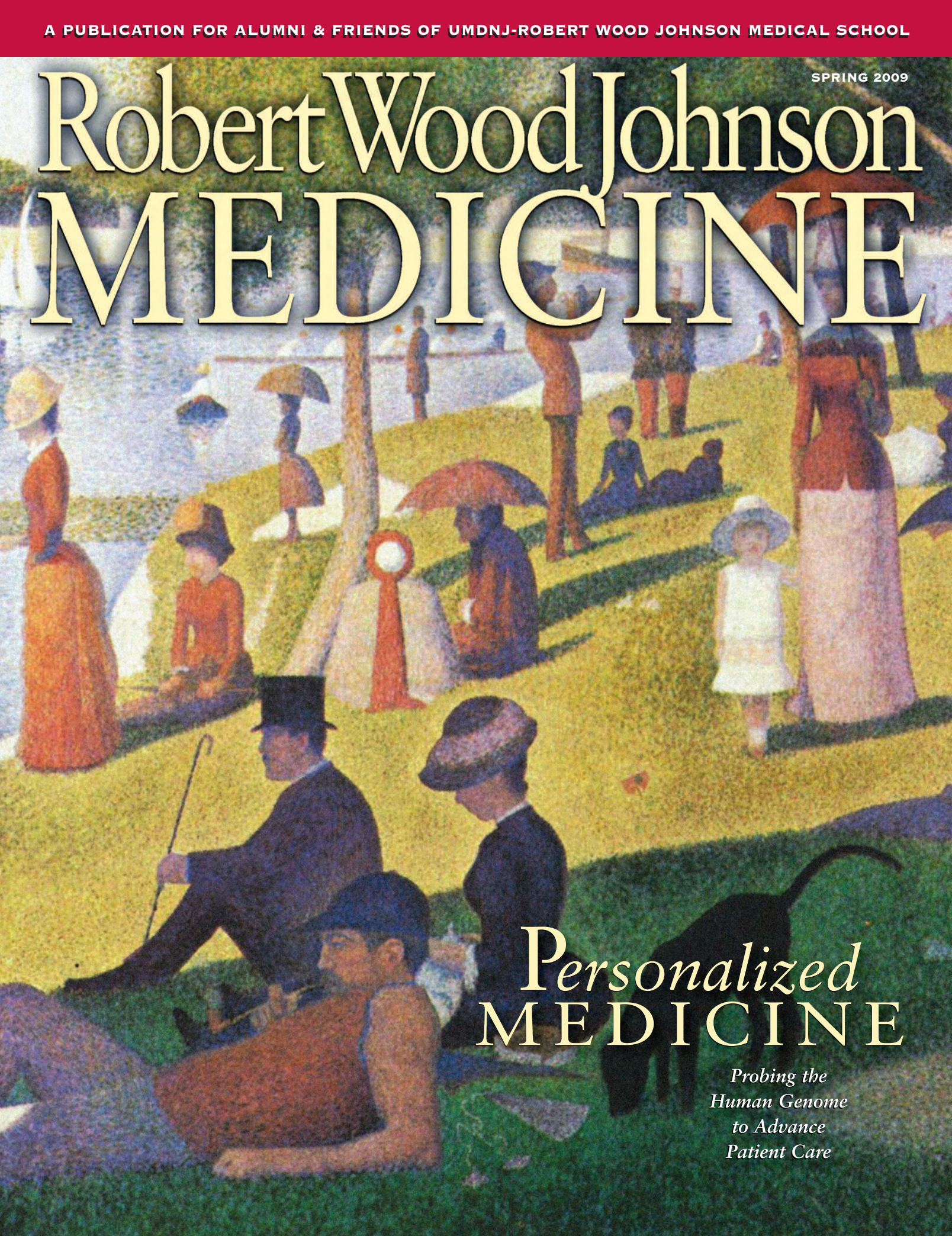


Robert Wood Johnson MEDICINE



Personalized MEDICINE

*Probing the
Human Genome
to Advance
Patient Care*

*“We believe our first responsibility
is to the doctors, nurses and patients,
to mothers and fathers
and all others who use our products
and services.”*

Our Credo

Johnson & Johnson

Dear Colleague,

The breadth of the articles in this issue of *Robert Wood Johnson Medicine* reflects the excellence and vitality of our programs at UMDNJ-Robert Wood Johnson Medical School. Separately and together, the people who lead these programs inspire admiration, appreciation, and pride. Without their shared vision, we would lack the richness and diversity of thought that drive our success.

Our cover story, *Personalized Medicine*, portrays the vast promise of a revolutionary field that evolved from the Human Genome Project. The scientists interviewed for this article are investigating therapies that will target variations in a patient's individual genome to prevent or treat human disease. At The Cancer Institute of New Jersey (CINJ), you will learn, the future is here: clinicians are already using genomic treatments. And researchers at our new Cancer Informatics Core are creating comprehensive, DNA-based data banks of information on individual treatment outcomes nationwide. Their findings will inform ongoing research in personalized medicine.

Celebrating Two Decades of Community Service describes the vision and achievements of a remarkable, broad-based community partnership, the Eric B. Chandler Health Center, which provides excellent care for New Brunswick's medically underserved population. In September, a successful gala celebrated Chandler's 20th anniversary along with our commitment to our mission in community health.

We are proud of Dr. Alfred Tallia's leadership as chair of the National Board of Medical Examiners committee that evaluated the U.S. Medical Licensing Examination. The committee's work and its potentially revolutionary recommendations are detailed in *RWJMS Professor Leads Initiative to Transform the Medical Licensing Program*.

As we learn in *The Cancer Institute of New Jersey*, physical expansion has not diminished the exemplary individual care devoted to each patient who chooses CINJ for cancer treatment. CINJ was established 15 years ago, and, along with its fast-growing facilities, its research programs and patient service have expanded enormously.

A RWJMS center is introduced in *The Great Mystery of Cystic Fibrosis*. Directed by Dr. Thomas Scanlin, the Cystic Fibrosis Center establishes an important hub for RWJMS experts seeking to understand and manage this devastating disease.

Would You Like Some Mercury with That Sushi? describes the startling results of Dr. Michael Gochfeld's research on mercury contamination, as reported in the *New York Times*.

Sukumar Nagendran, MD '94, is the subject of our alumni profile. An outstanding RWJMS graduate, Dr. Nagendran nurtures his ties to the medical school through the Nagendran Scholarship for International Medical Studies, a fund that helps medical students engage in clinical experience in international settings.

In the article on my appointment as dean, I was pleased to have the opportunity to share my priorities, vision, and long-term goals for RWJMS.

I look forward to hearing from you as, together, we plan for our successful future at RWJMS.

Sincerely,

Peter S. Amenta, MD, PhD
Dean



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70	5.7%
73	6.0%
76	6.4%
80	7.1%
85	8.1%
88	8.9%

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Robert Wood Johnson MEDICINE

A PUBLICATION FOR ALUMNI & FRIENDS OF
UMDNJ-ROBERT WOOD JOHNSON MEDICAL SCHOOL

Spring 2009 • Volume 11, Number 1

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R W J M S NEWS

BY KATE O'NEILL

MASTER EDUCATORS' GUILD NAMES 2008 MEMBERS

In September, the UMDNJ-Stuart D. Cook, MD, Master Educators' Guild named its 2008 members. Selected to represent the RWJMS faculty were **Kathleen K. Casey, MD '82**, clinical professor of medicine; **Michael J. Leibowitz, MD, PhD**, professor of molecular genetics, microbiology, and immunology and director of academic diversity initiatives, UMDNJ-Graduate School of Biomedical Sciences at RWJMS (GSBS); **Stephen Moorman, PhD**, associate professor of neuroscience and cell biology; and **John Pintar, PhD**, professor of neuroscience and cell biology and member, Center for Advanced Biotechnology and Medicine. Dr. Leibowitz and Dr. Pintar were nominated as GSBS faculty.

Working closely with 100 or more students each year, Dr. Casey is a model of clinical excellence, scientific rigor,

compassion for the patient, and dedication to the community. She directs the



Above: Kathleen K. Casey, MD '82 (top), and Michael J. Leibowitz, MD, PhD.

second-year physical diagnosis course and the third-year clerkship at Jersey Shore University Medical Center (JSUMC). In addition, she serves as associate program director of the JSUMC inter-



Left: Stephen Moorman, PhD (top), and John Pintar, PhD.



PHOTOS BY A. T. SUNDBROM

nal medicine residency program and is site program director for the joint infectious diseases fellowship on the two campuses.

Dr. Leibowitz is a national leader in the recruitment, retention, and training of underrepresented minority students for careers in biomedical research. Dr. Leibowitz has served as thesis adviser, thesis committee member, mentor, and adviser for scores of minority graduate students. In his own laboratory, he has trained undergraduates and medical students, many of whom have gone on to earn

grant support from the National Institutes of Health. In 1992, Dr. Leibowitz was appointed acting associate dean of GSBS, gaining a full appointment in 1995. He led in the creation of the molecular biosciences graduate programs umbrella and is the founder and course director of the ethical scientific conduct course.

Dr. Moorman advises and mentors extensively. His memorable teaching techniques and educational innovations engage learning communities both locally and nationally. The academic community benefits from his ingenious applications of technology, including video productions that assist medical students in gross anatomy; sophisticated, detail-specific course assessment software; and computer-assisted videoconferencing. He is well known for his

IDEAS, TECHNOLOGY, AND ESPRIIT DE CORPS UNITE CAMPUSES

Modifications in several areas are enhancing the partnership between the New Brunswick and Camden campuses of RWJMS. Each change helps equalize the student experience, particularly in areas affecting the medical school's missions in education and community health.

"We respect the individual strengths of the two campuses," says Carol A. Terregino, MD '86, associate professor of medicine, associate dean for admissions, and interim associate dean for the Camden campus. "But we're aiming for renewed esprit de corps, along with academic and administrative uniformity that will guarantee all our students the same great experience.

"Cross-pollination is

extremely important," adds Dr. Terregino. The student affairs deans and co-clerkship directors from both campuses meet regularly to guarantee parity in grading and grade reporting. They also seek to ensure that clinical activity is tracked and evaluated using identical criteria. The "Distinction" programs — in research, medical education, and service to community — are offered on both campuses, with some inter-campus teams.

In spring 2008, RWJMS hosted a single banquet for

"Prof-in-a-Box" technology, a distance learning technique that he developed, which uses Internet videoconferencing to put an anatomist — from a nearby office or anywhere in the world — virtually at the dissection table to answer students' questions.

Dr. Pintar teaches first-year medical students in histology and in cellular and genetic mechanisms, which he co-directs. He also co-directs and teaches the graduate course in advanced cell biology, which entails assigning and grading a writing project for 50 to 80 graduate students each year. He directs the joint Rutgers-GSBS program in neuroscience and is responsible for recruiting and training the program's graduate students. Furthermore, he is committed to training graduate students and fellows in his own laboratory and has served on thesis committees for more than 35 additional graduate students.



Peter S. Amenta, MD, PhD, dean, above, congratulates participants in the first annual Competition of the Classes.



PHOTOS BY JINZI PHOTOCRAZY

members of Alpha Omega Alpha and the Gold Humanism Honor Society. Starting in 2009, the school will have a combined graduation banquet and yearbook.

The first annual Competition of the Classes took place August 20 on the Livingston Fields, at Rutgers, The State University of New Jersey. Teams of students from years one and two competed against third- and fourth-year students from both campuses, spending the late afternoon and early evening engaged in informal athletic and non-athletic events.

"This kind of relaxed team building is a terrific way for students to interact with each other and with the faculty," says Peter S. Amenta, MD, PhD, dean, adding, "I'm already looking forward to next year's event."

NEW YORK MAGAZINE RANKS RWJMS PHYSICIANS AMONG "BEST DOCTORS"

The 2008 *New York* magazine list of "Best Doctors" in the New York area includes 44 full-time and volunteer RWJMS faculty members. The magazine states that this list represents about one-quarter of the top 10 percent of New York-area physicians. The list is an excerpt from *Top Doctors: New York Metro Area*, published by Castle Connelly.



PROMISE CLINIC SUCCESS DISCUSSED IN JOURNAL ARTICLE

In an article published in the April 1 issue of *Journal of Healthcare for the Poor and Underserved*, RWJMS students and faculty discussed the success of The Promise Clinic, a student-founded, student-managed project initiated in 2004. “The Promise Clinic: A Service Learning Approach to Increasing Access to Health Care” reports on the implementation of the clinic, which provides primary care services to clients of Elijah’s Promise, a community organization that offers meals, social services, health screenings, and life-skills development to people who are uninsured and lack conventional access to health care.

Teams of volunteer medical students provide clinical care under the direct supervision of volunteer, licensed physicians. Patients receive, at no cost, prescription medications, basic laboratory studies, and vaccinations, supported by grant funding. Student leaders are responsible for recruiting patients, student care providers, and faculty to staff the clinic. They also handle grant writing, budgeting, and management of day-to-day operations.

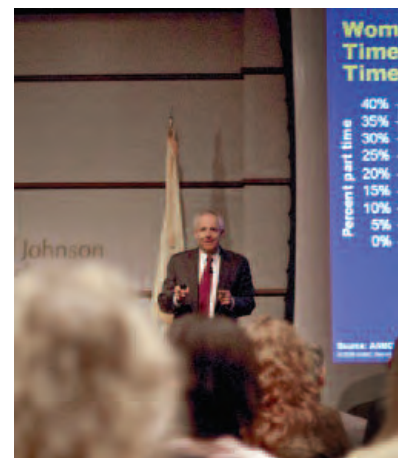
The report encourages other medical schools to

establish similar service learning programs, stating: “The student-doctor team model provides rich learning opportunities and exposure to continuity of care for students at all levels of training. . . . Continuity experiences can provide valuable lessons, including observation of the course and treatment of disease and formation of relationships with patients (rather than their complaints or disease). Such long-term interactions can create powerful bonds between a patient and a student.”

DR. KIRCH LECTURES AT RWJMS



Darrell G. Kirch, MD, president, Association of American Medical Colleges, presented a lecture at RWJMS in November, speaking on the need to transform the medical school curriculum to meet new national standards.



Dr. Kirch, a distinguished physician, educator, and medical scientist, is also a noted authority on the organization and management of academic medical

INTRODUCING CORE FACILITIES DAY: AN OCCASION FOR “TALKING SCIENCE”

Faculty, staff, and students from Camden, New Brunswick, and Piscataway converged on the Research Tower for the first annual Core Facilities Day, gaining fresh insights on the work under way at the medical school’s 25 core facilities. In conjunction with the event, RWJMS officially opened the Research Annex Core Facility Building on the Piscataway campus.

The keynote address, “Disease Discovery and Lysosomal Proteomics,” was

delivered by Peter Lobel, PhD, professor of pharmacology and resident member, Center for Advanced Biotechnology and Medicine. More than 20 researchers presented posters in the



Great Hall, showcasing and explaining the cores’ capa-

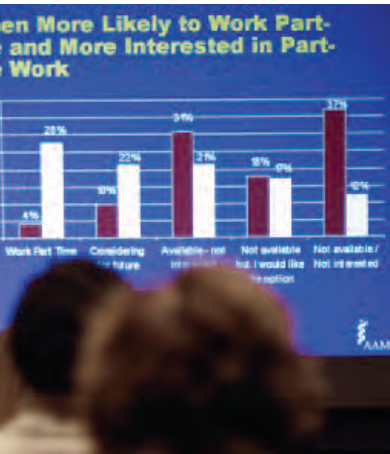


Left: Peter Lobel, PhD, professor of pharmacology and resident member, Center for Advanced Biotechnology and Medicine, delivers the keynote lecture at Core Facilities Day.

bilities and providing examples of research that has benefited from the specialized instrumentation and scientific expertise they offer.

Research News

By Kate O'Neill



PHOTOS BY LINZ PHOTOGRAPHY

centers. He has served in leadership positions at two medical schools and teaching hospitals and also at the National Institutes of Health.



Left: Rongjin Guan, PhD, research assistant professor, Center for Advanced Biotechnology and Medicine, discusses his poster with two visitors.

“Throughout the day, people took every opportunity to just talk science,” says Rick Wernoski, director of operations. “Conversations ranged from new projects for the core facilities, to potential collaborations, to simply learning more about how the cores might support or advance a scientist’s current research.”

The Robert Wood Johnson Foundation awarded a four-year, \$12 million grant to **The Cancer Institute of New Jersey (CINJ)**. The project aims to expand the research areas of cancer prevention, control, and population science at CINJ. As director of CINJ, **Robert S. DiPaola, MD**, professor of medicine, serves as principal investigator.

The National Institutes of Health awarded new grants or grant renewals of \$1 million or more to the following UMDNJ-Robert Wood Johnson Medical School faculty members:

- **Gary Brewer, PhD**, professor of molecular genetics, microbiology, and immunology: a five-year, \$1,824,839 competitive renewal of the grant for his study, “Post-transcriptional Regulation of Oncogene Messenger RNA.”
- **Ramsey Foty, PhD**, associate professor of surgery: a five-year, \$1,612,922 grant for his study, “Tumor Microenvironment, Tissue Liquidity, and Cell Interaction in Prostate Cancer.”
- **Raymond Habas, PhD**, associate professor of biochemistry: a five-year, \$1.3 million grant for his project, “Non-canonical Wnt Signaling and Cell Motility.”

- **Masayori Inouye, PhD**, distinguished professor of biochemistry: a five-year, \$1,248,000 EUREKA grant for his study, “The Method for Determination of Membrane Structures without Purification” (see page 9).
- **Estela Jacinto, PhD**, assistant professor of physiology and biophysics: a five-year, \$1,412,551 grant for her study, “Regulation of Cell Survival by the Rapamycin-Insensitive mTOR Complex.”
- **Shengkan Victor Jin, PhD**, associate professor of pharmacology: a four-year, \$1,023,360 grant for his study, “The Role of Autophagy in Age-Related Deterioration.”
- **Edmund C. Lattime, PhD**, professor of surgery: a five-year, \$1,571,000 competitive renewal for his study, “In-situ Activation of Anti-Tumor Effectors.”
- **Shaohua Li, MD**, assistant professor of surgery: a four-year, \$1,248,000 grant for his study, “Regulation of Embryonic Epithelial Morphogenesis.”
- **Jianjie Ma, PhD**, university professor of physiology and biophysics: a five-year,

\$2,203,656 grant for his project, “TRIC, a Novel Modulator of Intracellular Ca Homeostasis.”

- **Michael Reiss, MD**, professor of medicine: a five-year, \$1.5 million grant for his project, “Targeting Transforming Growth Factor in Metastatic Breast Cancer.”
- **Monica Roth, PhD**, professor of biochemistry: a four-year, \$1,145,700 competitive renewal of the grant for her study, “Targeting Entry of Retroviral/Lentiviral Vectors.”
- **Loren W. Runnels, PhD**, assistant professor of pharmacology: a five-year, \$1.5 million grant for his study, “Functional Analysis of the Bifunctional Ion Channel and Kinase TRPM7.”
- **Kathleen W. Scotto, PhD**, professor of pharmacology, vice president for research, UMDNJ, and interim dean, UMDNJ-Graduate School of Biomedical Sciences: a five-year, \$1.3 million grant for her project, “Caffeine Regulates Splicing of Cancer-Related Genes: Dissecting the Mechanism.”
- **Mona J. Thiruchelvam, PhD**, assistant professor of environmental and occupational medicine: a four-year, \$1,739,880 grant for her study, “Developmental Pesticide Exposure: The Parkinson’s Disease Phenotype.”

— Continued on Page 8

Research News

By Kate O'Neill

Continued from Page 7



The Department of Defense awarded a three-year, \$1.75 million Idea Award for a study, "Developing Treatment, Treatment Validation and Treatment Scope in the Setting of an Autism Clinical Trial." Serving as initiating principal investigator (PI) is **William G. Johnson, MD**, professor of neurology. **Sherie L. Novotny, MD**, assistant professor of psychiatry, is a partnering PI in this study.

PUBLISHED RESEARCH:

The following is a representative sample of articles by RWJMS faculty members published in leading biomedical journals:

- **Joseph R. Bertino, MD**, university professor of medicine and pharmacology and interim director, the Stem Cell Institute of New Jersey, was senior author of "A miR-24

MicroRNA Binding-Site Polymorphism in Dihydrofolate Reductase Gene Leads to Methotrexate Resistance," an article published in *Proceedings of the National Academy of Sciences of the United States of America* 2007: 104(33):13513–13518.

- **Gary Brewer, PhD**, professor of molecular genetics, microbiology, and immunology, was senior author of "Competitive Binding of AUF1 and TIAR to MYC mRNA Controls Its Translation," an article published in *Nature Structural & Molecular Biology* 2008:14(6):511–518.
- **Jeffrey B. Dunn, PhD**, associate professor of psychiatry, was first author of "Diffuse Pruritic Lesions in a 37-Year-Old Man after Sleeping in an Abandoned Building," an article published in the *American Journal of Psychiatry* 2007: 164(8):1166–1172.
- **Marc R. Gartenberg, PhD**, professor of pharmacology, was senior author of "A tDNA Establishes Cohesion of a Neighboring Silent Chromatin Domain," an article published in *Genes & Development* 2007:21(17):2150–2160.
- "Treating Hypertension in the Very Old," an editorial by **John B. Kostis, MD**, John G. Detwiler Professor of Cardiology, professor and chair, Department of Medicine, and chief of medical service at

Robert Wood Johnson University Hospital, was published in the *New England Journal of Medicine* 2008:358(18):1958–1960.

- **Sunita G. Kramer, PhD**, assistant professor of pathology and laboratory medicine, was senior author of "Repulsion by Slit and Roundabout Prevents Shotgun/E-Cadherin-Mediated Cell Adhesion during Drosophila Heart Tube Lumen Formation," an article published in the *Journal of Cell Biology* 2008:182(2):241–248.
- **Arnold J. Levine, PhD**, professor of pediatrics and biochemistry and resident member, CINJ, was senior author of "p53 Regulates Maternal Reproduction through LIF," an article published in *Nature* 2007:450(7170):721–724. Dr. Levine was also senior author of "Declining p53 Function in the Aging Process: A Possible Mechanism for the Increased Tumor Incidence in Older Populations," an article in *Proceedings of the National Academy of Sciences of the United States of America* 2007:104(42):16633–16638.
- **Peter Lobel, PhD**, professor of pharmacology and resident member, Center for Advanced Biotechnology and Medicine (CABM), was senior author of "Proteomics Analysis of Serum from Mutant Mice Reveals Lysosomal Proteins Selectively Transported by Each of the Two Mannose 6-Phosphate Receptors," an article published in *Molecular & Cellular Proteomics* 2008:7(1):A58–70.
- **Grace L. Lu-Yao, PhD, MPH**, associate professor of environmental and occupational medicine, was lead author of "Survival Following Primary Androgen Deprivation Therapy among Men with Localized Prostate Cancer," a study published in the *Journal of the American Medical Association* 2008:300(2):173–181.
- **Jianjie Ma, PhD**, university professor of physiology and biophysics, was senior author of "MG53 Nucleates Assembly of Cell Membrane Repair Machinery," an article published online by *Nature Cell Biology* on November 30, 2008.
- **James H. Millonig, PhD**, assistant professor of neuroscience and cell biology and resident member, CABM, was senior author of "The Orphan G Protein-Coupled Receptor Gpr161 Encodes the Vacuolated Lens Locus and Controls Neuregulation and Lens Development," an article published in *Proceedings of the National Academy of Sciences of the United States of America* 2008:105(6):2088–2093.
- **Joseph E. Parrillo, MD**, professor of medicine, was author of an editorial, "Septic Shock — Vasopressin, Norepinephrine, and Urgency," published in the *New England Journal of Medicine* 2008: 358(9):954–956.
- **Smita S. Patel, PhD**, professor of biochemistry, was sen-

ior author of "Transcription Initiation in a Single-Subunit RNA Polymerase Proceeds through DNA Scrunching and Rotation of the N-Terminal Subdomains," an article published in *Molecular Cell* 2008:30(5):567-577.

- **Michael B. Steinberg, MD, MPH**, associate professor of medicine, was first author of "The Case for Treating Tobacco Dependence as a Chronic Disease," an article published in the *Annals of Internal Medicine* 2008:148(7):554-556.

- **Eileen White, PhD**, adjunct professor of surgery and resident member, CABM, was senior author of "Role of Autophagy in Cancer," an article in *Nature Reviews Cancer* 2007(12):961-967.

- **Jill M. Williams, MD**, associate professor of psychiatry, was the author of "Eliminating Tobacco Use in Mental Health Facilities: Patients' Rights, Public Health, and Policy Issues," an article published in the *Journal of the American Medical Association* 2008:299(5):571-573.

- **Nancy A. Woychik, PhD**, associate professor of molecular genetics, microbiology, and immunology, was senior author of "Bacterial Addiction Module Toxin Doc Inhibits Translation Elongation through Its Association with the 30S Ribosomal Subunit," an article published in *Proceedings of the National Academy of Sciences of the United States of America* 2008:105(15):5885-5890.

Research Highlights

By Kate O'Neill

NIH Awards \$1.2M to Dr. Masayori Inouye for Innovative Research

The National Institutes of Health (NIH) awarded **Masayori Inouye, PhD**, distinguished professor of biochemistry, \$1,248,000 to develop innovative technology aimed at



STEVE HOCKSTEIN

Masayori Inouye, PhD determining the structure of membrane proteins. Dr. Inouye's project was among 38 selected under a new NIH program called Exceptional, Unconventional Research Enabling Knowledge Acceleration (EUREKA). In this, the program's first year, the NIH awarded a total of \$42.2 million in EUREKA grants.

To date, very few membrane protein structures have been determined, though they constitute approximately 30 percent of total proteins in species ranging from bacteria to humans and play various essential roles in living cells. It is vital to determine their three-dimensional structures, says Dr. Inouye. Yet, because they are hydrophobic and resist purification, determining their structure remains one of the most challenging areas in molecular biology.

Dr. Inouye's technology will be applied under the NIH-funded New York Consortium on Membrane Protein Structure, which aims to establish a pipeline for

structure determination of membrane proteins, applying structural genomics approaches informed by the collective experience of its team of investigators.

Dr. Daniel Wartenberg Co-authors Response to Report Linking Brain Cancer and Cell Phone Use

In response to a study warning that cell phone use may increase the risk of brain cancer, the National Academy of Sciences (NAS) called for more research on the topic. **Daniel E. Wartenberg, PhD**, professor of environmental and occupational medicine and director, division of environmental epidemiology, was involved in the NAS report and participated in writing the response in 2008 issue of *Cancer Research*.

The initial study was conducted by an international group of prominent doctors and public health researchers and officials. It came to no hard conclusions on the association between cellular phone use and brain cancer, but participants in the study issued the report as a precaution, believing that the public should be alerted to possible risks.

The report states in part: "The most recent studies, which include subjects with a history of cell phone usage during the last 10 years, show a possible association between certain benign tumors ... and some brain cancers on the side the device is used."

Dr. Wartenberg says that while there is concern about cell phone use as a risk factor for cancer, the research in the study is not as sophisticated as he would like. Still, he notes, there is enough data that it may be prudent to take precautions. For example, Dr. Wartenberg says he uses a headset or puts his phone on speaker mode. Bluetooth technology can reduce exposure, he adds, but because it uses a transmitter in the headset, it does not eliminate any possible risk of brain tumors.



Research Highlights

By Kate O'Neill

CINJ Researchers Describe Novel Treatments

Several distinguished basic and clinical investigators from The Cancer Institute of New Jersey (CINJ) showcased advances in laboratory, clinical, and translational



STEVE HOCKSTEIN

James S. Goydos, MD '88

research at a meeting of the American Association for Cancer Research.

James S. Goydos, MD '88, asso-

ciate professor of surgery, and **Jonathan H. Lee, MD**, assistant professor of surgery, presented an abstract describing a study of the effectiveness of the drug Riluzole in slowing the progress of cancer in patients



STEVE HOCKSTEIN

Jonathan H. Lee, MD



PETER BYRON

Lorna Rodriguez, MD, PhD

diagnosed with Stage III or Stage IV advanced melanoma who are scheduled to have their lesion surgically removed.

Presenter **Lorna Rodriguez, MD, PhD**, associate professor of obstetrics, gynecology, and reproductive sciences and chief of gynecologic oncology, CINJ,

is the lead investigator and author of findings of a study looking at the effects of using selenium in combination with two standard drugs to inhibit drug resistance in treating



STEVE HOCKSTEIN

Bruce G. Haffty, MD

ovarian cancer.

A team including **Bruce G. Haffty, MD**, professor and chair, Department

of Radiation Oncology, presented results of research involving the cancer-suppressing p53 gene to determine whether use of nuclear analysis of previously gathered tissue samples



JOHN EMERSON

Kim M. Hirshfeld, MD '99, PhD

would distinguish between different survival outcomes for breast cancer patients.

A poster highlighting prognostic indicators in breast cancer was presented by **Kim M. Hirshfeld, MD '99, PhD**, assistant professor of medicine, who worked in collaboration



JOHN EMERSON

Arnold J. Levine, PhD

with Dr. Haffty and **Arnold J. Levine, PhD**, professor of pediatrics and biochemistry.

New Results Show Cardiovascular Benefits of "Treating To Targets"

A new analysis of the Treating to New Targets study shows that intensive lowering of low-density lipoprotein (LDL) cholesterol in patients with stable coronary heart disease (CHD) whose systolic blood pressure was less than 140 mmHg lowered the risk of major cardiovascular events. The risk was reduced by 42 percent when compared with less intensive LDL lowering and uncontrolled blood pressure of 140 mmHg or higher.

The analysis was led by **John B. Kostis, MD**, John G. Detwiler Professor of Cardiology, professor and chair, Department of Medicine, and



PETER BYRON

John B. Kostis, MD

chief of medical service, RWJUH. Pfizer funded the post hoc analysis of the five-year, 10,001-patient TNT study,

which was published in the May issue of the *Journal of Clinical Hypertension*.

"People who have both high cholesterol and high blood pressure are at greater risk for cardiovascular disease than those with either condition alone," says Dr. Kostis. "Yet a minority of patients with both conditions is treated to currently recommended targets. The analysis reported today reminds us that intensive management of both cholesterol and blood pressure can significantly reduce the risk of heart attacks and strokes."

BY
KATE
O'NEILL

DR. TERRI GOSS KINZY APPOINTED TO LEAD GSBS AT RWJMS

Terri Goss Kinzy, PhD, professor of molecular genetics, microbiology, and immunology and pediatrics, has been appointed associate dean of the UMDNJ-Graduate School of Biomedical Sciences (GSBS) at RWJMS.

“Dr. Kinzy brings extensive research and educational administrative experience to her new position,” says Kathleen W. Scotto, PhD, professor of pharmacology, vice president for research, UMDNJ, and interim dean, UMDNJ-Graduate School of Biomedical Sciences. “We are confident that she will continue to contribute her considerable knowledge and boundless energy to the creation of first-rate, nationally competitive graduate programs on this campus.”

Dr. Kinzy joined the RWJMS faculty in 1995, establishing her research program on post-transcriptional control of gene expression and molecular targets for infectious diseases drugs within the translational apparatus. She was selected for membership in the UMDNJ Master Educators' Guild in 2001, representing the GSBS.

Dr. Kinzy's commitment to mentoring is recognized at many levels: in 2002, for example, she was named Faculty Mentor of the Year by the Compact for Faculty Diversity, a national partnership. In addition, she was named Somerset County's Woman of the Year in Medicine, in 2004, and received the RWJMS R. Walter Schlesinger

Basic Science Mentoring Award, in 2005.

Also in 2005, Dr. Kinzy was appointed director of the expanded MD/PhD program that encompasses RWJMS; Rutgers, The State University of New Jersey; and Princeton University. She has expanded and enhanced the pro-



JOHN EMERSON

gram, taking it to a position of national recognition. She has a similar vision for GSBS at RWJMS: to tap more deeply into the potential of the

MD/PhD partnership and to raise the funds needed to recruit top-level young researchers, here and abroad.

DR. ERIC JAHN APPOINTED SENIOR ASSOCIATE DEAN FOR COMMUNITY HEALTH

Eric G. Jahn, MD '88, associate professor of environmental and occupational medicine, has been appointed senior associate dean for community health. Dr.

Jahn previously served as acting senior associate dean, accepting the appointment in 2007. His responsibilities include overseeing community partnerships, which he views as key to the success of the RWJMS missions, not only in community health, but also in education and clinical care, because they help prepare culturally competent physicians.

The excellent quality of clinical care and social services at the Eric B. Chandler Health Center reflects Dr. Jahn's commitment to care for the whole

person, regardless of ability to pay. “Community health is a chance to take care of people and improve their lives in a way that only medicine can do,” he says. “Not having

resources doesn't mean you shouldn't get excellent care, follow-up care, or continuity of care.”

Dr. Jahn joined the faculty in 1992 and began his service as medical director of the Chandler

Health Center in 1994. A 1988 graduate of RWJMS, Dr. Jahn earned his undergraduate degree from Princeton University and completed pre-medical studies at Columbia University. He performed his residency and fellowship training in general internal medicine at the University of California, Irvine Medical Center.



STEVE HOCHSTEIN

BY
KATE
O'NEILL

DR. CÉLINE GÉLINAS TO SERVE AS ASSOCIATE DEAN FOR RESEARCH

Céline Gélinas, PhD, professor of biochemistry and resident member, Center for Advanced Biotechnology and Medicine (CABM), has been appointed associate dean for research.

Dr. Gélinas earned her PhD at the Université de Sherbrooke, in Quebec, and did her post-doctoral training in the laboratory of Nobel laureate Howard M. Temin, PhD, at the McArdle

Laboratory for Cancer Research at the University of Wisconsin, Madison, where she studied retroviruses and oncogenes. Dr. Gélinas joined the RWJMS faculty in 1988 as a resident member of CABM, and in 1995 she became a member of The Cancer Institute of New Jersey.

“Dr. Gélinas is a major player in the critically important field of NF- κ B biology, having discovered the transcriptional role of



WOLSKIN

NF- κ B family member Rel,” says Aaron J. Shatkin, PhD, professor of molecular genetics, microbiology, and immunology and director, CABM. “She is an insightful, dedicated, hardworking, and completely unselfish person. Her commitment to excellence at all levels of research, teaching, and service is truly amazing.”

DR. ROBERT DIPAOLO APPOINTED TO LEAD THE CANCER INSTITUTE OF NEW JERSEY

Robert S. DiPaola, MD, professor of medicine, was appointed director of The Cancer Institute of New Jersey (CINJ). His selection culminates a national search that began in 2007.

“It will be my privilege to advance CINJ to the top echelon of comprehensive cancer centers in the country,” says Dr. DiPaola. “By using a team science approach with collaborators from across the globe, we will achieve this vision and further establish CINJ as a



JOHN ERIKSSON

leader in the area of oncology research, treatment, and education, statewide and beyond.”

Dr. DiPaola joined the RWJMS

faculty in 1994. He is an accomplished senior clinician at CINJ, where he conducts internationally recognized clinical and laboratory research. His research interests have included targeting pathways of cancer resistance and metabolism as a means to restore drug sensitivity in patients with prostate, bladder, and kidney cancers.

Dr. DiPaola earned his medical degree from the University of Utah School of Medicine. He completed his medical residency at Duke University Medical Center and a fellowship in oncology and hematology at the University of Pennsylvania. He has written more than 200 articles, abstracts, and book chapters on cancer and his research, and he has been published by journals including the *New England Journal of Medicine*, the *Journal of the American Medical Association*, and the *Journal of Clinical Oncology*.

DR. MICHAEL LEIBOWITZ DIVERSITY INITIATIVES

Michael J. Leibowitz, MD, PhD, professor of molecular genetics, microbiology, and immunology, has been appointed director of academic diversity initiatives, a newly created position within the UMDNJ-Graduate School of Biomedical Sciences (GSBS) at RWJMS.

“Dr. Leibowitz has led GSBS with distinction since 1992,” says Peter S. Amenta, MD, PhD, dean. “The new position will allow him to focus and expand his noteworthy efforts in the recruitment and training of underserved and underprivileged minorities.”

As the director of two National Institutes of Health-funded programs — the Initiative to Maxi-

DR. JAVIER ESCOBAR SERVES IN NEW POST AS ASSOCIATE DEAN FOR GLOBAL HEALTH

Javier I. Escobar, MD, professor of psychiatry and family medicine, has been appointed associate dean for global health. The new Office of Global Health responds to the faculty's broad interest in this area, he says, and acknowledges medical students' eagerness to engage in international activities such as summer fellowships.



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Dr. Escobar is widely recognized as an expert on psychopharmacology, psychiatric epidemiology, cross-cultural psychiatry, and global health. He was principal investigator for several studies in psychiatric epidemiology of mental illness in Latino and non-Latino populations. He helped establish a consortium of

researchers interested in mentoring young scientists interested in the mental health issues of people in Latino communities. Since 2000, Dr. Escobar has participated as a member of a consortium that includes the National Institute of Mental Health (NIMH) and seeks to enhance the research and educational collaboration between nations of the western hemisphere.

From 1999 to 2003, Dr. Escobar served on the Advisory Mental Health Council of the NIMH and led the group that prepared the report *Racial and Ethnic Diversity in Mental Health Careers: An Investment in America's Future*. On sabbatical from RWJMS from 2003 to 2004, Dr. Escobar worked as senior adviser to the director of NIMH, helping to create the institute's Office of Global Health.

LEADS ACADEMIC



A. J. SUINSTRON

mize Student Diversity and the Bridge to the Doctoral Degree — Dr. Leibowitz has been awarded more than \$7.1 million in direct costs to date. He initiated the Graduate Science Careers Program, which evolved into Research in Science and Engineering (RISE), one of the nation's most successful residential summer undergraduate research programs promoting diversity.

DR. SONIA GARCIA LAUMBACH ACCEPTS POSITION IN STUDENT AFFAIRS

Just nine years after her graduation from RWJMS, **Sonia Garcia Laumbach, MD '99**, assistant professor of family medicine, was appointed assistant dean for student affairs.



STEVE HOCKSTEIN

Dr. Garcia Laumbach served as chief resident in the RWJMS Family Practice Residency Program. Dr. Garcia Laumbach joined the Family Medicine Residency Program at CentraState Medical Center, in Freehold, where she developed the educational curriculum for family medicine residents. She returned to RWJMS

in 2007 as director of student health services.

Dr. Garcia Laumbach, a native of Cuba, retains her fluency in Spanish.

As a medical student, she taught the elective in medical Spanish. She taught the course to fellow residents during her residency and fellowship, and will develop a medical Spanish elective. Dr. Garcia Laumbach says, "It's exciting to be back here — back in the place where I found out who I was."

DR. MITCHELL-WILLIAMS ACCEPTS STUDENT AFFAIRS POST ON CAMDEN CAMPUS

Jocelyn Mitchell-Williams, PhD, MD '97, assistant professor of obstetrics and gynecology, was appointed assistant dean for multicultural affairs and community affairs, Camden campus. Dr. Mitchell-Williams, who earned her medical degree on the Camden campus in 1997, says, "I have always loved the atmosphere here."

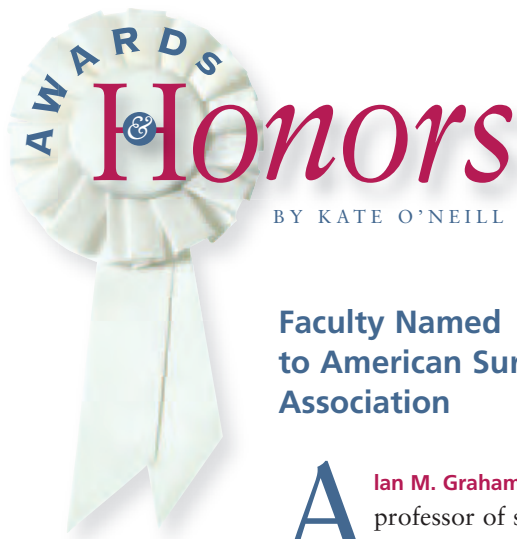


STEVE HOCKSTEIN

As assistant dean for multicultural affairs, she focuses on student initiatives in community health, such as the Health Out-

reach Project (HOP) clinics, community education programs, and student mentoring.

After earning a doctorate in biomedical engineering from Rutgers, The State University of New Jersey, Dr. Mitchell-Williams taught in the RWJMS Department of Molecular Genetics and Microbiology and in the Biomedical Careers Programs. Later, she decided to specialize in OB/GYN, completed her residency at Cooper University Hospital, and joined the faculty practice.



Faculty Named to American Surgical Association

Alan M. Graham, MD, professor of surgery and chief, division of vascular surgery, RWJMS and RWJUH, and **Stanley Z. Trooskin, MD**, professor of surgery and chief, division of general surgery, RWJMS and RWJUH, were recently elected to membership in the American Surgical Association (ASA). Founded in 1880, the ASA is the nation's oldest and most prestigious surgical organization, says Stephen F. Lowry, MD, professor and chair, Department of Surgery, and senior associate dean for education. Membership is highly selective and limited to 400 active members, including the nation's most prominent surgeons as well as leading surgeons from around the world.



NAT CIVIER

Alan M. Graham, MD



NAT CIVIER

Stanley Z. Trooskin, MD

In addition to Dr. Graham and Dr. Trooskin, the other ASA members from RWJMS are Dr. Lowry; James W. Mackenzie, MD, professor emeritus of surgery; and Peter M. Scholz, MD, James Mackenzie Professor of Surgery and chief, division of cardiothoracic surgery, RWJMS and RWJUH.

Dr. Joseph Bertino Awarded Top Honors for Research

The American Association for Cancer Research (AACR) presented the 2008 Joseph H. Burchenal Memorial Award for Clinical Research to **Joseph R. Bertino, MD**, university professor of medicine and pharmacology and interim director, the Stem Cell Institute of New Jersey. The award recognizes outstanding achievements in clinical cancer research. At the AACR's 2008 Annual Meeting in San Diego, Dr. Bertino delivered the Burchenal Award lecture, titled "A New Twist on Old Drugs: Methotrexate and 5-Fluorouracil."

Also in 2008, Dr. Bertino received the Distinguished Service Award for Scientific Achievement from the American

Society of Clinical Oncology (ASCO). The award recognized Dr. Bertino's dedication to cancer research and scientific inquiry and cited his exceptional record of service to the society. Dr. Bertino has been a member of ASCO for 41 years and served as president from 1976 to 1977.



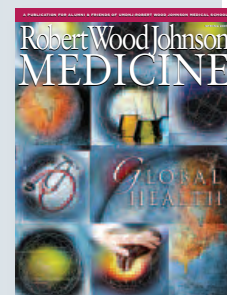
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Joseph R. Bertino, MD

RWJMS Magazine Earns National Awards

The Spring 2007 issue of *Robert Wood Johnson Medicine* won a Silver Award from the National Aster Awards: Excellence in Medical Marketing. The same issue earned a Merit Award in the 25th annual Healthcare Advertising Awards competition.

Barbara Walsh, art director of *Robert Wood Johnson Medicine*, was awarded a Silver Medal from the Art Directors Club of New Jersey for the Spring 2007 issue, in the category "Editorial Design: Magazine Design: Magazine Format Design: Trade or Consumer."



AACR Presents International Prize for Research to Dr. Arnold Levine

Arnold J. Levine, PhD, professor of pediatrics and biochemistry and resident member, The Cancer Institute of New Jersey, has received a major international award: the 2008 Kirk A. Landon-American Association for Cancer Research (AACR) Prize for Basic Cancer Research. Dr. Levine delivered his prize lecture, titled "Single Nucleotide Polymorphism in the p53 Pathway," at the 2008 AACR annual meeting in San Diego.

Dean's Research Awards Presented in Six Categories

Peter S. Amenta, MD, PhD, dean, presented the first annual Dean's Research Awards. The new program, initiated by Dr. Amenta, recognized the medical school's scientific community for the best peer-reviewed publications of calendar year 2007.

Awards were presented in six categories:

- Best Publication by a Medical Student: *William J. Kostis, PhD, MD '07*
- Best Publication by a Post-doctoral Fellow: *Badri-Nath Singh, PhD (Biochemistry)*
- Best Publication by a Graduate Student: *Prasun J. Mishra, MSc (Graduate Program in Cellular and Molecular Pharmacology)*
- Best Publication by Faculty: Basic Sciences: *James Q. Zheng, PhD, professor of neuroscience and cell biology*
- Best Publication by Faculty: Clinical Sciences: *Annette Reboli, MD, professor of medicine*
- Best Publication by a Clinical Fellow/Resident: *Vassiliki Karantzis-Wadsworth, MD '01, PhD, assistant professor of medicine and clinical fellow, medical oncology*

IN MEMORIAM

PAMELA C. CHAMPE, PHD

Dr. Champe passed away on June 22, at age 62. She began teaching at RWJMS while pursuing her doctorate in microbiology, and she accepted a full-time position in 1973 in the Minority Student Summer Pre-matriculation Program. She retired in 1996 as a professor of biochemistry but continued as an adjunct professor. She collaborated with colleague Richard Harvey, MD, professor emeritus of biochemistry, on a text series, *Lippincott's Illustrated Review*. She learned in the week before she died that more than a million copies of these titles have been purchased.

A gifted teacher, mentor, and confidante, Dr. Champe earned every teaching award offered by RWJMS. In addition, the student body created the Lifetime Achievement Award for Teaching and Support of Students especially to honor her. Her efforts to recruit and retain minority and women students left a lasting imprint on the medical school's admission process.

For her contributions to the education of women in medicine, Dr. Champe received the American Medical Women's Association's first Gender Equity Award, in 1994. Dr. Champe also

won the 1995 National Alpha Omega Alpha Teaching Award, presented annually to a medical school teacher in the

basic sciences. At the time of her retirement, she said the award was "the icing on my professional cake."

LAWRENCE TAFT, MD

Dr. Taft died on June 25, at age 85. He was founding chair of the Department of Pediatrics and chief of pediatric services at Robert Wood Johnson University Hospital. He served as chair from 1972 until 1988. Dr. Taft's work with Elizabeth Boggs was instrumental in establishing the Boggs Center on Developmental Disabilities. In October 2006 he was named professor emeritus of pediatrics.

After an internship in pediatrics at Bellevue Hospital in New York, he completed a residency in pediatrics at New York Hospital and a fellowship in pediatric neurology at the Children's Hospital in Boston. He joined the faculty at the Albert Einstein College of Medicine as an assistant professor of pediatrics and rose to the rank of full professor of pediatrics

and rehabilitation medicine. While there, he was instrumental in receiving approval and funding for the Rose Fitzgerald Kennedy University Center for Excellence in Developmental Disabilities.

Dr. Taft's many honors included:

- Distinguished Alumni Achievement Award, the Academic Health Science Center, Brooklyn, 1990
- Excellence in Teaching awards in 1987 and 1989 from the Department of Pediatrics, RWJMS
- President of the American Academy of Cerebral Palsy and Developmental Medicine
- 2001 Arnold J. Capute Award for his work for children and families with disabilities, presented at the national meeting of the American Academy of Pediatrics.

BY
KATE
O'NEILL

RWJMS Welcomes Class of 2012 at White Coat Ceremony

RWJMS formally welcomed the Class of 2012 at the 15th annual White Coat Ceremony. Celebrated at the end of Orientation Week, the ceremony honors each new class as future physicians.

Keynote speaker Patricia Whitley-Williams, MD, professor and interim chair, Department of Pediatrics, and chief, division of pediatric allergy, immunology, and infectious diseases, drew on each letter of the words



PHOTOS BY STEVE HOCKSTEIN

“White Coat Ceremony” to single out the themes in clinical medicine.

Members of the Class of 2012 recite the Hippocratic Oath together.



Radiation Oncology Residency Program Earns Full Accreditation

Following its first formal site review, the residency program in the Department of Radiation Oncology has earned full accreditation. It also has gained approval for an increase in the complement of residents, from six to eight. The first residents entered the program in 2006, and it remains the only radiation oncology residency training program in New Jersey.



JOHN EMBERTSON

“In addition to these achievements, we were given a review cycle of five years — the maximum allowed cycle time — with the next review in 2013,” says Bruce G. Haffty, MD, professor and chair, Department of Radiation Oncology (left).

“The approval for increase in resident complement and the five-year review cycle attest to the strength of the program, compliance with standards, and overall success of our training program at this early stage.”

During the four-year program, residents train in three facilities, including Robert Wood Johnson University Hospital.

“It’s not the coat that’s important; it’s the character of the person that wears the coat that counts,” she said. Peter S. Amenta, MD, PhD, dean, notes that Dr. Whitley-Williams’s comments resonated with this new class. As applicants, the students in the Class of 2012 had already built a remarkable record in community service and had participated in basic science and clinical research.

The first-year class entered the ceremony in street clothes, with their white jackets neatly folded over one arm. Later in the event, RWJMS deans “coated” the new students, incorporating a new generation of white-clad physicians-in-training into their profession. In closing, the Class of 2012 recited the Hippocratic Oath, led by Dr. Amenta.

Alexis Pelletier ’11 coordinated the ceremony.

The White Coat Ceremony, an initiative of The Arnold P. Gold Foundation for Humanism in Medicine, was piloted at RWJMS in 1994.

The Class of 2012 in Profile

Each new class adds its own distinct character to UMDNJ-Robert Wood Johnson Medical School. The Class of 2012 brings an unusually strong background in science, says Carol A. Terregino, MD '86, associate professor of medicine, associate dean for admissions, and interim associate dean for the Camden campus. Overall, members of this class had the highest MCAT score in biological sciences in the history of the medical school. Their average age is 22½, making this one of the youngest classes ever admitted to RWJMS. Still, they have accumulated a remarkable record of achievement in academia, research, and public service. "They arrived relaxed and ready to learn from us and from one another," adds Dr. Terregino.

The 156 members of the Class of 2012 have much to share. They were educated at 66 different institutions, with 22 percent graduating from Rutgers, The State University of New Jersey, and 18 percent from Ivy League colleges. Forty-six percent attended one of the nation's top 50 national universities or liberal arts colleges, as ranked by *U.S. News & World Report*. Six students were admitted as members of the MD/PhD program. More than half the class majored in the biological and physical sciences; 23 graduated with double majors — nine with double science majors — and 14 bring a liberal arts background to the mix. They have served in global health settings in 18 different countries. Thirty-three were born abroad, representing more than 20 different nations. Half are natives of New Jersey. Fourteen percent are from groups traditionally underrepresented in medicine, and, following a recent trend at RWJMS, more than half are women.

Right: Peter S. Amenta, MD, PhD, dean (left), and Carol A. Terregino, MD '86, associate professor of medicine, associate dean for admissions, and interim associate dean for the Camden campus (right), with the Dean's Scholars from the Class of 2012: Muhammad Shahid, Emily Donelan, Karina Lam, Krishnapriya Kalyam, Ankit Shah, Hannah Kim, and Ogechi Dike.



STEVE HOCKSTEIN

Dean's Scholars

The Dean's Scholars Program was inaugurated in 2006 by Peter S. Amenta, MD, PhD, then interim dean. The following extraordinary students in the Class of 2012 were named Dean's Scholars, each earning a four-year scholarship.

- **Ogechi Dike** was a Douglass Scholar at Rutgers University, where she majored in biological sciences and minored in African studies. Through the AccessMed program, ChiChi began studies at RWJMS while completing her undergraduate degree. As a physician, she hopes to address disparities in health care across races and between genders.
- Marathon runner **Emily Donelan** graduated from the University of Notre Dame with a double major in pre-med studies and psychology. Emily was an emergency medical technician in her hometown and at Notre Dame, and she volunteered at a camp for children with cancer.
- A native of India, **Krishnapriya Kalyam** moved to New Jersey in the seventh grade and graduated from South Brunswick High School. She was a biomedical engineering major at Rutgers University and mentored students in New Brunswick High School. From 2004 to 2008, Priya researched tissue engineering at the New Jersey Center for Biomaterials.
- **Hannah Kim** earned her undergraduate degree in biology at Dartmouth College. As a Presidential Scholar, Hannah did research on the effect of the flavonol epicatechin on the release of neurotransmitters from the neuromuscular junction, and she also participated in clinical research on cardiac ischemic risk associated with the blood concentration of the protein pro-BNP.
- **Karina Lam** majored in economics at Harvard University. As a neurological research assistant, Karina conducted research at Columbia Medical Center, where she cloned a dysbidin gene and transformed bacteria to study schizophrenia. As a health care volunteer at Luoyang Orphanage in China, she helped care for very ill infants and young children.
- At Rutgers University, **Ankit Shah** earned his undergraduate degree in cell biology and neuroscience. At the Rutgers Center for Alcohol Studies, he studied the bone matrix protein osteocalcin and presented a poster titled "Altered Stress Response in Osteocalcin Null Mutant Mice" at the American Society of Bone and Mineral Research. He also conducted research in the Department of Chemistry.
- **Muhammad Shahid** earned his undergraduate degree in cell biology at Rutgers University, where he was editor in chief of an undergraduate research journal. He studied the osteocalcin protein at the Center for Alcohol Studies, and, in the primate neuroscience laboratory, he studied the neurophysiology of visual perception in the primate cortex.

BY
KATE
O'NEILL

Core Competencies Become Household Words

In the course of their education, students at UMDNJ-Robert Wood Johnson Medical School are expected to accomplish learning objectives within six competency areas. These competencies were reformulated within the last few years by the Curriculum Committee and subsequently approved by the faculty. But only now are they becoming household words throughout the medical school.



PHOTO LEFT: JOHN EMERSON; PHOTOS CENTER AND RIGHT: STEVE HOCKSTEIN

Patient Care

Students will gather essential and accurate information about their patients in the context of a **compassionate** and **respectful** therapeutic **relationship**, to **provide effective care for health concerns**, health maintenance and disease prevention.

Students will use best **medical evidence**, patient information and patient preferences to support patient care decisions, patient education and counseling.

Medical Knowledge

Students will demonstrate **up-to-date knowledge** of the basic and clinical biomedical sciences and the **application of this knowledge**, through clinical reasoning and problem solving, for **effective patient care**.

Practice-Based Learning and Improvement

Students will be able to engage in **self-evaluation** regarding their academic and clinical performance, develop **plans for personal improvement** and recognize how the application of new learning can be used to improve patient care.

This new familiarity stems from a broad campaign launched by the Office of Education. Pocket cards and table tents on cafeteria tables, as well as banners and posters in hallways, publicize and define institutional objectives in each area of competency: patient care, medical knowledge, practice-based

learning and improvement, interpersonal and communication skills, professionalism, and systems-based practice.

"We want to make the competencies apparent to all who participate in the education and training of RWJMS students," says Siobhan A. Corbett, MD '87, associate professor of surgery and

chair, Curriculum Committee. "This awareness is important not only for our faculty but also for residents and faculty at our teaching affiliates."

The RWJMS competencies mirror the ones for residency training established by the Accreditation Committee for Graduate Medical Education (ACGME).

CORE COMPETENCIES



ROBERT WOOD JOHNSON
MEDICAL SCHOOL
University of Medicine & Dentistry of New Jersey



PHOTO LEFT: JOHN EMERSON; PHOTOS CENTER, STEVE HOCKSTEIN; PHOTO RIGHT: NAT CIVNER

Professionalism

Students will demonstrate **respect, compassion, and integrity** in interactions with peers, patients, and other health professionals, adherence to **ethical principles**, and **sensitivity to a diverse patient population**.

Students will demonstrate **accountability** and a commitment to excellence by recognizing and addressing personal limitations and behaviors that influence their effectiveness as physicians.

Interpersonal and Communication Skills

Students will be able to demonstrate **interpersonal and communication skills**, both verbal and written, that result in effective information exchange with patients, patients' families, peers and other health professions colleagues

Systems-Based Care

Students will demonstrate an **awareness of barriers to health care** and the importance of **advocacy in assisting patients** in gaining access to care.

Students will **work collaboratively** in a health care team to provide **patient-centered care** and to employ strategies that ensure **patient safety** and the **quality** of patient care.

By graduation, students will be able to demonstrate:

- A:** Personal **ACCOUNTABILITY** / Patient **ADVOCACY**
- B:** Use of **BEST** medical evidence / Recognition of **BARRIERS** to health care
- C:** **COMPASSIONATE** care / Superior **COMMUNICATION** skills
- D:** **DEDICATION** to quality / Sensitivity to patient **DIVERSITY**
- E:** Self-**EVALUATION** / Adherence to **ETHICAL** principles
- F:** Outstanding **FUND** of knowledge/ **FOCUS** on patient safety
- G:** Personal **GROWTH** / Collaboration on common **GOALS**
- H:** Commitment to **HELPING** others and to a **HEALTHY NJ**
- I:** Personal **INTEGRITY** / Respect for **INDIVIDUAL** preference

"Not all medical schools use the ACGME standards as a framework for their curriculum," says David E. Swee, MD, professor of family medicine and associate dean for education. "But we felt that we would best prepare our medical students for their residencies by adopting the core competencies

required by the ACGME and revising our curriculum to meet those objectives."

Like the ACGME competencies, the competency-based curriculum at RWJMS provides the tools for evaluating a medical student's progress in each area of competency and measuring it against national norms. Among the

assessment tools are multiple objectively structured clinical examinations (OSCE), now being used as early as the first year to evaluate medical knowledge along with professionalism and interpersonal and communication skills.

Dr. Swee adds that the definition of core competencies and ensuing modifications to the curriculum help to position the medical school well for re-accreditation by the Licensing Committee for Medical Education (LCME). "The LCME has its own set of standards," he says. "Its first medical education standard requires that the objectives of the educational program be reflected in the design of courses and clerkships and in developing the methods to evaluate students. In addition, the LCME expects the dean of the medical school and the leadership of the clinical affiliates to be among those who are familiar with these overall objectives."



Dr. Peter S. Amenta Appointed Dean

Partnerships: *A Foundation for the Future*

“Partnerships have been a key to much of the medical school’s success,” says Peter S. Amenta, MD, PhD, dean. “We must continue to enhance these existing partnerships, while building new ones. The financial constraints and challenges facing all of us will require novel approaches and alliances to continue our trajectory to excellence.”

Appointed dean of UMDNJ-Robert Wood Johnson Medical School in November, Dr. Amenta served the prior two and a half years as interim dean. In that time, and during his nearly 20 years at RWJMS, Dr. Amenta participated or led in building a variety of partnerships, all of them designed to meet his top priority for the medical school: to preserve and enhance its academic mission.

Dr. Amenta’s appointment by William F. Owen, Jr., MD, president, UMDNJ, and by the UMDNJ Board of Trustees concluded a one-year national search. The search committee, charged by Dr. Owen, was headed by Alfred F.

Tallia, MD ’78, MPH, professor and chair, Department of Family Medicine. The 20-member committee was drawn from the RWJMS community — half were RWJMS faculty — as well as affiliated institutions and the neighboring community.

“All were deeply committed to the future of the school and the university,” says Dr. Tallia, adding, “I’m very pleased with Dr. Owen’s choice. Peter brings clear goals, experience with our strengths and challenges, and great vision to the position. He is passionate about this school. He knows how to take us as far and as high as we can go, and he knows he can’t do it alone.”

B Y K A T E O ’ N E I L L



Left: Peter S. Amenta, MD, PhD, dean, RWJMS (left), and Stephen K. Jones, FACHE, president and CEO, Robert Wood Johnson University Hospital and Robert Wood Johnson Health System.

“Our partnerships work, in part, because across our academic health center and in each of our affiliates, we work with some of the nation’s most talented faculty, community physicians, staff, and students.”

Dr. Amenta says.

“By coordinating this energy and expertise, I truly believe we can and will do anything we set out to do.”

THE MASTER BUILDER

Developing a Top-Tier Academic Health Center

Affiliations and collaborations — many of them recent — strengthen the medical school and position it to grow. They add venues for teaching and research, broaden the range of clinical and academic expertise, and expand the research opportunities available to medical students and graduate students. In addition, these partnerships help to improve financial performance by diversifying the patient base and promoting the medical school’s clinical brand throughout the state. In institutes and departments that have been successful in this effort, revenues have increased, with corresponding programmatic growth.

Dr. Amenta joined the faculty in 1989 and became chair of the Department of Pathology and Laboratory Medicine in 1998. During his tenure as chair, he also served for four years as chief of staff and senior vice president of medical affairs at Robert Wood Johnson

University Hospital (RWJUH). In this capacity, he worked closely with the senior vice president for operations, Stephen K. Jones, who was named the hospital’s president and CEO in 2007. Through simultaneous service to the two institutions, Dr. Amenta provided valuable perspective to colleagues in both organizations, while solidifying existing collaborations and encouraging the development of new shared initiatives.

The growth of the academic health center is a leading priority for Dr. Amenta. He is pleased that high-quality academic health centers have evolved from strong, collaborative relationships between the medical school and its principal teaching affiliates, RWJUH and Cooper University Hospital in Camden. “My experience working with the staff of the pathology service at RWJUH first showed me how we could collaborate in support of the academic health center,” says Dr. Amenta. “My appreciation for the great potential of this partnership grew as I worked with the leaders at RWJUH and our other clinical affiliates.”

Dr. Amenta seeks to further develop these partnerships along with collaborative programs that generate progress not only on the two main campuses, but at all of the medical school’s affiliates. “We are working to develop a common strategic focus on our development as a statewide resource for New Jersey,” he says. “That kind of alignment is central to the decision making that advances our shared missions. Our partnerships work, in part, because across our academic health center and in each of our affiliates, we work with some of the nation’s most talented faculty, community physicians, staff, and students. By coordinating this energy and expertise, I truly believe we can and will do anything we set out to do.”



Advancing the Academic Enterprise

“Hospitals and medical schools depend on each other to succeed at the highest level,” says Dr. Amenta. “To develop a foundation for success, we have to be concerned with our financial strength. At the end of the day, a medical school and a hospital can have a great bottom line, but if we’re not providing excellent training for our medical students and graduate students, we’re not doing our job.”

For nearly two decades, Dr. Amenta has maintained an active teaching role at RWJMS. During his tenure as chair, he mentored junior faculty in his fast-growing department. In addition, he

served as director of the residency program and as a committee member for several PhD candidates. He currently teaches in both the second-year pathology course and the residency program.

Working with John Sheridan, president and CEO, Cooper University Hospital, Dr. Amenta and Stephen F. Lowry, MD, professor and chair, Department of Surgery, and senior associate dean for education, have substantially redefined the regional campus model at RWJMS by embracing the Camden campus’s unique contributions to the achievement of the missions of the medical school.

While recognizing the individual strengths of each campus, the faculty and staff in the two offices of academic and student affairs sought to ensure the

same high-quality educational experience for all students, whether they complete their clinical years in New Brunswick or in Camden. “Phenomenal expansion has taken place on the Camden campus,” says Dr. Amenta, adding that modifications are already enhancing the inter-campus partnership and encouraging a new esprit de corps.

As a physician-scientist, Dr. Amenta brings a valuable point of view to the academic mission. He maintains ties to researchers studying the extracellular matrix, the topic of his doctoral dissertation, and contributed to the recent characterization of the two rarest collagens in the human body, working with his friend and colleague Jeanne C. Myers, PhD, associate professor of physiology and



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biophysics, University of Pennsylvania School of Medicine. In addition, Dr. Amenta has collaborated with RWJMS colleagues in the division of gastroenterology/hepatology, headed by Kiron Das, MD, PhD, professor of medicine, to increase the understanding of the pathobiology of Barrett's esophagus and inflammatory bowel disease.

"Graduate programs are a vital cog in the academic machine," says Dr. Amenta, who earned his medical degree and completed a doctoral degree in anatomy, while completing his residency in anatomic and clinical pathology at Hahnemann University. "Graduate students enrich the academic atmosphere of the campus and create wonderful opportunities for learning, teaching, and research, particularly translational research."

Dr. Amenta was founding director of the Immunohistochemistry Shared Resource at The Cancer Institute of New Jersey (CINJ). As interim dean, he promoted the growth of this and other RWJMS core facilities and has committed himself to vigorously supporting their further expansion.

"We have to support and grow our

basic sciences as well as our translational and clinical sciences," adds Dr. Amenta. "Above all, we have to advance our mission to integrate research with patient care and education, with the goal of improving the health of our patients. Without this focus, we might be part of a health center, but not an academic health center."

In the second year of Dr. Amenta's service as interim dean, the medical school's steadily growing graduate programs were centralized at RWJMS. "This was an important change, says Dr. Amenta, adding, "I am grateful for our partnership with the UMDNJ-Graduate School of Biomedical Sciences and its interim dean, Dr. Kathleen Scotto. Now we are responsible for our own graduate programs, and we have more freedom to develop new initiatives on our campus."

Dr. Amenta is committed to working more closely with alumni. "We want to strengthen our ties to our alumni; their support is crucial to our mission," he says. "We need more people out there talking about us in a positive way, and alumni are our best ambassadors. We need to provide more meaningful con-

nections between students and the alumni. I don't believe we've fully realized the potential benefits to either students or alumni of this kind of partnership."

Growing the Virtual Hospital

Under Dr. Amenta's leadership, from 1998 to 2008, the number of faculty in the Department of Pathology and Laboratory Medicine doubled, and the department expanded its clinical, research, and educational programs. It now has clinical oversight responsibilities at RWJUH, RWJUH at Hamilton, Bayshore Community Hospital, and Southern Ocean County Hospital. The department also contracted with the New Jersey Department of Health and Senior Services (DHSS) to oversee its clinical laboratory.

In 2008, Evan M. Cadoff, MD, professor of pathology and laboratory medicine, was awarded a sixth renewal of a multimillion-dollar DHSS grant as well as a new grant from the New Jersey Department of Human Services. Together, the two grants support the department's administration of New Jersey's HIV rapid testing program in every county statewide.

As interim dean, Dr. Amenta worked with Christine W. Hunter, MD, associate professor and chair, Department of Anesthesiology, and the department's faculty to expand anesthesia services to Southern Ocean County Hospital. With the assistance of Bruce G. Haffty, MD, professor and chair, Department of Radiation Oncology, Dr. Amenta facilitated the establishment of UMDNJ's first cross-campus department, Radiation Oncology, which will serve both RWJMS and UMDNJ-New Jersey Medical School in Newark. "This is an excellent example of our ability as a university to provide services as a truly statewide resource," says Dr. Amenta.

"In the Department of Pathology, by contracting with other hospitals for our services, we created a network, or 'virtual hospital,'" he says. "RWJUH, a



LINZ PHOTOGRAPHY

Above, left to right: William F. Owen, Jr., MD, president, UMDNJ; Peter S. Amenta, MD, PhD, dean; Robert S. DiPaola, MD, director, CINJ; and Joseph R. Bertino, MD, interim director, Stem Cell Institute of New Jersey.

primary clinical affiliate, has 550 beds. The 500 additional beds at our clinical affiliates give us a more-than-1,000-bed virtual hospital, with about the same capacity as some of our better-known peers. Our virtual hospital annually performs approximately 5 million clinical tests and analyzes 45,000 anatomic specimens, creating additional revenue that we can then invest into all of our mission areas. This type of investment allows us to offer the kind of state-of-the-art services provided by our ‘aspirational peers.’”

In addition, as CEO of the Robert Wood Johnson Medical Group, Dr. Amenta led the drive to enhance the group’s business operations. His objectives, successfully achieved, included the improvement of interdepartmental cooperation, the streamlining of business practices, the implementation of a state-of-the-art electronic medical record (EMR) system, and improved

access to physicians.

“In the clinical practice, as in every other area, the development of sound partnerships is critical to success,” says Dr. Amenta. “Whether we’re implementing a new billing system or negotiating a managed care contract, we need to work as a group, or we’re going to be at a distinct disadvantage. For many of us, this has been a difficult transition to make; since we have been working in silos for so long, we knew nothing else.”

Describing the recent implementation of GE Healthcare Centricity Business, a state-of-the-art patient scheduling and billing system, Dr. Amenta says, “Since I’ve been here, this was the biggest change in the way we perform our patient care business. It was not without some difficulty and some calculated risk, but we did it. Afterward, I went to the front desk in every department to shake hands with our frontline staff, the people who made it happen. This changeover was huge, and we couldn’t have done it without them.

“Most important,” he adds, “we now have the technology to get better every year. We must now work with the

same vigor to improve all aspects of our patient services.”

THE PATH TO THE DEAN’S OFFICE

Dr. Amenta enjoyed his time as interim dean, from start to finish, and learned a great deal from the experience. “I gained a better understanding of the organization, of the position of dean, and of myself,” he says. He appreciated the opportunity to get to know more people at the medical school and to better appreciate the challenges faced by their respective departments. He also became more familiar with collaborating institutions, including Rutgers, The State University of New Jersey, and community non-profits that partner with the medical school.

Already familiar with RWJUH and the New Brunswick/Piscataway campus, Dr. Amenta spent time on the Camden campus, not only getting to know the faculty and students better, but also becoming more familiar with the leadership and strengths of Cooper University Hospital, a principal affiliate of the medical school.



JOHN EMERSON

You have to clarify what you're trying to do and how you're going to do it."

"I'm extremely happy and honored to have been appointed dean," adds Dr. Amenta. "As interim dean, you may be unexpectedly thrust into the position. You have to react quickly and your goal is to keep things steady. As dean, I look forward to the opportunity to continue

"I'm extremely happy and honored to have been appointed dean," adds Dr. Amenta. "I look forward to the opportunity to continue to work with our talented faculty, staff, students, and alumni, planning for our future and acting on a broader set of ideas and programs."

Dr. Amenta was particularly grateful for the insights he gained into the medical school's exceptional work in community health. On both campuses, he met with the faculty and students who provide clinical care and social services to people who are medically underserved and, often, uninsured. "In pathology and as chief of staff, I didn't have a lot of experience with these programs," he says. "So it was great to get out there and see what we are doing."

Dr. Amenta was delighted with the Eric B. Chandler Health Center's 20th-anniversary celebration in September, marked by a gala that raised \$125,000 to support the center's services. "Dr. Eric Jahn, recently selected as senior associate dean for community health,

has done an excellent job in leading us in this mission of community health," says Dr. Amenta.

While serving as interim dean, Dr. Amenta was also a candidate for the position of permanent dean. Throughout the search, he emphasizes, his first priority was to fulfill the leadership responsibilities of the dean's office, keeping the faculty, students, and staff focused on advancing the medical school in each of its four mission areas.

"Going through the search was an important process for me," says Dr. Amenta. "When you're applying for a position in a place where you already work, you're forced to articulate your thoughts about the institution to others who care as deeply about it as you do.



LINZ PHOTOGRAPHY

Edna Amenta and Peter S. Amenta, MD, PhD, dean, with Eric G. Jahn, MD '88, associate professor of environmental and occupational medicine and senior associate dean for community health, at the Eric B. Chandler Health Center's 20th-anniversary gala in September, which raised \$125,000 to support the center's services.

to work with our talented faculty, staff, students, and alumni, planning for our future and acting on a broader set of ideas and programs." **M**



Celebrating Two Decades of Community Service:

The Eric B. Chandler Health Center

By Joni Scanlon

Thousands of folders in vivid hues of the rainbow line industrial-strength shelves or lie in stacks to be filed in the patient records room of the Eric B. Chandler Health Center in downtown New Brunswick. Colorfully, they hint at the sheer volume of people who walk through the doors of this federally qualified community health center each day.

The center opened in 1987, in three temporary trailers on a city side street, the culmination of a community's dream for affordable, high-quality health care. A local health crisis served as the impetus for the launch of the Chandler Center — a community health center operated by the former Middlesex Hospital (now Robert Wood Johnson University Hospital) had been forced to close its doors, leaving the local population without access to care.

With community and foundation support, UMDNJ-Robert Wood Johnson Medical School joined forces with the Urban League of Greater New Brunswick (a precursor to the Civic League), led by C. Roy Epps, president and chief executive officer, to open the center.

Demand for its services was such that the center quickly outgrew its original space. With help from a grant from the Robert Wood Johnson Foundation, the center relocated in 1995 to a facility at 277 George Street. Again experiencing growing pains, the center opened a Church Street site in 2006 to accommodate patient overflow, also with financial assistance from the foundation.

Today, the two facilities are again reaching capacity, serving nearly 14,000 patients and generating nearly 60,000 encounters a year. Both provide acute and chronic care to patients of all ages and serve a population drawn from the greater New Brunswick area. In addition to basic primary medical care throughout the life cycle, the center offers HIV treatment, dental services, podiatry, nutrition counseling, and social services.

The center is directed by Eric G. Jahn, MD '88, associate professor of environmental and occupational medicine and senior associate dean for community health, and by Sandra Adams, executive director, in conjunction with the Eric B. Chandler Health Center Community Board. Dr. Jahn has served as medical director for 14 of his 16 years with the health center.

Besides expanding in physical space, the Chandler Center continually strives to increase the scope and quality of the services it offers. In recent years, the center has developed a partnership with Rutgers, The State University of New Jersey, to initiate two important programs: the New Brunswick Community Interpreter Project, which helps providers communicate better with a patient base that is largely Hispanic, and a clinical pharmacy student rotation.

Focusing on Quality Care

Another major focus of the center has been on improving the quality of care delivered, ensuring that no patient falls through the cracks. To further its quality goal, the center has adopted a quality measure known as “the Care Model.” This model was developed by Boston’s Institute for Healthcare Improvement and endorsed by the United States Bureau of Primary Healthcare, an agency within the Health Resource Services Administration and one of the center’s major funders. The Care Model offers a systematic approach for tracking patients throughout their health care experience. It is administered by Beverly Kaminski, RNC, BSN AE-C, program manager for quality assessment, who was appointed to the position in 2005.

Initially focusing on patients with diabetes, the center has developed a computerized registry that, along with weekly team meetings, helps to track diabetic patients and make sure appropriate treatment targets are being met, says Dr. Jahn. “We now have all the patients who have diabetes in our practice in the registry. We know what their blood pressure is, what their average blood sugar level is, who has had an eye exam, who has had appropriate foot care or dental care or immunizations,” he explains. “We use the registry and the team meetings to make our practice better around the issue of diabetes.” The center’s staff also provides educational programs and often reaches out to identify resources for these patients, such as sources for less costly medications.

Based on its early success in tracking an estimated 725 diabetic patients, the Care Model



PHOTOS BY JOHN EMERSON

Above: Chandler staff members in front of the mural by Caryl Henry-Alexander (left to right): Nicole Quiterio, MD, pediatric resident; Sandra Adams, executive director; Rodney Reid, business manager; Borum Sung, MD, pediatric resident; Usha Ramachandran, MD, pediatric attending; Jacqueline Lopez, RN, assistant nurse manager, pediatrics; Beverly Kaminski, RNC, BSN AE-C, program manager for quality assessment; Jacqueline Fleming, MD '88, pediatric director.

Left: Eric G. Jahn, MD '88, associate professor of environmental and occupational medicine and senior associate dean for community health, examines José Rodríguez at the Chandler Center.



is being extended to patients with cardiovascular disease, childhood asthma, obesity, or lead screening issues and used in preventive cancer care programs. Its use is also being considered for patients in the center's OB/GYN practice, as well as in its HIV practice, where new treatment protocols have shifted the focus of care from an acute disease model to a chronic one, says Ms. Kaminski.

The Church Street Site

The Church Street Site mainly offers primary care for adults and dental care for adults and children. It is staffed by lead physician Sally Mravcak, MD '00, a nurse, a dentist and dental assistant, and two receptionists. To reduce the number of no-shows, the site has an open

access system, in which patients can call the day before they want to schedule an appointment.

Barely two years old, the site is already experiencing strong demand, says Dr. Mravcak. “On the medical side, we’re seeing anywhere from 14 to 20 patients per day, somewhere near 1,600 medical patients [in our practice], which is getting pretty close to capacity,” she says. Dr. Mravcak estimates the facility’s overall capacity to be about 2,000 medical patients.

Despite the challenges it faces, the staff finds its work rewarding, says Dr. Mravcak. “It’s gratifying to be able to provide continuing care to individuals who otherwise couldn’t afford it,” she says. Like the George Street facility, she adds, “we also see patients who are further along the disease pathway, so we’re intervening at a time when something needs to be done. It’s satisfying to know that some of the decisions you are making are really having a significant impact on people’s lives.”

Access to Affordable Dental Care

Meeting a critical care gap, the Chandler Center offers the services of five dentists. Four practice at the center’s main facility on George Street, with one of them dividing her time between George Street and the Lord Stirling Community School in New Brunswick. The latter clinic operates five days and one evening a week during the school year, serving children attending the school. In addition, there is a full-time dentist at the Church Street site. Basic and complex dental services are offered at the Chandler Center and Church Street site to financially eligible patients on a sliding-scale basis. Last year, the three practices accommodated 11,609 patient visits by 5,230 patients.

For low-income individuals who lack insurance, dental care is one of the first things to be neglected, which adds to the challenges the center’s dentists face. Besides the two center clinics, which are available to adults and children, the pediatric dental program at the Lord Stirling School offers basic dental services including fillings, cleanings, and the administration of preventive sealants.



PHOTOS BY JOHN EMERSON



Above: Hank Dallmann, program director, the New Brunswick Community Interpreter Project, translates information as Jacqueline Fleming, MD '88, pediatric director, examines Catherine Grazo.

Left: Virginia Matos-Perrotte, DMD, administers dental care to one of her patients.

New Pharmacy Program

The Chandler Center and the Ernest J. Mario School of Pharmacy at Rutgers University launched a joint pharmacy program four years ago at the George

Street facility, through a grant from Johnson & Johnson. This initiative brings approximately 20 Rutgers pharmacy students into the center each year for their clinical rotations, which are supervised by Enid Morales, PharmD, clinical associate professor at the School of Pharmacy, who teaches on-site.

“This program allows us to provide enhanced services to some of our patients — especially to those who are taking large numbers of chronic medications and may need help understanding how to take them correctly,” says Dr. Jahn. “It’s good, practical experience for the pharmacy students.”



It gives our patients access to a level of care that wouldn't otherwise be possible. And it gives our learners — our residents and medical students — the chance to be exposed to a clinical pharmacist, an important health partner during their training.”

The Community Interpreter Project

About 72 percent of the Chandler Center's patients are Hispanic, and many speak Spanish as their first and often only language. The New Brunswick Community Interpreter Project, developed in partnership with Rutgers, is helping the center's medical staff and patients overcome the communication challenges that such language barriers present.

Begun in 1999, the program is “growing by leaps and bounds,” says Hank Dallmann, program director. “When the program first started, we had eight students who produced about 400 interpreter encounters a year,” he says. “Now we have 37 students who produce probably 400 encounters a week. Some of our doctors have told us they

wouldn't be able to do their job as effectively without the interpreters.”

The program draws its interpreters from the general Rutgers student population, including students in language or pre-med programs, according to Mr. Dallmann. Students, who staff the center's various clinics on days, evenings, and weekends, are compensated through the federal Work Study Program or can earn course credit. Participants pass an initial interview and screening test to evaluate their level of Spanish and ability to interpret effectively. They then take a five-hour training course and participate in up to twelve hours of on-the-job training.

In addition to learning about medical ethics, confidentiality, note taking, and other essential topics, the students are taught an adapted form of professional medical interpreting, such as positioning themselves unobtrusively during a patient encounter and making linguistic and cultural interventions so as to facilitate a strong patient-provider bond.

“It's not enough to just speak Spanish,” says Mr. Dallmann. “We believe that what separates what we do from programs that use people who just happen to be bilingual is the specialized testing, training, and supervision that we offer.” He adds, “Anyone can use their bilingual staff as interpreters. We offer quality control.”

Providing Social Services

A great strength of the Chandler Center is its ability to assist patients in areas beyond the medical realm through its social services department, which is directed by Carlos A. Cordero, MSW, LCSW. Cordero and his staff of two social workers assist approximately 1,000 clients a year with their basic needs for food, housing, jobs, and affordable prescriptions; connect them with legal representation; sponsor an array of educational programs; and provide mental health counseling when needed.

The social services staff also provides a number of outreach initiatives each year. These include parent education classes, sessions on domestic violence, and a child safety day that explores such topics as fire hazards, bike helmets, lead-based paint, and abduction.

Each year, the staff also hosts a day devoted to women's self-esteem workshops, including motivational speakers, dress-for-success and makeup programs, and discussions on empowerment.

Recently, Mr. Cordero helped launch a new initiative in partnership with Legal Services of New Jersey, with assistance from a grant from the Rutgers Community Health Foundation, which helps center clients resolve non-criminal legal issues, such as gaining access to entitlement programs, and securing child support.

Future Challenges

As it has since the day it opened, the Chandler Center will continue to cope with a demand that stretches its resources. Indeed, says Ms. Adams, who joined the staff in 2007, “the trend of hospital closings in New Jersey is likely to exacerbate that demand, pushing more patients into community health centers such as the Chandler Center.”

Space will always be an issue, she notes. “We’ll always be working to handle an influx of new patients. But most important,” she says, “is that we have to make sure we continue to meet the needs of the community for quality health care.”

Dr. Jahn could not agree more. “Our big goal is to identify the resources we need to continue to expand not just the number of patients we see, but to do it in a way that satisfies the expanding needs of the people we serve,” he says. “Just doing more medical encounters is not our goal. The goal is to do more medical and dental encounters that really represent the standard of care.”

Today, one of the individuals responsible for founding the Chandler Center is so proud of its accomplishments that he remains a patient there. “I could actually go anywhere, but I prefer to be there,” says Mr. Epps. “That’s my commitment.”

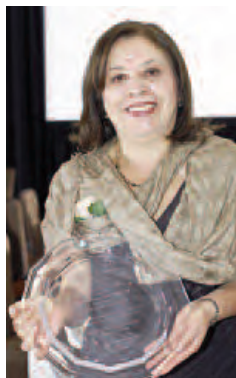
A Gala Celebration

In September, the Chandler Center celebrated its two decades of service to the community with a gala at The Heldrich in New Brunswick.

Thanks to the support and partnership of the Foundation of UMDNJ, the event raised \$125,000 in net profits, which will directly benefit the center.

New Brunswick Mayor James Cahill served as honorary chair, and the guests of honor included two individuals whose support for the center has been integral. Those honored were:

- C. Roy Epps, president and CEO, the Civic League of Greater New Brunswick. He received the award named in his honor: the C. Roy Epps Community Leadership Award.
- Mariela Herrera-Cifelli, BSW, CSW, social worker, Chandler Health Center. Ms. Herrera-Cifelli joined the staff in 1999 and developed its adolescents and domestic violence awareness programs. She received the Excellence in Service Award, honoring her leadership and dedication to patients.



The gala drew many supporters of the center, both past and present, including: William F. Owen, Jr., MD, president, UMDNJ; Denise V. Rodgers, MD, executive vice president, academic and clinical affairs, UMDNJ; Peter S. Amenta, MD, PhD, dean; Risa Lavizzo-Mourey, MD, MBA, president and chief executive officer, Robert Wood Johnson Foundation; and George F. Heinrich, MD, chief executive officer, Foundation of UMDNJ.

“Chandler is such an incredibly special place,” says Dr. Rodgers, who served as senior associate dean for community health at RWJMS during the center’s formative years. “It is a national model as a true collaboration between a medical school and a community board, and it serves as a training site for an array of health professions students as well as the undergraduate students who are a part of the New Brunswick Community Interpreter Project.”



Above: Dr. Jahn presents the C. Roy Epps Community Leadership Award to C. Roy Epps, president and CEO, the Civic League of Greater New Brunswick. Left: Mariela Herrera-Cifelli, BSW, CSW, social worker, Chandler Health Center, recipient of the Excellence in Service Award.

“The staff, faculty, residents, and students all strive to provide the highest-quality care to a highly diverse, multicultural, underserved population of patients,” Dr. Rodgers added. “I am proud to have been associated with the center for the past 10 years.”

Also present for the gala was Yesenia M. Hernandez, chair, Eric B. Chandler Community Board,

who spoke of the facility’s importance to the community. “The Chandler Health Center serves as an anchor in our community, bringing together residents, health care providers, and community leaders who support our mission,” says Ms. Hernandez. “It also serves as an educational facility offering valuable programs to promote healthy lifestyles, and, most importantly, the physicians and staff provide affordable, comprehensive health care without discrimination.” **M**



Personalized MEDICINE

Probing the Human Genome to Advance Patient Care

BY KATE O'NEILL

PORTRAITS BY JOHN EMERSON

PHOTO ILLUSTRATIONS BY BARBARA WALSH



The Human Genome: *The Sum of 25,000 Parts*

In the mid-1880s, Georges Seurat introduced Pointillism in revolutionary paintings that depicted the whole as the sum of its parts. In *Sunday Afternoon on the Island of La Grande Jatte*, for example, the artist depicts the setting and every form within it through thousands of small dots of color, carefully arranged on the canvas to present a unified, recognizable image to the viewer's eye.

A century later, the indiscernible, unifying parts of the whole would again come under analysis. And again, the results would be revolutionary. The Human Genome Project (HGP), a vast, international effort launched in 1990, took ten years — two less than planned — to complete 99 percent of its primary task: to map and sequence a human genome, the unique combination of genes and DNA that distinguishes *Homo sapiens* from all other species. By 2005, the project was complete, having reached or exceeded many of its goals.

The HGP discovered that a human genome is made up of as many as 25,000 individual genes, 10,000 fewer than scientists originally estimated. In any two people, researchers found, the genetic sequence is more than 99.9 percent identical. (To illustrate the importance of seemingly small percentages in genetics: a human genome is 99 percent identical to a chimpanzee's; it is 90 percent identical to that of a house fly.)

At the start of the project, its leaders established an important precedent that accelerated its accomplishments: within 24 hours of a discovery on genome sequencing, the findings had to be posted for public access. This ensured immediate, maximum benefit to researchers and the public worldwide.

The 0.1 Percent Solution: *Translating Genetic Variations into Novel Treatments*

Researchers had mapped a human genome and human DNA had been sequenced. Subsequently, they would map the 3.7 million single nucleotide polymorphisms

(SNPs) — DNA sequence variations caused by the alteration of a single nucleotide — that not only create recognizable differences between individuals, but also can have enormous health consequences. A single misplaced chromosome can cause serious, even fatal disease. Similarly, people with uncommon or common SNPs can suffer deadly results from a one-size-fits-all prescription.

The HGP did not study these genomic variations; it focused on the basic blueprint, the 99.9 percent of the human genome that is universally shared. But the project unlocked the door to personalized medicine, a revolutionary new field that studies the other 0.1 percent — that fraction of the genome profile that makes each person unique.

Well before the HGP was complete, its findings suggested a new paradigm for medical research and treatment: a world where, years before symptoms emerge, illness will be prevented based on knowledge of the patient's personal genome. Equally important, pharmacogenomics, applying the same knowledge, will prevent adverse drug reactions or identify responders associated with the genetic variability.

The goals of personalized medicine drive research projects in nearly every department at UMDNJ-Robert Wood Johnson Medical School. At two RWJMS institutes, The Cancer Institute of New Jersey (CINJ) and the Environmental and Occupational Health Sciences Institute (EOHSI), concentrations of scientists are advancing the understanding of genomic variability and helping to translate their findings into clinical settings. At the Center for Advanced Biotechnology and Medicine, scientists are immersed in a broad range of individual and multi-institutional bench research defined, at least in part, by the goals of personalized medicine.

Research in personalized medicine explores the health-related consequences of genetic variation, seeking answers to questions about complex human diseases including cancer, type 2 diabetes, Alzheimer's disease, autism, and cardiovascular disease, as well as normal processes such as the aging of cells. What explains



Personalized MEDICINE

the disparities between men and women in surviving cancer? Which SNPs put people at risk for which diseases? How do environmental factors interact with certain genotypes to create or heighten disease risk?

The answers to these and other related questions will have vast potential for translation into clinical applications, ranging from prevention to treatment — for example, early screening for people whose personal genomic profile suggests they are at higher risk to develop a disease, or therapies that treat the patient by targeting disease-associated DNA mutations. In some instances, research already has led to the use of drugs tailored to therapeutic targets in individual patients.

By the spring of 2008, the cost of sequencing an individual genome cost had decreased to \$350,000, nearly two-thirds less than the \$1 million it cost in 2007 to map the genome of James D. Watson, MD, co-discoverer of the structure of DNA. With national grant support and streamlining of the process, the cost may reach an affordable level within the coming decade. Consequently, a personal genome could be scanned and saved onto a memory stick the size of a ballpoint pen and read on a physician's office computer.

Individual biomarkers in a person's genome would indicate a susceptibility to developing a certain disease — cardiovascular disease or colorectal cancer, for example — and the patient and physician would begin developing a preventive health plan. Biomarkers would also predict the patient's match or mismatch with certain drugs, indicating the likelihood of resistance or adverse reaction. For example, the chemotherapy drug 5-Fluorouracil is differently metabolized by each patient. If a patient has a decreased level of the metabolizing enzyme dihydropyrimidine dehydrogenase, then Fluorouracil, instead of being metabolized, will accumulate in the cells, reaching a toxic, possibly fatal, level.

Joseph R. Bertino, MD, university professor of medicine and pharmacology and interim director, the Stem Cell Institute of New Jersey (center), with Robert S. DiPaola, MD, professor of medicine and director, The Cancer Institute of New Jersey (CINJ), and Kim M. Hirshfield, MD '99, PhD, assistant professor of medicine and medical oncologist, CINJ.

Customizing Cancer Treatment and Prevention, Patient by Patient

“Personalized medicine? It's what we've always tried to do. Now it's taken on new meaning.”

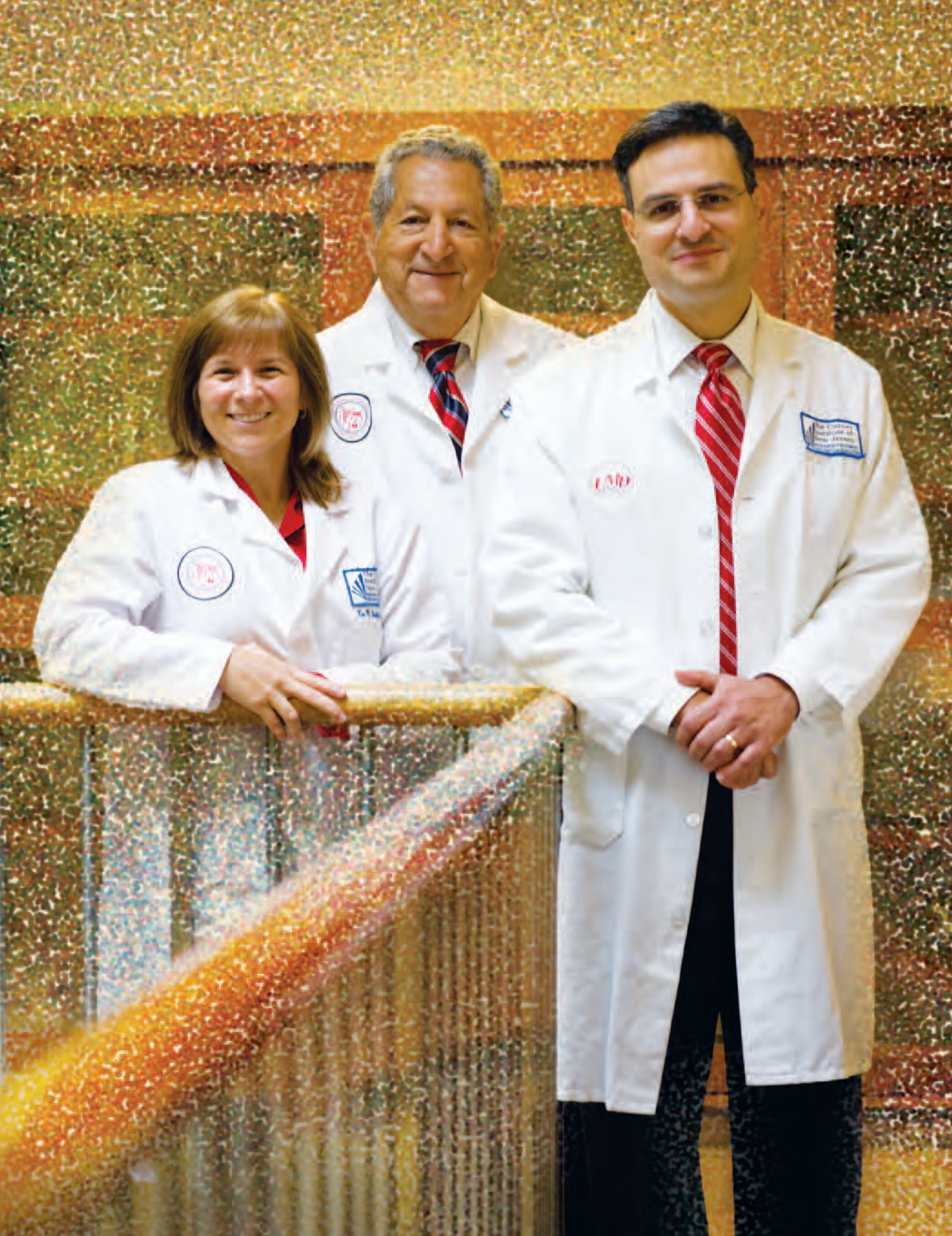
— Joseph R. Bertino, MD, university professor of medicine and pharmacology and interim director, the Stem Cell Institute of New Jersey



ersonalized medicine encompasses two distinct but related areas, says Robert S. DiPaola, MD, professor of medicine and director, CINJ. Scientists in one area focus on ways in which a personal genomic profile can inform both patient and physician about disease risk and customize preventive efforts. In the second, cancer treatment teams examine the genetic profile of a patient or a tumor to match the host to the treatment.

Dr. DiPaola is one of many physician-scientists at CINJ working on clinical trials that aim to treat cancer by targeting the apoptosis and the metabolism of cancer cells. One study for patients with prostate cancer stems from the knowledge that tumors have increased mechanisms of resistance, such as the overexpression of the resistance protein Beclin (bcl)-2. In multiple Phase I and Phase II trials. Dr. DiPaola and his colleagues have found that they can determine the expression of bcl-2 in a tumor and treat the cancer with agents that target bcl-2. They are hopeful that their analysis will determine the patient's prognosis and course of treatment.

In a second study, Dr. DiPaola is looking at the role of Beclin-1 as a biomarker for prostate cancer. Normally Beclin-1 regulates autophagy, a process that keeps cells clear of extraneous material. In human prostate cancers, however, its function may be impaired. Because Beclin-1, a tumor suppressor protein, is stainable, it “lights up” in a microarray. This allows its expression to be monitored and may eventually help the oncologist determine the best treatment. The study has moved to the clinical trial stage, with patients receiving 2-deoxyglucose to depress excess glycolytic activity, which causes cells to grow and reproduce too quickly. Dr. DiPaola reports that he





Tissue microarray analysis of cancerous tissue can determine the distribution and precise cellular and sub-cellular location where biomarkers are expressed in a tumor, helping to determine the exact stage of disease progression and improving prognostic accuracy. This technology means that “an oncologist will no longer need to proceed from treatment A to B to C to find the one that works best for a given patient,” says David J. Foran, PhD, professor of pathology and laboratory medicine and radiology and director, Center for Biomedical Imaging and Informatics, CINJ.

is encouraged by the initial results of laboratory and clinical studies targeting apoptosis and metabolism. But, he adds, further studies will be needed to fully understand these approaches.

Personalized medicine is well suited to treating patients with breast cancer. Long viewed as a single disease, cancer is now known as having many forms and causes, requiring that each patient receive person-

alized treatment tailored to his or her disease and genetic variables. The complexity of treatment is demonstrated by the fact that, as a result of genotype variations, the same drug, in an identical dosage, can put one patient into remission while meeting resistance or even causing toxicity in another. Kim M. Hirshfield, MD '99, PhD, assistant professor of medicine and medical oncologist, CINJ, explains that a complete genomic profile is not necessary to determine the best treatment: “In several forms of cancer, including breast and lung, five or six genes may predict the tumor’s response. If you find that a breast tumor has progesterone or estrogen receptors — predictive biomarkers for breast cancer — you know it will respond to hormone suppression treatment.”

Dr. Hirshfield started her work on predictive biomarkers while completing her post-doctoral training at RWJMS, mentored by Arnold J. Levine, PhD, professor of pediatrics and biochemistry and resident member, CINJ. The collaboration continues with their

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research into SNPs as biomarkers that not only predict the occurrence and recurrence of breast cancer but also can suggest optimum treatment modalities. For instance, Dr. Hirshfield explains, radiation and chemotherapy are forms of stress that activate the signaling pathway of p53, a tumor suppressor gene. Knowledge of whether p53 is unstable or disrupted can tell the physician whether to try a different form of treatment — newer medications or a drug in clinical trials. “The Human Genome Project is already helping us to ‘first, do no harm,’” she adds.

Interconnecting The Silos: *Using Informatics to Improve Cancer Care*

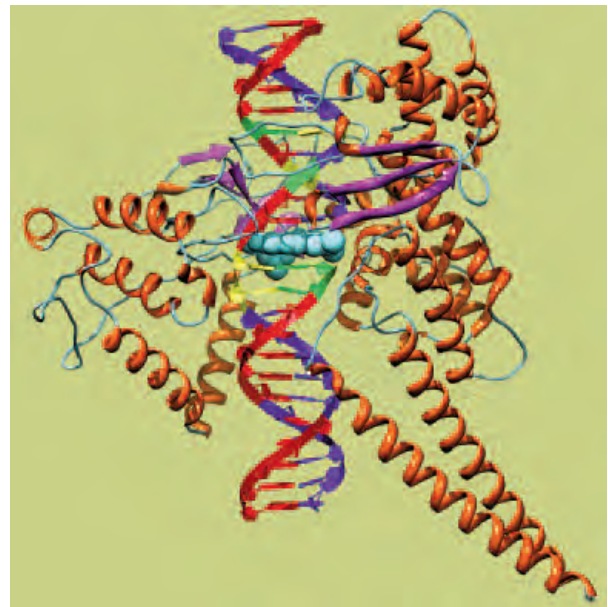
Patients with cancer are already benefiting from one of the legacies of the Human Genome Project: the advancement of high-performance computer technology. The science of informatics, high-throughput computing — often using the power of shared computer grids — has been married to biology through high-speed microarray tissue analysis, producing bioinformatics. The result is a dramatic improvement in the accuracy and speed with which cancer is characterized and classified. Together, these specialties provide the breadth and depth of analysis required to recognize similarities and variations in the human genome and develop personalized medicine as a strategy for disease prevention and treatment.

Tissue microarray analysis of cancerous tissue can determine the distribution and precise cellular and sub-cellular location where biomarkers are expressed in a tumor, helping to determine the exact stage of disease progression and improving prognostic accuracy. High-throughput computers compare these findings against expression signatures in thousands of other patients, giving physicians a comparative basis for determining treatment and predicting the outcome of the disease. This technology means that “an oncologist will no longer need to proceed from treatment A to B to C to find the one that works best for a given patient,” says David J. Foran, PhD, professor of pathology and laboratory medicine and radiology and

director, Center for Biomedical Imaging and Informatics, CINJ.

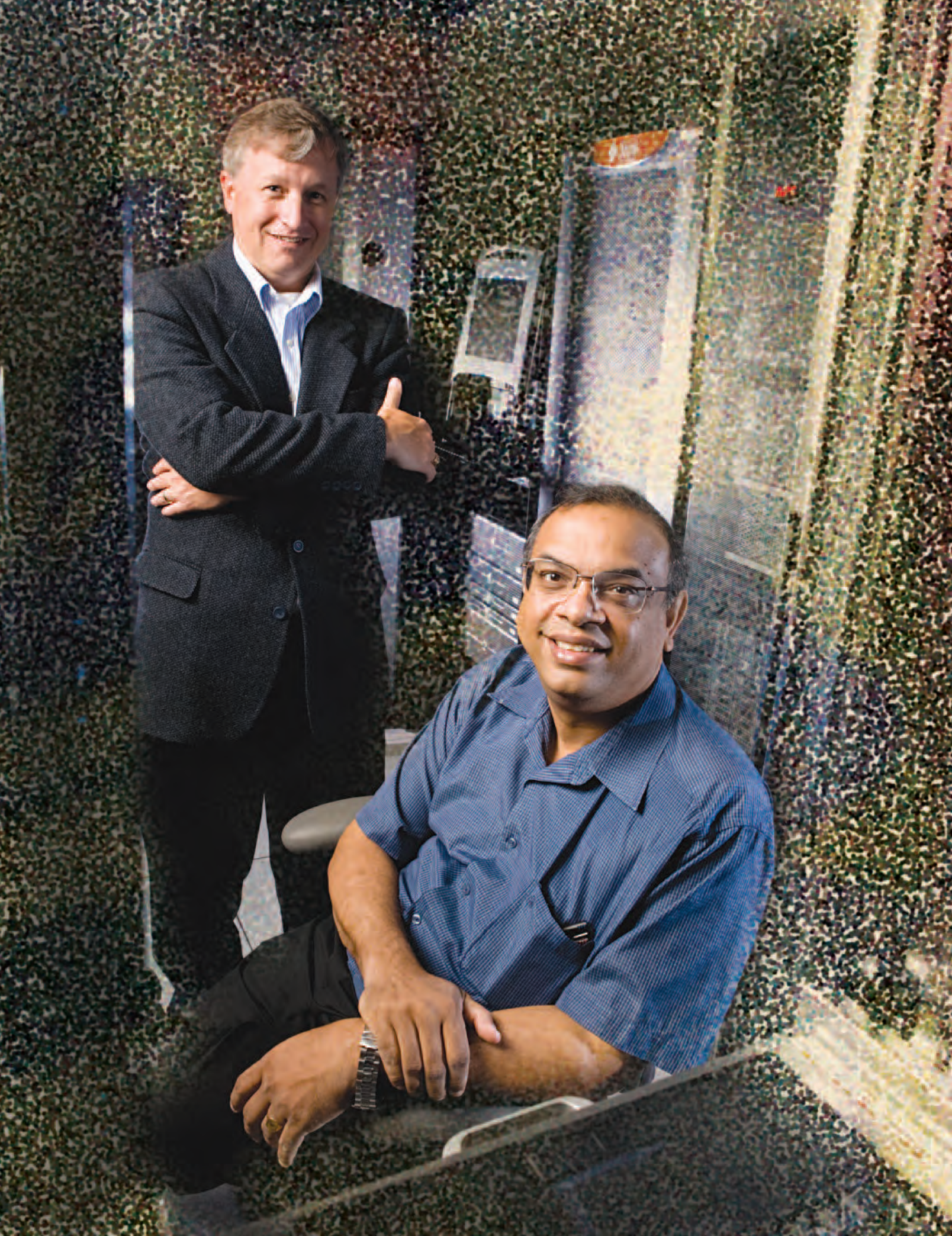
The RWJMS Cancer Informatics Core (CIC) is located at CINJ, where the mission in translational research creates an ideal environment for advancing personalized medicine. “In isolation, basic scientists tend to work with model systems, which don’t always succeed in the real world,” says Gunaretnam Rajagopal, PhD, executive director of bioinformatics, CINJ. “Here at CINJ, basic scientists hear about the real questions every day and fit their research to the questions people really need answers to.

“New Jersey has a phenomenal level of intellectual capability,” he adds. “With the pharmaceutical industry and the universities here, New Jersey is the Silicon Valley of scientific expertise.” The problem, he says, is



COURTESY OF JOHN E. KERRIGAN, PHD

This illustration depicts a model used in the design of novel anti-cancer therapeutics based on the inhibition of the enzyme topoisomerase I (orange and purple ribbons). The red, blue, gold, and green ribbon structure is the substrate DNA. The novel therapeutic that blocks the enzyme leading to death of the cancer cell is colored cyan. This research project is an ongoing collaboration between scientists at The Cancer Institute of New Jersey, the RWJMS Department of Pharmacology, and the School of Pharmacy at Rutgers, The State University of New Jersey.



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that the experts work in “silos,” more focused on individual projects than on shared end points. Dr. Rajagopal is positioning the CIC to serve as a true core, where bridges between silos will interconnect and state-of-the-art information technology will strengthen public and private enterprises. To mine, sort, and find patterns in the volumes of genomic material to be analyzed, the CIC offers the complementary strengths of multi-disciplinary teams of specialists and access to the latest and most powerful information technology.

Together, New Jersey and the Northeast make a perfect test tube for research in personalized medicine, says John Kerrigan, PhD, adjunct associate professor of pharmacology and associate director of bioinformatics, CINJ. He explains that the diverse populations of the region present an ideal opportunity for studying complex common diseases and analyzing the geographic, racial, economic, and ethnic bases for disparities in disease. The volumes of data available on patients treated at hospitals throughout the region will provide the extensive information needed to understand disparities in disease. And NJEDge, the state’s regional optical fiber network, has both the capacity to provide instant sharing of data and images and the potential for speed-of-light electronic collaboration between New Jersey’s governmental, industrial, research, and educational communities.

To facilitate collaborations, translational research, and the identification of disease biomarkers, the CIC has launched a pilot project, PopWeb, to build a statewide data warehouse and bio-specimen repository that will integrate genomic and clinical data to predict specific treatment options for cancer patients. NJEDge will link institutions in the New Jersey cancer research network. PopWeb will also be integrated into the National Cancer Institute’s biomedical informatics grid (caBIG).

Together, New Jersey and the Northeast make a perfect test tube for research in personalized medicine, says John Kerrigan, PhD, adjunct associate professor of pharmacology and associate director of bioinformatics, CINJ, (standing, left) with Gunaretnam Rajagopal, PhD, executive director of bioinformatics, CINJ.

In Help Defeat Cancer, a project led by Dr. Foran, researchers from CINJ, IBM, and several U.S. universities developed grid-enabled informatics tools that make use of tissue microarrays, pattern recognition algorithms, and grid-based supercomputing. The focus of the project is the creation of a “retrospective” reference library of staining and protein expression profiles for breast, head and neck, and colorectal cancers. To conduct the proof of concept required to get funding for the project, 100,000 patient tissues with known diagnoses were analyzed using CINJ’s specialized microarray software. Programmers from IBM adapted the software for grid analysis and ran the results on an IBM virtual supercomputer called the World Community Grid (WCG). The project would have taken a single desktop computer 2,900 years to complete, but it took the WCG less than six months, says Robin Willner, IBM’s vice president for global community initiatives.

The project is now supported by a new \$2.5 million R01 grant from the National Institutes of Health (NIH), which was awarded to Dr. Foran in October 2007. “The costs of investment in high-performance computing technology are significant; however, the benefits to all disciplines and disease areas far outweigh the expense,” says Dr. Kerrigan.

EOHSI: *Connecting the Dots*

Because personalized medicine studies complex diseases, the field is well suited to the mission of EOHSI. At this joint institute of RWJMS and Rutgers, The State University of New Jersey, scientists and clinicians address the health issues caused by exposure to environmental agents. Some of the studies focus on common sources of toxic exposure — workplace chemicals, tobacco, solar radiation, airway irritants, pesticides, insecticides, and fertilizers.

Depending on one’s personal genome, the biological response to these and thousands of other environmental agents ranges from null, to slowly emergent disease, to sudden death. Furthermore, the DNA a person is born with changes during a lifetime. Factors ranging from environmental factors to lifestyle and illness alter

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gene expression, rearranging the genome by degrees. This explains why identical twins, whose genome is the same at birth, ultimately develop different genomic profiles. Toxic environmental agents can significantly alter DNA, creating a susceptibility to disease that was not previously part of an individual's genotype.

EOHSI has taken a leadership role in investigating environmental health issues on an international scale. In the past decade, the institute's researchers have studied the health of veterans of the first Gulf War as well as exposure-related illnesses of the thousands of workers who helped clean up Ground Zero after the 2001 World Trade Center attacks. In collaboration with the UMDNJ-School of Public Health, several scientists at EOHSI also have been studying the health outcomes of China's efforts to lower levels of air pollution in Beijing during the 2008 Olympic Games.

"People have long been looking at polygenetic factors as a cause of disease," says Howard M. Kipen, MD, MPH, professor of environmental and occupational medicine and acting deputy director, EOHSI. Dr. Kipen, an environmental physician and epidemiologist, investigates how the interaction of genes and the environment makes disease more likely to occur. He says environmental factors are responsible for an estimated 80 percent of all cancers. "Now we are looking at how the two — genes and the environment — working together, may have a greater impact than either one of them would alone," he adds.

Andrew I. Brooks, PhD, associate professor of environmental and occupational medicine and director, Bionomics Research and Technology Center, EOHSI, investigates the mechanisms by which a polluted environment changes gene expression; he is seeking new evidence of how pollution can lead to disease and death. Dr. Brooks uses genome-based analysis to look at the body's cell-level defenses against stress-related over-oxidation. He hopes to learn whether these changes occur in response to pollution, and whether they are more common in people of a certain genotype.

Dr. Kipen is collaborating in a multi-institutional, multi-disciplinary study of the biological mechanisms that occur in response to air pollution. He and his colleagues are looking to see whether healthy subjects who are exposed to diesel exhaust fumes exhibit some

"People have long been looking at polygenetic factors as a cause of disease," says Howard M. Kipen, MD, MPH, professor of environmental and occupational medicine and acting deputy director, the Environmental and Occupational Health Sciences Institute (EOHSI) (seated, right), with Andrew I. Brooks, PhD, associate professor of environmental and occupational medicine and director, Bionomics Research and Technology Center, EOHSI.

of the biological changes that can accompany a heart attack. These include inflammation of the endothelial lining of blood vessels, blood vessel dilation, and heart rate variability.

Normally, the body produces low concentrations of nitric oxide (NO) to mitigate these changes. But up to 10 percent of the world population has an SNP in the enzyme known as endothelial nitric oxide synthase (eNOS) that may increase their susceptibility to particle-induced heart attacks, says Dr. Kipen. A sequenced personal genome with the eNOS polymorphism would suggest preventive strategies for those at the highest risk for cardiovascular disease. At a minimum, says Dr. Kipen, those individuals could lower their risk by adjusting their lifestyle to minimize exposure to air pollution, or they could take an aspirin to prevent the onset of a heart attack.

Preventive strategies might also include reducing outdoor activities when particularly potent types of pollution are present. Or, as Dr. Kipen found, it might be relevant to consider avoiding the New Jersey Turnpike's truck lanes at the peak of the morning commute. At that time, particle mass doubles, with the number of ultrafine particles rising to a maximum eightfold increase over the baseline measurement taken at EOHSI's labs in Piscataway.

Understanding these biological mechanisms of response may also suggest the use of specific medications and/or dietary intake of particular nutrients that can be targeted to interfere with the exact pathophysiological mechanisms of a certain type of air pollution. This may be particularly effective for those at highest risk by virtue of inheritance or preexisting disease, or for those who live in the world's most polluted areas.



Personalized Medicine in Primary Care: *Will It Have a Place in the Physician's Black Bag?*

Personalized medicine holds great promise for practical clinical applications, especially in disease prevention and drug safety. But it also raises new issues that will have to be resolved before it finds a place in the physician's black bag.

"In one form or another, family physicians have always seen genotype expression as we care for families over generations, in routine visits and in treatment," says Alfred F. Tallia, MD '78, MPH, professor and chair, Department of Family Medicine. "But for us personalized medicine puts a new spin on the understanding of the role of heredity and genetics in disease prevention and therapeutic intervention."

Using personal genome information in the clinic is still in its infancy, but specialists in the field believe that it will become routine once best practices are determined and additional scientific discoveries are made in associating genetic variations with disease. Fast-advancing computer technology and the economics of scale will enable individuals to have electronic medical records that not only capture their health history but also predict future risk of diseases and potential adverse drug reactions.

"We are seeing the payoff from the Human Genome Project," says Michael F. Christman, PhD, president and CEO, Coriell Institute for Medical Research. In 2007, the institute launched the Coriell Personalized Medicine Collaborative, a pioneering research study involving partnerships with Cooper University Hospital, a principal teaching hospital of RWJMS; Fox Chase Cancer Center; and Virtua Health. The study seeks to explore the utility of using genome information in clinical decision making. It also aims to understand why people often respond differently to treatments, and to discover presently unknown genes that elevate a person's risk of cancer and other complex diseases. The initial goal is to enroll 10,000 volunteers by the end of 2009, with an ultimate goal of 100,000 participants.

In addition to its ambitious scientific goals, the Coriell study addresses educational and ethical concerns surrounding the use of genome information in the clinic. Study participants are advised that they may choose

whether or not to be informed about their susceptibility to potentially "medically actionable" conditions — conditions that have a medical or lifestyle intervention to mitigate risk. In addition, they may choose whether to share all, some, or none of the information with their primary care physician, a specialist, family, or friends. Study participants can access their complete or partial profile online, at any time, using a secure Web site. There is no cost to participate in the study, and genetic counselors are available to discuss genetic results.

The sequenced genome raises other individual and societal concerns. Should an individual's genome information be available to their family members? For the common good, should health insurers or employers be informed about someone's potential risk of developing a costly or debilitating illness? Is "genetic discrimination" ever legal or ethical?

Physicians will have to learn how to use information from the genome. "Doctors in primary care settings are generally the patient's first encounter in the health care system," says Dr. Tallia. "Usually we are their only continuous encounter." Physicians will need to know what the human genome contains before they can interpret SNPs as predictors of a patient's susceptibility to disease or recognize biomarkers that would cause an adverse drug reaction.

"Knowledge of a patient's personal genome could have a profound effect on patient care," Dr. Tallia adds. "Genetic variations make drug research catch-as-catch-can at the level of clinical research, with the true test coming when the drug hits the market. If we had a practical way to apply this knowledge and predict a patient's positive or adverse response to a drug, it would be wonderful." **M**

"In one form or another, family physicians have always seen genotype expression as we care for families over generations, in routine visits and in treatment," says Alfred F. Tallia, MD '78, MPH, professor and chair, Department of Family Medicine. "But for us, personalized medicine puts a new spin on the understanding of the role of heredity and genetics in disease prevention and therapeutic intervention."



M.D. AGSI
Medicine

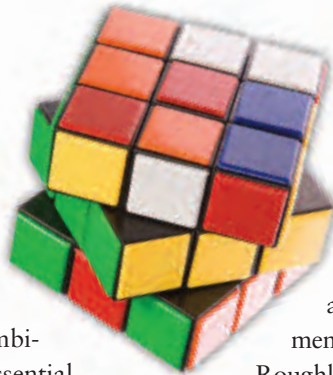


"As we understand more about cells, we may find a way to fix cystic fibrosis we never dreamed of," observes Thomas F. Scanlin, Jr., MD, professor of pediatrics, chief, division of pulmonary medicine, and director of the Cystic Fibrosis Center.



The Great Mystery of Cystic Fibrosis

AND THE PROMISING EFFORTS
TO UNDERSTAND IT



Imagine a Rubik's Cube with 1,500 squares. Now imagine that no matter how you manipulate it, there is never one perfect combination — no real solution. That is essentially the challenge of both diagnosing and treating cystic fibrosis (CF), a genetic disorder that affects 30,000 children and adults in the United States and, according to the American Lung Association, is the second most common life-shortening, childhood-onset inherited disorder.

Since the defective CF gene was discovered, more than 1,500 mutations have been reported, all with different effects. Both the variability in the degree and pattern of involvement of organs and the lack of information about the precise details of the molecular and cellular pathogenesis of the disease make it difficult to diagnose and manage. It is an enigma that the Cystic Fibrosis Center at UMDNJ-Robert Wood Johnson Medical School works to decode routinely.

There is promise. And there are successes. Regionally, many are a result of the CF Center and the team that Thomas F. Scanlin, Jr., MD, professor of pediatrics and chief, division of pulmonary

medicine, is building there.

The CF defective gene and protein are both called the cystic fibrosis transmembrane conductance regulator (CFTR).

Roughly 10 million people in this country are symptomless, unknowing carriers of CFTR. The main role of the gene is to control salt and fluid transport. The protein it produces causes cells in the epithelium — the layer of cells that lines organ passageways — to create mucus in the lungs and digestive system. In a person who does not have CF, the mucus is thin and serves as lubrication. In a person with CF, the mucus is viscous, clogs passageways, and promotes infection.

The Cystic Fibrosis Foundation reports that 1,000 new cases of the disease are diagnosed in the United States each year. More than 80 percent of CF cases are diagnosed by the age of three; however, 10 percent of new cases are diagnosed in people older than 18. Today, the average age of survivability of CF is 37 — up considerably from 50 years ago, when children typically did not live long enough to attend grade school.

To Dr. Scanlin and his colleagues, that is not good enough.

BY LYND A RUDOLPH ■ PORTRAITS BY JOHN EMERSON



Dr. Scanlin was appointed director of the new CF Center in 2005.

That was just the beginning of change. Since 2006, CF patients have been admitted to The Bristol-Myers Squibb Children's Hospital at Robert Wood Johnson University Hospital. Out-patient offices were relocated to the new Child Health Institute of New Jersey. A new adult program was established and was recently accredited. And the patient census — which was 56 in 2003 — has grown to 117. All of this dynamic growth gives the CF Center more opportunities to advance treatment for all patients, adults as well as children.

As director of the CF program at the Children's Hospital of Philadelphia (CHOP) from July 1980 to December 2004, Dr. Scanlin led one of the top five CF centers in the nation. He grew the program from 77 to 470 patients during his tenure. He was also instrumental in making the outcomes of all CF centers public so that parents and patients could make informed decisions. His pursuit of perfection was inspired by his association with Warren Warwick, MD, a retired University of Minnesota pediatrician who spearheaded the drive toward greater transparency in the reporting of outcomes and who is considered one of the top clinicians in the field. Dr. Warwick believed in a scrupulous attention to detail and a practical application of medicine — his invention of a mechanized, chest-thumping vest to mobilize lung secretions is perhaps the best evidence of that mind-set.

Dr. Scanlin was impressed by Dr. Warwick's doggedness. "He got us together," he says. "We saw that he was meticulous about what he was doing. We learned what practices worked." Dr. Scanlin has modeled the CF Center here after what he learned

from Dr. Warwick, as well as from the subsequent successes of the CHOP CF program. The comprehensive treatment regimen has unequivocally been shown to improve overall patient survival. But because CF is a complex disorder that affects different organs to different degrees, it is difficult to devise a typical treatment course.

The CF Center utilizes a team approach that addresses every conceivable need of the CF patient. For example, Dr. Scanlin says, "When I arrived here, the first thing I insisted on was adding nutritional expertise." Along with a dietitian, recently added team members include two nurse-practitioners with experience in CF and pediatric pulmonary disease, a program coordinator, a clinical nurse specialist, a social worker, and clinical nurse specialists in diabetes and gastroenterology.

A new physician, William Sexauer, MD, associate professor of medicine, was recruited in April 2006 to lead the adult program. The program was fully accredited by the Cystic Fibrosis Foundation in April 2008 and is growing as word spreads about it. According to Dr. Sexauer, "So many adults are now living with CF, the program is a necessity. Forty-four percent of the patients in the Cystic Fibrosis Foundation registry are adults. It's critical that we meet their needs." The percentage of adults with CF is growing because the standards of care are improving.

Three pulmonologists with internal medicine experience have also been engaged to work with adult patients — important because mortality in adults with CF is associated with obstructive airways disease. But all of the physicians in the division — a total of ten — are involved to some extent in adult patient care.

For the CF pediatric program,

there are also regular updates for parents and a family advisory council. The involvement of parents and other family members is another key component, not just to drive the success of the program but to improve treatment of the disorder. More than simply nights out to talk, parent update events are formally planned with serious topics and motivational speakers. Former National Football League quarterback Boomer Esiason, whose son has CF, was a recent presenter. (Mr. Esiason has also sponsored a golf tournament to benefit CF research at the center.) The family advisory council, which has a mission statement and bylaws, reviews patient registry data among other activities.

When it comes to research, there has been an evolution of thinking about CF. At first, there was hope for gene therapy. "When I talk to parents, they tell me that nothing captured their imagination more than the notion that CF could be cured by gene therapy," says Dr. Scanlin. It may happen, but it does not look promising at this time. Replacing the entire gene is technically daunting. Basic studies on the pathogenesis of cystic fibrosis may lead the way. "As we understand more about cells, we may find a way to fix CF we never dreamed of," Dr. Scanlin observes.

"Interfering RNAs — discovered in worms — may help us learn how to turn genes on and off," he adds. "This may be a therapeutically useful piece of information." RNA interference is a cellular antiviral response that can be harnessed specifically to inhibit the function of targeted genes, including those that cause diseases. RNA interference is already proving to be an invaluable research tool helping to identify novel genes involved in disease processes.

Researchers are also pursuing other powerful avenues of research. They

are collaborating with scientists to understand what happens inside the cell. There is also a lot of attention on fixing the chloride channel, but alternatives may present themselves.

Currently, three collaborative bench research projects are under way with UMDNJ faculty. The first is with Gill Diamond, PhD, associate professor of oral biology, UMDNJ-New Jersey Dental School (NJDS), on regulation of antimicrobial peptides in the CF airway epithelial cells. Another is with Daniel Kadouri, PhD, assistant professor of oral biology, NJDS, on the glycomimetic inhibition of biofilm formation by the bacterium *Pseudomonas aeruginosa*. The most recent is an exciting project with Jianjie Ma, PhD, university professor of physiology and biophysics, using confocal video microscopy, gene transfection, and RNA interference to study the intracellular movement of key molecules in CF airway cells.

In addition, a team of medical students is involved in research at the CF Center. All have received funding for their activities in Dr. Scanlin's laboratory. Participation in clinical trials may reveal other clinical pathways to manage the disorder. For example, new inhaled antibiotic trials for both children and adults are under way.

The CF Center also participates in newborn screening. New Jersey was among the first of ten states to make CF screening mandatory. The test is done in the nursery. According to Dr. Scanlin, "If we can identify these children before they get sick, we can help them make choices that could head off the disease."

Progress toward a cure, more than likely, will come not from one direction but from many. Understanding the mechanisms that cause CF and improving the management of it are reasons to feel hopeful.

"The momentum toward better outcomes," says Dr. Scanlin, "is cause for optimism." **M**

According to William Sexauer, MD, associate professor of medicine, "So many adults are now living with cystic fibrosis, the program is a necessity. Forty-four percent of the patients in the Cystic Fibrosis Foundation registry are adults. It's critical that we meet their needs."



By Lynda Rudolph

Portrait by John Emerson

The Cancer Institute of New Jersey:

*15 Years of Patient Care
Driven by Innovation and
Inspiration*

Jonas Salk once said, “Hope lies in dreams, in imagination, and in the courage of those who dare to make dreams into reality.” Although he never set foot in The Cancer Institute of New Jersey (CINJ), his sentiments perfectly express the mind-set of those who drive it and have been touched by it.

Just what forces were at play that took this institution from a diminutive storefront location on George Street in New Brunswick to a National Cancer Institute (NCI)-designated Comprehensive Cancer Center in just 15 years? And how has it managed to make such an imprint on so many of those who have been treated there? Was it the science behind the medicine or something harder to define — something in the character of the people?

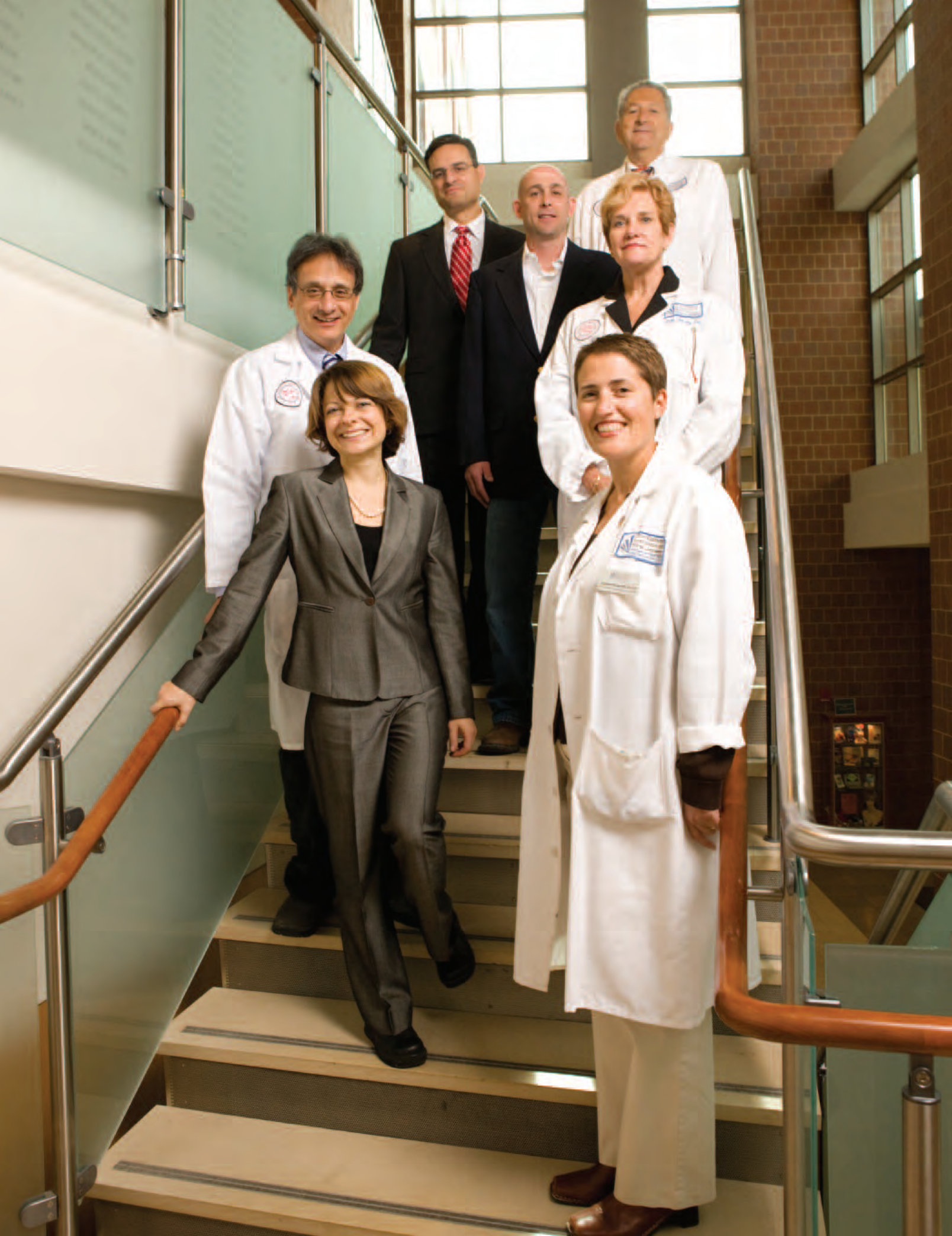
Listen to the administrators, clinicians, and patients. You will learn that it is both. Among the leadership, there is an iron-willed

determination to find a better way to do things. Patients are so impassioned by their own experiences that they feel the need to stay involved and give back.

To trace the roots of a blend of expertise and attitude that is building a legacy, you have to return to that storefront on George Street. “All we had was carpet,” remembers Linda Barker, the institute’s chief administrative officer and associate director of administration and planning. “No phone, no pencils, not even furniture. We sat on the floor and talked about this phenomenon that was forming around us — to bring premier cancer care to New Jersey. We got to know one another and shared why we were part of this. When a patient was expected, we would get excited and announce it — a patient’s coming! — loud and clear.”

Ms. Barker recalls one case in particular: “It was a young woman in her 20s. She had a melanoma and had to have chemo while she was pregnant. The baby was born and was healthy. But the mother died shortly afterward. It hit home to me then that this is why we’re here — to keep these kinds of tragedies from happening.”

“We treat our patients like family. We put ourselves in their shoes, and treat them with the utmost respect and care,” says Jackie Manago, RN, BSN, OCN, oncology nurse at CINJ and cancer survivor (front, right), with (counterclockwise) Mary Todd, DO, professor of medicine and chief operating officer of CINJ; Joseph R. Bertino, MD, university professor of medicine and pharmacology, interim director, the Stem Cell Institute of New Jersey; Scott Glickman, former patient, cancer survivor, and organizer of the Century for the Cure bicycle tour to benefit CINJ; Robert S. DiPaola, MD, professor of medicine and director, CINJ; Roger Strair, MD, PhD, professor of medicine and director of the hematologic malignancies program at CINJ; and Linda Barker, chief administrative officer and associate director of administration and planning, CINJ.



Ms. Barker was hired by then CINJ director William N. Hait, MD, PhD, clinical professor of medicine. “He made me believe in the future,” she says. And she has been present to witness the unfolding of much of that future to date. At first, she says, “we had tremendous basic science, but it wasn’t focused on cancer. One of the things we did was to scan the basic science research base and use it to inform cancer-focused programs.”

Researchers use their special sets of eyes and ears to find different ways to approach a problem or need. In one recent situation, a scientist, Susan Chen, PhD, was studying obesity with a mouse model when the mouse developed melanoma. After discovering that a new gene was involved, she conferred with James Goydos, MD ’88, professor of surgery and a melanoma expert at CINJ, and conducted research that determined there was a U.S. Food and Drug Administration–approved drug for neurological diseases that would also inhibit melanoma growth in animals. As a result, a clinical trial is being developed. This form of translational research reduces the time it takes to develop new therapies and makes it easier to make observations and track progress. “That is the essence of what we do — to bring science from the lab more quickly to benefit the patient,” says Ms. Barker.

“Research has allowed us to grow at a rapid pace,” says Roger Strair, MD, PhD, professor of medicine and director of the hematologic malignancies program at CINJ. Dr. Strair’s own focus is on hematologic malignancies, leukemia, Hodgkin’s lymphomas, and blood and bone marrow disorders. Rapid growth and the concurrent focus on research result in clinical pathway benefits.

Participation in clinical trials is evidence of the institute’s importance among NCI-designated centers. Many of the more than 400 clinical trials across the state are available at CINJ. In fact, CINJ currently enrolls approximately 18 percent of all new adult cancer patients and approximately 70 percent of all pediatric cancer

patients in clinical trials each year — surpassing the national accrual rate, which falls between 3 and 5 percent.

Some very sophisticated science is being done there, including understanding cancer cells at the molecular level and genetic implications that are fueling the new move toward personalized medicine. “The question we’re asking is, why do some cancers respond to treatment and others do not?” says Mary Todd, DO, professor of medicine and chief operating officer of CINJ. “Our goal is to find regimens that target tumor cells that cause the appropriate cellular response. We want to be able to identify them. We want to un-

“Research has allowed us to grow at a rapid pace,” says Roger Strair, MD, PhD, professor of medicine and director of the hematologic malignancies program at CINJ. . . . Rapid growth and the concurrent focus on research result in clinical pathway benefits.

derstand this extraordinarily complex microarray of data to gain cellular information.”

That data has to be available on an informatics platform to understand patterns that emerge for certain populations. To further develop the institute’s work in this direction, Gunaretnam (Guna) Rajagopal, PhD, was recently recruited from Singapore to head up the Biomedical Informatics Program at CINJ. “This platform will allow us to select therapies based on the genetics of a patient’s tumor,” explains Dr. Todd.

CINJ not only seeks groundbreaking treatment but also offers an attitude that focuses on patient experience. Jackie

Manago, RN, BSN, OCN — an oncology nurse at CINJ and a cancer survivor herself — collaborates with Dr. Strair. “We treat our patients like family,” she says. “We put ourselves in their shoes, and treat them with the utmost respect and care.”

The patients themselves are quick to tell their own stories of how CINJ has affected them. These stories are not just about cancer treatment. They are about the patients’ desire to stay involved and contribute in any way possible. They talk with a passion that is palpable. They believe there is important work being done there, and they want to be a part of it — to help it grow and thrive. Indeed, their own work has become part of the legacy of success of CINJ.

Diagnosed with colon cancer 13 years ago, Yetta Appel turned to CINJ for surgery and treatment. Her care was in the hands of Dr. Hait. To her, he was a visionary in the field and someone who clearly affected her, not just as a physician but as a fellow human being. “I was taken by his openness,” she says. “He wanted to set up a program under the National Cancer Institute and wanted maximum visibility. It was very important to us in New Jersey, with some of the highest cancer rates in the nation.”

But to Ms. Appel, a social worker and retired educator at Rutgers, The State University of New Jersey, the importance of talking frankly about cancer was also on her mind. She spoke about this with Dr. Hait, and with his support, Ms. Appel was instrumental in staging the first Cancer Survivors Day celebration in New Jersey. “It opens the dialogue for people who are hesitant to talk about cancer,” Ms. Appel says. “CINJ is a comfortable environment where they can just open up to the person across the table. It brings families together to discuss what they’re going through. And it celebrates victories.”

Along with her Survivors Day efforts, Ms. Appel also continues to endow a fellowship that trains social workers specifically for oncology. She explains, “I was affected by this experience myself. As a social worker, I felt it was important to

develop a collaborative program of study. I was also helped when I received a grant for my education. This is my way of returning the favor.”

Scott Glickman was treated for stage IV non-Hodgkin’s lymphoma more than a decade ago. He was one of the lucky ones; the disease kills more than half of the 50,000 Americans diagnosed each year. His experience at CINJ made him want to give back to the institution that was such a big part of his recovery. He had an idea to use his interest in cycling to raise awareness and dollars for research — and the Century for the Cure bicycle tour was born. The ride has help-

egation about issues cancer patients face in getting health care and disability benefits,” says Mr. Neeld. His group worked to obtain sponsorship of a bill to enable those who are fighting cancer to get disability benefits without the normal waiting period. They have also raised money for a patient relief fund, to help patients who have problems getting to where they obtain treatment, as well as for other related quality-of-life needs.

Why is Mr. Neeld so invested in CINJ? “It’s a personal involvement for me,” he says. “It’s the way I was treated when I walked in the door here. They’re treating the person as well as the disease, and I

annual Survivors Day is just one way that CINJ already actively participates in understanding and examining the needs of this significant group. In collaboration with the New Jersey Commission on Cancer Research, CINJ recently hosted an Annual Retreat on Cancer Research in New Jersey through a public forum. “Addressing the Unmet Needs of Cancer Survivors: A Dialogue for Action” focused on the broad range of issues that cancer survivors face, including physician challenges, sexuality, employment, and financial matters.

To Joseph R. Bertino, MD, university professor of medicine and pharmacology, interim director, the Stem Cell Institute of New Jersey, and former interim director,

CINJ, success is attributed to a combination of all the right elements: “From its inception, one of the major goals set forward by Dr. Hait was to provide exemplary patient care. This has been accomplished by the recruitment of well-trained physicians, nurse-practitioners, nurses, social workers, and other supporting personnel. We bring to patients the latest and most promising treatments coupled with compassionate care. Over the past 15 years, we have seen a remarkable growth of the center, and a corresponding increase in the number of patients cared for in our clinics and the Cancer Hospital of New Jersey at Robert Wood Johnson University Hospital.”

In the end, it’s all about the belief that the job is never over and that science should be bold and dynamic. It’s the reason CINJ has achieved its mission of creating a cancer center of extraordinary quality. Why it now sees close to 80,000 patients annually. Why CINJ cancer research is supported by more than \$99 million in research grants per year. Why compassionate care and the most promising treatments are equally important. Why it is a place where the dreams, imagination, and courage that Salk expounded on — and the founders of CINJ believe in — stay alive and flourish. **M**

Survivors Day — A Celebration of Life

More than 250 survivors and guests attended this year’s “Healthy Lifestyles for Survivorship: Mind, Body and Soul” event, which also featured seated yoga, an inspirational speaker, and nutrition tips. Held on Sunday, June 8, at the New Brunswick Hyatt hotel, the day’s events included an inspirational candle-lighting ceremony, with some of CINJ’s first patients and doctors taking part.



ed raise more than \$185,000 for cancer treatments and potential cures. Past rides have included recent cancer survivors. Mr. Glickman points out, “This isn’t about winning a race. It’s about making people aware of what can be done and helping to fund the future.”

Gordon Neeld was diagnosed with rectal cancer 14 years ago. Today, Mr. Neeld — who was a patient of Dr. Todd’s — serves on the CINJ Patient Advocacy Commission, directed by Betty Gallo of the Dean and Betty Gallo Prostate Cancer Center. The board’s goals are far-reaching. “We’ve gone to Washington, D.C., as a group to lobby representatives of the New Jersey congressional del-

want to help however I can.”

There are more than 10 million cancer survivors now living in the United States. Cancer survivorship has emerged as its own separate health issue. “While the numbers are a good thing,” Dr. Todd points out, “their needs are different than the newly diagnosed. There are important ramifications that should be followed, such as late side effects and the psychological implications of having the disease.”

How to follow cancer survivors long term is still being explored. At CINJ, survivor clinics are being established, and the Robert Wood Johnson Foundation has funded a program to look at survivorship issues and the affected population. The

Would You Like Some Mercury with That Sushi?

By Lynda Rudolph

T

una sushi has become a staple of the American diet. It is a delicacy that's consumed several times a week in the United States by a substantial number of people. It is why more than 5,000 sushi restaurants have opened here since 1970, turning these slivers of fish into a multibillion-dollar industry. Interestingly, the Japanese typically eat sushi just once a month. And 13 percent of them never eat it at all. Do they know something we don't?

Although sushi is perceived as a health food, the mercury content in tuna sushi makes it just the opposite. A respected authority on mercury in the environment is Michael Gochfeld, MD, PhD, professor of environmental and occupational medicine, member, Environmental and Occupational Health Sciences Institute (EOHSI), and chair, New Jersey Mercury Pollution Task Force, and recently he was involved in a study of mercury in tuna sushi.

"Joanna Burger and I were first approached about analyzing mercury levels in sushi by food editors at the *Chicago Tribune*," says Dr. Gochfeld. Joanna Burger, PhD, MS, professor of life sciences at Rutgers, The State University of New Jersey, is Dr. Gochfeld's wife and longtime collaborator. Together they have written books about toxicological effects in humans and animals and how these are bellwethers of environmental hazards.

Since their first research assignment with the *Tribune*, Dr. Gochfeld and Dr. Burger were asked to analyze sushi from 20 Manhattan stores and restaurants for the *New York Times*. In the most recent study, their laboratory tests detected mercury levels that exceeded the 1 part per million "action level" set by the U.S. Environmental Protection Agency (EPA) — the point at which the U.S. Food and Drug Administration (FDA) can remove the food from the market, even though that kind of action is rarely taken.







Michael Gochfeld, MD, PhD, professor of environmental and occupational medicine, member, Environmental and Occupational Health Sciences Institute (EOHSI), and chair, New Jersey Mercury Pollution Task Force, is a respected authority on mercury in the environment.



To the EPA, a blood mercury level of 5.8 µg/L, or 5.8 parts per billion, is acceptable; the agency considers anything lower than this to be without appreciable risk. In the New York tests, which were run several times for accuracy, five of the sushi samples had mercury levels higher than 1 part per million. Of the samples tested, the largest concentrations of mercury were found in bluefin tuna.

Another startling statistic emerged in the *Times* article: studies done by the New York City Department of Health and Mental Hygiene found the level of mercury in the blood of New Yorkers who were tested to be three times higher than the national average. New Yorkers who have a passion for sushi, along with those who catch striped bass in the Hudson River — and ignore the posted signs to “avoid consumption” — are the object of finger-pointing for that statistic.

So what’s the big deal about mercury, that silvery gray stuff that used to be in thermometers (and, incidentally, is the name of the messenger in Roman mythology)? Dr. Gochfeld explains: “Most mercury gets into the environment from coal-fired power plants. It settles into the land, gets washed into the water, and sinks to the bottom of waterways. There, bacteria convert it to methyl mercury — a more toxic and more readily absorbed form that affects every link in the food chain.” Contaminated plankton becomes food for small fish, which are eaten by larger fish — and with each “bite,” the amount of mercury is amplified, a process called bio-amplification.

Dine on a fish that’s more predatory, and chances are you’re consuming more mercury. The lesson learned here? Sharks should definitely be off everyone’s culinary wish list. Up there with tuna as poor consumption choices are swordfish and grouper. That is, unless you wouldn’t mind contracting Minamata disease — a poisoning syndrome that is a result of mercury consumption and is characterized by a loss of feeling in the lips and mouth, then difficulty concentrating, and finally a complete compromise of the nervous system. Talk about fish biting back.

Dr. Gochfeld says the levels of the tested sushi were so high that “no one should eat a meal with mercury levels like those found in the restaurant samples more than about once every three weeks.” Dr. Gochfeld added that children, along with women who are breast-feeding or pregnant, should avoid eating fish with potentially high mercury levels altogether.

To minimize the risk of mercury contamination, eat smaller fish. But if you’re really in the mood for a big meal of the fish variety, “the best trade-off,” according

The research that Dr. Gochfeld and others conduct into the levels of mercury in sushi and other products is essential in helping individuals, corporations, and policy makers make informed decisions.

to Dr. Gochfeld, “is salmon — wild Alaska salmon being the safest choice.” Unfortunately, that source may be in jeopardy of overexploitation.

Lest you think fish are your only concern, you may want to consider the other ways mercury can affect your life. It’s in some older dental fillings, in fungicides, and in those new energy-efficient compact fluorescent lightbulbs. A drop of it was once the miracle mechanism that turned the light on and off in your car trunk — thankfully, no longer. You may have even used a form of it in Mercurchrome to put on your cuts and scrapes, until the FDA removed it from drugstore shelves in 1998.

“The thing about mercury is,” Dr. Gochfeld emphasizes, “it’s a naturally occurring element. It doesn’t break down, and it never goes away. All we do is just move it around.”

Because of this, the research that Dr. Gochfeld and others conduct into the levels of mercury in sushi and other products is essential in helping individuals, corporations, and policy makers make informed decisions. In this case, that includes how often we should choose to indulge in a popular food. Results such as these also could lead to routine government testing of mercury in seafood — which currently doesn’t happen.

As Dr. Gochfeld reminds us, “Science helps us identify unintended consequences of well-intended policies.” Things that were reasonable ten or 20 years ago may not work for us now. A good example is the use of DDT after World War II. It changed the way we utilized insecticides: we used DDT almost like water, because of its effectiveness — and it also caused widespread contamination and unanticipated devastating effects, particularly in wildlife. In another example, bisphenol A — a chemical found in plastic bottles — is now under investigation for potential harmful effects.

In other words, information changes with time and knowledge. How we use that information and the importance of obtaining it are reasons science is essential in helping us examine how we live.

Including eating that California roll with a heaping helping of bluefin tuna. **M**



COMPETENCY
Knowledge
Skill
Attitude
Judgment

Ho Je Family



RWJMS PROFESSOR LEADS Initiative

to TRANSFORM *the*
MEDICAL LICENSING
PROGRAM

Alfred F. Tallia, MD '78, MPH (*standing*), professor and chair, Department of Family Medicine, observes Ho Je Lee, MD (*left*) and Carol Penn, DO, Department of Family Medicine residents.

AS CHAIR OF A SELECT NATIONAL COMMITTEE CHARGED WITH EVALUATING the United States Medical Licensing Examination (USMLE), Alfred F. Tallia, MD '78, MPH, professor and chair, Department of Family Medicine, is leading a movement that could revolutionize the way doctors acquire their licenses to practice medicine.

The Committee to Evaluate the USMLE Program (CEUP), led by Dr. Tallia, released its long-awaited recommendations for overhauling an exam program that many say has grown static since its introduction in 1992. The CEUP was appointed by the National Board of Medical Examiners (NBME), the Federation of State Medical Boards (FSMB) — the joint owners of the USMLE — and the Education Commission on Foreign Medical Graduates.

BY JONI SCANLON

PHOTOS BY JOHN EMERSON

Recommendations of the Committee to Evaluate the USMLE

The Committee to Evaluate the USMLE (United States Medical Licensing Examination) Program (CEUP) structured its recommendations into the following six key areas:

■ Assess Readiness at Two Patient-Centered Points

The USMLE should be modified to better assess a physician's readiness to provide care at two patient-centered points — the point at which a student enters supervised practice, generally at the beginning of graduate education, and the point at which he or she first enters independent practice. "We felt the USMLE really should reflect two decision points, but we didn't say specifically, for example, that the exam should have a two-step sequence or that the first decision point had to occur exactly after the third year of medical school," says Dr. Tallia.

■ Adopt a General Competencies Scheme

The NBME should adopt a general competencies scheme that would inform the overall design, development, and scoring of the USMLE. Individual medical schools would determine how these general competencies are taught. In addition, as the USMLE evolves, the committee recommends that the NBME foster a research agenda exploring new ways to measure general competencies not currently assessed. "It's clear the exam needs to evolve," Dr. Tallia says. "If we're saying all general competencies, such as the six promulgated by the Accreditation Council on Graduate Medical Education, are important, then we have to provide a better way to measure all of them."

■ Emphasize the Scientific Foundations of Medicine in All Components of the Examination

The CEUP calls for an assessment of scientific knowledge in all components of the examination process, rather than just during the Step 1 exam. "We're saying basic science is important to being a physician," says Dr. Tallia. "There should be assessment of the sciences fundamental to the practice of medicine in all parts of the exam sequence."

■ Expand Evaluation of Clinical Skills

Clinical skills are currently evaluated through an assessment involving standardized patients. The CEUP recommends that clinical skills assessment be expanded using other methodologies to evaluate a range of additional clinical skills, such as cultural competence.

■ Evaluate Students' Skills in Seeking and Interpreting Information

The USMLE should introduce a testing format designed to assess a student's ability to recognize and define a clinical problem, to access appropriate reference sources to address the problem, and to interpret and apply that information in an appropriate manner. "As the whole information base of medicine continues to change rapidly, this is a skill that will constantly keep doctors fresh in their capacity to not only to define a problem, but to seek information to solve a problem," Dr. Tallia explains.

■ Address the Needs of Secondary Exam Users

A final recommendation is that the NBME, one of the parents of the USMLE, should better address the needs of secondary users. "For example, a lot of residency programs use Step 1 as a way to sort candidates, and we need to be attentive to those needs," says Dr. Tallia. "Perhaps other exams or other sequences or modalities would be just as effective, if not more effective."

IF ADOPTED, THE COMMITTEE'S recommendations would dramatically alter the landscape at medical schools throughout the United States and Canada, where the test is given. They would shift the focus of the overall examination from a three-step, four-component program to one that better informs medical board licensure decisions at two gateways: entry into supervised post-graduate training, and initial unrestricted licensure. There would likely be several assessment components required at each gateway. The recommendations would also integrate basic sciences with clinical sciences in all exam components and assess a greater range of general competencies deemed important for providing safe and effective patient care.

The release of the CEUP report culminates a far-reaching, three-year process in which hundreds of stakeholders broadly drawn from inside and outside the "house of medicine" were surveyed and reams of data analyzed, says Dr. Tallia. "Our goal was to review the mission and purpose of the USMLE and to make sure the existing design, structure, and formats were still working," he notes. "The big questions we were trying to answer were, What's the purpose of this exam? Is it working? If it's not working, can we do better?"

Welcoming the participation of such a diverse group of stakeholders will be crucial to achieving consensus for the CEUP recommendations as they move forward, says Peter Scoles, MD, senior vice president for assessment services for the NBME. "The USMLE has an enormous impact on medical education and medical licensure in the United States," he says. "Recommendations for change must be thoroughly studied, and the divergent views of many stakeholders must be balanced and integrated."

Dr. Scoles credits Dr. Tallia — a well-respected, longtime member of the board and various committees of the NBME and chair of the governing committee of the U.S. Post Licensure Assessment System — with keeping a challenging process on track in his leadership of the CEUP.



“Our goal was to review the mission and purpose of the USMLE and to make sure the existing design, structure, and formats were still working,” notes Alfred F. Tallia, MD ‘78, MPH, (second from left), professor and chair, Department of Family Medicine. He discusses the licensing process for physicians with (left to right): Carol Penn, DO, resident (left), Jennifer Amico ‘09, and Ho Je Lee, MD, resident.

“Achieving consensus requires experience, insight, and personal grace,” Dr. Scoles says. “Having those qualities, Dr. Tallia is uniquely qualified to lead this process, and much of the credit for its success rests with him.”

A Process Grown Predictable

FOR RECENT GENERATIONS of medical students, the process leading to licensure has grown almost as predictable as it is challenging, largely due to the influence of the USMLE, which tests medical students’ skills and knowledge at set points in their educational careers through a sequenced series of “step” exams. Step 1, which students take after their second year, evaluates basic scientific knowledge. Step 2—Clinical Knowledge and Step 2—Clinical Skills, taken most often at the end of the clinical years,

assess how well students apply their medical knowledge, skills, and understanding of clinical science. During the Step 2—Clinical Skills examination, students are evaluated in their care of standardized patients — actors trained to portray real patients — under direct observation. Step 3, taken during residency, is the final assessment hurdle to becoming a licensed practitioner. It evaluates a candidate’s ability to apply clinical science to patient-centered, real-world scenarios without supervision. Medical licensing boards in states and territories all around the United States use scores from the USMLE in their decisions to grant licenses to physicians.

For all the reliability that the sequencing of the USMLE might offer, there are many in the medical education community who lament its rigidity, believing that the program places unnecessary restrictions on the medical school curric-

ula and inadequately addresses new trends in medicine — especially those emphasizing strong interpersonal skills and multicultural awareness in our next generation of doctors.

“The feedback we received was that to the extent the USMLE measures knowledge and some skills, it’s working,” says Dr. Tallia. “But we also heard from many people that the current sequencing and organization of the exam impede the evolution of the medical school curriculum at the expense of new and different ways of addressing the needs of medical education. The basic relentless advances in knowledge in clinical science and practice, as well as in basic sciences, really have made this a dated exam in some respects. And the overwhelming knowledge emphasis of the current exams has meant that other, equally important aspects of competency are often overlooked.”

For example, says Dr. Tallia, many medical schools, RWJMS included, are opting to move students' clinical experience earlier in their education — something the current USMLE sequencing fails to recognize. In addition, by testing basic science knowledge at the end of the second year via the Step 1 exam, the USMLE practically compels medical schools to “front-load” basic science in the first two years of their curricula, and it misses a valuable opportunity to assess students' basic science knowledge as it evolves throughout their medical training.

Guiding Principles Defined

WITH THESE ISSUES IN MIND, says Dr. Tallia, the CEUP set out first to define a set of six principles that would guide its task. The most fundamental of these was the principle that the USMLE program should be structured to assure medical licensing authorities that a licensure candidate possesses the knowledge and skills required to provide safe, effective patient care, and that licensure should continue to be the USMLE's primary objective. A second principle, however, recognized as important the exam's secondary uses, such as for advancement and promotion purposes and the identification of candidates for residency programs, as long as the primary purpose of the examination is served.

A third principle articulated the committee's belief that the overall purpose of the USMLE should be to assess a student's readiness for practice at two patient-centered decision points — at the point of entry into supervised practice and at the point of independent, unsupervised practice. A fourth principle acknowledged that a much broader spectrum of medical and professional behaviors and skills should be assessed to evaluate the competencies needed for the delivery of safe and effective patient care. A fifth principle reinforced the CEUP's conviction that the

public must be able to depend on the USMLE assessments to be reliable and valid. Finally, the CEUP's sixth guiding principle articulated the committee's belief that the USMLE should reflect the continuing evolution of medical practice over time.

“We used these principles to debate if and where any changes in the program might be,” says Dr. Tallia. “The process was very deliberative, with input from many outside sources about what was going on in the whole world of medical competencies.” Indeed, opinions were sought not only from within the medical community, but from a broad array of public interest groups as well, focusing on the types of competencies patients should expect from their doctors and how those competencies could be measured.

“There is a huge movement today in the medical education community, within the profession, within the licensing community, and among the public to really define what competencies clinicians should have,” Dr. Tallia notes. “We're asking, What do I want my doctor to be able to do? What should they know? What kind of skills should they have? What kind of judgments should they be able to make? What kind of attitudes should they have that are fundamental to the practice of medicine?”

Dr. Tallia cautions that the CEUP's recommendations are just that — recommendations — at this stage, and he predicts that a great deal of tinkering has yet to be done to refine the USMLE. “Following the review of the USMLE composite committee and NBME and FSMB boards, which should take about a year, there will be a development process that I don't anticipate will be anything shorter than three years,” he says. “Methodologies still have to be developed. Sequences have yet to be determined. The entire item pool of questions will need to be re-examined, with many new items developed. Our work was a 30,000-foot broad overview and series of recommendations.”

Transforming the Medical School Experience

ALTHOUGH IT WOULD BE premature for a medical school to begin modifying its curriculum based on the CEUP's recommendations, the committee's work is already generating much thought about what a medical school program might look like in the future if the USMLE program is radically altered.

Because it turns the status quo on its head, the CEUP report is also causing trepidation among some segments of the medical education community, adds Dr. Tallia. “We really have the potential to remove all the current structural barriers to addressing curricular change and to give schools much more freedom,” he says. “It's making people nervous, but it's the right thing to do because, ultimately, it will be good for patients and the profession.”

The CEUP report — and its potential for radical change — is also provoking much thought at RWJMS. “This program will encourage every medical school to seek more effective and pedagogically intelligent ways to address the USMLE through their curriculum,” says Stephen F. Lowry, MD, professor and chair, Department of Surgery, and senior associate dean for education. “At [RWJMS], we'll be doing that, but we're going to do it in a way that makes sense for our school, given the resources available to us, the size of our student body, and the excellent commitment of our faculty,” he adds.

As with previous modifications to the RWJMS curriculum, a broad array of stakeholders will be involved in any process to adjust the curriculum in response to a USMLE overhaul, says Dr. Lowry. He adds, “We look forward to engaging all interested parties in a grassroots effort to look at curriculum change, with the objective of preparing this institution for a transition in the examination process.” **M**

L E T T E R F R O M T H E
A L U M N I A S S O C I A T I O N
P R E S I D E N T

Dear Alumni and Friends:

Welcome to another edition of *Robert Wood Johnson Medicine*. It is always a pleasure for me to read about the wonderful endeavors and accomplishments that constantly occur within the Robert Wood Johnson Medical School community. It is especially pleasing and exhilarating when one of my own classmates is featured, for it reminds me of what being an alumnus of RWJMS is all about: being an active member of the RWJMS community. Whether we are practitioners, researchers, or educators — in central New Jersey, in the Midwest, or on the West Coast — we all contribute to and share in the success of RWJMS by doing our part to bring quality medical care to all.

By providing support to outstanding students with financial need, the Alumni Association also contributes in a very real and tangible way to the success and future of RWJMS. Last year, 427 alumni and friends made contributions, resulting in the awarding of \$130,500 in scholarships and low-interest loans this academic year, for which we are very grateful. But providing financial support to students is not the only purpose of the association. It is a vehicle through which classmates can reunite and keep in contact, and a framework that connects and ties all graduates and classes to the RWJMS community of which they are still a part. We hope that more alumni take advantage of the opportunities to strengthen these ties.

The Alumni Reunion Weekend on October 10-11, 2009 will honor the following graduating classes: 1968, 1969, 1973, 1974, 1978, 1979, 1983, 1984, 1988, 1989, 1993, 1994, 1998, 1999, 2003, and 2004. All members of these classes are invited and encouraged to attend. The annual Career Night and various events with the students are wonderful opportunities for local alumni to become involved. Please contact Roberta Ribner at ribnerrs@umdnj.edu if you are interested in participating or learning more about any of these events.

This year, we will concentrate on reaching out to the residents and fellows serving at RWJMS and our affiliated institutions, and we invite your suggestions, support, and involvement in this endeavor as well.

In closing, I would like to invite each and every alumnus of Robert Wood Johnson Medical School to become an active member of the Alumni Association, by participating in an event, making a contribution, or becoming a member of the board. RWJMS has come a long way in becoming a respected and renowned institution, and with our support and involvement, it will continue to provide the outstanding practitioners, educators, and researchers of the future.



Best regards,

Nancy Sierra, MD '89
President, RWJMS Alumni Association

P.S. Please visit our updated Web site at <http://rwjms.umdnj.edu/alumni> and click on *Make a Gift* to contribute to the Alumni Association Annual Fund.

R W J M S • A L U M N I NEWS

BY KATE O'NEILL

ALUMNI ASSOCIATION AWARDS SEVENTH HIPPOCRATES SCHOLARSHIP

The Alumni Association annually awards the Hippocrates Scholarship to an incoming first-year student, based on academic excellence. Hippocrates Scholars receive \$20,000 toward tuition each year. **Mindy Brittner**, Class of 2012, is the seventh Hippocrates Scholar.

If a conventional route to medical school exists, Mindy certainly did not take it. Despite a lifelong interest in becoming a physician, she chose to double-major in English and human rights studies at Barnard College. Uniting those interests in a single undergraduate thesis,

she wrote on theories of justice in the works of Somali novelist Nuruddin Farah.

Mindy says that “service to the underserved” will guide her career in medicine. She volunteered in the post-Katrina cleanup in Biloxi, Mississippi, and in New Orleans and “fell in love with the Bronx” during a public health internship, studying the effects of short-term incarceration on children’s health. She developed an interest in social medicine as a volunteer in a Bronx pediatric clinic.

While at Barnard, she volunteered in homeless shelters and was an SAT tutor



Mindy Brittner '12, winner of the Hippocrates Scholarship.

in East Harlem. After graduation, she worked for a year at the Albert Einstein Medical Center, as a research assistant in a five-year clinical trial funded by the National Institutes of Health, studying interventions to increase breast feeding among low-income women. The experience gave her “tons of clinical contact,” she says, and led to her publishing an article in the *Journal of Human Lactation*.

UMDNJ-Robert Wood Johnson Medical School was at the top of the list of medical schools she hoped to attend, so when she learned she would be offered the Class of 2012’s Hippocrates Scholarship, she was “absolutely thrilled,” she says, adding, “This is a great place, it’s where I want to be, and I’m extremely grateful to the Alumni Association.”

SAVE THE DATE

ALUMNI REUNION WEEKEND

Gala Alumni Reunion Dinner Dance

Saturday Evening
October 10
Hilton East Brunswick

*Honoring the following
anniversary classes:*

40th: 1968, 1969
35th: 1973, 1974
30th: 1978, 1979
25th: 1983, 1984
20th: 1988, 1989
15th: 1993, 1994
10th: 1998, 1999
5th: 2003, 2004

Alumni Breakfast

Sunday Morning
October 11
Hilton East Brunswick

*For additional information
or class lists to contact
classmates, please contact:*

Roberta Ribner at
ribners@umdnj.edu or
732-235-6310

*For updated information,
please check the Alumni
Web site at: [http://
rwjms.umdnj.edu/alumni](http://rwjms.umdnj.edu/alumni)
and click on Alumni
Reunion Weekend.*

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will benefit student scholarships. Please visit the Alumni Association Gift Shop at: <http://rwjmsaa.org/Store.php> or contact **Roberta Ribner: 732-235-6310** or ribners@umdnj.edu.



**LOIS RAMONDETTA, MD '93,
CO-AUTHORS *THE LIGHT WITHIN***

The *Light Within*, by **Lois Ramondetta, MD '93**, was named one of the five top health books of 2008 by WSJ.com, the online edition of *The Wall Street Journal*. These were books “that illuminated the experience of being ill in America today, from the perspective of both the patient and the doctor,” said the WSJ.com reviewer.

In alternating narratives, Dr. Ramondetta and her co-author, the late Deborah Sills, PhD, tell of a friendship rooted in their first meeting in 1998 — a hospital-room standoff over Dr. Sills’s refusal to take pre-operative medication. Dr. Ramondetta was a first-year fellow in gynecologic oncology at the University of Texas M.D. Anderson Cancer Center. Dr. Sills was fighting stage III ovarian cancer.

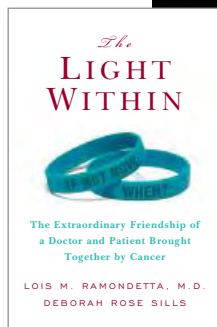
From adversarial beginnings, a deep rapport began to grow. Dr. Sills became more than the recalcitrant cancer patient, and Dr. Ramondetta was no longer the young physician issuing top-down orders. They discovered a common interest in religion. Dr. Sills taught the subject at California Lutheran University, and Dr. Ramondetta double-majored in religion and biology at Emory University.

The two women first co-authored a journal article on spirituality in illness. They then decided to reach a broader audience: trainees, physicians, nurses, palliative care givers, patients, and families. “Our book, *The Light Within*, explores the many perspectives caregivers and patients may have while experiencing a shared presence at the end of life,” says Dr. Ramondetta.

Writing about the odyssey of their friendship helped Dr. Sills prevent cancer from undermining her identity as a woman. In Dr. Ramondetta she found not



PAUL COHEN



just a candid and knowledgeable physician but also a soul mate, who helped keep her spiritually whole.

The literary partnership helped

Dr. Ramondetta understand the complexities of the doctor-patient relationship and the pain of watching her patient suffer and die from an incurable, ravaging illness.

Shortly before her death, while in hospice, Dr. Sills completed her part of their

book. It was published two years later, in 2008.

Dr. Ramondetta is an associate professor of gynecologic oncology at M.D. Anderson Cancer Center in Houston and director of the division of gynecologic oncology, the University of Texas Health Science Center-Lyndon Baines Johnson Hospital in Houston. Learn more about the book at www.thelightwithinbook.com.

**MARK YOUR
Calendar:**

May 14, 2009

Graduation Banquet
Westin Hotel, Princeton

May 18, 2009

Convocation

May 20, 2009

Commencement

For additional information, contact Roberta Ribner, at 732-235-6310 or email: ribners@umdnj.edu.

**Continuing Medical
Education**

For information about RWJMS Continuing Medical Education opportunities, please visit our Web site: www.umdnj.edu/ccoe/rwjms.

**ALUMNI ASSOCIATION APPROVES
NEW SCHOLARSHIPS AND LOANS**

The Alumni Association Board of Trustees approved \$130,500 in scholarships and loans for RWJMS students during the 2008–2009 academic year. The scholarships included \$20,000 awards to each of the four current Hippocrates Scholars. The association contributed an additional \$10,000 to the

RWJMS Alumni Association Endowed Scholarship Fund.

“RWJMS alumni are committed to supporting our students through scholarships and loans,” says **Geza K. Kiss, MD '95**, associate professor of anesthesiology and past president, Alumni Association. “Students need money, and we’re here to help.”



Sukumar Nagendran, MD '94, is building a legacy at RWJMS through the Nagendran Scholarship for International Medical Studies.

Sukumar Nagendran, MD '94

PRAGMATIST, VISIONARY,
PHILANTHROPIST

“It’s good to be back in New Jersey,” says Sukumar Nagendran, MD ’94.

After spending seven years in the Southwest, with Pfizer, and a year with Novartis, Dr. Nagendran joined the Tokyo-based pharmaceutical company Daiichi Sankyo (DS), where he serves as senior medical director for diabetes/metabolism and heads the corporation’s metabolism team for U.S. medical research and strategy. He focuses on drug development and health care policy.

At the same time, he is building a legacy at UMDNJ-Robert Wood Johnson Medical School through the Nagendran Scholarship for International Medical Studies. Over the past five years, Dr. Nagendran infused the scholarship with \$10,000 annually. This has enabled Nagendran scholars to fan out into clinical settings in the third world, broadening their medical education and gaining perspective on the educational opportunities they enjoy at RWJMS. “Eventually, with a \$150,000 gift from my estate,” says Dr. Nagendran, “I will continue contributing from the afterlife.”

The Nagendran Scholarship is administered by the Alumni Association. “Sukumar raises the bar for all of us,” says Geza K. Kiss, MD ’95, associate professor of anesthesiology and past president, Alumni Association.

BY KATE O’NEILL
PORTRAIT BY JOHN EMERSON

“Inspired by earlier alumni endowments, Suku created a scholarship that embodies his ideals and his vision for RWJMS. This truly is an amazing legacy and an example for all alumni to follow.”

A Totally Different World

Dr. Nagendran was a third-year medical student in his native Sri Lanka when the violent turmoil of the Tamil insurgency caused him to leave the country and pursue his medical education in the United States.

Although he was not certain he would continue to pursue a medical career, he wanted to complete the requirements for admission to an American medical school. So he accepted a scholarship at Rutgers, The State University of New Jersey, and started his undergraduate work all over again.

Some students might have been frustrated by having to return to square one, but Dr. Nagendran describes the experience as “liberating.” In contrast to the professional track in the British-modeled Sri Lankan educational system, the broad-based curriculum at Rutgers offered pre-med students the opportunity for a variety of choices, such as studying business and philosophy, while fulfilling their pre-med science requirements.

The liberal arts curriculum encouraged maturity, he believes, and allowed him to explore other interests, including a career in business. Ultimately, he returned to his plan to practice medicine. “The curriculum helped me to understand the American culture,” he says. “And because it wasn’t so scientifically oriented, it prepared me to understand the people I would work with and the people who would be my patients.”

Enrolling at RWJMS, Dr. Nagendran found an academic environment and faculty that were an excellent fit for his outlook and goals. From the start, in rigorous basic science courses, Dr. Nagendran appreciated the medical school’s high academic standards and its “interested, committed, excellent teachers — faculty who took the time to teach.”

Edward Viner, MD, professor of medicine and now emeritus chief of medicine, Camden campus, had a “bountiful influence” on his development as a physician, Dr. Nagendran says, and became a mentor during his clinical years. “I admired his interaction with his patients and students, and he inspired me to go into internal medicine.”

Go, See for Yourself!

Dr. Viner says, “Suku was an excellent student, who took a broader view than most. He was and is interested less in memorizing vast quantities of data than in understanding the *context* of things, whether it’s understanding the patient’s perspective or analyzing the issues of health care.”

In 2003, Dr. Nagendran’s enthusiasm for understanding things in context inspired him to create the scholarship that bears his name. Students who have been selected as Nagendran scholars

receive what he describes as a modest stipend, \$500 to \$1,000, which helps them travel to third world countries to observe and contribute to the practice of medicine. To date, 33 RWJMS students, working in 13 countries around the world, have benefited from the opportunity Dr. Nagendran has provided.

He says he has several reasons for wanting students to observe and immerse themselves in conditions so vastly different from those they encounter in an American medical school: “It will make them better physicians. Not only will they experience the depth of need for preventive and clinical care, but they will also see the ingenuity of caregivers in the world’s poorest countries.”

Dr. Nagendran adds, “It’s not a lot of money, but I have a passion for helping U.S. medical students understand how much this country has to offer. The scholarship is a small pebble thrown into the pond — enough to give students a new perspective on what the medical school has given them. I hope they will follow this example, as alumni. Then the ripples will spread across the water, helping more students to receive the same benefits, or better.”

Nagendran scholars may use the funds at their own discretion. In 2007, Alan Lowinger, MD ’08, used his award to extend his Student Scholar Year to include India, where he volunteered in clinics and screenings, learned about Indian traditional medicine and philosophy, and took Hindi lessons to improve his communication with patients. Dr. Lowinger, then president of the RWJMS International Health Interest Group (IHIG), says he “received an education that exceeded all expectations and cemented his commitment to providing care in international settings and to underserved populations.”

In 2008, MD/PhD candidate Desmond Brown, also an IHIG president, used his \$500 award to pay the airfare to Ghana, where he volunteered in three clinics in varied settings. Moreover, he organized a 13-student delegation to accompany him, supported by a special fund of the RWJMS Association of Families and Friends.

Medical students on missions to the third world know that the only supplies they have to work with may be those they bring. So, before leaving, they throw their own pebble into the pond, rallying fellow students to help raise funds for much-needed surgeries or gathering medical supplies for the clinics in which they will work.



The scholars are selected by Susan Rosenthal, MMS '75, MD, clinical professor of pediatrics and associate dean for student affairs for the clinical years, and Robert Risimini, MD, assistant professor of family medicine and assistant dean for student affairs, Camden campus. "Sukumar's a great guy, a stalwart but very understated supporter of the school, very hands off," says Dr. Rosenthal. "He understands that it's all one world, and while it's crucial for medical students to have these skills, it's a luxury for them to acquire them in global health settings."

In letters and essays, Nagendran scholars echo the description by Priya Narayanan '09 of the totally different world she discovered in Ecuadorian clinics. They find the experience "eye-opening,"

or "life-altering." They see clinics where supplies are so limited that one needle is sterilized 100 times to do bone marrow extractions; where people endure pain for months or even years before seeing a doctor; where patients and practitioners alike rely on, or revert to, folk medicine practices. In Malawi, says Jessica Kraeft, MD '08, simply feeding a child may be the first line of treatment. All speak of the remarkable gratitude of the patients in their care.



LINZ PHOTOGRAPHY

The following Nagendran Scholars presented posters at the Global Health Fair on December 2 (left to right): Gregory Lee, Abby Tubman, Jaheedah Roane, Denise Livingston, MD '08, PhD, R. Bryn Nolan.

"Go, see for yourself!" writes Nagendran scholar Denise Livingston, MD, PhD '08, who went to Mozambique in 2006. "An international health experience will change not only your personal perspective but also how you choose to practice medicine."

Solving the Diabetes Puzzle

Somewhat by chance, Dr. Nagendran became a diabetologist. After completing the Mayo Clinic's three-year internal medicine residency program, with five months of sub-specialty training in endocrinology/diabetes, he joined a medical practice in Phoenix.

"You had to become knowledgeable about diabetes," he says, "because we had a huge population of diabetic patients and patients with a family history of diabetes. It's a regional problem of enormous dimensions in the Southwest. Diabetes is very

— *Continued on Page 70*

In the spring of 2008, Moiz Manaqibwala, MD '08, worked in the Mae Tao Clinic on the Thailand-Burma border:

"The clinic began as a refuge from political persecution but now serves thousands of Burmese, along with ethnic populations who live along and across the border from Thailand. The clinic is known for the selfless service of the medics, often migrants themselves, staffing the facility. I had the opportunity to see medicine practiced in a practical, efficient, and resourceful way in an environment of limitations. This experience did more than improve my skills in clinical medicine; it also improved my understanding of global health care and allowed me to meet dedicated people fighting to fix the terrible inequity within the system."

Shruti Fadia, MD '08, participated in the Himalayan Health Exchange program, taking her to the remote Tibetan Borderland-Spiti Valley region in the northwestern Himalayas:

"At each campsite, our medical entourage set up tents that would serve as makeshift examining rooms. We were equipped with only the bare essentials including our stethoscopes, blood pressure cuffs, ophthalmoscopes, and pen lights. We couldn't perform X-rays or blood tests, so we had to make a correct diagnosis based on our clinical skills. Patients presented with diseases such as osteoarthritis, rheumatoid arthritis, psoriasis, scabies, tuberculosis, diabetes, eye infections, cataracts, and many had vitamin and iron deficiencies. We also saw interesting cases such as leprosy and neurofibromatosis.

My patients treated me with the same respect as they treated the other doctors in our team. Although I spent very little time with each of them, my first patients have become engraved on my mind, and I returned with a new understanding of the practice of medicine and a rekindled passion for my calling."

— Continued from page 69

challenging to the physician and patient. To control it is still a struggle, because diabetes really is not a single disease, it's a syndrome — a complex metabolic disorder — and it has serious consequences.”

Four years after entering private practice, Dr. Nagendran was recruited by Pfizer to serve as director of the company's Diabetes and Endocrinology Group. He had multiple roles at Pfizer, including being a director in a managed care medical group and becoming head of diabetes for the Regional Medical and Research Specialist team.

In these positions, and for a subsequent year in research and development at Novartis, Dr. Nagendran devoted himself to studying the value of drugs for patients with diabetes and hypertension or people at risk to develop these diseases. Many of the drugs he studies treat the complications of diabetes — lipid overproduction, hypertension, and cardiovascular disease. At Novartis, for instance, he studied Galvus and Tekturna, novel drugs that target glucose and blood pressure.

After working at two pharmaceutical “behemoths,” Dr. Nagendran now enjoys the smaller environment at DS, where he studies the metabolism of new drugs such as its newly approved Welchol, which addresses high LDL cholesterol and blood glucose, two cardiovascular risk factors in patients with type 2 diabetes.

While drugs are still in clinical trials, he studies their efficacy and value. “A physician needs to know good business practices as well as patient needs and should be able to evaluate the strengths and weaknesses of drugs,” he says. “We need to know how this specific drug applies to this specific patient, to know how much the patient understands about the drug, and how it fits into the whole armamentarium of drugs at a physician's disposal.

“I will always miss my patients,” he adds. “But I love working in the pharmaceutical industry, alongside some of the top minds in medicine and research. Here I have the ability to impact global health care.”

At work, Dr. Nagendran's time is spent solving challenging sections of a giant puzzle, but he prefers to leave puzzles behind when he goes home for the day. He says the best way to clear his mind and enjoy himself is by spending time with his wife, Christine, a native of Sri Lanka, whom he met in the United States, and their three young sons, Sanjay, Amrit, and Arjun: “After studying all day how a drug works, I want to relax with my family — no puzzles!” **M**

Yu-Ning Wong, MD '99

Adding Statistical Tools to the

During the coming year, Yu-Ning Wong, MD '99, will celebrate her tenth reunion at UMDNJ-Robert Wood Johnson Medical School. As an attending physician in the Department of Medical Oncology at Fox Chase Cancer Center, Dr. Wong treats patients who have a genitourinary cancer (prostate, kidney, bladder, or testicular). By any measure, her career is young, but her goals — to better understand cancer and cancer patients and to assess treatment outcomes — are shaped by the sort of maturity and insight one might expect from someone with decades more experience in the field.

Since 2004, the American Society of Clinical Oncology Cancer Foundation has awarded three grants to Dr. Wong, supporting her research. The most recent, announced in the spring of 2008, is a three-year, \$200,000 Career Development Award. The grant enabled her to establish an independent clinical cancer research program to further her studies of treatment outcomes. The award is presented to 13 physicians in their second, third, or fourth year as full-time faculty members in an academic setting.

One of Dr. Wong's recent projects focused on how cancer patients choose their treatment and how these decisions affect outcomes. Like all patients, those with cancer have many issues to weigh as they make decisions. The benefits of treatment must be balanced against medical and personal issues that differ for each patient. Expenses are increasingly problematic: the cost of therapy has skyrocketed as a result of scientific advances in cancer drugs, which now target tiny cell abnormalities rather than taking a “one size fits all” approach. Other factors in the equation include age, personal values, financial commitments, the health of a spouse, co-existing illnesses, individual co-pay arrangements, and access to care.

As a senior at the University of Virginia, Dr. Wong traveled to Singapore to assist in research on the structure and effectiveness of that nation's required medical savings accounts. Through her involvement with the project, she gained an early appreciation of how complicated health care policy can

By Kate O'Neill

Oncologist's Black Bag

be. She encountered a system in which citizens are required to take personal responsibility for saving up to pay for their own medical expenses, but they are also given the impossible challenge of predicting the unforeseeable costs of catastrophic illness. These issues continue as factors in her analysis of patients' treatment decisions.

In 1995, as a first-year medical student, Dr. Wong was still mainly interested in public policy and hoped to advance the field by expanding and applying her knowledge about global health care. Meanwhile, she kept an open mind about her choice of a specialty. For a time, during clinical rotations, she explored psychiatry. The experience she gained — at the University Medical Center at Princeton and at Bellevue Hospital Center in New York— stands her in good stead, she says, in counseling patients as they sort through their treatment options.

Not until Dr. Wong was completing a fourth-year oncology elective under Robert P. Fein, MD, clinical assistant professor of medicine, did she consider an internal medicine subspecialty. Several factors shaped her decision. "That was the year that Herceptin was approved as a treatment for breast cancer, and there was a lot of excitement in the field," she recalls. Medical oncology also attracted her, as a sub-specialty in which she would get to know her patients and develop a relationship over time.

Dr. Wong completed her residency in internal medicine at Thomas Jefferson University Hospital in Philadelphia. Then, following a three-year fellowship in hematology and oncology at a joint program with Temple University and Fox Chase Cancer Center, she accepted an appointment to the Fox Chase medical staff in 2005. Learning of her interest in assessing treatment benefits, Paul F. Engstrom, MD, senior vice president for extramural research programs, selected Dr. Wong to receive funding through a National Cancer Institute-funded training grant that allowed her to complete a master's degree in science in clinical epidemiology at the

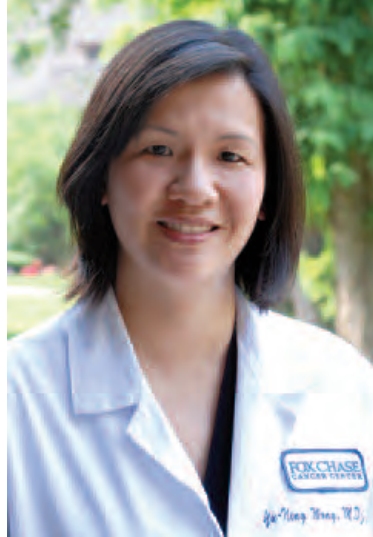


PHOTO COURTESY OF YUNING WONG, MD '99

"As part of my research life, I study national databases, consisting of tens of thousands of patients with prostate cancer," says Dr. Wong. "But as a physician, I focus on the person sitting across the desk from me, doing the best I can for each one and advocating for the most appropriate possible course of treatment."

University of Pennsylvania while working at Fox Chase. This master's program included courses in economics, statistics, and epidemiology. The skills she gained have equipped her to study and analyze the vast amount of information stored in national databases, identify patient populations, and determine the cost-effectiveness of cancer treatments.

Dr. Wong applies her post-graduate training in clinical epidemiology to the development of a reliable system of cost-assessment analysis for patients with prostate cancer. Using this knowledge, she is able to counsel her patients on their treatment options.

"As part of my research life, I study national databases, consisting of tens of thousands of patients with prostate cancer," says Dr. Wong. "But as a physician, I focus on the person sitting across the desk from me, doing the best I can for each one and advocating for the most appropriate possible course of treatment."

"Dr. Wong has a work ethic beyond any I have seen," says Dr. Engstrom. "Insightful, innovative, and goal-minded, she is also a superb clinician. When I'm away, she takes care of my patients, and they love her. She takes the time to listen to them and stops to explain everything. We are delighted to have her on our staff." **M**

C L A S S NOTES

NINETEEN SEVENTY-ONE

Charles Baldwin writes: "Remember me to the second class at Rutgers Medical School with Jackson and the other 14."

NINETEEN SEVENTY-THREE

Neil Calman is the president and CEO of the Institute of Family Health. He is also the principal investigator of a \$2.7 million grant from the National Institutes of Health's National Center for Minority Health and Disparities, to support its ongoing work to eliminate racial and ethnic disparities in health outcomes in the southwest Bronx.

NINETEEN SEVENTY-FOUR

The National Committee for Quality Assurance announced that *Robert Eidus* received recognition from the Physician Practice Connections Program for using information systems to measure practice-wide quality and improve clinical outcomes at the point of care.

NINETEEN SEVENTY-FIVE

Kris Parnicky writes: "I have retired from family practice. Looking for another career."

Susan Rosenthal reports: "I am associate dean for student affairs for the clinical years at RWJMS. My daughter, Rebecca, is a student at Mt. Sinai Medical School, where

I spent 1975–1977. My son Aaron works for Google in New York City, in technical sales, and my son Jonathan is a junior at Rutgers Preparatory School. My husband, George Karp, is a volunteer faculty member at RWJMS and a member of Central Jersey Oncology Group."

NINETEEN SEVENTY-SIX

Cadrin Gill writes: "I was appointed to a diplomatic position by the government of St. Vincent and the Grenadines as 'honorary consul general.'"

NINETEEN SEVENTY-SEVEN

Orthopaedist *Eldridge Anderson* joined the medical staff of Auburn Memorial Hospital in Syracuse, N.Y.

Ernie Biczak joined EKR Therapeutics Inc., a specialty pharmaceutical company, as senior vice president of marketing.

NINETEEN SEVENTY-EIGHT

Keith Calligaro is president of the Eastern Vascular Society (2008–2009).

Villi Enders writes: "Best regards to my classmates!"

NINETEEN SEVENTY-NINE

Patricia O'Connor Dreyfuss writes: "Meghann, the oldest of my three daughters, who was born during my senior

year at Rutgers Medical School, is a member of the original Broadway cast of *Mamma Mia*."

Winston Scott is chief of the Department of Ophthalmology at East Orange General Hospital.

NINETEEN EIGHTY

Steve Bloomfield and his wife, Jody, have four children: Isaac, Zoe, Orion, and Talia.

NINETEEN EIGHTY-ONE

Linda Meloy was promoted to professor at Virginia Commonwealth University.

NINETEEN EIGHTY-TWO

Lynn Helmer and her family announce the birth of her grandson, Aaron Samuel, on October 14, 2008.

Gary Moak was the president of the American Association for Geriatric Psychiatry for the 2007–2008 term.

NINETEEN EIGHTY-THREE

Nancy Ferguson writes: "I retired from full-time emergency medicine in 2005 and was recently deputy medical director for the Americas Region for International SOS, based in Treviso, Pa. We provide medical assistance services to an international clientele. . . . While travel is part of my practice, I am able to spend

more time with my partner of 15 years, Beth Wetterskog, and our children, Deven (5) and Chloe (6). . . . Someday I'll make that Reunion."

John Gallagher reports: "I completed a term as president of the Mercer County Medical Society and currently serve on the executive board of PAMPAC, the Pennsylvania Medical Society's political action committee."

Michael Miller writes: "I am co-author of the *AMA Guide to Cardiovascular Disease Prevention*. My oldest daughter, Avery, is a sophomore at Penn."

NINETEEN EIGHTY-FIVE

Thomas Gross writes: "I haven't seen anyone from RWJMS in 20 years. Stayin' alive."

NINETEEN EIGHTY-SIX

John Agens was appointed associate professor of geriatrics at Florida State University College of Medicine.

John Capo reports: "I am currently an associate professor and chief of hand and microvascular surgery at UMDNJ-New Jersey Medical School. We recently started an accredited hand and upper extremity fellowship. This year, I presented papers at the American Academy of Orthopaedic Surgeons in San Francisco and edited a textbook, *Minimally Invasive Hand and Wrist Surgery*.

Leonard Zawodniak is currently serving as vice president of the medical staff at Jersey Shore University Medical Center.

NINETEEN EIGHTY-SEVEN

Nathaniel Holmes is vice president and chair of the Department of Surgery at Jersey City Medical Center.

Grace Yang, is a professor of clinical pathology and laboratory medicine at Weill Cornell Medical Center. In 2007, she published a book titled *Transabdominal Fine-Needle Aspiration Biopsy: A Color Atlas and Monograph*.

NINETEEN EIGHTY-NINE

Kelly McMasters, Sam and Lolita Weakley Professor of Surgical Oncology at the University of Louisville School of Medicine, serves as a member of the corporate board of directors at Provectus Pharmaceuticals Inc.

Jamie Ullman writes: My husband, Mark Nearenberg, and I welcomed our beautiful daughter, Sara, into the world on August 23, 2007.”

NINETEEN NINETY

Laura Simai writes: “I was appointed the state breast-feeding coordinator of the American Academy of Pediatrics in North Carolina. I am very busy giving lectures on breast-feeding all over North Carolina.”

NINETEEN NINETY-ONE

Sabine Hack writes: “I practice child and adolescent psychiatry in New York City and live in South Orange with my husband and four children: Aidan (8), Calliope (5), Elodie (5), and Holden (3).”

NINETEEN NINETY-FOUR

Tamara LaCouture writes: “I have two beautiful sons: Brendan and Kieran. I am director of women’s services and acting chief of the Department of Radiation Oncology at Cooper University Hospital.”

Richard Leone is a cardiothoracic surgeon at St. Joseph Hospital in Bellingham, Wash. He is also director of the Mechanical Circulatory Support Program.

Andrew Olshen writes: “My wife, Audra, and I are living in Muskogee, Okla., where I am in solo practice in physical medicine and rehabilitation.”

Michael Steinberg is an associate professor of medicine at RWJMS and medical director of the Tobacco Dependence Program.

NINETEEN NINETY-FIVE

Nicole Stassen reports: “Aaron and I were proud to add twins, Noah and Hannah, to our family this past August. They join big brother Nathan. I am an associate professor of surgery at the University of Rochester and run the third-year clerkship.”

NINETEEN NINETY-SEVEN

Ian Leber writes: “I was named director of the Department of Emergency Medicine at Bayshore Community Hospital in Holmdel. I previously practiced at Capital Health System in Trenton as vice chairman of the Department of Emergency Medicine. I live in Freehold Township with my wife, Elizabeth, who is also an emergency physician.”

Suzanne Lind was named chair of the Department of Psychiatry at St. Peter’s University Hospital.

NINETEEN NINETY-EIGHT

Romy Drapkin received the 2008 Distinguished Alumnus Award from the UMDNJ-Graduate School of Biomedical Sciences. He serves as an assistant professor at Harvard Medical School, associate pathologist at Brigham and Women’s Hospital, and principal investigator at the Dana-Farber Cancer Institute.”

Stella King writes: “My husband, **Brad Turner ’97**, and I welcomed twins, Alyssa and Benjamin, on January 17, 2008. Brad is completing his training at the University of Florida in Gainesville. He will complete his second residency in pathology in June 2009 and start a surgical pathology fellowship. I am still working as the family medicine clerkship director of Florida State University College of Medicine and part

time in the Fast Track Section of the Emergency Department.”

Hitesh Patel reports: “My wife, **Kanchan Govil Patel (SPH ’99)**, and I are proud to announce the birth of our daughter, Tara, on August 25, 2008. She joins her two big brothers, Rohan and Aryan. I continue to run my private practice in Edison.”

NINETEEN NINETY-NINE

Nicholas Di Prospero is associate director of experimental medicine at Johnson & Johnson Pharmaceutical Research and Development. He joined the students in the RWJMS/Rutgers/Princeton MD/PhD program to talk about his career experiences, his research, and the opportunities and challenges of clinical research.

Tushar Patel practices at the Plastic Surgery Center in Shrewsbury.

Daniel Stewart is co-director of residency training at Mt. Sinai School of Medicine.

TWO THOUSAND

Mahalia Desruisseaux, a research fellow at the Albert Einstein College of Medicine, is the recipient of a five-year Burroughs-Wellcome Fund Career Award for Medical Scientists. Funding from the award will support her investigations of a mouse model of cerebral malaria.

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NOTES

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TWO THOUSAND

Jonathan Dunham is an assistant professor of medicine in the Department of Medicine/Rheumatology at the University of Pennsylvania School of Medicine.

Clarissa Febles Henson was appointed chair of radiation oncology at Trinitas Comprehensive Cancer Center. She served as chief resident at Thomas Jefferson University Medical Center and was awarded the A. Robert Kagan Fellowship in Palliative Care from the American College of Radiation Oncology.

Anish Nihalani writes: “After completing my residency in general surgery, which included a research year at Columbia University, I did a bariatric surgery/laparoscopic surgery fellowship at Princeton Regional Medical Center. Currently, I am in private practice based out of JFK, Muhlenberg, and Somerset hospitals. I am pleased to announce my marriage to Shubhamvada Nihalani, a physician specializing in family medicine/geriatrics.”

TWO THOUSAND ONE

Guri Bronner writes: “My wife, Jill, and I celebrated the birth of our second son, Elliott Michael. Elliott’s big brother, Joshua, welcomed the new addition! I am a vitreo-retinal surgeon at Retinal and Ophthalmic Consultants in southern New Jersey.”

Shayma Kazmi writes: “It’s great to read about some of my classmates through Class Notes. Sorry I had to miss Reunion; I was on call. I finished my fellowship in hematology/oncology and joined a private practice, Hope Community Cancer Center in Marmora, and I love it! I got married and have a baby boy, Ameen (6 months old). Life is great, and I always wonder what happened to some of my classmates.”

Jeffrey Schulman reports: “Last year I completed my fellowship in orthopaedic traumatology at the University of Maryland Shock Trauma Center. I have since joined the Orthopaedic Trauma Division at Inova Fairfax Hospital in Falls Church, Va. I live in Alexandria with my wife, Lessica Lazerov, MD (pediatrician), and our son, Max (2).”

Adarsh Verma and his wife, **Deepa Bogle Verma ’02**, write: “We are in Palm Harbor, Fla. Adarsh completed his interventional radiology fellowship at Baptist Cardiac Vascular Institute in 2007 and joined Radiology Associates of Clearwater. Deepa has been working part time as a family practitioner since completing her residency in 2005. We have two boys, Saahil (3) and Milan (1).”

Johanna Vidal-Phelan writes: “After living in Seattle for six years, our family recently relocated back to beautiful New Jersey. I married my husband, engineer Edward J. Phelan III,

in 2002 and became the mother of a very special little boy named Eduardo Sebastian Phelan-Vidal in 2005. We love our new home in Collingswood. I am currently working as a general pediatrician for Maria de los Santos, a Hispanic community health center in North Philadelphia. I greatly enjoy the challenges of working with a minority population, as I use my Spanish skills and my upbringing experiences from Puerto Rico.”

TWO THOUSAND TWO

Jonathan Marcus reports: “I completed a fellowship in pulmonary and critical medicine last July. I joined a private practice in West Palm, Fla., and moved to Boca Raton with my wife and five kids.”

In addition to being an emergency medicine physician at Cooper University Hospital, **Anthony Mazzealli** hosts *1210 Tonight* on WPHT (1210 AM), Mondays through Thursdays from 6:00 to 9:00 P.M.

Satyan Shah writes: “My wife and I have relocated to Albuquerque, N.M. I am working at the University of New Mexico as director of robotic surgery and minimally invasive urologic surgery.”

TWO THOUSAND THREE

Grant Cooper is an interventional spine and joint pain medical specialist. He is co-director of the Princeton Spine and Joint Center. He complet-

ed his fellowship at Beth Israel Medical Center in interventional spine and musculoskeletal rehabilitation.

Christina and **Mark Reiter** report: “We are pleased to announce that Cara Ann Reiter has joined our family. Her big sister, Jenna, is now 2. Christina is working as an anesthesiologist at St. Luke’s Hospital in Bethlehem, Pa. Mark is also at St. Luke’s, as an emergency physician. He recently launched Emergency Excellence, an emergency medicine benchmarking and consulting company.”

TWO THOUSAND FOUR

Lasanta Horana is assistant director of the Emergency Department at Robert Wood Johnson University Hospital in Hamilton. He and his wife, Carmen, are delighted to announce the birth of their daughter, Kayla Angelina, on January 10, 2008.

Lee Kubersky married Robin Naples, MD, on October 7, 2006. He is doing a fellowship in movement disorders at the University of Pennsylvania’s VA Hospital.

TWO THOUSAND FIVE

Christopher Gentle completed his residency in emergency medicine at Christiana Care Health Services and is an attending emergency physician at Washington County Hospital in Hagerstown, Md.

Nichole Eftychiou Post and *Robert Post* report: “We are currently residing in Charleston, S.C., where I am chief resident in psychiatry and Rob is a junior faculty member in the Department of Family Medicine. We welcomed our son, Robert Post III, on August 6, 2008. It is a very exciting and busy time for us, but we are doing great.”

TWO THOUSAND SIX

Anu Lala and *Arvind Trindade* were married in August 2008 at Tavern on the Green in New York. The *New York Times* published an article and photographs.

FORMER RESIDENTS

Celia Padron writes: “Taking care of pediatric gastroenterology in South Jersey for the last 18 years. I am division head of pediatric gastroenterology at Virtua Health System.”

WHAT'S NEW?

Please send your professional and personal news for

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Recently, the National Cancer Institute launched the cancer Biomedical Informatics Grid (caBIG) project (<https://cabig.nci.nih.gov>). The mission of the caBIG project is to develop a collaborative information network that accelerates the discovery of new approaches for the detection, diagnosis, treatment, and prevention of cancer, with a stated objective of improving patient outcomes. caBIG is just one of many examples of new projects that are currently under way creating opportunities for stimulating and sustaining cross-disciplinary collaborative research and training.

Another high-profile national project is the Biomedical Informatics Research Network (BIRN) initiative (<http://www.nbirn.net>), which focuses on support for collaborative access to and analysis of the massive data sets generated from neuroimaging studies. MammoGrid is an example of an international, multi-institutional project; it is funded by the European Union, with the primary objective of developing grid-based tools to promote standardization in medical image databases for mammography.

Recently, our own Cancer Institute of New Jersey (CINJ) led the Help Defeat Cancer project, using IBM's World Community Grid (www.worldcommunitygrid.org) to analyze more than 100,000 imaged cancer tissue core specimens. In an NIH-funded collaboration established with investigators at CINJ, Arizona State University, Emory University, the Ohio State University, and the University of Pennsylvania, the team is now developing software to

perform high-throughput comparative analysis of the expression patterns of immuno-stained histology specimens, including tissue microarrays. These tools and a growing reference library of expression signatures are being developed as deployable, caBIG-compliant resources that will be made accessible by the clinical and research communities.

In spite of the progress that has been made thus far through the increasing number of collaborative projects currently under way, the NIH Roadmap working committees emphasize the fact that while “the opportunities for discoveries have never been greater, the complexity of biology remains a daunting challenge.” The next generation of advances in the biomedical sciences will require a new breed of investigators who are cross-trained in several disciplines and who can integrate well with physicians and scientists in order to identify and resolve challenges that require highly complex solutions.

In the team science model, it remains the responsibility of the PI to provide the vision and leadership for any given project, but in this new paradigm the vision represents only the planned destination. For many undertakings, it will be the strategic alliances that are forged with other investigators that will actually make it possible to reach the target.

— *David J. Foran, PhD*
Professor of Pathology and Laboratory Medicine and Radiology,
Director, Center for Biomedical Imaging and Informatics,
The Cancer Institute of New Jersey

P A G E L A S T E

Team Science: A Cornerstone of Modern Research and Discovery

“The scale and complexity of today’s biomedical research problems increasingly demands that scientists move beyond the confines of their own discipline and explore new organizational models for team science.”
— National Institutes of Health (NIH) Roadmap for Medical Research

In the recent past, it may have been accurate to view the fields of computer science, engineering, and medicine as distinctly separate pursuits, with their respective practitioners often possessing totally different skills, interests, intellectual inclinations, and research objectives. Today, these pursuits are becoming inextricably interwoven.

Evidence of this trend can be found throughout practically every area of sub-specialization in medicine. Collaborative efforts between the clinical and research communities are giving rise to an increasing number of innovations and new technologies, ranging from high-resolution diagnostic imaging to minimally invasive robotic surgery and high-throughput molecular analysis. Together, they are providing unprecedented insights regarding the underlying mechanisms of disease progression while propelling advances in drug discovery.

The need to integrate new technologies into the study and practice of medicine is driven by financial incentives to reduce costs while maintaining or improving the quality of care deliv-

ered to patients; there is also a need to identify improved methods for organizing and assimilating a growing volume of information. As the level of complexity for many research efforts exceeds the resources and expertise of any one institution or facility, multi-institutional collaboration is quickly becoming

indispensable. In many cases, these collaborative efforts are conducted with investigators and resources spread out across several campuses, cities, and states.

For investigators working in the areas of medical imaging, proteomics, and clinical outcomes, for example, it is sometimes necessary to make use of advanced computing technologies to evaluate the vast amount of data that is generated. Grid technologies offer a possible solution for addressing the computational complexity of large-scale collaborative applica-

tions, by allowing execution of algorithms on computer and storage clusters even when they are distributed across multiple geographic locations.

Continued on Page 75



JOHN EMERSON

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