

UNC INSTITUTE FOR CONVERGENT SCIENCE

• the CAMPAIGN for CAROLINA •



**“Carolina was the first model for public higher education in America, and we can do it again. We will tap the power of intellectual centers across the country while at the same time serve as the home for a new way of translating research for the betterment of society.**

**The UNC Institute for Convergent Science will be at the heart of that vision, giving proven convergent thinkers both here and around the globe the tools and space they need to harness the tremendous amount of talent at their disposal. The opportunity is to take that talent and channel it into impact that makes a true difference in the real world.”**

**— Chancellor Carol L. Folt**

# ***Institute for Convergent Science***

**University of North Carolina at Chapel Hill**

***In this century, successful universities will be those that leverage scientific expertise to improve people’s lives. With the Institute for Convergent Science, Carolina will lead them.***

***The Institute gives us the opportunity to build something new, to discard outdated, ineffectual ways of thinking and doing.***

***We will erase barriers and converge knowledge.  
We will synthesize information and clarify solutions.  
We will translate research into impact.***



**“I pledged to be strategic, bold and student-focused when I became dean. The UNC Institute for Convergent Science is all of the above: a place ready to break down silos, take on the world’s grand challenges, and integrate research and teaching for maximum student benefit.”**

**— Kevin M. Guskiewicz,  
Dean of the College of  
Arts & Sciences**



# Silos No Longer Work

**To solve the world's most recalcitrant problems, universities must join forces across scientific disciplines.**

**Carolina recognizes this reality.  
Carolina embraces this reality.**

Our Science Complex, part of the most ambitious building program in our 222-year history, has brought together chemists and computer scientists, physicists and materials experts.

But the complex remains unfinished, and for good reason. We have saved the final site to build the culminating piece of this vision at the University of North Carolina at Chapel Hill: the UNC Institute for Convergent Science. Here, we will ask "what if" questions.

- + What if 3-D printed lab-on-a-chip technology could rapidly identify water-borne toxins?
- + What if polymer composite aircraft wings could be as light as feathers?
- + What if a biomarker could predict whether an athlete will develop degenerative brain disease?
- + What if a new catalyst enabled sunlight to split water into hydrogen and oxygen on an industrial scale?
- + What if new membrane materials enabled global water desalination?

**We will do more than ask questions.  
At the Institute, we will answer them,  
for the betterment of the world.**

“95 (41%) of the 231 funding opportunities published within the past year include the word interdisciplinary.” And more generally, “convergence of the life sciences with fields including physical, chemical, mathematical, computational, engineering, and social sciences is a key strategy to tackle complex challenges and achieve new and innovative solutions.”

Research Council Committee on Key Challenge  
Areas for Convergence and Health (2014),  
Division on Earth and Life Studies

“Real-world problems can no longer be solved by a single faculty member, working alone within the tradition of a single discipline. Today it takes a diverse team. Carolina is known for fostering collaboration. **Thirty percent of its extramural research funding currently supports projects with faculty investigators from more than one of its schools.** Our challenge is to do even better.”

Making Carolina's Best Even Better, Progress  
Report of the 21st Century Visioning  
Committee “Using Research to Solve the  
World's Problems,” May 21, 2013

# Speeding up the Impact of Innovation



✕ Edward T. Samulski



✕ Joseph M. DeSimone

For the past 25 years, 3-D printing technology has remained limited in that objects must be built or printed one layer at a time.

But a fundamentally new approach — developed by a Silicon Valley startup and UNC researchers — enables objects to rise continuously from liquid media.

Carbon's new technology enables ready-to-use products to be made 25 to 100 times faster than other methods and creates previously unachievable geometries that open opportunities for innovation not only in health care and medicine, but also in other major industries such as automotive and aviation.

Carbon was cofounded by Joseph M. DeSimone, Chancellor's Eminent Professor of Chemistry at UNC; Alex Ermoshkin, chief technology officer at Carbon; and Edward T. Samulski, Cary Boshamer Professor of Chemistry and chair of the UNC Department of Applied Physical Sciences.

# Culminating A Series Of Transformative Investments

The Science Complex, started in 2004, now boasts five interconnected buildings and includes nearly half a million square feet of current, expanded, and new space. The project cost \$250 million, with \$22 million coming in private gifts. It is home to the departments of chemistry, computer science, marine sciences, mathematics, and physics and astronomy in the College of Arts and Sciences, as well as the Institute for Advanced Materials,

Nanoscience and Technology. The complex forms an epicenter where scientists from across campus and disciplines come together to innovate and collaborate, where faculty and students share high-tech laboratories and classrooms.

***The groundwork has been done. The moment for the Institute for Convergent Science has arrived.***

***In 2013, the College of Arts and Sciences launched a highly innovative initiative in applied sciences to leverage our scientific expertise:***

- + The departments of applied physical sciences (APS) and biomedical engineering (BME) are the first new science departments in the College of Arts and Sciences in more than 40 years. APS transcends traditional scientific boundaries, bridging chemists with applied mathematicians with physicists and biologists to work on the most critical problems of the era. BME, a joint department with UNC's School of Medicine and N.C. State University's College of Engineering, offers both undergraduate and graduate programs. APS is a separate academic unit that transcends traditional scientific boundaries, bringing together interdisciplinary researchers to work on the most critical problems of the era.
- + BeAM (Be a Maker), the University's new MakerSpace network, enables students and scientists from all departments to build custom machines and instrumentation to serve their research. It empowers the UNC community to imagine, design and create things that solve, fascinate and inspire.



✕ Jeff Powell

# Helping Hand In 3-D

Jeff Powell '15 has built things for as long as he can remember. As a UNC biomedical engineering major, he applied that interest to help 7-year-old Holden Mora of Chapel Hill, who was born without fully formed fingers on his left hand. Using a 3-D printer, Powell developed a prosthetic hand for Holden. Now he's tying his shoes and swinging a baseball bat like most other boys his age.

Since graduation, Powell has launched the Helping Hand Project, which revolves around the idea of using 3-D printing technology to help create affordable prosthetic hands that are donated to children with disabilities.

## DELIVERING CARE Not Pain



✕ Katie Moga

While earning her Ph.D. in chemistry at UNC, Katie Moga used microneedles — projections big enough to break the skin, but small enough to not be felt — to help develop Band-Aid-like patches to painlessly deliver medication. She now works to deliver chemotherapy via microneedles to fight breast cancer. Along with sparing patients from pain, the method produces fewer harmful side effects than an IV.

Moga, who received her Ph.D. in 2015, epitomizes the type of student who will be supported by Institute fellowships.

# An Investment That Matches The Scale Of Our Ambitions

*The Institute for Convergent Science faculty and students will take on the world's most pressing problems.*

*To ensure their work translates into impact, all participants will have access to a privately funded organization, FASTER, LLC, that will link them to high net-worth individuals/investors out in the marketplace.*

## **Infrastructure Endowment:**

- + Funds to hire five new faculty per year (up to 25 hires over five years) to work collaboratively in the Institute and across multiple disciplines and departments at UNC, including Applied Physical Sciences.
- + Salary and start-up funds for the Institute director and associate director
- + Salary funds for five support staff
- + Faculty and graduate student research opportunities in Silicon Valley — “Carolina West”

- + Prestigious by-invitation-only faculty fellowships offered annually to six UNC faculty and six visiting faculty partners, who will team up to tackle the greatest obstacles to translating nanotechnology, materials science, and neuroscience technologies into practical applications
- + Prestigious by-application-only fellowships for 12–14 emerging scholars per year, awarded to graduate students, interns, and postdocs

## **Building Fund:**

The Institute for Convergent Science building will be designed from the ground up to support a culture of collaboration and innovation on campus. As the final piece of the Science Complex, the new building will be ideally located along the corridor connecting the academic affairs/life sciences and the health affairs/biomedical sciences.

Eventually, the building will house some 45 faculty members, and more than 100 graduate students, research fellows, and research technicians. One floor will be devoted primarily to technology transfer and incubator space for UNC faculty researchers. The building also will become the home of the applied physical sciences department.

*Our best chance is their*

*opportunity*





# Together We Will Lead The Way

**The investment in the Institute for Convergent Science will be returned many times over, on campus and far beyond. The impact:**

***Commercializable scientific research.***

As a dedicated entity, the Institute will be positioned to advance research that holds the most promise to produce results, seizing the critical moments in science when discoveries can be commercialized. New start-ups will emerge, creating jobs and wealth while making a difference in the world.

***Enriched funding opportunities.***

Federal agencies have identified applied interdisciplinary science initiatives as their top priority and earmarked increasing levels of funding for them. Universities organized for convergence will be the greatest beneficiaries — and the Institute for Convergent Science will place Carolina at the forefront.

***Climate of technological innovation.***

The Institute will incubate not just new companies but a spirit of collaboration that raises the intellectual climate of the entire campus. When researchers collaborate, students learn

to collaborate, and the effect is contagious. Successful new commercial ventures introduce new innovators and philanthropists to Carolina, expanding the University's network of supporters and enhancing the state's reputation as a center of innovation.

***Integration of research and teaching across existing disciplines.***

In addition to consolidating faculty expertise, the Institute for Convergent Science will promote flexible curricula to educate students across disciplines, balancing theory and experimentation to create a unique learning environment.

“NSF (National Science Foundation) would strategically support research projects and programs which are motivated by intellectual opportunities and/or important societal problems, and which would benefit from the convergence of (subsets) of physical sciences...”

*Science Magazine, 5/2/2016*

**The Institute will bring together great people to do great things, for the good of us all.**

FOR NOW

FOR NEW

FOR NEXT



## The University of North Carolina at Chapel Hill is a place like no other.

It's a place built from a public mission, propelled by a shared desire and unafraid to fight for a better future. We come together to make the world a better place for all.

The Institute for Convergent Science epitomizes that mission. With you, we will have what humankind needs.

The world is listening. What will you say next?

For all that's now, for all that's new, for all that's next.

For everyone today and in the future, join us in the next step for all kind.

To learn more about how you can support the Institute for Convergent Science and the Campaign for Carolina, visit [campaign.unc.edu](https://campaign.unc.edu).





THE UNIVERSITY  
*of* NORTH CAROLINA  
*at* CHAPEL HILL

FOR  
**ALL**  
KIND

*the*  
CAMPAIGN  
*for*  
CAROLINA