

HAYSTACK OBSERVATORY

MIT Haystack Observatory (<http://www.haystack.mit.edu>), a pioneering radio science and research facility, provides opportunities for undergraduate and graduate student research in radio astronomy, geodesy, atmospheric sciences, and informatics.

Haystack Observatory holds a worldwide leadership position in the development and deployment of the Very Long Baseline Interferometry (VLBI) technique, which uses a global array of radio telescopes to make high-resolution observations of galactic and extragalactic radio sources in astronomy and to perform precision geodetic studies of the Earth's plate tectonics and motions in space for geodesy. Using radio telescopes at Haystack and elsewhere around the world, the observatory supports strong programs in both science and technology using VLBI, including unique millimeter-wavelength observations of black holes.

High-power geospace radars using 46m and 67m antennas are used in conjunction with a variety of other techniques to study the structure and dynamics of Earth's upper atmosphere. Emphasis is given to the study of the effects of geomagnetic storms induced by solar disturbances on Earth's ionosphere as well as the coupling of atmospheric layers. Haystack researchers also study thermal effects in the upper atmosphere, including signatures associated with global climate change.

A strong instrumentation development program is also conducted at Haystack Observatory, particularly in the areas of wideband signal processing and high-rate data acquisition. Current applications include the design of small satellites for geospace research and large radio arrays to improve the flexibility and sensitivity of radio observations, as well as ultra-broadband receiving systems for VLBI measurements. These innovative instruments offer rich opportunities for unique geodetic, astrophysical, heliospheric, and ionospheric science.

Opportunities exist for students to get involved in all of these projects and use the facility instrumentation for research investigations.

Haystack Observatory is located in Westford, Massachusetts, about 45 minutes northwest of Cambridge. For further information, email Haystack Observatory (info@haystack.mit.edu) or call 617-715-5400.