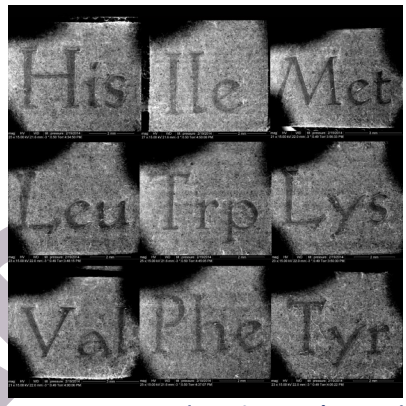
ARTS 409H /BIOL 409L:

Art & Science: *Merging Printmaking and Biology*

Fall 2018, M/W 11:15-2:00 (lab time included) (Alternative time possible 2:30-5:15)
Location: 301 Hanes Art Center (John C Henry Print Studio) and 214 Coker Hall (a Biology lab)

Course Details



Georgia Titcomb (UNC '14, Art/Biology)
Beta-amyloid protein
Letterpress, electron microscopy, photography

4 credit-hour Honors course (3 credits in ARTS, 1 in BIOL)
Students must register for both parts of the course — ARTS 409H and BIOL 409L — these are co-requisites.

Class cap: 16

Prerequisites: (1) Either a 200-level ARTS course OR BIOL 201 or 202, and (2) Permission of instructors.

General Education Requirements Satisfied:

- EE (Experiential Education)
- VP (Visual and Performing Arts)

Professors

ARTS409H and BIOL409L are both co-taught by professors Beth Grabowski from Studio Art and Bob Goldstein from Biology:

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Bob Goldstein
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Course Description

The title of this class, Art and Science, implies an intersection of two disciplines. Intrinsic to both is an investment in close observation, experimentation and visual analysis. While organized around meaningful connections between art and science, the course will actively consider disciplinary differences, especially with regard to what constitutes creative and scientific research.

ARTS409H and BIOL409L will bring together art majors and science majors to learn theory and practical skills in both art and science, and to make use of this learning to make artworks using a variety of printmaking techniques. Units in this course are organized according to topics in biology. As students learn specific biological concepts and practical lab skills, they will gather and generate visual information and pose questions that arise from scientific looking. This will become the source material (images, processes and ideas) for printmaking projects.

In the print studio, the course will introduce specific technical approaches within three categories of printmaking: intaglio (photogravure), relief (large-scale wood cut and/or letterpress) and stencil printing (screen-printing). Students will learn how to make printing matrices (plate, block or screen), how to print these matrices and explore the affordances of these technical skills (print strategies) as unique approaches to art-making.

Throughout the course, students will engage in artistic ideation to develop images through iteration involving trial and error, critical and aesthetic analysis. While generating ideas and images for projects, we expect students to learn from the professors, from each other, and from reading, about topics in both art and science. We expect students to enjoy challenging themselves by considering questions that arise from this merger:

Questions include:

- **What are the intersections of biology and printmaking?** What new ideas can arise out of this hybrid?
- **What does it mean to think like a biologist or a printmaker?** How is thinking for science or art different than/same as each other? Both disciplines engage in creative thinking; how does each discipline consider this process? How do we define originality?
- **How do ideas develop in each discipline, specifically with regard to visual analysis?** How do photography, graphic analysis or visual presentations of data function in each discipline? What disciplinary objectives mediate image manipulation? How does a printmaking matrix translate information? What the similarities and differences of how images communicate scientifically and artistically? What are the didactic and subjective dimensions of imaging? How does style, form, scale and context mediate understanding or interpretation?
- **What questions arise out of using scientific process and scientific imagery as a resource for art-making?** What questions and consequences arise from repurposing of scientific information (imagery and data) or process (microscopy, experimentation, etc.) toward artistic ends? Where do scientific and artistic frameworks overlap and depart? What is the role of subjectivity? Does this inform our understanding of science?
- **How can the tools and methods of one discipline shape the understanding of a concept in the other discipline?** How can curiosity, adaptive thinking, and repurposing strategies both within each discipline or borrowed from the other reveal new possibilities? Can thinking as an artist benefit the process of research in science, influencing for example the kinds of questions asked in research, or creative experimental design?

Course Structure

The class is organized around a series of studio printmaking projects that are informed by specific topics in biology. Each project begins with an immersive experience in the Biology lab and is prefaced by readings, presentations and/or experiments. Students will be expected to develop a solid understanding of the scientific ideas that will later serve as points of departure or interpretation in the art-making process. Learning will continue in the printmaking studio as students work with the source material generated in the laboratory experience to create images using specific printmaking techniques. Students will be free to work with the resource information in a myriad of ways, including a didactic aesthetic approach or one that may interpret or expand on the scientific source. Students are expected to contribute by collaboratively sharing ideas, images, questions, strategies, and solutions.

Each project unit comes with an assignment sheet outlining readings, materials needed, and a detailed calendar for lab sessions, technical demos, work days and due dates. These will be posted on the Sakai site at the conclusion of the unit just finished. Students are required to access this sheet and read it thoroughly prior to the class that begins the unit. The final project of the semester asks students to engage in an active and guided but individually focused inquiry. The challenge will be to think adaptively about not only scientific imagery, but also potentially about processes, tools or research methodologies as a way to interpret printmaking processes.

The semester culminates with a public exhibition of one or more works produced during the semester.

Schedule and Learning Objectives

	Topic	Biology Objectives		Printmaking/Art Objectives	
		Biological learning	***Lab skills***	***Art/aesthetic theory***	***Printmaking Skills***
Project 1 4 weeks	Microscopic worlds	Understand light, optics microscopic life biological diversity biological pattern formation	Experiential learning, develop capacities: Light microscopy Building a microscope Imaging living materials Plankton tow Photomicrography	Formal concepts (visual language) Generative Matrix Replication (multiple) & variant Delay Layers and Juxtaposition The photographic voice	Photoshop Intaglio printing (Photogravure)
Project 2 5 weeks	Biological motion	Understand microscopic and macroscopic biological motion Inertia, viscosity, Reynolds number governing biological motion	Experiential learning, develop capacities: Time-lapse and high-speed recording of biological motion Analyze: Data analysis and visualization using Image-J	Data visualization & interpretation/response back to analog forms Structures to denote time in 2-d (Sequence, series, State-prints, juxtaposition, layering)	Screen printing Layered printing Relief printing Woodcut and Letterpress (Possible Steamroller project)
Project 3 6 weeks	Final project- student selected topic that brings two disciplines together – Science understanding determines artistic approach	Understand explored issues in depth, unique to each student, guided tutorial-style through relevant biological literature	Create images customized to project to use for matrices for art project	Adaptive tinkering: Repurposing image, process and/or structure for artistic end. The modular print	Screen printing Alternative matrices Alternative inks Alternative supports (printing on fabric, glass, Print as means to another end (e.g. stop-motion animation, installation, book forms)

We will keep to this schedule as much as we can and will notify students if changes are unavoidable.

COURSE LOGISTICS, REQUIREMENTS & EXPECTATIONS

Information and Communication

Sakai: This class has a Sakai site that contains course documents (readings, technical handouts and informational handouts), links to relevant websites and video tutorials, and a forum for announcements. All written work is submitted in your individual Dropbox folder on Sakai.

One-to-one communication: Given that the class has 6 contact hours weekly, it is often possible to carve a few minutes out during lab or studio time for simple matters. Both professors are available for consultation individually as needed; please contact them directly to make an appointment for outside-of-class consultation

After-hours emergencies: dial 911 for life-threatening situations. **Print Studio**: Contact print Lab Manager, Brian Gardner for all else. **Biology lab**: Contact EH&S for any other lab safety emergencies: 919-962-5507.

Required Components

INTEGRATED LAB/STUDIO PROJECTS

Three integrated projects (outlined above) provide the structural backbone of the course.

1. The first project, Microscopic Worlds, introduces students to both laboratory and studio environments and sets up the questions that will govern the semester inquiry. Particular emphasis will be places on the nature of observation and interpretation of visual information.
2. The second project introduces concepts of biological motion and time with two additional forms of printmaking. This project specifically looks at the affordances of printmaking and artistic structures to suggest motion (and implicitly, time).
3. The final project turns a great deal of choice over to students and asks them to apply and expand on previous learning of concept and/or methodology, toward a project of their own design.

READINGS

Students will be assigned readings from both scientific literature and art relevant to each unit. In particular, the final project demands an independent inquiry, and readings will be identified relevant to the ideas being explored and developed.

WRITING COMPONENT

Work in this class carries minimum of 10 pages of writing, distributed between the three projects. This writing will be assessed for demonstration of learning scientific concepts and lab skills for your BIOL409L grade, and the remaining writing and the art will be assessed for demonstrating your learning of art/aesthetic theory and skills as a component of each project grade used for ARTS 409H.

The writing falls into two broad categories; proposal and self-evaluation.

Proposals: These are brief documents (1-2 pages) that identify the points of departure for the project at hand. They will be expected to demonstrate what has been learned about the scientific topics, including theory and insights gleaned from laboratory experience. The proposal concludes with how this understanding initially informs or intrigues the artistic exploration.

Self-evaluations After each project critique, students will complete a self-evaluation form (available on Sakai.) In addition to responding to specific questions on the form aimed at the understanding of

science, students will reflect on issues relevant to their interpretation of the science used to develop images and to the development of artistic voice.

Procedure for submitting written work:
All written work must be submitted to individual Drop Box folders on Sakai. Sakai records when items are posted and this time-stamp determines whether items have been submitted on time. Post-critique self-evaluations must be submitted within 3 days of the critique for full credit. Late evaluations receive partial credit.

EXHIBITION/PRESENTATION

In lieu of a final exam, work produced during the semester will be presented in a public exhibition. We will have a celebratory opening for this event, which will be open to everyone. During the opening (or possibly during another publically-scheduled event), students must be available to answer questions about their work. The exhibition will also provide the forum for a final critique, which takes place during the time scheduled for the final exam for the course. At this session, students will make brief presentations of their final projects.

PORTFOLIO DOCUMENTATION

All visual work produced will be documented in a digital portfolio, which will be submitted via the Sakai Drop Box at the end of the semester. This is required before final grades can be submitted. Missing final e-portfolios will earn an incomplete until submitted.

Attendance / Workload / Participation

ATTENDANCE POLICY

Everyone is expected to attend all class meetings, including biology lab sessions, studio presentations and technical demonstrations and open studio time. Attendance is recorded on a daily sign-in sheet. It is your responsibility to sign in on the attendance sheet. **This will be the only record of your attendance**. Up to three absences may be made without jeopardizing your grade, EXCEPT for critiques, which are mandatory (see below). Further absences–*for whatever reason*–will lower your final grade by a half-letter grade per absence. Save your absences for when you really need them such as illness, emergencies or official absences for things like team sports or job interviews.

Critiques Formal critiques are scheduled at the conclusion of each project assignment. Failure to participate in the formal critiques *WILL* adversely affect your course grade. If you have some serious problem or official reason as defined by the UNC Attendance Policy that causes you to miss a critique date, let us know about it. Please discuss any pre-planned, unavoidable conflict for critique dates. If your reason for missing a critique is not one of these officially sanctioned reasons, your work that was due for the critique will be considered late and your project grade will be affected.

TIME COMMITMENT

The average student spends *a minimum* of four hours outside of class each week. Exceptional students will often spend 9 hours (or more) outside of class each week.

CLASS PREPAREDNESS & PARTICIPATION

In a great class, each student is working at her or his personal best, focusing on the intellectual and creative possibilities inherent in the discipline. An intense lab/studio environment–full of hardworking people eager to try new things and to share insights–tends to bring out the best in everyone's work. The information that flows here is not one-directional from teacher to student; each person in the class has a role in and responsibility toward making the class better. In a class like this, your most valuable

feedback will usually come to you via informal conversations and class discussions. To participate fully means making a commitment to your curiosity and sense of exploration.

To be precise about it, make sure you are attending to these specifics:

- Come to class prepared: homework (readings, preparatory work, etc.) done, materials on hand, ideas in *visual* form, and work in progress.
- Participate in critiques with (finished) work and voice
- Cooperate with the demands of a communal shop and lab. Strive to be aware of the shop and lab conditions outside of your own needs; adopt a "leave it better than I found it" attitude with regard to clean-up.

A Note about the Creative Process as part of Preparation

We expect to see evidence of your creative process throughout the semester. The creative process has several parts:

Ideation Ideation is the generative stage of the process. Ideation is divergent thinking, where you are exploring a range of possibilities visually (photographs, collecting samples, thumbnail sketches, models/prototypes, story boards, concept maps etc.) and verbally (conversation, brainstorming webs, list-making…). In this class, you will be thinking through science with an eye toward artistic application. While in the laboratory or studio, strive for a meta-awareness of your own thinking process–write things down, make sketches or use your phone technology for voice memos or photos to remember things. Ultimately aim for a critical mass of "stuff"–this includes imagery, text, material and formal options, and technical approaches–that will allow you to explore new combinations. Usually first ideas represent the clichés (the low-hanging fruit if you will). To paraphrase Linus Pauling, to really have good ideas, it is important to have a lot of ideas.

Focus & Iteration Moving from divergent thinking you will introduce limits to provide a framework for your most promising ideas. Sometimes this segues naturally from the ideation process, but it is often the most difficult step because it means putting other good ideas aside when you don't necessarily know which idea is the most promising. Wallowing in indecision is not an option; it is important to commit and start. Your idea can further evolve as you begin to realize its details. You might even "fail," but you will always learn something.

This act of commitment also contains a component of fear. Fear of looking silly, of going down a dead end, of not having a "good" idea that the teacher will like… if you are honest with yourself, you know what these fears might be. So what to do? The fact is that by definition, creative processes are about going to something unknown, so fear is *always* part of the equation. The thing to acknowledge is that fear will be along for the ride, but it doesn't have to drive.

Execution Good craft takes time. Guerilla (in the stealth of the night just before a crit) printing rarely gives you the opportunity to recover if mistakes occur. Making the work is really just an extension of focus. You may find that you have false starts, or that clarity arises as you engage the work. Sometimes you actually figure out how you "should" have done something after you finish. This is par for the course in any learning experience. If something comes easily, it either means that: you are brilliant, you didn't challenge yourself, and/or you have time for another variation. As you understand the steps of technical process, there are some tasks that can be done alongside earlier steps (that might not depend on having figured out an approach completely). Sometimes these might be defined by the project parameters.

Assessment/Grading

The two parts of the class, ARTS 409H and BIOL 409L, both use the following percentages to arrive at a grade. Although the course exists as an integrated whole, the ARTS component focuses on the assessment of the work of art, and the BIOL grade primarily uses the written components to determine the final course grade.

Grade Breakdown:

Project #1 ..... 25%
Project #2 ..... 30%
Project #3 ..... 35%
Participation/Overall growth 10%

Projects and overall assessment will be averaged according to the above percentages. Letter grades will be assigned at the end of the semester on the typical 10-point scale: 90 and above for A, 80 and above for B, 70 and above for C, 60 and above for D. For grades of A through C, plus and minus grades will be assigned for 3 points on either side of each border (i.e. 87 to below 90 for B+, 90 to below 93 for A-, etc), except that A is the highest possible grade. Attendance may be a mediating factor. All grades are contingent on submission of the final e-Portfolio as described previously.

Written components (proposal and self-evaluation) will be assessed for demonstrated evidence of scientific understanding. An initial review of proposals allows correction of any misconception of scientific understanding, which should be addressed in the project self-evaluation.

Project Grades: Artwork produced in each unit will be subject to critique and assessment as projects are due. Each assignment will be graded on a 100-point number scale. Specific rubrics with point valuations will be provided for each assignment. The written component relevant to the development of the artwork will be a component of the project grade.

Revisions Often, the critiques provide useful feedback that enables a revision strategy. Although not required, students are encouraged to follow up on feedback as time allows. If you decide to revise, the original (or documentation of the original) along with a statement explaining your concept of what has improved the solution must accompany any revisions. Revisions may be submitted at any time before the end of the semester. Any late work or work not previously submitted is not allowable for revision.

Participation and Overall Growth This 10% component of the grade assesses the overall trajectory of work done in the class. For most students, this is an opportunity to account for demonstration of understanding and insights that occur across the semester, particularly as technical skill develops both in the lab and the print studio. For instance, printing technique might improve over the course of the semester and this component of the grade allows acknowledgement of that growth even though it might not be demonstrated in a specific assignment. It also reflects commitment to enhancing the overall learning experience as evidenced by preparedness, and relevant contributions to discussions and critiques.

Your semester's grade is dependent on several variables:

- **Overall grasp of key tools, methods, and concepts in the biology lab and print studio**. Sensitivity towards tools, materials, and process. Demonstration of increasing ability/transformation over the span of the semester.
- **Visual composition/design**. Sensitivity to placement and visual context, resolution of visual elements in printed work, perplexity, and inventiveness with visual possibilities.

- **Printing technique**. Technical execution, control and consistency of inking, registration, economy of means, systematic thinking, respect for materials, appropriate standard of craft.
- **Conceptualization, development of ideas**. Depth and range of experimentation, improvisational response through proofing and work in sketchbook (use of multiplicity, sequence and variation as a means of furthering ideas) Understanding of and follow-through on criticisms as reflected in subsequent work.
- **Participation/Performance in class and critiques**. Understanding of concepts presented in class as reflected in verbal articulation and written reflections. Attendance, punctuality (on time to class, projects finished on time, self-evaluations submitted on time,) and perseverance. Effort to understand, ask questions. Willingness to take risks and push out of your comfort zone.
- **Responsibility**, Self-motivation and involvement, ability to focus and pace yourself constructively, ability to collaborate and glean insights from group endeavors, ability to identify new directions for personal growth. Responsiveness to a group studio setting; contribution to the communal responsibilities of the lab/shop.
- **Good writing**: Thoughtful and well-written (organized and checked for grammar, fragments & spelling.)
- **Independent investigation beyond assigned work**, willingness to rework and improve projects, outside readings, outside parallel projects.

Honor Code

All students are expected to follow the guidelines of the UNC honor code. In particular, students are expected to refrain from "lying, cheating, or stealing" in the academic context. If you are unsure about which actions violate that honor code, please see us or consult https://studentconduct.unc.edu/