SoCal SETAC News
Society of Environmental Toxicology and Chemistry Southern California Chapter
Volume 30 Number 2 Summer 2023

FEATURE ARTICLE

Beneath the Surface of Cancer in Wild California Sea Lions

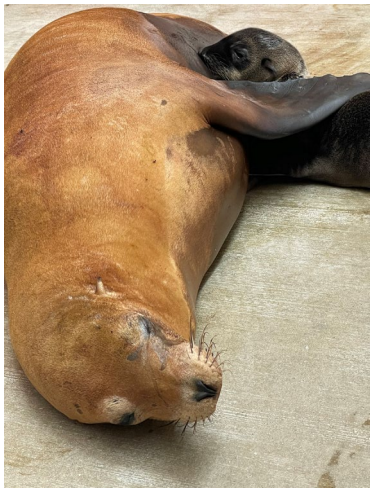
By: Alissa Demming, DVM, MS, PhD

A couple and their daughter walked down Huntington Beach shoreline one morning and came across a very skinny adult sea lion laying on the beach clearly in need of help. They called the local marine mammal rescue organization, the Pacific Marine Mammal Center, and a rescue team came out to assess the sick marine mammal. The rescue team agreed the sea lion was thin, lethargic and in need of medical care. They named her "Charlotte", after the little girl that reported her, and transported her to the rehabilitation hospital, the same way hundreds of other sick or injured sea lions are every year.

Another cancer case, the veterinary team predicted as the sea lion rolled into the hospital. The emaciated and muscle wasted sea lion had the typical look of a sea lion with end stage cervical cancer. They have seen cancer in this population of wild sea lions far too commonly, with the first case described in 1979. Since then, urogenital carcinoma has been persistently high in the sea lion population along the California coast, with end stage metastatic cancer diagnosed in 1 out of 5 (20%) of adult sea lions necropsied (animal autopsy) since the mid-1990s.

Charlotte was anesthetized to facilitate an exam by the veterinary team. Blood was collected to assess organ function and look for infections, followed by radiographs and an ultrasound. As the ultrasound probe scanned down her abdomen, it revealed severely enlarged, urine distended kidneys - a classic sign of end stage urogenital carcinoma. As the cancer spreads from the genital tract, it often infiltrates the sublumbar lymph nodes in the abdomen before spreading to other organs throughout the body. Sea lions have very narrow abdominal cavities and these enlarged cancerous lymph nodes can obstruct the ureters that drain urine from the kidneys to the bladder. This was the cause for the backup of urine in Charlotte's kidney seen on the ultrasound screen.

Charlotte's cancer was too far progressed, already spread from her cervix to her lymph nodes, liver, lungs and spleen; there was no chance for a successful treatment. The only option was humane euthanasia to end her suffering, but her story does not end there. Necropsies are performed on all patients that die at the rehabilitation hospital. Over 75 samples are collected for histopathology, molecular testing, contaminant analysis, and archiving. Researchers around the United States use these samples to piece together the story of what drives this cancer cluster in sea lions off our coast. Recently, members of the Sea Lion Cancer Consortium have linked this very common cancer to a sexually transmitted



California sea lion mother and pup. (Photo: PMMC)

President's Corner

Andrea Bonisoli-Alquati

Last time I was writing for our newsletter we were anticipating our Annual Meeting in Lake Arrowhead. We can proudly say that the Meeting was a resounding success. Various factors cooperated to make it so, including the quality of the talks and posters, a welcoming venue, and a general atmosphere of camaraderie and community. Of course we owe much of the success to the efforts of our Past President, Karin Wisenbaker, who worked effectively at the forefront and behind the scenes, in organizing…

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virus (Deming et al., 2020) and high contaminant levels, including DDT and PCBs (Gulland et al., 2020).

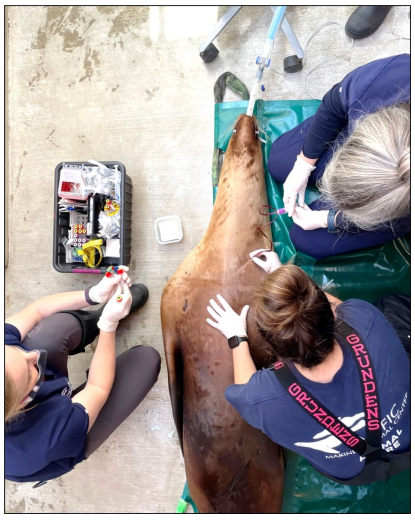
To understand why there are so many sea lions with urogenital carcinoma, you need to understand a little more about their behavior and the health of the environment they live in. Most California sea lions live, breed, give birth, and nurse their young around the Channel Islands of Southern California. The adult males live most of the year in northern California, Oregon, and Washington and come to the Channel Islands over the summer for breeding season. It is during this time that a sexually transmitted herpesvirus is spread amongst the breeding population- the first and necessary component to developing urogenital carcinoma.

The adult females are much more closely tied to the waters surrounding the Channel Islands and coastlines within the Southern California Bight because they give birth on the beaches (known as rookeries) and after foraging trips out to sea that can last several days, they must return to nurse their pups on the islands. Sea lions nurse their young for 9 months to a year, and typically give birth every year. This means the adult female sea lions primarily live and forage in the waters surrounding the Channel Islands year-round, for the vast majority of their life.

The negative impacts of DDT on human health started to come to light in the 1970s. DDT exposure was linked to an increased risk of cancer, primarily breast cancer and liver cancer. Mothers exposed to DDT during pregnancy or immediately after birth had an increased risk of breast cancer in their daughters and granddaughters (Cohn et al. 2015). DDT has also been found to cause epigenetic change in the germ line cells, resulting in transgenerational impacts including increased risk of obesity and cancer. As the significant negative health impacts of DDT were exposed, its use in the US was banned, but the ripple effects of the discharged and dumped insecticide will persist for much longer in the environment and the animals that call the Southern California Bight home.

The impacts of DDT on Southern California marine life was first brought to the public's attention in the 1970s through Rachel Carson's book "Silent Spring". In fish-eating birds including the bald eagle, brown pelican, California condor and peregrine falcon, DDT exposure caused reproductive failure due to eggshell thinning. More recently, in California sea lions, DDT has been linked to the high prevalence of cancer in the wild population. One study found that sea lions with higher DDT concentrations in blubber have higher odds of having cancer (Gulland et al., 2020), and the highest levels DDT+ every recorded have been identified in dolphin species in the region (Mackintosh et al., 2016).

In mammals, including humans and sea lions, DDT is consumed in contaminated fish or other exposure sources, and accumulates in the fat/blubber. Later, the DDT can be mobilized during pregnancy and lactation, exposing the fetus in utero and through consumption of milk before it even eats its first fish (Greig et al., 2007). This means not only does DDT and its breakdown products



PMMC staff performing a health assessment on an anesthetized California sea lion.

persist in the environment and prey, but is also passed down from one generation to the next during pregnancy and nursing. These sick sea lions have the potential to provide valuable insight into the transgenerational transfer of DDT as well as the mechanisms behind how DDT causes cancer in this real-life setting.

Cancer is a general term referring to uncontrolled cell replication and immortality. A cell that no longer is following the basic "rules" nature dictates. From single celled organisms to complex systems like humans, all cells are controlled by a similar set of regulatory genes responsible for cell growth, cell replication, DNA repair, and cell death. For multicellular organisms to function appropriately, the cells that make up that organism must work together and be good neighbors. They should divide only when told, stay where they are supposed to, and die when signaled it is time. When cells stray from these instructions the pathway to cancer begins.

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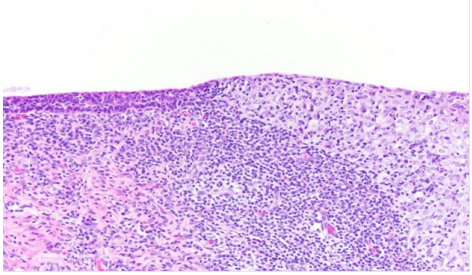


.Histology section of urogenital carcinoma lesion in the cervix of a California sea lion.

A variety of things can alter a cell causing it to wander from these basic principles of life, including random mutations in DNA, certain viral infections, contaminant exposure, inherited mutations, compromised immune systems, chronic inflammation, and more. Typically, it takes multiple insults, or "hits", in important regulatory and repair genes, epigenetic changes, and miRNA dysregulation to push a cell from normal to a malignant state.

A host has a variety of defenses to eliminate these rogue cells before they spread out of control and eventually result in death. Mammals, for example, have a lot of cell cycle checks and balances combined with a sophisticated immune system, which is typically very successful at preventing these transformed cells from gaining a foothold. However, if these redundancies or the immune system are compromised, the risk of cancer creeps up. This is why immune compromised and geriatric people have a higher risk of developing cancer.

Additional factors, like cancer causing viruses, up the odds of a cell turning cancerous. Basic viral reproductive strategy is to infect a host cell armed with viral genes that enable it to hijack the cell's replication machinery to redirect efforts to replicate the viral genome. In some instances, these genes takeover important replication pathways, block apoptosis (controlled cellular death) and hide the infected cell from the host's immune system by turning off antigen presenting pathways. All of these changes can threaten to push a cell to an immortal state, which is often the first of many steps to a cell transforming into a tumor.

In short, the pathway to cancer is complex, multifactorial and convoluted whether you are a sea lion or a human. Although there are many causes and characteristics unique to each tumor, there are also other shared mechanisms across cancer types and between species. Thus, sea lions with urogenital carcinoma can serve as a naturally occurring disease model, adding to laboratory models and cell cultures where cancer research is traditionally studied.

Now that we have begun to understand the major drivers behind sea lions with cancer, we can begin to expand on the research to learn as much as we can from the unfortunate cases that cannot be saved. Throughout their lifetime, wild sea lions are essentially "collecting" contaminant samples in their blubber and playing out a real life experiment on the impacts of exposure to their health. By creating support and standardized protocols for sample collection at rehabilitation facilities, we can tap into opportunistic samples from these wild animals to shed light on the impacts living in a world with DDT.

As for Charlotte, she is one of hundreds of sea lions already contributing to research. Samples collected during her necropsy have been sent to various research facilities, ranging from DDT+ testing, to comparative gene expression between primary and metastatic tumors, to validating a "liquid biopsy" technique that detects circulating metastatic cells in blood. The story of her life will continue to unfold with the hope that the information uncovered will help protect the next generations of sea lions, humans, and the environment that we all share.

<If you are interested in studying sea lion cancer, you can join the Sea Lion Cancer Consortium (SLiCC) by emailing ademing@pacificmmc.org. SLiCC is an international group of researchers, biologists and medical professionals working in a collaborative, synergistic way on a variety of research questions surrounding sea lion cancer. The group facilitates sample distribution and data sharing to optimize the information obtained from these valuable samples.>

President's Corner (continued)

organizing and smoothing things out. In this issue, you can find her recap of the Meeting. You can also find an interview with the winner of the best graduate student poster, Kameron Wong, of CSU Long Beach.

It will soon be my turn to take on the responsibility to organize our 2024 Annual Meeting. This year's meeting will be hard to follow. Still, I will do my best to help set up a platform for us – students, researchers, practitioners, policymakers – to get together and discuss the latest in our careers, our monitoring and research programs, our businesses, our campaigns. I know I can count on capable officers and board members, including the ones who will soon step up. In keeping with tradition, in this issue of the newsletter you will meet one of them, Molly Colvin, who will become our Chapter's VP during the next year (thank you, Molly!).

Meanwhile, the next crop of Board members for our Chapter have been elected. They are: **David Volz** (academia; University of California, Riverside), **Lindsay O'Donahue** (public sector; Los Angeles County Sanitation Districts), **Andy Martin** (private sector; Anchor QEA), and **Evan Tjeerdema** (student representative; Scripps Institution of Oceanography). I want to congratulate them and thank them for their service. I also want to thank the other candidates, and all of our Chapter's members who participated with their vote. The traditional adage is that any latest election is the most important in our lifetime. This may not apply to our Chapter, as there is reassuring continuity in its composition and activities. Yet, voting for the members of our Board from academia, government, the private sector, and NGOs is a powerful and important act that shapes our Chapter and its future activities.

As I said before, our activities and their foundations – our underlying interdisciplinary expertise, our passion for the natural world and its understanding, and our dedication to being leaders and stewards of the environment and protectors of public health – are more crucial than ever. In this newsletter, we are reminded of how much that is the case with summaries of two recent papers by members of our Chapter, and with a feature article that unpacks how pathogens and persistent organic pollutants combine to explain cancer occurrences in California Sea Lions. More generally, environmental contamination issues have been prominent in the news, reminding us of the critical role we play. In the past few months, multiple chemical makers settled claims for environmental liability in PFAS pollution of public drinking water systems; the EPA finally set national drinking water standards for PFAS; air pollution from unusually early and record-breaking wildfires clouded the skies of cities in Canada and the Midwest and Eastern US, reminding us of the Blade Runner-esque skies we experienced here in 2020. Meanwhile, the environmental and political consequences of the train derailment in East Palestine, OH, continue to unfold, a stark reminder of the ramifications of the plastic pollution crisis. On the topic, representatives of all countries in the United Nations convened in Paris last June for the second session of the Intergovernmental Negotiating Committee to develop an international legally binding instrument on plastic pollution, in a vein similar to the Intergovernmental Panel on Climate Change (IPCC).

I am also looking with anticipation at the consequences of two votes in the European Parliament. The first was on the so-called Nature Restoration Law. This landmark piece of legislation will require the restoration of 20% of Europe's land and sea ecosystems by 2030. It will become a cornerstone of the EU's 2030 Biodiversity Strategy. In essence, very good news for nature. The second vote is on a revision of EU's chemicals safety law (a.k.a. REACH) that would ban the most harmful chemicals from consumer products. The EU has estimated that tighter chemical safety regulation would benefit human health by limiting cancer, obesity, infertility, and other maladies linked to chemical exposure, outweighing costs to industry by more than 10 times. Initially planned for this summer, the vote was recently delayed. It may come in a few months. However geographically distant, these are important measures that move society in the direction of a cleaner, more just, and equitable future. My hope is that similar political initiatives will mirror these pieces of legislation elsewhere, including in the US. As experts on environmental contamination detection, monitoring, and assessment, we know pollution issues – we have studied them, we understand their complexity, and we have fought against them for a long time. There is growing societal awareness that rigorous science is needed for stewardship and regulatory and legal oversight. Such awareness is energy we can harvest to power advancements in our studies and our work.

This summer my mandate as President of our SoCal SETAC Chapter is coming to a close. It's been a pleasure and an honor, and I'm proud of what we achieved as a Chapter. We remain one of the most active and admired regional chapters of SETAC North America. I have total confidence in my successor, Maggie Stack, and am excited for her leadership. As for me, the role of President gave me the opportunity to meet many of you. I hope I'll continue to see you and learn about what you do.

SoCal SETAC Annual Meeting Recap

By: Karin Wisenbaker, SoCal SETAC Past President

The 2023 SoCal SETAC Annual Meeting was held on April 16-18 at the UCLA Lake Arrowhead Lodge. The lodge was in a spectacular location with beautiful views of the lake. We had an excellent turnout with 85 members attending the meeting. This year, we started out with a Sunday night dinner in the lodge and a beer and wine social after dinner. It was a great way to catch up with everyone and meet new members.

The annual meeting had two special sessions this year. The first special session, Talkin' Trash, Micro/Macroplastics and Beyond, featured nine platform presentations. This session started out focusing on larger trash and included presentations on watershed-wide trash assessments and the quantification of rocky shoreline trash. The focus of the talks then shifted to microplastics and included presentations on microplastic emission inventories, air and marine transport patterns and streamflow monitoring. The second special session, Multiple Stressors in the Environment, featured four platform presentations. Presentations included a variety of topics including the effects of lagoon restorations, causes of largemouth bass intersex, estuary benthic community stressor identification, and microplastics as vectors of Vibrio. We couldn't keep away from microplastics in this session! We also had two general platform sessions and a poster session that covered topics ranging from ecotoxicology to the San Pedro Basin DDT dumpsite.

We ended the meeting with the student awards and the announcement of our logo contest winner. Chris Sayers (UCLA) and Kameron Wong (CSULB) were awarded best graduate student presentation and best graduate student poster, respectively. Trina Miller (CSUF) and Monet Pedrazzini (LBCC) were awarded best undergraduate presentation and best undergraduate poster, respectively. Thank you to all of our student presenters and judges! This year the SoCal SETAC logo got a makeover to make it more social media friendly. Members who attended the meeting voted for Kara Wiggen's design. Thank you to everyone who submitted a logo, it was difficult to decide who to vote for!

I would like to thank our 17 sponsors for their support of this Chapter. Their support allowed us to have a terrific meeting and support our students through the presentation awards, research awards and travel grants. I would like to thank the board members and officers for their support in planning this meeting, especially Andrea Bonisoli-Alquatic, Maggie Stack, Leslie Nanniga, Aaron Angel and Barbara Orelo. Finally, I would like to thank the SoCal SETAC members who made the harrowing drive up the mountain to attend the Lake Arrowhead Annual Meeting. Your participation and involvement in SoCal SETAC is what makes this chapter so successful!

MEET THE BOARD

Molly Colvin

Naval Information Warfare Center Pacific

Hi SoCal SETAC members! My name is Molly Colvin and this is my second year as a Board member…soon to be VP of the chapter next year!! This is actually my third time participating on the Board for SoCal SETAC. I have been involved with the chapter on and off since 2003, but started more involvement starting in 2012 when I started as a student Board member and then became a professional Board member shortly thereafter!

I was born in the suburbs of Detroit, MI and then moved to Tucson, AZ when I was 10 and even though I bounced around, I spent almost every summer in Michigan with my family on the Great Lakes playing on the water in everyway we could. I knew from a very young age I wanted to be a marine ecologist in one way or another. I was able to start this journey when I moved to San Diego for college. I attended University of California, San Diego, where I earned a Bachelor's degree in Ecology, Behavior and Evolutionary Biology. I loved living so close to the water at UCSD and met my amazing husband freshman year in the dorms…we will be celebrating our 20th anniversary this month!

I bounced around a couple of positions after my undergrad, but ultimately went back to school for my MS in ecology with a marine emphasis at SDSU. My thesis research focused on the feeding behaviors, growth rates and metal accumulation in the infaunal polychaete *Polydora cornuta* in the Tijuana Estuary. During my graduate studies, I managed the off-campus marine lab at SDSU, the Coastal Marine Institute Laboratory, and helped many other grad students with their research, while conducting my own.

Eventually, I found an amazing student position that turned into a full-time federal position with the aquatic toxicology lab at the Naval Information Warfare Center (NIWC) Pacific. During my work at NIWC, I was able to hit the ground running to manage the ELAP accredited lab and numerous research projects. My projects, primarily funded by the Navy and Department of Defense, focus on improved understanding of the bioavailability and toxicity of DoD-relevant contaminants to biota, and the development of improved ecological risk assessment tools. Projects include both routine monitoring of effluent and ambient water and sediment samples as well as novel monitoring techniques and technologies such as the Pulsed Exposure toxicity methods, SEA Ring (in situ toxicity monitoring device), Signal Activated Bottom Lander (SABL) among many other exciting projects (including the Bight '23 Monitoring Program this year!). I enjoy training and mentoring new hires and students coming into our lab and sharing my love for this field of work.

Outside of work, I spend weekends in the desert riding dirt bikes with my family, playing at the beach with my dog while my son surfs and constantly working in my yard on our ever-changing garden. I frequently volunteer at our neighborhood schools teaching about coastal ecology and aquatic toxicology hoping to inspire the next generation of scientists! I look forward to continuing to work with SoCal SETAC over the next few years and more great meetings in person!

Paper Highlights

Our "Paper Highlights" showcases recent publications by Chapter members. This quarter, we share highlights from Dr. Kari Sant, PhD and Associate Professor at San Diego State University and Dr. Ochan Otim, Senior Chemist with the Environmental Monitoring Division of the City of Los Angeles and professor at University of California – Los Angeles.

Metagenomic Analysis of Microbial Contamination in the U.S. Portion of the Tijuana River Watershed

By Dr. Kari Sant
Paper link: https://www.mdpi.com/1660-4601/20/1/600

The Tijuana River is a binational watershed, flowing northward from Tijuana into southern San Diego County. This river is highly impaired, due to high levels of sewage entering the watershed, which leads to beach closures in Imperial Beach for more than half of the year. There are both point and non-point sources to the contamination, including inadequate sanitary infrastructure for the growing population in Tijuana, coupled with pump failures in the lines that carry contaminated waste to treatment. While routing monitoring surveys fecal indicator bacteria, the goal of our student was to comprehensively assess the microbiological contaminants in the Tijuana River using shotgun metagenomic sequencing.

Alexandra Fox (MS/MPH in Environmental Health and Latin American studies are SDSU) collects a surface water sample near the mouth of the Tijuana River for analysis

Trash and tires enter into the Tijuana River watershed during major storms.

The research team was led by Dr. Kari Sant (SDSU Public Health), Dr. Scott Kelley (SDSU Biology), and graduate students Nicholas Allsing ('22) and Alexandra Fox ('21). From 2019-2020, the team surveyed 5 transboundary sites that each receive storm flows and a downstream estuarine site, sampling monthly before, during, and after the rainy season. Water samples were collected within 24 hours of major rain. DNA was extracted and submitted for sequencing. Individual microbes were identified, including those found on the County of San Diego Reportable Diseases and Conditions reports for the sampling period. Metagenome diversity, associations with live fecal indicators, antimicrobial resistance genes, and breadth of coverage for species of interest were all assessed.

Fecal indicators, as detected via sequencing, were strongly correlated with live measures of fecal indicator bacteria such as E. coli. Overall, metagenomic diversity and evenness was inversely correlated with proximity to the border. Antimicrobial resistance genes were detected more frequently in the samples with high transborder water flows. A number of known and relatively understudied pathogens were found among the most abundant microbes in the samples, including *Salmonella enterica*, *Escherichia coli*, and *Arcobacter cryaerophilus*. Overall, this research was the first to characterize the metagenomes of transboundary flows at the US-Mexico border, with implications for public health.

Recent spatiotemporal trends of harmful algal blooms in California inland water bodies

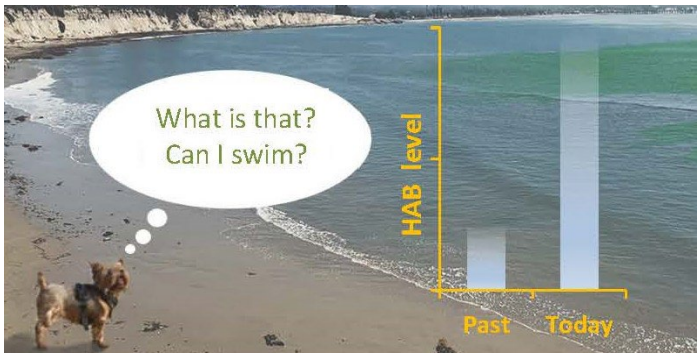
By Dr. Ochan Otim
Paper link: https://doi.org/10.1039/D3EM00115F

Harmful algae blooms (HABs), be they microalgae or phytoplankton blooms in open water, are public hazardous and a threat to environmental health. By current understanding, HABs occur naturally and sustained in some waterbodies by drivers originating from anthropogenic activities. A good example is a perpetual site of massive fish die-off in a once crystalline lagoon in the Mediterranean Sea that is now choked with cyanobacteria supported by farming-related pollutions. In the Gulf of Mexico as well, a microscopic dinoflagellate *Karenia brevis* (commonly known as red tide) is implicated in the declining fish industries in the area. In both cases, and similar waterbodies, toxins released by HABs into the surrounding waters are believed to be the cause of the fish die-offs.

In the State of California (USA), 71 HABs-related illnesses were reported between 2018 and 2020. Yet HABs occurrence on inland waterbodies, mostly proximal to human settlements or easily reachable, is poorly understood. Some attribute this lack of understanding to the absence of a formal statewide monitoring program/standard. Such a program, if implemented, would have come with specified quality goals and standardized analytical methods for collecting comparable and high-quality data required for a deeper knowledge of HABs on inland waterbodies statewide. The absence of a formal HABs program then means determining the likelihood of an HAB occurrence on inland waterbodies with certainty and predicting its severity will continue to be a challenge in California.

Kate Jang, an upcoming environmental scientist from Crossroads School for Arts and Sciences in Santa Monica, California (USA), believes that while we wait for high quality data and particularly given the urgency of time, the observational-only HABs dataset already in California's database should be explored for information that might be helpful in understanding and perhaps coping with HABs on California's inland waterbodies. This dataset has so far been used primarily to warn the public about the presence and the potential danger of HABs in an area.

Her PI, Ochan Otim, a Board Certified Environmental



Scientist, agrees that exploring empirical datasets such as the California's HABs observational-only dataset could help not only bridge the knowledge gap in the field but draw us closer to identifying factors supporting HAB occurrence in California.

Using a 2016-2021 mostly observational data from California State Water Resources Control Board reporting system, Jang asked three questions in her study. These were (i) whether HABs incidences are expanding in California, (ii) whether some California localities are more prone to HABs than others, and (iii) whether bivariate relationships exist between HABs observations and population density, or waterbody size, land area and geographical location. Addressing these questions, Jang believes, could help narrow down the list of localized inputs of HABs drives into a waterbody in the state. Her results, now published by the Royal Society of Chemistry, London (UK) on May 15, 2023 in their peer-reviewed journal *Environmental Science: Processes & Impacts* (https://doi.org/10.1039/D3EM00115F), show that the frequency with which HABs are observed on inland waterbodies in California is increasing statewide and that the observed increase is not correlated with population density, but with land area and with inland waterbody size. Jang's analysis also shows that between 2016 and 2020, the North Coast, Central Valley, and the San Diego regions were the most affected regions of California. More striking was a revelation that HABs are now beginning to appear on inland waterbodies in January, a California winter month. This revelation, if proven, may be signaling an emerging year-round problem that the state will have to contend with.

Overall, Jang has illustrated the value of exploring a simple dataset in advancing our understanding of a complex environmental phenomenon. She showed in this study that when high quality data is not available, probing 'what is available' in a multivariate space could move us closer to identifying the myriad of natural and anthropogenic factors supporting HAB occurrence in California.

STUDENT CORNER

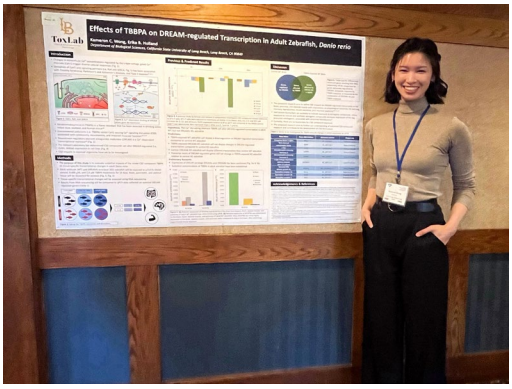
SoCal SETAC Annual Meeting Graduate Student Poster Winner: Kameron Wong

Interview by Dr. Jenna Wiegand

1) Tell us about yourself and what led you to where you are today?

My name is Kameron Wong, and I am entering the last year of my 3-year Master's program in Biology at CSU Long Beach. I am a student in Dr. Erika Holland's Molecular and Environmental Toxicology lab, and frankly, I would not be where I am today without her guidance and compassion. My journey in toxicology began in high school when I designed and conducted my own experiment studying the consequences of heavy metal exposure on marine organism health.

Although I had always been passionate about ecotoxicology, I wasn't aware it was a field I could specialize in until later in my academic career. After earning my Bachelor's degree in Marine Sciences from the University of Delaware, I was given the opportunity to work as a research assistant at the U.S. EPA in Duluth, MN. Here, I became familiarized with toxicological research, and my dedication to the field was solidified. As a result, I am eager to further my education by pursuing a doctorate degree in ecotoxicology after graduating from my Master's program.



2) What is your research on and what drew you to it?

My thesis research utilizes tetrabromobisphenol A (TBBPA) as a model contaminant to characterize the tissue-specific consequences of calcium signaling disruption. Specifically, I utilize transcriptomics to investigate the altered expression of genes regulated by the DREAM protein in adult zebrafish. What attracted me to this project is its potential impact on both environmental and human health. For this, I am indebted to Dr. Holland for introducing me to the versatility of using zebrafish as a model species.

Kameron Wong, Masters student at CSU Long Beach and recipient of SoCal SETAC's Graduate Student Poster Award.

This research aligns perfectly with my ultimate career goal of bridging the gap between scientific knowledge and public understanding. Furthermore, my experiences have shed light on the environmental injustices faced by socioeconomically disadvantaged communities. To me, this line of research plays a pivotal role in raising awareness about the higher risks of exposure to environmental contaminants faced by these communities and their surrounding ecosystems.

3) What are your passions and hobbies outside of school?

Outside of school, I enjoy exploring the incredible National Parks California has to offer, practicing aerial arts, and spending time with my cat, Astrid. I am also involved in a local Rotary Club chapter, where I am able to direct my humanitarian efforts towards promoting environmental awareness and sparking scientific curiosity in my community.

CALENDAR OF EVENTS

August 2023

August 28 – September 1

12th SETAC Young Environmental Scientists Meeting. *Landau, Germany.*
https://yes2023.setac.org/

September 2023

September 19

West Coast SETAC Summer Seminar Series: Dr. Leah Chibwe, "Diving deeper into the complex chemical mixture and toxicity of tire-wear". *Virtual.*
https://tinyurl.com/SETACSem1

October 2023

October 24

West Coast SETAC Summer Seminar Series: Dr. Kelly Moran, "Mitigation options for tire wear particles and chemicals". *Virtual.*
https://tinyurl.com/SETACSem1

November 2023

November 12-16
SETAC North America 44th Annual Meeting. *Louisville, KY, USA.*
https://louisville.setac.org/

Don't forget to follow our new LinkedIn page!

Connect with us to stay up-to-date on all events, job opportunities, grants, and more!

Southern California SETAC: https://www.linkedin.com/company/southern-california-setac/

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Past President	**Andrea Bonisoli-Alquati,** California State Polytechnic University, Pomona aalquati@cpp.edu
President	**Maggie Stack**, San Diego State University Research Foundation mstack@sdsu.edu
Vice President	**Molly Colvin,** Naval Information Warfare Center Pacific marienne.a.colvin.civ@us.navy.mil
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Co-Secretary	**Aaron Angel,** Delta Stewardship Council aaron.angel@deltacouncil.ca.gov
Webmaster	**Leslie Nanninga,** City of San Diego, Public Utilities Department LNanninga@sandiego.gov

SoCal SETAC 2023–2024 Board Members

Board Member (2021–2024) NGO	**Caroline Moore,** San Diego Zoo Wildlife Alliance camoore@sdzwa.org
Board Member (2022–2024) Academic	**Sean Anderson,** California State University, Channel Islands sean.anderson@csuci.edu
Board Member (2022–2024) Private	**Katie Payne,** Enthalpy Analytical katie.payne@enthalpy.com
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