

August 27, 2015

Keith Bonin
Department of Physics
Wake Forest University
Winston-Salem, NC 27109
Email: bonin@wfu.edu
Ph: (336) 758-4962

Dear Physics Alumni,

The Physics Department faculty and staff invite you to our **Homecoming reception on Saturday, September 26**. We are having a joint reception with Chemistry and Biology and a lecture demonstrations show. The show is designed to be of interest to everyone including children. The lecture demonstrations will begin at 10 am on Saturday morning in room 126 of Winston Hall. The demonstrations will be followed at 10:45 by a reception in the lobby of Winston Hall.

We've had two significant changes in the Physics Department over the past year. First, Professor Rick Matthews has returned to the Department after a seven year stint as Vice President for Information Systems. We are very happy to have him back. Last year he taught introductory physics but in an innovative way using a "flipped" classroom. The idea is to maximize student interactions and minimize lecture time. For this purpose, one of the teaching labs (Olin 105) was renovated and turned into a new Studio Physics classroom which simultaneously serves as a classroom, a room where students can work together in small groups, and a teaching laboratory. The new classroom was so successful that similar initiatives were added to the new Wake Will Capital Campaign.

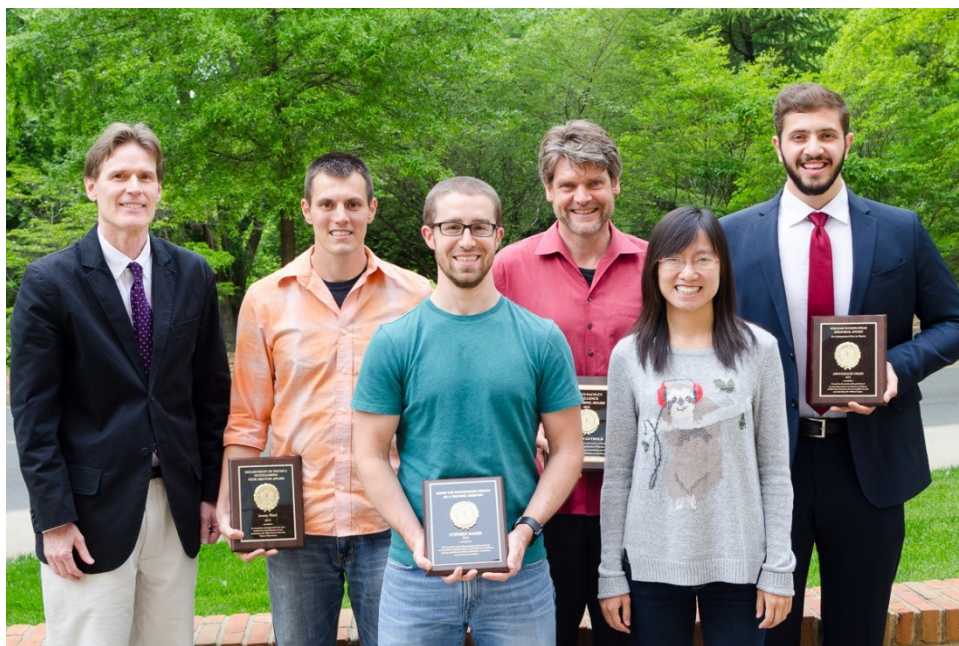
The second change is that our Staff Assistant Heather Chapman left after having a baby in March. Eric Chapman, our Instructional Resources Manager, and Heather are the proud parents of Boyd, who was born on March 11, 2015. We wish Heather and Eric all the best. A new Staff Assistant, Lesley Whitener, has joined us in the Physics Department this month, and her husband Paul works as a UNIX Systems Architect for Wake Forest's Information Systems. Previously Lesley worked as a Purchasing Agent for a plastics company in Mocksville, NC.

The Randall Ledford Scholarship is available to help recruit a first-year student beginning in the fall of the 2016-2017 academic year. This is a four-year half-tuition scholarship awarded to a promising incoming physics major attending Wake Forest University. The award is worth a minimum of \$91,000.

As in previous years some of our faculty have received awards. Oana Jurchescu was awarded Wake Forest University's 2015 Excellence in Research Award at Founder's Convocation on Feb. 19, 2015. This award recognizes the wonderful achievements of a faculty member who is an Assistant Professor or early in an Associate Professor position at Wake Forest University. She was also recently promoted to Associate Professor. Timo Thonhauser was awarded the Reid-Doyle Prize for Excellence in Teaching at Founder's Convocation. This award recognizes the dedication and high quality of teaching by a faculty member who is an Assistant Professor or early in an Associate Professor position at Wake Forest University. It is Wake Forest's highest teaching award for junior faculty members. And, David Carroll has received the Innovation Award from Wake Forest Innovations for his contributions to the field of alternative energy.

Some of our students have also received awards. Graduate student Wenxiao Huang, together with his collaborators from the University of Connecticut, made it to the final four in the BASF 150th Anniversary North American Science Competition. BASF is the world's largest chemical producer. Graduate Students Nicholas Lepley and Evan Welchman took first and second place respectively for the Reynolda Campus in the Graduate Research Day Three Minute Thesis Competition on March 20. And senior Derek Fogel won the Best Presentation Award in the undergraduate session at the APS March Meeting that took place this year in San Antonio, Texas.

At the Physics Department's annual awards ceremony last April Professor Martin Guthold received the Physics Department Excellence in Teaching Award. Graduate students Stephen Baker and Wei Li won the Outstanding Teaching Assistant award, graduate student Jeremy Ward won the Outstanding Peer Mentor award, and senior Abdulmalik Obaid received the Speas award. This fall he will be a graduate student at Stanford University.



From left to right, front row: Stephen Baker, Wei Li. From left to write back row: Keith Bonin, Jeremy Ward, Martin Guthold, Abdulmalik Obaid.

The number of students in our Department remains high. This fall we will have 2 sophomores, 29 juniors, and 25 seniors for a total of 56 majors. There will also be 38 graduate students. Our tradition of undergraduate research continues. Last year more than 35 undergraduate students engaged in research with our faculty. If you look around Olin, you will see posters and publications in our halls bearing the names of both our undergraduate and graduate students. You can also read about some of the students and their research projects at <http://www.wfu.edu/physics/profiles/profiles.html> .

For me, the academic year ending in July 2015 was busy on several fronts. I served on the committee that selected Wake Forest College's new Dean – Prof. Michelle Gillespie of the History Department. A lot of effort went into planning for potential new programs in a building undergoing renovation in the city's Innovation Quarter, located just west of highway 52 in downtown Winston-Salem. In research, we had Xinyi Guo earn her PhD in May, and she has continued into a Master's Program for Business, and she would like to work in the Health Care sector. A new student Hyunsu Lee joined our group and he has begun recently to take data on a new Atomic Force Microscope that was installed during the

year at Biotech Place in downtown Winston-Salem. Several students, including Xinyi Guo and Jiajie Xiao, gave presentations at international conferences in Biophysics. Several undergraduates continued research with the group – Daniel Nelli, Mizuki Saito, and River Wu. In addition, we had several new undergraduate students join the research group, namely Josiah Low and Tracey Pu.

This year we are taking a slightly different format for the Alumni Newsletter: we are having the abbreviated section above which describes department changes and successes, and we are adding a section where some of our faculty members briefly describe, as I have just done, highlights of the past year about themselves, either professionally or personally or both. The new section will be presented in alphabetical order.

I want to give special thanks to all of you who designated the Physics Endowment Fund as part of your alumni giving. The Physics Endowment Fund is used in a variety of ways. It helps to send students doing research to national and international conferences; it is used to support the annual faculty and student awards; it allows us to provide lunches at the career advising events for our undergraduate and graduate students; and it is used to support the students who are members of our local chapter of the Society of Physics Students in their activities and events throughout the academic year. The Physics Endowment Fund this past year also partially supported the expensive trip that graduating senior Abdul Obaid had to take to England to be interviewed as a finalist for the Gates Cambridge Scholarship. The members of the Physics Department and the university community greatly appreciate the support of our alumni.

Please come and join the fun if you can. We are looking forward to seeing you. If you can't make it to Homecoming, please drop me a note or give me a call and tell me what you're up to. If this letter was forwarded to you, please let us know your current address.

Go Deacs!



Keith Bonin
Professor of Physics & Chair

STATEMENTS FROM SOME FACULTY MEMBERS

Paul Anderson

It's been a good year. I was on sabbatical during the spring semester of 2015. I chose to stay here this time but made up for it with a fair amount of spring and summer travel. It was in 2015 that Einstein finalized his theory of general relativity and so there are various conferences in honor of that scheduled throughout the year. Most of the members of the gravity group attended one of these at Pennsylvania State University in early June. I also attended two others at which recognition of the centennial of Einstein's theory took place: the American Physical Society April Meeting in Baltimore and an international conference called the Marcel Grossmann Meeting on General Relativity that meets every three years. This year it was in Rome, so my wife and I decided to do some vacationing there before and after the conference. After the sabbatical and summer travel it is good to be back and I am looking forward to resuming teaching during the fall semester.

Samuel S. Cho

We have had a pretty active 2014-2015 year in the Cho lab. Rongzhong Li successfully defended his PhD, and he is planning to complete his MS in Computer Science by December. In total, his time at Wake will be 5.5 years, which is the average time for most graduate students to complete one PhD, but he will leave with two graduate degrees and at least 5 publications and a patent. A new physics PhD graduate student, Lauren Nelson, also joined the lab, and she will be co-mentored by Prof. Dany Kim-Shapiro. Her research has already resulted in an NIH pre-doctoral fellowship, and we're working on her first manuscript.

The undergraduate students in the group have been quite successful as well. Four undergraduate students, Jessica Leuchter, Adam Green, Cecilia Rambarat, and Julian Gilyard, wrote a peer-reviewed article summarizing recent developments in MD simulations. Their article was a special issue commemorating the 2013 Nobel Prize in Chemistry on the subject. Jessica presented her research at the Karlsruhe Institute of Technologie (Germany) thanks to a travel award she received, where she met Prof. Yaakov Levy. She is now a researcher with Prof. Levy at the Weizmann Institute (Israel), and she plans to pursue to a Ph.D. Adam is now attending a Ph.D. program at the University of Tennessee, Knoxville, where he was the recipient of their Chancellor's Fellowship, which is reserved for the top applicant and includes an \$40k extra stipend over 5 years. Cecilia and another undergraduate, Billy Nicholson, presented their research at the internationally attended Biophysical Society Meeting in Baltimore, MD. Julian presented his research at the Society for Industrial Applied Mathematics Conference in Salt Lake City, UT, and he is interning at the Swiss global financial firm UBS in Manhattan.

I was able to travel to a few conferences, but the highlight for me was attending the Kavli Institute for Theoretical Physics in Beijing, China. Despite the geopolitical news I hear day to day, it was nice to see so many energetic students who share our mutual love of science. Also, the Chinese food is amazing (!) and very different from the Chinese food in America. I was also invited to give a talk at Nanjing University, ranked #1 in Physics in China and the undergraduate university of my graduate student, Rongzhong Li. I made a special talk highlighting Rongzhong's work, and asked them to send students as talented as Rongzhong to Wake.

Gregory Cook

The last year began with Max Zalutskiy finishing his Master's degree in Computer Science and starting his final push toward finishing his work toward a PhD. This included his first publication with me: "Gravitational perturbations of the Kerr geometry: High-accuracy study." The fall semester also saw Anthony Craven join our group for a semester of undergraduate research. 2015 marked the 100th anniversary of Einstein's theory of General Relativity. Most of the gravity group made the trip to Penn State University in early June to attend a week-long celebratory conference: "General Relativity & Gravitation: A Centennial Perspective." Max and I were both invited to give talks during the afternoon parallel session.

Jack Dostal

During the 2014-15 year I taught several courses including The Physics of Music, taking students up to the carillon in Wait Chapel as well as to the hospital to see their own vocal cords! I also had the opportunity to give a couple of talks at professional meetings – one on musical acoustics in Indianapolis and the other on physics education in Minneapolis. I also kept busy by helping the Department host a meeting for about 50 North Carolina physics teachers in March. Perhaps the most memorable event for me was conducting an outreach session about sound and physics with approximately 100 second-grade students at Sherwood Forest Elementary. They thought it was pretty cool that plastic trombones make the same sounds as brass trombones!

Martin Guthold

A lot has happened in the Guthold lab in the past year. We have celebrated the graduation of three graduate students and one undergraduate student. In May, Xinyi Guo successfully defended her PhD dissertation. She liked Wake Forest so much that she stayed around to get a Master's degree in Accountancy. Her goal is to get a job in a consulting firm. In June, Stephen Baker successfully defended his PhD dissertation. He got a post-doc position with Gijsje Koenderink at the FOM Institute AMOLF in Amsterdam (Netherlands). In July, Wei Li successfully defended her PhD dissertation. She got a post-doc position with Tom Barker at Georgia Tech. Mizuki Saito, an undergraduate researcher in our lab, graduated in May and got accepted to Dental School at the University of Louisville in Kentucky.

Together with Dr. Hall (Biomedical Engineering), we also got a state-of-the art combined Asylum MFP-3D-BIO atomic force microscope (AFM) and an Olympus IX73 inverted optical microscope. This instrument will enable many exciting experiments.

We welcomed several new members to the lab, graduate students Hyunsu Lee and Ali Daraei (fall 2015), and undergraduate students Tommy Lucioni, Josiah Low and Tracey Pu. Our business collaboration with NanoMedica, LLC is going well. Former undergraduate student Victor Yu (Biophysics, '13), who was working with NanoMedica, was accepted at the Business/Biomedical Engineering program at Duke University.

The Guthold family is doing well. My wife, who is a lawyer for the city of Winston-Salem, is making sure the city is staying out of legal trouble. My son, Felix, has finished his PA program in Germany and is now working as a PA in a Cardiology unit at a hospital in Stuttgart (Germany). Our daughter,

Melissanthi, is starting 7th grade at Jefferson Middle School, and our two-year old son Alexander is making sure we have our priorities straight at home.

We hope to see you at homecoming, or just arrange a visit with us.

Natalie Holzwarth

This past year, undergraduate students Hannah (Xinran) Zhang and Zachary Pipkorn completed their BS degrees in Physics and participated in research by performing molecular dynamics simulations using the LAMMPS and GULP codes, respectively. Some movies resulting from that effort are posted in the web <http://users.wfu.edu/natalie/MD/hannahsMD.html> and <http://users.wfu.edu/natalie/MD/zacsMD.html>. Hannah's work resulted in an undergraduate thesis "Computational Modeling of Li Diffusion using Molecular Dynamics". Hannah is now attending University of Melbourne in a Master's degree program in Electrical Engineering. Zac will be joining the Marine Corp and becoming a pilot in a few months. Meanwhile he is returning to WFU and attending the Masters program in Management at the Business School. Jamie Drewery (BS 2014) spent part of the last year helping us to continue to update the <http://pwpaw.wfu.edu> webpages before joining some projects working with Richard Williams and David Carroll's groups. This fall, he will attend the University of Pennsylvania in their Masters of Materials Science program. Cameron Kates (BS 2014) is starting the second year of graduate school at the Pratt School of Engineering at Duke University. His senior thesis work on modeling Li4P2S6 is included in a manuscript submitted for publication in collaboration with Zachary Hood and several colleagues from Oak Ridge National Laboratory. Graduate student Nicholas Lepley is currently writing his thesis, expecting to graduate in September 2015. Graduate students Ahmad Al-Qawasmeh, Larry Rush, and Jason Howard are all working hard to model various battery materials.

Oana D. Jurchescu

Our Organic electronics group had a good 2014-2015 year. Graduate student Katelyn Goetz was awarded a National Science Foundation Graduate Research Opportunities Worldwide (GROW) fellowship and she spent three months in the group of Dr. Tatsuo Hasegawa at the Flexible Electronics Research Center (FLEC), National Institute of Advanced Industrial Science and Technology (AIST), Japan, performing research on opto-electronic materials. Jeremy Ward successfully defended his PhD thesis and is now in Washington DC working as a Materials Research Society (MRS) and The Minerals, Metals & Materials Society (TMS) Congressional Science and Engineering Fellow, on the staff of a member of Congress or congressional committee. Three undergraduate students graduated with honors in Physics: Abdul Obaid, Andy Vuong and Derek Fogel. They are now enrolled in PhD programs at Stanford University, UCLA and Washington State Univ, respectively. Abdul also won a Gates Cambridge Scholarship, which he declined. We had two cover articles, one in advanced Functional Materials and one in ChemPhysChem. Our work was featured in the Journal of Materials Chemistry C: 2014 Emerging Investigators Themed Issue, which highlights the best work from material scientists in the early stages of their independent career. This article was also selected as one of the most accessed articles for 2014 and included in the Most Accessed Articles 2014 web collection.

Daniel Kim-Shapiro

The 2014-2015 year has been pretty eventful in and out of the Kim-Shapiro lab. Andrea Belanger completed her PhD and is now working as a Licensing Associate at UT Dallas. Craig Clodfelter completed his PhD in Chemistry. Jack Janes completed a Bachelors degree and is now working at Lockheed while Pragna Shetty took her Physics bachelors degree to medical school. The group welcomed a new graduate student, Lauren Nelson, who is also working with Professor Sam Cho and who just won a NIF pre-doctoral fellowship. As usual, the whole group went to the meeting of the Society for Free Radical Biology and Medicine (including Jack) in Seattle.

On the homefront, my oldest son Soleil will be a junior in high school next year. He worked in Professor Jurchescu's lab this summer. The other two boys are in middle school. My wife (a pathologist) is working a lot both at Wake Forest's Lexington and Winston-Salem's hospitals. We had a great vacation in Maui visiting my wife's sister and her daughter. The highlight is when we caught a little octopus while tide pooling.

Hope to see some of you at homecoming – or just come for a visit and arrange to see us.

Rick Matthews

I'm back! After seven years in administration, first as Associate Provost and then as Chief Information Officer, I returned to Physics last summer. While I enjoyed being in a position where I could shape campus technology, I deeply missed teaching and time with students.

When you are away that long, you think a lot about what you would do differently when you get back in the classroom. My guiding principle was this: do not waste a moment of the time you and the students are together doing things you could do just as well when you are not together. That led me to blow up my old approach and “flip” my classes. I had students watch short lecture videos before coming to class and then we spent class time in immersive interactive activity, mostly small group problem solving. It worked wonderfully, in spite of my inexperience with this approach. I am grateful to the department for completely renovating one of the labs to accommodate such an intensely collaborative use of class time. I look forward to round two this academic year!

On the way back to Physics, I picked up another responsibility: Director of Academic and Instructional Technology for the College. In this role, I oversee the Instructional Technology Group and get to indulge my passion as a “tech evangelist.” Faculty in our department and across campus, enabled by technology, are finding more effective ways for students to learn. I love spreading the news of their successes.

So, I get to spend half my time ferreting out the best of teaching practices and the other half applying what I learn to my own classes. It has been a dream year.

Fred Salsbury

The 2014-15 academic years was a busy one in the Salsbury group. Ryan Godwin received a second year of fellowship funding from our NIH SCB training grant. He also went to the Protein Society first International Annual Meeting in Barcelona with me; ample great science in a beautiful city. Ryan Melvin gave an invited talk at Stanford on Sustainability and Simulation, and joined Ryan Godwin and me at the Biophysical Society Conference in Baltimore this year. The three of us also co-wrote a review article on Molecular Dynamics Simulations and Computer-aided Drug Discovery for *Methods in Toxicology*. Jiajie didn't join us in Baltimore this year, instead he covered the APS March meeting for our group.

In personal notes, Dr. Yan Lu had her baby, and my wife, Rebecca, is now the newest Assistant Principal at Reagan High School.

Timo Thonhauser

In the spring semester of 2015 I took 15 students to the WFU Flow House in Vienna/Austria. This is the first time that the introductory physics classes (General Physics I and General Physics II) were taught abroad. This option was very popular amongst students, in particular for the pre-med students who typically are not able to spend an entire semester abroad, as they were able to fulfill their entire physics requirement in one semester. In addition to physics, during this semester in Vienna the students also had to take a German class and either a Music or History class. We also took the students on several trips, visiting the Technical Museum, the Mauthausen Concentration Camp, Prague, and Budapest. It was a wonderful experience for everyone involved and an exciting way to extend the reach of our department to the WFU international programs!