



California State University, Long Beach
Department of Physics and Astronomy
2017-2018 Newsletter

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2017 PhysTEC Open House



Professor Thomas Gredig's Research Group



Dr. Curtis Bennett, New Dean of CNSM

The Year in Review

Dr. Andreas Bill

Dear Colleagues, Alumni and Friends of the department,

The department has undergone numerous changes during the academic year 2017-2018. Irene Howard retired, in July 2017, after 39 years of service to the department. Her retirement turns a page in the life of the department that many long-time members felt with a pinch in their heart. The Newsletter offers an overview of her career and presents the office staff that now replaces her; we are fortunate to have found a great new team! We express our deep gratitude for the work Irene did at the department, and particularly the open ear and heart that she had for students, faculty and staff alike. She truly embodied the heart and focal point of the department's life. To honor her commitment and service emeritus faculty Dr. Keung Luke decided to endow a scholarship in her name! This scholarship will be given each year to a student with demonstrated service to the department. We join Dr. Luke and thank you, Irene, for your commitment and being a steady and caring person in the ups and downs of the past 40 years department's history. We wish you many joyful and healthy years taking care of those you love, but also of yourself!



Dr. Andreas Bill, Department Chair

Changes were also felt in the composition of our faculty members. Dr. Thomas Klähn (or Klaehn) joined a team of 11 tenured and tenure track faculty members and one tenured faculty on FERP. Thomas is an astrophysicist interested in matter under extreme conditions, such as those encountered in a neutron star. With Prashanth Jaikumar the department has now two excellent astrophysicists to deal with the high demand on part of our students for classes and research projects in this area. More about Thomas Klaehn can be found in this letter.

Two other noteworthy news of this past year are both related to Dr. Claudia Ojeda-Aristizábal. She obtained a grant from the Department of Energy (DOE), and she developed a new experimental physics class entitled "Advanced Nanoscale Physics". Students are trained on state-of-the-art experimental techniques, and also in the art of methodically approaching and solving a problem on cutting edge research. The experimental class and her laboratory introduce students to instrumentation used in industry and PhD programs, and the problem solving skills are those needed to be a successful physicist.

For those of you who know this and other physics departments, you will have noticed that the number of tenured and tenure track faculty members in the department is the lowest ever and one of the smallest among CSU campuses with similar student body. At the same time the department has grown to one of the largest in the system (130 undergraduates – still increasing - and over 60 graduate students) and is for the 4th consecutive year the largest exit/terminal Master's graduating institution in the United States after the Naval Postgraduate School in Monterey, CA. It never fails to have either an alumnus, a retired colleague or a visitor asking how we manage this state of affair. The reality is that we are struggling to sustain the improvements we made to the program and the excellence we have achieved. We need support from the University to recover from the deep cuts that were made to our department in the past few years. Presently, our finances rely heavily on donations and endowments. One positive note is that we have been approved for a tenure track faculty search in 2018-2019. The department has chosen to open a search in Experimental Physics of Living matter or Soft Matter. We are hopeful that a young, dynamic faculty member will join in the Fall 2019!

Another very positive note for our department is that we received several endowments for supporting students in their studies and their research. Remarkably, the support comes from within: Professor emeritus Keung Luke, who was a professor from 1966 to 2003, offered the department three endowments! In this newsletter we present each of Professor Luke's endowment and the people they honor. Endowments are essentially an eternal commitment to support our students and program. We are grateful to you, Dr. Luke, for your generosity!

This Newsletter also remembers those who left us this year: one of our students, Santos Maurizio Fuentes, unexpectedly passed away in the summer 2018, as well as emeritus professors Jack Munsee and Alva Yano who passed away in December 2017 and March 2018, respectively.

There are many more news about our department in this newsletter. I invite you to read and see how vibrant and lively we have been during academic year 2017-2018, and celebrate with us the achievements of students, faculty and staff members of the department.

We hope to hear from you and see you here at the department. We are grateful for the CSULB Physics Community!

Enjoy the reading!

Welcoming the New Dean for the College of Natural Science and Mathematics



Dr. Curtis D. Bennett, New Dean of The College of Natural Science and Mathematics

Dr. Curtis D. Bennett has been selected as California State University, Long Beach's (CSULB) new Richard D. Green dean for its College of Natural Sciences and Mathematics (CNSM). Dean Bennett began his new duties on July 31, 2017. "Dr. Curtis Bennett is a nationally recognized mathematician with a well-developed understanding of the full range of the responsibilities of a dean of Natural Sciences and Mathematics within the CSU," said CSULB Provost Brian Jersky. "These include sustaining and developing both undergraduate and graduate studies, as well as the key role of research, within the Long Beach environment. He also has a good understanding of the need for focused fundraising. I am looking forward to his leadership of the college."

Dr. Bennett was a professor of mathematics at Loyola Marymount University (LMU), had served as the associate dean for Faculty Development in the Seaver College of Science and Engineering at the institution from 2011-15, a role in which he led several college initiatives, including heading up LMU's successful 2012 McNair grant proposal. Prior to that, he was LMU's chair for the Department of Mathematics (2006-11) and an associate professor in the department (2002-06). Before coming to LMU, he was at Bowling Green University in Ohio for 10 years. Dr. Bennett earned his Bachelor of Science in Mathematics at Colorado State University in 1985, and his Master of Science (1986) and Ph.D. (1990) at the University of Chicago.

Dr. Bennett replaces Laura Kingsford who was dean for 15 years. The Richard D. Green endowed dean position is supported by a \$2.3 million gift from its namesake, which, in addition, will fund a CNSM graduate fellowship, teaching activities, scholarly work and community service efforts. It marks just the third endowed dean's post in the entire California State University system, along with one at San Diego State (business) and San Jose State (engineering).

The department of Physics & Astronomy welcomes our new Richard D. Green dean to his new role in the College and looks forward to working with him to improve the sustainability of the successes harvested by the department, its resulting growth and to support the vision of a strong department that aims at preparing the next generation of physicists finding careers in all STEM fields.

New & Retired Staff

Hi! I am Lisa Dignadice. I graduated from California State University, Long Beach in 2011 with a BS in Health Care Administration and a Certificate in Asian Studies. I am currently in the Master's program here at CSULB in Public Administration. I have worked at CSULB as a full time staff member in Housing and Residential Life as well in Enrollment Services. I love being here on campus and working with our students to help them along their path to get their degree. I love to read books, watch movies, watch YouTube and sleep. I can speak a bit Tagalog and Korean, which I both wish I could speak fluently. I feel welcomed and I am happy to be working here in the Physics and Astronomy Department.



Lisa Dignadice
Administrative Assistant



Cindy Santiago and Nicole Torres

We also acknowledge the brief, but impactful appointment of Nicole Torres, who joined the department as Administrative Coordinator when Irene Howard retired, and Cindy Santiago, who worked as the department's Administrative Assistant while Korin Coombs was on maternity leave. Nicole has since returned to her previous department, Economics, where she has been promoted to Administrative Analyst, and Cindy was also promoted to Fiscal Coordinator in Biological Sciences. Thank you both for your hard work in the Physics Department!



Jay Conlon
Issue Room Technician

My name is Jay Conlon. I began working as a member of the department's technical staff at CSULB in October of 2017. My grandfather helped me use physics to win the Pinewood Derby as a boy scout, and I've loved it ever since. I went to UC Merced to earn my undergraduate degree in physics, and did my graduate studies here at CSULB. I finished my MS degree with honors this academic year. When I'm off the clock I am an avid gamer and all-around nerd, who's grateful to being employed doing something I love.

A Career Devoted to the Department: Irene Howard Retires After 39 Years



and a Certificate in Administration of Travel and Tourism, 2009. Our son-in-law, Kazuhiro Takatsuki, has degrees in Criminal Justice and Japanese, 2008. All of these degrees and certificates are from CSULB! Some earned higher degrees elsewhere afterwards, but their journey began at CSULB.

My hobbies include writing, drawing, and spending time with my two sweet grandchildren. I began as a Sculpture Major, and changed majors when I realized how much I enjoyed writing both poems and short stories. I worked in the CSULB library as a Student Assistant for the four years that I took classes at CSULB. Afterwards, I worked for six months in Admissions and Records while an employee was on maternity leave. When the employee returned back to work, I was offered a staff position in the Department of Physics and Astronomy in 1978 and worked in the department until retirement. I loved my job. I retired so that I could assist my mother who is over ninety years old, and to be able to visit my grandchildren more often.

What I loved most about my job in the Physics and Astronomy Department was that I could help the faculty and students. Each day was unique. I loved to order lab equipment for the research and teaching labs because I could see the equipment being used daily by the instructors and students. I enjoyed working with the outreach programs such as PhysTEC where I could see the students learning how to be teachers themselves. I enjoyed working with the Learning Assistants and watching them tutor other students in need of help. I loved the challenge of putting the classrooms into the Schedule of Classes to see if we could get rooms that are easy for the instructors to access and that have the latest technology. I also loved putting together the Department Newsletters where I could insert the photos that I had taken during the year. It was a way that I could be creative and see a project that was in my mind come to life. I enjoyed giving encouragement to students who let me know of their hardships and struggles.

To this day I keep in touch with the retired and current faculty, students, alumni, and staff. Having been a student at CSULB myself, it is just natural for me to want to encourage them to be the best that they can be, to reach for the stars. I still get emails and greeting cards from faculty, staff, and students from CSULB. Keeping in touch with them reminds me that my years on campus were precious. I would like to thank all of the faculty, staff, and students for making so many beautiful memories for me to cherish forever.

I'm hoping that with the "Irene Howard and Keung Luke Endowed Scholarship in Physics", which was established by Dr. Keung Luke with service being one of the main criteria, many students will be helped financially as the years go by. I am grateful that with this scholarship I can leave a legacy.

Irene Howard retired on June 30, 2017. All retired and present faculty, staff members of the department of Physics and Astronomy wish to express our deep gratitude to you, Irene, for the many years of dedication to our students, staff and faculty, the positive atmosphere you brought to the department during all these years and the excellent work you provided for the University. We wish you and your family many years of happiness and joy. The department is your extended family and we will always welcome your visits!



Irene with her Granddaughter, Claire

New Tenure-Track Faculty Member, Dr. Thomas Kläehn



New Tenure Track Professor,
Dr. Thomas Kläehn

Dr. Thomas Kläehn (or Kläehn) joined the faculty of our Department in August 2017. He received his doctoral degree from the University of Rostock (Germany) in 2005 and stayed a few more years after receiving his degree. He joined Argonne National Laboratory, Illinois, as a postdoctoral research fellow in 2007 for two and a half years. From 2009 to 2017 he worked at the Institute of Theoretical Physics at the University of Wroclaw, Poland, in an 'Adjunkt' position, the Polish equivalent to an Assistant Professor.

Dr. Kläehn's research is motivated by the question whether and how quarks and gluons, the elementary particles of Quantum Chromodynamics (QCD) and building blocks of for instance neutrons and protons, can be observed in an unbound state – the so-called quark-gluon plasma— at extremely large densities or temperatures. Interestingly, the density in the center of neutron stars might be just large enough to provide these conditions. Although this has not been confirmed by direct observation, this would make neutron stars the only objects in our Universe where free quarks and gluons can exist.

A distinctive feature of Dr. Kläehn's research is the ambition to model quark matter as closely as possible to QCD and to perform a consistent comparison of theoretical results with a complementary variety of observational data from both astrophysical observations and heavy ion collision data. His favored theoretical tool to attack this problem is the Dyson-Schwinger formalism, a Green function approach which has been proven successful in solid state physics and QED as well as in vacuum and finite temperature QCD. The research he will undertake in the coming years at CSULB will be centered around employing this formalism at finite density and low temperatures. Applying this approach in the context of neutron star physics towards a more realistic description of these stars or of matter in supernovae. This realistic modelling is needed, for instance, to understand recent LIGO gravitational wave data taken from the merging of two neutron stars.

Dr. Kläehn is a married father of three children and a fourth on the way who enjoys spending time with family and friends, camping, hiking, reading a variety of genres, playing family music or just walking the dog. He practiced Karate for nearly twenty years and holds a first-degree black belt.

Thomas Kläehn is an excellent addition to the existing expertise of the department and we are very glad he joined. Welcome!

Visiting Scholar & Nobel Laureate Lecture

2017-18 Visiting Scholar, Dr. Wei



Visiting Scholar, Dr. Wei Wei and
Dr. Prashanth Jaikumar

The Department of Physics and Astronomy welcomed Dr. Wei Wei as a visiting scholar for the 2017-2018 academic year. Dr. Wei is a tenured professor at Huazhong Agricultural University in China. She has a Ph.D. from Central China Normal University, and has authored multiple publications in the field of Neutron Stars and Pulsar Physics. She came to CSULB for her sabbatical year to collaborate with Dr. Prashanth Jaikumar and Dr. Thomas Klaehn on topics related to compact stars.

Dr. Wei's stay has been fruitful. She collaborated with our faculty members but also some of our graduate students and two publications are in final stages of writing as she returns home. Thank you Dr. Wei for your work and the research experience you brought to the department. We welcome your participation in the life of our department and wish you all the best!

Nobel Laureate Lecture From Dr. William Phillips

Nobel laureate in Physics, Dr. William Phillips, visited campus on Wednesday, April 11, 2018. Dr. Phillips was the recipient of the 1997 Nobel Prize in Physics for development of methods to cool and trap atoms with laser light. The department was especially excited to attend, and hear about his exceptional work as a scientist in this area of study.



Dr. Thomas Gredig, Dr. Michael Peterson,
Dr. William Phillips and Dr. Andreas Bill

Undergraduate & Graduate Programs

Undergraduate Program

Dr. Jiyeong Gu



In the 2017-2018 academic year we had 129 majors in Physics. This number has consistently increased in the last 10 years. We also had the largest ever graduating cohort of our department: 42 students graduated with a BS/BA degree. This is not only the largest undergraduate graduating cohort of our department, it is also the largest of all the 23 CSU Physics programs. In addition, we graduated more women and underrepresented minorities (URM) than any other Physics program in the US. For the success of its programs, the department of Physics and Astronomy obtained in 2016-2018 the “Award for Improving Undergraduate Physics Education” from the American Physical Society.

Graduate Program

Dr. Prashanth Jaikumar

Our Graduate Program is thriving, attracting high-quality students from around the nation. This year, we accepted 16 new students into the program, even as 20 students graduated with the MS in Physics degree. As Graduate Advisor, I have come to appreciate the varied ambitions and talents of our graduate students, and it gives me great pleasure to watch them cross the threshold towards a successful career in Physics. The various options in our Graduate Program (Applied, Computational, General, Professional) provide excellent training in Physics through a mix of core and elective courses that are further enhanced by participation in research with the faculty. We added another Astrophysicist to our faculty, Thomas Klaehn, expanding students' research opportunities. Our graduate students continue to make us proud by securing competitive positions in PhD programs, the private sector, and teaching professions. We remain a strong master's program and an example in the nation for providing access to graduate education to students of diverse backgrounds. To all well-wishers of the Department, I welcome your thoughts and feedback as we strive to make our graduate program even better for our students.



Society of Physics Students (SPS)

The Society of Physics Students (SPS) at CSULB is an undergraduate organization for people who love Physics. For years we have been the central community for students in physics. This academic year we look forward to expanding our efforts to increase our presence and activity as we build a strong foundation for newer students. SPS members have often represented our purpose of academic excellence and network building, however, this year we will strive to honor our purpose of community outreach.

Proudly, most of our officers have graduated, and we look forward to introducing new members into the executive body of SPS that are as excited as we are to bring forth positive impacts. In the past year we presented workshops with topics like "How to Find a Summer REU", "Life after Undergraduate Studies", with a full CSULB physics alumni panel, and hosted a Q&A session with renowned particle physicist Craig D. Roberts. It is our goal to continue to host and facilitate unique opportunities like the ones offered in the past year.

We are also looking to gain involvement with the Downey Space Center, among other institutions and local education centers for outreach involvement. It is our hope that hosting events such as these can encourage young scholars to become a part of the scientific community. Not only do we need more minds in this field, but we also need a scientific society that reflects the diversity we see in the world, and I feel our SPS chapter can impact this effort in a significant way.

It has become important for SPS to raise its own funds to operate and provide a productive/social environment on campus. As such we now sell food and drink which go directly towards funding club meetings and materials for undergraduates engaged in SPS. In addition, we intend to use social events such as movie and game nights to expand our fundraising opportunities for future outings. We hope to be able to fund social outings to academic institutions like the Griffith Observatory and NASA'S JPL as well health focused outings like our previous hike to Inspiration Point in Santa Barbara. SPS will continue to host regular body meetings and similar social events to interact with the student body, recruiting students to the cause. Lastly, we envision to organize with other alumni and organizations several workshops for physics undergraduates to promote their professional development, giving them invaluable information to pursuing an advanced degree in physics. We hope to find further support from our alumni, many of whom have been active in our SPS society! As always, everyone is welcome in our club room, and coffee is always available.



Naomi Marufo
SPS President



APS Bridge Program

Drs. Andreas Bill, Chuhee Kwon and Galen Pickett



Since 2013 the department of Physics & Astronomy is a bridge site of the American Physical Society (APS) (www.apsbridgeprogram.org). Being one of only six sites in the USA has been an excellent experience and our department contributes in unique ways to improving the diversity landscape in the physics community nationwide. The purpose of the program is to have more persons from underrepresented groups of the population in physics pursuing a PhD degree. That number has been shamefully low to this day. The way our department is involved is to have motivated underrepresented minorities students (URM) who have wrinkles in their undergraduate knowledge or other issues that prevent them from being successful in a PhD program to do a Master's degree first. In doing so, they acquire graduate level physics knowledge while polishing their undergraduate proficiency, and do substantial research with a faculty member that culminates in the writing of a Master's thesis. We also work with them on a variety of other practical and personal topics.



Dr. Galen Pickett, Dr. Andreas Bill, Marc Salinas, Johnae Eleby, Terence Baker, Dion Blackshire, Ben Deutsch, Dr. Chuhee Kwon, Santos Fuentes, Josue Rodriguez

The APS Bridge Program has a substantial impact on our graduate program. By working with the students and with the APS we have refined and extended the way we run the program, mentor our students and engage our faculty. The program serves the community not only by increasing diversity, but also by allowing students to refine their understanding of themselves and find a healthy and productive place in the community. As a result, we do not expect all our APS Bridge students to move on to a PhD program. Some will realize that the Master's graduate degree is all they need to be happy and successful in life and move on to work in industry or teaching. Similarly, some of the non-bridge students in the program benefit from the improvements made in our mentoring and realize on the way to the MS degree that they are interested by research and could well do a PhD.



Johnae Eleby, Ben Deutsch, Santos Fuentes, Josue Rodriguez

The program has been successful on two fronts. On the one hand, seven students finished their MS degree and joined prestigious PhD programs so far (Urbana Champaign, Ohio State University, Florida State University, Chapel Hill, etc.) and more are to come. On the other hand, the Bridge Program efforts have been noted outside University walls and we experience an increase of URMs both in the undergraduate and graduate program, slowly moving towards a physics student population that mirrors the average local population.

This Fall 2018 we are welcoming three new students: Tommie Day, Andrew Konz (Bridge fellows) and Everardo Molina (bridge student). We look forward to see what path they will choose once graduating from our department!

Physics Teacher Education Coalition (Phystec)

Dr. Laura Henriques, Dr. Chuhee Kwon and Dr. Galen Pickett

Phystec Program

The CSULB Phystec project is continuing the outreach and interact with high school physics teachers via the monthly Demo Days (at 4:30pm, every second Thursday of the month) and the annual open house (in the Fall).

Now in our ninth year, these Phystec activities continue to bring teachers and students together for a greater educational experience in Physics. During these events, physics teachers from various LBUSD and surrounding school districts share new and interesting ways to teach and learn physics.

The monthly Demo Days bring together physics majors who might consider teaching, prospective teachers, practicing physics teachers, college faculty and more. They are lively meetings with food and drinks where participants share ingenious experiments to be used in the classroom.

The Open House gathers about 50 teachers, high school students, CSULB students and faculty for a scientific talk from a Physics faculty, a hands-on activity, and brunch during which a panel of undergraduate students discusses why they chose to study physics, how they are doing and answer any questions that high school students and teachers may have. The morning ends with the optional visit of laboratories in the department.

In academic year 2017-2018, Tamara Araya at Sato Academy of Mathematics and Science was the Teacher-in-Residence and she taught PHYS 490C (Waves and Optics) and PHYS 390 (Exploring Physics Teaching). Academic year 2018-2019, we are excited to have Rod Ziolkowski back as Teacher-in-Residence; he was our first Teacher-in-Residence. He will be teaching PHYS 491D (Electricity and Magnetism) and PHYS 390.

The Phystec project received funding from the National Science Foundation and the APS Campaign for the 21st Century.



Phystec Outstanding High School Physics Teacher

The Physics Teacher Education Coalition (Phystec) recently announced the creation of a new award program, the Phystec Teacher of the Year. The award is designed to highlight the impact of recent graduates from physics teacher preparation programs in the classroom. Each of the winners was nominated by the Phystec member institution from which they graduated or received their teaching credentials. One national winner and several local winners were selected.



Phystec Outstanding High School
Teacher, Justin Fournier

Among these winners was our very own, Justin Fournier, who graduated from Cal State Long Beach in Fall of 2014. He is currently teaching at Cypress High School and regularly attends the departments Demo Days and other annual Phystec events on campus.

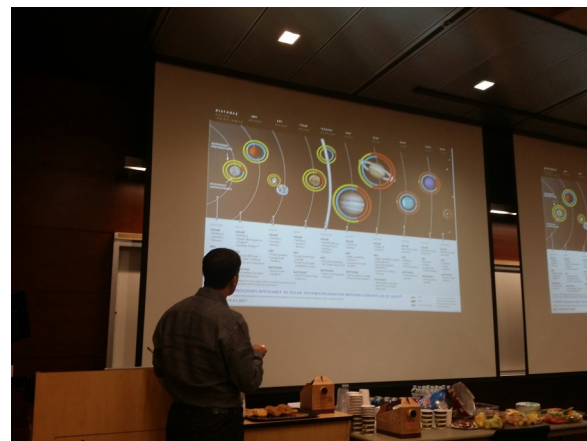
Phystec is led by the American Physical Society (APS) and the American Association of Physics Teachers (AAPT). The program aims to improve the education of future physics teachers by transforming physics departments, creating successful models for physics teacher education programs, and disseminating best practices. The project has supported more than forty sites to build physics teacher education programs and established a national coalition of over 300 institutions committed to improving physics teacher preparation (see www.phystec.org for more details).

Keck Energy Materials Research and Education Program (KEMP)

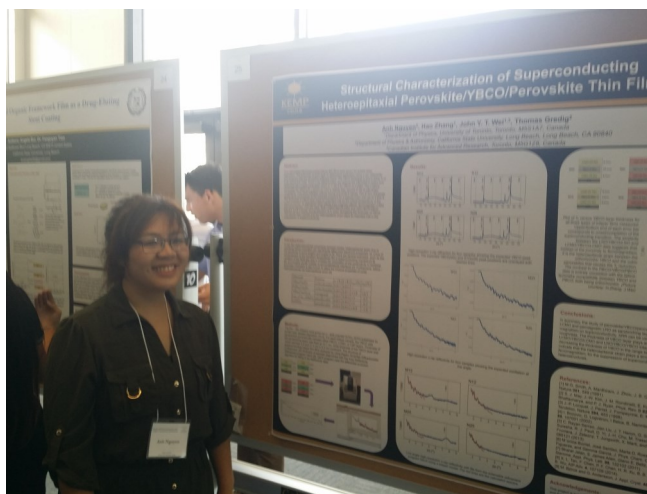
Dr. Michael Peterson and Dr. Thomas Gredig

The Keck Energy Material Science and Education Program (KEMP) is in its third year. It is an interdisciplinary program by Dr. Young-Seok Shon (Chemistry) and includes Dr. Michael Peterson (Physics), Dr. Thomas Gredig (Physics), Dr. Shahab Derakhshan (Chemistry), and Dr. Xianhui Bu (Chemistry) as primary faculty mentors. The mission of the KEMP program is to provide new and exciting interdisciplinary educational opportunities to CSULB undergraduate students and introduce them to the world of material science that bridges physics and chemistry.

The program explicitly integrates involvement in energy-related materials research and a set of new courses in Materials Science. The program offers 300-level Materials Science courses followed by a laboratory and colloquium in Materials Science. KEMP hosted 5 prominent speakers during the annual KEMP symposium: Dr. Sailor from UC San Diego, Dr. Penner from UC Irvine, Dr. Wu from UC Irvine, Dr. Huang from UCLA, and Dr. Flexural from JPL. In addition, many CSULB undergraduate students work in research labs of faculty members affiliated with the KEMP program and disseminated their findings through poster presentations at the KEMP Symposium and at the annual CNSM Students Research Symposium.



**Student presenting at
Annual KEMP Symposium**



**Graduate Student, Anh Nguyen, presents her
research at the Annual KEMP Symposium**

Night at the Observatory and Solar Telescope Sessions

Jessica Asbell and Dr. Paul Hintzen



The department of Physics & Astronomy has for many years hosted observatory open-house events for the CSULB community. This academic year was no exception. In addition to the now traditional “Nights at the Observatory” we offered observing sessions with Schmidt-Cassegrain style reflecting telescopes on clear weeknights and provided daytime solar observing with our collection of solar telescopes.

The Spring 2018 was a busy semester. The department hosted hundreds of visitors to the HSCI-Rooftop observing platform. These consisted of students, faculty, campus personnel and their families. Our astronomy observing events have attracted a diverse cross-section of our campus community, with events specially directed to the campus residence, the College of Arts, and the Alumni Association.

In addition, our department hosted a special solar viewing open house for CNSM Live Shark Week. We also participated in this year’s Young Scientists Camp. Children between 2nd and 5th grade got to use the solar telescopes to study solar prominences. These events have proven to be a very popular service to the College and University community.

In the Fall 2018 we will continue the “Nights at the Observatory” on every clear Monday evening, from 7:30 - 9:00 PM. Check the twitter account @CSULBPhysics for weekly observing updates. We hope to see you at one of our events!



Learning Assistant Program

Dr. Galen Pickett



Dennis Le, Kristin “Kirby” Anderson, Alexander Sabater, Kevin Tan, Jovanny To-var, Jacob Fallon, Jean-Baptiste Faure, Brandon Flores, Ricardo Gomez, Denzel Belleza and Angel Gomez

We started the Learning Assistant (LA) program in Fall 2011 with funding from the NSF (administered through both the American Physical Society and the American Association of Physics Teachers). The program has grown substantially since its inception. During our first year in operation, three LA’s served the PHYS 151 course with open-hours tutoring and laboratory support. This last year, we had fifteen LA’s supported by the program this time funded by HVDI on campus. They logged more than one thousand student-tutor contacts in the SAS Satellite room (HSCI-222). Students got help in over a dozen different courses, primarily in physics, mathematics and chemistry. LA’s were a crucial help in the upper-division gateway courses of PHYS 310, PHYS 340A and PHYS 350.

To become an LA requires specific training that is open to all students in the physics program. Students need to complete our training course, PHYS 390. Those students with either an “A” or “B” are eligible for working in the LA program. The course provides training in how to interact and effectively ask questions in a tutoring setting, among other skills.

It is noteworthy that our three first LAs have since graduated and moved on. Brandon Hessler now works for NavAir, Brandon Kawata just finished our MS program and is working on his physics teaching credential, and Brian Cacha finished our MS program and is in the Ph.D. program at Oregon.

The program has been invaluable to provide an additional resource for students who are taking PHYS 151 and other courses, and a path to train students of the program to assist the learning of their peers. We plan to extend the program to reach out to a larger community of students in physics classes.

The Department of Energy funds the Nanoelectronics Group



Dr. Claudia Ojeda-Aristizabal's Research Group

Congratulations to Dr. Claudia Ojeda-Aristizabal who has been recently funded by the US Department of energy to perform electronic transport and angle resolved photoemission (ARPES) measurements on novel layered materials. These materials feature a combination of exciting properties such as electronic correlations, spin orbit coupling and a honeycomb structure. They are referred to as relativistic Mott insulators, due to the interplay of many body and spin-orbit coupling effects. They hold interesting physics, as they constitute an experimental incarnation of the Kitaev-Heisenberg model, which describes a set of spin-1/2 moments arranged on a honeycomb lattice with spin couplings that are highly anisotropic. The model is exactly solvable and holds thrilling ground states such as spin-liquids and long ranged

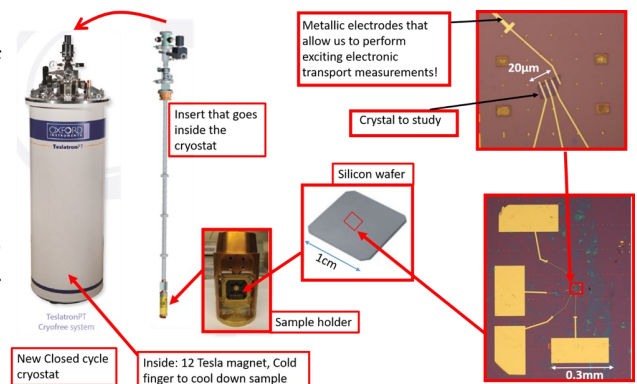
ordered zig-zag antiferromagnetic states. The project has been funded by the Department of Energy with \$275,000 over three years.

Graduate students Josue Rodriguez and Amirari Diego have been performing experiments on these materials (specifically on sodium iridate Na_2IrO_3 and Ruthenium chloride RuCl_3 , provided by the Analytis group at UC Berkeley) using a newly installed closed cycle cryostat from Oxford instruments. This new instrument allows to measure samples at very low temperatures (as low as 280mK) and high magnetic fields (up to 12 Tesla). Amirari and Josue are turning their efforts to explore the electronic properties of Na_2IrO_3 and RuCl_3 at temperatures below the magnetic ordering transition temperature in these materials, where they become highly insulating. Sample fabrication and characterization has been possible thanks to undergraduate students of the department Naomi Marrufo, Francisco Ramirez and Jared Lara.

Graduate student Sara Qubaj and new graduate student Everardo Molina are also working on projects funded by the DOE grant. They take a different approach to study the materials mentioned above: by creating heterostructures made of Kitaev materials and graphene. For this purpose, they have built with the help of our undergraduate student Luciano Alvarado, a new setup for sample fabrication. The station is made of highly precise manipulators and zoom lenses that will allow the fabrication of a variety of heterostructures. By gauging the physics of the Kitaev materials through graphene, the inconvenience of their insulating character at low temperatures is bypassed.

One more project is funded by the DOE grant. ARPES measurements performed at the Lawrence Berkeley National Lab in collaboration with the Lanzara group have been focused on the study of C_{60} , another interesting material where electronic correlations and electron-phonon coupling play an important role. CSULB undergraduate student Ryan Reno has been actively working on the data analysis. A paper is currently being written with these results. Graduate student Paul Anderson is working on electronic transport measurements of graphene samples fabricated by our collaborators from the University of Nebraska. These samples allow to impose strain on graphene through a sophisticated setup of actuators. Paul will test exciting theoretical predictions such as the appearance of an energy gap in graphene or the induction of gauge fields that act as effective magnetic fields that are very large.

We congratulate Dr. Ojeda-Aristizabal on receiving the DOE grant to pursue very active research at the forefront of condensed matter physics and involving a large number of both undergraduate and graduate students. Best wishes of success!



University Awards

Distinguished Faculty Scholarly and Creative Achievement Award

Associate Professor Dr. Prashanth Jaikumar was awarded the University's Distinguished Faculty Scholarly and Creative Achievement Award in 2016-17. Dr. Jaikumar is widely recognized for his innovative research ideas and contributions to the topic of Neutron Stars and Gravitational waves.

Since his appointment as Assistant Professor at CSULB in 2009, Dr. Jaikumar has been prolific in his research writing, publishing a total of 22 papers and conference proceedings in leading peer-reviewed journals in Physics and Astronomy, garnering over 500 citations for his publications.

Five of Dr. Jaikumar's Masters thesis students are now in PhD programs. For example, Zack B. Hall secured the Graduate Research Fellowship of the University last year (\$10K), while Raphael Monroy won the CSU Statewide competition for student research presentation in Physical and Mathematical Sciences earlier this year.

Dr. Jaikumar received grant support from the NSF in 2016, which allows undergraduate and graduate students to focus their time on research. This

comes on the heels of his previous grants from the Research Corporation (PI), NASA Graduate Student Fellowship (PI) and the U.S. Army High-performance Computing and Research Center (Co-PI), making up a continuous stream of federal and private funding since 2010 in excess of \$550K.

Dr. Jaikumar has served on NSF review panels, adjudicated in local research competitions, and reviewed over 40 papers for leading Physics journals since at CSULB. He is an associate member of the Gravitational Wave Physics and Astrophysics Center (GWPAAC) at CSU Fullerton, and actively collaborates with other research groups in the USA, Canada, India, and Brazil.

Congratulations on this well deserved award for your research!



Presidents Award for Outstanding Faculty Achievement

Dr. Chuhee Kwon and Dr. Andreas Bill were among several CSULB faculty receiving the President's Award for Outstanding Faculty Achievement. J. C. Conoley created this award this academic year "specifically to recognize the sustained effort of our senior professors [full professors] across the University and to reward their exceptional work—work essential to CSULB in fulfilling its promise to its students." Faculty had to demonstrate achievements in two of four areas (Teaching, Research, Service and Administration).

Dr. Kwon received the award for her service and administrative contribution over the years and as a chair of the department in particular. Dr. Andreas Bill received the award for his teaching and research contributions.

Congratulations for the sustained contributions to the department!



32nd Annual CSU Student Research Competition Winner Raphael Monroy



Raphael Monroy, graduate student of the department (Left photo: in the back, second from the right) won 1st prize in the category *Physical and Mathematical Sciences* at the 32nd Annual California State University Research competition, held on May 4-5, 2018 at CSU Sacramento.

The system-wide research competition attracted over 200 talented undergraduate and graduate students, representing 23 CSU campuses, to showcase their research in the full range of academic programs offered by the CSU. The top finisher in each discipline-specific category was awarded \$500. Raphael is a member of the astrophysics group of Prof. P. Jaikumar. He presented his work entitled *The Effect of Superfluidity on the Oscillation Modes of Compact Stars*. He finished his MS degree with a research thesis of the same title. Raphael is joining the Ph.D program in Physics at the University of Pittsburgh.

Web link to full announcement: <http://web.csulb.edu/divisions/aa/research/updates/>

Commencement 2018 Honorees

Graduate Dean's List

Brandon Kawata

Alberto Garcia

Departmental Undergraduate Honors

Christina Solis

Cristopher Luna

Nicholas Werner

Samantha Wilson

Departmental Graduate Honors

Raphael Monroy

Jay Conlon

College of Natural Sciences and Mathematics Awards

Richard D. Green Dean's Award Ryan Reno

Outstanding Thesis Award Brendan Chan

Specialty & Department Awards

AAPT Outstanding Teaching Assistant Award William Hutzell

Department Outstanding Learning Assistant Award Cecilia Cisneros

Department Outstanding Service Award Daisy Nava

University Graduate Research Fellowship... Anh Nguyen

Specialty & Department Scholarships - Undergraduate

Richard & Florence Scalettar Scholarship Andrea Nelson

Richard & Florence Scalettar Scholarship Norberto Gallegos

John & Terry Milligan Scholarship in Physics Jack Aldrich

Physics & Astronomy Scholarship Francisco Ramirez

Physics & Astronomy Scholarship Gabriel Rocha

Specialty & Department Scholarships – Graduate

Margaret Heeb Research Scholarship in Honor of W. Jordan Renyu Wang

Margaret Heeb Research Scholarship
in Honor of Dr. W & B Berry Bitu Mehr Motamedi

Physics & Astronomy Summer Scholarship Oscar Osorio

Physics & Astronomy Summer Scholarship Sara Qubbaj

Where Are They Now?

CSULB Physics and Astronomy is committed to creating long lasting relationships with all of our undergraduate and graduate students. We are sincerely interested in staying abreast of a student's performance after they graduate, and the ways in which they end up applying their degrees. The following are a few statements from recent graduates:



Alexander Beach- Grad. 2018

The best part of the CSULB Physics community was how inclusive and supportive everyone was. I always felt comfortable working with other students and faculty. I learned a lot taking classes and performing research at CSULB, and I will be continuing my education at the University of Illinois at Urbana Champaign, pursuing a PhD in physics.



**Shawn Kirby– Undergrad. 2014,
Cred. 2017**

I graduated from CSULB with a BS in Chemistry and a BA in Physics in 2014, and again in 2017 with my teaching credential. I am currently a Physics/Chemistry teacher at Palm Springs High School in Palm Springs, CA., and have been fortunate to teach science in Cambodia over the winter break. Thank you so much for the support through the Milligan Scholarship. It helped me achieve my dreams.



Alberto Garcia- Grad. 2018

What I liked the most about the Physics department at CSU Long Beach is that the faculty and staff care about the students and go out of their ways to help them. In addition, the physics students are all very friendly and accepting. This department is one of the most welcoming departments I've encountered. It feels like a big family. Looking forward, I will be pursuing a Ph.D. at Ohio State University with plans to do research in the future.



Brandon Kawata– Grad. 2018

I had a great experience in the CSULB Physics Department. Supportive faculty and students made the difficult journey an enjoyable one. I graduated from CSULB with a BS in Physics in 2010, and MS in Physics and credential in 2018. Starting this fall, I will be working at Animo Leadership, teaching physics and robotics.

In Memoriam



Dr. Alva Fumihiko Yano (Jan. 18, 1934 – March 13, 2018)

Al was born in El Centro, California as the youngest of five siblings. After being released from incarceration of Japanese Americans at Poston Internment Camp during World War II his family eventually settled in Los Angeles. Al graduated from Caltech with a bachelor degree in Physics. During his graduate studies at the University of Southern California (USC) he met Fleur Wang, whom he married in 1959 and with whom he had a son, Robert. Both Al and Fleur completed their PhD in physics at the University of Rochester in upstate New York.

Al joined the department of physics faculty at CSU Long Beach in 1964. He enjoyed the balance between teaching and research. His work in theoretical nuclear and particle physics was supported by various grants such as the National Science Foundation and the Stichting voor Fundamenteel Onderzoek der Materie. He was a visiting professor at the University of Groningen, the Netherlands, for one academic year (1969-70) and returned there the two following summers. He was a Senior Fullbright Lecturer in Spain (1973-74) where he worked at the University of Barcelona. He was also a guest professor at Uppsala University in Sweden (1984-85).

Al Yano was an avid reader of Jane Austen and Shakespeare. His other passions included classical music and tennis. A strong believer in the necessity for women to be economically independent, he was also committed to and active in progressive politics. He guided his life with moral rectitude, compassion and generosity.

Dr. Jack Howard Munsee (Sept. 27, 1934 – Dec. 16, 2017)

Jack was born in Niagara Falls, New York. The family moved to Steubenville, Ohio, where Jack spent his childhood. He earned a bachelor's degree in Mathematics from The College of Wooster, in Wooster, Ohio. He then was awarded a master's degree and a PhD. in physics from Case Western Reserve University in Cleveland, Ohio. Al joined the physics faculty at CSU Long Beach in 1968.

In 1962, Jack married Jean Ralston. They had four children, and Jack was very proud of the family they created. He was heavily involved in their youth activities. Jack loved traveling in family. Even when the kids became independent, Jack and Jean continued to explore the world - from the Arctic to the Antarctic, Europe, Asia, South America, and Africa.

Jack enjoyed a long and rewarding career at California State University, Long Beach, where he taught physics and astronomy with the aim to encourage students to approach problems rationally. He was always available to students for individual consultation and tutoring. He prided himself on personally grading all student work and returning exams with comments at the very next class meeting.

In addition to teaching, Jack was active throughout his professional life as a faculty leader who strove to enhance the university experience for students, faculty, and staff. He served as the Chair of the Academic Senate, President of the campus California Faculty Association, and Vice-President of the statewide CFA. Although he received numerous commendations for his work, he was especially pleased to be awarded the Nicholas Perkins Hardeman Academic Leadership Award in 1996.

Jack was an advocate for peace, justice and equality throughout his life. He was generous with his time, his resources, and his intellect in support of making the world a better place for all its inhabitants. He was honest, forthright, and uncompromising. He didn't know the meaning of equivocation. But Jack was certainly not all work and no play. He loved parties, outdoor adventures, gatherings around the campfire and exploring various cultures in the U.S. and abroad. His laugh was often the hardest and loudest!



In Memoriam



Santos Mauricio Fuentes (Nov. 1, 1992 – June 27, 2018)

Santos was born in El Salvador and his family migrated to the United States in 1999. Hence, he did all his schooling in the USA and expressed interest for science at an early age. Santos graduated in 2016 with BA in Physics at Hunter College of the City University of New York (CUNY). During his time at Hunter College he worked in a materials science fabrication laboratory working on thin films for solar cells. That is where he started orienting his career towards experimental physics applied to materials science and renewable energies. During these same years he also worked for an online service called “upswing.io” where he tutored for physics and mathematics.

When Santos graduated from Hunter College, he said “I want to do a PhD in Materials Science but do not feel ready and prepared enough, especially because I lack research experience”. For that reason, he applied to the American Physical Society Bridge Program.

Santos was one of 12 Bridge Fellows selected from a pool of 85 applicants. Together with Josué Rodriguez he joined our master’s program in the Fall 2016. Being a fellow means that he received some financial support from the American Physical Society for two years in the master’s program and had a faculty mentor assigned to him: Andreas Bill. According to his parents, Santos was thrilled to be accepted into our master’s program. He joined the group of Professor Thomas Gredig to do his master’s thesis.

Santos did well in class and very well in research. Dr. Gredig was very happy to have him in his group. His hard work in the lab bear fruit as he was awarded the Richard D. Green Dean Graduate Research Fellowship for 2018-2019.

Mentoring a Bridge Fellow involves discussing studies, life, housing, finances, etc. Through a friend of Santos from New York, the mentor was made aware that Santos struggled with a personal issue for some time and it was not improving. Santos was put in contact with CAPS. Unfortunately, Santos kept his ache to himself, and we lost him much too early on June 27, 2018. This will remain a very sad day in the heart of all who knew him.

Santos was friendly, helpful, and had a serving heart. Because he had done most of the research for his thesis and completed all required classwork Santos was awarded the master’s in physics posthumously.

As you read these lines, please remember that difficulties arise at all stages of life. It is important to share what is on your heart with trusted people and walk with them through the difficulties to find constructive solutions, new stability and happiness. At the University, you should contact the Counseling and Psychological Services (CAPS; 562-985-4001).

Emeritus Professor of Physics, Dr. Keung Luke Endows Three New Scholarships



In the academic year 2017-2018 and the months leading up to the Spring 2019, the Physics and Astronomy Department has been the grateful receiver of several new endowed scholarships. These scholarships are due to the generosity of Emeritus Professor, Dr. Keung Luke, who we have been fortunate to have as a faculty member from 1966-1997 and on FERP until 2003.

“I speak the truth and lie not, it is both a joy and an honor to give back to CSULB, my beloved professional home for thirty-two years.”

The following endowed scholarships have now been created as a product of Dr. Luke’s donation and are described in his own words:

Keung Luke, Charles Roberts, and Richard Whiteley Endowed Scholarship

The scholarship is established in honor of Dr. Roberts and Mr. Whiteley, two relationships I valued greatly especially during my years at the department of Physics & Astronomy. Dr. Roberts was the Physics Chair when he hired me in 1966. He set before me the goal of being a teacher-scholar. Over the years I strove to reach that goal. Mr. Whiteley was my first graduate student. Subsequently, he was a part-time physics instructor at CSULB and we collaborated in bringing the PC into the laboratory to automate data collection/analysis/display. We developed an entire senior/graduate level course on this subject and co-authored the laboratory manual for Interfacing in Experimental Physics, a unique course in the CSU system. [note of the chair: that course exists to this day, is still unique, and is called “Computer interfacing in Experimental Physics.” The use of Labview is now taught in that class.]

Irene Howard and Keung Luke Endowed Scholarship

This scholarship is established in honor of Irene Howard whom I deeply appreciate and admire her selfless attitude and actions in serving the department of physics and astronomy for nearly 40 years. Irene Howard is diligent, intelligent, responsible, and loyal, and, topping the list, has deep love and respect for people. Regardless who you are, whether a regular or part-time faculty member, a TA or a GA, a student assistant, a graduate or an undergraduate student, a major or a non-majors coming to the department, she greets and helps each with their needs. If you have a birthday, she will do something special – flowers, birthday cakes, a cute gift. So it is not surprising that months and years later, Irene is often invited by them to lunches and weddings. She made the Physics Office warm and inviting and our majors love to drop by for a visit.

The Kevin K. Chan, HK Alumni, Keung Luke Endowed Scholarship

This scholarship is established in honor of Kevin K. Chan and a number of other students from Hong Kong (HK) who showed deep loyalty to their alma mater. In the 1970s a number of students from Hong Kong attended CSULB, mostly in business and engineering. Among them was Anna Ngai, whose recent large donation is spearheading the construction of an Alumni Center on campus, and Kevin Kwok Chan, who is active in keeping the groups from Southern and Northern California together through social events and travel. [note from the chair: Dr. Luke is related to these students for having hosted and mentored them as they arrived in Long Beach and over the years since. His friendship to the HK alumni lasts to this day.]

Dr. Keung Luke, A Life Dedicated to CSULB



Irene Howard, Dr. Keung Luke, and Maryanne Horton

Dr. Luke came from China and obtained his PhD in Physics from MIT. In 1966 he became a faculty member at the department of Physics & Astronomy of the California State University, Long Beach. He likes to remind one of the reasons for choosing Long Beach State College (as it was called when he joined) by quoting Dr. Roberts who was the department chair at the time he was hired: "At the California State College at Long Beach we wish to foster the teacher-scholar combination and so our efforts to this end allow us to give merit to those with good teaching ability as well as those who do well in research. That is to say, promotion depends on both. On the other hand, we are not a publish or perish institution."

In 1992 Dr. Luke received the Distinguished Faculty Award for Scholarly and Creative Achievement by the University. The following year he earned the University Outstanding Professor Award. He taught Astronomy to filled classrooms. He also introduced a new class that teaches students to use the computer to interface experiments. To this day the department offers both the Astronomy class and a modern version of the unique computer interfacing class he developed.

Dr. Luke's research dealt with semiconductor materials and device characterization, optical signal processing, computational neural networks. Some of the research was conducted in collaboration with scientists at Jet Propulsion Laboratory (JPL).

Keung Luke has always valued the balance between teaching and research but importantly also his interactions with students whom he mentored and guided. This is brought to light by his three endowed scholarships. Dr. Luke, we are very grateful for your support of our students, our department, and this institution!

Donor and Alumni Giving

The Department relies heavily on private contributions for these key enrichment activities and supports for students:

Faculty-mentored Research Experiences (Winter Session and Summer)

Weekly Colloquia by Visiting Scientists

Training on Cutting-edge Instrumentation and programming tools

Learning Assistant Program (Tutoring)

Scholarships

Your gifts determine how rich an educational experience we can provide our students and ensure that hard-working students receive the financial support they need to keep on track, and graduate with minimal or no debt.



Maryanne Horton

Sr. Director of Development

GIVE ONLINE at [https://giveto.csulb.edu/cn/\(S\(43ouoql1fopyindxuj5rxncg\)\)/?view=NAT](https://giveto.csulb.edu/cn/(S(43ouoql1fopyindxuj5rxncg))/?view=NAT)

To establish a named scholarship, create an endowment, or include the Department in your Will or Trust, call or email Maryanne Horton, Senior Director of Development, 562-985-1687 or maryanne.horton@csulb.edu.

Our Current Scholarships

The Richard and Florence Scalettar Scholarship

The John and Terry Milligan Scholarship in Physics

The Margaret Heeb Summer Research Scholarship

The Scholarship Fund of the Department of Physics and Astronomy

The Olaf and Mary Jane Anfinson Endowed Scholarship

The John E. Fredrickson Endowed Scholarship

The Keung Luke, Charles Roberts, Richard Whitely Endowed Scholarship

The Irene Howard and Keung Luke Endowed Scholarship

The Kevin K. Chan, HK Alumni, Keung Luke Endowed Scholarship

Thank you for your continued support!