

Physics Matters

1995-96
Department of Physics

Faculty Profiles

Steven Tomsovic

Steven Tomsovic, assistant professor of physics at WSU since autumn 1994, is one of two new theorists to join the faculty. His current research interests have grown out of his postdoctoral work with Professor E.J. Heller, Harvard, and Professor O. Bohigas, Orsay, France where he worked extensively in a field that is often referred to as "quantum chaos." Their goal is to understand the deep connections between classical and quantum mechanics, especially in circumstances involving chaos. His work was featured in a July 1993 *Physics Today* article that he co-authored with Heller. This spring he is co-organizer of a five-month-long program at the Institute of Theoretical Physics, Santa Barbara, California, entitled "Quantum Chaos in Mesoscopic Systems."

Steve received his Ph.D. from the University of Rochester, Rochester, New York, under the direction of Professor J.B. French. In his thesis he developed new statistical methods for analyzing symmetry violation in heavy nuclei which was applied to Eugene Wigner's test of time reversal invariance in compound nuclei. In an ongoing collaboration, he is applying these same ideas to understanding the neutron resonance parity violation experiments being carried out at Los Alamos National Laboratory.

Steve already has an NSF-funded postdoctoral associate on board, **Julie Lefebvre**. Together, they are investigating the role of underlying chaos and weak disorder in quantum interference phenomena found in electron transport properties of nanostructures. Exploiting classical dynamics in new semiclassical theories has provided explanations of several recent experiments, such as quantum fluctuations in the magnetoconductance through anti-dot arrays.



Professors David Citrin (left) and Steven Tomsovic with postdoctoral research associate Julie Lefebvre.

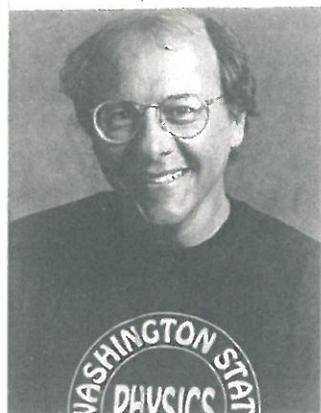
Steve is teaching at both the graduate and undergraduate levels. His advanced quantum mechanics course on scattering theory and relativistic quantum mechanics challenges our second-year graduate students. At the undergraduate level, he enjoys engaging his class in demonstrations that illustrate principles of electricity, magnetism, and geometrical optics.

David Citrin

David Citrin's research interests include the electronic structure and optical properties of semiconductor heterostructures and the dynamics of light emission and excitation transfer in condensed matter. How is light absorbed or emitted by solid materials, and how are these processes affected by the dimensionality of the structure, the presence of disorder, or the proximity to mirrors? Following his Ph.D. studies at the University of Illinois at Urbana-Champaign, he was a postdoctoral research fellow at the Max Planck Institute for

See Faculty page 2.

Greetings from the Chair



Michael Miller, Chair
Department of Physics

We are recovering from a hard winter here in the Palouse. As many of you are aware, we had a period of abnormally cold and snowy weather followed by rains and very warm temperatures. The result was, of course, serious flooding in Pullman and this section of the country. As a measure of how unusual things were, WSU canceled a day of classes.

We saw two of our faculty members leave this year (**Murnane** and **Kapteyn**) to take positions at the University of Michigan in EE. We are searching for experimentalists, and we expect to be able to hire four new people in the next two years. The quality of the applicant pool is very

high, and we are very optimistic that we shall bring in more outstanding young faculty. The highest priority is to enhance our presence in optical physics.

We have created two new courses this year. One is an honors version of our introductory Physics 201. This is being developed by **Tom Dickinson** with the support of **Howard Miles**. **Miles Dresser** and **Lisa Morris** have developed a new introductory science course, Physics 150, aimed at elementary education majors. This very useful hands-on course is trying to give the teachers of tomorrow a foundation which they can use to teach simple concepts to young children.

In the last academic year, we awarded seven bachelor's degrees, 11 master's degrees, and seven doctoral degrees in physics. The enrollment in our introductory physics courses has continued to increase, basically tracking the increase in enrollments at WSU.

The department joins me in wishing you all the best.

Michael Miller

Faculty from page 1.

Solid State Research in Stuttgart, Germany, in the group of Professor Manuel Cardona. There he developed a general theoretical formalism to describe the temporal behavior of light emission from low-dimensional semiconductors—quantum wells and wires.

The ideas developed at the Max Planck Institute were applied to new problems at the Center for Ultrafast Optical Science at the University of Michigan, where, as center fellow, he studied the optical dynamics of quantum wells embedded in microscopic optical resonators. Atoms in microwave resonators have been of interest for a number of years for the study of quantum mechanical effects associated with light.

Presently, as assistant professor of physics at WSU, David is continuing to explore theoretical issues associated with the dynamics of light interacting with solid-state materials. One project involves using ultrafast light pulses which are scattered off a semiconductor and then analyzed to characterize the disorder present in the material—resonant Rayleigh scattering. This technique shows promise to provide information about the quality of optical materials. In another effort, together with workers at the University of Michigan, David is working on the development of a high-speed optical switch of which he is co-inventor for the next generation of optical communications networks. This switch promises to be not just fast, but also should be able to operate at very high "bit rates."

David is currently serving on the subcommittee on Ultrafast Phenomena and Optical Interactions in Condensed Matter for the Quantum Electronics and Lasers '96 conference and is coeditor of a feature issue of the *Journal of the Optical Society of America B* entitled, "Radiative Processes and Dephasing in Semiconductors." David will be spending the summer of 1996 in Tokyo as a senior researcher at NTT (Nippon Telegraph and Telephone), where he will be working on optical dy-

namics and nonlinear optics in semiconductor optical resonators. And if you're not going to be in Tokyo this summer, look for him on the slopes of Snowbird, Utah, this spring, where he's an invited speaker at the workshop, Optical Properties of Mesoscopic Semiconductor Structures.

Around the Department

Miles Dresser received the College of Sciences Advising Excellence Award for 1994-95.

Dick Fowles retired from the physics faculty last May. He came to WSU in September 1966 from Stanford Research Institute. A reception for Dick and his wife, **Colleen**, was held in the Physical Science Building's lovely orange and green lounge. They are building a home on Orcas Island in the San Juan Islands and look forward to sailing, scuba diving, etc. We chipped in and bought Dick a "sailor's" watch.

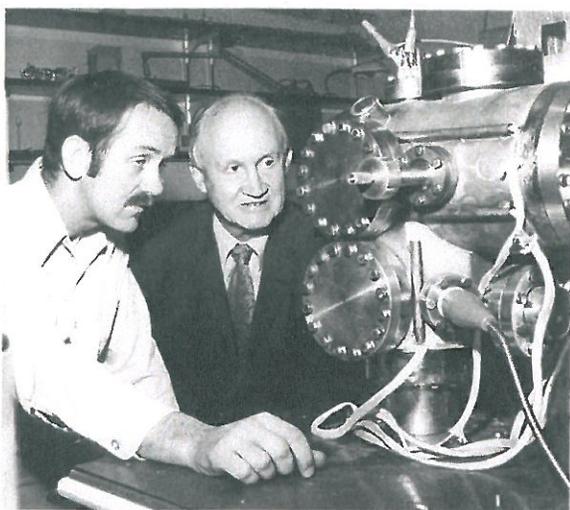


Ed Donaldson (left) conveys his good wishes to Dick Fowles at Fowles's retirement reception.

Yogendra Gupta and Ramamurthi Mahalingam (chemical engineering) received a \$50,000 Exceptional Opportunity grant from the Murdock Charitable Trust. Objectives of the work are to understand the fundamental mechanisms governing shock-induced chemical decomposition, polymerization, and catalytic activity in varied geologic media. The grant will fund a study of the potential of using large shock waves to rupture chemical bonds and cause polymerization in organic chemicals in the soil. The study may lead to new methods of rendering harmless chemical pollutants in soils.

Mark Kuzyk and David Welker recently obtained U.S. patents for "photomechanical positioning and stabilization method and devices using optical fibers and feedback."

Remembering Chester Calbick



Chester Calbick (right) is shown working with student Rolf Vatne in this 1977 photo.

Chester Calbick—Washington State College graduate, prominent physicist, and a man from humble origins—has indeed left his mark here at WSU.

Born in 1903, Chester grew up on a small dairy ranch nestled among the Kootenay Mountains. He attended high school in Nelson, a town which he called "rough at the edges" with saloons, hotels, and brothels. In 1918, his abilities landed him the Governor General's medal for being the top student in his province. This encouraged young Chester to seek out university admittance, but a lack of scholarships hampered his dream.

However, Chester wrote to Washington State College and was accepted. He enrolled in 1921. After four years and many academic honors, Calbick was offered a position at the newly-organized Bell Telephone Laboratories. He accepted immediately.

Calbick was assigned to a department that worked with the basic physics of vacuum tubes, which was headed by C.J. Davisson. Davisson would later win a

Nobel Prize in 1937 for the discovery of electron diffraction. Chester then had started graduate work in physics at Columbia University. After receiving his master's degree in physics in 1928, he started work on the early designs of television: a hot new concept at Bell Labs.

It was in 1929 that Calbick demonstrated the first television using mechanical scanners. Working with Davisson, together they developed a lens that could focus electronic images. Between 1934 and 1939, Calbick and Davisson developed a high-quality television receiving tube. It was considered by some to be the highest-quality receiving tube produced in that period—before the war and up to the 1950's. The duo were extremely proud of their accomplishments, and they exhibited the tube at the New York World's Fair in 1939. Together, Calbick and Davisson held seven patents for various features of the tube.

During World War II, Calbick continued to advance at Bell. He was in radar and was assigned to develop test equipment for the magnetron—the heart of a radar system. It was not until after the war that Calbick turned his attention to what many would call his specialty: the electron microscope. He worked in microscopy extensively, and later would receive the first Certificate of Recognition by the Electron Microscope Society of America for his work in electron optics.

After a career spanning 43 years and covering significant scientific fields—thermal emission, electron diffraction, electron optics, vacuum tubes for television, pulsed magnetrons, the structure and growth of thin films, surface physics, and electron microscopy—Calbick met up with **Arthur Cohen** in Boston, Massachusetts.

Cohen was the director of the electron microscope section here at WSU, and when they both presented historical papers at the Boston convention, Cohen encouraged Calbick to return to WSU. Calbick accepted the invitation and drove to Pullman in 1972 for a visit. It was in 1973 that the now prominent physicist returned permanently to Washington State with a rank akin to professor emeritus. He then designed a photo-electron microscope for the physics lab and consulted with a number of firms working directly with physics. Describing his position in *WSU Hilltopics*: "It is the best of two worlds. I can keep an interest in my professional field of physics, and yet I am free to travel when and where I want."

Chester Calbick took part in the technological revolution from the age of steam engines to supersonic travel. Writing his autobiography in the *EMSA Bulletin*, he summed up his life in these words: "My life has been more or less coincident with the great scientific revolution, from classical physics to quantum mechanical physics leading now to Grand Unified Theories. . . . I am glad I had some small part in this 20th century revolution."

Calbick passed away on March 31, 1990.

In Memoriam



George Harris, 86, passed away October 10, 1995, at his home in Pullman. He was born in England, and at the age of four moved with his family to Toronto, Canada, where he lived until moving to Pullman in 1952. George started blowing glass for the Canadian Radio Manufacturing Corporation in Toronto in 1926. Most of

the work was manual then, and the firm was producing radio tubes primarily. Harris also worked for a neon sign company for a time before coming to WSU. George retired from WSU in June 1974. He is survived by his wife, Doris; daughter, Dorian; and son, Norman. George was a good friend to all who knew him, and we will miss him.



A memorial service was held for **Thomas Edward Lutz**, 54, (astronomy, physics, mathematics) who died February 20, 1995 from cardiac arrhythmia at his Pullman home. Tom, a WSU faculty member since 1969, was known internationally for his research on the distances to stars. He also was an outstanding teacher who particularly liked doing hands-on learning

with his students. Tom's wife, **Julie Lutz**, is presently chair of mathematics at WSU. The College of Sciences has named its Annual Distinguished Teaching Award after Tom.



Cecil M. Hazen, 82, retired physics department employee, died December 29, 1995. Cecil began working for the department in 1965 and retired in 1976. He was a member of the Elks Lodge and enjoyed golf, bowling, and traveling. He is survived by one daughter, **Ruby Jones**, of Pullman; one sister,

of Shelbyville; four grandchildren; and three great-grandchildren.

Ira Thomas Myers (B.S. 1948; M.A. 1952) suffered a stroke in December 1994 and passed away October 1995. Ira was employed as a senior scientist for NASA in Cleveland, Ohio. He is survived by his wife, Betty.

Word has also been received of the deaths of **Maurice E. Knowles** (B.S. '50) and **Willard Norton** (B.S. '37).

President's Academic Honor Roll

We are proud to announce the names of the following physics students who earned places on the President's Honor Roll for fall 1995.

Arthur Binner, Wenatchee
Jeffrey D. Hall, Colfax
Justin Jacob, Wapato
Alexandre Klementiev, Tacoma
David Lishner, Spokane
Julia Plummer, Spokane
Susan Richardson, Richland
Chad Sprouse, Mountain Home AFB, Idaho
Dane R. Vinson, Vancouver

Alumni Achievements and News

Alums: Where Are You Now?

For our next issue of *Physics Matters*, we would like to know where you are and what you're doing. Please drop us a line. A postage-paid envelope is enclosed for your convenience.

Richard Lindsay (Ph.D. '61) retired January 1, 1995, from Western Washington University. He has joined the emeritus faculty at WWU.

Dean Casey (Ph.D. '73) is presently manager, Network Systems Department, GTE Laboratories in Massachusetts. He is responsible for a department of 22, working on advanced communication systems for video and data networking.

Life after Pullman

Students earning Ph.D.s from WSU's Department of Physics go on to a variety of careers. Here are some of our recent graduates and their locations.

Michael Boteler '93, Army Research Lab, Maryland
Zhenming Wang '93, U. Texas Medical Institute
Fassil Ghebremichael '93, Purdue University
Thomas Matula '93, U. of Washington APL Lab
Leonid Muratov '94, West Virginia University
Constantina Poga '94, Max-Planck-Institut, Germany
Gregory Kaduchak '94, University of Texas
Christos Bandis '94, Electron Spectroscopy Lab, WSU
Thomas Asaki '95, Los Alamos Scientific Lab, New Mexico
John Stroud '95, U. Cincinnati College of Medicine
Praveen Sinha '95, University of Wisconsin
Richard Webb '95, Pacific Union College, California
Chung-Po Huang '95, Quantronix Corporation
Jianping Zhou '95, Massachusetts Institute of Technology

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"Loose Lips Sink Ships": Parts 2 & 3

by Alfred Butler

During World War II, "loose lips sink ships" was a common saying, cautioning U.S. citizens to be careful of what they said. It warned people how simply an enemy might pick up information that could be very detrimental to our country. I know of three instances where this might have been the case. [Butler's first example appeared in the 1994-95 edition of *Physics Matters*.]

A second instance occurred in the Northern Pacific depot at Pasco, Washington. This was a railroad town which was exceedingly busy with war-related traffic. The men there knew that the Milwaukee R.R. was handling a good deal of freight on its Hanford branch. This was just off of the mainline, which was electrified. A rail fan friend of mine was working for Pacific Power and Light, which had a substation at Pasco. He showed me one day how he could keep track of the trains on the Milwaukee by watching the power drawn by the substation at Taunton, where the railroad supplied some of its trolley current.

Just what was being built and produced at Hanford was not known, just that lots of material was going in and they didn't see any freight coming out. However, one night in Pasco a man nudged my friend and said, "You want to know what they are making at Hanford? What's in that briefcase is what comes out." My friend looked and saw the gentleman ready to board the train with a briefcase chained to his wrist. That's all that was said or seen. What did it mean?

To someone with a good background in chemistry, physics, or even biology, it meant the likelihood of 1) a very high explosive; 2) a chemical or biological weapon, much more likely to be chemical than biological; 3) atomic energy of some kind.

This may seem like stretching the probabilities, but for physics students, atomic energy was a distinct probability at that time. In fact, one physics text actually had a diagram of how an atomic bomb might be constructed. This text was published sometime before December 7, 1941, and it was withdrawn from distribution before Hanford became a reality. However, lots of material going in, and something very concentrated coming out: that would be all an enemy would need, to know that this was a military target of first order. A simple sentence leaked vital information, which fortunately didn't reach the ears of Japan until much later.

The third instance of "loose lips" occurred within the chemical establishment itself. The dean of the Graduate School at Washington State College wrote a letter to one of his professional journals suggesting that they should have a section of the American Chemical Society at Hanford or Richland. This was all it took for him to be visited immediately by the FBI.

"How had he happened to make this suggestion?" The dean, who was an organic chemist, said it was



Al Butler

simple. He had noticed that a lot of chemists had their addresses changed to the Richland area, and there were certainly enough of them to warrant a chapter of the A.C.S. He had noticed that the address changes, which were published in the journal, had a higher than usual number of men who had specialized in rare earth elements, etc. Needless to say, the journal stopped such address changes immediately, and again, fortunately this information was not intercepted by enemy agents.

Scholarship Recipients, 1994-1995

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

Jennifer Hille received the George Duvall Shock Dynamics Award for her superb overall academic performance as a physics major and meritorious service to the Center for Shock Dynamics.

Colette Sacksteder and **Nicole Dawson Ricelli** received the College of Sciences Distinguished Student Award. Colette and Nicole were excellent physics students and cofounders and officers of Women in Technology and Sciences (WiTS), a support group for mathematics, sciences, and engineering students.

Jeffrey Hall, Colfax, received the Paul and Dian Bender Freshman Scholarship in Physics.

Reneé Cummings, Sumner, **Kristina Kimbrough**, Spokane, and **Michelle Repp**, Snohomish, received Claire May Band Freshman Scholarships.

Orion Carlisle, **Daniel Guenther**, **Colette Sacksteder**, and **Jason Swift** received Paul Anderson Awards for outstanding graduating seniors. They received B.S. degrees in 1995.

We are looking for additional scholarship funds to support talented freshmen. We would appreciate any donations for this purpose.

Letters from Our Alumni

The letters we receive from you, our physics department alumni, are always greatly appreciated. We hope to hear from more of you. We are very interested and would like to share your accomplishments with your fellow alumni and our current students. If you like, use the enclosed envelope to keep in touch.

"... I remember good times there in Pullman, taking classes from **Dr. Butler**, **Dr. Band**, and the last semester of theoretical physics under **Dr. Duvall**.

I have **Dr. Paul Bender** to thank for his suggestion that I apply for graduate work at the University of Colorado, where I won a research assistantship at the cyclotron working with **Dr. Rodman Smythe**. I also worked with three physicists from Los Alamos on a proton-proton spin correlation experiment, getting a good feel how experimental physics really works.

Unfortunately, I was not able to secure my Ph.D. and had to settle for an M.S. I took a job at the nearby Rocky Flats Nuclear Weapons facility, where I worked for 24 very rewarding years. The first seven years there I worked in cryogenics, building a liquid hydrogen laboratory in support of work being done for the Lawrence Livermore Laboratory, probably my most rewarding years. Completing that project, I became more of a support mathematician and computer guru for a chemistry R&D group. I developed automated digital data acquisition technologies and provided computer assisted data analysis for a very wide range of R&D and production support projects. I established and maintained production and research computer data bases and "translated" engineer's requirements for the statisticians who provided their analyses. Not bad for a person with only two weeks of formal computer training! I also provided plant liaison with the Los Alamos Laboratories on a variety of projects but never again met the three researchers I had worked for at the cyclotron. I eventually attained the title of Research Scientist, the highest technical level available and equivalent to Ph.D. level work.

I accepted early retirement in 1992 at the age of 50 when the DOE terminated production work at the end of the cold war. My wife, **Norma**, and I keep busy working at the apartment buildings (two) which we purchased as investments during my years at Rocky Flats. I also am active in amateur radio and have contributed significantly to the development of CLOVER, a digital communications system invented by my old Chelan High School friend, **Raymond Petit**, for the noisy high frequency bands."

*G. Edward Bixby (B.S. '64, WSU; M.S. '67, CU)
Boulder, Colorado*

"... I wasn't particularly thrilled with my M.S. thesis research in (essentially) biophysics under **Paul Anderson**. What really turned me on to my future career was a course in EM theory out of Stratton, taught by **S. Town Stephenson**. When I heard from **Professor Richard Brown** that there was a place called the Microwave Laboratory at Stanford University, I knew I had to go there. However, Professor Brown discouraged me from doing so, since **William Hansen**, who was the founder and guiding spirit of the place, had just died, and the laboratory would surely go downhill. Not heeding his advice, I headed down to Stanford in the fall of 1952, and with the exception of one year at Linfield Research Institute (McMinnville, Oregon), I have been associated with Stanford ever since."

*Perry B. Wilson (B.S. '50; M.S. '52)
Redwood City, California*

"... Thanks for the Physics Department T-shirt. T-shirts like yours help get people interested in physics. We need all the help we can get in the understanding of science. My wife and I have T-shirts from the American Physiological Society. They show a large circle enclosing a human figure with silhouettes of four animals in the four quadrants around it (dog, cat, rabbit, and mouse). Outside the circle the words 'Research Animals Save Lives' and, at the bottom, 'The American Physiological Society.' Unfortunately, this T-shirt does not go over so well at non-scientific functions.

I have not checked on my MCV (Medical College of Virginia) T-shirt venture since the last of June. This shirt would read 'MCV Scientist.' Since all faculty, both pre-clinical and clinical, are now required to do research, this T-shirt could appropriately be worn by both groups. All the faculty that I have contacted like the idea.

I thank you again for the physics T-shirt and will wear it proudly. I also hope you will keep up the design contest. You certainly have a good program at WSU."

*Leslie Edwards (B.S. '37; M.S. '39), Professor
Emeritus, Medical College of Virginia, Sandston*

"... Thank you for the annual departmental T-shirt designed by **Sterling Backus**. Clearly Mr. Backus has talents in addition to his physics abilities. I find myself giving mini-lectures in physics to people who inquire about the designs, both this year's and the one for last year.

I almost made it to the AAPT meetings there last fall, but plans got changed at the last minute. Someday I hope to see the current department.

*Bert E. Brown (B.S. '49)
Tacoma, Washington*

Note: Donors who contribute \$100 or more to the Department of Physics receive the department T-shirt.

The Department of Physics Honor Roll of Donors

We are proud to report the names of the following individuals who have contributed to the Department of Physics in the recent past. Their generosity enables us to build programs of distinction and provides direct support to our students and faculty. We extend our warmest thanks to our donors and encourage others to join them in support of our department.

Laureates

(\$1 million or more in lifetime gifts to WSU)

AT&T Foundation
+William & +Claire May Band
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Benefactors

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AT&T Foundation
+William & +Claire May Band
M.J. Murdock Charitable Trust
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Tektronix

Silver Associates

(Annual gifts of \$10,000 to \$99,999)

Philip & Neva (Martin) Abelson '33, '34

Crimson Associates

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

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

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

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William '50 & Eunice Boyd
Bert E. Brown '49
Robert '68 & Diana Bushey
Alfred B. Butler '35
Donald D. Casey '73
Charles '69 & Sharyn Cole
Lewis '72 & Mary Coleman
Charles '70 & Carron Collins
Dean R. Denison '55
Dale Doering '77 & Toyoko Tsukuda
Wilbur '71 & Pamela Dong
Donald '51 & Jo (Lysek) Doran
Miles & Muriel Dresser
Leslie '37 & Carolyn Edwards
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Dennis '72 & Janet Hayes
Kelley H. Holtman
Gerald & Mary (Skidmore) Johnson '37, '40
LeRoy '71 & Joanne Johnson
Scott & Judy Jones '81, '82
Edwin '71 & Marilyn Karlow
Robert '47 & Christy Kinkaid
Wilton H. Kuehn '74
Carl & Virginia (Edsall) Lagergren '44, '50
Lawrence '79 & Brigid Larson
Arthur '43 & Justina Lathrop
Richard '62 & Madelon Lindsay
Mark '79 & Mary Linquist
Chelcie & Katherine (Kyte) Liu '62
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David '51 & Patricia McDaniels
Michael & Mechthild '92 Miller
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Sustaining

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John '35 & Helen Downie
James '61 & Carmela Estes
Vladimir & Alexandra (Karmansky) Filippenko '52
Jerry '76 & Cynthia Forbes
Julian L. Frese '39
George '44 & Mary Fullmer
Jeffrey & Kris Furrer '84, '86
Oliver M. George '25
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+George E. Harris
Timothy J. Haugan '86
William '78 & Susan Iverson
Henry '66 & Linda Jones
Joseph & Rosalind (Cheng) Kan '66
Harry & Violet (Frantzich) Kellinger '50, '49
Lee R. Koller '78
James A. Kooreny '69
David '52 & Alyse Lenz
James '53 & Jean Lonborg
Robbe & Gloria (Aylesworth) Lyon '70, '73
James '52 & Jacqueline McCoy
Raymond '50 & Grace McCurdy
John & Helana (Haytas) McIntosh '92
Everald '68 & Patricia Mills
Dean A. Millsap '53
Joseph '66 & Patricia Muscari
Betty L. Myers
+Ira T. Myers '48
Robert '68 & Marion Pelton
Richard C. Raymond '38
Fredrick '64 & Denise Reinke
James '54 & Norma Rollins
Kevin J. Romero '85
Donald '63 & Terre Rottler
Ivan & Beverley (Becker) Rouse '74, '72
John N. Sanders '81
Frederick '67 & Lila Schultz
Louis '93 & Maria Scudiero
Xiao-An '84 & Amy Shen
Ralph '77 & Linda Simmons
Clifford & Beckie Kastl Stephan '90, '88
David '73 & Elizabeth Unger
Rolf '78 & Mary Vatne
Gordon E. Williams '56
Kevin '79 & Jerri Williams
+ deceased

Make a difference for Physics



Campaign WSU is a fund drive to raise \$200 million for scholarships, research, and access and retention programs; \$183 million has already been raised. In this final year of the Campaign, we invite all alumni to give to the academic area that is important to you.

Please use the enclosed envelope to:

- ▲ Share your news
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You can help a student...

Our science students need advisers and mentors to provide them career information through telephone and written contacts.

For details call Assistant Dean Ken Spitzer at 509-335-5548.



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Miller's Maulers



Twice a week, members of the Department of Physics faculty, graduate students, and friends meet for a bone-crunching game of street hockey. The players practice outdoors under all conditions—in mid-winter at 25 degrees below zero (Fahrenheit!), during blizzards and hailstorms, in scorching August heat, and torrential April downpours. Pain and punishment are inflicted upon all players regardless of departmental status.

The team is called "Miller's Maulers" (after Professor Michael Miller, chairman of the physics department). Prof. Miller (front row center in the photo) graciously lent his name to the effort, after he was presented with a team T-shirt bearing his likeness, skull-and-crossbones style, against a pair of crossed hockey sticks. Boy, was he surprised! (We probably

should have asked him first). In 1995-96, Miller's Maulers ended an undefeated season by winning the intramural floor hockey championships by the unprecedented margin of 7 to 0!

The photo above was taken in Professor Miller's Solid State Physics class the morning after the big win. His expression of incredulity is due to the impromptu nature of the photo-op. A horde of men and women bearing sticks and wearing their championship T-shirts barged into the classroom and surrounded the mild-mannered professor. Defenseless, Prof. Miller turned and faced the camera. (We probably should have asked him first.)

Prof. Miller has been unavailable for comment.