

Physics Matters

1998-99
Department of Physics

Department Welcomes Matthew McCluskey

Last fall, Matthew McCluskey joined the Department of Physics and the Institute for Shock Physics at WSU. His research interests focus on the optical properties of semiconductors. Matthew received a bachelor's degree in physics from the Massachusetts Institute of Technology and a doctorate in physics from the University of California, Berkeley. He was a postdoctoral research associate at the Xerox Palo Alto Research Center. Having grown up in Helena Montana, he is happy to have landed in the Northwest. Coincidentally, Matthew's father was an undergraduate at WSU and used to tell young Matthew stories about Al Butler's lectures.

As a graduate student, Matthew joined Professor Eugene Haller's research group and did research at Berkeley and the Lawrence Berkeley National Laboratory. He used infrared spectroscopy to study hydrogen vibrational modes in semiconductors, an important subject from both scientific and technological viewpoints. In addition to investigating new hydrogen-related complexes, he utilized hydrostatic pressure to probe the vibrational modes of hydrogen in semiconductors. By developing a new *in situ* pressure calibration technique, the precision of high-pressure infrared measurements was improved. This technique is now used to study resonant interactions between local vibrational modes and extended lattice phonons.

At Xerox Palo Alto Research Center, Matthew worked with Noble Johnson on the blue laser project, which generated headlines in October 1997 when it succeeded in demonstrating blue laser operation. Blue lasers will be important components in laser printers and compact-disc players. The blue lasers are fabricated from GaN and the alloys InGaN, materials that have generated extreme interest in



Matthew McCluskey

recent years. In addition to providing materials information for the blue laser project, Matthew was involved in several research projects. One was the study of phase separation in InGaN quantum wells. The formation of In-rich InGaN nanostructures in the light-emitting region was analyzed using both

See McCluskey page 2.



Miles Dresser
Interim Chair
Department of Physics

Greetings from the Chair

Greetings from the interim chair.

As I write this, I have been in this position for nearly a year. Reports from Linz, Austria indicate that **Mike Miller** is walking around there with a giant grin on his face. I am hopeful that Mike is getting the change of pace and setting that he needs to refresh himself for the task of chair when he returns in August.

As for me, it has been a very interesting time. One of the joys of this position has been responding to donors and sending greeting cards to people. I have enjoyed the recognition of students I have known over the years, or people who have come back and introduced themselves to me. We are always happy to hear from you in any format—phone, letters, e-mail, or whatever. If you are connected, be sure to visit our website, <<http://www.physics.wsu.edu/>>.

The active students passing through our program are also a joy. We recently had our fourth team in three years accepted to do zero gravity experiments at NASA Houston. This year's group included **Chris Breckon, Scott Douthit, Rick Graff, and Josh Clearman**. They were

studying noise emissions from rapidly collapsing bubbles. See page 3 for more on their experience. Our graduating class this year was the largest we have had since I became the major adviser (1989). We graduated a class of seven students—three women and four men—so our ratio of women to men remains well above national averages.

Last fall we had to deal with the retirement of the cornerstone of this department for the last 34 years, **Mickey Daniels**. Mickey started out as our office staff and left as the office support supervisor of two positions. She was the one who listened to and sympathized with students and their problems over the years. Some students remember her better than they remember our faculty. We miss her and wish her the best as she steps into her new role as grandmother and world traveler, free to go whenever and wherever she wants. You'll find some of her reminiscences on page 9.

It has been an interesting and rewarding year, and my thanks go out to all who have been a part of it. The Department of Physics is strong, its students are top-notch, and we take great pride in the accomplishments of our alumni.

Please keep in touch, and best wishes for your next year.

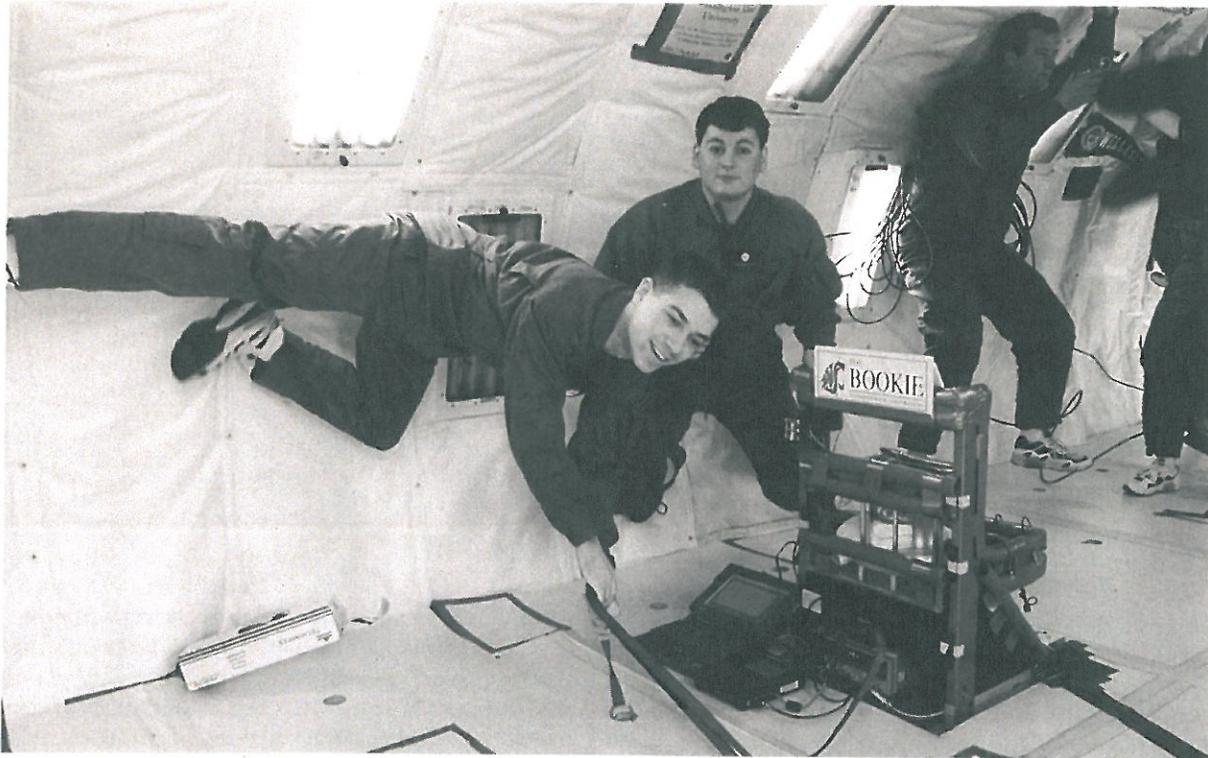
—Miles Dresser

McClusky from page 1.

optical and structural characterization techniques. In addition, Matthew has reported the first observations on InGaN quantum-well intermixing after annealing. In AlGaN, he observed oxygen DX centers, defects which had been predicted theoretically but never seen experimentally.

At WSU, Matthew is focusing on the response of semiconductors to both static and dynamical pressures. The application of these external perturbations can yield a great deal of insight into the structural and optical properties of these materials.

Please visit the department's web page at <<http://www.physics.wsu.edu/>>.



NASA's Reduced Gravity Flight

Once again, four physics undergraduates were invited to participate in NASA's Reduced Gravity Student Flight Opportunities program over spring break. The 16-day event had **Christopher Breckon**, **Joshua Clearman**, **Scott Douthit**, and **Richard Graff** off to Houston to fly aboard NASA's KC-135A plane, a.k.a. the "Vomit Comet." The aircraft flies parabolic trajectories, covering altitude changes around 20,000 feet. According to Chris, "The net result is the world's best roller coaster. When the plane goes up and begins going back down, the gravity inside is drastically reduced." The foursome studied the gravitational dependence of shockwave information and the transfer of heat when a small bubble formed from a hot element collapses. The collapse produces an audible sound. The group measured this "sound signature" and its gravitational dependence. Analysis will show any gravitational dependence of the aforementioned effects. Scott and Chris were making return trips—they both participated in NASA research last year.

If you would like to learn more about NASA's program for students, you can visit NASA's website at www.tsgc.utexas.edu/tsgc/floatn/. You may also wish to visit Chris and Rick's website which includes links and information about their project at www.wsu.edu/~socrates. And for more photos of our floating physicists, try www.physics.wsu.edu/GRADPROG/nasa/.

Student Honors

We proudly announce the names of the following students who earned places on the President's Honor Roll for fall 1998.

Arthur Binner, Wenatchee
Christopher Breckon, Bellevue
Rizal Hariadi, Dki Jakarta, Indonesia
Dirk Robinson, Colville

Many of the gifts from our alumni and friends support scholarships for our department's most deserving students. For the 1998-99 academic year, the following scholarship awards have been made.

Erin Craig, Spokane, received the Paul and Dian Bender Freshman Scholarship in Physics. Erin is a graduate of Mead High School.

Melissa Skala, Selah, received the Claire May Band Scholarship. Melissa is a graduate of Selah High School.

Rizal Hariadi, Dki Jakarta, Indonesia, received the Kate Webster Scholarship.

The following undergraduate physics majors received \$50 Physics Development Fund Book Scholarships for superior academic performance (3.30 GPA or better) during the fall 1998 semester: **Arthur Binner**, **Christopher Breckon**, **Rizal Hariadi**, **Michelle Repp**, **Dirk Robinson**.

In this issue of Physics Matters, we continue our series on the department's history with stories on the late **Chester Calbick** (this page) and the late **Al Butler** (page 7), former professors. We hope you enjoy reading about those who played an integral part in the building and shaping of our department.

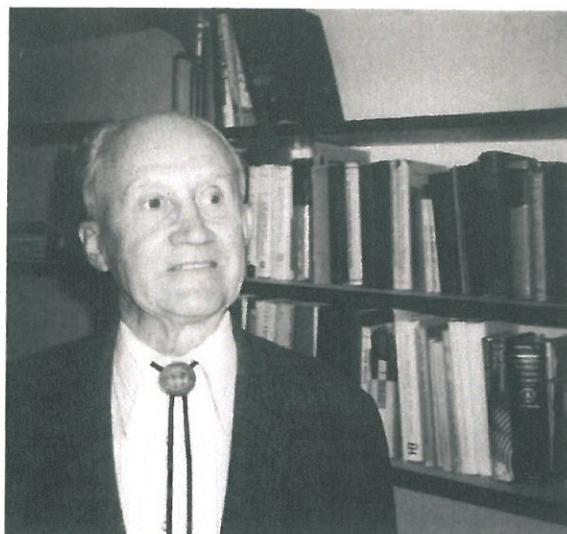
Chester Calbick's Contributions to the Discovery of Electron Diffraction at Surfaces

by Ed Donaldson, Professor Emeritus

In 1973, Chester J. Calbick, who had recently retired from Bell Labs, came to the WSU physics department as an adjunct professor. He participated in the work of the Surface Physics Group and was doctoral student Rolf Vatne's thesis adviser. Rolf's thesis concerned the development of one of the first photoelectric/thermionic electron microscopes and the investigation of the spatial distribution of electron emission from oxide dispenser cathodes. However, this brief article concerns Calbick and his historic participation in the discovery at Bell Labs of electron diffraction at surfaces and the wave nature of the electron.

It has been reported that Calbick immediately took charge of the experiment, and few of us who knew him doubt it for a moment. He had an orderly and thorough approach to problems that we could all admire.

Our story begins in 1920, when Clinton Davisson, with Charles Kunsman (at the Western Electric Laboratories, as it was then called), began studying electron scattering from materials. They discovered that when a beam of electrons was incident on a solid sample, about 1 percent of the electrons scattered back toward the electron gun with no loss of energy. Their further investigations were based on an analogy to the work of Ernest Rutherford. Because Rutherford had used alpha particles to probe the structure of the atomic nucleus, it was believed that elastically



Chester Calbick

scattered electrons could be used to examine the electronic structure of atoms. The measurements that Davisson made at that time were inconclusive and showed no significant structures in the scattered electron distributions. However, they published a description of the experiment and suggested that it might be used to support the shell model of the atom. It was actually a discouraging time for them.

In 1925, Davisson, with a young associate, Lester Germer, returned to the investigation of the elastic scattering of electrons from solid surfaces. On February 25 of that year, they had a fortuitous accident, and serendipity intervened. Specifically, their experimental glass vacuum tube broke and exposed the hot nickel target to air, causing it to grow an oxide layer. The oxide layer could only be removed by a prolonged heat treatment, first in hydrogen and then in vacuum, which they proceeded to perform.

Three months later, following this extensive heat treatment of the sample, they observed some hint of directed scattering of electrons. These new results called for explanation. So they cut the tube open, examined the target, and discovered that during the heating process the polycrystalline nickel target had fortuitously been transformed into a target consisting of a few relatively large single crystals. They correctly surmised that the new beams of scattered electrons must be caused by the *arrangement* of the nickel atoms in the sample and not by the *structure* of isolated nickel atoms themselves. Thus, they concluded that some cooperative effects among the atoms were producing the scattered electron beams. We should mention that at this time Davisson was not familiar with the recent developments in quantum mechan-

ics and matter waves, *i.e.*, diffraction was not on their mind.

Yet again, good luck intervened. During the summer of 1926 Davisson took a leave from Western Electric Laboratories to travel to England. He took with him some electron scattering data, which to him only showed rather feeble evidence of beams of scattered electrons. He was surprised that the European physicists he encountered quickly concluded that those small peaks in the scattered electron distributions verified the existence of deBroglie matter waves, *i.e.*, that the electrons could behave as waves. Clearly the Europeans already were believers in the reality of matter waves. On the return voyage, Davisson studied intensely the theoretical papers about matter waves and was convinced that his experiments were important to this new idea in physics.

At this point, 23-year-old Chester (Chet) Calbick arrived on the scene at Western Electric Labs. Calbick had recently graduated from Washington State College in electrical engineering. He had already become more interested in physics than in engineering and, in fact, subsequently took an advanced physics degree at Columbia University. Because Davisson's supervisors were also convinced of the importance of the electron scattering work, they assigned Calbick as an assistant to Davisson in the fall of 1926. It has been reported that Calbick immediately took charge of the experiment, and few of us who knew him doubt it for a moment. He had an orderly and thorough approach to problems that we could all admire.

By January 6, 1927, with Calbick's attention, the scattering results began to show much clearer patterns. Clean, resolved peaks were observed, and the scattering around the azimuth of the incident beam showed threefold symmetry. These were very exciting results that Davisson had been seeking over the last five years and must have served as compelling incentives for him to push the experimental program along as rapidly as possible.

To summarize what the situation was at Bell Labs at that time:

Davisson now had his hands on unambiguous diffraction data that called for exploitation. He knew that the physics community was waiting eagerly for his results, which would not only confirm the reality of matter waves, but would provide a new way to study crystalline matter.

Davisson believed that other workers in Europe were searching for the confirming evidence that he was beginning to obtain. He feared that someone might cut in front of him, so he sought prompt publication of his first results so that his priority would be established. He was right on this point, but he didn't know who the other scientists were.

The experimental results at Bell Labs still contained anomalous scattered beams which needed further study, and the results suggested many avenues in need of prompt exploration.

We can easily imagine how Davisson would have been eager to pursue this "gold mine," to push the experiment forward with vigor, and to get as far ahead of the competition as possible. Did he do this? Surprisingly, no! An unusual, perhaps inexplicable, event took place.

Chet was called to return to his home in Nelson, British Columbia because of the death of his mother. He was away from the labs from March 3 to April 6, 1927. During this period the experiments were halted. In spite of the obviously overwhelming pressure to

move the experimental work forward, no laboratory work was done until Chet returned.

Even though Chet was quite young, it is clear that the experiments could not have been conducted without his skilled participation. It is apparent that his presence was critical to the results. Because of his invaluable contributions, perhaps the work should have been designated "the Davisson-Germer-Calbick experiment."

As was mentioned at the beginning, Chet came to WSU in 1973 to begin an energetic retirement. He was still an active and interested scientist, and he interacted and collaborated for several years with members of the Surface Physics Group in their ongoing work. He always enjoyed talking about electron scattering, electron emission, and basic vacuum and surface science. We were fortunate to have him as a colleague.

Further information about Calbick and electron diffraction can be obtained from Physics Today, Feb. 1974 and Jan. 1978; Physics Matters 1995-96, "Remembering Chester Calbick"; and an oral history tape recording in the WSU Archives (May 1985) by Calbick. I thank Tom Dickinson for making me write this and for his suggestions.

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Around the Department

Assistant professor **David Citrin** received a Presidential Early Career Award for Scientists and Engineers. The award is the nation's highest honor for outstanding scientists and engineers who are in the early stages of their careers.



David Citrin

Professors **Yogendra Gupta**, **David Citrin**, **Kelvin Lynn**, and **Phil Marston**, as principal investigators, hosted a visit by Rear Admiral **Paul G. Gaffney II**, chief of naval research, and **James DeCorpo**, associate technical director at the Office of Naval Research. The PIs updated the visitors on ONR projects at WSU during the two-day visit last October.

The word is, the Institute for Shock Physics, **Yogendra Gupta**, director, is running strong with a five-year, \$10 million grant from the Department of Energy. The institute is slated to hire several individuals over the next several months. Contacts have been made with national laboratories, including Sandia.

The Center for Materials Research, **Kelvin Lynn**, director, has generated two grant proposals and participated in several others this past year. The largest is the NSF-IGERT submission generating graduate student support in materials. Lynn has received several major grants for application of his positron research and is a good contact for Lawrence Livermore National Laboratory. In his lab, he looks for defects in semiconductor materials, including those found in microprocessor chips. He is Boeing Chair in Advanced Materials.

Mark Kuzyk, associate professor of physics and material science, has been named a fellow of the Optical Society of America.



William Torruellas

The Department of Physics, along with the College of Sciences, recently sponsored a one-day workshop for 11 Washington companies interested in optics and optoelectronic materials. According to **William Torruellas**, assistant professor of physics and workshop organizer, optoelectronics has the potential of defining many of the technologies of the

Alums—Where Are You Now?

For our next issue of *Physics Matters*, we would like to know where you are and what you are doing. Please drop us a line at Department of Physics, Washington State University, PO Box 642814, Pullman, Washington 99164-2814.

Marcus Knudson (Ph.D. '98) is a senior member of technical staff at Sandia National Labs, Albuquerque. He is in the Shock Physics Applications division and is working in shock physics, using the Z accelerator at Sandia to perform shock physics experiments in the new Mbar pressure regime.

Dennis Roberson (B.S. '71) is vice president and chief technology officer of Motorola, Inc.

Kevin Williams (Ph.D. '85) was cited by *Journal of the Acoustical Society of America* for his contributions to measurement and modeling in ocean acoustics. Williams is employed by Applied Physics Laboratories at the University of Washington.

James Dull (M.S. '86) is assistant professor of physics at Albertson College, Caldwell, Idaho.

John Aidun (Ph.D. '89) is a member of the Engineering and Manufacturing Mechanics Division at Sandia Laboratories, Albuquerque, New Mexico.

Scot Morse (Ph.D. '98) has taken a postdoc position at the Physical Acoustics Branch, Naval Research Laboratory, Washington D.C. He is working in the field of acoustics, specifically, the micro-scale acoustics of composite systems. His aim is to more fully understand the acoustics of compliant (i.e. rubber-like) coatings for underwater structures, such as quieter submarines. In June 1998, he won a first-place prize of \$500 for a paper he submitted to the Acoustical Society of America (ASA).

Karen Gipson (Ph.D. '98) received an Honorable Mention for the Harriet B. Rigas Award, spring 1998.

Nathaniel Hicks (B.S. '98) has begun work toward a Ph.D. at Stanford University.

In Memoriam

Samuel B. Mompongo (B.S. '65) died in 1997 in Africa. He came to WSU from Zaire, formerly the Belgian Congo. His dream was to build a school in his home town of Ntondo. While at WSU, he collected funds from students and promised to name the school the WSU High School. When he returned to his village of 3,000 people, he organized people into teams and started on the school. It took eight years to complete the project. The spacious structure served 700 students. He became the first director, and classes began years before the structure was completed, with students contributing labor to finish the job. Later distinctions included Sam's appointment as Minister of Education in the Zairean Government and his membership on the original board of Habitat for Humanity.

Joseph Muscari (Ph.D. '66) died March 29, 1998 in Littleton, Colorado. He was not only a physicist, but also a writer and avid sailboat captain.

coming century. A common goal for the meeting was to "identify common interests and to achieve an even higher level of competitiveness for both the academic and industrial participants."

Lisa Morris, instructor, was awarded a Center for Teaching and Learning Summer 1998 Faculty Fellowship.

Some History of the WSU Physics Department

by Alfred B. Butler, Professor Emeritus of Physics
(1911-1997)

During World War II there was a great need for applied science research. As just one instance, when the Japanese landed on Kiska in the Aleutian Islands, they were observed on the radar. However, the landing was actually beyond what was thought to be the range of the radar. In other words, it was over the radar horizon. While planes were sent out and bombed where the radar operators said the Japanese were located, nothing was damaged "but the whales who were there." It became obvious that something needed to be learned about the distances which radar could be expected to operate. As a result, the Office of Scientific Research and Development (OSRD) let contracts to five schools to examine this phenomena. The WSU physics department received one of those contracts. MIT was among these five research groups as well.

The enrollment of WSU was down due to the war, and the department consisted of **Kenneth E. Fitzsimmons**, **S.T. Stephenson**, and **Paul A. Anderson**, chairman. When the contract was awarded, they asked **C.L. Barker** of civil engineering to join in their work. Each of these men had great strengths in various aspects of the work, and they made up a very effective team.

To carry on the work, they had to design and build a 10 cm. radio transmitter. This was the first modulated 10 cm. wave in the world. Many years later Bell Labs "invented" such a system, but then found out that our WSU men had done it much earlier.

The work was super secret, of course. You couldn't even mention the word "radar." The plan worked out by this group was to send 10-centimeter radio waves across the Palouse from Mt. Spokane to Steptoe Butte and also to the Blue Mountains. This would allow them to check transmission characteristics along with the meteorological conditions on the transmission path. It was suspected that the radar might be finding some conditions which provided a wave guide. If this were so, then the transmissions might be bending beyond the horizon.



This photo of Al Butler appeared in the March 1976 edition of Hilltopics.

To carry on the work, they had to design and build a 10 cm. radio transmitter. It would be convenient if they could talk over the system, so they built a modulator for the transmitter. This was the first modulated 10 cm. wave in the world. Many years later Bell Labs "invented" such a system, but then found out that our WSU men had done it much earlier.

Nowadays it doesn't seem like much of a job to carry equipment up to the top of Mt. Spokane, but in those days there was no road that was plowed during the winter, and it meant a hike of some considerable distance, carrying heavy loads, to establish the station on the mountain. The procedure was to transmit from one station and observe the reception at the second station. They also had to correlate the signal strength with the meteorological conditions at the time.

Not only was transportation of equipment difficult at times, just obtaining equipment you needed was a problem. All manufacturing companies were swamped with the needs of the armed forces, and the ordinary citizen couldn't go out and buy just anything. There was rationing of gasoline and some foods, and many things couldn't be had except by a high-priority rating. Our group had an A-1-A rating, so could at least order the equipment. There was also a delivery problem. Even though your order might be accepted, there might be such a demand before you that there would be considerable delay, even with the high priority.

One bright point was that Barker was a radio "ham" and had much necessary radio equipment. However, they did have some problems in explaining their activities sometimes. They had taken a truck with their gear to a likely spot to be on a line of sight with Mt. Spokane and close to the line with Steptoe Butte. Hav-

ing a truck drive into an uninhabited area aroused the suspicions of a farmer along the route, and when the group went about setting up a radio antenna, this clinched his suspicions. He called the sheriff. But when the sheriff arrived and asked what they were doing, all they could say is that they were working on a secret project for the government. That didn't sound too great to the officer, and when he asked for further details they really couldn't give him any. They did give him enough information as to whom he might call to verify that they were actually working for the government war effort, so he finally left.

It always sort of tickled the men when they would talk to one another. Half of the conversation was over

regular radio, which the FCC had equipment to monitor. The other half was over the 10 cm. set, and no one except our group had any means of receiving and demodulating such a signal. They could imagine the FCC hearing just half of a conversation and hunting frantically for the responding signal or message. Carrying equipment by snowshoe up to Mt. Spokane

gave them plenty of time to think of conversations which would leave a listener just hanging on answers he couldn't ever find.

By 1943 the work was well along, and WSU's team actually won the contract to build equipment that could be used by the Navy to determine radar ranges. Our team's work was judged the best from among the competing universities. The meteorological conditions fairly near the ocean's surface were very important to know, for it was near the surface where you might have an inversion which would serve as a wave guide for the radar signals. In order to do this effectively, they designed an instrument package that could be flown from the back deck of any naval ship. It consisted of a large box kite which could carry an instrument package to almost any elevation. There was an instrument portion which would be sent aloft and another that would be at the ship's deck to monitor conditions. A number of such packages were built, and several sets were taken on Navy ships to portions of the Pacific—Panama, for instance. Everything worked well, and they proceeded with the building of gear at the WSU campus in Pullman. At this point, they hired several other people who could help in parts of the construction, notably **Dale Riggins**.

The contract for the kites was given to Mr. J.R. Edmunds of Wray, Colorado. He made the box kites out of fine cloth and straight-grained spruce wood—both hard items to find in a war economy. The kites, which

cost \$75 each, were of superb quality. Each was encased in a canvas sack for protection and ease in carrying.

In designing the final form of the equipment, the team had an interesting resource on campus. The chemical engineering department had the pilot plant for the large magnesium plant at Willow Run, Michigan. As a result, while most of the country was "starved" for this light, strong metal, our team had access to magnesium right from our own magnesium production line. Of course, the demand was small, and the pilot plant easily had the needed amounts available.

Suddenly, with the development of the atomic bomb, the war was over, and all work stopped on contracts such as our department held. It was time to rebuild the department for its responsibilities for instruction and research. Dr. Anderson had made an agreement with Dr. Holland, president of WSU, that the overhead money from the OSRD contract should be held in a special account and not spent for general college needs, only those directly related to the needs of the physics department. (I think the reasoning went that our team had "earned" this money, and while they had used the department's facilities, those facilities would need refurbishing and renewing after the war.) This agreement was honored and, in effect, the instrument shop of the physics department was purchased with some of those funds.

Some of the funds were used to obtain "war surplus" machine tools. Whenever the demand on the physics shop was "low," the men would rehabilitate these war surplus tools. Any that they didn't need they could trade for something more useful. In a sense, with the help of this physics "reserve" fund, the shop pulled itself up by its bootstraps. Its cost to the college was minimal for a shop of such quality.

FYI—PHYSICS

The Department of Physics has recently acquired two new recruitment CD's—one promoting our undergraduate curriculum, the other describing our graduate program. Both can be seen on our website at <http://www.physics.wsu.edu/>.

Eight Chairs and 34 Years Later: Mickey Daniels Remembers

We—my husband, two children, and I—arrived kicking and screaming in Pullman in August of 1962. My husband had just completed his master's at Utah State University and was enrolling in an American Studies doctoral program. Due to severe hunger, I was forced to apply for employment at WSU and was finally hired in December by the College of Engineering Mining Experiment Station and Chemical Engineering Research. I stayed in this position until spring 1964, when my children and I took a short "nervous breakdown" leave of absence and returned to Utah—on a Greyhound bus. In August 1964, we returned to Pullman, and it was then that **Ed Donaldson** offered me a job in the physics department. It was because of the "big bucks" that I stayed for 34 years.

The physics office was located in Dana Hall. Faculty and student offices were scattered throughout the building. Also included in the department were the glassblowing shop—**George Harris**—and the "Physics Shop"—**John Guptill**, **Emerson Hough**, **Tommy Hellesto**, **Paul Bellamy**, **Ron "Miz" Morriset**, **Joy Schrader** (graphics), et al.

The faculty at that time (1964) included **Band** (chair), **Bender**, **Butler**, **Dodgen**, **Donaldson** (acting chair), **Dresser**, **Duvall**, **Riggins**, **Murphy**, **Schultz**, and **Stephenson**.

At the time I was hired, the office was essentially a "one-person" office with responsibility for all budget stuff (what's an "encumbrance"?), correspondence, course material, and exams with the aid of one old typewriter (no mimeograph, adding machine, calculator, ditto machine, copier, electric stapler, or collator). Office machines other than a typewriter were used by permission of the College of Engineering. Later we were able to purchase a new electric IBM typewriter and one four-drawer file cabinet; however, only one drawer was used. I later found out that Dr. Band kept most all departmental budget info, student files, correspondence, etc. in his office. Upon his retirement, these files were transferred to department files in the main office. By the way, the dean's office consisted of **Dean B.R. Ray**, **Ruth Vanderwall** (bookkeeper, etc.), and **Martha Keeney** (dean's secretary).

The physics department had a wonderful library; that is, if you were interested in stuff most people couldn't spell, let alone know what it was. However, the department had a few students who made extremely good use of this library; the top of the stacks were a great place for storing bathroom supplies such as towels, deodorant (thank goodness), tooth brushes, shaving supplies, etc. I found out later that at least one student slept in the building during winter months, because he couldn't afford heat for his trailer.

The department later moved to the ugliest building on campus, Sloan Hall. I don't remember the exact date, maybe 1967. **Keith Brandon** had joined the department as administrative officer, and **Libby Morri-**

son was employed half-time to assume the duties of librarian and also assisted Keith with posting, etc. Additions to the faculty during 1964-69 were **Bunch**, **Couch**, **Dickinson**, **Fowles**, **Gruber**, **Hinman**, **Knowles**, **Lowell**, **Lutz**, **Miles**, **Park**, **Poshusta**, **Sandberg**, **Sandstrom**, **Styris**, **Thomas**, and **Tripard**.

I tried to find out how many chairs the department has had. The best I could come up with is in the table below. If it is correct, then I worked with all but Steele and Anderson.

B.L. Steele, 1919-31

P.A. Anderson, 1931-61

William Band, 1961-67

Edward E. Donaldson, 1967-74

G.E. Duvall, 1974-76

Sherman C. Lowell, 1976-77

James L. Park, 1977-80

Edward E. Donaldson, 1980-84

G. Richard Fowles, 1984-90

Michael D. Miller, 1990-

Faculty hired since 1977: (Did we not have new faculty between '69 and '77?) **Braunlich** and **Schmid** ('77); **Marston** ('78); **Gupta** ('81); **Miller and Walker** ('83); **Collins** ('85), **Pate** ('89), **Kapteyn**, **Kuzyk**, **Murnane**, **Radziemski** ('90); **George** ('91); **Wang** ('93); **Tomsovic** ('94); **Citrin** ('95); **Dexheimer**, **Lynn**, **Toruellas** ('96); **McCluskey** ('98).

It is impossible to name my "favorite" faculty, staff, or students, because all were special one way or another. I will miss you all.

— Mickey



Maxine "Mickey" Daniels retired from the Department of Physics August 31, 1998.

Department of Physics Honor Roll of Donors

Thank you for your generous support. We are proud to list the names of those who contributed to the Department of Physics or the College of Sciences in the 1998 fiscal year (July 1, 1997-June 30, 1998). We extend our appreciation to those of you who have already given this year as well; your names will be listed in the next issue of Physics Matters. Your gifts make possible scholarships and special opportunities for our students and faculty. Your support is very important to us. Thank you again!

Laureates

(Lifetime gifts of \$1,000,000 or more)

*William & *Claire May Band

Benefactors

(Lifetime gifts of \$100,000 or more)

Philip '33 & Neva (Martin) '34 Abelson

*William & *Claire May Band

Kate B. Webster

Silver President's Associates

(Annual gifts of \$10,000 or more)

Philip '33 & Neva (Martin) '34 Abelson

Mitsubishi Heavy Industries

Crimson President's Associates

(Annual gifts of \$5,000 to \$9,999)

Edward '48 & H. Virginia (Voss) '45

Donaldson

President's Associates

(Annual gifts of \$1,000 to \$4,999)

Yogendra '73 & Barbara '70 Gupta

Peter '83 & Susan (McDougall) '78

Majewski

L. Stephen Price '75 & Cherri DeFigh

Price '75

Dean's Associates

(Annual gifts of \$500 to \$999)

AVTECH

Michael J. Barbour '71

Eugene '60 & Margaret Burke

Charles '70 & Carron Collins

Ronald '68 & Sandra (Hudson) '69

Hanson

Dale '48 & Leila (Cook) '51 Martin

Tower Club

(Annual gifts of \$100 to \$499)

John Aidun '89 & Joan Harris

Cynthia G. Anderson '85

James '71 & Patricia Asay

Christos Bantis '91

Donald '58 & Eva (Brownhill) Beale

Gary '70 & Cleo Bennett

William '50 & Eunice Boyd

Bert E. Brown '49

Robert '68 & Diana Bushey

Donald D. Casey '73

Richard T. Casper '86

David '80 & Teresa '80 Cremers

Donald L. Dittberner '50

Wilbur '71 & Pamela Dong

Donald '51 & JoAnne (Lysek) Doran

Miles & Muriel Dresser

Leslie '37 & Carolyn Edwards

J. Greg '83 & Dian Field

Richard '58 & Annette (Weissenborn)

'59 Gordon

Dennis E. Hadlock '90

Richard P. Hernandez '76

Chung-Po Huang '91 & Tsui-Lin Hsu

'94

LeRoy '71 & Joanne Johnson

Scott '81 & Judy '82 Jones

Michael & Donalyn Kallaher

C. Robert '44 & *Virginia (Edsall)

Lagergren '50

Lawrence '79 & Brigid Larson

Arthur '43 & Justina Lathrop

Chelcie '62 & Katherine (Kyte) '62 Liu

Raymond '50 & Grace McCurdy

David '51 & Patricia McDaniels

M. Randy McKay '86

Michael & Mechthild '92 Miller

Sergio L. Monteiro '81

David E. '56 & Eileen Pettijohn

Allen L. Pitner '64

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Quinn

David '91 & Anna Repp

John '71 & Rhoda (Setterberg) '67

Roper

Carl E. Rosenkilde '59

Frederick '67 & Lila Schultz

Ralph '77 & Linda Simmons

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Joann Albers

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Jeffrey '84 & Kris '86 Furrer	Walter '54 & Robin (Douglas) '54	Garret '68 & Maureen (Warrick) '69
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James '52 & Jacqueline McCoy	David M. Scuderi '93	

*deceased

While every effort has been made to ensure the accuracy of this information, please note that some names may have been inadvertently omitted or misspelled. If your name does not appear correctly, please let us know at 509-335-8370.

Letters from Alumni

Thank you so much for the winning tee shirt. I will wear it with pride at every opportunity and with good thoughts of the department which I enjoyed so much and which did so much to help me have a better life.

Frederick Schultz (Ph.D. '67)

Your latest edition of *Physics Matters* evokes another recollection. S.T. Stephenson once told us about a time in his student days at Yale, I presume, when he had borrowed a physics or math book from one of his professors. At several places in the book he encountered a notation in the margin,

Wary
nell
?

This puzzled him, and upon inquiring of the owner, it turned out to mean, "Wary nell did that come from?" So, if someone asks you "Wary nell on the WSC campus was the photo of William Band [taken]?" the correct answer should be, it wasn't on the campus, but rather at his home, on the same

hill NW of campus as his later home on Fisk St. but probably in a different house. . . . I had seen Band in the commencement ceremonies, and asked him if he would pose for a picture at home, and he graciously agreed. (Too bad your newsletter wasn't able to use the colors.)"

Bert Brown (WSC, '49)

Thanks for the newsletters . . . It is always good to hear about the physics dept. activities. We have two granddaughters at WSU now but unfortunately neither seems to be unduly inspired by physics."

Lila and Dale Martin (B.S. '48, M.S. '50)

" . . . **I** have an 89-year-old friend who graduated from Stanford as an EE in the same class as Hewlett and Packard. He is legally blind, but plays the piano for our 350-member SIR's (Sons in Retirement) group and our associated singing group."

George Fullmer '44



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