

Environmental Research Group (ERG) 2020
Collaboration, Commercialization and STEM Growth

Submitted on Behalf of ERG Members by:

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Submitted to:

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Executive Summary

Founded in 1987, at a time when UNH desired to dramatically increase research efforts, ERG became one of the University's organized research centers residing within UNH's College of Engineering and Physical Sciences. It has the distinction of providing coordinated responses to emerging environmental and water resources engineering issues through the establishment and support of topical research areas. ERG researchers are uniquely positioned to address the engineering research needs and applications related to global climate change and related impact mitigation of sea level rise and the increasing frequency of severe weather events. In addition, ERG has had an undergraduate and graduate degree programs molded around it.

The core of the ERG strategic activities consist of three areas:

Engagement/Visibility/Excellence/Partnership/Impact: ERG will develop the next generation of its research portfolio through emerging strategic partnerships needed to raise funds and build an endowment. ERG will draw upon the graduate alumni it has produced since 1987 and work closely with the UNH Foundation and CEPS development staff to build an endowment to achieve its strategic goals. ERG will work closely with new faculty hired through the recently approved "Resilient and Sustainable Infrastructure for Society" cluster hire proposal and increase its collaborations with the newly formed UNH Marine and Ocean Engineering School and the emerging Carsey School of Public Policy. ERG will strongly encourage and contribute to cluster hiring proposals that build upon the aforementioned ERG strengths in all areas of the water cycle.

CEPS Reputational Excellence and the ERG: ERG standards for success are extremely well aligned with CEPS measures of success. Continuing ERG success will elevate the College standings. With strategic support, ERG is also well positioned to enhance our productivity in scholarship, grant proposal activity and graduate student support. ERG will continue to favorably contribute to the recruitment and retention of women and under-represented minority students and faculty, aligning CEPS well with the UNH Advance program and initiatives. ERG will lead in upcoming conversations to increase the number of research assistantships and develop planned cohort Ph.D. programs.

Advancing UNH to 2020: ERG will advance the goals of the UNH strategic plan including increased interactions with the Marine and Ocean Engineering School and Carsey School of Public Policy. In the past three fiscal years, ERG has filed six disclosure/patent applications and worked closely with ORPC on several others with business and industry. ERG will expand on commercialization activities and develop new partnerships with UNH Innovation. ERG activities compliment and strengthen the Department of Civil and Environmental Engineering's scholarship plans and goals in the area of Environmental Stewardship and the Water and Materials related aspects of the impact of global climate change on infrastructure. ERG has a strong track record of new faculty support and can provide an intellectual home for new faculty that in turn will contribute to the growth of the BS Environmental Engineering program and assist UNH in meeting its goal of doubling the number of STEM graduates.

Environmental Research Group (ERG) 2020:

Collaboration, Commercialization and STEM Growth

Overview

Our Mission

The Environmental Research Group will improve human and environmental health and mitigate human impact on the environment by performing high-impact applied and fundamental research related to critical environmental/water resources science, engineering, regulatory and policy issues, by training qualified engineering and science professionals for the workforce, and by conducting engaged scholarship at local, state, national, and international levels.

ERG will support and incubate innovative environmental engineering research by providing its members and member centers with the necessary tools and services needed to flourish.

The Role of the Environmental Research Group

Scientific scholarship often occurs through individual and small teams of researchers, but is limited by the availability of community resources. ERG's role is to elevate its members' scholarship by facilitating the development of new ideas and tools, providing access to research infrastructure, coordinating group research efforts within and outside of ERG, helping to disseminate research findings and products, and improving our members' ability to communicate with stakeholders.

Background

Overview

Founded in 1987, ERG is one of the University's organized research centers residing within UNH's College of Engineering and Physical Sciences. It has a principal focus of applied and fundamental environmental engineering and science research. ERG has approximately 25 full-time faculty, research and support staff, and over 30 graduate students and 30 undergraduate researchers. It is also the home organization for many successful research centers. In the past three fiscal years, ERG has averaged approximately \$3.5 million annually in sponsored research support which generates approximately \$0.75 million in Finance and Administration fees for UNH. ERG funding is primarily from major federal funding agencies. However, a significant portion is derived from state and local agencies and private sources. ERG is located Gregg Hall on the Durham campus of UNH. Completed in 2001, Gregg Hall set a new standard in quality environmental educational and research space specifically designed for ERG research activities by ERG members. The undergraduate environmental engineering degree and the graduate degrees in environmental and water resources engineering are the direct result of ERG lines of inquiry.

People & Centers

ERG has nine faculty (four female, five male) and fourteen staff (Appendix A. Tables A.1 and A.2). It is host to many international scholars each year. Much of ERG's research strength and resources reside in the following major research centers:

- The Coastal Response Research Center (www.crrc.unh.edu) and Center for Spills in the Environment (CRRC/CSE)
- The Infrastructure and Climate Change Network (<http://theicnet.org/>)
- The New England Water Treatment Technology Center (<http://www.unh.edu/erg/new-england-water-treatment-assistance-center>)
- The UNH Contaminated Sediments Center (<http://www.unh.edu/erg/contaminated-sediments-center>)
- The UNH Stormwater Center (<http://www.unh.edu/unhsc>)

Infrastructure

ERG's Gregg Hall home is a four-story, 55,000 square feet building over 5000 sq ft of office space (including space for 30 graduate students) and 8000 sq ft of laboratory space dedicated to ERG research activities (Table A.3). The building was designed for and home to the Environmental Research Group; the NOAA-UNH National Estuarine Research Reserve Center formerly Cooperative Institute for Coastal And Estuarine Environmental Technology (CICEET); NH EPSCoR, UNH Innovation; the N.H. Innovation Research Center; NOAA's Northeast Coastal Ocean Program, Regional Coastal Management, and Coastal Management Leadership; and the Hubbard Center for Genome Studies.

Scholarship

Annually ERG faculty typically: publishes over 17 peer-reviewed papers, numerous agency reports, make tens of presentations and host dozens of workshops annually. The ERG faculty graduates on average two Ph.D. students and nine masters per year with a 3:7 ratio of female to male students for both degrees. Eight of the most recent 14 Ph.D. graduates are currently faculty members and another three relatively new Ph.D. graduates currently have post-doctoral appointments. In a recent survey, 100% of graduate students indicated that ERG supported activities and staff improved their graduate experience.

Because undergraduate scholarship is integral to the ERG mission and vision, the ERG faculty annually supports 30 undergraduate researchers and has sustained the undergraduate ENE-MP major since its inception. For the ENE-MP program, ERG has directly supported a full suite of its activities through research overhead funds. We are extremely proud that ERG faculty, staff and students have won numerous awards in the past five years.

Finances

ERG has maintained an independent financial model since inception, the policy initially established by the research vice president and more recently determined through

discussions with the CEPS Dean. CEPS' negotiates an annual budget with ERG based upon ERG-generated F&A funds. This budget includes the cost of one half-time administrative assistant, one half-time CEPS BSC staff member, ERG space, ERG IT support and ERG operating expenses. In Fiscal Years 11 through 13 ERG fiscal productivity as measured by F&A has produced and 2:1 return on this investment.

The ERG Model

ERG serves as the home organization that supports center and PIs functions. It provides the resources needed to incubate new research activities and to enhance the reputational excellence of premier centers and initiatives. For example, the success of ERG's first research center, the Bedrock Bioremediation Center (BBC), was leveraged to identify and obtain support for the subsequent series of environmental engineering research centers that exist today. Many of ERG's faculty members have participated in one or more Centers, then launched independent productive research activities.

ERG was established from the onset with the inclusion of research faculty, and research faculty have been continuously included in ERG membership which has greatly benefited to mission of ERG, CEPS and UNH. ERG support of Paul Kirshen and Alison Watts have helped both research faculty members expand their research activities at UNH as evidenced by Paul's major role at UNH in Global Climate Change adaptation and Alison's leading role on New Hampshire commissions to promote sustainable water resource practices for the state. ERG's support of Paul Kirshen also lead to his collaborations with ERG members Jennifer Jacobs and Jo Daniel in securing the NSF funded Infrastructure and Climate Change Network.

ERG support of the UNH Stormwater Center by providing administrative and IT staff support to Director Tom Ballestero as well as fostering the graduate (PhD) education of former center director Rob Roseen and current center co-director Jamie Houle has enabled the Center to gain national and international reputation as a one of a kind research facility. This reputation has led to numerous major research grants and scholarly achievements.

ERG community resources have included computer and instrumentation technicians, administrative assistance, conference and logistics support, graphics design and preparation of outreach, conference and proposal materials, and web site and interface design, support for visiting scholars, hosting international graduate students, laboratory and field instrumentation, computer and printing facilities, software license fees, and proposal preparation including program officer visits, editing, and matching funds. Prioritization of community resources is annually adjusted to reflect current research development opportunities, research support needs, and available resources.

ERG Purpose and Contribution to CEPS

Our vision is growth and advancement through reinvestment in more science, more projects, and more partners. The foundation of our vision is our core values. We value

scholarship, research to practice, collegiality, and high quality research. We are committed to engaged scholarship, participatory research, and research that has an impact on communities. We are consistent in ensuring that students are exposed to quality research methods.

ERG researchers are uniquely positioned to address the engineering research needs and applications related to global climate change and related impact mitigation of sea level rise and the increasing frequency of severe weather events. ERG member centers including the Coastal Response Research Center, Contaminated Sediment Research Center, Infrastructure and Climate Change Network, Storm Water Center and Water Treatment Technology Assistance Center bring national and international expertise in all areas of the water cycle from snow hydrology to coastal and marine issues.

The core of the ERG strategic activities consist of three areas:

Engagement/Visibility/Excellence/Partnership/Impact:

Fundamentally, we need a financial margin to accomplish our mission. Thus, we will immediately focus on initiatives to generate revenue through traditional research funding as well as the development of new types of funding sources.

ERG will develop the next generation of its research portfolio through emerging strategic partnerships needed to raise funds and build an endowment. ERG will draw upon the graduate alumni it has produced since 1987 and work closely with the UNH Foundation and CEPS development staff to build an endowment to achieve its strategic goals. ERG will work closely with new faculty hired through the recently approved “Resilient and Sustainable Infrastructure for Society” cluster hire proposal. ERG will strongly encourage and contribute to cluster hiring proposals that build upon the aforementioned ERG strengths in all areas of the water cycle. ERG will increase its collaborations with the newly formed UNH Marine and Ocean Engineering School and the emerging Carsey School of Public Policy. ERG will work closely with NH EPSCoR in pursuits of their next major strategic research proposals. ERG will take advantage of opportunities that take advantage of the one of a kind Stormwater Research Center field testing facilities, ERG Coastal Response Research Center and Center for Spills in the Environmental will continue to pursue research opportunities with the Gulf of Mexico Research Initiative (GOMRI) and National Academy of Sciences (NAS) in part made possible by the \$500 million dollar research funding from the BP Oil settlement.

While investment in individual PI research can enhance research funding and support, and will be pursued, we will continue to focus on research centers because of their alignment with our strengths of research, engagement, and collaboration and the financial resources and potential for long-term stability needed to advance ERG’s and CEP’s scholarly reputation. A key thread through all these incubation activities is strategic partnership between ERG faculty and external partners.

ERG also has considerable potential for supporting education and engagement (professor to practice) activities through advancement and foundation funding because we have 1) a

mature alumni and friend base, 2) considerable private sector partners, and 3) water sector foundations are growing. Initial steps are to develop the strategic partnerships needed to raise funds and build an endowment.

CEPS Reputational Excellence and the ERG:

ERG standards for success are extremely well aligned with CEPS measures of success as presented by Dean Mukasa in his state of the college messages. Continuing ERG success will elevate the College standings. With adequate strategic support ERG is also well positioned to enhance our productivity in scholarship, grant proposal activity and graduate student support. ERG will continue to favorably contribute to the recruitment and retention of women and underrepresented students and faculty, aligning CEPS well with the UNH Advance program and initiatives.

Several existing ERG Centers are well-positioned to enhance the scholarly reputation of ERG, CEPS and UNH. Maintaining and enhancing their position is a priority. Accelerating the scholarly reputation of the next generation of Centers will leverage knowledge and infrastructure from existing ERG successes. We will develop a targeted approach to capitalize on the collective intellectual output in a coherent and an efficient manner.

Research investments must advance the next generation. Moreover, the relationship between Ph.D. students, high quality research support, and peer-reviewed publications is well understood, but needs continuous attention to be well exercised locally. For engineering students, well directed cohorts are needed to accelerate UNH's recruitment, retention, and placement of doctoral students. Planned cohorts include Ph.D. programs in oil spill response, and climate change adaptation. ERG will be a leader in upcoming conversations around developing structures to advance graduate scholarship.

Advancing UNH to 2020:

ERG will advance the goals of the UNH strategic plan including increased interactions with the Marine and Ocean Engineering School and the Carsey School of Public Policy. In the past three fiscal years, ERG has filed six disclosure/patent applications and worked closely with ORPC on several others with business and industry. ERG will expand on it's existing commercialization activities and develop new partnerships with UNH Innovation. ERG activities compliment and strengthen the Department of Civil and Environmental Engineering's scholarship plans and goals in the area of Environmental Stewardship and in the Water and Materials related aspects of the impact of global climate change on infrastructure. ERG has a strong track record of new faculty support and can provide an intellectual home for new faculty that in turn will contribute to the growth of the BS Environmental Engineering program and assist UNH in meeting its goal of doubling the number of STEM graduates.

Appendix

Table A.1. ERG Faculty

ERG Faculty	Rank	Center Affiliation
Dr. Thomas Ballestero	Associate Professor	Stormwater Center
Dr. Robin Collins	Professor	NE Water Treat Tech Assistance Center
Dr. Jo Daniel	Professor	Infrastructure and Climate Change Network
Dr. Kevin Gardner	Professor	Contaminated Sediments Research Center
Dr. Jennifer Jacobs	Professor	Infrastructure and Climate Change Network Coastal Response Research Center/Center for Spills in the Environment
Dr. Nancy Kinner	Professor	
Dr. Paul Kirshen	Research Professor	Infrastructure and Climate Change Network
Dr. James Malley	Professor	ERG Director
Dr. Alison Watts	Res. Assistant Prof	Stormwater Center

Table A.2. ERG Staff by Center Affiliation

Center or Affiliation	ERG Staff
Coastal Response Research Center/Center for Spills in the Environment <i>Director: Nancy Kinner</i>	Peter Kinner David Kaiser, NOAA Kathy Mandsager
ERG <i>Director: James P. Malley, Jr.</i>	Joe Kazura Maddy Wasiewski (0.5 FTE)
Infrastructure and Climate Change Network <i>Directors: Jennifer Jacobs and Jo Daniel</i>	Lee Friess Jon Parker
New England Water Treatment Technology Assistance Center <i>Director: Robin Collins</i>	Damon Burt Peter Dwyer Kellen Sawyer
Contaminated Sediment Research Center <i>Director: Kevin Gardner</i>	Scott Greenwood Emese Hadnagy
Stormwater Center <i>Director: Jamie Houle</i> <i>Principal Investigator: Tom Ballestero</i>	Tim Puls

Table A.3. Summary of ERG Space (FY11)

Room Use	Number of Rooms	Total Space (Sq Ft)
Conference / Seminar Room	1	179
Lounge	2	408
Office	29	5251
Research/Nonclass Laboratory	27	8019
Computer Cluster	1	275
Total	60	14132