

ABRIDGED PROCEEDINGS
of the
Annual Meeting
of the
PACIFIC DIVISION of AAAS

Volume 35, Part I

21 May 2016

ABRIDGED MEETING PROGRAM

***Includes GENERAL INFORMATION and
full SCHEDULE of PRESENTATIONS.***

***Does not include ABSTRACTS or other meeting information included
in the Proceedings that meeting registrants receive at registration.***

**97th Annual Meeting of the Pacific Division of the
American Association for the Advancement of Science**

***University of San Diego
San Diego, California
14 – 17 June 2016***

*Accurate as of 22 May 2016.
Times and/or locations of events may change.
Please refer to the “Program Updates” flyer for updated information.*

Celebrating 100 Years of Meetings

97th Annual Meeting Program at a Glance

Tuesday through Early Thursday Morning

Unless otherwise noted, all events take place in the Kroc Institute for Peace and Justice (KIPJ)

TUESDAY, 14 JUNE

NOON – 5:00 p.m. Field Trip: Ramona Winery Exploration – meet in front of KIPJ

2:00 p.m. – 6:00 p.m. Registration KIPJ Rotunda

6:30 p.m. AAAS Pacific Division Presidential Address KIPJ Theatre

7:30 p.m. USD President's Reception KIPJ Rotunda

8:15 p.m. Student Judges Meeting KIPJ-E

WEDNESDAY, 15 JUNE

7:30 a.m. – 4:30 p.m. Registration KIPJ Rotunda

7:55 a.m. – 5:00 p.m. Symposium: *Recent Advances in Turbulence Research: Experiments, Theory, and Computations* KIPJ-E

8:20 a.m. – NOON Symposium: *Pharmaceutical Research and Development: From Bench to Patient Care* KIPJ-217

8:30 a.m. – 5:00 p.m. Symposium: *Not Just A Walk in the Park: Ecology and Education in Mission Bay, San Diego* KIPJ-218

8:50 a.m. – NOON Symposium: *Law Enforcement with Ethnographically Diverse Communities in the 21st Century using Forensic Psychological Science: A Culturally Responsive International Paradigm* KIPJ-F

8:50 a.m. – 5:00 p.m. Symposium: *Quantum Retrocausation III, Day 1* KIPJ-D

8:50 a.m. – 5:10 p.m. Symposium: *Boise Extravaganza in Set Theory (BEST 2016), Day 1* KIPJ-G

9:00 a.m. – 5:00 p.m. Symposium: *Particles in the San Diego Atmosphere: Reactions, Properties, Climate, and Health* KIPJ-C

9:00 a.m. – 11:20 a.m. Contributed Oral Session 1 KIPJ-219
Chemistry and Biochemistry
Earth Sciences

9:00 a.m. – 11:40 a.m. Contributed Oral Session 2 KIPJ-220
General and Interdisciplinary
Materials Science
Physics

9:00 a.m. – 11:30 a.m. Poster Session 1 KIPJ-A&B
Agriculture, Food, and Renewable Resources
Ecology, Environmental Sciences, and Sustainability
Education
Evolution, Organismal Biology, and Biodiversity
General and Interdisciplinary
Psychology
Science and the Arts and the Humanities
Social, Economic, and Political Sciences

10:15 a.m. – 4:30 p.m. Symposium: *How Ocean Acidification and Ocean Warming Could Influence the Functional Morphology and Ecology of Intertidal Organisms* KIPJ-H

1:00 p.m. – 3:30 p.m. Poster Session #2 KIPJ-A&B
Anthropology and Archaeology
Atmospheric and Hydrospheric Sciences
Chemistry and Biochemistry
Ecology, Environmental Sciences, and Sustainability
Materials Science
Mathematics
Physics

1:20 p.m. – 3:00 p.m. Contributed Oral Session 3 KIPJ-219
Anthropology and Archaeology
Ecology, Environmental Sciences, and Sustainability
Evolution, Organismal Biology, and Biodiversity

1:20 p.m. – 3:20 p.m. Contributed Oral Session 4 KIPJ-220
Social, Economic, and Political Sciences

1:20 p.m. – 5:00 p.m. Symposium: *Library Science Symposium: The Evolving Library, Day 1* KIPJ-I

1:30 p.m. – 3:30 p.m. Symposium: *Forensic Psychological Science on the Violence of Terroristic Groups: an Antiterrorism Threat Assessment Program* KIPJ-F

2:00 p.m. – 4:30 p.m. Symposium: *Recent Advances in Pharmacology and Toxicology* KIPJ-217

5:15 p.m. Reception: Pre-Town Hall Reception KIPJ Rotunda

6:00 p.m. AAAS Town Hall KIPJ Theatre

7:00 p.m. Reception: Post-Town Hall Reception KIPJ Rotunda

THURSDAY, 16 JUNE

7:30 a.m. – 4:00 p.m. Registration KIPJ Rotunda

8:30 a.m. – 4:30 p.m. Symposium: *Library Science: The Evolving Library, Day 2* KIPJ-I

8:50 a.m. – 11:30 a.m. Symposium: *Theory, Experiment and Computations: A Synergistic Approach to Research* KIPJ-F

8:50 a.m. – 5:00 p.m. Symposium: *Limits to the Second Law of Thermodynamics, Day 1* KIPJ-C

8:55 a.m. – 3:30 p.m. Symposium: *Quantum Retrocausation III, Day 2* KIPJ-D

9:00 a.m. – NOON Symposium/Workshop: *Mentoring and Deeper Learning in STEM Education* KIPJ-217

9:00 a.m. – 4:25 p.m. Symposium: *Boise Extravaganza in Set Theory (BEST 2016), Day 2* KIPJ-G

97th Annual Meeting Program at a Glance

Thursday Afternoon through Friday

THURSDAY, 16 JUNE, con't.

9:00 a.m. – NOON Workshop: *An Introduction to Grant-Writing for Foundations* KIPJ-H

9:00 a.m. – 11:30 a.m. Poster Session #3 KIPJ-B
*Cell and Molecular Biology
Engineering, Technology, and Applied Science*

10:00 a.m. – 12:30 p.m. Exhibit: *Scientific Maker Exhibit*
KIPJ-A

12:15 p.m. – 1:30 p.m. AAAS Forum: *Professional Development and Career Services Forum* KIPJ-E

1:20 p.m. – 5:00 p.m. Symposium: *Current Understanding and Data Gaps for Bahía de los Angeles, an International Biosphere Reserve* KIPJ-H

1:20 p.m. – 5:00 p.m. Symposium: *Innovative Methods from the Humanities and Sciences to Communicate Climate Change Solutions* KIPJ-217

1:20 p.m. – 4:30 p.m. Symposium: *Conducting Mental Health Research in the Community Setting for the Benefit of Underserved Populations* KIPJ-F

1:20 p.m. – 2:40 p.m. Contributed Oral Session #5 KIPJ-219
Engineering, Technology, and Applied Science

1:20 p.m. – 3:00 p.m. Contributed Oral Session #6 KIPJ-220
*Education
History and Philosophy of Science*

1:30 p.m. – 5:00 p.m. Symposium: *Scientific Maker Symposium*
KIPJ-B

3:00 p.m. Student Presentation Judges' Meeting KIPJ-E

6:15 p.m. – 9:30 p.m. Annual Student Awards Banquet University Center Forum C

FRIDAY, 17 JUNE

7:00 a.m. – 10:00 a.m. Pacific Division Council Meeting KIPJ Boardroom, Room 226

7:30 a.m. – 4:00 p.m. Registration KIPJ Rotunda

8:20 a.m. – NOON Symposium: *Precision, Ambiguity, and Creativity in Science and the Arts* KIPJ-217

8:20 a.m. – 4:30 p.m. Symposium: *Bahía de San Quintín: The Status, Threats, and Solutions for One of the Last Intact Coastal Lagoons in Western North America* KIPJ-H

8:50 a.m. – NOON Symposium: *United States World's Fairs and expositions: Seeing Fairs as More than Fun Places to Visit* KIPJ-F

8:50 a.m. – NOON Symposium: *Evaluating Return on Investment and Assessing Student Learning for Non-traditional Teaching Activities* KIPJ-I

8:55 a.m. – 1:00 p.m. Symposium: *Limits to the Second Law of Thermodynamics, Day 2* KIPJ-C

9:20 a.m. – 3:30 p.m. Symposium: *Philosophers of Biology Engaging the Biosciences* KIPJ-G

9:50 a.m. – NOON Symposium: *At the Crossroads of Global Water Issues: An Interdisciplinary Perspective* KIPJ-D

12:15 p.m. – 1:30 p.m. AAAS Forum: *Professional Development and Career Services Forum* KIPJ-E

1 p.m. – 5:00 p.m. Symposium: *Historical Perspectives on the Sciences* KIPJ Theatre

5:00 p.m. – 9:00 p.m. Field Trip: *San Diego Microbrewery Field Trip* Departs from in front of KIPJ

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GENERAL INFORMATION

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Sigma Xi, The Scientific Research Society
Agriculture, Food and Renewable Resources
Anthropology and Archaeology
Atmospheric and Hydrospheric Sciences
Cell and Molecular Biology
(including medical and dental research in these areas)
Chemistry and Biochemistry
Computer and Information Sciences
Earth Sciences
Ecology, Environmental Sciences and Sustainability
Education (Science and Technology)
Engineering, Technology and Applied Sciences
Evolution, Organismal Biology and Biodiversity
General and Interdisciplinary
History and Philosophy of Science
Materials Science
Mathematics
Physics
Psychology
Science and the Arts and Humanities
Social, Economic and Political Sciences
(including health services)

SAN DIEGO and the UNIVERSITY of SAN DIEGO

San Diego

With a near-perfect climate, 70 miles of beaches, and mountains and deserts just a short drive away, San Diego draws more than 26 million visitors each year. Known for its countless year-round outdoor activities, San Diego is packed with unique pursuits in the water, on the trails and in the sky. The University of San Diego is just minutes from sailing, windsurfing, kayaking and a host of other water sports. All of the city's beaches are ideal for surfing, body boarding, snorkeling, or simply soaking up rays on sand warmed by the ever-present sun.

Hundreds of miles of trails and parks wind throughout San Diego County, ranging from oceanfront land to mountain pine forests, making it very easy to backpack, hike, camp or rock climb in a variety of elevations and environments. The Pacific Crest Trail, which works its way through 150 miles of San Diego backcountry in its trek from Mexico to Canada, is designated one of America's National Scenic Trails.

San Diego has many attractions, including the world-famous San Diego Zoo and Wild Animal Park. Additionally,

the 148-year-old Balboa Park is a 1,200-acre oasis in the heart of the city, complete with 15 museums, eight gardens and the acclaimed Old Globe Theatre. San Diego is also home to one of only three Olympic training centers in the nation. And its coastal waters offer an exceptional seasonal experience: a first-rate vantage point from which to witness the annual migration of gray whales from Alaskan seas to Mexican lagoons.

University of San Diego

The University of San Diego (USD) is a Roman Catholic institution of higher learning. Presently enrolling more than 8,350 students (as of Fall 2014), it is known for its commitment to teaching, the liberal arts and the formation of values and community service. The university adds depth to education by inspiring students to grow spiritually, morally and socially.

USD's 180-acre campus, Alcalá Park, sits atop a mesa overlooking San Diego's Mission Bay and the Pacific Ocean. The university campus is a community treasure, with Spanish Renaissance inspired buildings and breathtakingly beautiful landscapes, including the spot where Father Junipero Serra founded the first Catholic mission in Alta California more than 247 years ago. Like California's oldest city, the university took its name from San Diego de Alcalá, a Franciscan brother from Alcalá de Henares, a monastery near Madrid, Spain. The Spanish Renaissance architecture that characterizes Spain's five-century-old University of Alcalá serves as the inspiration for all buildings on the USD campus.

Under the leadership of Mother Rosalie Hill of the Society of the Sacred Heart and Bishop Charles Francis Buddy of the Diocese of San Diego, the University of San Diego began as separate colleges for men and women. Chartered in 1949, the first classes met in 1952 and the School of Law opened its doors in 1954. By the late 1960s it became clear that both colleges would benefit from combining academic resources. In 1972 the University of San Diego became a single coeducational university.

Now governed by a board of trustees independent from the founding organizations, USD welcomes students, faculty and staff of diverse religious traditions and remains dedicated to the values originally articulated by Mother Hill and Bishop Buddy.

USD Students

Though the beach is nearby, USD is a serious academic institution. And while the campus itself is stunning, the people truly make the difference. For Fall 2015, more than 13,000 candidates vied for 1,100 freshman openings. The median incoming freshman this past Fall held a 3.84 GPA and had a 1208 SAT score. Yet each student is unique and selected

on expressions of diversity, leadership, service, talent, and essential human character.

Of great significance to USD students are small class sizes; great, accessible faculty; and fantastic lab facilities. Students choose from more than 78 undergraduate and graduate degree programs in academic divisions, including the College of Arts and Sciences and the schools of Business Administration, Leadership and Education Sciences, Law, and Nursing and Health Science. The Joan B. Kroc School for Peace Studies, in which this meeting will take place, was inaugurated in 2007.

Natural Sciences at USD

The natural sciences at USD include four departments: Biology, Chemistry and Biochemistry, Physics and Biophysics, and Environmental and Ocean Sciences. Curricula in the sciences are centered on the belief that students learn best when theoretical concepts are combined with hands-on experience. Students in the sciences take numerous lab and field courses, which provide opportunities to learn useful techniques and participate in the scientific process. Many students carry out research and perform internships that complement their formal course work. Interdisciplinary collaborations are common among faculty and students in different departments.

Interdisciplinary interactions are enhanced by the inclusion of all four science departments in the Donald P. Shiley Center for Science and Technology, which opened in 2003. The Center contains classrooms, offices, and modern labs that are used for teaching as well as faculty and student research. It is equipped with state-of-the-art instrumentation and equipment, including 500 MHz and 400 MHz nuclear magnetic resonance systems, a high pressure liquid chromatography – mass spectrometer, gas chromatography – mass spectrometry instruments, atomic analyzers, a nutrient analyzer, a bomb calorimeter, and a laser particle sorter. Microscopic resources include, among the usual assortment of compound and dissecting microscopes, scanning and transmitting electron microscopes and an atomic force microscope.

Several facilities were constructed for specialized functions, including a seawater system with two 2,000 gallon tanks, environmental chambers, aquarium room, a laser laboratory, and a greenhouse with five rooms with independent climate controls. Research and teaching collections include terrestrial and marine vertebrates, marine invertebrates, insects and an herbarium. A 16-foot research vessel is available for marine science investigations.

ANNUAL MEETING

TRAVEL TO USD

Coming from the North:

- Driving south on I-5 South, exit Sea World Dr./Tecolote Rd.
- Proceed left at stoplight toward Morena Blvd.
- Turn right on Morena.
- Turn left on Napa.
- Turn left on Linda Vista Rd.
- Travel to the second stoplight to USD's east entrance, turn left and enter campus.

Coming from the South (or the airport):

- Driving north on I-5 North, exit Morena Blvd. (signs will say: "Morena Blvd. use I-8 East").
- Stay to the right and follow the signs for Morena Blvd.
- Take the first right onto Linda Vista Rd.
- Travel to the third stoplight to USD's east entrance, turn left and enter campus.

Coming from the East:

- Driving west on I-8 West, exit at Morena Blvd.
- Turn right onto Linda Vista Rd.
- Travel to the third stoplight to USD's east entrance, turn left and enter campus.

PARKING ON THE USD CAMPUS

Parking is available for meeting attendees on the west end of the USD campus (please refer to building #2 on the campus map on the back cover of these *Proceedings*). All cars parked on campus must have a parking permit. A one-day guest permit at no cost may be picked up at the kiosk on the way onto campus.

If you will be on campus for more than a single day, a permit valid Tuesday, 14 June through Friday, 17 June may be printed in advance at no cost by following directions on the Division's Travel web page by entering this URL into your browser: <http://associations.sou.edu/aaaspd/2016SANDIEGO/Travel16.html> or by clicking on the QR code to the right. Note that you will need to first create a USD account and then you will be able to request the permit.

If you or someone you know will be coming onto campus only on Friday, 17 June, a one-day, no cost permit for that date may be printed in advance by following directions on the Division's Travel web page by entering this URL into your browser: <http://associations.sou.edu/aaaspd/2016SANDIEGO/Travel16.html> or by clicking on the QR code to the right. Note that you will need to first create a USD account and then you will be able to request the permit.

Computers are available at the Registration Center to print parking permits for those who come onto campus for more than one day but haven't yet printed a permit.

REGISTRATION CENTER AND REGISTRATION

The Registration Center is located in the rotunda of the Kroc Institute for Peace and Justice (#12 on the map on the back cover of these *Proceedings*). Hours of operation are the following:

Tuesday: 2:00 p.m. – 6:00 p.m.

Wednesday: 7:30 a.m. – 4:30 p.m.

Thursday: 7:30 a.m. – 4:00 p.m.

Friday: 7:30 a.m. – 4:00 p.m.

All persons attending the meeting are expected to register for the meeting. On-site registration fees for the full meeting are: professional, \$135.00; program planners/presenters, \$90.00; K–12, community college teachers, post-docs, students¹, retirees/emeritus, and unemployed \$67.50; participating spouses and/or family members, \$45. One-day on-site professional registration is \$90.00. Note that If you attend more than one day, you must pay the full registration fee.

The first ten K–12 and community college instructors that registered in advance (by 27 May) for this meeting were able to receive, upon request, a \$75.00 stipend to help defray their expenses to attend the meeting. The stipend is not available to teachers who register on-site. Note that to receive the stipend teachers must have checked the appropriate box on the Advance Registration Form. We wish to acknowledge and thank Bourns, Inc., Riverside, CA and the Bourns revocable trust for providing the funds to make these stipends available this year.

Students were given the opportunity to apply for travel awards of up to \$150 each to help defray their costs for coming to the meeting to present the results of their own research.

About field trips: Due to limited seating in vehicles and the need to inform some destinations of the number of people arriving, pre-registration was required for all field trips. If you didn't pre-register for a particular field trip in which you are interested in participating, please inquire at the Division's Registration Center to see if space is still available. At least one member of a family group requesting a field trip must be a paid meeting registrant. Participants who are not registered for the meeting will be charged a one-time \$10 field trip registration fee in addition to the fee for the field trip.

About workshops: All workshops at this meeting are available without additional charge to meeting registrants. Some workshops have limited space and persons indicating their interest on the Advance Registration Form will have priority in attending should a workshop fill.

About refunds: Requests for refunds must have been made in writing and received in the Pacific Division office no later than 10 May 2016. Under extreme hardship conditions beyond a registrant's control, requests for refunds may be honored beyond this date if presented in writing with an

¹Students receive a one-year student membership in AAAS, which includes all member benefits including on-line access to *Science* magazine, with payment of their registration fee for this meeting. Current student members will receive a one-year extension to their membership. Filled out membership form must accompany registration form.

adequate explanation of the hardship that precipitated the request for the refund. A \$15 handling fee is applied to all refunds. An additional 3.5% deduction is applied to the total amount for credit card refunds.

MESSAGES

To leave a message for a meeting registrant or to contact the AAAS, Pacific Division staff, call 541-292-1115. Please note that this line will be monitored only between the dates of 11 June and 18 June. Thereafter, please use the regular Pacific Division number, 541-552-6869, or email, aaaspd@sou.edu, in order to contact Pacific Division staff.

BREAKS

Mid-morning and mid-afternoon breaks are scheduled each day, as appropriate. Refreshments will be served in or just outside of the rotunda in KIPJ. We wish to thank the Academic Administration of the University of San Diego for providing funds to support refreshments at these breaks.

ON-CAMPUS MEETING HOUSING

A limited number of rooms in Maher Hall campus housing were available for participants at this meeting. Individual rooms in Maher each have two beds and can accommodate one or two people. Each room has its own bathroom. Included in the basic housing package for three nights (Tuesday, Wednesday, and Thursday) is a meal card loaded with \$30 which can be used on campus to purchase breakfast or other food. Included in the basic housing package for four nights (Tuesday, Wednesday, Thursday, and Friday) is a meal card loaded with \$40 which can be used on campus to purchase breakfast or other food. Food will be available at several locations on campus. There is no refund for unused money on the card.

Additional nights stays in Maher, both pre- and post-meeting, were available but needed to be purchased in conjunction with a three- or four-night package. Extra nights do not include a meal card with additional money on it.

Although parking on campus for meeting attendees is generally being made available at no charge, those parking a car on campus while staying in Maher, are required to have purchased a parking permit, which is \$5 per day or \$25 per week.

OFF-CAMPUS MEETING HOUSING

There are no hotels adjacent to or really close to the USD campus. The Division contracted for special meeting rates with three hotels that are fairly close to campus, the Days Inn (formerly Days Hotel) on the I-8 Hotel Circle (about three miles from USD), the Four Points by Sheraton (formerly a Hampton Inn and about one and three-quarters mile from USD), and The Dana on Mission Bay (about four miles from USD). The first two hotels offer limited shuttle service to USD and back for registrants of our meeting.

Reservations for off-campus housing should have been

made directly with the hotel. Note that the AAAS, Pacific Division offers these hotels without endorsement for any specific commercial enterprise.

Information about campus housing and also contracted housing at the Days Inn (Hotel), Four Points by Sheraton, and The Dana on Mission Bay, including such things as contact information, web links and links for reservations, is available on this Division web page: <http://associations.sou.edu/aaaspd/2016SANDEGO/Housing16.html> or click on the QR code to the right.

FOOD SERVICES ON CAMPUS

The USD campus has several locations where food may be purchased. The most convenient is Torero Tu Go, a food truck that is expected to be situated in front of our meeting site, the Kroc Institute for Peace and Justice (#12 on the campus map on the back cover of these *Proceedings*). This truck is expected to be available for lunch purchases Monday – Friday.

Other on-campus food locations include:

La Gran Terraza, located on the second floor of the University Center (#33 on the campus map), which offers a two to three course ‘business lunch’ prix fixe buffet in addition to the regular a la carte menu.

Pavilion Dining, located on Level 1 of the Student Life Pavilion (#34 on the campus map), which offers a variety of choices including Classical American, authentic Mexican, authentic Chinese, traditional Vietnamese and Thai dishes, etc.

Tu Mercado, located on Level 2 of the Student Life Pavilion (#34 on the Campus Map), which offers a grocery market, deli and espresso bar.

MEETING ROOMS, COMPUTERS, AND POWERPOINT PRESENTATIONS

Technical sessions will meet in the Kroc Institute for Peace and Justice, #12 on the back cover of these *Proceedings*. All meeting rooms are equipped with computers running Windows and Microsoft PowerPoint, and will be connected to computer projectors. Speakers requiring other specialized equipment such as slide or overhead projectors must have made their requests known when submitting their abstracts. If available, specialized equipment will be provided. If rental costs are incurred, payment of these costs will be the responsibility of the requestor.

If you are planning to use PowerPoint for your presentation, you must make sure that it will run properly on the Windows platform. Only CD-ROMs and thumb/USB/flash drives may be used to load presentations onto the computers. If you are preparing your presentation on a Macintosh computer, make sure it will load to a computer running Windows and that it looks on that platform the way you want it to appear.

Should a presenter wish to use their own laptop computer for their presentation, it is possible to connect the laptop directly to the LCD projector via a standard VGA port. It is the responsibility of the presenter doing this to supply any

needed adapters to connect their computers to the VGA cable of the LCD projector.

STUDENT AWARDS FOR EXCELLENCE

The AAAS, Pacific Division offers each affiliated society and section participating in the annual meeting the opportunity to recognize outstanding student participants through the presentation of Awards of Excellence and cash prizes of \$150 for first place (minimum judging pool of 3 presentations), \$100 for second place (minimum judging pool of 6 presentations), and \$50 for third place (minimum judging pool of 9 presentations). This year, due to a generous donation by an anonymous donor, these monetary awards will be increased, probably by about \$25 for each category. However, we won’t know exactly how much until we have determined how many of each type of award has been given at the meeting. In addition to the monetary awards, each winner receives a certificate of recognition.

In 2016, seven division-wide awards may be available: Laurence M. Klauber Award for Excellence (unrestricted); Geraldine K. Lindsay Award for Excellence in the Natural Sciences; J. Thomas Dutro, Jr. Award for Excellence in the Geosciences; Presidents Award for Excellence (unrestricted); Rita W. Peterson Award for Excellence in Science Education Research; Best Poster Award (for posters only but otherwise unrestricted); and the AAAS–Robert I. Larus Travel Award, which will provide a reimbursement for travel and other meeting related expenses up to \$1,000 for the awardee to attend the national meeting of AAAS in Boston, MA, 16 – 20 February 2017 for the purpose of presenting his/her winning presentation as a poster. The Klauber, Lindsay, Dutro, Presidents, Peterson, Best Poster, and Larus awards are given to those students whose presentations are judged the most significant in the advancement or understanding of science.

To be eligible for a sectional award or one of the division-wide awards, a student must be registered for the meeting prior to the session in which his/her presentation is to be judged, be the primary presenter of the presentation, and be the principal research investigator of the subject of the presentation. Student presentations, both oral and poster, are judged on their abstracts, content, style of delivery or presentation, and audiovisual aids and/or handouts (if used). Sample evaluation forms for both oral and poster presentations are posted on the Division’s meeting web page (<http://associations.sou.edu/aaaspd/2016SANDEGO/index.html>). Students who are competing for Awards of Excellence were invited to be guests of the Division at the annual banquet Thursday evening, 16 June 2016. Festivities that evening include the announcement of student awards. If you are a student in competition for an Award of Excellence and you do not have a ticket for the banquet, please inquire at the Registration Center to determine whether or not a ticket is available.

PLENARY LECTURES

Tuesday, 6:30 p.m. in the KIPJ Theatre. Dr. Frank Jacobitz, President of the AAAS, Pacific Division and Professor of Engineering, Shiley-Marcos School of Engineering, University of San Diego, will kick off the Division's annual meeting by presenting the annual Pacific Division Presidential Address, "*Why do Stars Shine? A Personal Journey of Engaging Science.*" For details, please refer to page 91 in these *Proceedings*.

Friday, 1:00 p.m. to 5:00 p.m. in the KIPJ Theatre.

Join us in the celebration of 100 years of annual meetings of the Pacific Division with a series of short talks highlighting historical aspects of various fields of science and scientists. Each 20 to 25 minute talk will highlight a different topic. Please turn to page 71 in these *Proceedings* for a complete listing of the times for the presentations and page 91 for an abstract for each talk.

1:00 p.m. Hobbies Among Early Sigma Xi Members, presented by Dr. George Edw. Seymour.

Dr. Seymour holds B.A., M.A., and Ph.D. degrees in Psychology. Both his Master's thesis and Doctoral dissertation were fundamentally statistical and broke new ground. Having served four years on active duty in the Navy, most of his 30+ years' work experience continued to be in Navy research laboratories. He also taught undergraduate and graduate courses in the Management Departments at California State University, Northridge, the University of San Diego, and the University of Southern California. Occasionally Dr. Seymour served as a consultant for organizations such as Disney, the San Diego County Department of Education, and a Japanese documentary movie company. He has more than 40 publications to his name and numerous work-related awards. His leadership experience, which began in the Navy, continued through his academic education and teaching, and then into the research labs where he led teams for a wide variety of research projects for the Department of Defense. During the past decade, he has created many webpages, including the useful Virtual San Diego (<http://www.2-sir.com/VirtualSanDiego/>). Dr. Seymour is a long-standing Board member of the San Diego chapter of Sigma Xi and is also the immediate Past-President of the chapter.

1:30 p.m. Thermodynamics and Life, presented by Dr. Andrew Rex, Department of Physics, University of Puget Sound.

Dr. Rex was born and raised in Peoria, Illinois. Like many other children of the 1960s and 1970s, his first encounter with physics came by watching the progress of the manned space program, culminating in lunar landings. After a first taste of academic physics in high school, Dr. Rex attended Illinois Wesleyan University, where he studied physics and followed other academic passions. He went on to graduate school at the University of Virginia, earning a PhD in 1982 after doing research in novel superconducting compounds. This afforded him a firsthand encounter with extremely

low temperatures: 15 K and lower, using liquid helium as a refrigerant.

After graduate school Dr. Rex became a professor at the University of Puget Sound. One day while preparing to teach a modern physics class unit on statistical physics, he read about Maxwell's demon and decided it would be a good example for the class. Now more than 30 years later, it's still a good example for physics students or anyone who wants to understand the Second Law of Thermodynamics. Over this time he has written several articles and two books on the subject, often in collaboration with Harvey Leff. In addition to his work on statistical physics and thermodynamics, he has published several textbooks, including *Modern Physics for Scientists and Engineers* (now in its fourth edition) with co-author Steve Thornton.

2:00 p.m. Interdisciplinary Water Quality Research Through the Lens of the Liberal Arts, presented by Dr. James Bolender, Department of Chemistry, University of San Diego.

Dr. Bolender earned his PhD in Physical Chemistry from the University of Virginia in 1994. He arrived at the University of San Diego in 1996 after post doctoral work at the Pennsylvania State University. Over the past 16 years, he has worked on projects involving water quality issues around the globe. These water quality monitoring projects include the pollution impact of a tuna and sardine cannery in Puerto San Carlos, Baja California Sur, Mexico, the impact of arsenic and other metals on the water quality of Uganda, and surveys of water quality in Kenya and Jamaica. All of these projects are interdisciplinary by nature, and call upon the collaborative expertise of colleagues in various disciplines. In addition to these environmental projects, Dr. Bolender actively pursues projects in the realm of nano materials based upon the rare earth metals. These materials have potential as MRI contrast agents and "green" high-efficiency phosphors. Dr. Bolender has been recognized for his outstanding teaching with the USD Davies Award for Teaching Excellence in 2007 and the Mens et Spiritus Award as Honors Professor of the Year in 2012. Additionally he has been recognized for his integration of the Liberal Arts in his research by being named the Knapp Chair of the Liberal Arts at USD in the 2015-16 academic year.

2:30 p.m. Climate Change Communication: The Need for Interdisciplinary Efforts and Innovative Resources to Reach Diverse Audiences, presented by Dr. Michel A. Boudrias, Department of Environmental and Ocean Sciences, University of San Diego.

Dr. Michel Boudrias has been Department Chair of Environmental and Ocean Sciences at the University of San Diego since 2006. He teaches courses in marine biology and coastal environmental science. His primary research area focuses on long-term ecological studies of shallow-water coastal habitats impacted by human activities at several locations around the world. He has been very active as the

Academic Director of Sustainability, where he is responsible for long-term strategic planning and implementation of inter- and multidisciplinary courses and research projects related to sustainability and climate change education both across the curriculum and across academic units. Since 2010, Dr. Boudrias has been the Principal Investigator on two prestigious National Science Foundation grants dedicated to climate change education for decision makers and key influential leaders. He leads Climate Education Partners (CEP), a team of climate and social scientists, formal and informal educators, policy makers and community leaders dedicated to informing San Diego about the impacts of climate change and how we can work together to find creative solutions to maintain our quality of life for future generations. CEP has been implementing innovative communication strategies and using newly developed climate science educational materials, strategies and approaches on unique place-based climate tours, in outreach to diverse communities of leaders (business, elected officials, tribal groups), and integrating decision makers directly into video resources. The ultimate goal of both Climate Education Partners and the broader Climate Change Education Program Alliance is to replicate our educational models and expand their scope to a national scale.

3:00 p.m. Break

3:30 p.m. *The Evolution of Drug Discovery: Past, Present, and Future Perspectives*, presented by Dr. Jozef Stec, Department of Pharmaceutical Sciences, College of Pharmacy, Marshall B. Ketchum University.

Dr. Stec is an Associate Professor of Medicinal Chemistry at Marshall B. Ketchum University College of Pharmacy. Prior to his current position, he was an Assistant Professor of Medicinal Chemistry at Chicago State University College of Pharmacy. He obtained education and training in Molecular and Pharmaceutical Biotechnology, earning an M.Sc. with Honors from Gdansk University of Technology, Poland, training in Organic and Organometallic Chemistry, culminating in a PhD from the University of Southampton, England, UK, and Postdoctoral training in Synthetic Medicinal Chemistry at the University of Illinois at Chicago, USA. Dr. Stec's research interests are in the field of widely understood synthetic organic and modern medicinal chemistry with the emphasis on discovery and development of new drug candidates suitable to combat tuberculosis and other infectious diseases. His research findings have been published in several international peer-reviewed journals. Throughout his academic career, Dr. Stec has been teaching the principles of organic and medicinal chemistry as well as mentoring students at the undergraduate and graduate/professional levels. Dr. Stec is involved in numerous internal and external service activities and he is an active member of professional associations, a few of which are The American Association for the Advancement of Science (AAAS), The American Chemical Society (ACS), and The American

Association of Colleges of Pharmacy (AACP).

4:00 p.m. *The Autodigestion Hypothesis*, presented by Dr. Geert W. Schmid-Schönbein, Department of Bioengineering, University of California, San Diego.

Dr. Schmid-Schönbein is Distinguished Professor and Chairman of the Department of Bioengineering at the University of California, San Diego (UCSD). He studied physics as undergraduate at the Justus Liebig University in Giessen, Germany, and received his Ph.D. degree in Bioengineering at UCSD. Following three years as Post-doctoral Fellow at Columbia University, New York, he joined the faculty of the Department of Bioengineering at UCSD in 1979 where he has since served.

He teaches bioengineering of living tissues and biomechanics. He is a Founding Member of AIMBE, former President of the Biomedical Engineering Society, the Microcirculatory Society and the North American Society of Biorheology, Fellow of the American Heart Association, the Biomedical Engineering Society, the Physiological Society, and the International Federation for Medical and Biological Engineering. He is Past Chair of the US National Committee on Biomechanics and Past Chair of the World Council for Biomechanics and a Member of the US National Academy of Engineering.

He published over 384 original peer-reviewed research reports, several books and patents. He is the 2008 Landis Award winner of the Microcirculatory Society, the recipient of the 2009 Outstanding Educator Award in the National Engineering Week, and the 2015 Poiseuille Award winner of the International Society for Biorheology.

He has a long-standing research interest in Molecular/Cell Mechanics and bioengineering analysis of the microcirculation in human disease. His research team pioneered the role of inflammatory mechanisms in heart disease, stroke, diabetic retinopathy and other forms of pathophysiology. Recently they discovered a fundamental mechanism for cell dysfunctions and inflammation due to "Auto-digestion." The team proposed a previously unrecognized mechanism for Shock and Multi-organ Failure and also discovered a mechanism for Type II Diabetes, Hypertension and co-morbidities in the Metabolic Syndrome X due to unchecked degrading protease activity.

4:30 p.m. *How to Engage the Liberal Arts by Capturing the Sciences*, presented by Dr. Noelle Norton, Dean, College of Arts and Sciences, University of San Diego.

Noelle Norton, PhD, was named dean of the College of Arts and Sciences in 2013. Norton joined the University of San Diego faculty in 1994, and had previously served as associate dean, co-director of USD's Living Learning Communities program, and director of the Honors Program while maintaining her faculty role in the Department of Political Science and International Relations. Under her leadership, the College of Arts and Sciences is addressing the advancement of liberal arts at USD; revising its core curriculum; creating new interdisciplinary programs; and

implementing new methods for including adjunct faculty in the USD community.

Norton has been published in the journals *Congress and the Presidency*; *Political Research Quarterly*; *Policy Studies Journal*; *Legislative Studies Quarterly*; *Women and Politics*; *Journal of the History of the Behavioral Sciences*; *Policy Studies*; and two edited volumes, Gender, Power, Leadership and Governance (Kelly/Duerst-Lahti, 1995) and Women Transforming Congress (Rosenthal, 2003). She is also the author of Creating Gender: The Sexual Politics of Welfare Policy with Georgia Duerst-Lahti and Cathy Johnson (Lynn Reinner Press, 2007). Norton is co-authoring a paper and edited volume on U.S. congressional handling of international women's rights legislation.

RECEPTIONS, EVENTS AND AWARDS BANQUET

Tuesday Evening USD President's Reception. 7:30 p.m. – 8:45 p.m. in the KIPJ Rotunda.

Sponsored by USD President Dr. James Harris, this event follows directly after the close of the AAAS, Pacific Division Presidential Address. Please join us for a convivial time of being welcomed to USD and the annual meeting as well as networking and visiting with old and new friends. All meeting registrants and their families are invited. Be sure to wear your name badge to this event.

Wednesday Evening Pre-Town Hall Reception. 5:15 p.m. – 6:00 p.m. in the KIPJ Rotunda.

Join us for a pre-Town Hall reception, hosted by AAAS and the Pacific Division. Help us toast AAAS members present at this meeting. Light refreshments will be served in addition to a champagne toast. All meeting registrants and their guests, as well as AAAS guests, are invited.

Wednesday Evening Town Hall with Dr. Rush Holt. 6:00 in the KIPJ Theatre.

Hear from Dr. Rush Holt about the history of AAAS and Dr. Holt's vision for the future of AAAS and science. Attendees will be given the opportunity to ask Dr. Holt questions and provide their own suggestions for engaging the public, communicating their work, or influencing society.

Wednesday Evening Post-Town Hall Reception. 7:00 p.m. – 8:15 p.m. in the KIPJ Rotunda. Following the Town Hall the evening continues with a post-Town Hall reception to include beer, wine, and finger foods. All meeting registrants and their guests, as well as AAAS guests are invited.

Thursday evening Student Awards Banquet. 6:15 p.m. – 9:30 p.m. in the University Center Forum C (UC Forum C).

Tuesday evening will be an exciting time for everyone as Division representatives will announce the names of student winners of sectional Awards of Excellence and also winners of the Division's Laurence M. Klauber Award for Excellence (unrestricted), Geraldine K. Lindsay Award for Excellence in the Natural Sciences, J. Thomas Dutro, Jr. Award for Excellence in the Geosciences, Rita W. Peterson Award for

Excellence in Science Education Research, the Presidents' Award for Excellence (unrestricted), the Best Poster Award (for poster presentations only but otherwise unrestricted), and the AAAS Robert I. Larus Travel Award.

The evening is planned to begin at 6:15 p.m. with a reception featuring a no-host beer and wine bar, followed by dinner service to begin about 6:45 p.m. After dinner will be a brief program, including the announcement of student awards. We ask that all students who win awards stay for the group photograph to be taken at the conclusion of the evening's program. The evening should end no later than 9:30 p.m.

Banquet attendees were asked to choose one of three entrées: Truffle Chicken (including brie whipped potatoes, morel mushroom ragu and truffle cream), Coffee Rubbed Pork Loin (including sweet potato puree, slow cooked greens, and bourbon-maple sauce), and Four Cheese Ravioli (including shaved zucchini and squash). All entrées include rolls and butter, salad, chef's choice of starch and vegetable, dessert, iced water, and coffee and hot tea service. Please note that if a substitution must be made, every effort will be made to insure that the replacement is comparable to or better than that which is listed here. A cash bar is anticipated during the reception and early part of the dinner for those wishing to purchase beer and/or wine. Banquet tickets are \$50 each and should have been purchased in advance. Note that a portion of the cost of each banquet ticket helps to support the complimentary tickets given to student presenters. Should you wish to attend the banquet but failed to purchase a ticket in advance, please check at the Registration Center to see if any tickets are still available.

Students in competition for Awards of Excellence were invited to be guests of the Division for this event. Note that if you are a student who requested a complimentary ticket, we expect you to attend the banquet. Please do not dishonor the Division's generosity in offering you this opportunity to fully participate in the meeting with minimal out-of-pocket expenses by asking for a ticket and then not showing up! If you are a student presenter and you failed to request a ticket earlier, be sure to check at the Registration Center to determine if any tickets remain.

BUSINESS MEETING

Friday Morning Business Meeting of the Council of the Pacific Division. The Council of the Pacific Division will hold its annual breakfast business meeting starting at 7:00 a.m. on Friday, 17 June in the Boardroom (Room 226) of KIPJ. The Council will elect officers and Council members, discuss programs for the 2017 and 2018 annual meetings, and transact such other business as is required by the Division's By-Laws. This is an open meeting and Pacific Division members with an interest in the governance of the Division are invited to attend.

WORKSHOPS AND AAAS FORUMS

Workshops and AAAS forums are available to all meeting

registrants. Should a non-registrant wish to attend one of the workshops or forums, he/she must register for at least the day of the program in order to be eligible to attend. Note that because of the lunch, attendance at one of the forums requires pre-registration. If you didn't pre-register but would like to attend one of the forums, please inquire as to availability at the Registration Desk. For full details about workshops and forums, including days, times, and locations, please turn to page 73 in these *Proceedings*.

FIELD TRIPS

All field trips are open to meeting registrants and their families. At least one member of a family group must be registered for the meeting. Unregistered family members will be charged an additional one-time-only \$10 field trip registration fee. This fee is paid only once for this meeting, regardless of how many field trips a non-registrant participates in.

Due to limited space, advance registration was required for all field trips. If you didn't sign up for a trip you would like to go on, ask about availability at the Registration Center.

Tuesday, 14 June

(1) Ramona Winery Explorations, NOON to about 5:00 p.m.

This trip will depart the USD campus in front of the Kroc Institute for Peace and Justice at noon. Prior to arriving at the first winery, a stop will be made at Panera Bread for lunch on your own. After lunch, we will visit two wineries in the Escondido area. Attendees will have a chance to learn about the blend of science and art that goes into starting up and running a noteworthy viniculture and winemaking operation in this terra nouveau wine producing region of California. We plan to return to USD by 5:00 p.m.

Includes transportation, tasting fees at two wineries, and field guide. Please note that lunch at Panera Bread is on your own. Cost: \$50.00 per person.

Friday, 17 June

(2) San Diego Microbrewery Field Trip, 5:00 p.m. to about 9:00 p.m.

Since early times, beer has played an important role in our society. But have you ever considered the *science* behind it? As technology has progressed, brewing techniques have been developed and refined, due in no small part to our increased knowledge in the fields of biotechnology, microbiology, and chemistry.

White Labs Brewing Company team members have been active in the American and worldwide craft brewing movements since the 1980s. The company, with headquarters in San Diego and offices in Davis, CA, Boulder, CO, Chicago, IL, Copenhagen, Denmark and soon in Asheville, NC, provides a wealth of services to brewers, winemakers, distillers

and others in the fermentation business.

The tour will depart from in front of the Kroc Institute for Peace and Justice on the USD campus at 5:00 p.m. and arrive at White Labs Brewing Company a short time later. We will take time to eat box dinners prior to taking our tour of the facility.

After dinner, our friends at White Labs Brewing Company will share their passion and knowledge with participants as we tour their facility and learn about how different varieties of yeast can result in beers with very different flavors and nuances. Following the tour at White Labs will be a tasting flight of 4 beers where the only difference is the type of yeast used in the fermentation process.

Once we've finished our visit to White Labs, we will drive to Longship Brewery to tour their new facility and hear about how they produce the variety of beers that they offer. Following the tour at Longship Brewery, participants will be offered a tasting flight of 4 beers in order to sample from the variety of beers made on the premises.

Come taste the differences!

Includes transportation, box lunch, and first beer flight at each brewery. Additional beer flights, individual tastings, and pints may then be purchased on your own. Cost: \$42.00 per person.

GENERAL SESSIONS

Tuesday, 14 June 2016

AAAS, Pacific Division Presidential Address*

KIPJ THEATRE

Tuesday

6:30 p.m.

1 *Why do Stars Shine? A Personal Journey of Engaging Science*, **FRANK G. JACOBITZ** (Mechanical Engineering Department, Shiley-Marcos School of Engineering, University of San Diego).

USD President's Welcome Reception

KIPJ ROTUNDA

Tuesday

7:30 p.m.

Immediately following the AAASPD Presidential Address, Dr. James Harris, President of the University of San Diego, will host a reception to welcome meeting attendees to the USD campus. Family members of meeting registrants are invited to attend. Please wear your registration badge to this event.

Student Awards Judges Organizational Meeting

KIPJ ROOM E

Tuesday

8:15 p.m.

Wednesday, 15 June 2016

Pre-Town Hall Reception

KIPJ ROTUNDA

Wednesday

5:15 p.m. – 6:00 p.m.

Join us for a pre-Town Hall reception, hosted by AAAS and the Pacific Division. Help us toast AAAS members present at this meeting. Light refreshments will be served. All meeting registrants and their guests, as well as AAAS guests, are invited.

AAAS Town Hall Meeting with Dr. Rush Holt, AAAS CEO

KIPJ THEATRE

Wednesday

6:00 p.m. – 7:00 p.m.

Please plan on joining us to hear from Dr. Rush Holt about the history of AAAS and Dr. Holt's vision for the future of AAAS and science. Attendees will be given the opportunity to ask Dr. Holt questions and provide their own suggestions for engaging the public, communicating their work, or influencing society.

Post-Town Hall Reception

KIPJ ROTUNDA

7:00 p.m. – 8:15 p.m.

Immediately following the close of the Town Hall Meeting will be a post-town hall reception, hosted jointly by AAAS and the Pacific Division. Beer, wine, soft drinks, and finger foods will be served. All meeting registrants and their guests, as well as AAAS guests are invited to enjoy this event to close out the evening.

*The public is invited to attend this program at no charge.

Thursday, 16 June 2016

Student Award Judges Meeting

KIPJ ROOM E

*Thursday**3:00 p.m.****Reception and
Student Awards Banquet***

UC FORUM C

*Thursday**6:15 p.m. – 9:30 p.m.*

The evening will begin at 6:15 p.m. with a reception that includes a no-host beer and wine bar, juices, soft drinks, and light hors d'oeuvres. Dinner service will begin about 6:45 p.m. Be sure to bring your dinner ticket with you, as it is needed not only to verify that you are on our dinner list but also to let the servers know your choice of entrée. Tickets to the banquet cost \$50 and needed to be purchased in advance. Students in competition for Awards of Excellence were invited to attend the banquet as guests of the Division by requesting a ticket in advance (at no charge). Following dinner will be the announcement of the winners of the student Awards of Excellence as part of a short program. *Student award winners are asked to stay until the end of the program so that photographs may be taken of the group.* The evening is expected to end by about 9:30 p.m.

Friday, 17 June 2016

***Meeting of the Council
of the Pacific Division***

KIPJ BOARDROOM (226)

*Friday**7:00 a.m. – 10:00 a.m.*

The Council of the AAAS, Pacific Division will hold its annual business meeting starting at 7:00 a.m. in Room 226. The Council will elect officers, discuss programs for upcoming annual meetings, and transact other business as is required by the Division's By-laws. This is an open meeting and members interested in the governance of the Division are invited to attend.

***Public Lecture Series:
Historical Perspectives on Science****

KIPJ THEATRE

*Friday**1:00 p.m. – 5:00 p.m.*

Join us this afternoon for a series of historically themed talks celebrating various aspects of science and its scientist practitioners. Please turn to page 11 in these *Proceedings* for information about the presenters and page 91 to read an abstract for each talk.

Session chair: *Frank Jacobitz*

- 1:00 2** *Hobbies Among Early Sigma Xi Members*, **GEORGE EDWARD SEYMOUR** (Escondido, CA).
- 1:30 3** *Thermodynamics and Life*, **ANDREW REX** (University of Puget Sound).
- 2:00 4** *Interdisciplinary Water Quality Research Through the Lens of the Liberal Arts*, **JAMES BOLENDER** (Department of Chemistry, University of San Diego).
- 2:30 5** *Climate Change Communication: The Need for Interdisciplinary Efforts and Innovative Resources to Reach Diverse Audiences*, **MICHEL A. BOUDRIAS** (Department of Environmental and Ocean Sciences, University of San Diego).

3:00 BREAK

*The public is invited to attend this program at no charge.

- 3:30 6** *The Evolution of Drug Discovery: Past, Present, and Future Perspectives*, **JOZEF STEC** (Department of Pharmaceutical Sciences, College of Pharmacy, Marshall B. Ketchum University).
- 4:00 7** *The Autodigestion Hypothesis*, **GEERT W. SCHMID-SCHÖNBEIN** (Department of Bioengineering, University of California, San Diego).
- 4:30 8** *How to Engage the Liberal Arts by Capturing the Sciences*, **NOELLE NORTON** (Dean, College of Arts and Sciences, University of San Diego).

TECHNICAL SESSIONS

1100 (time italicized and underlined) identifies a student presentation

* identifies the speaker from among several authors listed

63 (bolded number) is the abstract number

I. SYMPOSIA

Wednesday, 15 June 2016

Recent Advances in Turbulence Research: Experiments, Theory, and Computations

KIPJ ROOM E

Wednesday

7:55 a.m. – 5:00 p.m.

Program organizers: *Frank Jacobitz* (Mechanical Engineering Department, Shiley-Marcos School of Engineering, University of San Diego), *Marko Princevac* (Mechanical Engineering Department, Bourns College of Engineering, University of California, Riverside), and *Imane Khalil* (Mechanical Engineering Department, Shiley-Marcos School of Engineering, University of San Diego).

Program sponsored by the Pacific Division Section on Engineering, Technology, and Applied Sciences.

This symposium is a venue for the exchange of recent results in the field of turbulence research. Discussion topics will include geophysical turbulence and wildfire dynamics, but any topics related to turbulence research and fluid mechanics are appropriate for this session. Geophysical turbulence concerns flow with shear, stratification, or rotation and with applications in the atmosphere or oceans, including turbulence evolution, transport, and mixing of natural or anthropogenic substances. Atmospheric flows and turbulence in large part governs fire dynamics. Studies that involve laboratory or field experiments, theoretical analysis, as well as simulation approaches will be discussed. The organizers particularly encourage students at the undergraduate or graduate level to present their work in this symposium.

7:55 *Welcome*

8:00 **9 INVITED PRESENTATION** *Testing Kolmogorov on Russian Ships*, **CARL GIBSON** (Departments of Mechanical and Aerospace Engineering and Scripps Institution of Oceanography, University of California, San Diego).

8:45 **10** *Acceleration Statistics in Stably Stratified Turbulent Shear Flows*, **FRANK G. JACOBITZ**^{1*}, **KAI SCHNEIDER**², and **MARIE FARGE**³ (¹Mechanical

Engineering Department, Shiley-Marcos School of Engineering, University of San Diego; ²Laboratoire de Mécanique, Modélisation, et Procédés Propres du Centre National de la Recherche Scientifique, Aix-Marseille Université; ³Laboratoire de Météorologie Dynamique du Centre National de la Recherche Scientifique, Ecole Normale Supérieure).

9:15 **11** *Eulerian and Lagrangian Modeling of Air Pollution Dispersion from Ground Sources*, **MASOUD GHASEMIAN**^{1*}, **MARKO PRINCEVAC**¹, and **RUFUS D. EDWARDS**² (¹Mechanical Engineering Department, Bourns College of Engineering, University of California, Riverside; ²Epidemiology School of Medicine, University of California, Irvine).

9:45 **BREAK**

10:00 **12** *Flow Field Interactions in Two-Phase Flows*, **CAMPBELL DINSMORE**^{1*}, **AMIRHESAM AMINFAR**², and **MARKO PRINCEVAC**² (¹Mechanical Engineering Department, California State Polytechnic University at Pomona; ²Department of Mechanical Engineering, Bourns College of Engineering, University of California at Riverside).

10:30 **13** *Application of Computer Vision in Studying Bubble Deformation in Turbulent Jets*, **AMIRHESAM AMINFAR**^{1*}, **CAMPBELL DINSMORE**², and **MARKO PRINCEVAC**¹ (¹Department of Mechanical Engineering, University of California, Riverside; ²Department of Mechanical Engineering, California State Polytechnic University, Pomona).

11:00 **14** *Measurement of Temperature Field During Optical Thermal Cavitation Using PLIF Method*, **SEYED MAHDI AKBARIMOOSAVI**^{*}, **DARREN BANKS**, **BIN ZHANG**, and **GUILLERMO AGUILAR** (Department of Mechanical Engineering, University of California, Riverside).

11:30 **15** *Uncertainty Quantification in Two-dimensional Simulations of Spent Nuclear Fuel Assemblies*, **IMANE KHALIL**^{1*}, **QUINN PRATT**¹, **HARRY SCHMACHTENBERGER**¹, and **ROGER**

GHANEM² (¹Mechanical Engineering Department, Shiley-Marcos School of Engineering, University of San Diego; ²Sonny Astani Department of Civil and Environmental Engineering, Viterbi School of Engineering, University of Southern California).

12:00 LUNCH

1:30 16 *Compressed Sensing and Reconstruction of Turbulent Flow Simulations Datasets*, **MAHER SALLOUM**^{1*}, **NATHAN D. FABIAN**², **DAVID M. HENSINGER**², **JINA LEE**¹, **ELIZABETH ALLENDORF**³, **JEREMY A. TEMPLETON**¹, **JACQUELINE H. CHEN**¹, and **MYRA L. BLAYLOCK**¹ (¹Sandia National Laboratories, Livermore, CA; ²Sandia National Laboratories, Albuquerque, NM; ³Department of Physics, University of California, Los Angeles).

2:00 17 *Modeling of a Swirl Cooling Flow*, **DAISY GALEANA**^{1,2}, **MARKO PRINCEVAC**², and **HEEKOO MOON**¹ (¹Solar Turbines, Inc., San Diego, CA; ²Mechanical Engineering Department, Bourns College of Engineering, UC Riverside).

2:30 18 *Studies on Surface to Crown Transition and Spread in Chaparral Crown Fires*, **JEANETTE COBIAN IÑIGUEZ**^{1*}, **ALBERTINA ZUNIGA**¹, **AMIRHESSAM AMNIFAR**¹, **JOEY CHONG**², **GLORIA BURKE**², **DAVID WEISE**² and **MARKO PRINCEVAC**¹ (¹Department of Mechanical Engineering, University of California, Riverside; ²Pacific Southwest Research Station, USDA Forest Service, Riverside, CA).

3:00 BREAK

3:15 19 *Numerical Modeling of Studies on Surface to Crown Transition and Spread in Chaparral Crown Fires*, **SALVADOR ANTUNEZ**^{1*}, **JEANETTE COBIAN IÑIGUEZ**¹, **JOEY CHONG**², **GLORIA BURKE**², **DAVID WEISE**² and **MARKO PRINCEVAC**¹ (¹Department of Mechanical Engineering, University of California, Riverside; ²Pacific Southwest Research Station, USDA Forest Service, Riverside, CA).

3:45 20 *Effectiveness of Smoke Filter by a Forest Canopy*, **STEPHANIE PHAM**^{1*}, **DAVID COCKER**², **MARKO PRINCEVAC**¹, **DAVID WEISE**³, **JEANETTE COBIAN**¹, **MARY ELIZABETH KACARAB**², and **BEN SOMMERKORN**¹ (¹Department of Mechanical Engineering, University of California, Riverside; ²Chemical and Environmental

Engineering, University of California, Riverside; ³United States Department of Agriculture Forest Service, The Marlan and Rosemary Bourns College of Engineering, University of California, Riverside).

4:15 21 *Finally, The Solution of the Turbulence Problem*, **CARL GIBSON** (Departments of Mechanical and Aerospace Engineering and Scripps Institution of Oceanography, University of California, San Diego).

**Pharmaceutical Research and Development:
From Bench to Patient Care**

KIPJ ROOM 217

Wednesday

8:20 a.m. – Noon

Program organizer: *Jozef Stec* (Marshall B. Ketchum University)

Program sponsored by the Pacific Division Sections on Chemistry and Biochemistry; Cell and Molecular Biology; and General and Interdisciplinary Studies.

This symposium has an interdisciplinary nature and will blend research concepts pertaining to medicinal chemistry, microbiology, molecular biology and medicine. This symposium will be an excellent opportunity to learn more about contemporary pharmaceutical research and engage in the dialogue on the impact of pharmaceutical research on patient care. The presenters will showcase results from their bench research that can enable novel approach to treatment of various diseases such as cancer and bacterial/viral infections. The discussed topics will be easy to understand by the general scientific audience and will highlight the “translational” component of basic pharmaceutical research, i.e. how fundamental research discovery can be utilized in the clinic and ultimately improve patient care in the broader sense. Diversity among the invited speakers and presentation topics will provide an excellent opportunity for open discussion and networking for the symposium attendees.

Session chair: *Jozef Stec*

8:20 *Introductory Comments*

8:30 22 *β-Catenin Inhibitors as a Potential Treatment for Cancer*, **NILAY PATEL**^{1*}, **CHIAO K. WEN**¹, **LAUREN N. ADKINS**¹, **LUKE E. HANNA**², **KEVIN H. CHEN**², **ANKIT SALHOTRA**¹, **QUYNH C. TRAN**², **ANETA M. JELOWICKI**², **SARAH R. DAOUDI**¹, and **PETER DE LIJSER**² (¹Department

of Biological Science, and ²Department of Chemistry and Biochemistry, California State University, Fullerton).

- 9:00** **23** *Therapeutic Targeting of AKRIC3 in Castration Resistant Prostate Cancer*, PHUMVADEE WANG-TRAKULDEE^{1*}, ADEGOKE O. ADENIJI¹, DANIEL H. TAMAE¹, TIANZHU ZANG¹, BARRY M. TWENTER², MICHELLE ESTRADA², JEFFREY D. WINKLER², and TREVOR M. PENNING¹ (¹Department of Systems Pharmacology and Translational Therapeutics, University of Pennsylvania Perelman School of Medicine; ²Department of Chemistry, University of Pennsylvania).
- 9:30** **24** *Common Herbs as a Renewable Source for Small Molecules with Potential Against Brain and Psychological Disorders*, EHAB A. ABOURASHED^{1*}, ABIR T. EL-ALFY¹, AIDA ABRAHA², and SHABANA I. KHAN³ (¹Department of Pharmaceutical Sciences, College of Pharmacy, and ²Department of Chemistry and Physics, College of Arts and Sciences, Chicago State University; ³National Center for Natural Products Research, and Department of Biomolecular Sciences, Division of Pharmacognosy, School of Pharmacy, University of Mississippi).
- 10:00 BREAK**
- 10:30** **25** *How Understanding the Evolution of Metallo- β -lactamases Can Help Us Design Better Antibacterials*, PETER OELSCHLAEGGER (College of Pharmacy, Department of Pharmaceutical Sciences, Western University of Health Sciences).
- 11:00** **26** *Repurposing Contact-dependent Growth Inhibition (CDI) Systems to Combat Human Diseases*, CELIA GOULDING (Department of Pharmaceutical Sciences, University of California, Irvine).
- 11:30** **27** *An Ancient Disease in Modern Times: Addressing Challenges in Tuberculosis Drug Discovery and Development*, JOZEF STEC^{1,2*}, OLUSEYE K. ONAJOLE^{3,4}, SHICHUN LUN⁵, WILLIAM R. BISHAI^{5,6}, and ALAN P. KOZIKOWSKI³ (¹Department of Pharmaceutical Sciences, College of Pharmacy, Marshall B. Ketchum University; ²Department of Pharmaceutical Sciences, College of Pharmacy, Chicago State University; ³Department of Medicinal Chemistry and Pharmacognosy, College of Pharmacy, University of Illinois at Chicago; ⁴Department of Biological, Chemical and Physical Sciences, Roosevelt University; ⁵Center for Tuberculosis Research, Department of Medicine, Division of Infectious

Disease, Johns Hopkins School of Medicine; ⁶Howard Hughes Medical Institute, Chevy Chase, MD).

Not Just A Walk in the Park: Ecology and Education in Mission Bay, San Diego

KIPJ ROOM 218

Wednesday

8:30 a.m. – 5:00 p.m.

Program organizers: *Ronald S. Kaufmann* and *Nathalie B. Reyns* (Department of Environmental and Ocean Sciences; University of San Diego).

Program sponsored by the Pacific Division Section on Ecology, Environmental Science, and Sustainability.

Mission Bay Park is the West Coast's largest aquatic park and a central feature of San Diego's coastline. This urbanized estuary is fed by two major freshwater creeks and approximately 100 storm drains that channel runoff from a highly developed watershed into the bay. Besides its value for recreation, Mission Bay also hosts a diverse assemblage of aquatic species, ranging from phytoplankton and zooplankton to large invertebrates, fishes and marine mammals. The park also includes wildlife preserves that provide important habitat for nearly 100 species of birds, including the federally endangered Least Tern, Brown Pelican and Lightfooted Clapper Rail. Like many estuaries along the West Coast of North America, Mission Bay has experienced biological invasions by non-indigenous species, and some of these have been associated with substantial impacts on the native fauna. Speakers contributing to this symposium will discuss the ecology of the bay, as well as efforts to engage students from the University of San Diego and local residents in scientific investigations addressing various aspects of the Mission Bay ecosystem.

Session chairs: *Ronald S. Kaufmann* and *Nathalie B. Reyns*

8:30 *Welcome and Introduction to the Symposium*

8:40 **28** *Mission Bay Development*, IRIS ENGSTRAND (Department of History, University of San Diego).

9:00 **29** *Water Circulation and Transport in Mission Bay*, JOHN LARGIER (Bodega Marine Laboratory).

9:20 **30** *Interannual Variation in Water Quality and Plankton Communities in Mission Bay*, RONALD S. KAUFMANN (Department of Environmental and Ocean Sciences, University of San Diego).

9:40 31 *Zooplankton Distribution in Relation to Environmental Parameters on Diel Time Scales in Mission Bay, San Diego, California*, **JOY R. SHAPIRO***, **RONALD S. KAUFMANN** and **NATHALIE B. REYNS** (Department of Environmental and Ocean Sciences, University of San Diego).

10:00 BREAK

10:30 32 *A 24-hour Biogeochemical Study of a Mission Bay Seagrass Bed: A Collaboration Between Scripps and San Diego Middle School Students*, **TYLER CYRONAK^{1*}**, **ANDREAS ANDERSSON¹**, **JAMES PENNISE²**, **MELISSA KATIGBAK²**, **PHIL BRESNAHAN¹**, **SYDNEY D'ANGELO¹**, **ALYSSA FINLAY¹**, **CHARLES DAVIDSON¹**, **THEO KINDEBERG¹**, and **MARGOT WHITE¹** (¹Scripps Institution of Oceanography, University of California, San Diego; ²Ocean Discovery Institute, San Diego, CA).

10:50 33 *Mission Bay, Molluscan Diversity, Ninety Years of Reflection on a Metropolitan Marine Environment*, **PAUL M. TUSKES** (San Diego, CA).

11:10 34 *Unnatural History: Invasive Species as a Cause and Consequence of Ecological Change*, **JEFF CROOKS** (Tijuana River National Estuarine Research Reserve, Imperial Beach, CA).

11:30 35 *Top-Down Control of an Invasive Species: Results From Ten Years of Experiments in Mission Bay*, **KEVIN A. HOVEL** (Department of Biology, and Coastal and Marine Institute, San Diego State University).

11:50 LUNCH

1:20 36 *The 2013 San Diego Regional Monitoring Program, with an Emphasis on Current Conditions in Mission Bay*, **CHRIS STRANSKY**, **PHILIP GIBBONS**, and **RUTH KOLB** (Amec Foster Wheeler, San Diego, CA).

1:40 37 *Shifting Contamination Concerns in Mission Bay and the Impact of Sediment Contaminants on Sublethal Measures of Stress in Juvenile California Halibut*, **KEVIN STOLZENBACH^{1*}**, **RONALD S. KAUFMANN²**, **BETHANY O'SHEA²**, **DANIEL SCHLENK³**, and **WAYNE LAO⁴** (¹San Diego, CA; ²University of San Diego; ³University of California, Riverside; ⁴Southern California Coastal Water Research Project, Costa Mesa, CA).

2:00 38 *Engaging Our Imagination in Relationship with Mission Bay*, **KARIN E. ZIRK** (Friends of Rose Creek, San Diego CA).

2:20 39 *ReWild Mission Bay: Protecting and Restoring Wetland Habitat in the Northeast Corner of Mission Bay*, **REBECCA F. SCHWARTZ** (Conservation Program, San Diego Audubon).

2:40 40 *Experiential Learning and Interdisciplinary Research in Mission Bay: Results and Future Directions*, **NATHALIE REYNS*** and **ERIC CATHCART** (Department of Environmental and Ocean Sciences, University of San Diego).

3:00 BREAK

3:30 GROUP DISCUSSION

5:00 FINISH



Law Enforcement with Ethnoracially Diverse Communities in the 21st Century using Forensic Psychological Science: A Culturally Responsive International Paradigm

KIPJ ROOM F

Wednesday

8:50 a.m. – Noon

Program organizer: *Ronn Johnson* (School of Leadership and Education Sciences, Clinical Mental Health Counseling Program, University of San Diego).

Program sponsored by the Pacific Division Psychology Section.

The diverse worldwide policing demands of the 21st Century law enforcement has resulted in the need for qualified psychologists to grapple with substantive concerns associated with policing diverse communities. For example, in September of 2015 the Ferguson Commission Report concluded “We have not moved beyond race.” The report detailed an assessment of community conditions that fueled the diverse reactions observed in the aftermath of this case. Many of the reactions were the result of multigenerational economic, education, housing and health-related factors. Although the ignition point for the nationwide response seemed to be largely triggered by the pockets of negative perceptions of the criminal justice system and law enforcement. Forensic psychology can assume a pivotal role in the organizational structure of departments. The objective of this symposium is

to use a forensic psychological science to assess factors that are designed to make policing more culturally responsive.

Session chair: *Ronn Johnson*

8:50 *Introductory Comments*

9:00 **41** *Arrest and Incarceration of Women of Color*, **RONN JOHNSON**, **SUSAN SZAKONYI***, and **TAMAR CASSELL** (School of Leadership and Education Sciences, Clinical Mental Health Counseling Program, University of San Diego).

9:30 **42** *The Forensic Psychology of Policing in Diverse Communities: Post-Ferguson Commission Report*, **RONN JOHNSON**, **CHRISTINE COLLINS***, and **TAMAR CASSELL** (California School of Forensic Studies, Alliant International University).

10:00 BREAK

10:30 **43** *Culturally Responsive use of Clinical Forensic Psychological Evaluation Tools for Various Public Safety Purposes*, **RONN JOHNSON¹**, **J.Y. CINDY KIM^{2*}**, and **CHRISTINE COLLINS^{3*}** (¹School of Leadership and Education Sciences, Clinical Mental Health Counseling Program, University of San Diego; ²Department of Psychological and Quantitative Foundations, University of Iowa; ³Alliant International University).

11:00 **44** *Integrating Evidence-based and Culturally Responsive Mental Health Services for Policing Diverse Communities*, **RONN JOHNSON**, **BERENIS GONZALEZ***, **NICK DAVIS***, **LEILA ATI-YEH***, and **CLAUDIA DOMINGUEZ*** (School of Leadership and Education Sciences, Clinical Mental Health Counseling Program, University of San Diego).

11:30 **45** *Can Citizen Review Boards Fulfill a Dual Role of Facilitating Police Accountability and Promoting Ethnoracial Trust from Diverse Communities?* **RONN JOHNSON¹** and **J.Y. CINDY KIM^{2*}** (¹School of Leadership and Education Sciences, Clinical Mental Health Counseling Program, University of San Diego; ²Department of Psychological and Quantitative Foundations, University of Iowa).



Quantum Retrocausation III

KIPJ ROOM D

Wednesday

8:50 a.m. – 5:00 p.m.

Thursday

8:55 a.m. – 3:30 p.m.

Program organizer: *Daniel Sheehan* (Department of Physics and Biophysics, University of San Diego).

Program sponsored by the Pacific Division Section on Physics.

Causation – the principle that earlier events affect later ones, but not vice versa – undergirds our experience of reality and physical law. Although causation is predicated on the forward unidirectionality of time, in fact, most physical laws are time symmetric; thus, they formally and equally admit both time-forward and time-reverse solutions. Time-reverse solutions suggest that, in principle, the future might influence the past, i.e., reverse (or retro-) causation. Why time-forward solutions are preferentially observed remains an unresolved problem. Interest in retrocausation as a physical phenomenon has risen significantly over the last decade, with journal citations increasing exponentially in recent years.

Evidence for reverse causation is currently relatively scarce and controversial. While laboratory results are intriguing, theoretical models have lagged, not yet making solid connections with mainstream physics. Furthermore, many of the most basic physical issues, e.g., the role of the second law of thermodynamics in disallowing retrocausation, and whether retrocausation is best explained by energy transfers or simply by correlations without information exchange, remain open questions.

This symposium will explore recent experiments, theory, and philosophical issues concerning retrocausation. It is hoped the meeting will foster better theoretical models by which laboratory results can be understood, and stimulate new experiments and collaborations by which the underlying physics may be more clearly exposed.

References

Frontiers of Time: Retrocausation – Experiment and Theory, D.P. Sheehan, Editor, AIP Conference Series, Volume 863, (AIP Press, Melville, NY, 2006). Quantum Retrocausation: Theory and Experiment, D.P. Sheehan, Editor, AIP Conference Volume 1408 (American Institute of Physics, Melville, NY, 2011).

Session chair: *Andrew N. Jordan*

8:50 *Opening Comments*

9:00 **46** *How Does Retrocausality Help?* **ROD SUTHERLAND** (Centre for Time, University of Sydney).

9:30 **47** *What Do We Really Mean by “Retrocausation” in Quantum Theory?* **RUTH E. KASTNER** (Department of Philosophy, University of Maryland, College Park).

10:00 48 *Is Retrocausation an Illusion?* **HENRY P. STAPP**, (Lawrence Berkeley Laboratory, University of California, Berkeley).

10:30 BREAK

Session chair: *York Dobyns*

11:00 49 *Examining the Nature of Retrocausal Effects in Biology and Psychology*, **JULIA A. MOSSBRIDGE** (Department of Psychology, Northwestern University and Institute of Noetic Sciences, Petaluma, CA).

11:30 50 *John von Neumann's wave function Collapse and Information Transfer*, **KARLA GALDAMEZ** (Nascent Systems Inc).

12:00 51 *Testing the Chronology Protection Conjecture*, **DICK BIERMAN and JACOB JOLIJ** (University of Groningen, The Netherlands).

12:30 LUNCH

Session chair: *Karla Galdamez*

1:30 52 *Curious Correlations within Pre- and Post-Selected Ensembles*, **ELIAHU COHEN^{1*}, H. H. WILLS¹, and YAKIR AHARONOV²** (¹Physics Laboratory, University of Bristol; ²School of Physics and Astronomy, Tel Aviv University and Schmid College of Science, Chapman University).

2:00 53 *The Arrow of Time for Continuous Quantum Measurements*, **ANDREW N. JORDAN** (Department of Physics and Astronomy, University of Rochester).

2:30 54 *Negative Momentum: An Outcome of TSVF Offering a Novel Account of Retrocausation*, **AVSHALOM C. ELITZUR** (¹*Iyar*, The Israeli Institute for Advanced Research).

3:00 BREAK

Session chair: *Avshalom C. Elitzur*

3:30 55 *Towards Disentanglement*, **KEN WHARTON** (Department of Physics and Astronomy, San Jose State University).

4:00 56 *Causality in a Quantum World*, **FABIO COSTA** (School of Mathematics and Physics, University of Queensland).

4:30 57 *A Retrocausal Model of the Quantum Computational Speedup*, **GIUSEPPE CASTAGNOLI** (Elsag Bailey Quantum Information Laboratory, Genova, Italy).

Symposium continues Thursday morning at 8:55 a.m. Please refer to page 32 of these Proceedings for schedule.



Boise Extravaganza in Set Theory (BEST 2016)

KIPJ ROOM G

Wednesday

8:50 a.m. – 5:10 p.m.

Thursday

9:00 a.m. – 4:25 p.m.

Program organizers: *Liljana Babinkostova, Samuel Coskey, and Marion Scheepers* (Department of Mathematics, Boise State University).

Program sponsored by the Pacific Division Mathematics Section.

This program is a continuation of the well-known conference BEST (Boise Extravaganza in Set Theory). BEST focuses on the mathematical discipline called Set Theory, and its applications in other disciplines in Mathematics. BEST, for its first nineteen years hosted in Idaho at Boise State University, has been a symposium at the Pacific Division annual meetings since 2013.

Set Theory is the mathematical foundation for the study of the infinitary objects that routinely arise in Mathematics and its applications, and in the mathematical sciences. Contemporary set theoretic research addresses basic questions about provability, consistency and independence, and the relative strength of postulates or hypotheses in mathematized scientific theories. The methods developed by set theory serve as powerful tools for applications in many other mathematical disciplines, including algebra, analysis, combinatorics, complexity, topology and more.

The invited speakers for this program are successful set theorists from different career stages and will present high level scientific talks in several areas of set theory and its applications. The BEST symposium will also host contributed talks in Set Theory and its applications by participants. Undergraduate and graduate students will also present research accomplishments in these areas.

BEST 2016 acknowledges support from the National Science Foundation under grants DMS 1440263 and DMS 1638800

Morning Session Chair: *Marion Scheepers*

8:50 Welcoming Comments

9:00 58 *Topological Ramsey Spaces and Applications to the Triangle-free Random Graph*, **NATASHA DOBRINEN** (Department of Mathematics, University of Denver).

9:50 BREAK

10:20 59 *Jónsson Cardinals and pcf Theory*, **SHEZHAD AHMED** (Department of Mathematics, Ohio University).

10:50 60 *Every Analytic Equivalence Relation with All Borel Classes Is Borel Somewhere*, **WILLIAM CHAN** (Department of Mathematics, California Institute of Technology).

11:20 61 *Minimal Models of Kelley-Morse Set Theory*, **KAMERYN WILLIAMS** (City University of New York).

11:45 LUNCH

Afternoon Session Chair: *Samuel Coskey*

2:00 62 *The Isomorphism and Bi-Embeddability Relations for Finitely Generated Groups*, **SIMON THOMAS** (Rutgers University).

2:50 BREAK

3:10 63 *Indiscernibles for $L[T_n]$* , **CODY DANCE*** and **STEPHEN JACKSON** (University of North Texas).

3:40 64 *On the Conjugacy Problem for Automorphisms of Trees*, **KYLE BESERRA** (Department of Mathematics, Boise State University).

4:10 65 *Disjoint Borel Functions*, **DANIEL HATHAWAY** (Department of Mathematics, University of Denver).

4:40 66 *Automorphisms of $P(\lambda)/I$ -kappa*, **PAUL MCKENNEY*** and **PAUL LARSON** (Department of Mathematics, Miami University, Oxford, OH).

Symposium continues Thursday morning at 9:00 a.m. Please refer to page 34 of these Proceedings for schedule.



Particles in the San Diego Atmosphere: Reactions, Properties, Climate, and Health

KIPJ ROOM C

Wednesday

9:00 a.m. – 5:00 p.m.

Note: There are seven posters that are part of this symposium that will be available for viewing in Poster Session 2, 1:00 p.m. – 3:30 p.m. in KIPJ Rooms A & B. For additional information, please refer to the listing for Ecology, Environmental Sciences, and Sustainability posters on page 53 of these *Proceedings*.

Program organizer: *David De Haan* (Department of Chemistry and Biochemistry, University of San Diego).

Program sponsored by the Pacific Division Sections on Chemistry and Biochemistry, and Ecology, Environmental Sciences, and Sustainability.

Aerosol particles have significant impacts on human health and global climate. San Diego is home to many active research groups who study atmospheric aerosol particles in the laboratory and in the field. In this symposium, researchers will describe their current efforts to characterize the chemical, optical, and physical properties of aerosol particles, both freshly formed particles and those that have been “aged” by several days of atmospheric reactions. The sources of these particles, and the ways that they change while aging in the atmosphere, are still quite uncertain. This symposium will therefore include experimental, field, and computational work addressing aerosol effects on human health and climate, the properties of aerosol particles that cause these effects, studies of how these properties change over time, and studies of aerosol particle formation.

Morning session co-chairs: *Leila Hawkins* (Harvey Mudd College) and *David De Haan* (University of San Diego).

9:00 *Introductions*

9:10 67 *The Role of Acid-Base Chemistry in Atmospheric Nanoparticle Growth*, **JAMES N. SMITH***, **DANIELLE DRAPER**, and **MICHAEL J. LAWLER** (Department of Chemistry, University of California, Irvine).

9:40 68 *Coupling Between Deep Stratospheric Intrusions and Santa Ana Winds and Its Impacts on Ground-level O_3 and Cosmogenic ^{35}S Concentrations*, **MANGLIN¹***, **LIN SU²**, **JIMMY C.H. FUNG³**, and **MARK H. THIEMENS¹** (¹Department of Chemistry and Biochemistry, University of California, San Diego; ²Environmental Science Programs, School of Science, Hong Kong University of Science and Technology; ³Division of Environment and Department of Mathematics, Hong Kong University of Science and Technology).

10:00 69 *Browning of Aerosol Particles Upon Exposure to Methylglyoxal: Phase and Viscosity Effects*, **DAVID O. DE HAAN**^{1*}, **NATALIE G. JIMENEZ**¹, **ALEXIA DE LOERA**¹, **PAOLA FORMENTI**², **MATHIEU CAZAUNAU**², **ALINE GRATIEN**², and **JEAN-FRANÇOIS DOUSSIN**² (¹Department of Chemistry and Biochemistry, University of San Diego; ²Laboratoire Interuniversitaire des Systèmes Atmosphériques, Université Paris Est Créteil).

10:20 BREAK

10:40 70 *Marine Aerosol Particle Organic Composition: Sea Spray and Ship Sources and their Photochemical Aging*, **LYNN M. RUSSELL**^{*}, **DEREK J. PRICE**, **KEVIN J. SANCHEZ**, **AMANDA A. FROSSARD**, **RAGHU BETHA**, **JUN LIU**, **MARYAM A. LAM-JIRI**, and **CHIA-LI CHEN** (Scripps Institution of Oceanography, University of California, San Diego).

11:10 71 *Single Scattering Albedo of Aerosols Emitted from a Marine Engine Using Different Fuels*, **ROYA BAHREINI**^{*}, **JUSTIN DINGLE**¹, **YU JIANG**², **KENT JOHNSON**², **WAYNE MILLER**², **STEPHANIE GAGNE**³, **KEVIN THOMSON**³, **TAK CHAN**⁴, **GAVIN MCMEEKING**⁵, and **ROBERT CARY**⁶ (¹Department of Environmental Sciences and Environmental Toxicology Graduate Program, University of California, Riverside; ²CE-CERT, University of California, Riverside; ³National Research Council, ON, Canada; ⁴Environment and Climate Change Canada, ON, Canada; ⁵Droplet Measurement Technologies, Boulder, CO; ⁶Sunset Laboratory Inc., Tigard, OR).

11:30 72 *Sea Spray Aerosol – It's Not Just Salt: Molecular Characterization, Hygroscopicity, and Heterogeneous Reactivity of the Organic and Biological Components*, **VICKI H. GRASSIAN** (Departments of Chemistry and Biochemistry, Nanoengineering, and Scripps Institution of Oceanography, University of California, San Diego).

12:00 LUNCH

1:00 VIEW SYMPOSIUM POSTERS, KIPJ A & B
For additional information, please refer to Ecology, Environmental Sciences and Sustainability Posters on page 53 of these *Proceedings*.

Afternoon session co-chairs: *Robina Shaheen* (University of California, San Diego) and *David De Haan* (University of San Diego).

3:50 73 *California, Cars, and CCN*, **AKUA A. ASA-AWUKU**^{1,2*}, **DIEP VU**^{1,2}, **TOM DURBIN**^{1,2}, and

GEORGE KARAVALAKIS^{1,2} (¹Department of Chemical and Environmental Engineering, and ²Bourns College of Engineering – Center for Environmental Research and Technology, University of California, Riverside, CA).

4:20 74 *Oxygen Isotope Anomaly of Nitrate Aerosols: A New Tracer to Identify the Impact of Aviation on Air Pollution*, **S. CHAN**, **R. SHAHEEN**^{*}, **A. HILL**, **T. JACKSON**, **S. CHAKRABORTY**, and **M.H. THIEMENS** (Department of Chemistry and Biochemistry, University of California, San Diego).

4:40 75 *Gas-phase Vapors Play a Critical Role in CCN Activation*, **ASHLEY E. VIZENOR**^{*} and **AKUA ASA-AWUKU** (Department of Chemical and Environmental Engineering and Bourns College of Engineering – Center for Environmental Research and Technology (CE-CERT), University of California, Riverside, CA).

How Ocean Acidification and Ocean Warming Could Influence the Functional Morphology and Ecology of Intertidal Organisms

KIPJ ROOM H

Wednesday

10:15 a.m. – 4:30 p.m.

Program organizer: *Maya deVries* (Scripps Institution of Oceanography, Marine Biology Research Division, University of California, San Diego).

Session sponsored by the Pacific Division Sections on Ecology, Environmental Science and Sustainability, and Evolution, Organismal Biology and Biodiversity.

The acidity and temperature of the world's oceans are increasing at unprecedented rates. Ocean acidification (OA) and ocean warming (OW), have been shown to profoundly affect many marine organisms that build calcified structures (calcifiers). Yet, there is a hypothesis that intertidal calcifiers will be less susceptible to OA and OW because they are already exposed to large fluctuations in pCO₂ and temperature on a daily basis and have therefore evolved tolerance to extreme conditions. The goal of the proposed symposium is to evaluate this hypothesis and to understand why some intertidal calcifiers exhibit a response to OA and OW while others do not. We will begin by using tools from functional morphology to understand biomechanical and material properties responses to OA and OW. Specially, we will examine how rocky intertidal and coral reef organisms, including calcified algae, crustaceans, mollusks,

and echinoderms, respond to OA and OW conditions. We will then broaden this view to synthesize how morphological and biomechanical changes at the individual level could influence ecosystem dynamics and structure via changes to community structure and trophic dynamics. We will end with a panel discussion aimed at developing future research directions that integrate links between species responses and ecosystem responses to OA and OW. Together, the proposed symposium will provide a comprehensive evaluation of how intertidal communities are expected to fare under future ocean conditions.

Session chairs: *Maya S. deVries* and *Jennifer R.A. Taylor*

10:15 76 *Living in the Intertidal Regions of the Future: Intertidal Ocean Acidification and Warming Predictions and Their Possible Effects on Intertidal Organisms*, **MAYA S. deVRIES** (Scripps Institution of Oceanography, Marine Biology Research Division, University of California, San Diego).

10:30 77 *Ocean Acidification in Near-Shore and Intertidal Marine Environments*, **ANDREAS J. ANDERSSON** (Scripps Institution of Oceanography, University of California, San Diego).

11:00 78 *Hanging on by a Thread? Mussel Attachment in a Warmer, Higher CO₂ Ocean*, **EMILY CARINGTON^{1,3,*}**, **LAURA NEWCOMB^{1,3}**, **CAROLYN FRIEDMAN²**, **IAN JEFFERDS⁴**, **MATTHEW GEORGE^{1,3}**, and **MICHAEL O'DONNELL³** (¹Department of Biology and ²School of Aquatic and Fishery Sciences, University of Washington; ³Friday Harbor Laboratories, University of Washington; ⁴Penn Cove Shellfish LLC, Coupeville, WA).

11:30 79 *Structure and Function Responses to Ocean Acidification and Ocean Warming in Crustaceans*, **JENNIFER R. A. TAYLOR*** and **MAYA S. deVRIES** (Scripps Institution of Oceanography, Marine Biology Research Division, University of California, San Diego).

12:00 LUNCH

2:00 80 *Coupling Eco-Physiology and Shell Geochemistry of California Mussels: Carry-Over Effects of Larval Exposure to Upwelling and Relaxation Regimes*, **EMILY B. RIVEST^{1,*}**, **TESSA M. HILL^{1,2}**, **BRIAN GAYLORD¹**, **ERIC SANFORD¹**, **JENNIFER S. FEHRENBACHER²**, and **BRITTANY E. DAVIS³** (¹Bodega Marine Laboratory, University of California, Davis; ²Department of Earth and Planetary Sciences, University of California, Davis; ³Departments of Animal Science and Wildlife, Fish & Conservation Biology, University of California, Davis).

2:30 81 *Change in Biophotonics Properties of Organisms Facing Ocean Warming and/or Acidification: An Early Reporter of Physiological Stress?* **DIMITRI D. DEHEYN** (Marine Biology Research Division, Scripps Institution of Oceanography, University of California, San Diego).

3:00 BREAK

3:30 82 *Functional and Behavioral Consequences of Ocean Acidification for Intertidal Predation Risk*, **BRIAN GAYLORD^{1,*}**, **BRITTANY M. JELLISSON¹**, **ANNALIESE HETTINGER²**, **KRISTY J. KROEKER³**, **ERIC SANFORD¹**, and **TESSA M. HILL¹** (¹Bodega Marine Laboratory, University of California, Davis; ²College of Earth, Ocean, and Atmospheric Sciences, Oregon State University; ³Department of Ecology and Evolutionary Biology, University of California Santa Cruz).

4:00 83 *Natural Variability in pH Scales with Calcification Rates of Key Taxa on the Coral Reefs of Palmyra Atoll, USA*, **JENNIFER E. SMITH¹**, **NICHOLE PRICE²**, **MAGGIE JOHNSON¹**, **YUI TAKESHITA³**, and **TODD MARTZ¹** (¹Scripps Institution of Oceanography, University of California, San Diego; ²Bigelow Laboratory for Ocean Sciences, East Boothbay, ME; ³Carnegie Institution for Science, Department of Global Ecology, Stanford, CA).

Library Science Symposium: The Evolving Library

KIPJ ROOM I

Wednesday

1:20 p.m. – 5:00 p.m.

Thursday

8:30 a.m. – 5:00 p.m.

Note: There are three posters in Poster Session 1 that were submitted as part of this program. Please refer to the listing for General and Interdisciplinary posters on page 50 in these *Proceedings* for additional information.

Program organizers: *Crystal Goldman* (Geisel Library, University of California, San Diego) *Frank Jacobitz* (Engineering Department, University of San Diego), *Amy Besnoy* (Copley Library, University of San Diego), *Amanda Roth* (Geisel Library, University of California, San Diego), and *Kelly Riddle* (Copley Library, University of San Diego).

Program sponsored by the Pacific Division Section on General and Interdisciplinary Studies.

1100 (time italicized and underlined) identifies a student presentation

* identifies the speaker from among several authors listed

63 (bolded number) is the abstract number

abstracts contain complete contact information for authors

The history of libraries stretches back thousands of years, yet the contemporary library as a conceptual and intellectual space, in community, and especially on the university campus, continues to change rapidly. The roles of librarians have had to keep pace with the evolving needs of library patrons and the use of library space. A wealth of new technologies, such as digitization of print and realia, 3D printing, and institutional repositories for both content and data have played a major part in many of the recent transformations in library services and librarian positions. The application of technology to many aspects of the profession have allowed for innovations in areas such as instruction, reference, cataloging, access, digitization, and scholarly communication. While technology has radically altered the work of librarians, its application to library work has allowed librarians to participate more fully in their communities.

This symposium seeks to highlight the evolution of library spaces, services, and pedagogy, as well as other developments in the field of librarianship as librarians have embraced technology to better serve patrons. From the history to the future of libraries, we wish to foster a dialogue on the many advances and challenges that have shaped the profession and the space--both physical and intellectual--in which librarians operate.

Wednesday session chairs: *Crystal Goldman* and *Amanda Roth*.

1:20 *Opening Comments*

1:30 **84** *A Primer on Librarians' Sabbaticals, A Case Study of a Six Month Sabbatical at Home and Abroad*, **PETER L. KRAUS** (J. Willard Marriott Library, University of Utah).

2:00 **85** *Data Services, a Sabbatical Reflection*, **KHUE DUONG** (California State University, Long Beach).

2:30 **86** *Tools for the Discovery and Access of Oral History Collections*, **SVETLANA USHAKOVA** (School of Information, San Jose State University).

3:00 **BREAK**

3:30 **87** *Canceling Unmediated Document Delivery: Results and Implications at San José State University*, **EMILY K. CHAN** and **SUSAN L. KENDALL*** (King Library, San José State University).

4:00 **88** *Data Driven Assessments using Integrated Library System*, **SHAHRZAD KHOSROWPOUR** (Leatherby Libraries, Chapman University).

4:30 **89** *Where is the Science? Are Books Still Important?*

Is There Value There? **JULIA M. GELFAND** (University of California, Irvine Libraries).

Symposium continues Thursday morning at 8:30 a.m. Please refer to page 30 of these Proceedings for schedule.

Forensic Psychological Science on the Violence of Terroristic Groups: An Antiterrorism Threat Assessment Paradigm

KIPJ ROOM F

Wednesday

1:30 p.m. – 3:30 p.m.

Program organizer: *Ronn Johnson* (School of Leadership and Education Sciences, Clinical Mental Health Counseling Program, University of San Diego).

Program sponsored by the Pacific Division Psychology Section.

Homeland Security and forensic psychologists search for ways to empirically understand the motives behind the surge in what may be assessed as senseless violence. Acts of terrorism are traumatic incidents that have no international border restrictions. To no surprise, this type of violence is also used as a form of terrorism. Empirically, it has continued to have a traumatic effects on a diverse group of individuals and is an international phenomena. Terrorists use a variety of tactics, techniques, and procedures to achieve their often unstated objectives. Research has consistently demonstrated that Post-traumatic Stress Disorder (PTSD) can be one of the clinical outcomes for terrorism that also potentially results in forensic consequences. For example, the rescue of a large group of Kurds from ISIS who were destined for a mass killing revealed unimaginable testimonies about their tortuous imprisonment. The objective of this symposium is to use a forensic psychological science to assess senseless violence as a potential western recruitment approach used by groups like ISIS and AQAP.

Session chair: *Ronn Johnson*

1:30 **90** *Terrorism Exposed: Exploring Evidence-based Treatments for Direct and Indirect Exposure to Terrorism*, **RONN JOHNSON**, **NICK DAVIS***, and **DESIREE ACOSTA*** (School of Leadership and Education Sciences, Clinical Mental Health Counseling Program, University of San Diego).

2:00 **91** *What Does Science Reveal about the Forensic Psychological Mindset of Terrorists that Engage in*

Senseless Acts of Violence? **RONN JOHNSON**¹, **JESSICA MUELLER**^{2*}, **NERGIS AKKAYA**¹, **CLAUDIA DOMINGUEZ**^{1*}, **NICK DAVIS**^{1*}, and **CHARITY VIZCAINO**^{1*} (¹Department of Counseling and Marital and Family Therapy, University of San Diego; ² California School of Forensic Studies, Alliant International University).

2:30 BREAK

3:00 92 *What Empirically-based Threat Assessment Models Are Effective in Identifying PTSD Vulnerabilities in Homeland Security Personnel?* **RONN JOHNSON**¹, **J.Y. CINDY KIM**^{2*}, **DESIREE ACOSTA**^{1*}, **JESSICA MUELLER**^{3*}, and **JULIE BENNETT**^{1*} (¹School of Leadership and Education Sciences, Clinical Mental Health Counseling Program, University of San Diego; ²Department of Psychological and Quantitative Foundations, University of Iowa; ³Alliant International University).

3:30 93 *The Power of Resilience: Exploring Stress Inoculation Approaches as Evidence-Based Anti-Terrorism Strategies*, **RONN JOHNSON**, **NICK DAVIS**^{*}, and **JULIE BENNETT**^{*} (School of Leadership and Education Sciences, Clinical Mental Health Counseling Program, University of San Diego).

**Recent Advances in
Pharmacology and Toxicology**

KIPJ ROOM 217

Wednesday

2:00 p.m. – 4:30 p.m.

Program organizer: *Kristen A. Mitchell* (Department of Biological Sciences, Boise State University).

Program sponsored by the Pacific Division Cell and Molecular Biology Section.

The development of novel therapeutic strategies requires a detailed understanding of mechanisms that regulate homeostasis, along with an appreciation of the balance that exists between the therapeutic and toxic effects of chemical compounds. This session will focus on recent advances in understanding the pharmacological and toxicological effects of drugs, chemicals and environmental contaminants. Investigators are invited to present research on the identification of targets for new drug development, new drug screening strategies, and novel mechanisms of drug action. Emphasis will also be placed on the identification of mechanisms of toxicity

for drugs, chemicals and environmental contaminants.

Session chair: *Kristen A. Mitchell*

1:50 *Introductory Comments*

2:00 94 *Exposure to 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) Dysregulates Extracellular Matrix Remodeling During Experimental Liver Fibrosis*, **KRISTEN A. MITCHELL** (Biomolecular Sciences PhD Program; Department of Biological Sciences, Boise State University).

2:30 95 *Exploding Popularity of Electronic Cigarettes: A Popular Trend with Unknown Consequences*, **SARA J. HEGGLAND** (Department of Biology, The College of Idaho).

3:00 BREAK

3:30 96 *The Identification of a Novel Extracellular Metalloproteinase Produced by *Clostridium sordellii**, **MICHAEL J. ALDAPE**^{1,2*}; **AOXIANG TAO**³, **DUSTIN D. HEENEY**¹, **ERIC S. MCINDOO**¹, **JOHN M. FRENCH**¹, and **DONG XU**³ (¹Veterans Affairs Medical Center, Boise, ID; ²Northwest Nazarene University; ³Idaho State University-Meridian Health Science Center).

4:00 97 *Should Inflammatory Proteins be Therapeutic Targets for Metastatic Breast Cancer?* **CHERYL L. JORCYK** (Department of Biological Sciences, Biomolecular Sciences Ph.D. Program, Boise State University).

Thursday, 18 June 2016

**Library Science Symposium:
The Evolving Library**

KIPJ ROOM I

Thursday

8:30 a.m. – 4:30 p.m.

*This symposium is continuing from Wednesday.
Please refer to page 27 of these Proceedings for details.*

Thursday session chairs: *Frank G. Jacobitz, Amy Besnoy, and Kelly Riddle*

8:30 98 *Until Cloning is Feasible, Leveraging (Free) Technology to do More (Activity) with Less (Staff)*, **KAREN M. HESKETT** (Geisel Library, University of California, San Diego).

9:00 99 *Integrating ICT Literacy into Science Curriculum through MERLOT*, **LESLEY S. J. FARMER** (California State University, Long Beach).

9:30 100 *Bioinformatics and the Science Librarian: New Directions*, **ZOE PETTWAY UNNO** (USC Libraries, University of Southern California).

10:00 BREAK

10:30 101 *Bringing Information Literacy (IL) into the First-Year College Science Curriculum: Expanding a Faculty/Librarian Partnership to Develop Chemical IL Modules for Freshmen Lecture and Laboratory Courses*, **TERI M. VOGEL^{1*}, STACEY BRYDGES², DOMINIQUE TURNBOW¹, and AMANDA ROTH¹** (¹Geisel Library and ²Department of Chemistry and Biochemistry, University of California, San Diego).

11:00 102 *Active Learning Online and in the Classroom: Scaffolding and Assessing Library Instruction within a Multi-Course Writing Program*, **CRYSTAL GOLDMAN*, TAMARA RHODES, AMANDA ROTH*, DOMINIQUE TURNBOW, and HEATHER SMEDBERG** (Geisel Library, University of California, San Diego).

11:30 103 *Librarian as Strategic Partner: Engaging Students in Undergraduate Research through Curricular Design*, **KATHRYN M. HOUK** (San Diego State University Library).

12:00 LUNCH

1:30 104 *Beyond Books: Reprogramming Student Engagement in the Library*, **KATHERINE KOZIAR^{1*}, JULIE MASON^{1*}, and ANTHONY SANCHEZ^{2*}** (¹Orbach Science Library, University of California, Riverside; ²University Libraries, University of Arizona).

2:00 105 *Data Instruction: Developing New Roles for Data Librarians*, **TIM DENNIS* and REID OTSUJI*** (Geisel Library, University of California, San Diego).

2:30 106 *Facilitating the NIH Grant Process by Utilizing Linked Open Data from the Scripps VIVO Research Networking System*, **DANIELLE BODRERO HOGGAN^{1*}, CATHERINE DUNN¹, and MICHAEELEN TRIMARCHI²** (¹Kresge Library, The Scripps Research Institute; ²NCAR Library, National Center for Atmospheric Research).

3:00 BREAK

3:30 107 *Appeal to Peers: Data Management Testimonials*, **ANN HUBBLE*, CHRISTY HIGHTOWER*, and CHRISTY CALDWELL*** (University Library, University of California, Santa Cruz).

4:00 108 *Library Role in the Campus Implementation of a System-wide Open Access Policy*, **MARY LINN BERGSTROM** (Geisel Library, University of California, San Diego).



**Theory, Experiment and Computations:
A Synergistic Approach to Research**

KIPJ ROOM F

Thursday

8:50 a.m. – NOON

Program organizers: *C. Mark Maupin* (Department of Chemical and Biological Engineering, Colorado School of Mines) and *Owen M. McDougal* (Department of Chemistry and Biochemistry, Boise State University).

Program sponsored by the Pacific Division Sections on Computer and Information Sciences and Chemistry and Biochemistry.

The utilization of theory and computations to complement and sometimes lead (i.e. theory-driven research) experimental efforts is becoming increasingly common. The synergistic combination of experiment, theory, and computations has allowed for a greater understanding of many physical

phenomena. The structural information obtained from various techniques such as X-ray and NMR is often critical to the creation of realistic models for computations, while theory and computations often reveal molecular-level insights into catalytic mechanisms, binding phenomena, and system dynamics. This symposium is focused on the combination of experiment and theory/computations to expand our understanding of diverse systems ranging from gas phase reactions to complex condensed phase systems.

Program co-chairs: *C. Mark Maupin* and *Owen M. McDougal*.

8:50 *Opening Comments*

9:00 **109** *Molecular-level Insights through Computations*, **C. MARK MAUPIN** (Chemical and Biological Engineering Department, Colorado School of Mines).

9:30 **110** *DockoMatic 2.1: Constructing a Comprehensive Open Source Tool for Computational Chemistry*, **OWEN M. McDUGAL** (Department of Chemistry and Biochemistry, Boise State University).

10:00 BREAK

10:30 **111** *Chaperone Hsp27 Uncovers a Hidden Membrane-bound State of Alpha-Synuclein*, **MAHDI M. MOOSA***, **PRIYA R. BANERJEE**, and **ASHOK A. DENIZ** (Department of Integrative, Structural, and Computational Biology, The Scripps Research Institute).

11:00 **112** *Binding Affinity Optimization of α -Conotoxin MII Analogs to Nicotinic Acetylcholine Receptors*, **PAUL PHILLIPS** (Department of Chemistry and Biochemistry, Boise State University).

11:30 **113** *In Silico Insights into the Solvation Characteristics of the Ionic Liquid 1-Methyltriethoxy-3-Ethylimidazolium Acetate for Cellulosic Biomass*, **TIMOTHY C. SCHUTT***, **VIVEK S. BHARADWAJ**, **ADAM J. JOHNS**, and **C. MARK MAUPIN** (Chemical and Biological Engineering Department, Colorado School of Mines).



***Limits to the Second Law
of Thermodynamics***

KIPJ ROOM C

Thursday

8:50 a.m. – 5:00 p.m.

Friday

8:55 a.m. – 1:00 p.m.

Program organizer: *Daniel Sheehan* (Department of Physics and Biophysics, University of San Diego).

Program sponsored by the Pacific Division Section on Physics.

The second law of thermodynamics is foundational to science, engineering and technology. During the past two decades, however, more than two dozen challenges have been advanced into the general scientific literature by research groups worldwide. In recent years, several have undergone laboratory test, and their results indicate that the second law might not be universal.

In this symposium, the current experimental and theoretical status of second law, as well as its foundational issues, will be explored. Topics are expected to include Maxwell's demon, decoherence, the thermodynamic arrow of time, and developments in the theory of nonequilibrium systems. Special attention will be paid to laboratory experiments which address the question of its universality.

References

Quantum Limits to the Second Law, D.P. Sheehan, Editor; AIP Conference Proceedings, Vol. 643, (AIP, Melville, New York, 2002).

Challenges to the Second Law of Thermodynamics, V. Capek and D.P. Sheehan; Fundamental Theories of Physics, Vol. 146, (Springer, Dordrecht, Netherlands, 2005).

The Second Law of Thermodynamics: Foundations and Status, D.P. Sheehan, Editor, Special Issue, Foundations of Physics, Vol. 37.12 (2007).

Second Law of Thermodynamics: Status and Challenges, D.P. Sheehan, Editor; AIP Conference Volume 1411 (AIP, Melville, NY, 2011).

Session chair: *Peter D. Keefe*

8:50 *Welcome*

9:00 **114** *Maxwell's Demon: A Brief History*, **ANDREW REX** (University of Puget Sound Tacoma).

9:30 **115** *Black Hole Thermodynamics: More Than a Formal Analogy?* **CRAIG CALLENDER*** and **JOHN DOUGHERTY** (Department of Philosophy, University of California, San Diego).

10:00 **116** *Quantum Oblivion: The Extreme Reversibility Underlying Reversible Classical Physics*, **AVSHALOM ELITZUR** (*Iyar*, The Israeli Institute for Advanced Research).

10:30 BREAK

1100 (time italicized and underlined) identifies a student presentation

* identifies the speaker from among several authors listed

63 (bolded number) is the abstract number

abstracts contain complete contact information for authors

Session chair: *Craig Callender*

11:00 117 *Loschmidt's Temperature Gradient Paradox – A Quantum Mechanical Resolution*, **GEORGE S. LEVY** (Entropic Power Corp., San Diego, CA).

11:30 118 *Epicatalysis and the Inviolability of the Second Law*, **D.P. SHEEHAN***, **T.A. ZAWLACKI**, and **W.H. HELMER**. (Department of Physics and Biophysics, University of San Diego).

12:00 119 *Apparatus and Procedures for Detecting Temperature Differentials with Epicatalytic Materials*, **DAVID W. MILLER** (Sidney, ME).

12:30 LUNCH

Session chair: *David W. Miller*

1:30 120 *Harvesting Energy From Thermal Fluctuation Across a Non-Ideal Diode*, **GUOAN TAI** (The State Key Laboratory of Mechanics and Control of Mechanical Structures, Nanjing University of Aeronautics and Astronautics, Nanjing, China).

2:00 121 *How to build a Maxwell Demon from a 2nd order Phase Change System*, **REMI CORNWALL** (University of London Alumni Association/TEC Power Ltd.).

2:30 122 *Environmentally Heated Engine Concepts*, **KENNETH M. RAUEN** (San Juan, CA).

3:00 BREAK

Session chair: *George S. Levy*

3:30 123 *A Fundamental Collision Between Thermodynamics and Statistical Physics*, **ALEXEY NIKULOV** (Institute of Microelectronics Technology, Russian Academy of Sciences).

4:00 124 *Challenges to the Second Law Challengers*, **M. KOSTIC** (Mechanical Engineering Department, Northern Illinois University).

4:30 125 *Does Reduction in Entropy Associated with the Magneto-Caloric Phase Transition of Type I Superconductive Particles Violate the Second Law?* **PETER D. KEEFE** (University of Detroit Mercy).

Symposium continues Friday morning at 8:55 a.m. Please refer to page 41 of these Proceedings for schedule.

Quantum Retrocausation III

KIPJ ROOM D

Thursday

8:55 a.m. – 3:30 p.m.

This symposium is continuing from Wednesday. Please refer to page 23 of these Proceedings for details.

Session chair: *Ken Wharton*

8:55 Welcome Back

9:00 126 *From Time-Symmetry to Retrocausality? How Quantisation Makes a Difference*, **HUW PRICE** (Trinity College, Cambridge).

9:30 127 *Accommodating Retrocausality with Free Will*, **ELIAHU COHEN^{1*}**, **H. H. WILLS¹**, and **YAKIR AHARONOV²** (¹Physics Laboratory, University of Bristol; ²School of Physics and Astronomy, Tel Aviv University and Schmid College of Science, Chapman University).

10:00 128 *Bohm Pilot Wave Post-Quantum Theory*, **JACK SARFATTI** (Internet Science Education Project, San Francisco, CA).

10:30 BREAK

Session chair: *Julia A. Mossbridge*

11:00 129 *Perceiving the Future News: Evidence for Retrocausation*, **DALE E. GRAFF** (Psi-Seminars-Initiatives, Hamburg, PA).

11:30 130 *Prediction of Truly Random Future Events Using Analysis of Prestimulus Electroencephalographic Data*, **STEPHEN L. BAUMGART***, **MICHAEL S. FRANKLIN**, **HIROUMI K. JIMBO**, **SHARON SU**, and **JONATHAN SCHOOLER** (Theoretical and Applied Neurocausality Laboratory, Santa Barbara, CA; Department of Psychology and Brain Sciences, University of California at Santa Barbara).

12:00 131 *Empirical Retrocausality: Testing Physics Hypotheses With Parapsychological Experiments*, **YORK DOBYNS** (University of Kentucky).

12:30 LUNCH

Session chair: *Ruth E. Kastner*

2:00 132 *Guiding Quantum Histories with Intermediate Decomposition of the Identity*, **SKY**

NELSON-ISAACS (Department of Physics, San Francisco State University).

2:30 133 *Delayed Choice Experiments and the Problem of Free Will in Quantum Mechanics*, **ALEXEY NIKULOV**, (Institute of Microelectronics Technology, Russian Academy of Sciences).

3:00 134 *Neural-Dynamics and Time Reversal Under the Concept Of ‘Double Me,’* **KARLA GALDAMEZ** (Nascent Systems Inc.).

Mentoring and Deeper Learning in STEM Education

KIPJ ROOM 217

Thursday

9:00 a.m. – Noon

Program organizers: *Carl Maida* (University of California, Los Angeles) and *Louis Nadelson* (Utah State University).

Program sponsored by the Pacific Division Education Section.

Project-based learning and work practice activities that embrace mentoring are forms of deeper learning, which may serve as a corrective to current schooling regimes. However, there are limited opportunities for youth to actually engage in deeper learning activities with mentors within consciously designed communities of practice for skill acquisition. These activities are typically found in certain experientially based programs, such as internships and apprenticeships in the more progressive high schools, or in experimental co-curricular activities designed by universities and other non-profit organizations. Robert Halpern (2009) advocates for the high school apprenticeship as a form of learning that may provide the best chances for young people. Cognitive psychology and neuroscience are discovering what artisans have always known, namely the value of experiential and project-based learning in acquiring and retaining craft knowledge, or practical knowledge gained by experience. A sense of “knowing-in-action” comes from participation in practice-oriented learning experiences, which include school-to-work programs, service learning, mentorships, internships, and apprenticeships in various kinds of skilled work. Moreover, informal learning outside of school takes place in highly social venues that “offer a form of mentoring, apprenticeship, and participation that maximizes motivation and engages the learner’s sense of identity” (Meltzoff et al, 2009, 288), for example, as a fledgling scientist, engineer, designer, clinician, or teacher. Learning encounters between students and their mentors can be conceived as dialogues,

and a distinctive feature of project-based learning is how the teacher-student relationship is constructed and negotiated through such encounters. Students who experience this form of learning are rewarded through the responses of their mentors in these encounters. Scientists in the emerging field of social neuroscience view encounters, such as mentoring, as ways to enhance social interaction that is essential to learning, which, in turn, is supported by neural circuits linking perception and action for “close coupling and attunement between self and other,” and for synaptic plasticity (Meltzoff et al, 2009, 285). This session will combine didactic, experiential, and reflective activities to engage audience members, including teachers and informal science educators, and presenters in a professional learning community experience. The intent is to provide an opportunity for collaborative inquiry and the learning related to the promotion of mentoring as a deeper learning approach to STEM (Science, Technology, Engineering and Mathematics) in the classroom and beyond. Participants in a breakout session will consider ways to foster mentoring in deeper learning activities, including project-based learning in the classroom, in after school programs, and in experiential, community-based learning activities, such as mentored internships and apprenticeships. Panelists in roundtable format will discuss current issues and future trends in STEM education, including teaching integrated STEM curriculum, engaging students in authentic STEM research, integrating citizen science into the STEM curriculum, teacher adoption of educational innovations to teach STEM, pre-college science enrichment and “pipeline” programs, and scientist–student mentoring activities in formal and informal settings.

References

- Halpern, R. (2009) *The Means to Grow Up: Reinventing Apprenticeship as a Developmental Support in Adolescence*. New York: Routledge.
Meltzoff, A.N., Kuhl, P.K., Movellan, J. & Sejnowsky, T.J. (2009) Foundations for a New Science of Learning, *Science* July 17, 325: 284-288.

9:00 *Welcome*, **ROGER CHRISTIANSON** (Executive Director, Pacific Division of AAAS).

9:05 *Introductory Comments*, **CARL MAIDA** (University of California, Los Angeles) and **LOUIS NADELSON** (Utah State University).

9:15 *Keynote Address*, **STEPHEN HAMILTON** (High Tech High Graduate School of Education).

Comments, **RICHARD CARDULLO** (University of California, Riverside) and **JANET CARLSON** (Stanford Graduate School of Education).

10:00 *Panel: Promoting Mentoring and Deeper Learning in STEM Education*

Moderator

LOUIS NADELSON

Panelists

LILJANA BABINKOSTOVA (Boise State University)

STACEY CALLIER (High Tech High Graduate School of Education)

RICHARD CARDULLO

JANET CARLSON

TOM FEHRENBACHER (High Tech High)

RYAN GALLAGHER (High Tech High Graduate School of Education)

ICHIRO NISHIMURA (University of California, Los Angeles)

10:45 *Workshop: Mentoring and Deeper Learning in STEM Activities (breakout sessions with panelists)*

11:45 *Wrap Up*, **CARL MAIDA** and **LOUIS NADELSON**

Boise Extravaganza in Set Theory (BEST 2016)

KIPJ ROOM G

Thursday

9:00 a.m. – 4:25 p.m.

This symposium is continuing from Wednesday.

Please refer to page "Boise Extravaganza in Set Theory (BEST 2016)" on page 24 of these Proceedings for details.

Morning Session Chair: *John Clemens*

9:00 **135** *Killing Them Softly*, **ERIN CARMODY** (Department of Mathematical Sciences, Nebraska Wesleyan University).

9:50 BREAK

10:10 **136** *A New Notion of Cardinality for Countable First Order Theories*, **DOUGLAS ULRICH***, **RICHARD RAST**, and **CHRIS LASKOWSKI** (Department of Mathematics, University of Maryland at College Park).

10:40 **137** *Jonsson Properties for Non-Ordinal Sets*, **JARED HOLSHOUSER*** and **STEPHEN JACKSON** (Department of Mathematics, University of North Texas).

11:10 **138** *Rigid Ideals*, **MONROE ESKEW***, **BRENT CODY**, and **SEAN COX** (Virginia Commonwealth University).

11:40 **139** *Orientations of Graphs with Large Chromatic Number*, **DANIEL T. SOUKUP** (Department of Mathematics, University of Calgary).

12:05 LUNCH

Afternoon Session Chair: *Samuel Coskey*

2:00 **140** *Master Conditions from Huge Embeddings*, **MARTIN ZEMAN*** and **SEAN COX** (Department of Mathematics, University of California, Irvine).

3:00 **141** *A Borel Amalgamation Property*, **PAUL ELLIS^{1*}** and **SAMUEL COSKEY²** (¹Department of Mathematics, Manhattanville College; ²Department of Mathematics, Boise State University).

3:30 **142** *Relative Primeness of Equivalence Relations*, **JOHN CLEMENS** (Department of Mathematics, Boise State University).

4:00 **143** *On a Property of Corson*, **LILJANA BABINKOSTOVA*** and **MARION SCHEEPERS** (Department of Mathematics, Boise State University).

Current Understanding and Data Gaps for Bahía de los Ángeles, an International Biosphere Reserve

KIPJ ROOM H

Thursday

1:20 p.m. – 5:00 p.m.

Program organizer: *Drew M. Talley* (Department of Environmental and Ocean Sciences, University of San Diego).

Program sponsored by Pacific Division Section on Ecology, Environmental Science, and Sustainability.

For centuries, Bahía de los Ángeles has drawn explorers, naturalists, and scientific researchers from around the world to study the unique and contrasting desert and marine habitats, rich natural resources, and the high biodiversity that includes a variety of threatened and endemic species. These same elements have also attracted tourists; development, the pressures of which can be seen in the ecosystem; and have led to the declaration of the region as an International Biosphere Reserve. This region is a treasure in its own right and

also provides lessons about how to balance the use and conservation of coastal and marine resources.

The goal of this symposium is to provide an overview of the broad range of research being carried out in Bahía de los Ángeles, as well as to identify gaps in data needed to be filled to better understand and manage this region, and others like it.

Session chair: *Drew M. Talley*

1:20 *Introductory Comments*

1:30 **144** *Introduction to the Symposium and a Tribute to Antonio Resendiz*, **DREW M. TALLEY** (Environmental and Ocean Sciences, University of San Diego).

2:00 **145** *Whale sharks at Bahía de los Ángeles: Ecology, Tourism and Science*, **ABRAHAM VAZQUEZ-HAIKIN¹** and **OSCAR SOSA-NISHIZAKI^{2*}** (¹Grupo de Monitoreo Pejesapo, Bahía de los Ángeles, BC, Mexico; ²CICESE, Departamento de Oceanografía Biológica, Ensenada, BC, Mexico).

2:30 **146** *Baseline Data, Regular Monitoring, and Protection Needs for Island-nesting Waterbirds at Bahía de los Ángeles*, **DANIEL W. ANDERSON^{1*}**, **DOMINGO de JESUS ZATARAIN²**, **ROSALÍA AVALOS²**, and **CARLOS R. GODÍNEZ** (¹Department of Wildlife, Fish, and Conservation Biology, University of California, Davis; ²CONANP/SEMARNAT, APFF Islas del Golfo de California en Baja California, Dom. Conocido, Bahía de los Ángeles, Baja California, MX; ³Parque Nacional Cabo Pulmo, CONANP, Santa María la Ribera s/n, La Ribera, Baja California Sur, MX).

3:00 **BREAK**

3:30 **147** *Long-Term Changes in a Spatially Subsidized Ecosystem in the Archipelago of Bahía De Los Ángeles, Mexico*, **THAÏS M. FOURNIER^{1*}**, **ABIGAIL LOZANO²**, **DREW M. TALLEY¹**, **ZHI-YONG YIN¹**, and **THERESA S. TALLEY³** (¹Environmental and Ocean Sciences, University of San Diego; ²Ocean Discovery Institute, San Diego; California Sea Grant, Scripps Institution of Oceanography).

4:00 **148** *Development of Techniques to Reduce Sea Turtle Bycatch in Baja's Commercial Fisheries: High Value in Unique Collaborations*, **YONAT SWIMMER^{1*}**, **JOHN WANG²**, **CARLOS GODINEZ-REYES³** and **SHARA FISLER⁴** (¹NOAA National Marine Fisheries Service Pacific Islands Fisheries Science Center, Long Beach,; ²NOAA National Marine

Fisheries Service Pacific Islands Fisheries Science Center, Honolulu; ³Comisión Nacional de Áreas Naturales Protegidas, Ensenada, Baja California, Mexico; ⁴Ocean Discovery Institute, San Diego).

4:30 **149** *Authentic Research Experiences in Baja California, Mexico for San Diego's Urban, Underserved Students*, **SHARA FISLER¹**, **LINDSAY GOODWIN¹**, **DREW TALLEY²**, and **JOEL BARKAN^{1*}** (¹Ocean Discovery Institute, San Diego; ²Department of Environmental and Ocean Sciences, University of San Diego).

*Innovative Methods from the Humanities
and Sciences to Communicate
Climate Change Solutions*

KIPJ ROOM 217

Thursday

1:20 p.m. – 5:00 p.m.

Program organizers: *Michel Boudrias* (Department of Environmental and Ocean Sciences, University of San Diego) and *Robert L. Chianese* (Emeritus, Department of English, California State University Northridge).

Program sponsored by the Pacific Division sections of Ecology, Environmental Science and Sustainability, and Science and the Arts and Humanities.

Translating the complexities of climate science to connect to diverse audiences, from students in K-12 settings to college courses to zoos, aquaria and museums and to decision makers and the general public, has become a field of its own. Teams of researchers from multiple disciplines have been working together to find the best ways to explain the science, develop innovative educational resources and provide potential solutions to deal with the impacts of climate change. The Humanities can complement science education by focusing on what motivates and engages people to redress our damage to the eco-system besides familiar and devastating images and words that expose that damage. Artists, writers, philosophers, ethicists, and humanities-focused environmentalists provide new approaches to motivating the public to change our fossil-fueled ways, implement new sustainable technologies and living styles, and devise and market compelling ethical principles to keep the planet from heating up further. This symposium will involve scientists and humanists in presenting such innovative strategies.

Session chairs: *Michel Boudrias* and *Robert L. Chianese*

1:20 *Introductory Comments*

1:30 **150** *Water-Energy Relationship at the University of California, Riverside*, **BENJAMIN SOMMERKORN***, **MARKO PRINCEVAC**, **JAKE EGGAN**, and **ROBERTO HERNANDEZ** (Department of Mechanical Engineering, Marlan and Rosemary Bourns College of Engineering, University of California, Riverside).

2:00 **151** *Converting Science into Policies in Local Climate Action Plans*, **NILMINI SILVA-SEND** (Energy Policy Initiative Center, School of Law, University of San Diego).

2:30 **152** *The Role of Narrative in Bending the Curve on Climate Change*, **JON CHRISTENSEN** (UCLA Institute of the Environment and Sustainability, Department of History, Center for Digital Humanities, cityLAB).

3:00 **BREAK**

3:30 **153** *Are Personal Transgressions Against Nature Sources of Environmental Activism? Coleridge's *Mariner* and *A Tale We Must Hear**, **ROBERT L. CHIANESE** (Emeritus, Department of English, California State University, Northridge).

4:00 **154** *Humanities at Full Capacity: Addressing Climate Change in the Interdisciplinary Classroom*, **TOM FEHRENBACHER** (High Tech High Credentialing Department, High Tech High, San Diego, CA).

4:30 **155** *Integrating Climate Change Science and Sustainability in Environmental Science, Sociology, Philosophy and Business Courses*, **MICHEL A. BOUDRIAS^{1*}**, **JULIA CANTZLER²**, **SIMON CROOM³**, **CAROLE HUSTON⁴**, and **MARK WOODS⁵** (¹Department of Environmental and Ocean Sciences, ²Department of Sociology, ³Sustainable Supply Chain Institute, ⁴Department of Communication and ⁵Department of Philosophy, University of San Diego).



Conducting Mental Health Research in the Community Setting for the Benefit of Underserved Populations

KIPJ ROOM F

Thursday

1:20 p.m. – 4:30 p.m.

Program organizer: *Patricia L. Jones* (Community Allies for Psychological Empowerment, San Diego, CA).

Program sponsored by the Pacific Division Psychology Section.

At present, the status quo of mental health care for underserved populations lies in minimal services provided in county mental health, an absence of mental health care entirely, services rendered by volunteers lacking clinical training, and provision of non-clinical interventions through the conduit of peer support. In order to ameliorate the gap between good intentions and emergency mental health care, change is necessary. Funding the programs already in place is not enough to elicit sustained, prudent, efficacious change. Research that provides the capability to conduct rigorous statistical analysis of outcome-based data to ensure treatment efficacy and validate protocols tailored to our populations and community partner needs is necessary. This symposium is designed to provide a detailed overview of the planning, implementation, dynamics, operations, and goals of an evidence-based, data-driven, community research program. While the lessons here are specific to mental health, the model itself can be applied to a vast number of fields in which scientific inquiry has an impact on the lives of community members. Examining the data and feedback in the context of the original community experience isn't a novel idea, it's just good practice. Evidence-based practices and sound program development are the cornerstones of effective treatment, and the key to understanding and addressing the issues afflicting the communities we serve.

Session chair: *Patricia L. Jones*

1:20 *Introductory Comments*

1:30 **156** *Introduction to the Development of Community-Based Research Projects*, **GLENN LIPSON** (Alliant International University, San Diego, CA).

2:00 **157** *Implications of Culture and Ethnoracial Diversity for OED/OIF/OND Veteran Group Research Design*, **RONN JOHNSON** and **JENNY LI*** (University of San Diego, San Diego, CA).

2:30 **158** *Data Safety and Ethics - Longitudinal Research within Communities*, **KIMBERLY MACIAS** (University of San Diego, San Diego, CA).

3:00 **BREAK**

3:30 **159** *Designing Data Collection for Value-Added Reuse*, **ERIC BUSBOOM** (Civic Knowledge, San Diego, CA).

4:00 **160** *Interrupting Dichotomies to Promote Community Investment and Advancement of Research*, **PATRICIA JONES*** and **DAVID BOND** (Community Allies for Psychological Empowerment, San Diego, CA).

Scientific Maker Symposium

KIPJ ROOM B

Thursday

1:30 p.m. – 5:00 p.m.

Program organizers: *Joan Horvath* and *Rich Cameron* (Nonscriptum LLC, Pasadena, CA).

Program sponsored by the Pacific Division Engineering, Technology, and Applied Sciences Section.

Scientists have always been forced to create a lot of their equipment, but major discoveries typically have required large capital budgets. Even with those budgets, scientists often have to design their protocols to fit the equipment. Suppose it could be the other way around, and equipment could be easily developed to fit a protocol? Also, suppose you could put up plans for instrumentation and have people all over the world build something and go take data for you? This symposium highlights use of these technologies to educate students and also explores applications of low-cost maker technologies to do science in the lab and in the field.

Session co-chairs: *Joan Horvath* and *Rich Cameron*

1:30 *Introductory Comments*

1:40 **161** *The DIY Student Wind Tunnel*, **SIMON HUSS^{1*}**, **MATTHEW PARSON^{1*}**, **TRI NGUYEN¹**, **REGINA RUBIO¹**, **JOAN HORVATH²**, and **RICH CAMERON²** (¹Windward School, Los Angeles CA; ²Nonscriptum LLC, Pasadena, CA).

2:00 **162** *Project-based Learning for K-12 NGSS STEM Education*, **BETTY WONG** (California Institute of Technology, Pasadena, CA).

2:20 **163** *ISS-Above: Bringing the International Space Station into the Classroom*, **LIAM KENNEDY** (ISS-Above, Monrovia, CA).

2:40 **164** *3D Printed Structures for Magnetic-based Immunotherapy of Brain Tumors*, **ALEX PAI^{1*}**, **TORKOM PAILEVANIAN¹**, **PENGPENG CAO²**, **ETHAN WHITE²**, **KAUSHIK DASGUPTA¹**, **JEFF SHERMAN¹**, **DARYA ALIZADEH²**, **JACOB BERLIN²**, **BEHNAM BADIE²**, and **ALI HAJIMIRI¹** (¹California Institute of Technology, Pasadena, CA; ²Beckman Research Institute, City of Hope Medical Center).

3:00 **BREAK**

3:20 **165** *When Makers Meet Entomologists: A Case Study*, **JOAN HORVATH^{1*}**, **RICH CAMERON^{1*}**, **DANIEL BERRY²**, **ROGER D. SELBY³**, **DIEGO PORQUERAS⁴**, and **RICHARD STOUTHAMER³** (¹Nonscriptum LLC, Pasadena CA; ²Huntington Library, Art Collections and Botanical Gardens; ³Department of Entomology, University of California, Riverside; ⁴Deezmaker, Pasadena, CA).

3:40 **166** *CO2 Laser Cutter Builds-101: The Mental Model For Building A Homebrew Laser Cutter In Your Garage*, **JOSHUA VASQUEZ**

4:00 **167** *Vinduino Open Source Irrigation Efficiency Project*, **REINER VAN DER LEE** (Rancho Santa Margarita, CA).

4:20 **168** *Conducting Super Measurements for Superconductors*, **TOMAS ROBINSON***, **COLLIN CUPIDO**, **DAVE FORTIN**, and **MARK FREEMAN** (University of Alberta, Edmonton, AB, Canada).

4:40 *Wrap Up and Discussion*

Friday, 17 June 2016

***Precision, Ambiguity, and Creativity
in Science and the Arts***

KIPJ ROOM 217

Friday

8:20 a.m. – Noon

Program organizers: *Jesse J. Thomas* (Department of Religious Studies, San Diego State University) and *Dawn Marie Hamilton* (Herb Alpert School of Music, University of California, Los Angeles).

Program sponsored by the Pacific Division Section on Science and the Arts and Humanities.

When describing nature, science has traditionally utilized precise representations while the arts have utilized ambiguous metaphors, each discipline more or less agreeably leaving the other to its own devices. Recently, such distinctions have become increasingly difficult to maintain on both sides. In science, much of the discussion focuses on the meaning of creativity, where imprecise and ambiguous metaphors are developing. This can be found, for example in physical theories of nonlocality, evolutionary theories of spontaneity in the emergence of new species, cognitive science in childhood development theory. Cognitive scientists Thelen and Smith comment: “A dynamic system is a metaphor that turns empirical questions around by focusing attention on mechanism, the relation between stability and variability, the process of change.”

Papers may address such ambiguous questions as: Are the scientific and artistic metaphors of creativity compatible, or are they categorically different? How does science understand artistic creativity? How does art understand scientific complex systems? Is scientific creativity simply that which is not yet explainable in existing scientific terminology? Are complex systems all that creative, or simply too complicated for ordinary people to understand? How can one explain how space disappears in non-locality without metaphor? Are new species simply built from very old species and so complicated that they cannot yet be explained, or genuinely new ones that have never existed before? Can a computer be creative? Can a work of art be considered an organism? Can Descartes’ mechanisms survive today? How are instruction processes different in science and art? Can classroom teaching in either science or the arts, especially in online teaching, be genuinely creative, and if so, how?

Session chairs: *Jesse Thomas* and *Dawn Marie Hamilton*

8:20 *Introductory Comments*

8:30 **169** *The Parable of Bats in the Belfry: C. S. Peirce’s Pragmatism, Complexity Theory, and Embodied Cognitive Science*, **JESSE J. THOMAS** (Department of Religious Studies, San Diego State University).

9:00 **170** *Precise Science and Ambiguous Scientists: Perceiving the Universe Through Science and Participation*, **ARNOLD O. BENZ** (Institute for Astronomy, ETH Zurich, Zurich, Switzerland).

9:30 **171** *A Century of Increasing Precision, Creativity and Scope in Physics*, **RAGHAVAN JAYAKUMAR** (Retired Physicist, Lawrence Livermore National Laboratory).

10:00 BREAK

10:30 **172** *Using Metaphors, Imagery and Focus in Transferring Music by Instrument to Listener*, **SHERIDON STOKES** (Herb Alpert School of Music, University of California, Los Angeles).

11:00 **173** *The Illuminating Power of Paradox and Pataphors in Religion and Science*, **DARREN IAMMARINO** (Humanities Department, San Diego Mesa College).

11:30 *Panel Discussion of Presenters*

Bahía de San Quintín: The Status, Threats, and Solutions for One of the Last Intact Coastal Lagoons in Western North America

KIPJ ROOM H

Friday

8:20 a.m. – 4:30 p.m.

Program organizers: *Drew M. Talley* (Department of Environmental and Ocean Sciences, University of San Diego) and *Alan Harper* (Terra Peninsular).

Program sponsored by Pacific Division Section on Ecology, Environmental Science, and Sustainability.

San Quintín Bay is the best preserved coastal lagoon ecosystem in the Mediterranean zone of western North America. The enormous tidal prism of this hyper saline bay leads to near complete replacement of its contents on Spring tides. Due to the intact upland ecosystem, limited agricultural flow, high marine productivity and terrestrial fog drip, it is a refuge for numerous migratory, endemic, and economically important species, as well supporting a managed shellfishery. This

session will focus on recent research into the biodiversity and economic resources of the region, the potential threats, and how civil society, non-profits and government agencies are responding to those threats.

Session chair: *Drew M. Talley*

8:20 *Introductory Comments*

8:30 **174** *Controls of Nutrient Dynamics and the Fertility of San Quintín Bay: Upwelling, Primary Producers and Oysters*, **VICTOR F. CAMACHO-IBAR** (Instituto de Investigaciones Oceanológicas, Universidad Autónoma de Baja California, Ensenada, Baja California, Mexico).

9:00 **175** *Bahía San Quintín at 40 years of Sustainable Aquaculture*, **JOSÉ A. ZERTUCHE-GONZÁLEZ^{1*}**, **VICENTE GUERRERO-HERRERA²**, and **ISAÍ PACHECO-RUÍZ²** (¹Instituto de Investigaciones Oceanológicas, Universidad Autónoma de Baja California, Ensenada, Baja California, Mexico; ²Cultivos Marinos Integrados S de RL de CV. Av. Leona Vicario 315. Lázaro Cárdenas, San Quintín, B.C.).

9:30 **176** *Herpetofauna of San Quintín: Patterns of Diversity in a Coastal Ecotone*, **ANNY PERALTA-GARCIA^{1*}**, **BRADFORD D. HOLLINGSWORTH²**, and **JORGE H. VALDEZ-VILLAVICENCIO¹** (¹Fauna del Noroeste, Ensenada, B.C. México; ²San Diego Natural History Museum, San Diego, CA).

10:00 BREAK

10:30 **177** *San Quintín, Baja California: Environmental Violence and the Socio-environmental Evolution of a Landscape*, **SULA E. VANDERPLANK¹** and **NEMER E. NARCHI^{2*}** (¹Botanical Research Institute of Texas, Fort Worth, TX and Centro de Investigación Científica y Educación Superior de Ensenada. Carretera Ensenada-Tijuana No. 3918, Zona Playitas, Apartado Postal 360, Ensenada, Baja California, México; ²Centro de Estudios en Geografía Humana, El Colegio de Michoacán. Cerro de Nahuatzen 85, Fracc. Jardines del Cerro Grande, C.P. 59370, La Piedad, Michoacán, México).

11:00 **178** *The Coastal Dunes of Bahía de San Quintín, Baja California, Mexico*, **NATALIA RODRÍGUEZ-REVELO** (Universidad Autónoma de Baja California (UABC), Facultad de Ciencias, carretera Tijuana-Ensenada, Ensenada, Baja California, México).

11:30 **179** *What We Know (and Don't Know) about the Flora of San Quintín*, **SULA E. VANDERPLANK** (Botanical Research Institute of Texas, Fort Worth, TX and Centro de Investigación Científica y Educación Superior de Ensenada. Carretera Ensenada-Tijuana No. 3918, Zona Playitas, Apartado Postal 360, Ensenada, Baja California).

12:00 LUNCH

1:30 Invitation only discussion to identify next steps, data gaps, and discuss putting together a publication.



***United States World's Fairs and Expositions:
Seeing Fairs as More than Fun Places to Visit***

KIPJ ROOM F

Friday

8:50 a.m. – Noon

Program organizer: *Alan L. Bain* (National Anthropological Archives, Smithsonian Institution).

Program sponsored by the Pacific Division Sections on Anthropology; General and Interdisciplinary Studies; and Social, Economic, and Political Sciences.

United States world's fairs have been viewed by the public as enjoyable venues to visit, places to partake of their food, look at their entertainers, and glimpse people from around the world. In fact, fairs demonstrated the political, scientific, and racial attitudes of their times, and projected what the correct American way and values should be for its citizens.

How the American West thought of itself and its conscious effort to dispel eastern perceptions of the West as an untamed, wild, and uncivilized frontier shaped the four Pacific Coast fairs and expositions promoters' efforts in what was displayed at those fairs (1905 Lewis and Clark Exposition, Portland; 1909 Alaska-Yukon-Pacific Exposition, Seattle; 1915 Panama-Pacific Exposition, San Francisco; and 1915 Panama-California Exposition, San Diego). Themes of economic opportunity, the natural world and environment, and race, were presented throughout the fairs, proclaiming to visitors that the region west of the Rockies represented the future of the United States.

Although anthropology played a critical role in the exhibitions and village displays shown at world's fairs in the past, notably the World's Columbian Exposition (Chicago, 1893) and the Louisiana Purchase Exposition (St. Louis, 1904), the Panama-California Exposition witnessed the largest display of physical anthropology seen by an American audience. Anthropologists and researchers were sent around the globe to capture skeletons. Artistic renderings and skeletal displays of stages in human evolution shown at the Panama-California Exposition represented

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* identifies the speaker from among several authors listed

63 (bolded number) is the abstract number

abstracts contain complete contact information for authors

a unique effort. The lasting impact of the exhibition, its influence on later exhibitions in the United States, and the creation of the permanent Museum of Man provides an example of the influence of anthropology at the fairs and expositions. At the San Diego exposition, almost 300 Apache, Hopi, Navajo, and Zuni tribal members resided in a large Indian Village demonstrating their crafts and modes of dress. The outdoor portion of the Exposition unleashed a century of influence over landscape and architecture and forever changed Balboa Park. Anthropologists also went to the fairs' villages to collect anthropological data and conduct ethnological field studies. In addition, modern day use of poetry, literature, and performance show another side of world's fairs, how they were a display of American imperialism, racism, and racial stereotyping. This session is designed to provide anthropological, historical, literary and performing arts narratives towards understanding how the fairs were developed, how they were used by scientists, and what they symbolized beneath the veneer of public entertainment.

Session chair: *Alan L. Bain*

8:50 *Introductory Comments*, **ALAN L. BAIN**

9:00 **180** *Fairs of the Far West: Pacific Coast Expositions and the Selling of a New West*, **JOHN PUTMAN** (Associate Professor of History, Department of History, San Diego State University).

9:40 *Questions and Answers/General Discussion*

10:00 BREAK

10:30 **181** *The Panama-California Exposition, San Diego, 1915-1916*, **NANCY CAROL CARTER** (Professor of Law and Legal Research Center Director [Retired] University of San Diego).

11:00 **182** *Academics at the Fairs: Linguistic and Cultural Research with Exhibited Igorots in the Early 20th Century*, **DEANA WEIBEL** (Associate Professor and Chair, Anthropology Advising Faculty, Religious Studies Program, Department of Anthropology, Grand Valley State University, Allendale, MI).

11:30 *Questions and Answers/General Discussion*



Evaluating Return on Investment and Assessing Student Learning for Non-traditional Teaching Activities

KIPJ ROOM I

Friday

8:50 a.m. – Noon

Note: There is one poster in Poster Session 1 that was submitted as part of this program. Please refer to the listing for General and Interdisciplinary posters on page 50 in these *Proceedings* for additional information.

Program organizers: *Crystal Goldman* (Geisel Library, University of California, San Diego) and *Paula S. Krist* (Institutional Research and Planning, University of San Diego).

Program sponsored by the Pacific Division Section of General and Interdisciplinary Studies.

More and more often, educators are being asked to verify the effectiveness of their work through the assessment of student learning. Usually, the assessment of student learning takes place through the assessment of classroom experiences, using tests, papers, and projects. However, not all educational experiences occur in the traditional semester- or quarter-long course. There are compact overseas courses, one-shot library instruction sessions, and extracurricular programs, to name only a few, in which students can enrich their academic lives. For these non-traditional instructional settings, effective assessment can be a challenge. Those involved in such courses or programs still need to set reasonable goals and measurable outcomes, provide evidence of continuous improvement, and demonstrate a return on investment to the university. In many cases, authentic assessment strategies are more appropriate than classroom-based strategies.

This symposium highlights some of the many ways in which university faculty and staff authentically assess and evaluate their non-traditional teaching and learning activities.

Session chairs: *Paula S. Krist* and *Crystal Goldman*

8:50 *Introductory Comments*

9:00 **184** *A Case for Non-Traditional Assessment*, **PAULA S. KRIST** (Institutional Research and Planning, University of San Diego).

9:30 **185** *Transforming Learning Through Integrated Classrooms: Sustainability LLCs and Capstone*, **CAROLE L. HUSTON** (Provost's Office, University of San Diego).

10:00 BREAK

10:30 **186** *Assessing Library One-Shot Workshops for Undergraduate Writing Programs*, **CRYSTAL GOLDMAN** (Geisel Library, University of California, San Diego).

11:00 187 *An Assessment of Two Short-Term Study-Abroad Engineering Courses*, **FRANK G. JACOBITZ** (Mechanical Engineering Department, Shiley-Marcos School of Engineering, University of San Diego).

11:30 188 *Teaching Geology Students the Hard, Cold Facts: An Excursion on the Athabasca Glacier*, **MATTHEW J. JAMES** (Geology Department, Sonoma State University).

Limits to the Second Law of Thermodynamics

KIPJ ROOM C

Friday

8:55 a.m. – 1:00 p.m.

*This symposium is continuing from Thursday.
Please refer to page 31 of these Proceedings for details.*

Session chair: *Remi Cornwall*

8:55 *Welcome Back*

9:00 189 *Physical Ergodicity: Another Faith-Based Myth (Which We Were Not the First to Debunk)*, **L.S. SCHULMAN** and **B. GAVEAU** (Physics Department, Clarkson University).

9:30 190 *Quantum Heat Engine Enhanced by Coherence: Revisiting Chambadal-Novikov Efficiency*, **KONSTANTIN E. DORFMAN** (Precision Measurement Group, Singapore Institute of Manufacturing Technology, Singapore).

10:00 191 *The Quantum-Classical Correspondence and Robustness under Time Reversal*, **ELIAHU COHEN¹*, **H. H. WILLS¹**, and **YAKIR AHARONOV²** (¹Physics Laboratory, University of Bristol; ²School of Physics and Astronomy, Tel Aviv University and Schmid College of Science, Chapman University).**

10:30 BREAK

Session chair: *M. Kostic*

11:00 192 *Testing: The Gravitational Potentials of Equilibrium Solute-Concentration Fluctuations — Finding: The Gravitational Potentials Exist and The Second Law of Thermodynamics Is Not Universal*, **NORMAN K. BORSUK** (Alameda, CA).

11:30 193 *The Generation of Heat Through Insulated Assemblies of Molecules*, **RODERICH W. GRAEFF** (Koenigsfeld, Germany).

12:00 194 *Implementing Brownian Ratchets in Solid State*, **PETER M. OREM¹* and **FRANK M. OREM²** (¹Renton, WA; ²Lake Oswego, OR).**

12:30 195 *Entropy Decrease in Isolated Systems*, **JEAN-SELVA RATTINACANNOU** (180 rue du centre aere, 40990 Saint Paul les Dax, France).

Philosophers of Biology Engaging the Biosciences

KIPJ ROOM G

Friday 9:20 a.m. – 3:30 p.m.

Program organizer: *Roberta L. Millstein* (University of California, Davis).

Program sponsored by the Pacific Division Section of the History and Philosophy of Science.

Contemporary scientists are constantly being challenged to be more interdisciplinary and integrative in their approach; as such, tools from computer science and engineering are deployed in biology, and biological theory has been exported into new domains — from cancer biology to toxicology. These advances in modern biology have generated a set of interesting philosophical challenges: first, how best can we find common ground across disciplines, and what is distinctive about explanations in the biological sciences? We will focus on a number of case studies that illustrate the challenges and opportunities associated with moving across disciplinary boundaries: individualized medicine, sex determination, systems biology, and cancer biology. A central theme is the nature of reductive versus integrative approaches to the sciences.

Session chair: *Roberta L. Millstein*

9:20 *Introductory Comments*

9:30 196 *Millennial Biology: The National Science Foundation and American Biology, 1975-2005*, **DONALD J. MCGRAW** (Ephraim, UT).

10:00 197 *Cancer Systems Biology: The Promises and Pitfalls of a New “Paradigm”*, **ANYA PLUTYNSKI** (Department of Philosophy, Washington University in St. Louis).

10:30 BREAK

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* identifies the speaker from among several authors listed

63 (bolded number) is the abstract number

abstracts contain complete contact information for authors

11:00 198 *How Cancer Spreads: Reconceptualizing a Disease*, **KATHERINE E. LIU^{1*}**, **ALAN C. LOVE^{3,4}**, and **MICHAEL TRAVISANO^{1,2}** (¹Ecology, Evolution, and Behavior and ²BioTechnology Institute, University of Minnesota, St Paul; ³Department of Philosophy and ⁴Minnesota Center for Philosophy of Science, University of Minnesota, Minneapolis).

11:30 199 *Individualized Medicine and the Epistemological Challenges of Data Integration*, **MEGAN DELEHANTY** (Department of Philosophy, University of Calgary).

12:00 LUNCH

2:00 200 *Scientific Practice, Scientific Generalizations and Regularity*, **SARAH M. ROE** (Department of Philosophy, Southern Connecticut State University).

2:30 201 *Mechanisms and Explanatory Practice in Molecular Biology*, **ROBERT A. SKIPPER, JR.** (Department of Philosophy, University of Cincinnati).

3:00 202 *The Failure of Robust Data in Temperature-Dependent Sex Determination Measurement*, **VADIM KEYSER** (Department of Philosophy, California State University Sacramento).

*At the Crossroads of Global Water Issues:
An Interdisciplinary Perspective*

KIPJ ROOM D

Friday

9:50 a.m. – Noon

Program organizer: *James Bolender* (Department of Chemistry and Biochemistry, University of San Diego).

Sponsored by the Pacific Division General and Interdisciplinary Section.

Water contamination and access issues related to clean water is a global problem. Bacterial, parasitic, industrial run offs, pesticides, anthropogenic and geogenic heavy metal contamination of water is evident in developed and developing nations. There are common issues that can hinder access to this vital resource and common significant health outcomes as a consequence of consuming such contaminated water. This symposium aims to explore the issues in access to clean water across the globe and the health consequences from a scientific perspective. Discussion about the interdisciplinary attempts to address these problems via public health

education about nutritional and sanitation interventions to clean the water and promote excretion of contaminants; as well as locally accessible remediation processes that could be used to further improve access to and consumption of clean water will be addressed. We welcome contributions from fields as varied as engineering, sociology, environmental psychology, political science, chemistry, biology, and more.

Session chair: *James Bolender*

9:50 *Introductory Comments*

10:00 203 *Design of a Latrine Aid for Landmine Survivors: A Faculty Perspective*, **FRANK G. JACOB-ITZ^{1*}**, **LISA M. NUNN²**, and **MIKE WILLIAMS³** (¹Mechanical Engineering Department, Shiley-Marcos School of Engineering, University of San Diego; ²Department of Sociology, University of San Diego; ³Department of Political Science and International Relations and the Changemaker Hub, University of San Diego).

10:30 204 *A Survey of Water Quality Issues in Uganda and Kenya*, **JAMES P. BOLENDER** (Department of Chemistry and Biochemistry, University of San Diego).

11:00 205 *Uganda: Advancing Knowledge and Skill Transfer Partnerships in the Developing World*, **KEITH G. MACDONALD** (College of Arts and Sciences, University of San Diego).

11:30 206 *Uganda: Assessing the Health of Women of Child-Bearing Age and the Children for Developmental Health – The Impact of Heavy Metals*, **ANITA J. HUNTER** (College of Nursing, Washington State University, Vancouver).

*Public Lecture Series:
Historic Perspectives on Science*

KIPJ THEATRE

Friday

1:00 p.m. – 5:00 p.m.

Program organizer: *Frank G. Jacobitz* (Mechanical Engineering Department, Shiley-Marcos School of Engineering, University of San Diego).

Join us this afternoon for a series of historically-themed talks celebrating various aspects of science and its scientist practitioners. Please turn to page 11 in these *Proceedings* for

information about the presenters and page 91 to read an abstract for each talk.

Session chair: *Frank G. Jacobitz*

- 1:00 2** *Hobbies Among Early Sigma Xi Members*, **GEORGE EDWARD SEYMOUR** (Escondido, CA).
- 1:30 3** *Thermodynamics and Life*, **ANDREW REX** (University of Puget Sound).
- 2:00 4** *Interdisciplinary Water Quality Research Through the Lens of the Liberal Arts*, **JAMES BOLENDER** (Department of Chemistry, University of San Diego).
- 2:30 5** *Climate Change Communication: The Need for Interdisciplinary Efforts and Innovative Resources to Reach Diverse Audiences*, **MICHEL A. BOUDRIAS** (Department of Environmental and Ocean Sciences, University of San Diego).
- 3:00 BREAK**
- 3:30 6** *The Evolution of Drug Discovery: Past, Present, and Future Perspectives*, **JOZEF STEC** (Department of Pharmaceutical Sciences, College of Pharmacy, Marshall B. Ketchum University).
- 4:00 7** *The Autodigestion Hypothesis*, **GEERT W. SCHMID-SCHÖNBEIN** (Department of Bioengineering, University of California, San Diego).
- 4:30 8** *How to Engage the Liberal Arts by Capturing the Sciences*, **NOELLE NORTON** (Dean, College of Arts and Sciences, University of San Diego).



II. WORKSHOPS and AAAS FORUMS

Thursday, 16 June 2016

WORKSHOP

***An Introduction to Grant-Writing
for Foundations***

KIPJ ROOM H

Thursday

9:00 a.m. – NOON

Organizer: *Peter Kraus* (Associate Librarian, University of Utah, J. Willard Marriott Library, 295 South 1500 East, SLC, UT 84112; Peter.Kraus@utah.edu).

Participants will review the process of writing effective grant applications and assembling a good proposal to foundations. The basic components of a competitive grant proposal will be presented including the common pitfalls to avoid in grant writing and submission. Appropriate project funding sources will be discussed as well as establishing positive sponsor relationships, satisfying sponsor requirements, and the proposal review process.

FORUM

***Professional Development and
Career Services Forum***

KIPJ ROOM E

Thursday

12:15 p.m. – 1:30 p.m.

Facilitators: *Alex Torres* (Director, Professional Development and Career Services, AAAS, Washington, D.C.; atorres@aaas.org) and *Scott Nichols* (Product Manager, Professional Development and Career Services, AAAS, Washington, D.C.; sfnichols@aaas.org).

As part of the AAAS Office of Membership Development and Engagement, the new Professional Development and Career Services team will discuss online resources being developed specific to the professional needs of AAAS members. This session is also intended as a forum to hear from members and find out how to further meet those professional needs. Please join us to find out what is available, what is being planned and to give your input on the types of resources you would like to see developed. Similar forums are offered both Thursday and Friday.

A working lunch will be provided to participants at this event. Pre-registration was required, with enrollment limited to 30 participants at each session. If you didn't pre-register but would like to join in this activity, please check at the Registration Desk to see if space is still available.

Friday, 17 June 2016

FORUM

***Professional Development and
Career Services Forum***

KIPJ ROOM E

Thursday

12:15 p.m. – 1:30 p.m.

Facilitators: *Alex Torres* (Director, Professional Development and Career Services, AAAS, Washington, D.C.; atorres@aaas.org) and *Scott Nichols* (Product Manager, Professional Development and Career Services, AAAS, Washington, D.C.; sfnichols@aaas.org).

As part of the AAAS Office of Membership Development and Engagement, the new Professional Development and Career Services team will discuss online resources being developed specific to the professional needs of AAAS members. This session is also intended as a forum to hear from members and find out how to further meet those professional needs. Please join us to find out what is available, what is being planned and to give your input on the types of resources you would like to see developed. Similar forums are offered both Thursday and Friday.

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III. CONTRIBUTED ORAL PRESENTATIONS

1100 (time italicized and underlined) indicates a student presentation

* indicates the speaker from among several authors listed

63 (bolded number) indicates abstract number

*Quick Directory of Sponsoring Sections
for these Oral Presentations*

Anthropology and Archaeology	page 47
Chemistry and Biochemistry	page 45
Earth Sciences	page 45
Ecology, Environmental Sciences, and Sustainability	page 47
Education	page 49
Engineering, Technology, and Applied Sciences	page 49
Evolution, Organismal Biology, and Biodiversity	page 47
General and Interdisciplinary Studies	page 46
History and Philosophy of Science	page 49
Materials Science	page 46
Physics	page 46
Social, Economic, and Political Sciences	page 48

Wednesday, 15 June 2016

Oral Session 1

Chemistry and Biochemistry

Earth Sciences

KIPJ ROOM 219

Wednesday

9:00 a.m. – 11:20 a.m.

Organizer for the Chemistry and Biochemistry Section:
Owen M. McDougal (Department of Chemistry and Biochemistry, Boise State University).

Organizer for the Earth Sciences Section: *Jad D'Allura*
(Department of Chemistry, STEM Division, Southern Oregon University).

Session chair: *Jad D'Allura*

Earth Sciences

9:00 207 *Volcanism in the Miocene Western Cascades and Pliocene to Quaternary High Cascade Provinces, Northeastern Portion of the Cascade-Siskiyou National Monument, Southwestern Oregon, JAD A. D'ALLURA^{1*}, MEGAN MORTIMER-LAMB² and SPENCER JONES²* (¹Chemistry Department, STEM Division; Southern Oregon University; ²Department of Geological Sciences, University of Oregon).

9:20 208 *How Explosive Volcanic Eruptions Cause Global Cooling While Effusive Basaltic Eruptions Cause Global Warming, PETER L. WARD* (U.S. Geological Survey, retired, Jackson, WY).

9:40 209 *Evidence for Large Scale Flooding in Eurasia, GEORGE R. DE NEEF* (Vista, CA).

10:00 BREAK

Session chair: *Owen M. McDougal*

Chemistry and Biochemistry

10:20 210 *Ab Initio Kinetic Analysis of Hydrocarbon Combustion Intermediates Reacting in an Acetylene Flame, PIERRE WINTER* and ANDREW COOKSY* (Department of Chemistry and Biochemistry, San Diego State University).

10:40 211 *NHE1 and CHP2: A Critical Survival Mechanism for Nascent Non-small Cell Lung Cancer Tumor Formation, W.T. COTTLE^{1*}, J.J. PROVOST¹, and M.A. WALLERT²* (¹Chemistry and Biochemistry, University of San Diego; ²Departments of Chemistry and Biochemistry, and Biosciences, Bemidji State University).

11:00 212 *A 3D Printed Meter-Mix Device to Solve the Sample-to-Device Interface for LRS and POC Diagnostics, ERIK JUE^{1*}, NATHAN G. SCHOEPP², DAAN WITTEERS², and RUSTEM F. ISMAGILOV^{1,2}* (¹Division of Biology and Biological Engineering and ²Division of Chemistry and Chemical Engineering, California Institute of Technology).

1100 (time italicized and underlined) identifies a student presentation

* identifies the speaker from among several authors listed

63 (bolded number) is the abstract number

abstracts contain complete contact information for authors

Oral Session 2
General and Interdisciplinary
Materials Science

Physics
KIPJ ROOM 220
Wednesday
9:00 a.m. – 11:40 a.m.

Organizer for the General and Interdisciplinary Section: *Crystal Goldman* (Giesel Library, University of California, San Diego).

Organizer for the Materials Science Section: *George Quainoo* (Department of Engineering and Physics, STEM Division, Southern Oregon University). Co-organizer: *Vilupanur Ravi* (Department of Chemical and Materials Engineering, California State Polytechnic University, Pomona).

Organizer for the Physics Section: *Ellen Siem* (Department of Engineering and Physics, STEM Division, Southern Oregon University).

Session chair: *Vilupanur Ravi*

Materials Science

9:00 **213** *Halide Activated Pack Aluminizing of Steels*, **VILMA E. GONZALEZ***, **DYLAN VOGT**, and **VILUPANUR RAVI** (Department of Chemical and Materials Engineering, California State Polytechnic University, Pomona).

9:20 **214** *High Temperature Oxidation of Aluminized Steels*, **STEVEN GOLTRA***, **ALEXANDER JALBUENA**, **EYOSIAS MESGINA**, and **VILUPANUR RAVI** (Department of Chemical and Materials Engineering, California State Polytechnic University, Pomona).

9:40 **215** *High Temperature Cyclic Oxidation of Aluminized Nickel Chromium Alloys*, **JOE FURUKAWA***, **MOSES DELEON**, and **VILUPANUR RAVI** (Department of Chemical and Materials Engineering, California State Polytechnic University, Pomona).

10:00 BREAK

Physics

10:20 **216** *Dynamics of Bloch State Positronium Emission from MOF Targets Studied via Rydberg TOF Spectroscopy*, **ALINA M. PINEIRO ESCALERA***, **ADRIC C. L. JONES**, and **ALLEN P. MILLS, JR.**

(Department of Physics and Astronomy, University of California, Riverside).

10:40 **217** *Exact Thermal Density Functional Theory for a Model System*, **JUSTIN C. SMITH^{1*}**, **AURORA PRIBRAM-JONES^{2,3}**, and **KIERON BURKE⁴** (¹Department of Physics and Astronomy, University of California, Irvine; ²Lawrence Livermore National Laboratory; ³Department of Chemistry, University of California, Berkeley; ⁴Department of Chemistry, University of California, Irvine).

11:00 **218** *Anisotropic Light-Velocity and Gravitation Within Expanding Space-Time*, **THOMAS E. CHAMBERLAIN** (Los Angeles, CA).

General and Interdisciplinary

11:20 **219** *Power Satellites as a Solution to Carbon and Energy Problems*, **KEITH HENSON** (L5 Society, San Diego, CA).

Oral Session 3

***Anthropology and Archaeology
Ecology, Environmental Science
and Sustainability
Evolution, Organismal Biology
and Biodiversity***

KIPJ ROOM 219

Wednesday

1:20 p.m. – 3:00

Organizer for the Anthropology and Archaeology Section: *Sang-Hee Lee* (Department of Anthropology, University of California, Riverside).

Organizer for the Ecology, Environmental Science and Sustainability Section: *Richard Van Buskirk* (Department of Environmental Studies, Pacific University).

Organizer for the Evolution, Organismal Biology, and Biodiversity Section: *Julia Ruppell* (Department of Biology, Pacific University).

Session chair: *Richard Van Buskirk*

Ecology, Environmental Science, and Sustainability

1:20 220 *California's Forests Navigate Complex Terrain in a Changing Climate*, **JANET FRANKLIN^{1*}**, **JOSEP M. SERRA-DIAZ²**, **FRANK W. DAVIS³**, **LYNN C. SWEET⁴**, **IAN M. McCULLOUGH³** and **ALEXANDRA D. SYPHARD⁵** (¹School of Geographical Sciences and Urban Planning, Arizona State University; ²Harvard Forest, Harvard University; ³Bren School of Environmental Science and Management, University of California, Santa Barbara; ⁴Center for Conservation Biology, University of California, Riverside; ⁵Conservation Biology Institute, La Mesa, CA).

1:40 221 *Effects of Selective Planting and Invasive Plant Management on Ecosystem Function*, **MICHELLE J. LEE***, **NATHANIEL Y. PARK***, **HANAN ABELS-SULLIVAN***, **DALIA ASSOUM***, **RACHEL V. DAVIDSON**, **MARKUS MIN**, and **THOMAS W. GILLESPIE** (UCLA Institute of the Environment and Sustainability).

2:00 222 *Stop Motion Animation to Communicate Original Research in Coastal Ecology*, **ABBY LUNSTRUM** (NOAA Office of International Affairs).

Anthropology and Archaeology

2:20 223 *Premature Sutural Fusion and Cranial Shape Change: Evidence from the Prehistoric Record*, **ALEXANDRA M. McGOUGH^{*1}**, **LAURA E. CIRILLO²**, **JULIE DING¹**, **REBECCA S. JABBOUR³**, and **GARY D. RICHARDS⁴** (¹Department of Integrative Biology, University of California, Berkeley; ²Department of Anthropology, California State University, Chico; ³Department of Biology, Saint Mary's College of California; ⁴Department of Biomedical Sciences, A.A. Dugoni School of Dentistry, University of the Pacific).

**Evolution, Organismal Biology,
and Biodiversity**

2:40 224 *Food Abundance and the Aristotle's Lantern of Sea Urchins*, **SUMMER J WEBB*** and **MAYA S. DEVRIES** (Scripps Institution of Oceanography, University of California, San Diego).

Oral Session 4

Social, Economic, and Political Sciences

KIPJ ROOM 220

Wednesday

1:20 p.m. – 3:20 p.m.

Organizer for the Sociology, Economic, and Political Sciences Section: Carl A. Maida (UCLA Schools of Dentistry and Medicine, University of California, Los Angeles).

Session chair: *Carl A. Maida*

1:20 **225** *Health Disparities Associated with Homelessness Complexify Confronting End-of-Life Issues*, **DEBORAH KISSINGER** (Department of Complementary and Alternative Medicine, John A. Burns School of Medicine, University of Hawaii).

1:40 **226** *Fatal Motor Vehicle Crash Data in the Brazilian Federal District: A Comprehensive Study*, **ANA PAULA RODRIGUES BERÇOT^{1*}**, **JOÃO MARCOS DE JESUS COLARES¹**, and **JULIANO DE ANDRADE GOMES²** (¹Departamento de Estatística, Universidade de Brasília, Brasília; ²Instituto de Criminalística, Brasília).

2:00 **227** *Is it Safe to be a Pedestrian in the Brazilian Federal District? Analysis of Fatal Vehicle-Pedestrian Accidents*, **JOÃO MARCOS DE JESUS COLARES^{1*}**, **ANA PAULA RODRIGUES BERÇOT¹**, and **JULIANO DE ANDRADE GOMES²** (¹Departamento de Estatística, Universidade de Brasília, Brasília; ²Instituto de Criminalística, Brasília).

2:20 **228** *Less Blood, More Coal: The Introduction of Roof Bolting into Underground Bituminous Coal Mining, 1948-1969*, **MARK ALDRICH** (Department of Economics, Smith College).

2:40 **229** *The Influence of Loans in the College Major Market*, **JEREMY JUYBARI** (Department of Economics, San Diego State University).

3:00 **230** *The Further and Continuing Evolution of Government Under Science*, **PERRY BEZANIS** (San Pedro CA).

Thursday, 16 June 2016

Oral Session 5
***Engineering, Technology,
and Applied Sciences***

KIPJ ROOM 219

Thursday

1:20 p.m. – 2:40 p.m.

Organizer for the Engineering, Technology, and Applied Sciences Section: *Frank G. Jacobitz* (Mechanical Engineering Department, Shiley-Marcos School of Engineering, University of San Diego).

Session chair: *Frank G. Jacobitz*

1:20 **231** *Erythrocyte-Derived Optical Nanoparticles for Photodynamic Therapy of Breast Cancer Cells: An In-vitro Study*, **JOSHUA M. BURNS^{1*}**, **RAVIRAJ VANKAYALA¹**, **JENNY MAC²**, and **BAHMAN ANVARI¹** (¹Department of Bioengineering, University of California, Riverside; ²Department of Biochemistry, University of California, Riverside).

1:40 **232** *Lunar-Based Self-Replicating Solar Factory*, **JUSTIN LEWIS-WEBER** (Viewpoint School, Calabasas, CA).

2:00 **233** *Hot Corrosion of Steels in Chloride Salts for Concentrated Solar Power Generation Environments*, **JASON WANG***, **OBED VILLALPANDO**, **JARED LOGIER**, **DAVID GILMARTIN**, and **BLAKE MORRIS** (Department of Chemical and Materials Engineering and Department of Mechanical Engineering, California State Polytechnic University, Pomona).

2:20 **234** *A Comparative Study of Corrosion Behavior of Advanced Titanium Alloys in Simulated Physiological Environments*, **SHAY MCCARTHY**, **JACQUELINE MEDINA**, **KEVIN ROBLES***, **RUBY RODRIGUEZ**, **LUAN NGUYEN** and **VILUPANUR RAVI** (Department of Chemical and Materials Engineering, California State Polytechnic University, Pomona).

Oral Session 6

Education

History and Philosophy of Science

KIPJ ROOM 220

Thursday

1:20 p.m. – 3:00 p.m.

Organizer for the Education Section: *Louis Nadelson* (School of Education and Leadership, Utah State University).

Organizer for the History and Philosophy of Science Section: *Donald J. McGraw* (Ephraim, UT). Co-organizer: *Roberta Millstein* (Department of Philosophy, University of California, Davis).

Session chair: *Donald J. McGraw*

History and Philosophy of Science

1:20 **235** *Natural: A Code Word for “I/We don’t know,”* **LAWRENCE H. WOOD** (Physicist, Retired, Lacey, WA).

Education

1:40 **236** *What Time Should High Schools and Universities Start? A Sleep, Circadian Neuroscience, Chronotypes and Sociological Survey Technique Model the Answer to the Question*, **JONATHAN KELLEY¹** and **PAUL KELLEY^{2*}** (¹Department of Sociology, University of Nevada, Reno; ²British Science Association, London, UK).

2:00 **237** *From Stockhausen to Messiaen and Beyond: Creating Music from Astronomy for Public Outreach*, **RYAN STRAKA¹**, **MARIO DE LEO-WINKLER^{2*}**, and **TIMOTHY LABOR¹** (¹Department of Music, ²Department of Physics and Astronomy, University of California, Riverside).

2:20 **238** *The Vibrating Universe: Astronomy for the Deaf*, **MARIO DE LEO-WINKLER^{1*}**, **GILLIAN WILSON¹**, **TAMMY MITCHELL²**, **WENDY GREEN²**, **ELIZABETH DURHAM²**, **LISA CHUTE²** and **GLORIA DANIELS²** (¹Department of Physics and Astronomy, University of California, Riverside; ²California School for the Deaf, Riverside).

2:40 **239** *Implementing Experiential and Professional Skills Components in Graduate STEM Education, Lessons Learned*, **KIRIKO KOMURA¹** and **MICHAEL THOMAS²** (¹Keck Graduate Institute, Claremont, CA; ²University of La Verne, La Verne, CA).

IV. POSTER PRESENTATIONS

189 poster number is also the abstract number
193 (number italicized and underlined) identifies a student presentation
 *identifies the presenter from among authors listed

Boards on which to attach poster presentations will be in KIPJ A and/or B. The poster boards are 8' wide x 4' tall, so two posters will share each board. The boards each have numbers on them that coincide with the numbers assigned to the posters in this program (see number to the left of the title of each presentation). You *must* use the appropriately numbered space on your board for your poster. Please use map tacks (provided) to attach your poster to the board. Do not use tape!

Posters for the Wednesday morning session can be set up starting at 8:15 a.m. and must be in place no later than 8:55 a.m. Posters for the Wednesday afternoon session can be set up starting at 12:15 p.m. and must be in place no later than 12:55 p.m. Posters for the Thursday morning session can be set up starting at 8:15 a.m. and must be in place no later than 8:55 a.m.

All presenters must be present with their posters for the duration of the session in which they are presenting in order to discuss their research with interested parties.

All posters must be removed within 15 minutes of the close of the session in which they were presented.

Presenters assume full responsibility for the security of their poster and other materials. Unclaimed posters and other materials will be discarded at the close of the technical sessions on Friday afternoon.

Quick Directory of Sponsoring Sections for these Posters

<i>Section</i>	<i>poster numbers</i>
Agriculture, Food, and Renewable Resources	255
Anthropology and Archaeology	267 – 269
Atmospheric and Hydrospheric Sciences	277
Cell and Molecular Biology	298 – 315
Chemistry and Biochemistry	285 – 292
Ecology, Environmental Sciences, and Sustainability	256 – 261 and 270 – 276
Education	254
Engineering, Technology, and Applied Sciences	293 – 297
Evolution, Organismal Biology and Biodiversity.	262 – 266
General and Interdisciplinary	243 – 246
Materials Science	284
Mathematics	278 – 281
Physics	282 – 283
Psychology	248 – 253
Science and the Arts and Humanities	247
Social, Economic, and Political Sciences	240 – 242

of Statistics and Biostatistics, ²Department of Nursing and Health Sciences, California State University, East Bay).

241 *Implications of Rising Pregnancy-Related Deaths: An Exploration of Cause-Specific Maternal Mortality in the United States, 1959-2012*, **NICOLE V. DEVILLE** (Department of Population Health and Disease Prevention, University of California, Irvine).

242 *Diabetes as a Potential Risk Factor for Walking Impairment*, **JOHNATHAN M. BURLESON¹, SHIKHA K. CHUGH¹, IGNACIO P. FARIA^{1*}, ANA PAULA BERÇOT¹, STEPHEN J. MOREWITZ², JOSH KERR¹, ERIC SUESS¹ and MITCHELL WATNIK¹** (¹Department of Statistics and Biostatistics, ²Department of Nursing and Health Sciences, California State University, East Bay).

General and Interdisciplinary

Includes posters submitted to the Library Science Symposium, identified with ♣ (symposium oral schedule begin on page 27 of these *Proceedings*) and the Evaluating Return on Investment and Assessing Student Learning for Non-traditional Teaching Activities Symposium, identified with ♦ (symposium oral schedule begins on page 40 of these *Proceedings*).

***243** *That Looks Familiar: Assessing Student Retention of Foundational Library Instruction*, **JOSEPH AUBELE** (California State University, Long Beach).

***244** *Creating Faculty Friendly IR Workflow with Technology Support*, **TIEWEI LIU** (Henry Madden Library, California State University, Fresno).

Wednesday Morning, 15 June 2016 in KIPJ A & B

Poster Session 1
 KIPJ ROOMS A & B
 Wednesday
 9:00 a.m. – 11:30 a.m.

Social, Economic, and Political Sciences

240 *Is Education Associated with Walking Impairment?* **JOHNATHAN M. BURLESON¹, SHIKHA K. CHUGH^{1*}, IGNACIO P. FARIA¹, ANA PAULA BERÇOT¹, STEPHEN J. MOREWITZ², JOSH KERR¹, ERIC SUESS¹, and MITCHELL WATNIK¹** (¹Department

***245** *Online Librarianship: Taking the Distance out of Distance Learning*, **LUGENE ROSEN** (Leatherby Libraries, Chapman University).

246 *Nanomanufacturing Outside the Lab: A Case Study in Academic-Industry Partnerships*, **ANN E. DELANEY*** and **ERIC LINDQUIST** (Public Policy Research Center, Boise State University).

246a** *Familiarity of Engineering First-Year Students with Information Literacy Concepts*, **JULIAN CUOMO**, **KATHRYN FORSYTHE**, **MELANIE KLIEGEL**, **CHANDLER ROGERS**, **ALEX SPILDE, and **FRANK G. JACOBITZ** (Shiley-Marcos School of Engineering, University of San Diego).

Science and the Arts and the Humanities

247 *How Creativity Affects Mental Health Disparities: A Survey Study of Santa Monica Students*, **CACHE D. ROBINSON*** and **SHERAYE ESFANDYARI** (Theater arts Department, Santa Monica College).

Psychology

248 *Cross Modal Processing in Human Adults*, **W. CAROL AGAR***, **MARGARET LOO**, **BRITTNEY OTRUBA**, and **HENRY V. SOPER** (Psychology Department, Fielding Graduate University).

249 *Does Childhood Adversity Influence Cognitive Functioning in Midlife and Old Age?* **DANIEL BELTON*** and **FRANK J. INFURNA** (Department of Psychology, Arizona State University).

250 *Anterior and Posterior Components for Processing the Complex Figure*, **LESLIE CARRION***, **CINAMON ROMERS**, **BRITTNEY OTRUBA**, and **HENRY V. SOPER** (Fielding Graduate University).

251 *Behavioral Effects in an Unforced-Choice and Adaptively Staircased Detection Task*, **JAIME NAPAN^{1*}**, **ASHLEY ROYSTON^{1,2}**, **KIRA ANDERSON^{1,2}**, and **GEORGE R. MANGUN^{1,2,3}** (¹Center for Mind and Brain, University of California, Davis; ²Department of Psychology, University of California, Davis; ³Department of Neurology, University of California, Davis).

252 *Verbal Executive Assessment (Christiansen) for Bright Patients*, **BRITTNEY OTRUBA***, **DAWN M. WARE**, **SIOBHAN N. CHARLES** and **HENRY V. SOPER** (Psychology Department, Fielding Graduate University).

253 *Aging and Dementia: Healthy Aging and Cognition*, **CAMILLA SEIPPEL^{1*}**, **LINDSEY HRONEK²**, and **HENRY V. SOPER²** (¹Antioch University Santa Barbara; ²School of Psychology, Fielding Graduate University).

Education

254 *The Influence of Participation in a Classroom Undergraduate Research Experience at a Hispanic-Serving Institution on First-Year Students' Attitudes Towards Genetically Modified Plants*, **ALEJANDRO CORTEZ^{1,2*}**, **MARSHA ING²**, **JAMES BURNETTE III¹**, and **SUSAN WESSLER¹** (¹Dynamic Genome Program, ²Graduate School of Education, University of California, Riverside).

Agriculture, Food, and Renewable Resources

255 *Mountains Crumble Into the Sea*, **GEORGE MUELLER-WARRANT***, **CLAIRE PHILLIPS**, **JERRY WHITTAKER**, and **KRISTIN TRIPPE** (United States Department of Agriculture-Agricultural Research Service, Corvallis, OR).

Ecology, Environmental Sciences, and Sustainability

256 *Pellet Group Surveys Reveal Trends in Winter Habitat Use by Roosevelt Elk (*Cervus Canadensis Roosevelti*)*, **GABRIELLA S. BRILL***, **KATHERINE M. WOODRUFF***, and **RICHARD W. VAN BUSKIRK** (Department of Environmental Studies, Pacific University).

257 *The Effect of Variable Connectivity on Richness in Spatially Fragmented Pond Microcosm*, **HEATHER M. DAVID*** and **KURT E. ANDERSON** (Biology Department, University of California, Riverside).

258 *Comparing the Impacts of Invasive *Chrysanthemum* and Native Sagebrush Species on the Hydrologic Cycle*, **CAMERON HEYVAERT^{1*}**, **ZHI-YONG YIN²**, and **PAUL KEMP¹** (¹Department of Biology, University of San Diego; ²Department of Environmental and Ocean Sciences, University of San Diego).

259 *An Experimental Comparison of Phytoplankton and Marine Snow as a Food Source for Copepods*, **ANDREA MAST*** and **JENNIFER PRAIRIE** (Department of Environmental and Ocean Sciences, University of San Diego).

260 *Assessing the Dynamics of a Generalist Predator/Prey Model Across Different Spatial Configurations*, **ROSA M. MCGUIRE*** and **KURT E. ANDERSON** (Department of Biology, University of California, Riverside).

261 *Effects of Phytoplankton Growth Phase on Marine Snow Formation*, **QUINN W. MONTGOMERY***, **JENNIFER C. PRAIRIE**, and **KYLE W. PROCTOR** (Department of Environmental and Ocean Sciences, University of San Diego).

Evolution, Organismal Biology, and Biodiversity

262 *A Catalog of ERE1 Retrotransposons in the Genome of the Domestic Horse, *Equus caballus**, **SYRIA ARMENTA^{1*}**, **SARA E. KALLA²**, **ALLISON SEEBALD²**, **ALEXIS CHRISPENS¹**, **JEREMY J. ALLEN²**, and **NATHAN B. SUTTER¹** (¹Department of Biology, La Sierra University; ²College of Veterinary Medicine, Cornell University).

263 *Role of the Immune System During Tissue Regeneration of Imaginal Discs in *Manduca sexta**, **RACHEL BHASKAR***, **ANNETTE CHAN**, and **MEGUMI FUSE** (Biology Department, San Francisco State University).

264 *An Analysis of CSINE3A Retrotransposons Across Different Breeds of the Domestic Rabbit *Oryctolagus cuniculus**, **JOSE A. SALOME CORREA^{1*}**, **SARA E. KALLA²**, **JORDAN C. OROSCO¹**, **ALLISON SEEBALD²**, **EVE WATERS³**, **MOLLY A. FISHER⁴**, **JEREMY J. ALLEN²**, and **NATHAN B. SUTTER¹** (¹Department of Biology, La Sierra University; ²College of Veterinary Medicine, Cornell University; ³Virginia Tech; ⁴University of Georgia, Athens).

265 *Spatial Distribution of Zooplankton in Bahia Magdalena, Baja California Sur, Mexico*, **KAITLIN LATHROP*** and **MICHEL BOUDRIAS** (Department of Environmental and Ocean Sciences, University of San Diego).

266 *Discovery of Genetic Loci Associated With Rabbit Body Size*, **JORDAN C. OROSCO^{1*}**, **SARA E. KALLA²**, **JOSE A. SALOME CORREA¹**, **ALLISON SEEBALD²**, and **NATHAN B. SUTTER¹** (¹Department of Biology, La Sierra University; ²College of Veterinary Medicine, Cornell University).

Wednesday Afternoon, 15 June 2016 in KIPJ A & B

Poster Session 2

KIPJ ROOMS A & B

Wednesday

1:00 p.m. – 3:30 p.m.

Anthropology and Archaeology

267 *Archaeochemistry and Soil Samples in Bioarchaeological Contexts*, **MARIA JELACA-TAVAKOLI^{1*}** and **ALINA S. BILAL²** (¹Department of Anthropology, Southwestern College, Chula Vista, CA; ²Department of Anthropology, San Diego State University).

268 *3D Reconstruction of an Achondroplastic Skeleton from Prehistoric Central California*, **NATASHA A. CASSELLON-HINKLE¹**, **DANA E. BECKER^{1*}**, **EMILY FIELDS¹**, **THEA M. HANSON¹**, **REBECCA S. JABBOUR²**, and **GARY D. RICHARDS³** (¹Department of Integrative Biology, University of California, Berkeley; ²Department of Biology, Saint Mary's College of California; ³Department of Biomedical Sciences, A.A. Dugoni School of Dentistry, University of the Pacific).

269 *Neural and Vascular Changes in Achondroplastic Brains: Evidence from Prehistoric Central California*, **SIERRA M.H. LEE^{*1}**, **NICOLE K. APODACA²**, **JULIE T. LIU²**, **REBECCA S. JABBOUR³**, and **GARY D. RICHARDS⁴** (¹Department of Molecular and Cell Biology, University of California, Berkeley; ²Department of Integrative Biology, University of California, Berkeley; ³Department of Biology, Saint Mary's College of California; ⁴Department of Biomedical Sciences, A.A. Dugoni School of Dentistry, University of the Pacific).

Ecology, Environmental Sciences, and Sustainability

The posters in this second session of the Ecology, Environmental Sciences, and Sustainability Section are part of the *Particles in the San Diego Atmosphere: Reaction, Properties, Climate, and Health* symposium and are identified by this symbol: ♠. Symposium oral abstracts begin on page 109 of these *Proceedings*.

270 *Solidification of Organic Aerosol Particles Caused by Glyoxal + OH Reactions*, **ALYSSA D. ANDRETTA^{*}** and **DAVID O. DE HAAN** (Department of Chemistry and Biochemistry, University of San Diego).

271 *Source Characterization and Compositional Analysis of Ambient Aerosols in Fresno and Fontana, California*, **CHIA-LI CHEN^{1*}**, **LYNN M. RUSSELL¹**, **RAGHU BETHA¹**, **JUN LIU¹**, **KEVIN J. SANCHEZ¹**, **DEREK PRICE¹**, **SIJIE CHEN¹**, **JACKIE FIRST¹**, **XIAOLU ZHANG²**, and **CHRISTOPHER D. CAPPA²** (¹Scripps Institution of Oceanography, University of California, San Diego; ²Department of Civil and Environmental Engineering, University of California, Davis).

272 *HULIS Enhancement of Hydroxyl Radical Formation from Fe(II): Biomass Burning Aerosol and Suwanee River Fulvic Acid in the Presence of Alveolar Anti-Oxidants*, **DAVID H. GONZALEZ^{1*}**, **CHRISTOPHER K. CALA¹**, **QIOYUN PENG²**, and **SUZANNE E. PAULSON¹** (¹University of California at Los Angeles, Department of Atmospheric and Oceanic Sciences; ²Fudan University, Department of Environmental Sciences and Engineering, Shanghai, China).

273 *Connecting Aerosol Absorption and Chemical Composition in the Southern California Air Basin*, **LELIA N. HAWKINS^{*}**, **JASON CASAR**, and **RAUNAK PEDNEKAR** (Department of Chemistry, Harvey Mudd College).

274 *Characterizing Brown Carbon Aerosol Formation*, **NATALIE G. JIMENEZ**, and **DAVID O. DE HAAN** (Department of Chemistry and Biochemistry, University of San Diego).

275 *North Atlantic Marine Aerosol Properties*, **MARYAM A. LAMJIRI^{1*}**, **DEREK J. PRICE¹**, **RAGHU BETHA¹**, **CHIA-LI CHEN¹**, **LYNN M. RUSSELL¹**, **T. S. BATES²**, and **P. K. QUINN²** (¹Scripps Institution of Oceanography, University of California, San Diego; ²Pacific Marine Environmental Laboratory, NOAA, Seattle, WA).

276 *Effects of Aerosol-Phase Browning in Aldehyde Reactions with SO₂ or Amines*, **ALEXIA DE LOERA^{*}**, **BENJAMIN W. JOYCE^{*}**, and **DAVID O. DE HAAN** (Department of Chemistry and Biochemistry, University of San Diego).

Atmospheric and Hydrospheric Sciences

277 *Detection of Gas Emissions from a Low-Altitude Drone*, **RAZIQ NOORALI^{*}**, **SLAVYANA NEDELICHEVA^{*}**, **KIMLENG NGUOV^{*}**, **FRANCISCO LAGOS VILABOA**, **MICHELLE JANE VILLANUEVA** and **ANDREW YOUNG** (MESA at College of the Desert, Palm Desert, CA).

Mathematics

278 *Measure Theory in the Music Mathematic Workplace*, **TERENCE B. ALLEN** (Spokane, WA).

279 *Transversals in Latin Squares*, **SAM DWORETZKY***, **NATHAN SCHMIDT**, and **WILLIAM UNGER** (Department of Mathematics, Boise State University).

280 *A Study of Games Over Finite Groups*, **STEPHANIE POTTER¹***, **DAN KONDRATYUK²**, **LILJANA BABINKOSTOVA¹**, and **MARION SCHEEPERS¹** (¹Department of Mathematics and ²Department of Computer Science, Boise State University).

281 *Counting Discrete Models of Gene Regulatory Networks*, **ANYU ZHANG*** and **BRANDILYN STIGLER** (Department of Mathematics, Southern Methodist University).

Physics

282 *Detector for Measuring the Temperature of Large Bursts of Confined Positronium*, **GABRIEL CECCHINI***, **MELINA FUENTES-GARCIA**, **DANIEL ADAMS**, **ALINA PINEIRO ESCALERA**, **ROD GREAVES**, **JEREMY MOXON**, **ADRIC JONES**, and **ALLEN MILLS, JR.** (Department of Physics and Astronomy, University of California, Riverside).

283 *Energy Redefined*, **FRED J. WEBER** (Wrench Time, Inc., Orlando, FL).

Materials Science

284 *Pack Aluminization of Austenitic Stainless Steels*, **MICHELL ARANDA¹***, **DANIEL NAVARRO¹**, and **VILUPANUR RAVI²** (¹Department of Mechanical Engineering and ²Department of Chemical and Materials Engineering, California State Polytechnic University, Pomona).

Chemistry and Biochemistry

285 *Changes in the Activation Loop: A Molecular Dynamics Study on the Effects of Phosphorylation on Free Monomeric CDK2*, **JENNIFER MADRIGAL*** and **CHIA-EN CHANG** (Department of Chemistry, University of California, Riverside).

286 *The Ex Vivo Oxidation Rate of Human Serum Albumin*, **JOSHUA W. JEFFS*** and **CHAD R. BORGES** (School of Molecular Sciences, Arizona State University, Tempe; The Biodesign Institute, Arizona State University, Tempe).

287 *Evidence that the Anti-Diabetic Action of Metformin in Man Requires Vitamin D*, **LARRY M. BRAND**, (San Diego, CA).

288 *Examining the Relationship Between Respiratory Chain Structure and Reactive Oxygen Species Production in *Arabidopsis thaliana**, **NICKOLAS ALLEN*** and **MATTHEW ESCOBAR** (Department of Biological Sciences, California State University San Marcos).

289 *Peptide Ligand C391 as a Potential par-2 β -Arrestin Biased Antagonist*, **MONICA MING¹***, **KASTURI PAL¹**, **MICHAEL C. YEE²**, **KYU J. LEE¹**, **MARISOL ARELLANO¹**, **MICHAEL D. SIEGLER²**, **SCOTT BOITANO³**, and **KATHRYN A. DEFEA²** (¹Department of Biochemistry and Molecular Biology, University of California, Riverside; ²Division of Biomedical Sciences, School of Medicine, University of California, Riverside; ³Arizona Respiratory Center and Department of Physiology, University of Arizona).

290 *Synthesis of Neuroprotective Limonoid Natural Products*, **JOHNY M. NGUYEN*** and **DAVID B. C. MARTIN** (Department of Chemistry, University of California, Riverside).

291 *Progress Towards the Synthesis of the LpxC Substrate*, **MATTHEW SIMPSON*** and **ROBERT WOODWARD** (Department of Biochemistry, The University of Mount Union, Alliance, OH).

292 *Analyzing the Role of Polyphenol Oxidase in Plant Dopamine and Esculetin Metabolism*, **LAURA WALTERS*** and **MATTHEW ESCOBAR** (Department of Biological Sciences, California State University, San Marcos).

Thursday Morning, 16 June 2016 in KIPJ B

Poster Session 3

KIPJ ROOMS B

Thursday

9:00 a.m. – 11:30 a.m.

**Engineering, Technology,
and Applied Science**

293 *Construction of a Beowulf Cluster for High Efficiency Computing*, **NICK ADDIEGO**, **SHANNON BAILEY***, **CARSON EDWARDS**, **DAVID MAYHEW**, and **FRANK JACOBITZ** (Shiley-Marcos School of Engineering, University of San Diego).

294 *Using General Packet Radio Service for Realtime Sub-sea Sensory Data Transmission*, **GARRETT BLAKE JOHNSON^{1,2,3*}** and **RUTH GATES³** (¹Department of Information and Computer Sciences and ²Department of Marine Biology, University of Hawaii at Manoa; ³Hawaii Institute of Marine Biology, Kaneohe, HI).

295 *Laboratory Simulation of Marine Corrosion of Metallic Alloys*, **GAMER MARGOOSIAN*** and **VILUPANUR RAVI** (Department of Chemical and Materials Engineering, California State Polytechnic University, Pomona,).

296 *Aerodynamic Effects of Two Parallel Wing Segments*, **MARK DAVID MILLER, JR.** (College of Engineering, Embry-Riddle Aeronautical University, Prescott, AZ).

297 *Corrosion Behavior of Coated and Uncoated Nickel and Stainless Steel in Proton Exchange Membrane Fuel Cell Environments*, **MIGUEL REYES^{1*}**, **CYNTHIA DO¹**, **NINA RASTOGI²**, and **VILUPANUR RAVI¹** (¹Department of Chemical and Materials Engineering and ²Department of Electrical and Computer Engineering, California State Polytechnic University, Pomona).

Cell and Molecular Biology

298 *Cannabinoid Receptor 2 Stimulation Enhances Bactericidal Activity of Human Neutrophils*, **MARK B. WILEY***¹, **VICTOR NIZET²**, **PAUL A. INSEL³** and **ROSS CORRIDEN³** (¹Department of Biology, University of Mount Union, Alliance, OH; ²Department of Pediatrics and ³Department of Pharmacology, University of California, San Diego).

299 *Cannabinoid Receptor Expression in the Induction of Chronic Pain*, **PAUL ANTHONY TRUJILLO***¹, **ODALIS SAUCEDO***¹, **YATENDRA MULPURI²**, and **IGOR SPIGELMAN²** (¹UCLA Pre-College Science Education Program, UCLA School of Dentistry; ²UCLA School of Dentistry).

300 *Reexamining the Role of Painless in Electrophile Detection in *Drosophila**, **ALBERTO CORONA^{1*}**, **LINA NI²**, and **PAUL GARRITY²** (¹Department of Biology, University of California, Riverside; ²Department of Biology, Brandeis University).

301 *NFATc3 and Oral Carcinogenesis*, **CHIOMA OKE***¹, **BRIANA SIMPSON***¹, **SUNG HEE LEE²**, **APRIL BANG²**, and **KI-HYUK SHIN²** (¹UCLA Pre-College Science Education Program, UCLA School of Dentistry; ²UCLA School of Dentistry).

302 *GRHL2 in Oral Carcinogenesis*, **EDWARD VERGARA***¹, **ALEXIS TORRES***¹, **SAAKET VARMA²**, **SHEBLI MEHRAZARIN²**, and **MO KANG²** (¹UCLA Pre-College Science Education Program, UCLA School of Dentistry; ²UCLA School of Dentistry).

303 *Bacterial Minicells Decrease Colonic Tumor Development and Inflammatory Infiltration In a Mouse Model of Colon Cancer*, **MENGXI TIAN^{1*}**, **MOHAMMAD W. KHAN¹**, **NAIRIKA MESHGIN¹**, **KATHLEEN L. MCGUIRE¹**, **SHINGO TSUJI²**, and **MATTHEW GIACALONE²** (¹Department of Biology, Molecular Biology Institute, San Diego State University; ²Vaxiion Therapeutics Inc, San Diego, CA).

304 *Genetic Analyses of Mouse Repeats Potentially Important in Aggressive Colorectal Cancer*, **JENNIFER LUU***, **NITYA BHASKARAN**, **PRIYADARSHINI MAMINDLA**, **MOHAMMAD KHAN**, and **KATHLEEN L. MCGUIRE** (Department of Biology, San Diego State University).

305 *Immunity, the Colonic Environment and Colon Cancer*, **MOHAMMAD W. KHAN^{1*}**, **KATHLEEN MCGUIRE¹**, **MATTHEW GIACALONE²**, **SHINGO TSUJI²**, **MENGXI TIAN¹**, **NAIRIKA MESHGIN¹** and **SHEA GRENIER¹** (¹Department of Biology, Molecular Biology Institute, San Diego State University, San Diego; ²Vaxiion Therapeutics Inc., San Diego, CA).

306 *A Bioinformatics Approach to Find Mouse DNA Repeats Significant in Aggressive Colon Cancer*, **NITYA BHASKARAN***, **PRIYADARSHINI MAMINDLA**, **JENNIFER LUU**, and **KATHLEEN MCGUIRE** (Department of Biology, San Diego State University).

- 307** *New Estrogen Receptor Downregulators to Treat Breast Cancer*, **BRANDON BERT**^{1,3}, **DIANA C. MÁRQUEZ-GARBÁN**^{1,3}, **GANG DENG**^{2,3}, **EMELYNE DIERS**^{2,3}, **MICHAEL E. JUNG**^{2,3} and **RICHARD J. PIETRAS**^{1,3} (¹Division of Hematology-Oncology, Department of Medicine, David Geffen School of Medicine, ²Department of Chemistry and Biological Chemistry, and ³Jonsson Comprehensive Cancer Center at University of California, Los Angeles).
- 308** *EMP2 is a Promising Target for Treatment of Breast Cancer*, **TEEVIT DUNNSIRI**^{*} and **MADHURI WADEHRA** (Department of Pathology, University of California, Los Angeles).
- 309** *The Impact of Estrogen on Major Histocompatibility Complex Class II Gene Expression in Prostate Cancer*, **HARMONY SAUNDERS**^{1*}, **AIDA TRICE**¹, **TRACY LUU**¹, **PARDIS ZAERI**¹, **DAN MERCOLA**², and **KATHLEEN McGUIRE**¹ (¹Department of Biology, Molecular Biology Institute, San Diego State University; ²Department of Pathology, University of California Medical Center, Irvine, CA).
- 310** *Generation of Super NK Cells for the Treatment of Cancer*, **MARIA PAG-ASA SENTENYAL B. BALATAN**^{1*}, **SIFA MARIE GICHAU**^{1*}, **PAYTSAR TOPCHYAN**², **KAWALJIT KAUR**², and **ANAHD JEWETT**² (¹UCLA Pre-College Science Education Program, UCLA School of Dentistry; ²Weintraub Center for Reconstructive Biotechnology, UCLA School of Dentistry).
- 311** *Bioinformatics Approach to Analyze Racial Disparities in Cancer*, **PRIYADARSHINI MAMINDLA**^{1*}, and **KATHLEEN McGUIRE**² (¹Department of Bioinformatics and Medical Informatics, ²Department of Biology, San Diego State University).
- 312** *Goat Parasite Load in Deer Park, Washington and Upper Limbe, Haiti*, **EMILY WALZER**^{1,2*}, **MARIANE M. CAVALCANTE**^{1,3,4*}, and **MICHAEL SARDINIA**^{1,2} (¹Department of Biology, Whitworth University; ²Department of Agriculture, Universite Chretienne du Nord D'Haiti, Haut Limbe, Haiti; ³Department of Biology, University of Sao Carlos-Sorocaba, Sorocaba SP Brazil; ⁴Foundation for the Improvement of Higher Education Personnel – Capes, Brasilia DF).
- 313** *Identification of the Gut Microbiome of *Manduca sexta* and Native Invasion Pathogenesis*, **RYAN MARDER**^{*}, **MEGUMI FUSE**, and **LILY CHEN** (Department of Biology, San Francisco State University).
- 314** *Epigenetic Regulation of Alternative Developmental Trajectories in an Annual Killifish*, **AMIE L. T. ROMNEY**^{*} and **JASON E. PODRABSKY** (Biology Department, Portland State University).
- 315** *Comparing Femur Bone Marrow Derived Osteoblast Attachment to Titanium With or Without Disparate Chemically Modified Hydrophilicity*, **CAMILLE BURRUS**^{1*}, **DONGNI ZHAO**^{1*}, **NASER MOHAMMADZADEH REZAEI**², **BRENT AMIRI**², and **TAKAHIRO OGAWA**² (¹UCLA Pre-College Science Education Program, UCLA School of Dentistry; ²Weintraub Center for Reconstructive Biotechnology, UCLA School of Dentistry).

V. SCIENTIFIC MAKER EXHIBIT

189 exhibit number is also the abstract number

193 (number italicized and underlined) identifies a student presentation

*identifies the presenter from among authors listed

Tables on which to set up exhibits will be in KIPJ A. Electricity is available for each table. Before setting up an exhibit that uses electricity, the exhibitor must have provided the required Waiver of Liability form and also have had the exhibit checked for safety and approved by personnel of the Pacific Division of AAAS or the University of San Diego. The tables each have numbers on them that coincide with the numbers assigned to the exhibits in this program (see number to the left of the title of each presentation). You *must* use the appropriately numbered table for your exhibit. Nothing is to be hung on walls. Electrical cords must be taped down to prevent tripping.

Set-up of exhibits can begin at 8:00 a.m. All exhibits must be in place no later than 9:50 a.m. Exhibitors must stay with their exhibits at all times in order to answer questions and oversee their equipment. The exhibit ends promptly at 12:30 p.m. All exhibits must be removed by 1:00 p.m.

Presenters assume full responsibility for the security of their exhibits. Unclaimed exhibits and other materials will be discarded at the close of the technical sessions on Friday afternoon.

Scientific Maker Exhibit

KIPJ ROOM A

Thursday

10:00 a.m. – 12:30 p.m.

316 *3D Printed Shot Hole Borer Trap Systems*, **JOAN HORVATH^{1*}**, **RICH CAMERON^{1*}**, **DANIEL BERRY²**, **ROGER D. SELBY³**, **DIEGO PORQUERAS⁴**, and **RICHARD STOUTHAMER³** (¹Nonscriptum LLC, Pasadena CA; ²Huntington Library, Art Collections and Botanical Gardens; ³Department of Entomology, University of California, Riverside; ⁴Deezmaker, Pasadena, CA).

317 *The DIY Student Wind Tunnel*, **SIMON HUSS^{1*}**, **MATTHEW PARSON^{1*}**, **TRI NGUYEN¹**, **REGINA RUBIO¹**, **JOAN HORVATH²**, and **RICH CAMERON²** (¹Windward School, Los Angeles CA; ²Nonscriptum LLC, Pasadena CA).

318 *ISS-Above: Bringing the International Space Station in to the Classroom*, **LIAM KENNEDY** (ISS-Above, Monrovia, CA).

319 *Project-based Learning for K-12 Next Generation Science Standards STEM Education*, **BETTY WONG** (California Institute of Technology).

320 *Vinduino Soil Moisture Measurement Demonstration*, **REINER VAN DER LEE** (Rancho Santa Margarita, CA; reinervanderlee@gmail.com).

321 *3D Printed Structures for Magnetic-based Immunotherapy of Brain Tumors*, **ALEX PAI^{1*}**, **TORKOM**

PAILEVANIAN¹, **PENGPENG CAO²**, **ETHAN WHITE²**, **KAUSHIK DASGUPTA¹**, **JEFF SHERMAN¹**, **DARYA ALIZADEH²**, **JACOB BERLIN²**, **BEHNAM BADIE³**, and **ALI HAJIMIRI¹** (¹California Institute of Technology; ²Beckman Research Institute, City of Hope Medical Center; ³City of Hope Medical Center).

322 *Enhancing Measurement Quality with Robotics*, **TOMAS ROBINSON***, **COLLIN CUPIDO**, **DAVE FORTIN**, and **MARK FREEMAN** (University of Alberta, Edmonton, AB, Canada).

323 *Science Sticks – Accessible Ocean Measurement*, **TONY WHITE** (Ocean Lab LLC, Glendale, CA).

324 *Mitral Valve Backflow Pressure as Function of Leaflet Geometry*, **DAVID MITTELSTEIN** (California Institute of Technology).

325 *3D Printing in Astronomy*, **PAVAMAN BILGI** (California Institute of Technology).

326 *Interlock Meter-Mix Device for Metering and Lysing Clinical Samples*, **ERIK JUE** (California Institute of Technology).

327 *Using General Packet Radio Service (GPRS) for Real-time Subsea Wireless Data Transmission*, **GARRETT BLAKE JOHNSON** (Hawaii Institute of Marine Biology, Kaneohe, HI).

189 poster number is also the abstract number

abstracts contain complete contact information for authors

193 (number italicized and underlined) identifies a student presentation

asterisk (*) identifies the presenter from among several authors listed

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