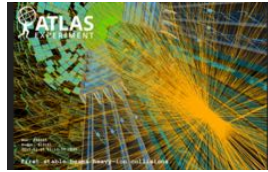
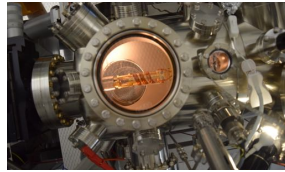




PHYSICS DEPARTMENT



SANTA CRUZ INSTITUTE OF PARTICLE PHYSICS



MSEI PROGRAM SPOTLIGHT



DIVERSITY AND INCLUSION

UC SANTA CRUZ PHYSICS

DEPARTMENT END OF THE YEAR NEWSLETTER



Letter from Physics Chair, Robert Johnson:

Dear faculty, students, staff, and friends of the the Physics Department,

It's a pleasure to bring to you this Physics Department newsletter, the first edition of what will hopefully become an annual tradition. Thank you to our wonderful and hardworking department manager Cathy Murphy for taking the initiative and leading the work to make it happen—something I've intended to do since becoming chair, and here I am nearing the end of year 4!

Upcoming Events

Summer Orientation-new
frosh and transfers
July 24-August 2

ICMFS Conference:
July 23-27 here at UCSC

This is an opportunity to highlight a few of the events, programs, and people who make up our department. As usual, we have had an exciting year filled with accomplishments by faculty, staff, and students, both undergraduate and graduate. They are too numerous to mention here, so you can read about them below in the "Awards" section of this newsletter.

This has been another year of growth in our department, with record numbers of students, both undergraduate and graduate, now studying physics and doing research with us. We are very pleased to welcome this year three new faculty members: Sergey Syzranov, a theorist in condensed matter physics, who arrived at the beginning of this academic year, and

Stefania Gori and Wolfgang Altmannshofer, both elementary-particle theorists, who will arrive this summer. You can find their photographs and more information about them below. We also have an important new staff member in the department office: Ben Miller, who is now energetically directing our graduate program and was one of the nominees this year for the Chancellor's Achievement Award for Diversity.

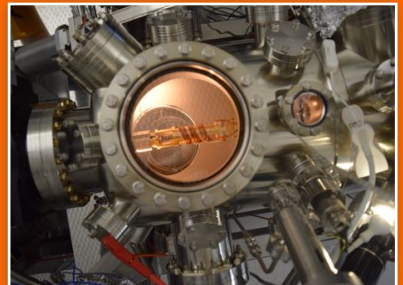
We also held some new departmental events this year. Most notably, we organized a special departmental event to be part of the University Alumni Weekend. That Friday we hosted two guest speakers who were UCSC Physics alumni, together with a reception, lab tours, and faculty visits. Dr. Konstantin Batygin and Dr. Susanne Hering were our two featured alumni colloquium speakers. Konstantin is a 2008 UCSC astrophysics graduate with a Ph.D. in Planetary Science from Caltech, where he is now an Assistant Professor of Planetary Sciences. Dr. Susanne Hering, an alumnus of the very first UCSC class, is the first recipient of the [PBSci Division's Distinguished Undergraduate Alumni Award](#). She earned a Ph.D. from the University of Washington and is founder and president of Aerosol Dynamics Inc. It was a fun and interesting event and weekend, which we closed out with our traditional Sunday picnic and softball game.

The Department also hosted an "Open House at the Delaware Labs," celebrating the move of our Materials Science and Engineering Initiative laboratories to their new home at 2300 Delaware. And we again celebrated "Giving Day," which this year raised \$4500 for the Society of Physics Students (SPS). We are particularly proud of our active SPS chapter, which organized numerous weekly events of interest and benefit to our students and which has tirelessly advocated for our majors.

We are making special efforts to enhance and celebrate diversity in our department as well as to improve the climate here for all of our students. To that end we have established a Diversity and Climate Committee whose purpose is to look at ways to improve the climate in the department to make it an inclusive and diverse place where all are welcomed. Our Departmental Diversity Statement is included below and will be promoted throughout the department. To that end, we have scheduled a visit by the APS Climate Site-Visit Committee, who will be coming this coming autumn to meet with students, faculty, and staff, evaluate the departmental climate, and provide feedback to us on how to improve. The APS has already surveyed our graduate students, and we are planning a survey of our undergraduates for autumn quarter. As part of our efforts to increase the number of underrepresented minorities in our graduate program we applied to become the first U.C. APS Bridge-Program Partnership Institution. That was unsuccessful, so we have some work to do before we try again in September.

On behalf of the faculty, staff, and students, I sincerely thank you for your continued interest and your support of our department. Please feel free to send me your feedback and to visit our website to learn more about the outstanding research that our students and faculty are doing, and about exciting developments and news throughout the coming year.

Robert Johnson
 Department Chair, Physics



Welcome to New Faculty Members!

Sergey Syzranov, Stefania Gori, and Wolfgang Altmannshofer



Dr. Sergey Syzranov joined our faculty in fall of 2017. Syzranov's research specializes in theoretical materials physics and also partially in atomic, molecular, and optical physics. A significant portion of his current research is centered around disordered systems, quantum critical phenomena, and high-temperature super conductivity.

This fall, Professors Stefania Gori and Wolfgang Altmannshofer will join our faculty.

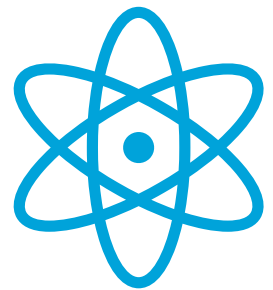
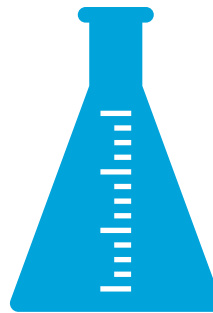
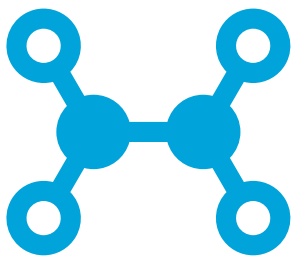
Dr. Gori's research specializes in the theoretical study of physics beyond the Standard Model of particle physics, the physics of the recently discovered Higgs Boson, and particle dark matter. Her research connects those deep theoretical topics to contemporary experiments carried out at the largest particle colliders, such as the CERN LHC, as well as at neutrino experiments, such as those being carried out at the Fermi National Accelerator laboratory.

Dr. Altmannshofer's research specializes in the theoretical study of elementary-particle flavor physics both in the Standard Model of particle physics and in theories that transcend the Standard Model. He uses modern techniques of quantum field theory to connect fundamental theories to contemporary experiments carried out at the largest particle colliders, such as the CERN LHC, as well as at fixed-target neutrino experiments, such as those being carried out at the Fermi National Accelerator laboratory.

Graduate Program Highlights:

This year we have had many exciting developments in our Physics Graduate Program. Graduate Coordinator **Ben Miller** joined our department in Fall 2018 from Florida State University. Highlights of our Graduate Program this year include:

- Opened the Graduate Student Collaborative Center (Thimann 361)
- Formed the Graduate Experience Development Initiative (GEDi Council) which is a Physics Graduate Student Organization
- Developed an Introduction to Teaching course (2 units) which has been approved to launch in Fall 2018
- Developed promotional materials for graduate recruitment
- Applied to become an APS Bridge Program Partner
- Celebrated the success of Preview Day 2018. We have 12 new admits!
- Continued work on redesigning the Physics Graduate Program website for graduate recruitment
- Relunched the Combined BS/MS Program
- Continued excellent programming by WIPA (Women in Physics and Astronomy)





OUR STARS SHINE BRIGHTER THAN THE SUN

Student Award Winners: Graduate

Chancellor's Dissertation Year Fellowship

Cameron MacKeen

President's Dissertation Year Fellowship

Christoph Lee

Chateaubriand Fellowship

Christoph Lee

CITL Pedagogy Fellowship

Dana Faiez

Marilyn Stevens Memorial Award

Carolyn Gee

Benjamin Lehmann

Michael Saccone

Outstanding TA Award

Dominic Pasquali

ARCS Scholars Program Award

Katie Hellier

Ben Lehmann



Undergraduate Program Highlights:

Our undergraduate program continues to grow in new directions under the leadership of our dedicated academic adviser, **Maria Nishanian**. Maria has been appointed to the Steering Committee for the 2019 UC System-wide Advisers Conference, which will take place here at UCSC next spring.

Highlights of our undergraduate program this year include:

- Addition of the Science Education major (replacing the Physics Education major)
- Relunched the Combined BS/MS Program
- Introduced Doc Verify as a way to streamline and archive the Senior Theses
- Sent out Quarterly Newsletters for undergrads with information about upcoming deadlines, events, advising tips and news
- Updated program planners, and improved website
- Taken first steps to launch eScholarship, which offers a robust scholarly publishing platform that enables departments, research units, publishing programs, and individual scholars associated with the University of California to have direct control over the creation and dissemination of the full range of their scholarship.
- Society of Physics Students weekly programming - innovative, community building, outreach to the larger community, emphasis on diversity
- Continued usage of the Undergraduate Collaborative Center, providing a space for peer tutoring, small group meetings, committee work
- The highly successful Mentoring Program run by SPS and WIPA, which intends to bridge the academic, social, and research gaps that are often experienced at the undergraduate level.
- Four of our undergrads will be doing internships at CERN this summer



George Brown: Update on the lower and upper division labs

The physics department has introduced four new advanced laboratory experiments this academic year: Optical Pumping, Physical Optics, Interferometry, and Fourier Optics. The department has also revived two experiments that had been in mothballs: Aerodynamics and Second Sound. We now have seventeen experiments, and can support an enrollment up to 34 students per quarter. These labs were commissioned just in time, as enrollment in Physics 134 has increased dramatically. To maintain momentum, we will be introducing three new experiments in the next year, so stay tuned!



Student Award Winners: **Undergraduate**

Undergraduate Research in Science and Technology Awards

Catherine Manea- Astrophysics
Raziq Noorali- Astrophysics
Nicholas Omahen- Astrophysics
Zafar Rustamkulov - Astrophysics
Marina Huang - UCO Lick

2018 Dean's Undergraduate Award for Outstanding Achievement:

Zafar Rustamkulov
Casandra Henderson
Wynn Jacobson-Galan
Benjamin Smithers
Peter Harrington
Clio Powell-Heard
Megan Splettstoesser

2018 Chancellor's Undergraduate Award for Outstanding Achievement:

Cassandra Henderson
Benjamin Smithers
Wynn Jacobsen-Galan

Undergraduate Kenneth and Ann Thimann Scholarship

Raul Reyes Hueros

Ron Ruby Memorial Scholarship

Tin Long
Nicholas Omahen
Mason Hargrave
Marina Huang
Gavin Rockwood
Elizabeth Yuneman
Basil Darby

Marilyn Stevens Memorial Award

Nicholas Omahen
Maya Silverman
Monica Gallegos

AWARD AND RECOGNITIONS-FACULTY

The 24 members of our physics faculty continue to provide cutting edge research and have received numerous awards.

Congratulations to the following faculty for their awards and achievements this past year!



Dave Belanger
Stephanie Bailey

<https://news.ucsc.edu/2018/06/instruments-of-good.html>

June 12-Introductory physics students test their knowledge and get exposure to the wider world in a class project in which they create musical instruments to be donated to kids in need.



Bud Bridges

has received the **Edward A. Dickson Emeriti Award** (nominated by Professor Michael Nauenberg). This award supports and maintains special annual professorships given to emeritus academic senate faculty members.



Sue Carter

May 10, *Tuesday/Newsday*

<https://news.ucsc.edu/2018/05/provost-carter.html>

Sue Carter named provost for Rachel Carson College



Sue Carter [NSF I-Corps pushes discoveries to market](#)™ January 3, 2018

Professor Sue Carter testified before congressional leaders on NSF Innovation Corps, which assists scientists and engineers in discovering commercial applications for their research.



Michael Dine

[Physicist Michael Dine wins Sakurai Prize for Theoretical Physics](#)

October 23, 2017 Michael Dine shares the prize with physicist Ann Nelson of the University of Washington for “groundbreaking explorations of physics beyond the standard model of particle physics, including their seminal joint work on dynamical super-symmetry breaking, and for their innovative contributions to a broad range of topics, including new models of electroweak symmetry breaking, baryogenesis, and solutions to the strong charge parity problem.”



Mike Hance

Hellman Fellows Program Award recipient. This goal of this program is to support the research of promising assistant professors who show capacity for great distinction in their research.



Tesla Jeltema

Physicist Tesla Jeltema probes the mysteries of dark matter and dark energy.

December 11, 2017

Jeltema has a leading role in the Dark Energy Survey, a major international collaboration that is gathering precise measurements of the evolution of cosmic structure.

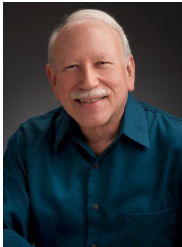


Robert Johnson, Bill Atwood, Steve Ritz, Hartmut Sadrozinski, Terry Schalk

The Fermi-LAT NASA orbiting gamma-ray telescope celebrated this June 11 its 10th anniversary since launch. Professors Atwood, Johnson, Ritz, Sadrozinski, and Schalk were major players in designing and building this highly successful experiment that continues to operate around the clock.

<https://apod.nasa.gov/apod/ap180608.html>

Robert Johnson, and graduate student Sarah Mechbal, together with a group from the University of Delaware, successfully flew in May 2018 their AESOP-Lite magnetic spectrometer on a NASA high altitude balloon from Sweden to Ellesmere Island, Canada. <https://aesoplite.com/>



Joel Primack

April 23, *Tuesday/Newsday*

<https://news.ucsc.edu/2018/04/deep-learning-galaxies.html>

Face recognition for galaxies: Artificial intelligence brings new tools to astronomy



Hartmut F.W. Sadrozinski, Abraham Seiden, Nicolo Cartiglia

1. US Patent # 9,613,993 B2, granted Apr. 4, 2017 “Segmented AC-coupled readout from continuous collection electrodes in semiconductor sensors”

2. Launchpad Award by UCSC IATC on Oct 13, 2017, matched by a generous gift from former SCIPP post-doctoral researcher Brad Hubbard.



Terry Schalk

Physicist Terry Schalk elected 2017 AAAS Fellow

November 20, 2017

Terry Schalk, adjunct professor emeritus of physics, has been awarded the distinction of AAAS Fellow by the American Association for the Advancement of Science (AAAS).



Bruce Schumm

Winner of the Launchpad Award by UCSC IATC on March 9, 2018, matched by a generous gift from the Hamamatsu Corporation.



Sasha Sher

May 24 *Tuesday/Newsday*

<https://news.ucsc.edu/2018/05/circuit-repair.html>

Study finds that selective neural connections can be reestablished in retina after injury



David Smith

The Committee on Teaching has awarded David Smith an **Excellence in Teaching Award**, one of 6 campus faculty to receive this award! The committee received approximately 470 student nominations, and also considered David's Statement of Teaching Philosophy as part of the criteria.

David also had 2 articles in the news:

<https://gizmodo.com/a-recent-hurricane-shot-a-bolt-of-antimatter-toward-ear-1826257505> from Gizmodo, 5/23/18

<https://news.ucsc.edu/2018/05/hurricane-antimatter.html>

Lightning in the eyewall of a hurricane beamed antimatter toward the ground



Steve Ritz

February 21, 2018

[Novel search strategy advances the hunt for primordial black holes](#)

Researchers analyzing data from the Fermi Gamma-ray Space Telescope for evidence of nearby primordial black holes put an upper limit on the number that might be lurking in the vicinity of Earth.



Jairo Velasco

has received an NSF Career Award in Condensed Matter Physics. The Faculty Early Career Development (CAREER) Program is a Foundation-wide activity that offers the National Science Foundation's most prestigious awards in support of early-career faculty who have the potential to serve as academic role models in research and education and to lead advances in the mission of their department or organization. In November, Jairo (lead PI) and David Lederman (Co-PI) were awarded a grant from the US Army for the acquisition of a glove box system for fabrication and characterization of quantum materials devices. Jairo was awarded the NSF CAREER to visualize and control chiral bound states and ballistic chiral electrons in two-dimensional material heterostructures.

Congratulations!



Thanks To Our Wonderful Staff!

The Physics Department is lucky to have a dedicated and talented staff, who work hard to make our department the best it can be. Thank you to Maria Nishanian (Undergraduate Adviser), Ben Miller (Graduate Coordinator), Amy Radovan (Department Assistant), and Cathy Murphy (Department Manager) for all the work you do on behalf of our department!



UCSC Department of Physics and Astronomy and Astrophysics DIVERSITY STATEMENT



The UCSC Department of Physics and Department of Astronomy & Astrophysics are fully committed to and supportive of the University of California's Diversity Statement (*see below*). If you witness any improper or disrespectful treatment of any of our undergraduate students, graduate students, faculty, postdocs, and staff, we encourage you to report it to one of the following entities:

Report Hate, <https://reporthate.ucsc.edu/>

Title IX Office, <https://titleix.ucsc.edu/>

Office for Equity, Diversity, and Inclusion, <https://diversity.ucsc.edu/>

As a community, we acknowledge the richness of commonalities and differences we share, the intrinsic worth of all who work and study here, and that physics education is enhanced by investigation of and reflection upon multiple perspectives. We also aspire to create respect for and appreciation of all persons as a key characteristic of our campus community and to achieve an environment that welcomes and supports diversity as well as ensuring full educational opportunities for all who teach and learn here. This work is essential to furthering the widely shared purposes of maintaining our premier status, noted for its excellence, richness and vibrancy. We are thus deeply committed to ensuring the continued diversity of our campus and will do whatever we can, legally and appropriately, to preserve and expand the diverse nature of our community.

[UC Regents Policy 4400](#)

