



Department of Physics



Tikhon Bykov
Physics Department, Box 38
McMurry University
Abilene, TX 79697
(325) 793-4875
tbykov@mcm.edu

Friend

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Dear Friend :

Greetings from McMurry Physics Department!

We hope that you had a wonderful holiday season and a good start to the new year. As usual at the beginning of the spring semester we bring you our news from the fall.

In December the department had two graduating physics majors and one graduating physics minor. Alistair Adams has completed all of the requirements for his degree. You may recall that being active military Alistair was transferred from Abilene and his graduation was delayed. This fall Alistair was able to complete his last upper division physics course taking it long distance. This was a new and challenging experience for both Alistair and Dr. Bykov who was teaching the course. At the end Alistair performed better than anybody else in this class. At the moment Alistair is still staying in the Air Force, but we hope to hear from him in the near future on what his post graduate career is going to be. He was always interested in the engineering field. Jared Land also graduated in December. His last semester at McMurry was devoted to finishing the Psychology minor, since all of the requirements for the physics degree were completed last spring. Currently, Jared is considering several graduate programs but he has not made his final decision on where he wants to go after McMurry. Cody Langston, math major and physics minor also graduated in December. Cody is going to work at an engineering firm.

Our seniors have continued working on their research projects. Arthur Ross worked through the summer and fall on improving the spectrophotometer owned by the Chemistry Department to convert it into a modern/digital piece of equipment. He has discovered and overcome many difficulties which were not obvious when he started working on this project last spring. Arthur presented the preliminary results of the project during the "West Texas STEM undergraduate student research conference" in Midland College, Midland in October. Arthur should be able to make final adjustments and present his project to the public late this spring. The other senior, Ben Sherwood, has continued working on his project of building a maglev train.

We had a large freshman class this year, six of our freshmen have continued into the spring semester. Two of them, Kent Grimes and Taylor Freehauf, have demonstrated outstanding performance in University Physics I. Taylor Freehauf is also a member of the University's Honors Program and has become the new physics student worker. Kent Grimes is an active member of the Society of Physics students.

In October two physics students, Arthur Ross and Ben Sherwood, accompanied by Dr. Renfro participated in the first "West Texas STEM Undergraduate student research conference" in Midland College, Midland. Dr. Renfro served as a judge in one of the conference sessions. Arthur Ross made oral presentation about his senior research project. Jared Land was not able to attend in person, but sent a poster about his senior research project "Electromagnetic Accelerator (Rail gun)". Finally, Ben Sherwood presented a poster of a class project he completed together with Daniel Zipprian under the supervision of Dr. Bykov in Classical Mechanics II last spring. The project was to find a numerical solution for the equation of motion of a simple nonlinear pendulum. To do this the RK4 numerical method for solving nonlinear differential equations was used. Numerical values for the period of the pendulum were compared to analytical values from the simple harmonic motion, Ritz method, and the expansion of elliptical

integrals. Then a drag force term was added to the equation of motion to see how the phase diagram would change. This poster won second place in its category and Mr. Sherwood received a cash prize of \$100.

Several physics students were able to visit with the Science and Math Advisory Board members during the fall SMAB meeting and talk about their future career plans. We are grateful to SMAB for providing this opportunity for students.

We have continued our alumni talk series “What did I do with my physics degree?” in late October. This time we were joined by our recent graduate Mr. Tyler McCracken. Tyler graduated from the physics department in 2008. Currently he is a PhD candidate in Astrophysics at the New Mexico Institute of Mines and Technology. Tyler was talking about “Stellar interferometry and the Magdalena Ridge Observatory Interferometer”. According to Tyler, interferometers synthesize a much larger telescope by combining light from multiple smaller telescopes and have become an important tool in wavelengths from the radio to the optical. The next generation of stellar interferometers that operate in the optical and near-infrared wavelengths start with the Magdalena Ridge Observatory Interferometer currently being built in New Mexico. Tyler is working on that project as part of his PhD training.

Tyler also was our homecoming speaker this year. In his homecoming talk “From building tips to tracking fringes: A graduate student's perspective on the McMurry experience” he talked about what McMurry meant for him and how the McMurry Physics Program prepared him for the challenges of the graduate school experience. Overall, the Science Homecoming Reception was a great success this year. We had over 40 visitors: alumni and friends from different science programs. The Physics Department was glad to welcome back our old friends like Dr. Girvin Harkins and recent graduates Todd Neer, Jeanette Schofield and Austin Wegner.

We hope to see even more of you as speakers in the “What did I do with my physics degree?” series as well as our visitors during homecoming in future years. If you happen to be in Abilene for any reason, please do come see us and our students and learn about the latest news in the Physics Department. In addition to our Facebook page (look for McMurry Society of Physics Students), we have also revised and launched a completely new version of the McMurry Physics web site this fall. Our new web site is located at <https://sites.google.com/site/mcmurryphysicsdepartment/home> We are very grateful to recent physics alumnus Tylar Murray who started the design of the new web site when he was a student in our program. The site is finally online and operational.

Some other news worthy to mention are the following:

In early November Dr. Bykov and Dr. Kosheleva attended Project Kaleidoscope and American Association of Colleges and University National conference “Next Generation STEM Learning: Investigate, Innovate, Inspire” in Kansas City. During the conference Dr. Bykov presented the poster “Integrated use of Tablet PCs and flexible instructional spaces in teaching of introductory physics” In this poster, Dr. Bykov showed how Tablet PC-based instructional technology and easy-to-reconfigure instructional spaces have been used at McMurry to create highly efficient blended learning environments for teaching of introductory physics courses. The poster was very well received and caused a lot of interest from representatives of different institutional settings, small teaching as well as large research oriented universities.

In the fall, Dr. Keith offered “Solar System Physics”. Brittany Haughton, the Ward-Bottom scholarship recipient, has completed a poster as part of this course. She will be presenting the poster at the Southwest regional “Undergraduate Women in Physics Conference” in Austin.

Dr. Renfro offered “Engineering Statics” in the fall. He decided to include practical assignments this year. The practical portion to the final exam was to build a structure out of spaghetti. This semester in Engineering Dynamics the practice will continue by developing tools for the machine shop. The first assignment is to design, draft, and build tongs, a simple mechanical engineering tooling question that one would see in manufacturing.

Speaking of the machine shop, the renovation of the shop started last spring was completed this fall by installing the new metal and the new wood lathes. Installation of the new metal lathe with digital readouts has proven to be a complicated task, but it was successfully completed just before homecoming. The picture below shows the new lathe in the shop.



The new lathe has replaced the old much smaller Sears lathe manufactured in the 1940s and used in the department since the 1960s. At the moment, the department is looking at selling the old lathe, which is still working, and using the money to supplement departmental budget. Even though it does not seem feasible to ship the old lathe anywhere outside of Abilene, if you know anybody in or in close proximity to Abilene who might be interested in purchasing the old lathe, please let us know.

With the shop equipment update being finished, we plan to include machine shop safety training as part of our senior research proposal course. Dr. Renfro will be conducting the first training sections this spring. He is also planning on studying how to do metal casting with students. Everything but the tongs is ready for that.

These were just some of the many news we had during the last semester. You can always keep track of our current news by visiting us on Facebook. Look for McMurry SPS group page.

If you have been recently added to our database and never received this letter before and/or by some reason want to be removed from the list and/or prefer to update your contact information and/or prefer to receive an electronic instead of a paper copy of this letter, please do not hesitate to contact me at the address above or by email at tbykov@mcm.edu.

Tikhon Bykov - Wayne Keith - Timothy Renfro, The McMurry Physics Department