



April 27, 2016

PARTNERSHIPS FAIR for Broader Impacts

Assessment and Evaluation



University of
New Hampshire



WELCOME PARTNERSHIPS FAIR for Broader Impacts Assessment and Evaluation

University research has the potential to spark innovation and transform lives. Research that engages the community outside of the university does just this.

The organizations depicted in this brochure are some of UNH's partners in transitioning, translating, or transforming our research to the ultimate benefit of New Hampshire's citizens and society at large – whether it be for families and youth, agricultural and other economic improvements, or becoming better stewards of our planet.

We thank our partners for their contributions and look forward to future discoveries and enhancements to our lives that we make together.

With best regards,

Jan Nisbet, UNH Senior Vice Provost for Research
Ken La Valley, Dean and Director
of UNH Cooperative Extension



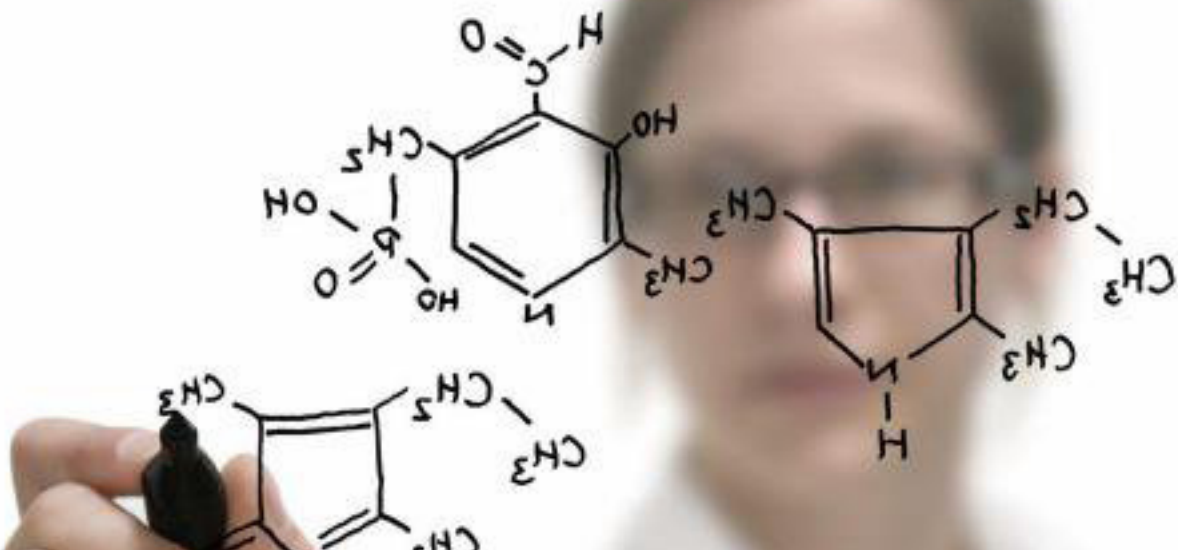
University of
New Hampshire

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AN NSF FUNDED PROGRAM TO IMPROVE THE CLIMATE FOR UNH FACULTY THROUGH FAIR AND EQUITABLE POLICIES, PRACTICES, AND LEADERSHIP DEVELOPMENT.

UNH ADVANCE is part of a long term National Science Foundation (NSF) initiative launched in 2001 for the advancement and support of women faculty in the Science, Technology, Engineering, and Mathematics (STEM) disciplines. NSF developed the program in response to a 1996 MIT study that found that women faculty at MIT were having a very different experience than men faculty at MIT: women faculty felt increasingly marginalized as their careers progressed at MIT, they earned significantly less, and were provided fewer resources despite professional accomplishments equal to those of their male colleagues.

Since 2001, NSF has issued over 65 multi-million dollar awards to colleges and universities to help them develop and institutionalize policies, programs, and practices aimed at recruiting, retaining, and advancing women in underrepresented fields.

[UNH.EDU/ADVANCE](https://unh.edu/advance)

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CORE INITIATIVES

UNH ADVANCE strives to accomplish these goals through the following core initiatives:

Faculty Career Advancement

Support faculty in advancing in their careers by providing resources and programs in the following areas:

- Career-Life Balance
- Career Progression: Promotion & Tenure
- Career Success: Mentoring

Faculty Leadership Development (REAL)

Design and implement a series of professional development opportunities for faculty aspiring to or in positions of leadership to build an inclusive, fair, and supportive institutional climate.

Faculty Recruiting (GEAR UP)

Develop consistent, effective, unbiased policies and procedures to ensure that UNH continues to attract and retain the best and most representative faculty possible.

Research: Tracking Our Success

Analyze and report institutional data and conduct research to assess the impact of the UNH ADVANCE initiative on individuals and the institution through the following research studies:

- Annual Faculty Climate Survey
- Social Science Research Study



APPLIED RESEARCH AND EVALUATION, CARSEY SCHOOL OF PUBLIC POLICY



Scientific research does not occur in a vacuum. NSF-funded research teams may be expected to reflect on pedagogical and research practices, develop collaborative interdisciplinary partnerships, and effectively disseminate information to key audiences prepared to translate findings to action. Faculty and staff of the Carsey School of Public Policy partner with scientific research teams to evaluate their efforts critical to creating real world impact.

EXAMPLES OF CURRENT AND PAST NSF-FUNDED PROJECTS CONDUCTED BY CARSEY FACULTY INCLUDE:

- An evaluation of EPSCoR's initiative to increase knowledge flow across EPSCoR institutions, and foster collaborative capacity within, across, and beyond EPSCoR jurisdictions, designed to identify the factors that support and obstruct realization of collaborative science.
- An investigation of the extent to which EPSCoR-funded academic researchers engage with practitioner stakeholders, a diverse group of potential non-academic consumers of research, and of strategies for communication of findings to this audience.
- An NSF-funded qualitative study of what attracts undergraduate women to STEM majors, and the supports and challenges to their completion of STEM programs, to inform recruitment and retention efforts.
- Consultation on an NSF-funded study of the adoption of innovations from engineering education research into pedagogical practice in that discipline.

In addition to these NSF-funded examples, Carsey researchers have worked on a variety of projects linking research to broader communities, including demographic assessments of specific locations, needs assessments around particular programs, and work with the public, private, and non-profit entities to better coordinate service delivery.

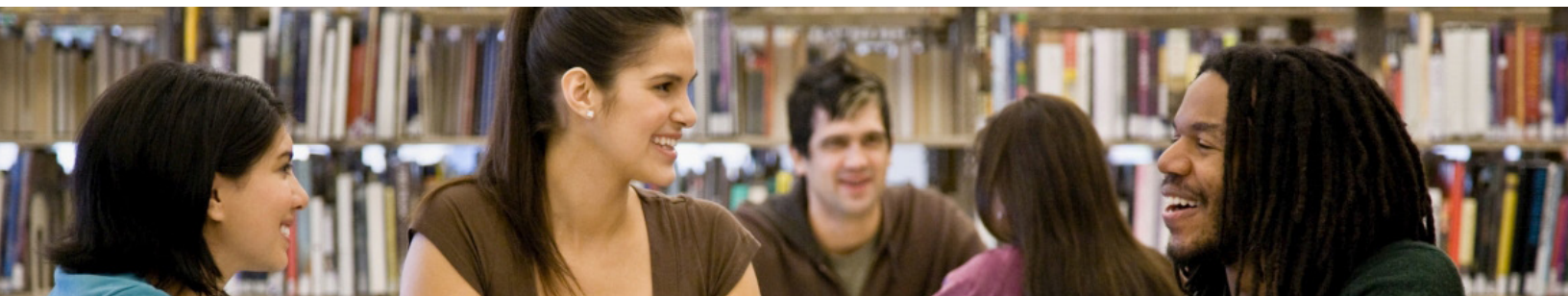
CARSEY.UNH.EDU

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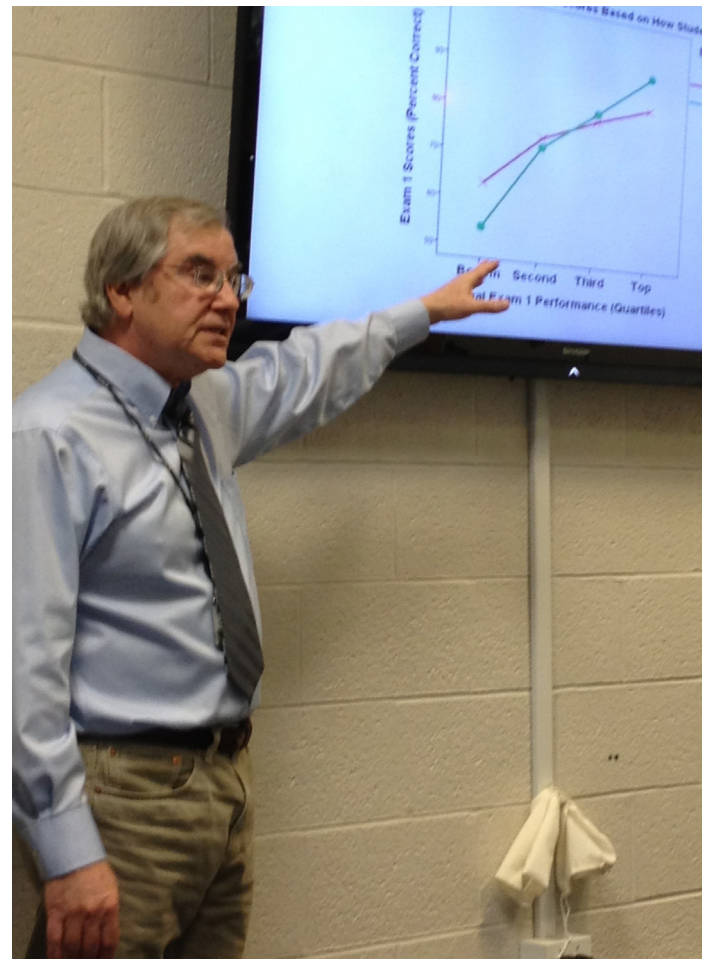
CENTER FOR EXCELLENCE IN TEACHING AND LEARNING



OFFERS A RICH COLLECTION OF RESOURCES, INFORMATION, AND EXPERTISE TO SUPPORT THE UNIVERSITY'S MISSION OF ENGAGING STUDENT LEARNING THROUGH THE CONTINUAL IMPROVEMENT OF TEACHING.

The Center for Excellence in Teaching and Learning (CETL) strives to promote the highest quality of student learning by providing full-time faculty, part-time faculty, and teaching graduate students with the resources they need to implement in their classrooms the best practices in college teaching. The Center's staff consults with individual teachers; offers workshops and courses on effective teaching; collaborates with other campus units interested in program development and review; assists individuals and academic units interested in designing and implementing student learning outcomes assessment initiatives; and conducts and disseminates research on the teaching/learning process. The teaching/learning process,

embodied in the creation, transmission, and application of knowledge, is the keystone of our university. It represents the University of New Hampshire's central mission.



UNH.EDU/CETL

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CETL PROJECTS AND SERVICES

Mid-Course Assessment Program The Center for Excellence in Teaching and Learning offers a service by which faculty can receive feedback about their students' perceptions of a course during the semester—in time to make adaptations as needed. This Mid-course Assessment Process (MAP) differs from the standard end-of-course teaching evaluation process in several ways, and we believe it offers teachers important information about how their teaching affects student learning.

Cognate in College Teaching The Graduate School, in conjunction with the Center for Excellence in Teaching and Learning, offers a thirteen-credit graduate program designed to enhance the effectiveness of college teaching. All courses needed to earn this credential carry full academic credit. Some of the classes are offered online, and some are held on campus. Possessing the requisite graduate degree(s), the interest, and the research experience in an academic discipline may no longer be sufficient for success as a college-level professor. Today's faculty members must possess a set of skills and understandings specific to effective teaching in a learner-centered environment: they have to know how students learn, how to design courses to enhance that learning, how to interact effectively with students, and how to assess teaching and learning. This program is designed to help faculty and graduate students learn and sharpen these skills and to broaden their knowledge base in the scholarship of college teaching. All courses in the program are based on the latest research and scholarship in the field of college teaching. The curriculum offers a rich blend of teaching and learning theory, a comprehensive overview of the current best teaching practices in higher education, and practical strategies for applying what is learned.

Certificate in College Teaching The Certificate in College Teaching offers a series of core and elective courses to prepare individuals to teach at institutions of higher education. The Certificate is open to current faculty members, post-docs, doctoral students enrolled at institutions other than UNH, and with permission master's students at UNH.

Cognition Toolbox Over the past year and a half, the Center for Excellence in Teaching and Learning (CETL) has been developing and pilot testing a new approach to meet its primary goal: assisting faculty in improving student learning and retention of course material and facilitating the utilization of teaching and learning strategies that promote the transfer of what is learned to new situations. This new approach, The Cognition Toolbox, is characterized by a set of strategies by which faculty implement one or more "cognitive tools" in courses they are currently (or will be) teaching. This new approach to improving student learning differs dramatically from the standard approach found in many other teaching and learning centers. Most teaching and learning centers rely on workshops, seminars, talks, and/or "bag lunch" sessions in which faculty are provided information and examples about pedagogical methods and techniques (e.g., "how to" sessions on using PowerPoint, incorporating writing into courses, techniques for facilitating active learning, etc.) We plan to meet with individual instructors; assess exactly what "cognitive tools" are likely to work in a specific course; devise a plan for the implementation of the recommended cognitive tools; provide assistance in the integration of the recommended cognitive tools into courses; develop outcome measures to assess the unique impact of incorporated cognitive tools on student learning.

Teaching and Learning with Multimedia Students learn more and are better able to apply what they have learned when they are instructed with words and pictures (than when they are instructed with words alone or pictures alone). Multimedia learning refers to the conceptual understanding that students develop from words and pictures. Multimedia instruction, based on the science of learning, deals with effective and efficient ways of promoting multimedia learning. Multimedia instructional materials are being used with increasing frequency in college and university instruction, in both traditional and online courses. Unfortunately, instruction using multimedia in real academic courses has not been informed by what is known about learning with multimedia. Staff at the University of New Hampshire (UNH) Center for Excellence in Teaching and Learning (CETL), in collaboration with staff of Teaching and Learning Services (Academic Technology), are undertaking a three-year project in which we will work with faculty at UNH and other New England colleges and universities to develop multimedia instructional presentations that are informed by principles of multimedia learning. These principles will be applied in both campus-based and online courses. The overarching goal is to develop templates and simple-to-follow instructions that can be used by faculty to create their own multimedia presentations that follow best principles of multimedia learning.

BRINGING INFORMATION AND EDUCATION INTO THE COMMUNITIES OF THE GRANITE STATE

UNH Cooperative Extension provides trusted, research-based education and information for a stronger New Hampshire. For over 100 years, we have been drawing on our deep understanding of the state's needs to support the economy, improve lives, and make natural resources healthier and more productive.

The scope of our work is rooted in four focus areas: youth and family; food and agriculture; natural resources; and community and economic development. Cooperative Extension also administers New Hampshire's robust 4-H youth development and mentoring program. And our Education Center info line, staffed by Extension professionals and trained volunteers, provides New Hampshire residents with answers to a wide range of home and garden questions.

To best fulfill our longstanding commitment to the Granite State, we are located in ten county offices as well as on the University of New Hampshire's Durham and Manchester campuses. Supported by advisory councils in each county, our innovative, connected, and energetic staff and volunteers are committed to delivering relevant programs and services, relationship driven engagement, and practical, sustainable solutions throughout the state.

EXTENSION.UNH.EDU

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UNH Cooperative Extension State Advisory Council at work in October 2013

FOCUS AREAS

FOOD & AGRICULTURE

The UNH Cooperative Extension Agricultural team offers a wide array of workshops, research and diagnostic services regarding agricultural business; dairy, livestock, and poultry; field and forage crops; food safety; fruit and vegetable production; greenhouse and floriculture; integrated pest management; nursery and landscape; pesticide safety education; soil testing; and insect and plant disease identification.

COMMUNITY & ECONOMIC DEVELOPMENT

Strong communities have engaged citizenry who participate in decision-making to address local needs. NH communities strive to identify their needs, engage their citizens, and increase public participation in order to improve their communities. The Community Development team at UNH Cooperative Extension works with community members, leaders, and our local, regional and state-wide partners to build their knowledge, skills and capacity for needs assessment, community engagement, decision-making, and action.

NATURAL RESOURCES

The Natural Resources team promotes research-based stewardship to insure the ecological health of New Hampshire's precious natural resources. Its efforts focus on preservation, management, and responsible use in the following areas: coastal and marine environments; energy, fisheries and aquaculture; forests and trees; geospatial technologies; lakes, streams, and watersheds; land and water conservation; stormwater; and wildlife. The team works with local volunteers and residents to design and conduct

educational programs that meet social, environmental and economic needs of NH's citizens and communities.

4-H YOUTH & FAMILIES

The Cooperative Extension 4-H Youth & Family team engages thousands of youth and volunteer mentors; delivers highly effective health education programming to low income families; trains educators to use hands-on research-based methods to engage youth in science, healthy living and citizenship projects; builds resilience with audiences facing extraordinary challenges through Military Youth & Family Programs and Youth Mental Health First Aid training; and engages youth with hands-on activities in order to open doors to careers and studies in the Science, Technology, Engineering and Math (STEM) fields.



CITIZEN SCIENCE PROGRAMS

UNH Cooperative Extension has worked with volunteers to help conduct scientific research since 1978 and the founding of the Lakes Lay Monitoring Program. Extension now coordinates a variety of citizen science programs and initiatives to engage people of all ages in New Hampshire-based scientific research. Through citizen science, UNH Extension brings together a century of expertise in recruiting, training, and working with volunteers with academic expertise in a variety of natural and physical sciences.

WHY CITIZEN SCIENCE?

Citizen science programs offer opportunities for the public to participate in science, but they may also raise public awareness on important issues or research, help researchers expand the scope of research, and improve broader impacts for grant-funded research projects.

Some of the programs our volunteers serve are...

- **THE NEW HAMPSHIRE LAKES LAY MONITORING PROGRAM** trains volunteers who conduct water quality research at more than 300 fresh water lake sites and 70 tributaries in a unique, “neighbor-to-neighbor” approach.
- **THE MARINE DOCENT** volunteers provide a lens through which students, educators, and the public view and explore the salt water marine coastal environment, while helping to educate the public about our natural resources.
- **4-H YOUTH DEVELOPMENT PROGRAM** - Adult volunteers have many roles – mentors, advisors, friends. You don't need any special knowledge or talent, just a desire to make a positive impact on a child's life.
- **NEW HAMPSHIRE COVERTS PROJECT** is a wildlife-focused program that helps landowners and other conservation-minded residents promote wildlife habitat conservation and forest stewardship in their communities.
- **MASTER GARDENERS** extend the outreach and education of UNH Cooperative Extension through community horticultural projects. They also answer our toll-free information line at our Education Center.
- **The COASTAL RESEARCH VOLUNTEER (CRV) PROGRAM** engages volunteers in enhancing and expanding locally relevant research and participating in meaningful science and stewardship opportunities.
- **EXTENSION ADVISORY COUNCILS** in each of New Hampshire's 10 counties help identify the educational needs of county residents and work with Extension staff and volunteers to meet those emerging needs.
- **NATURAL RESOURCES STEWARDS** engage those who enjoy learning about New Hampshire's natural history and resources and their role in sustaining communities. The program emphasizes hands-on learning and can be taken for college credit.
- **STEWARDSHIP NETWORK: NEW ENGLAND** - a new initiative to mobilize volunteers to care for and study lands and waters in their communities.

[EXTENSION.UNH.EDU/UNH-COOPERATIVE-EXTENSION-VOLUNTEERS](https://extension.unh.edu/unh-cooperative-extension-volunteers)

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MARINE PROGRAMS

NH SEA GRANT PARTNERSHIP

N.H. Sea Grant Extension, a partnership between N.H. Sea Grant and UNH Cooperative Extension, serves as the link between the marine community and UNH, and it helps stakeholders solve problems related to marine resources. Through informal education programs and day-to-day contact, extension staff members are able to assist individuals and groups in making informed decisions about the use, development and conservation of those resources. Extension's efforts are focused on maintaining healthy coastal ecosystems, promoting resilient communities and economies, and supporting sustainable fisheries and aquaculture. seagrant.unh.edu



MARINE DOCENT PROGRAM

The UNH Marine Docent Program is a volunteer-based effort that presents educational programs that provide a link between the University's research community and the public. Docents teach marine science to students in schools and camps, adults in community groups and organizations, and at public events in a variety of settings.

Through our SeaTrek in school programs or our Coastal Floating Lab programs aboard boats, Day of the Coast events at schools and numerous educator workshops, Docents are leading the way in marine education for the Granite State.

COASTAL RESEARCH VOLUNTEERS

The goals of the Coastal Research Volunteer (CRV) Program are to engage volunteers in meaningful science and stewardship opportunities while enhancing and expanding local coastal research. The program provides an interface where interested volunteers are matched with researchers to work on a variety of funded projects in the New Hampshire Seacoast and surrounding watersheds.

SEAGRANT.UNH.EDU/UNH-MARINE-DOCENTS

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SEAGRANT.UNH.EDU/CRV

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NATURAL RESOURCES VOLUNTEER PROGRAMS

Promoting research-based stewardship to insure the ecological health of New Hampshire's precious natural resources

NEW HAMPSHIRE COVERTS PROJECT Volunteers Working for Wildlife

Each year, 25 landowners and conservation-minded New Hampshire residents gather with a team of natural resource professionals at a rustic camp. For 3½ days, participants learn about the latest concepts and issues in wildlife and forest ecology, habitat management, land conservation, and effective outreach. In exchange for the training (meals, lodging, and materials are paid by program sponsors), participants agree to return to their communities and motivate others to become stewards of the state's wildlife and forest resources.



Over 400 people from throughout New Hampshire have completed the workshop and become Coverts volunteers since the beginning of the program in 1995. These volunteers have returned to their communities and hosted tours on their property, conserved land, presented wildlife programs in schools, joined conservation commissions, written articles for newspapers and magazines, staffed exhibits, initiated natural resource inventories, worked on community conservation projects, and much more.

[EXTENSION.UNH.EDU/VOLUNTEER/
NEW-HAMPSHIRE-COVERTS-PROJECT](https://extension.unh.edu/volunteer/new-hampshire-coverts-project)

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This new Cooperative Extension-based initiative helps mobilize volunteers to care for and study lands and waters in New England. Representing 130+ natural resource partners, the Network matches interested volunteers with stewardship and citizen science projects focused on forests, wildlife, marine ecosystems, invasive plants, water quality, trails, and more.

For scientists interested in introducing a volunteer component to their research, Network staff can provide technical assistance on working with volunteers and can advise on designing protocols to create successful citizen science research projects.

The Network also:

- Hosts an online hub of New England-based citizen science projects
- Trains volunteers online and through workshops
- Recruits volunteers through our weekly e-bulletin
- Develops research-based tools for citizen science researchers

NEWENGLAND.STEWARDSHIPNETWORK.ORG

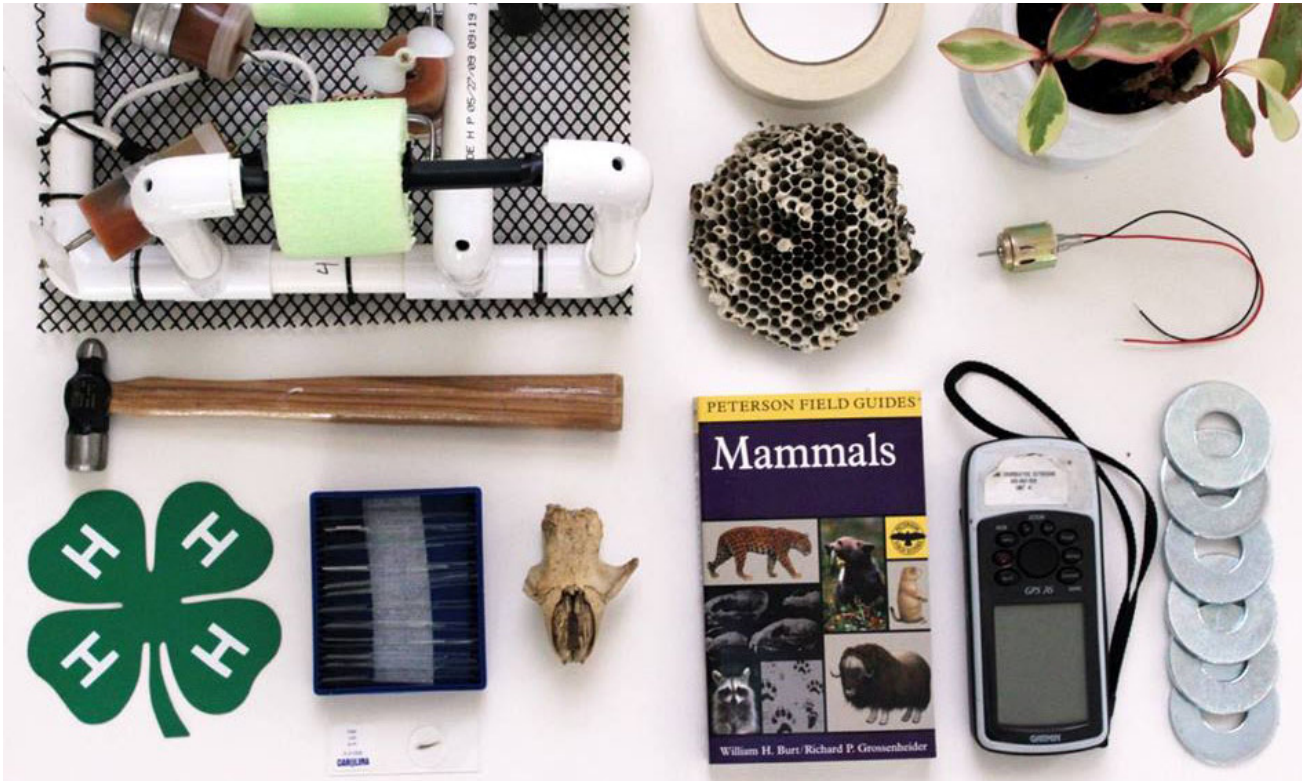
NATURAL RESOURCES STEWARDS

In exchange for education, participants are required to complete 40 hours of volunteer service within two years in their own communities or through a partnering agency's program. Graduates from the Natural Resources Steward Program have volunteered in over 40 different natural resources-related areas of their choosing. Open to all, the Natural Resources Stewards Program each year offers a 13-session course. Participants gain a comprehensive understanding of natural resources stewardship from awareness to activism through topics including:

- NH's wildlife and their habitats
- Ecosystems and watersheds
- Soil and water resources
- Land conservation and protection
- Tree identification, evaluation, planting, and care
- Invasive species identification and management

EXTENSION.UNH.EDU/VOLUNTEER/NATURAL-RESOURCES-STEWARDS





Science literacy engages New Hampshire youth and adults in exploring and understanding the science behind our natural and built world.

Credit: UNH Cooperative Extension

UNH COOPERATIVE EXTENSION



YOUTH AND FAMILY PROGRAMS

Some of what we do:

- Engage thousands of youth and volunteer mentors: 4-H Youth Development and Marine Docents
- Deliver highly effective health education programming to low income families: Nutrition Connections
- Train educators to use hands-on research-based methods to engage youth in science, healthy living and citizenship projects: Professional development in partnership with ACROSS NH.
- Build resilience with audiences facing extraordinary challenges through Military Youth & Family Programs and Youth Mental Health First Aid training.
- Engage youth with inquiry-based activities in order to inspire careers and studies in the **Science, Technology, Engineering and Math (STEM)** fields.

EXTENSION.UNH.EDU/YOUTH-FAMILY

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4-H YOUTH DEVELOPMENT

Through the Cooperative Extension System, 4-H's research-backed, life changing programs are available through 4-H clubs, camps, afterschool and school enrichment programs in every county and parish in the U.S. With a network of more than 6 million youth, 611,800 volunteers, 3,500 professionals, and more than 25 million alumni, 4-H helps shape youth to move our country and the world forward in ways that no other youth organization can.

NUTRITION CONNECTIONS

We help low-income families and children improve their diets and make the most of their food dollars. We work with adults to improve skills in saving money at the grocery store and healthy eating. We work with youth to help them be healthier through hands-on learning and trying new foods. We work with many organizations across the state to bring nutrition education to their clients. Nutrition Connections is New Hampshire's home for the Expanded Food and Nutrition Education Program (EFNEP) and Supplemental Nutrition Assistance Program Education (SNAP-Ed).

MILITARY YOUTH & FAMILY PROGRAMS

The UNH Cooperative Extension Military Youth and Family Program is an organization that collaborates with other organizations and community members to provide engaging programming and resources for NH military youth and their families. The 4-H Military Partnership works with 4-H Clubs around the state to provide awareness and opportunities for NH military youth to get involved in their communities.

YOUTH MENTAL HEALTH FIRST AID TRAINING

UNH Cooperative Extension has joined a force of more than 2,500 people worldwide who are becoming trained to head off violent acts by recognizing the early warning signs in young men and women struggling with mental anguish or despair. Members of Cooperative Extension's youth and family team have become certified as expert trainers in Mental Health First Aid (MHFA), a program embraced in President Obama's post-Sandy Hook "The Time is Now" initiative and the Mental Health First Aid Act of 2013, co-sponsored by New Hampshire Senator Kelly Ayotte. These bipartisan actions aim to help adults recognize the signs of mental health disorders in adolescents and find those youth the necessary care.

SCIENCE LITERACY

The Science Literacy team engages New Hampshire youth and adults in exploring and understanding the science behind our natural and built world. For example, at Family Science Night, a recent program hosted in collaboration with the UNH STEM Discovery Lab, each family worked as a team to build an Eco-Bot, a motorized robot built using only a toothbrush, a watch battery, a tiny motor, and tape. Families were challenged to use a variety of materials to build a secure containment area for the Eco-Bot to move in and then see how much "toxic waste" their Eco-Bot could clean in two minutes. The Science Literacy team also provides STEM professional development programs to educators, formal and informal, to increase capacity in STEM instruction. For instance, our Inquiry Methods series for educators promotes best pedagogical approaches to science literacy, helping educators achieve a more inquiry-based approach.

PROFESSIONAL DEVELOPMENT AND TRAINING FOR YOUR CAREER AND YOUR LIFE

ABOUT US

Professional Development and Training is an office within the University of New Hampshire whose mission is to serve individuals, businesses, and organizations in New Hampshire and surrounding regions by offering a wide range of professional development opportunities throughout the year, including:

- One-day Seminars
- Special Institutes and Conferences
- Short-term Certificate Programs
- Customized Training for Companies, Organizations, and Schools
- Online Courses of Personal or Professional Interest

Programs are designed to assist professionals in developing new or advanced knowledge and skills in a variety of fields. Instruction provides a balance of theory and practical skills that participants can immediately apply to the workplace.

Training is offered in three UNH locations plus at special off-site locations:

- Durham Campus
- UNH Downtown Manchester
- Portsmouth at Pease International Tradeport

We offer over 200 one-day seminars and short Certificate Programs each semester to provide you with new or advanced career and professional skills.

LEARN.UNH.EDU/TRAINING

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SEMINARS & CONFERENCES

UNH Professional Development & Training offers over 250 one-day seminars throughout the year in a variety of professional fields. The seminars are noncredit; you receive CEUs (continuing education units) attesting to your professional development. Seminars are offered in a number of professional fields and are taught by UNH faculty and other experts practicing in the field. Each offering is designed to provide you with practical, real-world training to help you develop new skills or advance the skills you already have. In addition to the seminars, UNH Professional Development & Training offers conferences and institutes focusing on special topics. To receive catalogs and information about our offerings each semester, be sure to add your name to our mailing list at learn.unh.edu/training/request-information-and-or-brochures.

CERTIFICATE PROGRAMS & SPECIAL SERIES

In addition to the seminars and conferences, UNH Professional Development & Training also offers short-term, noncredit Certificate Programs and Special Series/Concentrations that are comprised of six or more one-day seminars. Most can be completed in a year or less time and provide you with a broader knowledge of the subject area. For information about our Certificate Programs and Special Series/Concentrations, visit: learn.unh.edu/training.

CUSTOMIZED TRAINING SERVICES

If your company, school, or organization would like to train several people in a particular area, UNH Professional Development & Training will work with you to help assess your training needs and develop an on-site customized training program that meets those needs.



A BRANCH OF THE CONNECT PROGRAM SPECIFICALLY DESIGNED FOR STUDENTS INTERESTED IN STEM FIELDS

WHAT IT IS

- Connect STEM is a branch of the Connect program specifically designed for students interested in STEM (science, technology, engineering and mathematics) fields.
- Connect is a summer bridge and first-year transition program for underrepresented students including first-generation, low-income, and students of color.
- The Connect STEM program includes a year-long mentoring partnership which helps engage students with their coursework, provides professional development through networking and internships, explores future employment opportunities, and prepares for graduate and professional education.
- As part of the Connect program, students are also provided an educational counselor and peer mentor to work with throughout their first year.

WHO IT'S FOR

- Connect student participants who are looking to pursue a major within the field of STEM subjects (science, technology, engineering and mathematics) at UNH. Successful completion of Connect STEM will give you the skills and support network to enhance your first semester and build on your academic foundation, which will improve your chances of being admitted to the department of your choice.
- Participation in the program does not guarantee admission into your first choice major.

WHEN IT IS

- The summer session of Connect STEM begins with a two-week program prior to freshmen move-in day.
- Participants also attend program workshops and meetings with their peer mentor throughout the academic year.

UNH.EDU/ORIENTATION/CONNECT/CONNECT-STEM

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A STEMbassador works with students at the 2015 North Country STEMfest, where 16 students and seven faculty members provided a STEM rich educational experience to more than 400 students in 10 schools in the northern part of the state.

*photo credit:
UNH College of Engineering
and Physical Sciences*

WE ARE A VIBRANT COMMUNITY OF ENGAGED SCHOLARS AND STUDENTS LEARNING TOGETHER TO IMPROVE THE QUALITY OF EDUCATION FOR ALL STUDENTS.

Our work takes place in partnership with schools and community agencies where learning happens. Collaborative outreach is central to our mission. The Education Department has collaborative partnerships with many schools and community agencies. In 2015, 719 education students provided over 100,000 hours in 56 schools and community programs.

Our faculty prepares education professionals to meet the needs of our communities through reflective practice using tools of inquiry to investigate questions about teaching, learning and school reform. Our graduates become educational leaders in P-12 schools, community agencies, colleges and universities to inspire others to work toward educational change.



SEACOAST READS

Seacoast Reads is a local implementation of the America Reads Challenge.

Our Mission is:

- to help children increase proficiency in reading and writing
- to develop self-confidence and
- to encourage a love of reading

Seacoast Reads places UNH undergraduate volunteers into local schools, libraries, and after-school programs to help elementary and middle school students improve their reading and writing skills through one-on-one support. Volunteers travel with a group to their site twice per week for one semester to spend time with their “reading buddy” reading books, playing literacy games, and writing. Volunteers have the option to enroll in EDUC 506-Service Learning Experiences in Literacy, a one-credit course to take in conjunction with their volunteer experience.

COLA.UNH.EDU/EDUCATION

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PROJECT SEARCH

Challenging high school students to explore new ideas.

Project SEARCH is designed to provide an on-campus, intellectually challenging experience for academically motivated high school students. The program has been in operation since 1983, and the total program enrollment ranges from 200-225 students.

SEARCH's mission is to provide a forum in a college campus setting where high school students from southeastern New Hampshire and southern Maine can experience a series of presentations covering challenging interdisciplinary topics and interact with each other in discussion groups.

- To **foster** positive attitudes toward the exploration of new and stimulating ideas through the exposure to presentations and subsequent group meetings through which they can hone their discussion skills.
- To **provide** UNH graduate students with the experiential opportunity of developing group leadership and critical thinking skills for teaching intellectually curious students.
- To **encourage** a positive spirit regarding the joy of learning through the collaboration of the high schools, their students, future teachers and practicing educators.





OVERVIEW

The Global Learning and Observations to Benefit the Environment (GLOBE) Program is an international science and education program that provides students and the public worldwide with the opportunity to participate in data collection and the scientific process, and contribute meaningfully to our understanding of the Earth system and global environment. Announced by the U.S. Government on Earth Day in 1994, GLOBE launched its worldwide implementation in 1995.

VISION A worldwide community of students, teachers, scientists, and citizens working together to better understand, sustain, and improve Earth's environment at local, regional, and global scales.

MISSION To promote the teaching and learning of science, enhance environmental literacy and stewardship, and promote scientific discovery.

GLOBE provides grade level-appropriate, interdisciplinary activities and investigations about the atmosphere, biosphere, hydrosphere, and soil/pedosphere, which have been developed by the scientific community and validated by teachers. GLOBE connects students, teachers, scientists,

and citizens from different parts of the world to conduct real, hands-on science about their local environment and put in a global perspective. GLOBE is jointly sponsored by the U.S. National Aeronautics and Space Administration (NASA) and the National Science Foundation (NSF), with support from the National Oceanic and Atmospheric Administration (NOAA) and Department of State. Internationally, GLOBE is implemented through Government-to-Government agreements with each Country Partner responsible for in-country activities. As the lead agency for GLOBE in the U.S., NASA has the primary responsibility for administering the Government-to-Government agreements, and the management of the GLOBE Implementation Office and the data and information system that support the worldwide implementation.

GLOBECARBONCYCLE.UNH.EDU

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OUTREACH

The GLOBE Program enters into partnerships with U.S. organizations which undertake efforts to recruit GLOBE schools, train GLOBE teachers, and mentor GLOBE teachers and their students in their efforts to implement GLOBE and engage in GLOBE research activities. This spring, students from across the United States have the opportunity to come together at one of six face-to-face regional science fairs to share the results of field investigations using GLOBE Program protocols. Leading up to the science fairs, GLOBE teachers can attend live webinars (or view the archive) providing professional development on field investigations and enhancing scientific practices of the natural scientists in classrooms.

COLLABORATING SATELLITE MISSIONS

Here are [five](#) opportunities to take part in GLOBE Campaigns related to NASA Missions:

[Geostationary Operational Environmental Satellites - R Series \(GOES-R\)](#)

As the next generation of geostationary Earth-observing systems, the advanced spacecraft and instrument technology employed by the GOES-R series will provide significant improvements in the detection and observations of environmental phenomena that directly affect public safety, protection of property and our nation's economic health and prosperity. The GOES-R program is a collaborative development and acquisition effort between NOAA and NASA. The first satellite in the GOES-R series is scheduled for launch in October 2016.

[Soil Moisture Active Passive Mission \(SMAP\)](#)

This NASA Mission provides measurements of soil moisture and freeze/thaw state. SMAP produces daily maps of soil moisture with global coverage every three days. The SMAP team is looking for GLOBE Program students to take measurements at their schools. Students can compare these remotely sensed SMAP data to the actual soil moisture data they collect at their school locations.

[Global Precipitation Measurement \(GPM\)](#)

Clouds influence Earth's weather and climate. They bring water from the air to the ground and from one region of the globe to another. Clouds also have a large impact on Earth's radiation budget; even small changes in cloud abundance or distribution could affect climate.

GLOBE students and teachers can collect and enter data that will be compared to CloudSat measurements. CloudSat, in turn, contributes Earth science learning opportunities to lifelong learners and shares the results of CloudSat's scientific research mission to improve our understanding of clouds and global climate change.

[CloudSat](#)

Water participates in many important natural chemical reactions and is a good solvent. Changing any part of the Earth system, such as the amount or type of vegetation in a region or from natural land cover to an impervious one, can affect the rest of the system. Rain and snow capture aerosols from the air. Acidic water slowly dissolves rocks, placing dissolved solids in water. Dissolved or suspended impurities determine water's chemical composition.

Current measurement programs in many areas of the world cover only a few water bodies a few times during the year. GLOBE students provide valuable data to help fill these gaps and improve our understanding of Earth's natural waters.

[CALIPSO](#)

Aerosols, both natural and human-caused, can affect weather and climate. Launched on 28 April 2006 along with CloudSat, CALIPSO's mission is to study the role that clouds and aerosols play in regulating Earth's weather, climate and air quality. Both satellites fly in formation as a part of the international "A-Train" (Afternoon) constellation. CALIPSO is a collaborative NASA/CNES (Centre national d'études spatiales) satellite mission to profile the vertical distribution of clouds and aerosols and their role in the heating and/or cooling of Earth using LiDAR. CALIPSO and other A-Train satellites will substantially increase our understanding of the climate system.

THE GUNDALOW COMPANY'S MISSION – TO PROTECT THE PISCATAQUA REGION'S MARITIME HERITAGE AND ENVIRONMENT THROUGH EDUCATION AND ACTION HAS NEVER BEEN MORE IMPORTANT.

Our programs – held throughout the tidal towns of the Piscataqua – connect our maritime history with contemporary coastal issues such as water quality, habitat restoration, conservation, and stewardship.

Sailing and learning on the gundalow “Piscataqua” is a transforming experience! Our first four seasons were memorable – with over 5000 scouts,

campers, and students of all ages enjoying a unique educational experience on Piscataqua. They were immersed in hands-on learning during their voyage: setting the sail, steering the vessel, learning to navigate, towing for plankton, exploring human impact and analyzing water quality. Our expanded STEM sails feature additional activities focused on math and engineering.



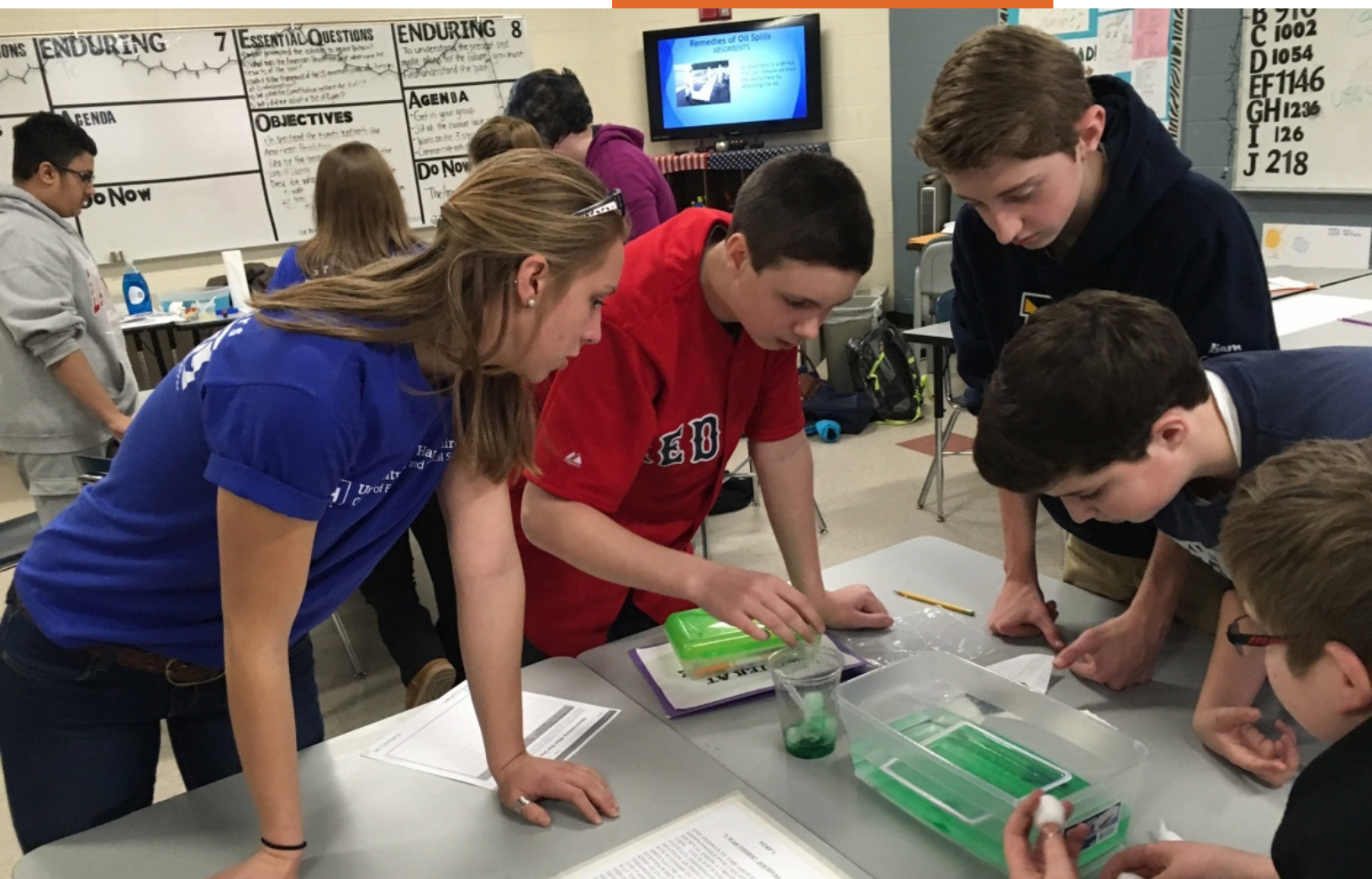
Credit: Gundalow 5433

CELEBRATING OUR RIVERS, our standard school program for grades 4 through adult, is based in Portsmouth and lasts approximately 2.5 hours. The programs and activities are correlated with state frameworks and closely aligned with principles of both estuarine and ocean literacy. Our staff works with teachers to customize each trip, to ensure each class enjoys a meaningful educational experience.

Also available is an expanded school sail for grades 6-12 focused on STEM based learning. Building upon the success of the original program, this sail incorporates math, engineering and technology along with our hands-on science.

GUNDALOW.ORG

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A STEM ambassador works with students at the 2015 North Country STEMfest, where 16 students and seven faculty members provided a STEM rich educational experience to more than 400 students in 10 schools in the northern part of the state.

photo credit: UNH College of Engineering and Physical Sciences

HAMEL CENTER FOR UNDERGRADUATE RESEARCH

AS A MAJOR RESEARCH INSTITUTION, THE UNIVERSITY OF NEW HAMPSHIRE STRIVES TO ENSURE ALL STUDENTS HAVE THE OPPORTUNITY TO ENGAGE IN RESEARCH IN THEIR UNDERGRADUATE YEARS.

The Hamel Center for Undergraduate Research exists solely to support this mission – providing resources and financial support for the research, scholarly, and creative projects of UNH students.

Today, the Hamel Center administers eight competitive grant programs and two variable-credit inter-college (INCO) courses. Research opportunities are available to students in ALL academic disciplines, working with faculty mentors from across campus. From the original design and development of the student's project through the preparation of the research proposal, the pursuit of the research, and the sharing of results in multiple venues, the Hamel Center endeavors to create a comprehensive educational experience for each undergraduate researcher.

For faculty planning to submit federal, state, or non-profit research grant proposals that include undergraduate researchers, the Hamel Center can provide support in two ways: 1) a letter of collaboration for the UNH faculty member's grant proposal, highlighting UNH's commitment to undergraduate research through competitive grant programs and credit-bearing courses; 2) an arrangement to cost share student stipends and research expenses for the UNH faculty member's proposed research, accomplished through the Hamel Center's grant application process.

In addition to its competitive grant programs, the Hamel Center also publishes *Inquiry*, UNH's online journal of undergraduate research, and administers the University-wide Undergraduate Research Conference (URC), which is one of the largest and most diverse conferences of its kind in the nation.

UNH.EDU/UNDERGRAD-RESEARCH
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THE PROGRAMS

INCO 590: STUDENT RESEARCH EXPERIENCE, INCO 790: ADVANCED RESEARCH EXPERIENCE

These variable credit courses allow undergraduates to explore topics of interest by assisting faculty mentors with teaching and research activities. INCO 590 (credit/fail) is designed as an entry-level experience to assist students in developing research skills. INCO 790 (graded) is designed as an advanced-level experience, for students who are applying research skills they already have developed.

RESEARCH EXPERIENCE AND APPRENTICESHIP PROGRAM (REAP)

REAP is a special program for highly motivated, first-year Honors students. Under the apprenticeship of a UNH faculty member, students spend the summer after their first year exploring their academic interests and developing their ability to pursue research.

UNDERGRADUATE RESEARCH AWARDS (URAs)

URAs are awarded to students who wish to conduct research either on campus or at other research sites within the U.S. during the academic year (including January term), or in the summer.

SUMMER UNDERGRADUATE RESEARCH FELLOWSHIPS (SURF USA & SURF ABROAD)

SURF grants are awarded to students who wish to conduct full-time research over the summer (ten weeks for SURF USA, nine weeks for SURF Abroad) at various locations in the U.S. or overseas.

INTERNATIONAL RESEARCH OPPORTUNITIES PROGRAM (IROP)

IROP grants support full-time summer research projects (nine weeks) in diverse settings abroad.

STUDY ABROAD RESEARCH GRANTS

These grants enable students who will be studying abroad to investigate a research question or idea using the special resources available at a foreign site.

HONORS THESIS GRANTS

This grant supports Honors students who, in the course of doing their thesis, find that they have unanticipated expenses or become aware of an opportunity that will enhance their thesis results.

RESEARCH PRESENTATION GRANTS

These grants support travel expenses and conference registration fees for students who are presenting their research findings at conferences and professional meetings beyond UNH.

HAMEL CENTER FOR UNDERGRADUATE RESEARCH

INTERNATIONAL RESEARCH OPPORTUNITY PROGRAM (IROP)



[UNH.EDU/UNDERGRAD-RESEARCH/INTERNATIONAL-RESEARCH-OPPORTUNITIES-PROGRAM-IROP](https://unh.edu/undergrad-research/international-research-opportunities-program-irop)

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IROP grants are competitive awards supporting qualified projects in diverse settings: universities, government agencies, museums, archives, art galleries, archeological and historical sites, research libraries, laboratories, and field sites. By working closely with a UNH mentor, students identify potential research sites and foreign mentors, and address issues of cross-cultural preparation.

Students of all majors may apply for an IROP award to fund their research, scholarly, or creative project. Students applying for IROP must have a minimum 3.0 cumulative GPA and junior-level preparation in their major prior to conducting the proposed research.

IROP assumes close contact between the student and UNH mentor during preparation for the research. During the time between acceptance into the IROP program and actual departure for the chosen research location, the student must ensure adequate language skill and cultural preparation, assume responsibility for completing the research described in the proposal, and commit to 9 weeks of summer research.

INTEROPERABILITY LABORATORY

WHAT IS THE UNH-IOL?

We are a non-profit lab located in downtown Durham, NH, that tests networking and data communications products for businesses across the globe.

Since 1988, we have enabled multi-vendor interoperability, conformance testing and developed custom testing solutions while preparing students for careers within the computer and engineering industries. Over the years we have grown steadily into one of the premier independent labs for new technologies, allowing us to become a thought leader within the data and networking world.



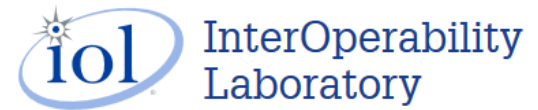
IOL.UNH.EDU/STUDENTS/HIGHSCHOOL-INTERNSHIP

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HOW WE CAN HELP MAKE AN IMPACT?

Industry Support

We work with over 150+ companies in industry; through our involvement our test bed and expertise has grown to one of the best in the networking world. When working with us, you gain access to industry test tools and equipment including:

- **A WIDE RANGE OF MULTI-VENDOR OSCILLOSCOPES**
- **TWO WIRELESS CHAMBERS**
- **IOT TESTING CAPABILITIES**
- **IPV6 MULTI-VENDOR ENVIRONMENT**
- **THE LARGEST INTEROPERABILITY TEST BEDS FOR ETHERNET TECHNOLOGIES**
- **IOL CUSTOM TESTING PLATFORMS AND TOOLS**

High School & Undergraduate Support

We founded the High School Summer Internship to help fill the pipeline of future engineers. Each year, we recruit bright and ambitious students interested in networking and data communications for a paid six-week internship at our state-of-the-art networking facility.

SAMPLE PROJECTS SUPPORTING NSF BROADER IMPACT

Living Bridge Project

PI: Erin Bell, Department Chair & Associate Professor,
Civil & Environmental Engineering Department, UNH

In the summer of 2015 we began our first interdisciplinary project with Professor Erin Bell. Two high school interns, along with Professor Bell's National Science Foundation (NSF) Research Experience undergrads, developed the Living Bridge website and its data infrastructure. Over the next two years they will continue its development.

During the first year interns were able to:

- Expand the interactive components of the website using a real-time data stream
- Configure the servers to support and test real-time data streaming from the field
- Integrate social media/outreach/feedback using the data stream and other relevant information related to the bridge and the Portsmouth-Kittery community

A University of New Hampshire project, funded by the National Science Foundation will transform the Memorial Bridge between Portsmouth, N.H., and Kittery, Maine, into a “living bridge.”

Credit: Courtesy of the Memorial Bridge Project



JUNIOR SCIENCE AND HUMANITIES SYMPOSIUM



The Junior Science and Humanities Program (JSHS) was established in 1958 to increase the number of highly trained scientists and engineers in the United States by promoting research and experimentation at the secondary school level and by recognizing high school students for their original research achievements. Since that time JSHS has become one of the most prominent pre-college programs in the country.

JSHS is sponsored by the United States Department of the Army, the United States Department of the Navy and the United States Department of the Air Force. The Academy of Applied Science, a non-profit educational organization in Concord, New Hampshire, administers the National JSHS Program. The regional JSHS at the University of New Hampshire (UNH) is co-operatively sponsored by the College of Engineering and Physical Sciences and the College of Life Sciences and Agriculture. The Joan and James Leitzel Center for Mathematics, Science, and Engineering Education at UNH is dedicated to improving education in STEM and offers informational support for JSHS.

The major activities of the NNE-JSHS (Northern New England) are conducted in a program in which selected high school students can present the results of their original research in Science, Technology, Engineering and Mathematics (STEM) in either an oral or poster session, have an opportunity to meet other students with similar interests in STEM research, visit research laboratories at UNH, and speak with professionals in STEM.



It Starts Here Credit: AEOP

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Objectives

- To promote experience in research and experimentation in sciences, technology, engineering and mathematics (STEM) at the high school level
- To provide an opportunity for students to publicly present their research
- To expand the horizons of research oriented high school students by offering opportunities in academic and governmental communities
- To recognize students and their teachers for outstanding achievement
- To encourage continuing interest in science, technology, engineering and mathematics (STEM) to widen the pool of trained scientific and engineering talent prepared to conduct research and development

For additional references to information on paper preparation, style and presentation, please refer to the website for the National JSHS Program at jshs.org

KIDS EAGER FOR ENGINEERING PROGRAM WITH ELEMENTARY RESEARCH-BASED SCIENCE



Located on-campus at the University of New Hampshire in Durham, *KEEPERS for Kids*SM provides a weeklong, half-day camp experience involving hands-on, minds-on challenges set up for campers entering grades 2-5. The activities develop inquiry and design skills through engineering challenges. Each day's programming is accomplished with experienced teachers and UNH faculty (and their graduate students) from Civil, Chemical, Electrical, Environmental, and Mechanical Engineering.

KEEPERS FOR TEACHERSSM : JULY 25 - 29TH, 9:00AM-1:00PM

*KEEPERS for Teachers*SM is a one-week professional development experience for K-8 teachers, held in conjunction with *KEEPERS for Kids*SM camp.

Throughout the week, teachers will work with our new *KEEPERS* teacher, Beth Sommers, who is a STEM Curriculum Coordinator in Greenland Central School. Teachers will learn and engage with each other on the following activities/educational areas:

- Day 1: The Nature, Content and Practices of Engineering
- Day 2: Translating Engineering Content Knowledge into the Classroom
- Day 3: Integrating Engineering into Other Subjects
- Day 4: Identifying Appropriate Instructional Materials, Curriculum, and Assessment
- Day 5: Research and Educational Practices

Educators will learn how to implement many engineering activities into their classrooms or after school programs.



LEITZELCENTER.UNH.EDU/KEEPERS/INDEX.HTML

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Ocean Discovery Day
visitors at the dock.

*photo credit: UNH
School of Marine
Science and Ocean
Engineering*



A demonstration at the Jere A. Chase Ocean Engineering Laboratory during Ocean Discovery Day, a collaborative effort between N.H. Sea Grant, the UNH Marine Docents, the Center for Coastal and Ocean Mapping, and the School of Marine Science and Ocean Engineering.

*photo credit: Mike Ross,
UNH Photo Services*

THE JOAN AND JAMES LEITZEL CENTER

FOR MATHEMATICS, SCIENCE, AND ENGINEERING EDUCATION



WORKS TO TRANSFORM EDUCATION IN MATHEMATICS, SCIENCE, AND ENGINEERING AT THE UNIVERSITY OF NEW HAMPSHIRE, IN ELEMENTARY AND SECONDARY SCHOOLS, AND INFORMAL SETTINGS THROUGH HIGH QUALITY RESEARCH, CAREFULLY EXAMINED PRACTICE, AND INTERDISCIPLINARY COLLABORATION.

The UNH Joan and James Leitzel Center facilitates partnerships and initiates programs with the goal of developing educators' knowledge of science, mathematics, and engineering concepts, along with human learning strategies—developing learners who experience the joy of discovery and the challenge of understanding; providing learning environments that support active engagement.

NH STEM TEACHERS COLLABORATIVE

STEM-TC is an interdisciplinary effort across UNH to coordinate and enhance our capacity to strengthen the STEM pipeline, with the primary goal of increasing K-12 teachers' expertise in computing, engineering and technology and extending the impact of excellent STEM teachers to more students throughout the state.

The STEM Teachers Collaborative is our first UNH initiative as a partner in 100Kin10, a multi-sector network that plans to meet the challenge of providing America's classrooms with excellent science, technology, engineering and math (STEM) teachers.

LEITZEL CENTER STRATEGIES

Inquiry

Conducting research, reviewing practices, employing assessments, reflecting on outcomes for learning, professional development, curriculum development

Engagement and Outreach

Generating knowledge and enhancing communication among UNH education and research communities, pre-college educators and administrators

Creativity

Fostering cross-disciplinary activities, cultivating relationships, exploring creative ideas, responding to local and national opportunities

Sustainability

A broad-based capacity for fund raising and grantsmanship, creative marketing and communication, and careful assessment focused on sustaining the Center

UNH Leitzel Center partners with

100Kin10

Enriching America's classrooms with 100,000 excellent STEM teachers by 2021



LEITZELCENTER.UNH.EDU

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Leitzel Center Programs

Kids Eager for Engineering Programs with Elementary Research-based Science (KEEPERSSM) – a week-long half-day experience involving hands-on, minds-on challenges set up for campers entering grades 2-5 coupled with KEEPERS for TeachersSM, a week-long professional development experience for K-8 teachers.

Research Experiences for Teachers of Engineering (RETE) – an immersive summer research experience for middle- and high-school teachers, pre-service teachers, and community college teachers with a particular focus on STEM learning that is funded by the National Science Foundation RISE program.

Research Experiences for Teachers and Undergraduates (RET) – a program that helps educators develop the skills needed to raise awareness of STEM career fields and to introduce the process of scientific inquiry to middle and high-school students that is funded by NH EPSCoR.

NASA Innovations in Climate Education (NICE) – a joint program with Elizabeth City State University for faculty of education at minority serving institutions to engage their pre-service teachers in learning about global climate change through the use of NASA Earth observation datasets.

Advancing Science – a program that provides teacher training to science and mathematics teachers in New Hampshire, and offers an instrument loan program for teaching molecular biology, spectroscopy, molecular modeling, and chromatography.

NorthEast Alliances for Graduate Education in the Professoriate (NEAGEP) – one of 26 National Science Foundation-funded Alliances for Graduate Education and the Professoriate (AGEP) in the US that work to increase the number of domestic students receiving doctoral degrees and entering the professoriate in the sciences, technology, engineering, and mathematics (STEM).

STEM Teacher Program Initiatives – one of 12 programs by the Army Education and Outreach Programs (AEOP; led by the U.S. Army and Virginia Technical Institute partnered with the Academy of Applied Science, the National Science Teachers Association, Technology Students Association, and American

Society of Engineering Education) that provides research-based training, competitions, and teacher programs in the STEM disciplines.

SUN to ICE – a National Science Foundation funded UNH research project that investigates extreme solar events and their effects on Earth that includes an education and outreach component to bring intensive STEM professional development to high school physics, chemistry, astronomy, and Earth and physical science teachers.

Leitzel Center Partnerships

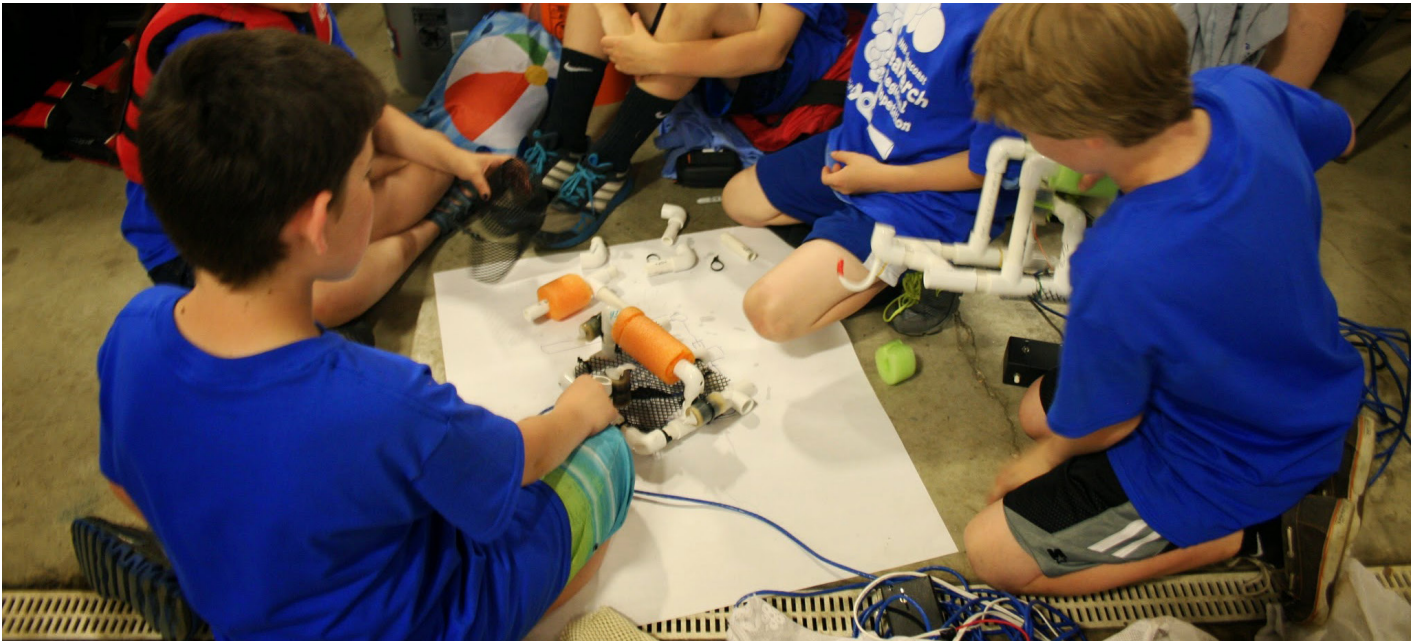
Project SMART – a four-week summer institute that challenges, educates, and motivates talented high school students in science and mathematics while acquainting them with the environment and resources of UNH as a place for higher education and research.

GEOChem Program – a two-year program supported by the Dreyfus Foundation that will provide enrichment in geochemistry for high school chemistry teachers through academic year workshops and classroom support from a UNH graduate student.

UNH Tech Camp – a two-week camp that offers concurrent programs for campers entering grades 7 & 8 and 9 & 10 that explore electrical, mechanical, aerospace, biomedical, and naval engineering; robotics; and computer technology.

Northern Ecosystems Research for Undergraduates (NERU) – a collaboration between UNH and the Abisko Scientific Research Station in Abisko, Sweden that provides a summer research opportunity to undergraduate students during which they explore the effects of climate change on ecosystems in northern Sweden and the northeastern US.

New Hampshire Experimental Program to Stimulate Competitive Research (EPSCoR) – an initiative that works to effect sustainable improvement in the capacities of NH's universities and colleges to compete for research and development funds which includes efforts in education and human resource development focusing on the growth and support of STEM research and training.



WHAT IS SEAPERCH?

SeaPerch is an innovative underwater robotics program that equips teachers and students with the resources they need to build an underwater Remotely Operated Vehicle (ROV) in an in-school or out-of-school setting. Students build the ROV from low-cost, easily accessible materials, following a curriculum that teaches basic engineering and science concepts with a marine engineering theme.

The SeaPerch Program provides students with the opportunity to learn about robotics, engineering, science, and mathematics while building an underwater ROV as part of a science and engineering technology curriculum. Throughout the project, students will learn engineering concepts, problem solving, teamwork, and technical applications.

WHEN YOUTH PARTICIPATE IN SEAPERCH, THEY GET...

A HANDS-ON EDUCATIONAL tool

A FUN AND challenging experience

LEARNING THAT MEETS Common Core Standards

*STEM (Science, Technology, Engineering, Mathematics)
LEARNING*

TRAINED TEACHERS AND mentors

TO BE PART of a team

INSPIRED!



UNH.EDU/SEAPERCH

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THE MCAULIFFE-SHEPARD DISCOVERY CENTER



THE MCAULIFFE-SHEPARD DISCOVERY CENTER IS NORTHERN NEW ENGLAND'S AIR AND SPACE MUSEUM, CENTRALLY LOCATED IN CONCORD, NH.

Dedicated to New Hampshire Space Pioneers Christa McAuliffe – the Concord High School teacher who was selected out of over 11,000 applicants to be NASA's Teacher-in-Space – and Admiral Alan Shepard – America's first astronaut and one of only 12 human beings to have set foot on the moon.

The Discovery Center's Mission is:

to inspire every generation to reach for the stars, through engaging, artful and entertaining activities that explore astronomy, aviation, Earth and space science.

The Discovery Center seeks to engage, educate, inspire and delight its visitors and program participants by making the pursuit of knowledge about science, technology, engineering and mathematics (STEM) an adventure.

STARHOP.COM

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Both a NH Space Grant Affiliate and NASA Educator Resource Center since 2000, the Discovery Center uses the following tools to accomplish its mission:

- Two floors of permanent and traveling STEM interactive and static exhibits
- Outdoor interactive STEM exhibits
- Immersive, full-dome digital planetarium
- Observatory with a Celestron CGE1400 Pro telescope and a Lunt LS100T H9 solar refractor telescope
- Space shuttle and lunar lander simulators
- Pre-K-12 school field trips
- Annual aerospace festival ("AerospaceFest")
- Teen Night monthly STEM workshops
- Public lecture series on astronomy, aviation, Earth and space science
- Summer STEM day camps in robotics, rocketry, aeronautics, space exploration, 3-D design and printing
- Outreach with portable digital planetarium, telescopes and more
- Gallery STEM activities
- Monthly home school workshops
- Sky observation nights with telescopes – on- and off-site
- Premiering in 2016: UAV summer camp, nightly teen summer astronomy club, afterschool STEM Club for middle schoolers



The McAuliffe-Shepard Discovery Center has been delighted to partner with University of New Hampshire and other college and university scientists, engineers, educators and students on a variety of STEM initiatives that bring both basic and cutting edge research and findings in astronomy, Earth and space science to the public. We look forward to continuing to partner with UNH on astronomy, space science and Earth science, and to expand our partnerships to include aeronautical sciences, educational research and other discipline areas where an affiliation between a science museum and university can make for a broader impact.

Projects in which the Discovery Center has collaborated with university and college partners: planetarium shows, exhibitions, lecture series, educator professional development, teen workshops, aerospace festival, program evaluation, outreach, art shows, strategic marketing, staff training in STEM content and delivery, curricular materials.

Founded as the 9400 square-foot Christa McAuliffe Planetarium in 1990 and expanded in 2009 to a 45,000-square-foot science museum, the McAuliffe-Shepard Discovery Center was state-run from 1990 – 2012. The McAuliffe-Shepard Discovery Center transitioned to a 100% independent private sector nonprofit science museum with IRS 501(c)(3) charitable status on January 1, 2013.

MCNAIR SCHOLARS PROGRAM



CONGRESS ESTABLISHED THE RONALD E. MCNAIR POST-BACCALAUREATE ACHIEVEMENT PROGRAM (OTHERWISE REFERRED TO AS THE “MCNAIR SCHOLARS PROGRAM”) IN 1986 TO HONOR THE MEMORY OF THE CHALLENGER ASTRONAUT AND NOTED LASER PHYSICIST.



2015 McNair Student Cohort

The McNair Scholars Program is a federally-funded TRIO program administered by the U.S. Department of Education. The McNair Scholars Program has been in existence at the University of New Hampshire since 1991.

McNair Scholars are either first-generation college students with financial need or members of a group that are traditionally underrepresented in graduate education (e.g. Black, Hispanic, Native Hawaiian, Native American Pacific Islander, American Indian or Alaskan Native). McNair Scholars participate in unique programming and educational activities designed to give them a competitive edge when applying to graduate school and to prepare them for success in their pursuit of a Ph.D. degree. Scholars attend courses, seminars and workshops on topics related to graduate school preparation; complete a research project under the guidance of a faculty mentor; and have the opportunity to present their research at local, regional and national conferences.

Faculty Mentors

A major component of the McNair program and the graduate school preparation process is a directed research experience under the guidance of a faculty mentor. Mentors assist McNair scholars by introducing students to the nature and rigors of research, serving as role models, helping to build professional networks with other scholars in the fields, and participating in social as well as academic activities with the protégés.

Since the program’s inception at UNH in 1991, more than one hundred faculty members have served as McNair mentors, as well as numerable graduate students. By joining them, you will have the opportunity to work one-on-one with an academically gifted individual and to help make a real difference for the mentee.

UNH.EDU/MCNAIR

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ABOUT

That EPSCoR designation then qualified New Hampshire researchers and research jurisdictions to apply for EPSCoR funds from federal agencies with EPSCoR programs—NASA being one of those agencies.

New Hampshire NASA EPSCoR is administered through the New Hampshire Space Grant at the University of New Hampshire. Dr. Antoinette Galvin, director of the NH Space Grant, is director of NH NASA EPSCoR. A New Hampshire EPSCoR Technical Advisory Committee serves to advise on the jurisdiction's research priorities, program progress, and accomplishments.

NASA EPSCOR INITIATIVES

The NASA Experimental Program to Stimulate Competitive Research, or EPSCoR, is a merit-based program designed to strengthen research capabilities in jurisdictions not equably participating in competitive aerospace and aerospace-related research activities.

EPSCoR-eligible jurisdictions are offered funding to develop a more competitive research base among their member academic institutions.

NASAEPSCOR.UNH.EDU

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603-862-3511
TONI.GALVIN@UNH.EDU

Two main initiatives of NASA EPSCoR are:

1. Research & Infrastructure Development (RID) Cooperative Agreements address enabling jurisdictions to build and strengthen relationships with NASA researchers. Typically up to \$125,000 may be awarded by NASA per year to a given jurisdiction. The RID proposal and award has a three-year cycle. A one-to-one match (non-federal, cash or in-kind) is required for every NASA dollar awarded. Each funded NASA EPSCoR proposal should focus on building the core strength needed to develop competitive research and technology development methods and activities for the solution of scientific and technical problems of importance to NASA as defined by one or more of the four Mission Directorates and/or one or more of the ten NASA Centers. The jurisdictional proposal should demonstrate a contribution to the overall research infrastructure, science and technology capabilities, higher education, and economic development of the EPSCoR jurisdiction. Only one proposal per jurisdiction may be submitted to NASA for a given RID solicitation. If selected, the NASA EPSCoR award is made to the institution of the NASA EPSCoR Director. Funding to other participating institutions is through sub-awards from the Director's institution (UNH). Each participating institution within the RID proposal will be responsible for providing 1:1 match as cost share for their portion of NASA funding, with the cost share guaranteed by their institution (the source for cost share will be provided as part of their proposal, and such cost share will be obligated to their institution under the sub-award process). Those institutions of higher learning within the jurisdiction who are interested in participating within a RID proposal should contact the NH NASA EPSCoR Director's office by November 1st of the year prior to the NASA solicitation due date. The upcoming NASA RID solicitations are expected to take place in early 2018 and 2021 (that is, the RIDs are on a three-year cycle).

Requests for internal UNH mini-award selections (small infrastructure research projects with a 1-3 year period of performance under existing RID) are due September 1st of each year. For details on these small awards, including eligibility, cost share requirements, and status of funding availability, please contact us.

2. Research Cooperative Agreements address high-priority NASA research and technology development needs. They are expected to establish research activities that will make significant contributions to strategic research and technology development priorities of one or more of the Mission Directorates and contribute to overall research infrastructure.

Awards are typically up to \$750,000 for a 3-year period. A 50% to 100% match (non-federal source of funds, cash or in-kind) is usually required for every NASA dollar awarded, but match requirements in each announcement may vary. NASA intends to solicit EPSCoR Research Cooperative Agreements yearly (typically in the December through March timeframe), pending available funding. All institutions of higher learning within the state of New Hampshire (the 'jurisdiction') are eligible to compete. However as only one proposal may be submitted per jurisdiction, there is a down-selection process done through the NH NASA EPSCoR Director's office (currently located at UNH). Currently, NASA policy is to make the award to the jurisdictional director's institution, and then a sub-award is made from that institution (UNH) to the proposal's Science PI institution. Those jurisdictional institutions of higher learning interested in having a research project considered for the New Hampshire submission for the upcoming solicitation year are to submit mini-proposals to the Director's office by November 1st of the preceding year.

NATIONAL SOCIETY OF BLACK ENGINEERS

NSBE UNH



UNH.EDU/NSBE/INDEX.HTML

CONTACT:

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ABOUT

NSBE-UNH (University of New Hampshire) is a recognized student organization and professional society on the UNH campus that provides an academic as well as a professional and social support system for multi-cultural students in the S.T.E.M. fields. NSBE helps students excel academically, incorporates opportunities for community contributions, and assists students while seeking a professional career. Our intention for the future is to help retain UNH S.T.E.M. students, and in addition to assisting in recruitment efforts, attract more multi-cultural students to the S.T.E.M. programs at UNH at both the undergraduate and graduate level. We invite you to contact us for more information.

Goals

- Establish a networking system for multicultural students in the S.T.E.M. field
- Promote academic growth
- Promote community involvement

MISSION STATEMENT

The mission of the University of New Hampshire's Collegiate Chapter of the National Society of Black Engineers, NSBE-UNH, is "to increase the number of responsible multi-cultural students in the fields of science, technology, engineering and mathematics (S.T.E.M.) who excel academically, succeed professionally and positively impact the community."

VISION STATEMENT

NSBE-UNH is a student organization that aspires to become a recognized professional society on the UNH campus and provide an academic, as well as a professional and social support system for the multi-cultural students in the S.T.E.M. fields. NSBE values students who want to excel academically, contribute their skills to the community, and seek a professional career. Our intention for the future is to retain the S.T.E.M students who are currently registered at UNH, in addition to assisting in recruitment efforts to attract more multi-cultural students to enroll in the S.T.E.M programs at UNH at both the undergraduate and graduate level.

Past Events

- Regional Leadership Conference
- Fall New England Zone Conference
- Fall Regional Conference
- National Conference
- Professional Development Series: Resume and Cover Letter preparation, Mock interviews/elevator pitches, Navigating UNH and NSBE Resources
- Site visits to: Google Boston; UNH Wind Tunnel; Six Flags New England; Seabrook Nuclear Power Plant; MIT-Lincoln Labs

NHIRC

The NHIRC was created in 1991 by the New Hampshire Legislature, designating \$500,000 annually to increase collaboration, technology development and innovation between New Hampshire businesses and universities. Businesses match their project awards to fund research which often leads to new products and processes.

OUTCOMES INCLUDE:

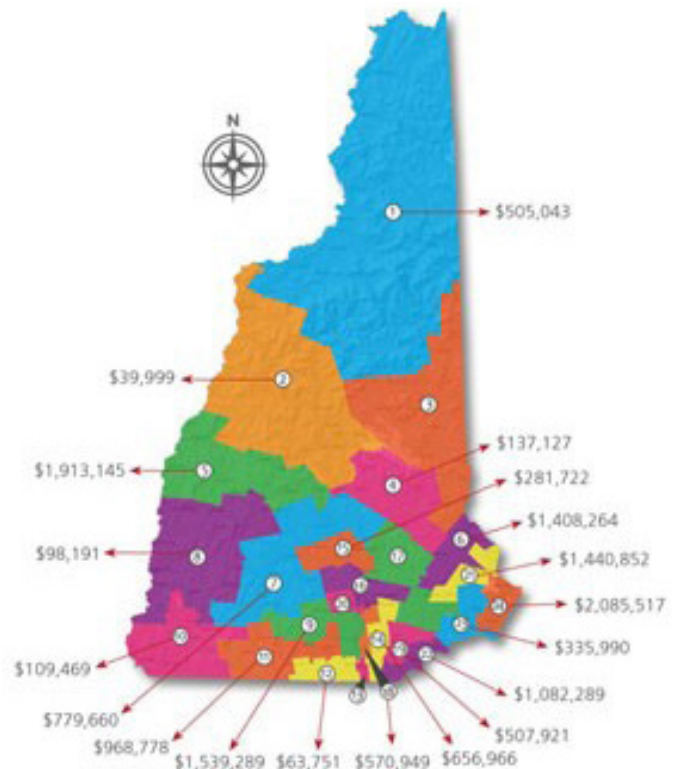
- Increased competitiveness and profitability for businesses.
- An increase in the tax-base and in the number of quality jobs.
- Additional funding from venture capitalists.
- Federal funding of Small Business Innovation Research (SBIR) awards.
- Federal funding (EPSCoR) for New Hampshire educational institutions.

Other benefits from NHIRC projects can include:

- Use of specialized equipment at universities that individual companies could not purchase.
- Field experience for students sometimes leading to employment following graduation.
- Patenting and/or licensing research, often leading to commercial ventures.
- Testing a theory before investing substantially.

NHIRC.UNH.EDU

CONTACT:
ELLEN CHRISTO, PROGRAM MANAGER
603-862-5446
ELLEN.CHRISTO@UNH.EDU



CRITERIA FOR SELECTING NHIRC PROJECTS

NOTE: ALL COMPANIES must be NH based.

REQUIREMENTS

- DOES THE project require an academic relationship?
- WILL THE research take place in a NH college or university?
- WILL THE company contribute a cash match?
- CAN THE company pay the 5% administrative fee?

IMPACT

WILL THIS PROJECT:

- CREATE JOBS?
- INCREASE PROFITABILITY for the business?
- CREATE A patentable or licensable technology?
- ALLOW THE company to test a theory before investing substantially.

FUNDING

DOES THIS PROJECT:

- ENABLE THE business to get additional funding from venture capitalists?
- ENABLE THE business to attain Federal funding such as:
 - SMALL BUSINESS Innovation Research (SBIR) awards.
 - GRANT OPPORTUNITIES for Academic Liaison with Industry (GOALI) awards.
- LEVERAGE OTHER Federal funding in NH educational institutions? (ex: EPSCoR)

VALUE

DOES THIS PROJECT:

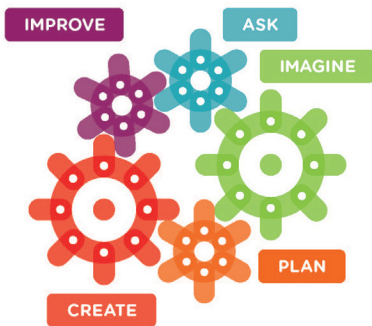
- USE SPECIALIZED equipment at a university that the company would not purchase?
- GIVE STUDENTS field experience?
- LEAD TO hiring students permanently upon graduation?

OUR MISSION:

Actively engaging families in hands-on discovery

OUR VISION:

To inspire all to become the next generation of innovators and creative thinkers



STEAM INNOVATION LAB

The Children's Museum of New Hampshire developed and launched a new Science, Technology, Engineering, Arts, and Math (STEAM) Innovation Lab. The Lab is a permanent, self-enclosed immersive learning environment within the Museum designed to serve as an incubator for innovative teaching methods focused on inquiry and project-based learning and utilizing materials, technology, tools and real-world challenges.



CHILDRENS-MUSEUM.ORG

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& COMMUNITY ENGAGEMENT

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PAULA@CHILDRENS-MUSEUM.ORG



LEARNING LABS

For Schools and Organized Groups

Mission to the Moon

Learn all about our cosmic sidekick, and take a look at how the Earth and Moon affect each other.

WHIZ! BANG! POP!

Experiment with sound - how do we make it, how do we hear it, and what's the science behind it?

The Blueprint for You

What makes you, YOU? It's all in your DNA! See some DNA for yourself and learn more about your body's instruction manual.

Birds, Beaks and Adaptations

Would a woodpecker be able to gather food in a pond? How successful would a duck be gathering food on a prairie? Find out all about bird beak adaptations.

Don't Work Hard, Work Smart!

This session focuses on the lever - let gravity do the work.

Keeping Current: Circuits!

Explore everyone's favorite circle: a circuit!

Anywhere the Wind Blows

Harness the power of a natural resource in this Lab all about wind power.

Up, Up and Away!

We'll introduce the Engineering Design Process in this create-and-test Lab all about flight.

Water: Who Needs It?

Using an interactive display, explore the local watershed and its effects on the people, plants and animals that rely on it.

PROFESSIONAL DEVELOPMENT FOR TEACHERS

CMNH educators bring inquiry learning to life through hands-on teacher workshops, pre/post visit activities and videos, and programs with our partners.

Please contact the Museum's Education department for more information.

When I enter the

STEAM

INNOVATION LAB

I am a:

- Scientist
- Technician
- Engineer
- Artist
- Mathematician



I take the lead in my own learning
I can solve problems
My ideas are respected
I have a voice

MISSION

NH EPSCoR advances the state's competitiveness in science and engineering by strategically investing in research infrastructure, promoting education in the STEM disciplines, and fostering partnerships with technology-based businesses that enhance job creation and economic development.

BUILDING RESEARCH CAPACITY

As one of 31 EPSCoR member states and territories, New Hampshire has received \$38 million in National Science Foundation Research Infrastructure Improvement awards, enabling scientists to be successful in obtaining an additional \$105 million in new federal research awards.

EDUCATION AND OUTREACH

During the past four years, NH EPSCoR outreach programs have reached nearly 20,000 people, largely through the training of K-12 teachers. Summer institutes and research experiences in scientific inquiry and in data use and analysis for teachers in middle and high schools provided them with new tools to teach science and math. Outreach programs in environmental science for youth have reached 368 students in summer camps at college campuses and in after-school programs delivered by Cooperative Extension 4-H in urban, low-income neighborhoods.



CURRENT OUTREACH ACTIVITIES

Citizen Science Networks for Educators

NH EPSCoR uses three citizen science programs to engage students and teachers in authentic science practice: 1) the Community Collaborative Rain, Hail, and Snow Network (CoCoRaHS), 2) CoCoRaHS-Albedo, and 3) the Lotic Volunteer Temperature, Electrical Conductivity, and Stage Network (LoVoTECS). These programs contribute data that is useful for characterizing and supporting research on NH's ecosystems and their functions. CoCoRaHS is a National Oceanic and Atmospheric Administration program that seeks to increase the number of K12 students and educators contributing and analyzing precipitation data. CoCoRaHS-Albedo is a network initially formed specifically for the NH EPSCoR project to provide geographically distributed data on the changes and variability of snow and ice reflectivity throughout the winter and into spring. LoVoTECS provides volunteer-collected data on stream temperature electrical conductivity, and stage (depth). After an initial two years of teacher workshops to introduce and train teachers on how to participate and collect data in the various citizen science programs, the education team has shifted focus to training on how to use the data for inquiry, discovery, and education on science practice.

NHEPSCOR.ORG

**CONTACT:
STEVE HALE
NH EPSCOR EDUCATION AND OUTREACH DIRECTOR
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STEVE.HALE@UNH.EDU**

Creative Computing Challenge

The Creative Computing Challenge (CCC) is a partnership model to build access to relevant computing education for underrepresented high school students. CCC provides professional development in computer science for teachers at career and technical education centers and engages high school students in computational thinking as they develop their own smartphone applications. Two cohorts of teachers, (Cohort #1 Dover, Pinkerton and Manchester School of Technology) and (Cohort #2 Concord, ConVal, and Keene) are participating in this project to integrate aspects of computational thinking practices into their curriculum areas to engage non-traditional computer science students in personally relevant, meaningful project-based learning. Recruitment for Cohort #3 in the North Country is under way. This year's summer camp, at Kennett High School in Conway, will be a one-week low-cost camp for girls curious about computer science. Campers will design mobile apps and use computers to solve challenges.

NHEPSCOR.ORG

**CONTACTS:
MIHAELA SABIN, ASSOCIATE PROFESSOR OF
COMPUTER SCIENCE, UNH MANCHESTER,
603-641-4144, MIHAELA.SABIN@UNH.EDU, OR
ROSABEL DELOGE, EDUCATIONAL CONSULTANT,
603-475-8992, ROSABE.DELOGE@GMAIL.COM.**

NEW HAMPSHIRE TEACHERS OF MATHEMATICS



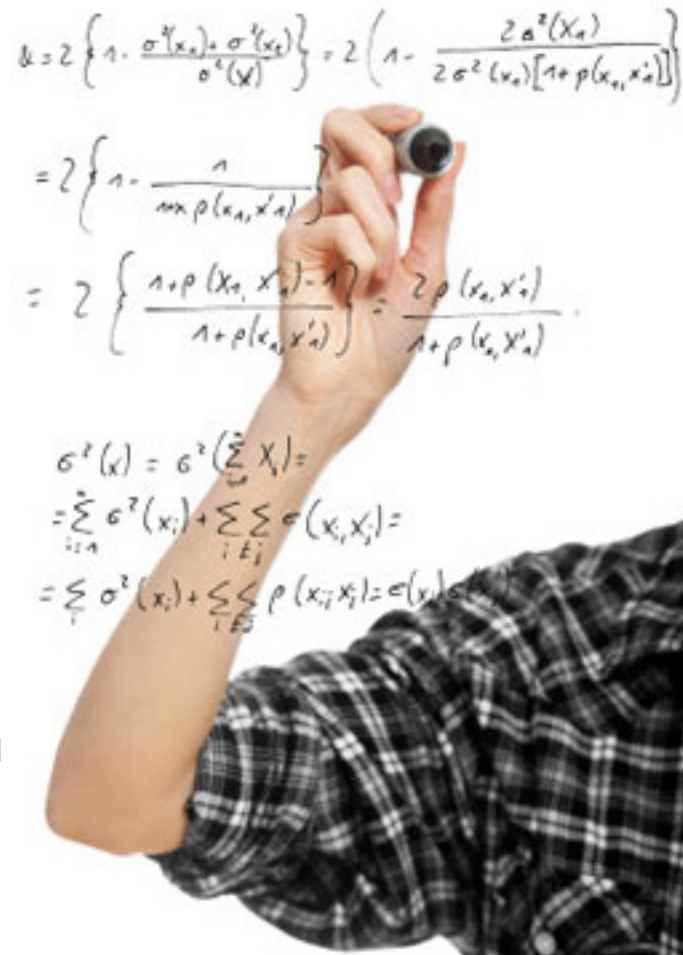
AN AFFILIATE OF THE NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS

WE ARE A VIBRANT COMMUNITY OF ENGAGED SCHOLARS AND STUDENTS LEARNING TOGETHER TO IMPROVE THE QUALITY OF EDUCATION FOR ALL STUDENTS.

The Mission of the New Hampshire Teachers of Mathematics (NHTM) is to provide vision and leadership in improving the teaching and learning of mathematics so that each student is ensured quality mathematics education and each teacher of mathematics is ensured the opportunity to grow professionally.

WHAT DOES NHTM DO?

- Provides leadership in Mathematics Education in the State of New Hampshire through its newsletter "Mathesis" and its Annual Spring Conference
- Provides professional development in Mathematics Education in the State of New Hampshire through its Annual Spring Conference and by sponsoring NCTM E-Workshops throughout the State
- Provides financial support to future mathematics teachers by offering two scholarships annually to prospective mathematics teachers
- Recognizes leaders in Mathematics Education by awarding three awards: Richard H. Balomenos Award for service, The Fernand J. Prevost Mathematics Teaching Award, and the Richard C. Evans Distinguished Mathematics Educator Award
- Provides financial support to the State Mathematics Contest
- Recognizes student achievement and teacher service with certificates of recognition
- Donates to the National Council of Teachers of Mathematics, Mathematics Education Trust (MET)



NHMATHTEACHERS.ORG

LOCAL CONTACT:
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603-862-3621
KAREN.GRAHAM@UNH.EDU

ADVANCING INNOVATION

THE NH HIGH TECH COUNCIL IS A MEMBER-DRIVEN ORGANIZATION WITH A FOCUS ON ADVANCING INNOVATION ACROSS NEW HAMPSHIRE.

Founded in 1983, the Council has a long history of advocating for a strong business climate that enables the technology sector to grow and flourish.

The Council is about connecting the elements of business to one another – customers, employees, and management are all critical pieces of our business ecosystem. We produce a continuous stream of high quality programs and events designed to create opportunities for members to get to know one another, to exchange ideas and best practices, to recognize significant achievement and to engage in business. We also have an active social media presence and are able to gain significant visibility for our members through numerous channels.

The Council is a member-driven organization for technology companies, with interest groups for female technologists, entrepreneurship, start-ups, biotechnology and software, that focuses on advancing innovation throughout the State of New Hampshire. The Council’s programs, services, and events support the Council’s commitment to expanding New Hampshire’s strong and cohesive technology sector.

The Council regularly collaborates with other organizations on research projects, outreach and advocacy efforts, and events that help support our goal of advancing innovation and serving as the voice of technology across New Hampshire.

Our efforts focus in three core areas:

- Engaging our membership in meaningful ways that support the economic prosperity of their businesses
- Outreach to the NH State Legislature to ensure that the state remains business friendly
- Coordination with educational providers to ensure that New Hampshire businesses have access to a highly skilled workforce.

PROGRAMS

ENTREPRENEUR FORUM

We produce an annual series of educational programs to support entrepreneurship and provide high-level resources to rapidly growing companies. At our Entrepreneur Forums, companies present their business challenge to a panel of industry experts and receive board-level and executive advice on how best to address their challenge, all in front of a live audience. Event attendees can ask questions and make comments to keep the session engaging for everyone. A cocktail hour with hors d'oeuvres provides time for networking among professionals from all areas of business. In addition to the company presentations, a fast-paced "Sky Dive" pitch from a start-up organization helps keep the energy flowing in the room. Entrepreneurs who are developing business ideas, members of the financial and investment community, students and the general public are encouraged to attend this low cost event.

PRODUCT OF THE YEAR

Each fall, we honor outstanding innovations produced by New Hampshire's tech companies. Since 2006, the Council has encouraged companies, large and small, to submit products to be considered for New Hampshire's Product of the Year. Our judges are distinguished professionals experienced in the development and commercialization of high-tech products. The fast-paced and engaging format of this event includes plenty of opportunities for networking and engagement, particularly through live audience voting to help determine the winner! Winners have their names included on the Hall of Fame Trophy located at the Manchester-Boston Regional Airport. Many have gone on to win additional competitions, gain more visibility, and receive grant and investment funds.

ENTREPRENEUR OF THE YEAR

Our Entrepreneur of the Year (EOY) event, held each May, attracts hundreds of influential leaders of tech-based companies from across the region and is one of the top networking events for those in or interested in our tech sector. The event includes a nationally recognized keynote speaker and special features, such as FIRST robotics displays. Since its start in 1988, the Council has recognized more than 60 New Hampshire

entrepreneurs who demonstrate leadership, ingenuity and innovation in the technology sector. These entrepreneurs have employed thousands of individuals and helped pump billions into the New Hampshire economy. Applications are solicited through corporations, attorneys, bankers, venture capitalists, entrepreneurs and others. Any founder, owner, or executive of a business in New Hampshire who successfully organized, developed, or managed a technology-based concept into a successful commercial product or service is eligible.

TECHWOMEN | TECHGIRLS

TechWomen|TechGirls is a forum focused on building a strong community of women enthusiastic about technology and supporting efforts where girls are exploring STEM as a career or area of study. TechWomen|TechGirls holds programs for professional women to connect, educate, and explore ideas around career development, technology initiatives, and innovation. The community will also deploy volunteers and mentors to support academic STEM initiatives and events for girls happening all over New Hampshire.

TECHWOMEN POWER BREAKFAST SERIES

Monthly gathering of TechWomen over networking breakfast on trending topics, networking, and camaraderie with a headliner female executive who shares her path and life lessons in being a break out success in the tech world.

TECHOUT

Run by the Council and AlphaLoft, TechOut is a startup competition that identifies talented, hungry entrepreneurs and funds them through investment capital awards of \$100,000. First place winners receive \$50,000, second place \$30,000, and third place \$20,000. The first two prizes are awarded based on the decisions of an esteemed group of judges with exceptional business experience, the majority of which are members in the Entrepreneurs Foundation of New Hampshire. Third prize is crowd-sourced at the event. That's \$20,000 in the hands of the audience voting.

NH MANUFACTURING EXTENSION PARTNERSHIP

THROUGH THE STATE OF NEW HAMPSHIRE, AN AFFILIATE OF THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY'S MANUFACTURING EXTENSION PARTNERSHIP (NIST MEP), A NATIONAL NETWORK OF SERVICES TO IMPROVE THE GLOBAL COMPETITIVENESS OF SMALLER MANUFACTURERS IN THE UNITED STATES

The NH MEP is an affiliate of the National Institute of Standards and Technology (NIST) under the U.S. Department of Commerce. The national MEP system is a network of manufacturing extension centers that provide business and technical assistance to smaller manufacturers in all 50 states, the District of Columbia, and Puerto Rico. Through MEP, manufacturers have access to more than 2,000 manufacturing and business “coaches” whose job is to help firms make changes that lead to greater productivity, increased profits, and enhanced global competitiveness.

The challenge for manufacturers today is satisfying escalating customer expectations in an increasingly volatile and competitive global market while also maintaining satisfactory profit margins. With technological change happening so rapidly, many small and medium manufacturing enterprises (SMEs) find it difficult to keep pace with the demands for new technologies that will enable them to remain profitably competitive. NH MEP provides affordable, innovative solutions to the problems encountered by today's manufacturing enterprise by facilitating interaction between industry, government and academia.

NH MEP-UNH PARTNERSHIP

In August, 2014, with funding from NIST, NH MEP joined the University of New Hampshire College of Engineering and Physical Sciences (CEPS) to hire an application engineer to assist UNH in collaborating

with manufacturers and positioning CEPS as a resource - both in terms of expertise and facilities - for technological advancement for manufacturers in the state. The position is dedicated to serving the research, education and business assistance needs of New Hampshire manufacturers.

The application engineer works in conjunction with CEPS to serve as a conduit between small- and medium-size manufacturers and UNH to disseminate and promote the world-class research being conducted within the college, identify new research opportunities and increase engagement with the local manufacturing industry.

The partnership also boosts UNH's long-term goal of building an Advanced Manufacturing Center for student training and workforce development, including internships and co-op experiences; manufacturing innovation; and the building of research partnerships with the manufacturing sector in the state. All of this benefits not only NH MEP, UNH and Granite State manufacturers, but also the state as a whole through innovation, job creation and economic growth.

NHMEP.ORG

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APPLICATION ENGINEER
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603-545-5317

SERVICES AND SOLUTIONS

Operational Excellence

- Lean Manufacturing Training and Implementation
- Six Sigma
- ISO 9001 Training and Certification
- ISO Internal Auditor Training
- AS 9100 Training and Certification
- Systematic Plant Layout Planning
- Quality Management Standards (QMS)
- Supplier Improvement
- Lean, Green and Energy
- Enterprise Resource Planning (ERP)

Workforce Development

- New Hampshire Manufacturing Week
- Training Within Industry (TWI)
- Incumbent Worker Training
- Leadership Effectiveness Training
- Team Involved Problem Solving

Innovative Growth Solutions

- Business Growth and Marketing Strategies
- Technology Driven Market Intelligence (TDMI)
- Technology Scouting
- Core Value Self-Assessment

Workshops

- Principles of Lean Manufacturing
- Six Sigma Green Belt Certificate Program
- Lean Enterprise Certificate Program
- DMI Informational Webinar
- TDMI Executive Information Session
- ISO 9001 Internal Auditor Training
- AS 9100 Internal Auditor Training
- MEP ISO 9001:2008 Collaborative

*"2014 Business Assistance
Organization of the Year"
Business NH Magazine*



*An initiative by
Gov. Maggie Hassan that
teams 8th graders with a local
manufacturer to
produce a video that looks at
career opportunities in
advanced manufacturing.*

*[nheconomy.com/manufacturing-in-nh/
videocontest.aspx](http://nheconomy.com/manufacturing-in-nh/videocontest.aspx)*

*Endorsed by the New Hampshire State
Board of Education*

In partnership with:



BAE SYSTEMS

Hypertherm
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NH SCIENCE TEACHERS' ASSOCIATION



MISSION

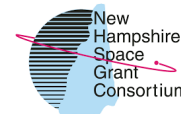
- Improve and coordinate science education at all levels of instruction
- Promote the advancement of education in any manner to assist such improvement and coordination of science teaching
- Increase scientific literacy and the application of science to everyday life.
- Promote science as a vehicle of lifelong learning for all citizens.
- Assume a leadership role in advocating for science education and creating an understanding of the value of science.

CONTACT:

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DANIEL REIDY, VICE-PRESIDENT, NHSTA
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NH SPACE GRANT CONSORTIUM

A NASA SPACE GRANT CONSORTIUM



MISSION

To stimulate and enhance science and mathematics education at all levels; providing motivation, improving quality, and increasing access for students, teachers, and the general public.



Brief History of NH Space Grant Consortium

Established by Congress in 1989, the National Space Grant College and Fellowship Program contributes to the nation's science and technology enterprise by funding research, education, and public service projects. The program works through a network of 52 university-based Space Grant consortia (representing every U.S. state, Puerto Rico, and the District of Columbia). Funded by the National Aeronautics and Space Administration (NASA), Space Grant Consortia provide support

to college and university students in science and engineering; they also administer pre-college and public service education programs. Nationwide, there are currently more than 700 institutions affiliated with Space Grant. New Hampshire Space Grant Consortium (NHSGC) was established in 1991 through a collaboration of the University of New Hampshire (UNH) and Dartmouth College. In the fall of 1999, NASA named the NH Space Grant Consortium a Designated Consortium — the top rating given to consortia.

NEW HAMPSHIRE SPACE GRANT PROJECTS

New England Fall Astronomy Festival

NH Space Grant provides support for the New England Fall Astronomy Festival held at the University of New Hampshire's Observatory. The festival includes keynote and featured speakers, sky watching and safe solar viewing, astronomy talks, telescope clinic (courtesy of the NH Astronomical Society), family activities.

Aerospace Festival

Aerospacefest celebrates space science and aeronautics with a weekend of rocket and balloon launches, telescopes and solar viewing, Mad Science, Ham Radio operators, radio-controlled airplanes, an Astronaut keynote speaker, and more. NHSGC one of several sponsors of this event.

UNH Undergraduate Research Conference: Interdisciplinary Science & Engineering Symposium

NHSGC provided one of nine awards for outstanding student research presented in the Interdisciplinary Science & Engineering Symposium, part of the week-long Undergraduate Research Conference held at the University of New Hampshire.

NHSGC.SR.UNH.EDU

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NEW HAMPSHIRE SPACE GRANT PROJECTS

LunaCats

NHSGC sponsored a UNH team, the LunaCats, in the Annual NASA Robotic Mining Competition. This year, the team placed 5th out of 46 teams in the competition held at Kennedy Space Center. Their highlight: the LunaCat robot completed a run where they mined more than double the required mass for a qualifying run.

Kennett HS HUNCH Students

Students from Mt. Washington Valley Career and Technical Ctr. of Kennett High School in N. Conway, NH, were recognized at Goddard Space Flight Center for their part in the NASA HUNCH program. During the school year, the advanced metals students used precision tooling to create components to be used at the International Space Station Training Facility — possibly to be used on the International Space Station. NHSGC funded the students' travel to GSFC, where they toured the machine shop and viewed NASA research, hardware, and engineering.

Project SMART

On July 1-25, 2014, UNH hosted a four-week summer program for 10th and 11th grade high school students interested in advancing their knowledge in a particular area of science, looking at scientific applications and societal implications. The Space Science module of the Project SMART program, funded by NHSGC, included faculty lectures and hands-on experience. One component of this is building the payload for in a high-altitude balloon. The 2014 balloon was launched in Durham, NH. Students tracked and recovered the payload in Turner, ME.

Climate & Carbon Investigations Workshop for STEM Teachers

On August 11-14, 2014, ten STEM-discipline teachers (grades 6-12) participated in a NHSGC-sponsored workshop on Climate and Carbon Investigations, held at UNH in Durham and taught by a team of UNH researchers and environmental science teachers. The Carbon Cycle and Climate Investigations materials were developed under a NASA Innovations in Climate Education Grant. Teachers received program materials useful in setting up their own classroom research plots, teaching students to collect and analyze data for exploring climate research questions.

Mount Washington Outreach Observers

Stationed at the Mount Washington Observatory summit facility, the Outreach Observers are trained weather specialists who offer tours, educational programs, and workshops.

SuperStellar Fridays

At the McAuliffe Shepard Discovery Center, every Friday is "SuperStellar." Open to the public, NHSGC supports Friday evening presentations by scientists on discoveries, historical events, and science concepts. The evening ends with a look at "Tonight's Sky" in the full-dome theatre.

Dartmouth College Wetterhahn Symposium

NHSGC offered support to Dartmouth College Women-in-Science students presenting their "capstone" research projects at the Wetterhahn Undergraduate Symposium.

McAuliffe-Shepard Discovery Center Exhibit

The discovery center created an exhibit on living and working in space, drawing on artifacts from prior space grant activities and from items obtained through NASA's de-accessioning program.

North Country Astronomy

The Margret and H. A. Rey Center, partnered with the McAuliffe-Shepard Discovery Center and the New Hampshire Astronomical Society, hosts stargazing evenings and astronomy education programs in Waterville Valley. Activities include Dark Sky Stargazing Nights, guided exploration of important night sky events, lecture programs, and family-friendly learning activities.

Rey Center Environmental Monitoring

The Margret and H. A. Rey Center oversees several environmental monitoring initiatives which support environmental stewardship and provide data for long-term datasets for natural resources management. The programs monitor climate change indicators, vegetation phenology, water quality, and more.

UNH TableSat Teams

NASA Exploration Systems Mission Directorate, through NH Space Grant, funds UNH student engineering teams working on projects that model NASA space missions. This year's team worked on components like those on the Magnetospheric Multiscale (MMS) mission.

CONNECTING NEW HAMPSHIRE'S COLLEGES AND UNIVERSITIES



NEW HAMPSHIRE TRANSFER CONNECTIONS PROGRAM

NHTCP is designed for New Hampshire students who eventually wish to enroll in a bachelor's program at one of the four public institutions that make up the University System of New Hampshire (USNH). NHTCP students begin their college study at Granite State College or one of the Community College System of New Hampshire (CCSNH) campuses.

NH TRANSFER CREDIT DATABASE

The NH Transfer Credit Database allows students to plan and assess how their courses will transfer from Community College System of New Hampshire (CCSNH) institutions to any of the NH Transfer partner institutions. There are four ways to search the database:

1. Course by course
2. Academic program (under development)
3. Transcript evaluation (temporarily disabled)
4. Keyword search. The database can be accessed anytime at nhtransfer.net/artweb/chgri.cgi

NHTRANSFER.ORG

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DUAL ADMISSION PROGRAM

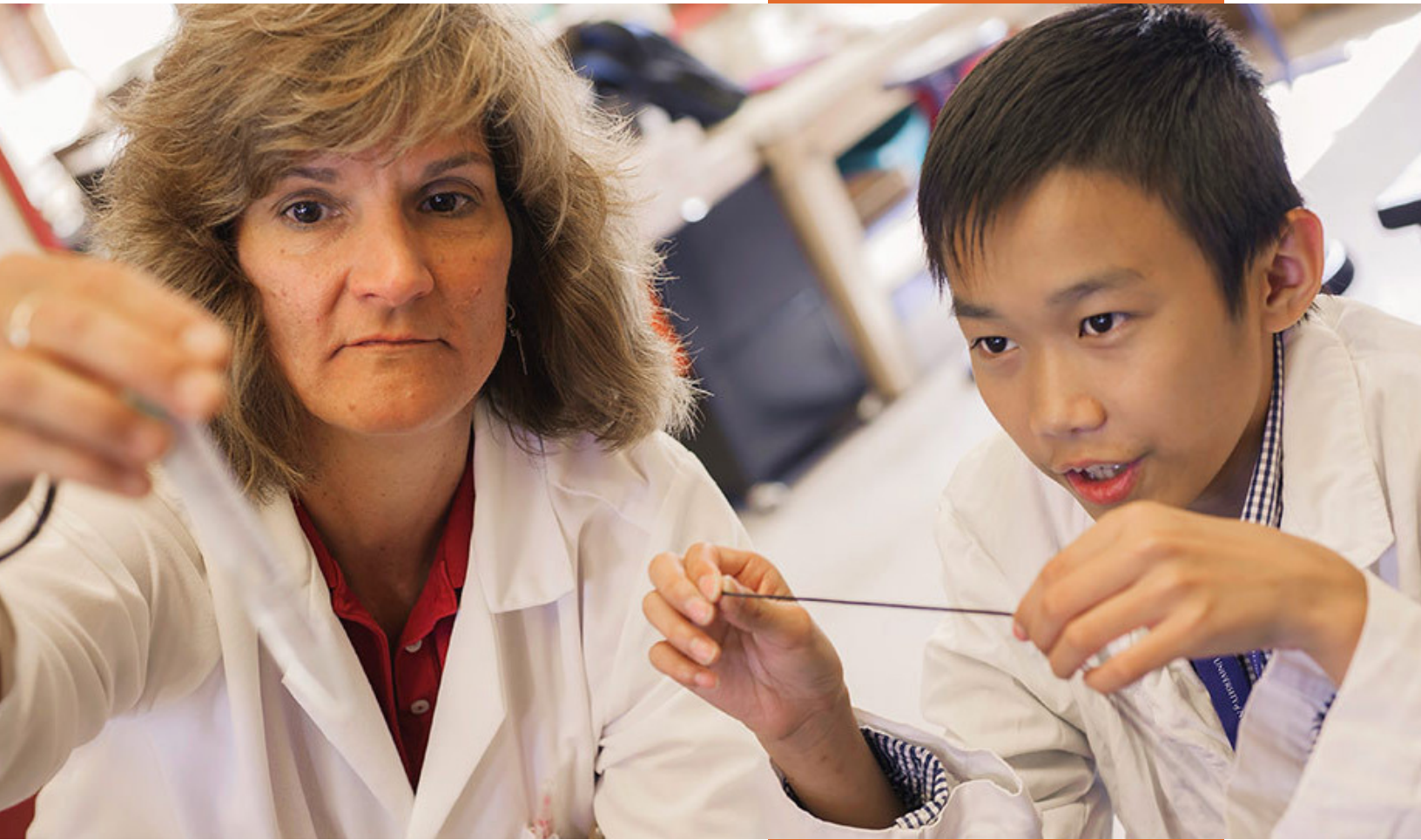
Designed for CCSNH students who wish to complete their associates degree and then enroll at a USNH institution. Pay one application fee and take advantage of a new educational pathway that allows you to enroll at one of the seven NH Community Colleges and be admitted into the University System of CCSNH at the same time.* First you'll complete an associate degree at the community college and then transition to one of the University System of NH institutions to complete a bachelor's degree. Along the way, you will receive special academic advising and enjoy activities at two colleges that may include academic, athletic, cultural and social events.

Public Pathways at UNH Manchester

New Hampshire community college students now have a simpler option to transition their associate's degree into a UNH bachelor's degree. Our new, four-year Public Pathways Program eliminates the transfer credit headache by clearly outlining the courses you should take in your first two years at community college, and how they will transfer to UNH's campus in Manchester.

RN to BSN Pathway Program

Designed for CCSNH Associate of Science, Nursing graduates who wish to complete their Bachelor of Science in Nursing, the NH RN to BSN Pathway program is a partnership between the CCSNH and USNH. This is a "public pathway" just for graduates of any CCSNH college to enroll in the RN to BSN program at Granite State College (GSC), continuing their Nursing education at the same cost per credit as their community college courses (currently only \$200 per credit)!



The UNH Manchester Educational Excellence for English Language Learners (EXCELL) is an intensive course that helps students who are speakers of other languages improve their academic English skills. Language and science are the focus. Here, Professor Patricia Halpin and a Manchester middle school student work on the DNA laboratory exercise.

*photo credit: Bridget Finnegan,
director, New and Emerging
Media, UNH*

PISCATAQUA REGION ESTUARIES PARTNERSHIP (PREP)



THE COMMUNITY FOR CLEAN WATER

SCIENCE & RESEARCH

At the core of the PREP program is our science, research and monitoring. PREP funds and coordinates scientific research projects and long-term monitoring to answer questions about the health of the estuaries and how they are changing over time.

PREP summarizes data from monitoring programs in the estuary using environmental indicators, which are measurable markers that help interpret the condition of the environment and how it changes over time.

PREP currently tracks 30 different environmental indicators of water quality, shellfish resources, land use and critical species and habitats. PREP also gathers and analyzes data on 20 other supporting variables that are used to understand the causes behind trends in the indicators. For each environmental indicator, PREP has developed a numeric target based on the goals and objectives in its Management Plan. Some targets are fixed thresholds (e.g. water quality standards like dissolved oxygen), while other targets are related to trends over time. Every three years PREP publishes a status and trends report called the State of Our Estuaries Report.

INITIATIVES

Priority 1: Reduce Pollution

Many rivers, streams, and bays in the Piscataqua Region have become polluted from paved areas, lawns, septic systems, farms, and wastewater treatment plants. PREP works with partners to tackle these issues by facilitating sustainable development planning and practices, while fixing hotspots for stormwater and nutrient pollution.

Priority 2: Conserve Natural Area

The best way to protect clean water and wildlife habitat is to preserve natural areas within and adjacent to wetlands, waterways, drinking water source areas, and critical wildlife habitat areas. A top priority for PREP is to facilitate and support long term protection of natural areas through education, proactive local regulations, and permanent voluntary land protection projects.

Priority 3: Restoring Rivers and Bays

Pollution and dramatic land use changes in the Piscataqua Region have damaged vital habitats. In recent decades oysters have declined by 95% and eelgrass has disappeared from tidal rivers. Dams and culverts in all coastal rivers block fish migration and degrade habitat. PREP and its partners are committed to restoring healthy oyster reefs, fish populations, eelgrass beds, saltmarsh habitat and natural flow in all waters.



PREPESTUARIES.ORG

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SEACOAST SCIENCE CENTER



OCEAN EDUCATION IS WHAT WE DO

From its inception, SSC has maintained a strong tradition of partnership, with the University of New Hampshire, and with other state, federal, and regional entities. We have a long track record of successful partnerships with:

- National Oceanic and Atmospheric Administration (NOAA)
- National Aeronautics and Space Administration (NASA)
- National Science Foundation (NSF)
- NH EPSCoR
- NH Department of Environmental Services (NH DES)
- and many others



WHAT MAKES SSC A GREAT PARTNER?

- We can help you meet your **Broader Impacts** goals
- **Experienced partners**
- **Diversified audiences:** general public, school groups, adult learners, pre-K, K-12 classroom visits
- **Solid infrastructure**
- **Risk tolerant** with capacity to experiment
- **Multiple vehicles for dissemination:** distance learning, outreach, exhibits, visitor and school programs, adult lectures, family learning interactions, hands-on programming, outdoor learning, and more
- **REACH** – 78K visitors/year; 20K school kids/year
- We are **translators of science**, and advocates for environmental and ocean literacy
- Providers of **hands-on, outdoor, and STEM learning** experiences
- **Multi-discipline** crossover opportunities – arts, literacy, STEAM

Coastal Ocean Observing Systems (NERACOOS), and New England Ocean Science Education Collaborative (NEOSEC), to name a few.

SSC/UNH PROJECTS AND PARTNERSHIPS

- **NH EPSCoR** –Development of the New Hampshire Informal Science Educators (NHISE) Network
- **Ocean Exploration Trust** –Community STEM program, Cooperative Extension
- **Infusing STEM** –Learning Scientists and museum staff working to infuse STEM into exhibit interpretation
- **Marine Mammal Rescue/Oil Spill Response**
- **NASA NIP**- Broader Impacts for research on ocean color/coccolithophore blooms
- **Shoals Marine Lab**
- **NH SeaGrant/Cooperative Extension and Consortium for Ocean Science Exploration and Engagement (COSEE)**- development of Broader Impacts tools, resources, map, and toolkit for scientist/educator teams

Working with us also opens up opportunities with our regional partners, like New England Aquarium (NEAQ), Mystic Aquarium, Northeastern Marine Science Center, Northeast Regional Association of

SEACOASTSCIENCECENTER.ORG

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OUR MISSION

Ocean education is what we do. We educate to motivate. We want everyone to recognize and understand that what we do every day has an impact on the health of the ocean and that ocean health impacts our daily lives. A healthy ocean drives our quality of life today and will for future generations.

Annual Operations At-a-Glance

Visitation: 77,500 people

Programs: 8,025 programs for visitors; 20,582 for students

Staff: 20 year-round; 75 peak season

Volunteers: 200 year round; 200 special events

ORGANIZATIONAL HISTORY AND MILESTONES

When we opened in 1992, the Center was a public/private partnership between the state, two non-profits and the University of New Hampshire (UNH). By 2001, we had outgrown that structure and became an independent non-profit organization. We maintain our tradition of partnership with a strong connection to UNH and by collaborating with a wide network of institutions. In 2004 and 2007 we completed two National Oceanic and Atmospheric Administration (NOAA) funded capital projects. The 2004 project included interior renovations and upgraded exhibit life support systems. The Gregg Interactive Learning Studio opened in 2007 with technology that connects on-site students and visitors to multimedia educational experiences. The Studio's distance learning programs reach across the country and as far afield as Australia.

In 2010, we were named an NBC's TODAY Show's Lend-a-Hand TODAY recipient. Lend-a-Hand TODAY recognizes smaller non-profits that make big impacts in their communities. The Seacoast Science Center was the only environmental education institution among the six chosen that year. We began integrating whale ecology into our

exhibits in 2007 when we acquired the skeleton of Tofu, a young humpback whale. In 2012, the exhibit was expanded and now includes the widest collection of marine mammal skeletons on public display in northern New England.

In 2014 we completed Families by the Seaside, a marine science education project that asked underserved families to create their own marine science learning experiences. With seven teams of science centers and community based organizations across New England, this \$500,000 NOAA-funded initiative has resulted in groundbreaking insights about what families from diverse backgrounds know and want to learn about the sea, how learning together outdoors strengthens families. The project's resulting Partnership Guide will advance the art and science of collaborating.

The Center was granted authorization by the National Marine Fisheries Service to lead New Hampshire's marine mammal rescue effort, effective January 1, 2014. The Center's Marine Mammal Rescue Team responds to stranded, injured and diseased seals, whales, porpoises, and dolphins in NH's coastal region. The team also educates beach goers and coastal communities about what to do when they spot a seal or other marine mammal on the shore.

Working closely with research scientists to translate and communicate their stories and findings is very important to SSC. In 2014 we worked with the Mount Washington Observatory on the NH EPSCoR Ecosystems & Society project to develop and build the capacity of a new network of NH Informal Science Educators (NHISE). This network is 10 organizations strong and was designed to act as a communication pipeline between NH research institutions and the general public.

SEACOAST SCHOOL OF TECHNOLOGY



The Seacoast School of Technology (SST) is the regional Career and Technical Center serving high school students from Epping, Exeter, Newmarket, Raymond, Sanborn Regional and Winnacunnet high schools. SST offers selective coursework preparing students for their lives after high school, college, whether it be for college, work, or the military.

Many of our programs, including Digital Media Arts and Computer Science allow students to earn for college credit and industry-recognized certifications while fulfilling their high school graduation requirements. Most importantly, students get the opportunity to explore areas of interest in a hands-on environment with great facilities and cutting-edge technology.

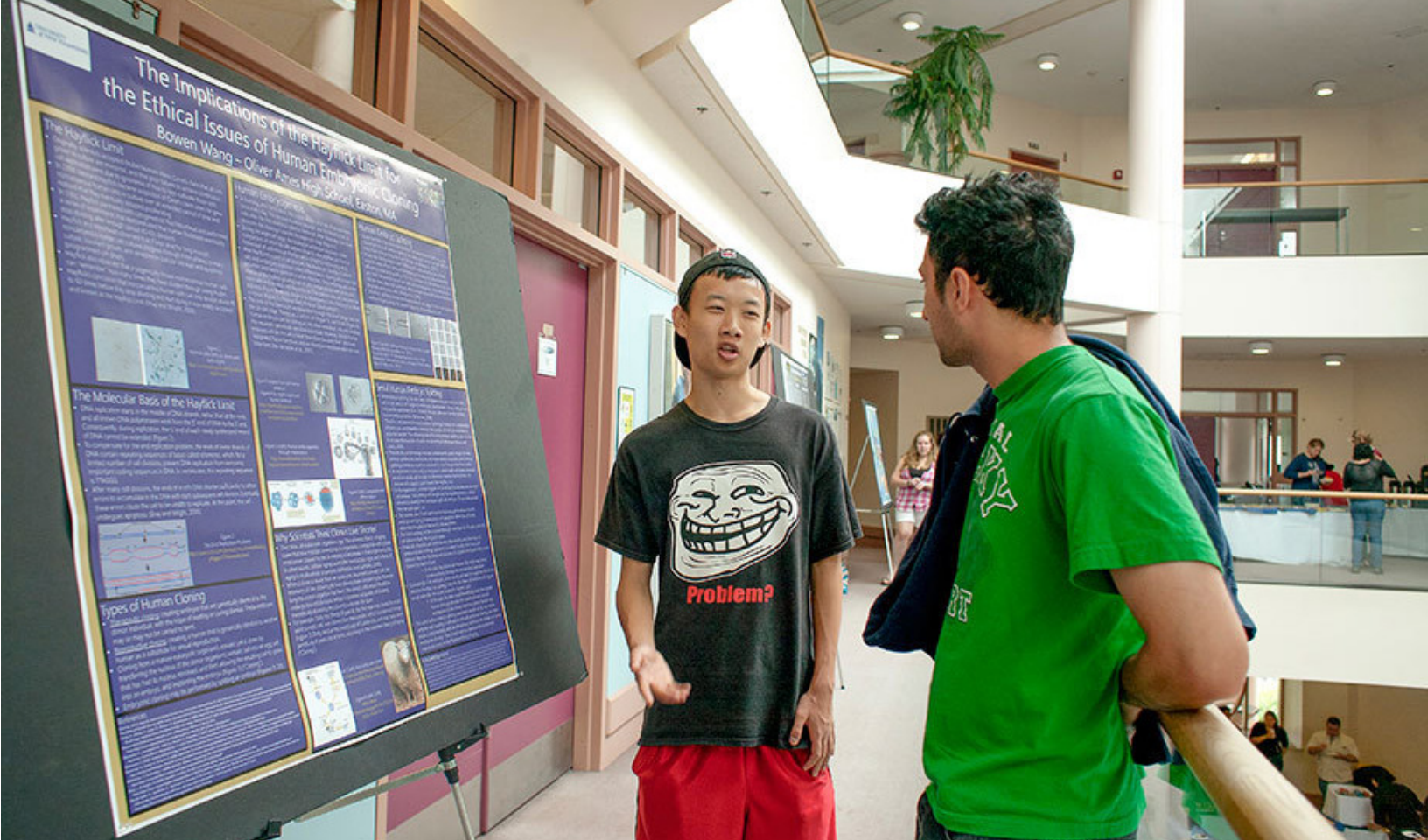
CLASSES OFFERED AT SST:

- Animal & Plant Science - greenhouse, small animal room, aquarium room, aquaculture tanks
- Automotive Technologies - dedicated automotive building, 13 bays, 8 lifts, computer diagnostics and a parts room
- Biotechnology - DNA replication capabilities, tissue culture lab, cryogenic freezers, electron microscopes, etc.
- Building Construction Technologies - SawStop technology, multi-trades lab
- Careers in Education - The Wright Start Preschool, child observation room, new outdoor playground
- Computer Science - dedicated student computer accounts, new computer labs
- Culinary Arts - Julia's Restaurant, Point of Sale (POS) system, large-scale production kitchen
- Digital Media Arts - video and sound production room, green screen, lighting grid, advanced graphics software
- Health Science Technologies - patient care facilities, health laboratory
- Marketing Technologies - Upper Deck school store, iPod surveying, Exeter Small Business Showcase
- Pre-Engineering - computer simulation software, engineering modeling capabilities
- Welding Technologies - 14 welding booths, plasma cutting capabilities, machining room

SEACOASTTECH.COM

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Project SMART is a summer institute that challenges, educates, and motivates talented high school students in science and mathematics while acquainting them with the environment and resources of the university as a place for higher education and research

photo credit: Julie K. Byrd-Jenkins



ABOUT

Project SMART is a Summer Institute at the University of New Hampshire (UNH) that challenges, educates, and motivates talented high school students in science and mathematics while acquainting them with the environment and resources of the University as a place for higher education and research. Participants study advanced topics in science, mathematics, and computers through lectures, demonstrations, hands-on laboratory experience, and field trips, and learn the process of research with UNH faculty

and graduate students. The Summer Institute provides an excellent opportunity to learn the interdisciplinary nature of the various science areas and the integration of math and computers with the scientific research. Best of all, participants develop life-long friendships.

SMART.UNH.EDU

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PROGRAM MODULES

Biotechnology and Nanotechnology

The module of biotechnology and nanotechnology combines two of the most powerful scientific areas that are likely to have a profound effect on life as we know it. Examples of topics to be covered are:

- Cloning of plants, animals and humans
- Genes, genetics and genetic engineering
- *In vitro* fertilization and surrogate motherhood
- Genetic screening, prenatal diagnosis and gene therapy
- Genetically Modified Organisms (GMOs)
- Present and future applications
- Ethics of nanotechnology
- Government regulation
- STM-Scanning tunneling Microscope
- “Nano-fear”

Space Science

The Project SMART Space Science module focuses on real-world physics and technologies. It includes classroom time, seminars, research projects, and a group balloon build. Along with the group projects, faculty mentors also work with students in defining and completing a space physics research project that parallels the seminars and coursework. At the Project SMART closing ceremony, students are given the opportunity to present a project poster on their research completed during the summer institute.



Photo: Charles Smith

Marine and Environmental Science

Field trips and research activities will be supplemented by discussions with UNH scientists about various “hot” topics in environmental sciences, including water resource management, global climate change, and land use/land change issues.



In addition, visiting scientists will discuss applications of the geospatial technologies in environmental sciences.

- Conduct an authentic research project
- Study ocean waters out to the Isles of Shoals
- Explore the alpine zone near the summit of Mt. Washington
- 5-day field trip to the White Mountains
- Understand and use the Global Positioning System (GPS)
- Investigate and use satellite imagery
- Study altitudinal gradients on forests, streams, and lakes
- Monitor forest vegetation and lake health
- Study marine invasive crab species
- Estimate size and rate of urban sprawl
- Learn about the impacts of climate change

In 2014 we completed *Families by the Seaside*, a marine science education project that asked underserved families to create their own marine science learning experiences. With seven teams of science centers and community based organizations across New England, this \$500,000 NOAA-funded initiative has resulted in groundbreaking insights about what families from diverse backgrounds know and want to learn about the sea, how learning together outdoors strengthens families. The project’s resulting Partnership Guide will advance the art and science of collaborating.



THE MISSION of Shoals Marine Laboratory is to provide education and research programs in a supportive environment that advance the 1) understanding of marine and coastal ecosystems and 2) development of sustainable solutions to environmental challenges.

Shoals Marine Laboratory (SML) is dedicated to undergraduate education and research in marine science and has been since 1966. SML offers undergraduate students a unique opportunity to study marine science in the field with exceptional faculty from institutions throughout North America. Instruction at SML is based upon giving participants a truly "hands-on" educational experience. SML courses and internships provide rigorous training in a diversity of marine subjects and prepare students for careers in the fields of marine and environmental science and sustainability. SML programs are couched in our ethos of responsible natural resource use and management, valuing scientific and community collaboration, and public service. SML is a joint venture between UNH and Cornell University.



Cornell University

SHOALSMARINELABORATORY.ORG

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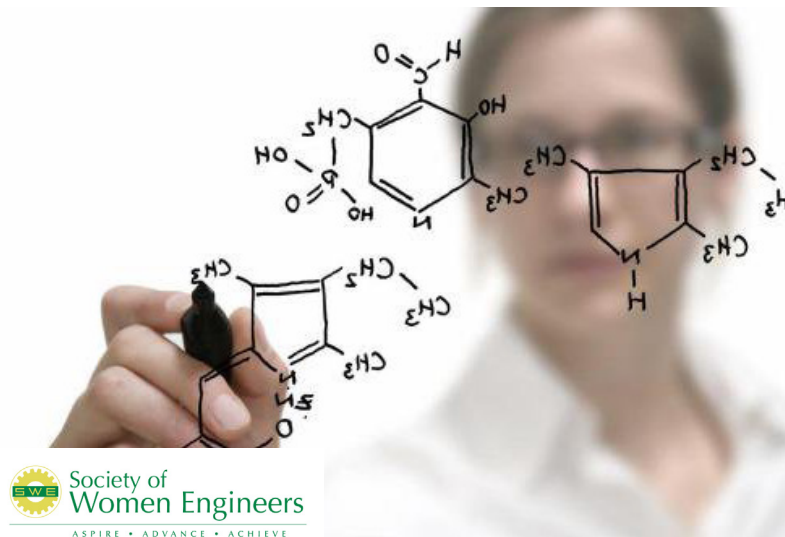


SOCIETY OF WOMEN ENGINEERS (SWE)



THE SOCIETY OF WOMEN ENGINEERS IS A PROFESSIONAL SOCIETY THAT CELEBRATES AND SUPPORTS WOMEN IN THE STEM (SCIENCE, TECHNOLOGY, ENGINEERING, MATHEMATICS) FIELDS.

SWE's main purpose is empowering women to spark an interest in, and develop a career in science and technology. We are an educational and service organization devoted to making a difference. SWE is the driving force that establishes engineering as a highly desirable career for women and empowers women to succeed and advance in those aspirations and be recognized for their life-changing contributions and achievements as engineers and leaders.



UNH SWE is particularly active in helping members to connect with female professionals in STEM fields as well as paying it forward through our extensive outreach programs.

We have cultivated a successful collaboration with Oyster River Middle School and Dover Middle School. The outreach programs we have designed and implemented work to inspire the next generation of women engineers and technologists. Our SWE members volunteer on a weekly basis to engage young girls to share the possibilities of this rewarding career path through a series of inspiring workshops and interaction with our SWE role models. This is a top priority for our organization and we believe in the value of inspiration and leadership; we make this commitment in addition to our rigorous college curriculum.

Another successful program we have is our Professional Series. We help connect students with professionals from leading companies and host them as presenters to our members at large. The presentations given by industry professionals are given with the intention of expanding the knowledge of our members with topics ranging from workplace etiquette, how to grow within a company, mentorship, resume workshops, and networking.

We also attend a National and Regional Conference every fall and spring respectively where we represent the University of New Hampshire. These are a fantastic investment in our future. These conferences offer great opportunities for our students to engage and learn about the next steps and the potential of our young careers.

[WILDCATLINK.UNH.EDU/ORGANIZATION/SWE](https://wildcatlink.unh.edu/organization/swe)

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A DYNAMIC AND INNOVATIVE LEARNING COMMUNITY OF NEW HAMPSHIRE TEACHERS AND LEARNERS WHO ENGAGE IN AUTHENTIC LEARNING EXPERIENCES TO ADVANCE SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM) EDUCATION FOR ALL

WHAT WE DO

- Develop and evaluate expanded learning programs to build educational pathways for students in grades K-12 through college
- Develop and evaluate professional learning programs to prepare and retain globally competitive and highly skilled teachers
- Conduct and participate in STEM education research to increase engagement, retention, and success of students underrepresented in STEM.

OUR MISSION

DEVELOP AND RESEARCH STEM educational innovations that improve teaching and learning and close the academic achievement gap among students underrepresented in STEM.

Community partners include the Manchester School District, Granite United Way, City Year of New Hampshire, Southern New Hampshire Services, New Hampshire Career and Technical Education Centers, and other educational and community organizations.

OUR TEAM

- Mihaela Sabin, Ph.D., Associate Professor of Computer Science, Faculty Director, UNH Manchester
- Melissa Gould, Operations Coordinator, UNH Manchester
- Sarah Grosvenor, M.A.T., Field Specialist, UNH Cooperative Extension and Affiliate Specialist, UNH STEM Discovery Lab

TEACHER PROFESSIONAL LEARNING

Creative Computing Challenge for Teachers

Career and Technical Education teachers learn to integrate aspects of computational thinking practices into their on-going curriculum when they engage students, including non-traditional computer science students, in personally relevant and meaningful project-based learning.



[MANCHESTER.UNH.EDU/OUTREACH/
STEM-DISCOVERY-LAB](https://manchester.unh.edu/outreach/stem-discovery-lab)

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Manchester Mobile Computer Science Principles

Manchester is a regional site for the Mobile CS Principles Professional Development program. High school teachers participate in the summer workshop and school year professional activities to pilot the Mobile CS Principles course designed to broaden participation in computer science among high school girls and underrepresented minorities.

NH CS Professional Development for High School Teachers

NHCS4HS extends the Mobile CS Principles community of practice by introducing teachers of diverse disciplines to CS Principles. Teachers complete the Mobile CS Principles course in the summer workshop and either teach the full course or integrate elements of the course in their teaching during the 2016-2017 school year.

Teacher-Engineer STEM Scholar Academy

Education teams of practicing engineers and middle school math and science teachers collaborate to support the development and integration of engineering education standards in the middle school classroom. The program includes a five-day summer workshop and school year support from area engineers.

Teachers Design Make Code

Practicing teachers in grades 5 – 8 participate in structured professional development that scaffolds understanding of computing and engineering content and practices with inquiry-based teaching practices. The program is a collaboration between STEM and Education faculty, Cooperative Extension field specialists, and Manchester School District.

STUDENT EXPANDED LEARNING

4-H SPIN Programs: UNH Cooperative Extension Special Interest Programs

4-H SPIN Programs are offered through UNH Cooperative Extension in partnership with the STEM Discovery Lab. SPIN programs are offered throughout the year and include a variety of exciting activities where young people learn STEM topics. Topics vary and include rocketry, robotics, roller coaster science, ecology, computing and more. SPIN clubs are led by educators, volunteers, interns and Cooperative Extension faculty who have a passion for STEM and want to share their knowledge with young people.

Agnes Lindsay STEM Fellowships

Funded by Agnes Lindsay Trust, the program supports the development of STEM talent among Manchester School District high school students. Students are recognized for promoting Agnes M. Lindsay's legacy of increasing access and engaged participation of "poor and deserving students" in educational programs that improve their lives and pave the way to successful careers.

Design Make Code: Afterschool and Summer Learning Program

Students in grades 6 - 8 engage in exploratory activities to design and prototype their own computing and engineering inventions. Focusing on collaborative mini challenges and project work, students participate in lab experiments, design and code computational animations, and make cool robots and other creative and programmable machines.

Educational Excellence for English Language Learners in STEM

This five-week summer program for students in grade 6 – 12 combines pre-college English language and hands-on science, engineering, and computing. Students conduct science experiments, solve computing and engineering challenges, and participate in STEM-focused field trips, all emphasizing inquiry, observation, analysis of data, and coding. STEM learning activities incorporate English Language tasks in academic reading and research, vocabulary building, writing, listening, and speaking.

Elementary Program Introducing Computing

This is a one-week summer program for students in grades 4 – 5. Students learn how to think logically and creatively through fun games, challenging puzzles, and visual programming. They build and program robots to tackle mini real-world challenges. Students discover why computer science is exciting and how it helps in our everyday life through technological innovations.

STEM TEACHERS COLLABORATIVE



STEM-TC IS AN INTERDISCIPLINARY EFFORT ACROSS THE UNIVERSITY TO COORDINATE AND ENHANCE OUR CAPACITY TO STRENGTHEN THE STEM PIPELINE



Future STEM Teachers

The STEM Teachers' Collaborative is an interdisciplinary effort across the University to coordinate and enhance our capacity to strengthen the STEM pipeline, with the primary goal of increasing K-12 teachers' expertise in computing, engineering, and technology and extending the impact of excellent STEM teachers to more students throughout the state. As part of our commitment to the 100Kin10 network, the STEM TC will provide more formal learning opportunities for practicing K-12 teachers to deepen their knowledge in STEM education.

[LEITZELCENTER.UNH.EDU/
STEM-TEACHERS-COLLABORATIVE](http://LEITZELCENTER.UNH.EDU/STEM-TEACHERS-COLLABORATIVE)

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KEY ACTIVITIES INCLUDE:

- Providing more STEM learning opportunities for both teachers and students, with particular focus on technology integration, computational thinking, and engineering design that will allow teachers to integrate these concepts and skills in their teaching. STEM professional development programs take place in a variety of hands-on settings in the community and on both the UNH Durham and Manchester campuses: on-site school district-sponsored workshops; local, regional, and national science and technology teacher meetings; summer programs; and in research experiences at UNH with STEM faculty. We are currently working with districts to provide streamlined, coherent STEM professional development across grade levels that is aligned with district goals and competencies as well as state and national standards. We take teachers out of their classroom to experience applied learning to later bring back to their teaching but also provide on-site observations and feedback as K-12 teachers implement new lessons and strategies. Many of these professional development opportunities for teachers include K-12 students where teachers can observe, try out new skills with the students, and be mentored by STEM experts. The result will be enhanced professional development curricula, real-world research experiences for teachers, and professional support during classroom implementation, all of which will help us meet the goal of retention and enhanced capacity of excellent STEM teachers.
- Hosting an annual statewide forum for STEM teachers on professional development topics teachers identify as timely (e.g., innovative practices, student learning, NGSS, Common Core, etc.). The first forum, "Science Research in the Classroom," was held on the Durham campus on May 30, 2015 and attracted over 80 educators from around the state of New Hampshire as well as neighboring states. The second forum, "Who is in your Classroom? Sparking a STEM Connection" will be held at UNH-Manchester on May 7, 2016. The forum has an expanded focus in 2016 on STEM workshops for elementary teachers, while still offering plenty of opportunities for middle school and high school teachers.

The keynote speaker for 2016 will be Dr. Chris Emdin of Columbia Teachers College, known for using hip-hop to connect students with science in his urban classroom and the author of the recent book, *For White Folks Who Teach in the Hood... And the Rest of Y'all Too*.

- Developing a web presence for STEM teachers that will serve as an information gateway for research-based, best-practices in STEM teaching and learning and for STEM professional development offerings happening at UNH Durham and Manchester campuses. The current email list includes over 150 teachers in New Hampshire and neighboring states, while @UNHSTEMTeach has over 330 followers on Twitter, and 100+ likes on the UNH STEM TC Facebook page. Plans include social media expansion to Pinterest and mailing list and social media integration with Salesforce. The current website will be overhauled in late spring, 2016.
- Increasing graduate level STEM opportunities for practicing teachers to deepen their knowledge in STEM education. This will be accomplished by creating additional courses in computing and technology integration and by adding graduate degree options in STEM and other areas of critical teacher shortage for the state of New Hampshire.
- Improving accessibility for more teachers across the state by developing online graduate courses in technology integration and more accessible online Master's degree options in STEM, including options to concentrate degree electives toward a STEM focused graduate certificate (i.e., Computing Education, Technology Integration, and STEM Education-Math or STEM Education-Science). These certificates will include a research experience. We will also target a NH area of critical teacher shortage by supporting teachers seeking to extend certification for the Education Technology Integrator endorsement.



The UNH College of Engineering and Physical Sciences, the UNH College of Life Science and Agriculture, the InterOperability Lab (IOL), the Center for Coastal & Ocean Mapping (CCOM), the Portsmouth Naval Shipyard (PNSY), Maine Missile, Math, and Science Club, and Wildlife Encounters are collaborating to offer a summer science and engineering experience on the University of New Hampshire Durham campus for the summer of 2016. This will be our 10th year and we will offer three different camp experiences for 6th through 12th graders: Engineeristas, Techsplorers, and Techventures.

WHAT IS UNH TECH CAMP?

UNH Tech Camp is a set of summer programs for students and teachers in grades 6 through 12 designed to increase STEM literacy. The programs engage young people in interactive hands-on, problem solving activities in areas of science, technology, engineering and mathematics (STEM). UNH Tech Camp is offered by the College of

Engineering and Physical Sciences at the University of New Hampshire and makes available the benefits of the UNH research campus to the community-at-large. Now in their 10th year, these programs are designed to immerse campers in the world of science, engineering and technology.

The new Tech for Teachers (TFT) program is a program within UNH Tech Camp that provides teachers their own immersion experience as they engage in authentic conversations about how students develop understanding of STEM topics. Teachers also develop and implement hands-on, open-ended project-based STEM curriculum and pedagogy.

CEPS.UNH.EDU/TEHCAMP

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PROGRAMS FOR STUDENTS

TechLeaders

This camp features leadership and entrepreneurship activities for young men and women in grades 10-12 who are considering a career in STEM. The campers participate in entrepreneurship workshops that will let them reflect on how to use their STEM passion and become leaders who create technical solutions that help society. They will work on life skills such as resume preparation, interviewing, and public speaking. Intertwined in all these activities, they will practice their leadership skills by serving as counselors-in-training for parts of the Techsplorers and Techventures programs. Additionally, these campers will attend seminars discussing current research in fields such as nanotechnology, space science, genomics, and bioinformatics.

UNH Engineeristas: Girls & Engineering

Engineeristas is a one-week camp experience for girls entering grades 6 and 7 that explores a wide range of engineering and science topics. Female professionals lead hands-on, interactive sessions related to the fields of: rocket science and engineering, robotics, computer science, animation, mechanical engineering, transportation, and environmental engineering. Campers will participate in field trips to related campus programs. There is a residential option available.

UNH Techsplorers

UNH Techsplorers is a two-week girls and boys camp for first-time campers entering grades 6 - 8. This camp explores electrical,

mechanical, civil, environmental engineering along with biomimicry, robotics, animation and computer technology. Campers will participate in various on-campus activities and local field trips interacting with numerous engineering and science professionals. During the 2nd week campers will work in small groups to develop and present a project. There is a residential option available.

UNH Techventures

This coed camp is designed for returning UNH Tech campers and new campers entering grades 9 - 10. The projects are more advanced than those of UNH Techsplorers. Campers will be able to choose two different one week long projects in the areas of rocketry, VEX Robotics, underwater robotics, renewable solar energy, and genetics, or one two week long animation project. There is a residential option available.



ELECTRICAL ENGINEERING TECHNOLOGY PROGRAM

With topics from technology communications to scientific programming to digital design, our ABET-accredited Electrical Engineering program gives you the practical experience to meet both industry demand and your career goals. Small class sizes mean big opportunities to collaborate with faculty who are industry experts, giving you one-on-one attention to excel in the dynamic, highly rewarding field of electronic design and development.

Please note: The Engineering Technology program offers only junior- and senior-level coursework, so you must have an appropriate associate's degree to be admitted.

Degree Option:

Computer Engineering Technology
Further focus your electrical engineering degree with the Computer Engineering Technology option, giving you deeper insight into the world of computing. Explore software programming, circuit design, network security and more — all in a hands-on, experience-driven environment.



Credit: Shawn K. Wickham, NH Union Leader

MECHANICAL ENGINEERING TECHNOLOGY PROGRAM

From power tools to combustion engines, our ABET-accredited Mechanical Engineering program will ignite your fascination with how things work. You'll work alongside faculty experts, and with state-of-the-art machining tools, to learn fluid technology, production systems, automation engineering and more. Through hands-on experience in the classroom and in the field, this applied degree program gives you the practical experience to turn your passion into a career.

INTERNSHIPS

Our campus is in the heart of the region's cultural, economic, entertainment and government activity — putting unlimited internship opportunities at your doorstep. We've partnered with local businesses to give you the real-world experience that sets you apart. Engineering technology majors have interned at many high-profile organizations in the area, including:

- BAE Systems
- Eversource
- IBM
- The MITRE Corporation
- Velcro

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ABOUT US

UNHInnovation's (UNHI) primary focus is advocating for, managing, and promoting the intellectual assets created by the university's students, faculty, and staff. UNHI ensures that the entrepreneurial ideas created at the university can be put to use in the wider world by facilitating the license of UNH innovations and supporting start-up companies based on UNH Intellectual Property. Beyond these functions, UNHI is dedicated to strengthening UNH's relationships with the business community by supporting and developing new opportunities for mutually beneficial commercial partnerships.

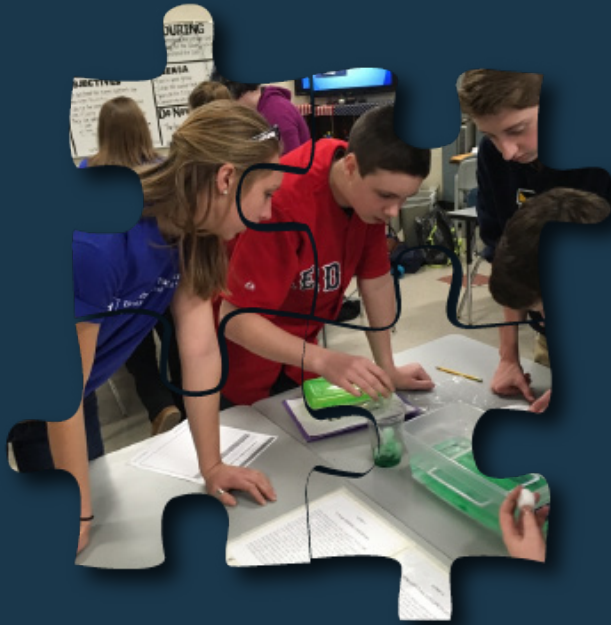
The entrepreneurial spirit is the backbone of innovation and commercialization success and UNHI is expanding entrepreneurship throughout the university and the state through the activities of the Peter T. Paul Entrepreneurship Center (ECenter). The ECenter is a co-curricular entrepreneurial hub that encourages interdisciplinary activities and provides real-world experiences, resources, and support for UNH entrepreneurs.

UNH's world-renowned InterOperability Lab is housed under the UNHI department, as is the newly formed Connectivity Research Center.



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The University of New Hampshire, founded in 1866, is a world-class public research university with the feel of a New England liberal arts college. A land, sea, and space-grant university, UNH is the state's flagship public institution, enrolling 13,000 undergraduate and 2,500 graduate students.

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