

California State University, Long Beach

Department of Physics and Astronomy

2016 Newsletter



Dr. Andreas Bill
Professor and Chair

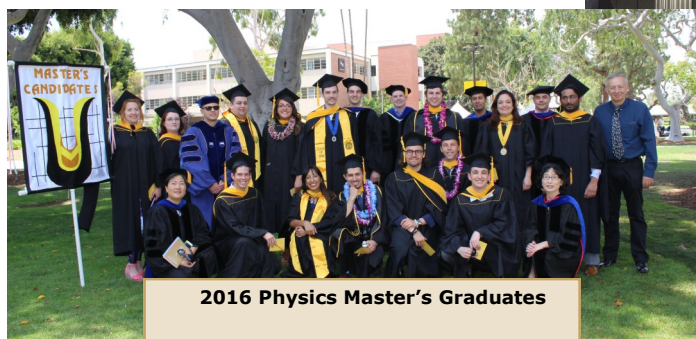
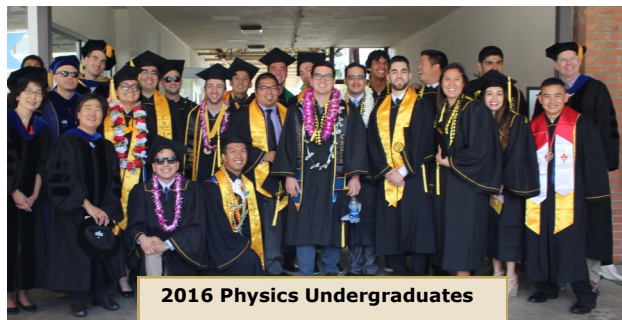
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layered crystal!

Inside this issue:

The Year In Review Dr. Andreas Bill	2
Our New Staff Members Brian Cacha, Korin Coombs, and Daisy Nava	3
The Graduate Program Dr. Prashanth Jaikumar	4
The Undergraduate Program Dr. Jiyeong Gu	5
The Society of Physics Students Joseph Guzman	6
The APS Bridge Program Dr. Andreas Bill	7
KEMP Drs. Michael Peterson and Thomas Gredig	8
PhysTEC Demo Days Dr. Laura Henriques and Eric Brundin	9
The Learning Assistants Dr. Galen Pickett	11
Observing the Solar System Jessica Asbell	12
CSULB Innovators Dr. Thomas Gredig	13
Research Grants Drs. Michael Peterson and Prashanth Jaikumar	14
The Mayfield Award, and Woman Physicist of the Month, Dr. Galen Pickett and Dr. Chuhee Kwon	15
Faculty Legacies—Drs. John Fredrickson and Olaf Anfinson	16
Alumni Giving — Marianne Horton	18
Dr. Chuhee Kwon is Celebrated	19



The Year In Review by Department Chair Dr. Andreas Bill



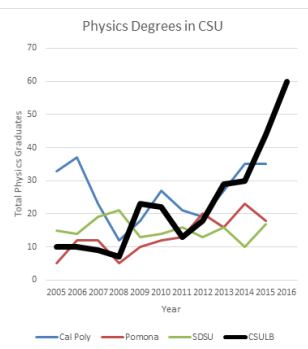
Dear Colleagues, Alumni and Friends of the department,

This past year has been special in several respects and this Newsletter has a wealth of news reflecting the achievements of the department. Among the main changes are those involving our members. Dr. Chuhee Kwon ended her five-year service as department chair. Irene Howard started her last academic year (2016-17) as department administrative coordinator. Korin Coombs joined the department office as administrative assistant. Brian Cacha, an alumnus of our MS program, became a technical staff member (July 2016).

Chuhee Kwon passed the baton in May 2016, after serving as department chair for the past five years. She went on a year sabbatical leave to develop new research and teaching projects and take a well-deserved break from her administrative duties.

The department is grateful for her leadership role, vision and positive attitude to strengthen the cohesion of the department. During her chairwomanship, she led a variety of initiatives. She headed the effort to improve the uniformity among sections of 100-level classes, and the implementation of the Koondis software developed by faculty members of the department. She led the creation and implementation of a new Master's degree in Professional Physics. She worked with her PhysTEC coPIs to implement sustainable activities such as the "Demo Days" and the "Open House" for active and future high-school teachers. She devoted time with her APS Bridge Program coPIs to increase the number of students from underrepresented groups of the population in Physics. Her remarkable organizational skills are also noted by the fact that she managed the largest ever increase of our student body while concomitantly leading the effort to increase the quality of our program. The number of majors tripled and the number of Master's students doubled during Chuhee Kwon's time as chair! During that same period, we paradoxically also experienced deep funding cuts. While we faced the largest percentile increase of students we also suffered the largest reduction in number of faculty numbers among all departments in the College. Under Dr. Kwon's leadership, the department received several accolades and I invite you to look back at previous issues of the Newsletter for details on these achievements. One award mentioned in this newsletter is the "Women Physicist of the Month" from the American Physical Society. Thank you Chuhee for your work as Chair!

There is much more news to read about on each of the 20 pages of this newsletter. We remember the legacy and gratefully acknowledge the financial support of former faculty members Olaf P. Anfinson and John E. Fredrickson. For other news, I invite you to read and see how vibrant and lively our department has been during 2016, and celebrate with us the achievements of students, faculty and staff members of the department. Enjoy the reading!



Our New Staff Members

Brian Cacha



I earned my B.S. and M.S. degrees in Physics at CSULB. I am always curious about the world around me and strive to enjoy my life while trying to make the world a better place. Trained in physics, I like to spend some of my off time building electronics for utility or aesthetic effects. Most of my time is spent around computers which suites me well since I'm quite tech-savvy. I enjoy the relationships with people around me, building strong bonds with friends and being very friendly which is of good use for dealing with our diverse student body. I like to travel, seeing the world around me and soaking in its beauty. All in all, I'm a fun loving, charismatic guy with a good head on my shoulders that continues to chase my endeavor to live life the fullest.

Korin Coombs

Korin Coombs began working as an Administrative Assistant with the department in July 2016. She is a California State University, Fullerton Alumni, with a B.A. in Communications and Film, and began her graduate studies here at CSULB with the English Department in the Spring of 2017. She is an avid reader and loves to write short stories. Her hobbies include discovering new restaurants with her hubby and two boys, (soon to be three), basketball, making paper flowers for events, and anything to do with the outdoors. She can hold an entire conversation in movie quotes and has an affinity for "staycations" and The Los Angeles Clippers.



Daisy Nava



We are very fortunate that our newest Work Study Student Assistant is also a Physics Major! She is bright and delightful as a "Daisy", and willing to take on many office tasks, always with a smile. Each Monday she helps us with preparing for our Colloquium, and she assists with many of our office duties. Her hobbies are kick boxing, cooking, baking, and making various arts and crafts. She said that she loves physics because it explains how everything works.



Largest Master's Program in the Nation Dr. Prashanth Jaikumar



Our Graduate Program continues to attract high-quality students from around the nation. This year, we accepted 17 students into the program, 3 of whom joined the new Professional Masters in Physics program.

Our faculty are dedicated to the success of our students, and as Graduate Advisor, my job is to help students make steady and timely progress towards their degree, and to help them through the inevitable rough spots. I also serve as Chair of the Graduate Committee, which oversees the program and its students at a departmental level.

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. Our graduate students have made us proud by securing competitive jobs in excellent PhD programs, the private sector, and teaching professions. To all students and faculty, I welcome your thoughts and feedback as we continue our efforts to make the CSULB Physics MS program one of the best of its kind in the nation.



Jessica Asbell and Thesis Advisor, Dr. Prashanth Jaikumar

Flourishing Undergraduate Program Dr. Jiyeong Gu

The undergraduate program is a fast growing component of our department. This year we have reached 130 majors in Physics! Last year we admitted the largest cohort our department ever had.



I took over the undergraduate advising job from Galen Pickett in Spring 2016 and it has been a great learning experience for me in many ways. I try to find a proper balance between advising, teaching and leading the group in research on nanomagnetic hybrid thin films.

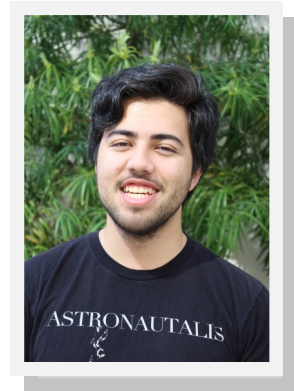
As an undergraduate advisor I help our majors to plan their courses for the degree requirement. But I also spend time mentoring them. According to the definition of “mentoring/advising”, mentoring includes any or all of the following components: direct assistance with career and professional development, emotional and psychological support, and role modeling. For now, as an undergraduate advisor for majors I am mostly focusing on the first one. However, I recognize the other two as vital components of student success. I am looking forward to grow into this role and contribute to the continuing growth of our department majors cohort.



Melynda Jaramillo, Sandra Diez, Dr. Jiyeong Gu, and Andrea Citati

The Society of Physics Students Joseph Guzman

The Society of Physics Students (SPS) at CSULB is an undergraduate organization for people who love Physics. As such, for this academic school year there are numerous opportunities that we would like to take advantage of. First, we would like to cooperate with outreach events such as the Cypress Boys and Girls Club. We are in the process of drafting a proposal to gain funding to develop and present exciting science experiments to middle school children, keeping them engaged in school while simultaneously instilling an interest in science. Several of us at SPS have put our names forward to be volunteers toward this unique collaboration.



In the same vein, we are also looking to gain involvement with the Downey Space Center, among other institutions for outreach involvement. It is my 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.



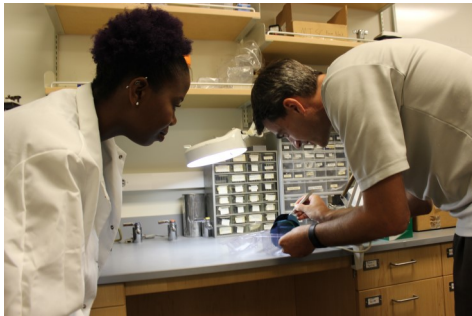
With recent changes in club funding, it has become important for SPS to raise its own funds to operate and provide a productive/social environment on campus. As such we have begun selling food and drink, already raising several hundred dollars, which will strictly go towards funding club meetings, and 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 in a way that can engage everyone. . I hope these activities

will continue so that we can provide useful resources for physics students.

SPS will continue to host regular body meetings and similar social events to interact with the student body, recruiting students to the cause. Lastly, I envision to organize with other officers several workshops for physics undergraduates to promote their professional development, giving them invaluable information to pursuing an advanced degree in physics. For instance, these workshops could cover topics such as “How to get into Graduate School”, “The Importance of and How to use Python”, “How to Write a Statement of Purpose” and so on. We hope to find further support from our alumni, many of whom have been active of our vibrant SPS society!



APS Bridge Program Drs. Andreas Bill, Chuhee Kwon and Galen Pickett



The Bridge Program of the American Physical Society (APS) aims at increasing the number of students from groups underrepresented minorities (URM) in physics to go to a doctoral program. The program focuses on three URM groups: African Americans, Hispanics and Native Americans. APS chose 6 institutions in the entire United States to serve as Bridge sites. The department is one of them.

Many other programs have joined the effort since the Bridge Sites have been established, but they have a slightly different status as Partnership institutions. CSULB Physics & Astronomy is also unique among the six APS-NSF grant recipients in that it is the only non-PhD granting institution.

Since 2013 when the program started at our department, we had 6 Bridge fellows and another 7 Bridge students. Only one left the program before finishing the MS.



We are pleased to announce that all five students of the first cohort have been admitted into multiple PhD programs across the country. Last year, Gilbert Arias and Daniel Diaz joined the PhD programs in Physics at the University of Illinois Urbana-Champaign and Florida State University, respectively. This year, Zack Hall (left, with his advisor) joins the University of North Carolina at Chapel Hill, Leslie Davis joins the University of Central Florida and Yonas Getachew joins The Ohio State University. We congratulate these students for their MS degree, and look forward to having many more students join the program!

Keck Energy Materials Research and Education Program (KEMP) Drs. Michael Peterson (3rd from right), and Thomas Gredig (1st from left)



The Keck Energy Material Science and Education Program (KEMP) is in its second 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. Its mission is to provide new and exciting interdisciplinary educational program opportunities to CSULB undergraduate students.

The program explicitly integrates involvement in energy-related materials research and a set of new courses in Materials Science. The program includes 300-level Materials Science courses followed by a laboratory and colloquium in Materials Science. Additionally, the KEMP hosted 4 prominent speakers during the annual KEMP symposium: Dr. Bernardi from CalTech, Dr. Gorodetsky from UC Irvine, Dr. Spokoyny from UCLA, and Dr. Yin from UC Riverside. CSULB undergraduate students presented 18 posters at the symposium disseminating their research findings.

PhysTEC Demo Days Dr. Laura Henriques



Now in our eighth year, PhysTEC activities are still going strong. The monthly demo days bring together physics majors who might consider teaching, prospective teachers, practicing physics teachers, physics faculty and more. In addition to building a community, we are helping re-think physics teaching in the age of Next Generation Science Standards while also helping to bring the fun of physics to the classroom.

This fall, one of the prospective physics teachers did the classic demo for conservation of angular momentum while spinning on a chair holding weights. As she extended her arms out her rotation slowed while bringing her arms in made her spin faster. One of our physics teachers had his young son with him that day. About a week later I got this email from him:



A few nights ago we took my boys to a park near my parents' house. The boys wanted to go on the little individual merry go rounds that spin them around. I spun Jeremiah and he wanted to slow down. I told him to lean back. It worked quite well. Then we sort of experimented with leaning forward and leaning back to control his rotational speed. He looks up at me and says, "Like the lady in the chair?" I had no idea what he was talking about, and said "What?"



He said, "Like the Lady in the chair when you took me and I ate all the Doritos?" I said, "Demo day. When I took you to the college and the woman sat on the chair with the weights?"

"Yep". He replied.

I was very impressed with my son, but I also think that it shows the power of a Demonstration.

Just imagine if we can help all our physics students (K-12 and university) to see the connections of physics and their everyday world! Physics Demo Day and the other PhysTEC activities help build teachers' skills and comfort level which will invigorate classroom teaching. *Physics Demo Days take place on the second Thursday of the month, 4:30-5:30 PM.*



What's Old is V Again? Eric Brundin

One of the reasons why the PhysTEC events are so powerful is that they bring together such a wide variety of people who just love physics: from emeritus veterans to the young children of physics teachers. It is wonderful to present or watch a demonstration that is used to engage high school or middle school students, then turn around to see CSULB physics faculty excitedly discussing it. There is a passion created by seeing something that makes you ask questions. You can see it in the eyes of children (even the adult-sized ones), and it is wonderful to see it still in the eyes of researchers.

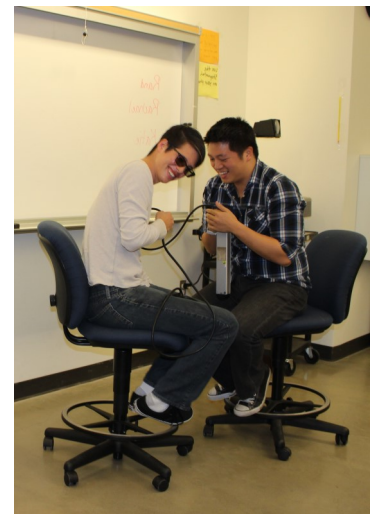


PhysTEC Coordinators: Katie Beck, Eric Brundin, Dr. Chuhee Kwon, Dr. Galen Pickett, Dr. Laura Henriques, and Kevin Dwyer



Physicsatthebeach.com

On our “Make, Take, & Teach” night, we constructed a black box with a hidden mechanism inside. Before giving away the secret, though, attendees had to solemnly vow never to show students the actual device inside, because that is what real scientists face when exploring how the universe works. Near the end, Shawn Kirby, a graduate student in the teaching credential program said, “I’ve waited seven years to find out how this works!” When I asked him about this, he said that this had been shown to his physics class by his teacher, Mr. Chris Long.



This was a very proud moment as I realized that his teacher had learned this as my student teacher many years ago. Thank you, Chris, for keeping the passion alive with your students!

Want to rekindle your passion about science? You should definitely come to the PhysTEC events.

Learning Assistants Dr. Galen Pickett

Several department initiatives have begun to bear fruit in remarkable ways, both quantitatively and qualitatively, at the close of the 2015-16 academic year. Many of our alumni of the past ten years have been touched by one or more of these projects. For instance, we are in the tenth year of our “Winter Physics Experience” project, in which promising physics majors (and students we feel can be recruited towards physics) are given a couple of weeks to explore the activity in our research laboratories.



Additionally, we have hired our fifth class of Learning Assistants. These are physics majors who have shown an interest in teaching, and we put them to work in supporting learning (primarily) in PHYS 151, although they support PHYS 152, 310, 340A, and 350 with advanced, supportive tutoring.

The Learning Assistant position is a paid one, and has been funded by the American Physical Society, the Highly Valued Degree Initiative, and by the Julius Sumner Miller Foundation. Just

\$750 pays for an entire semester’s support for a single student, and the entire administrative cost of the program is born by the department – each cent goes to a physics major helping other student s... become physics majors!

Our success in recruiting and graduating physics students has been truly astounding. As of 2015 (the last date in which public graduation data is available for our sister CSU campuses) CSU Long Beach became the largest physics program in the system (by degree production) edging Cal Poly . We, of course, have data for the 2016 graduating class (42 undergraduate degrees and 18 graduate degrees), and the data show clearly that the growth for which we have planned and prepared has become a very real effect. In 2015, fully 42% of all of the physical sciences undergraduate degrees awarded by CSU Long Beach went to physics students ... the 7th largest such fraction in the nation. Upper division courses have enrollments routinely exceeding sixty, which makes CSU Long Beach something like the 40th largest physics program in the US. Each of the larger programs is housed at a major research university dominated by the presence of strong Ph.D. programs and infrastructure. Here at CSU Long Beach, our 11 tenure-track faculty members are producing exciting, cutting edge research with authentic student involvement, and opening up life-changing careers to the excitingly diverse student population we are charged with serving.

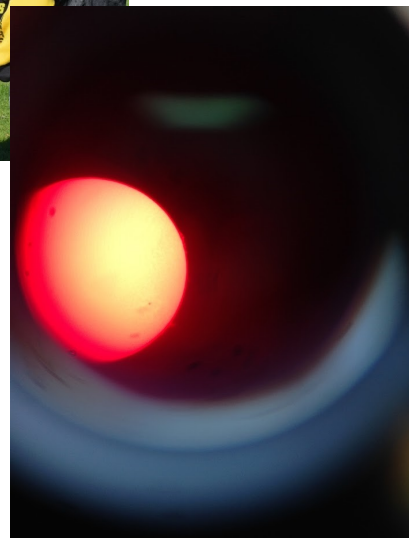


Night at the Observatory and Solar Telescope Sessions Jessica Asbell

The department of Physics & Astronomy has for many semesters hosted observatory open-house events for the campus community. The fall 2016 semester was no exception. In addition to the now traditional “Nights at the Observatory” observing sessions with Schmidt-Cassegrain style reflecting telescopes on clear Monday evenings, we also provided daytime solar observing with our collection of solar telescopes.

Fall 2016 was a busy semester. The department hosted over 850 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.

We also hosted a special solar viewing open house for homecoming. These events have proven to be a very popular service to the Cal State community. In the Spring 2017 semester we are trying out having Friday nights as the “Night at the Observatory”.



CSULB Innovators Inducted into NAI Dr. Thomas Gredig (standing, 3rd from right)



CSULB counts many inventors among its faculty. But, scattered throughout the university's eight colleges, they have few opportunities to cross paths. The establishment of a National Academy of Inventors (NAI) chapter on campus changed that.

Campus inventors were recently inducted into the newly-created National Academy of Inventors chapter at CSULB. Dr. Thomas Gredig from the department of Physics & Astronomy was among those inducted!

In early December, nearly two dozen inventors from the colleges of the Arts, Engineering, and Natural Sciences and Mathematics were inducted into the newly created chapter which will meet once each semester.

The chapter has been championed by Dr. Simon Kim, associate vice president for research and sponsored programs, and College of Engineering Dean Forouzan Golshani, holder of nearly a dozen patents.

"I'm proud to see we're the first CSU to join the NAI," said Kim, adding that "some of those smaller institutes" such as Caltech and UC Berkeley are also members. President Jane Close Conoley, who attended the induction ceremony, joked that she'd heard of some of those "small schools," but didn't realize Long Beach was the first in the California State University system to start an NAI chapter.

Dean Golshani has long hoped for some mechanism for bringing together CSULB inventors.

"I've always wanted to get us together," he said. "There are many, many innovators on our campus. I hope the group will be able to mobilize others to join."

Inventors generally pursue the lengthy and expensive process of applying for patents only if the invention has commercialization potential. If the moneymaking potential is dubious, researchers are more likely to just publish a paper or present at a conference.

Recent Research Grants Recipients**Dr. Michael Peterson**

“The grant I got started in Sept. 2015 and runs through august 2018. The total amount is about \$200K to support me over the summers, provides funding for student research, travel funds for myself and students, and money for some big fancy new computers! The title of the grant is *RUI: Numerical Studies of Topological Ordered Phases in Realistic Models* and it is from the National Science Foundation (NSF). The RUI stands for Research at primarily Undergraduate Institutions.”

**Dr. Prashanth Jaikumar**

“The grant I got started in July 2016 and runs through June 2019. The total amount is about \$200K and supports me over the summers, provides some funds for student research, travel funds for myself and students, and for computational resources. The title of the grant is “RUI: Probing Quark Matter through Compact Star Oscillations” and it is from the National Science Foundation (NSF).”



Federally funded grants such as the ones mentioned here are awarded through a merit-based peer-review process. They are extremely competitive and less than 1 of every 6 is typically recommended for funding. At an institution like CSULB, they take on added significance because it allows faculty as well as students to be paid for their research activities. In addition, the outreach activities conducted by faculty through these grants helps to engage citizens with modern Science and encourages the public's appreciation for the value of research. To obtain such grants is an achievement, and we congratulate our awardees!



Awards of our faculty members

The Mayfield Award

Dr. Galen Pickett



"It was a deeply humbling experience to receive the 2015-16 Mayfield Award. Any student in the sciences is allowed to vote on the award, so the award is a powerful statement and celebration by and for the students in this department. It is a pleasure serving each of you!"

Each year the College of Natural Sciences and Mathematics Student Council hosts the Mayfield Balloting event to allow students to recognize and vote for a favorite faculty member. The Mayfield Award is in honor of Dr. Darwin Mayfield, an inspirational chemistry professor.



**Dr. Chuhee Kwon -
APS Woman Physicist of the Month,
December 2016**

The American Physical Society conferred to Dr. Chuhee Kwon, former department chair, the Woman Physicist of the Month Award in December 2016. The program highlights exceptional female physicists and the award recognizes women physicists who have positively impacted other individuals lives and careers. Details on her award can be found by reading our Department News on our homepage.

*In Memoriam -
Faculty Legacies -
Paying it forward in perpetuity!*



Dr. John Erling Fredrickson

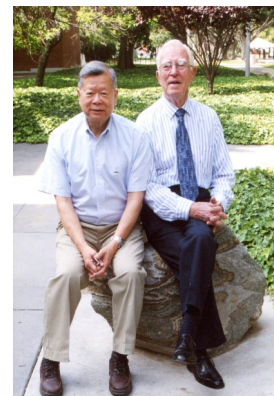
Dr. John Fredrickson (center), flanked on the left by his grandson, Kurt, a recent Physics Ph.D., in his brown regalia, and his son, Dave, wearing the blue regalia. His son has a Ph.D. in Theology. John generously designated the department as one of the beneficiaries of his life insurance policy. The gift of over \$50,000 created an endowed scholarship in Physics.

Dr. John Fredrickson graduated from USC with a Ph.D. in physics in 1956. He also joined Long Beach State College (as it was called then) that same year. He was the third member of the department. He played a critical role in building the department and establishing its programs. He especially engineered the electromagnetic and electronic laboratories. He served as the Chairman from 1976 until 1979. He retired from CSULB in 1984. He was a man of deep and living faith, a noble character. In his spare time he served as choir tenor and Sunday School teacher for the Rolling Hills Covenant Church.



September 12, 1919–

December 6, 2016



*Dr. John Fredrickson with
Colleague, Dr. Keung Luke,
1984.*





Dr. Olaf P. and Mary Jane Anfinson

Olaf “Ollie” Anfinson grew up on a farm in Minnesota that has been in the family for over 100 years. He earned his doctorate at the University of Northern Colorado in 1954. He joined the faculty at Long Beach State College in 1956 and immediately began the development of the physical science program; playing a pivotal role in establishing the young physics department. A respected teacher and scientist, he published three college textbooks and was elected a Fellow of the American Association for the Advancement of Science.

Ollie retired in 1974, but his love of teaching compelled him to return to CSULB part-time in 1979. He donated his salary to fund the Anfinson Scholarship for physics majors which he continued until his permanent retirement in 1988. Ollie and wife Mary Jane were adamant about supporting a scholarship and made provision in their Will for the department to receive proceeds from the sale of their home in Leisure World. A gift of \$274,000 recently arrived upon Mary Jane’s passing, which created the Anfinson Scholarship Endowment to support both undergraduate and graduate student.

What will your legacy be?



We are very grateful for the Fredrickson and the Anfinson families for supporting our students and the department.

Supporting the department through your estate is simple and easy – and once you have done it we will honor you during your lifetime as a member of the Legacy Society. You can designate a bequest in your Will or Trust or make the department a beneficiary of your IRA, 401(k), or life insurance policy.

Visit <http://csulbgiftplanning.org/> for bequest language and other helpful estate gift planning information.

Alumni Giving Makes a Difference!

The Department relies exclusively 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
- ◆ 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.



Maryanne Horton

GIVE ONLINE at <https://giveto.csulb.edu/?view=PSA>

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 Philip Ord Johnson Scholarship

The Margaret Heeb Summer Research Scholarship

The Scholarship Fund of the Department of Physics and Astronomy

Thanks very much for your support!

(And don't forget to leverage your contribution through your company's employee matching gift program if they have one.)



**Congratulations to Dr. Chuhee Kwon on a job well done
as Department Chair from 2011 until 2016!**



Nancy Ko, Dr. Chuhee Kwon, and Irene Howard



MS student Raphael Monroy played some beautiful violin pieces at the Japanese Garden gathering.

Department Gathering at the CSULB Japanese Garden, May 2016