

Thirty-Seventh Annual Briefing NEW HORIZONS IN SCIENCE

*November 7 through 11, 1999
Hershey Lodge and Convention Center
Hershey, Pennsylvania*

CASW *Council for the
Advancement of
Science
Writing, Inc.*

Program by:
Ben Patrusky, Executive Director, CASW

Sponsored by:
The Pennsylvania State University
Penn State's College of Medicine

With support from:
American Cancer Society
Bayer Corporation
Burroughs Wellcome Fund
Computer Motion
Howard Hughes Medical Institute
Wyeth-Ayerst Research

With additional support from:
Pennsylvania Newspaper Association
The Health Alliance of Pennsylvania

Sunday, November 7

6:30 p.m. to 9:30 p.m.

WELCOME RECEPTION/REGISTRATION
Cocoa Suites, Hershey Lodge and Convention Center.

Monday, November 8

8:30 a.m. to 11:30 a.m.

A TOTALLY IMPLANTABLE ARTIFICIAL HEART — AT LAST

Gerson Rosenberg, Ph.D., Jane A. Fetter Professor of Surgery, Professor of Bioengineering and Chief, Section of Artificial Internal Organs, The Milton S. Hershey Medical Center, Penn State's College of Medicine, Hershey, PA

With clinical trials in the offing, researchers think they are on the verge of ushering in a new era in artificial heart development. Until now, the best patients needing new hearts could hope for were mechanical devices that served as temporary "bridges" to transplantation. The main drawback: skin-penetrating electrical connections that are highly discomforting and infection prone. With this new generation of devices, energy (from a lightweight external power pack worn over the shoulder like a handbag) gets delivered across the intact skin via a pair of radio-frequency coils, one implanted in subcutaneous tissue, the other resting atop the body surface. If they prove their mettle, these new implants could well serve as permanent installations and, as such, go a long way toward alleviating the critical shortfall in donor organs.

THE WAR ON CANCER: NEW ARTILLERY

Anthony E. Pegg, Ph.D., J. Lloyd Huck Professor of Cell and Molecular Biology and Evan Pugh Professor of Cellular and Molecular Physiology and of Pharmacology, The Milton S. Hershey Medical Center, Penn State's College of Medicine, Hershey, PA

Waldemar Debinski, M.D., Ph.D., Director, Tumor Research, Section of Neurosurgery, Department of Surgery, The Milton S. Hershey Medical Center, Penn State's College of Medicine, Hershey, PA

Danny R. Welch, Ph.D., Associate Professor of Pathology, Jake Gittlen Cancer Research Institute, The Milton S. Hershey Medical Center, Penn State's College of Medicine, Hershey, PA

Reports from the research front on promising advances in efforts to increase cancer survival rates, including: development of an agent that deactivates the DNA repair machinery of malignant cells, thereby enhancing the cancer-killing power of currently available DNA-disrupting chemotherapeutic drugs; an immune-system-derived molecule that has been specifically tailored to target and destroy the most malignant form of brain cancer; new discoveries concerning metastasis suppression that could lead to some novel strategies for thwarting the spread of the malignancy to other sites. Since metastasis is the most lethal aspect of tumor biology, any advance here would certainly go a long way toward reducing the cancer mortality rate.

Monday, November 8
2:30 p.m. to 5:30 p.m.

THE PREBIOTIC ATMOSPHERE

James F. Kasting, Ph.D., Professor of Geosciences and Meteorology, The Pennsylvania State University, State College, PA

What was the make-up of the Earth's early atmosphere that set the stage for the emergence of life? Scientists are now reasonably sure they know what it did not contain. The primitive atmosphere did not, for instance, possess significant amounts of oxygen, nor of methane and ammonia (the famous Urey-Miller lightning-in-a-bottle experiments, notwithstanding). How about high levels of carbon dioxide — say, 1000 times above today's levels? That proposal (introduced as a solution to the "faint young sun" paradox) is now also open to serious challenge. So what did give rise to the organic substances required for life? While the question remains up in the air, researchers think that, with the completion of new laboratory experiments, they may finally have the answer — along with new insights to help in the search for life on other planets.

COSMIC ACCELERATION: WHY THE SUDDEN SPEED-UP?

Paul J. Steinhardt, Ph.D., Professor of Physics, Princeton University, Princeton, NJ

The cosmos never fails to surprise. The latest stunner: evidence suggesting that after 15 billion years of post-Big Bang slowdown, the expansion rate of the universe has begun to accelerate. For that to be happening, there must exist an exotic energy that acts to oppose, and is sufficient to overcome, the gravitational self-attraction of matter, the brake on expansion. But what is the nature of that missing energy? Two explanations are currently in contention. The acceleration, scientists say, probably derives either from a "cosmological constant" (boding the return of the concept introduced by Einstein for a static energy that permeates empty space) or from "quintessence" (a form of energy that evolves with time). Distinguishing which it is will have much to tell us about the evolution and fate of the universe and, whatever the case, require major revisions in the standard model of particle physics.

6:00 p.m.

Hospitality Suite open.

Tuesday, November 9
8:30 a.m. through 11:30 a.m.

**ENGINEERING NOVEL PHARMACEUTICALS AND
NUTRACEUTICALS: A STRUCTURAL APPROACH**

Joseph P. Noel, Ph.D., Associate Professor, Structural Biology Laboratory, The Salk Institute,
La Jolla, CA

It's a novel — you could call it “semi-rational” — scheme for improving nature's medicine cabinet. The rational part: using X-ray crystallography to decipher the structure of key enzymes that plants employ to make valuable pharmaceuticals and nutraceuticals (natural products that promote health). With these 3-D blueprints researchers are able to ascertain which sub-units of the enzyme (which of the 15 amino acids, say, in a protein composed of 400) are critical to function. The empirical part: tinkering with these “active-site” amino acids (via recombinant engineering) in hopes of producing altered versions of the enzymes that would act to generate more effective incarnations of these beneficial agents. As a complement to the enterprise: screening plant populations for naturally occurring variants of the critical enzymes that might also do the trick.

**NEW ROUTES TO NEW MATERIALS:
MOLECULAR TECTONICS/BIOEXPLOITATION**

James D. Wuest, Ph.D., Professor of Chemistry, University of Montreal, Montreal,
Quebec, Canada

Vicki L. Colvin, Ph.D., Assistant Professor of Chemistry, Rice University, Houston, TX

The business of chemistry is making new stuff. Today, however, the scale at which chemists work is far different from what it was, say, a decade ago. Now the challenge is not so much molecular (arranging tens of atoms together to form new materials with valuable properties) as it is supramolecular — fashioning architecturally complex, 3-D constructs from smaller, molecular building blocks. Several tantalizing ideas for making these novel assemblages have recently come to the fore. One makes use of sticky molecules called tectons (from the Greek word for builder) that self-assemble in well-defined and predictable ways. Another borrows components that nature employs to hold biological systems together (e.g. the molecular recognition machinery of DNA; protein scaffolds) to forge all manner of precisely ordered aggregates.

12:00 Noon

Buses depart for The Milton S. Hershey Medical Center where lunch will be served.

Tuesday, November 9
12:30 p.m. to 2:30 p.m.

WELCOME TO THE MILTON S. HERSHEY MEDICAL CENTER
C. McCollister Evarts, M.D., Dean, Penn State's College of Medicine

TOURS AND DEMONSTRATIONS

An opportunity to visit and explore two extraordinary facilities: a first-of-its-kind robotic system for performing closed-chest heart bypass surgery (under the direction of Ralph J. Damiano, Jr., M.D., chief of cardiac surgery); a hands-on simulation lab capable of modeling a host of medical scenarios to help hospital staff perform more effectively (with W. Bosseau Murray, M.D., associate professor of anesthesiology and director of the lab).

2:45 p.m.

Buses depart Hershey Medical Center for Hershey Lodge.

3:00 p.m.

Buses depart Hershey Lodge for tour of "Chocolateworld."

6:00 p.m. to 10:00 p.m.

GALA RECEPTION AND DINNER

The Hershey Hotel. Hosted by Penn State's College of Medicine. Shuttle service will be available to and from the Hershey Lodge throughout the evening.

Wednesday, November 10

8:30 a.m. to 11:30 a.m.

EARTH'S FATE

A look at a variety of efforts now underway that seek to reduce uncertainty about the global changes awaiting us.

ABRUPT CLIMATE CHANGE

Richard B. Alley, Ph.D., Professor of Geosciences and Associate, Environment Institute, The Pennsylvania State University, State College, PA

Newly acquired evidence indicates that big shifts in the Earth's climate can occur in a very short time, on the order of less than a decade. What could account for such dramatic transformations? One trigger has been found in the currents of the North Atlantic. The search is on for others, prelude to taking the surprise out of future episodes.

ELEVATED CO₂: ECOLOGICAL CONSEQUENCES

David N. Karowe, Ph.D., Associate Professor of Biological Sciences, Western Michigan University, Kalamazoo, MI

As the atmospheric concentration of CO₂ increases so too does plant growth rate. But not plant nutritional quality, particularly leaf protein content, which in fact tends to decrease. That, in turn, can have a major impact on the ecosystem food chain, beginning with larvae that feed on the plants (and parasites that feed on the larvae), as newly completed trials demonstrate.

'NEW' EYE ON THE ATMOSPHERE: STRINGS ATTACHED

Ben B. Balsley, Ph.D., Research Professor, Electrical and Computer Engineering and Fellow, Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado, Boulder, CO

Shades of Ben Franklin, they're back. High-flying meteorological kites, that is — come to help us get a better handle on the Earth's future. Their reemergence speaks to the need for a hovering atmospheric (and tropospheric) presence specially equipped to collect otherwise hard-to-capture information that would serve, among other things, to enhance the power of computer-based general circulation models (GCMs) to predict the consequences of global warming.

Wednesday, November 10

2:30 p.m. to 5:30 p.m.

RECOGNIZING FACES

Pawan Sinha, Ph.D., Assistant Professor of Computational Neuroscience, Massachusetts Institute of Technology, Cambridge, MA

How, exactly, does the brain identify faces? Intuition suggests that it's the fine details of the eyes, nose and mouth that provide the key. If so, then explain this: Test subjects gaze at a computer screen upon which flash photos of the famous. Except the faces have been deliberately blurred, projecting as little more than unfocussed blobs. No matter. Viewers consistently score high on even the most washed-out images. So facial perception involves something else. What is it, then, that the brain picks up on? For clues, a researcher is enlisting top cartoonists in a study of celebrity caricatures to determine how, with minimum information — a few strokes, really — they're able to generate instantly identifiable likenesses. Payoffs to be derived from the effort: development of enhanced object-recognition technology to run image-based searches on the Internet; improved tools for police sketch artists.

VIRTUALIZED REALITY

Takeo Kanade, Ph.D., U.A. and Helen Whitaker University Professor of Computer Science and Robotics and Director, The Robotics Institute, Carnegie Mellon University, Pittsburgh, PA

The visual media — painting, photography, movies, TV and video recordings — all have this in common: a "director" decides which view to present. Now imagine a time when the individual viewer gets to call the shots; when it's the spectator who chooses the perspective from which to witness a real (not virtual) event. Such as watching a live basketball game while standing on the court, say, or running alongside a particular player. Or seeing it from the referee's, or even the ball's, point of view. Or, to change arenas, allowing a surgical trainee to peer directly over the shoulder of the surgeon or to roam freely about the operating theater taking in the procedure from any angle. With the development of a new visual medium, virtualized reality, the outgrowth of major advances in computer vision and computer graphics, that time is fast drawing near.

6:00 p.m.

Hospitality Suite open.

Thursday, November 11

8:30 a.m. to 11:30 a.m.

NON-LETHAL WEAPONS

Edward G. Liska, Ph.D., Associate Director, Applied Research Laboratory, The Pennsylvania State University, State College, PA

War isn't what it used to be. The role of the U.S. military and the nature of the threats posed to our forces have changed significantly over the past decade. Our post-Cold War engagements have, for the most part, been against small units armed with inferior weapons. The big complication: use of the civilian populace as a defensive shield. In this environment, military options have been limited: lethal assault or withdrawal. Given this new reality, the military now wants to add to its arsenal a wide array of non-lethal weapons with which to protect U.S. interests, personnel and property in the face of future insurgencies. An effort has just gotten underway to explore new proposals for, among other things, containing conflicts, denying access to critical areas and controlling crowds while keeping serious injuries and fatalities to a minimum — innovations that will likely also prove of benefit to law-enforcement agencies.

IN SEARCH OF FAMILY VALUES

Tom Fricke, Ph.D., Director, Center for the Ethnography of Everyday Life, University of Michigan, Ann Arbor, MI

Anthropologists love to earn their stripes doing research in faraway places and, as a result, may be more than a tad inclined to discount work done too close to home. And even when they do turn Americanist, their efforts tend to center mainly on the "exotic," on the margins where the "other" exists — the homeless, the drug culture, outsiders, past civilizations — or on the "power chain," the dominant social groups. A newly launched initiative seeks to change all that. Using an innovative blend of field techniques, it's designed to test the discipline's capacity to illuminate the familiar — the everyday life of the American middle-class. The project, covering 12 Midwestern states, has begun to add much-needed "ground truth" to public debates concerning the impact that the cultural and social changes rippling across the nation are having on family life and the workplace.

President
JERRY E. BISHOP
Wall Street Journal (Ret.)

Vice President
ROBERT F. MURRAY, JR., M.D.
Howard University

Treasurer
PAUL RAEBURN
Business Week

Secretary
CRISTINE RUSSELL
Freelance

PHILIP M. BOFFEY
New York Times

LEWIS COPE
Freelance

BARBARA J. CULLITON
Genome News Network
Celera Genomics

JAMES T. DETJEN
Michigan State University

ARTHUR FISHER
Popular Science

WILLIAM T. GOLDEN
Chairman, American Museum
of Natural History

ANNE GUDENKAUF
National Public Radio

ROALD HOFFMANN
Cornell University

FRED JEROME
Media Resource Service

WARREN E. LEARY
New York Times

LEON LEDERMAN
Illinois Institute of Technology

POLLY MATZINGER
National Institute of Allergy
and Infectious Diseases, NIH

DAVID PERLMAN
San Francisco Chronicle

CHARLES PETIT
US News & World Report

JOANN E. RODGERS
Johns Hopkins Medical Institutions

CAROL L. ROGERS
University of Maryland

ALBERT ROSENFELD
Freelance

TOM SIEGFRIED
Dallas Morning News

RICHARD SMYER
The Oak Ridge

VICTOR COHN
EARL UBELL
Fellows

BEN PATRUSKY
Executive Director

DIANE MCGURGAN
Administrative Secretary

CASW Council for the
Advancement of
Science
Writing, Inc.

P.O. Box 404, Greenlawn, NY 11740

Tel: 516-757-5664 Fax: 516-757-0069

E-mail: dmcgurgan@worldnet.att.net

CASW Online: <http://nasw.org/users/casw>