EPSCoR
NEW HAMPSHIRE

Advancing Research
for a Better New Hampshire
NHEPSCoR.ORG

NH EPSCoR strategically directs federal investments in research infrastructure to support scientific research and STEM education that benefits New Hampshire. The benefits of NH EPSCoR reach beyond New Hampshire's borders, generating world-class research, commercially available products, and quantifiable improvements in quality of life.

Areas of Impact

ADVANCED MANUFACTURING OF BIOMATERIALS

NH BioMade—Biomaterials such as those used in implants and tissue engineering have stringent and potentially conflicting specifications. NH BioMade will advance the design and manufacture of biomaterials and support the rapidly growing biomaterials industry in the state through knowledge generation, academic-industrial research partnerships, and workforce development.

SUSTAINABILITY SCIENCE & DECISION-MAKING

The Future of Dams—Hydropower is a major source of renewable energy in New England, and 50 dams are scheduled for relicensing in the next decade. Dams can have adverse effects on coastal ecosystems and fisheries but also provide needed water for recreation and household consumption. Scientists in New Hampshire, Maine, and Rhode Island are working with communities to improve the use of science in making decisions regarding aging dam infrastructure.

ENVIRONMENTAL SCIENCE

Genomic Ecology of Coastal Organisms—Scientists in New Hampshire and Maine are teaming up to advance understanding of long-standing questions in evolutionary biology. Their work will provide new insight into genetic elements and mechanisms that underlie the resilience and adaptive capacity of tidal marsh birds and the ability of birds to respond to rapidly changing environments.

BRAIN SCIENCE

Attention in the Brain—Researchers in New Hampshire, Montana, Rhode Island, and Nevada have formed a consortium led by Dartmouth College to study the neural basis of focused attention, which is critical to countless daily tasks, from operating machinery to maintaining safety in high security settings.
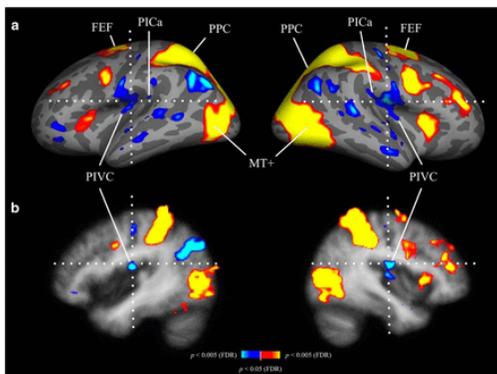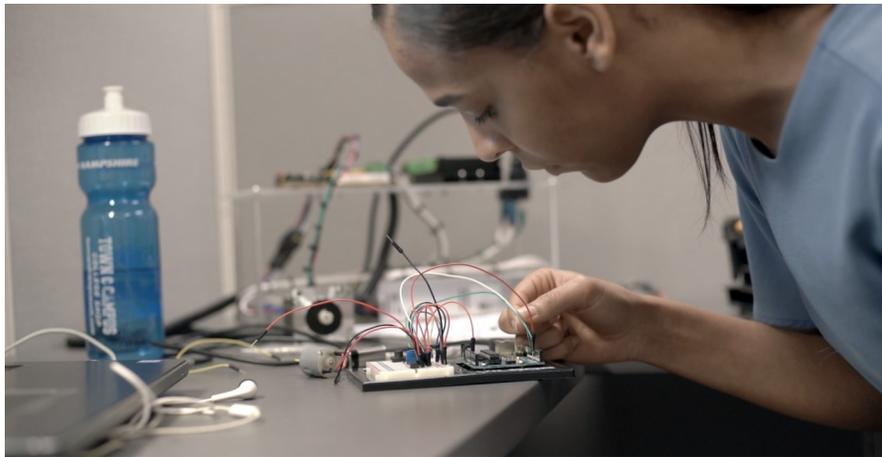
EDUCATION & WORKFORCE DEVELOPMENT

NH BioMade's Career Success Initiative offers work-based learning for high school and community college students, research internships for undergraduates, and transfer scholarships to support community college students transferring to a 4-year degree program. NH EPSCoR programs supported by NSF have provided research training for more than 250 graduate and undergraduate students, and educational outreach to 23,000 people, largely through the training of teachers.

INDUSTRY PARTNERSHIPS

NH EPSCoR develops partnerships with industry to bring new technologies to market. Past projects have produced a patent for detecting a virulent strain of bacteria that is used in shellfish management, and a device to measure the weight of snow on flat roofs to avoid building collapse. NH BioMade provides seed grants for high-risk, high-impact research and industry-university collaborations.

CYBERINFRASTRUCTURE

The UNH Data Discovery Center (**ddc.unh.edu**) is the public, free data repository and digital library for NSF EPSCoR projects, including dams; water, snow and soils data; and a high-resolution dataset which provides critical inputs for regional impact studies of climate extremes, water resources, economic impacts, and other decision-making elements crucial for sound regional planning.

Federal investments in university research infrastructure can significantly increase the research enterprise. **NSF EPSCoR awards in NH have generated over $181 million in new, competitive, non-EPSCoR awards.**

New funding generated by NSF EPSCoR awards in NH:

Years	Award	EPSCoR ($M)	New Funding ($M)
2007-2011	RII	$7.78	$45.83
2009-2013	Track-2	$1.20	$49.96
2011-2016	Track-1	$21.90	$76.40
2013-2016	Track-2	$3.00	$9.11
TOTAL		$33.88	$181.30

DEPARTMENT OF ENERGY EPSCoR

Effects of Fracking—UNH researchers are studying how hydraulically fracturing shale deep below the Earth's surface to release natural gas introduces microbes that can alter the ecosystem. Their findings will help industry manage microbial communities that can affect the quality of the gas, clog shale fractures and foul extraction equipment.

Shaping Energy Futures—UNH researchers are developing methods to harvest solar energy and convert carbon dioxide into fuels using molecular catalysts and metal oxide nanoparticles. Another DOE-funded project aims to improve the capacity and efficiency of data storage by transforming it to become three-dimensional.

NASA EPSCoR

Anti-icing Surface Coating—Researchers at UNH and Keene State College are developing new materials based on proteins found in fish, insects, bacteria and plants, that can be used to control icing of surfaces, which is vitally important in air transportation, planetary exploration and maintaining instruments on the space station. Potential applications include preserving the quality of foods, medications, and humans during long space travel.

Advancing Space Science—Engineers and scientists at Dartmouth and UNH are miniaturizing instruments for small space satellites and developing autonomous robots to expand ground-based remote sensing in polar regions. Another project, led by a former astronaut now at Dartmouth, is researching the vision changes that occur during space flight, in collaboration with Creare, a NH engineering R&D company.

EPSCoR awards in NH since 2004 from all federal agencies with EPSCoR programs:

Agency	Cumulative ($M)
National Science Foundation	$82.26
NASA	$6.60
Department of Energy	$5.74
Department of Defense	$3.66
USDA	$5.63
TOTAL	$103.89