



## Letter from the Chair

By *Andreas Bill, CSU Long Beach*



**Andreas Bill**

Dear Fellow APS Member,

This short newsletter is worth reading! We provide information about new activities of the section (The “What Do Physicists Do” day for example), summarize past events, list prize winners and offer an update on what happened at the APS Convocation and Congressional Visit Days. We also offer a

short article on the recent discovery of gravitational waves by a member of the executive committee who is also a co-author of the scientific papers.

The Far West Section (FWS) of the American Physical Society aims at bringing together physicists active in academia, industry and research institutions. We welcome all who have a background in, or a link to physics and wish to share their experience and knowledge, or simply wish to stay in touch with colleagues and the advances in the field. Most of our members live in California, Hawaii or Nevada, but the section is open to all who are APS members. Though all *can* be member of the FWS for free(!), not all *are* members. If you are an APS member and read these lines you should also become a section member. Just send a short email to [membership@aps.org](mailto:membership@aps.org) to express your desire in joining the Far West Section, or go [online](#) using your APS membership credentials (click on “Membership”). Your membership strengthens the section’s activities since the APS funding is proportional to its membership count. Please become a member now, and read the rest of the letter after...

This year we successfully launched a new event: The Physics Day “*What Do Physicists Do?*” You will find a report in this Newsletter on the first event held at SLAC in July. The section intends to expand that idea to other regions, Hawaii and Nevada in particular. This is a good way to organize events for all its members, including those who cannot readily travel to our annual meeting (this year at UC Merced).

Physics has undergone many changes in recent years and physicists in the region of our section have played a major role

in shaping the physics landscape. Not only have we advanced knowledge in key areas of fundamental and applied research, teaching and industry, but some of our members have also contributed in important ways to APS activities. There are thus many reasons to be part of this section and many opportunities for you to participate.

It is important that physicists speak out in a time where attempts are made at giving equal consideration to serious scientific endeavor, “opinion” and even plain false statements in the fog of information. It is also important for physicists to change their attitude. Do not expect that all should obviously recognize the value and merits of our field; demonstrate it! Do not think that physicists working in industry are valued less; they make up the largest segment of the physicists’ population. Do not believe that physics should remain the way it was when you were a student or will stay so in the future; physics is in continued transformation through our creativity and our new understanding of the physical world. Do not think that we do not need others; the APS

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is known for the great advances that immigrant physicists have made and should be known as an example of inclusiveness – We welcome all who have a passion for physics. We also should continue striving at extending our expertise to other fields while continue developing Physics as a major field of science.

We invite you to join one of the main activities of the APS Far West Section: our annual meeting taking place in the Fall, this year on November 2-4, 2017. This year's conference takes place at UC Merced, after meeting at UC Davis (2016), Cal State Long Beach (2015) and Univ. of Nevada, Reno (2014). This year's location is a good reason to participate: you will discover the youngest of the University of California campuses and meet the members of the physics department that will host us. This Newsletter contains an article about UC Merced and the meeting by its chair.

We highly recommend young scientists, more seasoned ones, those who made the headlines and those who contribute in shaping our economy through their presence in industry to join and present their latest research and achievements. The overall scientific level of our meetings steadily increases. We particularly encourage you, undergraduate and graduate students, to attend

what may be your first professional scientific meeting. Our encouragement is expressed in tangible ways: we provide shared lodging and some registration and travel support for student presenters. The meeting is also an opportunity to learn from and talk with established physicists, hear a distinguished banquet speaker and potentially win an award for best presentation by undergraduates, graduates and postdocs. See the list of awardees for 2016 in this Newsletter.

For those of you who want to be even more active in the Section, we offer many ways to do so. Very importantly, vote during our elections! Please contact one of the chair line members if you are interested in serving as an officer of the section, or wish to nominate someone else. Contact us also if you wish to make suggestions for invited speakers for future meetings, or if you wish to host a section meeting at your institution.

*Thank you* to all who are members of the section. Please do not hesitate to write to me or an executive committee member if you have suggestions on the activities of the section.

Best wishes from the Far West Section!

## 2017 FWS Annual Meeting, the University of California, Merced

By Sayantani Ghosh, Department of Physics, UC Merced

Conference Chair and APS Far West Section Executive Committee member



Sayantani Ghosh

modern architecture, and environmentally-conscious infrastructure and facilities, all bearing testament to the times. In the decade since its birth, the student population has grown rapidly, and now stands at 8,000, while the campus has embarked on an ambitious *Project 2020*, with the goal of doubling the footprint by that year and accommodating up to 10,000 undergraduates and 1,000 graduate students.

The physics department at UC Merced reflects the diverse and inter-disciplinary make-up of the campus, with specific focus on emerging areas, such as renewable energy, biophysics, and soft matter. We particularly emphasize multidisciplinary training for our students, and have designed our undergraduate and graduate curricula with this in mind. Our students have the opportunity to engage in research with faculty in other disciplines throughout their time on campus, and can leverage the flexibility in the

This year, the APS Far West Section welcomes its members to the University of California, Merced for the annual meeting. Merced is the tenth campus of the UC system, set in the heart of the San Joaquin Valley. Established in 2005, it is the only public research university founded so far in the 21<sup>st</sup> century in the United States. The highly diverse student, faculty and staff, work on a campus with

course structure to best suit their needs. Our research capabilities have been further strengthened by the establishment of two new centers on campus: the Merced Nanomaterials Center for Energy and Sensing (MACES) funded by NASA, and the Center for Cellular and Biomolecular Machines (CCBM), funded by NSF. Several physics faculty have leadership positions in these centers, and more than 50% are members of one or both. Through the centers, we can offer our undergraduate and graduate students training and internship opportunities on campus and elsewhere.

The invited speakers at this year's annual conference have been very carefully selected to reflect the research emphases in our department, and we are organizing tours of our laboratories and core research facilities to show you around our young campus. We look forward hosting you on our modern campus!

### Hotel and Travel Support for Students Giving Talks or Presenting Posters:

Students from outside the Merced area who identify at registration as presenters at the conference are eligible to receive up to two nights of accommodation on a shared basis. In addition, students are eligible for travel awards of up to \$100 to cover other travel expenses.

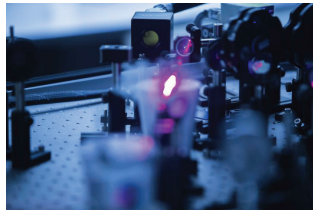
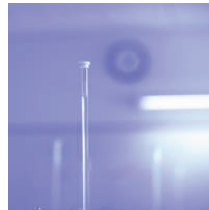
Similarly, for student presenters traveling from outside the Merced area may qualify for travel support, up to the maximum \$100. Unfortunately we are unable to cover conference registration fee or meals. Travel support varies, depending on the

distance that individuals travel to attend the meeting; persons who live farther away likely receive larger support. We encourage students to carpool, but can only reimburse one person for driving the group.

UNIVERSITY  
OF  
CALIFORNIA  
MERCED

# 2017 ANNUAL MEETING AMERICAN PHYSICAL SOCIETY FAR WEST SECTION California-Nevada-Hawaii November 3-4, 2017

<http://physics.ucmerced.edu/American-Physical-Society-Annual-Meeting>



## Banquet Performance

*Tadashi Tokieda (Stanford University)*

“Toy Models: Demonstrating Physics in Play”

## Plenary Speakers

*Kerwyn Huang (Stanford University)*

“The Physics Of Bacterial Growth And Form”

*Frances Hellman (UC Berkeley)*

“Amorphous Materials: Exotic Physics and Practical Applications Arising from Disorder”

*Andrea Ghez (UCLA)*

“The Galactic Center: A Unique Laboratory for Studying the Physics & Astrophysics of Supermassive Blackholes and Their Environs.”

*Andrei Derevianko (U of Nevada, Reno)*

“Hunting for dark matter with GPS and atomic clocks”

Welcome Reception  
November 2<sup>nd</sup>  
6 pm

Abstract submission deadline: September 29, 2017  
Contact: Sayantani Ghosh (sghosh@ucmerced.edu)  
Hendrik Ohldag (hohldag@Stanford.edu)  
For Conference Information Contact: nsfacutlysupport@ucmerced.edu



# Recollection of the 2016 FWS Annual Meeting at UC Davis

The Far West Section met at UC Davis November 2-3, 2016. The meeting counted nearly 150 registered attendees and started with a welcome reception organized Thursday evening.

The program featured slightly over 100 presentations including about 30 poster presentations. This year's talks and posters were divided in sessions on Astrophysics, Gravitation, Atomic, Molecular and Optical Physics, Condensed Matter Physics, Material Science and Molecular Transport, Plasma, Fluids and Atmospheric Physics, High Energy and Accelerator Physics, Nuclear Physics and Education.

One innovation of the 2016 meeting was the Saturday activity. In past annual meetings, we offered a panel discussion with up to five specialists on a topic of current interest, followed by a lunch around the panelists and faculty to offer an opportunity for direct interaction with students. This year instead, Crystal Bailey (Careers Program Manager of the APS) offered a well-attended and much appreciated *Interactive Career Workshop*.

There were four exciting plenary talks. On Friday, Robin Erbacher (UC Davis) spoke about *A new era of particle discovery*, and Alan Weinstein (CalTech) presented a very timely talk on *Gravitational waves observed by LIGO*. On Saturday, Jonathan Williams (U. of Hawaii) presented a talk on *Observing the birth of planets around nearby stars*, followed by Andrew Geraci (U. of Nevada, Reno) who opened for us the world of *The precision frontier: hunting for new short-range forces with resonant sensors*.

Henry Garcia was the Friday after-dinner speaker and fulfilled the high expectations that accompanied his employment and

topic: As a physicist working for Pixar he talked about *From Nanotech to Infinity and Beyond: A physicist's journey into the world of computer animation*. He offered great insight into computer animation from the vantage point of a physicist.

The 2016 annual meeting at UC Davis was yet another success of the Far West Section! Physicists from Industry, Research Institutes and Universities met in a friendly and motivating atmosphere leading to fruitful interactions. Make sure to reserve the time to join the next meeting.



Crystal Baley in conversation with a participant of the Interactive Career Workshop

## What Do Physicists Do?

Hendrik Ohldag, SLAC

Career Workshop for Students at SLAC National Accelerator Laboratory



Hendrik Ohldag

The 2016 Newsletter contained an article entitled *Unofficial mini-meeting of the Executive Committee below the Equator*, that summarized the outcomes of an informal meeting of three members of the Executive Committee of the section, Peter Beiersdorfer, Alla Safronova, and Doug Singleton. They proposed the idea of creating smaller one-day meetings in addition to the annual section meeting. Such meetings were envisioned in a variety of forms and expected to lead to greater collaborations between the Far West Section and other topical groups, or with societies such as the AAPT, AAS or SPS. In addition, Hawaii could host a meeting under the auspices of the Far West Section. This will likely happen in 2018.

Chair-elect Hendrik Ohldag took up the challenge of organizing the first meeting in a setting that allowed to test the ideas. He organized a Far West Section day "What Do Physicists Do?" at SLAC which turned out to be a great success! Below is a description of the event as it appeared in the *SLAC News* on July 25, 2017.

Graduating with a degree in physics marks a milestone accomplishment that quickly brings you face-to-face with your next challenge: starting your career. Physics graduates have a diverse array of options, from universities or laboratories to government or private industry. There are also a host of emerging technologies giving rise to new industries and requiring specialized skill sets.

For this reason the Far West Section decided it was time to extend their event program this year to include a career workshop



What Do Physicists Do? First one-day meeting of the Far West Section at SLAC.

tailored specifically to undergraduate and graduate students. The event, entitled “What Do Physicists Do?” was held on Saturday, July 8, and had 140 registered participants – many more than the organizers had expected. Situated in Silicon Valley, SLAC is perfectly placed to bring these viewpoints together to help students learn about opportunities and make informed career choices.

As a member of the committee and a staff scientist in the SLAC, Hendrik Ohldag served as the local contact for the organization of the workshop with the help of Enrique Cuellar, from the Hu-

man Resources Department at SLAC, and Pat Burchat, a physics professor at Stanford University. Pat maintains a network of physics alumni in the Bay Area who are pursuing a variety of interesting careers in the private sector, and has helped organize and/or moderate career panels before. “I like to ask panelists how they apply their physics training to their careers,” says Pat, who wants to make sure students come away from these events with greater awareness of the breadth of opportunities open to them. “To more senior panelists, I ask what they look for in a technical hire.” Because SLAC is in Silicon Valley, we figured it should be easy to attract speakers and panelists from the surrounding industries and facilities. The event program included panelists from universities and national labs, plus a variety of industries from manufacturing and digital agriculture, to video intelligence and a data science training program.

We received great feedback, and the workshop really seemed to fill a need. Students learned many practical skills, like how to write resumes and find job prospects using social networking tools. We had one panel discussion focusing on jobs in the private sector and another on jobs in academia and national labs. We actually ran out of time during both the panels due to the number of questions and the lively discussions they inspired. The success of this event has ensured that the career workshop will be run again next year, hopefully to become a staple of the APS Far West Section’s annual program of events.

*(A version of this article was published in SLAC News on 7/25/2017)*





# The Far West Section goes to Washington

Hendrik Ohldag, SLAC

On January 25<sup>th</sup> 2017, representatives of the Far West Section, Andreas Bill (CSULB), Hendrik Ohldag (SLAC) and Patricia Sparks (Harvey Mudd) joined other scientists from the region to visit congressional offices in Washington DC just a few days after Inauguration day. For many of the more experienced members of the congressional visit team it was evident that the atmosphere was different than in prior years. January is always a time of turnover on the hill as new members of congress begin their term, moving into their new office, and are trying to put together a group of experienced advisors and staff members to face the task of governing. This change of “personnel” always comes with some uncertainty how the day-to-day business between members of congress and their offices will be affected and how the numerous committees will change.

This time, however, it was quite different, especially from the point of view of a scientist. It was not about settling for a 3% increase instead of a 5% increase. It appeared obvious at the time that the scientific community would have to face a drastic change in the political environment and the support our community can expect from government leadership. By now we can most certainly say that our prediction has become true. Consequently, the sense of uncertainty about the federal budget in general and the R&D portion in particular was tremendous during the Congressional Visit Day and nobody knew what exactly would happen, once some initial and probably quite drastic first draft of the upcoming budget would be released. Nobody knows where the current budget deliberation will lead us. As an example, at some point during this process my position was scheduled for termination on January 1<sup>st</sup> 2018; however, as of now it looks as if I will be able to pay my bills in 2018 as well. This experience and the general atmosphere in Washington



Members of the FWS meeting with staff members of Rep. Jackie Speier (D-CA) in her office.

stressed once more that uncertainty is no way to “do science”. Successful and efficient science policy requires a stable funding situation, preferably with an upward trend.

So what can you do? Since the beginning of the year scientists around the country have started to become increasingly engaged into politics. We saw “Science Marches” everywhere, scientists contribute increasingly on social media as well as classic news outlets and finally scientists start running for office again. You can do this too, that means get involved, and make your voice heard! Call your members of congress and let them know how important federal funding is for your science program, for your students and the community around your institution.

# The first observations of gravitational waves with LIGO and Virgo

Joshua Smith\*, for the LIGO Scientific Collaboration and Virgo Collaboration

\*Dan Black Director of Gravitational-Wave Physics and Astronomy, Cal State Fullerton



Joshua Smith

Gravitational waves, predicted by Einstein’s theory of General Relativity in 1916, are ripples in *spacetime* that travel at the speed of light. These waves carry information about the motion of mass in astronomical systems and are thus an entirely new spectrum that humanity can use to view the universe.

In 2015, the US-based NSF-funded Laser Interferometer Gravitational-Wave Observatory (LIGO) opened this new spectrum by directly measuring the stretching and squeezing of spacetime

on Earth caused by the merger of two black holes [1], named GW150914 for the date on which it was observed. Since then, LIGO has reported on three additional coalescing binary systems of black holes. These observations have revealed a population of black holes with masses tens of times the mass of the sun (see Figure 2) and allowed tests of relativity in the strong gravity regime. The latest, GW170814, was also detected by the Italian-French-Netherlands Virgo Observatory, allowing a reduction in the inferred source sky location area from more than 1000 square degrees for LIGO-only to 60 square degrees for the network (see Figure 1). In October, following these black hole

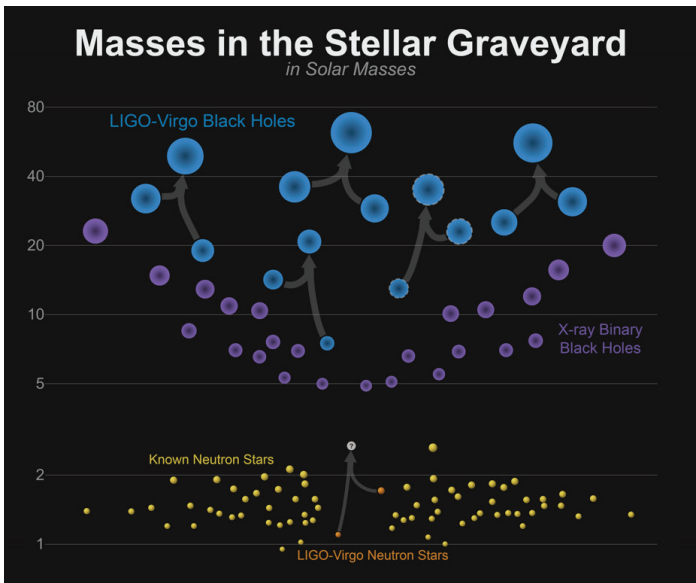


Figure 2. The masses of stellar remnants are measured in many different ways. This graphic shows the masses for black holes detected through electromagnetic observations (purple), the black holes measured by gravitational wave observations (blue), neutron stars measured with electromagnetic observations (yellow), and the masses of GW170817 measured by gravitational wave observations (orange). The remnant of GW170817 is unclassified, and labeled as a question mark. PHOTO COURTESY OF LOGO/VIRGO/NORTHWESTERN/FRANK ELAVSKY.

observations, the Nobel Prize in physics was awarded to Rainer Weiss, Kip Thorne, and Barry Barish “for decisive contributions to the LIGO detector and the observation of gravitational waves.”

This August, the LIGO-Virgo network debuted the field of gravitational-wave multi-messenger astronomy by discovering GW170817 [2], a binary neutron star merger with a gamma-ray-burst counterpart, and rapidly sharing its source location, which could be inferred to 28 square degrees, with the broader astronomical community, triggering observations of the system across the electromagnetic spectrum [3]. The gold mine of information produced by these observations is still being analyzed, but it has already been used to connect binary neutron star mergers with short gamma-ray-bursts and measure the speed of gravity to agree very precisely with the speed of light, provide a gravitational-wave standard-siren independent measure of the (local) Hubble constant, provide information about the tidal deformability of neutron stars, and suggest Kilonova emission in the aftermath of the merger.

The LIGO detectors are currently down, undergoing technical improvements, such as the addition of light with more favorable quantum-mechanical properties (known as “squeezed light”), that will increase their observing range and therefore their event rate. These more sensitive LIGO detectors will be joined by Virgo again in 2018 to observe the gravitational-wave sky.

[1] B. P. Abbott et al. Observation of gravitational waves from a binary black hole merger. *Phys. Rev. Lett.*, 116:061102, Feb 2016.

[2] B. P. Abbott et al. Gw170817: Observation of gravitational waves from a binary neutron star inspiral. *Phys. Rev. Lett.*, 119:161101, Oct 2017.

[3] B. P. Abbott et al. Multi-messenger observations of a binary neutron star merger. *The Astrophysical Journal Letters*, 848(2):L12, 2017.



Figure 1. From left to right: the LIGO Hanford, WA, LIGO Livingston, LA, and Virgo Observatories. PHOTO COURTESY OF LIGO AND EGO/VIRGO.

## Elections and Awards

This year's elections have been postponed to end of November. Once the election process has been completed we will email the section to announce the results. Please do not forget to vote when the election opens up and the announcement is sent to you through the APS mailing list for the Far West Section. Like past years, we will elect a new student representative, two new members to the executive committee and a new member for the chair line.

### 2016 Student Awards

The Far West Section awards prizes for student presentations at the annual section meeting in the categories of experimental and

## 2016 Graduate Student Awards

### Kennedy Reed Award Best Theoretical Research

**1st place:**

Justin Smith (University of California, Irvine)

**Title:** *Systematic method for improving first principle calculations of materials under extreme*

**2nd place:**

Patrick McDougall (Fresno State)

**Title:** *Particle Production in a Gravitational Wave Background*

Nader Inan (University of California, Merced)

**Title:** *Interaction of Gravitational Waves with Superconductors*

### Margaret Burbidge Award Best Experimental Research

**1st place:**

Julius De Rojas (University of California, Davis)

**Title:** *Synthesis of L10 FeNi thin films via High Speed Rapid Thermal Annealing*

**2nd place:**

Kimberly Schultz (University of Nevada, Reno)

**Title:** *X-ray Characteristics of Mixed Noble Gas Puff Irradiated with the Titan Laser at LLNL*

## 2016 Undergraduate Awards

### Helen Quinn Award Undergraduate Research Theory

**1st place:**

Alex Kemnitz (California Polytechnic State University San Luis Obispo)

**Title:** *Search for Ternary Fission Events and Analysis With the NIFFTE Time Projection*

**2nd place:**

Nicholas Sherman (University of California, Davis)

**Title:** *Calculating Nuclear Magnetic Relaxation (NMR) Rates with Numerical Linked Cluster*

theoretical physics, at both the undergraduate and graduate level. Below is a list of the 2016 section meeting winners at UC Davis. Student presentations and prizes are an important activity of the Far West Section. They offer the opportunity to recognize some of the best and brightest future physicists, and help connect all students with the physics community.

If you wish to contribute to the student prize money fund and/or student travel fund the section has included a donation box on the registration form. Please feel free to donate to support students as they embark on a career in physics.

### Steven Chu Award Undergraduate Research Experiment

**1st place:**

Noah Miller (California Polytechnic State University San Luis Obispo)

**Title:** *The Fast Interaction Trigger (FIT) Upgrade to the ALICE experiment at the CERN LHC*

**2nd place:**

Omar Cervantes (Hartnell Community College)

**Title:** *Using Block Co-Polymers to Create a Metal Oxide Hard Mask for Etching Silicon and Silicon Dioxide*

## 2016 Poster Awards

### Best Undergraduate Poster

Apryl Witherspoon (UNR)

**Title:** *Experimental Apparatus for Coupling Dielectric Nanospheres to Cold Atoms*

Chris Wong (Cal Polytech)

**Title:** *The First-Ever High Speed Video Capturing the "Snap" Transition of a Bimetallic Disc*

### Best Graduate Poster

Rachel Baarda (UC Davis)

**Title:** *Reliability Study of Normal Mode Analysis on the BPTI Protein*