AChemS
Association for Chemoreception Sciences
ANNUAL Newsletter
2015
FOSTERING CHEMICAL SENSES RESEARCH AND UNDERSTANDING SMELL AND TASTE IN HEALTH AND DISEASE

MESSAGE FROM THE PRESIDENT

Debra Ann Fadool, PhD

It has been a tough weather season this year and I look forward to welcoming you back to our Sunshine State to visit with your AChemS colleagues, plan new science trajectories, meet an impressive young presenter, or interview for your next career stage. We have had a long-standing tradition of electing broadly-trained chemosensory scientists with exceptional talent and energy to organize our scientific program and this year is no exception. Dana Small and her Program Committee have coordinated a wonderful series of sessions and workshops while also allowing time for more informal gatherings. We will be continuing many traditional events, modifying some functions, and initiating several new programs. Based on meeting attendee feedback, we have retained the parallel sessions for oral presentations and symposia initiated by Steve Munger last year, and continue to promote industry/attendee interactions with the Industry Breakfast Corners. This year, the Career Networking Social (mentoring event) welcomes both postdoctoral and graduate student career levels, so we encourage both to attend and sign-up for mentor pairings — watch your email for the upcoming announcement.

At the ECRO conference this fall, I was fascinated with the presentation of a perfumer, which left me wondering why AChemS doesn't have programming interfacing chemosensory science and art or commerce. I was excited to learn of the lecture this year by Harold McGee that will explore our sensory modalities of food preparation. Now that we have settled into our new meeting venue in Bonita Springs, Councilors Rachel Herz and Shawn Dotson have re-established connections in the community for our outreach program at the Imaginarium, a children's science museum. Thank you to the members who have volunteered to bring science demonstrations to very deserving, economically-disadvantaged students. There are so many pockets in Florida and in many communities across our country that can be touched by educational role models. In times when climate change, evolution, and immunizations are challenged or ignored, scientists have to keep mingling with young minds and shaping new questions in society.

Last fall we had a change in our bylaws that impacted the terms for a majority of our standing committees. Therefore, you will see many new faces of members who are helping to lead the Society on the committee rosters online. Now is a great time to become involved if you want to gain experience or contribute to the organization that helped mentor you! We still need volunteers for our Travel Fellowships for Diversity Committee so please let me know if you are interested in joining this committee. As we approach our 40th anniversary as a society in 2018, I felt it was important to bridge the chemosensory knowledge base of our mature members and our founders with those entering the field or just landing their independent laboratories. I am pleased to announce that Charlotte Mistretta has accepted the invitation to chair our first Archive Committee, which met during the Society for Neuroscience meeting to plan activities that will unfold over the next year. At the meeting this spring, we will recognize our inaugural class of Silver Members — individuals who have attended 25 or more annual meetings — as special members with years of dedication to the profession and to our organization.

The quality of our scientific sessions and ability to invite international experts to our meeting can only be accomplished through a solid fiscal base. Our membership and meeting attendance dropped modestly during our foray to the West Coast, which unfortunately coincided with tight federal budgets in Washington. Following our return to the East Coast last year, and the continued strength of

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the meeting program, we hope to see our member and attendance numbers return to previous levels. The Society remains financially secure and continues to try to retain two years of operating revenue in reserves. Contributing greatly to the Society's financial security has been the generous support from the late Ernest Polak, and his wife Ghislaine Polak. The annual donation is used to fund student and postdoc travel scholarships. Remember that AChemS is a registered 501(c)3 nonprofit and your tax deductible contributions are always welcome; numerous small contributions can add up to support special activities of our Society.

Participating in a meeting that provides REALLY great science, year after year, is largely due to the support by the NIDCD through the award of our R13 Conference grant authored by Barry Ache and Judy Van Houten. Congratulate these two for successful funding of years 21 to 25 of our conference activities through this mechanism! As a means of ensuring excellent administrative compliance to the grant of the new award, members have been asked to answer questions about demographics, disabilities, and representation during the meeting registration process. We will also be requesting feedback concerning the quality of our sessions through the post-meeting evaluation. Please help us ensure the longevity of this grant mechanism and our ability to shape our annual meeting to the needs of society members by providing the pertinent information. When the call comes to provide your post-meeting evaluation, let's make it a goal to double our online responses to 40% of our membership! Feel free to share your ideas for next year's scientific sessions with the incoming Program Chair, Julie Mennella, or your programmatic ideas with Diego Restrepo, who will be assisting the formulation of our competitive renewal.

Looking to the future, I felt it was imperative to reinvigorate our Long-Range Planning Committee to formulate strategic goals and future plans for the Society. Tim McClintock and Minghong Ma have agreed to co-chair this important committee that will advance our professional organization. If you have ideas or issues you feel should be addressed by this Committee, please chat with Tim and Minghong at the meeting. Finally, I think that the economy is beginning to open up as we are starting to see an increase in advertisements for career-track positions for young scientists, R01 funding rates by the NIDCD for established investigators have reached 22% for new awards and 43% for continuation awards and R01 funding rates for early stage investigators are currently 27%. I want to commend all of you involved in the training of the next generation of scientists at your home institutions and to recognize the career-long dedication of the staff at the NIH, which funds many of our laboratories. I remember learning the name of my first scientific review officer when I was a graduate scholar, and then sending my own students and fellows to speak to this same individual. I know you will be happy to learn that Dan Sklare received a standing ovation from his co-workers on his final day of work in January, and I am sure all of us wished we were there to share in his farewell to a job that touched all of us in the chemosensory field.

In closing, I'd like to express how grateful I am to have been given the opportunity to lead our organization for a year and interchange with such creative and dedicated members who have shared the responsibility to retain the professional standards of our organization for all to benefit. I look forward to handing over our newly repaired AChemS gavel (thank you Jim Smith - of Florida State University, where else?!) to Susan Travers at the upcoming Business Meeting. And watch out all you taste scientists...smell is going to leave you in the dust at the first annual Fun Run!

I am happy to meet any and all over s'mores in the fire pit.

Sincerely yours,

Debi

TREASURER'S REPORT

Joe Travers, PhD

The financial state of AChemS improved last year. A review by the independent auditors conducted in June 2014 revealed that AChemS' assets increased by approximately $50K. This increase was primarily due to the rebound in attendance at the annual meeting held in Bonita Springs and partially offsets the decreases in net assets sustained in the two previous years. With the expectation that attendance at the 2015 meeting would be similar to last year's, we did not increase either regular membership dues or abstract fees. UBS is now managing approximately $333K of AChemS assets. Since inception in December of 2011, the value of the portfolio has increased by approximately $36K.

PROGRAM CHAIR'S REPORT

Dana Small, PhD

The 37th Annual Meeting of the Association for Chemoreception Sciences will open at 5:00 pm Wednesday April 22nd. We will once again be at the Hyatt Regency Coconut Point in Bonita Springs, FL.

This year's meeting will feature many of the changes we adopted last year: a free Friday afternoon, posters up all day, cash bar at the evening poster sessions and parallel symposia. As we did last year, we will also hold the Givaudan Lecture immediately following the opening remarks and the announcement of the award winners. The evening will conclude with the Welcome Banquet.

Also, like last year, with the exception of our free Friday afternoon, Thursday, Friday and Saturday will be action-packed days and evenings so that we can all depart Sunday morning without missing any of the science. Please plan on staying to the end. There is a lot happening on Saturday, including four outstanding symposia and a special lecture by Harold McGee, former *New York Times* columnist and award winning author of *On Food and Cooking: The Science and Lore of the Kitchen.*

There will also be a couple of changes or new additions to the program; the first annual AChemS Fun Run/Walk, the special lecture by Harold McGee, and an extra half hour for the morning posters.

PROGRAM HIGHLIGHTS:

Givaudan Lecture

The Givaudan Lecture will be given by Marina Picciotto, PhD, the Charles B. G. Murphy Professor of Psychiatry and Deputy Chair for Research at Yale University School of Medicine. The title of her talk is "Nicotine Addiction: Molecular Basis of Behaviors at the Complex Interface between Reward, Food Intake and Taste." Professor Picciotto has contributed groundbreaking work on the molecular basis of nicotine addiction, for which she has been recognized by election to the Institute of Medicine and the American Association for the Advancement of Sciences (AAAS). She is a superbly dynamic speaker who moves fluidly from molecules to cells, cells to systems, systems to behavior and back again. Regardless of your methodological background, I promise you will not be disappointed! Preview her dynamic speaking skills on YouTube "What Doesn't Kill You Makes You Fatter."

Symposia

This year, we will have eight member-initiated symposia, the plenary Presidential Symposium and the plenary Polak Young Investigator Symposium.

Non caloric sweeteners and their not-so-sweet metabolic effects

Chair: Yanina Pepino

Yanina Pepino: **Non caloric sweeteners and their not-so-sweet metabolic effects**

Susan Swithers: **Not so sweet revenge: Unanticipated consequences of high-intensity sweeteners**

Ivan de Araujo: **Separate brain systems mediate the hedonic and metabolic actions of sugar**

Mary Burke: **Sucralose consumption decreases sweet taste sensitivity**

Yanina Pepino: **Metabolic effects of sucralose in subjects with obesity**

Signal transformation and routing in the olfactory system

Chair: Marc Spehr

Marc Spehr: **Signal transformation and routing in the olfactory system**

Gilad Barnea: **trans-Tango: Trans-synaptic mapping and manipulation of neural circuits**

Alexander Fleischmann: **Neural identity and odor coding in piriform cortex**

Chryssanthi Tsitoura: **Entrained oscillatory discharge in an accessory olfactory bulb microcircuit**

Andreas Schaefer: **Inhibition and olfaction**

Adaptive evolution of insect olfactory systems

Chair: Robert Anholt

Robert Anholt: **Adaptive evolution of insect olfactory systems**

Fred Gould: **The paradox of evolutionary diversification in sexual signaling**

Stephanie Rollmann: **Linking genotype to phenotype: Olfactory behavior in drosophila mojavensis**

Ayako Wada-Katsumata: **A bitter-sweet adaptive change in cockroach taste**

Marcus Stensmyr: **Drosophila olfactory neuroecology**

Cognitive influences on smell and taste: Mechanisms in mice and men

Chair: John McGann

John McGann: **Cognitive influences on smell and taste: Mechanisms in mice and men**

Dana Small: **Acute and prolonged top-down modulation of taste**

PROGRAM HIGHLIGHTS *continued*

Wen Li: **Emotional influences on olfaction – Anxiety state-dependent olfactory processing and neural circuitry adaptation**
Anan Moran: **Gustatory cortex neuronal ensemble response dynamics during learning and extinction**
John McGann: **Surprise and expectation modulate early olfactory processing in mice**

Presidential Symposium: Metabolic state shifts sensory systems
Chair: Debra Ann Fadool
Debra Ann Fadool: **Metabolic state shifts sensory systems**
Vanessa Routh: **Sweet talk in the brain: hypothalamic glucose sensing influences reward neurocircuitry**
Timothy Kern: **Oxidative stress, inflammation and a sensory neural cell: Diabetic retinopathy**
Robin Dando: **Inflammatory factors trigger apoptosis in taste cells, resulting in fewer taste buds in obese mice**
Nicolas Thiebaud: **Hyperlipidemic diet disrupts olfactory structure and function**
Claire Murphy: **fMRI of chemosensory response: relationship to BMI and metabolic status**

Avian species as a model for taste detection: molecular recognition, diet choice and evolution
Chair: Masha Niv
Masha Niv: **Avian species as a model for taste detection: molecular recognition, diet choice and evolution**
Eugeni Roura: **Oral nutrient sensing in the chicken: A look beyond T1R/T2Rs**
Maik Behrens: **Recognition profiles of avian bitter taste receptors**
Maude Baldwin: **The evolution of sweet taste perception in hummingbirds**
Masha Niv: **Taste and promiscuity: Structural determinants in G-protein coupled chemosensory receptors**

Feedback and modulation in the chemical senses
Chairs: Christiane Linster and Donald Wilson
Christiane Linster and Donald Wilson: **Feedback and modulation in the chemical senses**
Nathalie Mandairon: **Top-down control on adult-born neurons during olfactory learning**
Leslie Kay: **Gamma and beta oscillations describe early and late cognitive proceeding during odor discrimination**
Benjamin Sadrian: **Limbic system modulation of olfactory cortex**
Alfredo Fontanini: **Processing of anticipatory and chemosensory signals in the gustatory system: Where's the top and where's the bottom?**

cGMP signaling in the olfactory system: Implications for cellular and behavioral responses to sensory stimuli
Chair: Steven Munger
Steven Munger: **cGMP signaling in the olfactory system: Implications for cellular and behavioral responses to sensory stimuli**
Elissa Hallem: **Mechanisms of carbon dioxide sensing in nematodes**
Trese Leinders-Zufall: **Dissecting innate predator odor aversion: Circuit logic and genetic substrates**
Joerg Fleischer: **Relevance of cGMP signaling in sensory neurons of the Grueneberg ganglion**
Peter Mombaerts: **Trpc2-expressing sensory neurons in the mouse main olfactory epithelium of type B express the soluble guanylate cyclase Gucy1b2**

Transmitting chemical warnings in animals and men – The role of chemosignaling in social communication
Chair: Wen Li
Wen Li: **Transmitting chemical warnings in animals and men – The role of chemosignaling in social communication**
Lisa Stowers: **Leveraging pheromones to study emotional behavior in the mouse**
Gün Semin: **The multimodal nature of human communication**
Ana Farias: **Chemical and physical warning signals: Common and distinct effects**
Johan Lundström: **Chemical Warning Signals in Humans**

Oral Sessions
This year we have two fantastic Oral Sessions planned. In each there will be 6 speakers and each speaker will have a 20-minute slot (15 minutes to talk/5 minutes for questions). The Program Committee selected oral presentations based on scientific merit, keeping in mind our goal for a scientifically balanced meeting. Congratulations to the selected presenters and thank you all for agreeing to give a talk!

Oral Session 1
Chair: Charles Greer
Ruchira Sharma: **Olfactory receptor accessory proteins RTP1 and RTP2 play a crucial role in receptor gene choice, development and odor detection**
Kevin Daly: **Active sampling motor centers project to primary olfactory networks resulting in state dependent modulation of olfactory function**
Valentina Parma: **Anxiety-dependent modulation of olfactory fear conditioning: A multidimensional approach**
Kathrin Kollndorfer: **Smell training induces functional plasticity in patients with long-term smell loss**
James Howard: **Neural circuitry underlying expected food odor value in humans**
Matthias Laska: **Busting a myth: Humans are not generally less sensitive to odors than nonhuman mammals**

PROGRAM HIGHLIGHTS *continued*

Oral Session 2
Chair: Nirupa Chaudhari
Melissa Fillmore: **Alterations in the fatty acid signaling pathway affect dietary fat intake**
Danielle Nachtigal: **The effects of base temperature and taste context on perception of thermal sweetness**
Tom Finger: **The taste bud connectome: First results from scanning blockface EM**
Melissa Haley: **Bidirectional plasticity at basolateral amygdala synapses in primary gustatory cortex**
Max Fletcher: **Complex taste responses of neurons in gustatory cortex as revealed by 2-photon imaging**
Danielle Reed: **Epigenetics of the human TAS2R38 gene**

Platform Presentations: Polak Young Investigator Award Recipients
Thanks to the generous support of the Polak family, we will once again hold a plenary session to highlight the rising stars of the chemical senses.
Jennifer Beshel, **Alterations in Brain-derived Leptin-homolog Unpaired 1 Lead to Obesity Phenotypes in Drosophila through Regulation of Food Odor Value Signaling**
Daniela Brunert, **Serotonergic Modulation of Sensory Processing in the Rodent Olfactory Bulb**
Archana Kumari, **Pharmacologic and genetic disruption of Smoothened reveals dependence of taste organs on Hedgehog signaling**
Joost X Maier, **The Taste System Modulates Smell Perception via Neural Interactions at the Level of Primary Sensory Cortex**
Casey Trimmer, **Predicting human odor perception from olfactory receptor activation**
Corey L Williams, **Direct evidence for BBSome-associated intraflagellar transport reveals distinct properties of native mammalian olfactory sensory cilia**

Clinical Lecture
This year's focus on clinical research will feature a full-length lecture by Julie Mennella entitled "The Importance of the Chemical Senses During Early Life."

AChemS Fun Run/Walk!
The 37th AChemS Annual Meeting will hold the first annual AChemS Fun Run/Walk. Participants will receive t-shirts and there will be trophies for the fastest male and female chemoreception scientists in the taste and smell tracks. The run will be 5K (more or less). T-shirts will also be available for sale to support our community outreach program.

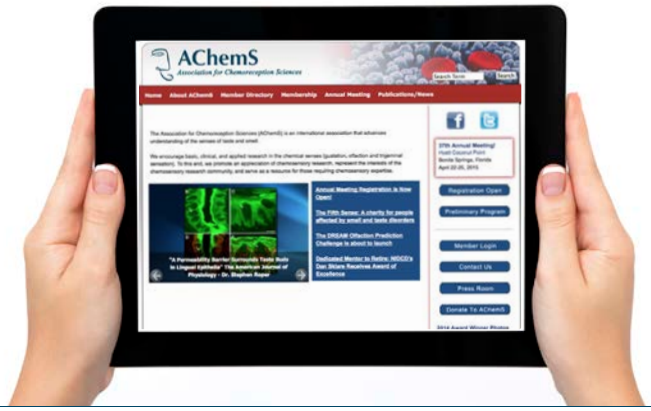
A word of thanks
It is thanks to our dedicated Program Committee that this year's meeting is shaping up to be a truly outstanding conference. I would like to personally thank all the members for their hard work, timely responses and great suggestions.

SECRETARY'S REPORT

John Boughter, PhD

AChemS successfully rolled out its new website (**www.achems.org**) last April, just in time for the Annual Meeting. The updated site possesses many new features and improved functionality, including a graphic interface on the front page that highlights new and important scientific findings by AChemS members. Please join me in commending the efforts of our former secretary, Julie Mennella, and the Ad Hoc Website Committee (Dylan Barnes, Denise Chen, Debi Fadool, Rachel Herz, and Cedric Uytingco) for their hard work and effort in making this update a reality.

Exciting changes and additions are in store for the near future, including an expanded section detailing the fascinating history of our Society. We continue to solicit feedback from AChemS members in an effort to address and refine any issues affecting functionality and appearance. In addition, please continue submitting examples of new and exciting science in the chemical senses for us to highlight on the site. All inquiries/submissions can be submitted to **jboughter@uthsc.edu** or through the website Contact Us form.

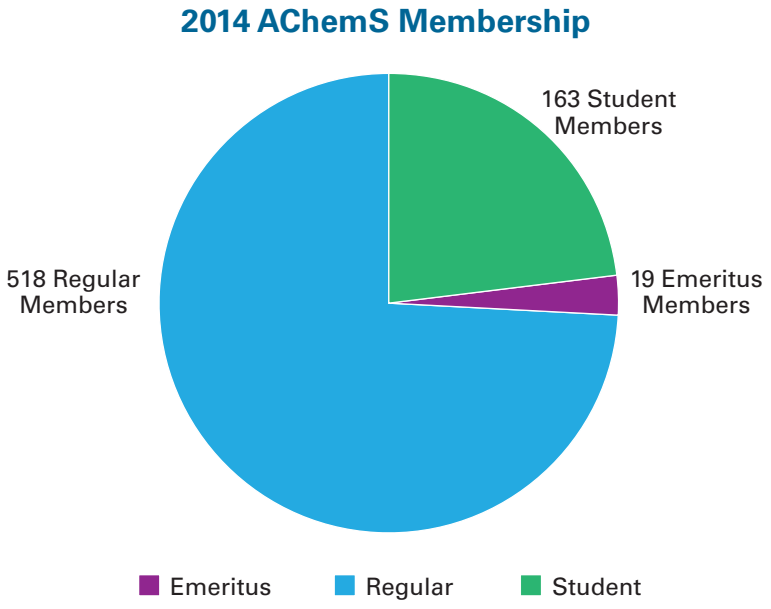


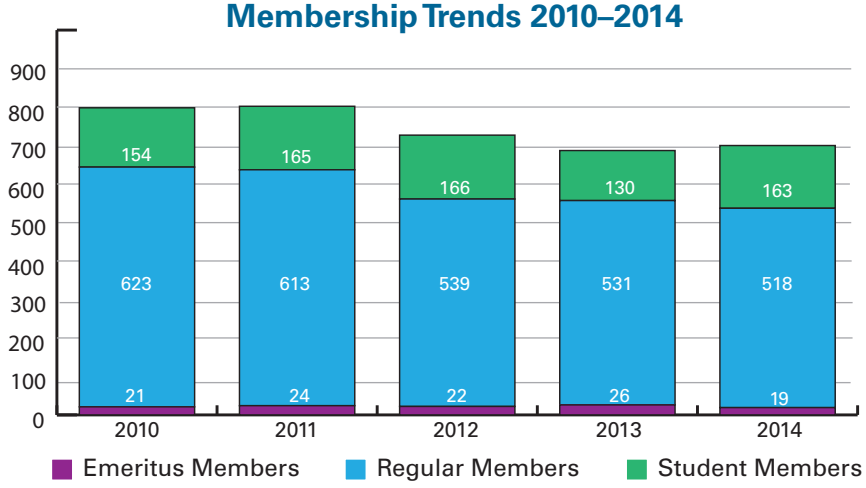
MEMBERSHIP CHAIR'S REPORT

Pam Dalton, PhD

Total membership numbers in FY 2014 increased slightly from the previous year, likely due to the return of the annual meeting to southwest Florida. However, the majority of this increase was due to new and renewing student membership. Our regular membership totals, which declined with our move to the West Coast, have not yet recovered to pre-2012 levels. As of early March 2015, 592 total members have renewed for FY2015, with numbers in each category remaining relatively stable from this time last year. Since the deadline for online meeting registration hadn't occurred as of this writing, we anticipate an increase in membership renewals prior to the meeting in line with previous years.

Each year, the number of non-renewing regular and student members remains relatively constant. While non-renewing student membership may simply reflect those who finish their degrees and don't continue in the chemical senses, the non-renewal of regular members is somewhat puzzling, as only a small number are eligible and apply for emeritus status. This year we implemented a more targeted outreach to encourage membership renewal among the pool of members who had been dropped from membership or were categorized as in arrears (had not renewed membership for two years). We hope that our end of year numbers will reflect the success of this approach.





COUNCILOR'S REPORT

Rachel Herz, PhD, *Senior Councilor* and Shawn Dotson, PhD, *Junior Councilor*

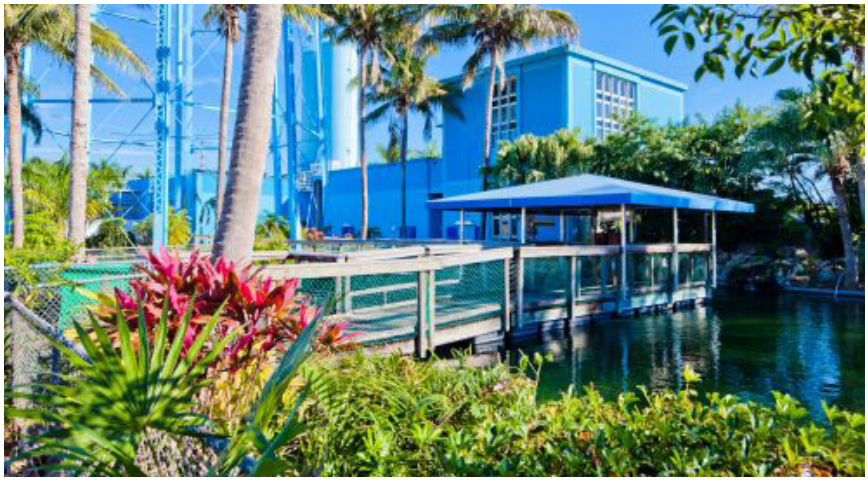
The association tries its best to continuously support the attendance of students and young scientists to our annual meeting. This year, AChemS will provide support to 52 domestic and international students through either the housing or the travel award. The Councilors have also selected five junior investigators to receive the Polak Postdoctoral Travel Award among 21 applicants.

We are thrilled that the AChemS 37th Annual Meeting will launch the reinstitution of our educational outreach mission with the local community. For those of you who remember the GWIZ event in Sarasota, this year we will inaugurate our new version of it in Bonita Springs and it looks like it will be an amazing success.

Last fall, we began investigating several educational institutions in the Ft. Myers and Naples area and established a great partnership with the **Imaginarium Science Center** in Ft. Myers. For our 2015 outreach event at the Imaginarium we will have more than 100 local 3rd and 4th graders participating from **Franklin Park Elementary**. The children from this school are an especially important audience because Franklin Park is one of the most socio-economically challenged areas of Lee County. Franklin Park Elementary has a 96% rate of free or reduced lunches and a minority population of 97%. It is also a Title I school, which means that it receives additional funding from the US Department of Education as an underachieving school with a high percentage of children from low-income families. Not only do we have the good fortune to enlighten and inspire a new generation of chemosensory scientists, engaging with the students at this school ties in perfectly with the diversity goals of our NIDCD grant.

Four AChemS members (Ruchira Sharma, Theresa White, Daniel Wesson, Elizabeth Gardner) have generously volunteered their time and expertise and will be aweing and inspiring the students with demonstrations illustrating topics such as genetic variation in androstenone sensitivity, the different contributions of taste and smell to flavor perception and food, the influence of color on the perception of odor, and olfactory health and the hazards of household products.

The event will take place at the Imaginarium Science Center, **http://i-sci.org/,** on Wednesday, April 22 from 9:00 a.m. – noon. We encourage any curious AChemS members to attend and see how you may be inspired to get involved in forthcoming years—who knows what you might learn! AChemS attendees are invited to join the event at a 50% discounted admission fee of $6.00. Make sure to indicate that you are an AChemS attendee to obtain your discount.





2014 ACHEMS

Award Ceremony

Donald Wilson, PhD

Max Mozell Award Recipient

Research Focus

My lab and I are interested in how the mammalian brain processes and remembers information. As a model system we focus on rodent (rats and mice) discrimination and memory for odors. Using electrophysiological, behavioral, genetic, neuroanatomical and pharmacological approaches we explore the neurobiology of memory and the role of experience in sensory system function. The underlying hypothesis of much of our work is that memory plays a critical role in even basic sensory discrimination. That is, your perception of the world is not static but reflects your past experiences. Some specific questions we are addressing include: how does sensory experience shape odor discrimination?; how does sensory encoding reflect hedonic/emotional associations of odors?; what role does sleep play in olfactory perceptual learning?; how do local neural circuits and larger regional networks interact to shape perception and memory? In addition, we are interested in how experiences early in life, or aging and dementia can influence olfactory system function.

Key Discoveries

- Odor processing in the piriform cortex is highly dynamic and is more odor specific than the olfactory bulb
- Synaptic plasticity within the piriform cortex can account for short-term odor habituation
- Plasticity within the piriform cortex promotes perceptual learning and configural odor mixture perception

Acknowledgements

My dear collaborator Regina Sullivan attracted me to olfaction and to Michael Leon's lab as a post-doc. Everything since then is due to her intellect, encouragement and friendship. Specific accomplishments of the lab reflect the dedication and passion of many undergraduates, graduates, post-docs and technicians. I have been very lucky to have a bunch of good people that want to hang out in the lab, and on occasion drink beer. Finally, all of the work costs money, and for that I thank the extreme generosity of NIH and NSF, and their hard working staff and review panels that supported our work.

C. Shawn Dotson, PhD

Ajinomoto Award Recipient

Research Program

My current research goal is to understand how the taste and gastrointestinal systems interact to regulate taste sensitivity and nutrient responses. Recent findings suggest that the gustatory system shares a number of common features with the gastrointestinal system, an idea that has important implications for both gustatory and gastrointestinal function. It has been hypothesized that the peripheral taste system may be modulated in the context of an animal's metabolic state. One purported mechanism for this phenomenon is that circulating gastrointestinal peptides modulate the functioning of the peripheral gustatory system. Recent evidence suggests endocrine signaling in the oral cavity can influence food intake (FI) and satiety. We hypothesized that these hormones may be affecting FI by influencing taste perception. My laboratory uses sophisticated animal psychophysical testing to evaluate these processes in animals that have genetically or otherwise manipulated nervous systems. These studies may lead to the design of food additives that could benefit individuals suffering from conditions that are linked to excessive intake of foodstuffs (e.g., alcoholism, type 2 diabetes).

Additionally, the recent discovery that many key gustatory transduction components (e.g., taste receptors) are also expressed in cells of the gastrointestinal tract, suggests that canonical taste transduction mechanisms may be involved in the nutrient-dependent regulation of metabolism, providing another route through which 'variation' in taste function may impact upon health. Thus, I am also investigating the influence that variation in genes associated with gustatory function has on a variety of obesity-related traits. These studies will help to solidify the link between taste function and disease.

Acknowledgements

My work was supported by the U.S. National Institutes of Health, grants P30-DC010763 and R01-DC012819, as well as by the Foundation for Alcohol Research.

Christina Zelano, PhD

Moskowitz-Jacobs Award Recipient

Research Interests

Combining behavioral, neuroimaging (fMRI) and invasive EEG (ECoG) techniques, our research over the past ten years has focused on perception and attentional mechanisms within the human olfactory modality. We have used fMRI techniques to show that attentional mechanisms occur in primary olfactory cortical brain regions (1) and to show that anticipatory neural signatures in these regions contain odor-specific information reflecting the expected smell (2) We have also shown that memory traces of odor percepts are maintained in primary olfactory cortical regions (3) More recently, we have begun to use invasive EEG techniques to measure local field potentials directly from the olfactory bulb, piriform cortex, the amygdala, hippocampus and orbitofrontal cortex. Using this technique, we have found that natural breathing entrains a broad-band network of oscillatory power across the olfactory neural circuit. This respiratory-locked oscillatory response extends beyond the olfactory neural circuit alone, impacting neural oscillations in the amygdala, hippocampus and parietal brain areas as well.

Acknowledgements

This work was conducted in part as a graduate student in the laboratory of Dr. Noam Sobel and in part as a post-doc in the laboratory of Dr. Jay Gottfried. This work was supported by a graduate NSF fellowship, a post-doctoral NRSA, and currently a NIH grant K99 SP0018386.

References

(1) Zelano, C., Bensafi, M. et al. (2005) Attentional modulation in human primary olfactory cortex. Nature Neuroscience. 8, 114-120.

(2) Zelano, C., Mohanty, A. and Gottfried, JA. (2011) Olfactory predictive codes and stimulus templates in piriform cortex. Neuron. Oct 6; 72(1): 178-87.

(3) Zelano, C., Montag, J., Khan, R., Sobel, N. (2009) A specialized odor memory buffer in primary olfactory cortex. PloS One. 4(3).

Stavros Lomvardas, PhD

AChemS Young Investigator Award Recipient

Research Program

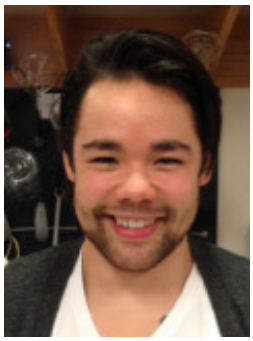
My research program aims to understand the mechanisms that govern the monogenic and monoallelic expression of olfactory receptor (OR) genes. OR genes compose the largest mammalian gene family consisted of more than a thousand members transcribed in a signular fashion in olfactory sensory neurons. The molecular underpinnings of this extreme form of stochastic gene expression remain enigmatic since Buck and Axel discovered this gene family two decades ago. To solve this problem we combine genetic and epigenetic approaches with modern imaging technologies and biochemistry and we use the mouse as a model system.

Key Discoveries

- We discovered that olfactory receptor (OR) genes are epigenetically silenced in olfactory sensory neurons, where they are marked by the hallmarks of constitutive heterochromatin.
- We showed that in olfactory sensory neurons, OR genes aggregate in unique nuclear foci from which the active OR allele is spatially separate.
- We showed that the OR-elicited feedback signal is mediated by the unfolded protein response (UPR) pathway, which induces downregulation of Lsd1, the histone demethylase that initiates OR transcription.

Acknowledgements

This work was possible thanks to the hard work and great ideas of Dr. Angeliki Magklara, Dr. Eleanor (Josie) Clowney, Dr. Bradley Colquitt, Ryan Dalton and David Lyons. Also many thanks to collaborators Dr. Gilad Barnea (Brown University), Manolis Kellis (MIT), Robert Lane (Wesleyan University) and Carolyn Larabell (UCSF-Lawrence Berkeley). Dr. Richard Axel inspired and continues to contribute to my research program. Finally, all this work is possible thanks to our funding sources, NIH, the Mcknight endowment for Neurosciences, Rett Syndrome Research Trust, and the Program for Breakthrough Biomedical Research from UCSF.



Adam Clark

Don Tucker Award Recipient

Research Focus

The environment is filled with a multitude of beneficial and harmful compounds; the gustatory system provides a tool to easily screen them, to determine which to consume and which to avoid. The five basic tastes; sweet, sour, bitter, salty, and umami provide information to guide intake of these compounds. For example, sweet, a highly appetitive taste, identifies energy rich simple sugars such as glucose, whereas bitter, an adverse taste, identifies structural motifs commonly associated with toxins. Truly our sense of taste is an invaluable resource in determining the biological impact of the substances in our surroundings.

Oddly as it may sound, taste is not limited to taste, or, more accurately, receptors that initiate taste perception have dual functions in non-gustatory tissues. Extra-oral taste receptors in the gut and the airways provide an example of this. Sweet taste receptors located in endocrine cells signal proper utilization of energy rich simple sugars. Whereas extra-oral bitter taste receptors in the upper and lower airways detect irritants and initiate actions helpful in eliminating or reducing the effect of the agent.

My research goals have revolved around non-gustatory bitter taste receptors (TAS2Rs) and their role in recognition and response to toxins, with my doctoral dissertation research focusing primary on characterization of T2Rs in the human thyroid. Currently my dissertation research findings are subdivided into two main studies. The first characterized the expression of TAS2Rs in the thyroid using polymerase chain reaction and immunohistochemistry techniques. These experiments identified thyroid TAS2R mRNA and protein, along with the associated G-protein subunit α-gustducin. The second study identified a functional role of thyroid TAS2Rs utilizing $Ca2^{+}$ and iodide signaling assays. Stimulation of thyroid cells with various levels of thyroid stimulating hormone (TSH) and or TAS2R agonists indicated TAS2R signaling inhibits TSH mediated $Ca2^{+}$ signaling and iodide efflux.

These findings implicate thyroid TAS2Rs as mediators of TSH signaling cascades, which likely modulate hormone production. TAS2R associated hormone modulation may serve as a protective response to circulating toxins which reach the thyroid.

Acknowledgements

I must give a tremendous amount of thanks to my mentor Steven Munger. Steve has the uncanny ability to provide valuable and useful information and advice on any question or problem I may have, regardless of the area or topic. Throughout my doctoral studies I have relied heavily on his guidance. I also need to thank and acknowledge Stephan Vigues. Stephan is a daily resource for each and every question I may have both important and mundane. I can say with almost certainty that I ask Stephan at least one question a day, whether it be in regards to finding a reagent or the best way to homogenize cells. I would also like to thank all the members of the Munger lab both current and past that I have had the opportunity to work with. Specifically, thank you Amanda Elson, Kaylin Adipiatro, Shawn Dotson, Renee Cockerham, Tatsuyuki Takahashi, Veronica Lopez, Kendra Edwards, Blossom Tewelde, and Cedric Uytingco.

Additionally I would like to thank Wolfgang Meyerhof, Anja Voigt, Ulrich Boehm, and Nanette Steinle for their valuable contributions to my research project.

Genevieve Tauxe

Don Tucker Award Recipient

Research Focus

Mosquitoes transmit diseases like malaria, dengue, and West Nile fever that kill more than a million people every year and put more than a billion people at risk. Even mosquitoes that do not transmit disease are a major economic pest in many parts of the world. Despite decades of interest in the chemical ecology of mosquitoes, some of the most basic questions remain unanswered. One of the most beguiling questions is deceptively simple: how are mosquitoes so good at finding us? That is, what human cues attract mosquitoes, and how does a host-seeking mosquito detect and integrate those cues to direct her behavior toward a human? Although it is generally accepted that mosquitoes use their sense of smell to find humans from a distance, addressing this question in greater detail has been complicated because humans give off hundreds of different, potentially attractive compounds; because the mosquito's olfactory system is complex and only partially decoded; and because mosquito host-seeking behavior is likewise complex and integrates multiple cues at different stages and distances from the host. Add in the fact that the over 3,000 different species of mosquito each

have their own preferred hosts and host-finding strategies, and the problem becomes more difficult still.

In my Ph.D. research, I have used the olfactory system of the yellowfever mosquito *Aedes aegypti* as a model to show how a specific olfactory neuron class detects human odor and contributes to specific elements of host-seeking behavior. Focusing on the contribution of a single sensory neuron class at a time allows me to dissect out which host cues contribute to different phases of host-seeking behavior and simultaneously identify targets for behavior modification by new repellents and masking agents.

Much of my work has focused on the cpA olfactory neuron class located on the maxillary palps (mouthparts) of mosquitoes. This neuron was previously known to detect carbon dioxide, an important host cue used routinely for trapping many mosquito species. I found that, in addition to CO_2, the same neuron is also activated by odor collected from human skin. It turns out that this neuron is highly sensitive to a number of volatile compounds found in human odor, and that this function is conserved in the distantly related malaria mosquito *Anopheles gambiae*. This single neuron class responds more to the combination of CO_2 and skin odorants than to either alone and resolves both with high temporal acuity. I was able to develop a system to selectively disable this neuron for an extended length of time by exposing a mosquito to a reactive compound and used this system to show that the earliest phase of host-seeking behavior depends on activation of this neuron (Tauxe et al., 2013).

Tauxe, G.M., MacWilliam, D., Boyle, S.M., Guda, T. and Ray, A. (2013) *Targeting a dual detector of skin and CO2 to modify mosquito host seeking.* Cell, 155, 1365-1379.

Acknowledgements
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NETWORKING/MENTORING COMMITTEE REPORT

Robin Dando, PhD, *Chair*

Please join us for the Career Networking Social on the Estero Terrace and Royal Palm Courtyard Thursday, April 23, 4:00 – 6:00 pm

After a long and unforgiving winter (for most), not only do we get to take in some science in the sunshine, we have time to make some new connections and maybe some friends, at the AChemS networking social. We had perhaps the busiest social we've seen last year, with more than 275 RSVPs, our biggest yet, and a great new venue. This year, we'll be in the same place, the Estero Terrace and Royal Palm Courtyard, from 4:00 – 6:00 pm on Thursday the 23rd. There will be conversation, food, and the first keg is on AChemS! While previously the mentoring event targeted mainly postdocs and new faculty, we have decided that we'd just like to have as many of you show up as possible. This means, please invite your fellow lab-mates, grad students, undergrads, heck, even invite the boss along! We encourage those of you who arranged a mentor with us to meet one-on-one before the social this year, which will leave you more time at the event to network, and to hear from the many group discussions going on at the event this year.

On that subject, last year's introduction of topic tables went well. Let's have some more! This year we will bring you discussions on careers outside the US, interviewing tips, and careers in industry, as well as the usual suspects of funding opportunities, life in a big vs. small school, and that old punchline "the work/life balance." We'd love to know what your suggestions are for topics next year. Please email me with anything you'd like to see next time, and we'll do our best to make it happen.

Last year's Graduate Student Happy Hour was not quite as visible as we'd like it to be. This year, join us at the Mangroves Patio, at 6:00 pm on Thursday 23rd, make some new connections, and help us turn it from a hidden gem to a new meeting highlight.

As usual, if you have anything that you'd like us to think about bringing in next year, please contact us, the Mentoring/Networking Committee (**info@achems.org**). We hope to see you all at the social.

CHEMICAL SENSES REPORT

Wolfgang Meyerhof, *Editor-in-chief*

	2007	2008	2009	2010	2011	2012	2013	2014
Impact factor	1.896	3.041	3.031	2.327	2.599	3.222	3.278	-
Original submissions	141	145	194	218	161	147	141	163*~#
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	34+ 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 days	75+ days
Accepted articles	91	73	74	96	77	62	65	64~
Accept ratio	**62.32%**	**51.77%**	**46.54%**	**46.15%**	**48%**	**42%**	**46%**	**42%**

**153 original articles, 7 review articles, 2 commentaries, 1 letter*
#No. of submissions: United States > Germany > UK > China > Japan > France = Spain > Sweden > Australia = Italy = Iran = Turkey > Austria = Egypt > 20 other countries;
+ time required by authors to prepare revisions not included.
Submission rate remains low, but did not drop further.

Editorial board rearranged

Editor-in-chief:
Wolfgang Meyerhof

Executive Editors:
Keiko Abe, Paul Breslin, Tim McClintock, Yuzo Ninomiya, Alan Spector, Alexander Steinbrecht, Kazushige Touhara, Susan Travers, Donald Wilson, Frank Zufall

Editorial Board:
Sylvia Anton, Linda Bartoshuk, Maik Behrens, Peter Brennan, Earl Carstens, Ivan de Araujo, Eugene Delay, Richard Doty, Dennis Drayna, John Glenndinning, Barry Green, Thomas Hummel, Hideto Kaba, Makoto Kashiwayanagi, Russel Keast, Sue Kinnamon, Sigrun Korsching, Christina Kuhn, Yuko Kusakabe, Chris Lemon, Steven Liberless, Minghong Ma, Robert Margolskee, Christian Margot, Steven Munger, Eva Neuhaus, Richard Newcomb, Paolo Pelosi, Anandasakar Ray, Danielle Reed, Randall Reed, Diego Restrepo, Stephen Roper, James St. John, Teiichi Tanimura, Makato Tominaga, Leslie Vosshall, Matt Wachowiak, Stephen Wooding, Yoshihiro Yoshihara

In 2015 *Chemical Senses* became also the official journal of the Australasian Association for ChemoSensory Science.

CLINICAL RELATIONS COMMITTEE REPORT

Valerie Duffy, PhD, *Chair*

Clinical Lecture to Feature Julie Mennella—Prominent Scientist in Human Taste, Development and Early Nutrition Thursday, April 23, 4:00 pm

Obesity and related diseases such as diabetes and heart disease have reached pandemic levels worldwide. The chemosenses drive how we respond to an obesiogenic environment while promoting health, quality of life and well-being. For the second year, the Clinical Relations Committee (Valerie Duffy, Pamela Dalton and Don Leopold) is proud to offer all AChemS meeting attendees the opportunity to hear about how chemsensory science translates into individual health and public health arenas. Steve Munger, Program Chair last year, requested that the Clinical Luncheon be transitioned into a Lecture, open to all and free of charge. In response, the Committee featured Howard Hoffman from NIDCD and a series of small lectures on the new chemosensory component in the U.S. National Health and Nutrition Examination Survey. This year, with support from Dana Small, current Program Chair, we will feature the cutting edge and interdisciplinary work of Julie Mennella from the Monell Chemical Senses Center. Julie has advanced science into the development of preferences toward nutritionally-significant foods and tolerance of orally-delivered medications. Specifically, how genetically-guided chemosensory responses interact with early life exposures toward the development of healthy ingestive behaviors that can carry into adulthood. Health experts agree that obesity needs to be prevented early in life through novel interventions that match individual characteristics with science-based approaches. Julie is recognized for her scientific and leadership achievements not just within AChemS, but also within nutritional and medical communities. You will not want to miss Julie's talk as a model for leveraging chemosenses into nutrition and health guidelines, and public policy for the prevention of chronic diseases.

INDUSTRY LIAISON COMMITTEE REPORT

Chris Simon, PhD, *Chair*

The Industrial Liaison Committee (ILC) would like to welcome new members Johan Lundström (Monell Chemical Senses Institute) and Steve Munger (University of Florida). Thanks to Bob Margolskee and Tom Finger for their previous service.

The ILC will host another Industry Workshop on Thursday, April 23 from 2:00 – 4:00 pm at the upcoming AChemS Annual Meeting. This year's Workshop will entail three sequential facilitated roundtable discussions (approximately 40 minutes each) in which panels of experts from industry and academia will discuss the needs, issues and potential solutions relevant to areas of interest to the chemosensory community, including sugar replacement, salt reduction and aromatherapy. The impact of these workshops will be heightened by the participation of audience members. Please plan on attending!

The ILC has completed the annual AChemS Sponsorship Campaign. The sponsorship campaign is a significant source of revenue for AChemS and helps to sustain the excellent quality of the Annual Meeting. Sponsorship contributions also help to support graduate student Travel and Housing Awards, the Don Tucker Memorial Award for Graduate Student Research and the Mentoring/Networking Social, a traditional networking opportunity for the mentors and mentees paired through the Mentoring Program. We would like to sincerely thank our continuing sponsors—Givaudan Flavors, PepsiCo, Ajinomoto, Kao, Mind Genomics Associates—and welcome our newest sponsor Maxcyte, Inc. Your generous support of AChemS is gratefully acknowledged.

Please note that we are always looking for new sponsors and will work with your company to find a sponsorship level that works for you! For those companies considering AChemS sponsorship opportunities in the future, we received positive feedback on the revised benefits in 2015 and plan to maintain them for the upcoming year. In particular, the revised benefits at the Diamond, Platinum and Gold levels include 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. This year, sponsoring companies have the option of hosting Breakfast Corners on multiple days throughout the meeting. As I look out my window, eight inches of snow are on the ground. Florida sure sounds good right about now! I look forward to seeing you there.

INTERNATIONAL COMMITTEE ON OLFACTION AND TASTE (ICOT) REPORT

Charlie Greer, PhD, *AChemS Chair*

ICOT is composed of representatives from Association for Chemoreception Sciences (AChemS), European Chemoreception Research Organization (ECRO), and Japanese Association for the Study of Taste and Smell (JASTS). Our primary charge is to help coordinate activities among the three organizations, particularly in relation to the rotating sponsorship of the International Symposium on Olfaction and Taste (ISOT).

- **ISOT 2016 Update**
  The local organizer, Dr. Yuzo Ninomiya, reports that plans for the meeting in 2016 are rapidly progressing. The meeting is scheduled for Sunday, June 5 – Thursday, June 9, 2016 in Yokohama, Japan. Program and related committees are staffed and invitations have gone out to selected plenary speakers. Details on the meeting can be found at the website (**www.isot2016.com**). Please note that the deadline for proposing symposia is rapidly approaching (May 1, 2015). Additional deadlines are also posted as is information regarding meeting registration, lodging, and further details related to the meeting.

- **ECRO XXV 2015**
  ECRO 2015 will be held in Istanbul, Turkey, September 1-5, 2015. Stefan Fuss, the local organizer from Boğaziçi University, has established a website (**http://www.ecro-online.com/ecro2015/**) with full details on abstract submission, lodging, registration, etc. Please note that the deadline for symposia proposals was March 2, 2015. Other important dates include the deadline for abstract submissions, June 30, and the deadline for applying for travel grants, June 15.

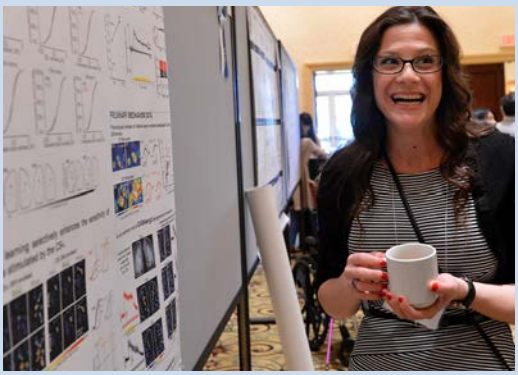
- **ECRO XXVI 2016**
  Details about the 2016 ECRO meeting have yet to emerge. However, the venue will be in Athens, Greece. The organizer, from École Normale Supérieure in Paris, is Marika Kapsimali.

AChemS is represented by Charles Greer (Chair), Thomas Finger, and Kevin Daly. During the next ISOT meeting we will meet with the representatives from the other two organizations to negotiate the annual contributions to the next host organization. These funds are used to support planning and the general preparations necessary for hosting an ISOT meeting. Planning typically covers a period of about 3 years. An ISOT meeting is held every 4 years. The upcoming ISOT will be hosted by JASTS at Yokohama in 2016. AChemS will host the following ISOT in 2020.

AChemS
Association for Chemoreception Sciences

2014 Annual Meeting

Hyatt Regency • Bonita Springs, FL



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