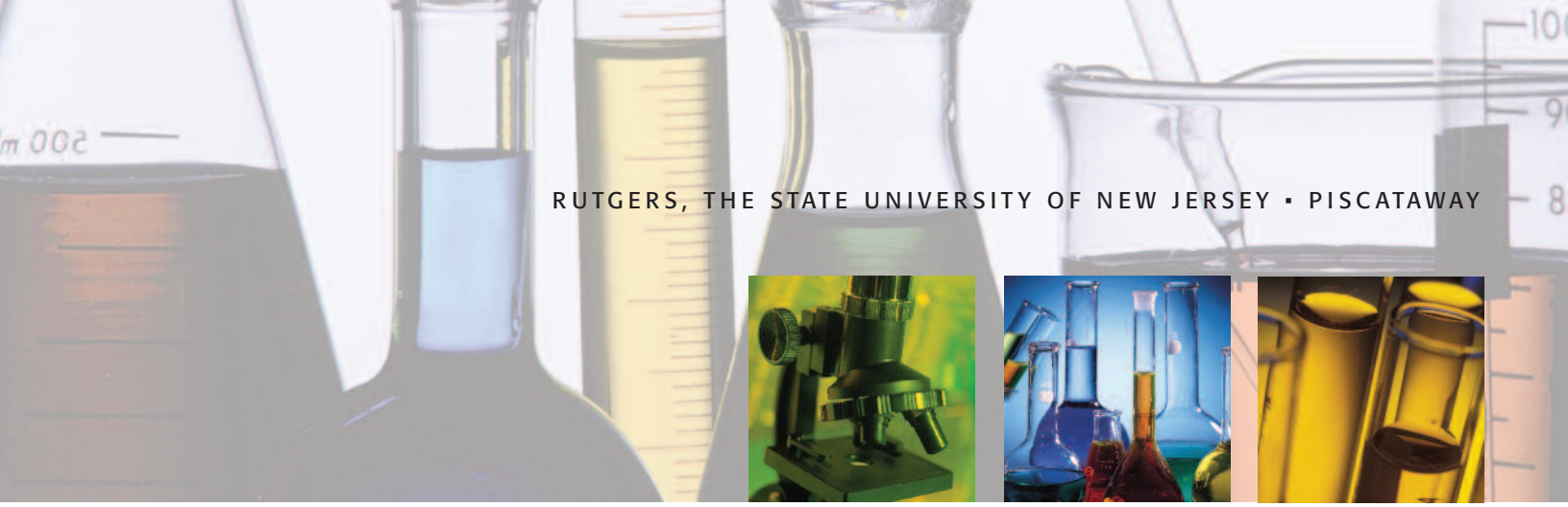

RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY • PISCATAWAY

Chemistry & Chemical Biology News

The Business of Chemistry

Paul Keimig credits former Cook College Dean Lee Schneider for helping set his future course. Back in 1984, when Keimig was a junior at Rutgers, he approached Schneider and shared his vision: he didn't want to major only in chemistry, he also wanted to study business. The two of them created a chemistry-with-business option, and Keimig ultimately used his knowledge of both to found Chemical Resources, Inc.

The 1986 graduate's first job was researching and developing specialty polyolefins for Union Carbide. While there, Keimig developed a geomembrane liner that prevents landfills from leaching waste into the groundwater, captures methane gas and allows the overlying land to be reused. Because of the liner's success, Keimig was able to move into technical sales.

When he took a sales job at Solvay Polymers, Keimig gained even more experience. He soon realized that if he took unstabilized resin and mixed it with an antioxidant at different locations throughout the country, he could deliver a better product than large companies, like Solvay. So, in May 1995, he concocted such a mixture in his garage, creating 100 pounds of product. Within a month he had taken orders amounting to a 10 million pound, $4 million business.

During that same month, the entrepreneur also saw opportunity in reprocessing materials. He approached the company that makes lemonene, the lemon-lime flavor used in many sodas. The process of creating the flavor can produce unusable material, which is discarded. Keimig purchased some of this discarded solution and sent it to a distiller, who fractionated it off into its two marketable compounds, lemonene and alcohol. "Within a day we made a profit of $0.72 a pound," Keimig recalls.

A third event occurred that auspicious month. Keimig's brother went to a reunion at the Hong Kong International School, which they had both attended. He met an alumnus who had a plant in China that used a resin to manufacture fiber. There were problems with the resin, and Keimig convinced the plant's owners they could increase output by using a different grade. They placed an order large enough to allow Keimig to quit his job and found Chemical Resources.

Keimig's company is now a global supplier of commodity and engineering resins, headquartered in Princeton. Part of Chemical Resources' success can be attributed to Keimig's willingness to explore new avenues, such as industrial recycling. "Lots of companies are looking to see how they can reduce their carbon footprints," Keimig points out. "It's where the market is."

One of his industrial recycling success stories involves the contact lens mold compound that Chemical Resources manufactures for Johnson & Johnson. Every contact lens produced uses two molds made from the compound, which are then discarded. The molds used to be landfilled, but two years ago Chemical Resources approached the company and said they could reprocess the material and turn it into

continued on page 8

Robert S. Horvath

Paul Keimig, CC'87, used his Rutgers education to found Chemical Resources, Inc.

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This newsletter is published for alumni and friends by the Department of Chemistry and Chemical Biology
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RUTGERS

The Protein Data Bank Marches On

Berman has been involved with the PDB since its inception in 1971, when it contained only seven structures. There are now more than 58,000.

Last summer, the National Science Foundation (NSF) approved continued funding for the management of the Protein Data Bank (PDB) through 2013 by the Research Collaboratory for Structural Bioinformatics (RCSB), of which Rutgers is the lead institution. The RCSB PDB is the archive keeper for the only global repository of information about the structures of large biological molecules, and it has been headed by Rutgers chemical biology professor Helen M. Berman since 1998.

Berman has been involved with the PDB since it's inception in 1971, when it contained only seven structures. There are now over 58,000. The database contains information that helps scientists understand how these molecules work in health and disease, and can also be used for drug development. But 40 years ago, not everyone saw the point of such an undertaking. "I remember thinking this was really, really important, and other people thinking this was really, really crazy," Berman told David N. Berol in a Chemical Heritage Foundation interview.

The Board of Governors professor's interest in this project grew out of her work as a crystallographer. After receiving her Ph.D. from the University of Pittsburgh, Berman became a researcher at the Fox Chase Cancer Center. Around that time, she worked with other scientists who also wanted to create some sort of archive. At a meeting on protein crystallography in 1971, a group of them informally presented their idea to Brookhaven National Laboratory's Walter C. Hamilton. He agreed to try to set up the project at Brookhaven. It was an idea whose time had come—the beginnings of the PDB were formally announced in the October 1971 issue of *Nature New Biology.*

Until 1975, funding for the PDB came indirectly, as part of another project. That year, the NSF approved funding for the data bank—and has supported the project continuously ever since, leading a federal funding consortium that includes the National Institute of General Medical Science, the Department of Energy, the National Library of Medicine, the National Cancer Institute, the National Institute of Neurological Disorders and Stroke, and the National Institute of Diabetes and Digestive and Kidney Diseases.

courtesy Helen Berman

CCB professor Helen M. Berman heads up the RCSB PDB

Over the years, the PDB has responded to the ever-changing practices and technologies of the scientific community. In the 1980s, the focus was on data sharing issues. This was partly due to the AIDS epidemic, as the National Institutes of Health wanted structures related to the virus to be available. Once again, Berman worked with committees of scientists who established guidelines for depositing structures to the PDB; these guidelines were published in 1989.

That same year, after two decades at Fox Chase working on nucleic acid crystallography and drug-nucleic acid interactions, Berman moved to Rutgers. She expanded her program to include protein crystallography and started working on the Nucleic Acid Database, a subset of structures found in the PDB. This led to the project of creating a much richer representation of all data in the PDB so that different kinds of analyses could be performed.

In 1998 Berman created the RCSB, a consortium that proposed building a new system to handle the ever-increasing data load. The RCSB, of which the University of California, San Diego is a partner, got the NSF contract that year, and became responsible for overseeing the PDB.

In 2003, the RCSB PDB joined forces with PDB Europe, PDB Japan—and eventually the Biological Magnetic Resonance Bank—to form the worldwide PDB (wwPDB). Berman was instrumental in forming this organization, which ensures that the structures contained in the archive will continue to be made freely available to the international community in a standardized format.

The current RCSB PDB systems allow users around the world to easily access a wealth of information at www.pdb.org. Berman explains that students, educators and scientists in fields such as biology, biochemistry, genetics, pharmacology, biophysics and bioinformatics can now access and download coordinate files, query the database about specific features, create reports about and access summaries of individual structures, visualize the structures using different tools, browse the database for information from other data resources and access educational materials for learning about molecules.

The outcome of the vision that Berman had almost 40 years ago has surpassed even her own expectations. She and many others have worked hard to create the PDB, and they continue to do so, ensuring that information on everything from minute proteins to complex molecular machines like the ribosome are available free of cost. And, Berman told in-cities.com, this work will extend well into the future: "New features and resources are continually being developed to support our broad community of users."

Back on Campus

As a Rutgers undergraduate, Joseph Marcotrigiano carried out research at the Center for Advanced Biotechnology and Medicine (CABM). In 2007, he returned as a Chemistry and Chemical Biology Assistant Professor. "It was weird to wrap my mind around the first year—I'm back in the same building, but now I have my own office, my own lab and my own grad student!"

Not only is the New Jersey native back in the same place, he's working in the same field—investigating protein structure. Marcotrigiano had initially wanted to do medically relevant research because he was thinking of becoming a doctor. He had heard of the work that chemistry professor Eddy Arnold was doing on the HIV virus, and though he knew that there were no openings in Arnold's lab, he was persistent. "I just kept showing up saying, 'I want to work with you.' I was a pain in the neck!" He eventually wore Arnold down and joined the team.

This exposure to research as an undergraduate helped Marcotrigiano decide to pursue a future as a scientist. After he graduated in 1995 as a Henry Rutgers Scholar with highest honors, the chemistry major went on to do graduate work in structural biology at The Rockefeller University in New York City.

It was professor Aaron Shatkin, head of CABM, who helped guide his research. Shatkin had pioneered the field of translation initiation of protein synthesis, and at Rockefeller, Marcotrigiano started working on one of the proteins that he had discovered.

Toward the end of Marcotrigiano's stint in graduate school, Charles M. Rice joined the faculty. His research involved RNA viruses, particularly the hepatitis C virus (HCV). Since HCV has a unique mechanism of translation initiation, Marcotrigiano was interested, and joined Rice's lab in 2000, after he graduated. He has been researching HCV ever since.

"HCV is a major human pathogen," he notes. "Throughout the world there are 120–170 million people chronically infected by the virus." In the United States alone, HCV infection results in 10,000–20,000 deaths a year. There is no vaccine, and the current treatment, which consists of pegylated interferon-alpha in combination with ribavirin, has many side effects and doesn't work in 30–50 percent of patients.

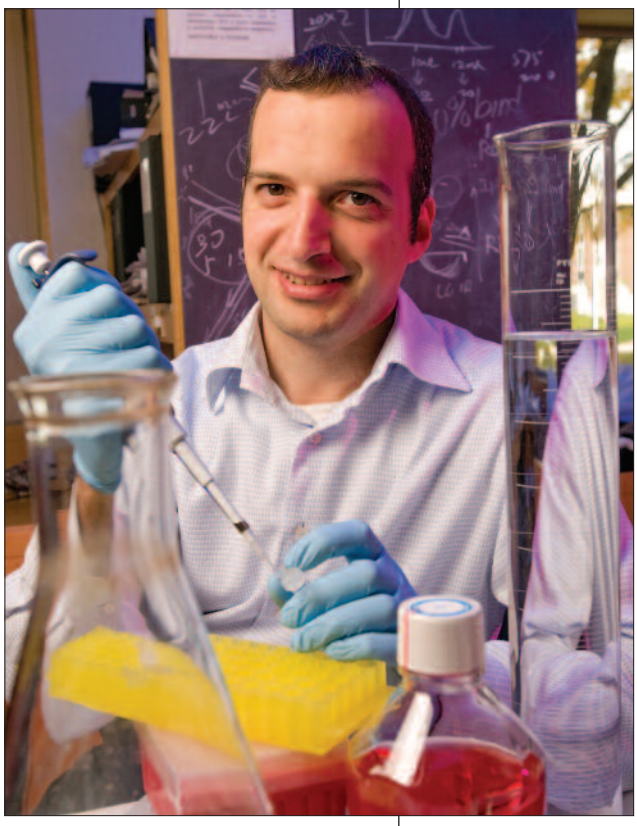
The problem with these drugs is that they don't target the virus. They simply boost the immune system, which can create flu-like symptoms. The treatment can also lead to depression. "So there really is a need to find inhibitors that specifically target HCV proteins, and it's also important to find a vaccine to reduce the spread of the virus," explains Marcotrigiano, who has spent the last eight years trying to help accomplish these goals.

Since 2007, his work has taken place in his lab at CABM. He ended up back at Rutgers after receiving an email from his old mentor Eddy Arnold, asking him to apply for a position. Before long, Marcotrigiano was back in New Brunswick: "I'd been looking for a new job and choosing Rutgers was a no-brainer for me. Everything just clicked."

Some of Marcotrigiano's recent research, in collaboration with scientists from the University of Washington School of Medicine and UT Southwestern Medical Center, was published in *Nature* in July 2008. They discovered that a cellular protein in the innate immune system (RIG-I) can recognize a specific region of the HCV genome and signal a certain gene (IPS-I) to sound the alarm to crank up the immune system. "But HCV is smart," explains Marcotrigiano. "What it does to combat this is to encode an enzyme that cleaves the IPS-I gene, basically shutting off the alarm signal."

Marcotrigiano is enthusiastic about his work and his return to his alma mater. "I've had a bunch of really great students," he says. "I even teach a class that I took—Physical Chemistry for Biochemical Systems." He makes sure his students understand the importance of medical research, telling them that he had considered medical school, but realized he could have a much larger impact on people's lives by doing research: "If I can contribute to a better therapy for HCV infection, even in a small way, I can have a positive effect on the lives of so many people."

And it all began in the CAMB building sixteen years ago. "If it weren't for Rutgers, I wouldn't have ended up on this road," notes Marcotrigiano. "I came here not knowing what I was going to major in and left having found my life's work."



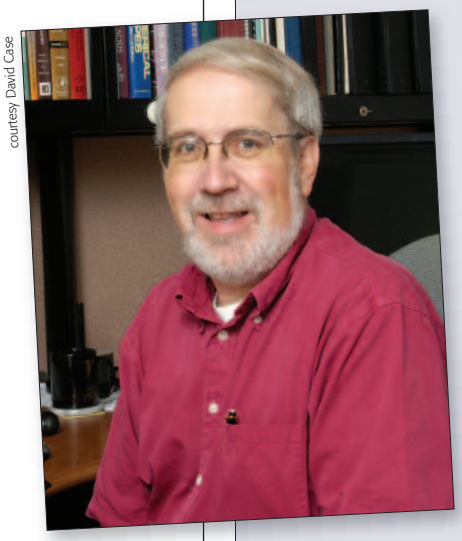
Nick Romanenko

CCB professor Joseph Marcotrigiano investigates the hepatitis C virus

FACULTY PROFILE **David Case**

Case Study

It was an organic chemistry textbook that set David Case on the road to being a scientist. He was in high school in Ohio when he saw an older friend's college text and thought it looked "really, really interesting." Case, who accepted a joint appointment in the BioMaPS Institute for Quantitative Biology and the Department of Chemistry and Chemical Biology last year, points out, "I didn't end up being an organic chemist, but I'm not too far away from that."



courtesy David Case

CCB and BioMaPS professor David Case is best known for overseeing the development of the Amber simulation programs

Case's path to his current position at Rutgers crisscrossed the country. After receiving a B.S. in Chemistry from Michigan State University, he headed east to Harvard University, where he received his Ph.D. in Chemical Physics. He then headed west, spending ten years as a chemistry professor at the University of California, Davis before moving to La Jolla to be a professor in the Department of Molecular Biology at The Scripps Research Institute (TSRI).

The lure of the world's largest independent non-profit biomedical research facility—not to mention the institute's beautiful seaside setting—kept Case at TSRI for over two decades. But last year, the Alfred P. Sloan Foundation Fellow decided it was time for a change. "First and foremost, I wanted to get back to teaching—TSRI had a small graduate program, and no undergraduates," he explains. "And nobody believes this, but I actually wanted to get out of the San Diego area."

Another reason for the move, he continues, was the "chance to collaborate more closely with all of the great people at Rutgers." He adds that at TSRI, which is a "very biological-based place," his work was at the more chemical end of the continuum. At Rutgers, his work is "more in the middle of the scientific continuum," which he likes. So it's safe to say that the Princeton resident is glad he made the move. "Rutgers—and the East Coast—are very new and promising environments," he declares.

Case's mid-continuum work is concentrated on the theoretical chemistry of biomolecules. In particular, he notes, "I'm trying to help the community develop methods of doing computer simulations that tell us about the properties of these molecules." Case's research includes molecular dynamics simulations of proteins and nucleic acids, electronic structure calculations of transition-metal complexes, developing and applying methods for nuclear magnetic resonance (NMR) spectroscopic structure determination, and computational drug design.

But perhaps Case is best known for overseeing the development of the Amber suite of programs for biomolecular simulation. "This involves people from many different places—mostly in the United States, but some from around the world—contributing to a common project," he explains. "And it's one of the accomplishments that I'm most proud of." The contributors add to computer codes that are used in over 900 academic, pharmaceutical and biotechnology labs to carry out molecular dynamic analyses.

Case has long enjoyed the computational side of chemistry. He notes that his older siblings work for IBM, so he had an idea of computers and what they could do from a fairly young age. He got involved with Amber back in the 1970s as an offshoot of his graduate work. Amber's original developer was at the University of California, San Francisco, only a few hours drive from UC Davis, where Case was a professor. So it was easy for him to get involved. "When you look back, everything seems planned," he says, "but it just happened, and then developed over many years."

Along with all his other endeavors, Case is glad to be doing more teaching. He points out that teaching graduate courses makes him have to do different types of work than he had been doing, so he too is learning. "It's working out well," he admits. "I haven't gotten tired of it yet!"

Despite the organic chemistry textbook that set him on his scientific path, Case thinks it's important as a teacher not to just repeat the contents of a book. "I like trying to make things that seem hard seem not so hard," he elaborates. "When I can explain a difficult concept to someone, beyond what a textbook can do, that is one of the real satisfactions of teaching."

Building Bridges

AN OUTREACH PROGRAM ON GREENHOUSE GASES AND GLOBAL WARMING

Global warming and climate change are recognized as being among the most important problems facing humanity today. Research in reduced-carbon energy sources is a national priority. With talk of rising temperatures, greenhouse gases, energy conservation and green technology infiltrating the popular media, most high school-aged students in this country are highly aware of global warming. But how many genuinely understand it?

With this in mind, a team of Rutgers students, under the leadership of Alan S. Goldman, initiated a new high school outreach program in the spring of 2007. The overlapping goals of this effort are to convey to the students an understanding of the causes of climate change, to challenge them to think independently about scientific problems and to expose them to the world of science beyond the walls of a high school classroom, from academic research to scientific careers. Working from global warming as a base topic, the Rutgers team has designed several related curricula that incorporate hands-on experiments, discussions of scientific principles and plentiful opportunities for direct contact between high school students and the Rutgers team members.

In order to tie together the concepts of global warming and gases, and to highlight aspects of university-level study, the Rutgers team has chosen to focus on carbon dioxide (CO_2), the single most critical greenhouse gas. CO_2 is also studied in biology classes and is very familiar to students even at the high school level. What makes CO_2 an especially satisfying choice for demonstration experiments is the opportunity to work with it in solid form as dry ice—a major crowd-pleaser among both high school students and faculty.

The Rutgers program is sponsored by the Center for Enabling New Technologies through Catalysis (CENTC), which is the first-of-its-kind Center for Chemical Innovation. Funded by the National Science Foundation (NSF), CENTC is spread over 15 major universities and national laboratories. The Rutgers outreach program is a pilot that is already being adopted at other CENTC member universities; with NSF support, it is hoped that it will ultimately spread nationwide.

Now in its third year, the program at Rutgers has expanded to encompass visits to three school systems: Highland Park, Westfield and New Brunswick, yielding a total of 16 classes of students in several scientific disciplines (standard and honors chemistry and environmental science). Co-directors David Laviska and Sarah Sparks personally instructed and met with approximately 350 students for the 2008-09 school year. With at least three additional school districts interested in the program and a variety of new projects in the pipeline, the Rutgers team will continue expanding to local high schools, as well as helping spread the program nationally by mentoring graduate students at other universities.

courtesy David Laviska

CCB professor Alan Goldman, graduate students Sarah Sparks and David Laviska and undergraduate student Bobby Spink during an outreach visit to Highland Park High School

—By David A. Laviska, Sarah Sparks, Keisha Stephen, and Alan S. Goldman

HIGHLIGHTS

CHEMISTRY GRADUATE STUDENT (GSA) ACTIVITIES

The Industrial Speaker Series

Hosted by the GSA throughout the fall and spring semesters, this series features Rutgers alumni from local industries who return to speak about their career paths. Speakers have included Zhijian Lu (Merck), Robert Ianiello (BASF), Brian Regler (Schering-Plough), Jennifer Albaneze-Walker (Schering-Plough) and Frank Gibson (Cornerstone Pharmaceuticals). With the help of the Northern New Jersey American Chemical Society (ACS) and Bill Suits, the series has been expanded to include a career development program. The GSA has worked closely with Suits and the CCB over the past year to make this program more thorough for the upcoming year.

The Annual GSA Lecture

The GSA resurrected this event in February, after a hiatus of more than ten years. The invited speaker was Robert S. Langer, Sc.D., of the Massachusetts Institute of Technology, a world-renowned scientist in the field of biotechnology and materials science. Undergraduate and graduate students met with him in three well-attended sessions that covered topics from research to career path to the commercial-

The ACS honored five Rutgers faculty and alumni for 50 years of membership.

ization of research. Professor Langer's lecture covered polymer chemistry, drug delivery, tissue engineering and more. This event was co-sponsored by the Northern New Jersey ACS, which presented Professor Langer as the 2009 Cecil Brown Lecturer and sponsored a post-lecture reception. Over 250 people from academia and industry attended the lecture and reception. The next Annual GSA Lecture will be delivered by Harvard University synthetic chemist Andrew Myers, Ph.D., on November 13.

— By Eric Klauber, Ashley Carbone and Sarah Sparks

RETIRED FACULTY AND ALUMNI NEWS

▪ CCB Professor **Robert Moss** was recently awarded a four-year grant from the National Science Foundation (NSF) for his proposal "Fundamental Chemistry of Diazirines and Carbenes." This grant marks 44 years of continuous funding from the NSF, beginning in 1965.

▪ The American Chemical Society (ACS) honored the following faculty and alumni for 50 years of membership: **Sidney Toby,** CCB Professor Emeritus; **Phillip E. Sonnet** (Ph.D., 1963, with Prof. Ronald Sauers); **Thomas M. Valega** (Ph.D., 1964, with Prof. Donald Denney); **John Vill** (Ph.D., 1963, with Prof. Donald Denney); **Hilton M. Weiss** (Ph.D., 1963, with Prof. Donald Denney).

STUDENT AWARDS

AWARDED DECEMBER 2008

Graduate Students

CHEMISTRY 171 TEACHING EXCELLENCE AWARD: Awarded to the most outstanding first-year teaching assistant in Chemistry 171 for the 2007–2008 academic year. **Brian Moore,** the winner, was awarded $100, while Honorable Mention went to **Vaibhav Doshi, Aniruddh Solanki** and **Prasad Subramaniam.**

RIEMAN PRIZE: Awarded for outstanding performance as a teaching assistant during the 2007–2008 academic year. Winners **Lisa Hurd, Lijuan Kang, Eric Klauber** and **Ramya Rao** each received a certificate and $500. **Renee Butler, Chandra De, Gary DiFilippo** and **Tian Sun** were awarded Honorable Mentions and each received a certificate and $100.

AWARDED SPRING 2009

Graduate Students

GRADUATE STUDENT EXCELLENCE AWARDS: Awarded for exceptional research performance. Each recipient received $1,500. Third year winners: **Chandra De** and **Alexander Reznichenko.** Fourth year winners: **Mohannad Abdo, Ashley Carbone** and **Chen Zhang.** Fifth+ year winners: **Sabuj Kundu, Michael Romanelli** and **Kuen-Phon Wu.**

EXCELLENCE IN LEADERSHIP AWARD: Eric Klauber was awarded $1,500 and **Sarah Sparks** was awarded $1,000.

Undergraduate Students

CRODA AWARDS: Presented for outstanding undergraduate activities. For Excellence in General Chemistry, **Alexander Harrison, Jennifer Jung, Lawrence Vaynerchuk** and **Tian Xia.** Each received a Croda briefcase and CRC Handbook. **Leonid Garber** and **Rima Rana** were named Outstanding Sophomores for Excellence in Organic Chemistry. **Andrew Morgan** was named Outstanding Junior for Excellence in Organic Chemistry Laboratory.

COURSEWORK AWARDS

Jared Reichenberg received The Rufus Kleinhans Award for Excellence in General Chemistry.

Mabel Mayorga received The Roger Sweet Award for Excellence in Organic Chemistry.

Eric Hagee received The Phyllis Dunbar Award for Excellence in Physical Chemistry.

Iraklis Pappas received The Ning Moeller Award for Outstanding Academic Achievement by a Chemistry Major in the Junior Year.

Brittany DeRonde received the ACS Analytical Division Award for Excellence in Instrumental Analysis.

Christopher Skalit received The Hypercube Award for Excellence in Chemical Physics.

Lauren Navallo received The Merck Award for General Academic Excellence and Research.

Krzysztof Wojtak received The Bruce Garth Award for General Academic Excellence and Research.

Robert Comito and **Aleksandr Rozenberg** received the Enzon Awards for Excellence in Chemistry.

CHEMICAL RESOURCES AWARD: Melissa Lash and **Daniel Weingard** received the award for Outstanding Research by Sophomores. **Bridget Huang, Marlena Koniezynska** and **Jonathan Seidel** received the award for Outstanding Research by Juniors. **Brittany DeRonde, Lauren Navallo, Aleksandr Rozenberg** and **Krzysztof Wojtak** received the award for Outstanding Research by Seniors.

CHEMISTRY SERVICE AWARDS

Luming Li received the Chemistry and Chemical Biology Award for Excellence in Community Service in Chemistry.

CHEMISTRY SOCIETY OUTREACH PROGRAM: The following students were recognized for their participation in the Rutgers Chemistry Society's Chemistry Connections Outreach Programs in the fall of 2008: **Steve Bagienski, Robert Comito, Carolyn Fox, Leo Garber, Han Ah Gil, Andrew Harrison, Kein Huang, Holly Johnson, Han La Lee, Tsz Kwok, Li Luming, Vladimir Lokshin, Roman Obolonskiy, Christine Perez, Priyanka Vijay** and **Zhang Xiao.**

DEGREES CONFERRED

MAY 2008

Ph.D.

Partha Ghosh, "New Methods and Strategies Towards Total Synthesis: (S) Dihydroerythronolide A"
Advisor: L. Williams

Michelle Johnson, "Polyanhydride Blends as Drug Delivery Matrices to Control Biofilms, Bone, and Nerve Regeneration"
Advisor: K. Uhrich

Karen Steege, "Fluorescence Probing of Complex Solvent Environments: Aggregates of Polymeric Nanocarriers and Rilpivirine"
Advisor: E. Castner

Xiongying Tu, "Structural Studies of HIV-1 Reverse Transcriptase Resistance to AZT via ATP-Mediated Pyrophosphorolysis"
Advisor: E. Arnold

M.S. (with thesis)

Walter Won, "Arabinofuranose I-Deoxy-B-L-C-Sulfonic Acid"
Advisor: S. Knapp

M.S.

Michael Arberg
Landon Greene
Lisa Hurd
Yingdong Lu
Chen Wang

B.A.

COOK COLLEGE
David Allara
Emmanuel Anim-Danso
Greg Symber

DOUGLASS COLLEGE
Shereen Ansay
Brenda Rodriguez

LIVINGSTON COLLEGE
Dana Barretta
Tahreen Chowdhury
Aaron Truppo

RUTGERS COLLEGE
Christopher Campbell
Matthew Connors
Jennifer Dilks
Sehyun Kim
Tina Lee

(RC Cont'd)
Nicholas Masino
Holly Moeller
Adrienne Nguyen
Robert Ono
Ashay Patel
Hitesh Patel
Thomas Porturas
Chika Sakamoto
Matthew Schoenfeld
Robert Spink
Michel Sun
Brenton Taggart
Vaida Tamulyte
Kevin Theisen
Karnav Trivedi
Bryan Urbanowicz

SCHOOL OF ARTS AND SCIENCES
Shinida Cho (the first SAS student to graduate with a chemistry major)

UNIVERSITY COLLEGE
Michael Amoafo
Boris Benavente
Matthew Eibling
Manish Sharda

OCTOBER 2008

Ph.D.

Jason Giurleo, "Time-Resolved Fluorescence Studies of Protein Aggregation Leading to Amyloid Formation"
Advisor: D. Talaga

Wooseok Ki, "Synthesis, Characterization, and Film Fabrication of Inorganic and Hybrid Semiconductor Materials for Optoelectronic Applications"
Advisor: J. Li

Sezgin Kiren
Advisor: L. Williams

Xuejun Liu, "Thermodynamically Controlled Synthesis of Covalent Nanocapsules"
Advisor: R. Warmuth

Dongye Wang, "Ensemble Fluorescence Energy Transfer Analysis of RNA Polymerase Clamp Conformation"
Advisor: R. Ebright

Ke Wu, "Developing Microcomposite Pharmaceutical Materials Using Dense Gas Technique"
Advisor: J. Li

M.S. (with thesis)

James Bennett, "Assembly of a Novel Cavitand Utilizing Dynamic Covalent Bond Formation"
Advisor: R. Warmuth

M.S.

Daisy Cardoso
Jeffrey Ludlum
Di Xu

JANUARY 2009

M.S. (with thesis)

Bahar Demirdirek, "Synthesis and Evaluation of Amphiphilic Scorpion-like Star Macromolecules for Biomedical Applications"

M.S.

Vaibhav Doshi

MAY 2009

Ph.D.

Luke Czapla, "The Statistical Mechanics of Free and Protein-bound DNA by Monte Carlo Simulation"
Advisor: W. Olson

Leilani Del Rosario, "Preparation and Evaluation of Amphiphilic Macromolecules—Based Conjugates and Micelles for Anticancer Drug Delivery"
Advisor: K. Uhrich

Jun Zhang, "Analysis of Consumer Products by FTIR, Raman, and Chemometrics—I. Method Development and Validation for the Simultaneous Quantitation of Dimethicone and Cyclomethicone in Skin Protective Ointments by FTIR. II. Characterization of Fish Oil Supplements Using ATR-FTIR, Micro-Raman, Principle Components Analysis, and 2D ATR-FTIR Correlation Spectroscopy"
Advisor: G. Hall

Jianwei Zhao, "Synthesis and Characterization of Seven Thiophosphate Analogs of Cycli Diguanosine Monophosphate"
Advisor: R. Jones

B.A.

DOUGLASS COLLEGE
Brittany Deronde
Brianna Probasco
Jennifer Silva

LIVINGSTON COLLEGE
Katie O'Neill
Thomas Stelling

RUTGERS COLLEGE
Aaron Bonilla
Matthew Colombo
Robert Comito
Kevin Huang
John Kim
Bridget Lang
Kevin Lee

(RC Cont'd)
Peter Murr
Lauren Navallo
Patricia Niziolek
Aleksandr Rozenberg
Paul Ritch Santos
Christophe Skalit
Ravi Thakkar
Krzysztof Wojtak

SCHOOL OF ARTS AND SCIENCES
Rebecca Cohen

UNIVERSITY COLLEGE
Douglas Johnson
Matthew Richards
Theresa Stenger

"Anything that works well for Rutgers, works well for Chemical Resources."

hundreds of thousands of dollars of savings for them. "We got the business," relays Keimig. "The material we get from recycling the molds goes into products including food trays and coat hangers." Thanks to new opportunities, Chemical Resources will be doubling the size of its recycling business next year.

This search for new ways to recycle non-traditional plastics is one of the areas that has helped tie Keimig once again to the Rutgers chemistry department. Seven years ago, Dean Schneider heard about Chemical Resources and reached out to Keimig. At that time, Rutgers President Richard L. McCormick was looking to get business owners more involved, and asked if Keimig would be interested in working with undergraduates. "I started by giving a few talks, and from there I just got more involved," says Keimig.

Getting more involved has included offering an internship to undergraduates, being the Jean Day Lecture speaker and donating $3,000 to the Chemistry and Chemical Biology Department to create the Chemical Resources Award. This May, the first nine undergraduates received the awards, which honor outstanding research by students in their sophomore, junior and senior years. It was Keimig's recognition of the need for talented, creative chemists that inspired his generosity. "Smaller companies need someone who can think outside the box," he points out. "They need people who can create a whole process—figure out how to handle a product as well as how to ship it and clean up."

Keimig notes that at around the time Rutgers approached him, he approached Rutgers to investigate the potential for collaboration. He is exploring options with Chemistry and Chemical Biology professor Kathryn Uhrich. "Rutgers does development and Kathryn's work in the lab has interest in the consumer market," explains Keimig.

A future possibility is to take a plastic wrap and compound it with natural spices such as cloves, to create an antimicrobial protection around the food being packaged. This could help save the industry hundreds of millions of dollars by extending the food's shelf life. And since the plastic used would be derived from sugar cane, it would also satisfy the market's desire for "all natural" packaging.

Over twenty years since he first explored chemistry and business at Rutgers, Keimig is energized to be working with the University once again. "I want to keep extending the relationship," he emphasizes. "Anything that works well for Rutgers, works well for Chemical Resources."

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