AChemS
Association for Chemoreception Sciences
ANNUAL Newsletter
2013
FOSTERING CHEMICAL SENSES RESEARCH AND UNDERSTANDING SMELL AND TASTE IN HEALTH AND DISEASE

MESSAGE FROM THE PRESIDENT

Alan Spector, PhD, *President 2012-2013*

Tough Year.
Let's face it, it's been a tough year for chemosensory scientists. In July, we lost a great friend and advocate of chemical senses research at the National Institute on Deafness and Other Communication Disorders (NIDCD), Dr. Barry Davis. Barry served as Director of the Taste and Smell Research Program at the NIDCD since 1999. He helped all of us either directly or indirectly at one time or another. He will be sorely missed. As a tribute to Barry's many years of contribution to the chemical senses, both as a researcher and a Program Director, we are permanently renaming the grants workshop held every year at our annual meeting, a tradition that Barry started to provide advice to new investigators about the various funding mechanisms and review processes at the NIH, to *The Barry Davis Workshop: NIH Funding Opportunities for the New Investigator*. Although Barry leaves large shoes to be filled, Dr. Susan Sullivan is now very ably serving that role. We welcome Susan in her new position and wish her the very best.

Of course, the national budget crisis continues to loom as I write these words and this has had a paralyzing effect on biomedical research priorities and has posed significant hardships to many investigators, new and established alike. I urge all of you to contact your senators and congressional representatives and voice your concern. I nonetheless remain hopeful that, in the long run, the necessity and wisdom of maintaining a nationally supported scientific research infrastructure in this country will be realized by Congress. To help our members optimize their funding potential during this challenging period, I have asked the Federal Liaison Committee, newly chaired by Barry Ache, to facilitate the lines of communication between AChemS and federal funding agencies, most importantly the NIDCD. If you have suggestions or concerns about federal funding issues regarding chemical senses research, please share these with Barry. During these difficult times, it is important that we do our best to protect the future of our field by promoting the independent careers of our junior colleagues and keeping them afloat.

On The Brighter Side: This Year's Annual Meeting.
Many thanks to Paul Breslin and the Program Committee for organizing what promises to be a very exciting series of symposia and oral and poster sessions for our annual meeting in Huntington Beach, CA this April. The Executive Committee decided to forgo the Sunday morning sessions this year to allow attendees from the east coast an opportunity to return home at a reasonable hour. This was done last year and was generally well received. The Executive Committee also approved Paul's recommendation to forgo the opening banquet on the first evening and instead hold it on the last evening. This will allow us to celebrate the closing of our always invigorating meeting in a festive fashion. Accordingly, we will be starting the Welcome/Awards ceremony, followed by the Givaudan lecture, a little earlier than is customary so that everyone will have time afterwards to get dinner and catch up with friends and colleagues over some liquid refreshment. I encourage all of you to share your opinions on the new meeting format by completing the post-meeting survey.

Attendance at the meeting dropped significantly last year. This was likely due to a confluence of circumstances, including the fact that it was an ISOT year, declining federal research support, and the new meeting venue in California. Our annual meeting is the lifeblood of AChemS. The quality of the science is routinely exceptional. It is also a great vehicle for the professional development of our students and junior members. It is a place where investigators

continued on next page

can network and form new collaborations. It provides a platform where scientists from academia and industry can interact. As sensory science goes, we are a small but distinguished field. We need to all work together to keep the energy high and to promote and nurture our collective research interests. One of the best ways to do that is by attending the meeting. So please support AChemS and join us in Huntington Beach, CA this year.

Still On The Bright Side: Next Year's Annual Meeting.
Next year, we will be returning to Florida. The meeting will be held at the Hyatt Coconut Point in Bonita Springs, FL. The hotel is situated on the beautiful blue/green waters of Estero Bay and is 14 miles from Southwest Florida International Airport. The conference facilities meet our current needs exceptionally well and allow for growth. The staff appears friendly and competent. The amenities are quite extensive, some included in your registration fee (pools, putting green, evening fire pit, exercise room, tennis) and some will cost extra (kayaking, deep sea fishing, boat cruises, golf on the property). The rooms are undergoing renovation and the new design will include flat screen TVs, more modern furniture, queen-size instead of double beds (in addition to kings) and a mini-fridge in every room. There is plenty of self-parking which will be free for guests and for those staying in other hotels when they attend the conference. Of course, our members like to unwind at the end of the conference day and the bar area is perfect for our group. It includes a variety of very pleasant and extensive seating options both inside and outside. It will easily serve as the "Boathouse" for the next generation. The hotel provides a free boat shuttle across the bay to their private beach. The 15-min ride is really pleasant and fun and it doesn't take much luck to see a dolphin jumping or to skirt a school of manatee. The beach has an enclosed pavilion with changing rooms, rest rooms, and shade. Lounge chairs and umbrellas are also provided. The hotel has agreed to extend the hours that the boat service runs. There are 5 dining options on the property (plus room service) for various budgets and a nice assortment of off-site options scattered in the area, but the latter would require a car or a taxi. The Executive Office negotiated a very competitive contract for a hotel of this quality. We have signed a 4-year contract that commits us to two years with an option to be released from our obligation if the membership finds the venue less than optimal.

Our Finances.
Fortunately, despite the economy, AChemS remains fiscally secure. Our Treasurer, Joe Travers, along with the guidance of the Finance Committee has been reviewing our investment strategies and has been providing budget recommendations to the Executive Committee. We continue to benefit from the generous donation from the Polak family as well as from the NIDCD meeting grant, both of which contribute largely to our ability to keep the meeting registration fees extremely affordable for members and students. We are also grateful for the contributions from our corporate sponsors. That said, last year we encountered an anticipated budget deficit, and this year we are expecting yet another year in the red. Although this currently does not pose any significant fiscal risk to AChemS, clearly it is unsustainable. Accordingly, the Executive Committee endorsed some cost saving actions and also decided that we need to raise the registration fee modestly. It has been 8 years since the last increase. Please rest assured that the Executive Committee remains committed to keeping the registration fee affordable, especially during a time when funding pay-lines are poor.

Please stay engaged.
It has been truly uplifting to see the selfless devotion of so many working hard behind the scenes on the Executive Committee and on our various other committees helping to keep AChemS strong and vibrant. I am sincerely grateful for their efforts. Many thanks go to Tisha Kehn and Leslie Orvedahl from the Executive Office for their highly competent management of our organization. It has been my privilege to serve a scientific organization that has played such a fundamental role in my (continuing) development as a scientist. In a few months I will pass the gavel to John Glendinning who, I am certain, will provide exceptional leadership. More than anything, the health of AChemS depends on your involvement. Please volunteer and answer the call to service when the opportunity comes. Please keep your membership active even if you can't attend the meeting in a given year. And, by all means, please share your views on how AChemS can better serve its members and the chemosensory research community at large.

COUNCILOR'S REPORT

Haiqing Zhao, PhD and Christiane Linster, PhD, *Councilors*

During the 2012 annual meeting, AChemS hosted a mini symposium entitled "Olfaction in Health and Disease" as an Educational Outreach event. The symposium was held at UC Long Beach campus through the Osher Lifelong Learning Institute on April 28 from 3:00 to 5:00 pm. Two of our long-term AChemS members and world-renowned scientists presented at the symposium. Dr. Claire Murphy from San Diego State University spoke about olfaction loss and its relation to neurological diseases. Dr. Gordon Shepherd from Yale University discussed the perception of smell and flavor and their neural basis. Dr. Shepherd also had a book signing for his recent book, *Neurogastronomy*, at the end of the event. AChemS gives thanks to Drs. Murphy and Shepherd for their generous support, and to our previous Senior Councilor, Dr. Kevin Daly, for his effort and time in organizing this successful outreach activity. Due mainly to the tight budget, no outreach event will be held during this year's annual meeting.

The association tries its best to continuously support the attendance of students and young scientists to our annual meeting. This year, AChemS will provide full or partial support to some 52 domestic and international students through either the housing or the travel award. The Councilors have also selected 5 junior investigators to receive the Polak Junior Scientist Travel Award for $1,200 each.

SECRETARY'S REPORT

Julie Mennella, PhD, *Secretary*

Hello Everyone. I would like to take this opportunity to thank the members who contributed feature articles for this newsletter as well as those who submitted newsworthy items for posting on the "Science and Scientists in the News" section on our AChemS website. This section of the website continues to highlight the depth and breadth of the latest scientific findings in the chemical senses. Please continue to alert us of any press coverage related to your recent publications.

During the past year, the website was modified to include a section where donations can be made to AChemS. Expect even more changes in upcoming months, thanks to Dana Small, Debi Fadool and Mike Meredith who spearheaded efforts to increase functionality and give our website a makeover. The Executive Committee has approved this endeavor and we are exploring different re-design options at this point.

If you have expertise and/or opinions about this please weigh in. *See you in California!*

CHEMICAL SENSES REPORT

Wolfgang Meyerhof, PhD, *Editor*

Statistics:	2007	2008	2009	2010	2011	2012
Impact factor	1.896	3.041	3.031	2.327	2.599	
Original submissions	141	145	194	218	161	**147*#**
Avg. time from submission to 1st decision	33.53 days	31.32 days	27.43 days	27.62 days	29	**35**
Avg. time from submission to final decision	106.63 days	81.57 days	69.57 days	70.37	100	**95+**
Accepted articles	91	73	74	96	77	**62**
Accept ratio	**62.32%**	**51.77%**	**46.54%**	**46.15%**	**48%**	**42%**

**2 letter to editor, 138 original articles, 3 review articles, 3 commentaries*

 # No. of submissions: USA > Germany > France = China > Italy = Japan > Spain = UK; with submission rates from USA, France and Germany being constant, submission rates from Japan dropped down to 25%, submissions from Spain, Netherlands, and UK also declined

+ time required by authors to prepare revisions not included

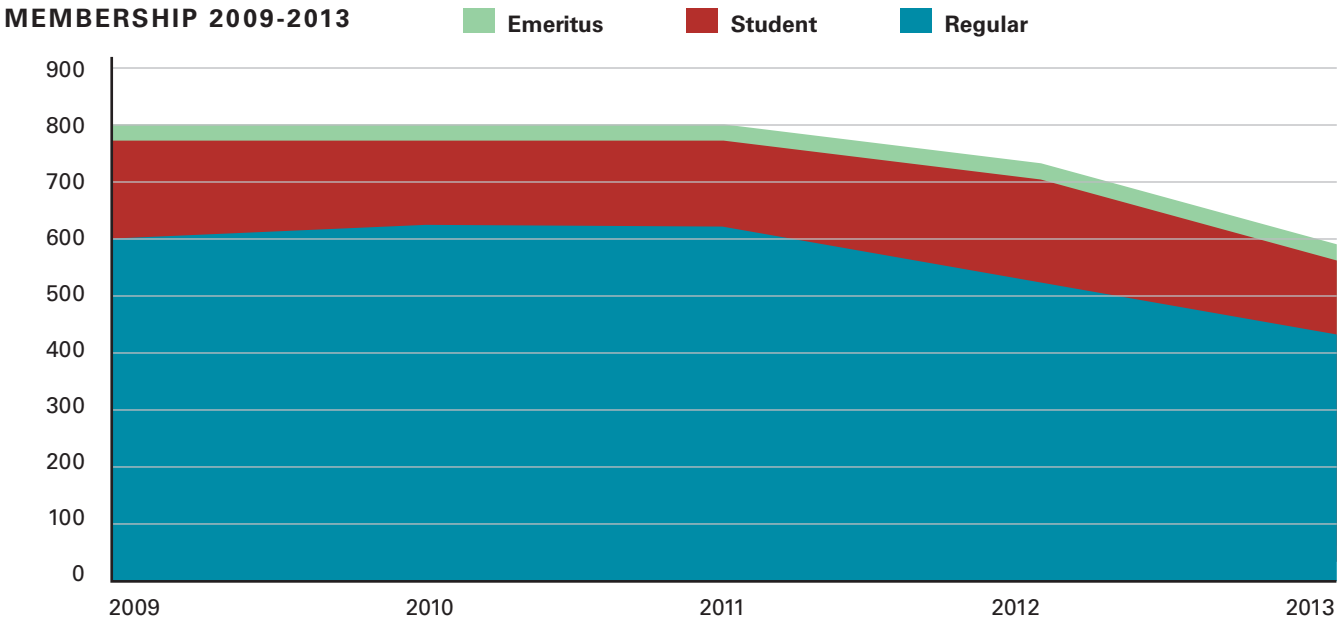
To do 2013: Rearrangement of editorial board

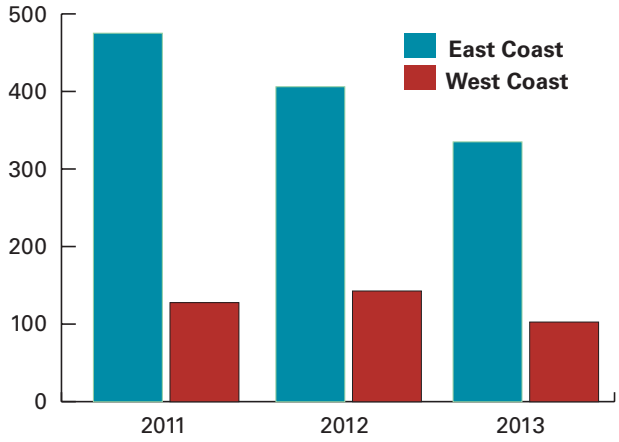
MEMBERSHIP REPORT

Submitted by: Dana Small, *Membership Chair*

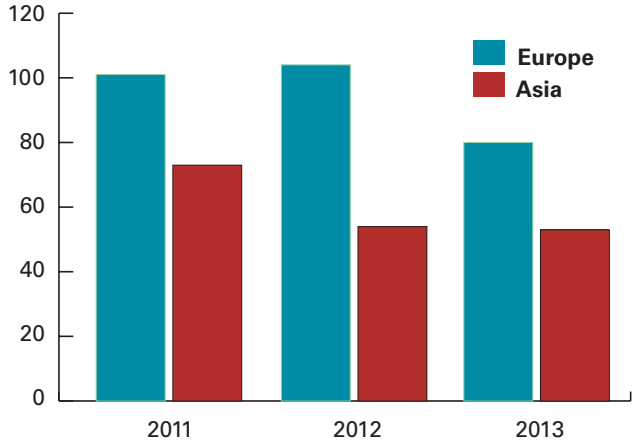
Membership Totals:
Membership was stable from 2009 to 2011. In 2012 membership dropped from 802 in 2011 to 727 in 2012. This drop likely reflects our move to the west coast and the competion with ISOT. Interestingly, the drop was entirely due to a decline in regular members (613 in 2011 to 539 in 2012). Student membership (renewing and new) was stable (165 in 2011 and 166 in 2012). Emeritus membership (renewing and new) was also stable (24 in 2011 and 22 in 2012).

The good news is that membership is up compared to this time last year. We currently have 598 members in good standing, whereas last year only 328 were in good standing. The number for 2013 depicted in the graph looks low because it reflects current totals (February) and is charted relative to numbers collected at meeting time in previous years (always higher). We are on track to see membership return to 2011 levels at the next meeting.





One reason we moved AChemS to the west coast was to increase west coast membership. To see if our experiment was successful I broke the numbers down by coast; east coast vs. west coast. West coasters represented 27% of the US membership in 2011, 35% in 2012, and 31% in 2013; however, if you look at the graph this is largely the result of decreasing east coast membership rather than the hoped for increase in west coast membership.



Finally, I was curious to see how the move to the east coast would affect European and Asian membership. Surprisingly European membership did not seem influenced by the move and Asian membership actually dropped.

PROGRAM CHAIR'S REPORT

Paul Breslin, PhD, *Program Chair*

The 2013 AChemS meeting will kick off on Wednesday, April 17th at 5:00 pm at the Hyatt Regency in Huntington Beach, CA, and will conclude with a closing banquet on Saturday evening at 7:00 pm. Like last year, there will be no AChemS activities on Sunday, April 21st.

As seasoned AChemS meeting veterans will note, Wednesday evening has been rearranged due to the banquet being held on Saturday. It will begin with the Welcome/Awards Ceremony at 5:00 pm and transition directly into the Givaudan lecture. There are no additional AChemS events after the Givaudan lecture, which is scheduled to end at 7:00 pm.

The Program Committee put forth much effort in planning the program this year and the result is an excellent selection of symposia, invited lectures, platform presentations and poster sessions. I look forward to seeing you there and am confident you will find the meeting both educational and enjoyable.

Many thanks to the Program Committee for all of their efforts and also to the AChemS Executive Office.

TREASURER'S REPORT: FISCAL YEAR 2011-2012

Joseph Travers, Ph.D, *Treasurer*

The financial status of AChemS is fundamentally sound. However for the fiscal year ending June, 2012, the independent auditors reported a net loss of $37,000. This loss was anticipated from moving the annual meeting to California and the simultaneous competition from the ISOT meeting. This year, to offset expected losses, the Executive Committee approved a modest increase in registration fees, however we still anticipate a loss from the meeting similar to last years.

On the bright side, UBS has been managing approximately $200,000 of AChemS assets. They have adopted a conservative approach that has yielded for the (2012) calendar year approximately $12,000 in dividends and interest, and an increase in the value of the portfolio of $13,000. The Finance Committee will continue to monitor the performance of the manager at UBS.

2013 Annual Meeting Events for Students and Junior Scientists

ACHEMS Student Social

Wednesday, April 17, 2013
7:30 pm (Following Givaudan Lecture)
in Pete's Sunset Grille Bar Area

Interested in meeting others at your same career stage? Want to know what it's like studying at a different university or in another country? Take a few minutes to relax with fellow students and discuss your research and the upcoming weekend events. Meet people to connect with throughout the conference. Or just come to enjoy a few drinks. This event is all about students. All undergraduate, graduate and post-doctoral students are welcome. Drink specials available; pay-as-you-go. RSVP not necessary, but appreciated: Melissa Murphy at **mam816@scarletmail.rutgers.edu**

Chemosensory Enterprise and Mentorship Alliance (CHEMA) Social

Friday, April 19, 2013
5:00 pm – 7:00 pm

Join us for this social event designed for junior and senior AChemS members to network and talk about issues important to junior scientists. Senior AChemS scientists willing to mentor junior members will attend. All AChemS members who have achieved an advanced degree (PhD, MD, DVM, DDS) within the last 10 years are automatically members of ChEMA. It's a relaxed way to talk one on one, or in a group, with AChemS members in your field who know the ropes. Food and beverages available for ChEMA mentors and mentees. RSVP when you register for the meeting online.

ANNOUNCEMENT OF 2013-2014

Rose Marie Pangborn Sensory Science Scholarship

One $15,000 Sensory Science Scholarship will be awarded for the 2013-2014 academic year to support a Ph.D. student who intends to teach and conduct research in the area of sensory science at the University level. This scholarship is awarded in honor of the memory of Professor Rose Marie Pangborn, who initiated the scholarship fund to encourage the education of Sensory Scientists intending to pursue academic careers.

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

Applications, including all required documentation must be postmarked no later than May, 1, 2013.

For additional information and application forms contact

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

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

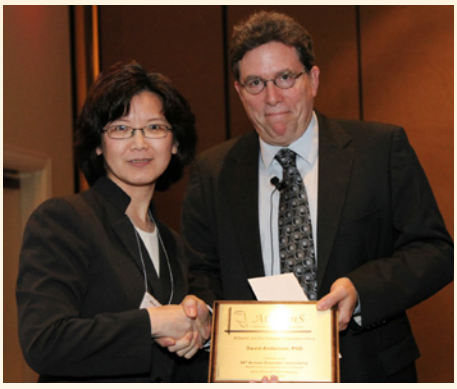
Application forms are also downloadable at:

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

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








2012 ACHEMS *Award Ceremony*

Yuzo Ninomiya, PhD

International Flavors & Fragrances (IFF) Award Winner

Research Focus

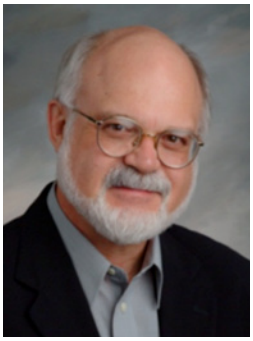
The main focus of my research has been to understand how the taste coding system works. My collaborators and I used a multidisciplinary approach combining techniques in physiology, molecular biology and genetics to understand the taste coding from signal detection in taste cells to signal transmission to taste nerves. Our genetic studies in early 1980's examined phenotypic variability in single taste fiber responses and behavioral responses of different mouse strains and provided the first evidence for existence of a genetic locus responsible for sweet taste of D-phenylalanine (*dpa*) in the mouse chromosome 4. This finding led to the subsequent identification of the *Sac* (saccharin preference) locus on the same chromosome 4, which was later found to encode the T1R3 sweet/umami receptor component by our and several other groups in 2001. Also, our physiological characterizations of the *db* (diabetes) locus in the same chromosome 4 at around 1990 led to our later findings of inhibitory modulation of sweet taste by leptin in 2000's. Our analyses of neural responses in genetically engineered mice over past 10 years helped to understand function of several proteins involved in taste reception, transduction and transmission (T1R3, Trpm5, $G_{gustducin}$, $G_{transducin}$, IP_3R3, PKDs, GPR40, GPR120 and P2X2/X3).

Recently, we developed an on-cell recording technique that allowed us to use the same taste cell to record taste-evoked activity, analyze gene expression, and measure transmitter release. By using this technique, we confirmed the expression of T1r3 gene in sweet/umami responsive taste cells, involvement of ENaC in NaCl responses of amiloride-sensitive taste cells, and roles of action potentials and a hemichannel, pannexin 1, in ATP release by taste cells.

Another focus of my research has been to understand the roles of taste signals in the regulation of food intake and nutrition. Leptin and endocannabinoids (EDs) are known as anorexigenic (reducing food intake) and orexigenic (stimulating food intake) mediators, respectively, that act via their receptors in the hypothalamus and limbic forebrain. We showed that taste cells also express the receptors for these mediators and responses to sugars and sweeteners are selectively suppressed by leptin, but enhanced by EDs via their cognate receptors. This suggests that reciprocal regulation of peripheral sweet taste reception by leptin and EDs may contribute to their opposing actions on food intake and energy homeostasis. Recently, my collaborators and I demonstrated that gut enteroendocrine cells and pancreatic beta cells express sweet taste receptor systems and activation of the sweet receptors facilitates nutrient absorption and triggers insulin secretion. We are currently studying on whether or not leptin and EDs would also act as modulators for these cells and influence nutrient absorption and hormonal secretion.

Acknowledgements

I would like to express my sincere thanks to the International Flavor and Fragrance Inc. and to the AChemS Award Committee for this great honor. The accomplishments of our lab in multiple research programs have depended primarily on the works by talented and hard working PhD students and postdocs. Among them, Keiko Yasumatsu, Noriatsu Shigemura, Ryusuke Yoshida, Tadahiro Ohkuri and Keisuke Sanematsu have greatly contributed to the development of new experimental techniques and now are opening new research fields through their efforts. I am fortunate to have been supervised by Profs. Yngve Zotterman, and Goran Hellekant in Sweden, and Masaya Funakoshi in Japan at the beginning of my work on neural basis of taste, and to have had great help from Prof. Bernd Lindeman at the later stage with my studies on cellular physiology. Also, I wish to thank my many collaborators and friends not only in Japan but also in the US and Europe who have helped to move my research in the direction of the molecular basis of taste: Drs. Toshiaki Imoto, Bob Margolskee, Gary Beauchamp, Sasha Bachmanov, Hiroaki Matsunami, Tom Finger, Sami Damak and Wolfgang Meyerhof. Finally, I am deeply grateful to the following foundations and companies for their ongoing financial support of my research: Japan Society of Promotion of Science, Ajinomoto Co. Inc, Nestle Research Center, and Mitsubishi Shoji Foodtech Co Ltd.



John Hildebrand, PhD

Max Mozell Award Winner

Research Focus

My interest in the chemical senses traces back to my childhood. My father, a scientific polymath who was educated as an organic chemist and specialized in the natural-products chemistry of essential oils and related flavor and fragrance chemistry, often brought home flavor and fragrance test samples for everyone in our family and our neighborhood to experience. For example, there were new perfumes and experimental chewing-gum flavors. The latter made me and my siblings popular with our fellow kids! And my father stimulated our interest by explaining what we were experiencing. Much later, as a graduate student in bio-organic chemistry working on mechanisms of enzyme reactions in bacteria at the Rockefeller University, I got interested in neurobiology, and especially insect olfaction, through recreational reading. It eventually dawned on me that I could combine my interests in chemistry, the nervous system, animal behavior, the sense of smell, and insects by choosing to work in the field of insect neurobiology and focusing on the olfactory system and the roles it plays in the lives of those creatures. And that's what I have been doing for more than 40 years. I enjoy telling my students, postdocs, and faculty colleagues that I'm a professor in a field, and an investigator of a group of animals, that I never studied formally during my education!

I was fortunate to be accepted to pursue postdoctoral research training in the then-new Department of Neurobiology at Harvard Medical School. In the late 1960s and through the 1970s, there surely was no more exciting and stimulating place to work in the fledgling field of neurobiology than that remarkable department. But I didn't launch myself into chemical-sensory research until I began my independent faculty career and started my own lab in 1972. I chose the giant hawk moth *Manduca sexta* as my research model system because of its large size, experimentally favorable nervous system, and predictable olfaction-dependent behaviors. *Manduca* and I have collaborated ever since. My group's research combines anatomical, behavioral, molecular and neurophysiological approaches in multidisciplinary studies of the functional organization, physiology, behavioral roles, and postembryonic development of the olfactory system in *Manduca*; chemical and sensory ecology of moth-host plant interactions; sensory neuroethology of feeding, mating, and oviposition; and the neurobiology and behavior of disease-vector insects. In recent years we have been interested mainly in the neural processing of sensory information about behaviorally significant, natural olfactory stimuli (typically complex mixtures) through the olfactory pathways in the moth's brain. That pursuit has taught me and my coworkers a lot, but perhaps no lesson has been clearer than our finding that the similarities of CNS circuitry and olfactory-information processing in moths and mammals are far more striking than their differences. Moreover, it matters greatly to me that while we study *Manduca* as a model system, in the tradition of the Krogh Principle, to learn about olfaction in general, at the same time we are discovering how olfaction serves the most important behaviors in the lives of insects. In doing that we are helping to understand how the many insects in our world that are either harmful or beneficial for human health and welfare go about their business.

Acknowledgements

With deep appreciation and gratitude, I acknowledge the many undergraduate and graduate students, postdocs, research staff, and collaborators without whom I would not have received this great honor. I also feel ever so grateful to have had as my scientific mentors John Law, Edward Kravitz, Christian de Duve, and the late Leonard Spector, Fritz Lipmann, and Stephen Kuffler. If I turned out to be a creditable scientist, it is thanks to them.

My many friends and colleagues throughout the world, and especially those in the AChemS family, have encouraged me and immeasurably enriched my scientific life. It is a signal honor to be recognized by my colleagues and allowed to carry the distinction of the Max Mozell Award. And without support for our work, it would not have been done. I thank NIDCD, NINDS, NIAID, NSF, DARPA, ARO, and USDA as well as Monsanto for enabling us to keep working for more than four decades.

Finally, the love, support, and joy in academic science and the arts that I share with my wife, Gail Burd, have sustained me and made it all fun and rewarding. She's the best of all the good things that have happened to me!

Juyun Lim, PhD

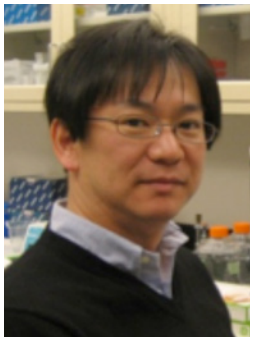
Moskowitz Jacobs Award Winner

Research Focus

My primary research interest is the roles of sensory, cognitive, and nutritional factors in flavor perception and hedonics. While I began my studies by focusing mainly on topics in taste perception, my more recent work has been aimed at understanding various aspects of taste-odor interactions, including the role of taste in retronasal odor referral to the mouth, the enhancement of retronasal odors by taste, the relative roles of taste and retronasal olfaction in flavor hedonics, and the importance of perceptual congruence in all of these interactions. I also have a strong interest in psychophysical theory, particularly as it pertains to optimizing the measurement of human perceptual and hedonic responses.

Acknowledgements

I would like to thank Moskowitz Jacobs Inc. for their sponsorship of this award. I would also like to express my sincere gratitude to my mentors and colleagues who have guided me in my development as a psychophysicist. I could not be here without their support, guidance, and encouragement. I owe special thanks to Mike O'Mahony, Harry Lawless, Bruce Halpern, and Barry Green.



Ichiro Matsumoto, PhD

Ajinomoto Award Winner

Research Focus

In humans, primary taste qualities are categorized into five: sweet, umami, bitter, sour, and salty. This is probably also the case with some other animal species. However, even among vertebrate animals there is a diversity of their feeding habitats that include carnivore, herbivore, terrestrial, aquatic, and so on. My research questions whether other vertebrate animals have sets of taste qualities similar to humans.

Recent molecular genetic studies in rodents revealed that the cells responsible for evoking sweet, umami, bitter, sour, and a part of salty taste sensations are mutually exclusive. Therefore, based on the current knowledge, the number of basic taste qualities seems to be equivalent to the number of types of taste cells. For about a half of taste cells, their function is still not identified in mice and these unidentified cells may be involved in reception of tastes other than the 5 basic taste qualities. The number of basic taste qualities may not be always five. The focus of my research is to understand variation in taste among the vertebrate species and to elucidate the molecular and cellular mechanisms responsible for the diversity of taste cells within and among species.

Acknowledgments

First of all, I wish to thank all the people who've supported my research as a mentor, a collaborator, and a friend, although there are too many to list them one by one. I'm sure I would not be here without them. Also, I'd like to thank the Ajinomoto Corporation and the AChemS Awards Committee for this honor. This Award encourages me to continue research in this field. Finally, I acknowledge the Ministry of Education, Culture, Sports, Science and Technology of Japan, the Danone Institute of Japan, NIDCD, and Monell Chemical Senses Center for their generous financial support.

Richard Benton, PhD

AChemS Young Investigator Award Winner

Research Focus

For several hundred million years, animal brains have undergone remarkable diversification in their structure and function. Brain evolution occurs because the properties of these biological information processors are constantly being challenged and optimised (through natural selection of their organismal hosts) by the demands placed upon them in the ecological niche in which they operate. My group is interested in defining the genetic mechanisms and environmental driving forces underlying the evolution of olfactory receptors, circuits and behaviours in *Drosophila* and other insects, with a view to obtain more general insights into the mechanisms of, and constraints on, nervous system evolution.

Acknowledgments

My lab is grateful for financial support from the University of Lausanne, a European Research Council Starting Independent Grant, the Swiss National Science Foundation, a Human Frontier Science Program Young Investigator Award and the European Molecular Biology Organisation Young Investigator .

Cecil "Jake" Saunders

2012 Don Tucker Memorial Award Winner

Research Focus

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

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

Acknowledgments

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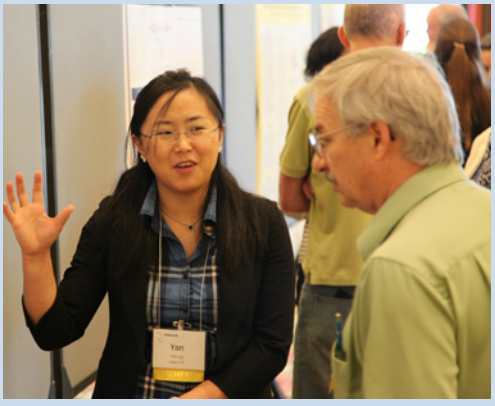

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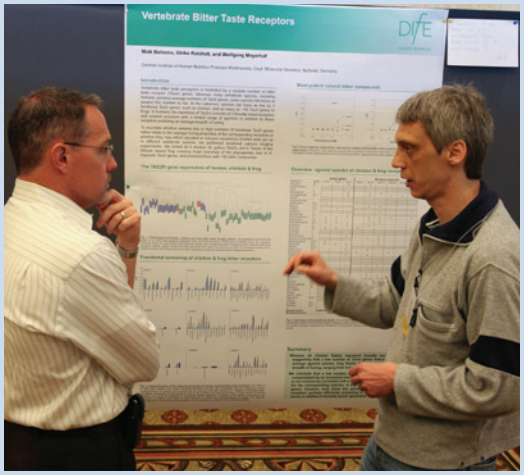

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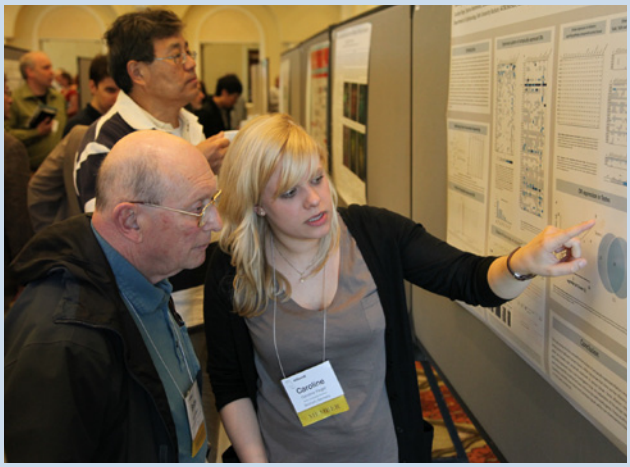

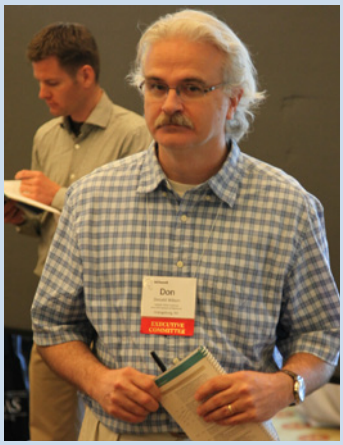




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