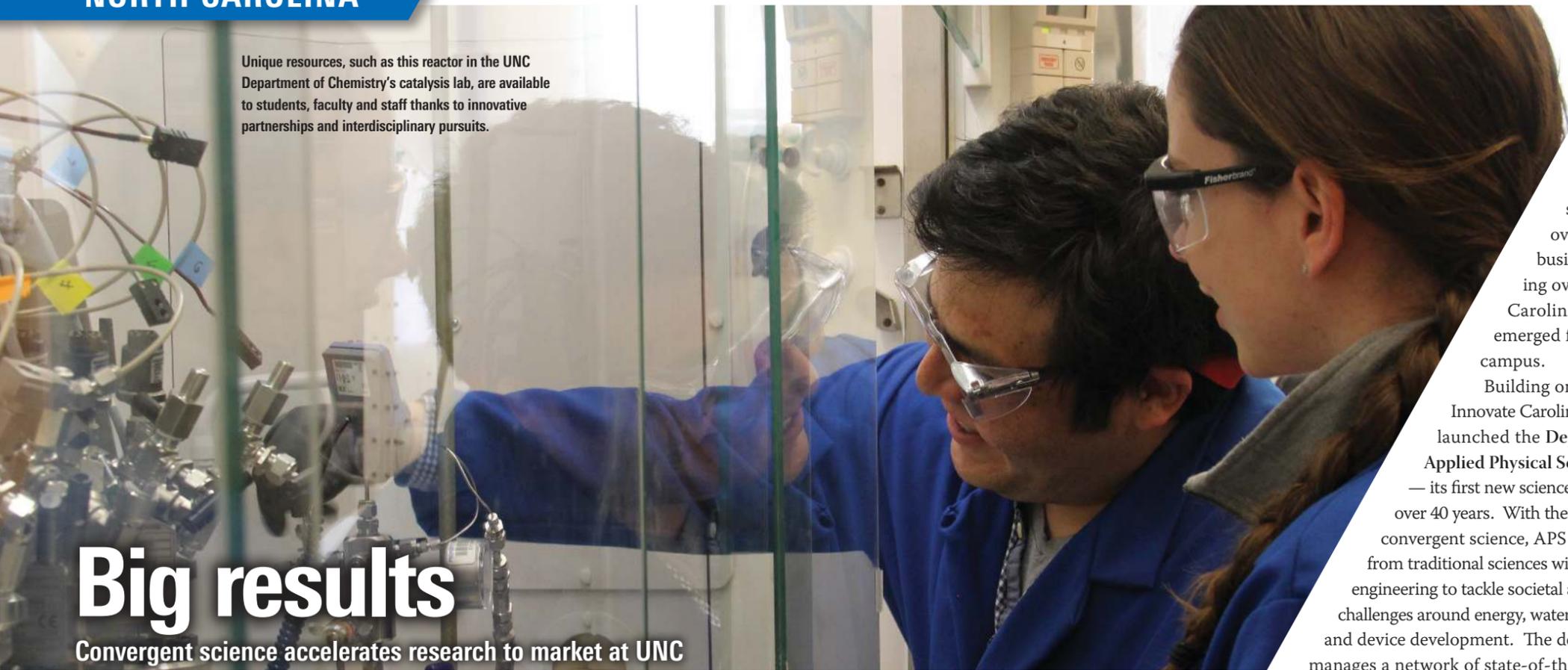


Unique resources, such as this reactor in the UNC Department of Chemistry's catalysis lab, are available to students, faculty and staff thanks to innovative partnerships and interdisciplinary pursuits.



Big results

Convergent science accelerates research to market at UNC

What if nanotechnology could be used to extract minerals from water so effectively that mining became obsolete? What if it could also offer a low-cost solution to water scarcity all over the world?

Addressing a need that affects over 1.8 billion people worldwide, a team of polymer chemists, computational modelers and engineers at the University of North Carolina at Chapel Hill is developing an innovative membrane-based water purification tool that can safely remove a broad range of water contaminants. This novel technology is more energy-efficient and holds promise for large-scale, affordable production.

The project, led by UNC's Applied Physical Science Professor Theo Dingemans, and joined by scientists from Applied Mathematics and the Gillings School of Public Health, is one example of how Carolina is investing in convergent science — using its research strengths to produce practical new technologies, new businesses, and answers to society's most complex challenges.

> A bold approach

With a reputation for cutting-edge science, Carolina ranks as the nation's 11th largest research university. Much of its science is discovery-driven. From biologists studying how cells repair DNA damage, to marine scientists studying forces behind

hurricanes that impact coastlines, it involves the careful study, within specific disciplines, of how the world works. Over time these discoveries accumulate, yielding new treatments for cancer, or better disaster plans to save lives and property.

Convergent science flips this model on its head. It starts by identifying problems to be solved and relies on transdisciplinary teams with diverse perspectives to engineer tailored solutions. It represents a radical departure from traditional discipline-based science and a foray into problem-focused collaboration. Its focus on practical outcomes and commercially viable solutions is powering breakthroughs in fields like neuroscience, nutrition, precision health and energy.

> Investments in innovation

Over the past decade, Carolina has steadily increased its emphasis on convergent science. A strategic planning process begun in 2010 gave rise to **Innovate Carolina**, a comprehensive network of programs that translate UNC's research and entrepreneurial spirit into technologies, business ventures and inventions. Led by the Vice Chancellor for Innovation, Entrepreneurship and Economic Development, Innovate Carolina has fostered a campus-wide entrepreneurship culture, with coursework and programs, startup support, business incubator space, seed funding competitions, patent navigation services and access to

venture capital. UNC's impact in this area has been impressive. Since 1958, over 300 active businesses employing over 8,000 North Carolinians have emerged from Carolina's campus. Building on the vision of Innovate Carolina, in 2013 UNC launched the **Department of Applied Physical Sciences (APS)** — its first new science department in over 40 years. With the goal of driving convergent science, APS fuses expertise from traditional sciences with principles of engineering to tackle societal and technology challenges around energy, water, material science and device development. The department also manages a network of state-of-the-art campus makerspaces known as **BeAM (Be a Maker)**. These

new technology-rich studios provide students and faculty access to 3-D printers, electronics, wood and metal working and digital fabrication tools, allowing them to design, develop and test prototypes of their ideas and inventions.

UNC's most recent investment in convergent science comes from the Vice Chancellor for Research. The office's recently launched **Creativity Hubs** awards program is an annual competition that awards up to \$500,000 to successful "Hub teams" — project-specific collaborations of scientists working across disciplines to tackle complex grand challenges. Dingemans' water purification project is one of two teams selected for

awards this year. The Creativity Hubs support will help position it for external funding, investment and industry partnership.

> A new home for convergent science

Until this past year, UNC's emphasis on convergence science has been relatively quiet — known on campus among faculty and students, but less visible to the North Carolina public. But that is rapidly changing.

In October, UNC announced it will use private donor funds to create an **Institute for Convergent Science**. The Institute will be housed in a major new building in the Carolina physical sciences complex, located in the heart of campus. Rather than being the domain of a single scientific discipline, it will provide a home for diverse and fluid teams of faculty, students, industries and entrepreneurs who assemble to tackle and solve grand challenges. It will provide collaborative and entrepreneurial research space, meeting rooms, support services, and offices for visiting entrepreneurs and industry scientists. All of this activity will take place in a physical environment designed to promote the transdisciplinary collisions that lead to creative problem-solving.

The new Institute for Convergent Science will be a highly visible keystone for Carolina's strategic investments in convergent science — another way UNC research is serving North Carolina, and changing the world.



RESEARCH

UNC Chapel Hill
Office of the Vice Chancellor for Research
Chapel Hill, NC
Research.unc.edu

