

## **BARRY W. ACHE, Ph.D.**

Distinguished Professor of Biology and Neuroscience

Founding Director of University of Florida Center for Smell and Taste



I have been active in chemical senses research since first assuming a faculty position at UF in 1978. For much of that time my work has been continuously funded by the NIH (NIDCD). In more recent years I have focused on understanding the cellular basis of odor coding in the olfactory periphery. My laboratory uses primarily electrophysiological, but also molecular, biochemical, and imaging approaches on crustacean, insect, and mammalian animal models to understand how natural, complex odor mixtures determine the output of olfactory receptor neurons. In collaboration with Dr. Jose Principe in the Department of Electrical

Engineering we also are studying a novel subset of spontaneously oscillating or 'bursting' olfactory receptor neurons that has the heretofore unsuspected potential to encode the spatiotemporal dimension of odor signals. In addition to contributing to our basic understanding of olfactory organization, this work opens the door to creating a new generation of electronic noses capable of not only recognizing but also locating an odor source. In addition to maintaining an active research program, through 2015 I was the Founding Director of the University of Florida's Center for Smell and Taste (UFCST) on campus, whose goal it is to integrate and foster chemical senses research across the University and the Southeast.

### **Education:**

1967-1970	Ph.D. in Behavioral Physiology, University of California Santa Barbara, Department of Biological Sciences
1965-1967	M.S. in Animal Behavior, University of Illinois Campaign/Urbana, Department of Zoology
1961-1965	B.S. in Biology, Albright College

### **Professional Experience:**

1999-present	Distinguished Professor of Biology and Neuroscience, Whitney Laboratory, University of Florida
1998-2016	Director, University of Florida Center for Smell and Taste
1986-present	Professor, Department of Zoology (now Biology), University of Florida
1986-present	Affiliate Professor, Department of Neuroscience, University of Florida
1984	Visiting Scientist, University of Konstanz, FRG
1983-1986	Affiliate Associate Professor, Department of Neuroscience, University of Florida
1980-1990	Assistant Director, Whitney Laboratory
1979	Visiting Scientist, Res. Sch. Biological Sciences, Australian National University
1978-1986	Associate Professor, Department of Zoology, University of Florida
1978	Visiting Associate Professor, Department of Zoology, Duke University
1975-1978	Associate Professor, Department of Biological Sciences, Florida Atlantic University
1970-1974	Assistant Professor, Department of Biological Sciences, Florida Atlantic University
1970	Instructor, Department of Biological Sciences, University of California, Santa Barbara

### **Research Interests:**

- Sensory biology- chemical senses (olfaction and taste)
- Olfaction - mechanisms of olfactory transduction and synaptic processing of odor information  
Intracellular signaling - second messenger- and ligand-activated ion channels.

### **Membership in Professional Societies:**

Society for Neuroscience  
Association for Chemoreception Research  
European Chemoreception Research Organization

### **Honors:**

NIH Predoctoral Fellowship, 1968-1970  
Grass Foundation Fellowship, 1972  
Claude Pepper Award, NIDCD, NIH, 1992  
Regensburger Universitätsstiftung Hans Vieberth Lectureship, Univ. Regensburg, 1993  
Alexander von Humboldt Foundation Humboldt-Prize, 1995 (received 1996)  
H. R. Wright Award in Olfactory Research, 1997 (received 1998)  
University of Florida Professional Excellence Program Award, 1998  
University of Florida Distinguished Professorship, 1999  
Outstanding Achievement in the Chemical Senses Award, AChemS, 2000  
Manheimer Award for Career Achievement in the Chemosensory Sciences, Monell Chemical Senses Center, 2002

### **National /International Professional Service (since 1987):**

- Regular Member, Sensory Disorders and Language Study Section, NIH, 1987-1991
- Program Chairperson, Association for Chemoreception Sciences, 1989
- Executive Chairperson, Association for Chemoreception Sciences, 1991-1992
- External Advisor, NIH/NIDCD Program Project Award, Univ. Colorado, 1992
- External Advisor, NIH/NIDCD Program Project Award, Harvard Univ., 1992, 1994
- Member, Committee of Visitors, Neuroscience Cluster, National Science Foundation, 1994
- Chairperson, Special Review Committee for Research and Training Centers, NIH/NIDCD, 1994
- Chairperson, Special Review Committee on Marine Biotechnology, American Institute of Biological Sciences, 1994
- Ad Hoc Panel Member, Sensory Disorders and Language Study Section, NIH, 1994-1998
- Chairperson, Gordon Conference on the Chemical Senses, 1996
- Associate Editor, Primary Sensory Neuron, 1996-
- Chairperson, International Commission on Olfaction and Taste, 1994-1997
- Member, Committee of Visitors, Division of Integrative Biology and Neuroscience, National Science Foundation, 1997
- Executive Editor, Chemical Senses, 1997-2008
- Associate Editor, Journal of the Association for Research in Otolaryngology, 1999-2005
- Member, Strategic Planning Committee, Association for Chemoreception Sciences, 2000
- Chair, Special Emphasis Review Panel, NIH/NIDCD, 2000
- Ad Hoc Member, ICFN-4 Study Section, NIH/CSR, 2000
- Ad Hoc Member, various Special Emphasis Panels, NIH/CSR and NIDCD, 2000-present
- Member, National Advisory Council, National Institute for Deafness and Other Communication Disorders (2003-2007)

### Recent Publications (2010-Present):

**Ache, B.W.**, Hein, A.M., Bobkov, Y.V., and Principe, J.C. (2016). Smelling Time: A Neural Basis for Olfactory Scene Analysis. *Trends in Neurosciences*; Oct;39(10):649-655. doi: 10.1016/j.tins.2016.08.002. Review. PMID:27594700

Ukhanov, K., Corey, E., **Ache, B.W.**, (2016). Phosphoinositide-3-Kinase Is the Primary Mediator of Phosphoinositide-Dependent Inhibition in Mammalian Olfactory Receptor Neurons. *Front Cell Neurosci*; Apr 11;10:97. doi: 10.3389/fncel.2016.00097. PMID:27147969

Park, I.J., Hein, A.M., Bobkov, Y.V., Reidenbach, M.A., **Ache, B.W.**, Principe, J.C. (2016). Neurally encoding time for olfactory navigation. *PLoS Comput Biol*. Jan 5;12(1):e1004682. doi: 10.1371/journal.pcbi.1004682. PMID: 26730727

Corey, E.A. and **Ache, B.W.** (2016). Comparative olfactory transduction. In: Zufall F and S Munger, eds. *Chemosensory Transduction: Detection of Odor, Taste, and Other Chemostimuli*. Elsevier Academic Press, San Diego. <https://doi.org/10.1016/B978-0-12-801694-7.00012-3>.

Ukhanov, K., Bobkov, Y., Corey, E.A., **Ache, B.W.** (2014). Ligand-selective activation of heterologously-expressed mammalian olfactory receptor. *Cell Calcium*. Oct;56(4):245-56. Doi:10.1016/j.ceca.2014.07.012. Epub 2014 Aug 4. PMID: 25149566. PMCID: PMC4188773.

Bobkov, Y., Corey, E.A., **Ache, B.W.** (2014). An inhibitor of NA(+)/Ca(2+) exchange blocks activation of insect olfactory receptors. *Biochem. Biophys. Res. Commun*. Jul 25;450(2):1104-09. Doi:10.1016/j.bbrc.2014.06.120. Epub 2014 Jul 1. PMID: 24996179. PMCID: PMC4112011.

Park, I.M., Bobkov, Y.V., **Ache, B.W.**, Principe, J.C. (2014). Intermittency coding in the primary olfactory system: a neural substrate for olfactory scene analysis. *J Neurosci*. Jan 15;34(3):941-52. doi: 10.1523/JNEUROSCI.2204-13.2014. PMID: 24431452. PMCID: PMC3891969.

Park, I.J., Bobkov, Y.V., **Ache, B.W.**, Principe, J.C. (2013). Quantifying bursting neuron activity from calcium signals with blind deconvolution. *J Neurosci Meth*. May 24. doi:pil: S0165-0270(13)00190-8. 10.1016/j.jneumeth.2013.05.007. Epub 2013 May 24. PMID: 23711821. PMCID: PMC3877933.

Ukhanov, K., Corey, E.A., **Ache, B.W.** (2013). Phosphoinositide 3-kinase dependent inhibition as a broad basis for opponent coding in Mammalian olfactory receptor neurons. *PLoS One*. Apr 9;8(4):e61553. doi: 10.1371/journal.pone.0061553. Print 2013. PMID: 23585911; PMCID: PMC3621990.

Pask, G.M., Bobkov, Y.V., Corey, E.A., **Ache, B.W.**, Zwiebel, L.J. (2013). Blockade of insect odorant receptor currents by amiloride derivatives. *Chem Senses*. Mar;38(3):221-9. doi: 10.1093/chemse/bjs100. Epub 2013 Jan 4. PMID: 23292750; PMCID: PMC3569625.

Corey, E.A., Bobkov, Y., Ukhanov, K., **Ache, B.W.** (2013). Ionotropic crustacean olfactory receptors. *PLoS One*. 8(4):e60551. doi: 10.1371/journal.pone.0060551. Epub 2013 Apr 3. PMID: 23573266; PMCID: PMC3615998.

Bobkov, Y., Park, I., Ukhanov, K., Principe, J., **Ache, B.W.** (2012). Cellular basis for response diversity in the olfactory periphery. *PLoS One*. 7(4):e34843. doi: 10.1371/journal.pone.0034843. Epub 2012 Apr

13. Erratum in: PLoS One. 2012;7(4): doi/10.1371/annotation/b7163295-4bf4-4ddc-8a17-044c6eb54a5d. Park, III [corrected to Park, II]. PMID: 22514675; PMCID: PMC3325939.

Ukhanov, K., Bobkov, Y., **Ache, B.W.** (2011). Imaging ensemble activity in arthropod olfactory receptor neurons in situ. *Cell Calcium*. Feb;49(2):100-7. Epub 2011 Jan 12. PMID: 21232792; PMCID: PMC3050052.

Ukhanov, K., Brunert, D., Corey, E.A., **Ache, B.W.** (2011). Phosphoinositide 3-kinase-dependent antagonism in mammalian olfactory receptor neurons. *J Neurosci*. Jan 5;31(1):273-80. PMID: 21209212; PMCID: PMC3079265.

Bobkov, Y.V., Corey, E.A., **Ache, B.W.** (2011). The pore properties of human nociceptor channel TRPA1 evaluated in single channel recordings. *Biochim Biophys Acta*. Apr;1808(4):1120-8. Epub 2010 Dec 29. PMID: 21195050; PMCID: PMC3062711.

**Ache, B.W.** (2010). Odorant-specific modes of signaling in mammalian olfaction. *Chem Senses*. Sep;35(7):533-9. Epub Jun 2. Review. PMID: 20519266; PMCID: PMC2924424.

Bobkov, Y.V., Pezier, A., Corey, E.A., **Ache, B.W.** (2010). Phosphatidylinositol 4,5-bisphosphate-dependent regulation of the output in lobster olfactory receptor neurons. *J Exp Biol*. May;213(Pt 9):1417-24. PMID: 20400625; PMCID: PMC2856499.

Brunert, D., Klasen, K., Corey, E.A., **Ache, B.W.** (2010). PI3Kgamma-dependent signaling in mouse olfactory receptor neurons. *Chem Senses*. 2010 May;35(4):301-8. Epub Feb 26. PMID: 20190008; PMCID: PMC2854420.

Corey, E.A., Bobkov, Y., Pezier, A., **Ache, B.W.** (2010). Phosphoinositide 3-kinase mediated signaling in lobster olfactory receptor neurons. *J Neurochem*. Apr;113(2):341-50. Epub 2010 Feb 2. PMID: 20132480; PMCID: PMC2941884.