AChemS
Association for Chemoreception Sciences
ANNUAL Newsletter
2011
FOSTERING CHEMICAL SENSES RESEARCH AND UNDERSTANDING SMELL AND TASTE IN HEALTH AND DISEASE

MESSAGE FROM THE PRESIDENT

Don Wilson, PhD, *President 2010-2011*

Opportunity

Despite hard times on the funding front, its been another good year in the chemical senses, with exciting and important advances being made in many areas. AChemS continues to serve as the leading organization dedicated to facilitating interaction between scientists, serving as a venue to promote great science, and helping to train the next generation of researchers in the field. In a sense, AChemS represents a door of opportunity waiting to be opened to reveal a new collaboration, a new idea, a new technique, a new training possibility, a new job, or maybe just another beer with friends.

For the first time in its history, AChemS changed the venue of its annual meeting in 2010 from Sarasota to St. Pete's Beach. Moving a meeting of this size to a new location is no small feat, and I would like to thank Bob Margolskee, the Program Chair of the 2010 meeting for doing a great job. Of course selecting the new venue involved a lot of work over the past couple of years, and I would particularly like to thank Tisha Kehn and Leslie Orvedahl of the Executive Office for making all the behind the scenes process go so seamlessly for those of us in front of the scenes.

Our other officers have been working hard as well, and thanks go out to Secretary Dana Small, Councilors Helen Treloar and Kevin Daly, Treasurer Carol Christensen and Membership Chair Steve Munger. I want to especially note that Dana Small has put a lot of effort in to the AChemS webpage and now has AChemS on Facebook. Friend us!

We continue our national tour

The annual meeting will be held at St. Pete's again in 2011, and in response to membership feedback there will be several changes in the meeting's physical organization to help make things more cohesive. Matt Wachowiak, this year's Program Chair, is hard at work on that now. However, again in response to membership feedback, the annual meetings in 2012 and 2013 will be held on the west coast. After an extensive venue search and several Executive Committee meetings, we have chosen the Hyatt Regency Huntington Beach Resort and Spa in Huntington Beach, California. The resort is right across from the beach (with its own bridge to the sand), with ocean views from most rooms and it's just a short walk down the boardwalk to the pier and main street restaurants and bars. The meeting rooms are very well designed and fit our meeting extremely well. The resort is a nice size to accommodate our conference so we won't be competing with other events. Tisha Kehn has even negotiated free in-room internet. There are several options close by for less expensive student lodging. More details will follow, but this is a nice opportunity to try a new venue and attract new people to the meeting.

Membership involvement

If you've actually read this far, chances are you already understand the importance of individual members to the success of AChemS. It is individual members who propose symposia, who serve as volunteers or run for office, who provide feedback and new suggestions for improving the meeting and organization, and in short, who allow AChemS to function at all. To paraphrase something I read somewhere, AChemS is of, by and for the members. If you think AChemS is awesome, take a second to thank or recognize members that put time and effort into helping make it so. If you think AChemS is not so awesome, get involved! Run for office, volunteer, propose content for the meeting, provide existing officers with feedback. We're all in this together. There are many opportunities for you (yes you!) to make an impact on how AChemS works. You can even help AChemS financially. AChemS is a registered 501(c)(3) organization, and, thus, contributions are tax deductible. Your donations will go directly into improving the organization through funding of travel awards, innovative program additions and/or outreach efforts.

Have a great year.

COUNCILOR'S REPORT

Helen Treloar, PhD and Kevin Daly, PhD, *Councilors*

During our years in Sarasota, AChemS hosted an educational outreach program at the GWIZ Science Museum which connected our membership with kids in the Sarasota school district. Despite our best efforts, we were unable to transition this program to the St. Petersburg/Tampa area when we changed venues last year.

The decision was made to redirect our outreach program to establish connections with the local community in St. Petersburg/Tampa. Plans are underway to arrange a public symposium on "Olfaction: In Health and Disease" highlighting some of AChemS prominent authors with an opportunity for attendees to learn about olfaction, ask questions from a panel of experts, meet the authors and attend a book signing. This event will be held at Eckerd College — Continuing Education Center in St. Petersburg.

SECRETARY'S REPORT

Dana Small, PhD, *Secretary*

If you are reading my report, you have likely noticed that the AChemS annual newsletter now includes feature articles. The goal of the feature article is to provide an opportunity to the membership to report profiles of research groups and members, and perspectives on scientific or science career-related matters of interest to other AChemS members. Feature articles will be solicited every December.

There have also been some updates to the AChemS website. Since April 2010 we have been posting "Recent Articles in Chemical Senses" on our home page. Every month the titles of three articles, selected by Chemical Senses editorial staff, appear under an image of the cover of the journal. Clicking on the title takes you to the abstract and from there you can navigate to the pdf or fulltext as your permissions allow. Yet another good reason to submit your paper to *Chemical Senses!* Other updates to the website include an expansion of our Clinical Centers listing and the addition of a few AChemS historical documents. These can be found under "About AChemS" and include the report, submitted by Max Mozell, Executive Chairperson at the time, following the very first AChemS meeting. Please let us know if you are in possession of any AChemS historical documents that you would like to share.

Our society has always been very social and this is reflected in our new virtual social network.

Finally, I am happy to report that AChemS now has a Facebook group. Our society has always been very social and this is reflected in our new virtual social network. The group went live December 16th, 2010 at 11:30 EST with 6 members. By 11:34 it had its first post and one hour later membership had risen to 26. We currently stand at 91. The purpose of the group is to connect AChemS members with one another before, during and after the annual meeting. Before the meeting you can use the site to find roommates and arrange to share rides to and from the airport. During the meeting you can comment on restaurants to visit or avoid, or post pictures of AChemS scientists having a good time. Use the group after the meeting to connect with people whose work you might have just learned about. I (or future Executive Committee members) may also use the Facebook group to post AChemS announcements – for example to share information on possible new AChemS venues. "Friend" us anytime.

MEMBERSHIP REPORT

Steven D. Munger, PhD, *Membership Chair*

Current and Recent Membership Totals

After a peak in FY08 (coinciding with ISOT), membership dropped below FY07 levels in all categories and has stayed at those lower levels (Figure). A large decline in student memberships in FY10 (now at 59% of FY08 levels) was offset by a rise in regular memberships. Emeritus members have declined to 75% of their recent peak and remain a minor component of the membership.

As of January 28, 2011, FY11 dues have been paid by 681 individuals (19 Emeritus, 509 regular and 153 student members). Numbers of emeritus and student members are almost identical to those for FY10. 172 of the paid members are new members, a number slightly above the average of ~150 new members per year over the last four years. 289 members who were in good standing in FY10 have not paid their dues for this year. Based on past years, a minority (~35%) of these individuals are likely to do so. If this trend holds, the number of active members will remain stable in FY11.

Members who are in arrears are kept on the books for three years before they are dropped from the member rolls. Of the 681 currently in arrears (yes, the exact same number as members who are current on their dues), 155 are in their third year and will be changed to non-members if they do not pay their dues in FY11.

If you are an AChemS member and have not paid your dues for this year, please do so at www.achems.org. Your continued support is critical for the continued success of AChemS!

Survey of Lapsed Members

Several reasons have been suggested for the drop in membership from pre-ISOT levels, including money and dissatisfaction with the annual meeting. In September, 2010 we sent a short survey to 604 individuals (383 whose membership was in arrears for 1-2 years and 221 who were changed to non-member status for being at least 3 years in arrears). The goal of the survey was to assess the reasons for not renewing memberships. The survey accompanied a reminder/request for recipients to pay their dues. 18 surveys were completed. Four individuals paid their dues in response to the email reminder (two in the inactive group and two in the non-member group).

While the sample was limited and not random, the major reason for members not renewing appeared to be money: either the individual did not have the funds, or chose to spend his/her limited funds elsewhere. Meeting content was the second most cited reason for letting the membership lapse.

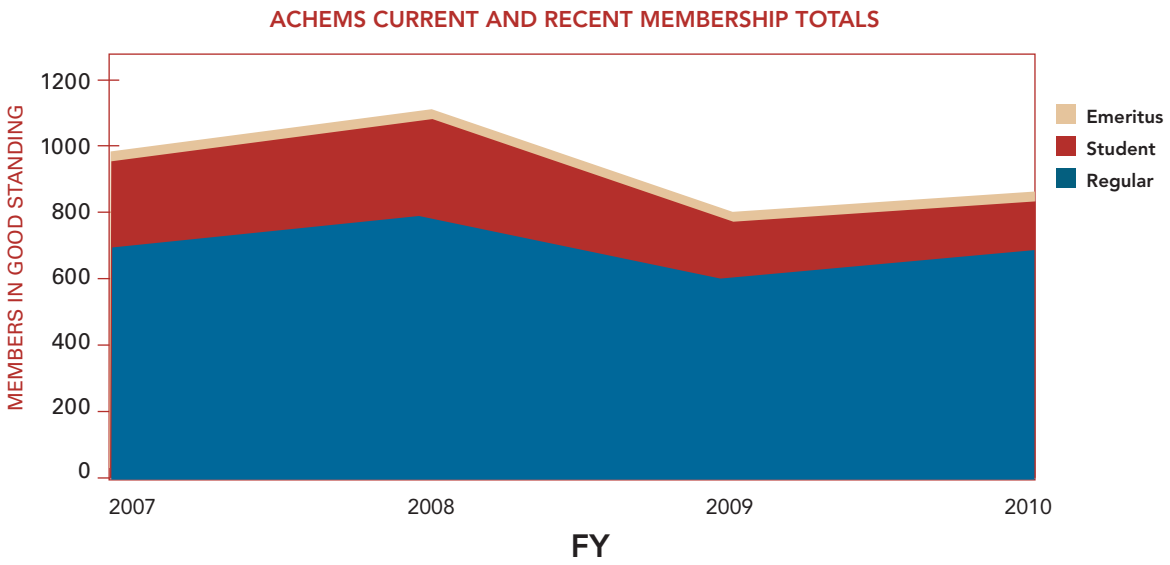


Figure: Membership Trends FY07-FY10

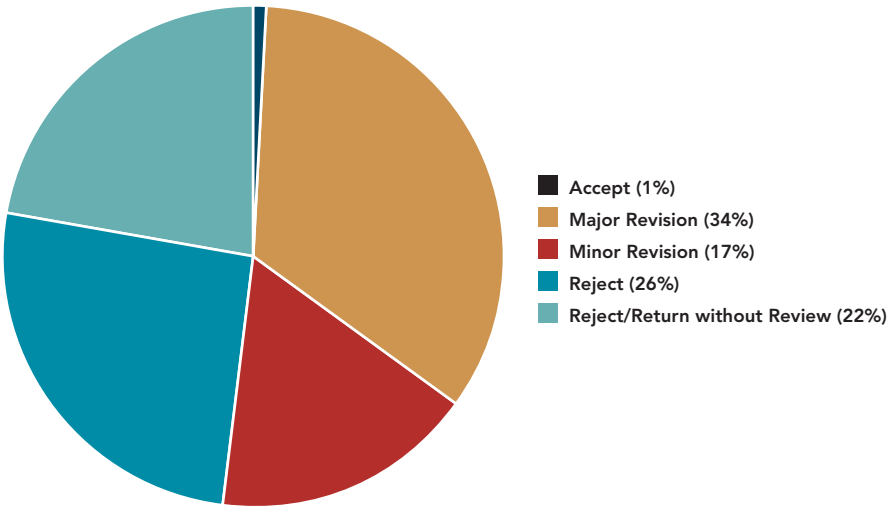
CHEMICAL SENSES REPORT

Wolfgang Meyerhof, PhD, *Editor*

Statistics:

YEAR	2007	2008	2009	2010
Impact factor	1.896	3.041	3.031	
Original submissions	141	145	194	218*
Avg. time from submission to 1st decision	33.53 days	31.32 days	27.43 days	27.62 days
Avg. time from submission to final decision	106.63 days	81.57 days	69.57 days	70.37
Accepted articles	91	73	74	96
Accept ratio	62.32%	51.77%	46.54%	46.15%

**from 29 countries, (USA>>Germany>>Japan>France=China>UK=Netherlands>Spain=Italy), 1 book review, 4 commentaries, 3 letters to editor, 207 original articles, 3 review articles*



Achieved or maintained

- Impact factor consolidated in 2010
- Regular 'In this issue, Articles highlighted' section established
- Regular display of images on the cover related to an article in the current issue established
- Submission rate still increased, highest rates for the 3 societies' countries

To do

- Appointment of an additional executive editor for 'clinical research'
- The planned appointment of an editorial board consisting of ~ 40 members has been postponed / cancelled. The reason is that it appears questionable whether ~ 40 board members combine the required expertise given the huge number of experts that actually reviewed papers for Chemical Senses in 2009 and 2010. This matter should have been discussed at the 2010 AChemS conference. The editors' meeting, however, was cancelled as several participants could not attend unexpectedly (volcano ash cloud!).
  The problem of establishing a coherent review process will be discussed at the next editors' meeting.
- Inclusion of one review article per issue on a regular basis. (Still difficult to identify volunteers).

PROGRAM CHAIR'S REPORT

Matt Wachowiak, PhD, *Program Chair (matt.wachowiak@utah.edu)*

A Preview of AChemS 2011

The 33rd annual AChemS meeting will be held April 13-17, 2011 at the Tradewinds Island Grand Resort in St. Pete Beach, FL. As most of you reading this already know, AChemS is the major annual meeting for presenting research on all aspects of olfaction, taste and other chemical senses, and is a great venue to connect with colleagues old and new. The Program Committee has put together a very strong program this year, with over 400 poster, platform and symposium presentations scheduled for the meeting. In addition, the program includes networking and career development events such as the Industry Symposium and Reception, the NIH Workshop on funding opportunities for new investigators, a Clinical Luncheon on the sentinal function of the chemical senses in health and disease, and the ChEMA Social. This year will also feature an Educational Outreach lecture series geared toward a public audience, and one-of-a-kind 'Odor Art' exhibit featuring works by professional artists who use olfaction in their pieces! Finally, if you did not attend AChemS last year, I want to call your attention to the fantastic meeting location - the Tradewinds is directly on the beach, and has a multitude of south-Florida resort amenities. For more information, go to http://www.tradewindsresort.com.

On behalf of the Program Committee, we look forward to seeing you there!

AChemS 2011 Program highlights:

Givaudan Lecture

Dr. Karel Svoboda will deliver this year's Givaudan lecture. Dr. Svoboda is a Group Leader at the Janelia Farm Research Campus of the Howard Hughes Medical Institute. Dr. Svoboda's work focuses on the neural substrates of active touch sensation, using the mouse whisker system as a model. He has been a leader in developing and using optogenetic and electrophysiological tools to understand how sensory systems function in the behaving animal. His work uses molecular and genetic tools to monitor and manipulate the function of neurons in the intact brain, leading to fundamental insights into the organization of sensory cortex, principles of neural coding, and mechanisms underlying plasticity in brain function. His lecture is titled, "The Neural Mechanisms Underlying Touch-Based Object Localization."

Featured Symposia

The Program Committee received many outstanding proposals for symposia this year. The seven symposia at this year's meeting cover a broad range of current high-interest topics in the chemical senses and feature an outstanding list of speakers. A complete list of symposia speakers and organizers can be found at http://www.achems.org/i4a/pages/index.cfm?pageID=3932.

1. Presidential Symposium: Olfaction in Translation
2. Optogenetics: Using Light to Study Smell
3. New Frontiers In Chemesthesis
4. Expanding The Canonical View Of Synaptic Processing In The Olfactory Bulb
5. Ionotropic Sensory Receptors
6. Odor-Based Social Behavior In Mammals: Signals, Brain And Behavior
7. Basic Tastes: Why Five?

Other special presentations include the International Flavors and Fragrances Special Lecture, a special Platform Presentations session featuring the Polak Young Investigator Award winners, and the Industry Symposium "Taste And Smell In Translation: Applications From Basic Research."

ISOT

The 16th meeting of ISOT celebrates 50 years of cutting edge research in taste and olfaction.

ECRO WELCOMES YOU ALL TO STOCKHOLM!

The International Symposium on Olfaction and Taste (ISOT) brings together scientists working on chemosensory sciences from all over the world. It has convened every 3-4 years since its inaugural meeting in Stockholm 1962. The meeting rotates locations between Europe, the United States and Japan reflecting the co-operation of the three large regional societies for investigators of the chemical senses; the European ECRO, the American AChemS, and the Japanese JASTS. The 16th ISOT will be held in Stockholm, Sweden June 23-27, 2012 under the umbrella of ECRO and in combination with the XXII meeting of ECRO. Participants from all over the world typically make ISOT a very lively forum and an excellent arena for collecting and dispersing information in the area.

All information regarding the meeting can be found at http://www.isotxvi.com

I very much hope that as many AChemS members as possible will attend our meeting in Stockholm. Beyond the excellent scientific possibilities at ISOT, Stockholm is a beautiful city, especially around midsummer.

See you in Stockholm 2012!

For the Organizing Committee Bill S Hansson

FOLLOW THE NOSE:

New Funds for Olfactory Research in Germany

Research on olfaction has considerably strengthened in Germany over the past few years: several research groups have moved their focus into this area, Universities and research institutions such as the Max Planck Society have appointed new PIs that investigate olfaction, and an increasing awareness for the beauty of olfaction is also visible in substantial coverage in the news media. The main governmental funding agency, the DFG, German Research Foundation (yearly budget, across all disciplines represented at German Universities: € 2,2 billion), has recognized this development, and instituted a Priority Programme in Olfaction (SPP 1392, "Integrative Analysis of Olfaction"). Priority programmes are research initiatives offering funding for research groups around Germany for a period of three years, renewable for another three years, in order to establish an emerging field, and to create synergistic interactions. The SPP 1392 for Olfaction started in Summer 2009, with total funds of approx. € 6,000,000 ($ 7.75 million) during the first three years.

The purpose of the Priority Programme is to achieve a comprehensive understanding of the neural basis of olfactory coding in the animal kingdom through the analysis of olfactory systems at all levels of olfactory processing: 1) signaling and coding, 2) information processing, 3) sensory and behavioral performance, and 4) perception and cognition. Animal models range from Drosophila and other insects to humans, from mice to fish and Xenopus, with research questions ranging from transduction to neural network control, from development to social behavior. Currently, a total of 16 research projects are funded, each consisting of at least two PIs forming a tandem, generally from different institutions. Thus, even within each research project, creating networks and information exchange within the community has a high priority. Together, 21 German research institutions (Max Planck Institutes and Universities) form the SPP network.

Central activities in the SPP "Integrative Analysis of Olfaction" create additional value: an annual meeting of the whole SPP with external guests, small collaborative meetings, funding for travel money for PhD students to visit each other's labs and to attend the annual SPP Students meetings, research schools are among the highlights.

Some future plans intend to extend the scope of the programme and to foster the scientific exchange between the SPP active groups and international olfactory research groups with a strong focus on the research projects of the SPP 1392.

For information, please contact Giovanni Galizia at galizia@uni-konstanz.de, and/or visit http://neuro.uni-konstanz.de/SPP

AChemS extends a sincere thank you to Howard Hoffman of NIDCD for his contributions to the NHANES survey taste and smell assessment.

AChemS is Moving to the West Coast!

The votes are in! After polling the AChemS membership in 2010, leadership made the decision to rotate the location of the AChemS Annual Meeting between the East and West Coasts every two years.

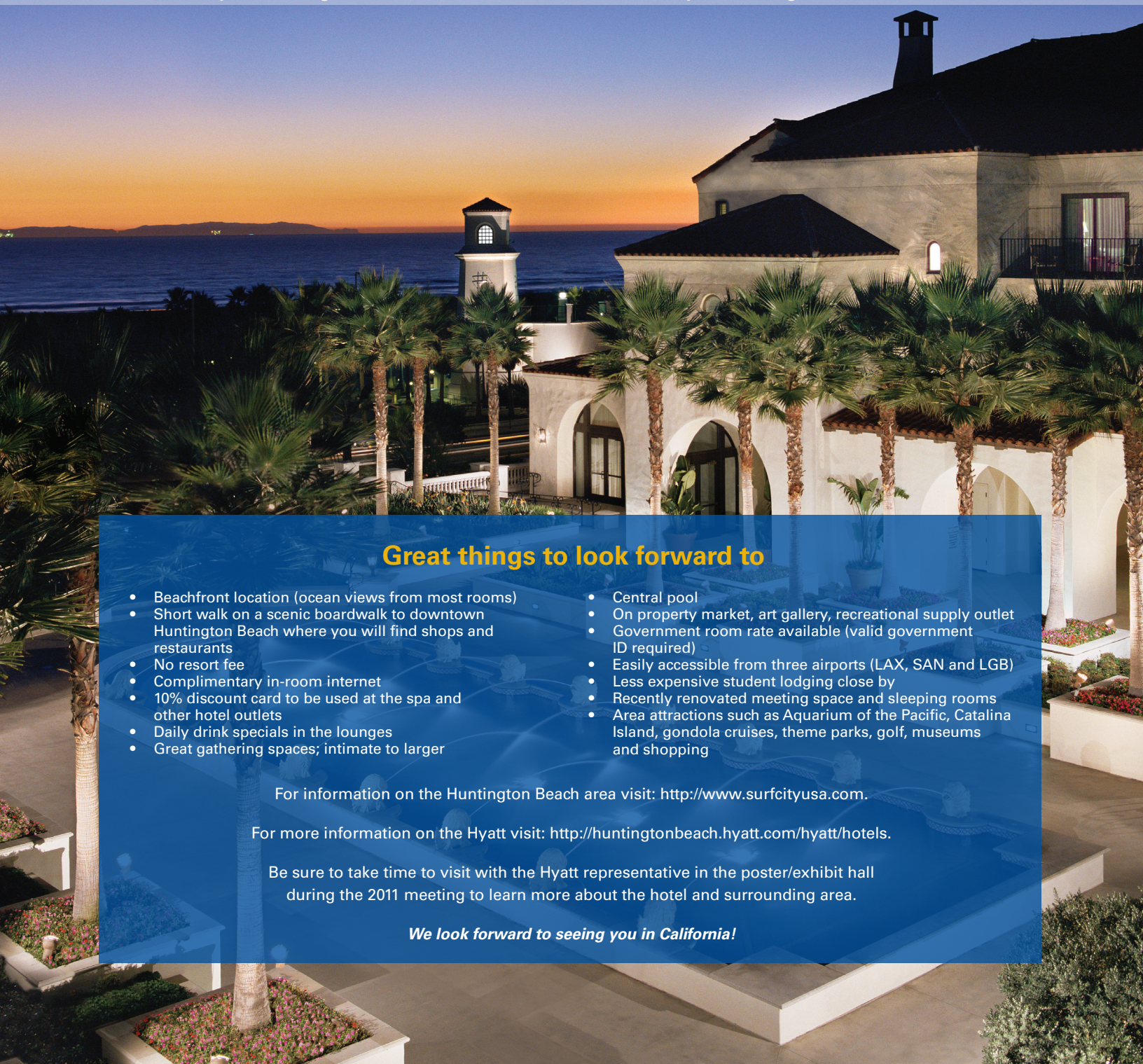
Mark Your Calendars:

34th Annual Meeting

April 25-29, 2012
Hyatt Huntington Beach, CA

35th Annual Meeting

April 17-21, 2013
Hyatt Huntington Beach, CA



Great things to look forward to

- Beachfront location (ocean views from most rooms)
- Short walk on a scenic boardwalk to downtown Huntington Beach where you will find shops and restaurants
- No resort fee
- Complimentary in-room internet
- 10% discount card to be used at the spa and other hotel outlets
- Daily drink specials in the lounges
- Great gathering spaces; intimate to larger
- Central pool
- On property market, art gallery, recreational supply outlet
- Government room rate available (valid government ID required)
- Easily accessible from three airports (LAX, SAN and LGB)
- Less expensive student lodging close by
- Recently renovated meeting space and sleeping rooms
- Area attractions such as Aquarium of the Pacific, Catalina Island, gondola cruises, theme parks, golf, museums and shopping

For information on the Huntington Beach area visit: http://www.surfcityusa.com.

For more information on the Hyatt visit: http://huntingtonbeach.hyatt.com/hyatt/hotels.

Be sure to take time to visit with the Hyatt representative in the poster/exhibit hall during the 2011 meeting to learn more about the hotel and surrounding area.

We look forward to seeing you in California!

Peeling The Onion

by Barbara Stuckey

One year ago, I didn't know the difference between orthonasal olfaction and retronasal olfaction. What a year it's been.

For the past fourteen years I've worked in a food development lab in Northern California. Before that, I reviewed restaurants for the Mobil Travel Guide. I did a stint with Phil Romano (creator of Romano's Macaroni Grill and Fuddruckers) helping him to develop a new retail food concept. Before that, I sold foods and beverages to chefs and restaurant operators. Not once in my entire food-focused education or career was I ever taught the principles of sensory science.

About three years ago I became really interested in the chemical senses. One of my job responsibilities was trying to figure out how to make food taste better. Wouldn't it be great if I really understood the mechanisms of taste? Wouldn't that give me unique insight into how we taste and more importantly, how we perceive what we taste? I'm using the word taste colloquially here, as I have also learned over the past year that taste, or gustation (to speak your language!) is just a tiny part of our sensory experience of food.

At the beginning, I searched for a book about taste and smell for non-scientists like me. Surely there had to be a book for foodies who wanted to know what happens physiologically when we eat. I went to the web and googled *Taste for Dummies, Sensory Evaluation for Dummies,* and *The Chemical Senses for Dummies*. All three struck out.

Then the light went on. I could teach myself the science and write about the process of doing so. Now, it's official. I am writing that book.

A publishing house eagerly accepted my proposal. They, too, were excited to discover that there was a burgeoning field of study in the chemical senses, yet no book on the subject accessible enough for the science-phobic masses. The problem was, I didn't know how much I didn't know.

It was shocking (shocking!) to find that something that tastes unbearably bitter to me doesn't taste of anything at all to someone else. I had no idea our bitter tasting abilities varied so greatly. This insight immediately gave me pause. Each week, my company sends hundreds of boxes of food prototypes to consumers' homes for them to taste, serve to their families, and give us their feedback. Should we be screening these households with PROP before sending them an 82% cacao "extra bitter" chocolate bar? And if the answer is yes, whom do we want on our panel: PROP tasters or PROP non-tasters? Which group does dark chocolate appeal to? Does PROP tasting correlate with the type of chocolate a consumer generally chooses? Do our confectionery clients know this? Why don't I, as a food development specialist, know this?

My introduction to the chemical senses was (by necessity) swift and overwhelming. It was akin to being dropped from an airplane into the middle of a fertile forest, blooming with life, teeming with beauty, all of it shiny and new to me. Where to start? Which direction to head? I had to get my bearings about me before I could start writing, much less writing anything coherent enough that the general public would want to read it.

It was shocking (shocking!) to find that something that tastes unbearably bitter to me doesn't taste of anything at all to someone else.

When I found out about The Monell Center, an organization devoted to discovering the mysteries of taste and smell (who knew?!) I decided it was definitely the place to start. Luckily for me, I happened to be speaking at the Flavor and Extract Manufacturers Association convention the same year Gary Beauchamp was being honored. I stalked him the entire conference, managing to get myself seated next to him at lunch one day. My biggest coup was finagling myself into the back seat of a taxi with him on the way back to the airport. Since then, Dr. Beauchamp and his colleagues have been amazingly generous with their time. Linda Bartoshuk has lent her infectious passion to the project. And the other experts in the field who have given me time are too numerous to list (a few: Howard Moskowitz, Barry Green, Ann Nobel, Dick Doty, Paul Rozin).

Yet every time I talk to someone, I realize there are three more experts that I need to interview. Every paper I read has a list of dozens of references that all seem to be relevant. To use one of the English language's many wonderful food metaphors, I realized I was peeling one big onion. Perhaps scientists are humbled by this experience early in their career, but I am not a scientist. In fact, I took astronomy in college so I wouldn't have to take biology or chemistry. *Astronomy!* I deeply regret that decision today.

Now the clock is ticking towards my publishing deadline. I'm terrified that I might miss some of the exciting, game-changing research that's going on in this field. How can I know that I'm covering the most up-to-date findings? How do I stay on the bleeding edge of research as the months roll forward?

My goal is to translate your science to the general public and I am writing this note to ask for your help. What are you working on that you're most excited about? Who else should I talk to? What's the one thing I absolutely must communicate to my readers? Please contact me if you're willing to be a part of this project.

Barb Stuckey
barbstuckey@mac.com

TASTE WHAT YOU'RE MISSING
Understanding the Science of
Taste to Get More Out of Every Bite
San Francisco, California
415-602-1325
Free Press, an imprint of Simon & Schuster, early 2012

Follow my tweets:
www.twitter.com/tastewhatumiss

[1] *Gustation* seems an important enough concept that the noun form of it should be in the Microsoft Word dictionary. Yet it's not. Who is going to change this? I hope my book is a step in that direction.

The smell of Fraunhofer–

sensory assessment meets odorant analytics

Andrea Buettner and Jonathan Beauchamp, andrea.buettner@ivv.fraunhofer.de

The flavor of a food depends on manifold parameters that include the physicochemical properties of the food matrix and its constituent aroma compounds, sensory modalities, and physiological as well as psychological responses of individual consumers. These diverse interactions contribute to the complex undertaking of developing and optimizing novel foods, which has long been a key activity at the Fraunhofer Institute for Process Engineering and Packaging (or IVV, from the German name *Institut für Verfahrenstechnik und Verpackung*) in Freising in south-east Germany.

Since 2007, Fraunhofer IVV has been home to a new group that focuses on odors and olfactology. Under the direction of AChemS member Andrea Buettner, the Sensory Analytics workgroup combines expertise in sensory considerations of aromas with analytical tools for identifying and characterizing specific compounds for a range of applications. In terms of Fraunhofer IVV's main subject area of food and packaging, the group's activities include elucidating off-flavor compounds occasionally present in foods and ascertaining their causes. Such off-odors may arise via the transfer of odorants from packaging materials to foods due to manufacturing defects or incorrect storage, or may come from oxidation processes of food ingredients themselves. Optimizing aromas in foods is another task that is dealt with by the group, relating in particular to in-house developed new foods. For instance, the temporal aroma release from sugar- or fat-reduced foods can be characterized by analytical means to allow for adaptations of food ingredients for improved flavor.

The research interest of the group is, however, not just limited to odors from specific food and packaging, but encompasses a wide spectrum of topics relating to olfactology and odors in general. Considerations in this multifaceted field include the human impact of odors, such as physiological response to a particular odor, or the psychological effect of exposure to a certain smell, both of which aspects are strongly interrelated. In the case of the former, research is currently being conducted on the autonomic reaction to odorants of varying composition in order to address questions such as to what extent certain odorous compounds elicit beneficial or detrimental physiological effects on the person being exposed. In relation to the latter, odor quality character and hedonic rating play an important part in how particular odorants are perceived, i.e. how does the body respond to a 'pleasant' smell as opposed to an 'offensive' odor?

A further undertaking of the group is the evaluation of odor perception in relation to sniff behavior. For instance, by combining olfactometry and on-line mass spectrometry it is possible to determine odorant concentrations directly at different positions within the nose, such as at the olfactory cleft or nasopharynx. Such intra-nasal measurements lay important foundations that aid our understanding of the transfer of odorants within the nasal cavity in terms of odorant type (polarity, solubility, etc.), sniff behavior (airflow velocity and pathways), and other parameters such as mucosal uptake. The latter is, amongst several other considerations, of particular relevance to retronasal perception of food aromas during consumption, since the longer, indirect pathway of an odorant to the epithelium via the pharynx, past the velum palatinum, permits prolonged interaction opportunities of the odorant over a large mucosal surface area.

Understanding the aforementioned physiological and psychological impact of odorants is aided by knowledge of their specific chemistry. In particular, the odor-structure effects on odorant properties and thereby human response to the odor is of particular interest to the Sensory Analytics group. Thus, focused studies have been conducted on the direct relationship between odorant structure and named quality or hedonic rating. Skills in sensorial identification of odorants by group members are honed in weekly training sessions in which a specific flavor language database describing odor qualities of a multitude of odorants has

Figure 1: Gas chromatography olfactometry (GC-O).

been established. Thus, the group has a broad knowledge on a wide spectrum of odorous compounds beyond just food-relevant aromas.

Complementary to this extensive knowledge base, the group operates a series of sophisticated analytical equipment with which to characterize odorants. This includes gas chromatography olfactometry (GC-O), which utilizes the analytical strengths of the GC method with flame ionization (FID) or mass spectrometric (MS) detection and parallel olfactometric assessment of odorants using the human nose. Unknown odorants in specific sample materials can thereby be identified based on their odor qualities in combination with their retention indices on different capillaries and comparison with reference mass spectra (see figure 1). A powerful supplementary method to GC-O that is in place in the Sensory Analytics labs is two-dimensional GC mass spectrometry/olfactometry (2D-GC-MS/O). This instrument operates on the same principles as 'basic' GC-O, but has the additional benefit of enabling an eluted GC time-segment to be transferred to a second GC system, whereby further GC separation with simultaneous olfactometric and mass spectrometric detection occurs for detailed analyses of co-eluting compounds (see figure 2).

Despite the powerful analytical capabilities of the GC systems, often a more rapid assessment approach is required, for which on-line mass spectrometry is the ideal tool. The Sensory Analytics group operates a high-resolution proton-transfer-reaction mass spectrometer (PTR-MS), which offers a time resolution for individual odorants of just 100 ms and detection limits in the lower pptv regime. This system is utilized for real-time assessments of odorant concentration changes, such as the intra-nasal measurements mentioned above, or for nose-space monitoring of flavor release during food mastication.

A further tool that completes the test battery of the group's holistic approach to sensory evaluations is the human physiological assessment system, which comprises a series of individual apparatus that allow an overall picture of physiological and psychological responses of individuals to be composed. More specifically, parameters such as pulse and breathing frequencies and amplitudes and galvanic skin response can be monitored with simultaneous electroencephalography (EEG), mimic analysis and eye tracking assessments.

The workgroup currently comprises scientists and engineers from several disciplines, including food chemistry, physics and biology, with combined expertise in chemical analyses and behavioral psychology, amongst others. As a whole, despite the relatively recent establishment of the Sensory Analytics group and its activities in the field of olfactology, the individual competencies of group members and principle expertise of the group as a whole are an excellent basis for conducting investigations in this almost limitless field. The group welcomes the opportunity to expand its ties with renowned international research groups in both academia and industry for both transfer of knowledge and participation in stimulating projects.

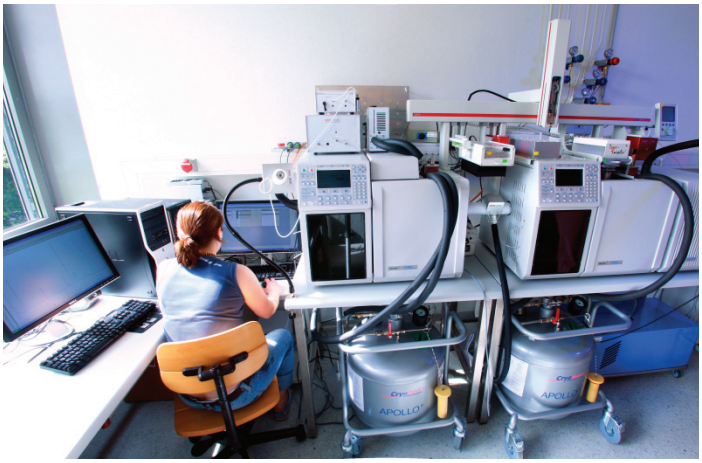


Figure 2: Two-dimensional gas chromatography mass spectrometry/olfactometry (2D-GC-MS/O).

2010 ACHEMS *Award Recipients*

Marc Spehr, PhD

AChemS Young Investigator Award for Research in Olfaction

The AChemS Young Investigator Award for Research in Olfaction is awarded annually to an outstanding junior scientist who is an emerging leader in the field of olfaction. The research record should provide evidence of excellence and contributions that have had or are likely to have a major impact on research in the field of olfaction.

Dr. Spehr Writes:

In most mammals, conspecific chemical communication controls complex social and sexual behavior. Information about individuality, social and reproductive status is conveyed by an elusive class of chemical cues – pheromones. Despite their fundamental significance, however, the basic chemosensory mechanisms of pheromone detection and, thus, conspecific social communication remain largely unknown. Therefore, a superior goal of research in my laboratory is to understand the molecular and cellular basis of chemical communication in conspecific mammals. The highly reproducible character of pheromone responses offers a unique opportunity to address the neuronal basis of genetically programmed behavior. Using complementary molecular, biochemical, physiological, and behavioral techniques in wildtype and mutant mouse models, my group aims to uncover physiological mechanisms underlying mammalian pheromone sensing. On the long-term, these studies are designed to provide detailed functional insight into the mechanisms that link chemosensation and social behaviors.

Acknowledgements

I would like to express my sincere gratitude to AChemS and the members of the Awards Committee for this great honor. Joining AChemS as a graduate student in 2001, the society's activities and annual meetings have always been highly stimulating and inspiring. Therefore, AChemS and its members had a great impact on my work.

There are a number of people that I would like to thank for their support and continuing guidance. I had the pleasure to have been trained by some outstanding mentors. I received my Ph.D. through the Department of Cellular Physiology at the Ruhr-University Bochum under the mentorship of Hanns Hatt. I was then recruited by Frank Zufall and Trese Leinders-Zufall as a postdoc. Frank and Trese gave me the chance to work abroad and benefit from the vibrant working environment at the University of Maryland's Department of Anatomy and Neurobiology. Here, I enjoyed interacting with and learning from distinguished colleagues such as Steven D. Munger, Adam Puche, Frank Margolis, and Michael T. Shipley.

I am also thankful to a number of people that I had the pleasure to collaborate with on various projects in previous years. Both past and on-going fruitful collaborations with Barry W. Ache, Richard K. Zimmer, Ivan Rodriguez, Sabrina Corazza, Charles Sell, Andrea Büttner, Thomas Hummel, Eva M. Neuhaus, Michael Eisenbach, Stephen D Liberles, and others provided invaluable experiences.

In my first years as an independent researcher, I had the chance to work with some outstanding students and postdocs. Currently, Lisa Möller, Monika Gorin, Annika Cichy, Sophie Veitinger, Daniela Fluegge, Thomas Veitinger, and Silke Hagendorf are exceptional coworkers and I am grateful to them all.

Finally, I would like to thank the following institutions and foundations for their generous financial support: The Deutsche Forschungsgemeinschaft (Emmy Noether Program), The Academy of Sciences of the state of North Rhine-Westphalia (Junges Kolleg), the Mercator Foundation, and the Volkswagen Foundation.

Charles Zuker, PhD

International Flavors and Fragrances Award for Outstanding Research on the Molecular Basis of Taste

The IFF Award for outstanding research on "Molecular Systems of Taste" is made possible by the generous support of International Flavors and Fragrances Inc, and is awarded for critical advances of long-lasting impact, in the understanding of the molecular basis of taste.

Ask Charles Zuker how he got into researching how we taste, and he'll tell you it was driven by his desire to decipher how the brain represents our sensory experiences. Zuker wants to do more than understand why sugar is sweet. He wants to know how the brain can turn reception into perception. How do the physical and chemical stimuli that we take in all the time—through sight, hearing, taste, touch, and smell—turn into signals that neurons transmit to the brain? How does light hitting your eye change into a chemical signal that makes you squint? How do sound waves hitting the eardrum transform into words that you "hear" in your head? Why does a drop of lemon juice on the tongue make you wrinkle your nose?

Zuker and his laboratory have made advances in the understanding of sight and hearing. They've also discovered taste receptors for four of the five tastes: sweet, sour, bitter, and "umami" (savory). Salt is the fifth, and it's only a matter of time before Zuker tracks it down.

Perhaps more important than just discovering the receptors is Zuker's research showing that each taste cell is hardwired for one taste. Scientists used to think that every taste bud could pick up on all five tastes, and that a different signal would be sent to the brain for each one. Zuker's lab did experiments with mice that proved that taste cells are simpler than that. Each taste cell has only receptors for one taste modality. And each cell sends a specific signal to the brain. This signal doesn't change, even if you swap out one receptor for another. For example, you can remove the receptor from a "sweet" cell and replace it with a receptor that's normally activated by a bitter chemical, and now "bitter" tastes sweet.

This research has obvious commercial implications—for example, what if we could find ways to reduce our "dependence" on sugar and salt, two key food ingredients that have a significant impact on our well-being? In 1999, Zuker started Senomyx, a company that looks to identify novel flavors and taste enhancers for the food and beverage industry. "It's interesting to work on something that could ultimately [improve] human health, and perhaps help enhance our human sensory experience so we can get more joy out of life."

Stephen Roper, PhD

Max Mozell Award for Outstanding Achievement in the Chemical Senses

The Max Mozell Award for Outstanding Achievement in the Chemical Senses is intended to recognize the accomplishments of a senior scientist working in the chemical senses. The research record should provide evidence of excellence and contributions that have a major impact on research in the chemical senses.

Dr. Roper's research focuses on the cellular and molecular biology of chemosensory transduction in taste buds. He has been interested in such questions as: What are the initial events of taste reception? Are G protein-coupled receptors involved in taste transduction? What neurotransmitters are released by taste receptor cells? What sort of signal processing occurs in taste buds? and so forth.

The sense of taste provides us with a view of our immediate chemical environment, particularly information about the safety and palatability of substances we ingest. Taste and olfaction are part of the chemical sensory systems of the body. At the most primitive level, the sense of taste guides nutrient intake. At the highest level, taste and olfaction unite to produce what we commonly term "flavor" and allow us to savor (or reject) foods. Dr. Roper and his colleagues are investigating the cellular and molecular mechanisms of how chemical stimuli, such as sugars, acids, salts, etc., are transduced into electrical signals by receptor cells in vertebrate taste buds. In his lab he uses a combination of techniques, including patch clamp and intracellular microelectrode recordings, light and electron microscopy, immunocytochemistry, image analysis, in situ hybridization, and even animal behavioral tests to study the structure and function of receptor cells in taste buds.

Dr. Roper's findings tell us that taste buds are much more complex than originally believed. There are chemical and electrical synaptic connections between taste cells. This means that there may be a certain degree of information processing in the peripheral sensory organs before signals are transmitted to higher centers in the brain. Furthermore, there are diverse mechanisms for converting taste stimuli into electrical signals.

continued on page 14

Award Recipients *continued*

Lastly, his group has identified a membrane-bound receptor that may transduce taste stimuli, particularly the taste of monosodium glutamate (MSG) (Chaudhari, et al., 2000). This is a G-protein coupled receptor similar to a synaptic receptor found in the brain. Activation of this receptor during taste stimulation leads to an important intracellular cascade of enzymatic reactions. The net result of this cascade is the modulation of ion channels on the surface of the taste cell. Modulation of ion channels produces an electrical current in the taste cell, and this is the response that ultimately signals the presence of taste stimuli at the apical, chemosensitive tips of taste cells.

Dr. Fontanini

Ajinomoto Award for Young Investigators in Gustation

The Ajinomoto Award for Young Investigators in Gustation, made possible by the generous support of The Ajinomoto Corp., is awarded annually to an outstanding junior scientist who is an emerging leader in the field of gustation. The research record should provide evidence of excellence and contributions that have had or are likely to have a major impact on research in the field of gustation.

Dr. Fontanini Writes:

Tasting a food is a psychologically engaging experience. Tastes and flavors evoke a perceptual phenomenology that goes beyond the pure sensory dimension. A bite of our favorite recipe is capable of evoking a multitude of chemical-physical sensations, memories, desires and emotions, all unfolding over time. This multidimensional experience is not fixed and immutable, but it is highly dependent on the psychological and physiological state of the subject.

Our research program aims at understanding the neural basis for such a rich perceptual experience. In particular we are interested in studying how populations of cortical neurons process the multiple physical and psychological dimensions of taste during different behavioral states, and in understanding how interactions between multiple brain areas generate these state-dependent multidimensional codes. The regions on which we are currently focusing involve the primary gustatory cortex (insular cortex), gustatory thalamus and two high order areas involved in the processing of cognition and affection, orbitofrontal cortex and amygdala.

The core of our research relies on the use of multi-site multielectrode techniques, in vivo intracellular recordings, brain stimulation, pharmacological and behavioral methods to simultaneously record and manipulate neural activity in the different brain regions of behaving rats.

Acknowledgments

I would like to express my gratitude to the Ajinomoto Corporation and to the AChemS Award Committee for this honor. Looking at the roster of the past Ajinomoto Awardees is both inspiring and very, very humbling. Joining this list has been possible only thanks to the mentoring of Don Katz at Brandeis University and Jim Bower at Caltech (now at UTSA), who introduced me to the pleasures of taste and olfaction and without whom science would have been less fun and way less intellectually rewarding.

I would like to thank also many friends, colleagues and fellow AChemS member for their generosity in sharing ideas and in helping me at every stage of my career, the group of very talented scientists that make our current research possible (Martha Stone, Matt Gardner and Chad Samulesen), and my present — and future — collaborator, Arianna Maffei. Last, but definitely not least, I would like to thank NIDCD for their financial support both as a postdoc and now as an independent PI, the Swartz Foundation, the Klingenstein Fundation and the Department of Neurobiology and Behavior at SUNY Stony Brook.

AChemS 2010 Logo Contest Award Winner:

Alison Ventura, *Monell Chemical Senses Center*

The recipient of the 2010 Don Tucker Memorial Award was Mavis Irwin of the University of Utah.

The Don Tucker Memorial Award

The Don Tucker Memorial Award is made to a graduate student member of AChemS who makes an outstanding presentation at the Annual AChemS Meeting.

Mavis Irwin, a native of rural Idaho, obtained her BA in Biology and Biomedical Physics at California State University Northridge. She is currently a doctoral student in the Physiology Department at the University of Utah. Her research focus is on the physiological role of pituitary adenylate cyclase activating polypeptide (PACAP) in the developing olfactory system. PACAP is an essential peptide in development and throughout life and is studied as a candidate for preventing the oxidative stress associated with neurodegenerative diseases. Without PACAP, the neonates often die before weaning age, directing that PACAP is required for normal development. For the past two years, Mavis used confocal calcium imaging of mouse olfactory bulb slices to identify the cell types and mechanisms mediating PACAP-induced modulation of calcium levels in olfactory bulb neurons and glia. Dr. Mary Lucero and Dr. Mike Michel are her mentors. Funding: NIH NIDCD *Disability Administrative Supplement* to R01 DC02994-8; NIH NIDCD ARRA Supplement to R01 DC02994-9; AChemS Minority and Disability Travel Awards.

OTHER UPCOMING SCIENTIFIC MEETINGS

Summer School Human Olfaction
Dresden, Germany
July 24-29, 2011
http://www.tu-dresden.de/medkhno/riechen_schmecken/summerschool_2011.htm

12th meeting on Chemical Signals in Vertebrates (CSiV XII)
Berlin, Germany
August 27-31, 2011
Website: http://tinyurl.com/CSiV2011
Contact: Martin Dehnhard, Dehnhard@izw-berlin.de
https://mail.vcollaborate.com/owa/UrlBlockedError.aspx

Polak Young Investigator Awards

The purpose of this award is to encourage and recognize innovative research at the Annual Meeting by young investigators. The Polak awards are funded by the Ilsje Werner-Polak Memorial Fund in memory of their niece, Ghislaine Polak gassed by the Nazis in 1944 at the age of 7 and the late Ernest Polak.

The Recipients of the 2010 Polak Young Investigator Awards were:
Daniel Wesson, *Boston University*
Fumiaki Imamura, *Yale University*
Kai Cheng, *NIH/NINDS*
Marco Tizzano, *University of Colorado Denver*
Rene Barro-Soria, *University of Miami*
Sanne Boesveldt, *Monell Chemical Senses Center*

AChemS Minority Travel Fellowship Awardees

Funded by a generous grant from the National Institute on Deafness and Other Communication Disorders and the National Institute on Aging, NIH

Juan Aggio, *Georgia State University*
Rhonda Bibbs, *Alabama State University*
FaMitah Buchanan, *Tennessee State University*
Norma Castro, *San Diego State University*
Wambura Fobbs, *Yale University*
Yaihara Fortis-Santiago, *Brandeis University*
Kristina Gonzalez, *Clark University*
Mavis Irwin, *University of Utah*
Isabel Perea-Martinez, *Miller University of Miami*
Ernesto Salcedo, *University of Colorado Denver*
Aleida Silva Garcia, *Philadelphia College of Osteopathic Medicine*
Natasha Spencer, *VISTA*
Tamika Wilson, *Monell Chemical Senses Center*

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1 Alfredo Fontanini receiving the Ajinomoto award from Bob Bursey
2 AChemS 2010 Award Winners
3 "I can't believe how much fun I'm having!"
4 Dick Doty and friends
5 Johannes Frasnelli and Eva Alden
6 Look before you leap!
7 AChemS 2010 President, Scott Herness
8 Theresa White, Rachel Herz and John Prescott

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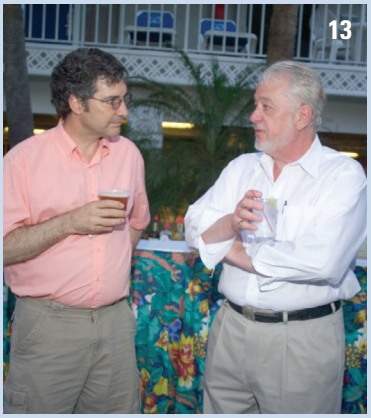
9 Jay Slack, Givaudan representative
10 Weihong Lin, Aurelie Vandenbeuch, Marco Tizzano and Sue Kinnamon
11 Minghong Ma, Matthias Laskas and David Willhite
12 2010 Program Chair, Bob Margolskee
13 Diego Restrepo and Charlie Greer
14-17 Enjoying the banquet



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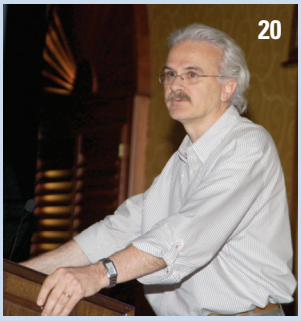

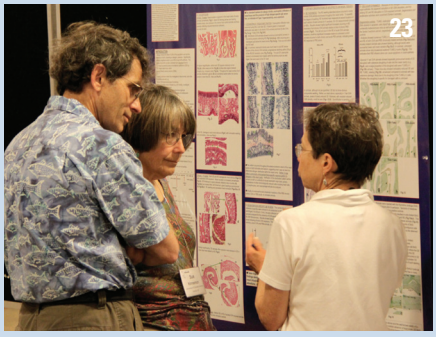

18 Robin Latham
19 Michael Shipley, Peter Brunjes, Richard Doty and John Hildebrand
20 Don Wilson
21 John Hayes, Tyler Lorig and Claire Murphy
22 Founding AChemS President Max Mozell at Yuri Yakov's poster. Photo Courtesy of Brad Formaker
23 Tom Finger and Sue Kinnamon visit poster. Photo courtesy of Brad Formaker.
24 Christina Zelano attracts a crowd: Photo Courtesy of Brad Formarker
25-27 Enjoying the banquet

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