The Smilodon

The Newsletter of the Southern California Academy of Sciences

Newly Recognized Desert Tortoise Species Named for David Morafka

An undated photo of Dr. David Morafka, Professor of Biology at California State University, Dominguez Hills (1972-2002). Dr. Morafka has been posthumously honored with the naming of a newly recognized species of desert tortoise, **Gopherus morafkai.**

Dr. David Morafka, Professor of Biology at California State University, Dominguez Hills and Southern California Academy of Sciences member, has been honored posthumously by the naming of a newly recognized species of desert tortoise, *Gopherus morafkai*, (common name Morafka's desert tortoise).

In 2002, Morafka, along with Dr. Kristen Berry of USGS and Dr. Robert Murphy of Royal Ontario Museum, published a study (cited below) suggesting the existence of at least two, and possibly four, distinct populations in what was then classified as a single species, *Gopherus agassizii*. A recently published study by Murphy, Berry, and coworkers (also cited below) reviewed the history of the classification of *G. agassizii*, and used mitochondrial DNA analysis to resolve a number of inconsistencies. The DNA data, when combined with morpological, physiological, and ecological evidence, support two populations of desert tortoise, the Mojavian, west and north of the Colorado River, and the Sonoran, south and east of the Colorado River. The Mojavian population retained the name, *G. agassizii* (Agassiz's desert tortoise) and the Sonoran population was named in honor of Dr. Morafka. Since *G. agassizii* is listed as threatened under the federal Endangered Species Act, the recognition of *G. morafkai* has important implications for desert tortoise conservation. For example, recognition of *G. morafkai* as a distinct species reduces the range of *G. agassizii* to approximately 30% of its previously proposed range.

Dr. Morafka's internationally recognized research focused on herpetology and desert biogeography, including the conservation biology of desert tortoises. A San Francisco native, he developed an early passion for biology by independent exploration, collection of reptiles and amphibians of the Bay Area, and participation in the Junior Academy at the California Academy of Sciences. He earned a BA with Honors from UC Berkeley in 1967

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President's Corner

Thanks are extended to the following people for their outstanding efforts that made our May 2011 Annual Meeting at Cal State Polytechnic University Pomona a great success—Sylvia Medina, who was in charge of catering, Sue Wise, who handled the room reservations, and Cal Poly students of the Science Council, who handled signage and poster set up, our own John Roberts and Dan Guthrie, and Gloria Takahashi for leading the Junior Academy part of the meeting, faculty judges of student presentations, symposium organizers, and plenary speakers Eric G. Strauss of Loyola Marymount University and John A. Long of the Natural History Museum of Los Angeles County. Registration was more than 300, with 118 oral presentations, 74 poster presentations and 10 oral presentations by Junior Academy participants. A special thanks is extended to two major meeting sponsors, MBC Applied Environmental Sciences and the Palos Verdes Peninsula Land Conservancy.

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SCJAS UPDATES

The following six Southern California Jr Academy of Sciences delegates (w/ their research titles) were chosen at the Southern California Academy of Sciences (SCAS) May 2011 Annual Meeting to represent the SCJAS at the 2012 national meeting of the American Jr. Academy of Sciences (AJAS) in conjunction with the 178th Annual Meeting of the American Association of Academies of Sciences (AAAS) in Vancouver BC, Feb 15-19, 2012.

INCIPIENT SPECIATION OF THE MUSTACHED BAT *PTERONOTUS PARNELLII* IN THE WEST INDIES
Bonnie R. Lei (third year delegate to AJAS-freshman at Harvard 2011). Walnut High School.
Stony Brook University, Department of Ecology and Evolution, Stony Brook, NY.

EXPRESSION OF MULTIPOTENCY MARKERS IN ADULT ADIPOCYTE-DERIVED STEM CELLS AS A FUNCTION OF TIME
Laurine J. Shamirian (12). Chaminade College Preparatory.
David Geffen School of Medicine, UCLA.

EXTRACTING RANGE FROM MONOCULAR TEXTURE FOR AUTONOMOUS ROBOT LOCALIZATION AND MAPPING
Kenny Lei (second year delegate to AJAS-12).
Walnut High School.
Harvey Mudd College, Claremont, CA.

EXAMINATION OF PHYSIOLOGICAL AND BEHAVIORAL EFFECTS ON WHITE SEABASS *ATRACTOSCION NOBILIS* IN A CLOSED RECIRCULATING SYSTEM
Samuel M. Holley (12) and John Su (12)
Huntington Beach High School.

THE EFFECT OF *GINKO BILOBA* ON THE MOUSE HIPPOCAMPUS
Alexa Aranjo 12. Chadwick School, Palos Verdes Peninsula, CA.
USC Department of Biological Sciences, Neurology and Biomedical Engineering, Los Angeles, CA.

Research Training Program 2011-2012

Thirty-one students from Los Angeles and Orange County High Schools were chosen to participate in the 2011-12 Southern California Academy of Sciences Research Training Program. Topics of the projects include robotics, marine & fresh water biology, nano technology, physiology, to entomology. Students will work with mentors at local research institutions, and will meet as a group at three Saturday workshop meetings to help prepare for their final written report and presentation of their research results at the May 4-5, 2012 Annual Meeting at Occidental College. Dr. John Dorsey, past SCAS President and the Loyola Marymount University's Environmental Science Department hosted the first Saturday meeting on September 17, 2011. Cabrillo Marine Aquarium and SCAS Board members Dr Ralph Appy (SCAS past President) and Dr Julianne Passarelli hosted the meeting on "Writing a Scientific Paper," and "Scientific Poster Format" on November 5, 2011. The third and final Saturday meeting will take place at UCI's Air Pollution Lab on March 24, 2012--Dr. Robert F. Phalen (past SCAS Board member) and Dr. Robert N. Phalen will discuss "Science Ethics" and Oral Presentations.

Articles by three RTP participants describing their particular experiences with the program are included in this edition of the Smilodon.

SAVE THE DATES!!!

SCAS 2012 Annual Meeting--
May 4 and 5
at Occidental College

Information available at:
http://scas.jsd.claremont.edu/annual/annual.html

SCAS RTP Student Finalist at Intel ISEF

By Kenny Lei, SCAS RTP Participant

After being a participant in SCAS Research Training Program for three years, I can tell you first hand that it has been a life changing experience. Each event has been eye-opening and unforgettable, from attending workshops to presenting at the annual meeting, from working at a university lab to representing SCAS at international conference. This year, I had a life changing opportunity to participate in Intel International Science and Engineering Fair as a Finalist.

Attending ISEF was exciting and rewarding for all the hard work I had put into my science research project. As the local host, the Los Angeles County team represented the United States on the opening ceremony along with representatives from 65 countries. The experience of meeting other kids interested in science was enriching and encouraging. I enjoyed interacting with participants from all around the world and exchanging pins with them during the first night. The participants of ISEF had started out as strangers to me, but by the end, have become close friends with bonds strong enough to last the long distances and years ahead.

For many years I have known that I wanted to be a scientist, and my own project in robotics and programming, as well as avid involvement in energy conservation across the globe, has given me an enormous passion for computer science research. Nothing, however, quite compares to my experience at ISEF. The format of the ISEF permitted me exposure to student research in virtually every discipline in science and engineering. I walked away from each poster impressed not only by what I had learned, but what I had been exposed to. I suspect that few scientists have the privilege of such interdisciplinary exposure, particularly at such a young age. I was taught that research was enormously rewarding and that bold ideas were an essential element of good science.

While ISEF has brought together all the serious and dedicated young scientists together, there were also opportunities for us to enjoy ourselves and simply have fun. This was best exemplified in our trip to the Universal Studios and LA Live attractions after we presented our projects to a wide audience. It was s well deserved off time with newly met acquaintances.

While it was very exciting for me to be presented Excellence Award from US Army at ISEF Special Award Ceremony, it was the people I met, the lessons I learned, and new perspective I formed made it an unforgettable event. I have to track back all these accomplishments to SCAS, the program that first introduced me to the research world, opened doors for me to work at a university lab under a mentor, provided me training in presentation, confirmed my interest in science, and encouraged me to pursue a career in computer research beyond high school and college. Thank you Southern California Academy of Sciences!

My Experiences in The RTP

by Sam Holley, SCAS RTP Participant

A year ago I was simply a student interested in science who believed that the research papers in professional scientific journals were only attempted by a handful of scientists with doctorates scattered throughout the United States. Little did I know that not only are graduate and undergraduate students presented with opportunities to conduct and present research, but that even a high school student such as myself may do so. Due to the opportunities presented by the Southern California Academy of Sciences and its Research Training Program, I was able to spend my 2010-2011 school year recording and analyzing the results of a school project in which we grew an at risk species, the California white seabass (Atractoscion Nobilis), in a fully closed system in order to study them and release them in the wild. Without the assistance of SCAS, this experiment which had never before been attempted with the species may have gone without an opportunity to become known to any of the scientific community.

In order to participate in the Research Training Program, I had to spend a large amount of my time at my school in order to collect data, do maintenance on the fish tank, and educate others about growing the white seabass. Although I learned from this experience more than I could have from normal coursework, what really challenged me was analyzing the data in order to create something meaningful out of it. The Discussion section of my paper took by far the longest to write, because it forced me to think for myself and predict the implications of the study. In addition, on the day I presented my research paper with my partner at SCAS, I used skills of dealing with people that the general public does not believe are necessary in scientific fields. In order to coherently present my research, I had to have confidence, speak clearly and amiably, and answer questions. It was almost as important to present my research to others in pleasing way as it was to collect and analyze it!

Finally, the program allowed me to realize how much any individual can accomplish. In the past I would never have dreamed that I could have completed a scientific research paper at such a young age, but now that I have done so, I realize how much any human being can accomplish with enough motivation. This has been the most valuable piece of information that my experience working with SCAS has taught me. As a result of my being part of the Research Training Program this year, I hope to always contain an enthusiasm that allows me to encourage others to attempt projects that they may never have even considered.

Seeking Clues to "Supereruptions"

By Adam Voiland
NASA's Goddard Space Flight Center

The geological record holds clues that throughout Earth's 4.5-billion-year lifetime massive supervolcanoes, far larger than Mount St. Helens or Mount Pinatubo, have erupted. However, despite the claims of those who fear 2012, there's no evidence that such a supereruption is imminent.

What exactly is a "supervolcano" or a "supereruption?" Both terms are fairly new and favored by the media more than scientists, but geologists have begun to use them in recent years to refer to explosive volcanic eruptions that eject about ten thousand times the quantity of magma and ash that Mount St. Helens, one of the most explosive eruptions in recent years, expelled.

It's hard to comprehend an eruption of that scope, but Earth's surface has preserved distinctive clues of many massive supereruptions. Expansive layers of ash blanket large portions of many continents. And huge hollowed-out calderas – craters that can be as big as 60 miles (100 km) across left when a volcano collapses after emptying its entire magma chamber at once – serve as visceral reminders of past supereruptions in Indonesia, New Zealand, the United States, and Chile.

The eruption of these prehistoric supervolcanoes has affected massive areas. The magma flow of Mount Toba in Sumutra, which erupted some 74,000 years ago in what was likely the largest eruption that has ever occurred, released a staggering 700 cubic miles (2,800 cubic km) of magma and left a thick layer of ash over all of South Asia. For comparison, the quantity of magma erupted from Indonesia's Mount Krakatau in 1883, one of the largest eruptions in recorded history, was about 3 cubic miles (12 cubic km).

Volcanologists continue to seek answers to many unanswered questions about supervolcanoes. For example, what triggers their eruptions, and why do they fail to erupt until their magma chambers achieve such enormous proportions? How does the composition compare to more familiar eruptions? And how can we predict when the next supervolcano will erupt?

But there's one thing that all experts agree on: supereruptions, though they occur, are exceedingly rare and the odds that one will occur in the lifetime of anybody reading this article are vanishingly small.

In Yellowstone, the rim of a supervolcano caldera is visible in the distance. Credit: National Park Service.

The most recent supereruption occurred in New Zealand about 26,000 years ago. The next most recent: the cataclysmic eruption of Mount Toba happened about 50,000 years earlier. In all, geologists have identified the remnant of about 50 supereruptions, though teams are in the process of evaluating a number of other possibilities. That may sound like a large number. However, when one group of scientists used the count of all the known supervolcanoes to calculate the approximate frequency of eruptions, they found that only 1.4 supereruptions occur every one million years.

That's not to say that a supervolcano will occur every million years at regular intervals. Many millions of years could pass without a supereruption or many supervolcanoes could erupt in just a short period. The geological record does suggest supervolcanoes occur in clusters, but the clusters are not regular enough to serve as the basis for predictions of future eruptions.

Scientists have no way of predicting with perfect accuracy whether a supervolcano will occur in a given century, decade, or year – and that includes 2012. But they do keep close tabs on volcanically active areas around the world, and so far there's absolutely no sign of a supereruption looming anytime soon.

reprinted from www.nasa.gov

SCJAS: Presentation Play-By-Play

By John Su, SCAS RTP Participant

Tick tock…Tick tock… Tick tock…As this repetitive noise rings through my ears, my heart rapidly beats as I approach the podium with my partner. Having spent over six months on the White Seabass project, we were responsible for observing the physiological changes for 60 of Hubb Seaworld's White Seabass. In building the tank, feeding the fish, and conducting pH and nitrate tests, we were the first students ever to grow White Seabass in a closed-re-circulating aquaculture system. This feat would require us to seek guidance from the SCAS training program in order to learn the fundamental steps in composing a scientific research paper. As a result, we were fortunate to have our abstract published in the bulletin, and the big day also arrived in which we would present the fruits of our labor in front of the SCAS committee. In my entire life, these 15 minutes spent on stage would be the most challenging but yet become the most rewarding experience.

As the applause from the crowd died, a deep silence filled throughout the room, and all eyes were on us as my partner started off the presentation. In just a few moments, it would be my turn to take the lead, and the butterflies in my stomach would only get worse. I was never a comfortable speaker, and the thought of speaking in front of highly intellectual scientists who would eventually grill us with questions proved even more nerve-wracking. Frightened by the thoughts of speaking too quickly, reading too much from the PowerPoint slides, and forgetting what I was suppose to say, I was about to confront my worst nightmare.

Grabbing the clicker from my partner, it was now my turn. As the eye contact from my partner reassured me that I would do just fine, I shyly projected my voice to the audience as I began discussing the aquaculture environment in which the White Seabass lived in. While I spoke for those 7 long minutes, an otherworldy feeling engulfed my soul. After my partner had concluded the presentation and we had answered all the questions, I was struck by awe as I sat down again to listen to the remaining presentations. Throughout this entire journey, I was able to tackle one of the biggest fears in my life, doing so in an eloquent manner in which others could also understand. Speaking was no longer a burden, and I felt like I could go back up and speak for another hour! However, this shouldn't be an issue since we were selected to attend the AJAS conference in February. Having been part of the SCAS organization has truly promoted my interest in conducting research and helped boost my confidence levels.

Morafka Honored

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(he co-authored his first scientific paper as an undergraduate) and a PhD from USC in 1974. His dissertation ultimately resulted in a book in 1977 titled A Biogeographic Analysis of the Chihuahuan Desert through its Herpetofauna. He joined the biology faculty at CSUDH in 1972, where he taught evolution, ecology and biogeography, maintained a very active research program, and mentored a number of Junior Academy, undergraduate, and graduate students. After his retirement from CSUDH in 2002, he and his wife, Sylvia, returned to San Francisco, where he became a Research Associate at the California Academy of Sciences. He died in 2004 after a long struggle with autoimmune disease and pancreatic cancer.

In addition to mentoring Junior Academy students, David was active in SCAS annual meetings; in 1997, for example, he organized a symposium humorously, but aptly, titled "Guns and Water," which concerned mesic land under military control in the California desert. Those fortunate enough to do field work with him remember his encyclopedic knowledge, tireless energy, and passion for road-side diner food. Because of his frequent travel to a project at Ft. Irwin, he became an authority on restaurants between Los Angeles and Las Vegas; this expertise was acknowledged in an article in Sunset magazine. After retirement, he and Sylvia continued their research on restaurants and coffee houses in San Francisco, which they graciously shared with visitors.

References:

Murphy RW, Berry KH, Edwards T, Leviton AE, Lathrop,A, and Riedle, J.D (2011). *The dazed and confused identity of Agassiz's land tortoise,* Gopherus agassizii *(Testudines, Testudinidae) with the description of a new species, and its consequences for conservation*. ZooKeys 113: 39–71

Berry KH, Morafka DJ, and Murphy RW (2002). *Defining the desert tortoise(s): our first priority for a coherent conservation strategy.* Chelonian Conservation and Biology 4:249-262.

President's Corner

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This year we were especially pleased to bestow the Wheeler North Award for outstanding service to Southern California science to Dr. Camm C. Swift, Emeritus Associate Curator of Fishes, Natural History Museum of Los Angeles County and retired from Cardino ENTRIX, Santa Barbara.

Abstracts of the annual meeting presentations are published in our Bulletin, 110(2):64-139 in August 2011.

Congratulations and welcome to a newly appointed Board member, Ann Bull of the Bureau of Ocean Energy Management, who has been appointed to fill a vacancy created by the resignation of Sabrina Drill.

If you have scientific papers to publish remember that our Academy Bulletin publishes papers by members without page charges, so please consider submitting your manuscripts relating to Southern California. Submissions may be made through the SCAS Bulletin Website, www.scasbulletin.org.

Jonathan N. Baskin, President

The Last Word

SCAS is always looking for volunteers to help with the Annual Meeting and to serve on the Board of Directors.

If you want to help with the Annual Meeting, we always need judges for student presentations and posters, and for papers and presentations by Junior Academy students. To volunteer for student paper or poster judging, please contact Jonathan Baskin (jnbaskin@pacbell.net) or John Roberts (jroberts@csudh.edu). To volunteer to judge Junior Academy students, please contact Gloria Takahashi (myopick@aol.com).

If you would like to nominate yourself for the upcoming election for the Board of Directors, or if you have any interest in serving in the future, please contact John Roberts, Chair of the Nominations Committee (e-mail above).

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Address correction requested

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