



ANNUAL REPORT FY 2007

FY 2007

Emerging Dimensions

Research at Cornell



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From the Senior Vice Provost for Research



Robert Buhrman

The imagination and energy of the Cornell faculty are impressive. Because of the faculty's peerless drive, Cornell is witnessing a broadening of its already rich, distinctive legacy in the physical sciences and engineering, and at the

same time, an expanding preeminence in the life sciences and computational sciences. There is also growing strength in the social sciences and humanities. The university has made several key hires in these areas, enhancing our ability to forge new directions. We are particularly proud of our young faculty. Cornell received more career awards than any other university. We are number one in the National Science Foundation (NSF) Faculty Early Career Development Program awards and in NSF's Presidential Early Career Award for Scientists and Engineers (PECASE). This is an excellent indicator of the strength of Cornell's young faculty and the bright future ahead.

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Making Our Strong Possibilities Strong Realities



Robert Buhrman

The imagination and energy of the Cornell faculty are impressive. Because of the faculty's peerless drive, Cornell is witnessing a broadening of its already rich, distinctive legacy in the physical sciences and engineering, and at the same time, an expanding preeminence in the life sciences and computational sciences. There is also growing

strength in the social sciences and humanities. The university has made several key hires in these areas, enhancing our ability to forge new directions. We are particularly proud of our young faculty. Cornell received more career awards than any other university. We are number one in the National Science Foundation (NSF) Faculty Early Career Development Program awards and in NSF's Presidential Early Career Award for Scientists and Engineers (PECASE). This is an excellent indicator of the strength of Cornell's young faculty and the bright future ahead.

Cornell's prominence in nanoscale science and technology and materials science prevails. Recently the university received a King Abdullah University of Science and Technology (KAUST) Global Partnership grant of \$25 million (\$5 million per year for five years) to focus on application and fundamental studies of organic and inorganic hybrid nanomaterials, originally discovered at Cornell, as new platforms for emerging energy technologies. This partnership with Saudi Arabia's KAUST will strengthen our efforts in energy and sustainability. Cornell was competitive in NSF's Integrative Graduate Education and Research Traineeship (IGERT) awards during the past year. Two centers, Cornell Center for Materials Research (CCMR) and

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Nanobiotechnology Center (NBTC), received multimillion-dollar awards for training researchers in new materials, nanotechnology, and interdisciplinary approaches. CCMR also increased its funding, and with NSF support formed educational partnerships with several minority-serving institutions, including the Tuskegee Institute and the University of Puerto Rico.

As the faculty looked for ways to make contributions to the nation's search for alternative energy resources and practices, the Cornell Center for a Sustainable Future emerged. This new campuswide collaborative center has three areas of focus: energy, environment, and economic development. Stretching across many domains is another initiative to address the magnitude of data generated in today's large-scale research programs, such as sky surveys from Arecibo Observatory or insect flight data from the Laboratory of Ornithology. These massive amounts of data need to be processed, stored, and curated so that many researchers can utilize the data. Researchers need to be able to find an interesting needle in the haystack—or employ a different method of looking for a particular needle in the haystack of data. Cornell's Department of Astronomy and Mann Library, in partnership with our reorganized Center for Advanced Computing, are working to establish a Cornell effort called DISCOVER that will systematically tackle some of these data challenges and exciting opportunities.

Cornell and all research universities face some challenges of a national scope. Federal research funding has been flat for the past several years, and we now expect flat funding for at least another year. Federal regulations that govern research have been rapidly changing and intensifying, and we must ensure full compliance with them. A major goal of the Office of the Vice Provost for Research is to minimize as much as possible any negative impact of these regulations on Cornell researchers, to keep the highly entrepreneurial spirit of the Cornell faculty positive and strong.

Our mission is to help make our strong possibilities stronger, propelling them into actuality as we move the cutting edge of research forward.

Robert A. Buhrman



Senior Vice Provost for Research

An Applaudable Year

CORNELL

Received three PECASE and 12 Faculty Early Career Development awards

Pushed forward with Energy Recovery Linac (ERL) technology and testing

Developed an excellent academic model for the life sciences and enhanced the interaction between the life sciences and the physical sciences

Maintained a preeminent position in nanoscale scienceand

technology and materials science

Continued to build strength in computational science

Moved successfully forward on a number of exciting astronomy and space science initiatives and continued to pursue exciting and unique research at Arecibo Observatory

Strengthened intercampus culture between the Ithaca and Weill Cornell Medical College campuses

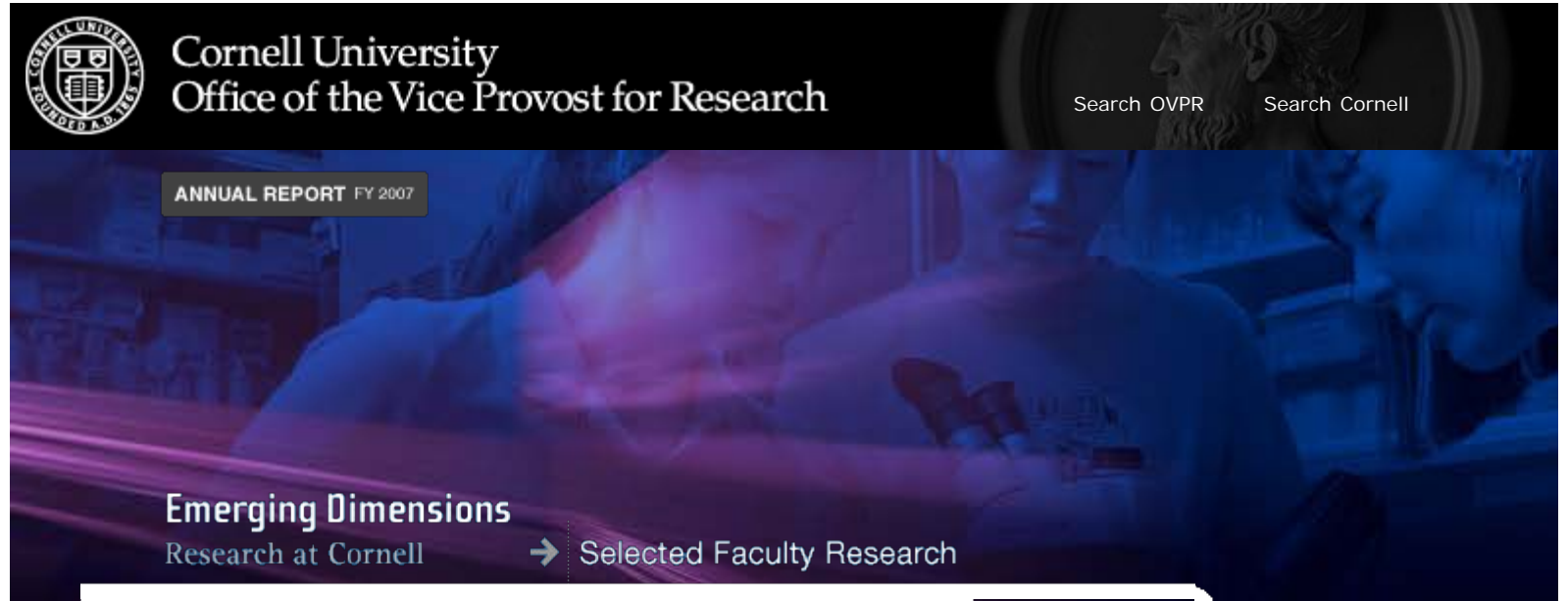
Has three new high-tech facilities in progress: Weill Hall for the life sciences, the new physical science building, and Gates Hall for computational science

Transitioned the Cornell Theory Center into a new form and organization, the Center for Advanced Computing (CAC), to serve the high-performance computing needs of Cornell researchers in a sustainable manner that enables their success

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- 01. Nanolamps Light the Way**
Héctor Abruña, Chemistry and Chemical Biology, George G. Malliaras, Materials Science and Engineering, Harold G. Craighead, Applied and Engineering Physics
- 02. Mauve Majesty**
Mark P. Bridgen, Horticulture
- 03. Our Cells' Circadian Clocks**
Brian R. Crane, Chemistry and Chemical Biology
- 04. A Superconductivity Jam-Up**
James C. Séamus Davis, Physics
- 05. From the Womb to Later Life**
Rodney R. Dietert, Microbiology and Immunology
- 06. A Green Lamp**
Jack Elliott, Design and Environmental Analysis
- 07. Stressed-Out Teens**
Gary W. Evans, Human Development
- 08. The Spinal Cord in Action**
Joseph R. Fetcho, Neurobiology and Behavior
- 09. The Right Model for Growing Experimental Tumor Cells**
Claudia Fischbach-Teschl, Biomedical Engineering
- 10. Immunotherapy against Alzheimer's**
Gunnar Gouras, Neurology and Neuroscience, Weill Cornell Medical College
- 11. Global Warming and Coral Reefs**
C. Drew Harvell, Ecology and Evolutionary Biology
- 12. Chocolate as Wine or Other Treat?**

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John S. Henderson, Anthropology

13. [Li and Be](#)

Roald Hoffmann, Chemistry and Chemical Biology, Richard G. Hennig, Materials Science and Engineering, Neil W. Ashcroft, Physics

14. [Resisting Cardiac Arrhythmia](#)

Michael I. Kotlikoff, Biomedical Sciences

15. [A Shift Overseas](#)

Sarosh Kuruvilla, Industrial and Labor Relations

16. [Seeing Behind the Gene Transcription Scene](#)

John T. Lis, Molecular Biology and Genetics, Watt W. Webb, Applied and Engineering Physics

17. [Pathogens versus Plant Defenses: An Evolutionary Battle](#)

Gregory B. Martin, Plant Pathology

18. [Smokers and Stop-Smoking Ads](#)

Alan D. Mathios, Rosemary J. Avery, and Donald S. Kenkel, Policy Analysis and Management

19. [Self-Pollination](#)

June B. Nasrallah, Plant Biology

20. [Born to Be Breastfed](#)

Christine M. Olson, Nutritional Sciences, and Nancy M. Wells, Design and Environmental Analysis

21. [Just One Amino Acid](#)

Nikolaus Osterrieder, Microbiology and Immunology

22. [Red Wine and Tooth Decay](#)

Olga I. Padilla-Zakour, Food Science and Technology

23. [Breaking Down Plant Materials for Energy](#)

Jocelyn Rose, Plant Biology

24. [Stem Cells](#)

Shahin Rafii, Genetic Medicine, Weill Cornell Medical College

25. [Silly Walks](#)

Andy L. Ruina, Theoretical and Applied Mechanics

26. [Studying Tuberculosis](#)

David G. Russell, Microbiology and Immunology

27. [Deep Brain Stimulation](#)

Nicholas D. Schiff, Neurology and Neuroscience, and Joseph J. Fins, Medicine/Public Health, Weill Cornell Medical College

28. [From Gene Mutation to Infertility](#)

John C. Schimenti, Biomedical Sciences

29. [A Faster STM](#)

Keith C. Schwab, Physics

30. [New Human Genes](#)

Adam C. Siepel, Biological Statistics and Computational Biology

31. [E. Coli and Crohn's Disease](#)

Kenneth W. Simpson, Clinical Sciences, Ellen J. Scherl, Medicine, Weill Cornell Medical College

32. [Violence and Small Business in Colombia](#)

Wesley D. Sine, Johnson Graduate School of Management

33. [Radical Light!](#)

Steven E. Stucky, Music

34. [Engineering Tissue for Transplants](#)

Abraham D. Stroock, Chemical and Biomolecular Engineering, Lawrence J. Bonassar, Biomedical Engineering

35. [Communication Networks after Downsizing](#)

Alex M. Susskind, Hotel Administration

36. [Preventing Bone Loss](#)

Marjolein C. H. van der Meulen, Mechanical and Aerospace Engineering, Mathias P. G. Bostrom, Orthopaedic Surgery, WCMC

37. [A Question about Replication Answered](#)

Michelle D. Wang, Physics

38. [Healthy Food, Unhealthy Choices](#)

Brian C. Wansink, Applied Economics and Management

39. [Efficient Fuel and Solar Cells](#)

Ulrich B. Wiesner, Materials Science and Engineering, Francis J. DiSalvo, Chemistry and Chemical Biology

40. [Lessons from the Fruit Fly](#)

Mariana F. Wolfner, Molecular Biology and Genetics

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01. [N'Dri T. Assié-Lumumba, ed., Africana Studies and Research Center](#)

Women and Higher Education in Africa: Reconceptualizing Gender-Based Human Capabilities and Upgrading Human Rights to Knowledge (CEPARRED, 2007)

02. [Kaushik Basu, ed., Economics](#)

The Oxford Companion to Economics in India (Oxford University Press, 2007)

03. [Sherene B. Baugher, ed., Landscape Architecture, \(with John H. Jameson\)](#)

Past Meets Present: Archaeologists Partnering with Museum Curators, Teachers, and Community Groups (Springer, 2007)

04. [Susan M. Christopherson, City and Regional Planning, \(with Jennifer Clark\)](#)

Remaking Regional Economies: Power, Labor, and Firm Strategies in the Knowledge Economy (Routledge, 2007)

05. [Robert H. Frank, Johnson Graduate School of Management](#)

The Economic Naturalist: In Search of Explanations for Everyday Enigmas (Basic Books, 2007)

06. [Ronald B. Furry, Biological and Environmental Engineering \(emeritus\)](#)

A Pioneering Department: Evolution from Rural Engineering to Biological and Environmental Engineering at Cornell University, 1907–2007 (Internet-First University Press, 2007)

07. [Tarleton L. Gillespie, Communication](#)

Wired Shut: Copyright and the Shape of Digital Culture (MIT Press, 2007)

08. [Valerie P. Hans, Law, \(with Neil Vidmar\)](#)

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American Juries: The Verdict (Prometheus Books, 2007)

09. [Terence H. Irwin, Philosophy](#)

The Development of Ethics: A Historical and Critical Study (Oxford University Press, 2007)

10. [Jonathan D. Kirshner, Government](#)

Appeasing Bankers: Financial Caution on the Road to War (Princeton University Press, 2007)

11. [Suzanne B. Mettler, ed., Government, \(with Joe Soss and Jacob S. Hacker\)](#)

Remaking America: Democracy and Public Policy in an Age of Inequality (Russell Sage Foundation, 2007)

12. [Robert R. Morgan, English](#)

Boone: A Biography (Algonquin, 2007)

13. [Muna B. Ndulo, ed., Law](#)

Security, Reconstruction, and Reconciliation: When the Wars End (University College London Press, 2007)

14. [Derk Pereboom, Philosophy, \(with John M. Fischer, Robert Kane, and Manuel Vargas\)](#)

Four Views on Free Will (Blackwell, 2007)

15. [Sidney I. Resnick, Operations Research and Information Engineering](#)

Heavy-Tail Phenomena: Probabilistic and Statistical Modeling (Springer, 2007)

16. [Diane S. Rubenstein, Government](#)

This Is Not a President: Sense, Nonsense, and the American Political Imaginary (New York University Press, 2008)

17. [Aaron Sachs, History](#)

The Humboldt Current: Nineteenth-Century Exploration and the Roots of American Environmentalism (Viking, 2006)

18. [Paul W. Sherman, ed., Neurobiology and Behavior, \(with Jerry O. Wolff\)](#)

Rodent Societies: An Ecological and Evolutionary Perspective (University of Chicago Press, 2007)

19. [Sydney S. Shoemaker, Philosophy \(emeritus\)](#)

Physical Realization (Oxford University Press, 2007)

20. [Meredith F. Small, Anthropology](#)

The Culture of Our Discontent: Beyond the Medical Model of Mental Illness (Joseph Henry Press, 2006)

21. [Anna Marie Smith, Government](#)

Welfare Reform and Sexual Regulation (Cambridge University Press, 2007)

22. [Bernard F. Stanton, Applied Economics and Management \(emeritus\)](#)

George F. Warren: *Farm Economist* (Cornell University, 2007)

23. [Sidney G. Tarrow, Government, \(with Charles Tilly\)](#)

Contentious Politics (Paradigm, 2006)

24. [Helena Maria Viramontes, English](#)

Their Dogs Came with Them (Atria, 2007)

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The **Arecibo Observatory** discovered radio interulses from the Crab Nebula pulsar that feature never-before-seen radio emission spectra. This finding leads astronomers and physicists to speculate that the Crab Nebula pulsar could be the first known cosmic object with a third magnetic pole.

Larry D. Brown, Earth and Atmospheric Sciences, received a \$1.3 million grant from the National Science Foundation to complete a survey using explosions to probe the deep earth and discover how continents formed millions of years ago. The project, International Deep Profiling of Tibet and the Himalayas (INDEPTH)—led by Brown since its inception in the early 1990s—is a major international collaboration among scientists from the United States, China, Germany, Canada, and most recently, Ireland.

Cornell Center for Materials Research (CCMR) received a \$2.9 million grant from the National Science Foundation's Integrative Graduate Education and Research Traineeship (IGERT) program to foster graduate students' interdisciplinary research training in nanoscale science at Cornell. The CCMR's IGERT fellowships teach graduate students from a variety of scientific fields to become interdisciplinary thinkers.

Cornell High Energy Synchrotron Source (CHESS) techniques uncovered a 1919 magazine illustration beneath the 1924 unfinished oil painting, "Family Portrait," of N. C. Wyeth, who frequently painted new works over his illustrations. CHESS is one of three groups in the world working with art conservationists and historians to conduct analyses of actual objects of art with historical significance.

Bruce Ganem, Chemistry and Chemical Biology, received the American Chemical Society's 2007 Award for Creative Invention, which recognizes "the successful application of research in chemistry and/or chemical engineering that contributes to the material prosperity and happiness of people." Ganem solved a crucial problem in the production

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of paclitaxel, a successful drug used to treat ovarian, breast, and lung cancer.

Johannes E. Gehrke, Computer Science, **Matthew DeLisa**, Chemical and Biomolecular Engineering, and **Dan Luo**, Biological and Environmental Engineering, received a NYSTAR award totaling \$2.25 million (\$750,000 to each researcher) to pursue high technology research with commercial potential—DeLisa, to engineer humanlike glycosylation pathways in bacteria; Luo, to produce recombinant proteins in an in-vitro system called P-gel; and Gehrke, to develop declarative languages that will allow scalability and extensibility in massive evolving databases.

Jon M. Kleinberg, Computer Science, was one of America's Young Innovators in the Arts and Sciences featured in the fall 2007 issue of *Smithsonian* magazine. Kleinberg studies how websites and people link to one another online, suggesting ways that these linkages could be made more useful.

The Nancy and Peter Meinig Family Investigatorships in the Life Sciences, designed to recognize and support innovative life sciences research by Cornell faculty, were established with a \$25 million gift from the Meinig family. Meinig investigators will receive 50 percent salary support, direct research support, and graduate student/postdoctoral support.

Cornell's **Nanobiotechnology Center (NBTC)** received \$3.2 million over five years from the National Science Foundation's IGERT program to design and test biodevices using flexible electronics. With Christopher K. Ober, Materials Science and Engineering, as principal investigator, the funding supports 30 to 40 IGERT fellows at Cornell and partners SUNY-Binghamton and SUNY-Albany/Wadsworth Center.

Quinetta M. Roberson, Industrial and Labor Relations, was recognized by *Diverse Issues in Higher Education* magazine as one of the top 10 emerging scholars for 2007. Roberson's areas of research are diversity and inclusion, fair employment practices, group dynamics and processes, human resources management, inclusive organizations, motivation, theory and behavior, and fair employment practices.

Emin G. Sirer, Computer Science, was selected as one of *Popular Science* magazine's Brilliant Ten—one of the magazine's most creative and groundbreaking young scientists in the United States. Sirer studies and builds networking and distributed systems.

David M. Soderlund, Entomology, Geneva, was awarded more than \$2.5 million for toxicology studies. Two major research grants from the National Institute of Environmental Health Sciences support research in his lab on the neurotoxic actions of insecticides. The projects involve two chemical classes of insecticides that target the

sodium ion channel proteins of nerve membranes. The research is expected to provide new insights into mechanisms of insecticide toxicity that will aid in assessing human health risks associated with the use of these insecticides.

Steven H. Strogatz, Theoretical and Applied Mechanics, received the Joint Policy Board for Mathematics (JPBM) Communications Award, which cites Strogatz's ability to capture the popular imagination with novel research, engaging writing, and a flair for finding new answers to an old question: what does complex math have to do with real life?

Abraham D. Stroock, Chemical and Biomolecular Engineering, was honored as a *Technology Review* 2007 Young Innovator. Stroock studies how to move small volumes of liquid through channels that are usually etched into a rigid material, such as glass or silicon—but Stroock's exciting research features hydrogels. These soft polymers that absorb water have potential for medical uses.

Weill Cornell Medical College (WCMC) received a \$49 million Clinical and Translational Science Award (CTSA) from the National Institutes of Health—the largest federal grant ever awarded to WCMC—to lead a new Clinical and Translational Science Center, creating a network for biomedical collaboration on Manhattan's Upper East Side. A diverse group of collaborating institutions, including Cornell's College of Human Ecology, Memorial Sloan-Kettering Cancer Center, Hospital for Special Surgery, and Hunter College, will comprise the center.

Klaas J. van Wijk and **Robert E.G. Turgeon**, Plant Biology, **Thomas Brutnell**, Boyce Thompson Institute for Plant Research, and researchers at Yale University received a \$5.5 million, four-year grant from the National Science Foundation to provide a better understanding of the biology of rice, maize, and sorghum, among other crops. The scientists will compare two categories of grass crops known as C3 and C4. Common C3 grasses include wheat, rye, and rice. C4 grasses, which evolved from C3s, include such major cereal crops as maize and sorghum, as well as the most promising biofuel crops, such as switchgrass. C4 grasses are more efficient than C3 grasses in their photosynthesis when under stress or exposed to higher temperatures and are able to create more biomass.

Departments of Electrical Engineering, Computer Engineering, Food Science, and Information Science rated number one in the nation in their fields according to the latest Faculty Scholarly Productivity Index, based on data from 2005. The index compiles faculty publications (books and journal articles), citations of those publications, federal research funding, and awards and honors.

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American Philosophical Society

> Paul A. Marks, Medicine, Weill Cornell Medical College/Sloan-Kettering Cancer Center

American Academy of Arts and Sciences

> Héctor D. Abruña, Chemistry and Chemical Biology
> Stephen T. Emlen, Neurobiology and Behavior
> Isabel V. Hull, History
> Jon M. Kleinberg, Computer Science
> Stephen B. Pope, Mechanical and Aerospace Engineering

National Academy of Sciences

> Richard T. Durrett, Mathematics/Statistical Sciences
> Scott D. Emr, Molecular Biology and Genetics

National Academy of Engineering

> Harold G. Craighead, Applied and Engineering Physics
> Éva Tardos, Computer Science

American Academy of Arts and Letters

> Steven E. Stucky, Music

American Academy of Arts and Letters Academy Award in Literature

> Robert R. Morgan, English

Presidential Early Career Award for Scientists and Engineers

> Brian J. Kirby, Mechanical and Aerospace Engineering
> Chekesha M. Liddell, Materials Science and Engineering
> Bruce D. McCandliss, Psychiatry, Weill Cornell Medical College

Faculty Early Career Development Program

> Wilkins Aquino, Civil and Environmental Engineering
> Kavita Bala, Computer Science
> Sunil A. Bhave, Electrical and Computer Engineering
> Garnet K.-L. Chan, Chemistry and Chemical Biology

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- › Peng Chen, Chemistry and Chemical Biology
- › Juan Hinestroza, Fiber Science and Apparel Design
- › Uri Keich, Computer Science
- › Robert D. Kleinberg, Computer Science
- › David A. Putnam, Biomedical Engineering
- › Adam C. Siepel, Biological Statistics and Computational Biology
- › Julia Thom, Physics
- › Aaron B. Wagner, Electrical and Computer Engineering

National Institutes of Health Method to Extend Research in Time (MERIT) Award

- › Steven S. Gross, Pharmacology, Weill Cornell Medical College

Sloan Foundation Research Fellowship

- › Carlos D. Bustamante, Biological Statistics and Computational Biology
- › Garnet Chan, Chemistry and Chemical Biology
- › Peter Wittich, Physics

Guggenheim Memorial Foundation Fellowship

- › Victor Nee, Sociology

Fulbright Scholar Awards

- › Josephine A. V. Allen, Policy Analysis and Management
- › James A. Gross, Industrial and Labor Relations
- › Stacy A. Langwick, Anthropology
- › Michal Lipson, Electrical and Computer Engineering
- › Philip E. Protter, Operations Research and Information Engineering

Benjamin Franklin Medal in Earth and Environmental Science

- › Steven W. Squyres, Astronomy

American Society of Mechanical Engineers Lyapunov Award

- › Francis C. Moon, Mechanical and Aerospace Engineering

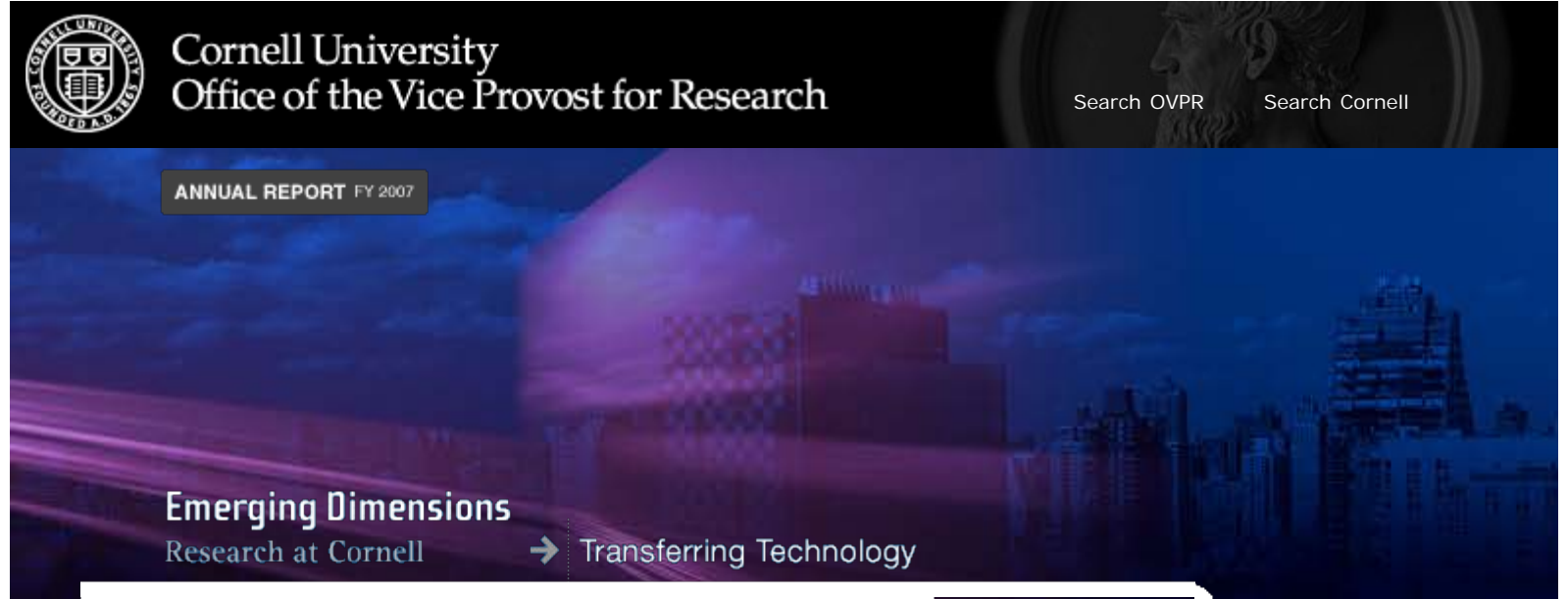
The Royal Society

- › Stephen B. Pope, Mechanical and Aerospace Engineering

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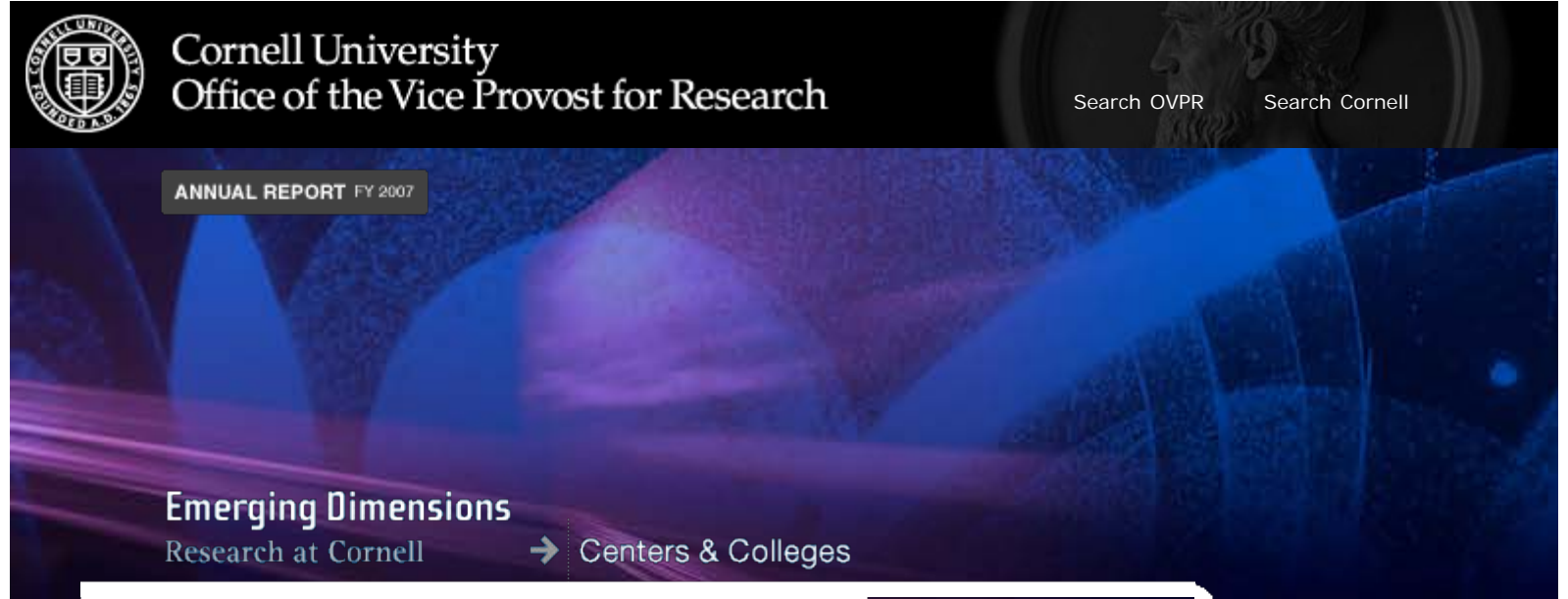
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From the Senior Vice Provost for Research



Robert Buhrman

The imagination and energy of the Cornell faculty are impressive. Because of the faculty's peerless drive, Cornell is witnessing a broadening of its already rich, distinctive legacy in the physical sciences and engineering, and at the

same time, an expanding preeminence in the life sciences and computational sciences. There is also growing strength in the social sciences and humanities. The university has made several key hires in these areas, enhancing our ability to forge new directions. We are particularly proud of our young faculty. Cornell received more career awards than any other university. We are number one in the National Science Foundation (NSF) Faculty Early Career Development Program awards and in NSF's Presidential Early Career Award for Scientists and Engineers (PECASE). This is an excellent indicator of the strength of Cornell's young faculty and the bright future ahead.

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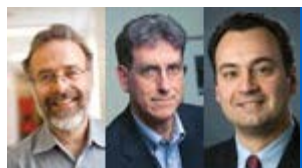
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01. Nanolamps Light the Way



(l. to r.) Héctor Abruña, Harold Craighead, George Malliaras

Héctor Abruña, Chemistry and Chemical Biology, George G. Malliaras, Materials Science and Engineering, Harold G. Craighead, Applied and Engineering Physics, and research colleagues created

one of the smallest organic light-emitting devices to date. These nanofibers, at 200 nanometers wide, are smaller than the wavelength of light they emit. Using the technique of electrospinning, the researchers made the nanofibers from a mixture of the metal complex ruthenium tris-bipyridine and the polymer polyethylene oxide. They found that the fibers give off an orange light, like a tiny light bulb, when excited by low-voltage, micropatterned electrodes. This type of localized light source could be beneficial in applications ranging from sensing to microscopy to flat-panel displays, as electronics become increasingly smaller. The researchers showed that organic light-emitting nanodevices can be made with simple fabrication methods. How they will endure subsequent processing and use, however, is still under investigation.

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02. Mauve Majesty



Mark Bridgen

Mark P. Bridgen, Horticulture, patented Cornell's first ornamental plant, Mauve Majesty. The plant, a hybrid of *Alstroemeria*, is a nonfragrant perennial with a lavender-lilac flower. It blooms throughout the

summer until the first hard freeze in the cooler climates of northern states, grows year-round in the greenhouse, and its flower can last for two weeks in a vase. It is one of the first in its color class to be hardy in zones five and six (the northern states) of the U.S. Department of Agriculture Plant Hardiness Zone Map. Bridgen developed the plant over five years, including testing it and growing it in large enough quantities for the market. It is now widely available through nurseries and mail-order catalogs. *Alstroemeria* flowers, native to South America, are the fifth most popular cut flower in the United States.

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03. Our Cells' Circadian Clocks



Brian Crane

Brian R. Crane, Chemistry and Chemical Biology, and research colleagues explained the biological mechanism that allows circadian clocks to sense light through a process that transfers energy from light to chemical reactions in

cells. Circadian clocks in cells respond to differences in light between night and day allowing organisms to anticipate changes in the environment by pacing their metabolism to this daily cycle. Circadian clocks help determine processes such as when blooming plants open and close their petals, when humans sleep and wake, and when fungi release spores to maximize reproduction. The researchers studied a fungus (*Neurospora crassa*) and discovered how it uses circadian clock light sensors to control production of carotenoids, which protect against damage from the sun's ultraviolet radiation after sunrise. They focused on a vivid protein, which contains a chromophore—a light-absorbing molecule. The chromophore captures a photon or particle of light, and the captured energy from the light triggers a series of interactions that ultimately lead to conformational changes on the surface of the vivid protein. These structural changes on the protein's surface start a series of events affecting the expression of genes, such as those that turn carotenoid production on and off. A similar "switch" may be responsible for timing the sleep cycle in humans. Disruptions of circadian rhythms can cause jet lag, mental illness, and even some forms of cancer.

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04. A Superconductivity Jam-Up



James Séamus Davis

James C. Séamus Davis, Physics, and his research team explained why superconductivity can be stalled by a form of electronic gridlock. The researchers found that copper oxides, or cuprates, can serve as high-

temperature superconductors, but in a slightly different configuration, they become stalled. Understanding how and why that transition takes place is a crucial question for cuprate superconductivity research, since if the gridlock did not occur, the maximum temperatures for superconductivity could be much higher. Scanning lightly hole-doped cuprate crystals with a highly precise scanning tunneling microscope (STM) revealed strong variations in electronic structure with some copper-oxygen-copper (Cu-O-Cu) bonds distributed randomly through the crystal exhibiting “holes” where electrons are missing. The researchers also found larger rectangular regions with missing electrons that were spaced four units of the crystal lattice apart, which may represent the first direct observation of long-sought electronic stripes in cuprates. This new research’s innovation was to compare current flow in opposite directions at each point in the scan in a process called tunneling asymmetry (TA) imaging. At regions of the crystal containing fewer electrons (more holes), more electrons can flow down into these voids than up. TA imaging might also reveal if the electronic stripes are made up of the same kind of holes and precisely how the hole patterns suppress superconductivity.

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05. From the Womb to Later Life



(l.) Janice Dietert (r.) Rodney Dietert

Rodney R. Dietert, Microbiology and Immunology, and his research colleague conducted the first comprehensive review of diseases—including asthma, allergy, autoimmunity, cancer, cerebral palsy, atherosclerosis,

hypertension, and male sterility—that appear later in life among people who were exposed to environmental toxins or drugs as infants or in the womb. In all of these diseases, two immune processes, T-helper (Th) cell balances and dendritic cell maturation, are compromised in ways that disrupt the regulation of inflammatory cell function and lead to exaggerated inflammatory responses. Toxins linked to developmental immunotoxicity (DIT) include herbicides, pesticides, heavy metals, antibiotics, diesel exhaust, PCBs, and maternal smoking, drinking, and drug abuse. Most therapeutic approaches have looked at specific disease outcomes from DIT. This study instead examined the common immune dysfunction related to many diseases. Knowing the most common immune dysfunction patterns from DIT enables researchers to consider therapeutics that can restore inflammatory cell regulation, promote dendritic cell maturation, and restore a desirable Th balance. In their literature search, the researchers found that herbal and fungal chemicals offering promising results when taken at appropriate doses include Astragalus, Echinacea, sang-hwang shiitake mushrooms, black seed, Asian ginseng, wild yam, and Greek clover. The study points to the need for further research on immune dysfunction and fetal and infant toxins.

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06. A Green Lamp



Jack Elliott, Design and Environmental Analysis, created the first swarf lamp using the lamp's own aluminum waste shavings from the process for another one of its components. The lamp exemplifies three green

principles: reducing, reusing, and recycling. Its ceiling mount and base holder are made from recycled aluminum bar stock that is 100 percent recyclable, and the shade is made from swarf, fine metallic filings or shavings that are a waste product of machining. The cord is made from cross-linked polyethylene, making it PVC-free—unlike most cords, which have PVC jackets that could potentially produce dioxin, a suspected human carcinogen, if burned. Elliott's design reduces both the amount of material needed to create the product and the product's waste. The lamp was a winner at the Haute Green international sustainable design competition. This is also Cornell's first design patent.


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07. Stressed-Out Teens



Gary Evans

Gary W. Evans, Human Development, and his research group conducted the first study to explore how mothers' responsiveness and support may protect adolescents against the cumulative effects of chronic

exposure to family turmoil, violence, noise, poor housing, and other risk factors. Although these youths show more stress-induced physiological strain on their organs and tissues than other youths, when they have responsive mothers, they do not experience negative psychological changes. Evans' study is also the first to examine cardiovascular recovery from stress in youths. Adolescents who are exposed to several chronic risk factors show compromised cardiovascular systems regardless of maternal responsiveness. The results of the study suggests that the physiological toll of coping with multiple risk factors is significantly greater than that of coping with a single severe event. Evans' group studied seventh- and eighth-grade youths in rural upstate New York, who had participated in the first stage of the study while they were in elementary school.

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08. The Spinal Cord in Action



Joseph Fetcho

Joseph R. Fetcho, Neurobiology and Behavior, and research colleagues showed how the spinal cord controls speed of movement. Mapping neurons in the spinal cord of a larval zebrafish, the researchers found a pattern of

activity that regulates the speed of the fish's movement. They mapped how neurons in the tail end of the fish's spinal cord become active during slow movements, while cells further up the spinal cord activate as movements speed up. With laser beams the researchers removed specific neurons in the lower spinal cord, making the zebrafish incapable of slow movements. When they removed nerves higher up the backbone, the fish had difficulty moving fast. Because larval zebrafish are transparent, the researchers could see their cells. They injected a fluorescent dye into the spinal cord, which lit up when calcium ions flooded in as the nerve cells activated with the fish's movement. A confocal microscope with lasers allowed the researchers to image the cells at very high resolutions as the zebrafish moved at different speeds. The research provides insight into the structure and function of nerves in the spinal cord, which could help scientists assess whether nerves in an injured spinal cord are regrowing normally. Knowing the pattern of activity, the researchers can explore how it changes in diseased states. The research has implications for treating injured human spinal cords and Parkinson's disease, where movements slow down and become erratic.

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09. The Right Model for Growing Experimental Tumor Cells



Claudia Fischbach-Teschl, Biomedical Engineering, and a research colleague showed that tumor cells grown in a three-dimensional manner are resistant to cancer treatments such as chemotherapy. The researchers found the behavior

of the tumor model more aggressive than those grown on traditional glass slides or in a Matrigel culture, which only partially recreate the aggressive behavior of tumors in the body. The Cornell scientists grew tumors in synthetic, porous scaffolds made of a lab-created polymer called polylactide-co-glycolide (PLG). After injecting the tumors into mice for in-vivo analysis, the researchers discovered that the cells grown in the PLG scaffolds developed into bigger and more aggressive tumors. The researchers were also able to analyze distinct biological functions of the cells, such as the presence of secretions, that might point to the cancer cells' ability to survive. In order to understand cancer cell behavior, cancer researchers need experimental tumor models that resemble tumors grown in the body. This research may provide an understanding of tumor cell behavior that can be used to develop more effective anticancer drug therapy.

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10. Immunotherapy against Alzheimer's



Gunnar Gouras

Gunnar Gouras, Neurology and Neuroscience, Weill Cornell Medical College, and research colleagues discovered how antibodies work both inside and outside brain cells to reduce amyloid peptides, the hallmark of Alzheimer's

disease. Using transgenic mice bred to approximate the progress of Alzheimer's in humans, the researchers exposed amyloid-filled neurons from the mice to antibodies similar to those used in clinical trials. They examined changes in the cells using high-tech microscopy. The researchers discovered that instead of working outside the cell, the antibodies to beta amyloid bind with a specific part of amyloid precursor protein—a precursor molecule to beta amyloid—as it lies on the outside of the affected cell. This complex is then internalized within the cell, where it works to decrease levels of amyloid peptides, the building block of plaques found outside and between cells. The antibodies decrease intracellular amyloid accumulation by about one-third. The research demonstrates that immune-based therapy can rid brain cells of amyloid and provides a better understanding of how immunotherapy works. This discovery raises new hope for the use of immunotherapy against the disease. More research is needed, however, before all the mysteries are cleared up, and a cure is still a ways in the future. The research could also have implications for other studies, particularly of autoimmune disorders where the immune system mistakenly attacks its own tissues.

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11. Global Warming and Coral Reefs



Drew Harvell

C. Drew Harvell, Ecology and Evolutionary Biology, and a global group of research colleagues predict that the Earth's coral reefs—the world's most biodiverse marine ecosystems—will not survive the global warming and

acidification predicted for later this century if global action is not taken immediately. In a major international study, the researchers found that increasing carbon dioxide emissions from burning fossil fuels are making oceans warmer and more acidic and causing widespread coral disease and suppression of coral growth. The study showed that levels of CO₂ could become unsustainable for coral reefs within five decades. Acidification threatens all marine animals and plants with calcareous skeletons, including corals, snails, clams, and crabs. Ecosystems that provide habitats for a large variety of marine species essential to oceans' complex food chains are at stake. Coral reef ecosystems also provide livelihoods to 100 million people who live along the coasts of tropical developing countries. One example is diving tourism in the Caribbean, an industry that generates more than \$100 billion a year. The loss of these ecosystems also exposes people to flooding, coastal erosion, and the loss of food and income from reef-based fisheries. For the short term, better management of overfishing and local stressors may increase reefs' resilience to climate threats, but rising global CO₂ emissions will rapidly outstrip the capacity of local coastal managers and policy makers to maintain the health of these critical ecosystems if the emissions continue unchecked. Determining how temperature stress decreases the immune response of corals, which are complicated animals, offers future promise for boosting the immunity of coral reefs.

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12. Chocolate as Wine or Other Treat?



John Henderson

John S. Henderson, Anthropology, and research colleagues discovered that our infatuation with chocolate began at least 500 years earlier than previously believed. The group analyzed shards of pottery from one of

Henderson's excavations in the Ulúa Valley region of northern Honduras (Puerto Escondido), revealing that the first people to consume a product of the cacao tree used the pulp around the seeds instead of the seeds—the cacao beans—to create a fermented, wine-like drink. The chocolate taste we know today was discovered later. The researchers found traces of caffeine and theobromine, an alkaloid similar to caffeine but specific to cacao, in 11 shards dated to 1100 B.C.—chemical evidence for the world's earliest cacao consumption. In the past, chemical detection in ancient pottery required an intact vessel—a great rarity—and a substantial amount of residue. To detect much smaller chemical traces on broken shards, the researchers used new extraction techniques along with liquid chromatography, gas chromatography, and mass spectrometry—techniques that could be used for sensitive chemical testing on many more remnants in the future. For centuries, the cacao drink was traded, shared, and used in ceremonies, creating social networks across the region and beyond. The shift from wine made from pulp to chocolate made from seeds means that all the pomp and luxury that surrounded chocolate in later years was an unintended consequence of early brewing experiments.

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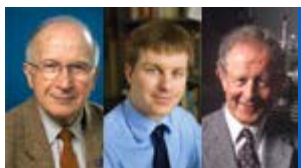


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13. Li and Be



(l. to r.) Roald Hoffmann,
Richard Hennig, Neil Ashcroft

Roald Hoffmann, Chemistry and Chemical Biology, Richard G. Hennig, Materials Science and Engineering, Neil W. Ashcroft, Physics, and research colleagues used computer modeling and

“chemical intuition” to discover hypothetical conditions in which lithium (Li) and beryllium (Be), when squeezed together under hundreds of thousands of atmospheres of pressure, bind to form stable—and potentially superconducting—alloys. This totally unexpected combination of two of the simplest elements would be highly complex, with layers of electrons forming quasi-two-dimensional sheets between tightly packed nuclei. Ashcroft’s research group predicted and confirmed in the 1990s that Li alone at high pressure could be a superconductor. Beryllium alone is not a superconductor, but many of the element’s characteristics indicate that it could play a role in a superconducting compound. The researchers do not yet know if the elements—which do not mix under normal circumstances—will create an exceptional superconductor when combined or if the alloys will retain their peculiar structure when returned to normal atmospheric pressures. A superconductor that requires constant squeezing to millions of atmospheres is not useful, so the researchers are now investigating new ways to exert the pressure necessary to create the alloys. This may mean looking beyond mechanical techniques to chemical elements or compounds that, when added to the mix, could serve a compressing or bonding function.

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14. Resisting Cardiac Arrhythmia



Michael I. Kotlikoff, Biomedical Sciences, and research colleagues implanted living embryonic heart cells into the damaged cardiac tissue of mice that had suffered heart attacks, and the mice became resistant to

cardiac arrhythmias. The group discovered that a protein called connexin43, expressed by the transplanted embryonic heart cells, improved electrical connections to other heart cells, which helped activate the transplanted cells deep within the damaged section of heart tissue. The researchers were able to see for the first time how cells used in therapy work with other cells in a complex organ within a living animal. The implant technique reversed in mice the risk of developing ventricular arrhythmias after a heart attack, the number one cause of sudden death in the Western world. The research has important implications for using cell-transplant therapies to restore damaged heart tissue in humans.

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15. A Shift Overseas



Sarosh Kuruvilla, Industrial and Labor Relations, found that high-skilled jobs in finance, engineering, and medical research are joining low-skilled service occupations in shifting overseas. His latest research showed that many

high-skilled U.S. jobs, such as financial industry equity research, data modeling, and actuarial analysis, are outsourced to India. Highly skilled U.S. occupations in several other industries are also outsourced, including aerospace and civil aviation engineering services, software research and development, and animation, and medical services, including radiology and drug discovery and testing. For India, this is a valuable opportunity for economic development, but the long-term growth of the Indian outsourcing industry is likely to be weakened by a shortage of skills in some fields. At present, most Indian research scientists and engineers come to the United States for training. According to Kuruvilla, the Indian higher education system needs a major reform if it is to produce more and better researchers, scientists, and engineers. The movement of high-skilled jobs has implications for the United States, as well. People with master's degrees in life sciences, chemistry, and finance may not find good jobs in this country. Kuruvilla concluded that America must make investments in basic and advanced education so that those whose jobs have disappeared can be retrained, while graduates are prepared for value-added jobs that help the U.S. to innovate.

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16. Seeing Behind the Gene Transcription Scene



(l.) John Lis (r.) Watt Webb

John T. Lis, Molecular Biology and Genetics, Watt W. Webb, Applied and Engineering Physics, and research colleagues revealed that the molecular machinery behind gene transcription is not stationed in special

transcription factories within a cell nucleus. Instead, the enzyme RNA polymerase II (Pol II) and other key molecules can assemble at the site of an activated gene, regardless of the gene's position. They observed polytene chromosomes—large, multistranded chromosomes in the salivary gland tissue of fruit flies that have hundreds of sets of the genome, instead of the usual two sets in conventional cells—using multiphoton microscopy developed by Webb, which allows high-precision 3-D imaging in living cells. The researchers activated heat shock genes, which protect cells from sudden rises in temperature, and watched them in real time as they began to be transcribed. They tagged Pol II with a fluorescent marker to track its movements within the nucleus. The research will lead to developing new ways of actually seeing, in vivo, how gene regulation works.

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17. Pathogens versus Plant Defenses: An Evolutionary Battle



Gregory Martin

Gregory B. Martin, Plant Pathology, and research colleagues at the Boyce Thompson Institute for Plant Research gained insight into how *Pseudomonas syringae*, a bacterium that infects tomatoes by injecting a protein

into the plant's cells, weakens the plant's defense system. Resistant plant varieties often become susceptible to pathogens about six years after their release, since pathogens evolve quickly to tear down the plant's defenses. The researchers showed how a single bacterial protein, AvrPtoB, which *P. syringae* injects into plant cells with a molecular "syringe," attacks the plant. The plant's defense system, in turn, tries to detect the pathogen. As part of its surveillance system, tomatoes carry a protein in their cells called Fen that helps detect *P. syringae* and trigger an immune response to prevent disease. Some strains of *P. syringae* have evolved the AvrPtoB protein, which mimics a tomato enzyme known as an E3 ubiquitin ligase that tags proteins to be destroyed. Once injected, AvrPtoB binds to the Fen protein, and the plant's own system eliminates it, allowing the bacteria to avoid detection as it causes disease. The study provides molecular data on how pathogens develop new ways to spread and attack organisms and the novel defenses organisms create to battle them. Understanding why some plant varieties have more durable disease resistance is important to the development of sustainable agricultural practices.

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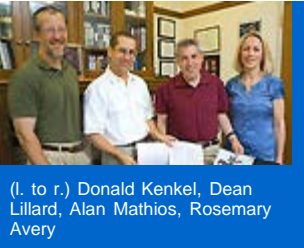
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18. Smokers and Stop-Smoking Ads



Alan D. Mathios, Rosemary J. Avery, and Donald S. Kenkel, Policy Analysis and Management, and research staff found that smokers who see more magazine ads for smoking-cessation products, such as the nicotine patch, are more likely to quit successfully

without buying the products. The researchers used databases on the consumer behavior and magazine-reading habits of 28,303 current or former smokers and advertising data on 26 consumer magazines. Although some of the quitting behavior of smokers involved buying smoking-cessation products, just seeing the ads made it more likely that they would try to quit—so the ads’ public health returns exceed the private returns to manufacturers. The researchers also calculated that if the smoking-cessation product industry increased its average annual spending on magazine advertising by about \$2.6 million or 10 percent, the average smoker would see 2.1 more ads each year. Since about 45 million people in the United States smoke, this would translate to about 80,000 additional quits per year. The research has important implications for advertising for a wide range of health products.

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19. Self-Pollination



June Nasrallah

June B. Nasrallah, Plant Biology, and her research group extended their findings on genes that turn a plant's ability to self-pollinate on and off. Cultivated tomatoes and canola are among crops with the ability to self-pollinate. To

get hybrid seeds, plant breeders and seed producers plant two different varieties in the same field to allow them to cross-pollinate. If one or both varieties can self-pollinate, workers must remove the pollen sacs from the flowers by hand. This is a labor-intensive and costly process for developing hybrid varieties and producing hybrid seeds on a commercial scale. Working with *Arabidopsis thaliana*, a cabbage relative, Nasrallah's group previously showed that two genes known as SCR and SRK are the key to self-incompatibility. Working with the highly self-fertile *A. thaliana* and the self-incompatible *A. lyrata*, the researchers created *A. thaliana* varieties that could not self-pollinate or had only a limited ability to self-pollinate (pseudo self-compatible). The study mapped the genomes of several varieties of transgenic *A. thaliana* and isolated a gene known as PUB8 that seems to regulate whether or not SRK is turned on to manufacture its protein. Nasrallah's team concluded that pseudo self-compatibility is a best-of-both-worlds mating strategy, because it maintains the benefits of cross-pollination while providing reproductive assurance when mates or pollinators are scarce. The researchers' goal is to understand precisely how self-pollination is inhibited in self-incompatible plants, which are unable to self-pollinate because their stigmas can recognize and reject their own pollen. Plant breeders may then be able to transfer this mechanism to any plant as they create hybrids.

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20. Born to Be Breastfed



(l) Christine Olson (r.) Nancy Wells

Christine M. Olson, Nutritional Sciences, and Nancy M. Wells, Design and Environmental Analysis, completed a community intervention study in which a campaign to make parents comfortable with breastfeeding

their child in public was successful. For three months, people living in upstate New York's Herkimer County saw the message, "Babies are born to be breastfed," on billboards, posters, and public service announcements during breaks in shows such as *Deal or No Deal*, *Today*, and the *Dr. Phil Show* and on the Comedy Channel, Court TV, Nickelodeon, and Soap TV. After the campaign almost 69 percent of men and 46 percent of women surveyed said they would be comfortable with having their child breastfed in public—up from 54 and 35 percent, respectively, before the campaign. The intervention was the first initiative of the Healthy Start Partnership of Herkimer County, which seeks to improve the cultural acceptance of breastfeeding as helping women shed pounds after childbirth, while reducing infants' risk of obesity in later life. The evaluation shows that this kind of community intervention can create a social environment that is more supportive of breastfeeding. Researchers do not completely understand why breastfed infants have a lower risk of obesity later in life, but as Olson noted, it is harder to overfeed a breastfed infant than a bottle-fed one, and breastfed infants gain weight more slowly, which has been linked to a lower obesity risk. The advertising campaign was part of a one-million-dollar, four-year project led by Olson and Wells that seeks to promote healthy weights in childbearing women and their infants through the Healthy Start Partnership.

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21. Just One Amino Acid



Nikolaus Osterrieder

Nikolaus Osterrieder, Microbiology and Immunology, and a collaborator discovered that a tiny chemical change in horse herpes virus (a relative of the chickenpox virus in humans) could make the difference

between triggering a cold or a life-threatening neurological disorder. The researchers showed that varying a single amino acid in an enzyme that is part of the DNA copying process of equid herpesvirus type 1 (EHV-1) creates a more serious type of EHV-1, which causes neurological disorders in horses. Both types of EHV-1 can cause abortions. The research proved that there are two distinct pathotypes of EHV-1, and one of them is likely to cause the neurological disease. After cloning the genome of the virus obtained from a mare that had developed neurological symptoms and lost a fetus, the researchers altered one amino acid in the viral enzyme, DNA polymerase, and rendered the virus unable to cause neurological disease. The amino acid change reduced levels of the virus in the horse's bloodstream, and lower levels of the virus reached the central nervous system. The mutation also made the virus more susceptible to antiviral drugs. The researchers believe the reduced replication and levels of virus in the blood may be why one form of the virus does not cause neurological disorders. The horse herpes virus lives in horses' nostrils and is commonly spread by droplets in the air. Horses remain infected for life. Because EHV-1 is a virus, prevention is crucial.

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22. Red Wine and Tooth Decay



Olga Padilla-Zakour

Olga I. Padilla-Zakour, Food Science and Technology, and a research colleague discovered that red wine grapes and pumice, a residue of red winemaking, contain substances that may help prevent tooth decay. Specific

polyphenols—chemicals present in fermented seeds and skins discarded after grape pressing—interfere with the ability of bacteria (*Streptococcus mutans*) to contribute to tooth decay. Fermented winemaking waste contains as many polyphenols as whole fruit, and red grapes have been shown to contain 40 percent more polyphenols than white grapes. To examine the makeup of polyphenols in red wine grape varieties and their ability to interfere with *S. mutans*, the researchers prescreened 2005 grape varieties from New York's Finger Lakes region and prepared polyphenolic extracts from them. The researchers believe that potential drugs could be made directly from fermented winemaking waste. They aim to isolate the key compounds in pumice that render bacteria harmless, perhaps developing a new kind of mouthwash. The study may also hold clues for new ways to reduce life-threatening, systemic infections caused by bacteria.

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23. Breaking Down Plant Materials for Energy



Jocelyn Rose

Jocelyn Rose, Plant Biology, and his research team discovered a class of plant enzymes that allows plant materials to be broken down more efficiently and at less cost than current technologies.

The enzymes may make the production of cellulosic ethanol less expensive than corn-based ethanol. Despite its low cost, corn-based ethanol is not a long-term solution as an alternative energy source, so cellulose has become an increasingly key area of research. Producing cellulosic ethanol requires breaking down a plant's cell wall material and fermenting the sugars that are released. Current technologies use microbial enzymes, cellulases, to digest the cellulose in grasses and rapidly growing trees such as poplars. The microbial enzymes have a structure that makes them very efficient at binding to and digesting plant cell wall material called lignocellulose. The new class of plant enzymes discovered by Rose's group has a similar structure, while offering researchers new properties for producing ethanol even more efficiently. This is the first example of a cellulose-binding domain in a plant cell wall enzyme—enabling the enzyme to digest cellulose effectively. Although the new type of enzyme was first isolated in a tomato plant, Rose's group has evidence that these plant proteins exist in many species that could be used for biofuel production. Biofuel research may also uncover new uses for these enzymes. The researchers now aim to understand how plants use this class of enzymes.

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24. Stem Cells



Shahin Rafii

Shahin Rafii, Genetic Medicine, Weill Cornell Medical College, and colleagues at the Ansary Center for Stem Cell

Therapeutics showed that stem cells in adult testes provide an alternative to controversial

embryonic stem cells for organ regeneration in a breakthrough study in mice. These easily obtained and manipulated adult stem cells found in a male's testicles have the same capability to form new tissue as embryonic stem cells. Using spermatogonial progenitor stem cells (SPCs) obtained from mice testes, the researchers were able to redirect the cells' development in the lab to form multi-potent adult spermatogonial-derived stem cells (MASCs). These cells developed into working blood vessel (endothelial) cells and tissue, as well as cardiac cells, brain cells, and other cell types. The mouse SPCs do not require any addition or tweaking of genes to get them to form the multi-potent cells (MASCs) that produce all of these cell types. However, more work is needed. Experiments need to be replicated in humans, and researchers need to find the exact "switch" that allows control of SPC development on demand. The researchers look forward to designing clinical strategies for regenerating failing organs in patients with heart disease, Alzheimer's, Parkinson's, strokes, diabetes, arthritis, macular degeneration, and infertility induced by chemotherapy and irradiation. The research may also provide a novel strategy to target tumor blood vessels and inhibit cancer growth and metastasis.

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25. Silly Walks



Andy Ruina

Andy L. Ruina, Theoretical and Applied Mechanics, and a research colleague explained mathematically why the silly walks of John Cleese in *Monty Python's Flying Circus* have never been utilized by *Homo sapiens*. These silly walks use

up too much metabolic energy compared to conventional locomotion. The researchers created a mechanical model of human walking and running that assumed that each leg is a telescoping actuator that can change its length. In walking, the body vaults forward in circular arcs with the toe and heel providing the push-off and landing point for each movement. In running, the body travels from one parabolic arc to the next with a bounce in between. After calculating the metabolic energy used in a whole range of silly walks and runs, the researchers determined that regular walking and running are the most energy-efficient gaits for the human species. The research has implications for biomechanics and robotics.

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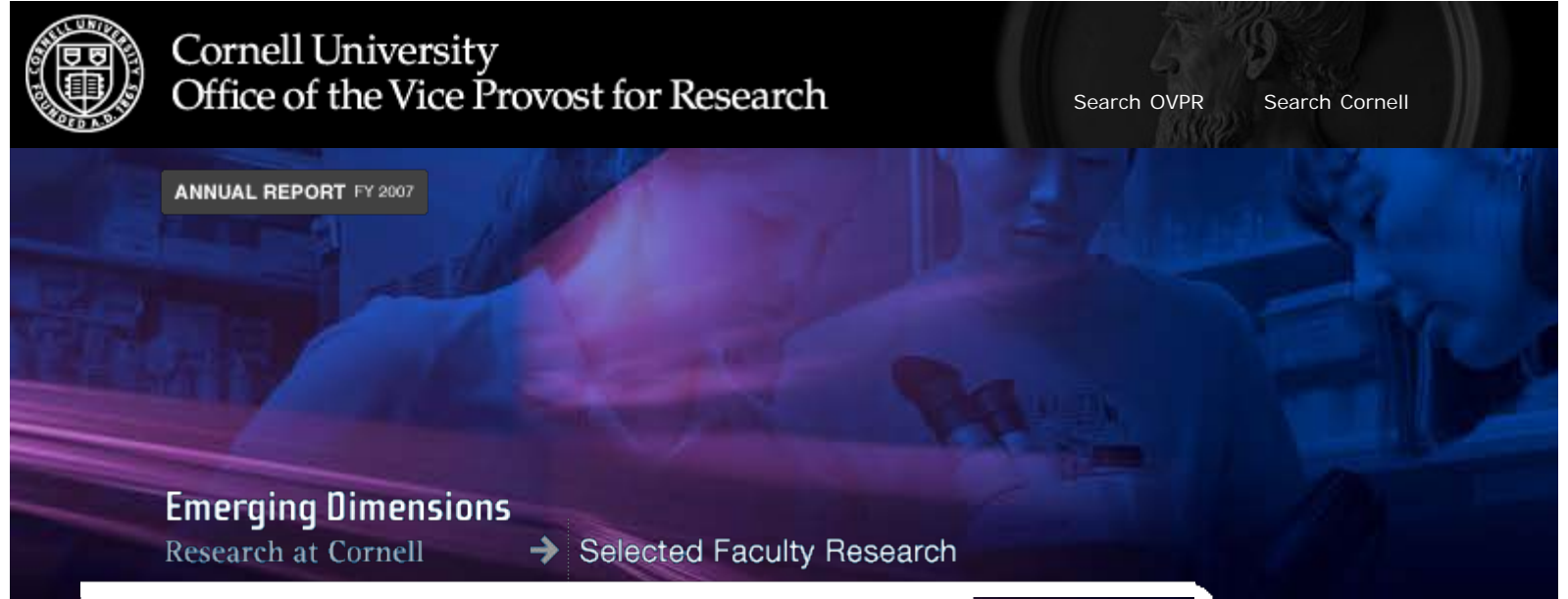
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26. Studying Tuberculosis



David Russell

David G. Russell, Microbiology and Immunology, and his research colleague gained a better understanding of how tuberculosis survives inside human defense cells. Using advanced genetic techniques, the researchers discovered that unlike many bacterial pathogens, *Mycobacterium tuberculosis* does not react when immune system cells called macrophages initially make contact. The bacterium's genes instead become activated minutes after the pathogen is enveloped by a macrophage and contained in one of its membrane-bound compartments called vacuoles. Increased acidity inside the vacuoles serves as the trigger for *M. tuberculosis* genes to express proteins. The research also compared the responses of *M. tuberculosis* and a live-bacterial tuberculosis vaccine, Bacillus Calmette-Guerin (BCG). It found that the two bacteria may respond differently to the same stimulus and that BCG appears less capable of protecting itself once inside a macrophage. The study is part of a larger plan to understand the processes that allow the *M. tuberculosis* bacteria to survive within macrophages in order to develop faster and more effective drugs to fight tuberculosis, which currently kills two million people worldwide each year. Existing drugs require six to nine months to treat the active disease, which invades the lungs.

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27. Deep Brain Stimulation



Nicholas Schiff

Nicholas D. Schiff, Neurology and Neuroscience, and Joseph J. Fins, Medicine/Public Health, Weill Cornell Medical College, and research colleagues performed the world's first successful

electrical stimulation for a minimally conscious brain-injured patient, who regained the power to communicate. The experimental study provided the first rigorous evidence that a prosthetic device can initiate and sustain recovery in such a severely disabled person years after the injury occurred. After his brain was stimulated with pulses of electric current, a 38-year-old man with a severe head injury who had spent more than five years in a minimally conscious state (MCS) could interact regularly with family members, while recovering his ability to move. The patient was treated with deep brain stimulation surgery, a technique that targets deep brain structures with millimeter precision using computer-generated maps, image-guided navigation and physiological brain mapping. Tiny electrodes implanted into the brain are then connected to programmable pacemaker batteries in the chest. The researchers knew that some patients in a MCS retain functioning brain networks above the brainstem. Activity within these integrated neural networks is supported by cells in an area of the brain called the central thalamus, which is key to adjusting brain activity as it responds to cognitive demands. Experts estimate that from 100,000 to 300,000 patients with traumatic brain injury are diagnosed as in a MCS. Under the current standard of care, most do not receive active rehabilitation and are cared for in long-term nursing facilities. This first deep brain stimulation procedure is part of an FDA-approved pilot study that will include 12 patients in post-traumatic MCS.

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28. From Gene Mutation to Infertility



John Schimenti

John C. Schimenti, Biomedical Sciences, and one of his research colleagues discovered a gene mutation that causes infertility in male mice. This is the first time a dominant mutation that leads specifically to infertility in a

mammal has been discovered. Similar mutations may exist in the DNA of some infertile men, although little is presently known about the genetic causes of infertility in humans. The gene, Dmc1, provides the code for a key protein involved in meiosis, the process that produces sperm and egg cells for reproduction. These sex cells contain only one set of chromosomes that combine during conception and create an embryonic cell with two chromosome sets, one from each parent. The mutation leads to a change in an amino acid in Dmc1 that blocks meiosis, preventing sperm production. The mutant allele (one version of the pair of genes inherited from each parent) is dominant. Females who carry it remain fertile, but pass the mutation on to future generations. The researchers discovered, however, that female carriers show higher rates of abnormalities during meiosis, which can potentially cause chromosome imbalances and birth defects. The researchers randomly induced mutations in the mouse genome and then looked for infertility in the resulting mice. The researchers aim to identify all the genes needed for fertility in mice and apply the information to the humans. Up to 15 percent of couples of childbearing age struggle with infertility.

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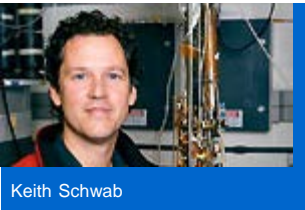
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29. A Faster STM



Keith C. Schwab, Physics, and research colleagues used an existing technique in an innovative way to make the scanning tunneling microscope (STM), which can image individual atoms on a surface, at least 100 times faster. The

researchers made a simple adaptation based on a method of measurement currently used in nano-electronics. The STM uses quantum tunneling, the ability of electrons to “tunnel” across a barrier, to detect changes in the distance between a needlelike probe and a conducting surface. Researchers apply a tiny voltage to the sample and move the probe—a simple platinum-iridium wire snipped to end in a point just one atom wide—a few angstroms over the sample’s surface. By measuring changes in current as electrons tunnel between the sample and the probe, they can reconstruct a map of the surface topology down to the atomic level. Since its invention in the 1980s, the STM has enabled major discoveries in fields from semiconductor technology to nano-electronics. This innovative technique could also give STMs significant new capabilities, including the ability to sense temperatures in spots as small as a single atom and to detect changes in position as tiny as 0.00000000000001 meters: a distance 30,000 times smaller than the diameter of an atom.


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30. New Human Genes



Adam Siepel

Adam C. Siepel, Biological Statistics and Computational Biology, and a team of colleagues discovered 300 new human genes and found extensions of several hundred genes already known using evolution-tracking

methods. The discovery is based on the idea that as organisms evolve, sections of genetic code that do something useful for the organism change in different ways. The researchers used supercomputers to compare portions of the human genome with those of other mammals. The complete human genome was sequenced several years ago, so the order of the three billion chemical units that make up the genetic code is known, but the exact location of all the short sections that code for proteins or perform regulatory or other functions remains to be identified. Although more than 20,000 protein-coding genes have been identified, this discovery shows that there could be many more genes that have been missed using current biological methods. These methods are effective at finding genes that are widely expressed but may miss those that are expressed only in certain tissues or at early stages of embryonic development. Using the computer as microscope for observing the results of evolution, Siepel's research group set out to find genes that have been conserved—that are fundamental to all life and have stayed the same, or nearly so, over millions of years of evolution. From building and testing the mathematical models to running final laboratory tests, the project took about three years.

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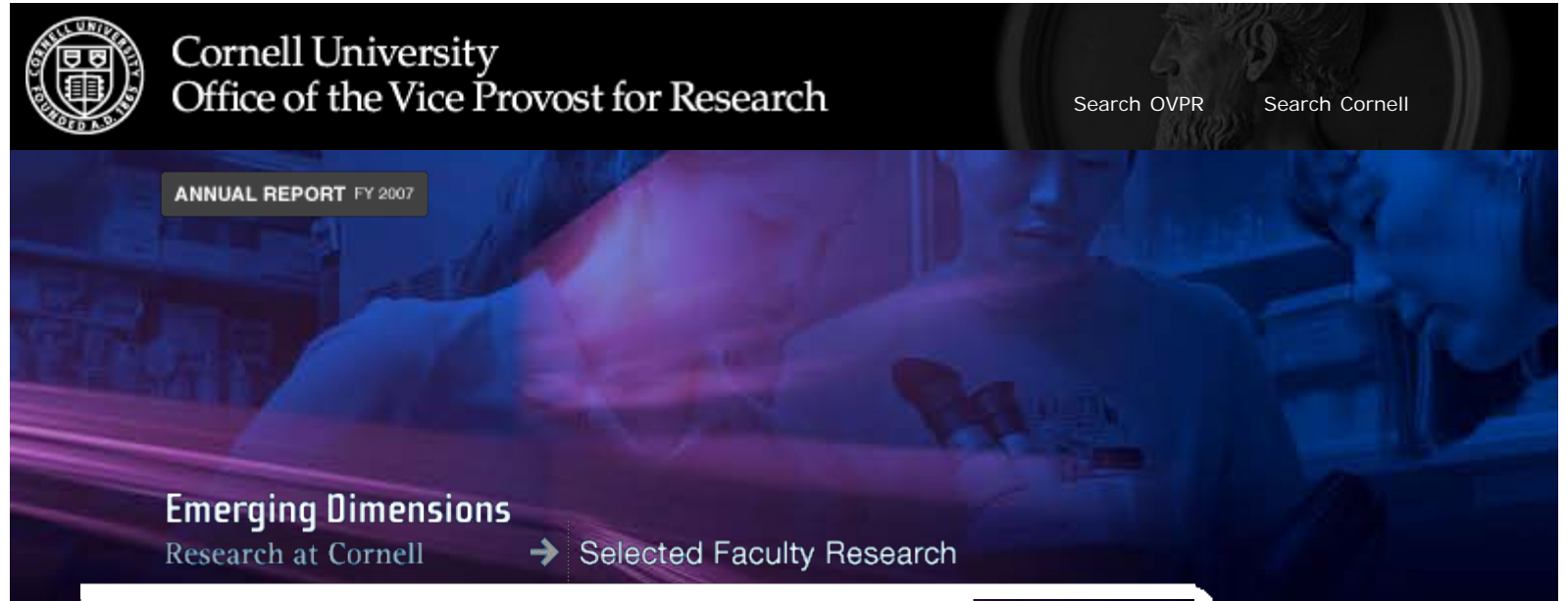
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31. *E. Coli* and Crohn's Disease



Kenneth W. Simpson, Clinical Sciences, Ellen J. Scherl, Medicine, Weill Cornell Medical College, and research colleagues discovered that intestinal inflammation in patients with Crohn's disease might be associated with a

group of *E. coli* bacteria. Researchers have long suspected that *Mycobacterium avium paratuberculosis* (MAP) is central to the development of Crohn's disease, an incurable disorder that most commonly causes inflammation in the ileum, the lower part of the small intestine. The mechanisms that drive the inflammatory response, however, have not been identified. The Simpson research team compared the intestines of healthy individuals with the intestines of patients with Crohn's restricted to the ileum and the colon. Instead of MAP bacteria, they found an increased level of *E. coli* in more inflamed areas of the small intestines. These findings suggest that a novel group of *E. coli* contains opportunistic pathogens that may cause chronic intestinal inflammation in susceptible individuals. The researchers suggest that treatment that considers an individual's intestinal bacteria in addition to disease phenotype and genotype may improve the outcome for Crohn's patients. Crohn's disease affects one in 1,000 people in Europe and North America.

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32. Violence and Small Business in Colombia



Wesley Sine

Wesley D. Sine, Johnson Graduate School of Management, and research staff found that Colombia's violence has damaged the nation's economic growth on several levels, including the willingness of entrepreneurs to

network, grow their businesses, and innovate. Colombia has suffered decades of brutal violence engendered by revolutionary movements, drug cartels, private militias, and street gangs. Street violence affects Colombians every day and threatens the survival of their small businesses, such as shops, bakeries, automotive garages, and manufacturers. Domestic instability directly limits entrepreneurs' ability to prosper. Yet Colombia also boasts rich natural resources, abundant gold and emerald production, and a relatively educated populace. The researchers analyzed data from five Colombian cities, tracking the successes and failures of 1,000 small businesses from 1997 to 2007. They interviewed hundreds of workers, entrepreneurs, and families, while tracking rates of homicide, kidnapping, and other statistical measures of violence. Since the decline of major insurgencies, such as the National Liberation Army (ELN), the Revolutionary Armed Forces of Colombia (FARC), and the paramilitaries, survival rates for small businesses have doubled.

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33. Radical Light!



Steven Stucky

Steven E. Stucky, Music, was commissioned by the Los Angeles Philharmonic to compose a work. Stucky delivered *Radical Light*. The orchestra, conducted by Esa-Pekka Salonen, premiered the work at the Walt Disney

Concert Hall on October 18, 2007, followed by the orchestra's European premiere of the piece on November 2, 2007, at London's Barbican Centre. The program, entitled "Sibelius Unbound: Stucky and Sibelius," included Sibelius' fourth and seventh symphonies, with *Radical Light* between the two symphonies. Salonen and the orchestra held five-day residencies based on the program at the Barbican Centre and the Salle Pleyel in Paris. They played single-night performances of the program in Barcelona, Madrid, and Lisbon. Stucky also completed a new arrangement of Stravinsky's *Les Noces*. Salonen led the world premiere of this new arrangement in the final concert of the 2007–8 season, featuring it with his own Piano Concerto and Colin Matthews' arrangement of several of Debussy's preludes.

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34. Engineering Tissue for Transplants



(l.) Abraham Stroock (r.)
Lawrence Bonassar

Abraham D. Stroock, Chemical and Biomolecular Engineering, Lawrence J. Bonassar, Biomedical Engineering, and their

research team developed a microvascular system that can nourish growing tissues, such

as synthetically engineered muscle or cartilage needed for transplants. The researchers engineered within a water-based gel tiny channels that mimic a vascular system at the cellular scale and can supply oxygen and essential nutrients to feed individual cells. The gel scaffold can hold tens of millions of living cells per milliliter in a 3-D arrangement, such as the shape of a knee meniscus, to create a template for the forming tissue. One challenge in building engineered tissues is feeding the core of the tissue during culture. By embedding this simulated microvascular system, researchers can control distributions of fluid with oxygen, sugar, and proteins over both time and space within the developing tissue, allowing the biochemical environment of the cells to be fine-tuned while the tissue grows. The tissue may need to develop into bone on one side and cartilage on the other: now scientists can supply the right nutrients and proteins to certain parts of the growing tissue to ensure the intended outcome. Theoretically, the scaffold system could accommodate many kinds of tissue. Researchers believe the technology offers the potential of growing implants from the patient's own cells to replace damaged or diseased tissue. Some of the biological challenges include finding a source of cells that can be harvested from a patient and grown without changing the cell's characteristics. As new tools develop, researchers hope to use these engineered tissues in nonclinical applications—perhaps as replacements for laboratory animals in drug and chemical testing.

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35. Communication Networks after Downsizing



Alex Susskind

Alex M. Susskind, Hotel Administration, found that one of the effects of a corporate layoff is the interruption of communication networks for employees who remain in the workplace.

Because information that

passes along informal networks is a vital part of the workplace, it is difficult for remaining employees to reestablish connections after a layoff. Workers' access to information and status as central points in a communication network are key elements in job satisfaction and have a strong influence on turnover intentions. This study measured pre- and post-downsizing information flow, as well as post-downsizing turnover intentions of downsizing survivors in the corporate office of an international hotel company. Using a combination of network and path analysis, the study examined the relationship between changes in downsizing survivors' "betweenness"—the extent to which information transmits through them—and perceptions of information adequacy, relating these factors to reported turnover intentions at two months and four months after the layoffs. The study found that an increase in network members' centrality augmented their perceptions of information adequacy, which in turn reduced their intentions to seek new employment. The study also found that turnover intentions diminished at some point between two and four months after the layoff, correlating with stabilization of the communication network. The study implies that managers should consider ways to help remaining employees establish communication pathways after a corporate downsizing.

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36. Preventing Bone Loss



Marjolein van der Meulen

Marjolein C. H. van der Meulen, Mechanical and Aerospace Engineering, Mathias P. G. Bostrom, Orthopaedic Surgery, WCMC, and research

colleagues found that forces produced during daily activities

and exercise (mechanical loading) increased bone mass and prevented bone loss caused by hormone deficiency. They discovered that forces applied to the skeleton are anabolic stimuli in cancellous bone, independent of estrogen status. In earlier studies, the researchers developed a method for applying forces to the skeleton to simulate exercise and found that mechanical forces stimulated bone growth similarly in healthy male and female mice and enhanced bone mass and trabecular architecture. When sex hormones were removed in male mice, the adaptation to mechanical loading was not affected: the stimulated exercise actually counteracted bone loss induced by hormone deficiency. The mechanism of the anabolic effect is not yet completely understood. The research has implication for better integration of joint replacements and for osteoporosis, which increases the risk of skeletal fractures particularly at cancellous sites.

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37. A Question about Replication Answered



Michelle Wang

Michelle D. Wang, Physics, and a collaborator determined how helicases, a class of enzymes, play a key role in gene copying. The researchers answered a fundamental question about how two strands of DNA—the familiar

double helix—separate to start replication, the process by which genes copy themselves. Scientists have known that helicases bind to the area of a double helix where the two strands fork away from each other. The forked area opens and closes very rapidly. Scientists have debated whether helicases actively separate the two strands at the fork or if they passively wait for the fork to widen on its own. Wang and her colleague found that the helicase exerts a force on the fork to separate the two strands—so the mechanism is an active unwinding motor, not a simple passive unwinding. To observe this mechanism in action, they anchored one end of one of the double-helix strands to the surface of a microscope cover slip, while the end of the other strand was attached to a micron-sized plastic bead. They focused a laser beam on the tiny bead, trapping the bead within the beam of light. This setup allowed them to measure the position and force on the bead, creating a very precise sensor of helicase motion. As the helicase moved toward the fork and the double helix unwound, the tension on the two strands lessened. Using statistical mechanics models, the researchers could compare actual measurements of movement with predictions based on both active and passive scenarios. The researchers believe that helicases work with other enzymes, with accessory proteins assisting the helicase by destabilizing the fork junction.

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38. Healthy Food, Unhealthy Choices



Brian C. Wansink, Applied Economics and Management, and a colleague found that healthy food restaurants often prompt consumers to treat themselves to higher-calorie side dishes, drinks, or desserts than they

might when they eat at fast-food restaurants that make no health claims. The researchers determined that people also underestimate by 35 percent the number of calories that healthy restaurant foods contain. They found that asking people to reconsider restaurants' health claims prompts them to estimate calories more accurately and discourages them from ordering as many side dishes. These studies help explain why lower-calorie menus at fast-food restaurants have not led to the expected reduction in total calorie intake and obesity rates. The researchers recommend that public policy efforts help people to better estimate the number of calories in foods.

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39. Efficient Fuel and Solar Cells



(l.) Ulrich Wiesner (r.) Frank DiSalvo

Ulrich B. Wiesner, Materials Science and Engineering, Francis J. DiSalvo, Chemistry and Chemical Biology, and their research colleagues showed that a one-pot process could make more efficient materials for fuel cells

and solar cells. In a fuel cell, a material with nanoscale pores offers more surface area over which a fuel can interact with a catalyst. In a solar cell, a porous material similarly offers more surface area over which light can be absorbed, so more of it is converted to electricity. Porous materials have previously been made on hard templates of carbon or silica or by using soft polymers that self-assemble into a foamy structure. Hard porous templates are tricky to make, and while the polymer approach is easier and creates a good structure, the metal oxides must be heated to high temperatures to crystallize fully, which causes the polymer pores to collapse. Wiesner and DiSalvo combined the best of the two approaches, creating porous films of crystalline metal oxides by using a soft block copolymer called poly(isoprene-block-ethylene oxide), or PI-b-PEO, that carbonizes when heated to high temperatures in an inert gas, providing a hard framework around which the metal oxide crystallizes. Subsequent heating in air burns away the carbon. The researchers call this approach CASH (combined assembly by soft and hard chemistries). The resulting materials were examined by electron microscopy, x-ray diffraction, and a variety of other techniques, all of which confirmed a highly crystalline structure and a uniform porosity. The next step is to apply the CASH process to the creation of porous metals.

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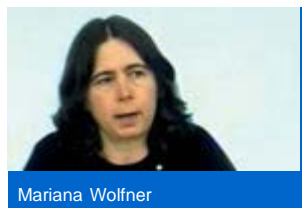
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40. Lessons from the Fruit Fly



Mariana Wolfner

Mariana F. Wolfner, Molecular Biology and Genetics, and a research colleague found that seminal fluid can impact the female fruit fly's fertility—a discovery that offers clues to human reproduction. The researchers

identified six accessory-gland proteins in the seminal fluid of fruit flies that affect reproduction by changing the female's post-mating behavior and physiology. They found that one of the proteins is required to stimulate egg production fully in the *Drosophila* female on the first day after mating. The other five proteins sustain changes in the female caused by mating, such as increasing her egg production and reducing her likelihood to mate again. Until now, the ability in insects to maintain these responses had been associated with a single insect-specific accessory-gland protein. Maintaining these responses after mating requires the presence of stored sperm. Females of all internally mating species store sperm in the body, from a few days in most mammals to 20 years in some bees and ants. Studying *Drosophila* gives researchers a workable model for pinpointing the functions of such proteins. These insights may direct future studies on the function of these classes of seminal proteins in humans, which may advance understanding of some cases of infertility in humans. The research may also aid in developing new strategies to control insects that transmit human diseases. The mosquitoes that transmit dengue fever and West Nile Virus, for example, are "cousins" of fruit flies.

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01. N'Dri T. Assié-Lumumba, ed., Africana Studies and Research Center



Women and Higher Education in Africa: Reconceptualizing Gender-Based Human Capabilities and Upgrading Human Rights to Knowledge (CEPARRED, 2007). This collection of studies, also forthcoming in French and Arabic, contributes to the discourse on education, gender equality, and social development in African countries. The focus on women's access and participation in higher education has emerged as a popular topic of study among African scholars. The book points out that no African country has achieved universal primary education, much less the goal of ensuring access to higher education. The majority of Africa's women and girls have been denied access to education, which in turn is an economic and political issue. Within the context of social, economic, and political reforms, gender inequality has not been systematically, consistently, and seriously addressed, although scholars and institutions have identified inequality in all sectors of education in Africa as one of the most important internal factors that continues to contribute to the underdevelopment of Africa. The book brings analytical insight to the dynamic relationship between higher education and other levels of the educational system and between education and other social institutions.

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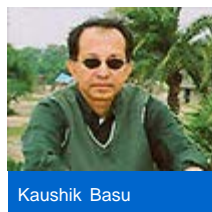
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02. Kaushik Basu, ed., Economics



Kaushik Basu



The Oxford Companion to Economics in India (Oxford University Press, 2007). Basu presents a collection of 204 essays on the contemporary Indian economy by economists, business

leaders, policy makers, and analysts. The first comprehensive resource of its kind, the work covers the evolution of the Indian economy and its emergence as a global economy. The wide array of topics includes India's leadership in the software and information technology industry; India's success in outsourcing; India's widespread poverty, farmer suicides, and child labor; and India's phenomenal growth. Basu has received India's Padma Bhushan title, one of the government's most prestigious civilian awards for the highest distinguished service.

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03. Sherene B. Baugher, ed., *Landscape Architecture*, (with John H. Jameson)



Sherene Baugher



Past Meets Present: Archaeologists Partnering with Museum Curators, Teachers, and Community Groups (Springer, 2007). This volume provides models for implementing public outreach programs

with an emphasis on collaborative community partnerships. Effective collaborative models enable the archaeology of the past to meet the educational and interpretive needs of the present. While service-learning has been around as a pedagogy since the 1960s, it has only recently arrived in archaeology classrooms. For more than fifteen years, Baugher has applied service-learning to archaeology, combining teaching, research, and community outreach in four different courses with a service-learning component. She developed an archaeological model and tested it in her classes at Cornell. Baugher discusses these techniques and suggests how her archaeological model can be applied to other universities. In addition to coediting the collection, Baugher provided two essays: "Service-Learning: Partnering with the Public as a Component of Archaeology Courses" and "Public Interpretation, Outreach, and Partnering: An Introduction."

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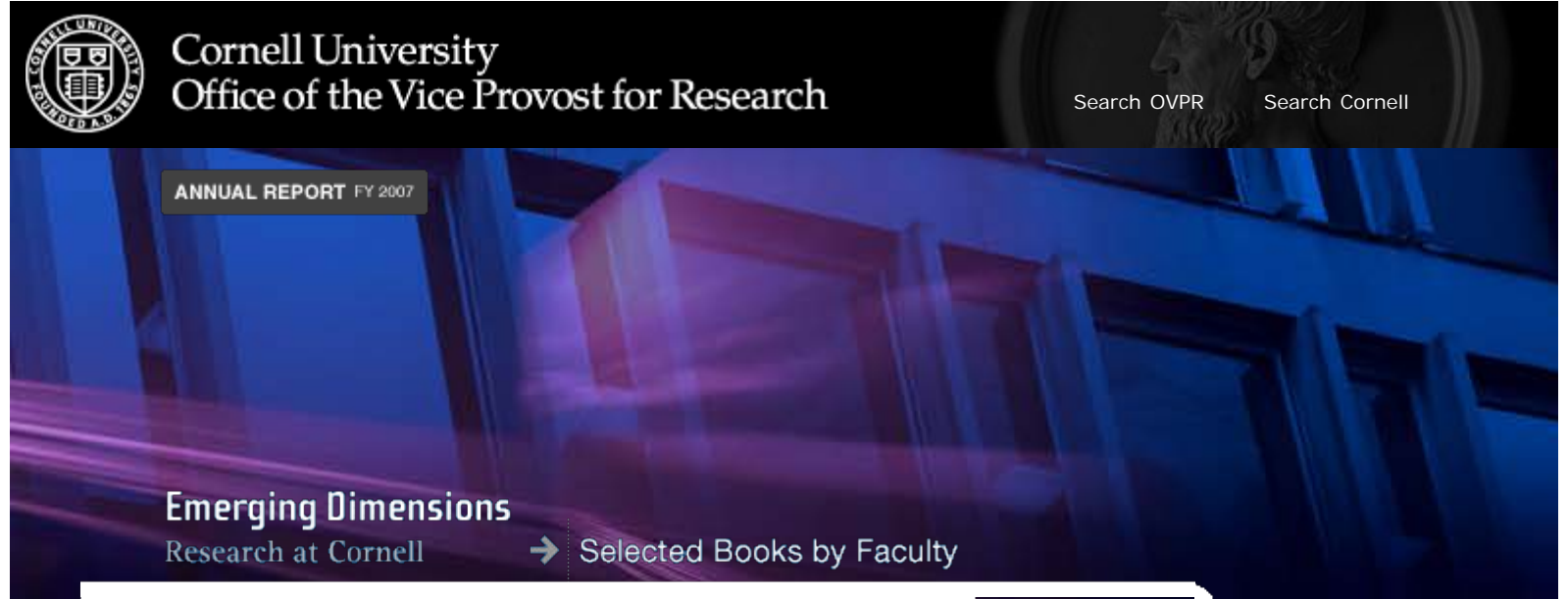
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04. Susan M. Christopherson, *City and Regional Planning*, (with Jennifer Clark)



the United States economy, offers a critique of the new regionalism and a return to regional concerns of equity and uneven development. It presents case studies from the optics and imaging industry and the film and television industry—small and large photonics and entertainment media firms—which rely on skilled, innovative, and flexible workers. It also discusses the regions that constitute these industries’ production centers. Since the early 1980s, geographical region has been central to thinking about the emerging character of the global economy. In diverse fields such as business management, economic geography, and sociology, regional scale has become an organizing concept for interpretations of economic change.

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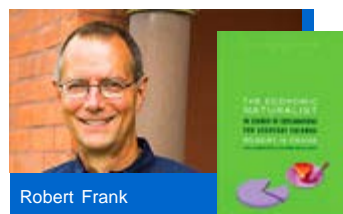
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05. Robert H. Frank, Johnson Graduate School of Management



Robert Frank

The Economic Naturalist: In Search of Explanations for Everyday Enigmas (Basic Books, 2007). Frank presents basic economic principles in a most fascinating and fun way. He uses questions from

everyday life to explain how economic principles govern our world: Why do the keypads on drive-up cash machines have Braille dots? (Because it is cheaper to make the same machine for both drive-up and walk-up locations.) Why are round-trip fares from Orlando to Kansas City higher than those from Kansas City to Orlando? (Because Kansas City travelers are usually price-sensitive tourists with many choices of destination, whereas travelers originating in Orlando typically choose Kansas City for specific family or business reasons.) Why do brides spend so much money on wedding dresses they will wear only once, while grooms rent tuxedos although they will have future occasions to wear one? (Because most brides want to make a fashion statement. Rental companies would have to stock 40 to 50 distinctive dresses in each size, so the company would have to charge more than the purchase price of a dress to cover its cost since each dress would be rented infrequently.) Frank also covers key ideas such as the cost-benefit principle, the no-cash-on-the-table principle, and the law of price.

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06. Ronald B. Furry, Biological and Environmental Engineering (emeritus)



Ronald Furry



A Pioneering Department: Evolution from Rural Engineering to Biological and Environmental Engineering at Cornell University, 1907-2007 (Internet-First University Press, 2007). This history

traces from 1900 the evolution of one of Cornell's pioneering academic departments, then agricultural mechanics, to the present-day Department of Biological and Environmental Engineering. The department began as a farm-oriented discipline rooted in Cornell's land-grant mission. Biological and environmental engineering is now a theoretical and applied discipline that centers on using biology as an engineering tool. The book also profiles the people who helped to make the department a leader in the field.

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07. Tarleton L. Gillespie, Communication



Tarleton Gillespie



Wired Shut: Copyright and the Shape of Digital Culture (MIT Press, 2007). Gillespie looks at how the enforcement of copyright laws in the digital media industries has shifted from regulating the copying of a

work's contents to technical copy protection: the design of technology such as encryption to protect the work. The book examines the political, economic, and cultural arrangements that are being put into place to make the "technical fix" work. As the music and film industries build alliances with legislators, regulators, and the courts to protect digital material, they are increasingly commercializing culture and regulating communication, as well as undermining the democratic potential of a networked society. Gillespie discusses three recent controversies over digital copyright: the failure to develop copy protection for portable music players with the Secure Digital Music Initiative (SDMI), the successful encryption system used in DVDs and the film industry's legal response to the tools that challenged them, and the FCC's attempt to mandate the broadcast flag copy protection system for digital television. Gillespie holds that digital copyright shows us how we use mechanisms of law, technology, and the marketplace to structure cultural expression and how the outcomes of today's controversies over digital copyright will shape the future of digital culture.

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08. Valerie P. Hans, Law, (with Neil Vidmar)



Valerie Hans

American Juries: The Verdict (Prometheus Books, 2007). Topic by topic, the authors present over 50 years of empirical research on civil and criminal juries and give stories behind important trials. They

provide fact-based answers to important questions concerning how juries make decisions: how jury verdicts compare to verdicts of trial judges and technical experts, roles jury consultants play in influencing trial outcome, juries' comprehension of complex expert testimony, and juries' potential biases against doctors and big business. Hans and Vidmar explore suggestions for improving the way juries are asked to carry out their duties, but they conclude that the American jury system is fair and democratic.

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09. Terence H. Irwin, Philosophy



explores the thinking and ideas of Socrates, Plato, Aristotle, and thinkers from all the centuries that follow—from ancient Greece to the Reformation. He introduces each thinker with substantial quotations and interprets and evaluates their philosophies in discussions of their work. The book is the first of three volumes that will examine the history of ethics in the Socratic tradition up to the twentieth century.

The Development of Ethics: A Historical and Critical Study (Oxford University Press, 2007). In this historical and critical study of the development of moral philosophy over two thousand years, Irwin

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10. Jonathan D. Kirshner, *Government*



Jonathan Kirshner

Appeasing Bankers: Financial Caution on the Road to War (Princeton University Press, 2007). Kirshner uses historical case studies to demonstrate how domestic financial interests and international financial

markets can shape and constrain states' foreign policy strategies and influence decisions about war and peace. Through examples that include interwar France, the Falklands crisis, the Spanish-American War, interwar Japan, and the United States during the Cold War, Kirshner argues that financial institutions dread war or policies that risk war. His historical, economic, and political analyses show that the financial world values economic stability and peace, while international political crises and war threaten stability. States that pursue appeasement when assertiveness is valid are usually appeasing their bankers. The book reveals the relationship between economics and security in international relations, as well as the realities that shape state strategy in a world of global financial markets.

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11. Suzanne B. Mettler, ed., *Government, (with Joe Soss and Jacob S. Hacker)*



Suzanne Mettler



Remaking America: Democracy and Public Policy in an Age of Inequality (Russell Sage Foundation, 2007). The authors investigate the complex interactions of economics, politics, and policy in their

examination of how postwar distributed economic growth has given way to newer trends: inequalities of income and wealth, politics' shift to the right, and the increasing role of government in American lives. The authors show how these changes affect the social standing of Americans and the character of democratic citizenship in the United States, examining Medicare, tax policies, low-income women, mass incarceration, and the effect of new policies on participation in the labor force. The authors show that for many disadvantaged Americans for whom the government was a source of opportunity and security, it has in the last three decades instead become paternalistic and punitive.

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12. Robert R. Morgan, English



Boone: A Biography (Algonquin, 2007). In this expansive biography of Daniel Boone, Morgan separates myth from reality and explores the real man behind the legends. Boone exemplified the visionary spirit of his time. Hunter, explorer, politician, speculator—he was a trailblazer, a revolutionary, and an American icon for more than two hundred years. Born in 1734, Boone served in the Virginia legislature, participated in the settling of the Middle West, fought in the French and Indian War and the American Revolution, and witnessed the election of his friend as first president of the United States, the Louisiana Purchase, and the beginning of westward expansion. Unlike many others of his time, he had a deep respect for the Indians, who taught him how to hunt, navigate, and survive in the wilderness he came to revere. In telling Boone's story, Morgan tells the story of early America—its ideals, its promise, its romance, and its destiny.

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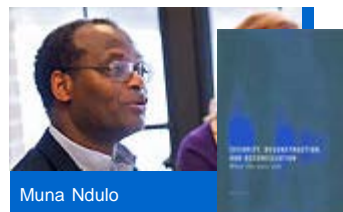
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13. Muna B. Ndulo, ed., Law



Muna Ndulo

Security, Reconstruction, and Reconciliation: When the Wars End (University College London Press, 2007). This work addresses the challenges of postconflict societies and in doing so, articulates a

vision for a new kind of secure and equitable society. The book's essays discuss potential solutions and lessons learned in the field on the social, political, and economic dimensions of conflict; the impact of conflict on women and children; disarmament, demobilization, reintegration, and postwar reconstruction; reconstruction and past human rights violations; and the role of the international community peace process in building a capable state.

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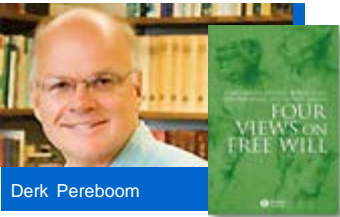
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14. Derk Pereboom, Philosophy, (with John M. Fischer, Robert Kane, and Manuel Vargas)



Four Views on Free Will (Blackwell, 2007). This interactive work presents leading proponents of four major views on the question of free will. The debate focuses on the concepts and interactions of free will, moral responsibility, and determinism. The book first presents the viewpoint of each philosopher—libertarianism, compatibilism, hard incompatibilism (Pereboom), and revisionism—and then the philosophers respond directly to one another's arguments. The book is an up-to-date account of contemporary positions on a central question in Western philosophy.

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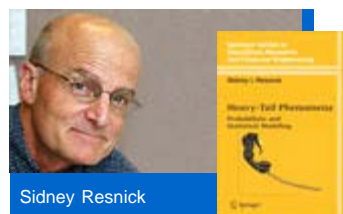
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15. Sidney I. Resnick, Operations Research and Information Engineering



Sidney Resnick

Heavy-Tail Phenomena: Probabilistic and Statistical Modeling (Springer, 2007). Resnick's text was among the 20 best-selling mathematics books in 2007. He presents an intriguing blend of mathematical,

probabilistic, and statistical tools used in heavy-tail analysis. Heavy tails are characteristics of many phenomena where the probability of a single huge value impacts heavily. Some examples of heavy-tailed phenomena are record-breaking insurance losses, financial-log returns, file sizes stored on a server, and transmission rates of files. The book covers heavy tails in the fields of data networks, finance, insurance, and hydrology. It is useful to researchers, engineers, and others who need to model and statistically analyze phenomena driven by heavy tails.

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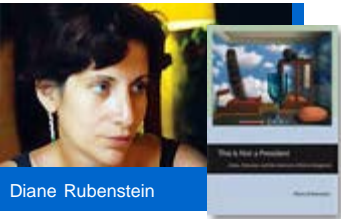
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16. Diane S. Rubenstein, Government



along with a discussion of Hillary Rodham Clinton. Focusing on blind spots in recent American presidential politics, Rubenstein examines symptomatic moments in political rhetoric, popular culture, and presidential behavior to elucidate profound and disturbing changes in the American presidency and the way it embodies a national imaginary. In a series of essays written in real time over the past four presidential administrations, Rubenstein traces the vernacular use of the American presidency, exploring the ways in which the presidency functions as a “transitional object” that allows the American citizen to meet or discover the president while going about everyday life. The book argues that French theory—Lacanian psychoanalysis and the radical semiotic theories of Jean Baudrillard—best accounts for American political life today. Through episodes as diverse as the Iran-Contra affair, George H. W. Bush vomiting in Japan, the 1992 Republican convention, Bill Clinton’s failed nomination of Lani Guinier for assistant attorney general, and the Iraq War, the book situates our collective investment in American political culture.

This Is Not a President: Sense, Nonsense, and the American Political Imaginary (New York University Press, 2008). Rubenstein looks at the postmodern presidency—from Ronald Reagan through George W. Bush—

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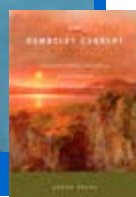
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17. Aaron Sachs, History



Aaron Sachs



The Humboldt Current: Nineteenth-Century Exploration and the Roots of American Environmentalism (Viking, 2006). Alexander von Humboldt (1769–1859), a Prussian scientist, explorer,

and polymath who visited America for the first time in 1804, had a profound impact on nineteenth-century American intellectual life, including science and exploration, politics, transcendentalism, and literature. Intertwining von Humboldt's philosophy on the interconnectness of nature, Sachs traces Humboldt's legacy by profiling four American naturalist-explorers who were inspired by his example: newspaper editor J. N. Reynolds, the first U. S. Geological Survey director Clarence King, Arctic expeditionist George Melville, and Sierra Club founder John Muir. Sachs views these four men as alienated romantics who used Humboldt's notion of "unity in diversity" as a way of critiquing their increasingly industrialized society. He argues that their examples laid the groundwork for an ecological tradition more radical than that of today. Sachs also documents the naturalist impulse in writers such as Thoreau, Whitman, and Poe. Although today his enormous legacy to American thought is nearly unknown, von Humboldt achieved unparalleled fame in his own time. Sachs seeks to reverse Humboldt's undeserved obscurity by tracing his pervasive influence on American history.

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18. Paul W. Sherman, ed., *Neurobiology and Behavior*, (with Jerry O. Wolff)



Paul Sherman

Rodent Societies: An Ecological and Evolutionary Perspective (University of Chicago Press, 2007). This volume synthesizes and integrates current knowledge about the social behavior of

rodents, laying out ecological and evolutionary contexts for understanding rodent societies and highlighting emerging conservation and management strategies to preserve them. The book begins with a summary of the evolution, phylogeny, and biogeography of social and nonsocial rodents, providing a historical basis for comparative analyses. Subsequent sections focus on group-living rodents and characterize their reproductive behaviors, life histories and population ecology, genetics, neuroendocrine mechanisms, behavioral development, cognitive processes, communication mechanisms, cooperative and uncooperative behaviors, antipredator strategies, comparative socioecology, diseases, and conservation. Squirrels, mice, chipmunks, hamsters, and gerbils are a few of the more than 2,000 types of rodents, which represent 44 percent of all mammal species worldwide. Using the highly diverse and well-studied order of rodents as model systems, the authors explore questions of cross-disciplinary interest: Why do individuals sound an alarm when a predator appears nearby? (To warn kin and to confuse predators.) Why do some rodents commit infanticide? (To obtain food and appropriate breeding territories.) Why are beavers one of the few monogamous mammals? (Because pairs must cooperate to build and maintain dams, lodges, and food larders.) This work is a stimulus for future collaborative and interdisciplinary investigations.

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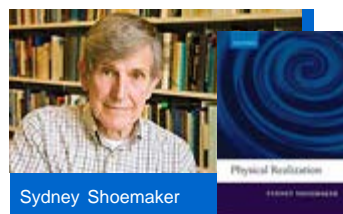
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19. Sydney S. Shoemaker, Philosophy (emeritus)



the world of physical properties? Physicalism requires that the mental properties of a person are realized in the physical properties of that person and that all instantiations of properties in macroscopic objects are realized in microphysical states of affairs. Shoemaker provides an account of both types of realization, one that allows the realized properties to be causally effective. He also explores the implications of this account for a wide range of metaphysical issues, including the nature of persistence through time, the problem of material constitution, the possibility of emergent properties, and the nature of phenomenal consciousness.

Physical Realization (Oxford University Press, 2007). Shoemaker questions how physicalism can be true: How can all facts about the world, including mental ones, be constituted by facts about distribution in

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20. Meredith F. Small, Anthropology



illnesses like depression and anxiety—conditions that appear in different forms and for different reasons according to culture, rather than biology. Many consider the Western medical model of mental health incomplete. Small finds a more workable solution to mental problems than the medical model by rethinking assumptions and questioning standard treatment programs. Stepping outside the current disease model reveals new ways to understand, treat, and accept negative mental conditions. Westerners turn quickly to physicians seeking pharmaceutical solutions when unhappy or mentally discomfited. We expect brain chemistry to be at the root of any mental malady, forgetting the interwoven relationship between the biology of the brain and the environment in which we think, feel, and react. Small holds that by stepping outside the traditional Western model to explore alternative perspectives and by examining culture itself rather than focusing on biology, we can fully understand the nature of our discontent.

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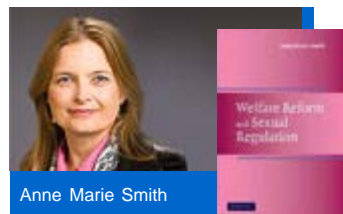
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21. Anna Marie Smith, Government



Anna Marie Smith

Welfare Reform and Sexual Regulation (Cambridge University Press, 2007). Smith explores the scope and structure of the child support enforcement, family cap, marriage promotion, and abstinence education

measures that are embedded in contemporary United States welfare policy. She presents original legal research and draws from historical sources, social theory, and normative frameworks to argue that these measures violate the rights of poor mothers. Smith shows that welfare policy has consistently constructed the sexual conduct of the racialized poor mother as one of its primary disciplinary targets. The book concludes with a detailed critique of Senator Hillary Rodham Clinton's support for welfare reform law and an outline of a progressive feminist approach to poverty policy. Inspired by the political and philosophical interventions of feminist women of color and Foucauldian social theory, the author provides a comprehensive, up-to-date treatment of welfare law at the federal and state levels in the United States.

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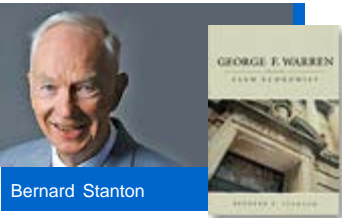
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22. Bernard F. Stanton, *Applied Economics and Management* (emeritus)



George F. Warren: *Farm Economist* (Cornell University, 2007). This biography details the life and legacy of Cornell economics professor, George F. Warren, 1874–1938. As a key economic adviser to President Franklin D. Roosevelt and an international leader and revered teacher in the emerging field of farm management, Warren influenced national economic policy under FDR, as well as state policy on conservation, land use, local government structures, highway improvement, regional markets, and rural schools. The biography traces Warren's roots as a farm boy herding sheep on the Nebraska prairie, his Cornell study with Liberty Hyde Bailey, and his service on the Cornell faculty. Warren chaired Cornell's Department of Agricultural Economics from 1907 until his death in 1938. The book also traces Warren's work as a leader in farm price analysis in the 1920s and '30s, as the agricultural depression of the 1920s became a harbinger of the Great Depression, and his contributions to helping the United States recover from the Depression. Warren's many accomplishments were recognized by FDR, who funded construction of Warren Hall on the Cornell campus in 1932.

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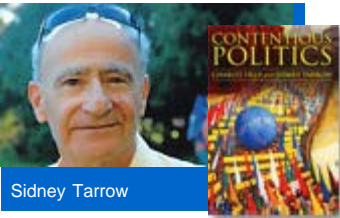
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23. Sidney G. Tarrow, Government, (with Charles Tilly)



transnational movements. These present a set of tools and procedures for studying, comparing, and explaining forms of contentions. Based on historical and contemporary cases, the book shows that similar principles describe and explain a wide variety of struggles, as well as many more routine forms of politics. Beyond its historical value, the book provides an exciting new method for political and sociological analysis.

Contentious Politics (Paradigm, 2006). The authors examine different forms of contentious politics: revolutions, social movements, religious and ethnic conflict, nationalisms and civil right, and

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24. Helena Maria Viramontes, English



Helen Maria Viramontes

Their Dogs Came with Them (Atria, 2007). In the barrio of East Los Angeles, a group of unbreakable young women struggle to find their way through the turbulent urban landscape of the 1960s. Androgynous Turtle

is a homeless gang member. Ana devotes herself to a mentally ill brother. Ermila is a teenager poised between childhood and political consciousness. And Tranquilina, the daughter of missionaries, finds hope in faith. The teenage girls support each other in their intent to protect themselves. In this portrait of everyday Latino life in East Los Angeles, Viramontes' prose is potent and street tough, and the book vibrant, artfully crafted, and kaleidoscopic.

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01. Veratag Radio Frequency IDs



Harold Craighead

Someday anything that needs security protection, such as passports, house keys, or pharmaceuticals, may be identifiable by tiny devices on silicon chips smaller than the tip of a pin. Veratag, a startup company in Albany, New York,

aims to build powerful security systems based on MEMS devices. Founded on research from the lab of Harold G. Craighead, Applied and Engineering Physics, Veratag's product is a tiny MEMS resonator called a MEMflake™. Producing unique analog signals, it can be incorporated into almost any manufactured product. Like snowflakes, each MEMflake is unique and uncloneable, making them ideal for security identification and product authentication.

To create the company's security technology, a MEMS resonator is placed on a silicon chip that can be read and uniquely identified. A MEMS resonator is like a violin string that vibrates at a particular frequency. Veratag will add a minuscule antenna to the MEMflake to make a radio frequency identification (RFID) tag for identification and to fight counterfeiting. MEMflakes require a nonstandard reader. In addition to creating MEMflake chips, Veratag will develop readers. A complete Veratag RFID security system will consist of MEMflakes, a special reader, and software.

With applications like passports and ID cards, Veratag's product offers a robust alternative to encrypted RFID, because MEMflakes cannot be cracked and obviate the need for a secure communications infrastructure to handle encryption keys. For applications in RFID, MEMflakes have a number of practical advantages, including short read time, a small footprint, and a low power requirement. The growing market for RFID tags for security applications will be \$2.8 billion in 2008.

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02. Thermostable Ligase

A Cystic Fibrosis Diagnostic Technology



Francis Barany

A key tool of the biotechnology industry is a polymerase chain reaction (PCR) using thermostable DNA polymerase. PCR amplifies DNA based on specific sequences at either end of a region of interest, but in itself provides no

information about the middle of the region. Laborious subsequent steps need to be performed in order to determine if the region is mutated and to identify those mutations. Francis Barany, Microbiology and Immunology, Weill Cornell Medical College, isolated and cloned a different thermostable enzyme, a ligase, and developed an assay dubbed ligase chain reaction (LCR) that both amplifies DNA and discriminates single-base substitutions in a region of interest. LCR can be combined with additional methods to identify other large-scale genetic mutations. The method, enzyme, and several subsequent elaborations have been licensed to Applied Biosystems, Inc. The company has developed two products from this technology: a diagnostic for cystic fibrosis and the SNPlex™ Genotyping System.

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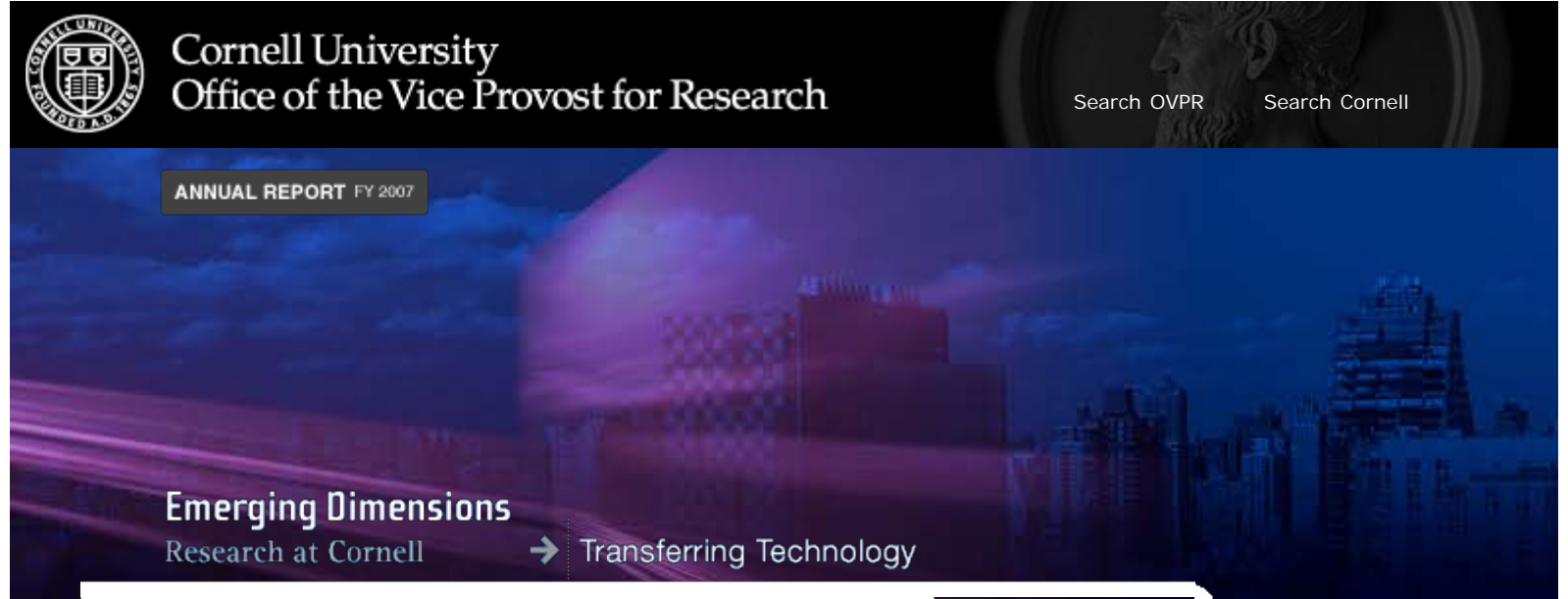
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03. Transferring Technology, Statistics FY 2007

IP Disclosures	
Total	237
Inventions	198
Plants	33
Copyrights	5
Patents Filed	
Total	363
United States	223
International	140
Patents Issued	
Total	141
United States	61
International	80
Licenses	
Total	79
Inventions	47
Plants	31
Copyrights	1
Number of Companies Started	2

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Revenue	
Total	\$8,314,236
Inventions	\$5,137,423
Reimbursements	\$3,152,529
Extraordinary Income*	\$24,284

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01. Funding Cornell's Research, FY 2007

Cornell's Total Research Expenditures, FY 2007		\$659,382
By Dollars Expended		Dollars in Thousands
Sources		
Total Federal Sources		\$388,786
Sponsored		382,916
Budgeted		5,870
Total Non-Federal Sources		270,596
Sponsored Total		98,340
State & Local Governments		17,764
Corporations & Trade Associations		23,655
Foundations		20,071
Nonprofit Organizations		35,585
All Others		1,264
Budgeted Total		172,256
Cornell University		118,040
New York State		54,216
Federal Agencies		

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DHHS Department of Health & Human Services	195,855
NSF National Science Foundation	121,579
USDA Department of Agriculture	19,447
DOD Department of Defense	16,130
NASA * National Aeronautics & Space Administration	11,386
DOE Department of Energy	6,460
AID Agency for International Development	3,699
All Others	8,358

Source: Cornell University, Office of Sponsored Programs
Discrepancies may occur due to rounding.

* NASA includes JPL funds under subcontract.

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02. Expending Research Dollars, FY 2007

Total Research Expenditures, FY 2007		\$659,382
		Dollars in Thousands
By Cornell Divisions		
Endowed Colleges	228,646	
Contract Colleges	232,872	
Medical College	197,864	
By Disciplines		
Medical Sciences	\$254,094	
Biology	97,519	
Multidisciplinary	57,333	
Agriculture	50,602	
Physics	44,183	
Astronomy	28,457	
Computer Sciences	23,304	
Chemistry	18,380	
Electrical Engineering	14,208	
Sociology	10,905	
Business & Management	9,925	
Institutional & College Research Support	9,159	
Mechanical Engineering	7,518	

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Civil Engineering	6,923
Metalurgical & Materials Engineering	6,161
Economics	6,029
Earth Sciences	5,823
Chemical Engineering	5,122
Mathematical Sciences	4,995
Psychology	4,278
Bioengineering-Biomedical Engineering	1,252
Communication, Journalism, & Library Sciences	891
Humanities	595
Political Sciences	263
Law	245
Oceanography	214
Visual & Performing Arts	3

Source: Cornell University, Office of Sponsored Programs
Discrepancies may occur due to rounding. Disciplines are defined by the National Science Foundation.

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03. Ranking Cornell Nationally

By Research Expenditures, NSF FY 2007

	Dollars in Thousands
The Johns Hopkins University *	\$1,554,103
University of California, San Francisco	842,840
University of Wisconsin, Madison	840,672
University of California, Los Angeles	823,083
University of Michigan	808,731
University of California, San Diego	798,896
Duke University	781,843
University of Washington	756,787
Ohio State University	720,206
Stanford University	687,511
Pennsylvania State University	652,144
University of Pennsylvania	648,247
Cornell University	641,936

Source: National Science Foundation; these data do not include nonscience and engineering research expenditures and R&D expenditures at university-associated federally funded research and development centers.

* Johns Hopkins University includes the Applied Physics

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Laboratory, with \$777,813 in total R&D expenditures.

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04. Ranking Cornell in New York

By Research Expenditures, NSF FY 2007

	Dollars in Thousands
Cornell University	\$641,936
Columbia University	545,995
University of Rochester	373,247
State University of New York, Buffalo	314,837
State University of New York, Albany	309,221
New York University	297,867
Mount Sinai School of Medicine	269,451
State University of New York, Stony Brook	268,282
Rockefeller University	233,917

Source: National Science Foundation; these data do not include nonscience and engineering research expenditures and R&D expenditures at university-associated federally funded research and development centers.

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01. Crossing Disciplines

Selected Research Centers at Cornell

Nanoscale Science and Technology

- > Center for Nanoscale Systems
- > Cornell Center for Materials Research
- > Cornell NanoScale Science and Technology Facility *
- > Nanobiotechnology Center

Medical Research

- > Abby and Howard P. Milstein Chemistry Biology Center
- > Ansary Center for Stem Cell Therapeutics
- > Arthur and Rochelle Belfer Institute of Hematology and Medical Oncology
- > Center for Aging Research and Clinical Care
- > Center for Complementary and Integrative Medicine
- > Center for the Study of Hepatitis C
- > Center for Vascular Biology
- > Cornell HIV Clinical Trials Unit
- > Dyson Vision Research Institute
- > Hamad bin Khalifa Institute of Genetic Medicine
- > Howard Gilman Institute for Valvular Heart Diseases
- > Institute for Computational Biomedicine
- > Institute for Reproductive Medicine
- > Lehman Brothers Lung Cancer Research Center
- > Sackler Institute for Developmental Psychobiology

Life Sciences

- > Agricultural Experiment Stations (Geneva, Ithaca)
- > Baker Institute for Animal Health
- > Cancer Protein Expression Laboratory
- > Center for Life Science Enterprise
- > Center for Reproductive Genomics
- > Cornell International Institute for Food, Agriculture, and Development
- > Institute for Biotechnology and Life Science Technologies
- > Institute for Genomic Diversity
- > Institute of Food Science
- > National Biomedical Center for Advanced ESR Technology

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- › Sprecher Institute for Comparative Cancer Research
- › Weill Institute for Cell and Molecular Biology

Physical Sciences and Engineering

- › Center for Advanced Computing
- › Center for Applied Mathematics
- › Center for Radiophysics and Space Research
- › Cornell Center for a Sustainable Future
- › Cornell High Energy Synchrotron Source *
- › Cornell Laboratory for Accelerator-Based Sciences and Education
- › Laboratory for Elementary-Particle Physics *
- › National Astronomy and Ionosphere Center *

Social Sciences and Humanities

- › Africana Studies and Research Center
- › Bronfenbrenner Life Course Center
- › Center for Analytic Economics
- › Center for the Study of Economy and Society
- › Center for the Study of Inequality
- › Cornell Institute for Research on Children
- › Cornell Institute for Social and Economic Research
- › Cornell Language Acquisition Lab
- › Employment and Disability Institute
- › Institute for the Social Sciences
- › Institute for Women and Work
- › Mario Einaudi Center for International Studies
- › Program on Ethics and Public Life
- › Society for the Humanities

Business and Management

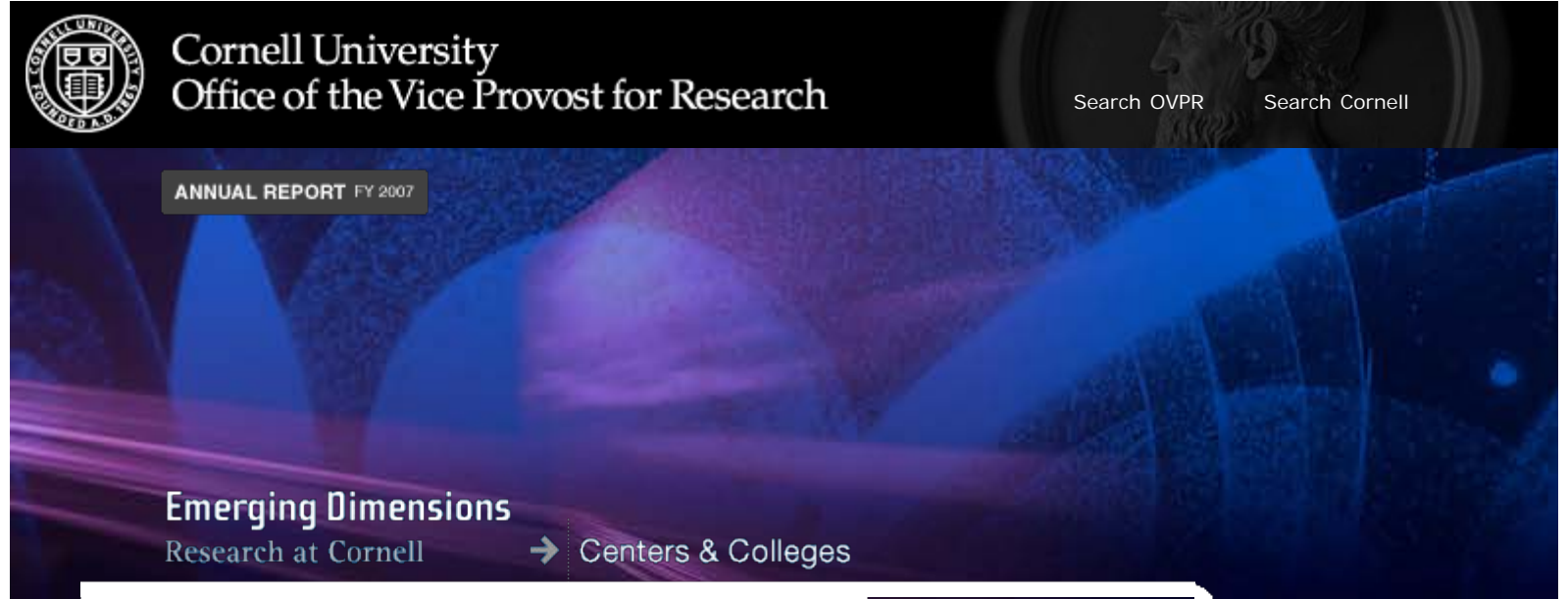
- › Center for Advanced Human Resource Studies
- › Center for Hospitality Research
- › Parker Center for Investment Research
- › Smithers Institute for Alcohol-Related Workplace Studies

* National Center

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02. Cornell's Colleges and Divisions

- › College of Agriculture and Life Sciences †
- › College of Architecture, Art, and Planning
- › College of Arts and Sciences
- › College of Engineering
- › College of Human Ecology †
- › College of Veterinary Medicine †
- › Division of Nutritional Sciences
- › Faculty of Computing and Information Science
- › Graduate School
- › Johnson Graduate School of Management
- › Law School
- › School of Continuing Education and Summer Sessions
- › School of Hotel Administration
- › School of Industrial and Labor Relations †
- › Weill Cornell Graduate School of Medical Sciences (New York City)
- › Weill Cornell Medical College (New York City)

† Contract College


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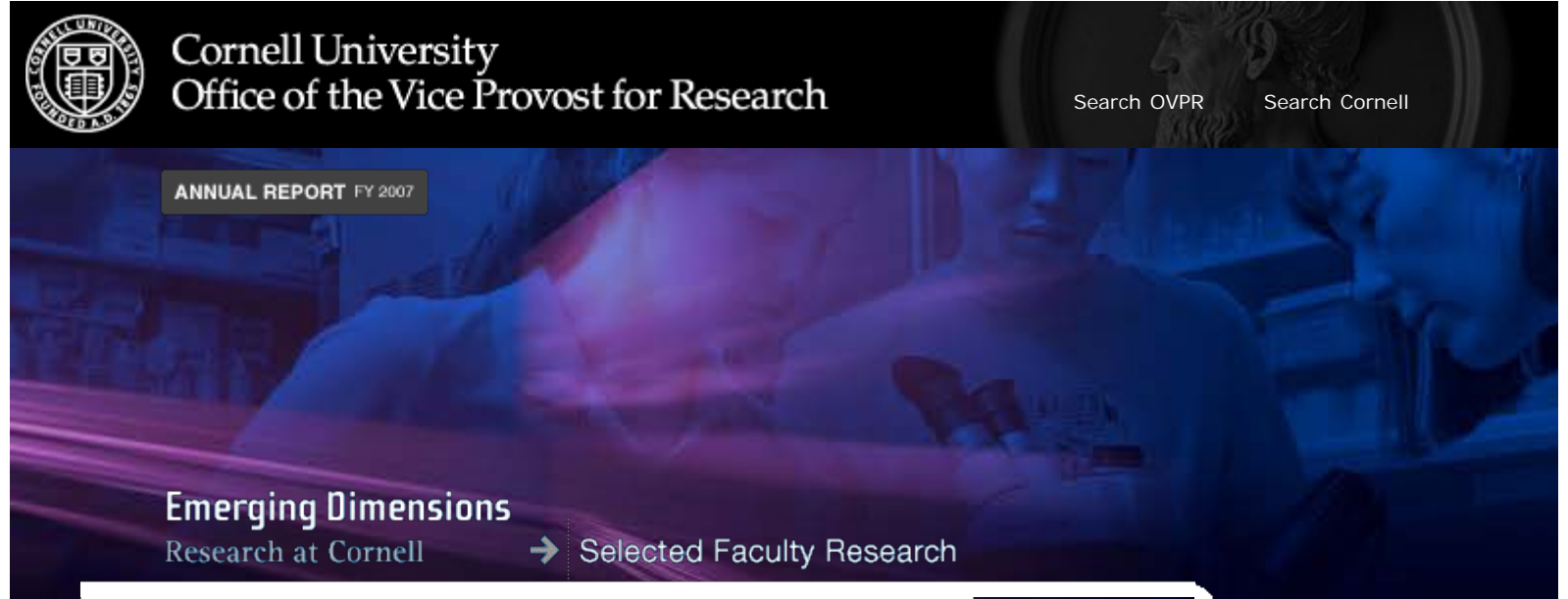
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Mark P. Bridgen, Horticulture

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Brian R. Crane, Chemistry and Chemical Biology

04. [A Superconductivity Jam-Up](#)

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05. [From the Womb to Later Life](#)

Rodney R. Dietert, Microbiology and Immunology

06. [A Green Lamp](#)

Jack Elliott, Design and Environmental Analysis

07. [Stressed-Out Teens](#)

Gary W. Evans, Human Development

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Joseph R. Fetcho, Neurobiology and Behavior

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Claudia Fischbach-Teschl, Biomedical Engineering

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Gunnar Gouras, Neurology and Neuroscience, Weill Cornell Medical College

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C. Drew Harvell, Ecology and Evolutionary Biology

12. [Chocolate as Wine or Other Treat?](#)

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John S. Henderson, Anthropology

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Michael I. Kotlikoff, Biomedical Sciences

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Sarosh Kuruvilla, Industrial and Labor Relations

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Jocelyn Rose, Plant Biology

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Nicholas D. Schiff, Neurology and Neuroscience, and Joseph J. Fins, Medicine/Public Health, Weill Cornell Medical College

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Adam C. Siepel, Biological Statistics and Computational Biology

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Kenneth W. Simpson, Clinical Sciences, Ellen J. Scherl, Medicine, Weill Cornell Medical College

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Wesley D. Sine, Johnson Graduate School of Management

33. [Radical Light!](#)

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Abraham D. Stroock, Chemical and Biomolecular Engineering, Lawrence J. Bonassar, Biomedical Engineering

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Alex M. Susskind, Hotel Administration

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Marjolein C. H. van der Meulen, Mechanical and Aerospace Engineering, Mathias P. G. Bostrom, Orthopaedic Surgery, WCMC

37. [A Question about Replication Answered](#)

Michelle D. Wang, Physics

38. [Healthy Food, Unhealthy Choices](#)

Brian C. Wansink, Applied Economics and Management

39. [Efficient Fuel and Solar Cells](#)

Ulrich B. Wiesner, Materials Science and Engineering, Francis J. DiSalvo, Chemistry and Chemical Biology

40. [Lessons from the Fruit Fly](#)

Mariana F. Wolfner, Molecular Biology and Genetics

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01. [N'Dri T. Assié-Lumumba, ed., Africana Studies and Research Center](#)

Women and Higher Education in Africa: Reconceptualizing Gender-Based Human Capabilities and Upgrading Human Rights to Knowledge (CEPARRED, 2007)

02. [Kaushik Basu, ed., Economics](#)

The Oxford Companion to Economics in India (Oxford University Press, 2007)

03. [Sherene B. Baugher, ed., Landscape Architecture, \(with John H. Jameson\)](#)

Past Meets Present: Archaeologists Partnering with Museum Curators, Teachers, and Community Groups (Springer, 2007)

04. [Susan M. Christopherson, City and Regional Planning, \(with Jennifer Clark\)](#)

Remaking Regional Economies: Power, Labor, and Firm Strategies in the Knowledge Economy (Routledge, 2007)

05. [Robert H. Frank, Johnson Graduate School of Management](#)

The Economic Naturalist: In Search of Explanations for Everyday Enigmas (Basic Books, 2007)

06. [Ronald B. Furry, Biological and Environmental Engineering \(emeritus\)](#)

A Pioneering Department: Evolution from Rural Engineering to Biological and Environmental Engineering at Cornell University, 1907–2007 (Internet-First University Press, 2007)

07. [Tarleton L. Gillespie, Communication](#)

Wired Shut: Copyright and the Shape of Digital Culture (MIT Press, 2007)

08. [Valerie P. Hans, Law, \(with Neil Vidmar\)](#)

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American Juries: The Verdict (Prometheus Books, 2007)

09. [Terence H. Irwin, Philosophy](#)

The Development of Ethics: A Historical and Critical Study (Oxford University Press, 2007)

10. [Jonathan D. Kirshner, Government](#)

Appeasing Bankers: Financial Caution on the Road to War (Princeton University Press, 2007)

11. [Suzanne B. Mettler, ed., Government, \(with Joe Soss and Jacob S. Hacker\)](#)

Remaking America: Democracy and Public Policy in an Age of Inequality (Russell Sage Foundation, 2007)

12. [Robert R. Morgan, English](#)

Boone: A Biography (Algonquin, 2007)

13. [Muna B. Ndulo, ed., Law](#)

Security, Reconstruction, and Reconciliation: When the Wars End (University College London Press, 2007)

14. [Derk Pereboom, Philosophy, \(with John M. Fischer, Robert Kane, and Manuel Vargas\)](#)

Four Views on Free Will (Blackwell, 2007)

15. [Sidney I. Resnick, Operations Research and Information Engineering](#)

Heavy-Tail Phenomena: Probabilistic and Statistical Modeling (Springer, 2007)

16. [Diane S. Rubenstein, Government](#)

This Is Not a President: Sense, Nonsense, and the American Political Imaginary (New York University Press, 2008)

17. [Aaron Sachs, History](#)

The Humboldt Current: Nineteenth-Century Exploration and the Roots of American Environmentalism (Viking, 2006)

18. [Paul W. Sherman, ed., Neurobiology and Behavior, \(with Jerry O. Wolff\)](#)

Rodent Societies: An Ecological and Evolutionary Perspective (University of Chicago Press, 2007)

19. [Sydney S. Shoemaker, Philosophy \(emeritus\)](#)

Physical Realization (Oxford University Press, 2007)

20. [Meredith F. Small, Anthropology](#)

The Culture of Our Discontent: Beyond the Medical Model of Mental Illness (Joseph Henry Press, 2006)

21. [Anna Marie Smith, Government](#)

Welfare Reform and Sexual Regulation (Cambridge University Press, 2007)

22. [Bernard F. Stanton, Applied Economics and Management \(emeritus\)](#)

George F. Warren: Farm Economist (Cornell University, 2007)

23. [Sidney G. Tarrow, Government, \(with Charles Tilly\)](#)

Contentious Politics (Paradigm, 2006)

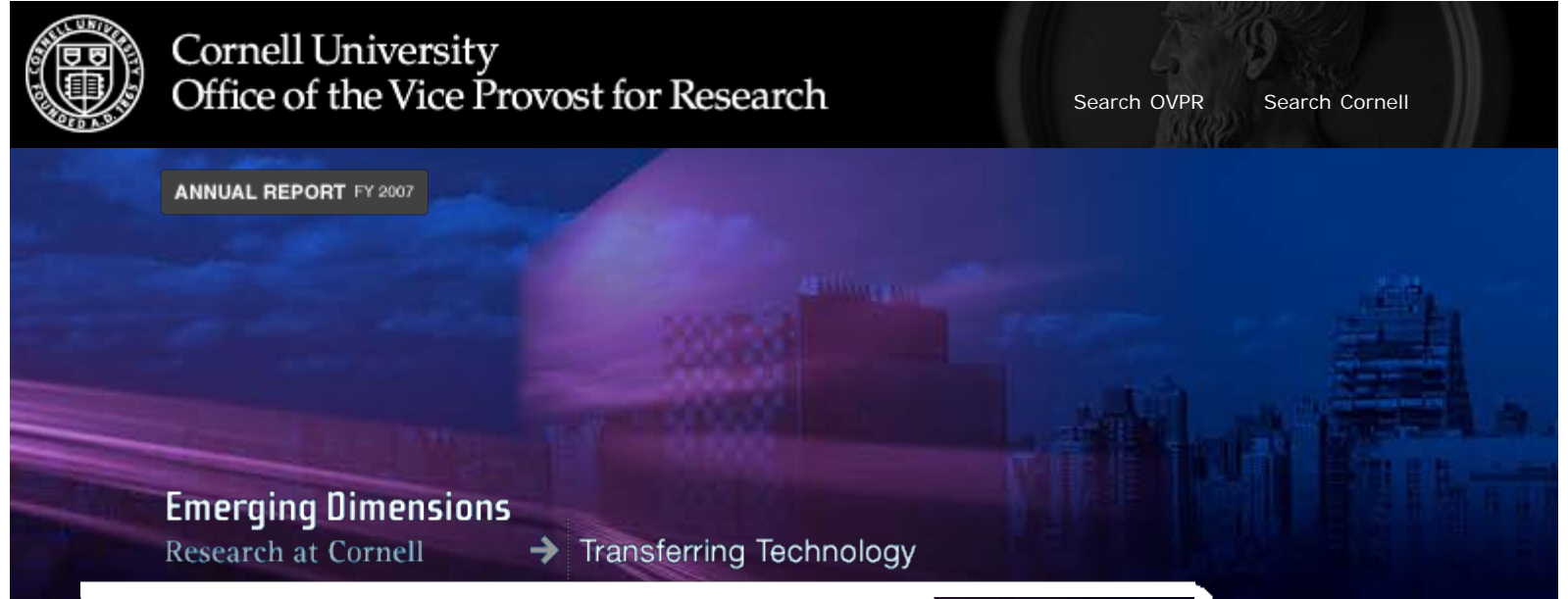
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Their Dogs Came with Them (Atria, 2007)

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