September 2013

Northern California

President's Message

It is truly a privilege to serve as the president for the NorCal SOT regional chapter. We, the NorCal Board members, have started the year with renewed enthusiasm and a mission to continue and build upon the wonderful legacy of our predecessors. This year each board member has volunteered to lead at least one core area of focus for the chapter. An outline of their efforts is summarized below.

We will host two symposia, one on 24 October 2013 and the other in Spring 2014. They will focus on current topics in the field of toxicology. We believe in engaging scientists from around the Bay Area as well as nationally recognized experts, who are engaged in cutting edge science. Donna Dumbach and Pamela Lein are spearheading the organizing committee. The Fall 2013 Symposium theme is "ADME and its role in toxicology". They have put together an excellent panel of speakers who will address various aspects of ADME and how they might affect the outcome of toxicity. You can find details page 2.

We are fortunate to have a number of Universities in Northern California that have active programs in toxicology or related fields. NorCal SOT's mission is to support student mentoring activities and to reach out to young scientists so that they can be a part of this vibrant scientific community. Eric Harstad is leading the student outreach and mentorship program. Together with Sandra Chang and Kathryn Page they have planned a great program for this year. You can read more about the upcoming events on Page (9). NorCal SOT supports a variety of student and postdoctoral awards. Once the SOT abstracts are accepted, do not forget to apply. See award application deadlines and details on our website. Toufan Parman continues to lead our K-12 outreach. ToxSA from UC Berkley has always played an active role in this event. Stay tuned for another exceptional K-12 event announcement in the near future. We encourage you to volunteer for these events!

The Bay Area is home to many Biotech and Pharmaceutical companies. Therefore the chapter also provides support for forums where scientists can discuss issues and current advances in their specific field. Such forums include Preclinical Drug Safety Dinners that are held every quarter. NorCal leadership is also invited to participate in other Bay Area DMPK related chapters. Jeff Tepper is our Board liaison for such activities (See page 5).

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President's Message, cont'd

Spread the word - become a member! Caroline English leads the new membership drive. If you know of anyone who is interested in joining the chapter, please refer them to Caroline.

We publish at least two newsletters a year. We are interested in publishing short scientific articles on current issues or topics of interest. Amy Lambert leads the Newsletter team. I encourage you to contact her if you would like to contribute to the next Newsletter.

Many thanks to all our Sponsors! Your sponsorship goes a long way in funding all the chapter activities. Sponsorship drives occur prior to each symposium. If you are interested in becoming a sponsor please contact Toufan Parman to learn more about how your sponsorship can contribute to the continued growth and success of the chapter.

Elections will be coming up in December. If you would like to be a part of the NorCal SOT Board as a VP elect, Councilor or Secretary, please contact Jeff Tepper for details. Thanks to all Board members for their continued support, hard work and dedication.

I look forward to your participation,

Best Regards,
Sushmita M. Chanda, PhD DABT

SAVE THE DATE!!

OCTOBER 24, 2013

NORCAL SOT FALL SYMPOSIUM

"ADME and Its Role in Toxicology"

Venue: South San Francisco Convention Center, 225 South Airport Blvd
South San Francisco, CA

Preliminary Program*:*

- **Assessing Toxicity Potential of Nucleotide Inhibitors of the Hepatitis C Virus in vitro: Joy Feng, PhD, Sr. Scientist, Gilead Sciences**
- **Role of Metabolism in Respiratory Toxicity: Alan Buckpitt PhD, Professor Molecular Biosciences, UC Davis**
- **Role of Ceruloplasmin in Mn Distribution and Toxicity: Donald Smith PhD, Professor Physical and Biological Sciences, UC Santa Cruz**
- **Chemoproteomic and Metabolomic Strategies for Drug Discovery and Toxicology: Keynote Speaker, Daniel Nomura PhD, Assistant Professor Nutritional Sciences and Toxicology, UC Berkeley**
- **Transporters in Metabolism and Toxicity: Joseph Ware PhD, Sr. Scientist, Genentech, Inc.**
- **How Drugs Get into the Brain & Assessment of Brain Levels: Carol Green PhD DABT, Senior Director, Toxicology and Pharmacokinetics, SRI International**

Sponsor Article: Nonclinical Immunotoxicology Assessment in Nonhuman Primates: Utilizing the Right Assay to Meet Study Objectives

Nathan Yee, Ph.D., Norbert Makori, Ph.D., and Stefan Nechev, M.D.
SNBL USA, Ltd., Everett, WA

Many pharmaceuticals have the potential to act on or modulate the immune system, either by design or as an unintended consequence, making incorporation of appropriate immunologically-relevant assays a crucial element of the study design. Toxicology testing for the increasing number of biotechnology-derived pharmaceuticals relies on the use of nonhuman primates (NHPs) due to their biological similarity to humans. Therefore, designing and optimizing appropriate bioassays to evaluate the NHP immune response is of utmost importance.

The immune system is divided into two separate arms, each involving different modes of action. Innate immunity is a generalized, quick and non-specific response to infection, whereas the adaptive immune system specifically targets pathogens to eliminate or prevent their growth. There are a host of phenotypic and functional assays to evaluate the variety of specialized cell types and soluble mediators (antibodies, cytokines, etc.) that comprise the NHP immune system. For instance, immunophenotyping of major leukocyte cell types and subsets can be accomplished by robust flow cytometry analysis of surface and intracellular leukocyte markers from primary and secondary lymphoid organs, which supplements standard toxicological endpoints from anatomic and clinical pathology. Potential immunomodulation can also be assessed by a suite of core functional assays to determine T-cell dependent antibody responses (TDAR), NK cytotoxic activity, antigen-specific cytokine synthesis, cell proliferation, complement split product generation, NHP acute phase protein levels, and anti-drug antibody detection. Taken together, these assessments create innate and adaptive immunology profiles to aid in the evaluation of the toxicity or efficacy of drug candidates. Study design and assay selection must incorporate relevant background data in order to generate interpretable results from sometimes subtle immunological endpoints, and variations in animal origin, age, or sex are important considerations. If you would like more information as to how understanding your test system is critically important for evaluating immunomodulation, contact Michelle Taylor at mtaylor@snblusa.com to request the unabridged paper of Drs. Yee, Makori and Nechev's: "Nonclinical Immunotoxicology Assessment in Nonhuman Primates: Utilizing the Right Assay to Meet Study Objectives."

A Review of the 2013 Spring NorCal SOT Symposium

On 23 April 2013, NorCal SOT hosted the 2013 Spring Symposium at the South San Francisco Convention Center. The NorCal SOT President, Dr. Jeff Tepper, along with Board of Directors greeted approximately 85 attendees from regional business, government and academia. Our featured speakers and their topics are listed below:

- "The UC Davis CounterACT Center of Excellence: Improving Medical Countermeasures for Acute Intoxication with Seizurogenic Chemical Threat Agents", Dr. Pamela Lein, Professor, Department of Molecular Biosciences and Chair, Pharmacology & Toxicology Graduate Group, UC Davis
- "Toxicokinetics and Risk Assessment: Refining the Dose Relationship", Dr. John Lipscomb, Toxicologist, US EPA-NCEA
- "Developmental PCB 95 exposure affects spatial memory in weanling mice" NorCal Graduate Student Award Winner: Christopher Barnhart, UC Davis
- Key Note: "The Effects of Environmental Toxicants on Immune Function in Autism ", Dr. Judy Van de Water, Professor, Department of Internal Medicine, School of Medicine, UC Davis
- "Contributions and Impact of Toxicology on Product Quality and Occupational Health Assessments", Dr. Susan Rice, Susan A. Rice and Associates
- "Genetic Variation of Iron Metabolism" NorCal Postdoctoral Fellow Award Winner: Dr. Kathryn Page
- "Integrated Assessment of Cardiovascular Functional Liabilities: Electrophysiology and Beyond", Dr. Mark Holbrook, Vice President, Global Lead Safety Pharmacology and Harrogate Site Lead for Safety Assessment, Covance
- "Use of In Vitro Models to Investigate Short and Long-Term CV Safety of Small Molecules", Dr. Dinah Misner, Senior Scientist and Investigative Toxicology Laboratory Group Leader, Genentech, Inc.

Speakers and attendees engaged in lively discussions about the symposium topics over breakfast, lunch, and a wine and cheese reception provided by our Sponsors. The poster session was well attended. The always popular Lunch with an Expert event attracted graduate and undergraduate student and mentors.

Above all, we would like to appreciate and thank our Sponsors for making this event a success:

- Gold Sponsors: SNBL and Amgen
- Silver Sponsors: BioReliance, Charles River, Genentech, Gilead, Huntingdon Life Sciences, MPI Research, Novartis and WIL Research
- Bronze Sponsors: ChanTest, CiTox Lab, Covance, Cyprotex, ITR Laboratories, Pacific BioLabs and Toxikon

CACO-PBSS-Phamaceutical and Bioscience Society- Seek Collaborators

On Apr 12, 2013, at Crowne Plaza Hotel Foster City, **CACO-PBSS** (Pharmaceutical & BioScience Society International, Bay Area chapter) and **BAPKPD** (Bay Area PK/PD Network) hosted a productive happy-hour meeting for the leaderships of the major local societies in various disciplines of drug discovery and development. The purpose was to foster opportunities for these organizations to collaborate and develop mutually beneficial scientific programs. The following organizations were represented.

- **AAPS – BADG** (American Association of Pharmaceutical Scientists Bay Area Discussion Group)
- **BAADME** (Bay Area ADME Society)
- **BAMS** (Bay Area Mass Spectrometry Society)
- **BAPKPD** (Bay Area PK/PD Network)
- **CASSS** - An International Separation Science Society
- **CACO-PBSS** (Pharmaceutical & BioScience Society International, Bay Area chapter)
- **SOT-NorCal** (Society of Toxicology, Northern California chapter)

The collaborations can be in the form of seminars, training workshops, or minisymposia. In the past years, CACO-PBSS has collaborated successfully with several of these local organizations through joint seminars and workshops. For workshop collaborations, the collaborating partners develop the workshop program (topics & speakers) jointly, while CACO-PBSS handles all of the operational activities such as online registration and meeting operation. The profit is shared 50:50 between the workshop partners. For further information or collaboration proposals, please contact shichang.miao@pbss.org.

Preclinical Drug Safety Group

Eighteen NorCal members with experience in the safety assessment of pharmaceuticals met for dinner at Sapore Italiano in Burlingame on July 23rd. On top of informal networking, group discussions covered diverse topics ranging from strategies for species selection; the role of clinical pathology in short-term bioassays; evaluation of effector function for monoclonal antibodies; use of in vitro micronucleus for genotoxicity; and strategies for combining cardiovascular/pulmonary/CNS endpoints in a single safety pharmacology study. There was very active participation by the attending members that represented large pharma, small biotech, CROs, consultants, and academia and brought a wealth of knowledge to discussion. Additionally, the food was excellent. Thanks again to Covance for helping support the dinner and wine. Stay tuned to additional dinner events in the near future.

K-12 Event Report

I Love Science and Kids do too!! More Education Outreach Please!

By Toufan Parman, PhD, DABT, Chair of NorCAL SOT K-12 Outreach Program

California, including San Francisco Bay Area is the cradle of science, technology and much of the US innovation in science, yet our elementary schools are not equipped and our teachers are not empowered to teach science as there is lack of both federal and state funding for elementary science education improvement efforts[1]. Just over 50% of school districts do not have capacity in their district office to support science education[1]. Recent national reports have stressed upon the importance of science education in the elementary grades (K-8) and fostering interest in science early in life[2,3]. Despite these reports, California students produce inadequate achievement results in science. Based on the 2011 California standards Test "Star Test" results, 21% of California's 8th grader tested proficient and 47% were far below basic in science while nationwide 32% of students tested proficient[4]. Similarly according to California standards Test in science during spring of 2007, more than half of the 5th graders failed to reach proficiency in science.

I became more aware of the challenges of teaching science to elementary students when I became the president of the parent teacher association (PTA) in my daughters elementary school. I was quite disheartened to hear about the challenges that teachers are facing in science education. Many teachers feel less prepared to teach science than any other subjects, and there are very little opportunities available to them to improve their skills[2]. My children are lucky to be attending a school in an affluent area in California where more than 60% of the parents have higher education and are willing to fund various science events for the school; however, this is not true for all schools in California. This inspired me to volunteer in education outreach programs through Northern California (NorCal) chapter of the Society of Toxicology (SOT). In spring of 2011, as the chair of K-12 outreach program for NorCal SOT and in collaboration with Lawrence Hall of Science Museum and the Toxicology Student Association (ToxSA) at the University of California, Berkeley I organized an event to teach K-8 students about the basic sciences and toxicology. This was a very successful event that used fun and interactive ways to teach science.

Toxicology volunteers from SRI, local pharmaceutical companies, Berkeley University, and government, as well as ToxSA from Berkeley University provided tremendous support. ToxSA Berkeley students are all in light or dark blue T-shirts and were led by ChenChen Han (8th from the left). From left to right: Kyuri Kim from SRI (3rd person), Leigh Ann Burns from Gilead (4th person), Tao Wang from Novartis and WIT representative (5th person) and Toufan Parman from SRI (9th person), Hua Shen from Berkeley U. (13th person), and Sille Fenna from Berkeley U. (14th person). Many volunteers are not present in this picture.

The event was open to the public and over 400 kids attended the event. The event was funded by the National SOT.

This year, I organized a 7-8 grade hands on science day event for a couple of local Girl Scout troops. The event was funded by NorCal SOT chapter and Women in Toxicology (WIT) specialty interest group of the SOT. The ToxSA Berkeley student designed, developed and taught the hands on experiments in a fun, interactive, energetic and friendly environment. Toxicologist from government, biotech, and pharmaceutical companies were present during this event and spoke with the girls about their profession, why they were interested in science and the import of science in the field of toxicology. Approximately 30 girl scouts attended this event and all Girl Scout attendees expressed interest in teaching what they learnt to the younger troops next year, if given the opportunity. It was very rewarding to see the sparkle in the girls' eyes as they learnt about dose-response, pH and its role in environment, and household hazards. It was fun and rewarding to see these young minds try to figure out the effect of energy drinks (caffeine) on the worms. We even managed to involve some of the parents. At the end of the program parents mingled with the toxicologists and asked question about toxicology and possible career opportunities in the area of toxicological sciences.

At the event, toxicologists explained the concept of concentration and dose-response relationship. Under the guidance of ToxSA Berkeley undergraduate students and toxicology volunteers, 7th and 8th graders prepared different concentrations of caffeine and determined the effect of this compound on black worms' behavior.

I have found the NorCal and National SOT outreach programs so rewarding that I would like to pursue the possibility of setting up a bigger science day event with Girl Scouts to attract more troops. I enjoy every opportunity to encourage kids to explore and have fun with science, and teach them how to work together to solve scientific problems.

Improving science education in schools will require not only the support from government and educators but also from the community at large. If you are interested in getting involved in education outreach, but don't know where to start or if you already are involved and have some tips or favorite resources to share, please post your questions or suggestions in the comments section below so we can join forces.

The Society of Toxicology Education Committee has ways to help support these types of opportunities, and for K-12 in particular a website of ideas, experiments, and how-to's is available on the SOT site to get you started. You can read more about the Science Education in Bay Area Elementary schools by looking up the references or at this link: http://www.lawrencehallofscience.org/rea/bayareastudy/

My special gratitude goes to all the volunteer scientists (Kyuri Kim, Kathila Rajapaksa, Leigh Ann Burns, Tao Wang, Hu Shen, Sille Fenna, Rudd Colette, Amy Kim), and particularly ToxSA students from University of Berkeley. Without their support this event would not have been possible.

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Student Outreach – Focus on Career

NorCal SOT has been responding to student and postdoc requests for more information on toxicology careers in academia, industry, consulting, and government. As such we're continuing highly-successful events, such as "Speed Mentoring" held last year at UC-Berkeley, in additional regions to facilitate student engagement locally. We are excited for the upcoming UC-Davis event Kathryn details in the following section and are working on additional events at UC-Santa Cruz later this fall and San Jose State following shortly thereafter. We recognize there are additional regions for outreach and are looking forward to future events driven by local student interest.

Part of the strategy is facilitating student leadership of these events, and as such we are building a Student Outreach Committee to facilitate communication and liaise NorCal SOT members with local students and their institutions. Several inaugural members have been identified, but we're still in the growth and development phase and are looking forward to additional student representatives from area institutions. Participation is primarily focused on graduate students and postdocs, but aspiring undergraduates with interest in career choice are encouraged to reach out as well. If you are interested in participating as a student or academic advisor for your institution, please contact Sandra Chang, Kathryn Page, or Eric Harstad.

Eric: harstad.eric@gene.com

Sandra: sndchang@ucdavis.edu

Kathryn: kpage@berkeley.edu

Speed Mentoring
NorCal SOT is hosting a 'Speed-Mentoring' event
Tuesday October 1st
6-9 pm, Sudwerk, 2001 2nd St, Davis, CA 95618 (Davis)
On-line registration is now open!!!

The idea is similar to speed-dating, except with an emphasis on careers in toxicology. Mentors will remain in their seats, while mentees rotate from person-to-person at the sound of a bell. Each conversation will be limited to 3 minutes, with participants encouraged to discuss their work, how they got started and progressed, and what their scientific interests/goals are. Although it will be a fast-paced and energetic event, the night will conclude with a relaxing social hour to allow participants to re-visit contacts or meet with those they missed. The event will include students (undergraduate and graduate), post-docs and toxicology professionals from all over the Bay Area. It will be an excellent opportunity, especially for students, to learn about the diverse career opportunities in government, academia, industry and consulting and can also serve as a way to hone interviewing skills.

For more information on this event, please email Kathryn at kpage@berkeley.edu
Go to our website now to register!!

Postdoc / Student Updates

News, events and updates from your NorCal SOT student and postdoc representatives.
Thank you to Marianna Stamou and Tami Swenson who have passed the torch onto a new face for this year's student rep; Kathryn Page will be your postdoc rep for another year. Here is the Nor Cal SOT info you are going to need to get the most out of your student and postdoc memberships.

Please welcome your new student rep:

Sandra Chang, Student Representative (UC Davis)

I am a graduate student of the Pharmacology and Toxicology Graduate Program at UC Davis. My research in Dr. Richart W. Harper's laboratory is focused on how the NADPH oxidase, dual oxidase, influences the lung. I conducted my undergraduate studies in Environmental Toxicology at UC Davis and I have been a member of SOT since 2007.

Upcoming events

With last year's mentoring events being a huge success we are increasing our output and hoping to bring you more networking, mentorship, and career building opportunities. We will be having not one but two speed mentoring events, the first to be held at Sudwerks Brewery in Davis on October 1st. The set up will be like last time where students rotate round a panel of mentors for one on one 3-minute chats, followed by a social hour to revisit mentors they just

met or start conversations with new mentors. Registration is limited so sign up now (link is on the NorCal website)!! We are also organizing a career day in the San Jose/Santa Cruz area to promote SOT and toxicology careers at campuses in those areas. As always, the Fall and Spring symposiums will include "Chat with an Expert" during the lunch session, so don't forget to sign up when you register!!

Thanks for your time, and we look forward to meeting you at the NorCal SOT Fall Symposium. Don't forget to sign up for Speed Mentoring!!
Reps out!

Kathryn and Sandra

Career Corner: Interested in a Career in Risk Assessment?

J. Caroline English, PhD, DABT, NorCal SOT Councilor, jenglish@nsf.org

Risk assessment is central to what we do as toxicologists. Whether directly or indirectly—the goal of our discipline is to apply research knowledge towards assessing and characterizing the potential for adverse chemical effects in order to protect human and ecological health. Regulatory decisions, such as setting drinking water standards or cleaning up hazardous waste sites, rely on human health and environmental risk assessments. Students and postdocs often do not receive formal training in this area. If you are interested in a career in risk assessment, here are some ideas for you:

- Join the Society of Toxicology (SOT) (www.toxicology.org) as a student or post doctoral member.
- Join SOT's Risk Assessment Specialty Section (RASS) and note the seminars that they offer on-line. See http://www.toxicology.org/ISOT/SS/RiskAssess/index.asp Attend the RASS mixer at the SOT meeting.
- Look for and take a continuing education course on the fundamentals of risk assessment.
- Become an active, supportive member of the Northern California Chapter of the SOT.
- Join the Society for Risk Analysis (SRA) Dose-Response Specialty Group and note the on-line seminars they offer. Go to www.SRA.org; look under "About SRA", and then under "Specialty Groups."
- Consider attending the SRA annual meeting (the next one will be held in Baltimore, MD, December 8-11, 2013) and peruse some volumes of their journal, Risk Analysis.
- Consider attending the Toxicology and Risk Assessment Conference (TRAC) in Cincinnati Ohio. The next conference is April 7-10, 2014. http://www.cdc.gov/niosh/conferences/TRAC/default.html

- Suggest to your department to add a speaker on Risk Assessment to your departmental seminar series, and/or invite a guest lecturer in Risk Assessment as part of Pharmacology or Toxicology course work.

About me and my employer

I am a toxicologist. I have a Ph.D. from the University of Rochester (Pharmacology and Toxicology). My B.S. is in Biology, and M.S. degree is in Environmental Toxicology. I am certified by the American Board of Toxicology (DABT). My interests are in quantitative health risk assessment, food and dietary ingredient safety, drinking water and green chemistry/ alternatives assessments. I began my career at the Eastman Kodak Company Health and Environment Laboratories, where I started out as study director for GLP toxicology and metabolism studies. I designed and oversaw research and testing programs to support product development and stewardship. As an early participant in the U.S. EPA's sustainable futures initiative, we used risk screening models in predictive toxicology to support the economical development of safer new chemicals. For 10 years I served as adjunct faculty in the University of Rochester's Department of Environmental Medicine and subsequently as a member of the University's Environmental Health Sciences Center External Advisory Board. I've authored a few dozen peer-reviewed publications and risk assessments, and a book chapter on Metabolism and Toxicokinetics.

As a full member of the Society of Toxicology (SOT) since 1993, I've had the privilege of serving on the executive boards of the Risk Assessment Specialty Section, and the Michigan and NorCal Regional Chapters. After relocating to the Bay Area a few years ago, I've found that NorCal SOT has much to offer with outstanding local scientific meetings on contemporary topics and many other great programs that are described in this newsletter. It's a wonderful forum for meeting other NorCal scientists, which I look forward to at each of the biannual symposia. I'm also enjoying working with the NorCal Executive Committee to continue to advance SOT's strategic priorities.

My current employer is NSF International, which is an independent, not-for-profit, nongovernmental organization, that tests and certifies products and writes standards for food, water, dietary supplements and consumer goods to protect public health, safety, and the environment (www.nsf.org). Founded in 1944 out of the University of Michigan School of Public Health, and headquartered in Ann Arbor, NSF is now a global enterprise and a World Health Organization Collaborating Centre for Food and Water Safety and Indoor Environment. When a non-regulated substance is identified as a direct or indirect drinking water additive, NSF conducts a risk assessment according to U.S. EPA risk assessment guidelines, many of which can be found at http://www.epa.gov/risk/guidance.htm .

Two key elements of a risk assessment are 1) choosing the critical effect – the adverse outcome that occurs at the lowest dose, and 2) the dose-response assessment. When the critical effect is identified, we are interested in predicting human exposures that are without increased risk of adverse effects, when encountered over a lifetime. The dose-response assessment is usually accomplished using benchmark dose modeling, and the U.S. EPA has made downloadable software and an instruction manual that are freely available at: http://www.epa.gov/ncea/bmds/bmds_training/methodology/intro.htm

Final risk values incorporate all available information related to environmental exposure sources and levels. After internal review, our risk assessments are independently reviewed by the external NSF Health Advisory Board, which is a panel of world-renowned toxicology experts from government, industry, and academia, who serve on a voluntary basis. The final risk assessment document is then published and listed in the International Toxicity Estimates for Risk Assessment (ITER) website http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?iter, a publicly available database of independently reviewed risk assessments, such as from U.S. EPA and Health Canada, that can be accessed through the National Library of Medicine website.

Through this brief introduction to risk assessment, perhaps you can begin to see how your respective research projects can contribute to the risk assessment process and the protection of human and environmental health. If you are trying to decide if a career in risk assessment is right for you, you could start by checking out some of the documents and links referenced, and by attending the upcoming NorCal SOT symposium.

This article was inspired by Drs. John Lipscomb and David Szabo

In Memorium

Karen Louise Steinmetz, Ph.D., D.A.B.T., passed away on August 19, 2013 after a year-long battle with uterine cancer. Karen graduated from UC-Davis with a B.S. in psychology in 1980. After a brief period working at Syntex, she joined SRI International's Life Sciences Division in February of 1982 as a Biological Technician, and quickly rose through the organization, becoming the first non-Ph.D. in the Division's history to be promoted into the scientist category. She developed and published on new assays for measurement of genotoxicity in pancreatic cells, cell proliferation assays as an indicator of carcinogenesis, human hepatocyte assays, and seminal papers on the mechanism of carcinogenicity of methapyrilene and paradichlorobenzene. While working at SRI full-time she obtained her M.A. in toxicology from San Jose State University in 1986.

In 1991, Karen left SRI to enter a doctoral program at Indiana University in the laboratory of Dr. Jim Klaunig. She conducted research on the role of transforming growth factor-α in liver carcinogenesis. She received her Ph.D. in 1996, followed by a postdoctoral fellowship in the lab of Dr. Henry Pitot at the McArdle Laboratory for Cancer Research at the University of Wisconsin. After completing her postdoc, Karen returned to the San Francisco Bay Area where she held positions as Toxicologist at Alza Corporation; Head of the Toxicology and Pharmacology Group at Xenogen Corporation; and Associate Director of Toxicology at Sugen Inc. She rejoined SRI as Director of Mammalian Toxicology in 2003, where she won several important new contracts, including a NIA-funded program for preclinical development of drugs for treatment of Alzheimer's disease, and a NICHD-funded program for development of new contraceptive drugs. She became widely known and respected in a broad range of fields including cancer models, Alzheimer's disease, neurotoxicity testing and juvenile animal models. She served as President of the Northern California Chapter of the Society of Toxicology.

Karen was an avid outdoors enthusiast, having white water rafted rivers on several continents, often telling stories of dodging hippos on the Zambezi River, or catching rattlesnakes on the Upper American River. She was also an accomplished pianist and artist, as well as a devoted supporter of public television, often working phone banks during station KQED's pledge drives.

Karen is survived by her devoted husband Peter and step-children Alexander, and Cassandra, and her loving mother Carolyn, sister Kristin, brother Erik, and nephew Andrew. In lieu of flowers, Karen has requested that donations be made to KQED public television station or to the charity of your choice.

Other Upcoming Events

Register Now! Charles River Symposium-September 9-11 2013

Location: Hilton Carlsbad Oceanfront Resort & Spa
1 Ponto Road
Carlsbad, CA 92011
760-602-0800

SYMPOSIUM INFORMATION
Registration Fee: $1095
Online Registration

Please contact Lisa Antolick at 781.222.6111 or lisa.antolick@crl.com if you have any questions.