# Ling 272: Biophysics of Language
## [Is Language Unique to Humans?]

Instructors: J. Uriagereka (juan@umd.edu); A. Fishbein (afishbein87@gmail.com), J. Locke (jelocke2@gmail.com)
Website: elms.umd.edu Companion book: *Biolinguistic Investigations* (Uriagereka, Routledge, 2018)

**DESCRIPTION:** A classical debate concerns whether natural (human) language is unique. While natural communication systems are common, the specific properties witnessed in human language have not been easy to find in other species. **This I-series course debates that question**, different sides of which (extreme or synthesizing) are left for students to take. The only precondition is that the matter be approached scientifically, starting with notions from the Computational Theory of Mind. Depending on the majors students seek, insights from linguistics, paleo-anthropology, cognitive psychology, animal behavior, neuroscience, molecular biology, biophysics, etc., may be brought to bear on how an abstract systematic behavior can arise within an animal brain, and what that says about language and evolution.

**PREREQUISITES:** This is an interdisciplinary class, in which participants **need not have an extensive backgroun**d. At the same time, **a general interest in some of the topics** under discussion is expected. Participants ought to bring their own interests to a question that can be approached from many angles, thus contributing to the formation of a few different affinity groups, in consultation with the professor.

**FORMAT:** Prior to the Midterm, the focus is on presenting language foundations, through **guest lectures from experts on campus.** These are accompanied by reading assignments and involve preparatory presentations by the instructors and subsequent group discussions. The class is to **divide into affinity groups, to pursue the topic from a given perspective, such as: (i) animal behavior, (ii) paleoanthropology, (iii) comparative physiology, (iv) paleogenomics**--or others depending on interest.

The Midterm is an **"open forum" discussion in the class chatroom,** with a **"position" statement** from each group and individual reactions (limited to 200 collective words and an extra 100 in rebuttals).

After the Midterm, affinity groups are to visit identified groups (labs, museums, the zoo or aquarium) or any other information source previously discussed with the instructor, with "hands on" goals.

Affinity groups then collectively **write a report of their investigation** (with context, results, and discussion as relevant). In addition, groups are expected to come up with a ***proposal*** for an original experiment of their own, within the area of expertise pursued in their visits and investigation.

Thereafter, the class will engage in an analysis--in the specific Wikipedia Foundation format--of a wikipedia *topic related to the investigation the course has pursued.* The final project will be the **students' written assignment on the Wikipedia topic, with edits accumulated in the process.**

An individual, hand-written, in-class final will cover **the Wikipedia topic and the proposed experiment.**

**Course Goals:** Students succeeding in the class should be able to:

- Critically evaluate the human & animal cognitive behavior literature (on communication & thinking).
- Gain skills related to the analysis & production of written scientific studies.
- Formulate arguments related to central issues in the language sciences and science more generally.

**Carillon Mission:** Carillon Communities creates an inspiring and supportive living and learning environment for first year students. Carillon promotes academic success and innovative thought. In Carillon, students consider their own interests and knowledge, and become more active agents in their own education.

**Grading and Assignments**

Grading is based on eight criteria (assignments turned in via ELMS and exams in class).

| Assignment | Proportion | Description |
|---|---|---|
| Lecture Reflections | 10% | <1 paragraph written discussion of guest lectures. |
| Quizzes | 5% | Multiple choice questions about lectures & readings. |
| Group Discussion | 5% | Contributions to & engagement in group topic. |
| **MIDTERM** | 15% | "open forum" in chatroom, w/ "position" statement from groups & individual reactions. |
| Group Presentation & Lab Report | 10% | Group power-point (5%) & individualized report (5%) of external visit. |
| Experiment Proposal | 15% | 1 page (group) experimental proposal. |
| Wikipedia Work | 15% | Group work on Wikipedia topic. Results may be posted on Wikipedia after proofread by instructor. |
| **FINAL** | 25% | Hand-written, in-class, final asking about (a) experiment and (b) Wikipedia Project |

Note on **collective work:** Each affinity group will establish an informal (one or two paragraph) "**group contract**" **that** will **be checked by the instructors** prior to establishing a collective grade.

Unjustified late assignments will be accepted by the next available class with a 50% penalty, and not thereafter. If a student believes to have a *university-sanctioned exception* to a late assignment policy, or will miss a class or exam due to an excused absence, they should make this known as soon as possible by emailing the instructors, and providing the appropriate documentation as needed.

Please see the undergraduate catalogue for description of grades, and other policies and procedures:
http://www.umd.edu/catalog/index.cfm/show/content.section/c/27/ss/1584/s/1534

**GENERAL GRADE RANGES (FROM - to +): A: 85-100%, B: 70-85%, C: 55-70%, D: 40-55%, F: <40%**

**Communication about This Course**

Students are responsible for keeping their email address up to date and must ensure that forwarding to another address functions properly. Failure to check email, forwarding errors, or returned email are the student's responsibility, and do not constitute an excuse for missing announcements or deadlines.

**Selected Bibliography [To be updated]**

Brainard, M. & T. Fitch, 2014. 'Editorial overview: Communication & Language,' *Curr. Op. Neurobiol.* 28.
Cox, R., J. McGlothlin & F. Bonier, 2016. 'Hormones as mediators,' *Integr. & Comp. Biol.* 56.
Foster, P. & C. Renfrew, 2006. *Phylogenetic Methods & the Prehistory of Language,* Cambridge.
Gallistel, R. & A. King, 2009. *Memory and the Computational Brain*. Wiliey-Blackwell.
Hauser, M.; N. Chomsky & T. Fitch, 2002. 'The faculty of language,' *Science* 298.
Kayser, J. 2013. 'RNA helps resurrect ancient DNA,' *Science* 342.
McBrearty, S. & A. Brooks, 2000. "The revolution that wasn't,' *Jour. Hum. Evolution* 39.
Noble, D., E. Jablonka, M. Joyner, G. Müller & S. Omholt, 2014. 'Evolution evolves,' *Jour. Physiol.* 592.
Pinker, S. & R. Jackendoff, 2005. 'The faculty of language: What's special about it?' *Cognition* 95.
Snowdown, C.2017. "Learning from Monkey "Talk",' *Science* 330.
Sun, R. 2018. "The Origins of Behavior,' *Inference*, 3-4.
de Waal, F. 2017 *Are We Smart Enough to Know How Smart Animals Are?,* W.W. Norton.
Wynn, T. and F. Coolidge, 2011. 'Implications of Working Memory Model,' *Int. J. Evol. Biol*.

**Expected Course Schedule**
**[Topics may vary slightly depending on students majors & interests]**

| Month | Presenter | Topic | Syllabus | Assignments |
|---|---|---|---|---|
| September | Instructor [Other names below used as examples that may vary] | What is Language? | General Introduction | |
| | | | Hauser et al. (2002) Pinker & Jackendoff (2005) Intro to *Biolinguistic Investigations* | *What is Language?* Quiz & Lecture reflection |
| | J. Fritz | Animal Behavior | DISCUSSION, Brainard & Fitch 2014, Snowdon 2017, Sun 2018, ch. 8 of *Bioling. Investigations* | *Animal Behavior* Quiz & Lecture reflection |
| | M. Leone | Paleo-anthropology | DISCUSSION, McBrearty & Brooks 2000, Wynn & Coolidge 2008, ch. 7 of *Bioling. Investigations* | *Paleo-anthropology* Quiz & Lecture reflection |
| October | B. Hodos | Comparative Physiology | DISCUSSION, Noble et al. 2014, Cox et al. 2016, ch. 6 of *Bioling. Investigations* | *Comp. Physiology* Quiz & Lecture reflection |
| | P. Johnson | Paleo-genomics | DISCUSSION, Forster & Renfrew 2006 Intro, Kaiser 2013, ch. 9 of *Bioling. Investigations* | *Paleo-genomics* Quiz & Lecture reflection |
| | **MIDTERM** | | | |
| | Protagonist | Theme | Syllabus | Assignment |
| | Entire class | Framing Debate: Is recursion elsewhere? | COLLECTIVE DISCUSSION OF MIDTERM POSITIONS<br>AFFINITY GROUPS ORGANIZE PRELIMINARY HYPOTHESES, WITH INPUT FROM CLASS AS RELEVANT | Affinity Group *Revised* Position Papers |
| November | Affinity Groups | Delving Deeper with Professionals | WITH HELP FROM INSTRUCTOR, AFFINITY GROUPS ORGANIZE VISIT CAMPUS OR LOCAL LIBRARIES, LABS, MUSEUMS, AND OTHER RELEVANT SITES | Detailed Note taking of visits |
| | Affinity Groups | Reporting Findings | AFFINITY GROUPS PRESENT TO CLASS RESULTS FROM COLLECTIVE "SCOUTING EXPEDITION" | POWER POINTS |
| | Entire class | Wrapping up Experimental Proposal | DISCUSSION OF WIKIPEDIA PROJECT | Wiki Article Draft<br>Wiki Peer Review |
| December | Entire class | Wrapping up Experimental Proposal | EXPERIMENT PROJECTS & DISCUSSION | Experiment Proposal Writeup |
| | Affinity Groups | Wrapping up Wiki Project | FINAL DISCUSSION OF WIKI PROJECTS | Wiki Article |
| | Entire class | | Class wrap-up & preparation for final | |
| | **FINAL** | | | |

## *COURSE POLICIES*

Full participation in the class is expected. Students should contribute to course discussions, do assignments in a timely fashion, and participate in group activities. Students should read all assigned materials before the class in which they're going to be discussed, enough to discuss them effectively in class. Missing class without being previously excused normally leads to lose participation points in the course, or more generally to miss crucial information to succeed academically.

### *Technology*

Students are expected to bring a copy of materials being discussed every day. Whether these are paper or electronic is up to students' discretion. If students choose to bring their own laptop in order to read the papers, it is obvious that it must not be used for other purposes (email, Facebook, etc.); doing so may entail losing the privilege to bring such technology into the classroom. Students must also avoid using cell phones or other hand-held electronic devices during class, as this will harm the quality of the discussion. If students need to use a recording device, they must speak to the instructors first.

### *Course Evaluation*

Student feedback about this course is very important. As this is a new class, instructors anticipate to give students ways to provide feedback during the course itself. The most important campus-wide evaluation is the online evaluation at the end of the semester. Towards the end of the semester, CourseEvalUM will be open to students to complete their evaluations at www.courseevalum.umd.edu.

### *University Policy*

For details on university policies (on students with challenges or disabilities, academic dishonesty, copyright, religious observance and more), visit **www.ugst.umd.edu/corserelatedpolicies.html**