

Right: This image uses fundamental quantum physics to show where the electrons in iron oxide (FeO) are. Iron is an important component of most minerals in the Earth. Iron's influence on mineral properties at high pressures is crucial to understanding the behavior of the deep Earth. Current electronic structure methods fail to describe FeO correctly. These methods predict, for example, that iron oxide is metallic when it is actually insulating.

In a grant funded by the National Science Foundation program Collaborations in Mathematical Geoscience, researcher Ronald Cohen of the Carnegie Institution of Washington and his collaborators aim to go beyond the current state-of-the-art method and develop and apply more accurate methods known as "Quantum Monte Carlo" to this and other problems in Earth materials. These new methods will increase the accuracy of our understanding of the deep Earth.

Credit: Ronald Cohen, Carnegie Institution of Washington

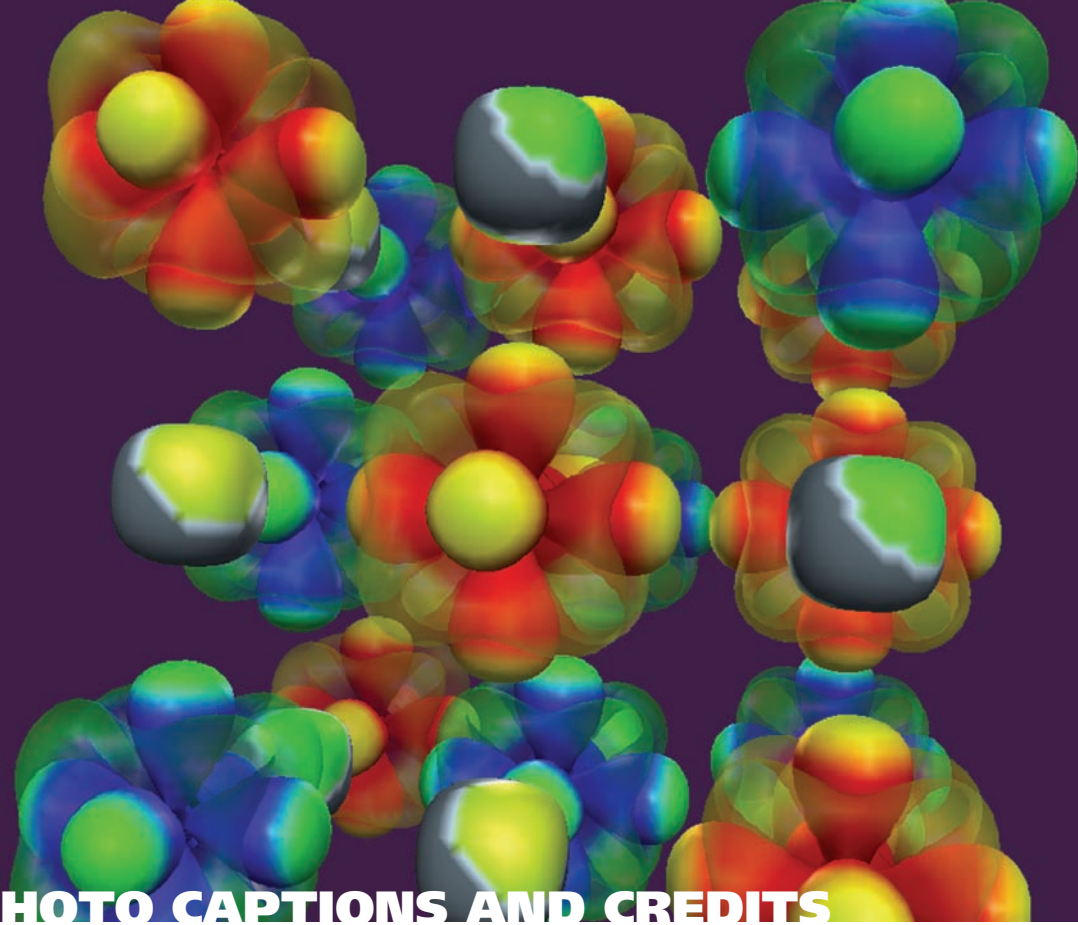
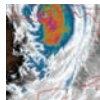


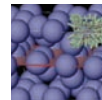
PHOTO CAPTIONS AND CREDITS



Page 1

Real-time radar data and high-tech communications were the keystones to success recently as the Rainband and Intensity Change Experiment (RAINEX) project began its research with Hurricane Katrina. The first hurricane research project to fly planes nearly simultaneously inside and outside a hurricane's principal rainband, RAINEX gathered information that will help scientists to better understand changes in a hurricane's intensity and to validate state-of-the-art numerical models used in forecasting. Once data are collected and analyzed, the researchers will share this information with hurricane operational centers and national environmental prediction centers throughout the country and the world. The National Science Foundation funded the work of atmospheric scientist Robert Houze, University of Washington, and meteorologist and physical oceanographer Shuyi Chen, University of Miami Rosenstiel School of Marine and Atmospheric Sciences, who also worked with scientists from the National Center for Atmospheric Research in Boulder, CO, the National Oceanic and Atmospheric Administration, and the U.S. Navy on the RAINEX project.

Credit: National Oceanic and Atmospheric Administration



Page 6

Credit: Virgil Percec, University of Pennsylvania



Page 10

Credit: Courtesy of New York-Presbyterian Hospital



Page 10

Credit: Global Biodiversity Information Facility



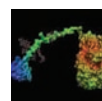
Page 12

Credit: Adrian Pingstone



Page 16

Credit: WGBH



Page 16

Credit: San Diego Supercomputer Center



Page 18

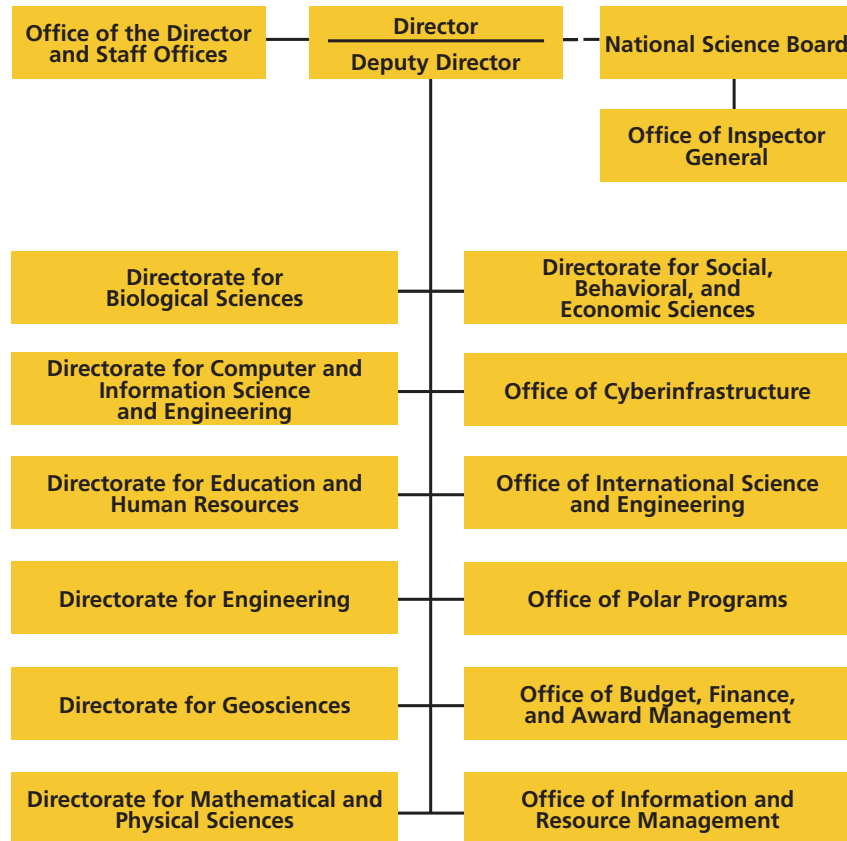
Credit: Gary Urton, the Khipu Database Project, Harvard University/Zina Deretsky, National Science Foundation



Page 22

Credit: Dave Finley, courtesy National Radio Astronomy Observatory and Associated Universities, Inc.

FY 2005 Organization Chart



NSF is headed by a Director who is appointed by the President and confirmed by the U.S. Senate. A description of each directorate and management office and a listing of NSF's executive staff and officers can be found in appendixes 1 and 2. A 24-member National Science Board (NSB), also appointed by the President with the consent of the Senate, meets six times a year to establish the overall policies of the Foundation. The NSB, made up of prominent contributors to the science, mathematics, engineering, and education communities, also serves the President and the Congress as an independent advisory body on policies related to the U.S. science and engineering enterprise. A list of NSB members can be found in appendix 3.

The NSF workforce includes approximately 1,400 full-time staff. In addition to the permanent staff, NSF regularly recruits visiting scientists, engineers, and educators who are leaders in their fields. Recruiting active researchers and educators to fill rotating assignments infuses new talent and expertise into NSF and is integral to the Foundation's mission of supporting the entire spectrum of science and engineering research and education, particularly research at the frontier. Rotators make up about 15 percent of NSF's workforce. NSF also employs contractors who are engaged in commercial administrative activities.