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# **Cottrell Scholar Awardees**

1994

**Warren F. Beck**, Department of Chemistry, Vanderbilt University: Ultrafast charge-transfer dynamics in blue-copper proteins - \$50,000

**D. Scott Bohle**, Department of Chemistry, University of Wyoming: Understanding the cytotoxicity of peroxyxynitrite - \$50,000

**Robert M. Bowman**, University of Kansas: Femtosecond investigations of the optical properties of nanometer-sized semiconductor particles - \$50,000

**David M. Collard**, Department of Chemistry and Biochemistry, Georgia Institute of Technology: Nanofabrication and integration of electronically conductive organic polymers - \$50,000

**Peter K. Dorhout**, Department of Chemistry, Colorado State University: Linking structure and property-new metastable materials from zintl ion salts - \$50,000

**Herbert A. Fertig**, Department of Physics, University of Kentucky: Molecular dynamics simulations of the two-dimensional Wigner crystal - \$50,000

**L. Michael Hayden**, Department of Physics, University of Maryland, Baltimore County: The effect of the ratio of monomer/chromophore size on the stability of nonlinear optical polymers - \$50,000

**Heinrich M. Jaeger**, The James Franck Institute, University of Chicago: Vibrated granular materials: An investigation of new dynamical behavior far from equilibrium - \$50,000

**Nancy Makri**, Department of Chemistry, University of Illinois at Urbana-Champaign: Path integral methods for polyatomic quantum dynamics - \$50,000

**Ann E. McDermott**, Department of Chemistry, Columbia University: Conformation, conformational dynamics and hydrogen bonding in enzyme catalysis - \$50,000

**Sanjib Ratan Mishra**, Department of Physics and Astronomy, Harvard University: A next generation neutrino experiment: Beyond the standard model - \$50,000

**Lyman Alexander Page**, Department of Astronomy, Princeton University: Characterizing the anisotropy in the cosmic microwave background radiation from 0.5 degrees to 180 d - \$50,000

**Lynmarie Agnes Posey**, Department of Chemistry, Vanderbilt University: Microsolution and condensed phase perspectives on charge transfer in transition metal ion complexes - \$50,000

**Roger W. Romani**, Department of Astronomy, Stanford University: Viewing the evolution of large scale structure - \$50,000

**Bradley D. Smith**, Department of Chemistry and Biochemistry, University of Notre Dame: Artificial metal cation/saccharide cotransporters - \$50,000

**Lynmarie K. Thompson**, Department of Chemistry, University of Massachusetts, Amherst: Site-directed solid-state NMR studies of molecular mechanisms of transmembrane signaling - \$50,000

**Rene A. Walterbos**, Department of Astronomy, New Mexico State University: Innovative teaching through research on the interstellar medium in galaxies - \$50,000

Total 1994 (17 items, \$850,000)

1995

**Eberhard Bodenschatz**, Fluid Dynamics, Pattern Formation & Nanobiocomplexity, Cornell University: Direct optical vorticity measurements of coherent vortical structures in fully developed turbulence - \$50,000

**Thomas J. Curtiss**, Department of Chemistry, University of Utah: Adsorption microcalorimetry and sticking probabilities of radicals on metal and semiconductor single crystal surfaces - \$50,000

**Andrew David Ellington**, Department of Chemistry, Indiana University at Bloomington: In vitro evolution of self-replicating nucleic acids - \$50,000

**Thomas J. Gramila**, Department of Physics, Pennsylvania State University, University Park: Electron drag measurements: A new window on electron physics - \$50,000

**Kim F. Griest**, Department of Physics, University of California, San Diego: Search for dark matter using gravitational microlensing - \$50,000

**Martin Gruebele**, Department of Chemistry, University of Illinois at Urbana-Champaign: Early stages of protein folding via laser-induced temperature jumps - \$50,000

**Randy Heflin**, Department of Physics, Virginia Polytechnic Institute and State University: Excited state enhancement of the nonlinear optical response of electroluminescent polymers - \$50,000

**Selman Hershfield**, Department of Physics, University of Florida: Nonperturbative techniques for calculating nonequilibrium transport in nanostructures - \$50,000

**William S. Jenks**, Department of Chemistry, Iowa State University: Investigations of the photochemistry and photophysics of sulfoxides - \$50,000

**James W. Leahy**, University of California, Berkeley: Controlled formation of carbon-carbon bonds - \$50,000

**Bruce Hisashi Morimoto**, Purdue University: Signal integration mediated by a novel dopamine receptor - \$50,000

**David Alan Shultz**, Department of Chemistry, North Carolina State University: New high-spin molecules based on porphyrins - \$50,000

**Xi-Cheng Zhang**, Department of Physics, Rensselaer Polytechnic Institute: Novel electro-optic organic sensor for transient electric fields - \$50,000

Total 1995 (13 items, \$650,000)

1996

**David Z. Besson**, Department of Physics, University of Kansas: Measurement of coherent radio wave emission induced by ultra-high energy neutrino interactions - \$50,000

**John M. Blondin**, Department of Astronomy, North Carolina State University: Dynamics of rapid mass transfer in high-mass x-ray binaries - \$50,000

**Gregory Chung-Wei Fu**, Department of Chemistry, Massachusetts Institute of Technology: A versatile new chiral catalyst for stereoselective synthesis - \$50,000

**George Nicholas Gibson**, Department of Physics, University of Connecticut: Ultrafast time-resolved measurements of the ionization and dissociation of molecules by strong laser fields - \$50,000

**Mark Lee**, University of Virginia: New physics from an old material: Exploring the correlated motion of interacting electrons in silicon - \$50,000

**Dale F. Mierke**, Department of Chemistry & Molecular Pharmacology, Clark University: Design, synthesis and structural characterization of a novel peptidomimetic: 1, 4-disubstituted diazepinone - \$50,000

**Karl T. Mueller**, Department of Chemistry, Pennsylvania State University, University Park: Efficient NMR methods for determining multiple internuclear distances in complex solids - \$50,000

**Catherine J. Murphy**, Department of Chemistry & Biochemistry, University of South Carolina, Columbia: Probing sequence-directed DNA bending in dilute solution - \$50,000

**Philip A. Pinto**, Department of Astronomy, University of Arizona: Lightcurves and spectra of type Ia supernovae - \$50,000

**David H. Reitze**, Department of Physics, University of Florida: Coherent control of charge carrier motion in semiconductor heterostructures - \$50,000

**Vincent M. Rotello**, Department of Chemistry, University of Massachusetts, Amherst: Synthetic models of flavoenzyme activity: Modulation of flavin redox behavior by hydrogen bonding and  $\pi$ -stacking - \$50,000

**Mats A. Selen**, Department of Physics, University of Illinois at Urbana-Champaign: Precision tests of the standard model and a new trigger system for the CLEO experiment - \$50,000

**Grover A. Swartzlander**, Optical Sciences Center, Worcester Polytechnic Institute: Experimental investigation of optical solitons used as "optical tweezers" - \$50,000

**Brian Max Tissue**, Department of Chemistry, Virginia Polytechnic Institute and State University: Characterization of interfaces in nanocrystalline materials using laser spectroscopy of lanthanide probe ions - \$50,000

**Mark Thomas Tuominen**, Department of Physics and Astronomy, University of Massachusetts, Amherst: Measurements of single-electron nanostructures in a quantum cavity: Manipulating the quantum interaction of matter and light - \$50,000

**Richard James Van Kooten**, Department of Physics, Indiana University at Bloomington: Searches for evidence of supersymmetry in high-energy electron-positron annihilations using the OPAL detector at LEP2 - \$50,000

**Ziqiang Wang**, Department of Physics, Boston College: Theoretical studies of the effects of localization, Coulomb interaction, and electronic transport in high magnetic field - \$50,000

**Xiaoyang Zhu**, Department of Chemistry, Southern Illinois University at Carbondale: Surface reaction dynamics in chemical vapor deposition - \$50,000

Total 1996 (18 items, \$900,000)

1997

**Cynthia A. Cattell**, School of Astronomy, University of Minnesota, Twin Cities: A study of the effects of perturbations on energization and scattering of charged particles in a field-reversed magnetic field geometry - \$50,000

**Corbin E. Covault**, Department of Physics, University of Chicago: Gamma-Ray astronomy from 20 to 300 GeV: The last unopened window - \$50,000

**Sylvia Daunert**, Department of Chemistry, University of Kentucky: Ligand-induced conformational changes of binding proteins: Probing signaling events in single cells - \$50,000

**Adam F. Falk**, Krieger School of Arts & Sciences, Johns Hopkins University: Theory and phenomenology of bottom and charmed hadrons: production, decay, and spectroscopy - \$50,000

**John T. Fourkas**, Department of Chemistry and Biochemistry, Boston College: Ultrafast spectroscopy of liquids at negative pressure: exploring the role of attractive interactions in dynamics and structure - \$50,000

**Douglas L. Gin**, Chemistry and Biochemistry, University of California, Berkeley: Fluorescent chemosensors for biologically active molecules based on molecular imprinting - \$50,000

**Clare P. Grey**, Department of Chemistry, SUNY at Stony Brook: An NMR and diffraction study of the adsorption of halocarbons on molecular sieves: Removal of halocarbon impurities from industrial processes - \$50,000

**Melissa A. Hines**, Department of Chemistry and Chemical Biology, Cornell University: Understanding the evolution of surface morphology during anisotropic etching - \$50,000

**Daniel P. Lathrop**, Department of Physics, University of Maryland, College Park: An experimental dynamo: Self-generating magnetic fields from a liquid metal - \$50,000

**Yi Lu**, Department of Chemistry, University of Illinois at Urbana-Champaign: Spectroscopic study of metal-binding sites in ribozymes: A new class of metalloenzymes - \$50,000

**James D. Martin**, Department of Chemistry, North Carolina State University: Metal-halide analogs of zeolites: A next generation of microporous materials - \$50,000

**Dominic Vincent McGrath**, Department of Chemistry, University of Connecticut: Photoactive chiral dendrimers for light-controlled transport - \$50,000

**Mark B. Moldwin**, Department of Physics and Space Sciences, Florida Institute of Technology: Observing lightning and sprites from space: Integrating research into the classroom with the ROGUE program - \$50,000

**Heather Morrison**, Department of Astronomy, Case Western Reserve University: Galactic History: Population studies in 10 nearby disk galaxies - \$50,000

**Elisabeth Joyce Nicol**, Department of Physics, University of Guelph: Towards understanding superconductivity in the alkali-doped fullerenes and other novel superconductors - \$50,000

**M. Daniel Raftery**, Department of Chemistry, Purdue University: Surface selective NQR spectroscopy - \$50,000

**Susannah L. Scott**, Departments of Chemical Engineering and Chemistry, University of Ottawa: Molecular chemistry on surfaces: A strategy for the preparation of surface-stabilized reactive organometallic fragments for C-H activation - \$50,000

**Kevan M. Shokat**, Department of Cellular and Molecular Pharmacology, Princeton University: Engineered chemical tags for tracing cellular signal transduction cascades - \$50,000

**David Wayne Snoke**, Department of Physics & Astronomy, University of Pittsburgh: Spontaneous coherence of excitons: A novel light source - \$50,000

**Michael A. Strauss**, Department of Astrophysical Sciences, Princeton University: Quantitative cosmology from large-scale bulk flows of galaxies - \$50,000

**Grzegorz Szamel**, Department of Chemistry, Colorado State University: Statistical mechanical theory of dynamics of supercooled liquids - \$50,000

**Keith Allen Woerpel**, Department of Chemistry, University of California, Irvine: Tandem aldol-Tishchenko reactions: Highly stereoselective methods for organic synthesis - \$50,000

Total 1997 (22 items, \$1,100,000)

1998

**Lars Bildsten**, Kavli Institute of Theoretical Physics, University of California, Berkeley: Variable stars on the main sequence: Pulsation and rotation - \$50,000

**Paul A. Deck**, Department of Chemistry, Virginia Polytechnic Institute and State University: Preservation of single-site behavior in "face-up" silica-supported metallocene olefin polymerization catalysts - \$50,000

**Victoria J. DeRose**, Department of Chemistry, Texas A&M University: Spectroscopic probes of metal sites and dynamics in RNA molecules - \$50,000

**Jon Holtzman**, Department of Astronomy, New Mexico State University: Stellar populations in local group galaxies and hands-on research in the undergraduate classroom - \$50,000

**Jeffrey L. Krause**, Department of Chemistry, University of Florida: Quantum control in semiconductor devices - \$50,000

**Steven R. Majewski**, Department of Astronomy, University of Virginia: Galactic cannibalism and the formation of the Milky Way - \$50,000

**Peter R. McCullough**, Department of Astronomy, University of Illinois at Urbana-Champaign: High sensitivity astronomical imaging with robotic cameras - \$50,000

**Philip James Reid**, Department of Chemistry, University of Washington: Elucidating the origin of solvent effects in condensed-phase environmental chemistry using resonance Raman spectroscopy - \$50,000

**Vivek Sharma**, Department of Physics, University of California, San Diego: A search for CP symmetry violation in high energy matter-antimatter interactions - \$50,000

**Qimiao Si**, Department of Physics, Rice University: Theoretical studies of non-Fermi liquid behavior in mixed valence systems - \$50,000

**Sylvain Veilleux**, Department of Astronomy, University of Maryland, College Park: Galaxy evolution in the local universe: The impact of large-scale galactic winds and fountains on nearby galaxies - \$50,000

**Jeffrey A. Willick**, Stanford University: Constraints on the cosmological density parameter Omega from a measurement of the abundance of rich clusters at z=0.6 - \$50,000

Total 1998 (12 items, \$600,000)

1999

**Dimitri Basov**, Department of Physics, University of California, San Diego: An infrared probe of interlayer electrostatics in unconventional superconductors - \$50,000

**Stacey Shane Bent**, Department of Chemical Engineering, New York University: Chemical reactivity of amorphous thin film semiconductors - \$50,000

**Karen S. Bjorkman**, Department of Physics & Astronomy, University of Toledo: Investigating the nature of circumstellar envelopes throughout the life cycles of stars - \$50,000

**Stephen E. Bradforth**, Department of Chemistry, University of Southern California: Ultrafast electron detachment in the condensed phase - \$50,000

**Deborah G. Evans**, Department of Chemistry, University of New Mexico: Theoretical studies of electron and exciton transport in dendrimeric macromolecules - \$50,000

**David Y. Gin**, Department of Molecular Pharmacology & Chemistry, University of Illinois at Urbana-Champaign: New methods for glycosylation using activated sulfoxide reagents - \$50,000

**Michel J.P. Gingras**, Department of Physics, University of Waterloo: Spatially modulated magnetic moment structures in strongly correlated electron and highly-frustrated quantum antiferromagnetic systems - \$50,000

**Ivan Gitsov**, Department of Chemistry, SUNY College of Environmental Science & Forestry: Self assembling fullerene materials with star-branched and dendritic architecture - \$50,000

**Rigoberto Hernandez**, Department of Chemistry and Biochemistry, Georgia Institute of Technology: Stochastic dynamics in irreversible non-equilibrium environments and computer-enhanced communication in the physical chemistry curriculum - \$50,000

**James L. Leighton**, Department of Chemistry, Columbia University: Olefin carbonylation in organic synthesis - an efficient asymmetric synthesis of mycotin A - \$50,000

**Chung-Pei Ma**, Department of Astronomy, University of Pennsylvania: Weighing superclusters with gravitational lensing - \$50,000

**Matt C. McIntosh**, Department of Chemistry and Biochemistry, University of Arkansas, Fayetteville: Total synthesis of eunicellin diterpenes: A new model for the integration of research and teaching missions at research universities - \$50,000

**Scott J. Miller**, Department of Chemistry, Boston College: Asymmetric catalysis with minimal peptides - \$50,000

**Michael F. Schatz**, Department of Physics, Georgia Institute of Technology: Research and teaching in large systems: Control of spatiotemporal chaos in convective flow and improving instruction in introductory courses - \$50,000

**Benjamin J. Schwartz**, Department of Chemistry, University of California, Los Angeles: Combining femtosecond experiments with quantum computer simulations to build a molecular understanding of charge transfer reactions - \$50,000

**Gerald T. Seidler**, Department of Physics, University of Washington: Critical and supercritical complex fluids - \$50,000

**Weihong Tan**, Department of Chemistry, University of Florida: Probing single molecules - \$50,000

**Sheryl A. Tucker**, Department of Chemistry, University of Missouri-Columbia: Starburst dendritic polymers for high performance liquid chromatography: separation of complex chiral and nonchiral heterogeneous mixtures - \$50,000

**Ann H. West**, Department of Chemistry and Biochemistry, University of Oklahoma: X-ray crystallographic analysis of a phosphorylation-regulated molecular switch protein - \$50,000

Total 1999 (19 items, \$950,000)

2000

**Jillian M. Buriak**, Department of Chemistry, Purdue University: Nanolithographic formation of stable, highly functional monolayers on semiconducting silicon and germanium surfaces - \$75,000

**David P. DeMille**, Department of Physics, Yale University: Search for an electron electric dipole moment in the a(1) state of PbO: Reshaping the undergraduate laboratory experience at Yale - \$75,000

**Michael B. Dennin**, Department of Physics & Astronomy, University of California, Irvine: Toward a better understanding of spatiotemporal chaos: Spatial and temporal modulation of control parameters in electroconvection - \$75,000

**Brett D. Ellman**, Department of Physics, Kent State University: Incisive ultrasonic probes of gap functions in unconventional superconductors - \$75,000

**Hicham Fenniri**, Department of Chemistry, Purdue University: Functional nanotubular architectures - \$75,000

**Michael R. Geller**, Department of Physics & Astronomy, University of Georgia: Tunneling into strongly correlated electron systems - \$75,000

**Stephen Hill**, Department of Physics, Montana State University, Bozeman: Electrodynamics of the spin triplet superconductor Sr<sub>2</sub>RuO<sub>4</sub> - \$75,000

**Arthur Kosowsky**, Department of Physics and Astronomy, Rutgers University: Microwave background constraints on the universe - \$75,000

**Wenbin Lin**, Department of Chemistry, Brandeis University: Polar and chiral solids by design: Second-order nonlinear optical and chiral zeolitic materials - \$75,000

**Jeffery G. Saven**, Department of Chemistry, University of Pennsylvania: Generalized foldability criteria for theoretical studies of protein folding and structure prediction - \$75,000

**Paul R. Selvin**, Loomis Laboratory of Physics, University of Illinois at Urbana-Champaign: Turning on and off voltage-gated ion channels: Is the on-off switch a plunger, rotating knob or corkscrew? - \$75,000

**Donna Theo Strickland**, Department of Physics, University of Waterloo: Chirped optical dissociation of molecules by climbing vibrational or rotational energy levels - \$75,000

**Wilfred A. van der Donk**, Department of Chemistry, University of Illinois at Urbana-Champaign: Novel convergent approach for the synthesis of glycoconjugates - \$75,000

**David A. Vanden Bout**, Department of Chemistry & Biochemistry, University of Texas at Austin: Using single molecule spectroscopy to obtain a microscopic picture of small molecule motion in amorphous materials - \$75,000

**Stephen P. Watton**, Department of Chemistry, Virginia Commonwealth University: Biomimetic supported catalysts - \$75,000

**Shiwei Zhang**, Department of Physics, College of William and Mary: Computational studies of electron correlations in materials - \$75,000

Total 2000 (16 items, \$1,200,000)

## 2001

**Brian Chaboyer**, Department of Physics & Astronomy, Dartmouth College: Stellar ages and cosmology - \$75,000

**Shaowei Chen**, Department of Chemistry, Southern Illinois University at Carbondale: Nanoscale electron transfer: An electrochemical perspective - \$75,000

**Ian R. Gould**, Department of Chemistry, Arizona State University: Oxidative processes in duplex DNA - \$75,000

**Ulrich Heintz**, Department of Physics, Boston University: Search for the origin of mass and a b-quark trigger for the D0 experiment - \$75,000

**Lyle D. Isaacs**, Department of Chemistry and Biochemistry, University of Maryland, College Park: Hydrophobic self-assembly: Integrated teaching and research initiatives - \$75,000

**Paul F. Lyman**, Department of Physics, University of Wisconsin, Milwaukee: Experimental tests of a direct method for surface x-ray crystallography - \$75,000

**David W. C. MacMillan**, Department of Chemistry, California Institute of Technology: Enantioselective organocatalysis: A new and broadly useful strategy for asymmetric synthesis using organic catalysts - \$75,000

**Kevin S. McFarland**, Department of Physics & Astronomy, University of Rochester: Precision studies of the top quark and muon telescopes for high school classrooms - \$75,000

**J. Christopher Mihos**, Department of Astronomy & Physics, Case Western Reserve University: Using intracluster light to probe the evolution of galaxy clusters - \$75,000

**Normand Mousseau**, Department of Physics, Ohio University: Ab-initio activation-relaxation technique study of self-diffusion mechanisms in GaAs and GaN, and an outreach scientific program for Southeastern Ohio - \$75,000

**David A. Rabson**, Department of Physics, University of South Florida: Geometric effects and tunneling in layered magnetic structures - \$75,000

**Dalibor Sames**, Department of Chemistry, Columbia University: C-H bond activation in complex chemical assembly - \$75,000

**Carlos L. Simmerling**, Department of Chemistry, SUNY at Stony Brook: Using large clusters of personal computers to improve simulations in the condensed phase and increase enthusiasm in the physical chemistry curriculum - \$75,000

**Dennis W. Smith**, Department of Chemistry, Clemson University: Synthesis and fabrication of novel fluoropolymers for photonic applications - \$75,000

**David Allan Spivak**, Department of Chemistry, Louisiana State University: Controlling the molecular architecture of functionalized organic materials using novel fluoro-organic mesophases - \$75,000

**Jeffery L. Yarger**, Department of Chemistry & Biochemistry, University of Wyoming: Understanding structural transitions within tetrahedral network glasses and liquids - \$75,000

**Andrei K. Yudin**, Department of Chemistry, University of Toronto: New generation of versatile asymmetric catalysts derived from polyfluorobinaphthol ligands - \$75,000

Total 2001 (17 items, \$1,275,000)

## 2002

**David M. Adams**, Columbia University: Single molecule spectroscopy of interfacial electron transfer - \$75,000

**Antonella Badia**, Department of Chemistry, University of Montreal: Atomic force microscopy studies of the phase behavior and lipid/protein interactions in supported phospholipid membranes - \$75,000

**Patrick R. Brady**, Department of Physics, University of Wisconsin, Milwaukee: Towards the detection of gravitational waves from black hole binaries - \$75,000

**Andrew L. Feig**, Department of Chemistry, Indiana University at Bloomington: Thermodynamics of RNA cold denaturation and its relationship to the cold shock response - \$75,000

**Eric L. Hegg**, Department of Chemistry, University of Utah: Heme A synthase: Elucidating the mechanism of this novel heme-containing monooxygenase and identifying its physiological partners - \$75,000

**Neil L. Kelleher**, Department of Chemistry, University of Illinois at Urbana-Champaign: Solution phase hydrogen/deuterium exchange of proteins with a novel mass spectrometric readout - \$75,000

**Jane Kondev**, Department of Physics, Brandeis University: Theoretical studies of dense polymer systems - \$75,000

**Michael J. Krische**, Department of Chemistry and Biochemistry, University of Texas at Austin: Enantioselective catalysis via chiral (beta-diketonato)metal templates - \$75,000

**Edmund R. Nowak**, Department of Physics and Astronomy, University of Delaware: Experimental studies of dense granular media: Towards a thermodynamic description of powders - \$75,000

**Hanadi F. Sleiman**, Department of Chemistry, McGill University: Transition metal-linked branched oligonucleotides: Synthesis and applications - \$75,000

**Max Tegmark**, Department of Physics, University of Pennsylvania: Beyond cosmological parameters - \$75,000

**John J. Tesmer**, Department of Pharmacology, University of Texas at Austin: The structure and function of RGS homology domains: X-ray crystallographic studies powered by undergraduate research - \$75,000

**Sankaran Thayumanavan**, Department of Chemistry, Tulane University: Globular macromolecules with functionalized interiors - \$75,000

**Barrett O. Wells**, Department of Physics, University of Connecticut: Interactive classroom for physics majors and interactive electrons in functional oxide films - \$75,000

Total 2002 (14 items, \$1,050,000)

2003

**T. Daniel Crawford**, Department of Chemistry, Virginia Polytechnic Institute and State University: Quantum mechanical studies of chirality: Local correlation methods for optical rotation in large molecules - \$75,000

**J. Steven Dodge**, Department of Physics, Simon Fraser University: Terahertz measurements of quasiparticle lifetimes - \$75,000

**David Andrew Egnolf**, Department of Physics, Georgetown University: Computational science in the heart and in the classroom - \$75,000

**Daniel R. Gamelin**, Department of Chemistry, University of Washington: Synthetic, magnetic, and spectroscopic approaches to understanding and controlling the magnetism of doped inorganic nanocrystals - \$75,000

**Taekjip Ha**, Department of Physics, University of Illinois at Urbana-Champaign: Structural dynamics of Holliday junction: Single molecule studies of conformer transitions and branch migration - \$75,000

**Michael D. Hildreth**, Department of Physics, University of Notre Dame: Enhancing the potential for Higgs discovery at the Fermilab Tevatron - \$75,000

**Sarah L. Keller**, Department of Chemistry, University of Washington: Specialized domains in lipid bilayers and monolayers - \$75,000

**Michael R. Meyer**, Department of Astronomy, University of Arizona: A whole greater than the sum of its parts: Understanding the origins of stellar masses and mentoring tomorrow's scholars - \$75,000

**Nicola L. Pohl**, Department of Chemistry, Iowa State University: Chemical biology of glycopolymer and deoxysugar biosynthesis using mass spectrometry - \$75,000

**Brian M. Stoltz**, Division of Chemistry and Chemical Engineering, California Institute of Technology: New innovations in the teaching and implementation of synthetic chemistry - \$75,000

**Richard P. Taylor**, Department of Physics, University of Oregon: Fractal conductance fluctuations in ballistic nanostructures - \$75,000

**Mark Trodden**, Department of Physics, Syracuse University: Geometry, topology and Kaluza-Klein cosmology - \$75,000

Total 2003 (12 items, \$900,000)

2004

**John Cerne**, Department of Physics, SUNY at Buffalo: Infrared hall effect in strange magnetic metals - \$75,000

**Paul J. Chirik**, Department of Chemistry & Chemical Biology, Cornell University: Nitrogen fixation with group 4 transition metals - \$75,000

**Seth M. Cohen**, Department of Chemistry and Biochemistry, University of California, San Diego: A bioinorganic approach for designing improved matrix metalloproteinase inhibitors - \$75,000

**Anthony D. Dinsmore**, Department of Physics, University of Massachusetts, Amherst: Photonic glasses: Influence of the topology of random media on light propagation - \$75,000

**Rustem F. Ismagilov**, Department of Chemistry, University of Chicago: Using minimal chemical model to understand complex biochemical networks and to create biomimetic functional systems - \$75,000

**Bhuvnesh Jain**, Department of Physics and Astronomy, University of Pennsylvania: Gravitational lensing as a probe of dark energy and cosmology - \$75,000

**Vassiliki Kalogera**, Department of Physics and Astronomy, Northwestern University: Genetic algorithms in gravitational wave astrophysics - \$75,000

**Rosa Alejandra Lukaszew**, Applied Science Department, University of Toledo: Investigating the structural and magnetic properties of nano-magnets - \$75,000

**Christian E. Schafmeister**, Department of Chemistry, University of Pittsburgh: The development of rigid bivalent inhibitors of influenza hemagglutinin - \$75,000

**Garth J. Simpson**, Department of Chemistry, Purdue University: Nonlinear optical probes of structure and function in biological systems; anatomy of a green laser pointer - \$75,000

**Carsten A. Ullrich**, Department of Physics, Missouri University of Science & Technology: New approaches for electron dynamics in semiconductor nanostructures and for teaching modern condensed-matter physics - \$75,000

Total 2004 (11 items, \$825,000)

2005

**Paramjit S. Arora**, Department of Chemistry, New York University: Control of protein-protein interactions with artificial alpha helices and innovations in the teaching and implementation of organic chemistry - \$100,000

**Pierre Bergeron**, Department of Physics, University of Montreal: White dwarf stars as cosmochronometers and distance indicators - \$100,000

**Helen E. Blackwell**, Department of Chemistry, University of Wisconsin, Madison: Regulation of bacterial communication pathways with synthetic ligands - \$100,000

**Keith Fagnou**, Department of Chemistry, University of Ottawa: Preventing catalyst decomposition and achieving reactivity in the direct arylation and amination of C-H bonds - \$100,000

**Boyd M. Goodson**, Department of Chemistry, Southern Illinois University at Carbondale: Enhancing NMR signals from biomolecular, organic, and polymer thin films using optical nuclear polarization - \$100,000

**Chuan He**, Department of Chemistry, University of Chicago: A chemical crosslinking method to study DNA repair/modification proteins - \$100,000

**Eric W. Hudson**, Department of Physics, Massachusetts Institute of Technology: Searching for hidden order in exotic superconductors by scanning tunneling microscopy - \$100,000

**Zhiqiang Mao**, Department of Physics, Tulane University: Studies of metamagnetic quantum critical phenomena in ruthenates - \$100,000

**Teri W. Odom**, Department of Chemistry, Northwestern University: Nanoscaffolds for the growth and manipulation of chemical and biological structures at the single component-level - \$100,000

**Chad M. Rienstra**, Department of Chemistry, University of Illinois at Urbana-Champaign: Science beyond the limits of diffraction and disciplinary borders: 3D magic-angle spinning NMR and the liberal arts - \$100,000

**Gary Shiu**, Department of Physics, University of Wisconsin, Madison: Connecting string theory to experiment - \$100,000

**Thomas Vojta**, Department of Physics, Missouri University of Science & Technology: Disordered electronic quantum phase transitions and an interactive approach to teaching computational physics - \$100,000

**Hongcai Zhou**, Department of Chemistry and Biochemistry, Miami University: Hydrogen storage in novel C-N based porous materials - \$100,000

Total 2005 (13 items, \$1,300,000)

2006

**Mu-Hyun Baik**, Department of Chemistry, Indiana University at Bloomington: Towards a quantitative understanding of diastereoselective carbocyclizations through quantum chemical modeling - \$100,000

**Jeffrey W. Bode**, Department of Chemistry, University of California, Santa Barbara: New ligation reactions for the synthesis of biomolecules and biomaterials - \$100,000

**Erica W. Carlson**, Department of Physics, Purdue University: Quantum soft matter - \$100,000

**David S. Ginger**, Department of Chemistry, University of Washington: Probing optoelectronic processes in conjugated polymer blends - \$100,000

**Darren W. Johnson**, Department of Chemistry, University of Oregon: Supramolecular arsenic coordination chemistry - \$100,000

**Masaru K. Kuno**, Department of Chemistry & Biochemistry, University of Notre Dame: Disorder induced optical heterogeneity in solution-based straight/branched semiconductor nanowires - \$100,000

**Adam Leibovich**, Department of Physics, University of Pittsburgh: Particle physics calculations using effective field theories - \$100,000

**Thorsten Ritz**, Department of Physics and Astronomy, University of California, Irvine: Weak magnetic field effects on blue-light signaling in *Arabidopsis thaliana*: A model system for geomagnetic field detection - \$100,000

**Justine P. Roth**, Department of Chemistry, Johns Hopkins University: How do intra-protein redox reactions control the activities of enzymes involved in oxidative stress? - \$100,000

**Melanie S. Sanford**, Department of Chemistry, University of Michigan, Ann Arbor: Transition metal-catalyzed carbon-fluorine bond-forming reactions - \$100,000

**Jairo Sinova**, Department of Physics, Texas A&M University: Spin-Hall effect in semiconductors and related phenomena in nano-spintronics - \$100,000

**Keivan G. Stassun**, Department of Physics & Astronomy, Vanderbilt University: A systemic approach to problems in star formation and minority representation - \$100,000

**Joseph C. Weingartner**, Department of Physics & Astronomy, George Mason University: The alignment of grains with the interstellar magnetic field - \$100,000

Total 2006 (13 items, \$1,300,000)

2007

**Christopher W. Bielawski**, Department of Chemistry and Biochemistry, University of Texas at Austin: Dynamic polymers as recyclable catalysts: An integrated teaching, mentoring and research program in macromolecular chemistry - \$100,000

**Alexander Deiters**, Department of Chemistry, North Carolina State University: A Library Approach to Cellular Light Receptors - \$100,000

**Nancy Forde**, Department of Physics, Simon Fraser University: New directions in Biological Physics at Simon Fraser University: From single-molecule research to the teaching laboratory - \$100,000

**Jordan Mitchell Gerton**, Department of Physics, University of Utah: Toward Nanoscale Microscopy and Manipulation of Functional Biomolecular Networks - \$100,000

**Song Jin**, Department of Chemistry, University of Wisconsin, Madison: Nanoscale Magnetic Semiconductor Materials for Spintronics - \$100,000

**Neepa T. Maitra**, Department of Physics and Astronomy, CUNY, Hunter College: Strong-Field Dynamics of Atoms and Molecules in Time-Dependent Density Functional Theory: A Phase Space Exploration - \$100,000

**Benjamin J. McCall**, Department of Chemistry, University of Illinois at Urbana-Champaign: New Approaches to Research and Teaching in Astrochemistry: Carbocation Spectroscopy and a Novel Laboratory Course - \$100,000

**Carlos Andres Meriles**, Department of Physics, CUNY, City College: Generation and control of nuclear spin magnetization in semiconductor nanostructures - \$100,000

**Mary Elaine Putman**, Department of Astronomy, University of Michigan, Ann Arbor: Mapping the Galaxy's Gaseous Halo - \$100,000

**Diego Troya**, Department of Chemistry, Virginia Polytechnic Institute and State University: Cottrell Scholar Award 2006: Making progress toward the theoretical description of the dynamics of gas-organic surface chemical reactions - \$100,000

Total 2007 (10 items, \$1,000,000)

2008

**Rachel Bean**, Department of Astronomy, Cornell University: Signatures of Fundamental Physics in the Cosmos - \$100,000

**Kirill Belashchenko**, Department of Physics and Astronomy, University of Nebraska, Lincoln: First-Principles Studies of Electronic Structure and Transport in Magnetic Systems at Finite Temperatures - \$100,000

**Matthew David Disney**, Department of Chemistry, SUNY at Buffalo: Towards the Rational Design of Small Molecules Targeting RNA - \$100,000

**Jeanne Ann Hardy**, Department of Chemistry, University of Massachusetts, Amherst: Controlling Protein Function with Designed Allosteric Switches - \$100,000

**Nils Kroger**, School of Chemistry and Biochemistry, Georgia Institute of Technology: Diatom Bio-Nanotechnology: A New Paradigm for the Synthesis of Functional 3D Nanomaterials - \$100,000

**Franklin Wayne Outten**, Chemistry and Biochemistry, University of South Carolina, Columbia: Characterization of a Novel FeS Scaffold System Used By Pathogenic Bacteria Under Oxidative Stress and Iron Starvation - \$100,000

**Gil Refael**, Department of Physics, California Institute of Technology: Breakdown of Superfluidity in Low-Dimensional Disordered Systems - \$100,000

**Charles Sykes**, Department of Chemistry, Tufts University: Single-Molecule Studies of Ferroelectric Self-Assembly - \$100,000

**Sergei Urazhdin**, Department of Physics, West Virginia University: Magnetoelectronic Phenomena in Nanostructures - \$100,000

**Yiyang Wu**, Department of Chemistry, Ohio State University, Columbus: Searching for New Electrode Materials and Nanostructured Architectures for Efficient Dye-Sensitized Solar Cells - \$100,000

**Tehshik Peter Yoon**, Department of Chemistry, University of Wisconsin, Madison: Oxidative Functionalization of Hydrocarbons Using Oxaziridines - \$100,000

Total 2008 (11 items, \$1,100,000)

2009

**Lane Allen Baker**, Department of Chemistry, Indiana University at Bloomington: Instrumentation and Development of New Techniques for Measuring Molecular Recognition with Ion Currents - \$100,000

**Penny J. Beuning**, Department of Chemistry and Chemical Biology, Northeastern University: At the Interface of Chemistry and Biology: Integrating teaching and research on mutagenic DNA polymerases - \$100,000

**Michael David Gladders**, Department of Astronomy and Astrophysics, University of Chicago: The Second Red-Sequence Cluster Survey: 100 Million Galaxies for the Masses - \$100,000

**Duncan Ross Lorimer**, Department of Physics, West Virginia University: Bursts, flickers and cosmic flashers -- exploring the transient radio sky - \$100,000

**Robert McDermott**, Department of Physics, University of Wisconsin, Madison: Noise and Cooperative Phenomena in Amorphous Dielectric and Magnetic Systems - \$100,000

**Maura Ann McLaughlin**, Department of Physics, West Virginia University: Detecting Gravitational Waves Using Pulsar Timing: Drift-Scan Searches for Millisecond Pulsars - \$100,000

**Scott Alan Snyder**, Department of Chemistry, Columbia University: Achieving Synthetic Control When Nature Abandons Selectivity: Total Synthesis of Oligomeric Natural Products - \$100,000

**Snezana Stanimirovic**, Department of Astronomy, University of Wisconsin, Madison: The dynamic interstellar medium: confluence of observations and numerical simulations - \$100,000

**Rory Waterman**, Department of Chemistry, University of Vermont: Catalytic Methods to Low-Valent Phosphorus - \$100,000

**Yadong Yin**, Department of Chemistry, University of California, Riverside: Self-Assembly of Superparamagnetic Colloids to Field-Responsive Photonic Crystals - \$100,000

Total 2009 (10 items, \$1,000,000)

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Grand Totals (228 items, \$16,000,000)

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