Physics Matters

DEPARTMENT OF PHYSICS

2001—2002

1998 Physics Alumna Helps Commission National Gravitational Wave Facility

BY BETSY WEAVER, B.S., PHYSICS, 1998

My time at LIGO started in the summer of 1998 when I became an intern at the LIGO Hanford Observatory here in the Tri-Cities. The internship allowed me and the LIGO staff to see how we liked each other, with the hope of future employment at the Observatory after graduation.

Hope turned into reality when I was offered an assistant engineer position right after graduation in December, 1998. The Observatory had just finished its construction phase and was beginning to lay out and install pieces of the detector instrumentation. These included optics, lasers, and complex seismic isolation systems. I joined the optic suspension team. (Ironically, *Optics* is the one course I didn't take in the WSU physics undergraduate program.)

Over the course of the last two and a half years, I have learned the art of suspending optics, large and small. Working at LIGO has also involved learning clean room practices, the basics of interferometry, the basics of vacuum technology (we have the largest high vacuum volume in the world—in fact, it dwarfs the vacuum volumes at both the CERN and Fermi Labs), and the basics of seismometry (measuring and identifying noise sources in our area and around the region).

I have also had the opportunity to work with the other teams on the different areas of the LIGO detector as we are a fairly tight-knit group and tend to help each other out in order to get the job at hand done. LIGO has a wonderful staff of about 250 people

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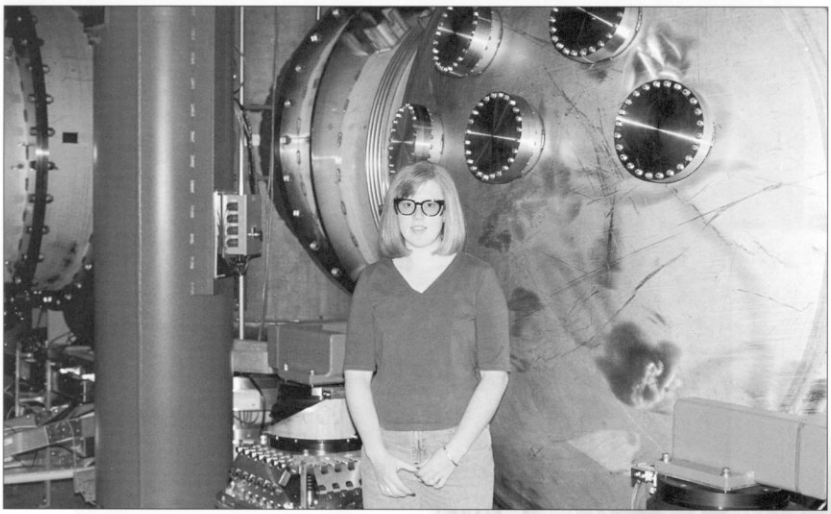


Betsy Weaver at LIGO Hanford Observatory

WASHINGTON STATE UNIVERSITY

World Class. Face to Face.

The circle element above represents gravitational waves emanating from merging black holes.

Greetings from the Chair

WELL, **THIS** WAS A YEAR OF CHANGE.

We saw the retirements of our two most senior faculty: **Miles Dresser** and **Howard Miles.** Howard and his family have moved to Albuquerque; Miles and Muriel are still residing in Pullman. Our long-time administrative officer, **Marilyn Burns**, left to become the finance officer of the College of Education. **Teri Carrington**, our fiscal specialist, left for Oregon with her husband and family. We had two faculty resignations–**David Citrin** took a position at Georgia Tech and **Carter White** decided to return to NRL in Virginia. The Astronomy Program moved to Physics from the Department of Mathematics and we hired two new faculty to staff it.

Miles Dresser and Howard Miles–between them they represent 74 years of service to the Department of Physics, the college and the university. A retirement reception for them was held in April last year.

In total, we hired eight new faculty and staff people:

- **Doerte Blume** was hired as assistant professor in theoretical physics. Doerte's specialty is the application of sophisticated numerical techniques to many-body systems such as helium drops and Bose-Einstein condensations.
- **Sukanta Bose** was hired as assistant professor of astrophysics. Sukanta studies gravitational waves and is part of the LIGO consortium at Hanford.
- **Fred Gittes** was hired as instructor. Fred is a superb teacher with an abundance of energy.
- **Moonsoo Kang** was hired as assistant professor of experimental physics. Moonsoo has studied electronic excitations in high T_c superconductors and also the properties of two-dimensional electronic systems.
- **Guy Worthey** was hired as assistant professor of astronomy. Guy studies observational cosmology, stars and stellar populations.
- **Tom Cowger** took over as fiscal specialist. Tom came to us from Extended University Services (which has nothing to do with the fact that he commutes 50 miles each way from Rosalia).
- **Gordon Johnson** took over as director of Instructional Labs. Gordon was a long-time faculty member at Walla Walla College.
- **Helen Miller** took over as administrative manager. She came to us from the Institute of Biological Chemistry at WSU.

I hope this very brief introduction of our new folks will give you some idea of the changes we have experienced. I am extremely excited about the prospect of working with all these wonderful people and invite you to get in touch with any of them if you are interested in their area of expertise.

Mike Miller, Chair

Miles Dresser and Howard Miles.

Around the Department

A groundbreaking ceremony for the new WSU Institute for Shock Physics building was held on Saturday, September 22, 2001. The ceremony took place at the construction site, east of the Webster Physical Sciences Building. When it opens in early 2003, the three-story building will give the Institute some 33,300 square feet, three times more space than it now has in Webster. The additional space will be used for more laboratories and other institute facilities. Currently the institute is bursting at the seams, with approximately 30 people, and lack of space is the main limitation to its further growth.

Institute Director and Professor of Physics **Yogendra Gupta**, WSU Regent **Peter Goldmark**, Dean of the College of Sciences **Leon J. Radziemski**, Washington State Representative **Shirley Hankins** from Richland and WSU President **Lane V. Rawlins** each made comments at the groundbreaking. "Thanks to the influential research of Yogi Gupta, the Institute brings considerable visibility, prestige and important technical benefits to our university and the state...WSU's long tradition of excellence in the field is reflected in the fact that the majority of U.S. shock physics scientists have been produced at WSU," Rawlins said.

WSU's research in the physics and chemistry of materials has been enhanced by the purchase of an extremely fast, high-intensity, solid-state laser. WSU physicists **Susan Dexheimer, J. Thomas Dickinson, Mark Kuzyk, Kelvin Lynn** and others, as well as researchers from the University of Idaho, received a $323,000 two-year grant from the National Science Foundation and matching funding from WSU to purchase the laser. The new instrument opens a vast array of research and technology opportunities in the fields of materials processing, optoelectronics, biophysics, and the fundamental science of solids and molecules. **Leon J. Radziemski**, dean of sciences and physics professor, observed that the new facility, which is located in the Webster Sciences Building, will enhance our capabilities to address exciting areas of materials research. The research supports a core of "excellence and strength in the area of optical science" at WSU. In addition, "use of this top-of-the-line research equipment provides a great benefit to our graduate and undergraduate science and engineering students."

J. Thomas (Tom) Dickinson received the WSU College of Sciences **Tom Lutz Memorial Teaching Award** in spring 2001. He is the first member of the physics department to receive this recognition. Tom has concentrated most of his recent teaching efforts on the Honors Physics Courses (Physics 205/206) that offer our best students the opportunity to experience a course equivalent to the best in the nation. A former Physics 206 student comments: "The expansion of my mind and my ability to teach myself were greatly improved by this course. Dickinson opened up not only the whole realm of physics, but also my own ability to creatively look at problems, gather all of the information that I can, and find solutions."

Tom Dickinson receives the Tom Lutz Memorial Teaching Award from Leon Radziemski, Dean of the College of Sciences.

Tom uses his research expertise in surface science, laser interactions with surfaces, and nanotribology continually in his classes to give the students a feel for contemporary research. Almost daily, he e-mails them his "GNEWS," a set of web sites announcing new developments in science and technology. (If you want to join his list, send him an email at jtd@wsu.edu). Every year, the handful of undergraduates doing research in his laboratory have done extremely well in the Faculty Association for Scholarship and Research/Sigma Xi Undergraduate Research Awards competition.

Over the last several months Tom has been developing effective methods to use computers to ask students questions and probe their answers (using JAVA*) in non-trivial ways*. (Most computer quizzes ask only true/false or multiple choice questions). This requires clever ways of using computers to dissect students' answers (sentences and equations) and Tom is determined to do it! He is working to create a package for generating challenging tutorials and tests for beginning science courses. Finally, Tom periodically forms reading clubs for women science and engineering students to read and discuss articles in *Scientific American, Science,* and *Nature* dealing with breakthroughs and new technology. We congratulate Tom on this recognition.

Yogendra Gupta received the 2001 Shock Compression Science Award from the American Physical Society at the Topical Conference on Shock Compression of Condensed Matter last June in Atlanta. The award recognized his contribution to understanding condensed matter and nonlinear physics through shock-wave compression.

Congratulations to **Mark Kuzyk**, who has recently been promoted to full professor. Mark is one of 99 U.S. academics to receive research equipment purchased by the Department of Defense.

Continued on page 5

Physics Welcomes Five New Faculty Members

Doerte Blume

A theoretical physicist, **Doerte Blume** explores the interplay between chemistry and physics by working on the microscopic description of quantum clusters and Bose-Einstein condensates by Monte Carlo techniques. She investigates such questions as "At zero temperature, how can we describe the interactions between atoms and molecules microscopically, and how does the formation of macroscopic solids, liquids and gases take place?" Her research interests have grown out of her postdoctoral work at JILA, formerly called the Joint Institute for Laboratory Astrophysics, at the University of Colorado.

Doerte earned her doctorate in physics from Georg-August-Universität zu Göttingen in 1998, where she worked closely with researchers from the chemistry department at the University of California, Berkeley. Here at WSU, she looks forward to fruitful interactions with students inside and outside the classroom.

Sukanta Bose

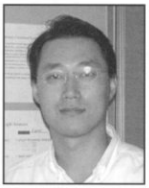
Sukanta Bose is one of two new astronomy faculty hired last fall. Sukanta earned his master's degree from the Indian Institute of Technology, Kanpur, in 1991. In 1996 he earned a doctorate from the University of Wisconsin and was subsequently awarded a five-year postdoctoral fellowship by Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, India. During the course of his doctoral work he found a solution in certain theories of gravity describing the spacetime of an evaporating black hole. There he also showed that owing to a type of "degeneracy" pressure it is impossible to form an arbitrarily small black hole in a gravitational collapse of scalar matter fields in certain theories of gravity.

Since then, he has primarily worked on the generation of gravitational waves (GWs) in astrophysical and cosmological scenarios as well as on devising strategies for detecting them. Last year, while employed at the Albert Einstein Institute in Germany, he led a task-group that studied the use of a network of long-arm interferometers to detect GWs from binary compact stars. He also participates in an effort to put bounds on the energy content of cosmologically produced GWs that are a relic of the birth pangs of our universe.

Fred Gittes was hired last fall as an instructor. Most recently Fred was assistant professor of physics and astronomy at Vanderbilt University. He earned his bachelor's degree from the University of California, Berkeley, and his master's and doctoral degrees in 1994 from the University of Washington. Fred published work in a wide variety of research areas at the University of Washington, the University of Michigan, Ann Arbor, and at Vanderbilt University. He has developed novel spatial statistics for analyzing electron micrographs, studied the biophysics of motor proteins, worked on the statistical mechanics of biopolymers and complex fluids, and developed new methodologies in optical trapping.

Fred Gittes

Here at WSU, Fred is pursuing a keen interest in teaching physics, and expects to enjoy the opportunity to teach at many different levels, both in lecture and laboratory formats. This year he has been teaching introductory physics classes, both with and without calculus, as well as a laboratory-based class (Physics 150) aimed at prospective elementary-education majors. The lectures are taught in a fairly traditional format, with Web-based augmentation. In the future, he will gradually modify this format to find out what is possible within the constraints of a high-enrollment course. Physics 150, on the other hand, is providing an opportunity to develop pedagogical techniques for those with little or no science or mathematics background, and yet communicate the excitement of physics to this crucial audience of elementary school teachers.



Moonsoo Kang

Moonsoo Kang's current research explores the physics of low-dimensional systems and nano-structures. Moonsoo came to WSU from New York City, where in 1998 he began his postdoctoral research at Columbia University and Lucent Technologies' Bell Laboratories. During his stay he investigated the fractional quantum Hall effect and other exotic phenomena in two-dimensional electron systems confined in semiconductor nano-structures.

Moonsoo earned a Ph.D. in physics from the University of Illinois at Urbana-Champaign in 1997. He explored the physics of high temperature superconductors, especially collective behaviors of strongly interacting electrons in superconducting materials, using light scattering spectroscopy.

A native of Casper, Wyoming, **Guy Worthey** is the second of our new astronomy faculty. Guy attended Casper College

Additional New Members of the Physics team

Fiscal specialist **Tom Cowger** has spent the last eleven years at WSU working in accounting-related positions. He and his wife, Joy, own a small plot of land where they raise horses, exotic birds, dogs and ducks. Tom works in tandem with our finance/budget manager and among many duties, sees to it that we all get paid on time.

Tom Cowger

Gordon Johnson is our new director of Undergraduate Laboratories. His interest has always been in experimental physics, thus his new position in the laboratory program allows him to "feed" that interest in a more focused manner.

Gordon comes to WSU after teaching for 27 years in the physics department at Walla Walla College in College Place, Washington. Sixteen of those years he served as the department chair. Although his undergraduate degree is in physics, his Ph.D. is in electrical engineering from Caltech. He is quick to remind us that his work in thin film magnetic materials was really applied physics. He is looking forward to improving the quality of the undergraduate laboratory program here at WSU with the hope of keeping students excited about "doing" physics.

Gordon Johnson

We are happy to announce that **Helen Miller** has joined the physics department as our new finance/budget manager. Helen has 12 years of experience at Washington State University in the field of accounting and holds a B.A. in business and accounting from WSU. Helen and her husband Ron, enjoy wilderness camping, riding horses and raising cattle in their spare time. ■

Helen Miller

for two years before transferring to the University of Wyoming in Laramie, where he switched from geology to astronomy. He attended graduate school at the University of California, Santa Cruz, where he received his Ph.D. Guy spent five years at the University of Michigan doing postdoctoral research.

Guy Worthey

He is the author of what have become known among astronomers as "the Worthey models," a set of computations of the spectral light expected to come from galaxies. Recently, he joined the science team of SIM (Space Interferometry Mission), a NASA mission in the planning stages. SIM will find planets around other stars and settle many long-standing astronomical problems related to distance measurements. It is due to launch in 2009. ■

AROUND THE DEPARTMENT *CONTINUED FROM PAGE 3*

The purchases ranged from $50,000 to $1 million and averaged $186,000. Kuzyk's award was over $200,000.

The College of Engineering and Architecture gave its 2001 Outstanding Research Faculty Award to **Kelvin Lynn**, director of the Materials Research Center and professor of materials science and physics. Kelvin's major research contribution has been in the pioneering use of positrons to study defects in materials. The work makes possible a plethora of electronic devices that are an everyday part of our modern world. Lynn was one of the first to moderate positrons and to obtain a particle beam. Last year Kelvin and his group were awarded a $1.1 million grant from the W.K. Keck Foundation for an antimatter-physics research laboratory. **Alan Hunt** and **Marc Weber** are research faculty and Kelvin's primary associates at the Center. Recently Lynn was elected a Fellow in the American Association for the Advancement of Science (AAAS).

Lai-Sheng Wang, physics professor at WSU Tri-Cities and affiliate chief scientist at Pacific Northwest National Laboratory in Richland, and his collaborators have made a discovery that could eventually lead to the development of new materials. Their creation of the first all-metal aromatic molecule was reported in an article in the February 2001 issue of *Science* magazine.[1]

The new aromatic molecule was discovered by accident during work on aluminum and copper alloy clusters. Wang uses a photoelectron spectroscopy system to break down metals, cluster them together into new molecules and then measure their electron energy spectra. With these measurements and calculations by Wang's colleague Alexander Boldyrev, the scientists proved that the new molecules met the structural and electronic criteria for

CONTINUED ON PAGE 6

[1] Wang's colleagues on the research are theoretical chemists, assistant professor Alexander Boldyrev and doctoral candidate Aleksey Kuznetsov from Utah State University, and technical assistant Xi LI and physics post-doctoral student Hai-Feng Zhang, both from WSU.

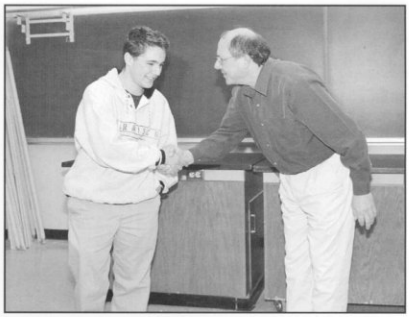
AROUND THE DEPARTMENT *CONTINUED FROM PAGE 5*

aromatic compounds. For news coverage on this matter visit http://www.tricity.wsu.edu/~physics/picture/science-pictu/8.html.

Associate professor **James Walker** was named the 2001-2002 Boeing Professor of Science and Mathematics Education.

Physics majors **Ryan Leach** and **Rizal Hariadi**, and Pullman High School senior **Joe Wasem**, were among six winners of the annual undergraduate awards sponsored by the Faculty Association for Scholarship and Research and Sigma Xi. Joe had spent two years in our department as a participant in Running Start, a program in which high school students can earn college credit. Joe is currently a freshman at California Institute of Technology at Pasadena, California.

Rizal was named the College of Sciences Undergraduate Research Scholar for January 2002 for his research on nanometer-scale surface modifications which he does in Tom Dickinson's lab. ■

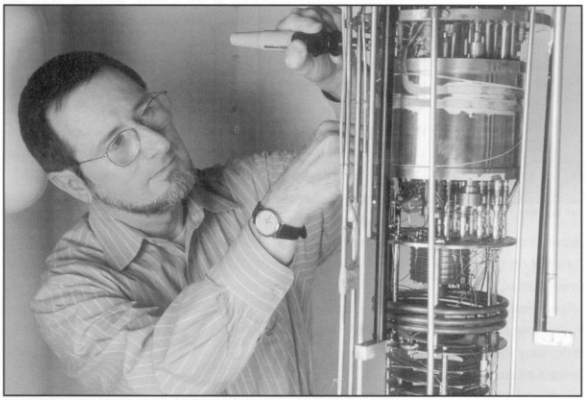


Joe Wasem receives the annual undergraduate award from Michael Miller, Chair of Physics.

S. Town Stephenson Lectures for 2000–2001

ABSOLUTE ZERO AND TWENTIETH CENTURY SCIENCE

In fall 2000, the 1996 Nobel Prize winner in physics, **Douglas Osheroff**, delivered an S. Town Stephenson Distinguished Lecture entitled "So What Really Happens at Absolute Zero?" Osheroff used a few simple consequences of quantum theory that most people learn about in high school—such as the Heisenberg Uncertainty Principle and the Pauli Exclusion Principle—to explain some of the unusual behavior found at extremely low temperatures. A professor of physics at Stanford University, Osheroff and his research group work on superfluids and solids in two and three dimensions. In addition, his group has developed a program to study the low temperature properties of amorphous solids. He received the Nobel Prize for the discovery of superfluidity in helium-3.



Osheroff received the Nobel Prize in Physics in 1996, along with David Lee and Robert Richardson, for the discovery of superfluidity in helium-3 (3He).

Charles V. Shank

Charles V. Shank delivered a second Stephenson Lecture entitled "Extraordinary Scientific Pursuits for the 21st Century—a Personal Perspective" in the spring of 2001. Shank, director of Ernest Orlando Lawrence Berkeley National Laboratory, in Berkeley, California, since 1989, is a nationally recognized scientist and research leader. He oversees the oldest and most varied of the Department of Energy's multiprogram research laboratories. In addition to his duties as laboratory director, Shank has a unique triple appointment as professor at the University of California, Berkeley, in the departments of physics, chemistry, and electrical engineering and computer sciences. ■

Letters from Alumni

Professor Bert Brown (B.S. Physics, 1949) writes:

Dear Mike,

I recently received the enclosed letter from Louis Brown (no relation, as far as I know) re: history of radar. He has written a book on it. Unfortunately, our WSU people were apparently 'scooped' in the matter of modulating microwaves; I suppose we won't ever know if Anderson, Stephenson et al were ever aware of the earlier work in Europe.

Yours,

Bert Brown

3 April 2000

Dear Professor Brown,

Professor Evenson, Editor of History of Physics Newsletter, sent me a copy of your letter to him with the article by Alfred Butler, "Some History of the WSU Physics Department." I was interested in learning of work done at WSU but must point out that microwaves had been modulated for communication in 1931 in a link across the English Channel between British and French telephone companies. There is a photograph of one of the antennas on p. 30 in my recently published book, A Radar History of World War II (Institute of Physics Publishing, Bristol, 563 pp., xvi, 1999). It is hardly surprising that this was not known in America, as a strong characteristic of our knowledge of electronics history is its parochial nature, something I encountered over and over. Of particular note along microwave lines were the four independent inventions of the resonant magnetron. It took me nearly eight years of digging to get what I consider the first approximation to the radar story straight, and I know of course that there are still errors and omissions, but one must stop sometime.

Best wishes to a fellow emeritus and a Brown.

Yours sincerely,

Louis Brown, Emeritus Staff Member

George C. Fullmer, (physics major, 1940-43) shared with us the following recollection..."We have our 'annual' (for the past several years) get-together of Bill McIlraith (Mt. Vernon, Wash.), Don Johnson (Walnut Creek, Calif.), and myself—all in Pine Manor at the beginning of WWII—scheduled for December 27, 1999, at Walnut Creek, Calif. In relation to the recent bright moon: Bill McIlraith, with me as passenger, drove his old Chevy from Pasco to Pullman w/o generator in 1942 – bright moon on snow, turning on headlights only when meeting cars (which was rare in those days)."

Frederick H. (Fred) Schultz (Ph.D. 1967) Professor Emeritus, University of Wisconsin-Eau Claire, has a small article published in the Sept. 1999 issue of *The Physics Teacher* entitled, "Vectoring Backwards." Schultz discusses the subject of vectors–using air velocity and wind velocity "to get the resultant ground velocity." In 1943 he was at the University of North Dakota "teaching physics in the Army Air Corps Pre-flight Program to men waiting to get into actual flight training." While lecturing to the students, he questions whether, given air velocity and wind velocity, could this actually be negative...causing an airplane to go backwards? Check out the article for an interesting anecdote that helps answer the question. Incidentally, Fred, his wife Lila, and youngest son John were on hand for Howard Miles and Miles Dresser's retirement party, May 2001. ■

Please visit the department's webpage at :
http://www.physics.wsu.edu.

College of Sciences home page address:
http://www.sci.wsu.edu

Department of Physics e-mail address:
(physics@wsu.edu)

WSU home page address:
http://www.wsu.edu

Physics Students on President's Honor Roll

We proudly announce the names of the following students who earned places on the President's Honor Roll for fall 2001. They are:

Joshua Carmichael, Sequim
Tyler Cumby, Puyallup
Aubrey España, Waitsburg
Rizal Hariadi, Dki Jakarta, Indonesia
Ryan Leach, Colville
Pieter Nauta, Spokane
Melissa Skala, Selah


Joshua Carmichael


Tyler Cumby

Scholarship Recipients

Many of the gifts from our alumni and friends support scholarships for our department's most deserving students. For the 2000-01 academic year, the following scholarship awards were made.

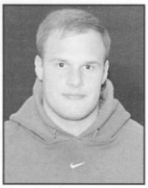
Kelli Weed, of Port Angeles High School received the Claire May Band Scholarship fall 2000. **Aubrey España** was awarded a Claire May Band Scholarship, fall semester, 2001. Aubrey came to WSU as a transfer student from Walla Walla and was the spring 2000 recipient of a Physics Transfer Student Scholarship. First year graduate student **Karen Roberts** received a Claire May Band Scholarship for the year 2001-2002. Karen received a B.A. in physics from Central Washington University, Ellensburg. **Lifeng Cui** received the Graduate School Scholar Award. **Neill Bafus**, Endicott High School, St. John, Washington, was the year 2001-2002 recipient of the Paul and Dian Bender Freshman Scholarship in Physics. A Transfer Physics Scholarship was awarded to **Joshua Carmichael** last spring. Joshua transferred to WSU from Peninsula College, Port Angeles, Washington. Graduating senior and Honors student **Rizal Hariadi** received the Edward E. Donaldson Surface Science Scholarship Fellowship, spring 2001. **Katherine Hegewisch** was awarded the Claire May Band Scholarship for the year 2000-2001 and the prestigious Abelson Fellowship for academic excellence at the graduate level for 2001-2002. Graduating senior, spring 2001, **Dirk Robinson** received the Paul Anderson Award for Excellence in Physics Scholarship in spring 2001. **Aaron Rogan** received an Abelson Fellowship for the year 2001-2002.

The following undergraduate physics majors received $100 book scholarships for superior academic performance (3.30 GPA or better) fall semester, 2001: **Ian Barney, Stuart Campbell, Joshua Carmichael, Tyler Cumby, Aubrey España, Rizal Hariadi, Ryan Leach, Pieter Nauta, Jedidiah Serven, and Melissa Skala.** ■

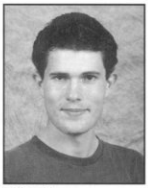

Aubrey España


Rizal Hariadi


Katherine Hegewisch


Ryan Leach


Karen Roberts


Dirk Robinson


Aaron Rogan


Melissa Skala


Kelli Weed

Physics Honor Roll of Donors

—July 1, 1999 through June 30, 2001—

Your support of physics students, faculty and programs is very important to us. Your gifts make possible scholarships and many special opportunities. We extend our appreciation to those who have made a gift this year as well; your names will be listed in the next issue of Physics Matters. Thank you!

Note: Because Physics Matters was not published last year, this year we list the names of those who made gifts in either or both of the last two years.

LAUREATES

(Lifetime Gifts of 1,000,000 or more)

*William & * Claire May Band
M.J. Murdock Charitable Trust

BENEFACTORS

(Lifetime Gifts of $100,000 or more)

Philip '33 & *Neva (Martin) '34 Abelson
AT&T Foundation
*William & *Claire May Band
Battelle Pacific Northwest National Labs
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M.J. Murdock Charitable Trust
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(Annual Gifts of $10,000 or more)

John Abelson '60 & Christine Guthrie
Philip Abelson '33 & *Neva (Martin) Abelson '34

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Peter '83 & Susan (McDougall) '78 Majewski
L. Stephen Price '75 & Cherri DeFigh-Price '75
Harold '63 & Marjorie Winters

DEAN'S ASSOCIATES

(Annual Gifts of $500 to $999)

John Aidun '89 & Joan Harris
Donald '58 & Eva (Brownhill) Beale
Richard Casper '86
Charles '70 & Carron Collins
Richard '58 & Annette (Weissenborn) '59 Gordon
Ronald '68 & Sandra (Hudson) '69 Hanson
George '70 & Ann (Melvin) '71 Jannison
Dale '48 & Leila (Cook) '51 Martin
M. Randy McKay '86
Allen Pitner '64
John '71 & Rhoda (Setterberg) '67 Roper
Steven '96 & Lesa Vigil

TOWER CLUB

(Annual Gifts of $100 to $499)

Joann Albers
Cynthia Anderson '85
George Anthony '50
James '71 & Patricia Asay
Michael Barbour '71
Arthur '51 & Diane Barry
Gary '70 & Cleo Bennett
John '71 & Jacklyn (Johnson) '72 Boardman
William '50 & Eunice Boyd
William Brammer '49
Bert Brown '49
Jeffery Brown & Letha Owens
Robert '68 & Diana Bushey
Donald '60 & Cynthia (Brislawn) '62 Calbick
Gaylon '68 & Judith (Harris) '64 Campbell
Donald '73 & Helen Casey
Nicholas Cerruti '98
Gary & Peggy Collins
David '80 & Teresa '80 Cremers
Lee '77 & Susan Danielson
Paul '72 & Karen Davis
Dean Denison '55
Wilbur '71 & Pamella Dong
Donald '51 & JoAnne (Lysek) Doran
Miles & Muriel Dresser
Leslie '37 & Carolyn Edwards
James '61 & Carmela Estes
Robert Flock '86 & Nissa Nack '84
Todd Gilmore '77
John '61 & Patricia (Rotan) Gould
Dennis '72 & Janet Hayes
Jerry '65 & Michele Hendrickson
Richard '66 & Carol (Sloan) '65 Holben
Gerald '37 & Mary (Skidmore) '40 Johnson
LeRoy '71 & Joanne Johnson
Scott '81 & Judy '82 Jones
Edwin '71 & Marilyn Karlow
Larry Kirkpatrick '63
Mark & Patricia Kuzyk
C. Robert Lagergren '44
Lawrence '79 & Brigid Larson
Arthur '43 & Justina Lathrop
Richard '62 & Madelon Lindsay
Mark '79 & Mary Linquist
Chelcie '62 & Katherine (Kyte) '62 Liu
David '51 & Patricia McDaniels
John '92 & Helana (Haytas) '92 McIntosh
Michael & Mechthild '92 Miller
Dean Millsap '53
David '56 & Eileen Pettijohn
Warren '51 & Bernice (Birkhofer) '51 Quinn
David '91 & Anna Repp
Frederick '71 & Marilyn (Fulfs) '68 Robinson
Carl Rosenkilde '59
John '50 & Carolyn Schauble
V. Hugo '51 & Shirley Schmidt
Frederick '67 & Lila Schultz
Robert Sharp '65
William '51 & Carolyn (Frantz) '61 Slippern
Garret '68 & Maureen (Warrick) '69 Spears
Paul Spencer '63 & Susan Daniels
Brad Stapleton '90
Richard '64 & Jan Stout
Grant '62 & Karen Thorsett
Brett Thovson '84
William Torruellas
Alfred & Beryl (Butler) '64 Turner
Edgar '73 & Karen Vickery
Jack '62 & Judith Westerman
Perry Wilson '50
Windshield Doctor

SUSTAINING GIFTS

Paul '86 & Cheryl Adams
Gordon Adrian '97
Glenn '53 & Marian Anderson
Bin Bai '95 & Ying Shen

Frank '60 & Irene Barmore
Claude '56 & Betty Barnett
John '70 & Lorraine (Raymond) '70 Barnum
Harry '75 & Rita Beeler
Burton '66 & Karen (Johnson) '69 Berringer
Florian Blonigen '95
Todd Brown '92
Randy Carr '89
Lewis '72 & Mary Coleman
Stuart '83 & Sharon Davey
Kenneth Dodson '74
Peter '85 & Tara Eschbach
Jay Evett '53
Vladimir '52 & Alexandra (Karmansky) '52 Filippenko
Marguerite Fiorella
Daniel & Sandra (Bolton) '80 Fisher
Charles '63 & Donna Fitzsimmons
Mark '79 & Rosanna Folkerts
Jerry '76 & Cynthia Forbes
Melvin '52 & Andjelka Fronsdahl
George '44 & Mary Fullmer
Dennis Garvey '99
Julianna Gothard '92
Jay '68 & Catharine Holberg
Michael '66 & Cynthia Jackson
Roger '83 & Jeannette Johnson
Henry '66 & Linda Jones
Harry Kellinger '50
Lee Koller '78
James Kooreny '69
David & Jennifer (Thomas) '93 Lindquist
Gary Lucas '61
Robbe '70 & Gloria (Aylesworth) '73 Lyon
David '84 & Mitzi (Hulet) '83 Mann
Leonard '68 & Lucille Mapston
Gregory '89 & Kathlene McGhee
Everald '68 & Patricia Mills
Scot '94 & Elizabeth (House) Morse
Robert '65 & Patricia Parry
Michael Radach '68
Dan '66 & Shirley (Miller) '65 Radecki
Richard Raymond '38
Fredrick '64 & Denise Reinke
James '54 & Norma Rollins
Kevin Romero '85 & Beatriz Aldana-Romero
John '81 & Carol Sanders-Reed
Ralph '77 & Linda Simmons
Leonard '68 & Deborah Slack
Robert Small
George Start '59
Daniel '73 & Mary (Gudjohnsen) '74 Stoneman
Eric '88 & M. Kirsten Stubbs
James Thomas '76 & Mary Bartholomew '76
Kathleen Turner '64
David '73 & Elizabeth Unger
Gloria Villalobos '94
Wayne '72 & Karen (Griffin) '73 Wilcox
Gordon Williams '56

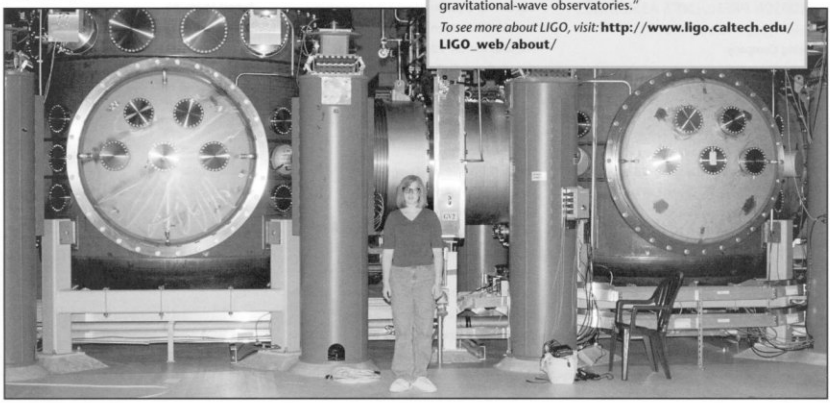
GRAVITATIONAL WAVE FACILITY *CONTINUED FROM PAGE 1*

at CalTech, MIT, and other collaborating universities around the world. I have had the opportunity to work with a number of these creative and talented individuals.

Within the last few months, the LIGO Hanford Observatory has moved from the installation-of-the-equipment phase to commissioning the detector. We are currently characterizing and qualifying the detector, and as a result, my more mechanical duties have slowed down. After the commissioning period, we will go into full operation and I will again shift duties to become an operator of the Observatory. ■

"The Laser Interferometer Gravitational-Wave Observatory (LIGO) is a facility dedicated to the detection of cosmic gravitational waves and the harnessing of these waves for scientific research. It consists of two widely separated installations within the United States—one in Hanford, Washington and the other in Livingston, Louisiana—operated in unison as a single observatory. LIGO is being built by the California Institute of Technology (Caltech) and the Massachusetts Institute of Technology (MIT). Funded by the National Science Foundation, LIGO will function as a national resource for both physics and astrophysics. When it reaches maturity, this observatory will be open for use by the national community and will become part of a planned worldwide network of gravitational-wave observatories."

To see more about LIGO, visit: **http://www.ligo.caltech.edu/LIGO_web/about/**



ALUMS, WHERE ARE THEY NOW?

John B. Aidun (Ph.D. 1989) is department manager of Computational Biology and Materials Technology at Sandia National Laboratories.

Gary Bennett (Ph.D. 1970) has kept busy since his retirement from NASA. He continues to do consulting work for NASA and attends national conferences to give talks on aerospace power systems. Gary and his wife Cleo live near Boise, Idaho, where he works locally with area scientists to ensure that Idaho's high school science standards reflect the "best information available." His work has not gone unnoticed and he recently was honored with a 'Friend of Darwin' award from the National Center for Science Education.

Randy C. Carr (B.S. 1989) has started his own computer/network consulting business.

D. Dean Casey (Ph.D. 1973) has recently been made a director in the Verizon Technology Organization at the Verizon Laboratories in Waltham, Massachusetts. Casey's organization is responsible for the design and deployment of Verizon's next-generation optical network. They are currently conducting laboratory trials and plan to launch a field trial somewhere in the U.S. during summer, 2002. The company hopes to have full deployment of sales for optical services by the first part of 2003. Dean notes that Verizon is using MEMS technology for the core switching function and are operating at OC-192 (10 Gb/s) transport rates.

Richard L. Gordon (Ph.D. 1966) completed a four-year term as manager of the Separations and Analysis Program of the Division of Chemical Sciences, Biological Sciences and Geosciences of the Office of Basic Energy Sciences, U.S. D.O.E. Most recently he returned to Richland, Washington.

Twice retired (from academia and from national labs) **Carl E. Rosenkilde** (B.S. 1959) continues to teach physics and calculus to students in a private college-prep high school.

Ronald J. Vargas-Esquivel (M.S. 1989) is teaching physics in the Instituto Tecnologico de Costa Rica.

E.A. (Al) Vickery (B.S. 1973) is deputy director of the River Protection Project, Fluor Global Services in Richland, Washington. ■

CONTINUED FROM BACK COVER

current trends elsewhere, we are finding that interdisciplinary training is becoming more and more important and attractive. We responded several years ago by developing what we call "Physics With Options." This plan provides a variety of options for students to broaden their interests with no decrease in the required number of physics courses. Thus students often take 15-20 hours additional credit hours beyond the minimum College of Sciences and University degree requirements.

The option list currently includes:

- Astrophysics
- Biophysics
- Environmental Physics
- Material Physics
- Mathematical Physics
- Optics and Electronics
- Physics Education
- Computational Physics
- Continuum Physics/Acoustics
- Technical (Instrumentation) Physics

The additional required courses often can lead to a minor or a second major in the appropriate cognate departments. We encourage all majors to take the Honors versions (2 semesters each) of calculus, chemistry, and physics. All of the Honors courses are more demanding, more rigorous, and involve smaller sections (15-40 students) than the non-honors versions. These students are often lured into research projects in the department. The early involvement in research projects further develops their skills and capabilities. Personal interaction of young researchers and faculty is a win-win situation for both. The Edward E. Donaldson Surface Science Fund, the College of Sciences, the Physics Development Fund, and the Honors College offer limited summer support for such students. All physics majors are now required to carry out an independent research project and write a senior thesis; the resulting manuscripts often form drafts for publications in journals such as Journal of Applied Physics. We continue to fine-tune and improve the major and improve the climate for attracting top undergraduate majors. One important component of recruiting good students for our degree program is the ability to grant scholarships and to provide summer support for research. This is where your help is needed. I am asking you to contribute to the Physics Development Fund or to the two major undergraduate Scholarship Funds (the Claire May Band and the Dian and Paul A. Bender Scholarships). Another way you can help our undergraduates is to provide summer work experiences. If you and your company or organization can hire a student summer intern, please contact us. Your involvement will pay off greatly as we educate this next generation of scientists.

If you have any questions please contact Tom Dickinson (Chair of the Undergraduate Studies Committee) by email (jtd@wsu.edu) or Mike Miller (Chair, Physics Department) (mdm@wsu.edu). ■

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The Department of Physics
September 2001

The Undergraduate Physics Major at WSU

How You Can Help

BY TOM DICKINSON

One of the most important functions of the WSU Physics Department is the education and training of undergraduate majors in physics. Our students continue to have a wide range of interests and career goals that include moving directly into industry or going to academic or government lab positions after master's and/or doctoral training here or elsewhere. As you all know, our degree is among the most demanding on campus in terms of both breadth and depth. Many of our students also major in mathematics in addition to physics. Consistent with

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