



BLOOD MOON ECLIPSE - SEPTEMBER 2015 – PHOTO BY DR. LEVENTE BORVAK

University of Dallas Physics News

Fall 2015

IN THIS ISSUE

Over 50 Majors and Growing!

Dear Alumni and Friends,

Since becoming Chair of the Department in 2014, I have wanted to write a letter to our alumni and friends to inform them of our new faculty hires, the growth in our number of majors, and some of the initiatives in our department.

The department has seen a tremendous growth in majors in the last ten years having grown from 15 in 2005 to over 50 in 2015. These students are bright and enthusiastic and they keep us constantly searching for new research opportunities, new laboratory and course ideas, and for intellectual challenges to keep them excited about physics.

To serve these students, the department was able to hire a third tenure-track faculty member, Dr. Jacob Moldenhauer, in 2015 and a new laboratory director, Dr. Levente Borvak, in 2015. These new faces join Dr. Richard Olenick, Mr. Arthur Sweeney, and me as the Physics faculty.

Our recent graduates have been very successful carrying on the tradition of excellence that you started. Since 2005, we have had three Fulbright, two NSF

Fellowship, and one Goldwater honorable mention recipients. We have alumni in prestigious physics and engineering graduate programs across the nation and our undergraduates are frequently the recipients of REUs at these same universities.

With support from the UD administration and generous gifts from alumni, we are working to offer new experiments and in-house research opportunities for students in both our physics and Core classes.

I would also like to use this letter to thank Dr. Richard Olenick for his many years of service to the University as the Physics Chair. As I write this he is enjoying a sabbatical at his beautiful cabin in the Upper Peninsula of Michigan with his borzois. There is also sad news to convey as Fr. Benedict passed away in 2014.

Please let us know how you are doing and stop by if you are passing through. The next issue will focus on students.

Sincerely,

Sally Hicks, Professor and Chair of Physics



New Faculty Members

The Department of Physics was fortunate to have cosmologist Dr. Jacob Moldenhauer and atomic physicist Dr. Levente Borvak join the department in 2015. (Photo courtesy of Dr. Levente Borvak.)

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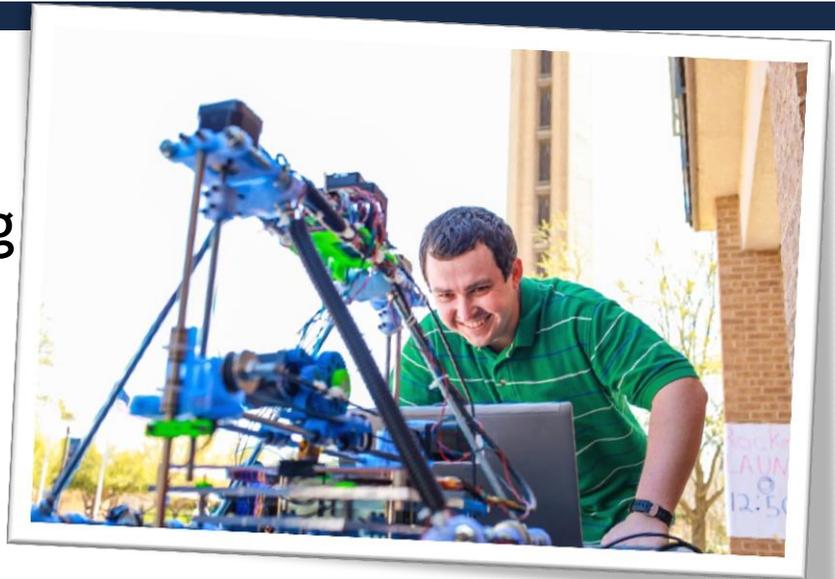
Undergraduate Research

Undergraduate research continues to be an important component of the undergraduate physics program at the University of Dallas.

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New Major: Electrical Engineering

Students entering the University of Dallas (UD) as physics majors have the opportunity to pursue a cooperative degree in electrical engineering through the University of Texas at Arlington (UTA) Electrical Engineering Department. The dual degree program is designed for the well-prepared student to be able to complete two degrees, a B.A. in physics from UD and an electrical engineering degree from UTA, in five years. The program is rather unique in that students take classes from both institutions beginning in their freshman year. This allows students to establish early in their undergraduate education that they desire to be an electrical engineer with a firm grasp of the Western intellectual tradition, to have extensive reading and writing abilities, and to understand the physical nature of our world, which are characteristics offered by the completion of the physics degree and core curriculum at UD. This dual-degree program



also offers the liberally educated UD student the opportunity to understand the advances in technology noted on the UTA electrical engineering webpage, "more than ever, electrical engineering demands a multidisciplinary approach to address challenges of the future and problems of today," and it demands that engineers must have the ability to communicate well their ideas to others. It is the goal of this program

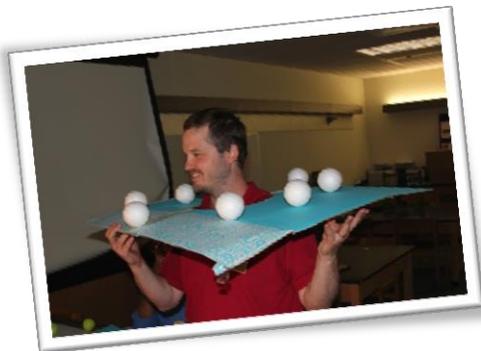
to educate liberally engineers and physicists who meet these challenges.

INFORMATION: EE/PHY PROGRAM

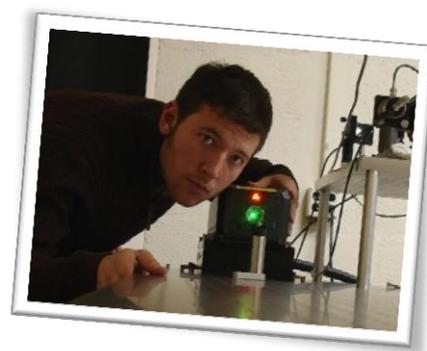
[Electrical Engineering at UTA](#)

UD EE Program Director: Dr. Sally Hicks

New Faculty: Assistant Professor Jacob Moldenhauer and Lab Coordinator Dr. Levente Borvak



Dr. Jacob Moldenhauer received his Ph.D. in physics from the University of Texas, Dallas in August 2010. His primary research interest is in computational and theoretical cosmology. Dr. Moldenhauer joined the department in a tenure-track role in August 2015; prior to that he was an affiliate professor in the department. *(Photo courtesy of Dr. Levente Borvak.)*



Dr. Levente Borvak received his Ph.D. in atomic physics from the University of Notre Dame in 2015. Dr. Borvak is full of fresh ideas for the laboratories and for the department. He is teaching all the introductory labs in 2015-2016, in addition to serving as the manager of the department, and he will be instrumental in the department having an expanded open house schedule for the observatory.

CLARE BOOTHE LUCE EVENTS 2015



Clare Boothe Luce Events

The Fall 2015 semester started with Clare Boothe Luce Speaker (CBL) Series Events. Former CBL Scholar and alumnae Dr. Stephanie Wissel ('05) kicked off the Series with a seminar over her cosmic ray and neutrino research in Antarctica. Dr. Nathan Keim presented his research on *Memory in Cyclically Driven Systems* during two physics-packed days for students.



Students listen intently to speakers during the CBL events in Gorman Faculty Lounge.

FAST FACTS

100%

All ten 2015 graduating seniors completed the research projects necessary to obtain the B.S. degree.

>27%

Physics alumni have gotten Ph.D.s in Physics or a related area. An additional 13% are currently Ph.D. candidates.

FOR MORE QEP INFORMATION

Office of Personal Career Development

Phone: 972-721-5131

Email: career@udallas.edu



The Quality Enhancement Program (QEP) provides travel stipends for students to give presentations at professional meetings. All ten 2015 seniors presented their senior thesis research at Texas APS meetings and were partially funded through the QEP or through APS travel awards.

New Opportunities for Students

UD physics majors have many opportunities that were not available to students just a few years ago. These initiatives are instrumental in improving the undergraduate experience for our students and include:

- ◆ The Donald A. Cowan Physics Institute
- ◆ Physics Scholarships
- ◆ Clare Boothe Luce Scholarships
- ◆ The UD Quality Enhancement Program
- ◆ Laboratory Equipment Upgrades

The Donald A. Cowan Physics Institute

Students completing research under UD physics professors are eligible for summer support from the Donald A. Cowan Physics Institute. This endowment from the family, friends, and students of former UD President and Physics Professor Donald Cowan has been instrumental in supporting many students completing their research in astronomy, nuclear physics, and astrophysics and cosmology. While maybe not in Dr. Cowan's favorite area of optics, the success of these students after leaving UD is certainly in his vision of possibilities for UD students and what they can accomplish with a UD liberal arts education.

Physics Scholarships

Incoming freshmen can compete for Physics Scholarships that provide up to \$5k/year for students planning to major in physics. These scholarships have been very beneficial for the department as we work to attract students to our program. Students must satisfy certain criteria each year for continuation of the award. Information on the scholarship can be found at [physics scholarships](#).

Clare Boothe Luce Scholarships

The Henry Luce Foundation has provided a grant for eight one-year full-tuition scholarships for junior and senior female students at the University of Dallas majoring in Computer Science, Mathematics, Physics, or Engineering. These scholarships are named Clare Boothe Luce (CBL) Scholarships and students receiving these scholarships are CBL Scholars. The University of Dallas has offered an additional award to supplement the Henry Luce Foundation grant to provide ten CBL Scholarships so that two awards can be given each of the academic years 2015-2016 and 2016-2017 and three in 2017-2018 and 2018-2019.

Other initiatives associated with this grant are the *CBL Speaker Series* and a *CBL Panel* to encourage students, especially women, to major in CBL areas by introducing them to speakers and professionals in STEM disciplines.



The UD QEP

Through a rigorous liberal arts undergraduate education, UD students are well-prepared for success in life. The Quality Enhancement Plan (QEP) "Discern, Experience, Achieve: Preparing for Life and Work in a Changing World", intends to build on this educational excellence and to provide students with opportunities and resources to make informed career and vocational choices. The QEP, which is managed through the Office of Personal Career Development, has supported physics majors through travel stipends to attend

professional events such as Texas American Physical Society meetings and the Division of Nuclear Physics national meeting. The QEP has been instrumental in enabling the department to continue to support all B.S. students who give talks at professional meetings

New Laboratory Equipment

Generous gifts from alumni provided the funds necessary to develop further our nuclear spectroscopy capabilities. A new multi-channel analyzer and some electronics modules expanded our capabilities in the quantum laboratory and expanded our advanced lab possibilities.

The electronics modules purchased with these alumni gifts opened up other possibilities, including a muon detector that is currently in setup stage. The muon detector will enable students to measure the speed of muons produced from cosmic-ray

collisions and to observe time-dilation effects by looking at muon decays.

A new Fabry-Perot interferometer, an X-ray spectrometer, and a Faraday rotation apparatus have also been added to our quantum physics, optics, and advanced laboratories. These devices will be used in more than one advanced laboratory.

Another new laboratory was instituted in the Fall 2015 semester in the area of molecular physics. This excellent laboratory investigating rotational and vibrational excitations in N_2 molecules was a serendipitous find—a brand new high-level experiment that required no new equipment except a gas tube for about \$35.

A lot of the equipment development and setup of these new devices has and is being completed by upper level laboratory manager Mr. Arthur Sweeney. His

experience in engineering and physics make him an asset in laboratory and project development.

Mr. Sweeney's love, however, is astronomy. He continues to lead the development of instrumentation and the use of the remote observation for astronomy student projects.

Finally, we are now offering a cross-disciplinary laboratory investigating the color blue. Physics, biology, and chemistry majors team together to investigate a wide range of color blue phenomena.

Community Service and Social Events

Each year students and faculty in the Department of Physics reserve time to give back to the greater community and for social events for departmental members. Some of these social events are organized and driven by students and some by faculty.

Outreach activities for the department include a *Star Night* for University Hills residents, a summer workshop for over 75 public school teachers from Region 10, tutoring for UD and other students, demonstrations, science fair judging, career days, movie nights, as well as many other activities. A goal for the 2015-2016 academic year is to have the observatory open to the

public for viewings more frequently.

Students organize Society of Physics Students (SPS) such as *Liquid Nitrogen Ice Cream* during Charity Week and *Physics Week* during the spring semester. Both events have a strong turnout of campus students. During the Spring 2015 semester, Bubble Soccer, model rocket demonstrations, and the science poster presentations were all a big success during *Physics Week*, as was the demonstration of our 3-D printer on the University mall.

Other social events include the *Christmas Party* at Dr. Olenick's house with spiced cider, hot chocolate, and the singing of Christmas carols, and the *Physics Picnic* at Dr. Hicks' house where students seem to be able to eat an unbelievable amount of food each year. The students even manage to schedule some competitive battle(s) with the math majors each year.



FOR MORE INFORMATION

Contact Dr. Levente Borvak, Department and Laboratory Manager

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Searching for the Unknown

Undergraduate Research at the University of Dallas

Why has the number of UD physics majors more than doubled in the last ten years? The complete answer is probably complex, but the strength of the department's undergraduate research program is often given by students as a leading reason for their coming to UD, along with the Core Curriculum and the Rome program. Students who complete the B.S. degree must write a senior thesis over research that is typically completed during the summer between their junior and senior years; they also are strongly encouraged to give a talk at a professional meeting. These stringent requirements push students to excel in areas outside of our normal curriculum. Even before their junior year of study, students are encouraged to participate in research whenever it is possible.

External Research Opportunities

UD physics majors are encouraged to apply for external NSF supported Research Experiences for Undergraduate (REU) positions at leading universities, as well as for positions at national laboratories. These external experiences allow them to work with new people and to investigate opportunities in the field. Most REU opportunities are for a 10-week time period during the summer.

During the summers of 2014 and 2015, our students completed research projects off campus at the National Institute of Standards and Technology (NIST), Lawrence Livermore National Laboratory (LLNL), Sandia National Laboratory, in the NASCENT program at the University of Texas, Austin, the CASPER program at Baylor University, the University of Florida, Texas A&M Cyclotron Institute, and Howard University.

These experiences allowed students to investigate thin films, energy-related nuclear fusion, fusion reactions, nanotechnology, high-energy proton collisions, and particle interactions in plasmas, as well as many other topics and to learn about the experimental and theoretical techniques needed to complete the research.

Learning from the Night Sky

Each summer Dr. Richard Olenick and Mr. Arthur Sweeney include students in their astronomy observational program. This

research program has included observations in Pitkin Colorado, the Upper Peninsula of Michigan, and most recently through a remote observatory using University of North Texas facilities.

The research focuses on exoplanet research and cataclysmic variable stars. In the last four years, a number of exoplanet candidates have been observed and five to ten validated new variable stars have been discovered. Students are always excited by the night-time observations and their new discoveries.

Testing General Relativity and Modeling Head Trauma

UD students joined Dr. Jacob Moldenhauer's research program even before he became an Assistant Professor of Physics. Dr. Moldenhauer was awarded a grant from the University of Texas for his research with students using their high-performance computer cluster. During the summers of 2014 and 2015, students diligently made good use of that computer time modeling data from the Sloan Digital Sky Survey. Their research has already been the subject of several conference presentations.

Collaboration with scientists in other departments is also big for Dr. Moldenhauer, as he has worked with UD biologist Dr. Stephen Slaughter to study and model head and brain trauma; this research is being done with both biology and physics students.

Scattering Neutrons for Fission Reactor Applications

The Department of Energy has awarded Dr. Sally Hicks three 3-year grants to include UD undergraduate students in her neutron scattering research program. She and the students spend about two months a year measuring neutron scattering cross sections that are needed for determining criticality conditions in the next generation of fission reactors, as well as in existing reactors.

This research has resulted in several publications and talks at professional meetings, as well as trained several students who are currently in graduate school in nuclear engineering and nuclear physics to understand more about our nation's energy needs and, hopefully, to help find solutions.

UNDERGRADUATE RESEARCH



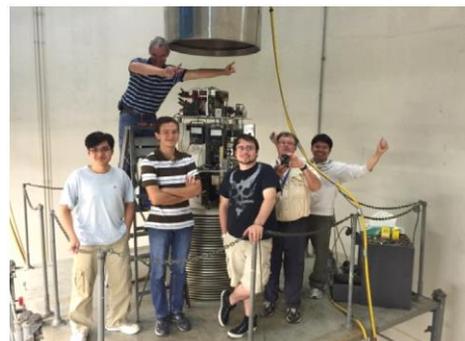
Exoplanet Searches in Michigan

Seniors Anthony Kersting and Laura Aumen complete their senior research projects looking for exoplanets in the night skies in the Upper Peninsula of Michigan with Dr. Richard Olenick and Mr. Arthur Sweeney.



REUs at Other Universities

MacKenzie Warrens (front left) and Anna Poulsen (front center) join students from other universities at Texas A&M Cyclotron Institute's REU program.



Nuclear Physics at UKAL

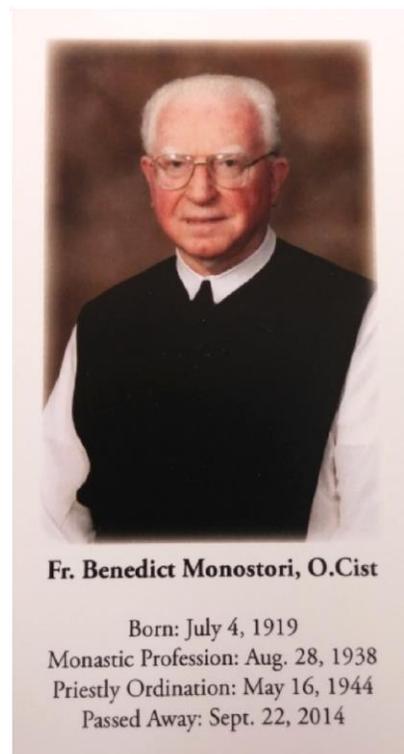
University of Dallas students ThienAn Nguyen, Philip Lenzen, and Daniel Jackson work with University of Kentucky and United States Naval Academy scientists to repair the accelerator at the University of Kentucky Accelerator Laboratory and to have a little fun while doing so.

IN MEMORIAM

Emeritus Associate Professor and past Chairman of the Physics Department (1962-1989) passed away on September 22, 2014. The following obituary appeared in the Dallas Morning News 9/23-9/24/2014.

MONOSTORI, Benedict József József Monostori was born on July 4, 1919 in Kövágóórs, Hungary, on the northern shore of Lake Balaton, Hungary's most popular vacation spot. He was the fourth of five children. As a toddler, he moved to Budapest with his family, where he grew up. Always an excellent student, József realized by the end of his high school years that he wanted to be both a priest and a teacher. To pursue this vocation, he entered the Cistercian Monastery of Zirc, receiving the novice habit and the religious name of Benedict on August 29, 1937. He made simple vows on August 28, 1938. He completed studies in philosophy and theology and on May 16, 1944 the future Cardinal Joseph Mindszenty ordained him to the priesthood, just before the end of World War II in Europe. In addition to his studies for the priesthood, he pursued studies to become a teacher of mathematics and physics. In the fall of 1945, he was assigned to teach math and physics in the Cistercians' school in Székesfehérvár, Hungary. This first teaching assignment came to an end in 1948 when the communist government nationalized all the Cistercians' schools. Fr. Benedict then was put in charge of the young monks in formation in Zirc, where he also taught them philosophy. This teaching job was also brought to an end when in 1950 the Communists suppressed the Cistercian Order in Hungary along with most other religious orders. Fr. Benedict joined a group of 20 Cistercians in their early twenties in an adventurous escape from Communist Hungary to Austria. Walking at night through minefields, evading guards

with watchdogs, and crossing barbed wire fences, the group reached Austria. Tragically, eight monks were detected as refugees and returned to Hungary, where they were subjected to show trials, imprisoned, and tortured. Fr. Benedict revisited his memories of the harrowing escape throughout his life, but especially in his last days. Fr. Benedict accompanied the young Cistercian refugees to Rome and served as their prefect for the following year. He obtained a graduate degree in philosophy from the Pontifical Academy Sant' Anselmo and then pursued a doctorate in philosophy at the University of Salamanca, Spain. His superiors soon asked him to join the Cistercian community in Spring Bank, Wisconsin, where the Hungarians exiled from their monastery in Zirc were gathering. Fr. Benedict was among the first Cistercians to come to Dallas in 1954. In 1956 he was one of nine Cistercians on the original faculty of The University of Dallas, where he initially taught math and philosophy. He was soon asked, however, to study physics. He earned his PhD in physics Fordham University in 1964. Fr. Benedict served as the Acting Chair and then the Chair of the Physics Department from 1962. He retired in 1989. Throughout his life, Fr. Benedict enjoyed assisting in parishes throughout the Dallas Fort Worth area. Upon retirement from full-time teaching, he became the chaplain for the Holy Family of Nazareth Sisters in Grand Prairie, where he served for 22 years. In the Cistercian Monastery here in Dallas, Fr. Benedict served as Prior from 1975 to 1988. Fr. Benedict's greatest joy was to see fulfilled in the Cistercian Monastery Our Lady of Dallas that dream with which he and so many Cistercians fled Hungary. He is survived by one niece, Jutka Monostori, and her extended family in Hungary.



Fr. Benedict Monostori, O.Cist

Born: July 4, 1919
 Monastic Profession: Aug. 28, 1938
 Priestly Ordination: May 16, 1944
 Passed Away: Sept. 22, 2014

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