

BODY AND SOUL

Fulfilling its pivotal role as a public university of research, teaching, and public service, Rutgers has rightfully developed an esteemed reputation for the breadth and depth of its encyclopedic research endeavors, which often lead to breakthroughs that have significant benefits regionally, nationally, and internationally. In the area of human health and health care policy alone, the university's contributions in the sciences and humanities are vast and significant. *Rutgers Magazine* presents a sampling of the research and teaching undertakings that are having an impact on the quality and longevity of our lives.

To Your Health

With rising medical costs, hospital funding cuts, and more than a million uninsured, health care is a hot topic in New Jersey. The Rutgers Center for State Health Policy, part of the Institute for Health, Health Care Policy, and Aging Research, has built a sound reputation as a respected, nonpartisan source of health-policy information and analysis. It studies areas of vital concern, including childhood obesity, long-term care and support services, access and coverage, health and the long-term care workforce, and health system performance improvement. Using its collective expertise and research findings, the center informs health-policy decisions in New Jersey and beyond.

When a Loss Is a Gain

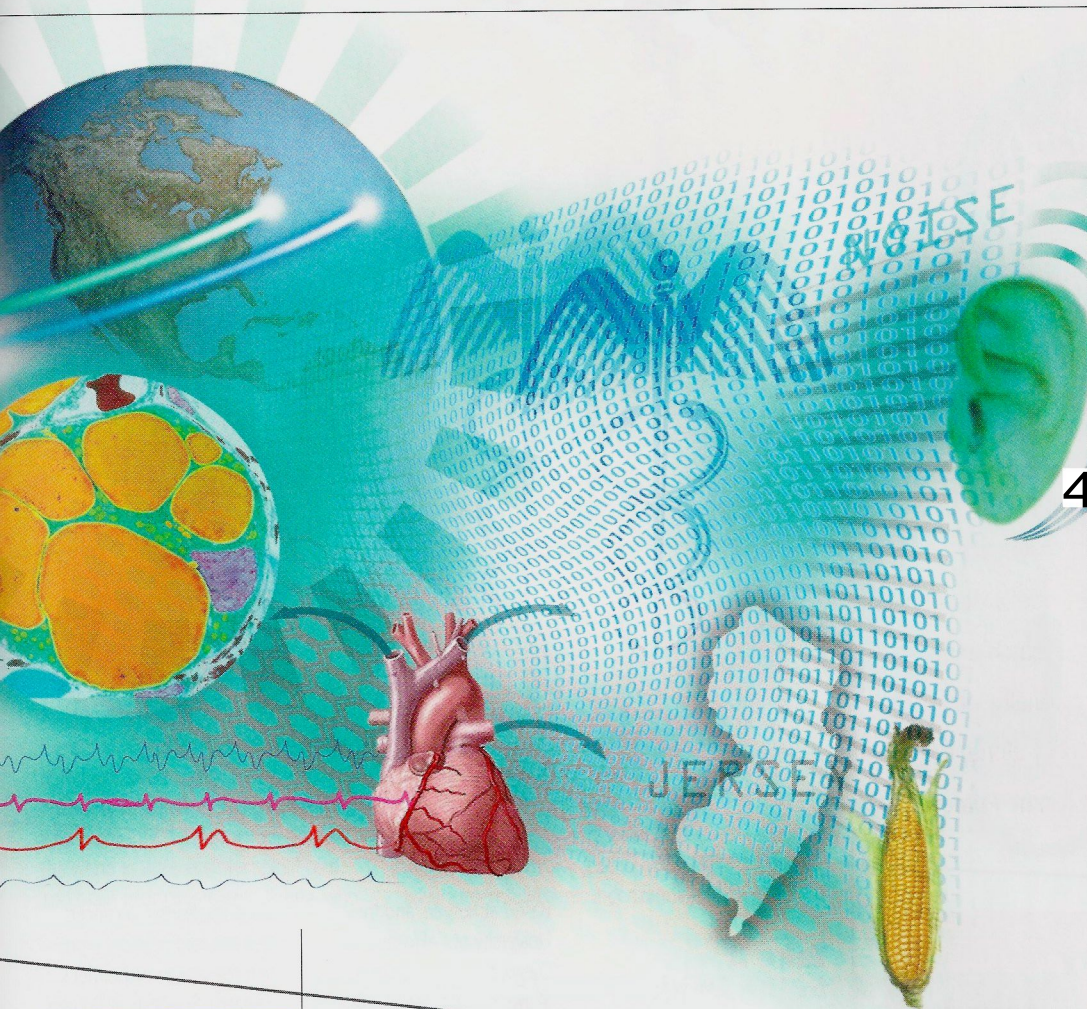
if decades of diet crazes have taught us anything, it's that we are far from winning the war on fat. For a group of researchers at the School of Environmental and Biological Sciences on the George H. Cook Campus, the

key is keeping the enemy close-as in studying it at the molecular level. The Rutgers Center for Lipid Research works to better understand how lipids, or fat-related substances, are metabolized. its findings can be used to

combat lipid-based diseases, like heart disease, diabetes, and cancer. And, in getting us closer to understanding the roots of the mounting epidemic of obesity, its gains may very well be our los5.

Unforgettable

Alzheimer's is a disease that attacks the brain; Rutgers is attacking back with its brainpower. At the Center for Molecular and Behavioral Neuroscience at Rutgers-Newark, Laszlo Zaborszky studies the basal forebrain's cholinergic cells, which are destroyed by the disease. Also in Newark, through the Memory Disorders Project, an interdisciplinary team of researchers studies memory formation and loss, and works to combat Alzheimer's disease in African-American communities and the Middle East. In New Brunswick, professor and Department of Cell Biology and Neuroscience chair Karl Herrup focuses on what makes nerve cells die in diseases like Alzheimer's; Mary Konsolaki, associate research professor of genetics, works to understand the mechanisms involved in Alzheimer's onset and progression.



Alzheimer's is a disease that attacks the brain, and Rutgers is fighting back with its brainpower. At different centers throughout the university, researchers are investigating memory formation and loss, what makes nerve cells die, and what mechanisms are involved in the disease's onset and progression.

Say That Again

If your neighbor's kid is in a garage band, you might regard the recent discovery of three Rutgers professors with skepticism. But the collaboration of biologists **Joseph Martin** and **William Saidel** and computer scientist **Dawei Hong** reveals that noise has biological benefits. Specifically, the Rutgers-Camden researchers produced a mathematical theory promoting the idea that white noise actually enhances hearing, a discovery that could lead to major improvements in hearing-aid technology.

A Healthy Dose of Discovery

Home to many of the world's biggest pharmaceutical companies, New Jersey has long been known as the grande dame of drug innovation. As the state's only pharmacy school, established well over a century ago, Rutgers' Ernest

Mario School of Pharmacy plays a pivotal role in feeding that pipeline. Its internationally recognized faculty educates future generations of pharmaceutical experts while students study drug development in its labs. And through its Institute

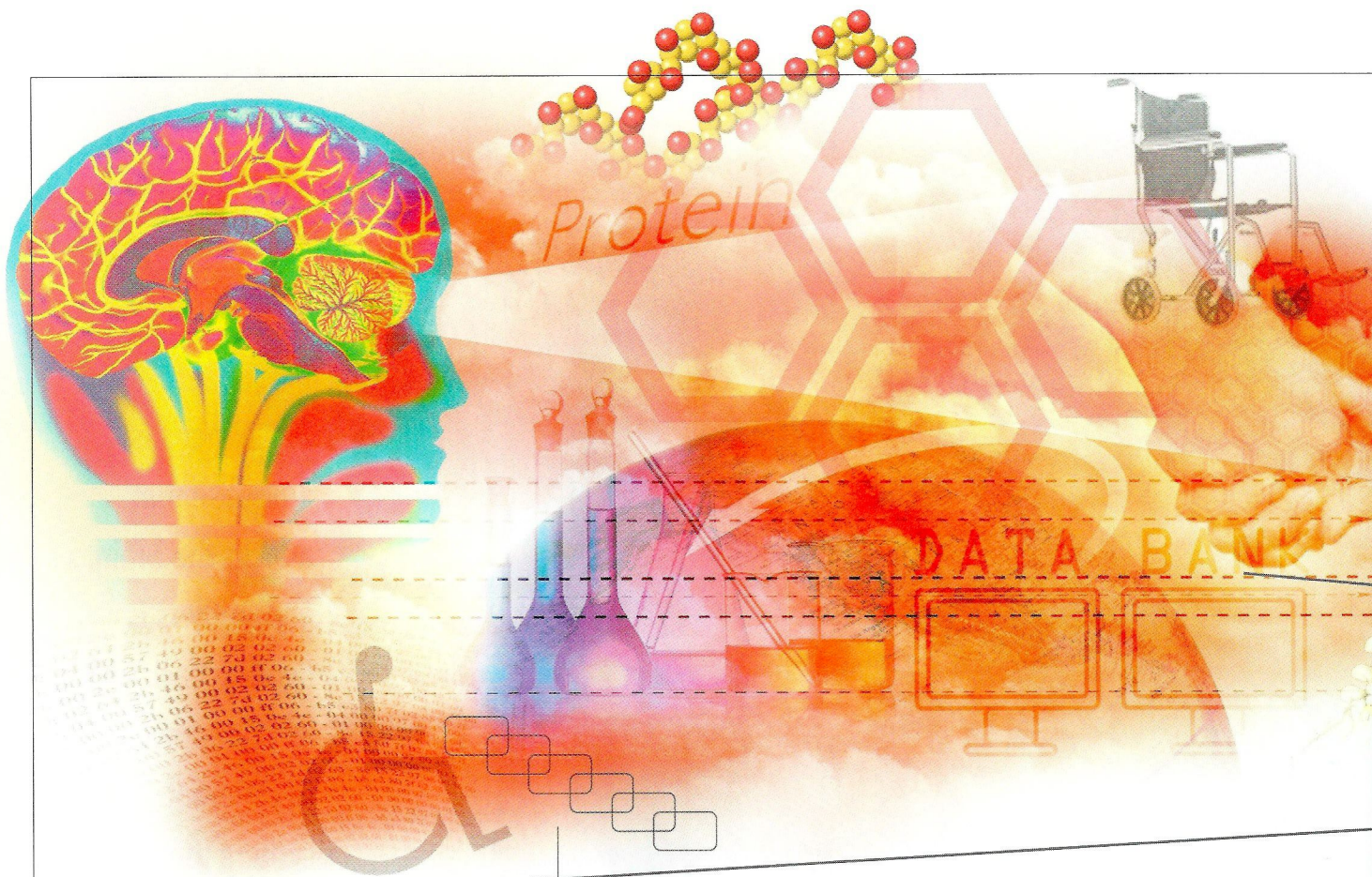
for Pharmaceutical Industry Fellowships, the school connects graduates of doctor of pharmacy programs nationwide with specialized training in New Jersey's pharmaceutical industry.

Going with the Grain

One day, a new kind of rice will resist drought and disease, consume fewer natural resources, and feed more hungry people all over the world. A similarly high-achieving breed of corn will follow. The Plant Genome Initiative at Rutgers, housed at the Waksman Institute of Microbiology on the Busch Campus, explores

the DNA structure and function in plants with the hope that their more useful properties can be harnessed to address urgent needs. As part of an international consortium, Rutgers was a key player in successfully mapping the rice genome—the first complete DNA map for a crop.





The Political History of Health Care

Keith Wailoo, director of the Center for Race and Ethnicity at Rutgers-New Brunswick and the Martin Luther King Jr. Professor of History, and Stephen Pemberton, who teaches history at Rutgers-Newark, study the history of medicine. In 2006, they coauthored *The Troubled Dream of Genetic Medicine*, which won the Association of American Publishers book award in History of Science. Wailoo, author of numerous books, has forged his own eclectic scholarship by standing at the crossroads of medicine, ethnicity, politics, and history to evaluate the relationship between ethnicity and the cultural politics of health care. Pemberton is writing a book about how systems to produce plasma for hemophiliacs in the 1980s inadvertently infected them with HIV and hepatitis.

Take It to the Bank

Heart disease holds steady as the leading cause of death in the United States, but the Protein Data Bank (PDB) holds clues that will revolutionize the development of drugs to fight it. Those clues are recently discovered protein structures (specifically, adrenergic receptors), and they're widely available to researchers all over the globe.

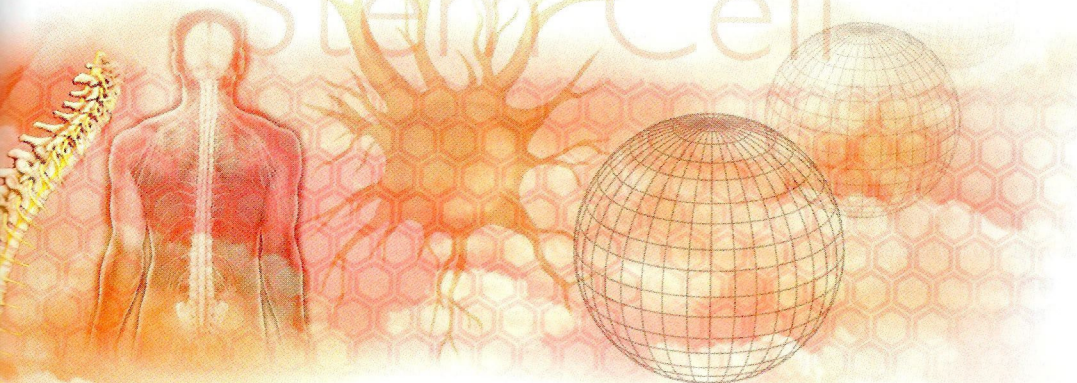
Based at Rutgers and the University of California, San Diego, the online archive allows researchers and students to study, store, and share molecular information. The PDB now contains more than 50,000 protein structures, with 25 new experimentally determined structures uploaded each day. Examples include HiV enzymes that drive new AIDS therapies; insulin, the protein deficient in diabetes patients; the p53 tumor suppressor

often implicated in cancer; and amyloid peptide, a protein relevant to Alzheimer's research. Scientists at Rutgers are responsible for reviewing and annotating the structures, then releasing them into the archive. Under the direction of Rutgers Board of Governors Professor of Chemistry Helen Berman and managed by a consortium called the Worldwide Protein Data Bank, it is the only archive of its kind in the world.

True Chemistry

Looking for love in all the wrong places? Researchers at Rutgers can help steer you through the tunnel of love. In New Brunswick, anthropologist Helen Fisher has done extensive research on the brain chemistry behind love and attraction. In Newark, psychologist Barry Komisaruk, who published the first evidence of the brain regions affected during female orgasm, teamed with the College of Nursing's Beverly Whipple to research and write *The Science of Orgasm* (The Johns Hopkins University Press, 2006).

Stem Cell



Search for the Cure

As founding director of the W.M. Keck Center for Collaborative Neuroscience at Rutgers, Wise Young has assembled a team of researchers that collaborates with more than 100 laboratories around the world in the search for spinal cord and brain injury treatments. Young, who

holds the Richard H. Shindell Chair in Neuroscience, is among the world's outstanding neuroscientists and is a leading advocate for stem cell research; his own experiments on rats with spinal cord injuries—some involving stem cells—are advancing researchers' understanding of

cellular therapeutics. Before coming to Rutgers in 1997, Young was on the research team whose breakthrough work upended conventional wisdom: that spinal cord injuries resulted in permanent damage.

Massaging Mental Muscles

After decades of studying human cognition, Paula I. Lalor, a Rutgers Board of Governors Professor of Neuroscience and codirector of the Center for Molecular and Behavioral

Neuroscience on the Newark Campus, helped devise a revolutionary technique—and a highly successful software program—that promotes children's literacy by strengthening the neural processes responsible for language comprehension through mental exercises that take advantage of the inherent malleability of the brain.

On Pins and Needles

An assistant professor of biomedical engineering at Rutgers-New Brunswick, David I. Shreiber is contributing to the still-lean body of research on why acupuncture is effective. Shreiber and his colleagues have created three-dimensional, collagen-based in vitro models to help them understand the body's responses to the needles. Shreiber's acupuncture studies are part of his ongoing trio of neural tissue and cellular biomechanics projects, which also include spinal cord injury and cell growth research.

Health Care Law and Order

Few people are better versed in the intersection of America's health care system, politics, and the law than Rutgers School of Law-Camden professors David Frankford and Rand Rosenblatt. Coauthors of the widely used health law case-

book *Law and the American Health Care System* and its supplements, the two have helped shape policy on patients' rights, managed care, and other issues. Frankford is the faculty director of Rutgers Center for State Health Policy and associate editor for

the *Journal of Health Politics, Policy and Law*. Rosenblatt's analyses of pending and recently passed federal legislation have been quoted by congressmen and former president Bill Clinton.

The Protein Data Bank, based at Rutgers and the University of California, San Diego, is the largest online archive of more than 50,000 protein structures, including HIV enzymes that drive new AIDS therapies. The bank allows researchers to study, store, and share molecular information, which grows daily.



Got Safe Food?

from understanding food-borne illnesses to developing an efficient food-distribution center during a crisis, the food Policy Institute in New Brunswick is on the cutting edge of food-policy research. An academic research unit of the New Jersey Agricultural Experiment Station, a component of Rutgers, it conducts research to help

government, industry, farmers, food retailers, restaurateurs, and consumers make informed decisions on critical issues affecting food policy. Director William K. Hallman, a U.S. delegate to last year's Asia-Pacific Economic Cooperation summit on public perceptions of agricultural biotechnology, is overseeing the institute's

current analysis of the 2006 nationwide recall of spinach contaminated with E. coli. Another project aims to engage children in prevention behaviors against food-borne illnesses. And a third is examining public perception of the threat of bird flu to the food supply.

A New and Present Danger

With one out of 166 children classified as having some form of autism, and with the number rising, detection and early intervention is at the forefront of many parents' minds. The Douglass Developmental Disabilities Center, founded by executive director Sandra Harris, has been a pioneer in autism research, education, and outreach for decades. Ongoing studies analyze the outcome of treatment at a very young age, examine the factors that lead to disruptive classroom behavior, and evaluate a variety of intervention methods.

A Vaccine for AIDS

When the first successful AIDS vaccine emerges, it just may come from the Center for Advanced Biotechnology and Medicine at Rutgers-New Brunswick, in a laboratory run by professors Eddy Arnold and Gail Ferstandig. The husband-and-wife duo have created a large number of chimeric human rhinoviruses-mutated versions of the virus that causes the common cold-incorporating proteins that mimic those pieces of

the AIDS virus capable of stimulating the immune system. They hope that one of these engineered viruses will produce an immune response to HIV in humans, thus serving as the basis for a potential vaccine. Arnold and Ferstandig's team of researchers at the lab are also using research tools like X-ray crystallography to develop newer and better drugs to target the AIDS virus.

The Stories of Sick Children

Myra Bluebond-Langner is a distinguished professor of anthropology at Rutgers-Camden and the editor of the Rutgers University Press Book Series in Childhood Studies, the first multidisciplinary series of its kind. An expert on children's health, illness, and socialization, and the founding director of the Center for Children and Childhood Studies at Rutgers-Camden, she has written books and articles on chronically ill children and the parents and siblings of those who are dying. Her latest project is a book on decisions facing caretakers of children with incurable cancers. Bluebond-Langner predicts that the burgeoning research on childhood issues will do for children what women's studies did for women at the end of the 20th century.

Virtual Rehabilitation

Physical therapy can be a tedious and repetitious process. But Grigore Burdea, director of Rutgers' Human-Machine Interface Lab, is changing that. He's developed a virtual reality-based "telerehabilitation" system using Sony's PlayStation 3, which allows patients to go through rehab at home by playing with onscreen graphics. He also led the team that designed the Rutgers Master, a virtual-reality glove that helps stroke victims regain manual dexterity, and the Rutgers Ankle, a robotic device that allows patients to exercise in a virtual environment.



Fantastic Voyage

It's medicine's final frontier: the human brain. With 100 billion nerve cells, it is just beginning to reveal its secrets, thanks in part to the 13 dedicated research teams working at the forefront of neuroscience at the Center for Molecular and Behavioral Neuroscience at Rutgers-Newark. Scientists study neuroscience from the molecular to the behavioral, advancing knowledge of how the brain works, how it breaks down, and how it might be repaired.

Professor Denis Pare looks at both human behavior and small slices of the amygdala to determine how phobias emerge; his work could well lead to medications that treat posttraumatic stress disorder. Professor Joan Morrell studies the behavior of maternal rats alongside scans of their brains to learn why mothers, human and rodent, might neglect their children and turn to drug abuse. Professor April Benasich "eavesdrops" on infant brains to discover the potential causes of dyslexia and language delays. And assistant professor Bart Krekelberg eyes the intricacies of vision by working to identify areas of the brain responsible for eye movement and visual perception—research that might lead to treatments for both dyslexia and schizophrenia.

Professor Mark Gluck researches memory and learning; his work with Parkinson's sufferers could contribute to more effective medications that treat the disease's physical symptoms without affecting memory or cognition. And professor Gyorgy Buzsaki, one of the world's leading neuroscientists, is revealing the way rhythms, both in the brain and in the smallest brain cell, help neurons communicate with one another and contribute to the creation of memory. Like his colleagues, he's a pioneer in territory that the center is determined to chart.

The Rituals of Death

A culture's rituals around death tell you a lot about its attitudes toward the living. Hiroshi Obayashi, a professor of religion in New Brunswick who has taught the popular course "Death and Afterlife" for two decades, has made cross-cultural studies of funeral rituals, burial practices, and beliefs about the afterlife. Western practices, for example, highlight the preeminence of the individual. Eastern practices, however, communicate that individuals are part of a greater whole.

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The First-Response Team

The Environmental and Occupational Health Sciences Institute (EOHSI)

has responded to a host of environmental concerns and crises with research, assessment, and education. A world leader in research on the effects of ozone, dioxin, pesticides, and heavy metals, as well as the health of our drinking water and the effect of the environment on children and the elderly, EOHSI continues to address the most pressing issues of our time, in New Jersey and around the globe.

Life-Saving Alchemy

Kathryn Uhrich, a professor of chemistry at Rutgers-New Brunswick, is developing novel ways to use polymer technology and household aspirin to create commercial products that could soon revolutionize medicine, cosmetics, and food worldwide—from a biodegradable cardiac stent to a polymer coating that protects organic produce from premature spoilage.

A Stubborn Nemesis

Rutgers is on the front lines in the war on cancer, from discovering new drugs to fight it to the role of stress and exercise in preventing it. Rutgers faculty and graduate students have made significant progress. At the Susan Lehman Cullman Laboratory for Cancer Research, Rutgers professor Suzie Chen discovered that a drug used to treat Lou Gehrig's disease also slows the growth of melanoma, the most aggressive form of malignant skin cancer. In addition, assistant research professor Xi Zheng and Allan (onney), director of the lab, discovered promising evidence that a combination of the anti-inflammatory medication Celebrex (celecoxib) and cholesterol-lowering Lipitor (atorvastatin calcium) may stop early prostate cancer from

progressing to its more aggressive and potentially fatal stage. Researchers at Rutgers' Ernest Mario School of Pharmacy, which discovered that green tea holds great promise in preventing cancer, has found that the curry spice turmeric can help treat and prevent prostate cancer. Eileen White, at the Center for Advanced Biotechnology and Medicine, conducts research into understanding pathways controlling cell proliferation and cell death that will lead to better treatments for cancer and viral infections. At the new Center for Endocrine Research, 40 scientists from Rutgers and UMDNJ's Robert Wood Johnson Medical School are collaborating to figure out why thyroid cancer in New Jersey is up 40 percent in the past five years.

Mind Games

"if you see something, say something" goes the familiar post-gill mantra. But who's to say what that "something" is? Maggie Shiffrar, professor of psychology at Rutgers-Newark, studies the human visual system to better understand how autistic people perceive gestures and movements. In a separate project for the US Department of Homeland Security, she and coinvestigator Kent Harber, associate professor of psychology at Rutgers-Newark, are using that knowledge to learn how people detect a possible threat based on the movements of others. Another Newark psychology researcher, assistant professor Mauricio Delgado, explores how knowledge of rewards and punishments is represented in the human brain, and how that knowledge drives behavior.



Finding Genes That Fit

The hopes for millions of families suffering from genetically based disorders sit frozen in 50 gleaming metal cryotanks in a five-year-old facility on the Busch Campus. The Rutgers University Cell and DNA Repository, part of the Department of Genetics, is the world's leading bank for genetic material. The RNA, DNA, and cell lines in storage are available for use by researchers searching for the causes of, as well as cures for, hundreds of inheritable diseases,

from diabetes and kidney disease to depression, schizophrenia, and alcoholism. Recently, samples supplied by the center resulted in identifying genes responsible for autism and Crohn's disease and, in a turn of events that director Jay Tischfield describes as "very uplifting," have helped researchers find a potential treatment for progeria, a rare childhood ailment that causes premature aging and early death.

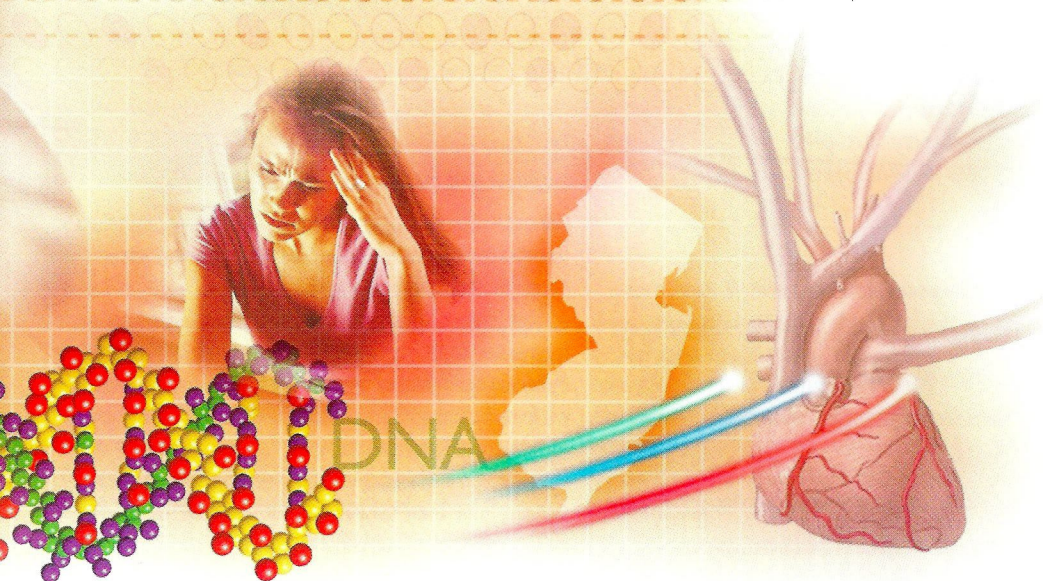
Mirror, Mirror on the Wall

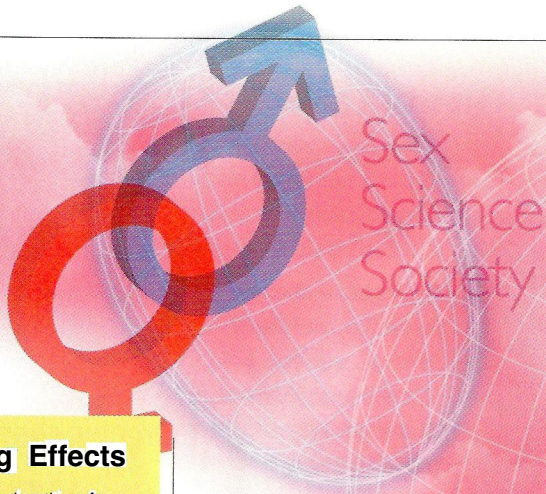
Charlotte Markey, an associate professor of psychology at Rutgers-Camden, conducts research on social and personality influences on our health. Her research attempts to answer questions such as what affects how we view our body image and what influences what we eat. One recent study took a look at how romantic partners attempt to control each other's eating behaviors. Another examined associations among young women's body image, self-esteem, and impressions of reality television makeover shows and their interest in obtaining cosmetic surgery. Women who found these shows inspiring and realistic were more likely to express an interest in obtaining plastic surgery.

You Gotta Have Heart

Cardiovascular disease is the number-one killer of Americans each year, and it puts another six million in the hospital. Rutgers research is leading to breakthroughs that reduce the numbers through programs that address the need for better nutrition, fitness, access to care, and treatment. The Robert Wood Johnson Foundation provides funds to the Rutgers Center for State Health Policy for a study to evaluate and improve congestive heart failure care for African Americans and Latinos in New Jersey. The Healthcare Foundation of New Jersey has given the center a grant to examine ways to improve the treatment of patients hospitalized with heart failure.

Organic chemist Kathryn Uhrich is developing novel ways, already patented, to use polymer technology to create commercial products that could revolutionize medicine, cosmetics, and food production and distribution worldwide.





Lasting Effects

Does the explanation for adult substance abuse lie in childhood depression and anxiety? That's the question that Naomi Marmorstein, associate professor of psychology at Rutgers-Camden, is working hard to answer. In the process, she's also looking for a possible link between early substance abuse and adult anxiety and depression. As an associate at the Center for Children and Childhood Studies, Marmorstein embodies the center's mission to promote an understanding of childhood experience through research and to find real-world applications that enhance the life of children and the adults they'll become.

Pain Is the Word

The literary world long held that pain is so unspeakable that it could not be described in words. Ann Jurecic doesn't completely agree. An assistant professor of English in New Brunswick, she teaches a course on "illness narratives" and is writing the book *Pain's Eloquence: Writing About Illness in a Skeptical Age*. Determining what aspects of pain can be communicated, she says, is important for the practice of medicine as well as the humanities.

Insulation against Destruction

Healing a damaged spinal cord, slowing the course of multiple sclerosis, preventing diabetics' numbed limbs from dying: these tasks demand a deeper understanding of myelin, the insulating structure

that helps nerves conduct electrical signals. Haesun Kim, assistant professor of biological sciences at Rutgers-Newark, studies how the body creates and destroys myelin, and how it may lead to drug treatments

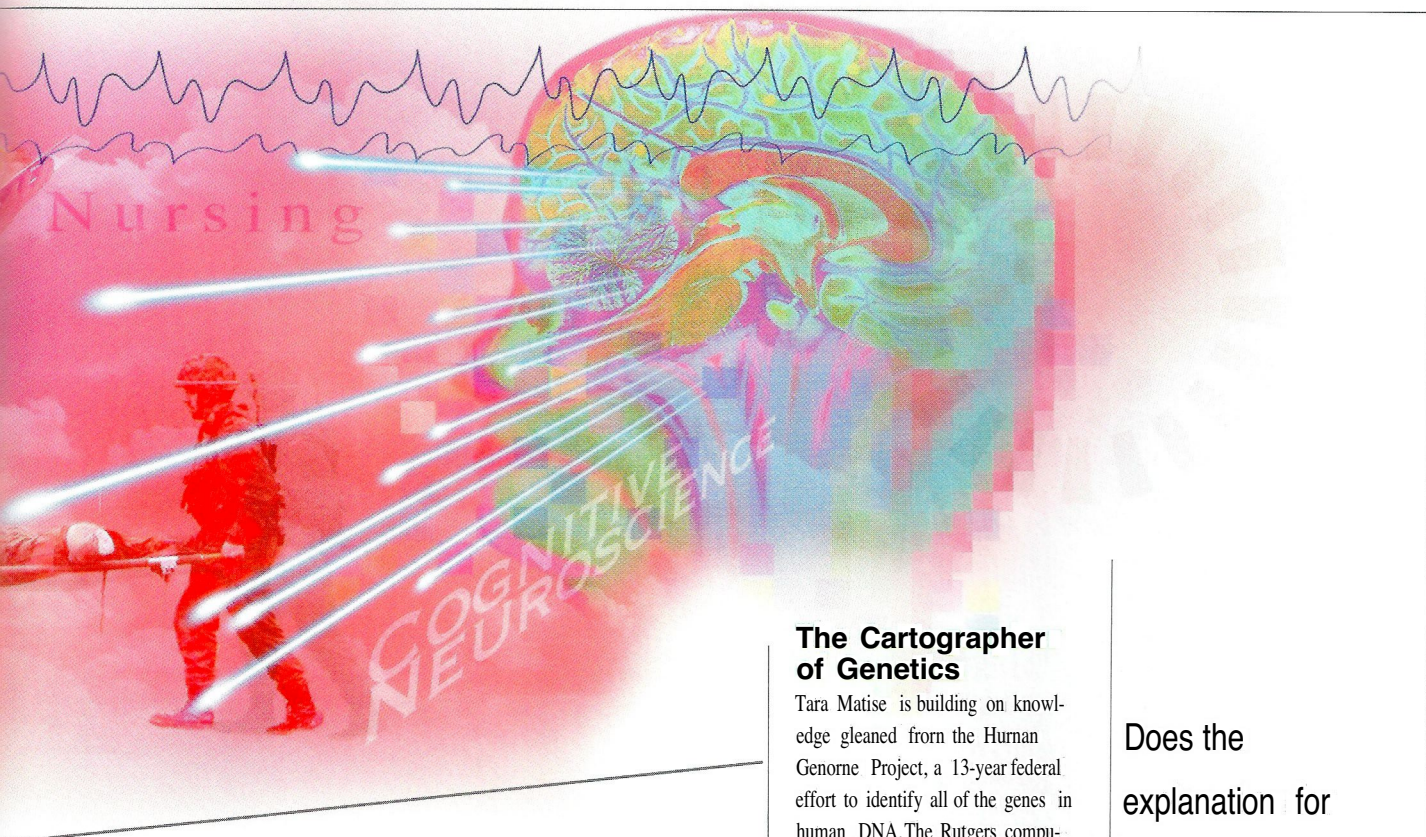
for common afflictions. "We have to find what happens within the cell, at the molecular level, that leads to myelin destruction," Kim says.

Acing Sex Ed

Sex Research in America is the working title of the latest research project by James W. Reed, a veteran history professor and former dean of Rutgers College. Visiting the famed Kinsey Institute for Sex Research at Indiana University and working in New Brunswick, Reed is asking questions such as "Who studied sex?" and "What can we learn from the immense discourse constructed by sex researchers?" He teaches courses titled "How Sex Changed" and "Sex, Science, and Society" and has written about teen pregnancy, adolescent sexuality, and the history of women's contraception. His new book will be entitled *Road to Viagra: Sex, Science, and Medicine in the United States*.

Saving Lives and Limbs

Life and limb is at stake and at the heart of a new consortium spearheaded by Joachim Kohn, director of the New Jersey Center for Biomaterials on the Busch Campus, a Rutgers-based academic-industrial research center that uses polymers in regenerative medicine. Last April, the center received a \$42.5 million five-year grant to create one of two academic groups that will form the Armed Forces Institute of Regenerative Medicine (AFIRM), whose goal is to find ways that new biological, chemical, and engineering technologies can help treat people suffering from severe blast injuries, such as those sustained by military personnel in Iraq and Afghanistan.



Is There a Nurse in the House?

There may be a nationwide nursing shortage, but there is no shortage of scholarly achievement in nursing at Rutgers. At the College of Nursing in Newark, assistant professor Rachel Jones has earned accolades for her research into the potential of soap opera videos to change attitudes about HIV risk reduction in urban women. Assistant professor Robert Atkins studies the effects of urban poverty on child and adolescent development, and associate professor Wendy Nehring's work involves intellectual and developmental disabilities. And in Camden, associate professor Joanne Robinson investigates issues that affect older adults, such as the quality of care in nursing homes.

I Know, Therefore I Am

How do we know what we know? That and related philosophical questions have framed the career of Alvin I. Goldman, a professor of philosophy and cognitive science in New Brunswick. From his Theory of Human Action, which classifies our simultaneous actions, to his Casual Theory of Knowing, with its revised accounts of how we obtain knowledge, Goldman has been among the most influential contributors to our understanding of

knowledge and justification theory. He has worked in several areas of philosophy, and portions of his work have provided links between philosophy and psychology, cognitive neuroscience, and the social sciences. More recently, he has turned his academic attention to such tantalizing and understudied topics as mind-reading and blogging.

The Cartographer of Genetics

Tara Matisse is building on knowledge gleaned from the Human Genome Project, a 13-year federal effort to identify all of the genes in human DNA. The Rutgers computational geneticist constructs genetic linkage maps and writes computer programs that may help pinpoint DNA differences that predispose people to diseases such as schizophrenia, osteoporosis, alcoholism, and diabetes. She's also looking for genes that control female reproductive aging and markers that may play a role in infertility. Matisse was recently tapped by the National Human Genome Research Institute of the National Institutes of Health as the principal investigator of its coordinating center for specific genetic-variant research.

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Linking the Food Chain

The Center for Advanced Food Technology at Rutgers-New Brunswick is bridging the traditional divide between research scientists and commercial purveyors of food products. In addition to doing research into areas like food chemistry, packaging, functional foods, and the potential applications of nanotechnology to food production, the center also works with the private sector to develop new products at its 31,000-square-foot facility, complete with baking ovens, commercial sterilizers, and a heat seal packaging line. William Franke, the associate director, is a coprincipal investigator for a Department of Defense contract to develop combat rations to improve the physical and mental performance of soldiers under stress.



The Psychology of Religious Fervor

Religious terrorists are neither abnormal nor psychopathological, asserts James W. Jones, a professor of religion in New Brunswick, in his new book, *Blood That Cries Out from the Earth: The Psychology of Religious Terrorism* (Oxford University Press, 2008). The terrorist mentality, Jones claims, stems from otherwise normally adjusted people who have been subjected to a deep shame or humiliation. They also tend to live in societies that condone or facilitate violence. Jones's research into the relationship between psychology and religion led to *Terror and Transformation: The Ambiguity of Religion in Psychoanalytic Perspective* (Routledge, 2002), which examined how religion has been used to justify acts of terrorism.

The Art of the Body

Susan Sidlauskas and Tanya Sheehan, professors in the Department of Art History in New Brunswick, teach the course "The Art of the Body: Visual Culture and Medicine," which views the relationship between Western art and modern medicine. The course looks at how doctors, patients, disease, pain, and medical technologies are represented in various media while examining the metaphorical uses of disease and deviance in the visual arts.