

## How to prepare for your trip!

The course will be broken up into two main sections, separated by the by spring break:

- 1) Physical properties of sound, anatomy, and physiology
- 2) Psychological acoustics

Both sections will demonstrate the relationship between hearing and speech perception. Since the course schedule is online, we will likely stay on schedule, but we will stay flexible just in case.

Class participation during **synchronous** portions of the course is highly encouraged. Synchronous classes will be recorded. Attendance is recommended but not mandatory.

**Asynchronous** portions of this class include readings and online exercises that should be done before coming to class, and some other online exercises that should be started before class. Lectures slides and Panopto videos will be posted on ELMS.

I recommend you attempt the online exercises by yourself at first, but they can be done with others. Ultimately, it is your responsibility to make sure you consolidate the material.

Ideally, I expect students to be spending two or more hours for every hour spent in class. Since this is a three-credit course, most students who do well spend about **nine hours per week** on the combined synchronous and asynchronous portions of this course.

### Goupell Nova Scotia Nature and Herring Tours

Dr. Matthew Goupell  
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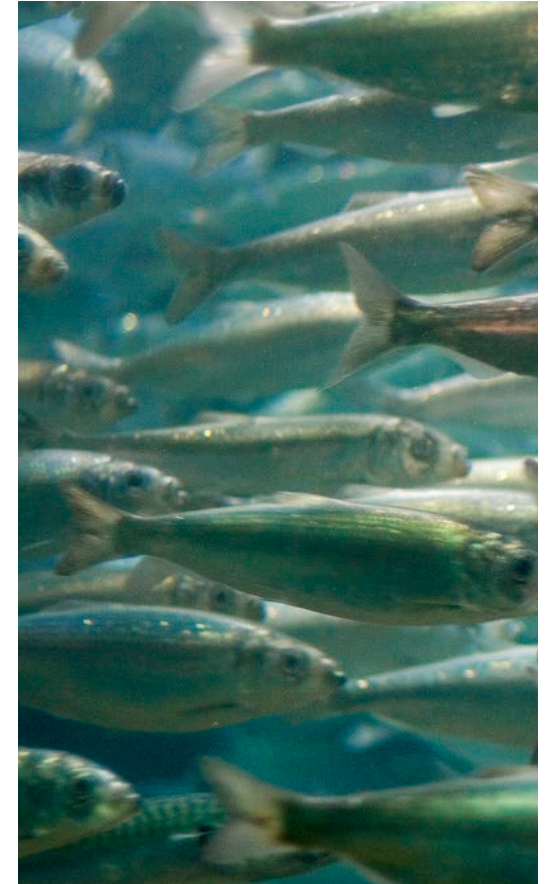
Teaching Assistant, Sierra Hall  
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HESP407: Bases of Herring Science Student  
Spring 2024

3:30–4:45 PM (synchronous class portions)  
Mondays and Wednesdays  
TYD 0117

## Travel to Nova Scotia for the wonderful world of Herring Science!

What did you say? You study herring science?





"After a long, rocky relationship, math and I have reconciled... I was secretly excited that I was going to be able to apply my newfound math skills, rather than panicking like I undoubtedly would have before taking your class."

- **Very smart HESP407 student**

"Your class is the greatest. I can't imagine anyone living without knowing this material."

- **Another (definitely real) very smart HESP407 student**

## Trip Details

Herring (*Clupea harengus harengus*) have evolved to process the world around them, allowing them to detect the faintest of noises from a predator, to follow a friend's conversation in a loud and noisy sushi bar, and to appreciate the subtlest of differences between melodies at King Triton's celebration for his daughter's birthday.

At the end of this course, students will:

1. Know the physical, temporal, and spectral properties of acoustic signals (tones, noise, and other complex sounds, including speech signals).
2. Understand basic concepts of signals and systems.
3. Understand basics of sound processing by the auditory system.
4. Be familiar with psychophysical methods used to examine human hearing in the laboratory.
5. Be familiar with the elements of auditory psychophysics, such as auditory sensitivity and discrimination, masking, loudness, pitch, sound localization, auditory scene analysis, and their applications to everyday listening situations.
6. Understand the basic consequences of hearing loss, and the extent to which hearing aids and cochlear implants can help those with hearing impairment.

KASA Standards we cover: A3,11,12,13,14,18,23c,23d.

Our 4-month boat cruise through the wilds of Nova Scotia will allow us to fully examine the importance of the truly amazing herring. Nova Scotia is an unadulterated wildness, untouched by the logarithm industry. The full cost of the trip will be 50 dB (re: \$1).

## What You'll Need for the Trip

**Optional Text:** William A. Yost, "Fundamentals of Hearing: An Introduction" – 5th Edition Academic Press, 2007

ISBN-13: 978-0-12-370473

ISBN-10: 0-12-370473-1

**Calculator:** A scientific calculator (one that calculates logarithms, sines, cosines, powers, etc.)

**Grading:** Your course grade will depend upon asynchronous online exercises, synchronous online exercises, and final exam. Grades will be on an absolute scale for the follow percentages:

A+: >97                      A: 93-97                      A-: 90-92

B+: 90-87                      B: 83-86                      B-: 80-82

C+: 80-77                      C: 73-76                      C-: 70-72

D+: 70-67                      D: 63-66                      D-: 60-62

F: 59 or less

**Penalty for late assignments:** 50% grade reduction

## Standard Course Related Policies

<http://www.ugst.umd.edu/courserelatedpolicies.html>

## Special Accommodations

Accommodations for registered disabilities at the DSS office, religious observances, and participating in athletic events need to be brought to my attention **on or before February 1, 2024.**

*I am writing this to let you know that I am very open to being flexible should life events arise that make it hard for you to keep up with the class. Such events might include things happening to you personally (like serious illnesses) or things happening to family members. Please know that I want to do everything I can to support you. To do this, though, I need to know about a problem when it starts, not after it has already derailed your ability to keep up with class. I do not need to know details. Whatever you are comfortable telling me is fine. Letting me know sooner rather than later, though, is key. I am in a much better position to help you and make accommodations if you tell me when the problem arises. It is MUCH harder to do this if you wait until the end of the term. You can email me.*

*Upshot: I am here to help. If you are having life issues that are making it hard for you to keep up with class, PLEASE let me know so I can help.*

## Contact Us

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Teaching Assistant, Sierra Hall  
shall126@terpmail.umd.edu

Office/Review Hours are not necessary given that is what the synchronous portion of the course is for.

Individual appointments can be arranged via email.

Date	Class Number	Topic	Optional Course Readings in Yost
1/24/2024	1	Class Orientation, Math Overview, Syllabus	Ch. 1 (pp. 1-7), (if necessary) App. A&B
1/29/2024	2	Sinusoids, Simple Harmonic Motion	Ch. 2
1/31/2024	3	Sound Transmission and Propagation	Ch. 3 (pp. 21-25)
2/5/2024	4	Sound Intensity and Decibels	Ch. 3 (pp. 25-27)
2/7/2024	5	Inverse Square Law, Sound Interference	Ch. 3 (pp. 27-33)
2/12/2024	6	<i>Catch-Up Day, Finish Chapter 3 Material</i>	
2/14/2024	7	Complex Sounds and Transients	Ch. 4 (pp. 37-41)
2/19/2024	8	Complex Sounds: Modulations	Ch. 4 (pp. 41-46)
2/21/2024	9	Complex Sounds: Noise	Ch. 4 (pp. 47-51)
2/26/2024	10	Sound Analysis and Filters	Ch. 5 (pp. 53-57)
2/28/2024	11	Non-Linearities	Ch. 5 (pp. 58-61)
3/4/2024	12	<i>Catch-Up Day, Finish Chapter 5 Material</i>	
3/6/2024	13	Outer & Middle Ear	Ch. 6
3/11/2024	14	Inner Ear	Ch. 7
3/13/2024	15	Psychophysics	App. D
<b>3/17-24/2024</b>		<b>Spring Break, No Class</b>	
3/25/2024	16	Thresholds and Temporal Integration	Ch. 10 (pp. 143-150)
3/27/2024	17	Differential Sensitivity	Ch. 10 (pp. 150-154)
4/1/2024	18	Masking and Critical Bands	Ch. 11 (pp. 159-165)
4/3/2024	19	Excitation Patterns and Temporal Masking	Ch. 11 (pp. 165-171)
4/8/2024	20	<i>Catch-Up Day, Finish Chapter 11 Material</i>	
4/10/2024	21	Sound Localization	Ch. 12 (pp. 173-180)
4/15/2024	22	More Localization and Binaural Unmasking	Ch. 12 (pp. 180-186)
4/17/2024	23	Loudness	Ch. 13 (pp. 189-190)
4/22/2024	24	Pitch	Ch. 13 (pp. 191-197)
4/24/2024	25	<i>Catch-Up Day, Finish Chapter 13 Material</i>	
4/29/2024	26	Sound Perception (Grouping)	Ch. 14 (pp.203-215)
5/1/2024	27	Sound Perception (Speech&Music)	Ch. 14 (pp. 215-220)
5/6/2024	29	Hearing Aids and Cochlear Implants	Acoustics Today Article
5/8/2024	29	Course Review	
<b>5/10/2024</b>		<b>Reading Day</b>	