

geophysics

Welcome to the 2016 newsletter. You receive this letter in the midst of a season of change for the department. Our beloved department head, Terry Young, has retired to spend more time with his family. Tom Davis retired after launching hundreds of students on a career in the geophysical industry. Another driver for change is the low price of oil, which has prompted us to rebalance our research and teaching portfolio. In the CSM administration, we have a new President, Paul Johnson, and a new Provost, Tom Boyd, who bring a fresh wind to the school.

But the many losses that we have incurred are also opportunities to renew. We welcome Whitney Trainor-Guitton and Brandon Dugan who joined us in the last year. Whitney's research focuses on geostatistics and flow in porous media. Brandon holds the Baker Chair and runs a research program that involves hydrology, geomechanics, borehole geophysics, and ocean-going research. Program Assistant and surrogate mother of students, Dawn Umpleby, was needed elsewhere in the CSM organization, but recently rejoined us as Research Administrator for the Center for Wave Phenomena. We are fortunate that Joana Perez recently joined us in her role of administrative assistant. We also welcome Jeff Shragge and Ebru Bozdogan, who will join us in the next year. Jeff works on computational aspects of exploration seismology, while Ebru is an expert on computational global seismology. We have ongoing searches for a new department head and for a new leader of the Reservoir Characterization Project. In order to make wise choices, the department has formed a "reimagine group" that has outlined directions for future research and teaching in geophysics.

As always our students are our greatest asset. Working with these young people is a privilege for our faculty and staff. The department has a healthy enrollment of undergraduate students, and we are proud of the gender-balance among all of our students. We are also proud that our students are admitted to prestigious schools for graduate studies, and that they find internships at high-tech research centers such as NASA. But above all, we love working with these young people and helping them prepare for their careers.

The future of the department is looking good, but the rate at which the changes take place has been breathtaking at times. We've had our losses, we have done our weeping, but we are seeking, and finding, new ways to give shape to the department, and find the time to laugh and rejoice. It is a privilege and a pleasure to go through this season of change with a group of supportive and enthusiastic faculty and staff, and to work with our wonderful students.



Roel Snieder, Department Head

Dr. Terry Young - A Career of Service

Ken Larner, Professor Emeritus

We don't want it to happen, but it's a most fitting and well-earned reward for his service: Terry Young has retired as CSM Geophysics Department Head in May of this year. Always, Terry's mindset has been to serve others, and always he has served them superbly. This holds for the five years he spent in the US Navy, training as a pilot, flying from aircraft carriers, and teaching (yes, teaching way back then) as a flight instructor. Likewise, in the leadership role that gravitates toward Terry, he goes out of his way to make sure that all benefit and thrive whether it was while he was serving the Society of Exploration Geophysicists (SEG) as President, the CSM Geophysics Department that he has led as Department Head since 2000, or the students that he so much cares for.

An unlikely prelude to the profession of exploration geophysics, Terry started his academic training with a BS degree in English from Stanford University. Following his time in the Navy, he established his career in geophysics by first obtaining MS and PhD degrees from CSM as Assistant Professor. After two years of research with CGG in Denver, during the next 17 years (1983-2000) Terry moved up through research with Mobil R&D in Dallas, serving there as manager of geophysical research before becoming exploration Team Leader and Strategic Planner for Mobil North Sea Limited. His scientific passion drew him in 1989-1999 to the Statistics Department at Carnegie Mellon University in Pittsburgh as Visiting Scholar. In 2000, Terry returned to CSM, where, fortunately for all in the geophysics program at Mines, and for CSM in general, he has since served as Head of the Geophysics Department.

Terry's dedication to service and his leadership talents benefitted more than the academic program at Mines. In 2005-2006 Terry served as President of the SEG and his service to the Society has continued with his active involvement through today. In all stages in his career, Terry has advanced to positions of leadership and teaching wherever the opportunity presented itself. Always, his



mindset has been to serve others. Terry goes out of his way to make sure that the careers of his faculty members thrive. He does this in many ways, for example by being a sturdy spokesperson for the Geophysics program to the CSM Administration, by encouraging new initiatives for and growth in his people, by actively mentoring junior faculty, and by teaching much more than his share so that other faculty members have more opportunities for pursuing their research. Terry spends much time with students, in one-on-one conversations, exit interviews, and personal advising, and in his classes and at the geophysics field camp that he is so passionate about. Throughout his career, he has gained the admiration of all around him, reciprocally founded on the admiration he has for others. To say that his door is always open is understatement; his heart is always open for whatever matter anyone brings in his direction. Is he busy in the midst of doing something else? He puts it down to devote himself to the welcomed visitor. He believes in people, in students, staff, colleagues. Simply put, he believes.

For 16 years, we have known Terry as Department Head, but far more than that for so many in the Mines community, as a friend. We wish Terry, and his lifelong companion Nadine, a retirement filled with health, happiness, love, and fulfillment.

Global Friendship – Dr. Thomas L. Davis

Steve Roche, Manager of Geophysics, Cimarex Energy

When attending a geophysical convention, with attendees from across the globe, you may have the opportunity to visit with Tom Davis on the convention floor. You may have agreed to meet at a certain time, perhaps at the Colorado School of Mines booth, with the intention of walking somewhere nearby for a quick lunch. Let me assure you, that walk from the CSM booth across the convention floor to the exit will be memorable. What you will observe, or endure, depending on how hungry you are, is that Tom cannot traverse 5m without greeting someone he knows. You will note, as you grow faint from lack of nourishment, that Tom has worked with and mentored geophysicists from all over our world and truly knows the global community of geoscientists.

I am proud to know Tom and am quite confident my story is similar to others who have had the pleasure of working with him. We met in Chengdu, China in the early 1990's at an SEG event where I was a young geophysicist working for GSI. I had been invited to give a paper on a

3D seismic case history from West Texas. One evening in particular was spent with the delegation from Russia, toasting with chilled vodka; glasses would be raised, "To good Russian bread!" to which Tom would add, "and Canadian wheat!"

Back in North America, we co-taught an AAPG course on 3D seismic which rapidly evolved to be the norm for onshore oil & gas exploration in the Permian Basin. In 1994, Tom encouraged me to join his Reservoir Characterization Project (RCP) at Colorado School of Mines and to pursue graduate studies. Under his and Bob Benson's guidance, RCP conducted the first onshore, time-lapse 9C multicomponent project, and I was fortunate to have participated in that effort. As a welcome change from coursework and comprehensive exams, I did field work with Tom which included dodging tornadoes in Eastern Colorado and dust storms in SE New Mexico.

As RCP continued to acquire, analyze and integrate time-lapse 9C seismic, it became apparent that characterizing the reservoir over time, using both P-wave and S-wave information, was a viable and powerful tool for understanding reservoir performance. The work done within RCP has greatly advanced the knowledge and understanding of using multicomponent imaging. Tom, Bob and I compiled the work done by the RCP students into a course on dynamic reservoir characterization (DRC). This course has been presented across the globe, including France, St. Petersburg, Brazil, Canada, India and the U.S. Let me assure you, everywhere we presented this course Tom was known to many of the participants and had already met with many of them.

In addition to his broad range of global relationships, Tom equally knows the geologic and seismic characteristics of most, if not all, of the geologic basins in the world. Quite amazing is to see him engage a geoscientist over a particular seismic image and discuss in detail the nuances of seismic stratigraphy and hydrocarbon production for that geologic province.

When Tom and I taught the DRC course in India, we were in the Jorhat region just over the Himalayas from where we met in Chengdu China 20 years before. We reflected on the many events that had transpired. In the spirit of continuing our toast, thank you, Tom. I appreciate your leadership, guidance, mentorship and friendship, and therefore, "to life, health and global friendship".





Dr. Whitney Trainor-Guitton returned to the Mines Geophysics department, 15 years after graduating. During those years away from the Mines campus, Whitney served as a Peace Corps Volunteer in Panama, received her Masters and Doctorate degrees from Stanford University, enjoyed numerous internships with Schlumberger and Chevron, was a risk analyst for a catastrophe-modeling software company, and most recently, was a research scientist at Lawrence Livermore National Laboratory (LLNL). As a “statistical geophysicist,” at LLNL, she was working on topics in energy and earth science research that are consequential to national security. Specifically, she worked on geothermal exploration and carbon sequestration projects, designing methodologies for evaluating the value of geophysical techniques to aid in decision-making for these scenarios.



Dr. Brandon Dugan joined the Geophysics Department in July 2016 as the newest occupant of the Baker Hughes Chair of Petrophysics and Borehole Geophysics. His previous appointment was as an Associate Professor at Rice University where he served on the Geophysics faculty since 2005. Brandon obtained his PhD (2003) at Penn State University and was a recipient of a prestigious Mendenhall post-doctoral fellowship with the United States Geological Survey at the Woods Hole Coastal and Marine Science Center. Brandon’s many research interests include fluid flow and geomechanics, both basic and applied to problems relevant for energy and environment. His research integrates geological and geophysical observations, laboratory experiments, and numerical and analog models to understand fluid flow and geomechanical processes at the boundaries of Earth science and engineering. Brandon served and continues to serve as (co-) Chief Scientist for several Integrated Ocean Drilling Program (IODP) missions.



Dr. Ebru Bozdogan will join the Geophysics Department in February 2017. Ebru is currently an Assistant Professor of Geophysics at the University of Nice Sophia Antipolis (France). She obtained her PhD (2009) from Utrecht University (the Netherlands) and continued her studies with postdoctoral and Research Associate positions at Princeton University. Ebru’s research focuses on the theory and numerics of wave simulation and inversion at the global scale, primarily aimed at understanding the complex 3D structure of the deep Earth interior. She is also active in geodynamical and tectonic interpretations at global and regional scales, seismic hazard analysis, and has recently become a member of the seismic analysis team of the upcoming InSight mission to Mars. She is co-PI on a major project for global-scale tomography using Titan, one of the largest computers available for scientific research at the Oak Ridge National Labs.



Dr. Jeffrey Shragge is joining the Geophysics Department and the Center for Wave Phenomena in August 2017, at the conclusion of his current appointment as the Woodside Professor of Computational Geoscience at the University of Western Australia. He obtained his PhD (2009) from Stanford University, following his MSc (2001) from the University of British Columbia. Jeff has many research interests ranging from exploration to near-surface to crustal seismology, using seismic and electromagnetic waves, and involving field and laboratory measurements. Jeff’s current research focus is in computational seismology with complex conformal meshes, primarily applied to exploration and reservoir geophysics. He is a recipient of the J. Clarence Karcher Outstanding Young Geophysicist award from the SEG for his early-career work, and remains heavily involved with SEG in leadership roles for various student-related programs.