Earth is the planet we call home, but we have only just begun to understand what transpires in its vast and inaccessible interior, deep in its oceans, and in the atmosphere far above.

Curiosity about the Earth is in MIT's DNA—the seeds of the Department of Earth, Atmospheric and Planetary Sciences (EAPS) were planted in 1861 by geologist William Barton Rogers, MIT's founder and first president, with Geology and Mining Engineering (Course IV) being one of the original six courses taught at MIT.

In EAPS, our curiosity leads us to ask fundamental questions about our planet's 4.6 billion year history—and its future. How did Earth come to be? What forces shaped it over time? And what sequence of events produced a world where life can thrive? Which mechanisms caused major environmental upheavals in Earth's past? How can we meet humanity's need for energy and natural resources while maintaining Earth's habitability? Will we ever be able to predict earthquakes? Could we be approaching another mass extinction?

Every day, EAPS scientists and students conduct discovery-driven research to understand the processes shaping our planet, investigating Earth's deep interior structures, the forces that build mountains and trigger earthquakes, the climatic influences that shape landscapes and stir the oceans, and the conditions that foster life.

Why study the Earth?

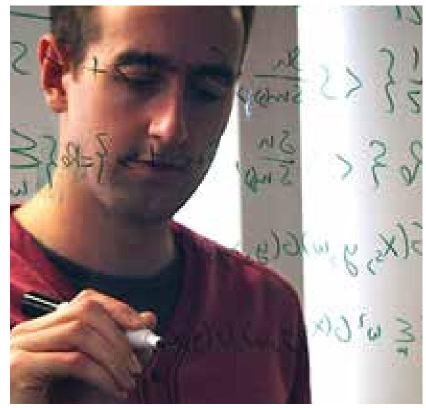
We depend on Earth to sustain us. Earth has evolved to provide everything that allows modern human life to flourish, from the vital water we require to drink and grow our food; to the minerals like iron, aluminum, copper, and silicon that build everything from giant skyscrapers to tiny computer chips; to the energy that powers both industry and the everyday. But our dynamic planet also unleashes natural disasters which reshape the landscape and threaten communities. Research into these fundamental processes and forces reveals quantitative evidence and shapes our understanding of Earth's present, its past, and its potential future. It is this type of discovery-driven research which helps advise scientific and industrial colleagues and policymakers in their endeavors to find practical solutions to key societal issues—like innovations in the safe extraction of water and energy resources, the prevention of landslides, or the engineering of structures to withstand earthquakes and hurricanes.

Image Credit: NASA

How do EAPS scientists conduct their research?

The Earth is our laboratory. Our students and faculty sail the oceans, fly into the clouds, and scale glaciers and mountains to observe and sample. Back in our world-class labs, we design complex experiments and computational models. Our research demands that we cross disciplines. Physics, mathematics, chemistry, and biology are all brought to bear in our investigation of the interconnected, overlapping systems that support life on Earth.

Measurements of uranium and lead isotopes in Siberian volcanic rocks give us an elemental clock, pinpointing the eruption of 5 million cubic kilometers of lava over 252 million years ago and revealing a link to the demise of almost 90% of life on Earth. Past landslides inform computational models using soil depth, root strength, and pore water pressure to accurately predict future patterns and vulnerable areas. GPS and seismographic sensors deployed in the field enable detailed mapping to understand everything from large-scale mantle dynamics and tectonic activity all the way down to localized surface deformations and seismic events induced by man-made changes in subsurface reservoirs. And we combine lab experiments with computer simulations to help explain how fluids flow through the pores of rock structures deep underground—with implications for increased recovery of hydrocarbon resources, carbon sequestration, and the exploitation of geothermal energy.



EAPS strength is our integrated approach. Combining theory, field work, and laboratory experimentation, our students and faculty cross boundaries between disciplines, fostering interdepartmental collaborations unmatched by any other program.

EAPS Professor David McGee examines an outcrop of carbonate rock found along the shoreline of an ancient lake in northern Chile. Today, this region is known for being one of the driest on Earth, but these fossilized remains of algal reefs suggest it was once a much wetter place. By combining fieldwork, uranium-thorium dating, and computer modeling, the McGee Lab seeks to understand when in Earth's history these ancient lakes existed and why, in order to better contextualize future changes in water availability in drylands around the world.

EAPS

http://eapsweb.mit.edu

Join Us

For our work to continue, we need you. EAPS relies on generous gifts from our alumni and friends to ensure we continue to attract the most outstanding students and scientists in the field. There are a number of ways you can participate, such as supporting a graduate student or donating to our Discretionary Fund. Or, better yet, establish your own fellowship and create a lasting legacy at MIT.

For more information about EAPS and how to support our research and our graduate students, please contact Angela Ellis, Senior Development Officer, at 617-253-5796 or aellis@mit.edu.

DEPARTMENT OF EARTH, ATMOSPHERIC AND PLANETARY SCIENCES
Massachusetts Institute of Technology | eapsinfo@mit.edu | 617 .253 .2127