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Presentation of the Mineralogical Society of America Award to Quentin C. Williams

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Mr. President, members of the Society, and guests:

It is with great pleasure and considerable pride that I introduce you to the recipient of the Mineralogical Society of America Award for 2000, Quentin Williams.

A professor of Earth Sciences at the University of California at Santa Cruz, Quentin Williams has established himself as a leader in the field of mineral and melt spectroscopy. He has documented changes in atomic packing taking place in melts at high pressures, revealing why the physical processes of geochemical differentiation are distinct throughout the bulk of the Earth, as compared with the well-known differentiation processes of the crust and uppermost mantle.

For example, he has identified coordination changes in silicate glasses at high pressures, similar to those taking place in crystalline minerals. The coordination changes are found to occur reversibly on compression and decompression of the glass, proving that comparable structural changes also take place in the kinetically unhindered melts at depth within the planet. Following up with pioneering in-situ measurements of the same coordination changes in analog melts at high pressures and temperatures, his work has revealed the structural mechanism behind why magmas deep in the Earth may commonly sink, rather than rising buoyantly and erupting as is typical of melts of the crust and uppermost mantle.

His studies 10–12 years ago of the melting of iron and its alloys at ultrahigh pressures significantly influenced research on the temperature of the Earth's deep interior, the result being a systematic increase in the estimated temperatures at depth. He has made fundamental contributions on the presence of "water" and carbon (in the form of hydrogen, hydroxide and carbonate) within mineral phases inside the Earth. High-pressure experiments bearing on element partitioning in the transition zone of the mantle, as well as characterization of mid-ocean ridge basalt genesis—via studies of uranium-series disequilibria—are but a few examples of key research with students and collaborators. More recently, he has moved into the use of spectroscopy to address problems in archeology.

Working with seismologists, Quentin Williams has been a leading figure in the physical interpretation of modern wave-form data in terms of mineral phases and equilibria. He has thus become well known for interpreting "ultralow" seismic-wave velocities at the base of the mantle as representing regions of partial melt just above the core–mantle boundary. These ultra-low velocity zones may well be the source regions, or "footprints," of the volcanic and tectonic plumes observed at the Earth's surface.

With dozens of publications in the mineralogy, physics, geochemistry, geophysics, structural geology, and archeology literature, he has maintained a spectacular level of research activity over the past 15 years. He has had a half-dozen PhD students; he has developed and taught half a dozen courses, some as many as 6 or 7 times each; and he has served the community in numerous capacities, including as a National Science Foundation Panelist. The father of three (about to be four children), he has collaborated extensively with his spouse, the talented Elise Knittle who is currently chairman of his Department. They commonly teach mineralogy to classes of 50 or more students: quite a feat for a small department.

How does anyone manage to accomplish so much? Hard work, talent and perseverance surely play a role, but it also helps to start early. Quentin Williams was raised in Newark, Delaware, the son of an eminent condensed-matter physicist at the University of Delaware. After a Bachelor's degree in Chemistry at Princeton University, he came to the University of California at Berkeley 17 years ago for his Ph.D. studies. I was most fortunate to have him work with me for a few years.

He has been at UC Santa Cruz for more than a decade now, where he has established a major presence for our discipline, both in research and in teaching. Recipient of a Presidential Faculty Fellowship from the National Science Foundation, an Excellence in Teaching Award from Phi Beta Kappa, and other recognition as well, he has already shown himself to be a true mentor of students as well as a generous member of the research and academic community. He sets a high standard for the field, which we in the MSA are proud to recognize.

Ladies and gentlemen, please welcome the new MSA Award recipient, Quentin Williams.