

Physics News

MICHIGAN TECH PHYSICS DEPARTMENT NEWSLETTER

Winter 1999-00

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A note from the Chair

*By Dr. J. Bruce Rafert
Professor and Chair*

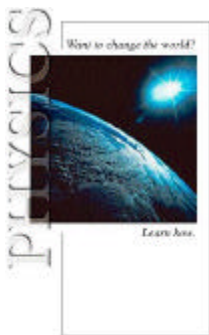


Faculty, Students, and Alumni:

I've some exceptional news to share with you in this issue of the Physics News. First of all, join me in congratulating Dr. Raymond Shaw (our newest hire) on obtaining a NSF CAREER Award. These prestigious research awards are offered to our nation's most exceptional university researchers, who demonstrate excellence in both research and teaching. Physics now has both of the faculty who have received NSF CAREER awards in the College of Sciences and Arts at Michigan Tech.

Next, it's noteworthy that research activity in Physics has now grown to the point where our extremely competitive externally funded activities lead the College, and have surpassed many of the engineering departments as well. All sorts of opportunities have emerged for students in our graduate program as a result.

Finally, our undergraduate program continues to grow, with each entering class of first year students bringing a set of credentials that challenges those of the previous year's students. We can all be proud of Michigan Tech, our Department, and our efforts to help MTU 'Change the World'. Come visit us at <http://www.phy.mtu.edu> to find out more.



Current Research: Dr. Alex Kostinski

*By Alex Kostinski
Professor*



My recent research has been in the general area of atmospheric physics. With a collaborator, Dr. Arthur Jameson of RJH Sci., Arlington, Virginia, during the last 4 years we have completed a series of six articles in the Journal of Atmospheric

Sciences (Part VI has just appeared in the February, 2000 issue) devoted to the role of number density fluctuations in various precipitation phenomena. For example, the soothing sound of raindrops striking the roof of a house has long been considered a classic example of a Poisson process ("pure randomness") - yet we claim that this is often not the case because closer attention reveals "hints of rhythm" or correlations in the rain.

The physics is in the conjecture that in both, time and space, the uneven and intermittent mixing by atmospheric turbulence, among other factors, causes "patchiness" of clouds and rain on the scales of most experiments. This patchiness, in turn, is associated with correlations between drop counts corresponding to non-overlapping time (or space) intervals. Such correlations represent departures from the statistical independence assumption and, therefore, lead to deviations from the Poisson distribution.

We have also applied the above ideas and techniques borrowed from statistical physics (e.g., fluctuation-correlation relations) to analyze spatial distribution of cloud droplets. The results are described in: Kostinski and Jameson, "On the Spatial Distribution

Current Research

Continued from page 1

of Cloud Particles”, Journal of the Atmospheric Sciences, 2000, in press. Another application of this approach to the icing process is described in Jameson and Kostinski “The Effect of Stochastic Cloud Structure on the Icing Process”, J. Atmos. Sc. 2000, in press.

Together with a former Ph.D. student Dr. Alan Koivunen (currently on faculty in MTU’s Electrical Engineering Department) we considered an important problem in radar meteorology: optimal signal processing of correlated (in time) weather radar echoes. This work is described in: Koivunen and Kostinski, “A Feasibility of Data Whitening to Improve Performance of Weather Radar”, Journal of Applied Meteorology, 1999, pp.741-749 and Kostinski and Koivunen, “On the Condition Number of Gaussian Sample Covariance Matrices”, to appear in Jan. 2000 issue of the IEEE Transactions on Geoscience and Remote Sensing.

I spent the 98-99 academic year on sabbatical leave as a Visiting Fellow of the Laboratory for Atmospheres, NASA Goddard Space Flight Center, Greenbelt Maryland. There I had a chance to visit with another former Ph.D. student of mine, Dr. John Kwiatkowski who has become one of the key people behind NASA’s spaceborne radar TRMM (Tropical Rainfall Measuring Mission) success. I also collaborated with several Goddard and MTU scientists on a problem of radiative transfer in satellite monitoring of volcanic ash clouds e.g. see Krotkov, Krueger, Kostinski, Riley, Rose; “Effect of Particle Non-Sphericity on Satellite Monitoring of Drifting Volcanic Ash Clouds”, J. Quant. Spectroscopy and Radiative Transfer, Nov. 1999 and Krotkov, Torres, Krueger, Kostinski, Rose, Bluth, Schneider, Schaefer, Comparison of TOMS and AVHRR volcanic ash retrievals from the August 1992 Eruption of Mt. Spurr, Geophysical Research Letters, Feb.15, 1999.



*First Place -- Delta Sigma Phi
(Winter Carnival 1999)*

“The Copper Rise Cost Miners Their Lives”

Recent Degree Recipients - Fall 1999

Alan Koivunen, Ph.D.
Frank Underdown, Ph.D.
Daniel Moor, BS
George Zimmer, BS



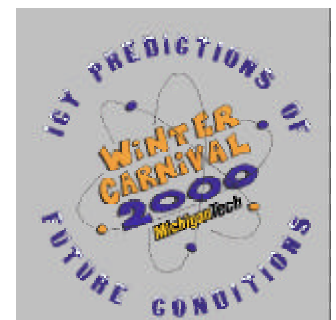
Department Update

Robert H. Mount, Assistant Professor, retired from the department on December 22, 1999. Professor Mount has been a Professor in the Physics Department for 45 years. We send our best wishes to Professor Mount for a happy retirement.

Donald A. Daavetilla, Associate Professor, will be retiring from the department on February 29, 2000. Professor Daavetilla has been a Professor in the Physics Department for 36 years. We send our best wishes to Professor Daavetilla for a happy retirement.

Cindee Molnar, Secretary, has recently received the Department of the Air Force Commendation Medal. Master Sergeant Cindee Molnar was awarded this medal for meritorious service as Electronic Intelligence Operations Support Superintendent and Assistant Unit Deployment Manager, Information Operations Control Division, National Air Intelligence Center, Wright-Patterson Air Force Base, Ohio, from May 17, 1999 to August 13, 1999.

The Blue Key National Honor Fraternity of MTU presents Winter Carnival - 2000 "Icy Predictions of Future Conditions" February 2-6, 2000. Check out the Winter Carnival 2000 web site at <http://www.hu.mtu.edu/~bluekey> for pictures of the statutes, updates, and carnival event results.



Thanks!

We offer our deepest thanks to friends and alumni who have made a recent contribution to the University. We appreciate your continued interest in the Department of Physics at Michigan Technological University

Raymond J. Dombroski, Jr.
Raymond E. Schramm
Gordon & Carla Lyon
Andrew & Janice Callahan
Bradford & Roseann Smith
Denise & Curtis Puisto
Jon H. MacLeod, P.E.
Alan & Kathy Boutilier
Warren & Barbara Jivery
B. Thomas Woodroffe
Guy & Susan Richards
John & Elaine Johnson
Anthony & Sharon Suppelsa
Roger & Susan Urbaniak
Ronald & Diane Case
Larry & Patricia Wittenbach
Gerald & Katherine McKindles
Norman & Beth Prange
Robert & JoAnn Matheson
Paul & Peggy Kaptur
Charles & Mary Zeigler
John & Helen Decaire
Rodney & Teresa Mattson
John & Pauletta Houston
Thomas & Dona Gould
Dwight & Adelaide Bishop
Joseph & Stephanie Roti
James & Donna Rafert
Ulrich Hansmann

Louis and Diane Hein
C. John & Kathryn Umbarger
Alfred & Deborah Trapanese
Randall J. Fisk
Donald & Ann Parry
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Joseph & Susan Rowe
Harold W. Paul
Thomas & Renee Kugler
Richard & Cheryl Detwiler
Thomas & Karen Freeman
Floyd & Pamela Croy
John P. Thyren
Peter N. Jansen, Jr.
Kenneth J. Javor
Mark A. Turkal
David & Sandra Lazarus
Dale & Lauren Mukavetz
Gary & Lynn Zulauf
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John & Elaine Johnson
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Thomas & Margaret Mohr
Gerald & Patricia Shroeder
Robert & Doris Pohanka
Thomas & Judith Essig
Fred & Jill Slocum
David & Crystal Byrd
David & Lucille Grewe
James & Brenda Cross
Gary P. Agin
Edward & Nina Nadgorny

Last year Michigan Tech attracted more than \$19.7 million in gifts with a significant portion of these funds coming from MTU alumni. These alumni chose their area of support at the University which included the Cornerstone Fund (unrestricted gifts used where the need is greatest), an academic department, a favorite scholarship fund, or a special program. During the 1997-98 Annual Giving year, 125 physics alumni chose to support their alma mater with financial contributions totaling \$ 24,620. Of these gifts, \$ 6,665 was designated for the physics department assisting in the achievement of several departmental objectives last year. In addition to the ongoing support provided by the Annual Giving Program, the Michigan Tech Fund has embarked upon its most ambitious fund-raising effort to date – a five-year capital campaign that will transform the image of the University from one of excellence to one of eminence. The campaign has an initial goal of \$100 million, aimed at helping the University continue to attract outstanding students and faculty, and to provide superior academic programs. According to the campaign plan, alumni giving will account for 70 percent of the goal, through cash, pledges, and planned giving. The remainder will come from the support of corporations and foundations. Your gift to Michigan Tech will help the University achieve this campaign goal, and will build an even greater academic institution for today's and tomorrow's students.



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Faculty Spotlight

Gary P. Agin
Associate Professor, Ph.D.
Kansas State University, 1968
Low Energy Nuclear Physics



A degree in physics is an excellent foundation for whatever career a student eventually follows. There are many “hidden physicists” in our society, whose job titles don’t mention physics. Physicists don’t just do physics research or teach. Some are engineers. Some are attorneys. Some are accountants. Some are corporate executives. The analytical, problem solving that is a major part of physics has application in most careers.

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