

**WINTER 2017/18**

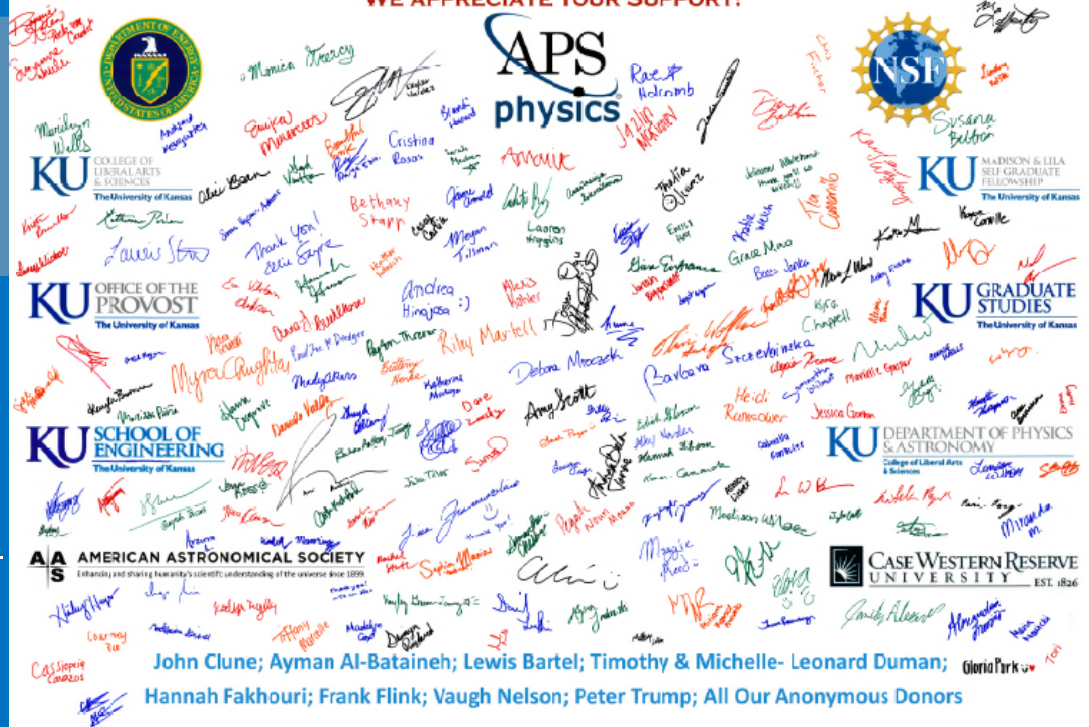
**THANK YOU TO ALL OF OUR 2018 CUWIP DONORS AND SPONSORS!**

**WE APPRECIATE YOUR SUPPORT!**



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**John Clune; Ayman Al-Bataineh; Lewis Bartel; Timothy & Michelle- Leonard Duman; Hannah Fakhouri; Frank Flink; Vaugh Nelson; Peter Trump; All Our Anonymous Donors**



From **Friday Jan. 12** through **Sunday Jan. 14**, the Department of Physics and Astronomy hosted one of 11 American Physical Society **Conferences for Undergraduate Women in Physics**, joining other regional universities like Arizona State, Columbia, and Oregon to help undergraduate women continue in physics by providing them with the opportunity to experience a professional conference, information about graduate school and professions in physics, and access to other women in physics of all ages with whom they can share experiences, advice, and ideas. KU was the official host for the Midwest— particularly Arkansas, Kansas, Missouri, Nebraska, Oklahoma, and Texas. **January in Kansas—what could go wrong?** Strangely enough, nothing! Despite temperatures that occasionally dipped into single digits and a few inches of snow, a new experience for some of our participants from further south, the meeting was an exceptional success and the students had a great time. A large dose of credit goes to the Department office staff who effectively constructed the meeting from the ground up and maintained a quick and steady response to any and all challenges as they arose, aided by graduate and undergraduate majors in the Department, faculty, and academic support staff. The 3-day program can be accessed [here](#), but included tours of a number of labs in Malott and the Engineering School, as well as campus museums, talks by a long list of distinguished women [speakers](#) both locally and via remote access, a networking fair populated by 15 different institutions, 18 panel discussions on a wide array of personal and professional topics (science communication, graduate school, role models, applying to college, etc.) and a poster session detailing relevant research and career initiatives. Presentation slides of the speakers can be accessed at this [link](#), while those who contributed both time and financial support are detailed at this [link](#). We are especially grateful to those individuals who donated funds in support, some are listed in the signed poster above, while all are noted in **blue** in the annual donor summary on pg. 6. The value of this conference for the attendees and the institution cannot be overstated.



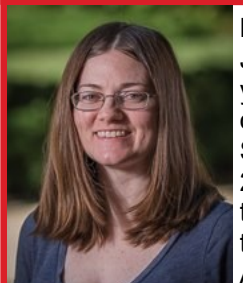
## COMINGS & GOINGS



### DR. CHRISTOPHER ROGAN—ASSISTANT PROFESSOR

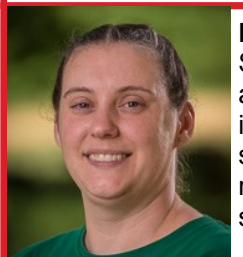
Originally from Daytona Beach, Florida, Chris attended high school in Port Orange at Spruce Creek High School, and from there went on to earn a B.A. at Princeton University and Ph.D. from Caltech. He was then a Junior Fellow in the Harvard Society of Fellows, focusing on research using the ATLAS experiment at the CERN Large Hadron Collider (LHC). Chris has been working on research related to the LHC since he was an undergraduate at Princeton, helping design the measurement of the online luminosity (the rate at which protons are colliding) for the CMS experiment. He continued on CMS as a Caltech graduate student, working on the testing, installation, and commissioning of the CMS electromagnetic calorimeter (ECAL) and hadron calorimeter (HCAL). As a contributor to

the ATLAS experiment He worked to upgrade the muon spectrometer system and am now beginning to work on an upgraded precision timing detector for CMS. An emphasis of his research on the LHC has always been using the events recorded by the particle detectors to look for evidence of new physics, beyond the particles and forces included in the Standard Model (SM) of particle physics. "It's possible that new, undiscovered particles, forces, and symmetries which are detectable at the energy scales accessible to the LHC could explain many of the shortcomings of the existing SM, including the identity of Dark Matter, the huge differences in the strengths of fundamental forces and sub-atomic particle masses, and the matter/antimatter asymmetry that characterizes our physical world."



### DR. JENNIFER DELGADO— LABORATORY PROGRAM DIRECTOR

Jennifer has been the Physics and Astronomy Laboratory Program Director for the past two and half years, taking over the position previously held for more than 30 years by Mr. Curry. Prior to taking over the position, she developed the first online Physics courses at KU: PHSX 201 and PHSX 202. She joined the KU family after receiving her PhD in Astrophysics from the University of Minnesota in 2013. She has expanded her contribution to undergraduate education within the Department by teaching ASTR 191 for the first time in Spring 2018 while collaborating with Dr. Anthony-Twarog on the development of the first on-line astronomy class, a resurrection of the lab formerly known as ASTR 196.



### DR. SARAH LEGRESLEY RUSH—TEACHING SPECIALIST

Sarah is currently a Teaching Specialist at the University of Kansas in the Department of Physics and Astronomy. She has a Master of Arts in mathematics and a Doctorate of Philosophy in Physics in 2017, both from the University of Kansas. Her graduate research work included probability and statistics (Markov Chains, stochastic processes, etc.) and Biophysics (DNA damage and possible relocation from a physics point of view, protein translocation, etc.). Before going to graduate school, she spent several years as a high school math teacher in Pasadena, TX and Lawrence, KS.



### KAYLA WEGLEY—UNDERGRADUATE COORDINATOR

Kayla recently graduated with her Bachelors of Fine Art in Dance from KU in December 2017. She is happy to join the staff as the Undergraduate Coordinator after nearly three years as an Office Assistant to the Department during her undergraduate career. Kayla studied movement analysis, production, filled several roles in arts administration positions, and continues to teach classes and assist local studios. She is excited to pursue work in education administration, and be a part of the Lawrence community more permanently. Kayla replaces Kim Hubbel, who left the Department in Fall 2017 after 11 years of service.

### PROFESSOR EMERITUS—DR. ADRIAN MELOTT

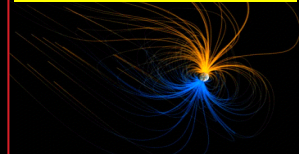
After more than 30 years of haunting the hallways of Malott, terrorizing young physicists, engineers and astronomers, Adrian officially retired in May 2017. While he has ceased teaching classes and taking part in service/committee work, his research continues at full speed. For the latest in his Astrobiophysics studies and the many ways the Universe is trying to kill us on a continuous basis, have a look at the link on the bottom of page 4. Adrian has also applied his expertise on a more practical level to impact the local lighting within Lawrence. In recent months, Westar, who operates the majority of the roughly 5,000 streetlights in Lawrence, selected the 4,000 K LEDs as replacements for the older lights. Citing health and environmental issues, Adrian worked with a local group to request that lights with a temperature of 3000 K be selected instead. On Feb. 20, the [Lawrence City Commission voted](#) to pursue 3000 K LEDs for both city-owned streetlights and those operated by Westar.



## OTHER EVENTS and ALUMNI NEWS

In addition to the regional CUWIP conference in January, the Department of Physics and Astronomy organized a one-day **Alumni-Industry Workshop**, primarily for graduate students, to explore career opportunities in Physics and Astronomy outside of academia. This late September Saturday meeting, coordinated by Prof. Emeritus and Physics and Astronomy Board member, Dr. Doug McKay, Director of Graduate Studies, Dr. Greg Rudnick, and staff graduate coordinator, Joel Sauerwein, sought to address a vital shortcoming of many, including our own, graduate programs, the likelihood that the vast majority of PhD and MS students will not be earning a living doing the same jobs as their faculty advisors. Five alumni, **Patrick Sterner, Javier Baca, Judy Yu, Nurur Rahman, and Jie Chen**, as well as graduating PhD **Jamie Wilt**, conducted presentations and panel discussions for ~20 students on *Paths to Current Employment, How to Prepare for Industry Jobs, Advantages and Disadvantages of Academic vs. Non-academic Life, Social Media Marketing, and Interview Skills*, with mock interviews. The meeting then broke out into small group sessions focused on *How to Prepare for Industry* and *From CVs to Resumes*. The response across the board from all participants was enthusiastically positive, so much so that this will likely become a biannual event. **Many thanks to the alumni who volunteered their time and expertise to help our students.**

### LOWRY GRADUATE



**PROSSER**  
**UG PHYSICS**

KU DEPARTMENT OF PHYSICS  
& ASTRONOMY  
College of Liberal Arts  
& Sciences

### Spooky Dark Matter The Ghostly Stuff That Binds the Universe

**October 27, 2017**

In Partnership with Crema Dolce Gelato

The KU Department of Physics and Astronomy presented "Spooky Dark Matter: The Ghostly Stuff that Binds the Universe". The public talk, featuring presentations from **Professor Ian Lewis, Professor Chris Rogan, and Professor Greg Rudnick**, as well as physical demonstrations by the KU **Society of Physics Students**, was part of **National Dark Matter Day**, a globally recognized celebration of this cosmic riddle. It is sponsored by the **Interactions Collaboration**, an international community of particle physics communication specialists. The extremely popular event was followed by a social at Crema Dolce Gelato (704 Massachusetts Street) where participants tried to figure out the flavor of the special Dark Matter gelato created by Crema Dolce especially for the event.



**TOMBAUGH**  
**ASTRO**

### ENGINEERING PHYSICS



**Luis Vargas, BS Physics, Astronomy 2008** has taken a position as a Data Scientist within Digital Intelligence at JPMorgan Chase & Co. in New York. Luis, featured in Center for Undergraduate Research—**Alumni Spotlight: September 2017**, completed his PhD in Astronomy at Yale University in 2015. He then spent 4 months as a Data Science Fellow at Insight Data Science, before joining Security Scorecard in New York as a Senior Data Scientist for 2.5 years.



Triple 8 Management of Austin, TX announced that Senior VP of Marketing **Jesse Atwell** has been promoted to the position of **Associate Partner**. **Atwell** graduated from the University of Kansas with a **B.S. in Astronomy** in 2003 and earned his Master's Degree in Music Business from New York University. Both during and after his time at NYU, he worked as a Junior Product Manager at Razor & Tie Entertainment. He moved on to Hallmark Cards as the Associate Product Manager of New Concept Development & Greetings Innovations, and later became the Manager of Digital Marketing for Sony Music Entertainment. In 2011, he joined Triple 8 Management as Vice President of Digital Marketing and Tour Marketing. Three years later, he was promoted to Senior Vice President of Marketing.



**ZELLER**  
**INSTRUMENTATION**

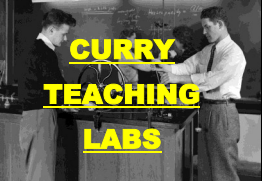


**MLO 1.25M**  
**TELESCOPE**

# RESEARCH HIGHLIGHTS



**STRANATHAN  
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**CURRY  
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**STRANATHAN  
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**UNDERGRADUATE  
SCHOLARS**



**JOHNSON  
UG ASTRONOMY**

## South Pole Research Probes Cosmic Mystery



## MEET THE ODDERON



## STAR FORMATION & THE COSMIC WEB



## Steven Prohira Awarded Beam Time at SLAC



## COSMIC KILLER COMET CHANGES CLIMATE



## Department of Physics & Astronomy



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FAX: 785-864-5262



# From the Chair

A long-standing question that continues to raise the hackles of amateur and expert alike is *what separates the human species from the rest of the animal kingdom, i.e. what makes us so special?* Over the decades various suggestions periodically have been made — the use of tools, language, self-awareness, sometimes referred to as the mirror test — only to be challenged by observations of specific members of the animal kingdom who apparently are capable of passing some version of the test which we claim sets us apart. Having attended hundreds of committee and faculty meetings within academia, my personal choices placing humans in a class by themselves are the coupled characteristics: (a) we're really, really smart. (*If you don't believe me, just ask any university faculty member*); and (b) we have the ability to rationalize the irrational, often making choices leading to a short term benefit even though we recognize in the long term our decision will actually do us harm.

In the glow of the CUWIP conference that took place at KU in January, I looked back over the role our Department has played in the encouragement and advancement of women and minorities within Physics and Astronomy. Since a picture sometimes is worth a thousand words, perhaps the best illustration of the problem can be found in a pair of photos from a past annual newsletter—*Momentum 2004*, accessible at this [link](#). The photos contrast the Physics & Astronomy faculty of 1977 with that of 2004. The obvious difference is that of 23 full-time faculty, the 1977 photo is completely composed of white males; the 2004 photo includes 4 female faculty but no minorities. KU was by no means unique in

1977<sup>1</sup>. Between 1971 and 1975, the average % of women receiving PhD's in Physics was 4%, slightly less than half the rate of women earning Physics BS degrees. In 1970, the PhD rate for women in ALL fields was 13%.

It would be easy in hindsight to criticize the academic community of 40 years ago for their failure to recognize the problem inherent in a group photo like the Department of 1977, in much the same way we collectively shake our heads as acts of systemic sexism or racism play out before us on the screen in movies and documentaries of the 50's and 60's and ask *What were they thinking?*

The good news is that some progress has been made. Between 1975 and 2002, the percentage of women earning bachelor's degrees in Physics rose from 10% to 22%. The bad news is (a) the comparable fractions in Chemistry and Biology are 50% and 61%, respectively, and (b) since 2002, the percentages have declined to below 20% for Physics at the Bachelor's and PhD level, despite the fact that 45% of the students taking high school Physics are women. While we can, like many of our predecessors, rationalize that the status quo is the product of forces beyond our control, as emphasized by the many outstanding presentations at CUWIP, the reality is that not only can we, as a profession, do more, we MUST do more to make the community more welcoming and diverse. On a more local point, with the retirement of Dr. Anthony-Twarog in Summer 2018, the number of female tenure-track faculty in the Department will drop to 2, returning to the level first achieved in 1993. With apologies to Pogo:

*We have met the past and it is us.*

<sup>1</sup> The first tenure-track female assistant professor hired by Physics & Astronomy was Dr. Barbara Anthony-Twarog in 1982.



**THE MR. BOB CHALLENGE: 100<sup>2</sup>**  
*Support Undergraduate Labs in Physics & Astronomy*  
**Donate \$100 and Receive a MR. BOB T-shirt – FREE!**

**CALLING ALL PAST LAB TA's & LAB STUDENTS!** The [Mr. Bob Challenge](#) has the goal of raising 100 donations of \$100 (or more) each in support of the undergraduate lab facilities used in teaching within the Department of Physics and Astronomy at KU. The **Bob Curry Fund for Undergraduate Teaching Labs** was established to honor **Mr. Robert Curry**, Director of Undergraduate Labs within the KU Department of Physics and Astronomy for 35 years. In addition to his outstanding service supervising the labs and the graduate teaching assistants who directed them for the last three decades, Mr. Curry has become a [YouTube star](#), where his laboratory video demonstrations of the fundamental ideas underlying the undergraduate Physics labs at KU are now among the most watched videos linked to KU. For each \$100 donation, donors will receive free a Mr. Bob T-shirt featuring the ultimate-in-cool image of Mr. Bob on the front and the phrase "That's Mr. Bob to You" on the back.



**ENDOWMENT HONOR ROLL 2017****CUWIP Donor****> \$1000**

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Allen G. Taylor & Selma A. Taylor		Mark J. Walters



**Robert James "Bob" Friauf 1926 - Dec. 03, 2017**

Robert was born to Helen Cox and James Friauf in Pittsburgh Pennsylvania. His family, including his younger brother Walter, moved to Milwaukee Wisconsin when he was 4 years old, and to Arlington Virginia when he was 14. Bob attended Washington -Lee High School and graduated in 1944 as valedictorian of his class. Written by his photo in his senior yearbook, "Shhh. Genius at work." He went immediately into the Navy V-12 Program which was a very coveted and competitive Officers Training Program to get into. The program sponsored his college education at Duke University on an accelerated track. He graduated in

1947 and stayed in the Navy Reserve for 4 more years. After Duke he moved to Chicago for graduate studies. He studied with some of the giants of 20th century physics including Enrico Fermi and Edward Teller, and had many entertaining stories to tell about them.

In the Summer of 1948, Bob and his brother went on an amazing cross country bicycle trip of 3300 miles from Arlington, VA to Seaside, OR. The trip included many difficult challenges and exhilarating experiences that the brothers shared. In Chicago he met his future wife Betty Schroer. They were married on September 10, 1949. He completed his PhD in Physics, Summa Cum Laude (highest honors) from the University of Chicago in 1953. His first daughter was born that year and they moved to Lawrence, Kansas a month later. There he began his long career with the University of Kansas as a professor of Physics, Astronomy and Western Civilization. His graduate thesis and subsequent research was on Ionic Conductivity in Silver Bromide (the photographic process), and he developed this into a lecture that he gave over 30 times in the US and Europe. He gave this signature lecture for his retirement in 1994 as his swan song to the Physics and Astronomy department, and felt, "I was going out in a burst of glory".

Bob was very active with many interests throughout his life. From his childhood years spent in Milwaukee, he was an avid lifelong Green Bay Packers fan. Once in Lawrence he became an enthusiastic fan of Jayhawk Basketball. He also loved camping, backpacking, photography and rode his bike every day to work. Later in life he took up snow skiing, sailing, and square dancing with the Happy Time Squares. He had a lifelong love of playing the clarinet. He started playing in 4th grade, played in the Cadet Corp in high school and continued through graduate school. He joined the Lawrence City Band in 1975 and was a founding member of the New Horizons Band in 1996. Soon after this band began, Bob started the Clarinet Quartet, which rehearsed before every band practice and performed at every band concert. He delighted in playing regularly in the bands right up to his death.

Bob is preceded in death by his wife Betty and his friend Lila Wrigley. He is survived by his brother Walter (wife Ida), daughters Ann (wife Kari), Barbara, and Nancy (husband Sean), grandchildren Chelsea (husband Juan), Adrian, Sophia and Dara, great granddaughter Sofia, niece Linda (husband Paul) and nephew Ken (wife Anjanette), grand nieces and nephews Grace, Anthony, Christopher and Helen. Bob was devoted to his family and loved each person in it tremendously. He spoke often about how much he enjoyed the wonderful family weekend gathering to celebrate his 90th birthday.



**Roland Eugene Rentz Sep. 1, 1932 - Sep. 30, 2016**

Eugene was born in Houston, TX. He Graduated from Reagan High School in Houston, Texas, attended Rice University and was a member of the Rice Baseball Team. Roland served in the United States Air Force. He then graduated with a Bachelor degree in Engineering Physics from University of Kansas in 1959. Roland worked for the defense industry for over 30 years and retired from Raytheon in Garland, Texas. He was diagnosed with MS in 2009. Roland and his wife, Dorothy, were married for 58 years, have four children (one son and three daughters) and

seven grandchildren.

