

# Chemistry & Chemical Biology News

## Building Groundbreaking Launches A New Era of Chemistry Research & Education

**R**utgers University will break ground this Spring on a new state-of-the-art science building on the Busch Campus to serve the students, faculty, external partners and staff of the Chemistry and Chemical Biology (CCB) Department.

"CCB is a national leader when it comes to educating chemistry students at all levels as well as securing federal funding for research that is vital to many technology-based industries," said CCB Professor

Alan Goldman. "We are very excited about the future of the chemistry program at Rutgers because the infrastructure commitment enhances our ability to educate students and advance research that creates the materials and products of everyday life, from the invention of new synthetic polymers to innovations in health care and energy."

The \$115 million, 130,000-square-foot signature research and teaching facility will complete construction in 2016 and be located just north of the depart-

ment's principal site, the Wright-Rieman Chemistry Complex.

"Chemistry is really the cultural gateway to the sciences," said Professor Jean Baum. "The new building reaffirms the university's commitment to serving the needs of STEM education—science, technology, engineering and mathematics—as well as the essential role and impact of chemistry in a modern research and teaching university of Rutgers' caliber."

continued on page 6

**WINTER 2014  
VOLUME 15**

This newsletter is published for alumni and friends by the Department of Chemistry and Chemical Biology Rutgers, The State University of New Jersey  
610 Taylor Road  
Piscataway, NJ 08854

For questions or suggestions, please contact:

Roger A. Jones, Chair  
Phone: 848/445-1554  
Email: [chemchair@rutgers.edu](mailto:chemchair@rutgers.edu)  
Web: [chem.rutgers.edu](http://chem.rutgers.edu)

Coordinator: Karen Fowler  
Faculty Liaison: Eric Garfunkel  
Writer/Editor: Fred Feiner



An artist's rendering of the new CCB building.

## Establishing A Cutting Edge Infrastructure

**Welcome to the Winter 2014 edition of Chemistry & Chemical Biology (CCB) News,** our special issue on the new building planned for the department. We hope to break ground on the new facility by Spring 2014.

As many of you are aware, the department's current facilities have not kept up with the cutting edge research and education that has become the hallmark of CCB. Faculty, students, and industry partners have long contended with aging conditions, as well as power outages and leaks—constant reminders that the existing structures cannot accommodate the modern techniques and equipment so critical to advancing chemistry.

Rutgers needs to invest in new chemistry facilities—labs, classrooms, and common areas

designed to foster and enhance research, collaboration and education, and attract leading scholars and students. Seventy-five percent of our peer institutions have taken this step in the last decade. Our faculty and staff are proud of the fact that CCB has continued to provide world-class education and research programs while coping with the facilities challenges.

But growth of the student population—the number of students in Rutgers chemistry courses has risen from 4,800 to 7,200 per semester in the last six years—and the realization that our research and recruitment programs would suffer if the facilities were not modernized have brought us to this exciting period in time.

By passing a critical higher education bond issue in Fall 2012, New Jersey voters demonstrated their support for improving our facilities—a clear and powerful mes-

sage, particularly in these difficult economic times. It is important to remember, however, that the bond is designed to cover the “bricks and mortar” for the new building. Additional funding is needed to transform it into a truly premier research facility, one capable of supporting modern chemistry research agendas, both now and long into the future.

We are counting on our alumni and friends to support this valuable investment in the future of Rutgers and New Jersey. Please join us in getting behind this important endeavor as we prepare for the challenges that lie in front of us. I hope you enjoy the newsletter's inside look at our new home and we welcome your assistance moving forward.

Sincerely,  
Roger A. Jones  
Professor and Chair

Cris Pannullo



Flad Architects



## Designing an Iconic Science Building with the Future in Mind

The new Chemistry and Chemical Biology (CCB) building will be highly sustainable, seeking LEED (Leadership in Energy and Environmental Design) Gold designation for energy efficiency from the U.S. Green Building Council. The design of the facility is led by Flad Architects, a nationally recognized firm specializing in the planning and design of innovative facilities for higher education, science and technology. R. G. Vanderweil Engineers (MEP) and Langan Engineering (Civil) are part of the team and contribute to the sustainable design.

Flad Architects Project Designer Garrick Maine, AIA, LEED AP provides an inside look at the design of the iconic new CCB building in the following Q&A.

### Why is it significant that an educational facility of this type be designed with green principles in mind?

The reason is twofold. First, buildings in the U.S. account for about 40% of primary energy use, 60% of electricity demand and nearly 38% of total annual carbon dioxide emissions. Research laboratories represent a class of construction that uses far more energy, typically 5 to 10 times as much, and water per square foot than the average building due to increased equipment, process and ventilation demands. Because of their intense resource utilization, labs represent a special challenge and opportunity in sustainable design.

Second, as an academic building, the CCB facility provides Rutgers with an opportunity to visibly demonstrate its expressed commitment to environmental stewardship. As David W. Orr, chairman of the Environmental Studies Program at Oberlin College, points out, "Buildings have their own hidden curriculum that teaches us as effectively as any course taught in them."

Exploring sustainability within the higher education arena is important because of the impact colleges and universities make on the economy, the environment, and community. Campuses represent an enormous investment in building stock and land. The actions universities take in building and maintaining that stock are important to the environmental health of the broader society. Even more importantly, colleges and universities in the U.S. teach 14.5 million students each year, and the lessons they teach will play a critical role in helping shape a more sustainable future.

### What are some of the green design elements that will be utilized in the new building?

The building's landscape development is designed to encourage biodiversity and maximize water conservation. To the greatest extent possible, native plant species will be used and no potable water will be used for irrigation. All landscape development adheres to the Rutgers Stormwater & Landscape Management Masterplan. Stormwater runoff for the north-

ern half of the site is being directed to a new bioretention area.

Attention to a building's orientation and its placement on the site can impact energy performance. The CCB's long, narrow footprint, aligned along an east-west axis, and its predominantly north facing glazing reduces internal solar heat loads while maximizing desirable daylighting and outdoor views. Selection of a spectrally selective, low-emissivity (low-e) glass and a high reflectance, ENERGY STAR compliant roof membrane further reduces the solar heat gain.

The building's structure is primarily concrete, with some steel. Steel produced in an electric arc furnace is typically composed of 90% recycled materials and is itself recyclable. Concrete reinforcing is also almost entirely composed of scrap metal. Concrete has the advantage of being composed largely of materials produced locally, which has the benefit of reducing energy expended in transportation.

The building systems that provide ventilation, air-conditioning, water and lighting represent the largest area of opportunity for green laboratory design. Among the many efficiencies that will be achieved in this area are:

- Utilization of the most advanced air handling systems available today will target labo-



Flad Architects' Garrick Maine, AIA, LEED AP

continued on page 4

**DESIGN**

continued from page 3

ratory ventilation energy demand, which can account for as much as 30% to 50% of a laboratory's total electricity usage.

- Provision of heat through a nearby high temperature hot water cogeneration plant.
- Centralized lighting controls, maximizing natural lighting and daylight dimming will be used to manage electricity use. Automatic lighting controls will not be used in areas where automatic lighting control could pose

a threat to the safety of occupants, such as certain laboratory spaces.

- The building exhaust system is comprised of two large energy recovery units. These are custom fabricated units that will provide sensible recovery as high as 90 percent of the available energy.

**Will the building be using recycled materials?**

There is no opportunity to reuse an existing building and little realistic, cost-effective opportunity for the use of salvaged and/or reused building materi-

als. However, significant opportunities exist to incorporate recycled content building products. While specific product selections have yet to be made in many instances, major sources of recycled content materials include: nearly all ferrous metal products (i.e. steel structure, metal studs, metal doors and frames, metal wall panels, and hardware), blanket insulation, acoustic ceiling panels, resilient sheet flooring and carpeting, synthetic gypsum board, and some composite wood products like particleboard and medium density fiberboard.

## State Commissioned Artwork to be Featured at CCB

The new CCB building will feature commissioned artwork that reflects the discipline of Chemistry and the varied work and research being conducted by the department without being too literal. By early 2014, Rutgers expects to request proposals from a handful of artists selected by the Chemistry Building Arts Inclusion Committee and state officials.

The artwork, which will be created and designed to enhance the exterior of the building site and/or to enhance the interior lobby space, will be the 12th art project at Rutgers New Brunswick/Piscataway campus funded under the New Jersey Arts Inclusion Program. Visit the following website to view the existing collection of public sculpture at Rutgers: <http://nb.rutgers.edu/visit-us/discover-our-public-sculpture>

Since the passage of the Arts Inclusion Act in 1978, this program has led to the commissioning and installation of

hundreds of artworks in state financed construction projects. Under the law, up to 1.5% of the state-funded portion of the construction budget is dedicated to art. The New Jersey State Council on the Arts will manage the artist selection process and monitor the CCB projects in collaboration with Rutgers faculty and staff and

Flad Architects.

The timeline for the development of the art project will be independent of the building's construction schedule. For more information on the project, please contact Rutgers Senior Landscape Architect Lawrence Porter, ASLA, LLA at [laporter@facilities.rutgers.edu](mailto:laporter@facilities.rutgers.edu) or 848/445-2520.



Nick Romanenko

An abstract human figure in motion created by Ralph Helmick at the Biomedical Engineering Building. Signal is the most recent sculpture at Rutgers created through the New Jersey Arts Inclusion Program.

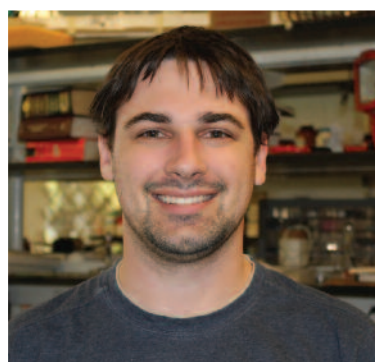
## Students Look Forward to New Science Hub for CCB

The new Chemistry building will offer many benefits to students when it opens its doors in 2016, ranging from smart classrooms to collaborative spaces to state-of-the-art labs. Both graduate and undergraduate students are looking forward to the new facilities.

"The building will not only serve as a means for Rutgers students to continue conducting groundbreaking research in their respective fields, but will provide a more collaborative environment," said Allison Faig, President of the Rutgers Chemistry Graduate Student Association. "The field of chemistry is becoming more interdisciplinary and this collaborative atmosphere will allow for students to learn techniques and ideas from different areas of chemistry, providing them with diverse experiences and a more well-rounded education to prepare them for their future endeavors."

Rutgers Chemistry Ph.D. candidate Paul F. Smith agrees.

"Arguably, graduate students have the most to benefit from a new chemistry building at Rutgers," Smith said. "As someone who works full time on synthesizing pure materials and running experiments under carefully controlled conditions, a state-of-the-art research facility would greatly improve the work environment. It's not a coincidence that most highly regarded research universities have modern, high-tech chemistry resources, so it's pleasing to see Rutgers commit to developing a new building."



Students (clockwise from upper left) Allison Faig, Emily Buginsky, Paul F. Smith and Chris Kaplan.

Other planned features in the new building include ground level core facilities, a new auditorium, class 100 chemistry clean room, x-ray crystallography laboratories, microscopy suite and laser, mass and NMR spectroscopy laboratories.

The new environment has even recent graduates like Chemistry Class of 2013 graduate Emily Buginsky excited about the future.

"I think the new building is great; I am actually jealous of the future chemistry students!" said Buginsky, who is now a student in the Rutgers Graduate School of Education. "As always, it's a little sad because I have many fond memories as an undergrad in the chemistry

building, but now new undergrads can make their memories. The building is being designed with extensive student input and will function better and inspire other students to get more involved with lab work and chemistry."

"It's definitely an exciting time to be studying and researching chemistry at Rutgers," added undergraduate student Chris Kaplan, a senior graduating in May. "Rutgers has always been one of the best universities in the country for students interested in chemistry and science. Future opportunities to take part in discovery, innovation and industry collaboration are just getting stronger every day."

*Future opportunities to take part in discovery, innovation and industry collaboration are just getting stronger every day.*







Flad Architects

CCB large research laboratories will be flexible and reconfigurable as scientific needs change.

### GROUNDBREAKING continued from page 1

The growing STEM demand is driven by America's technology based economy that emphasizes education in related disciplines. The chemical industry employs more than 1 million U.S. workers directly, generates trillions of dollars yearly in revenue, and is responsible for over 10 percent of exports. New Jersey has the largest concentration of chemical industry research, development, and production in the nation, with direct employment of over 60,000 and more than \$1 billion in state and local tax contributions.

"We are creating a signature science building for Rutgers University that will help serve the increasing student demand for Chemistry educational programs and result in a better-trained workforce," said Professor Eric

Garfunkel. "The building will emphasize collaboration, which is key in today's world of scientific discovery. Combining instructional spaces, flexible research laboratories, state-of-the-art core facilities and multiple common areas will support an interdisciplinary science environment."

Facilities will feature new smart classrooms and collaborative spaces that will enable modern teaching tools and methods strengthening the mentoring and training of Rutgers undergraduate and graduate students. Core facilities will include a microscopy suite, as well as laser, mass and NMR spectroscopy laboratories, x-ray crystallography laboratories, and a class 100 chemistry clean room.

Large research laboratories will be flexible, with space, equipment, and furnishings reconfigurable as scientific needs and research teams evolve. Equally

important, specialty rooms will meet the particular needs of instrumentation that require high vibrational, thermal, humidity and/or electromagnetic field stability. The design of space, light, and pedestrian flow will optimize interaction and productivity for faculty, students and external partners from both academia and industry.

"Today's modern scientific methods rely on critically sensitive tools that require extremely stable environments to function properly," said Associate Professor KiBum Lee. "We are very excited about the future of chemistry research at Rutgers because the unique requirements of each research endeavor is being incorporated into the new building's design. It is impossible to predict what tomorrow holds, but we will have the infrastructure in place to meet any challenge."

*"Today's modern scientific methods rely on critically sensitive tools that require extremely stable environments to function properly."*



# THE FUTURE OF CHEMISTRY

**RUTGERS**

School of Arts and Sciences



Flad Architects

## WE HOPE THE ENTIRE CCB FAMILY WILL CONSIDER SUPPORTING THE DEVELOPMENT OF OUR NEW HOME.

There are multiple opportunities for alumni and friends to support the new building with perhaps the most significant being a variety of naming opportunities from our new lobby and auditorium to several centers and innovation zones, including a Drug Design Center, an Energy Institute, an Imaging Center, a Sustainable Chemistry Institute, a Chemical Biology Laboratory, an Organic Microfab Cleanroom, and a Bio-nanochemistry Suite.

Institutions interested in learning more, should contact Paul Mouravieff, Director of Development, at 848/932-2351 or [pmouravieff@winants.rutgers.edu](mailto:pmouravieff@winants.rutgers.edu); individuals should contact Emily Miller-Gonzalez, Director of Development, at 848/932-6455 or [emiller@sas.rutgers.edu](mailto:emiller@sas.rutgers.edu).

**OUR RUTGERS**  
**OUR FUTURE**  
 A CAMPAIGN FOR EXCELLENCE



# RUTGERS

Department of Chemistry and Chemical Biology  
Rutgers, The State University of New Jersey  
610 Taylor Road  
Piscataway, NJ 08854

Non-Profit Org.  
U.S. Postage  
PAID  
New Brunswick, NJ  
Permit No. 157

## Breaking Ground SPRING 2014

Watch your mail for a special groundbreaking ceremony this Spring for the new CCB building. We will be hosting a special event to commemorate this historic department milestone and hope the entire CCB family of alumni and friends will be able to join in the festivities. We also invite you to regularly visit <http://www.sas.rutgers.edu/cms/chembldg/> – a special website for our friends to stay up to date with building progress and to communicate with us to discuss how you can participate.



Flad Architects