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Dear Friend :

Now that the 2009-2010 Academic year is over, as usual, we are finishing it by sharing the department news with our alumni and friends.

We only have one graduate this year, Todd Neer. As you may recall, Todd's senior research project was the building of a prototype ultrasonic dog deterrent device. The main goal was to make this device so compact that it fits into a wristwatch case. Todd presented his work to the public in February and also met with a patent lawyer to begin working to have the device patented in his name. He is so excited about his success that his first plan after graduation is to keep working on the device and hopefully find a manufacturer for his invention to put it on the market. Todd's future plans will be dependent on whether or not he will be able to achieve this goal. We should also note that not only did he present his work at McMurry, but for the first time since we have required a senior research project for the McMurry physics degree, Todd made a presentation of his work at the Texas Section of the joint APS/AAPT/SPS meeting at the University of Texas at Austin in late March of this year. Todd's talk at the meeting went very well and he received several interesting questions and suggestions from the audience.

As was mentioned in the last news letter, this spring we had a record high number of five juniors working on their senior research proposals. Four of them presented their proposals to the public at the binging of May. Tylar Murray's proposal is entitled "Fuel Cell Design and Construction" and according to this proposal in the course of the next academic year he will be building a hydrogen fuel cell. The proposal was awarded with the first in McMurry history *Charles & Lisa Bloomer Research Stipend*. The stipend in the amount of \$1500 is awarded by the Science and Math Advisory Board once per year to a student from the School of Natural and Computational Sciences to work on a research project. We are proud that the first ever stipend was awarded to a physics student. Congratulations to Tylar! This stipend should help in purchasing expensive parts of the fuel cell for Tylar's project. Austin Wegner's proposal is entitled "Wind Tunnel Design and Construction". After the construction is finished the wind tunnel will be used in future senior projects as well as for studying the effects of wind on various shapes and materials. In particular, the tunnel can be used for testing of Aaron Ward's model plane, which he proposed building in his "UAV Design and Construction" proposal. Finally Michael Herriage presented the proposal entitled "Table Top Cyclotron Design and Construction", with which he hopes to build a working model of a cyclotron. Alistair Adams is still working on his proposal "Backyard Conversion of Waste Biomass to Ethanol". Even though Alistair was not able to present his proposal to the public in May since he was deployed with the military for most of the semester, the proposal is almost finished and he will be ready to start building a gasifier to produce syngas from biomass as early as this summer and hopefully finish with ethanol production sometime in the fall.

We are looking forward not only to our juniors' but also to our sophomores' performance in the near future. This year Jared Land, Jeremiah Land and Tylar Murray (who is technically a sophomore, but plans on finishing the degree in 3 years) were very successful with their final electronics project. Under the supervision of Dr. Renfro they have built a 403 nm diode laser, powered by a signal sent through a 555 timer. It has a maximum output of 300mW.

Unfortunately we were not very impressed with our freshman class this year and the new freshman enrolment is just starting, so it is difficult to make any projections on incoming freshmen physics majors at the moment. The General Physics enrolment is still very high as it was last year and once again we will be offering two General Physics sections in the fall, one of which is already completely full.

Since the picture with the enrollment of the new physics majors is not quite clear and the five physics majors and minors who we had last year did not do extremely well, as usual we would like to ask your help in telling prospective students interested in physics about our physics program and your experience at McMurry. Please feel free to give these prospective students our contact information and invite them to visit our web site at

<http://www.mcm.edu/newsite/web/academics/ncs/physics/index.htm> or visit us on Facebook under “McMurry Society of Physics Students”.

We have not had any of you coming to visit and meet with our students this spring, but we hope to continue the tradition of alumni talks. Even if you are coming here not with a special purpose of giving a talk but for some other occasion, please do let us know about your visit and we will be happy to chat with you and hopefully get some of our students to meet with you. Speaking of different occasions to visit McMurry, this year's Homecoming will take place during the weekend of October 14th-17th. As in the past, we will have a special reception for science alumni. This year, however, the reception should have a very special meaning. In early fall, please watch your mail for the reception invitation.

The reason why this year's reception will be special is the event which we have been waiting for the last several decades. With the end of classes this May, we took a final look at the Science Building's rooms S104, S105 and S106 as we knew them during the last 40 years. Many of you took your first physics course in our lecture room S104 and remember SPS meetings and Labs in room S106. However, during the last 40 years the standards of how we teach physics, what equipment we use and how the typical classroom should look like have changed significantly. The building, which some of you still call the new science building (in contrast to the “old quadrangle”) is far from being new and far from being modern. Unfortunately, our hopes for constructing an entirely new building have not come true in these difficult economic times. However, very extensive renovation will modify the look of almost the entire first floor of the current building. In the physics areas, rooms S104, S105 and S106 will be completely redone. At the moment the old walls existing between these rooms have been taken down. The new lecture room will be located in the place of old lab room S105; the new labs will be located on either side of the lecture room (former rooms S106 and S104). The rooms will be separated by movable partitions, which will allow for teaching combined as well as separate lecture/lab sessions. All the tables in the rooms will be movable to be used in different configurations for typical lectures as well as various types of group work. The walls in the rooms will be made out of the white board material, so that almost any wall can be used for writing as well as a screen for projections. Multiple projectors and large screen TVs will be mounted on the walls to allow projection of multiple images from individual student and instructor's computers. The new prep rooms will be created adjacent to each of the new spaces to keep the equipment and prepare lecture demonstrations. The new demonstration table will not be stationary but can be moved in and out of the lecture room as needed. The space can be used not just for typical teaching functions, but also for scientific conferences and receptions, like our Homecoming reception, which we hope to host in the new space (if construction is finished on time) and to celebrate the opening of the renovated science building. In addition to the room renovation, we should also obtain several new sets of equipment to be used in the introductory physics labs.

Among the other events of this spring, we should note the following:

In late February a team of graduate school recruiters from Texas Tech University visited the McMurry science departments. Texas Tech Physics Department was represented by Dr. M. Sanati who talked about first thermodynamics principles and Density Functional Theory algorithms in electronic structures of semiconductors. He then discussed the possibilities for students to continue their education at Texas Tech. We hope that the Texas Tech Graduate School representatives' visits will become a tradition and we are also considering a visit by our students and faculty to Texas Tech in the early fall to learn more about their programs and facilities.

In late March Dr. Bykov and Dr. Renfro, accompanied by three students (Michael Herriage, Aaron Ward, and Todd Neer) attended the Texas Section of the American Physical Society/ American Association of Physics Teachers/ Society of Physics Students meeting at the University of Texas in Austin. During the meeting, as mentioned earlier, Todd Neer made a presentation of his senior research project. Dr. Bykov gave a talk entitled “Designing flexible instructional space for teaching introductory physics with emphasis on inquiry and collaborative active learning”. In this presentation Dr. Bykov described the recent changes in McMurry introductory physics curriculum and how these changes lead to re-evaluation of the existing teaching spaces and allowed physics department to design the space for upcoming renovation of the science building. While at UT the group also toured the Texas Petawatt Laser, the most powerful laser in the world. This laser is 2,000 times more powerful than all the power plants in the United States, but its power lasts only for a very short period of time, a 10th of a trillionth of a second. When fully operational the light of the laser is brighter than sunlight on the surface of the Sun.

Also in March Dr. Keith attended a meeting of the PEACE instrument team, which is a part of the international Cluster satellite mission. The meeting was held at the Mullard Space Science Laboratory of the University College of London. MSSL is located in rural Surrey, about 40 miles southwest of London. The PEACE

instrument measures electrons, and along with many other scientific instruments on the four Cluster spacecraft, has been studying the interactions of the solar wind and the Earth's magnetic field for the past decade. During the meeting, Dr. Keith gave a presentation entitled "Drift-corrected CIS Pitch Angle Data for Cluster and DMSP Conjunctions in the Cusps". On the Monday and Friday prior to and following the meeting, Keith visited several museums in the London area and viewed numerous important artifacts to the history of science, including the Rosetta Stone, the world's oldest steam engine, the cathode ray tube with which J. J. Thomson first measured the charge to mass ratio of an electron, the first plane to fly nonstop across the Atlantic, telescopes built by Sir William Herschel (discoverer of Uranus) and one of the first heliocentric mechanical models of the Solar System.

At the end of March Dr. Keith was honored at the Eighteenth Annual Tarleton State University Alumni Academic Forum as one of two outstanding alumni in the College of Science and Technology. Keith is a 1995 graduate of Tarleton, and was asked to speak to two Tarleton physics classes about his experiences since graduation before the awards luncheon.

Throughout the academic year Dr. Bykov has continued his work on the development of the modular teaching approach for introductory physics courses. Now that this approach has been tested in the University Physics course, it will be extended to a larger scale next year. One of the two General Physics sections as well as University Physics will be taught this way with active use of peer instruction and tablet technology and mixed laboratory and lecture sessions. The reconstructed areas of the science building will serve a great deal to support this innovative teaching approach.

Dr Bykov's efforts in the development of the McMurry Physics Program have been rewarded this spring. By the decision of the McMurry Board of Trustees, he was granted tenure and promoted to the rank of the Associate Professor starting the new academic year.

The proposal for a new "Automated Experiments" course, designed by Dr. Renfro, which would utilize the LabVIEW software as the main platform to collect and analyze experimental data, is now approved as a required part of the physics major. Dr. Renfro will be teaching the course for the first time in the fall and almost all the seats in this class have already been taken. Unfortunately, the university was not able to find the funds necessary to purchase several equipment sets for this course, so for now the number of seats in the class will be limited by one equipment set, which will be purchased by the Physics Department from the money available through the Ward-Bottom Fund, generously donated by Roger and Kim Ward.

In late May Dr. Keith traveled to Flagstaff, AZ to perform astronomical observations at the Lowell Observatory through the NURO program. Four McMurry students joined him at the observatory; physics majors Austin Wegner and Tylar Murray, plus history major Nick Bonds and religion major Zach Kerzee. Austin and Tylar, along with Dr. Keith, spent four nights searching for poorly-known asteroids in the hopes of improving our knowledge of their orbits. Although the data has not been completely analyzed yet, multiple asteroids have already been detected in some of the images, and it is hoped that one or more of them may even be a new discovery. In any case, it was an excellent learning experience for the students. The other two students were present at the observatory, but did not participate directly. During the afternoons, side trips with all four students were made to the Grand Canyon, Meteor Crater, and the historic Lowell Observatory in downtown Flagstaff.

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