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WOOSTER *physics*

ANNUAL REPORT

*Summer "Research"
Adventures with a big marshmallow,
a bell jar, and a vacuum pump...*



Greetings! Last year was an exciting year in the department. We were able to increase the visits of the outreach program to local schools because of the enthusiasm and numbers of our first-year students. The class of 2013 looks like it could produce a record-breaking

✧ Greetings ✧

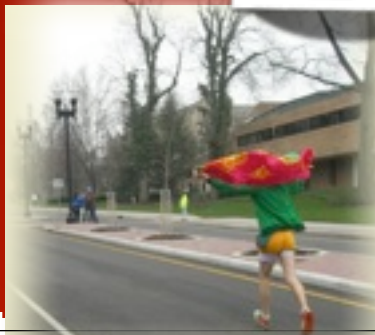
FROM SUSAN LEHMAN, CHAIR

number of majors! Our visiting particle physicist Deva O'Neil kept us all updated on events at the LHC at CERN, and our visiting astronomer Brendan

Miller set up several viewing nights with the telescopes. We're looking forward to another great year this year with John Lindner back from a research leave and our new tenure-track astrophysicist Karen Lewis.



*Mike Winters '10
celebrating completion of
Independent Study in
his own personal style.*



Class of 2010



Mike Winters, Heather Moore, Alison Huff, Rob Daniels, Corey Atwood-Stone

Raymond Michael Winters

Oak Park, Illinois

(Double major in Physics and Music)

Mike plans to travel in U.S. and abroad and then consider graduate school.

James Robert Daniels

New London, Ohio

Rob is in the Dual Degree Program with Case Western Reserve University and will be completing his second year of the 3/2 engineering program.

Heather Jean Moore

Fairport, New York

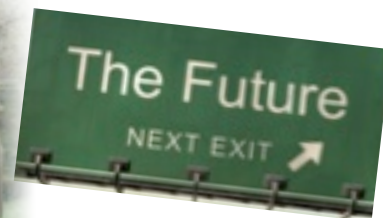
(Major in Physics, minor in Math)

Heather plans to teach at Clear Springs High School in League City, TX.

Alison Aiko Huff

Los Angeles, California

Alison is attending graduate school at Miami University of Ohio.



Corwin Atwood-Stone

Terry, Mississippi

Corey is attending graduate school at the University of Arizona to study planetary science.

Physics Faculty

Donald T. Jacobs

Victor J. Andrew Professor of Physics



AT WOOSTER
SINCE 1976

Ph.D Colorado
1976

BA, MA South
Florida 1971,72

TEACHING
2009/10

Electronics + lab
Senior I.S. (2)
On leave Sem. II

RESEARCH INTERESTS

- Phase transitions of liquid-liquid mixtures, polymer-solvent systems, triblock copolymers, micelles, and biological proteins
- Self-organized criticality
- Percolation of granular materials

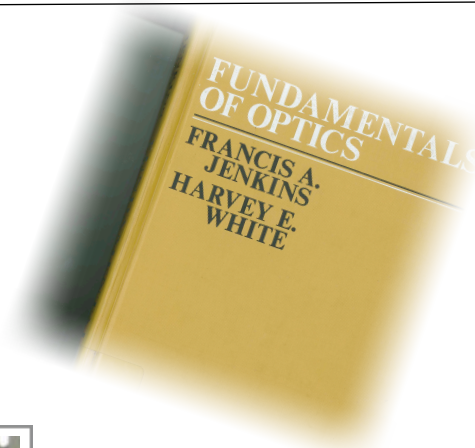
Dr. Jacobs took on a new role this past year as the Faculty Grants Associate, a position that assists faculty across campus in locating external funding sources and then writing more competitive proposals. He organized writing workshops, held webinars, prepared website material, and reviewed faculty proposals.

In his electronics course, in addition to modifying a new unit on programming using LabVIEW, he revised and extended a project-based learning module. Students were divided into three teams and given a Lego Mindstorms robot kit and charged with building a new sensor, interfacing it to the microprocessor, writing the software to access the sensor and then to make it work. The module worked well.



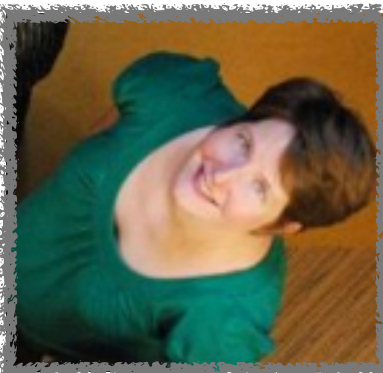
BETTER LATE THAN NEVER

A big thank you goes out to Shoaib Zaidi '89 for recently returning the book *Fundamentals of Optics* that he borrowed in 1988 from Dr. Jacobs. As it turns out, the book was from the library....maybe we should calculate the fines after 22 years! :)



Dr. Jacobs continued a multiyear Research Corporation grant “Cylindrical micelles from block copolymers: Self-assembly as an indirect model for biological systems”. He reviewed articles for the *American Journal of Physics*, *Journal of Chemical Physics*, and *Physics Review E*, as well as a grant proposal for the National Science Foundation.

Physics Faculty



Susan Lehman

*Clare Boothe Luce Associate Professor of Physics
and Chairperson*

This year was Dr. Lehman's first as department chair. In addition to all the administrative work that being chair entails, she also served on the Provost Search Committee and Financial Advisory Committee. She was the admissions liaison for the Physics Department and the Pre-engineering Program, colloquium coordinator, a senior mentor in the New Faculty Mentoring Program, and a panelist on "Attracting and Retaining High Quality Faculty Members" session for the Academic Affairs Committee of the Board of Trustees. Dr. Lehman had two publications appear:

❖ "Lateral variations in self-assembled InGaAs quantum dot distributions," A. Roshko, T. E. Harvey, B. L. Hyland, S. Y. Lehman, and K. D. Cobry, *Journal of Crystal Growth* 311:16, 4109 (2009).

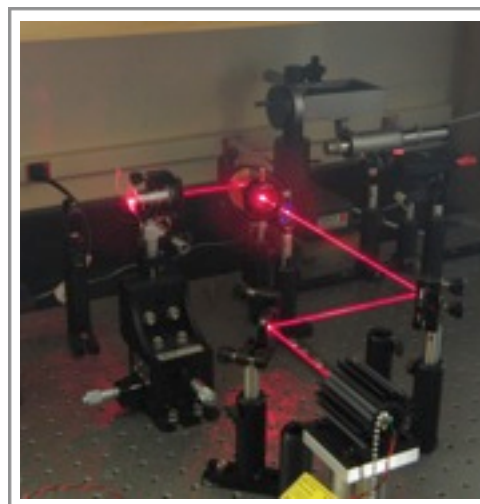
❖ "Topography of epitaxial GaAs surfaces for growth," S. Y. Lehman, A. Roshko, R. P. Mirin, K. A. Bertness, T. E. Harvey, and K. D. Cobry, *The Journal of Vacuum Science and Technology B* 27:3, 1072 (2009).

She is one of the Senior Personnel on "Acquisition of an X-Ray Diffractometer (XRD) and X-Ray Fluorescence Spectrometer (XRF) to Enhance Undergraduate Research at a Primarily Undergraduate Institution (PUI)",

an NSF-MRI proposal, funded January 2010, \$295,961.

SPECIAL DELIVERY

Dr. Lehman's most exciting accomplishment of the year was the birth of her and husband D.J.'s second son, Edward, born March 11. He joins big brother William, age 4.



Students in Jr IS used a fog machine to visualize the optical tweezers experiment.

AT WOOSTER
SINCE 2003

MS, PhD North
Carolina 1996,99
BA Goshen 1993

TEACHING
Foundations of
Physics
Modern Physics
Lab
Junior I.S.
Senior I.S. (2)

RESEARCH INTERESTS

- Cavity ring-down spectroscopy
- Semiconductor nanostructures with scanning probe microscopy

Physics Faculty

AT WOOSTER
FOR 2009-10

Brendan Miller



Visiting Assistant Professor of Physics

Dr. Miller attended the 215th American Astronomical Society Meeting in January and presented a poster “X-ray Emission from Optically Selected Radio-Intermediate and Radio-Loud Quasars”. He served as a referee for the *Astrophysical Journal*. He co-authored a paper entitled “A Chandra Survey of the X-ray Properties of Broad Absorption

Line Radio-Loud Quasars” which appeared in the *Astrophysical Journal*, Volume 702, pp.911-928 (2009).

Dr. Miller has accepted a post-doctoral position at the University of Michigan conducting research on high-energy astrophysics.

PhD Penn State
2009
BS MIT 2002

TEACHING
Astronomy of Solar System
Modern Physics
Foundations & General Labs
Physics Revolutions
Math Methods
Senior I.S. (1)

RESEARCH INTERESTS
•Radio-loud quasars
•Binary star systems

AT WOOSTER
FOR 2009-10

MA, PhD UC
Santa Cruz 2004,09
BS UC San Diego
2002

TEACHING
Mechanics
Particle Physics
Quantum Mechanics
Foundations & General
Labs
Senior I.S. (1)

RESEARCH INTERESTS
•Two-Higgs doublet model, a theory of multiple Higgs particles

Deva O'Neil

Visiting Assistant Professor of Physics

Professor O'Neil served as advisor to the Physics Club this year since Dr. Lindner was on sabbatical, and she did a very commendable job with our current group of very



ambitious and active physics majors. She also formed the department's first Physics Knitting Club and taught several students and faculty the basics of knitting. In February she attended the joint meeting of the American Association of Physics Teachers and the American Physical Society.

Dr. O'Neil has accepted a tenure-track teaching position at Bridgewater College in Virginia.



Physics Faculty

John Lindner *Moore Professor of Astronomy*

AT WOOSTER
SINCE 1988

PhD Caltech
1989
BS Univ of
Vermont 1982

ON SABBATICAL
2009-10

RESEARCH INTERESTS

- Nonlinear dynamics
- Chaos
- Stochastic resonance
- Cellular automata
- Computer visualization

Dr. Lindner spent the 2009-2010 academic year as a Visiting Scientist at the University of Portland in Portland OR. He coauthored three papers

completing research begun with Wooster students: "Order and chaos in the rotation and revolution of a line segment and a point mass", a problem that would have intrigued Newton, was published in the

Physical Review with Frank King '09 and Amanda Logue '11 as coauthors; "Tracking Stars, Sun, and Moon to Connect with the Universe" was accepted for publication in the American Journal of Physics with



Corey Atwood-Stone '10 and Travis Brown '10 as coauthors; "Electronic and Mechanical Realizations of One-way Coupling in One and Two

Dimensions" was submitted to the Physical Review with Katsuo Maxted '12 as a coauthor. Dr. Lindner coauthored three posters presented at the March 2010 American Physical Society meeting in Portland, including "Escape from the Three Body Problem" with Margaret Raabe '12. At the University of Portland, he created (or

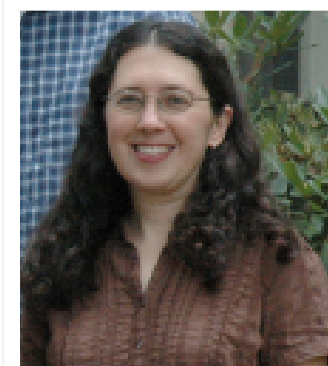
substantially revised) and presented three public lectures: "Quantum Reality", "Time Machines", and "Science, Theism, and the Nature of Reality". He also learned to juggle 5 balls.

Physics Staff

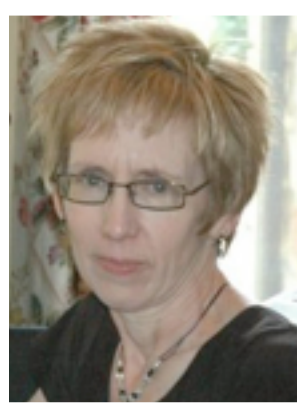
*Lab Coordinator and
Adjunct Teaching Staff
since 2007*

In addition to being the Department's laboratory technician, Manon taught Physics 101 and 102 (General Physics) this past year.

Manon Grugel-Watson



Jackie Middleton



*Administrative
Coordinator
since 1989*

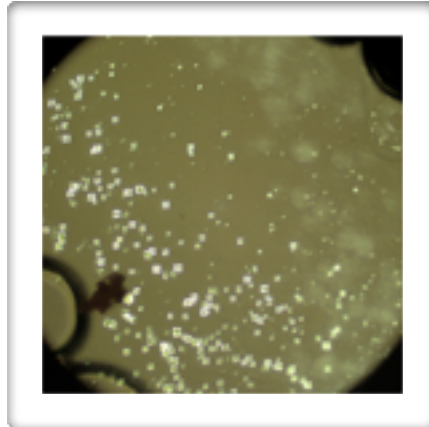
Senior Independent Study (text taken from each student's abstract)

MICHAEL V. ZAPPITELLO (DEC 2009 GRADUATE)

A FRACTAL MODEL OF PROTEIN AGGREGATION

ADVISORS: DONALD JACOBS (PHYSICS) AND PAMELA PIERCE (MATH)

In biological systems, aggregates known as *spherulites* appear under certain conditions. While protein spherulites have been known to exist for the past 50 years, their growth kinetics and structure remain in question. I am proposing that a fractal aggregation and fractal structure are consistent with



Spherulites with cross polarizers

current data in the subject. Further, I have observed the growth of insulin spherulites under different temperatures and in solutions with different salts. I propose that different salts affect the fractal dimensionality of the spherulite and the discrepancies in the growth kinetics with different salts are the result of this change in fractal dimensionality.

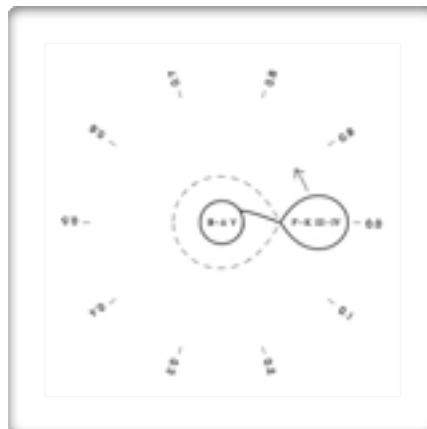
CORWIN ATWOOD-STONE

ACCRETION FEATURES OF AU MON

ADVISOR: BRENDAN MILLER

AU Mon is a long period (11.113 days) Algol binary system with a stable accretion disk that can be seen in the double-peaked emission in the $H\alpha$ line. We present new modeling of the accretion structures in this system. We have reexamined archival UV data from the IUE telescope spanning 15 years and we have also analyzed high resolution echelle spectra from the Hobby-Eberly Telescope. We use these data to self-consistently model the temperature and structure of both the accretion disk and the gas stream using the Shellspec program. We examine these generated synthetic emission profiles for several lines of interest including $H\alpha$, $H\beta$, the Al III

doublet and the Si IV doublet, in order to best model the system. The wide wavelength coverage



of our data permits investigation of gas flows occurring at a variety of temperatures.

Senior Independent Study

ALISON HUFF

EXAMINING THE CHARACTERISTICS OF 17R4 USING REFRACTIVE INDICES AND DYNAMIC LIGHT SCATTERING

ADVISORS: DONALD JACOBS AND SUSAN LEHMAN

17R4 is a tri-block copolymer that forms micelles when placed in water or D₂O. Both samples, at different concentrations, go through three stages. At low temperatures, the 17R4 does not start to form micelles but forms a large unimer network. After passing the temperature at which micelles start to form, the sample becomes clear. Both of these stages are in a one-phase state. At higher temperatures, the sample enters a two phase state, where there is a polymer-rich and polymer-poor state. Both phases contain 17R4, just at different concentrations. By measuring the refractive index at various concentrations and



temperatures, we are able to obtain a series of graphs, known as coexistence curves, which helps us understand the trend of 17R4 concentrations in both water and D₂O. By using dynamic light scattering (DLS), we are able to determine the sizes of micelles and possibly 17R4 in water at varying concentrations and temperatures. Both these experiments help us analyze and understand the characteristics of 17R4.

The glove box used to prepare samples of 17R4 in D₂O in a nitrogen gas environment, providing minimal contact with water molecules in the air.

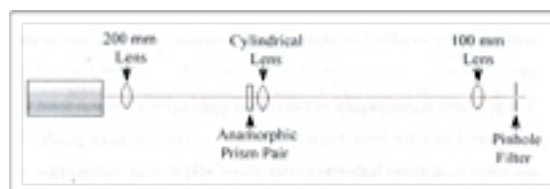
HEATHER J. MOORE

CONTINUOUS WAVE CAVITY RINGDOWN SPECTROSCOPY

ADVISOR: SUSAN LEHMAN

Modifications were made to an existing cavity ringdown to efficiently spatially filter the laser beam, precisely align the cavity, and add control of optical feedback. The optical components comprising the cavity were characterized with two different methods of beam injection into the half symmetric cavity. The first method injected the waist of the beam through the back of the flat mirror. This method produced strong ringdown signals. From the time constants of the decay, a mirror transmissivity of 0.00122 ± 0.00005 , corresponding to a reflectivity of 0.9988, was determined. This value is lower than desired and is an indication that the mirrors should be carefully and thoroughly cleaned so that they can reclaim the manufacturer's reflection level of 0.9998. The second method injected the beam by a weak reflection off a pellicle beam splitter. This technique harnessed the

optical feedback from the resonant cavity causing stronger and more regular ringdown events. Time constants recorded produced multiple transmission fractions through the pellicle beam splitter depending on the angle of the pellicle beam splitter. The values for the three recorded data sets were 0.998 ± 0.025 , 0.9994 ± 0.0003 , and 0.9991 ± 0.0001 . Using the second method of injection, the reflectivity of a distributed Bragg reflector was measured to be 0.938 ± 0.005 . Data should be recollected because there were questionable artifacts in the decay curves.



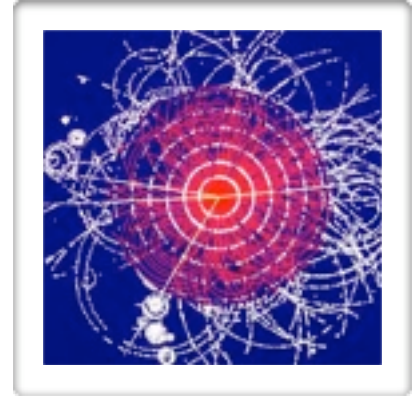
Senior Independent Study

R. MICHAEL WINTERS

THE TWO-HIGGS DOUBLET MODEL AND SONIFICATION: USING SOUND TO UNDERSTAND THE ORIGIN OF MASS

ADVISOR: DEVA O'NEIL

The Two-Higgs Doublet Model is a well studied extension of the Standard Model of particle physics. Most notably, it predicts the existence of five Higgs particles, three of which are electrically neutral (h_1 , h_2 , and h_3), a charged particle H^+ , and its anti-particle H^- . Contributions of the basis-independent CP -violating Two-Higgs Doublet Model to the oblique parameters S, T, U, V, W, X were calculated. Relationships between the oblique parameters and the five Higgs particles were determined numerically. The effects of adjusting the theoretical upper bounds for ζ_1 , $\text{Re}(\zeta_6 e^{-i\theta_{23}})$, $\text{Im}(\zeta_6 e^{-i\theta_{23}})$, $\text{Re}(\zeta_5 e^{-2i\theta_{23}})$, $\text{Im}(\zeta_5 e^{-2i\theta_{23}})$, ζ_{34} , and ζ_3 by factors of 1/10, 1/2, 2, and 20 were studied. Using the original theoretical upper bounds, correlations between S-V-W- m_1 , S-V-W- m_{H^\pm} , T-U-X- m_1 , and T-U-X- m_{H^\pm} were sonified using the sound synthesis program SuperCollider.



Junior Independent Study

SELF-DESIGNED EXPERIMENTS

◆ *AERODYNAMIC FORCES ACTING ON AN AIRFOIL*

Alex Sullivan

◆ *CHUA'S CIRCUIT: A METHOD OF POSSIBLE CHAOS DISCOVERY*

Alex Saines

◆ *SODA, SODA, SODA, POP! COMPARING PRESSURE WITHIN THE CANS OF VARIOUS TYPES AND BRANDS OF SODA*

Louisa Catalano

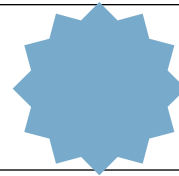
◆ *A NON-MORPHOLOGICAL METHOD TO ISOLATE RED SPIRAL GALAXIES*

Amanda Logue

◆ *TRAPPING E. COLI IN OPTICAL TWEEZERS USING A 30 MW DIODE LASER*

Roger Klein

Honors and Awards



Latin Honors

- * Heather Jean Moore, *Magna cum laude*
- * Raymond Michael Winters IV, *Cum laude*
- * Corwin Atwood-Stone, *Cum laude*

The Joseph Albertus Culler Prize in Physics

- * Margaret Elisabeth Raabe

The Arthur H. Compton Prize in Physics

- * Heather Jean Moore

The Whitney E. Stoneburner Memorial Prize in Education

- * Heather Jean Moore

The Mahesh K. Garg Prize in Physics

- * Heather Jean Moore

Women's Advisory Board Scholarship

- * Heather Jean Moore

Outstanding Doctoral Thesis



At the March Meeting of the American Physical Society, Jeffrey Moffitt '03 received the Award for Outstanding Doctoral Thesis Research in Biological Physics for his project, "Viral DNA

Packaging at Base Pair Resolution". Jeff earned his MA and PhD from the University of California at Berkeley and is currently studying the dynamics of genetic networks in E.coli at Harvard University. Jeff credits his early research experiences in Wooster's Physics Department for helping him to build a foundation for understanding and executing research methods. Congratulations, Jeff, from your friends at Wooster!

KSTF Teaching Fellow

The Knowles Science Teaching Foundation was established by Janet H. and C. Harry Knowles to cultivate and support exemplary science and mathematics high school teachers and develop the next generation of leaders in education. Heather Moore '10 is one of twelve KSTF Teaching Fellows in Physical Science for 2010. Renewable for up to five years, the program provides Fellows with comprehensive professional development, mentoring and a community of peers to help them stay in the profession and become leaders in education. Heather plans to teach at Clear Springs High School in League City, Texas, in a school district committed to innovation in science teaching.



Physics Club

OFFICERS 2009-2010

President:
Heather Moore

Vice President:
Alison Huff

Secretary:
Larry Markley

Treasurer:
Mike Winters

Advisor:
Prof. Deva O'Neil

XXXXXX

TAYLOR
BOWL XXI
MATH/CS
102.2

PHYSICS
98.2

XXXXXX

OUTREACH
2009-10
15 VISITS TO
7 DIFFERENT
LOCAL
ELEMENTARY
SCHOOLS

EVENTS

18 April 2010: Taylor Bowl 21

17 April 2010: Community Science Day

14 January 2010: Physics Club selected as a 2009 Outstanding SPS Chapter!

17 November 2009: Leonid Meteor Shower Viewing

5 November 2009: Great Lakes Science Center, Cleveland OH

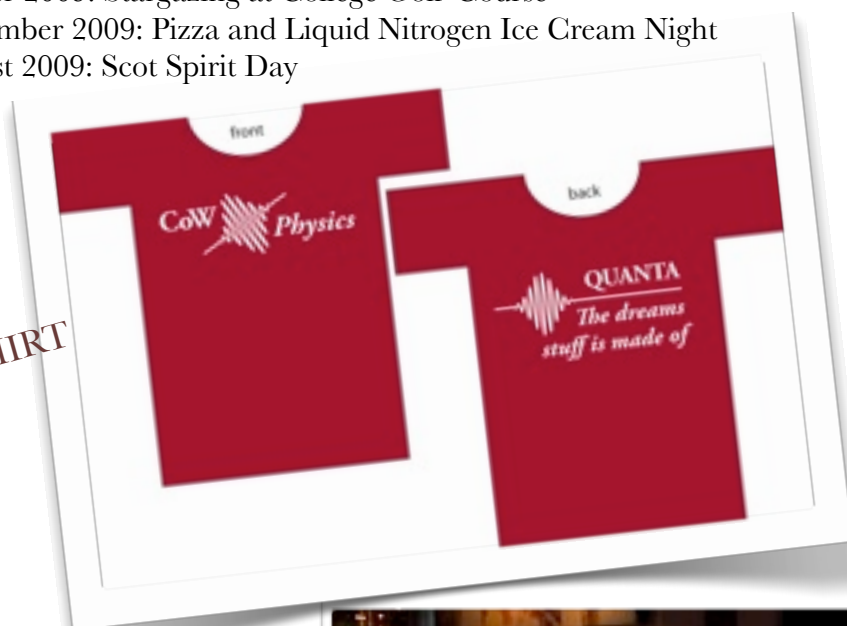
15 October 2009: Summer Research Symposium

1 October 2009: Stargazing at College Golf Course

10 September 2009: Pizza and Liquid Nitrogen Ice Cream Night

28 August 2009: Scot Spirit Day

T-SHIRT



GREAT
LAKES
SCIENCE
CENTER



SPS ZONE 7 MEETING

Ten Wooster physics students attended the February Zone 7 meeting of the Society of Physics Students at Grove City College in PA. Activities included a talk on the Manhattan Project by Professor Richard Leo, physics jeopardy, skits, a grad school expo, and a talk by Dr. Nancy Morrison (Univ. of Hawaii) entitled "The Jewels of Orion's Belt".

Due in part to the unbounded enthusiasm of an amazing first-year class of physics students, Outreach visits to elementary schools continued this year despite the fact that the President was student teaching and not available most afternoons. Early in the year, Physics Club officers provided in depth training to anyone who was interested in demonstrating cool physics at local schools. The response was incredible! Thanks to all!

Summer Research

The summer of 2010 marked the 17th consecutive summer of the Department of Physics Research Experience for Undergraduates funded by the National Science Foundation. Since its inception, the program has given research opportunities to 137 students who have come from 43 colleges and universities in 21 states. Our department encourages students to get involved in research early in their academic careers; consequently 82 percent of the students have finished just one or two years of college when they participate in our program.



2010 PROJECTS

Lily Christman, CoW '13

The Physics of Swellable Organically Modified Silica
Advised by Susan Lehman

Michael-Erik Ronlund, CoW '13

Mass Transfer in Algal Binaries
Advised by Brendan Miller

Gerhardt Funk, Centenary College (LA) '13
Numerical Analysis of the Oblique Parameters in the Two Higgs Doublet Model

Advised by Deva O'Neil

Lorenzo Dumancas, CoW '13

The Heat Capacity and Self-Aggregating Behavior of the Triblock Copolymer 17R4 in H₂O

Advised by Donald Jacobs

Andrew Blaikie, CoW '13 (with M. Winters '10)
Simulating Electroweak Baryogenesis in the Standard Model

Advised by Deva O'Neil

Christine Welling, Dickinson College (PA) '12
Broad Absorption Line Variability in Radio Loud Quasars

Advised by Brendan Miller

Colin McGuire, High Point University (NC) '12
Effects of Temperature and pH on the Fluorescence of 4-amino Benzoic Acid and its Derivatives

Advised by Sarah Schmidtke (Chemistry)

Hosanna Odhner, Bryn Mawr College (PA) '13
The Coexisting Phases of Poly(Propylene Oxide)-Poly(Ethylene Oxide)-Poly(Propylene Oxide) in D₂O

Advised by Donald Jacobs

Tyler Rhoades, CoW '13
Electrical Percolation in Conductive and Non-conductive Beads

Advised by Donald Jacobs

Alexander Chartrand, Mt Union College '11
Relativistic Hotspots in Double-Lobed Radio Sources

Advised by Brendan Miller

Alyse Martinez, CoW '13
Self-Organized Criticality: A Magnetized Bead Pile
Advised by Donald Jacobs

Alyse Martinez, a Coast Guard reservist, was called to duty two-thirds of the way through the research period to help with the oil clean up in the Gulf. Thanks for your service, Alyse!

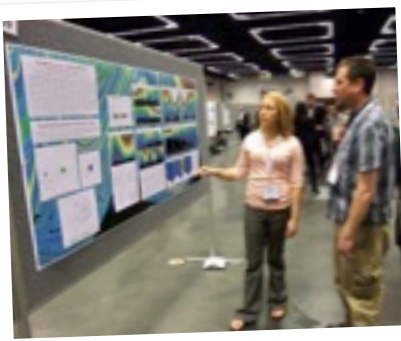
American Physical Society Meeting

Student Poster Presentations

*CoW Student

†REU Student

Portland OR March 15 - 19



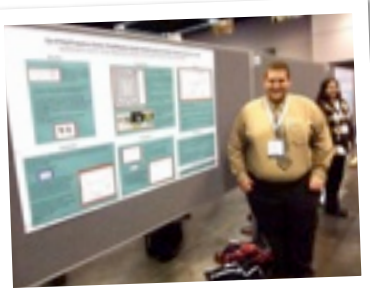
Alison Huff*, Kelly Patton*, D.T. Jacobs, Bryna Clover, and S.C. Greer, *Micellization and phase transitions in a triblock copolymer-water system*

Margaret Raabe and Joe Neff '93

Jacob Lynn†, and Frank W. King*, *Chaos and Order in the λ -Body Problem*

Larry Markley*†, Mary Mills*† and D.T. Jacobs, *Self-organized Criticality or not in Spherical Bead Piles*

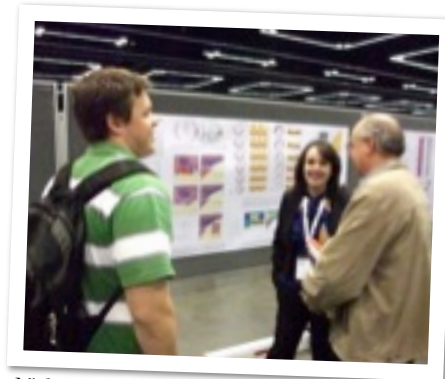
Katsuo Maxted*†, John F. Lindner, and Barbara J. Breen, *Two-dimensional, one-way coupled arrays*



David Simpson

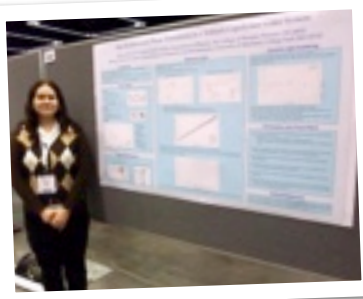
Heather Moore*, Lorenzo Dumancas*, Tyler Rhoades*, Mark Zimmerman* and D.T. Jacobs, *Percolation transition in spherical granular materials*

Margaret Raabe*† and John F. Lindner, *Escape from the 3 Body Problem*



Nick Harmon '04, Amanda Logue and Dr. Jacobs

David Simpson*† and D.T. Jacobs, *Specific heat at the micellization and phase transitions in a triblock copolymer-water system*



Alison Huff



Ceiling of East of India restaurant in Portland

American Chemical Society Meeting

Mitchell P. Thayer† and Sarah J. Schmidtke, *Environmental and structural effects on intramolecular charge transfer exhibited by 4-aminobenzoic acid and its derivatives*, American Chemical Society National Meeting, San Francisco CA (March 2010)

Colloquia

Taviare Hawkins, Mount Holyoke College
Biomechanics of Cellular Microtubules
4 March 2010

Jason Stalnaker, Oberlin College
Counting the Cycles of Light: Using Optical Frequency Combs to Study Atoms
28 January 2010

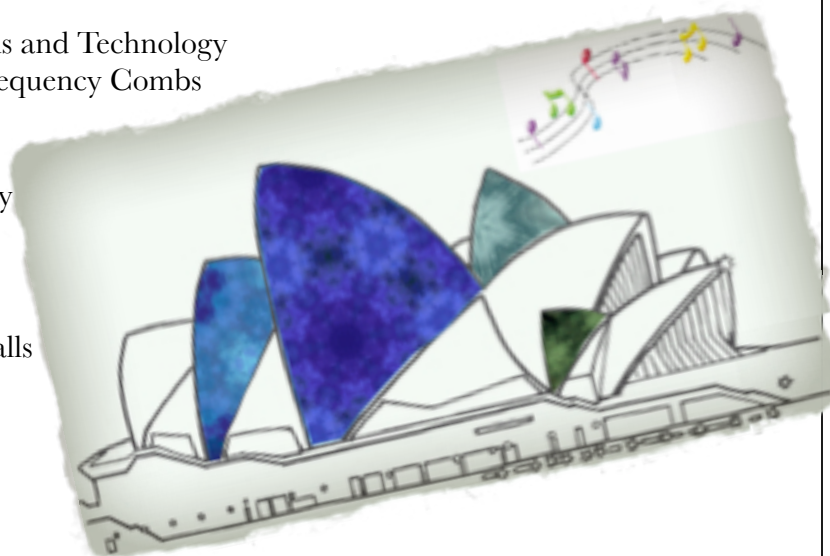
Karen Lewis, Dickinson College
Unveiling the Monster: Using Spectroscopy to Unravel the Structure of Active Galactic Nuclei
16 November 2009

Todd Johnson, National Institute of Standards and Technology
Molecular and Atomic Spectroscopy using Frequency Combs
11 November 2009

Maryam Farzaneh, Denison University
Thermal profiling of optoelectronic devices by thermoreflectance microscopy
6 November 2009

David Bradley, Vassar College
Acoustic Wave Scattering: Where Concert Halls and Fractals Collide
20 October 2009

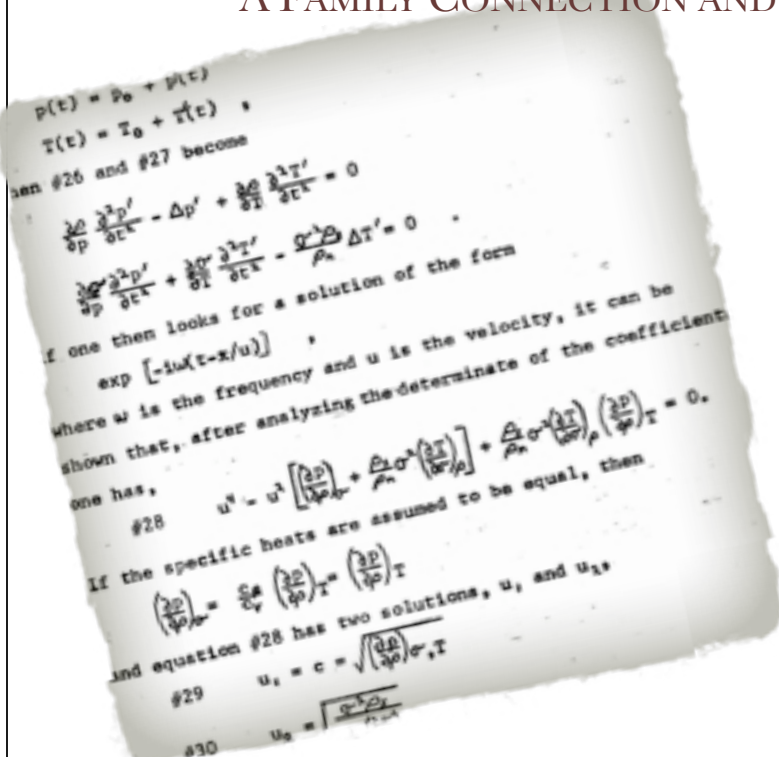
Wooster Physics Student Researchers
Summer Research Symposium
15 October 2009



A FAMILY CONNECTION AND AN I.S. FROM THE PAST

The Physics Department was very excited to learn that Phil Wales '13, a newly-declared physics major, is the son of 1971 Wooster Physics grad Stephen Wales, Ph.D. Just for fun, we pulled Dr. Wales' Senior Independent Study thesis, "Second Sound in Superfluid Helium". Our current students were quite intrigued by his use of a typewriter and by the handdrawn symbols and equations. It will be interesting to see what Phil's I.S. looks like in 2013!

Dr. Wales is a physicist for the Naval Research Labs in Washington DC. His daughter Pam '11 is also a student at Wooster, double majoring in mathematics and biochemistry/molecular biology.



The Compton Family Plot

Many members of the Compton family are buried at Wooster Cemetery, just south of town. Arthur Holly Compton was born in Wooster in 1892, the son of Elias Compton, Professor of Philosophy and Dean of the College of Wooster. Arthur was educated at the College, graduating in 1913, and in 1927 won the Nobel Prize in Physics for his discovery of the effect named after him.

ARTHUR'S FATHER



ARTHUR'S MOTHER



ARTHUR'S BROTHER



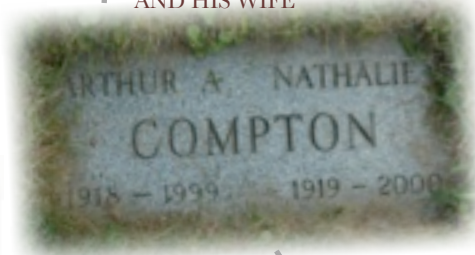
ARTHUR'S BROTHER'S WIFE



ARTHUR'S WIFE



ARTHUR'S SON AND HIS WIFE



ARTHUR'S NIECE



ARTHUR'S NEPHEW



ARTHUR'S GRANDSON



Arthur's mother Otelia was on the Board of Managers of the Children's Missionary homes on campus. In 1955, Otelia Compton Hall was built in her honor. Arthur's brother Wilson, Class of 1911, was the president of Washington State University and a renowned economist. Some records indicate that Arthur's brother Karl T. Compton, Class of 1908, is also buried at Wooster Cemetery, but we did not find a marker in the Compton plot and the cemetery does not have his burial in their records. Arthur's sister, Mary Compton Rice, Class of 1911, is buried in a different plot at the Wooster Cemetery.

WOOSTER SUN HALO 5/25/10



A Sun halo occurs when high thin clouds containing many, many tiny ice crystals cover much of the sky. Each ice crystal acts like a miniature lens. Because most of the crystals have a similar elongated hexagonal shape, light entering one crystal face and exiting through the opposing face refracts at an angle corresponding to the radius of the Sun halo.

A FEW ALUMNI TIDBITS...

Tom Taczak '91 came to visit the department in January. He works at Naval Research Labs on atmospheric modeling for projectiles and lives in Annapolis MD.

Mark Wellons '08 is attending University of Wisconsin Madison graduate school. He is in the Ph.D. program in computer science and will be working in the same research group as John Gamble '08.

Averell Gatton '09 is attending graduate school in physics at Auburn University.

Christie Egnatuk '03 obtained her masters degree in Nuclear and Radiation Engineering at University of Texas Austin and passed the qualifiers for the PhD program.

Sarah Suddendorf '07 obtained her masters in Curriculum and Instruction from University of Wisconsin Milwaukee.

Jonathan Partee '91 is a research faculty member at Penn State's Electro-Optics Center in the Sensor Technology Division.

Jon Rosch '07 has passed the qualifier exam at the College of Optics and Photonics at the University of Central Florida. He is working towards a Ph.D. in optics.

WOOSTER PHYSICS

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