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A Message from the Chair - Dan Gibson

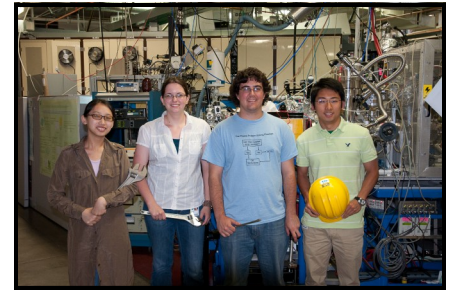
Denison Physics and Astronomy has exciting news to share. We welcome two new tenure-track faculty members to the department. Dr. Maryam Farzaneh is now teaching in our introductory physics program and the Experimental Physics program. Maryam is a solid state physicist so she also provides an important research area for students to explore in our field. Dr. Riina Tehver has also joined our faculty. Riina studies computational biophysics and is teaching in our introductory sequence and in our upper level theory courses. Riina is looking forward to getting started on student research this summer. Biophysics is really a quickly emerging area of physics research so we are very pleased to have opportunities for students to study the subject and the chance for collaboration with other departments.

We have also been fortunate to have two visiting faculty with us this past year. Juan Burciaga has been teaching with us for two years and he has brought a detailed knowledge of physics pedagogy. With the new faculty in the department, it has been especially good to have another seasoned instructor around to discuss teaching methods and ideas. This academic year we have also been hosting a PhD candidate in a teaching fellowship. Ryan Johnson is ABD in Astronomy at Dartmouth and we have been fortunate to have him here in Granville this year. Ryan has

been teaching Astronomy and learning about life at a liberal arts college while he works on his dissertation.

On a different note, our long time technical assistant, Ken Bixler, has recently retired from Denison. While we have always appreciated Ken's contributions to our laboratories, demos, repair needs and outreach programs, we are just now figuring out the full extent of his involvement in the department as we scramble to cover his duties during the search for his successor. Ken has been enjoying some travel with his wife Sue and has already been back to bring us disks full of vacation photos!

The Physics and Astronomy Outreach program is going strong. We continue to have all of the Granville second graders visit our department each year for both a physics demonstration show and a planetarium show. Countless other school groups, Girl Scout and Boy Scout troops and the like come through as fast as we can schedule them. Our student outreach group has been traveling to The Works, the Licking County hands-on science museum, to take part in numerous Science and Technology programs. Our faculty and students continue to look for opportunities to share their love of science with Denison students and others. We hope you will keep in touch with us and look us up when you are in the area.



Yige Li ('12), Rachael Alton ('12), Dan Matyas ('12), and Edwin Lou ('12) at the ALS Lab, Berkeley, CA.



Robbie Christian ('09) and Maureen Crotty ('10) prepare a demo for Granville 2nd graders.



Road trip! Several majors visited Fermilab in the Spring of 2009 and 2010. Pictured: Edwin Lou ('12)



Physics majors regain their title as Science Olympic Champions, Spring 2010!

Emeriti Corner

by Professor Sandy Yorka

Life after Denison? That question takes on a whole new meaning when the “life after” refers to retirement, not graduation! The short answer is, of course – yes, there is. I spent a year or so after I retired from Denison helping my daughter set up her own scrap-book store (*way* out of my field of expertise), but after that was done I was looking for something else to do – and accidentally became a high school science teacher. I had heard of an experimental charter high school which was doing some pretty neat things, so I decided I would offer my services for, perhaps, an occasional astronomy evening for the students. I went in to propose this to the head of the school, and walked out committed to teaching a Physics class and an Advanced Algebra class. I had three weeks to set up the classes – and a very basic Physics lab. That was Surprise #1. Surprise #2? The students. The school had a wide mixture of students, from students who were drawn to the experimental school but who would have excelled at

any high school, to those for whom this was the school-of-last-resort. Initially the classrooms were crowded and noisy – not quite what I was used to in comparison to the nice, quiet, civilized planetarium and observatory at Denison! I figured I had finally become comfortable with the transition when a couple of students announced that they would like to sit *under* the table rather than *at* the table – and I didn’t bat an eye.

During this four year post-Denison phase I taught several classes: physics, advanced algebra, freshman science, and astronomy. My husband had been ill for some time, and as his illness became increasingly debilitating I stopped teaching to care for him. Following his death in 2008 I worked for a computer software company, editing science content for on-line high school classes. In 2009 I began teaching again, at ITT-Tech this time. Teaching adult students, many of whom have not been in a classroom for 25 years, has been quite challenging and extremely



Sandy Yorka pictured with one of her grandchildren, Harper.

rewarding. I am now teaching physics and intro math classes.

This past year, Denison celebrated the 100th anniversary of Swasey Observatory. Several Physics/Astronomy students were invited back to give seminars, as part of the year-long celebration. Three students were my former night assistants at Swasey. I had a wonderful time re-connecting with them and discovering what they are doing “after Denison”. I would love to hear from any other former students who also want to fill me in on their Life After Denison.

Life after Denison for Recent Graduates

Both **Charlie Baldwin ('09)** and **Nick Geitner ('09)** are attending Miami University, OH pursuing a M.S., then Ph.D., in physics.

Matt Bishop ('09) joined a Global Mission service project working in Hungary.

Derrick Carman ('10) is attending law school at Syracuse.

Robbie Christian ('09) is taking Marine Science and Geoscience courses at the University of Miami, FL.

Maureen Crotty ('10) is attending the University of Dayton and is pursuing an M.S., and possibly a Ph.D. in Engineering.

David McGinnis ('10) is attending the University of Cincinnati and is pursuing an M.S. in Engineering.

Richard Field ('09) is working towards a Ph.D. in Physics at the University of Michigan.

Michael McComick ('10) is attending the University of Arizona and plans to pursue a Ph.D., in physics.

Jacob Shaprio ('10) is pursuing a Masters in Math at Miami University, OH.

Rebecca Tidman ('09) has applied to graduate schools to pursue engineering.

Geng Zeng ('09) is attending the University of Washington, Seattle, and pursuing a Ph.D. in Physics.

Swasey Observatory Celebrating 100



Throughout the 2009-2010 academic year, the department has been celebrating the centennial anniversary of Swasey Observatory, dedicated on June 15, 1910. The original 9" Warner & Swasey telescope, refurbished in the 1980s, is still used every semester as part of our Astronomy and Physics laboratories to explore and measure the night sky. Despite the continued growth of that part of campus, beginning with the construction of Swasey Chapel in 1924, Swasey Observatory has continued to provide wonderful views of planets, bright stars and nebulae, the Moon, and the occasional globular cluster to generation after generation of Denison students.

On October 12, 2009 the Department of Physics & Astronomy kicked off the centennial celebration with the 2009-10 Anderson Science Lecture. Guest speaker, Steven Squyres, Scientific Principal Investigator for the Mars Exploration Rover Project, and Professor of Astronomy at Cornell University, gave a talk to a packed Swasey Chapel entitled

“Roving Mars: Spirit, Opportunity and the Exploration of the Red Planet.”

The celebration continued with our “Stars of Swasey” Colloquia during the Spring of 2010. Alumni and Emeriti returned to campus to give talks on a variety of astronomy topics. In February, Professor Emeritus, Mike Mickelson began the series with a talk entitled “Archaeoastronomy: Uncovering Ancient Sky Knowledge” which detailed some of his work to uncover Astronomical alignments of ancient archeological structures, revealing the deep understanding that ancient peoples had of the sky. Dr. Mickelson held the J. Anderson Reid Chair of Physics and Astronomy and taught in the Physics & Astronomy Department from 1969 – 2001.

Our “Stars of Swasey” series continued in March when **Jim Kernohan ('83)**, Science Teacher at Milton Academy, returned to campus to talk about “Transit Observations of the HAT-P-10 or How a Group of High School Students Were Able to Detect an Extrasolar Planet” which illustrated how high school students can use modern astronomical facilities to conduct research. In early April, our featured Honors Day alumni speaker, **Rachel Berger Connolly ('96)** gave a talk entitled “How Do You See the Universe? - How Data Visualization Will Change the Way We Teach and Do Science.” Rachel is currently the Director of Gheens Science Hall and Rauch Planetarium at the University of Louisville, and her talk explored new ways in which three-dimensional data visualization in a planetarium setting can be used as a powerful teach-

ing and research tool. In late April, **Dr. Tracy Huard ('93)**, Assistant Research Scientist at the University of Maryland, returned to campus to talk about his recent work to understand the birthplaces of stars in a talk entitled “Windows into Star Formation.”

The semester long colloquia series culminated in a talk given on Reunion Weekend by **Dr. John Clarke ('74)**. Dr. Clarke earned his master's and doctoral degrees in physics from the Johns Hopkins University and currently serves as the Center for Space Physics Associate Director, and Professor of Astronomy at Boston University. Dr. Clarke's lecture, titled “Following the Water on Mars and Venus – the Goldilocks Problem,” gave a packed lecture hall of alumni, faculty, and summer students a view into the history, background science, and current work his research group is doing to understand the fascinating question of why the Earth has so much water but our sister planets have so little.

In addition to these lectures, Open Houses were scheduled at the Observatory for the campus, community, and alumni during Reunion Weekend, on Friday, June 4th, and a few weeks later on June 18th. Between the two shows, the Observatory hosted several hundred guests who enjoyed views of Saturn, the Moon, Venus, and Mars.

It was wonderful to have alumni and faculty return to campus to celebrate this very special anniversary with those currently in the community.



Members of Denison's Sigma Pi Sigma Chapter: Prof. Mike Westmoreland, Prof. Mike Mickelson, Prof. Wes Walter, Zack Goldman ('11), Jeff Cochran ('11), Prof. Dan Gibson, Russell Holden ('11), Jacob Shaprio ('10), Drew McCallister ('12), Dan Matyas ('12), Michael McCormick ('10), Edwin Lou ('12), Amanda Bruce ('12), Prof. Ron Winters, Yige Li ('12), Rachel Berger Connolly ('96), Prof. Maryam Farzaneh. Photo taken on Honors Day, 2010 at the Sigma Pi Sigma Induction Ceremony.

Updates from Alumni

Adam Amornyard ('06) is a Head Merchant at Abercrombie and Fitch.

Cameron Bieganek ('06) earned his M.S. in Physics from the University of Minnesota.

Matt Bowers ('06) started his third year of teaching physics in Chesterfield County, Virginia. His wife, Kate Cobb ('06) entered her fourth year at the medical college of Virginia and is applying for residencies. Kate gave birth to a baby girl, Leesa Addison, on June 5th.

Chris Byrnes ('08) earned his M.S. in Religion, Ethics and Politics at Harvard in 2009. He is currently attending law school at Georgetown. Chris plans to become a patent/IP attorney.

Susan Buchanan ('83) worked as a Family Physician for ten years and then went back to school and earned a Master in Public Health in Environmental Occupational Health Sciences. She is now Board Certified in Occupational and Environmental Medicine. Susan recently received an EPA grant to train physicians on the risks (mercury poisoning) and benefits (better neurodevelopment) of eating Great Lakes fish during pregnancy. She works at the University of Illinois in Chicago.

Robbie Christian ('09) traveled extensively, through the South Pacific, New Zealand, Egypt and other locations, and has settled into Miami, FL. He is currently taking Marine Science and Geology classes at UM and is participating in Orchestra. While in Egypt, he and classmate, Matt Bishop, filmed an application video for "The Amazing Race."

Cynthia Dolbeer Tomasch ('92) accepted a position in a management training program at what was at that time B.F. Goodrich in Cleveland, OH. The company is now PolyOne Corporation and Cynthia has been there for 18 years and is currently the General Manager of the Specialty Coatings & Resins business unit. Cynthia earned her MBA at the Weatherhead School of Management at Case Western. She and her husband, Seth, have three children Eli (11), Andrew (10) and Sarah (6) and live in Olmsted Falls, OH.

Lars English ('96) received tenure in the Physics Department at Dickinson College and a promotion to Associate Professor of Physics.

Cynthia Gedelian Huising ('03) "Cynthia and her husband Damian, are proud to announce the result of years of planning and experimentation in their secret Southern California laboratory, Victor Theodon Huising, born March 5th, 2010. They are transplanting their superior specimen/future physicist to the wild of Northeast Ohio this fall for further study."

Dave Green ('00) is working as an Aircraft Performance Engineer for Gulfstream. He continues to pilot his own aircraft. He and his wife and two girls, Jazmine (6) and Zoe (4), live in Savannah, GA.

Andrea Habakuk Janssen ('99) and her husband, Brad are proud parents of a baby boy born in the spring of 2008.

Aaron Jackson ('07) plans to complete his Ph.D. in Physics and Astronomy at Stony Brook University, NY in 2011. In July, Aaron had his first paper accepted to the Astrophysical Journal, and has had two papers published since that time.

James Kernohan ('83) continues to teach Physics, Advanced Physics, Astronomy, Cosmology and Particle Physics at Milton Academy where he has been for the past 22 years. Recently Jim worked with a group from the Harvard Smithsonian Center for Astrophysics in Cambridge, developing a curriculum to enable high school students to search for extra-solar planets.

Doug Livingston ('84) taught physics for many years, first at the high school level and later at the bachelor level. Recently Doug moved from the Midwest to the northern coast of California to work for the largest retailer of Solar and other sustainability products, first as an applications engineer, then as a Technical Products Merchandise Manager. In 2001, Doug began consulting on his own, and troubleshoots old PV systems. He and his wife Carolyn live near Boonville, CA and have a daughter, Claire who is six.

Adam Lowe ('07) is living in New York City and working as a Regional Consultant for an asset management firm, Lord Abbett and Co.

Kim Murley Stroka ('06) continues to work on her Ph.D. in Bioengineering at the University of Maryland and plans to finish in 2011. She is studying biophysical aspects of white blood cell transmigration through the vascular endothelium, using methods such as atomic force microscopy, traction force microscopy, and confocal microscopy. Kim and her husband, Tom recently completed their first triathlon race in August!

Matt Palotti ('02) earned his Ph.D. in physics from the University of Wisconsin, Madison this year.

Mimi Pierson ('08) will be attending the environmental engineering program at UCD in Dublin, Ireland after traveling extensively.

Dave Richardson ('08) was recently accepted into a teaching certification program at Delaware Valley College.

Cuyler Smith ('01) says that Alaska is starting to feel like home as he has been living there for two years. He continues to be employed by the National Park Service as an IT Specialist. Cuyler travels a lot to "the lower 48" for meetings. In August, Cuyler traveled to Katmai backcountry to help with a vegetation survey.

Geng Zeng ('09) graduated in December and traveled to Germany this past summer where he studied German. Geng will be starting a physics graduate program at the University of Washington, Seattle this fall.

Note: Our last newsletter was published in the fall of 2009, so this update covers the last two years of information we've received from alumni..

Palash Banerjee **[banerjeep@denison.edu]**

I am delighted to be a part of Physics and Astronomy here at Denison University. We have recently moved to Granville from Columbus and love our new surroundings.

I spent this summer working on designing a new experiment for studying the physics behind small magnetic structures. Most of it came along very well, and hopefully I will be able to continue working on it during the semester too. I also maintained, on a part-time basis, my previous relationship with Ohio State. I will be trying a new experiment there in the coming weeks, looking to see if quantum tunneling can be experimentally observed in magnetic systems at very low temperatures. There is a strong possibility that the experiment might fail, but I find it thrilling nonetheless.

On a personal note, we drove to the Grand Canyon for a two week vacation in July-August. We camped out on the North Rim and it rained every single day. We did find time to hike the trails on the rim though, and even took our trustworthy Subaru on an off-road trail through the nearby National Forest (note to self: although it can be done, do not try this again).

I will be teaching P122 next semester. Denison has a great group of students and I am looking forward to working with them in class and in the lab.

Juan Burciaga **[burciagaj@denison.edu]**

This is my second year at Denison. While at Denison I have taught Astronomy 100, Physics 121, an FYS class, and Electronics. I am an Education Officer for the National Society of Hispanic Physicists. I gave a talk at the 2010 AAPT summer meeting in Portland. At the request of the AAPT's Committee on Women in Physics and the Committee on Graduate Education, I developed and lead a workshop on Leadership "Roles and Models in the Classroom, Academia and Beyond." In May, a collection of my pedagogical work, "Crafting the Laboratory Experience: An Exercise in Pedagogical De-

sign, Development and Assessment", was accepted by MedEd Portal, a peer-reviewed, electronic archive developed by AAMC where pedagogical work pertaining to undergraduate science for life science majors is published and archived. This work is one of the nine pilot programs published in the archive.

Kim Coplin [coplin@denison.edu]

I'm now in my 5th year working as an Associate Provost at Denison, and have agreed to make this position in the Provost's Office permanent. I spent time this summer finally clearing out my office and lab in Olin. In the process, I came across lots of photos and notes and I had a bittersweet time reminiscing about all the wonderful students I had the pleasure to teach and the amazing colleagues I worked with in the Department of Physics and Astronomy. Fortunately for me, the department still makes me feel very welcome, and many of the department events I'm able to attend involve food of some sort!

My administrative work continues to include oversight of the academic/curricular piece of the college. I do continue to work with students on various committees, and I have also enjoyed getting to know faculty and staff from across the college in my work. Since I last wrote a newsletter update, Denison received a "clean bill of health" from the North Central Association of the Higher Learning Commission (our accrediting body.) It was very rewarding to work on the steering committee and be a part of the process that led to this extremely positive re-accreditation outcome. The highlight of my fall semester this year was getting to teach 8 young women in one of our new "structured advising" courses.

Here's a quick family update: Rick continues to love his work with Tech Columbus. Daniel is now a sophomore, is way taller than me, and is very close to getting his driver's license (yikes!). Jake is 13, is taller than me too, and is extremely fast on both the soccer field and the basketball court. Lia is 7, is still shorter than me, and is an elementary school cheerleader. (I've learned that cheerleading is going to be a whole new world for me.)

Steven Doty [doty@denison.edu]

Writing these updates is an interesting way to keep track of what has been happening as life continues to roll along here at Denison. Matthew just turned 8. He still loves space and flying, and has added science and baseball to his list. Last weekend, he presented at the Licking County Science Fair. He investigated the effect of rocket fin shape and placement on missile travel -- complete with Newton's 3rd law. I have been coaching his baseball team (we'll see how long he's willing to let me do that).

The PHYS 245, Applied Math for Physical Systems course has now become permanent as PHYS 201. Buildings are still swaying, but we keep adding new problems as well. I taught astrophysics last year, and really enjoyed it. We ended up doing a bit more cosmology than previously, and I may expand that in the future. Research continues to go well. I am a scientist with the WISH Guaranteed Time Key Project on the Herschel Space Observatory. It is placed at the Earth-Sun L2 point. Launch in May 2009 was terrifying, but all went well. The data continue to come in, and it is amazing. We are changing our view of the dynamics of massive star-forming regions -- especially the fact that hypersonic outflows are significant. **Jeff Cochran ('11)**, **Kris Oman ('12)**, and **Amanda Bruce ('12)** have worked with me recently, and all presented posters at AAS meetings. Jeff and I are working on two papers at the moment. Kris and **Clay Crocker ('13)** will be traveling to Germany with me this year to visit the Max Planck Institute outside of Munich. Suffice it to say, things are busy, and I (still) talk/write too much. As always, drop me a line to let me know what/how you are doing!

Maryam Farzaneh **[farzanehm@denison.edu]**

I am excited to start my second year at Denison and my first year in a tenure track position. I had such a great experience here last year that I decided to stay for an extended period of time. This fall I will teach the sophomore level PHYS 127 (electricity and magnetism). I will also be teaching the experimental physics course, PHYS 312. I am especially excited about this class, because I like to

be involved in experimental work. I had a great time last year when I co-taught PHYS312 with Dr. Gibson.

This summer was both hectic and interesting. We finally moved to Granville to an old farm house near the bio-reserve. I attended a few workshops, including one for a new physics and astronomy faculty in Maryland, which was very useful. I also met a number of interesting people (all physicists) there. The summer research went very well and my research students, **Alphonse Harris ('11)** and **Adam Lebovitz ('12)** got very good results through their hard work. I am looking forward to the new academic year and expanding and setting up my lab. After the summer research program, my husband, Palash, and I drove to the North Rim of the Grand Canyon for a week of camping (and a week of driving!). We did not hike down the canyon much but hiked a lot on the rim. Anyone interested in the majesty of the Grand Canyon can stop by my office and take a look at a panoramic poster on the wall.

Dan Gibson [gibson@denison.edu]

Denison and Granville continue to be good to the Gibson family. Robin continues to volunteer in the schools and has co-founded a group to promote academic enrichment opportunities. She has recently started working part-time at the library and is enjoying helping children (other than our own!) find their love of reading. Daniel (12), Benji (8) and Dylan (6) keep us busy with soccer, cello, Legos and swimming. The boys always enjoy the chance to visit Denison and can usually be found at the Physics department activities and the occasional Quidditch team match. We feel very lucky to live in such a vibrant community with so many friends and activities.

This has been a busy year and a half for me. In addition to chairing the department, I still direct the Oak Ridge Science Semester program to provide off-campus research opportunities for science students from 28 colleges and universities. I like learning about the other scientific areas and seeing how the Oak Ridge National Lab research projects bring together the different disciplines. The ORSS program has really helped convince me that the future of science will be much more cross-disciplinary. My own research continues to be interesting and productive. This past sum-

mer, Wes Walter and I were able to take a group of 4 physics majors to the Advanced Light Source in Berkeley to do an x-ray experiment and we hope to do so again this May. While our on-campus research program is thriving, the excitement and energy of a national lab always send us home with renewed enthusiasm. This academic year has brought me a new teaching opportunity as well. I am teaching Observational Astronomy for the first time. I am really enjoying working with our astronomy minors on optics, imaging, spectroscopy and trying to get some beautiful pictures of the sky. Cross your fingers for a few clear nights. Denison continues to promote lifelong learning - for the faculty as well as the students!

Dan Homan [homand@denison.edu]

This is my eighth year at Denison, and I have been on sabbatical all year. I'll be returning to the classroom in the Fall of 2011 to teach our PHYS 125 and 127 classes. During my sabbatical, I've been working on my study of the radio jets associated with distant active galaxies, in particular their magnetic fields and particle properties through observations of their polarization. Since our last newsletter, I've published a number of papers both on the kinematics of jets, in particular the acceleration observed in the flows, as well as the connection between the low energy radio emission from jets and high energy gamma-ray photons observed with the NASA's new Fermi gamma-ray telescope. **Michael McCormick ('10)**, **Chris Wotta ('11)**, and **Drew McCallister ('12)** have worked in my lab over the last two summers and school years on projects related to many of these research goals. On the personal side, my son, Nate, has just turned nine and is loving the third grade, and my daughter, Maddie, is now two and half.

Christie Kasson [kasson@denison.edu]

The 2009/10 academic year was extremely busy with the department hosting the Anderson Lecture and celebrating the centennial of Swasey Observatory. In October, at Big Red Weekend, I had the opportunity to catch up with a few alums and meet the parents of some of our current majors. I am looking forward to seeing **Cuyler Smith ('01)** at our Spring Honors Day event this year, (Cuyler is our featured speaker) and also to this summer's Reunion Weekend as members of the classes of 2001 and 2006 will be celebrating their reunions. (I began my employment in the department in 2000 so

I know these returning alums!). On the home front, Jennifer (15) played her first ever sport this past fall (field hockey) and attended her first homecoming. She continues to love art and sold 3 pieces of her work at a recent fund raiser. Kris (17) continues to be on Granville's bowling and tennis teams, and enjoys participating in the school's drama department and singing in the Men's Chorus, Symphonic Choir, and Chamber.

Riina Tehver [tehverr@denison.edu]

I am delighted that I was given the opportunity to join the Denison physics department as a new assistant professor this fall. After two and a half months at Denison, I already feel like I belong here. I am teaching quantum mechanics to physics seniors and introductory physics to non-majors this semester. It has been great to be able to work with these two very different groups of students and think about some aspects of physics I rarely need to worry about in my research. As most starting professors, I am mostly busy with teaching and have relatively little time for anything else, including research. My area of expertise is theoretical biophysics and I am currently working on motor protein dynamics. I can't wait for next summer to begin research with a few students in my new lab in earnest.

Wes Walter [walter@denison.edu]

This past year during my sabbatical, I concentrated on research. I continued experiments together with Prof. Dan Gibson and students studying the properties of negative ions using the lasers in our on-campus lab and the x-rays at the Advanced Light Source at Lawrence Berkeley National Lab in California. I also made several trips to Sweden to do research with Prof. Dag Hansstorp's group at the University of Gothenburg. (Some of you may remember one of the graduate students from Gothenburg, Pontus Andersson, who visited Denison to work in our lab for ~6 months in 2005; I recall **Dave Richardson ('06)** stumping Pontus with the question, "What do they call jazz trumpeter Miles Davis in Europe?"). This fall, I'm enjoying teaching Physics 305 Classical Mechanics and Physics 125 Quarks to Cosmos (with a record 26 students!). On the family side, we all enjoyed traveling to Sweden in August, and my daughter Marissa (17) and son Ben (14) are both playing soccer this fall.

Presentations, Grants & Publications

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SELECTED FACULTY PUBLICATIONS (student names in bold font)

"Inner-Shell Photodetachment from Ru", I. Dumitriu, R.C. Bilodeau, T.W. Gorczyca, C.W. Walter, N.D. Gibson, Z.D. Pešić, D. Rolles, and N. Berrah, *Physical Review A* 82, 043434 (2010).

"Electron Affinity of Indium and the Fine Structure of In Measured using Infrared Photodetachment Threshold Spectroscopy", C.W. Walter, N.D. Gibson, **D.J. Carman ('10)**, **Y.G. Li ('12)**, and **D.F. Matyas ('12)**, *Physical Review A* 82, 032507 (2010).

"Electron Affinity of Arsenic and the Fine Structure of As⁻ Measured using Infrared Photodetachment Threshold Spectroscopy", C.W. Walter, N.D. Gibson, **R.L. Field III ('09)**, **A. P. Snedden ('08)**, **J.Z. Shapiro ('10)**, **C.M. Janczak ('07)**, D. Hanstorp, *Physical Review A* 80, 014501 (2009).

"Promoting a Core Electron to Fill a d-shell: A Threshold Law and Shape and Feshbach Resonances", R.C. Bilodeau, I. Dumitriu, D. Rolles, N.D. Gibson, C.W. Walter, and N. Berrah, *Physical Review A* 80, 0131403 (Rapid Communications) (2009).

"Short Pulse Laser-induced Dissociation of Vibrationally Cold, Trapped Molecular Ions", J.D. Alexander, C.R. Calvert, R.B. King, O. Kelly, W.A. Bryan, G.R.A.J. Nemeth, W.R. Newell, C.A. Froud, I.C.E. Turcu, E. Springate, P.A. Orr, J. Pedregosa-Gutierrez, C.W. Walter, R.A. Williams, I.D. Williams, and J.B. Greenwood, *Journal of Physics B* 42, 154027 (2009).

"Depletion of the excited state population in negative ions using laser photodetachment in a gas-filled RF quadrupole ion guide," A.O., Lindahl, D. Hanstorp, O. Forstner, N.D. Gibson, T. Gottwald, K. Wendt, C.C. Havener and Y. Liu, *Journal of Physics B*, 43, 115008 (2010).

"The chemical history of molecules in circumstellar disks, I. Ices", R. Visser, E.F. van Dishoeck, S.D. Doty, & C.P. Dullemond, 2009, *A&A*, 495, 881.

"Chemical modeling for young stellar objects, I. Methods and benchmarks," S. Bruderer, S.D. Doty, & A.O. Benz, 2009, *ApJS*, 183, 179.

"Automated fitting of B335 dust continuum observations: approach and evidence for grain evolution," S. D. Doty, **R. Tidman ('09)**, Y. Shirley, & **A. Jackson ('07)**, 2010, *MNRAS*, 406, 1190.

"MOJAVE: Monitoring of Jets in Active Galactic Nuclei with VLBA Experiments. VII. Blazar Jet Acceleration," by Homan, D.C., Kadler, M., Kellermann, K.I., Kovalev, Y.Y., Lister, M.L. ROs, E., Savolainen, T., & Zensus, J. A. (2009) *The Astrophysical Journal* vol 706, p.1253.

"Full Polarization Spectra of 3C 279", by Homan, D. C., Lister, M. L., Aller, H. D., Aller, M. F., & Wardle, J. F. C. (2009) *The Astrophysical Journal* vol. 696, p. 328

"The Relation Between AGN Gamma-Ray Emission and Parsec-Scale Radio Jets", by Kovalev, Y. Y., Aller, H. D., Aller, M. F., Homan, D. C., Kadler, M., Kellermann, K. I., Kovalev, Yu. A., Lister, M. L., **McCormick, M. J. ('10)**, Pushkarev, A. B., Ros, E., & Zensus, J. A. (2009) *The Astrophysical Journal Letters* vol. 696, p. L17

STUDENT PRESENTATIONS (student presenter underlined)

"The Electron Affinity of Indium and the Fine Structure of In Measured using Infrared Photodetachment Threshold Spectroscopy", C.W. Walter, **Y. Li ('12)**, **D.J. Matyas ('12)**, **D.J. Carman ('10)**, N.D. Gibson, OSAPS-Ohio-Region Section of the American Physical Society Spring Meeting, Flint, Michigan (4/2010).

"Tunable Infrared Laser Photodetachment Spectroscopy of Ce", Poster, **Y.-G. Li ('12)**, **R.M. Alton ('12)**, **S.E. Lou ('12)**, **D.J. Matyas ('12)**, **R.L. Field III ('09)**, N.D. Gibson, C.W. Walter, D. Hanstorp, Poster, OSAPS—Ohio-Region Section of the American Physical Society Fall Meeting, Marietta, Ohio (10/2010).

"Tunable Infrared Laser Photodetachment Spectroscopy of La", Poster, R.M. Alton ('12), **Y.-G Li ('12)**, **D.J. Matyas ('12)**, **S.E., Lou ('12)**, C.W. Walter, N.D. Gibson, OSAPS-Ohio-Region Section of the American Physical Society Fall Meeting, Marietta, Ohio.

"Effects on Problem-Solving Skills Due to Particular Styles of Questions," Poster, **Z. Goldman ('11)**, **G. Zeng ('09)**, Dr. K. Harper, AAPT--American Association of

Physics Teachers summer meeting, Ann Arbor, MI (7/2009).

"Interpretation of Molecular Absorption Lines Toward NGC 7538 IRS 9" **J. Cochran ('11)**, S. Doty, J. Lacy (University of Texas), J. Barentine232 (University of Texas). 215th American Astronomical Society Meeting in Washington, D.C. (01/2010)

"Modeling Disks Around Massive Protopostars" **J. Cochran ('11)**, S. Doty, J. Lacy (University of Texas). 217th American Astronomical Society Meeting in Seattle, WA (01/2011)

"Modeling the Distribution of Linear and Circular Polarization from AGN Jet Cores", **Christopher B. Wotta ('11)**, D. C. Homan, M. L. Lister, 217th Meeting of the American Astronomical Society, Seattle, WA (01/2011).

"Chemical Evolution of Collapsing Clouds in Massive Star Formation," **K.Oman ('12)**, S. Doty, M. Krumholz (University of California Santa Cruz), American Astronomical Society, AAS Meeting #217, Seattle, Washington, (01/2011.)

"Probing the Intrinsic Brightness Temperature Distribution of the MOJAVE Complete Sample" by McCormick, Michael, '10, Homan, D.C., Lister, M.L., & Kovalev, Y.Y. (2009) BAAS, poster presented at the American Astronomical Society Meeting 213, #422.10.

"Circular Polarization from Helical Fields in Extragalactic Radio Jets" by Baldwin, C. ('09), & Homan, D.C. (2009) BAAS, poster presented at the American Astronomical Society Meeting 213, #422.10.

GRANTS

C. W. Walter, Wenner-Gren Foundation of Sweden Visiting Researcher Grant, in collaboration with Prof. Dag Hanstorp (University of Gothenburg), \$10,000 (2010)

C.W. Walter, Mellon Foundation (Denison University) Faculty Career Enhancement Grant, \$2,400 (2010).



Jack Pearson ('09) admiring his spokes on the flywheel he created.



Maureen Crotty's ('10) vertical piston, compressed air engine.

Shop 101

by David McGinnis



David McGinnis ('10) with his flywheel.

Shop Talk

By Ken Bixler

“What a great pleasure it has been to spend the past 15 years with the faculty and students of Denison. Frankly, I was not optimistic about the future when I came here in 1995. Coming in from industry I had not been exposed to motivated and critically thinking young people.

The last couple of years I have had the opportunity to pass some machining knowledge onto several students. Some have completed the standard “Lucy” acrylic compressed air motor while others have chosen their own project.

Jack Pearson ('09) built a stirling engine a couple of years ago and created a flywheel with spokes rather than a simple dish and rim. A picture of the finished project appeared in a machine tool trade magazine.

Dave McGinnis ('10) spent two semesters building two Lucys and was kind enough to donate one to the Department's display.

“Last semester I had the opportunity to work with Ken Bixler in the machine shop for a second year in a row. I chose to build another air engine with some modifications that Ken and I came up with to improve the function and the look of the flywheel. The entire project was made out of a few pieces of Lexan and aluminum, and a large ring of brass for the flywheel. The main support structure and the piston block were both made out of clear Lexan, which allows for all the moving parts to be seen from any side. The piston was made out of a small aluminum cylinder and it connected to a small aluminum disk which was also connected to the flywheel. The flywheel that Ken and I designed called for a ring of brass to fit flush with aluminum spokes in the center for support. To create the flywheel, a large ring of brass was cut out of a solid brass cylinder.

Maureen Crotty ('10) decided to make a vertical piston, compressed air engine. Maureen and I traded “what ifs?” on the material used and I have to say it looks great and runs well.

Chris Wotta ('11) was my most recent victim and built another Lucy engine. He did a great job, but unfortunately, Dave M. had corrupted him. I want my Maureen back because she at least said she was sorry when she hurt my feelings. ☺

Last year, **Adam Lebovitz ('12)** suggested and helped build a vacuum demo apparatus for the Outreach Program. It works great, looks good and faculty were impressed too.

I have enjoyed my time at Denison and reading the email and newsletter notes from past students makes me very, very proud to know you.”

A second, smaller disk of aluminum was lathed out of a solid aluminum cylinder with its outer diameter cut just larger than the inner diameter of the brass outer ring. To put the two pieces together I heated the outer brass ring and cooled the aluminum ring with liquid nitrogen before dropping the smaller disk inside the brass ring. When the two metals reached equilibrium, they made one solid piece. After a few pins were put into the flywheel to ensure the two pieces would not fly apart while in use, I cut out spokes on the mill. This provided both a nice look for the flywheel, and also improved its performance. The project took longer than expected but the results were awesome. I would like to thank Ken for helping me with both of my projects and providing the expertise that he has gained over his many years of service to our department.”



Honors Day 2009



Professor Walter presents Richard Field with the Samuel C. Wheeler Award.

In 2009 four students were inducted into the Denison Sigma Pi Sigma Chapter: Jeff Cochran, Zack Goldman, Russell Holden, and Jacob Shapiro. Dr. Coplin ('85), who currently serves as Associate Provost, gave a talk titled "A Look at Denison Physics through the Lens of Our Mission." At the award banquet following, several awards were given. Robbie Christian was awarded the "Denison Society of Physics Students Leadership Award" recognizing him for his work with the Department's Outreach Program and coordination of several departmental activities including lunches, bowling, and picnics. Richard

Field was honored with the Samuel C. Wheeler Award for Excellence in Physics. Other awards presented include: Excellence in Introductory Physics (for majors) to Yige Li, Matt Lipner, Dan Matyas, and Drew McCallister; Excellence in Introductory Physics (for non-majors) to Mary Carrington, Chase Foy, Bobby Fresch, David Porter, Krista Rieger, and Sammy Spear; Senior Fellows to Maureen Crotty, Michael McCormick, David McGinnis, Jacob Shapiro, and Geng Zeng.; Junior Fellows to Jeff Cochran, Zack Goldman, Russell Holden, and Chris Wotta. Michael McCormick was named Honorable Mention for the 2009

Goldwater Scholarship. Professor Emeritus Dr. Trig Gamble was honored by President Dale Knobel with the Bowen Emeritus Faculty Scholarship which were bestowed to Yige Li and Rachael Alton.



Wes Walter congratulates SPS Leadership Award recipient, Robbie Christian.

Honors Day 2010

Honors Day 2010 kicked off with our Sigma Pi Sigma Induction. This year's newest inductees to Denison's Chapter include: Amanda Bruce, Yige Li, Edwin Lou, Dan Matyas, Drew McCallister, and Professor Maryam Farzaneh. Alumni speaker, Rachel Berger Connolly ('96), gave a talk titled "How Do You See the Universe? - How Data Visualization Will Change the Way We Teach and Do Science." This lecture was a part of the "Stars of Swasey" Series (celebrating 100 years of the Swasey Observatory). After Rachel's talk, the group adjourned to the President's Dining Hall where students were recognized for their achievements:.

For Excellence in Introductory Physics (majors): Clay Crocker; Excellence in Introductory Physics (non-majors): Louise Carroll, Tian Lan, Peter Surace, Devon Widmer, Sam Wolock and Kendal Wyllie; Junior Fellows: Rachael Alton, Amanda Bruce, Yige Li, Edwin Lou, Dan Matyas, Drew McCallister, and Kris Oman; Senior Fellows: Jeff Cochran, Zack Goldman, Russell Holden, and Chris Wotta. Maureen Crotty was awarded the Denison Society of Physics Students Leadership Award to recognize her excellent leadership in our SPS Chapter. Michael McCormick received the Samuel C. Wheeler Award for Excellence in Physics, and Geng Zeng received the Ronald R. Winters Graduate School Award in Physics.



Samuel C. Wheeler Award recipients Mike Bait ('87) and Michael McCormick.



Maureen Crotty, receives the SPS Student Leadership award from Professor Dan Gibson.



2010 Sigma Pi Sigma inductees: Edwin Lou, Dan Matyas, Amanda Bruce, Drew McCallister, Yige Li, and Professor Maryam Farzaneh.



Geng Zeng, pictured with Professor Emeritus, Ron Winters.

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Alumni Corner

by Keith Starr ('06)

“One day, all children will have the opportunity to attain an excellent education” read the poster outside my senior year quantum mechanics class in Olin. I decided to apply to Teach for America in 2006 and was accepted to teach in rural eastern North Carolina, one of the few rural placements. I did not know at the time that five years later I would still be involved in the fight for educational equality for all students in America, no matter their skin color or zip-code. Currently, I teach at KIPP: Pride High School in Gaston, NC, as the founding AP Physics teacher and an instructional coach for first year teachers. We are a free and public charter school serving students in the rural communities of North Carolina.

There are two things I love (after my lovely wife Emily): physics and talking about how people learn physics. I believe that an education in physics is a



Keith Starr ('06), on crutches, and a student in front of Morehead Planetarium during a summer workshop

gateway into the higher levels of science and necessary to be a productive citizen. In my class, we focus on the experimental side of physics and learn the basic laws through my students' natural curiosity (For more information, research the Coupled Inquiry Cycle). I am passionate about all students taking physics because of the opportunities it opens up. All of the seniors at the high school where I teach are required to take a high level of physics and I know that this will make them more competitive as they move on in their lives.

I have also spent the last three years working with Dr. Sheila Kannappan, an astro-

physics professor at UNC – Chapel Hill, on developing an astrophysics curriculum for high school students in North Carolina. Dr. Kannappan is a Teach For America alumnus whose research interests involve finding methods to increase the diversity of students who study physics by providing college level research opportunities to them early in their education. The end goals of this collaboration are that we will make this curriculum accessible to physics teachers across the country and we will develop a research summer experience for students and their teachers at UNC-CH.

Emily and I have settled in rural North Carolina enjoying the ability to start a rather large garden and keep five egg-laying chickens. We have been canning all summer and hope to move towards raising most of our own food. We also have the benefit of living eight miles down the road from a farm that sells organic produce and near plenty of farmers markets who provide us with sustainably raised meat, poultry and pork. As they say, “Goodness grows in North Carolina.”