AChemS
Association for Chemoreception Sciences
ANNUAL Newsletter
2014
FOSTERING CHEMICAL SENSES RESEARCH AND UNDERSTANDING SMELL AND TASTE IN HEALTH AND DISEASE

# MESSAGE FROM THE PRESIDENT

John Glendinning, PhD

I am happy to report that AChemS is thriving. The finances of the Society are strong, attendance at our upcoming meeting is looking robust, and despite a difficult funding environment, our members are continuing to make important advances in chemosensory biology. It is incredible to think that Max Mozell's simple idea—to create a Society of scientists interested in the chemical senses—has developed over the past 36 years into such a vital and self-sustaining entity. This is due in large part to the many small and large selfless actions of our members: serving on committees, running for office, reviewing papers for *Chemical Senses* and organizing symposia.

**Upcoming Annual Meeting**

I hope all of you share my excitement about the upcoming meeting in Bonita Springs, Florida. After a winter filled with polar vortices and incessant snow storms, I am eagerly anticipating the lush vegetation and sunny beaches of south Florida. I am also excited about the prospect of ending our 4-year quest for a new "home." The Hyatt Coconut Point is a beautiful site with many amenities on their 26 acres, including a private beach, a well-appointed spa, tennis courts, 18 holes of golf, kayaking through mangroves, and lots of restaurants both on-site and within a short drive or shuttle ride. Plus, the hotel is a mere 20 minute drive to Southwest Florida International Airport.

Steve Munger and the Program Committee have developed an exciting scientific program, with symposia that span the diverse interests of our membership. Because the Program Committee has staggered the symposia and poster sessions, you will be able to enjoy both types of sessions without having to run back and forth between them. To jazz up the evening poster sessions, there will be a cash bar. Finally, based on overwhelming feedback from the membership, we have returned the banquet to the opening night. So, please arrive early enough to enjoy the good food, socializing and awards ceremony.

**Executive Committee Actions**

Your Executive Committee (EC) (Debra Fadool, Rachel Hertz, Christiane Linster, Timothy McClintock, Steven Munger, Julie Mennella, Dana Small, Alan Spector, Joe Travers, and I) has been busy over the past year.

- We asked the Secretary, Julie Mennella, to create a Website Committee and upgrade our website. After lots of work, the committee has developed a site that will feature easier navigation, improved aesthetics, and better content organization. They hope to launch the site just prior to the Annual Meeting.
- We are in the process of updating the Society Bylaws. The goal is to make them more comprehensible and conform to how we run our Society in 2014. The entire membership will be asked to vote on the Bylaw changes during the Business Meeting at the Annual Meeting. I encourage you to attend this meeting and cast your vote.
- As part of the Bylaw changes, we are proposing to make the Chemosenosry Enterprise and Mentorship Alliance (ChEMA) an official Standing Committee. We are also proposing to simplify its name to the "Mentorship/ Networking Committee." Suzanne Sollars created this committee over a decade ago, and has worked tirelessly to nurture and expand its mission. She is to be commended for her hard work. Please try to get involved in the Mentoring/Networking Social at the Annual Meeting.

*continued on next page*

- We have been working with the new Chair of the Industry Liaison Committee (ILC), Chris Simons, and his committee to increase the relevance of the Annual Meeting to industry, and create stronger links between our industry and academic members. Please attend the upcoming Industry Workshop to learn about their efforts. On a parenthetical note, Michael Meredith served as Chair of the ILC for nearly a decade, and created many memorable Industrial Symposia. I want to thank him for his outstanding work and tireless dedication.
- You might have noticed (while submitting your meeting abstract) that we instituted a financial conflict of interest policy. This was done to ensure that everyone identifies any real or apparent conflicts of interest with respect to the content their submitted abstracts.

**Money Matters**

Under the careful watch of our Treasurer, Joe Travers, and the Finance Committee, our cash reserve fund has grown steadily over the past year. Its current market value is about $530K. This cash reserve buffers AChemS against tough times that we might encounter in the future. After much deliberation, we voted to allow our investment portfolio manager to diversify our cash reserves by including more stocks. This action should provide him with more flexibility to take advantage of the current financial environment.

We are all indebted to Barry Ache and Judith van Houten for once again preparing a successful renewal of our NIH/NIDCD meeting grant. The grant had two specific aims: (a) help bring outside scientists to the Annual Meeting and (b) increase the participation of under-represented individuals, persons with disabilities, and veterans. As the grant will provide AChemS with $40K/year over the next five years, it will substantially increase the quality of the scientific program and scope of our outreach at the Annual Meeting. As a show of gratitude, I encourage you to buy Barry or Judith a drink at one of the evening poster sessions.

I would be remiss if I did not acknowledge two additional revenue streams. We receive generous donations from our industry sponsors to support awards and events at the Annual Meeting, and from the Polak Family to support travel and housing awards for graduate students and postdocs at the Annual Meeting.

In closing, I want to say that it has been a pleasure and honor to serve AChemS as its President. One of benefits of this position is that you get to observe firsthand how much work occurs behind the scenes to make our Society function so smoothly. The dedication and passion of the people serving on our committees has been truly inspiring. You also learn to appreciate the invaluable contributions of Tisha Kehn and Leslie Orvedahl from the Executive Office. Without them, the Society would succumb to entropy. If you did not pre-register for the upcoming Annual Meeting, you can still do so onsite. I look forward to seeing all of you in Bonita Springs!

# CHEMICAL SENSES REPORT

Wolfgang Meyerhof, PhD, *Editor*

*Statistics (2013):*

| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|
| **Impact factor** | 1.896 | 3.041 | 3.031 | 2.327 | 2.599 | 3.222 | — | — |
| **Original submissions** | 141 | 145 | 194 | 218 | 161 | 147 | **141*#** | **23** |
| **Avg. time from submission to 1st decision** | 33.53 days | 31.32 days | 27.43 days | 27.62 days | 29 days | 35 days | **33 days+** | — |
| **Avg. time from submission to final decision** | 106.63 days | 81.57 days | 69.57 days | 70.3 days | 100 days | 95 days | **82+** | — |
| **Accepted articles** | 91 | 73 | 74 | 96 | 77 | 62 | **65** | — |
| **Accept ratio** | **62.32%** | **51.77%** | **46.54%** | **46.15%** | **48%** | **42%** | **46%** | — |

**133 original articles, 4 review articles, 3 commentaries, 1 letter*

*#No. of submissions: Unites States > Germany > Japan = China > India > France > Canada = Italy = UK > 22 other countries; + time required by authors to prepare revisions not included*

*Submission rate constantly low (current submissions 113)*

*Rearrangement of editorial board: in process*

## COUNCILOR'S REPORT

Christiane Linster, PhD and Rachel Herz, PhD, *Councilors*

The Association tries its best to continuously support the attendance of students and young scientists to our Annual Meeting. This year, AChemS will provide support to 62 domestic and international students through either the Housing or the Travel Award. The Councilors have also selected 5 junior investigators to receive the Polak Postdoctoral Travel Award among thirteen applicants.

Now that we will be back in Florida for the foreseeable future we hope to be able to begin outreach programs again. We will begin to explore possibilities for chemosensory science educational opportunities and venues in the surrounding communities of Bonita Springs at this year's meeting.

## INDUSTRY LIAISON COMMITTEE REPORT

Christopher Simons, PhD, *Chair, Industry Liaison Committee*

The Industrial Liaison Committee (ILC) has re-organized to include both academic and industrial members. Current membership includes Tom Finger, PhD (University of Colorado, Denver), Linda Flammer, PhD (PepsiCo), Rachel Herz, PhD (Brown University), Bob Margolskee, MD, PhD (Monell Chemical Senses Center), Nancy Rawson, PhD (AFB International), Jay Slack, PhD (Givaudan Flavors Corp.) and Christopher Simons, PhD, Chair (The Ohio State University). Sincere thanks go out to Michael Meredith, PhD and previous committee members for their past dedication and commitment to the ILC.

The ILC has been hard at work organizing for the upcoming Industry Workshop to be held on Thursday, April 10 from 2-4 at the AChemS Annual Meeting. This year's Workshop will focus on Open Innovation and how both industry and academic members can benefit from this sponsored research paradigm. The line-up of speakers will include Susan Ward, PhD, President of ITECS-Innovative Consulting, Greg Yep, PhD, Senior Vice President of R&D at PepsiCo, and Gary Beauchamp, PhD, Director and Member of Monell Chemical Senses Center. Please make sure you plan your schedule so you can attend this exciting and informative event!

In addition, the ILC has completed the annual AChemS Sponsorship Campaign. New benefits were added to the various sponsorship levels. At the Diamond, Platinum & Gold levels, sponsors receive a complimentary recruitment and/or tradeshow booth that can be used for advertising, promotional and/or recruitment purposes. Additionally, all support levels may participate in Industry Breakfast Corners on Thursday morning. A reserved and highly visible table with signage will be provided during the Thursday morning breakfast to offer sponsors a structured opportunity to network with academic and government colleagues, student attendees and other industry professionals. Please be sure to visit our industry partners and thank them for their support. More information regarding the Breakfast Corners will be sent out to attendees prior to the meeting, so you can plan your networking visits.

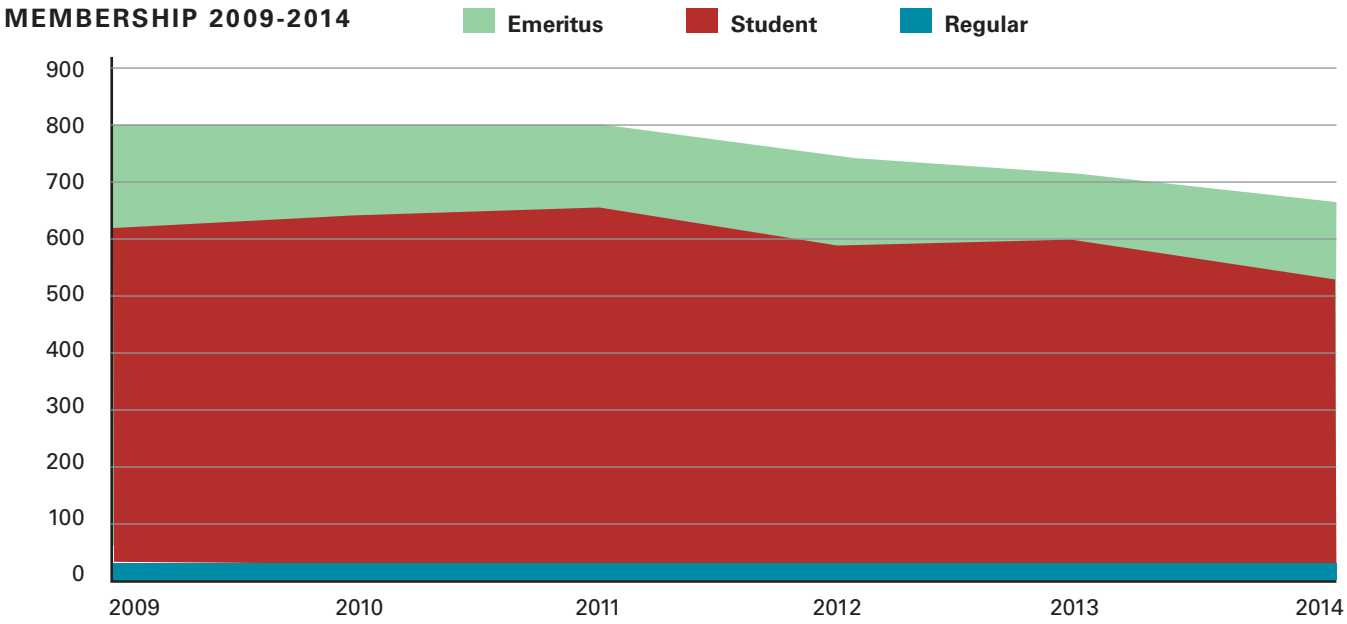
Sustaining AChemS sponsors include Givaudan, PepsiCo, International Flavors & Fragrances (IFF), Ajinomoto, KAO, and Moskowitz-Jacobs. This year we are excited to welcome back Arylessence, Tate & Lyle and Unilever as second time supporters and Sensonics International who, in addition to exhibiting, is a first time meeting sponsor this year. Please help me give a warm thank you to these industry sponsors without whom, the AChemS Annual Meeting would be a vastly different event!

Following the Arctic Vortex that enveloped much of the US, Florida is sounding mighty good—I look forward to seeing you there!

# MEMBERSHIP REPORT

Submitted by: Dana Small, *Membership Chair*

**Membership Totals:**
Membership was stable from 2009 to 2011. In 2012 we moved to the west coast in hopes of increasing our Asian and west coast contingency. Unfortunately this did not happen. West coast and Asian membership declined in step with all other regions. In 2011 we had 802 members in good standing. This dropped to 727 in 2012 and 687 in 2013. Here is the good news. Compared to this time last year we are UP by 11% from 598 to 661. If we add in the ~100 enrollments expected at the annual meeting we are almost back to 2011 levels. In short, our membership totals suggest our society favors the warm Florida climate in April. Let's hope the weather holds!




# TREASURER'S REPORT

Joseph Travers, PhD

The financial status of AChemS is fundamentally sound. A review by the independent auditors conducted in June 2013 indicated that AChemS assets declined by approximately $33K. This was less than the previous year's decline of $37K and is primarily attributable to a 24% reduction in attendance at our Annual Meeting. Although the decline of $33K represents only 6% of our total assets, it prompted a modest increase in both registration and abstract fees for the upcoming Annual Meeting. Projected attendance at this year's meeting, based on submitted abstracts, suggests that Annual Meeting expenses should at least break even with revenue. UBS is now managing approximately $322K of AChemS assets. Since inception in December of 2011, the value of the portfolio has increased by approximately $25K.

# PROGRAM CHAIR'S REPORT

Steven Munger, *Program Chair*

The 36th Annual Meeting of the Association for Chemoreception Sciences will mark a return to Florida, albeit at a new venue: the Hyatt Regency Coconut Point in Bonita Springs, FL. The Annual Meeting will open at 5:00 pm on Wednesday, April 9th with brief opening remarks, announcements of award winners, the Givaudan Lecture (presented by Dr. Richard Lifton, Yale University) and the Opening Banquet. The Annual Meeting will run through the final symposium and poster sessions scheduled for the evening of Saturday, April 12th. There are no scheduled activities on Sunday.

This year brings a number of changes to the Annual Meeting. They include the following:

- There will be 13 total symposia, including 10 symposia proposed by AChemS members; and a revamped Clinical Symposium (a series of presentations on the inclusion of the chemical senses in NHANES that replaces the ticketed Clinical Luncheon from previous meetings). The Presidential Symposium and Polak Young Investigator Award Symposium remain popular components of the Annual Meeting program.
- The 10 member-led symposia will run in five concurrent sessions spread throughout the meeting, increasing the likelihood that every member will find a symposium of interest in each session. This arrangement will also ensure that the poster sessions will not have scientific competition. Because each symposium will have the same number of speakers and the same schedule for their talks, it should be relatively easy for audience members to move back and forth between concurrent symposia.
- "Gustation" and "Olfaction" platform sessions, which had included short talks selected from submitted abstracts were eliminated in favor of including short talks (selected from the submitted abstracts) in each of the member-initiated symposia. The goal here was to maintain speaker diversity (especially including junior scientists) while offering a more cohesive program.
- Poster sessions will be two hours each, but posters will remain up for the full day (as in recent meetings). There is a cash bar available in the poster area for the evening sessions.
- A new Industry Workshop will include a panel of academic and industry members who will discuss the Open Alliance model for industry-academia collaborations.
- There will be an unscheduled Friday afternoon, giving attendees time to meet with collaborators or to just relax on the beach.

To date, membership participation has been impressive. A total of 386 abstracts have been accepted for the meeting, a 22% increase over 2013. Twenty-seven symposium proposals were submitted by our members, almost all of which could have been excellent additions to the program. The Program Committee selected ten proposals that were not only scientifically strong but which would bring novelty, balance and diversity (in sensory system, approach, and speakers) to the program. I strongly encourage members whose proposals were not selected to revise them (if they like) and submit them for the 2015 Annual Meeting.

Several changes were made to the proposal process that I believe contributed to the increase in the number and quality of submissions and also facilitated review by the Program Committee. These include a relatively early (July) call for proposals; additional personal entreaties (a.k.a., arm-twisting) to a number of AChemS members to make proposals in their areas of interest; a common format for proposals; and a prescribed number of speakers (three invited long talks, and one short talk selected from general abstracts). Speakers from outside the chemical senses community were strongly encouraged for each symposium.

I believe that advertising the selected symposia and the preliminary meeting program early (prior to the October Call for Abstracts) has helped to build enthusiasm for the Annual Meeting, though this is only anecdotal. In times of tight grant dollars and interdisciplinary research, AChemS can no longer assume that our Annual Meeting will always be the first choice for our field. I strongly encourage future Program Chairs to communicate the scientific content of the meeting to our membership early and often.

Finally, I would like to thank the Program Committee for all its hard work, especially in reviewing symposium proposals and submitted abstracts. They were thoughtful in their contributions and timely in their duties, and I very much enjoyed the opportunity to work with them all. I am sure more than one of them will be Program Chair in the near future.

## Focusing on multimodal sensory integration processes with regards to food and their packaging and presentation — a new fund for market-oriented and applied research

The sensory analysis of staple and luxury foods is currently only performed in a relatively one-dimensional way with the focus on analysis of odor, taste, or texture. In daily life, however, we seldom encounter unisensory sensations in isolation, but rather experience multisensory stimulation. For example, the smell of brewing coffee is usually accompanied by the sound of a coffee machine or the sight of the coffee packaging. It is therefore necessary to consider the various combinations of sensory stimuli associated with foods and their packaging and presentation form and to characterize the key principles of multimodal sensory integration in people when they choose and eat food.

The Fraunhofer-Gesellschaft, Europe's largest organization for applied research has recognized this development and installed the Fraunhofer Attract group Multisense ("Multimodal sensory integration processes with regards to food and their packaging and presentation"). The Fraunhofer Attract programme is an excellence stipend programme that funds innovative ideas for product-oriented research and industry-oriented development work. This programme offers outstanding scientists to promote their ideas with the focus on an actual application in the market. The scientist is offered a position as a research group leader with a budget of 2.5 Million Euros for 5 years. More information about the funding program can be found here: http://www.fraunhofer.de/en/jobs-career/fraunhofer-attract.html

The focus of the MultiSense project is on the holistic perception and characterization of sensory parameters for evaluating foods and developing of staple foods, luxury products, and cosmetics. Our goal is to carry out market-oriented pre-competitive research in order to study and understand the physiological and psychological processes taking place when choosing and eating foods and when using cosmetic products. Multisensory stimulation scenarios will be employed to achieve a multidimensional, holistic perception of real-life and ecologically relevant stimuli. Also, a wide range of analytical methods will be used. This will include chemical-structural methods, physiological evaluation, and psychological-emotional analyses. We thereby wish to bridge the gap between the analysis and description of product properties including their direct sensory perception and to understand the complex integration, interpretation, and evaluation processes and the influence on people's mood.

**For more information, please contact Jessica Freiherr at jessica.freiherr@ivv.fraunhofer.de or http://www.ivv.fraunhofer.de/en.html.**

# Join us for the ChEMA/Mentoring Social

## Thursday, April 10
## 4:00 – 5:30 p.m.
## Estero Ballroom Terrace/Royal Palm Courtyard
## Hyatt Coconut Point, Bonita Springs, FL

The weather warm and sunny, the company insightful and cheery: another successful ChEMA Social at last year's AChemS conference. With over 100 in attendance, we met to share stories, network, mentor and be mentored, and just have some relaxation, fun, food and beverage. We'll be gathering again in Florida at a lovely outdoor venue, definitely with congenial colleagues, hopefully with great weather. We are the mentorship and networking group within AChemS designed for those who have obtained an advanced degree (e.g., Ph.D., MD, DDS, DVM, terminal Master's) within the previous 10 years. If you are in this category, we invite you to be a member of our group!

While a principal goal of our group is mentoring, we also provide a focused mechanism for you to build long-term career networks while in the early stages of your career. Having a social during the Annual Meeting provides you with a home base to network with peers who are in the same career stage while being introduced to colleagues a little further into their careers. There can be something reassuring about knowing others are in the same boat as you, and talking to many who have successfully negotiated the waters.

If you have ideas of programing that you would like to see happen, then please contact the Mentoring/Networking Committee (info@achems.org). We welcome you to attend our Social on Thursday, April 10 from 4:00 – 5:30 at the Hyatt Coconut Point, Bonita Springs, FL. There will be light snacks, beer and non-alcoholic beverages, provided free of charge. Even if you didn't check the attendance box during conference registration, you're still welcome to attend. Hope to see you there!

*— Suzanne Sollars, PhD*

# Rose Marie Pangborn Sensory Science Scholarship

One $15,000 Sensory Science Scholarship will be awarded for the 2014-2015 academic year to support a Ph.D. student who intends to teach and conduct research in the area of sensory science at the University level. This scholarship is awarded in honor of the memory of Professor Rose Marie Pangborn, who initiated the scholarship fund to encourage the education of Sensory Scientists intending to pursue academic careers.

Applicants for the scholarship must be enrolled in a Ph. D. Program such as Food Science, Nutrition, Psychology or Physiology. The planned or on-going dissertation research must be on a sensory topic under the guidance of a sensory scientist. Candidates will be evaluated on the basis of their academic record, intended research in human sensory science, commitment to a career in teaching in the field of sensory science, and support determined by letters of recommendation. The Board of Directors of the Sensory Science Scholarship Fund (SSSF) will determine policies governing the award and will select recipients.

Applications, including all required documentation must be postmarked no later than May, 16, 2014.

For additional information and application forms contact

Dr. Rick Mattes, Purdue University
Department of Nutrition Science
700 W. State St., W.
Lafayette, IN 47907-2059

USA PHONE — 765-494-0662
FAX — 765-494-0674
EMAIL — mattes@purdue.edu

**Application forms are also downloadable at:**

**http://www.purdue.edu/hhs/sensorysciencescholarship/**

**Past recipients include:** Cordelia Running, Nuala Bobowski, Erin Green, Melinda Murray, Michael Nestrud, Karen Ann Lusk (Hein), Gaston Ares, Martha Bajec, John Hayes, Derek Snyder, Cheryl Armstrong, Zuzana Drobna, Terri Rosett, Nicolette van der Klaauw, Sophie Bonnans, Jeannine Delwiche, Liz Gwartney, Thomas Heinbockel, Andrew Smith, Barbara Guggenbühl, Elba Cubero-Castillo, Randy Lee, and Lotika Bhatia Savant.

## 2013 ACHEMS

# *Award Ceremony*

**Wolfgang Meyerhof, PhD**

## *International Flavors & Fragrances (IFF) Award Winner*

**Research Focus**

My interest in taste research is a logical extension of my prior activities in the area of G protein-coupled receptors and their neuroendocrine functions. When I searched for new research opportunities after joining the German Institute of Human Nutrition, it became obvious to me soon that nutrition starts with the interaction of food ingredients with by then unknown taste receptors. Since then my laboratory in collaboration with others was interested in understanding the receptor basis of taste. After their initial discovery we established functional expression assays for taste receptors. This allowed us to identify cognate compounds for most of the human bitter taste receptors as well as receptor-specific antagonists and new taste-active compounds for sweet or umami taste receptors in human. Currently, we extend these activities to other vertebrate species.

Undoubtedly, bitter blockers appear promising research tools in order to identify the individual contribution of a particular receptor to a bitter response or to other physiological responses in the case of bitter receptors present in extragustatory cells. Based on the widespread distribution of taste receptors, taste modulators could be potentially useful alternative drugs to treat multiplicity of disease states. The receptor assays also enabled us to take insights into the receptors' binding sites and function. Based on the receptors' pharmacology we were able to explain quite complex sensory experiences such as bitter off-tastes of sweeteners and sweet water taste. We also examine genetic variability in taste receptor genes to explain the observed perceptual differences in the population and to assess to what extent genetic variation in taste affects food preferences. Currently, we examine functional organization of taste receptor cells and gustatory transmission and processing in genetically engineered strains of mice.

**Key Discoveries**

My laboratory determined the molecular receptive ranges and functional principles of the human bitter taste receptors. A combination of very broadly tuned receptors, receptors with an intermediate number of agonists, and specialist receptors as well as two that recognize common chemical substructures in numerous substances explains how humans detect the countless bitter compounds. We also found specific bitter taste receptor antagonists useful for delineating the contribution of individual receptors to a bitter response. Further, we demonstrated that genetic variability accounts for perceptual differences of bitterness in the population which impacts on ingestive behavior.

**Acknowledgements**

First of all I would like to thank my coworkers and collaborators who created a stimulating and enthusiastic environment and whose valuable contributions were indispensable for my research. Second, I am grateful to my Institute and sponsors for providing the long-term logistics necessary to establish ambitious research programs. Third, I thank the taste research community for supporting me when I accessed the field as a newcomer some 12 years back. Finally, I am indebted to the Awards Committee for this great honor and to International Flavor and Fragrances Inc. for sponsoring the prize.

**Stuart Firestein, PhD**

## *Max Mozell Award Winner*

**Research Program**

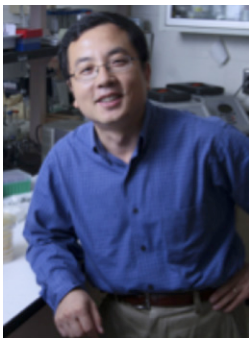
My laboratory investigates the mechanisms used by the vertebrate olfactory system to detect and discriminate between a vast array of small molecules, odors. This simple question however leads us into the fields of chemistry, pharmacology, neural development and local circuit processing. Finally we hope to answer that fundamental human question — how do I smell?

**Key Discoveries**

- Discovery of the first ligand-receptor pair (I7 and octanal)
- Identification of the vast number of odor receptor genes as odor receptors through bioinformatics and microarrays
- Development of glomeruli is activity dependent
- But the most important discovery is still to come.

**Acknowledgements**

NIH for continued support; Charles Greer and Peter Mombaerts for collegiality well beyond the call of duty; Linda Buck for inviting me to Stockholm on one of the greatest nights of my life and for being a friend for many years; Gordon Shepherd for being the mentor everyone should have. Mostly, the long suffering and remarkably understanding members of my lab, past and present.



**Peihua Jiang, PhD**

## *Ajinomoto Award Winner*

**Research Interests**

Understanding the precise relationships among taste receptor structure, dietary choice and the associated metabolic pathways constitutes one of my two main research interests. Until recently, it was thought that all mammals — including humans — detect the same five basic tastes. Our work, along with the work of others, has shown that there are many exceptions to this general belief. Many mammalian species show specific taste loss due to the pseudogenization of taste receptor genes. Further, loss of taste receptor function appears directly related to a change in diet.

The other line of my research focuses on the identification and characterization of adult taste stem cells. Taste cells regenerate constantly during an animal's life, yet the identity of adult taste stem cells for replenishing taste epithelium has remained elusive.

We utilize a broad range of approaches in these studies, including molecular, genetic, cellular, computational and imaging techniques.

**Key Discoveries**

- Identified multiple ligand binding sites within the human sweet taste receptor T1R2/T1R3
- Characterized major taste gene loss in carnivorous mammals
- Determined identity of adult taste stem/progenitor cells

**Acknowledgements**

I would like to express my gratitude to the Ajinomoto Corporation and to the AChemS Award Committee for this honor. I want to thank Bob Margolskee for introducing me to the taste field, his mentoring as my postdoctoral adviser and his continuing support and guidance. I also would like to thank many friends, colleagues and fellow AChemS members for their help at every stage of my career, including Gary Beauchamp, Danielle Reed, Mike Tordoff, Paul Breslin, Joe Brand, Leslie Stein and Xia Li, as well as many others I do not have space to cite. I am deeply grateful to NIH-NIDCD for ongoing support of my research program. I also want to thank the PA state fund, the Charles H. Revson Foundation and the Ambrose Monell Foundation for their financial support at various stages of my career.

**Wen Li, PhD**

## *Moskowitz-Jacobs Award Winner*

**Research Program**

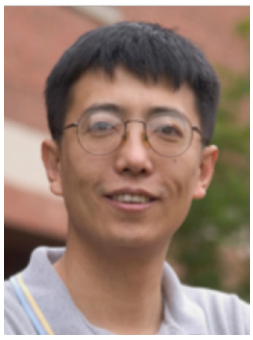
My research pertains to learning and plasticity in human olfactory encoding and how these processes interact with emotion processing. Applying a constellation of methods including psychophysics, functional magnetic resonance imaging (fMRI), brain event-related potentials (ERPs) and autonomic psychophysiology, I investigate mechanisms mediating the malleability and dynamics in odor object perception. Specific questions include perceptual learning via olfactory exposure, aversive learning via olfactory Pavlovian conditioning, and odor representational plasticity due to changes in the internal milieu or external sensory and affective contexts.

**Key discoveries**

Most important discoveries are 1) Aversive learning sharpens neural ensemble coding specificity in the piriform cortex, enabling perceptual discrimination of highly similar odor cues; 2) Olfactory exposure produces olfactory expertise via experience-dependent plasticity in human piriform and orbitofrontal cortices; and 3) Odor object coding in the piriform cortex is subject to various influences including limbic neuropathology and individual differences (e.g., threat sensitivity and anxiety).

**Acknowledgements**

I am deeply grateful to my postdoctoral mentor Dr. Jay A. Gottfried for introducing me to the exciting field of olfaction and providing outstanding training in neuroscience research. I also owe great gratitude to Drs. Ken A. Paller and Richard E. Zinbarg for the wonderful mentorship and nurturing environment throughout my graduate studies. I am thoroughly appreciative of the strong support from colleagues at the University of Wisconsin-Madison and the hard work of talented postdoctoral fellows, graduate students and staff that I have been fortunate to work with. Finally, I thank my loving family for the unconditional support in my pursuit of scientific truth and excellence.



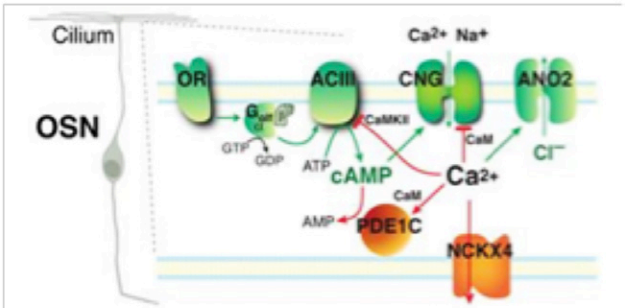
**Haiqing Zhao, PhD**

## *AChemS Young Investigator Award Winner*

**Research Program**

We are interested in the first step of olfaction — olfactory transduction, the process by which olfactory sensory neurons transform information of odorous chemicals into membrane potential changes. Our current research focuses on identifying proteins that partake in or regulate the transduction process and on understanding how calcium-dependent regulatory events influence the sensitivity and response kinetics of vertebrate olfactory sensory neurons.

**Key Discoveries**




In most vertebrate olfactory sensory neurons, olfactory transduction is achieved through a G protein-coupled, cyclic AMP-mediated signaling pathway in olfactory cilia, starting with the binding of an odorous chemical to its receptor protein. $Ca^{2+}$ plays a key role in mediating and regulating olfactory transduction. On the one hand, $Ca^{2+}$ amplifies OSN depolarization; on the other hand, it negatively regulates the transduction pathway to cause adaptation—a phenomenon manifested as a reduced sensitivity upon repeated or prolonged odor exposure.

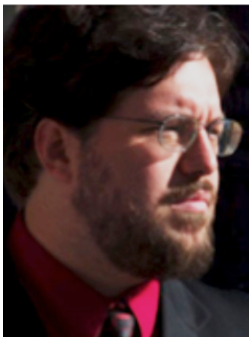
In the illustration, green arrows indicate activation steps; red T's or arrows indicate mechanisms for termination and adaptation.

*continued on page 13*

## *AChemS Young Investigator Award Winner, continued*

1. Molecular identification of vertebrate olfactory transduction components, ANO2 (Stephan et al., PNAS 2009) and NCKX4 (Stephan et al., Nature Neurosci 2012).
2. Elucidation of molecular mechanisms governing the termination kinetics of vertebrate olfactory transduction (Cygnar et al., Nature Neurosci 2009; Stephan et al., Nature Neurosci 2012).
3. Re-evaluation of molecular mechanisms underlying olfactory adaptation (Song et al, Neuron 2008; Cygnar et al., J Neurosci 2013)

**Acknowledgements**
I thank the AChemS award committee for honoring me with this prestigious award. I thank my scientific mentors, particularly Stuart Firestein and Randy Reed. I have ever benefited from their way of thinking in making scientific discoveries and from the rigorous training they provided to me. I thank my long-term collaborator Johannes Reisert. The honor goes to him as well. I am most deeply grateful to all my students, particularly Aaron Stephan, Kate Cygnar and Yijun Song, who not only perform the experiments, but also fuel the intellectual drive of our research. I also thank NIH/NIDCD and the Whitehall Foundations for the financial support of our research.



**Cecil "Jake" Saunders, PhD**

## *2012 Don Tucker Memorial Award Winner*

**Candidate Research Interests**
Noxious substances in the environment continually attack the respiratory tract and negatively impact human and animal health. Many noxious chemicals stimulate trigeminal and vagal nerve fibers directly, but some chemicals act on specialized epithelial cells that form synapses with these fibers. Nasal solitary chemosensory cells (SCCs) and tracheal chemosensory brush cells (BCs) are activated by traditionally "bitter" substances and bacterial metabolites via the canonical bitter signaling pathway (T2Rs, αGustducin, PLCβ2 and TRPM5). Stimulation of SCCs or BCs causes the sensation of irritation, local inflammation and results in recruitment of respiratory reflexes.

My PhD research focuses on how SCCs and BCs transduce sensations of irritation, contribute to inflammation and are produced during development. In my 2012 AChemS poster, I presented data that demonstrated BCs are a static population in the healthy adult trachea, showing no evidence of the cell replacement typical of chemoreceptor cells. The majority of brush cells present in the healthy adult mice are generated perinatally, during the period the trachea is increasing in size. Finally, I utilized an in vitro model of tracheal injury to establish that brush cells can be regenerated from adult epithelial cells following damage.

**Acknowledgements**
My research would not be possible without the advice, support and dedication of my PhD mentor, Tom Finger. Science is a collaborative process and I have been fortunate to be surrounded by outstanding lab-mates and many excellent scientists at the Rocky Mountain Taste & Smell Center and University of Colorado. In particular, I thank Marco Tizzano, Sue Kinnamon and Sue Reynolds for their counsel and technical advice. Finally, I extend my gratitude to Wayne Silver (Wake Forest University) for introducing me to the study of chemical senses. My research was supported by National Institutes of Health Grants R01 009820 (T.E.Finger), P30 DC004657 (D. Restrepo) and RO1 HL075585 & Supplement HL075585-S1 (S.D.Reynolds).

AChemS
*Association for Chemoreception Sciences*

# 2013 Annual Meeting

Hyatt Regency Huntington Beach Resort & Spa • Huntington Beach, CA


AChemS
*Association for Chemoreception Sciences*

# 2013 Annual Meeting

Hyatt Regency Huntington Beach Resort & Spa • Huntington Beach, CA








AChemS
*Association for Chemoreception Sciences*

# 2013 Annual Meeting

Hyatt Regency Huntington Beach Resort & Spa • Huntington Beach, CA