-82
Geol. Sci. 2, Sem. I, enrollment 99
Geol. Sci. 251 (with E. M. Parmentier and C. Simpson), Sem. I, enrollment 5
Geol. Sci. 253 (with J. A. Tullis and C. Simpson), Sem. I, enrollment 4
Geol. Sci. 45 (with J. A. Tullis), Sem. II, enrollment 31
Supervised undergraduate research of Ken Conca

1982-83
Geol. Sci. 2, Sem. I, enrollment 110
Geol. Sci. 251 (with E. M. Parmentier), Sem. I, enrollment 7
Geol. Sci. 45 (with J. A. Tullis), Sem. II, enrollment 33
Independent study: Francis A. Brooks, III, "An Experimental Study of the Effects of Various Surfactants on the Relation Between Stress Intensity Factor and Crack Velocity in Quartz"

1983-84
On sabbatical leave

1984-85
Geol. Sci. 2, Sem I, enrollment 77
Geol. Sci. 45, (with T. Byrne and J. Tullis) Sem II, enrollment 30
Geol. Sci. 253, (with J. Tullis and T. Byrne) Sem II, enrollment 10
Independent Study: Deborah Travis, "A Study of the Mechanism of Deformation of the Purgatory Conglomerate, Rhode Island"

1985-86

Geol Sci. 2, Sem I, enrollment 40
Geol. Sci. 251, (with T. Byrne), Sem I, enrollment 13
Geol. Sci. 45, (with T. Byrne), Sem. II, enrollment 30

1986-87
Geol. Sci. 2, Sem I, enrollment 50
Geol. Sci. 45, Sem II, enrollment 20

1987-88
Geol. Sci. 22, Sem. I (with R. Yund), enrollment 49
Geol. 251, Sem. I (with E. M. Parmentier, J. A. Tullis, and T. Byrne), enrollment 4
Geol. Sci. 145, Sem. II (with J. A. Tullis), enrollment 11
1988-89
Geol. Sci. 22, Sem. I (with R. Yund), enrollment 48
Geol. 251, Sem. I (with E. M. Parmentier, J. A. Tullis, and T. Byrne), enrollment 10
Geol. Sci. 145, Sem. II (with J. A. Tullis)
1989-90
Geol. Sci. 22, Sem. I (with R. Yund), enrollment 47
Geol. Sci. 145, Sem. II, enrollment 18 (with J. A. Tullis)
Independent Study: Paul Ecker, "Experimental Study of Contact Area as a Function of Normal Stress in Marble"
Independent Study: Padhrig McCarthy, "Modeling Accretionary Wedge Deformation"
1990-91
On sabbatical leave
1991-92
Geol. Sci. 22, Sem. I (with J. Tullis), enrollment 94
Geol. Sci. 145, Sem. II (with J. Tullis), enrollment 20
1992-93
Geol. Sci. 22, Sem. I (with R. Yund), enrollment 85
Geol. 251, Sem. I (with E. M. Parmentier), enrollment 3
Geol. Sci. 145, Sem. II, enrollment 28
1993-94
Geol. Sci. 22, Sem. I (with R. Yund), enrollment 93
Geol. Sci. 252, Sem I (with J. Tullis), enrollment 5
Geol. Sci. 145, Sem. II (with J. Tullis), enrollment 26
1994-95
Geol. Sci. 22, Sem. I (with R. Yund), enrollment 85
Geol. Sci. 251, Sem I (with E. M. Parmentier and J. Tullis), enrollment 11
Geol. Sci. 145, Sem. II (with J. Tullis), enrollment 20
1995-96
Geol. Sci. 22, Sem. I (with R. Yund), enrollment 94

Geol. Sci. 253, Sem I (with J. Tullis), enrollment 6
Geol. Sci. 1, Sem II (with B. Giletti), enrollment 37
Geol. Sci. 145, Sem. II (with J. Tullis), enrollment 14

1996-97
Geol. Sci. 251, Sem I enrollment 5
Geol. Sci. 1, Sem II, enrollment ~100
Geol. Sci. 145, Sem. II (with J. Tullis), enrollment ~15
Independent Study: Margaret Boettcher, "Design of See-through Apparatus for Observation of Granular Aggregates During Deformation"

1997-98
On sabbatical leave
1998-99
Geol. Sci. 251, Sem I enrollment 6
Geol. Sci. 1, Sem II, enrollment 61
Geol. Sci. 145, Sem. II (with J. Tullis), enrollment 17
Independent Study: Margaret Boettcher, "Design of See-through Apparatus for Observation of Granular Aggregates During Deformation"
1999-2000
Geol Sci. 211, Sem I.: Independent Reading Course for Sarah Zaranek, "Rock Friction and Earthquake Mechanics"
Geol. Sci. 1, Sem II, enrollment 80
Geol. Sci. 145, Sem. II, enrollment 15
2000-2001
Geol. Sci. 251, Sem I, enrollment 5
Geol. Sci. 1, Sem II, enrollment 59
Geol. Sci. 145, Sem. II (with J. Tullis), enrollment 16
Geol. Sci. 253, Sem. II (with J. Tullis), enrollment 3
Independent Study: Timothy Cook, "Paleoenvironment of a Sequence of Fluvial Sediments at Dodgeville, Attleboro, Southeastern Massachusetts"
2001-2002
Geol 291, Sem I: Seminar/reading Course - Earthquake Mechanics, Earthquake Prediction, and Rock Friction, enrollment 2
Geol Sci. 1, Sem II, enrollment 49
2002-2003
Geol 251, Sem I, enrolment 8
Geol Sci. 1, Sem II, enrollment 64
Participant in Wayland Collegium Course, The University in the Digital Age, led by Kathryn Spoehr
2002-2003
Geol 211, Sem I: Independent Reading Course for Lydia Boroughs – “Advanced Structural Geology, Earthquake Mechanics, and Rock Friction”
Geol Sci. 1, Sem II

Masters Thesis Supervision

M.S. Thesis of Roger C. Holeywell, June 1973
M.S. Thesis of Martha J. Withjack, June 1975
M.S. Thesis of Denise M. Nelson, June 1977
M.S. Thesis of Janet H. Hickey, June 1979
M.S. Thesis of Daniel Ela, June 1982
M.S. Thesis of Frank G. Horowitz, June 1982
M.S. Thesis of Z. Zhoa, June 1983
M.S. Thesis of Timothy Bechtel, June 1984
M.S. Thesis of Michael L. Blanpied, June 1985
M.S. Thesis of Elizabeth Lorenzetti, June 1988
M.S. Thesis of Scott W. Costello, June 1999
M.S. Thesis of Katharine Sayre, June 2002
M.S. Thesis of Julie Trotta, June 2003

Ph. D. Thesis Supervision

Ph.D. Thesis of Glen S. Stockmal, August 1983
Ph.D. Thesis of Michael L. Blanpied, June 1989
Ph.D. Thesis of William L. Power, June 1989
Ph.D. Thesis of Linda A. Reinen, June 1993
Ph.D. Thesis of Nicholas M. Beeler, October 1994
Ph.D. Thesis of Valerie J. Scruggs, February 1997
Ph.D. Research of Jennifer Junger
Ph.D. Research of Julie Trotta
Ph.D. Research of Lydia Boroughs

Postdoctoral Supervision

Dr. John Weeks, Stanford University, 1980-1994.
Dr. Shuqing Zhang, Australian National University, June 1995-Nov. 1996.
Dr. David Goldsby, Univ. Minnesota, January, 1997-June 2008.
Dr. Stephane Bouissou, Université Montpellier, France, January 1999-August 1999.
Dr. Naoyuki Kato, Geological Survey of Japan, March 1999-March 2001.
Dr. Yasin Dursin Sari, SDU EAF Mining Engineering Department, Turkey, August 2001-June 2001.
Dr. Brian deMartin, MIT, February 2007- August 2008.
Dr. Ory Dor, USC, August 2007-August 2009.

10. May 21, 2010.