

FIVE YEAR REPORT

The North Carolina Collaboratory, 2016-2021

FEBRUARY 1, 2022



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL



Note from Executive Director Jeff Warren

In 2016, the North Carolina General Assembly (NCGA) authorized the creation of the North Carolina Policy Collaboratory. Headquartered at the University of North Carolina at Chapel Hill, the Collaboratory is a unique research-policy model able to leverage all 17 institutions of the University of North Carolina System. In 2020, the legislature also permitted partnerships with the state's private colleges and universities, expanding the reach of the program even further.

The establishment of the Collaboratory raised skepticism that the creation of the organization was a partisan attempt to co-opt academic research, and thereby undermine academic freedom and institutional autonomy. Faculty across the UNC System bristled at the realization the center had been established without their input and even suggested, via faculty resolutions, that the NCGA had broken their own laws in doing so.

Despite these concerns, the Collaboratory hit the ground running, working to fulfill its mission of supporting research on a variety of water quality and natural resource management topics and sharing the latest findings with legislators, policy-makers and the general public. The work of the Collaboratory was guided by an Advisory Board comprised of leading environmental faculty at UNC-Chapel Hill. The Provost-appointed Advisory Board ensured research projects selected met the standards of academically rigorous research, while also ensuring that results contributed value to the state.

As the Collaboratory marked its fifth anniversary in July 2021, this report provides an opportunity to summarize numerous examples of program success. To date, the Collaboratory has funded, or is poised to fund this year, more than 300 projects – many of which are related to legislatively mandated research – across all 17 campuses in the UNC System and two private universities. The Collaboratory has received approximately \$145 million in legislative appropriations – funding that otherwise would not have entered the UNC System.

In addition to an annual recurring budget of \$2 million, most of these dollars represent legislative earmarks for specific research projects, including \$2 million for flood resiliency, \$3.75 million for nutrient management, a \$3.5 million matching grant to supplement externally funded research, and close to \$20 million for statewide PFAS surveillance as well as testing and development of technology to mitigate human exposure to these compounds..

In May of 2020, the Collaboratory also received \$29 million to award to campuses across the UNC System for a variety of COVID-19 related research, including development of vaccines and novel therapeutics as well as community testing. Building on that work an additional \$15 million was allocated in 2021 for an important coronavirus sequencing project in partnership with the North Carolina Department of Health and Human Services. An additional \$30 million in COVID-19 related funding was also appropriated by the legislature in November 2021 bringing the total amount of COVID-19 funding for research projects managed by the Collaboratory to \$74 million.

The current state of faculty acceptance of the Collaboratory can be summarized by two prominent campus leaders at UNC-Chapel Hill – Barbara Rimer, dean of the Gillings School of Global Public Health and Chancellor Kevin M. Guskiewicz. The chancellor recently stated that, “The North Carolina Policy Collaboratory has been extremely important to us,” and Dean Rimer followed with, “a model not just for North Carolina, but for the country.”

Despite initial skepticism, the unique model that is the Collaboratory has proven an effective bridge between academic research and policy partnerships from both sides of the political aisle.



Jeffrey Warren, PhD

*Executive Director, NC Collaboratory
Professor of the Practice, Dept of Public Policy
The University of North Carolina at Chapel Hill*



Collaboratory Background

WHAT WE DO

The original authorization of the Collaboratory (see section 11.8 of Session Law 2016-94, effective July 14, 2016, as amended by section 8.(c) of Session Law 2020-74, effective September 4, 2020) to work with the University of North Carolina System and other institutions of higher learning across the state for practical use by state and local government allows the Collaboratory's research portfolio to have a broad scope in areas that may benefit from utilizing academic talent, expertise, and analytical infrastructure. This includes, but is not limited to, investigations based on science, law, economics, and public health.

As part of its mandate, the Collaboratory has been directed to facilitate and fund research related to the environmental and economic components of the management of the natural resources within the state of North Carolina and of new technologies for habitat, environmental and water quality improvement. The Collaboratory focuses on two types of projects: legislatively mandated studies and Collaboratory targeted research initiatives. In addition, the Collaboratory has a significant COVID-19 research portfolio with more than 110 projects supported with \$74 million in funding from the North Carolina General Assembly.



MISSION

The Collaboratory facilitates and funds research primarily related to the environmental and economic components of the management of natural resources and public health concerns. The Collaboratory's work is focused within the state of North Carolina and is designed to inform the policy-making process with the latest research findings, relevant data and expert advice.

The Collaboratory develops and disseminates relevant best practices to interested parties, leads and participates in projects across the State related to environmental quality, natural resource management, and public health and is authorized to make recommendations to the North Carolina General Assembly.

"Something positive happened over the last several years of the Collaboratory. Many faculty members and administrators had gone from hands-off to cautious appraisal to full-on partnership. Jeff Warren often acted as an effective translator and communicator between researchers and legislators. The results are good for all participants and for the environment of North Carolina. Academics and legislators should talk more, judge less, and focus on outcomes that benefit their states and regions."

Barbara K. Rimer
Alumni Distinguished Professor and dean, Gillings School of Global Public Health



Our Work Beyond the Collaboratory

INFORMING POLICY THROUGH RESEARCH

- A multi-year study led by the UNC Institute of Marine Sciences to grow the state's oyster industry resulted in legislation that implemented more than a dozen recommendations to strengthen the state's shellfish industry and improve coastal habitat.
- A study led by researchers at North Carolina State University of energy storage opportunities in North Carolina resulted in a new docket being opened by the North Carolina Utilities Commission to further explore the study recommendations.
- A three-year study to improve water quality in Jordan Lake resulted in new data and scientific findings that add knowledge to the understanding of the dynamics of the lake. A similar study is now being conducted in nearby Falls Lake. These results will assist in shaping new approaches to improving water quality actions in the watershed.
- The Collaboratory delivered a Flood Resiliency Study report in June 2021 focused on issues ranging from floodplain buyouts, infrastructure and natural systems. The results of the study helped guide state policy and budget appropriations, and facilitated securing additional flood resiliency funding for the state.

TECHNOLOGY DEVELOPMENT

- As part of the Collaboratory's COVID-19 research portfolio researchers at UNC-Chapel Hill engineered a peptide-modified surface-enhanced Raman spectroscopy (SERS) based assay for the detection of SARS-CoV-2, which could also be used as a biosensor in the future of other viruses.
- With an initial investment from the Collaboratory, researchers at UNC-Chapel Hill are working on a digital assay platform to conduct high volumes of COVID-19 tests. The research received \$1.9 million in additional funding from the Department of Defense to expand the project.
- Working across disciplines, UNC-Chapel Hill engineers and chemists have developed an ionic fluorogel resin that has been successful in removing most PFAS from water. This technology is outperforming other technologies on the market (at the lab scale) and is currently being scaled up for real-world deployment at water and wastewater treatment plants in the state for additional pilot testing. The technology landed UNC-Chapel Hill assistant professor of chemistry, Frank Leibfarth on *Popular Science's* Brilliant Ten list in September 2021. *(Left) Leibfarth tests the rotary evaporator in his renovated lab in Kenan Labs at UNC-Chapel Hill.*



SERVICE TO THE STATE

- To better understand COVID-19 across North Carolina, researchers in partnership with the North Carolina Department of Health and Human Services are testing samples of wastewater from wastewater treatment plants for SARS-CoV-2, the virus that causes COVID-19.
- With CARES Act funding and in coordination with the UNC System the Collaboratory was able to deploy more than sixty freezers for vaccine storage to fifteen system campuses. The project was designed to increase the capacity for regional vaccine distribution across all regions of the state.
- Following Hurricane Matthew in 2016 the Collaboratory's first project was launched as a research collaboration between UNC-Chapel Hill and NC State resulting in a partnership with six local governments in eastern North Carolina. The project developed new planning and design materials for these communities in preparation for future storm events.



UNC-Chapel Hill senior Rhyan Stone and Institute for the Environment research technician Aleah Walsh collect water samples and data from local watersheds feeding into Jordan Lake on June 20, 2018.

SHARING RESEARCH RESULTS

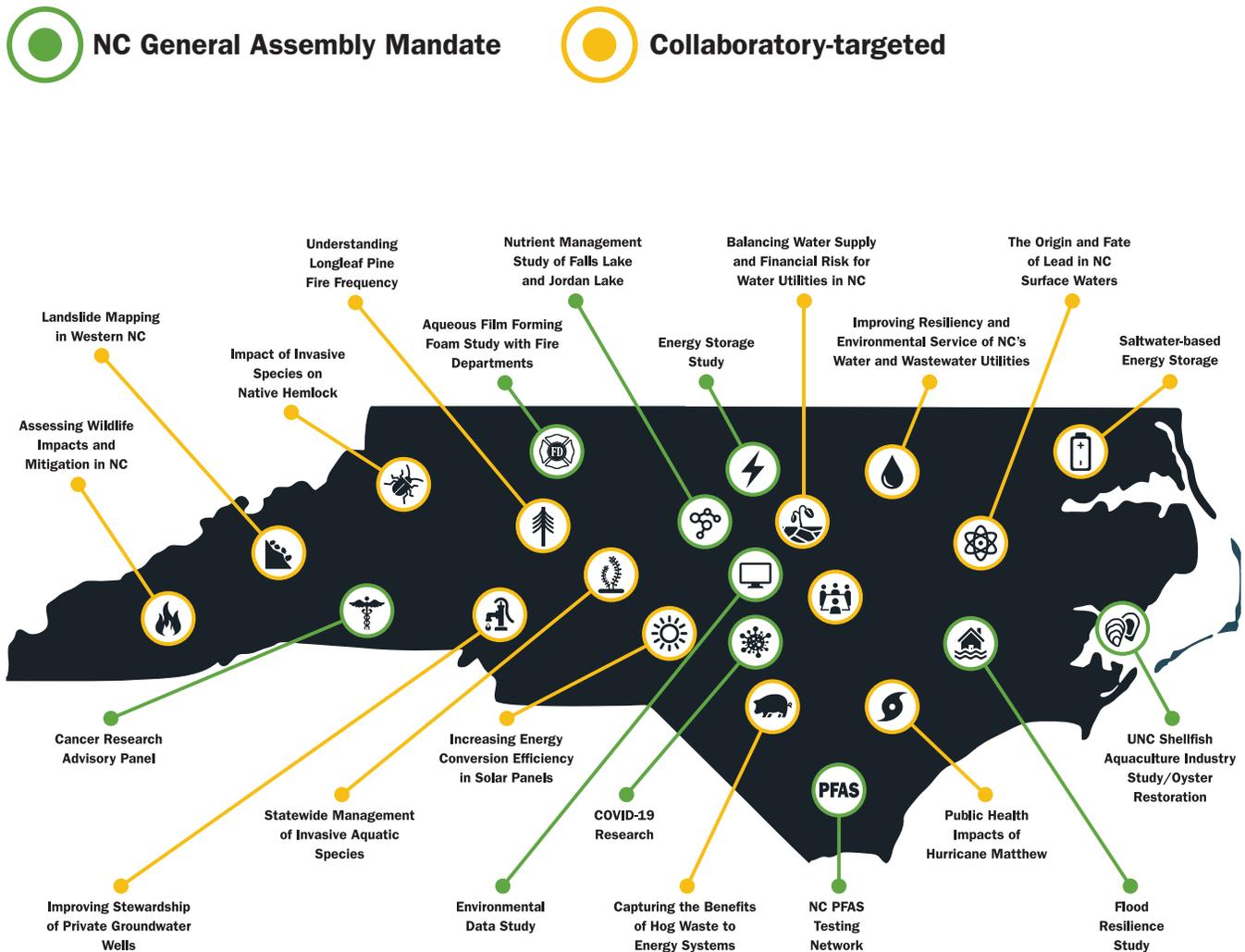
A significant component of the work of the Collaboratory is sharing research results and findings with policy-makers, stakeholders and the general public. As such, over the last five years the Collaboratory has hosted multiple public forums and symposiums and researchers have participated on a wide range of topics including a PFAS Testing Network events in the Cape Fear region and annual Jordan Lake Study public forums in the Triangle. Additionally, with the support of Collaboratory funding, the Sero Surveillance Network and the Gillings Center for Coronavirus Testing, Screening, and Surveillance project teams collaborated to create the Gillings COVID-19 Dashboard, a comprehensive online resource housing essential information on the current status of coronavirus in NC, accessible to researchers, policymakers, and the general public.

WHO THE COLLABORATORY SERVES

- NC Legislators
- Researchers
- The General Public
- State and Local Government Staff
- Non-Governmental Organizations
- Industry Organizations

Overview of Collaboratory Funded Projects

Since its inception in July 2016, the Collaboratory has overseen more than 300 individual research projects across the state of North Carolina. The map below highlights a few of our projects, from Oyster Restoration to PFAS Testing to Landslide Mapping, the Collaboratory's involvement spans a wide variety of subjects across every geographic region of the state.



Highlighted Projects

NC PFAS TESTING NETWORK

Final report submitted to the legislature on April 15, 2021.

- The North Carolina Per and Polyfluoroalkyl Substances Testing (PFAST) Network is a statewide research collaboration to test for current levels of PFAS chemicals in drinking water and air samples across the state. The Network comprises principal investigators from NC State, Duke, UNC-Chapel Hill, UNC Wilmington, UNC Charlotte, East Carolina University and North Carolina A&T State University.
- The project is divided among 19 researchers from institutions across the state into eight teams, including but not limited to: Water Sampling & PFAS Analysis; Private Well Risk Modeling; PFAS Removal Performance Testing; and Air Emissions & Atmospheric Deposition.
- Thus far, the research has resulted in the publication of numerous academic papers and has led to more than \$20 million additional external funding for PFAS projects. Technology has also been developed at UNC-Chapel Hill in the form of a promising new ionic fluorogel resin that, at least at the lab scale, appears to remove numerous PFAS compounds from the water at a far greater efficacy than other technologies tested that are available on the open market. The NCGA has made an additional \$10 million investment in scaling up this technology for testing under real-world conditions at facilities such as municipal water wells, water treatment plants, and wastewater treatment plants.

NC FLOOD RESILIENCY STUDY

Final report submitted to the legislature on June 1, 2021.

- The Collaboratory was charged with studying flooding and resiliency against future storms in eastern North Carolina and developing an implementation plan with recommendations.
- A team of researchers evaluated a number of issues, including policies related to flood plain management, such as buyout of residential properties, natural systems' role in mitigating flooding, the vulnerability of critical infrastructure, the financial risks associated with major weather events, and potential public health impacts.
- Recommendations from the Collaboratory report to the legislature led to the NCGA creating policies related to flood resiliency, and appropriating additional funds to address the issue in November of 2021.

UNC-Chapel Hill student Joey Carter performs research in Albemarle Sound on Sept. 11, 2020, at Jockey's Ridge State Park in Nags Head, NC.





Former UNC-Chapel Hill professor Kaylyn Gootman and one her students perform research at Jordan Lake.

NUTRIENT MANAGEMENT STUDY OF JORDAN AND FALLS LAKE

Six-year study: *Jordan Lake Final Report* submitted to the legislature in December 2019 and continuing work on Falls Lake.

- In 2019, researchers across the state finished research projects focused on nutrient management in Jordan Lake, and modeled what impact decreases in nitrogen and phosphorus runoff would have on nutrient loading in the lake over time.
- In 2020, researchers from UNC-Chapel Hill, ECU, and NC State conducted a number of research projects focused on Falls Lake as part of the study, including:
 - Evaluating reservoir vulnerability to eutrophication, including harmful algal blooms, relative to nutrient and sediment loads, streamflow patterns, and climate, for both current conditions and future scenarios.
 - Identifying major sources of nutrients and sediments to Falls Lake and the timing of loading.
 - Evaluating likelihood of nutrient mitigation through the implementation of best management practices, regulatory measures and restoration efforts.
 - Evaluating innovative financing mechanisms for stormwater controls and analysis of costs and benefits of water quality improvement.

OYSTER STUDY

The NC Strategic Plan for Shellfish Mariculture analyzed ways in which to grow the state's shellfish mariculture presence to a \$100 million industry by 2030. This study was mandated by the North Carolina General Assembly in the annual budget bill, House bill 1030, during the 2016 legislative session. Over an 18-month period dozens of stakeholders worked together to develop the plan, which was submitted to the legislature in December 2018.

By evaluating industry challenges and analyzing similar industries in other states, the study identified various funding options, economic programs, regulatory and promotional frameworks, and statutory considerations that could support shellfish growers and the industry. Ultimately, the study recommendations resulted in legislation with policy and budgetary changes designed to grow the shellfish mariculture industry in the state.

WILDFIRES AND LANDSLIDES

Starting in 2019 the Collaboratory initiated a project to discover the connections and relationships between wildfires and landslides in the western North Carolina mountains. Other states have conducted extensive research to describe the relationship between wildfires and landslides, yet North Carolina has little evidence of this relationship and the impacts on our communities. Researchers on the project are working in partnership with federal and state officials along with local government officials in western North Carolina.

Collaboratory COVID-19 Studies

GENERAL COVID-19 / SARS-CoV-2 RESEARCH

In May 2020 the Collaboratory was awarded \$29 million by the North Carolina General Assembly to support research projects focused on treatment, community testing and prevention of COVID-19.



\$74M

total Collaboratory funding from NCGA for COVID-19 research.

CORONAVIRUS VARIANT SEQUENCING (CORVASEQ) PROJECT

In May 2020, the Collaboratory was awarded \$15 million from the NCGA to work with NC DHHS to create a statewide SARS-CoV-2 genetic sequencing and variant tracking network. The resulting CORVASEQ (CORonavirus VARIant SEQuencing) project includes six academic sequencing partners (ECU, NC State, UNC-Chapel Hill, UNC Charlotte, Duke and Wake Forest) and the hospitals related to their medical schools (ECU, UNC-Chapel Hill, Duke, Wake Forest) as well as six additional non-academic hospital systems (Atrium, HCA, Novant, VA, Vidant, and WakeMed) allowing for surveillance of patients across 67 individual hospitals from around the state.



12

projects tracking variants through genetic sequencing.



103

total projects funded.



3

vaccine-related projects.



\$6M

funding for 32 projects across six Historically Minority Serving Institutions in the UNC System.



16

economic impact projects.



20

community testing initiatives.



\$1.9M

external funding leveraged so far, including a project that leveraged external funding at a 1:5 ratio within just one month of research award.



7

campuses with community testing initiatives.



3

projects focused on elderly adults.



>800

research team members.



>50K

study participants across all projects.



14

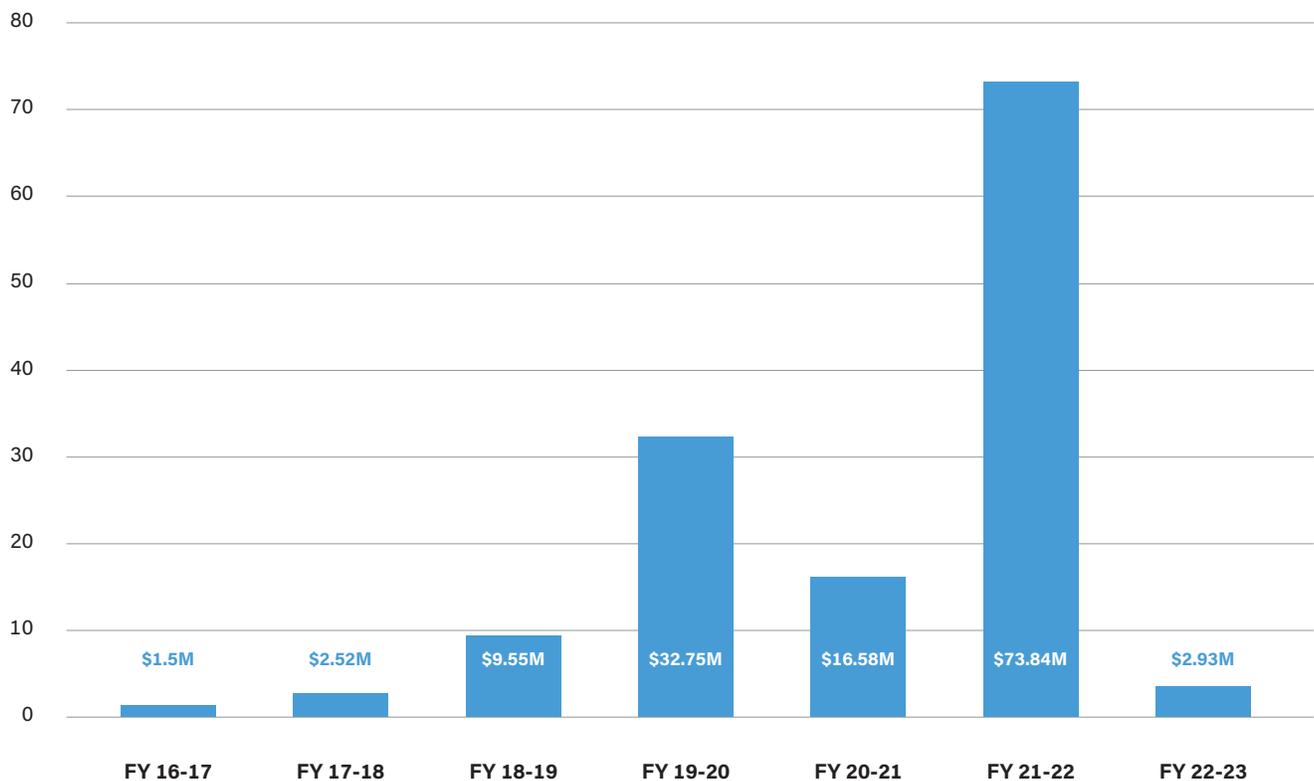
therapeutic treatment projects.

Collaboratory Financials

The following chart show a breakdown of state funding the Collaboratory receives for each of the five years the Collaboratory has been in operation (2016-2021), with projections through 2023.

NCGA Appropriations

Dollars in Millions



Our Funding Explained

In addition to the majority of funds that come from the NCGA, the Collaboratory has also received Challenge Grant funding along with donor funding. The Collaboratory has also seen an exponential increase in funding from the state since its beginning in 2016, with a spike in funding in 2020 due to a one time \$29 million grant designated to COVID-19 studies.

Jeff Warren, executive director of the NC Collaboratory, addresses the UNC Board of Trustees during a full board meeting held at The Carolina Inn, Sept. 26, 2019.



Looking Ahead

The Collaboratory is proud of the last five years of our work and the continuing impact our research is having for our state officials and citizens throughout North Carolina. Working with hundreds of university researchers on the most pressing challenges facing the state, the Collaboratory's investigations have addressed these challenges and identified real world solutions.

The Collaboratory represents an innovative model, unique to the nation, that utilizes the tremendous asset of the UNC System and other institutions of higher learning to inform and assist elected and appointed officials in making policy decisions based on relevant and unbiased scientific data and findings.

This successful partnership between the state legislature and the university system was particularly illustrated during the early stages of the pandemic with the North Carolina General Assembly funding the Collaboratory \$29 million for COVID-19 research.

This endeavor, which started in 2016, was further solidified when the Collaboratory was made permanent and codified into statute in the 2021 budget bill (Section 8.8 of Session Law 2021-180), which created a new freestanding Article 31A within NCGS 116-255. Importantly, the statute expands the scope of the Collaboratory's work beyond environmental policy with an increased focus on public health and technology development.

Along with the new statutory language came increased funding for additional projects in coming years. The 2021 budget bill provides more than \$76 million in funding for significant research projects on a range of topics. The Collaboratory received funding to strengthen its research portfolio on COVID-19. In addition, ongoing work on PFAS will include water sampling and developing technology designed to remove PFAS.

Also of note, the Collaboratory was directed to lead a new program designed to increase research capacity at the state's six Historically Minority-Serving Institutions that provides recurring funding of \$500k per year for a competitive grant program to assist projects that enhance and expand research capacity at each campus.

The commitment that the NCGA has shown to the Collaboratory is a clear indicator that our state's leaders value scientific research. Making the Collaboratory a permanent part of the state's scientific and decision-making apparatus will allow for research to be a critical factor in important policy discussion into the future.

In response to our rapid growth, the Collaboratory has begun to expand our staff in FY 2021-22 to support the workload associated with our funding increases from the NCGA. For the first five years of our existence, the executive director was the only full-time position, but we have now added a full-time financial analyst and research director, and are actively working to hire a full-time communications specialist. We will also be announcing an opening for a new full-time administrative assistant/office manager soon.

Rachel Noble of the UNC Institute of Marine Sciences, examines water samples in her lab.



Collaboratory Leadership, Staff and Advisory Board

COLLABORATORY STAFF



Al Segars
Chair



Jeff Warren
Executive Director



Laurie Farrar
Budget and Finance



Greer Arthur
Research Director



Steve Wall
Outreach Director



Gabrielle Schust
Graduate RA



Rebecca Rice
Graduate Intern

2022 COLLABORATORY SPRING INTERNS

Over the last five years the Collaboratory has employed a number of paid student undergraduate and graduate interns to serve the organization. The student staff is critical to the Collaboratory's mission and contribute to our work by conducting background research, writing project briefs, assisting with legislative reports, developing communications materials and much more.



Ally Adams
Belmont, NC



Janis Arrojado
Concord, NC



Christian Chung
Charlotte, NC



Taylor Fitzgerald
Asheville, NC



Sierra Foster
Mocksville, NC



Lucy Gray
Boone, NC



Elijah Gullett
Lexington, NC



Ameena Hester
Gastonia, NC



Sascha Medina
Wilmington, NC



Georgia Morgan
Cary, NC



Mykel Yancey
Louisburg, NC

COLLABORATORY ADVISORY BOARD

Al Segars, Chair - PNC Distinguished Professor of Strategy and Entrepreneurship and Faculty Director of the Center for Sustainable Enterprise, Kenan-Flagler Business School

Anita Brown-Graham, Professor of Public Law and Government, School of Government

Jaye Cable, Senior Associate Dean for Natural Sciences, Professor, Institute of Marine Sciences

Greg Characklis, W.R. Kenan Jr. Distinguished Professor, Environmental Sciences and Engineering

Don Hobart, Associate Vice Chancellor for Research

Mark Little, Executive Director of CREATE, UNC Kenan Institute of Private Enterprise

Rick Luetlich, Professor and Director, Institute of Marine Sciences

Mike Piehler, Director, UNC Institute for the Environment

Nate Knuffman, ex-officio member, Vice Chancellor for Finance and Operations



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