

## Good Science...

**Dr. Eleanore T. Wurtzel** is Professor of Biological Sciences at Lehman College and the CUNY Graduate Center, Chair of the CUNY Ph.D. subprogram in Plant Sciences, upcoming Chair of the 2013 Gordon Research Conferences on Carotenoids, a member of the Board of Trustees of the Gordon Research Conferences, and Monitoring Editor of the most highly cited plant journal, *Plant Physiology*. A Fellow of the American Association for the Advancement of Science and a Fellow of the American Association of Plant Biologists, she has dedicated her career to improving the nutritional value of the crops which people in the developing world depend upon for the bulk of their caloric intake: maize, rice and wheat. Through her research, she is addressing the global deficiency in vitamin A which leaves over 250 million children vulnerable to blindness and life-threatening illness.



*Dr. Eleanore T. Wurtzel*

Working with research partners in academia, government and industry, Dr. Wurtzel has studied lines of maize from around the world. For grains to be a good source of Vitamin A, they need to be as rich as possible in beta carotene. Her lab has therefore focused on how the plants regulate the biosynthesis and accumulation of provitamin A carotenoids. This research brings together molecular biology, systems biology, bioinformatics, genetics, biotechnology, chemistry, biochemistry, and comparative genomics. By advancing their understanding of gene regulation in maize, Dr. Wurtzel, her colleagues and her students have been able to pinpoint DNA-based indicators, which plant breeders can use to develop plants which produce the highest level of provitamin A. "Breeders," she says, "will be able to develop new lines of maize by using the DNA diversity that already exists in these collections." Dr. Wurtzel points out that the group's analysis of maize has led to the discovery of a new carotenoid biosynthetic step that is essential in all higher plant carotenoid biosynthesis, and that this knowledge can be translated into enhancing provitamin A carotenoid content in other grasses. In addition, Dr. Wurtzel's research has yielded three provisional patents, including one for a new way of making lutein, a carotenoid which is capable of reducing the risk of macular degeneration.

Often in scientific inquiry, a line of research leads to a breakthrough in an unexpected area. As part of their efforts to identify critical enzymes in the biosynthetic pathway that helps accumulate carotenoids, Dr. Wurtzel and her team studied the role of the CruP plant protein. Though they found that it did not function as an enzyme of the pathway, they discovered that it could make crops more resistant to climate change, and their results were published in the Proceedings of the National Academy of Sciences. "The evidence suggests that the CruP protein is a unique target for developing plants and algae with increased tolerance to temperature variation and other abiotic stresses that affect plant growth and development," she says. "The availability of stress-resistant plants will help address the issue of global food security in the face of climate change."

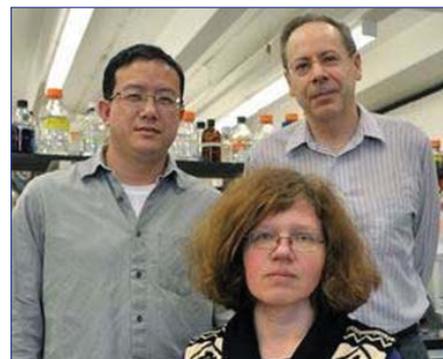
## ...for the Public Good

**Dr. Paul Gottlieb** is Medical Professor of Microbiology and Immunology at the Sophie Davis School of Biomedical Education. His research on structure and assembly of some of the world's most widespread viruses is leading to lifesaving treatments and vaccines.

With his longtime collaborator Dr. Alvin Katz, Gottlieb is using cryo-electron microscopy to study a cystovirus, which is non-infectious to humans, but in which the mechanism of RNA packaging, replication and transcription is analogous to that of rotavirus, a major cause of severe infant gastroenteritis. The research could have broader implications: Dr. Gottlieb explains that viruses which appear different can share similarities in the RNA polymerases which synthesize nucleic acids. Therefore, this work also could lead to advances in understanding other RNA viruses including influenzas, hepatitis and Dengue fever.

Gottlieb and Sophie Davis colleague Dr. Linda Spatz are studying the role of the Epstein-Barr virus in the etiology of the devastating autoimmune disease, Systemic Lupus Erythematosus (SLE). Anti-double stranded (anti-dsDNA) antibodies are an SLE hallmark. In a healthy body, regulatory mechanisms keep B cells from secreting the antibodies. However in SLE, they are secreted at elevated levels and can lodge in organs, causing tissue damage. Drs. Spatz and Gottlieb have found that when mice are immunized with EBNA-1, a major nuclear protein of the Epstein-Barr virus, this can elicit the production of pathogenic anti-dsDNA antibodies that can deposit in the kidney. Decoding the mechanism by which EBNA-1 leads to the production of autoimmune antibodies will be a significant step in understanding Lupus.

Each year brings new strains of influenza and the need for a new vaccine to meet their threat. Dr. Gottlieb collaborates with New York Medical College, which develops high-yield reassortant strains for the production of the world's annual supply of influenza vaccine. He uses cryo-electron microscopy to analyze the assembly of influenza reassortant strains in order to determine the physical qualities that quarantine high level antigenicity. Dr. Gottlieb also collaborates with a company in the New York City region that utilizes recombinant technology to isolate virus-like particles for use as influenza and respiratory syncytial virus vaccines. Currently, he is working with Distinguished Professor of Computer Science and MMA faculty member **Gabor T. Herman** on a revolutionary way to classify vaccine strains. Using the cryo-electron microscopes at the New York Structural Biology Center, Dr. Gottlieb is studying surface proteins of vaccine strains. Then, using mathematical modeling, he and Dr. Herman are applying algorithms to determine their antigenic potential.



*Professor Paul Gottlieb, right, with senior scientists Alexandra Alimova, seated, and Hui Wei. Not present: Alvin Katz.*



**Robert Bittman** (Queens) is PI on a 2-year Finnish Medical Fdn/Univ of Helsinki grant for "New Lipid Probes for Studying Lipidoses," and on a 1-year NIH grant for the "Role of Sphingolipids in the Pathology of Lung Injury."

**Zimei Bu** (CCNY) is a grant reviewer for the Department of Energy - Basic Energy Sciences.

**Leslie Davenport** (Brooklyn) is PI on a 4-year NIH-SCORE grant, "Conformation and Multimeric Formation of G-Quadruplexed DNA: Effects of Ligand Interactions."

**C. Michael Drain** (Hunter) is serving on the Editorial Board of *Analytical Chemistry Insights* and *E-Journal of Chemistry*.

**Ranajeet Ghose** (CCNY) is PI on a 2-year NIH-NIAID grant, "Interactions between Bacterial Tyrosine Kinases and Phosphatases."

**Brian Gibney** (Brooklyn) is co-PI (PI: F. Breitling, Karlsruhe Institute of Technology) on a 3-year European Commission grant, "Peptide-based Diodes for Solar Cells."

**Lane Gilchrist** (CCNY) is co-PI (co-PI: Yueming Li, PI: Karen Hubbard) on a 2-year NIH grant, "Development of a Proteolipobead Platform to Probe the Inhibition of Notch Cleavage by Gamma-Secretase."

**Dixie Goss** (Hunter) is PI on a 1-year and a 3-year NSF grant, both titled "Functional Role of BYDV 3' RNA Translation Enhancer Element."

**Nancy Greenbaum** (Hunter) is PI on a 1-year subcontract from Weill Cornell Medical Center under an NIH grant, "Effect of Structural Variation of Noncoding RNA on Synthesis of Beta-Globin."

**Marilyn Gunner** (CCNY) served as Chair of the 2012 Gordon Research Conference on Protons & Membrane Reactions. She is also serving on the APS Panel on Public Affairs, on the Editorial Board of *Biochimica et Biophysica Acta - Bioenergetics*, and on the Board of the Telluride Science Research Center.

**Gabor Herman** (GC) is PI on a 3-year NSF grant, "Computational Methods for Inverting the Soft X-Ray Transform." He is currently serving on the Editorial Boards of *Computerized Medical Imaging and Graphics* and *Journal of Visual Communication and Image Representation*.

**George John** (CCNY) was promoted to Professor at City College. He is serving on the Editorial Advisory Board of *Current Green Chemistry*.

**William L'Amoreaux** (CSI) was awarded the CSTEP Shining Star Recognition for Undergraduate Mentoring.

**Louis Levinger** (York) is PI on a 3-year NIH grant, "tRNase Z reaction is central to tRNA maturation," with 2 Diversity Supplements for undergraduate trainees. He received a Senior Faculty Fellowship to support a sabbatical with Dr. Liang Tong, Biological Sciences, Columbia University.

**Ronald Koder** (CCNY) was promoted to Associate Professor at City College. He is PI on a grant from the AFOSR under the Defense University Research Instrumentation Program, "Charge separation proteins for attachment to biofuel-generating enzymatic domains and deposition on light-harvesting metamaterial electrodes."

**Krishnaswami Raja** (CSI) was promoted to Associate Professor at the College of Staten Island.



Bittman



Bu



Davenport



Drain



Ghose



Gibney



Gilchrist



Goss



Greenbaum



Gunner



Herman



John



Koder

## Upcoming Events

### IEEE Signal Processing in Medicine & Biology Symposium Saturday, December 1, 2012

City College of New York (CCNY) - Steinman Hall  
PLENARY SPEAKERS: Jelena Kovacevic - Carnegie Mellon University, "Problems in Bioimaging: Opportunities for Signal Processing;" Jonathan Viventi - Polytechnic Institute of NYU, "High-Resolution Brain Machine Interfaces using Flexible Silicon Electronics"  
WEBSITE: <http://bme.ccnycuny.edu/IEEE-SPMB-2012/>

### New York Structural Biology Discussion Group (NYSBDG), Winter Meeting

Thursday, January 24, 2013

For further details: <http://www.nysbdg.org/>

## 2 New MMA Faculty Members at City College



Professor **David Jeruzalmi**, Ph.D. Yale University, specializing in Biochemistry/ Structural Biology/Biophysics.



Assistant Professor **Reza Khayat**, Ph.D. Columbia University, specializing in Biochemistry/Molecular Biophysics.

Research Interests: To carry out faithful transmission of genetic information, organisms have evolved processes to replicate their genomes and defend them from attack. We study two important mechanisms associated with these processes, DNA replication and nucleotide excision repair. My group applies X-ray crystallography, supplemented with electron microscopy and biochemical studies, to understand these long-standing problems in DNA biology.

Research Interests: My research goal is to understand the life-cycle of DNA viruses at atomic resolution. In particular we seek to characterize the mechanisms by which these viruses identify their hosts, acquire entry into the cell, modify the cellular cytoskeleton, deliver their genomes to the nucleus, replicate, assemble and exit from the cell. We use a combination of biochemistry, biophysics, X-ray crystallography and cryo-electron microscopy to address these problems.

## Kudos, continued



**Kevin Ryan's** (CCNY) meeting abstract, "Circularized synthetic oligodeoxynucleotides function as RNA polymerase III templates for small RNA production in human cells," was selected for plenary presentation at the RNA and Oligonucleotide Therapeutics Meeting, Cold Spring Harbor, NY.

**Chwen-Yang Shew** (CSI) was awarded the JSPS Invitation Fellowship award by the Japanese Society for the Promotion of Science.

**Ruth Stark** (CCNY) was awarded the City of New York Alfred P. Sloan Foundation Public Service Award.

**Shuiqin Zhou** (CSI) is PI on a 1-year ADA grant, "Molecularly Imprinted Hybrid Nanogels for Glucose Sensing and Continuous Monitoring."

Continued on next column