

PHYSICS DEPARTMENT NEWS

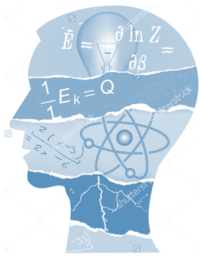
Winter Quarter 2017



Students & Faculty Attend AAS Conference

DePaul Physics had a very strong representation at the 229th meeting of the American Astronomical Society (AAS) in Grapevine, Texas. On January 4, undergraduate physics major Justin Potvin presented a poster on Zeeman Effect observations toward 36 GHz methanol masers in the Galactic Center which detailed the results from his summer research experience at the National Radio Astronomy Observatory (NRAO) in Socorro, New Mexico, carried out under the joint supervision of NRAO scientist Dr. Emmanuel Momjian and Dr. Anuj Sarma.

On January 5, senior physics majors Noel Garcia and Yunyun Wu presented a poster on their work detecting Baryon Acoustic Oscillations (BAO) using discrete wavelet packets. Their research, under the supervision of Dr. Jesús Pando, included contributions by Kevin Kadowaki, a former graduate student of Dr. Pando. On January 7, Dr. Sarma gave a talk on observations of the Zeeman Effect in Class I Methanol Masers. In addition to presentations by current DePaul students and faculty, the following contributions by DePaul alumni took place. Joseph Booker, a DePaul physics graduate, and current graduate student at University of Toledo, presented on an imaging survey of protostars in Orion carried out with the Hubble Space Telescope. Matthew Rickert, a current graduate student at Northwestern University, who received his MS from DePaul under advising by Dr. Sarma, delivered a talk on high resolution surveys of water and methanol masers in the Central Molecular Zone of our Galaxy.



Student & Faculty Recognition

The department welcomes **Dr. Bernhard Beck-Winchatz** from the STEM department as a joint-appointed professor.

The Quality of Instruction Council awarded an instructional grant to **Dr. Susan Fischer** to support her work on "Videos for Physics Demonstrations". Working with Sigma Pi Sigma (SPS) students, they will create videos for introductory physics courses to be used at DePaul University.

The CSH Research and Faculty Development Committee awarded **Dr. Eric Landahl** a summer stipend to work on his research project entitled "Towards a Molecular Mechanism of Parkinson's Disease."

Dr. Anuj Sarma delivered a talk entitled "Observations of the Zeeman Effect in Class I Methanol Masers" at the AAS Conference in Dallas.

Jim Scheidhauer was selected as one of three recipients for the first-ever award for the innovative use of the Art Institute in a First Year Program Course. The prize committee appreciated the assignment in his Discover Chicago class (LSP 110), "Chicago in Sound," which employed a variety of artworks to plant important seeds for discussion.

Noah Wilson (BS Physics 2014) joined the department as adjunct faculty teaching Sound and Acoustics this quarter.

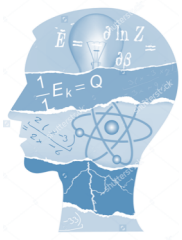
G. Jackson Wilson, Michael Watson, and Dr. Eric Landahl have a recent publication entitled "Direct Measurements of Multi-photon Induced Nonlinear Lattice Dynamics in Semiconductors via Time-resolved X-ray Scattering" in *Scientific Reports* 6 (Article #39506).
www.nature.com/articles/srep39506.

Kevin Kadowaki, advised by **Dr. Jesus Pando**, earned his MS from DePaul University in August 2016. His thesis was entitled "An Application of Wavelet Methods to the Search for Baryon Acoustic Oscillations". He is attending University of California in Irvine to pursue his PhD.

Ines Kusmic, advised by **Dr. Eric Landahl**, earned her MS from DePaul University in November 2016. Her thesis was entitled "Examination of the Beta Coefficient in GaP Crystal Utilizing Single and Double Photon Absorption". She is currently teaching in the Physics Department at Chicago State University and hoping to pursue her PhD in the future.

Thomas McManus (BS Physics 2011) is completing his PhD in Mechanical Engineering at Ohio State University. For his thesis research, he developed laser diagnostics for measuring temperature and velocity in turbulent combustion jet flows.

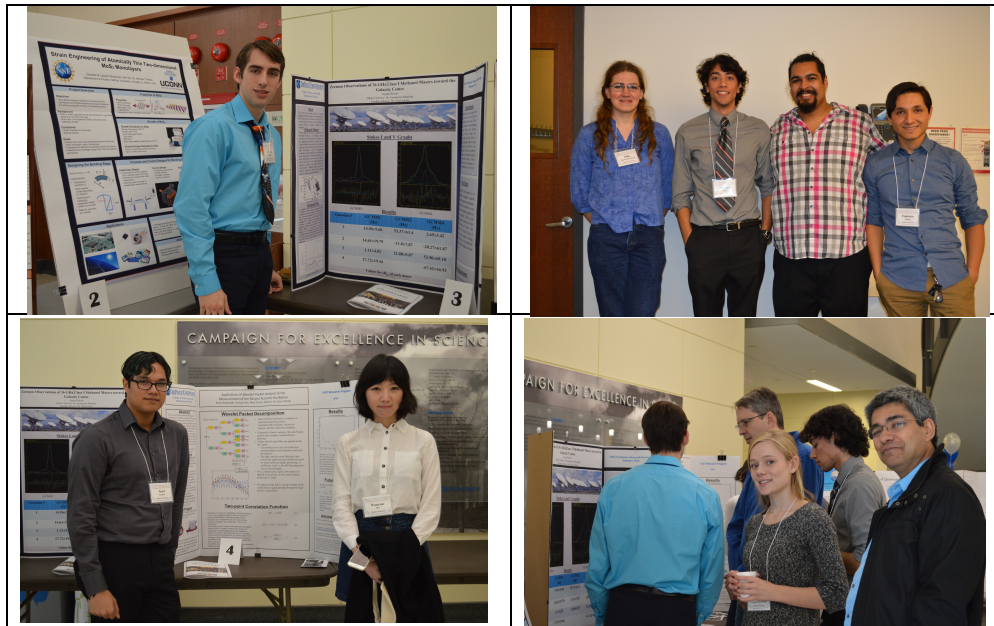
In October 2016, **Nicolas Santiago**, senior physics major, delivered his research presentation at 2016 SACNAS: The National Diversity in STEM Conference in Long Beach, CA. Judges recognized Santiago's work "Chinese Archaeomagnetism" with a student participation award.

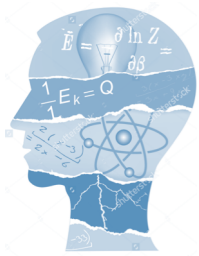


Physics Representation at the Showcase



Physics students highlighted their current and summer research at the 14th Annual Natural Science, Mathematics and Technology Undergraduate Research Showcase. Seniors Joe Hollowed and Michael Shah gave oral presentations. Research posters were showcased by Ellie Martin-Eberhardt, Fabricio Marin (Dean's Undergraduate Fellowship), Noel Garcia, Joe Hollowed, Justin Potvin, Nicolas Santiago, Danielle Leppert-Simenauer, and Yunyun Wu.





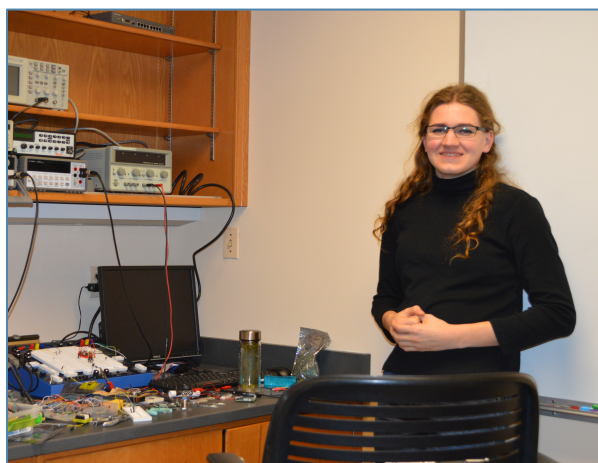
Collaborating with Faculty in the Research Labs



BEYOND THE CLASSROOM

Working with Dr. Gabriela Gonzalez-Aviles, senior physics major **Michael Shah's** research primarily focuses on the thermal evolution and stability of synthetic hydroxyapatite (HA). HA is used as a substitute for the mineral component of bone in dental implants, hip replacement surgeries, and bone grafts. The research group studies how the structure of doped-HA powders changes under thermal treatment. Michael analyzes how the

undoped (pure) and doped HA samples decompose as they transform to other crystalline phases at high temperatures. The effect of several dopants (zinc, strontium, and cadmium) is assessed by running doped and undoped samples under the same conditions. These data were measured at the Advanced Photon Source in Argonne National Laboratory using high-energy x-rays. Hundreds of diffraction images were collected rapidly to study in situ any structural and phase changes. This allowed the group to create structural models of the HA powders and to better understand how dopants affect the stability of the samples. With a year under his belt, Michael's work primarily involves the cadmium-doped samples, but plans to move onto more complex models in the near future.



HANDS ON LEARNING-A VITAL COMPONENT

Junior physics major, **Ellie Eberhardt-Martin**, is working with Dr. Eric Landahl in the Development Lab making inexpensive Quantum optic detectors. There are several different ways to count photons, and the conventional, expensive option is with a Photo Multiplier Tube (PMT). Ellie is researching a new way to count light particles with a solid-state device called a silicon photon multiplier (SiPM). Ellie values the opportunity to do research here at DePaul. Graduate student **Jon**

Murphy (*DePaul Physics 2015*) is also working on this project for his MS thesis.