

2023-2024 NEWSLETTER

EDITION 39

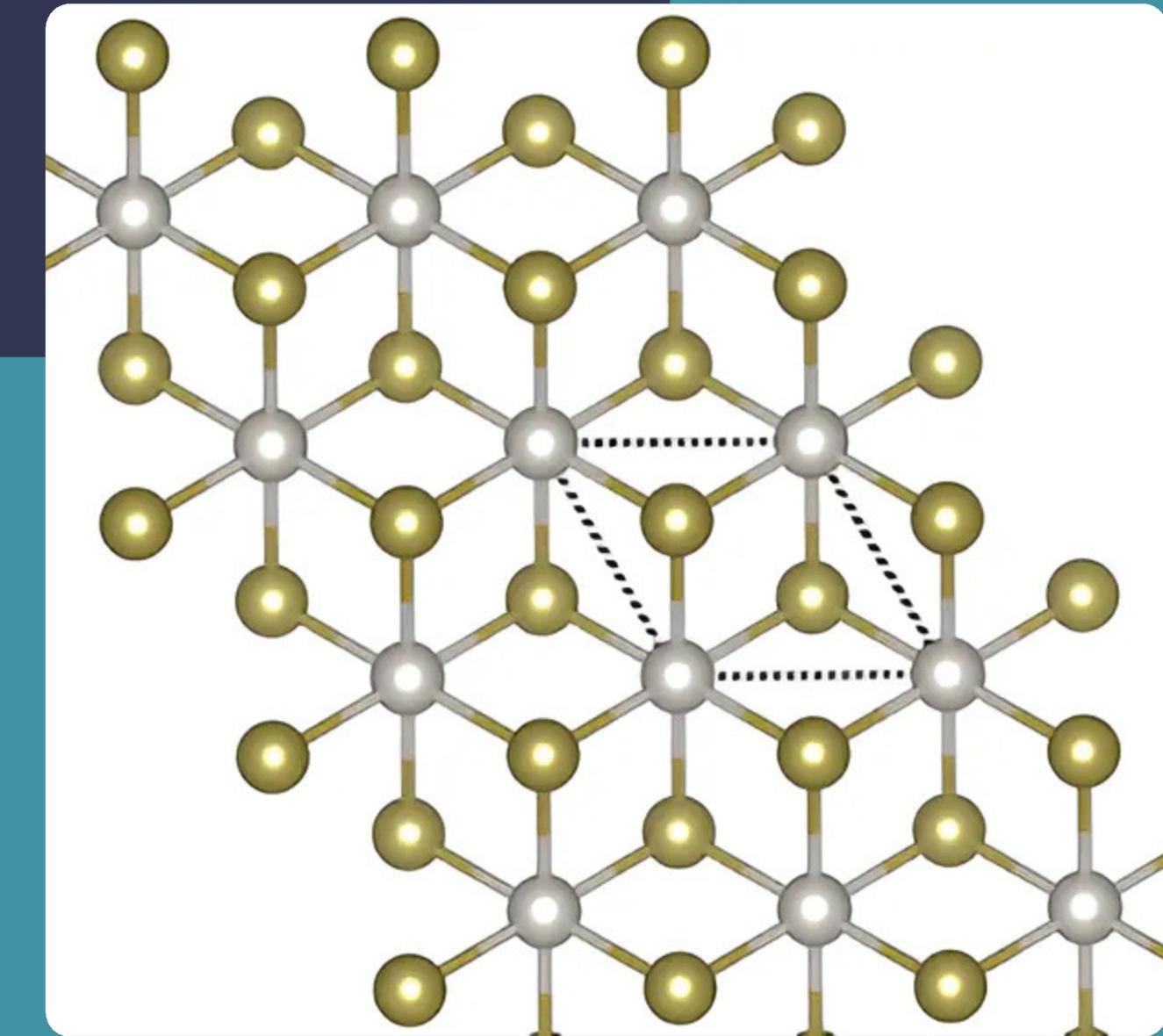
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Department of Physics & Astronomy

Newsletter #39

2023-2024



California State University Long Beach

CSULB PHYSICS AND ASTRONOMY

OUR ANNUAL NEWSLETTER FOR ALUMNI AND FRIENDS OF THE DEPARTMENT

EDITION 39

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College of Natural Sciences and Mathematics

Society of Physics Students (SPS)

Women in Physics (WiP)

Astronomy Club



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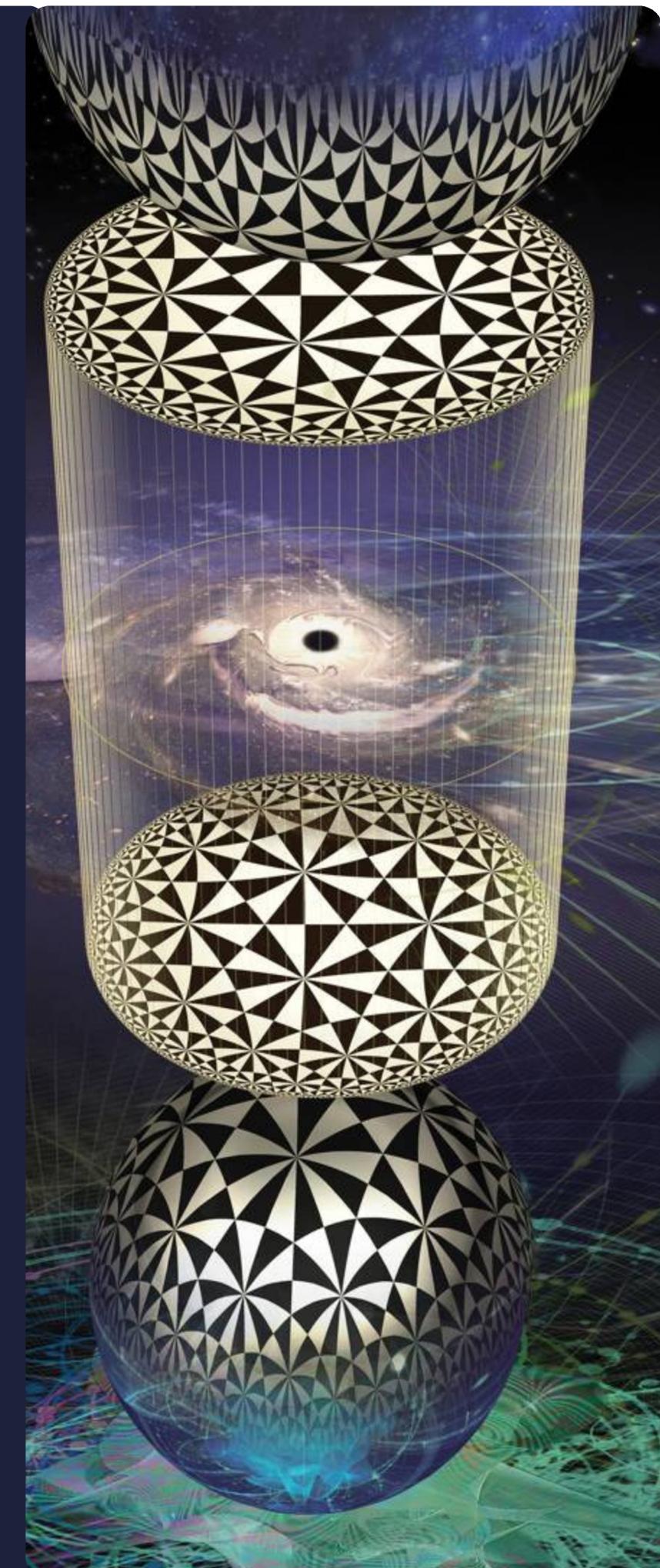
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2023-2024

Year In Review

Dr. Prashanth Jaikumar

Department Chair



Dear Readers, Colleagues, and Friends,

It is with pleasure and pride that I share with all of you the annual newsletter of our Department for 2023-24. It has been a busy year (as always!), and the department had many accomplishments and events that brought us together. In these following pages, I hope you will enjoy reading about our activities in the past year.

One of the highlights of the department is the collaborative spirit of the faculty in taking on new projects and initiatives. The PREM grant (page 13) was renewed and reinforced thanks to the vision of both theorists and experimentalists in the department. This has increased student participation in faculty research, opening up travel and professional development opportunities for many of them.

In Spring, our campus viewing event for the Great North American Solar Eclipse (page 17) attracted several hundred visitors. We also hosted Dr. Ramamoorthy Ramesh, Vice-President for research at Rice University, for a Distinguished Physics Lecture (page 9). We hired new staff in the department office and issue room, graduated 18 Masters & 31 Bachelors in Physics students and welcomed new faculty Dr. Sarah Grefe (page 11), a condensed matter theorist. Dr. Alex Klotz was awarded an NSF CAREER grant (page 7) for Biophysics research, Dr. Subhash Rajpoot was awarded sabbatical leave, and Dr. Jiyeong Gu secured an Immersion equipment grant, among other faculty accomplishments. The department mourned the passing of Dr. Hitoshi Nishino and retired lecturer Dr. Hooshang Tahsiri (page 31). Both were active in research, and are remembered as highly professional in their instruction of students.

Our students continue to make us proud! It is fulfilling to see our graduates enter competitive PhD programs, find employment in industry or choosing to give back through teaching. Despite the challenges with rising living and tuition costs, students have shown remarkable resilience, managing to stay focused on their studies and graduation plans. Our student clubs organized many growth and wellness activities, on campus and off, to help the student community raise funds and support each other.

As you read further in this newsletter, I hope you get a sense of our welcoming and thriving community. Thank you to everyone who is contributing their ideas, hard work and dedication to our Department, and I wish you all a happy holiday season.

Happy readings!



Top: Class of 2024 Commencement Ceremony at the The Stadium at Anaheim

Bottom: Physics, faculty with current and former students at the APS March Meeting

Foreword:

Dr. Curtis Bennett

Richard D. Green Dean
College of Natural Sciences & Mathematics



Hello and Welcome to the '23-'24 Physics Department Newsletter!

The Physics Department has had another impressive year with new collaborations, new grants, and new faces!

I'm so pleased to welcome back one of our own alums, Dr. Sarah Grefe, who has joined us as an assistant professor. I know I speak for the entire College when I say how happy we are to have Sarah with us. I'm sorry to say we lost some of our valued faculty as well, Dr. Hitoshi Nishino and retired lecturer Dr. Hooshang Tahsiri. Their loss is felt around the Department, and they will be greatly missed.

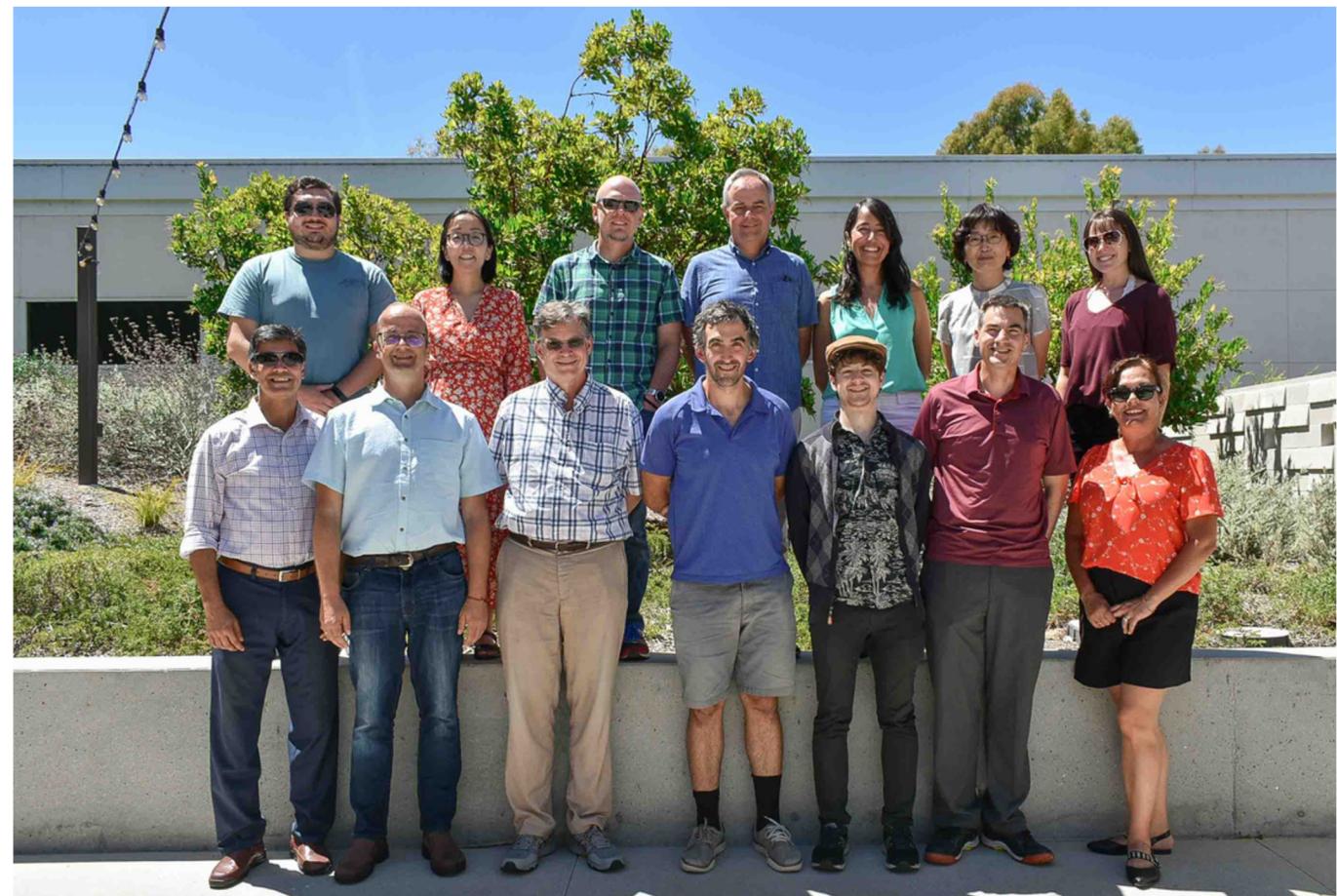
The Physics Department has always maintained a dedication to advancing student success and promoting research, and this year was certainly no exception! The ground-breaking PREM program has continued and expanded, creating new research opportunities for our faculty and students, and faculty grants are paving the way for future physics research with major equipment and National Science Foundation support.

I'm thrilled to see our Physics student groups becoming so active as well! From the Women in Physics club, to our chapter of the Society of Physics Students, to the Astronomy club, our students are important members of the Department and our CNSM community.

It's so gratifying to see the way this group comes together, from the faculty to the staff and students. I'm incredibly proud of our Physics Department and look forward to another year of discovery and opportunity!



APS Bridge Program: Some of our Master's students in the APS Bridge Program (Carlos Lima, Deanna Diaz, Jose Camacho-Osuna, Daniel Torres) with faculty mentors (Galen Pickett, Michael Peterson, Claudia Ojeda-Aristizabal, Prashanth Jaikumar, Andreas Bill)



Faculty/Staff Retreat: (Top row, L->R) Nicholas Lozano, Dr. Ann Kim (Guest Faculty), Dr. Michael Peterson, Dr. Andreas Bill, Dr. Claudia Ojeda-Aristizabal, Dr. Jiyeong Gu, Rachel Robnett; (Bottom row, L->R) Dr. Prashanth Jaikumar, Dr. Thomas Klaehn, Dr. Galen Pickett, Dr. Alex Klotz, Dr. Joel Zinn, Dr. Thomas Gredig, Joey Grant



Our Staff



Joey Grant | Department Coordinator

Hello, I am Joey Grant. I started working as the Physics & Astronomy Department Coordinator in May 2023 but have been with CSULB since 2018. I have all kinds of hobbies but the ones I enjoy the most is cooking, gardening, watercolor painting, working with clay and spending time with my family. I have two amazing grandchildren who live on the east coast who I get to Facetime all the time. I am very lucky to be able to work here on campus and I really enjoy working with all the students and faculty in this department.



Rachel Robnett | Administrative Assistant

Hello, I'm Rachel! I graduated from CSULB in May 2023 with a Photography major and a Forensic Science minor. My goal is to become a Crime Scene Investigator or Forensic Photographer. Outside of work, I love being outdoors with my camera! I grew up in Seattle, WA, and spent lots of time in the mountains, but I have loved every minute of living in Long Beach. You can always find me exploring new places and going on adventures. I am happy to have started working in the department in April. I love talking to all the students who come in for snacks!



Ciara Barnes | Student Assistant

Hi, I am Ciara! I am currently a second year student at California State University, Long Beach. I am pursuing my BS in health science and minoring in International Studies. I have worked in the Physics and Astronomy department as a federal work study student assistant since Fall 2022 and have loved every minute here. In my free time, I love to paint, draw, be outdoors, and spend time with my two dogs, Nike and Hershey. I was born and raised in the Bay Area, so I moved to SoCal for a different scenery. Working in this department has helped me in many ways. Everyone here is very supportive and are helpful people.

Jay Conlon | Instructional Support Tech

My name is Jay Conlon. I began working 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 for my undergrad, and did my Graduate studies here at CSULB. When I'm off the clock, I'm an avid gamer and all-around nerd, who's grateful to being employed doing something I love.



Nick Lozano | Instructional Support Tech

I originally joined the Physics department when I enrolled in the master's program at CSULB in 2020 during the pandemic. After earning my MS in Physics in 2022 I decided to stay at CSULB and I began working as a lecturer teaching multiple introduction physics and astronomy classes. Now, as the newest addition to the issue room staff, I've been using my experience teaching the classes to ensure the instructional labs have everything they need. In my free time I enjoy stargazing, camping, and hiking.



Mark McLaughlin | Instructional Support Tech (Retired)

Our instructional support technician, Mark McLaughlin, retired from CSULB on Apr 1, 2024. He began his studies as a Master's student in 1999 under the supervision of Prof. Emeritus Dean Ayers, and continued working in the Department, maintaining and supervising the operation of our instructional laboratories. In effect, he has been a part of this Department for 25 years! Mark has been a steady presence in the Department, a friendly face who is available to help students, staff and faculty alike. He keeps busy now with camping in the mountains and working on his pick-up truck. We wish him well on his adventures after retirement!



Faculty Focus:

Dr. Alexander Klotz



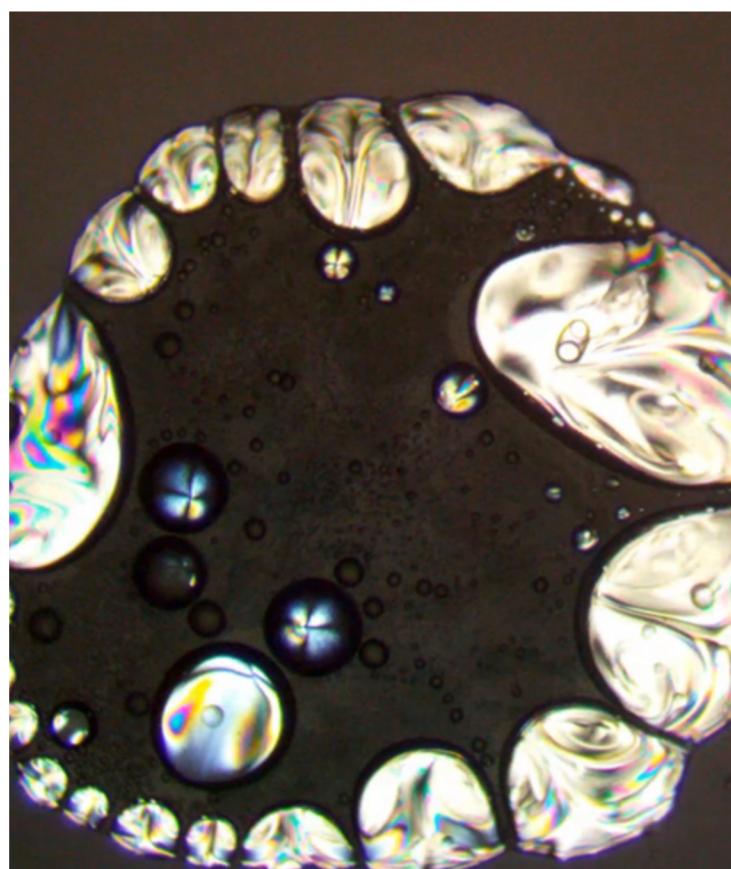
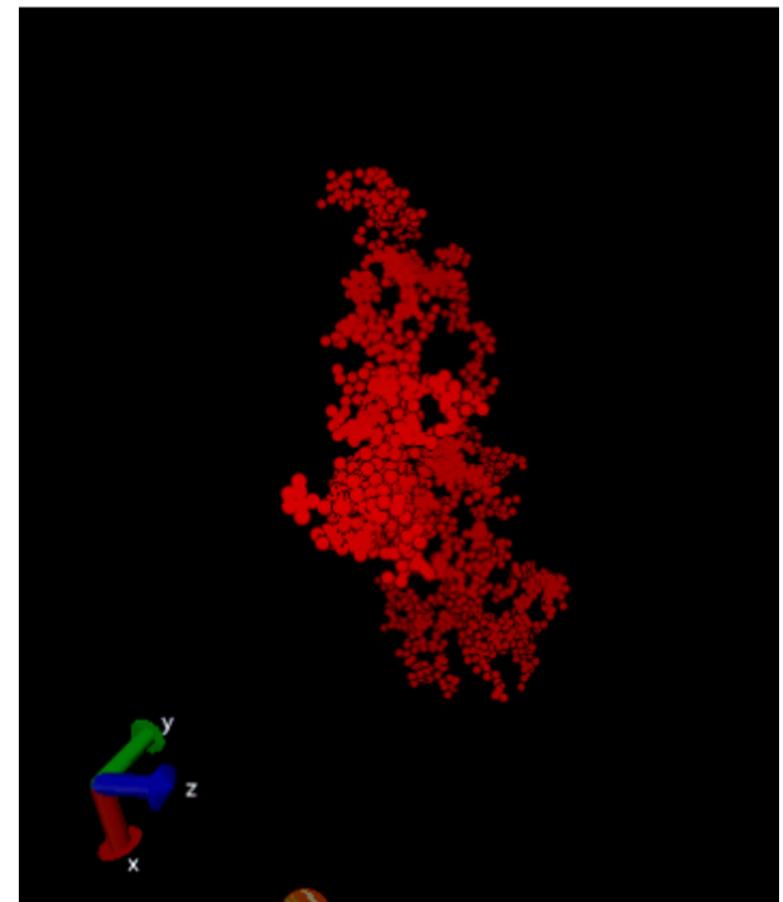
Assistant Professor Dr. Alex Klotz is an experimental physicist whose eclectic research interests include biophysics, rheology, topology and soft condensed matter physics —his laboratory is one of very few in the world advancing the understanding of soft matter through studies of kinetoplast DNA. He studies the Physics of active matter and biomolecules using a range of experimental techniques from microscopy to microfluidics, augmented by numerical simulations. His research provides fundamental insight into biomaterials, molecular topologies, and genomic mapping with applications to rapid diagnostics.

Dr. Klotz is also an expert in the physics of knots, which he began researching as a postdoc. He is fascinated with the structure of chainmail / kinetoplast DNA that comes from parasites and has pioneered experiments with this system, using its complex topology to learn more about how molecules and materials made from molecules behave. In fact, his first successful NSF grant aimed to explore the physics of two-dimensional materials using kinetoplasts. 2D materials are also an active area of research within condensed matter physics.

In addition to his research chops, Dr. Klotz is an excellent teacher in the classroom, with the College's Student Council awarding him the Mayfield award for teaching. The College faculty council also selected him for the "Pretty Darn Good Professor" award! Going beyond instructional responsibilities, Dr. Klotz adopts a multi-faceted approach to his students education, infusing research-based pedagogy, equitable assessment techniques and engaging his students with innovative projects. As one student in his classroom writes: "It felt like we were real scientists trying to uncover an answer to a question that hasn't been solved yet."

Dr. Klotz's research is a new direction in the department and has proven to be tremendously popular among the students (and apparently with granting agencies as well!). With his keen sense of interesting unsolved problems and collaborative spirit, Dr. Klotz's research lab is successfully offering an array of research problems and training methods to both graduate and undergraduate students at CSULB. Additionally, Dr. Klotz joins the rarefied ranks of NSF CAREER awardees at our University. After Dr. Gredig's CAREER award in 2009, this is the first such accomplishment in the Department. Starting in 2024, this grant sets Dr. Klotz and his large group of graduate and undergraduate students up for a productive and exciting next 5 years of research!

In the past year, he successfully secured internal funding from two multidisciplinary grants from CSULB. He is also part of the team on the PREM grant. These are just rewards in recognition of his prolific research, with 13 papers from CSULB in just 5 years! We are fortunate to count him amongst our faculty.



Dr. Alex Klotz and his students perform experimental and computational research in the area of soft condensed matter physics, including studies of complex biomolecules (top left) and liquid crystal droplets (bottom right)

Distinguished Lecture in Physics:

Dr. Ramamoorthy Ramesh
AVP Research, Rice University

In Spring 2024, the Department hosted renowned material scientist and researcher Prof. Ramamoorthy Ramesh, Professor at UC Berkeley and currently AVP of research at Rice University, for the Distinguished Lecture in Physics for 2024. He is the 4th speaker in the Distinguished Lecture series instituted in the Department in 2018 with the goal of inviting preeminent scientists who inform and inspire students and the public through first-hand accounts of their path-breaking inventions and scientific discoveries.

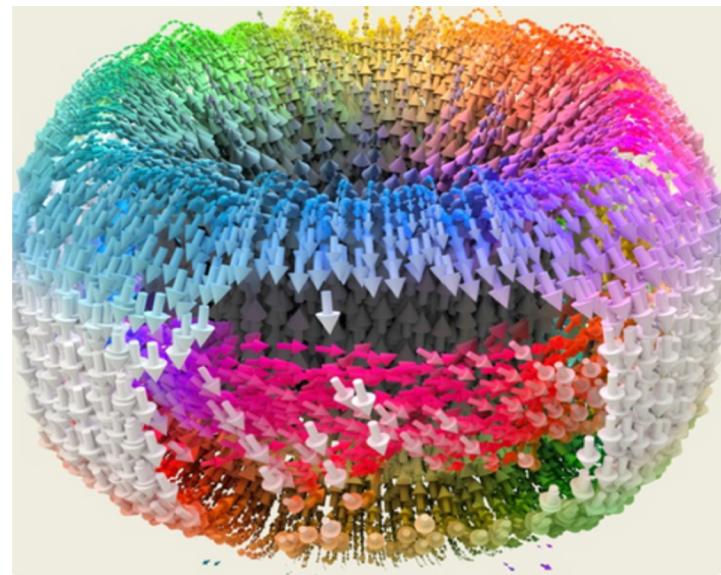
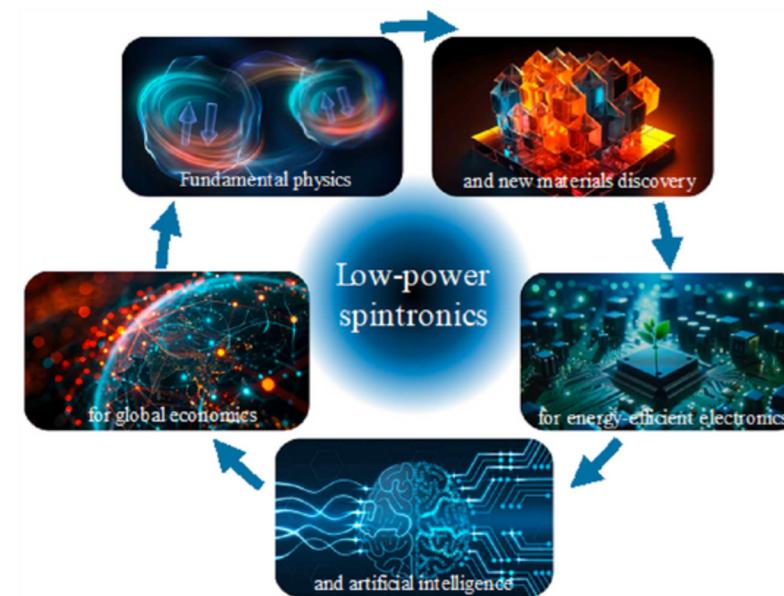


Dr. Ramesh has published extensively on the synthesis and materials physics of complex oxides, and his achievements have been recognized worldwide. He is a fellow of the APS, AAAS & MRS and an elected member of the U.S. National Academy of Engineering. His awards include the Humboldt Senior Scientist Prize, the MRS Turnbull lectureship prize, the APS Adler Lectureship and McGroddy New Materials Prize, the TMS Bardeen Prize and the IUPAP Magnetism Prize and Neel Medal and the Europhysics Prize in 2022. Prior to his current position at Rice University and UC Berkeley, Dr. Ramesh served as the Founding Director of the successful Department of Energy SunShot Initiative in the Obama administration, envisioning and coordinating the R&D funding of the U.S. Solar Program. He also served as the Deputy Director of Oak Ridge National Laboratory and the Associate Lab Director at LBNL.

Dr. Ramesh gave two talks: One was a public lecture on challenges and opportunities at the Energy Frontier. Citing Energy and Water as the most pressing issues facing the world, Dr. Ramesh showed how research into the Physics of materials can enable successful strategies that can be pursued at scale to benefit humanity. His second, more specialized talk, covered topological features and emergent phenomena in ferroelectrics. He showed how vortices, cycloids and skyrmions have been discovered in some materials using scanning transmission electronic microscopy (STEM) and their potential in future technologies. Both talks were well-attended and resonated with the audiences, including our faculty in condensed matter theory and experiment, who investigate topology and quantum information in their own research. Dr. Ramesh spent some quality time with our graduate students, talking about setting high expectations of oneself, and overcoming difficult challenges on the path to scientific success. This was much appreciated by the students!

Dr. Ramesh has been instrumental in government initiatives to bring the cost of solar power down to grid parity, and is now tackling problems in energy and climate science by promoting fundamental research into energy-efficient electronics (eg., spintronics). He is also a co-founder of Kepler Computing, which is focused on low power computing based on his work on ferroelectrics.

We are very grateful to the anonymous donors for their generous support of this important annual activity of the Department!



Dr. Ramesh's Distinguished Lecture visit included talks about his research on spintronic materials and skyrmions, and interactions with our students, culminating in dinner with the faculty at L'Opera Ristorante in downtown Long Beach.

New Faculty:

Dr. Sarah Elaine Grefe

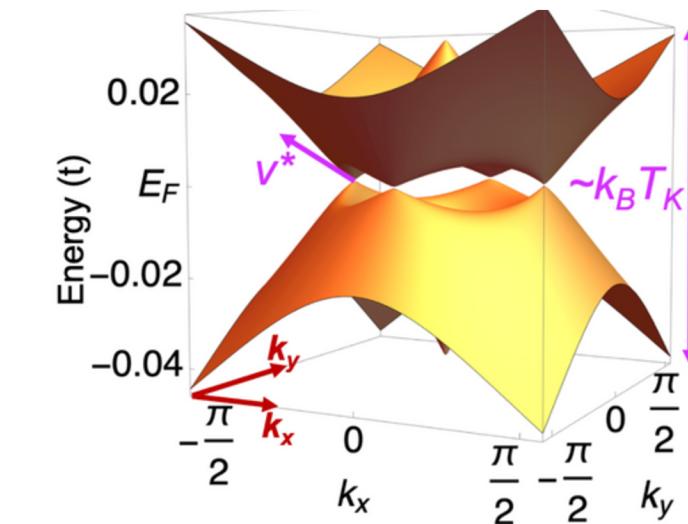
Dr. Sarah E. Grefe began studying physics in CSULB's physics department. With encouragement from early undergraduate research experiences in Dr. Jiyeong Gu's lab, she graduated in Applied Mathematics. She then joined Dr. Yohannes Abate's lab while graduating from CSULB's physics Master's program, performing classical electromagnetic simulations and lab experiments on nanoparticles with strong near-electric field responses, and collaborating with Dr. Zoltan Papp on numerical approximations of scattering potentials. She then completed her PhD at Rice University, beginning her work on the effects of strong electron-electron interactions on nontrivial topological states. Her work in this area continued in her postdoc in the T-4 Theoretical Division at Los Alamos National Laboratory. She has come full-circle to her Long Beach hometown as a new faculty at CSULB, and now enjoys working alongside the many mentors, teachers, and collaborators that she had as a student, as well as new colleagues.

Her work focuses on theoretically modeling metals with mobile electrons and heavy magnetic elements. These systems exhibit the Kondo effect, a quantum entangled state of a mobile electron spin and a localized magnetic spin, stemming from particularly strong electronic correlations. In two-dimensional systems, she discovered that when the magnetic spins collectively fluctuate in a spin liquid state, the Kondo effect allowed the intrinsic mobile charge carriers to emulate the spin liquid through the anomalous Hall current, which does not require an applied magnetic field. This may aid experimentalists to probe exotic quantum spin liquid states using transport measurements.

She also found that the heavy magnetic elements use the Kondo effect to form a topological semimetal state in similar, three-dimensional crystal models with strong spin-orbit couplings. Corresponding experimental systems exhibit giant topological Hall resistivities without requiring a magnetic field. This curious finding has motivated her to simulate how the diverse quantum phases found in the theoretical model responds to intense, short laser pulses, where such strongly correlated systems are exceptionally sensitive and yield highly nonlinear currents. This ongoing work sheds light on how topological phases might be detected in the strongly correlated regime, where other detection methods may fail.

Inspired by the recent advances beyond noisy intermediate-scale quantum computing, Dr. Grefe has begun exploring quantum dot qubit systems which exploit the Kondo effect to create exotic particles known as Fibonacci anyons. These anyons could potentially be used for measurement-based topological quantum computing, and if produced in a cleverly designed Kondo impurity system, could offer another type of physical qubit for future quantum information applications.

Outside of her research interests, Dr. Grefe enjoys hiking and backpacking, learning how to knit, and spending time with family.



(Left): Example of band dispersion in Weyl-Kondo semimetals, which Dr. Grefe studies in her theoretical research
(Right): Dr. Sarah Grefe with department chair Dr. Prashanth Jaikumar at the Fountain outside Brotman Hall



Faculty on the stairs outside the Hall of Science (L->R): Dr. Alex Klotz, Dr. Michael Peterson, Dr. Prashanth Jaikumar, Dr. Claudia Ojeda-Aristizabal, **Dr. Sarah Grefe**, Dr. Galen Pickett, Dr. Andreas Bill, Dr. Jiyeong Gu, Dr. Joel Zinn, Dr. Thomas Gredig



Dr. Michael Peterson,
PI, PREM grant



Dr. Jiyeong Gu,
Co-PI, PREM grant

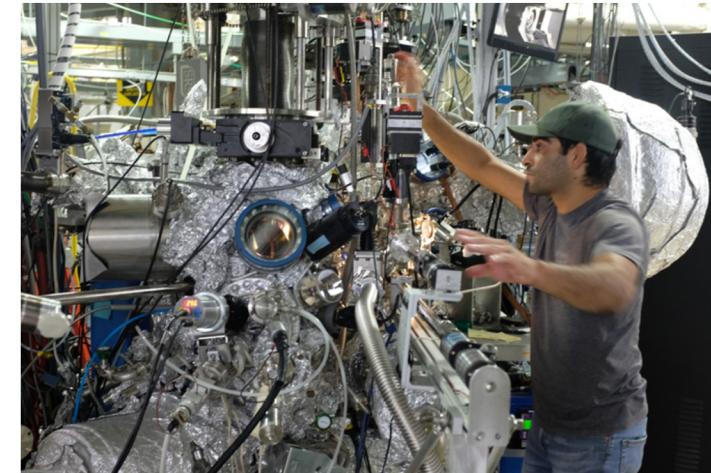
PREM grant

Partnership for Research and Education in Materials

Funded by the Division of Materials Research (DMR) at the National Science Foundation (NSF), the Partnership for Research and Education in Materials Research (PREM) program aims to enable, build, and grow partnerships between minority-serving institutions and DMR-supported centers and/or facilities to increase recruitment, retention, and degree attainment (which collectively define the PREM pathway) by members of those groups most historically underrepresented in materials research, and at the same time support excellent research and education endeavors that strengthen such partnerships.

Building on a 'seed' PREM grant in 2021, this year California State University Long Beach (CSULB) Physics and Ohio State University's Center for Emergent Materials (OSU CEM) are advancing their collaboration with a 6-year \$4.2 million NSF PREM grant. Led by CSULB faculty PI Dr. Michael Peterson (Physics and Astronomy), Co-PI Dr. Jiyeong Gu (Physics and Astronomy), and Dr. Ryan Blair (Mathematics and Statistics), the project empowers underrepresented students in STEM, offering career pathways like research-based MSc programs, post-baccalaureate Bridge programs, and REU opportunities. The collaboration spans multiple departments at both universities, including Physics, Chemistry, and Mathematics, focusing on cutting-edge materials science research. This includes exploring topology, magnetism, and superconductivity in two-dimensional crystals, thin films, and biopolymers, with projects examining exotic magnetic states, metal-organic spin structures, and topological effects in biomolecules. Each project combines complementary expertise from CSULB and OSU, using advanced characterization techniques, sample synthesis methods, and theoretical approaches, further strengthening collaborative relationships and aligning with OSU CEM's interdisciplinary research focus.

The partnership has hosted two CSULB-OSU Symposia, engaging over 40 participants, including OSU faculty and students. It has supported 30+ students and 9 faculty in research and education, resulting in multiple APS presentations, 4 student-coauthored papers (2 with OSU), and 7 CSULB students completing REUs at Ohio State. This vibrant collaboration fosters an inclusive, research-driven culture and we are looking forward to the next 6 years!



Graduate student at work at the Advanced Light Source in UC Berkeley; travel opportunities abound for students thanks to PREM support



Dr. Thomas Gredig (CSULB; left) in discussion with Dr. Jay Gupta (OSU; right) at the PREM Symposium



The **PREM Symposium** brings PREM faculty from CSULB and OSU together for a day of research talks, student posters and planning discussions in a collaborative spirit

Academic Programs

Graduate Advisor Dr. Jiyeong Gu



Our Graduate Program, already one of the top Master's programs in the Nation, continues to work well. Students complete coursework in fundamental Physics subjects and are trained in applied, theoretical and computational research, leading to a master's thesis or project. Highlights of our program the year 2023-24 include graduation of 18 students with Master's degrees, 38% of whom entered top PhD programs around the nation, such as the University of California San Diego, University of California Irvine, University of California Riverside, and USC. Also, our MS alumni become physics teachers at local high schools where they inspire young students to pursue their interest in physics at CSUs or at local community colleges. We were very happy to see quite a few students from the 2021 and 2022 cohort graduate this summer. The Master's program is a true value addition to career prospects and earnings, as data from the American Institute of Physics shows.

In Fall 23 and Spring 24, we welcomed a cohort of 21 new graduate students who have since joined the research groups of our faculty. In Fall 2023, we welcomed one of our own alumni, Prof. Sarah Grefe, as our new faculty member. She obtained her MS from CSULB in 2013, her PhD at Rice University in 2020, and was a postdoctoral researcher at Los Alamos National Laboratory until 2023. 2010 MS graduate, Dr. Julius De Rojas (Bill group) is now a faculty member at the Oklahoma State University starting in Fall 2023. Another alumnus, Dr. Ashkan Paykar, 2015 MS graduate, started to teach at the University of Minnesota Rochester from January 2024 after getting his PhD from University of Florida in 2023. We also had a reunion at the APS March meeting in March 2024 where quite a few alumni from our MS program, now working as PhD students, post docs, and professors, attended and mixed with our current students.

My experience as a graduate advisor so far has been enriched by helping our MS graduate students have the best experience in our program. Following the mission in our department, I try to advise each student as best as I can based on his/her career ambitions, life situations and personality, all of which can evolve during their time here. I really appreciate our outstanding administrative staff, Joey Grant and Rachel Robnett, as well as former staff in the past years, Korin Coombs, Lisa Dignadice, John Shaw, Sergio Mendoza, Bianca Lopez Mendez, & Amber Robertson. Their care and concern for the well-being of our graduate students is an invaluable asset to the Department and to the graduate program.

Undergraduate Advisor Dr. Thomas Gredig



The undergraduate Physics and Astronomy program at CSULB ranks highly within the CSU on a number of metrics. By the numbers, we have 102 physics juniors and seniors enrolled in Fall 2024; amongst those students, 46 upper-division students are double majors. This means that we attract a lot of mathematicians and engineers in our program as well. The Physics B.S. and B.A. degrees are comprehensive and we have updated the roadmap as part of the Universities' 4-year revision plan to provide authentic physics experiences to our Physics majors. 7 undergraduate students presented research at Cal Poly Humboldt for APS Far West section, and several students presented at the APS March meeting in Minneapolis. At the national level, we had 6 undergraduate students successfully compete paid summer internships in the NSF REU program this year. In part, the students also benefit from the NSF sponsored PREM research program directed by Dr. Michael Peterson. This research collaboration with the Ohio State University provides students direct access to an R1 research institution and get hands-on experience with problem solving.

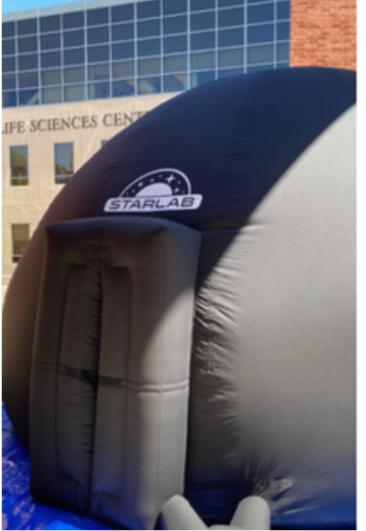
We have redesigned and updated several courses, for e.g., Dr. Jiyeong Gu's acquisition of the new Optical Microscopy Course Educational kits through the ALPhA immersion grant from the Jonathan F. Reichert Foundation will serve students in the upper division/graduate laboratories. Dr. Thomas Gredig updated the PHYS 445 experimental course with a table-top apparatus for proton spin manipulation, and also PHYS 360, renamed "Computational Physics," emphasizing data processing, visualization and presentation skills for students.

The Department tries actively to build a community for our undergraduate students. Our student-led programs have been very social with weekly activities: Society of Physics Students (president: Nathan Kim, advisor: Dr. Claudia Ojeda-Aristizabal), Women in Physics (president: Audrey Corbin, advisor: Dr. Jiyeong Gu), and Astro Club (president: Reon Allen, advisor: Diego Gutierrez); they have also been instrumental in outreach programs, especially the solar eclipse event in the Spring.

Physics is an important pillar of the University; this becomes evident from looking at the enrollment in 100-level physics courses, as about 18,000 physics units shaped the lives of CSULB students in F23/S24. Additionally, we had seven physics teachers getting their credentials with emphasis in physics. These exciting educational experiences and research opportunities prepare our students well for the next steps in their promising careers.

Great North American Solar Eclipse

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(L→R): The Astronomy Club promotes CSULB programs at the Long Beach Aquarium; Dr. Joel Zinn's Mobile Planetarium for Outreach; Star show in progress inside the Mobile Planetarium's Dome.

The total solar eclipse of April 8, 2024 (partial eclipse in Long Beach) shone a well-deserved spotlight on the University's Astronomy program and related outreach activities. Hosted by our Department and coordinated by Dr. Joel Zinn — who also runs the campus rooftop observatory — the public gathering on the main quad attracted students, faculty, community members, and at least a dozen media outlets. Eclipse-appropriate music — everything from R.E.M.'s "Man on the Moon" to David Bowie's "Star Man" — played in the background as folks of all ages stretched out on the grass and snapped photos on their phones. The crowd exceeded expectations. By the time of maximum coverage (11:11 a.m.), all 750 pairs of solar eclipse glasses had long since been distributed. Total eclipses are possible since the moon and the sun appear to be roughly the same size in the sky; the sun's diameter is 400 times bigger than the moon, while the moon is 400 times closer to the Earth. The last time Long Beach was in the path of totality was on New Year's Day 1889, and the next won't be until after the year 2200!

In addition to eclipse glasses, it was possible to view the eclipse through a set of solar telescopes, and a few lucky people were also able to spy sunspots and solar prominences which Dr. Zinn described as "giant arcs of plasma on the surface of the sun." "Being in Southern California, the sun is something we take for granted, so this was a chance to actually consider it in more detail," Dr. Zinn said. While the eclipse is transitory, the Department hosts a rolling event atop the Hall of Science every clear Tuesday night while school is in session. A hidden gem in its own right, the unlit space features five massive telescopes and, while open to the public, is most often used by Astronomy students as part of their coursework. One recent Tuesday night, as students peered through the scopes and made various calculations, Astronomy Club President Reon Allen was on hand to answer questions and keep the telescopes from drifting. The Gemini constellation was on display, as was the wispy, colorful cloud that is Orion's Nebula — a celestial maternity ward where stars are being born. Our Astronomy classes and outreach programs reaffirm our strong commitment to general education and community engagement at this University and the people of Long Beach.

Student Clubs

Society of Physics Students (SPS)

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(Left): The SPS Club (faculty advisor: Dr. Claudia Ojeda-Aristizabal) meets regularly to promote Physics and community building among our students and in the public; **(Right):** SPS members outside the Hall of Science

During the 2023-2024 year, SPS participated at Day at the Beach, and ran a booth where the attendees could see physics demos and learn more about the life of a physics student. We organized an Instagram takeover where students doing research shared their experiences through different posts for a week. We promoted mental health awareness to our club by introducing, in collaboration with the Women in Physics (WIP) club, self-care hours. Additionally, we organized an event to advertise REUs and in particular, the one at Ohio State University. This event was very successful and led to students traveling to Ohio and other REUs across the country. Overall, our social events were successful in introducing students to the club and shaping an environment for students to destress from classes.

Additionally, we hosted a panel with PhD graduate students and alums working in industry. The event ran for more than one hour, where students had the opportunity to ask multiple questions about working in academia and industry. Finally, we would like to highlight that a lot of our students went to the 2024 APS March meeting in Minneapolis, MN. SPS Students gave presentations and attended the talks. This was a very enriching experience, that helped them with their career path decisions.

A big Thank You to the 2023-2024 board members,—President Christian Castruita, Vice President Jandrie Rodriguez, Secretary Mathew Maldonado, Publicist Emiliano Benitez and Treasurers Nathan Kim and Imad Atik. We would also like to acknowledge the current board members—President Nathan Kim, Vice President Kate Ramirez, Secretary Steven Le, Publicist Audrey Corbin, Treasurer Ivy Boiko, Events Organizer Gigi Castaneda, Outreach Coordinators Al Camacho and Emiliano Benitez, Fundraising Specialist Joshua Luna, and Content Moderator Henry Cueva. We look forward to continuing to grow our community together.

Student Clubs

Women in Physics (WiP)

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The Women in Physics (WiP) Club at CSULB creates a welcoming community that supports gender diversity in physics, offering a space where everyone can belong, connect, and succeed. We kicked off the year at CSULB's Week of Welcome and held an introductory meeting to welcome new members.

To support our members academically, we organized a Conference for Undergraduate Women and Gender Minorities in Physics (CU*iP) application event and hosted guest speaker Jessica Ardinger, who shared her experiences as a woman in STEM. WiP also prioritizes self-care, with events like Stars of Affirmation—where members create star jars filled with positive messages for midterm season. Aside from midterm season, we also host events to celebrate the holiday season! We partnered with SPS and the Astronomy Club for Halloween festivities, including pumpkin painting, movie watching and a murder mystery solving, and later held a Friendsgiving with hand turkey crafts, pastries, and Thanksgiving films. Looking ahead, we're planning more holiday, self-care, and joint club events, including collaborations with Women in Computing and the Society of Women Engineers. We couldn't have achieved this without our dedicated board: President Audrey Corbin, VP Katerina Ramirez, Secretary Ying Le, Treasurer Sofia Tejada-Sarria, Publicist Ivy Boiko, and Events Coordinator Gigi Castaneda. If you are interested in supporting our club financially, please get into contact with our treasurer via email at Sofia.TejadaSarria01@student.csulb.edu.



The **Women in Physics (WiP)** club (faculty advisor: Dr. Jiyeong Gu), organizes several events aimed at creating a more welcoming and inclusive community of Physicists in the Department, and also promotes student wellness and friendship

Student Clubs

Astronomy Club



The **Astronomy Club** organizes Astronomy outreach events, Hall of Science rooftop observation events (above), and camping trips to observe the night sky well away from city lights, such as in Joshua Tree national park (below)

The CSULB Astronomy Club is a dynamic organization on campus that seeks to expand access to Astronomy to all students with even a small interest in space. While the organization is centered in the Physics and Astronomy department, those of us on the board work to incorporate Arts, Engineering, Education, and many more majors into the club. This is so students in fields outside of physics can not only find community within the club, but can also be introduced to the Physics and Astronomy Department.

In the club we host general meetings that feature a variety of space themed events, such as Galactic Tie-Dye. We host special observing nights off campus in darker areas, and also larger, long-term events like overnight camping at Joshua Tree. Since the start of Covid the club struggled to stay afloat. Since last year we have worked tirelessly to fundraise and restore the club to what it used to be and so much more. We have implemented committees like projects, fundraising, and even astrophotography to keep students involved even when not on the board. With the help of President: Reon Allen, Vice President: Steven Le, Secretary: Ivy Boiko, Treasurer: Chenchu Yakasiri Saravanan, Publicist: Mario Gonzalez, and faculty advisor Diego Gutierrez, we are excited for what's to come.



Physics Education

The PhysTEC program

Physics lecturer Justin Fournier (**right**) leads the PhysTEC program with DemoDays, teaching PHYS 390 and the 491 pedagogy series. He is also a Physics teacher at Cypress High School and an active member of the SCAAPT. Physics teachers and students (**below**) gather at CSULB for DemoDays on the second Thursday of each month to share interesting Physics demonstrations and brainstorm new ones.

The PhysTEC program continues to foster a vibrant community of high school physics teachers through engaging events and valuable resources. In 2023-2024, CSULB's PhysTEC program hosted the Southern California American Association of Physics Teachers (SCAAPT) meeting in the Fall of 2023 and PhysicsCon 2024 in the Spring. These events brought together physics teachers and enthusiasts, featuring presentations by CSULB physics faculty Dr. Klotz, Dr. Zinn, and Mr. Justin Fournier. Leading these annual meetings were CSULB MS graduate from 2011 and now President of SCAAPT James Lincoln, and Ryan Carroll, professor at Long Beach City College. There were several intriguing and innovative demonstrations shared with the audience, including a rendition of music for the Lute composed by Galileo Galilei!

Our Demo Days continued to thrive, offering hands-on experiences for local physics teachers, CSULB physics students, and faculty. Participants engaged in exciting activities like building modulated LEDs and physical accelerometers, launching rockets, and racing sailboats. We have also teamed up with our Women in Physics (WiP) organization to present the STEP UP curriculum, encouraging young women to major in physics and discussing what is being done at both the high school and university level. These interactive sessions fostered collaboration and sparked new ideas for engaging demonstrations and discussion into the classroom.



Alumni

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Paul Fischer | M.S. Physics 2022

What is Paul doing now?

Vehicle Software Engineer at Relativity Space, Long Beach CA

"I greatly enjoyed my time at CSULB and all the relationships I made with the other students and faculty. My research gave me the opportunity to develop software engineering skills that prepared me well for finding a job in industry that I find exciting and allows me to continue to do physics. The mentoring program Beach Nexus also provided invaluable connections to people in industry who generously donated time to help prepare me for both technical and behavioral job interviews."

Enrique Hurtado | M.S. Physics 2019

What is Enrique doing now?

Software Engineer, Sunnyvale CA

"Whether it's preparing you for a Ph.D program or industry, a Master's in Computational Physics from CSULB is a great foundation. I took the industry route, and found that the asset that I had was the ability to solve problems, not necessarily how much Physics I knew. This allowed me to be very versatile in my career; my roles were Test, Systems, Data analysis, and Software Development. The computational physics degree allowed me to move into any field that was necessary to advance my career, and ultimately to the one I desired: Software Engineering."



Walter Alvarado | M.S. Physics 2017

What is Walter doing now?

Scientist, Space Biosciences Research Branch, NASA Ames Research Center

"The physics department at CSULB stands out for its unwavering belief in the potential of its students. The faculty and staff fostered an environment that encouraged me to trust in my abilities as a scientist by providing the mentorship and research opportunities essential to my growth. The lessons I learned have been instrumental in achieving my goals, serving as a testament to the quality and impact of the program."



Sabbaticals

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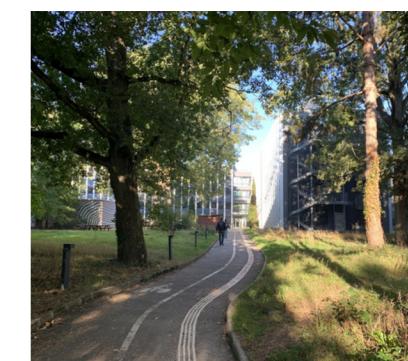
Dr. Zoltan Papp

Dr. Zoltan Papp was awarded a Difference in-Pay leave in 2023/24 to complete the lecture note manuscript on "Mastering Quantum Mechanics", which are intended for our two semester graduate quantum mechanics courses, Physics 550A and Physics 550B, and rose from his extensive experience teaching quantum mechanics as well as his research. The Springer Publishing Company has expressed interest in publishing the notes and is currently reviewing the manuscript. Also, during the leave, he published two peer-reviewed papers on relativistic non-Hermitian quantum mechanics with present and former CSULB students (Antonio Garcia and Derek Wingard). He also published a paper on hydrogen atoms in strong magnetic field that naturally exists on the surface of neutron stars, with an alumni member, Ben Carter, who is one of the main supporters of our Colloquium series. Congratulations to Dr. Papp on a very productive sabbatical and the success of his book!



Dr. Andreas Bill

Dr. Andreas Bill took sabbatical in 2022/23 after serving as department chair for six years. Choosing to pursue his growing research interest in topology in condensed matter physics, he spent the year with the theory group of the Laboratoire de Physique des Solides (LPS) at the Université Paris-Saclay, France, led by Dr. M. Goerbig. One of the very first Colloquia he attended at LPS was given by Dr. Alain Aspect, who would receive the Nobel prize in Physics two months later! With LPS scientist Dr. Frédéric Piéchon, he studied the impact of quantum geometry and topology on plasmons in the presence of an external magnetic field. He presented the work of his research group at CSULB at a colloquium talk at LPS. He also visited his colleague, Prof. G. Seibold, and his student C. Martens in Cottbus, Germany and discussed with them the effect of electromagnetic radiation on heterostructures and strongly correlated materials. Finally, he continued working with 4 CSULB master's students, 2 of whom graduated in summer 2023 with a research-based thesis. Now back in the department, Andreas has already started offering projects to graduate and undergraduate students in the field of quantum geometry and topology in solids, and infusing these topic into the graduate E&M and Solid State classes he teaches.



Commencement 2024

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Commencement Awards (College)

Richard D. Green Dean Outstanding

Baccalaureate Award

Benjamin Estabrooks

**Graduate Dean's List of Outstanding
Scholars and Artists**

Deanna Diaz

(Group of Dr. Claudia Ojeda-Aristizabal)



CNSM Outstanding Thesis Award

Ryan Mizukami

(Thesis Advisor: Dr. Thomas Gredig)

Graduation Ceremony

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Department Highlights:

- 39 B.A./B.S. Graduates
- 18 M.S. Graduates
- Across all terminal Masters-granting institutions in the U.S. with a Physics program:
 - The highest percentage of undergraduates from under-represented groups (44%)
 - The highest percentage of women in graduate programs (23%)
 - The largest number of graduate and undergraduate students (combined)



Other Awards & Recognitions

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Richard D. Green Graduate Research Fellowship

Jose Camacho Osuna
Michelle McKenzie



Departmental Honors (Undergraduate)

Matthew Maldonado
Christian Castruita
Maria Maalouf
Jandrie Rodriguez

Departmental Honors (Graduate)

Daniel Torres
Derek Wingard
Armando Reynoso

Departmental Outstanding Service (Graduate)

Sylvia Chow

AAPT Outstanding Teaching Assistant

Henry Sundland

Department Outstanding Teaching Associate

Nick Franco



2023 Scholarship and Assistantship Dinner

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Thank You to all our Scholarship donors!

Scholarships

John E. Fredrickson Endowed Scholarship
Camille Beard

Olaf and Mary Jane Anfinson Endowed Scholarship
Rachel Perelgut, Ivy Boiko, Eriel Jan Jasmin,
Kate Ramirez, Trevor Weiss, Ahmad Zaghari

Physics and Astronomy Department Scholarship
Michelle McKenzie, Bailey Branam, Jason Spada,
Jonathan Strange, Miguel TzinTzun

Keung Luke, Charles Roberts and Richard Whiteley
Endowed Scholarship
Kaeden Russell

Kevin Kwok Chan, HK Alumni, Keung Luke
Endowed Scholarship
Brian Wilcox

John and Terry Milligan Scholarship in Physics
Movindu Kawshan Dissanayake

Richard and Florence Scalettar Scholarship
Benjamin Estabrooks, Nathan Kim

Irene Howard and Keung Luke Endowed Scholarship
Adam Bowen

Congratulations to all the awardees!

Thank You to all our Assistantship donors!

Assistantships

Google Summer Assistantship
Movindu Dissanayake, Rachel Perelgut,
Kaeden Russell

Margaret Heeb Student Research
Assistantship
Fernanda Razo

John Turner Assistantship
Jose Chavez

Lai Kai Gunn, Ng So-Ning and Keung Luke Assistantship
Tyler Hadsell

Kristina T.L. Wong, L. Desmond Wong, Nancy F. Wong,
Pamela T. M. Wong Rennick and Keung Luke Assistantship
Gio Rosales

Giesela and Wilfried Eckhardt Endowment
Jameson Jewell

Simon George and Keung Luke
Assistantship
Alan Mejia

Daniel and Grace Lim and Keung Luke
Assistantship
Emiliano Benitez

Congratulations to all the awardees!

In Memoriam

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Dr. Hitoshi Nishino

Dr. Nishino passed away unexpectedly in January 2024. He was a trustworthy colleague in his teaching. He never missed a class and was always prepared. Colleagues recall that he was very precise in his teaching and his writing on the board was always very clean; an example to others in this respect. He taught in the traditional method, the way many faculty learned physics. Dr. Nishino's generational, cultural, and scientific background informed his teaching.

When he was not teaching, he worked in his office wrestling with physics and solving difficult problems. Over the years he published regularly and consistently, mostly with Dr. Subhash Rajpoot. He was a man of few words but spoke through his excellent work. The department honors his memory for his many contributions to Physics research and teaching.



Dr. Hooshang Tahsiri

Dr. Tahsiri passed away in April 2024. Dr. Tahsiri received his PhD in Plasma Physics from UC Irvine in 1976 and joined the department in the early 1980s, teaching classes at various levels until his retirement in 2012. He was also a lecturer at UC Irvine for a large part of his career, which saw him obtain patents and publish many papers. In addition, he received support from the NSF for standards-based teacher education.

He left Iran decades ago in a time of turmoil and worked as a Physics lecturer and inventor in the US. His strong background meant he was able to teach pretty much any class of the undergraduate and graduate curriculum. He was flexible and always ready to help. He also played a key role in the early ideas and implementation of computational physics in the department. We honor his memory for his contributions to the department.

Giving

The Department relies solely on private contributions to fund essential student enrichment activities. These include:

Faculty-mentored Research Experiences
Weekly Colloquia Featuring Visiting Scientists
Training on State-of-the-Art Instrumentation
Rooftop Astronomy Nights & Outreach
Mobile Planetarium Trips & Maintenance
Scholarships & Assistantships

Student Clubs (SPS, Women in Physics, Astronomy Club)

Your generous contributions directly impact the quality of the educational experience we can offer our students. They play a crucial role in ensuring that diligent students receive the necessary financial support to stay on course and graduate with minimal to no debt.

Give online at www.giveto.csulb.edu



To establish a named scholarship or assistantship, create an endowment, or include the Department in your Will or

Trust, please call or email:

Christina Hall, Director of Development

562-985-1780

Christina.Hall@csulb.edu

We offer heartfelt thanks to our generous donors, named and anonymous, for their invaluable support. Your contributions towards enhancing educational experiences for our students are truly making a lasting impact. Thank you for championing the causes of Physics and Astronomy at CSULB, and acting as catalysts for change in our students' lives.

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