# 2001–2002 Degree Recipients

### Bachelor of Science
- **Jonathan D. Beezley** (Dec. 2001) is applying for admission to graduate programs in mathematics.
- **Mary Jo Gabig** (May 2002) is working at Pfizer in Lincoln and will be getting married in August.
- **Shawn T. Langan** (May 2002) is in the physics graduate program at UNL working with Professor Edward Schmidt.
- **James Strohaber** (Dec. 2001) is in the physics graduate program at UNL working with Professor Kees Uiterwaal.

### Master of Science
- **Alekber Aktag** (Aug. 2001) is in the physics Ph.D. program at UNL working with Professor Roger Kirby.
- **Lan Gao** (Dec. 2001) is in the physics Ph.D. program at UNL working with Professor Sy-Hwang Liou.
- **Andrei Istomin** (May 2002) is in the physics Ph.D. program at UNL working with Professor Anthony Starace.
- **Renee J. Lathrop** (May 2002) is teaching at Charlestown High School North in Cold Spring, NY.
- **Christopher D. Lindseth** (Aug. 2001) is currently working on his family's farm in Rugby, ND.

### Doctor of Philosophy
- **Ioan-Bogdan Borca** (Dec. 2001) is a postdoctoral research associate at JILA in Boulder, CO.
- **Rebecca S. Lindell** (Aug. 2001) is an Assistant Professor in the Physics Department at Southern Illinois University in Edwardsville, IL.
- **Carl L. Lundstedt** (Dec. 2001) is a Lecturer at UNL in the Department of Physics & Astronomy.
- **Stephanie A. Snedden** (Dec. 2001) is a staff astronomer at the Apache Point Observatory in New Mexico.
- **Yuanguang Xu** (Aug. 2001) is a Research Associate in medical physics at Columbia University.
- **Hao Zeng** (Dec. 2001) is working at the IBM T.J. Watson Research Ctr. in Yorktown Heights, NY.

# 2002–2003 Degree Recipients

### Bachelor of Science
- **John David Burton** (May 2003) is in the physics graduate program at UNL working with Professor Evgeny Tsymbal.
- **Chad M. Petersen** (May 2003) is in the physics graduate program at UNL working with Professor Dan Claes.
- **Nathan Lee Powers** (May 2003) is in the physics graduate program at the University of Iowa.

### Master of Science
- **Geoffrey W. Brooks** (Aug. 2002) is substitute teaching in Omaha.
- **Christina Marie Othon** (Dec. 2002) is in the physics Ph.D. program at UNL working with Professor Stephen Ducharme.
- **LeighAnn Nicholl** (May 2003) is in the physics Ph.D. program at UNL working with Professor Sy-Hwang Liou.
- **Matthew Aaron Poulsen** (Aug. 2002) is in the physics Ph.D. program at UNL working with Professor Stephen Ducharme.
- **Seth Andrew Root** (Aug. 2002) is in the Ph.D. program at Washington State University.
- **David C. Schmittle** (Dec. 2002) is in the physics Ph.D. program at UNL working with Professor Diandra Leslie-Pelecky.

### Doctor of Philosophy
- **Lu Yuan** (Dec. 2002) is in the physics Ph.D. program at UNL working with Professor Sy-Hwang Liou.
- **Mengjun Bai** (Dec. 2002) is a postdoctoral associate at Argonne National Laboratory.
- **Benjamin G. Birdsey** (May 2003) is applying for postdoctoral positions.
- **Ruihua Cheng** (Dec. 2002) is a postdoctoral research associate at Argonne National Laboratory.
- **Daniel L. Freimund** (May 2003) is a post-doctoral research associate in the Department of Chemistry at the University of Maryland.
- **Takashi Komesu** (Dec. 2002) is a postdoctoral research associate working on a University of Missouri–Rolla project at Argonne National Lab.
- **Bo Xu** (Dec. 2002) is a postdoctoral research associate at the University of Maryland Materials Science and Research Engineering Center.
- **Jian Zhou** (Dec. 2002) is a postdoctoral research associate at UNL.
2001–2002 Fellowships and Traineeships

Donald F. and Mildred Topp Othmer Graduate Fellowships
Alexei V. Belolipetski Geoffrey W. Brooks Daniel A. Johnson

Richard H. Larson Fellowships
Daniel L. Freimund Luis G. Rosa

Hazel V. Emiley Fellowship
Adam S. Green

J. W. McDonald Fellowship
Hae-Kyung Jeong

Graduate Research Traineeships
Tom C. Koch Christina M. Othon Deborah S. Williams

Stars Scholarship
Luis G. Rosa

Sue Wilson Fellowship
Cheol-Soo Yang

2002–2003 Fellowships and Traineeships

Summer Graduate Research Fellowships
Brett Barwick Glen Gronninger Kristin Kraemer Justin Zohner

Donald F. and Mildred Topp Othmer Graduate Fellowships
Daniel Johnson Kristin Kraemer

Wheeler Fellowship
Amiran Khuskivadze

McDonald Fellowship
Victoria Mariupolskaya
2001–2002 Scholarships

Stowell Fund Scholarships
Jonathan D. Beezley  Paul R. Demmel  Feroz Y. Patwa  Bradley W. Peterson
Nathan L. Powers  Jonathan P. Reyes  Gary R. Ruplinger
Hagen D. Schafer  Travis J. Warnsing

U.S. Harkson Scholarships
John D. Burton  Mary K. Everett

Ed Hirsch Fund Scholarships
Daniel V. Chevalier  Rebecca A. Harbison

Henry H. Marvin Memorial Scholarships
Matthew R. Dvorak  Andrea L. Fuchser

Joel Stebbins Fund Scholarships
Terrence J. Hall  Robert D. Lefferts

Banti and Mela Ram Jaswal Scholarship
Dustin Jeck

Physics & Astronomy Alumni Scholarship
Garrett V. Pommeranz

John E. Almy Scholarship
John P. Wilson

2002–2003 Scholarships

Stowell Fund Scholarships
Andrew Behlen  Andrew Benker  Mathew Brase  Paul Demmel
Mary K. Everett  Alicia Gilmore  Dustin Jeck

Henry H. Marvin Scholarships
John David Burton  Andrea L. Fuchser  Rebecca A. Harbison

U.S. Harkson Scholarships
John David Burton  Andrea L. Fuchser  Rebecca A. Harbison

Kurt Meyer Physics Scholarship
Paul Demmel

John E. Almy Scholarship
Mary K. Everett

Physics & Astronomy Alumni Scholarship
Alicia Gilmore

Banti & Mela Ram Jaswal Scholarship
Rebecca A. Harbison
2001–2002 Honors

Sigma Xi Graduate Student Poster Awards
Christina M. Othon        Anthony N. Caruso

Promotions to Rank of Associate Professor with Tenure
Daniel Claes       Diandra Leslie-Pelecky

Named Charles Bessey Professor of Physics
Peter A. Dowben

Named George Holmes University Professor of Physics
Anthony F. Starace

2002 Berg Prize of the International Committee for Imaging Science
Vladimir Fridkin

UNL Parents Association and UNL Teaching Council Certificate of Recognition for Contributions to Students; Kappa Delta Educator of the Month Award; ASUN Student Government Finalist for “Outstanding Educator of the Year Award”
Martin Gaskell

2002 Distinguished Graduate Teaching Assistant Award
Tikhon Bykov

2002 Distinguished Undergraduate Teaching Assistant Award
Hagen Dean Schafer

2001–2002 College of Arts & Sciences “Applause Awards”
Kay Hayley        Marilyn McDowell

2001–2002 Society of Physics Students Officers
Brad W. Peterson, President
Raymond P. Lemoine, Vice President
Mary K. Everett, Secretary
John P. Kayl, Treasurer
2002–2003 Honors
College of Arts and Sciences 2003 Graduate Research Awards
Sigma Xi Outstanding Graduate Student Awards
Tikhon Bykov  Bo Xu
Promotions to Rank of Associate Professor with Tenure
Herman Batelaan  Bernard Doudin
Sigma Xi Outstanding Young Scientist Award
Herman Batelaan
UNL Parents Association and Teaching Council Awards
Martin Gaskell  Gregory R. Snow
Promotion to Emeritus Professor
John R. Hardy
2002 Distinguished Graduate Teaching Assistant Awards
Zhen Qin  LeighAnn Nicholl
2002 Distinguished Undergraduate Teaching Assistant Award
Nicholas Reding
2002–2003 Society of Physics Students Officers
Raymond P. Lemoine, President
Andrew M. Kubick, Vice President
Rebecca A. Harbison, Secretary
Andrea L. Fuscher, Treasurer
2001–2003 Faculty Professional Activities

In addition to service on Department, College and University–wide committees, during 2001–2003 a number of the faculty were active in local, national, and international professional activities, as follows:

- **Clifford Bettis**: President, Physics Instructional Resource Association
- **Daniel Claes**: Member, NSF Review Panel for the Elementary, Secondary, and Informal Education Teacher Enhancement Program
- **Bernard Doudin**: NSF representative for the 50th anniversary of the NSF
- **Peter Dowben**: Center for Advanced Microstructures and Devices (CAMD) Users Advisory Committee, 2000–present; 3 M TGM participating research team leader at CAMD, 1997–present; CAMD VUV beamline Scheduling Committee (Chair), 2001–present; MCD beamline PRT participant, 2002–present; Member, Editorial Board of the Journal of Physics: Condensed Matter, 2002–present; American Vacuum Society Division of Magnetic Materials and Interfaces Executive Committee, 2001–2002
- **Ilya I. Fabrikant**: Member of the NSF Review Panel for Theoretical AMO Physics; Chair of the International Symposium on Electron–Molecule Collisions and Swarms, 2001; Member of the International Scientific Committee: Second Conference on Elementary Processes in Atomic Systems, 2002; Co-organizer of the U.S.-Japan Workshop on Resonances in Physics, Chemistry, and Biology, 2002; Member of the Scientific Committee: International Symposium on Atomic Cluster Collisions, 2003; Member of the Scientific Committee: 13th International Symposium on Electron-Molecule Collisions and Swarms, 2003; Co-organizer of the ITAMP Workshop Interaction of Slow Electrons with Molecular Solids and Biomolecules, 2003
- **Timothy J. Gay**: Secretary/Treasurer of the Division of Atomic, Molecular, and Optical Physics (DAMOP) of the APS; Member, Committee on Atomic, Molecular, and Optical Physics of the National Academy of Sciences Board on Physics and Astronomy; Member, DAMOP Program Committee (ex-officio); Member, International Scientific Committee for the Twelfth International Symposium on Polarization and Correlation in Electronic and Atomic Collisions (2002–3); General Committee of the International Conference on the Physics of Electronic, Atomic, and Photonic Collisions (2001–2007)
- **Diandra Leslie-Pelecky**: Secretary, Steering Committee, Magnetism and Magnetic Materials Conference, 2001–2002; APS Representative to AIP Advisory Committee on Career Services
- **Kam-Ching Leung**: American Astronomical Society, Chrétien International Award Committee; Hong Kong Astrophysical Society, Vice President; Pacific Rim Conference Planning Committee, Chair, 1993–present; Chinese Academy of Sciences, Shaanxi Astronomical Observatory, Distinguished Professor, 1990–Present; Peking University, China, Guest Professor, 1996–Present; Chinese Academy of Sciences, Beijing Astronomical Observatory, Guest Professor, 1997–Present; Hong Kong Space Museum, Science Adviser, 2000–present; Chiang Mai University, Professor, and Advisor to the Ministry of Sciences of Thailand, 2002–present
- **M. Eugene Rudd**: Associate Editor, Rittenhouse: Journal of the American Scientific Instrument Enterprise
- **Edward G. Schmidt**: Coordinator of the Archives of Unpublished Variable Star Observations of the International Astronomical Union
- **David J. Sellmyer**: Chair Elect and Chair of APS Group on Magnetism and its Applications, 2001–2003; Nebraska State EPSCoR Committee; Consultant to National Academy of Sciences Committee on Smaller Materials Research Facilities, 2003–present; Honorary Member of State Key Magnetism Laboratory, Chinese Academy of Sciences; International Organizing Committee, Magneto-Optics Research International Symposium, 2003–present; National Advisory Committee, 17th International Conference on Rare Earth Magnets and Applications, 2002; Organizing Committee, North Central States Nanosystems Consortium, 2003–present
- **Gregory R. Snow**: Member of Fermilab Board of Overseers, 2001–present; Member of the APS Division of Particles and Fields Committee on Education and Outreach, 2002–present; U.S. representative to the European Particle Physics Outreach Group, 2003–present; NSF proposal review panels for the Teacher Enhancement program, Panel Chair, 2002; Professional Continuum Program, Panel Chair, 2003; CAREER Program 2003; NSF experiment site visit review panels for the HiRes Cosmic Ray experiment, Univ. of Utah, 2002; IceCube Cosmic Neutrino Experiment, Univ. of Wisconsin, 2004; QuarkNet Education and Outreach Program, Advisory Group Member, 2001–present; Secretary of the Ph.D. Thesis Award Committee for the CMS experiment at CERN, 2000–present; Task Leader for Education and Outreach for the Pierre Auger Cosmic Ray Observatory in Argentina, 2001–present
2001–2003 Visiting Staff Members

Visiting Professors:

Visiting Associate Professors:
Mikhail Chibisov (Ph.D. 1967, Kurchatov Institute, Russia) working with Ilya I. Fabrikant, and Jianjun Liu (Ph.D. 1994, Jilin U., P.R. China) working with John R. Hardy.

Visiting Assistant Professors:

Visiting Researcher:
Katarzyna Krajewska (MSc 1999, Warsaw U., Poland), working with Anthony F. Starace.

Adjunct Professors:

Adjunct Research Associate Professor:
Yaroslav Losovyj (Ph.D. 1984, U. of Lviv, Ukraine) working with Peter Dowben.

Research Associate Professor:
Yi Liu (Ph.D. 1988, Tohoku U., Japan) working with David J. Sellmyer.

Research Assistant Professors:

Jorgensen Postdoctoral Fellows:

Postdoctoral Research Associates:
2001 Fall Semester Colloquia

September 21
Professor Sergei I. Krasheninnikov, University of California–San Diego
“Physics of Edge Plasmas in Fusion Devices”

September 27
Professor Sitaram S. Jaswal, University of Nebraska–Lincoln
“Quantum Mechanics of Nanomagnetic Systems”

October 4
Dr. Robert H. Kraus, Jr., Los Alamos National Lab
“SQUID’s R Us; Application of Superconducting Quantum Interference Devices From Functional Brain Imaging to Corrosion Detection”

October 10
Bessey Medal Award Lecture
Professor Alan Heeger, University of California–Santa Barbara
“Semiconducting and Metallic Polymers: The Fourth Generation of Polymeric Materials”

October 16
Professor David Pritchard, Massachusetts Institute of Technology
“Quantifying Quantum Decoherence with an Atom Interferometer”

October 18
Professor James M. Feagin, California State University–Fullerton
“Computing with Quantum Machines”

November 1
Professor R. Stephen Berry, University of Chicago
“The Mysterious Phases of Small Systems”

November 15
Professor Herman Batelaan, University of Nebraska–Lincoln
“Observation of The Kapitza-Dirac Effect”

2002 Spring Semester Colloquia

January 24
Dr. Laurence A. Marschall, Gettysburg College
“The Search for Extrasolar Planets”

February 7
Professor Roger D. Kirby, University of Nebraska–Lincoln
“The Double Well Potential in Condensed Matter Physics”

February 28
Dr. Markus Wohlgenannt, University of Utah
“Electroluminescence in Pi-Conjugated Materials”

March 11
Dr. Xiao-Min Lin, University of Chicago
“Gold Nanocrystal Arrays: Synthesis, Self-Assembly and Electronic Transport”

March 13
Dr. Jean-Marc Bonard, Ecole Polytechnique Fédérale de Lausanne
“Field Emission: Past, Present, Future”

March 14
Professor Robert Antonucci, University of California–Santa Barbara
“Polarization Insights for Active Galactic Nuclei and Quasars”

March 25
Dr. Armin Gölzhäuser, Universität Heidelberg
“Molecular Nanostructures at Surfaces”

April 4
The Jerry E. Ruckman Lecture
Professor Gary Gladding, University of Illinois at Urbana–Champaign
“Educating in Bulk: The Introductory Physics Course Revisions at Illinois”

April 11
Dr. Mark Bottorff, University of Kentucky
“Fractals in the Interstellar Medium and Quasars”

April 18
Dr. Orhan Yenen, University of Nebraska–Lincoln
“Disentangling at a Distance: Measurements of Photoelectron Partial Probabilities and the Implications for Quantum Mechanically Complete Experiments”

May 2
Professor Dan Claes, University of Nebraska–Lincoln
“The Cosmic Ray ObservatoryProject: Nebraska’s Outreach and Education Experiment”
2002 Fall Semester Colloquia

September 12
Professor Martin Gaskell, University of Nebraska–Lincoln
“Variability of X-Ray, Ultra-violet, and Optical Continuum Radiation Emitted Around Supermassive Black Holes”

September 19
Dr. Linn D. Van Woerkom, Ohio State University
“Atoms Over the Edge: High Intensity Multiphoton Ionization and More”

September 26
Dr. Bradley Schaeffer, University of Texas-Austin
“Cosmology from Gamma-Ray Bursts”

October 10
Dr. Jeff Kelber, University of North Texas–Denton
“Chemistry at Oxide/Metal Interfaces Using STM-Induced Electric Fields”

October 24
Professor Dan Reich, Johns Hopkins University
“Multifunctional Magnetic Nanowires: New Approaches for Biomagnetics”

October 31
Dr. David Hestenes, Arizona State University
“Reforming the Mathematical Language of Physics”

November 7
Professor Bernard Doudin, University of Nebraska–Lincoln
“Localized Transport in Magnetic Junctions”

November 14
Professor Sergey Zapryagaev, Voronezh State University
“Higher Education in Russia”

November 21
Professor Manfred Fink, University of Texas
“The Production of a High Flux, Monoenergetic, Ultracold Molecular Beam”

December 5
Professor Diandra Leslie-Pelecky, University of Nebraska–Lincoln
“Scientists and K-12 Education: Can We Make a Difference?”

December 12
Professor Arthur F. Hebard, University of Florida
“Magnetic Bits, Giant Magnetoresistance (GMR), and Spin Glasses”

2003 Spring Semester Colloquia

January 23
Professor Richard McCray, University of Colorado
“Transforming Undergraduate Physics & Astronomy Courses”

February 5
Eric Cornell, National Institute of Standards & Technology and JILA
“Stone Cold Science: Bose-Einstein Condensation and the Weird World of Physics a Millionth of a Degree from Absolute Zero”

February 24
Dr. Shireen Adenwalla, University of Nebraska–Lincoln
“Exchange Coupled Thin Films and Multilayers with Out-of-Plane Anistropy”

February 27
Dr. Mikhail Yu. Ivanov, National Research Council, Canada
“Sub-Femtosecond Electron Pulses and Sub-Femtosecond Measurements with Conventional Laser Pulses”

February 28
Dr. Sergei Demokritov, Kaiserlautern University of Technology
“Spin-Wave Dynamics in Structured Media: Closer to Reality”

March 10
Dr. Snorri Ingvarsson, IBM Research, Yorktown Heights, NY
“What Causes Magnetization Relaxation in Ferromagnetic Transition Metals?”

March 12
Dr. Igor Altfeder, Harvard University
“Virtual Quantum Dots in Scanning Tunneling Microscopy”

March 13
Dr. L.F. DiMauro, Brookhaven National Laboratory
“Strong Field Atomic Physics: Electrons, Atoms and Intense Light Pulses”

March 14
Dr. Lincoln Lauhon, Harvard University
“Semiconductor Nanowires for Nanoscale Science and Technology”

March 17
Dr. Fengyuan Yang, Johns Hopkins University
“Spin Structures in Magnetic Thin Films”

March 19
Dr. Christian Binek, Universität Duisburg-Essen
“Model Systems in the Magnetism of Heterostructures and in Statistical Physics”

2003 COLLOQUIA
continued on page 10
2003 COLLOQUIA
continued from page 9

March 21
Dr. Wei Chen, The State University of New York at Stony Brook
“Single Electron Devices”

March 24
Dr. Tae Hee Kim, Massachusetts Institute of Technology
“Spin Polarized Tunneling Studies in Transition Metal Ferromagnets”

March 26
Dr. J.S. Dyck, University of Michigan
“Diluted Magnetic Semiconductors Based on the Layered $A_2^\text{IV}B_3^\text{VI}$ Compounds”

April 3
Dr. Francis Robicheaux, Auburn University
“Simulations of Ultra-Cold Plasmas”

April 10
Dr. Victor V. Flambaum, Smithsonian Astrophysical Observatory
“Do the Fundamental Constants of Nature Vary with Time and Distance?”

April 15
Dr. John D. Gillaspy, National Institute of Standards and Technology
“From the Quantum Vacuum to Nanoelectronics: The Physics and Applications of Highly Charged Ions”

May 1
Dr. Chang Kee Jung, The State University of New York at Stony Brook
“Uncovering the Mysterious World of Neutrinos: Recent Discoveries and Their Implications”

2001 Faculty Publications

Astronomy and Astrophysics


Atomic, Molecular, and Optical Physics


Condensed Matter Physics


**High Energy Physics**


The Record


Interdisciplinary Physics

Archeometry


Physics History


Physics Education


2002 Faculty Publications

Astronomy and Astrophysics


Atomic, Molecular, and Optical Physics


Condensed Matter Physics


The Record


Hong Tang, Jian Zhou, and David J. Sellmyer, “Mechanically Milled Nanostructured (Sm,Pr)$_{12.5}$Co$_{85.5}$Zr, Magnets with TbCu, Structure,” J. Appl. Phys. 91, 8162 (2002).


Interdisciplinary Physics

Archaeometry


Physics History


Physics Education


Track Physics

# New Research and Renewal Grants and Contracts

*during the period November 1, 2001 through October 31, 2002*

<table>
<thead>
<tr>
<th>Principal Investigator</th>
<th>Title (Source of Funds)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenwalla / Ducharme</td>
<td>Nanoscale Structural Engineering of Ferroelectric Polymers (DOE ESPCoR)</td>
<td>$93,584</td>
</tr>
<tr>
<td>Batelaan</td>
<td>Matter Interferometry with Charged Particles (ARO)</td>
<td>$35,000</td>
</tr>
<tr>
<td>Batelaan</td>
<td>Matter Optics with Intense Laser Light (NSF)</td>
<td>$94,380</td>
</tr>
<tr>
<td>Batelaan/Starace/Sellmyer</td>
<td>Quantum Information Technology (NRI)</td>
<td>$113,770</td>
</tr>
<tr>
<td>Burrow/Comfort/Shea</td>
<td>Managing Soil and Water Contamination Using Novel Predictive, Remediative Treatment, and Exposure Assessment Techniques (US EPA)</td>
<td>$48,180</td>
</tr>
<tr>
<td>Burrow/Shea</td>
<td>Building Surface Analysis into a New University Infrastructure in Environmental Science (NRI)</td>
<td>$8,000</td>
</tr>
<tr>
<td>Doudin</td>
<td>Optical Microscopy Station for Micromanipulation and Nanosynthesis (NU Foundation)</td>
<td>$93,000</td>
</tr>
<tr>
<td>Doudin/Sellmyer</td>
<td>Magnetometry on Individual Nanometer-Sized Ferromagnet (NSF)</td>
<td>$5,166</td>
</tr>
<tr>
<td>Dowben/Doudin</td>
<td>Spin Polarization at Ferromagnetic/Insulator Interfaces (DOD-ARO)</td>
<td>$94,721</td>
</tr>
<tr>
<td>Dowben/Ducharme</td>
<td>Adsorption and Desorption of Water from Crystalline Polymer Surfaces (ACS)</td>
<td>$30,000</td>
</tr>
<tr>
<td>Ducharme</td>
<td>High Performance Capacitors and Nonvolatile Memories from Langmuir-Blodgett Films of Ferroelectric Polymers (NSF)</td>
<td>$69,182</td>
</tr>
<tr>
<td>Ducharme/Dowben/Adenwalla</td>
<td>Ultrathin Polymer Films for Microelectronic Devices (NRI)</td>
<td>$131,441</td>
</tr>
<tr>
<td>Fabrikant</td>
<td>Collision Processes Involving Low-Energy Electrons (NSF)</td>
<td>$70,000</td>
</tr>
<tr>
<td>Fuller/Plano-Clark/Spiegel</td>
<td>Collaborative Proposal-Reforming Physics: Algebra-Based Physics with Human Applications (NSF)</td>
<td>$115,147</td>
</tr>
<tr>
<td>Gay</td>
<td>Polarized Electron Physics (NSF)</td>
<td>$175,000</td>
</tr>
<tr>
<td>J. Hardy</td>
<td>Studies on Novel Ferroelectrics for Microwave Optics (ARO)</td>
<td>$15,000</td>
</tr>
<tr>
<td>Jaecks</td>
<td>Mass Dependent Effects in Correlated Motion of Massive Coulomb Interacting Particles: Quantitative (NSF)</td>
<td>$210,000</td>
</tr>
<tr>
<td>Jones</td>
<td>Assess Student Achievement in Undergrad Education (NSF)</td>
<td>$41,096</td>
</tr>
<tr>
<td>Lee</td>
<td>AAS Small Grant Proposal (American Astronomical Society)</td>
<td>$3,900</td>
</tr>
<tr>
<td>Lee</td>
<td>Astronomy Applet Development (Space Telescope Science Institute)</td>
<td>$10,320</td>
</tr>
<tr>
<td>Lee</td>
<td>Increasing Participation in Computer Science, Engineering, and Mathematics through NSF Scholarships at the University of Nebraska-Lincoln (NSF CSEMS)</td>
<td>$110,000</td>
</tr>
<tr>
<td>Leslie-Peleck</td>
<td>Cluster-Assembled Soft Magnets for Power Electronics Applications (ONR-DEPSCoR)</td>
<td>$71,230</td>
</tr>
<tr>
<td>Leslie-Peleck</td>
<td>Magnetic Nanoparticles for Biomedical Applications (NRI)</td>
<td>$170,380</td>
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<tr>
<td>Leslie-Peleck</td>
<td>CAREER: Cluster-Assembled Magnetic Nanostructures (NSF)</td>
<td>$80,000</td>
</tr>
<tr>
<td>Leslie-Peleck/Buck/Dussault/Kirby</td>
<td>GK-12: Project Fulcrum-Building Partnerships (NSF)</td>
<td>$243,363</td>
</tr>
</tbody>
</table>

*2001–02 Grants and Contracts* continued on page 20
<table>
<thead>
<tr>
<th>Name(s)</th>
<th>Project Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liou/Doudin/Qiang/Rajca/Sellmyer</td>
<td>Acquisition of a Focused Ion Beam Workstation for Processing of Single Crystals and Nanometer-Size Materials (NSF)</td>
<td>$158,500</td>
</tr>
<tr>
<td>Liou/Sabirianov</td>
<td>Magnetic Domains of Nanometer-Size Magnetic Features (ARO-DEPSCoR)</td>
<td>$90,000</td>
</tr>
<tr>
<td>Qiang/Sellmyer/Skomski</td>
<td>Dynamics and Control of Interacting Spins in Nanoscale Metamaterials (ARO-DEPSCoR)</td>
<td>$93,000</td>
</tr>
<tr>
<td>Schmidt/Lee</td>
<td>Pulsational Properties of Type II Cepheid Variable Stars (NSF)</td>
<td>$40,000</td>
</tr>
<tr>
<td>Sellmyer</td>
<td>Extremely High Density Recording (NSIC)</td>
<td>$22,530</td>
</tr>
<tr>
<td>Sellmyer</td>
<td>Dynamics of Monodispersed, High-Anisotropy Cluster-Assembled Films for Extremely High Density Magnetic Data Storage Media (NIST)</td>
<td>$36,750</td>
</tr>
<tr>
<td>Sellmyer</td>
<td>Materials Research Science and Engineering Center: Quantum and Spin Phenomena in Nanomagnetic Structures (NSF-MRSEC)</td>
<td>$600,000</td>
</tr>
<tr>
<td>Sellmyer</td>
<td>Nanoscale Science and Technology Program of Excellence (NU)</td>
<td>$50,000</td>
</tr>
<tr>
<td>Sellmyer/Jaswal</td>
<td>Fundamental and Magnetic-Hardening studies of Rare-Earth Nanocomposite Magnets (DOE EPSCoR)</td>
<td>$90,000</td>
</tr>
<tr>
<td>Sellmyer/Doudin/Ianno</td>
<td>Nanoscale Magneto-Electronic Structures and Devices (ONR)</td>
<td>$1,171,000</td>
</tr>
<tr>
<td>Sellmyer/Doudin/Dowben/Kirby/Liou</td>
<td>Nanoscale Materials for Information Technologies (NRI)</td>
<td>$100,000</td>
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<tr>
<td>Skomski</td>
<td>Raytheon Magnetic Meta-Materials (Raytheon)</td>
<td>$45,708</td>
</tr>
<tr>
<td>Skomski/Sellmyer/Liu</td>
<td>Novel Magnetic Nanostructures (DOD-AFOSR-DEPSCoR)</td>
<td>$110,000</td>
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<tr>
<td>Snow</td>
<td>Scientific &amp; Information Technology Equipment (UN Foundation)</td>
<td>$100,000</td>
</tr>
<tr>
<td>Snow/Claes</td>
<td>Cosmic Ray Observatory Project (NSF)</td>
<td>$323,639</td>
</tr>
<tr>
<td>Snow/Claes</td>
<td>Experimental High Energy Physics (NSF)</td>
<td>$185,400</td>
</tr>
<tr>
<td>Starace</td>
<td>Atomic, Molecular, and Optical Physics Program of Excellence (NU)</td>
<td>$44,025</td>
</tr>
<tr>
<td>Starace</td>
<td>Dynamics of Few-Body Atomic Processes (DOE)</td>
<td>$120,000</td>
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<tr>
<td>Starace</td>
<td>Coherent Control of Continuum Quantum Processes (NSF)</td>
<td>$85,000</td>
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<tr>
<td>Tsymbal</td>
<td>Nanoscale Junctions for Magnetoelectronic Applications (NRI)</td>
<td>$157,066</td>
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<tr>
<td>Tsymbal</td>
<td>Multiscale Modeling of Magnetic Nanocontacts (Seagate Technology)</td>
<td>$54,500</td>
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<tr>
<td>Tsymbal/Jaswal</td>
<td>Theory of Electronic, Magnetic and Transport Properties of Nanoscale Magnetic Junctions (NSF)</td>
<td>$96,588</td>
</tr>
</tbody>
</table>

**TOTAL**                                                                 | **$5,905,566**
# New Research and Renewal Grants and Contracts

*during the period November 1, 2002 through October 31, 2003*

<table>
<thead>
<tr>
<th>Principal Investigator</th>
<th>Title (Source of Funds)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenwalla / Ducharme</td>
<td>Nanoscale Structural Engineering of Ferrroelectric Polymers (DOE ESPCoR)</td>
<td>$96,391</td>
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<tr>
<td>Batelaan</td>
<td>Matter Interferometry with Charged Particles (ARO)</td>
<td>$35,000</td>
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<tr>
<td>Batelaan</td>
<td>Matter Optics with Intense Laser Light (NSF)</td>
<td>$97,664</td>
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<tr>
<td>Batelaan / Starace / Sellmyer</td>
<td>Quantum Information Technology (NRI)</td>
<td>$185,331</td>
</tr>
<tr>
<td>Burrow / Comfort / Shea</td>
<td>Managing Soil and Water Contamination Using Novel Predictive, Remediative Treatment, and Exposure Assessment Techniques (US EPA)</td>
<td>$35,053</td>
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<tr>
<td>Burrow / Shea</td>
<td>Building Surface Analysis into a New University Infrastructure in Environmental Science (NRI)</td>
<td>$8,000</td>
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<tr>
<td>Dowben / Doudin</td>
<td>Spin Polarization at Ferromagnetic/Insulator Interfaces (DOD-ARO)</td>
<td>$94,721</td>
</tr>
<tr>
<td>Ducharme</td>
<td>Nonvolatile Memories (Hewlett Packard)</td>
<td>$3,200</td>
</tr>
<tr>
<td>Ducharme / Dowben / Adenwalla</td>
<td>Ultrathin Polymer Films for Microelectronic Devices (NRI)</td>
<td>$135,376</td>
</tr>
<tr>
<td>Fabrikan</td>
<td>Collision Processes Involving Low-Energy Electrons (NSF)</td>
<td>$70,001</td>
</tr>
<tr>
<td>Fuller / Plano-Clark / Spiegel</td>
<td>Collaborative Proposal-Reforming Physics: Algebra-Based Physics with Human Applications (NSF)</td>
<td>$97,569</td>
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<tr>
<td>Gaskell</td>
<td>A Detailed Photoionization Study of Broad Line Region of NGC 5548 (Space Telescope Science Institute)</td>
<td>$30,500</td>
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<tr>
<td>Gaskell</td>
<td>Variability of Active Galactic Nuclei (NSF)</td>
<td>$102,639</td>
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<tr>
<td>Gay</td>
<td>Polarized Electron Physics (NSF)</td>
<td>$175,000</td>
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<tr>
<td>J. Hardy</td>
<td>Studies on Novel Ferroelectrics for Microwave Optics (ARO)</td>
<td>$75,000</td>
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<tr>
<td>Jaecks</td>
<td>Mass Dependent Effects in Correlated Motion of Massive Coulomb Interacting Particles: Quantitative (NSF)</td>
<td>$210,000</td>
</tr>
<tr>
<td>Jones / Lee</td>
<td>Assess Student Achievement in Undergrad Education (NSF)</td>
<td>$41,097</td>
</tr>
<tr>
<td>Lee</td>
<td>Increasing Participation in Computer Science, Engineering, and Mathematics through NSF Scholarships at the University of Nebraska-Lincoln (NSF CSEMS)</td>
<td>$110,000</td>
</tr>
<tr>
<td>Lee / Schmidt</td>
<td>Development of Interactive Simulation Environments for Inquiry Astronomy Teaching (NSF)</td>
<td>$112,191</td>
</tr>
<tr>
<td>Lee / Schmidt</td>
<td>AstroBiology High-School Summer Camp (Nebraska Space Grant)</td>
<td>$2,250</td>
</tr>
<tr>
<td>Leslie-Pelecky</td>
<td>Cluster-Assembled Soft Magnets for Power Electronics Applications (ONR-DEPSCoR)</td>
<td>$71,729</td>
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<tr>
<td>Leslie-Pelecky</td>
<td>Magnetic Nanoparticles for Biomedical Applications (NRI)</td>
<td>$152,445</td>
</tr>
<tr>
<td>Leslie-Pelecky / Buck / Dussault / Kirby</td>
<td>GK-12: Project Fulcrum-Building Partnerships (NSF)</td>
<td>$509,598</td>
</tr>
<tr>
<td>Liou</td>
<td>Scanning Probes for Magnetic Resonance Force Microscopy (University of Washington Subcontract from DARPA MOSAIC)</td>
<td>$25,000</td>
</tr>
<tr>
<td>Liou</td>
<td>Scanning Probes for Electron Spin Detection (UCLA Subcontract from DARPA MOSAIC)</td>
<td>$150,005</td>
</tr>
<tr>
<td>Liou / Sabirianov</td>
<td>Nanometer-Size Magnetic Devices (NE EPSCoR US Army)</td>
<td>$97,750</td>
</tr>
</tbody>
</table>
2002–03 GRANTS AND CONTRACTS  
continued from page 21

<table>
<thead>
<tr>
<th>Project Details</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qiang/Sellomyer/Skomski</td>
<td>Dynamics and Control of Interacting Spins in Nanoscale Metamaterials (ARO-DEPSCoR) $97,000</td>
</tr>
<tr>
<td>Robertson, Doudin, Dowben</td>
<td>Development of Novel Inorganic Dielectric Barrier Layer for Magneto-Resistive Junctions (NSF) $129,447</td>
</tr>
<tr>
<td>Schmidt/Lee</td>
<td>Pulsational Properties of Type II Cepheid Variable Stars (NSF) $40,000</td>
</tr>
<tr>
<td>Sellmyer</td>
<td>Extremely High Density Recording (NSIC) $37,918</td>
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<tr>
<td>Sellmyer</td>
<td>Acquisition of an X-Ray Diffractometer for Nanoscale Materials Research and Education (NSF) $252,000</td>
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<tr>
<td>Sellmyer</td>
<td>Nanoscale Information Processing (W.M. Keck Foundation) $371,873</td>
</tr>
<tr>
<td>Sellmyer</td>
<td>Materials Research Science and Engineering Center: Quantum and Spin Phenomena in Nanomagnetic Structures (NSF-MRSEC) $900,000</td>
</tr>
<tr>
<td>Sellmyer</td>
<td>Nanoscale Science and Technology Program of Excellence (NU) $284,000</td>
</tr>
<tr>
<td>Sellmyer/Jaswal</td>
<td>Fundamental and Magnetic-Hardening Studies of Rare-Earth Nanocomposite Magnets (DOE EPSCoR) $90,000</td>
</tr>
<tr>
<td>Sellmyer/Doudin/Ianno</td>
<td>Nanoscale Magneto-Electronic Structures and Devices (ONR) $1,165,000</td>
</tr>
<tr>
<td>Sellmyer/Doudin/Dowben/Kirby/Liou</td>
<td>Nanoscale Materials for Information Technologies (NRI) $50,000</td>
</tr>
<tr>
<td>Skomski/Sellmyer/Liu</td>
<td>Novel Magnetic Nanostructures (DOD-AFOSR-DEPSCoR) $115,000</td>
</tr>
<tr>
<td>Snow/Claes</td>
<td>Cosmic Ray Observatory Project (NSF) $346,024</td>
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<tr>
<td>Snow/Claes</td>
<td>Experimental High Energy Physics (NSF) $190,960</td>
</tr>
<tr>
<td>Starace</td>
<td>Atomic, Molecular, and Optical Physics Program of Excellence (NU) $133,050</td>
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<tr>
<td>Starace</td>
<td>Dynamics of Few-Body Atomic Processes (DOE) $105,000</td>
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<tr>
<td>Starace</td>
<td>Coherent Control of Continuum Quantum Processes (NSF) $65,000</td>
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<tr>
<td>Tsymbal</td>
<td>Nanoscale Junctions for Magneto-electronic Applications (NRI) $160,000</td>
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<tr>
<td>Tsymbal/Jaswal</td>
<td>Theory of Electronic, Magnetic and Transport Properties of Nanoscale Magnetic Junctions (NSF) $100,429</td>
</tr>
<tr>
<td>Weymouth</td>
<td>Hopeton Earthworks National Historic Site (National Park Service) $2,400</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$7,358,611</strong></td>
</tr>
</tbody>
</table>

ACS – American Chemical Society  
AFOSR – Air Force Office of Scientific Research  
ARO – Army Research Office  
CRDF – U.S. Civilian Research and Development Foundation  
DARPA – Defense Advanced Research Projects Agency  
DEPSCoR – Defense EPSCoR  
DOD – Department of Defense  
DOE – U.S. Department of Energy  
EPSCoR – Experimental Program to Stimulate Competitive Research  
IBM – International Business Machines  
MIT – Massachusetts Institute of Technology  
MOSAIC – Molecular Observation, Spectroscopy and Imaging using Cantilevers  
MRSEC – Materials Research Science & Engineering Center  
NSF – National Science Foundation  
NSIC – National Storage Industry Consortium  
NIST – National Institute of Standards and Technology  
NRI – Nebraska Research Initiative  
NU – University of Nebraska Central Administration  
ONR – Office of Naval Research  
USDA – U.S. Department of Agriculture  
US EPA – U.S. Environmental Protection Agency
The Art of Physics

Calculated density of electronic states in the two-dimensional Brillouin zone of bulk and surface cobalt atoms for an oxidized cobalt surface. Top and bottom rows: majority and minority electronic spin densities respectively. (IMAGE COURTESY OF K. BELASHCHENKO AND E. TSYMBAL)

High energy physics “events” obtained on 4/10/2003 at the CMS detector in Geneva, Switzerland. (For more photos, go to http://cmsinfo.cern.ch/Welcome.html/ and click on “CMS Media.”)
Good Vibrations

Standing wave pattern in a coffee mug produced by building vibrations during the construction of the new second entrance to the underground research laboratory in Behlen's sub-basement. (Full details on the construction project will appear in the next issue of Spectrum.)

IMAGE COURTESY OF J.P. REYES