

ABOUT AGU

Manga Receives 2002 James B. Macelwane Medal

PAGE 39

Michael Manga was awarded the 2002 James B. Macelwane Medal at the AGU Fall Meeting Honors Ceremony. The medal is given for significant contributions to the geophysical sciences by a young scientist of outstanding ability.

Citation

"I am pleased to give the citation for Michael Manga for the James B. Macelwane award. Michael is an outstanding young scientist who has made significant contributions to geophysics. He also reflects Macelwane's deep interest in teaching and encouraging students.

"I especially enjoy being at a university where I interact with unusually creative and able students, who quickly move on to become creative, able, accomplished, and respected colleagues. Michael made the transition from student to colleague early in his graduate career, and I have continued to learn from him ever since. He is a gentle person and teacher, who is quiet and reserved while being direct and honest. He possesses deep physical insight, analytic ability, and a nose for getting to the essence of a problem through a combination of experiment, analysis, numerics, and observation.

"Michael has been incredibly productive, and his 60 or so publications attest to his broad interests and abilities. His contributions cover experimental and theoretical fluid mechanics (16 papers), mantle flow and convection (10 papers), properties of magmas and volcanology (11 papers), flow of groundwater and hydrology (14 papers), and planetary science (four papers) and diamond anvil research (four papers). In each area, his contributions have been original and important. He combines careful (and sophisticated) fluid mechanics with insightful application to geophysical observations and understanding physical processes.

"Michael came to graduate school from McGill with his own source of curiosity. He saw the relevance of what he was learning in courses in Earth science, engineering, and math, and put the ideas together to produce new insights and results. He came up with his own questions, and sought advice when he needed it—then he would go off to solve problems. He did the major part of his work with Howard Stone, who is an inspired teacher and mentor. Michael was an inspired student. Under Howard's guidance and inspiration, Michael started state-of-the-art boundary integral calculations to investigate the dynamics of bubbles and diapirs. He sought out the G. I. Taylor style of fluid mechanics, and did elegantly simple experiments to extend his insight into the mechanics of rising bubbles that he had already addressed numerically. I believe that he may have gone beyond Taylor

when much later he demonstrated waves of rising bubbles in foam by distributing glasses of Guinness at an AGU session.

"As a Miller Fellow at Berkeley, Manga extended his interests to diamond anvils and hydrology. As a grad student, he had noted the numerous ads in *Eos* for hydrology positions. Perhaps this inspired him to start work in this area (although I really think the first-rate colleagues he had at Berkeley did it).

"After moving to the University of Oregon, Manga did some laboratory convection experiments, and investigated the transitions of convective patterns. He used the experimental results to analyze the development of thermal boundary layers, and has related this to simple models that account for the observations.

This style—laboratory experiments, numerical calculations or simple fluid mechanical models, and extrapolation to geophysical problems—is characteristic of his work. He also addressed more problems in volcanology, and started field projects in hydrology (with his wife Susan as a field assistant). He used spring and stream-flow rates to investigate subsurface flow processes, including time scales for flow, heat transport, and characteristics of subsurface aquifers. Since returning to Berkeley in 2001, Manga has maintained his remarkable productivity.

"Manga is a gifted teacher and advisor and mentor of graduate students. He engages students and introduces them to new problems and ideas as well as to other faculty. He started giving undergrads hands-on experience when he was still at Harvard, where he received rave reviews as a teacher. He is generous with his ideas and advice, and takes the time to straighten out misconceptions that others may have, even if he has to write a paper to do it. He is known for his scholarly and high-quality teaching style, and has received the Ersted Award for Distinguished Teaching at Oregon.

"I take great pleasure in having Michael as a former student, a colleague, and friend. I only wish that I could keep up with him!"

—RICHARD J. O'CONNELL, Harvard University, Cambridge Mass.

Response

"When the beige AGU envelope arrived in February, I eagerly opened it expecting to read yet another letter thanking me in advance for agreeing to serve on some vitally important AGU committee. Learning that I was selected to receive the Macelwane Medal was a pleasant surprise, to say the least. It is indeed an honor to accept this recognition, and I share the honor (but not the medal) with all my collaborators because our science, perhaps more than ever before, is a cooperative venture.

"My teachers and collaborators, and even some administrators, played key roles in making me stand up here. This is not the place or time to thank everyone by name, but I do want to point out the vital role that unselfish mentoring by others played in my professional development. My first exposure to scientific research, beginning in junior high school, was provided by the



Macoun Field Naturalist Club at the Natural History Museum in Ottawa. Academic and government scientists, in particular Stephen Darbyshire, spent evenings and weekends helping us explore and appreciate the natural world. In fact, my first two written scientific contributions were based on these experiences. As an undergraduate physics major, I quickly became captivated by the unsolved and yet strangely understandable problems in the geophysical sciences. And I was fortunate that my undergraduate advisor, Jafar Arkani-Hamed, was willing to spend so much time helping an undergraduate learn how to write and debug code, and ultimately how to do research. My graduate advisors, Rick O'Connell and Howard Stone, taught me to appreciate rigor and critical thinking. My postdoc advisor, Raymond Jeanloz, introduced me to the human side of science. And, once I found a job, Kathy Cashman, Dana Johnson, and my wife Susan provided models for how to maintain balance in an academic life.

"A large part of my academic life involves teaching. I am often asked by students and their parents which part of my job I like better: research or teaching. I think this question conveys a misunderstanding of our responsibilities as faculty members, and perhaps reflects our collective shortcomings in communicating with our students and the public. I have always found that my involvement in research is essential in order to convey the excitement of our field and to thoughtfully answer questions. I am not ashamed to admit that a large fraction of my research ideas and new research directions have grown out of teaching and questions from perceptive students. Most important, it is through interactions with students that I am forced to understand and appreciate our science. For this reason, I am especially grateful to my 16 different student co-authors, who have given me the opportunity to vicariously share the joys of discovery and the pain of disappointment. Their enthusiasm and questioning continually remind me that while much has been learned, there is much more to be discovered.

"I feel fortunate to have had the opportunity to study the Earth and other planets. As my 4-year-old son Max explained to his kindergarten teacher on the morning I wrote this acceptance, 'Daddy studies rocks and red hot lava; that is pretty cool, but not as cool as being a paleontologist.'"

—MICHAEL MANGA, University of California, Berkeley