Biology of Chemosensory Systems (3 credits)
708Q/339D, Fall, 2013

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http://www.clfs.umd.edu/biology/aranedalab/

Office Hours: Mon 5:00-6:00*

*If this time is a conflict, I can arrange a meeting at another time. Please send me an email (raraneda@umd.edu) to schedule an appointment. Students with disabilities should contact Dr. Araneda during the first week of class to discuss special accommodations. Communication among course participants is essential. I want to hear your comments, criticisms, questions, etc. I am always available via the Canvas site and during the office hours.

OBJECTIVES
The chemical senses play an important role in mammalian physiological processes, including feeding, sexual behaviors and homeostasis. The significant role of these sensory systems to human life is often underscored by our lack of understanding of the biology underlying chemoreception. Although we usually associate chemosensation to olfaction and taste, several other chemosensory systems play an important role in basic physiological functions.

In this course will cover a wide range of chemosensory systems including olfactory, gustatory, pheromonal, gastrointestinal and central chemosensation. Lectures and paper discussions of these topics will emphasize recent advances in transduction mechanisms, neural processing and the organization of central pathways. We will also correlate these biological aspects of chemosensation to their function in physiological and pathological states.

This is a graduate course, seminar style, and therefore participation from students is very important. You are invited to actively engage in the course by asking questions and bringing useful knowledge that complements our learning goals.

PREREQUISITES
BSCI353 (undergraduates), or an equivalent neuroscience course (graduate students). There are no books associated with the book, but students are encouraged to read the selected reviews provided for the course.

LECTURES
Monday, Wednesday @ 2:00 – 3:15 PM in BPS 1230

A PDF of the slide presentation used for the lecture will be made available the day before the lecture (Files: Lectures folder). Please note that sometimes this PDF file may
not contain all the material covered in the lecture. The lecture schedule is posted online and also includes links to supplemental materials that complement these lectures (e.g. reviews).

Each Wednesday one or two student(s) will lead the discussion of two papers relevant to the field (see below). Student presentations will begin on September, Wednesday 11.

CANVAS WEB SITE
Students are expected to routinely access the course canvas site. In this site you will find relevant links and course materials. Please feel free to share any relevant audiovisual material with the rest of the class (video, magazine article, etc). You can ask content questions by posting them on the Ask Dr. Araneda. Confidential questions may be sent using a direct email.

If you have difficulty accessing or using the site, please contact the OIT or elms Helpdesk via the web or by calling 301-405-1400.

EXAMINATIONS
Midterm: Monday, October 28
Final: Wednesday, December 11

The midterm is an in class exam spanning materials from the olfaction and taste lectures, in particular the papers discussed in class.

For the final, students will present a science project that can have any of the following formats.

• A scientific review summarizing recent findings in one of the areas discussed in class.
• A grant proposal, with two specific aims, that test hypotheses developed from a research topic in the discussion papers.
• A preview or "news and views" of a recently published paper
• Art work, for example a digital design for a webpage or a short video (i.e. commercial), highlighting one of the topics discussed in class.

A part of the grade for the final exam, students will give a short presentation of their proposal to the whole class (December 11). The final is due on December 14. For projects involving writing, these should be limited to two pages, single space (not including figures and references).

GRADES
An important component of the final grade is class participation:

Examinations = 100 points
Discussion = 20 points

Participation and Attendance = 80 points

STUDENT PRESENTATIONS
Class meetings on Wednesday consist of student presentations. A previously committed student(s) will lead the discussion of two papers. Although, one student is in charge of leading the paper presentation, everyone is expected to read the papers and contribute to the discussion. The presentation should be complemented with background information.

A Final Note
I am dedicated to making this course an enjoyable and worthwhile learning experience for everyone. To do well in this course you must attend the lectures and actively participate in the discussion meetings. Please, arrive on time! If you arrive more than 15 min late you will lose partial attendance points for that day.
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<thead>
<tr>
<th>DATE</th>
<th>LECTURE/DISCUSSION</th>
<th>PAPER ASSIGNMENTS</th>
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<tr>
<td>4-Sep</td>
<td>Welcome &amp; Organization</td>
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<td>9-Sep</td>
<td>Chemical Senses Overview</td>
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<td>11-Sep</td>
<td>Discussion</td>
<td>1&amp;2 (Araneda)</td>
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<td>Main Olfactory System I</td>
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<td>18-Sep</td>
<td>Discussion</td>
<td>3&amp;4</td>
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<td>30-Sep</td>
<td>The Vomeronasal system and Pheromones I</td>
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<td>2-Oct</td>
<td>Discussion</td>
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<td>7-Oct</td>
<td>The Vomeronasal system and Pheromones II</td>
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<td>9-Oct</td>
<td>Discussion</td>
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<td>14-Oct</td>
<td>Gustation I (invited)</td>
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<td>16-Oct</td>
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<td>21-Oct</td>
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<td>Flavor</td>
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<td>4-Nov</td>
<td>Invertebrate Chemosensation</td>
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<td>6-Nov</td>
<td>Discussion</td>
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<td>11-Nov</td>
<td>SFN</td>
<td>15&amp;16</td>
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<td>13-Nov</td>
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<td>18-Nov</td>
<td>Gastrointestinal Chemoreception</td>
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<td>20-Nov</td>
<td>Discussion</td>
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<td>25-Nov</td>
<td>Central Chemoreception</td>
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<td>27-Nov</td>
<td>Discussion</td>
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<td>2-Dec</td>
<td>Social Behaviors and Chemoreception (invited)</td>
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<td>4-Dec</td>
<td>Discussion</td>
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<td>9-Dec</td>
<td>Evolution of Chemosensation</td>
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<tr>
<td>11-Dec</td>
<td>FINAL (Presentation of projects)</td>
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PAPERS FOR DISCUSSIONS

General


Main Olfactory System I


Main Olfactory System II


The Vomeronasal System and Pheromones I


The Vomeronasal System and Pheromones II


Gustation I

**Gustation II**


**Invertebrate Chemosensation**

15- Sato, K., M. Pellegrino, T. Nakagawa, et al. (2008) "Insect olfactory receptors are heteromeric ligand-gated ion channels". Nature 452:1002–1006


**Gastrointestinal Chemoreception**


**Central Chemoreception**


**Social Behaviors and Chemoreception**
