

Art & Science: Merging Printmaking and Biology

Fall 2020, M/W 12:00-2:45 (lab time included)

Location: 301 Hanes Art Center (John C Henry Print Studio) most days, and 214 Coker Hall (Biology lab) on occasion

Lab Manager: Mark Soderstrom: masoders@email.unc.edu

COURSE DETAILS

- 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.
- Prerequisites: (1) Either a 200-level ARTS course OR BIOL 201 or 202, and (2) Permission of instructors.
- 3.0 minimum GPA required for Honors course
- General Education Requirements Satisfied:
 - VP (Visual & Performing Arts)
 - EE (Experiential Education)

Professors

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

Beth Grabowski

311A Hanes Art Center

beth.grabowski@unc.edu

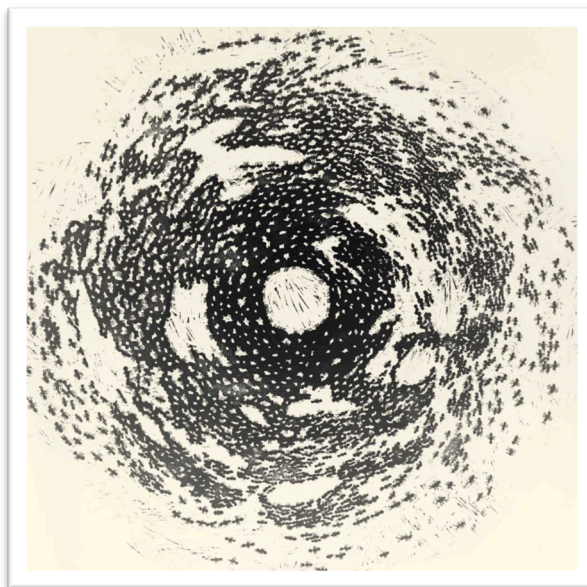
(919) 274-5831 (cell)

Bob Goldstein

616 Fordham Hall

bobg@unc.edu

(919) 428-8442 (cell)



Zita Voros, *Ant Mill*,
2018
woodcut, 48" x 48"

COURSE DESCRIPTION/STRUCTURE

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. The course actively considers both meaningful connections between art and science as well as disciplinary differences, especially with regard to what constitutes creative and scientific research and interpretation/analysis of visual information.

ARTS/BIOL 409H/L brings art majors and science majors together to make artwork that arises out of scientific inquiry. Because the class is comprised of students with varying levels of art and science experience, we operate with an attitude of "meeting you where you are at". Projects are designed with latitude for individual interpretation. You will work hard, but at a level appropriate to your experience.

Units in this course are organized according to topics in biology and begin with science learning, often in the Biology lab. In the process of learning specific biological concepts and practical lab skills, you will gather and generate visual information and pose questions that arise from scientific looking/thinking/analysis. You will augment these lab sessions with individual research appropriate to your science background to both build some science knowledge and generate the source material (images, processes and ideas) for the printmaking projects. This gathering stage of the art project will hopefully generate more than you might end up using in the print projects. You will be free to work with this information in a myriad of ways, including a didactic approach, pure aesthetics, or one that may interpret, expand on or even complicate and question the scientific sources in narrative or poetic manners. We will discuss what these terms and options mean within a broader exploration of the creative process.

In the print studio, the course introduces specific technical approaches to several types of printmaking (relief, stencil and intaglio processes). Students will learn how to make printing matrices (block, screen or plate) and how to print these matrices both in traditional ways and with an attitude of "print strategies" that take advantage of the affordances of printmaking in a more alternative use of printmaking.

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 readings 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? Creativity and the creative process?
- **How do ideas develop in each discipline, specifically with regard to visual analysis?** What are the similarities and differences in how images communicate scientifically and artistically? What are the didactic and subjective dimensions of imaging? How does a disciplinary framework mediate attention? How do photography, graphic analysis or visual presentations of data function in each discipline? How does a printmaking matrix translate information? 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 objectives overlap or depart? What about subjectivity? How does it 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? It is easier to consider the ways science can inform art-making, but 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?

General Education Objectives

(text from Undergraduate Ideas in Action curriculum document)

As part of the General Education curriculum satisfying the Creative Expression, Practice, and Production, this course will enable students to engage in individual and collaborative creative exploration and expression in visual art. This focus capacity asks students to engage with tools, techniques, methods, design processes, technologies, and materials for creating works that express, innovate, or create solutions to problems. The above learning goals encompass the University's objectives for this General Education requirement:

Questions for Students

1. What processes and practices can I use to produce meaningful expression or effective solutions with lasting impact?
2. How does collaboration and teamwork change or enhance the creative process?
3. How does a design strategy affect or enhance the creation and evaluation of a work of value?

Learning Outcomes

1. Compose, design, build, present, or perform a work that is the result of immersion in a creative process using appropriate media, tools, and techniques.
2. Explain the roles and influences of creativity, technologies, materials, and design processes in the creation of knowledge, expression, and effective solutions.
3. Evaluate their own and others' creative work to demonstrate how critique creates value in creative domains.

Overview Schedule and Learning Objectives

TOPIC	BIOLOGY OBJECTIVES		PRINTMAKING/ART OBJECTIVES	
	<i>Concepts</i>	<i>Lab skills</i>	<i>Art concepts</i>	<i>Technical</i>
PROJECT 1 Microscopic Worlds 5 weeks	UNDERSTAND: <ul style="list-style-type: none"> • light, optics • microscopic life • biological diversity • biological pattern formation 	EXPERIENTIAL LEARNING TO DEVELOP CAPACITIES: <ul style="list-style-type: none"> • Building a microscope • Light microscopy • Photo-micrography • Imaging living materials • Plankton tow 	DEFINE/REVIEW: <ul style="list-style-type: none"> • Formal concepts (Anatomy of a Visual message) • Multiples and variants • Color Theory DEVELOP CREATIVE PRACTICE: <ul style="list-style-type: none"> • Translating source material • Building images from multiple sources 	STENCIL PRINTING (Screen printing & Pochoir) <ul style="list-style-type: none"> • Handmade and digital transparencies • Edition printing • Layered printing (registration) EXPANSIONS: <ul style="list-style-type: none"> • Other printing substrates (windows, Tyvek, fabric) • Use of the stencil matrix to explore other affordances of printmaking- e.g. using the multiple in a modular or repetitive way to create something larger or sculptural
PROJECT 2 Biological Motion 5 weeks	UNDERSTAND: <ul style="list-style-type: none"> • microscopic and macroscopic biological motion • Inertia, • viscosity • Reynolds number governing biological motion 	EXPERIENTIAL LEARNING, TO DEVELOP CAPACITIES: <ul style="list-style-type: none"> • Time-lapse and high-speed recording of biological motion • Analyze: Data analysis and visualization using Image-J 	APPROACHES <ul style="list-style-type: none"> • Data visualization & interpretation back to analog forms • Structures to denote time in 2-d—e.g. Sequence, series, State-prints, book forms, juxtaposition, layering 	RELIEF PRINTING (Linocut/Woodcut) <ul style="list-style-type: none"> • block-making (linocut) • tool care • printing by hand and with presses EXPANSIONS <ul style="list-style-type: none"> • Collagraph interventions • Print Animation

PROJECT 3 Self-directed projects 5 weeks	<ul style="list-style-type: none"> • Understand explored issues in depth, unique to each student • guided tutorial-style through relevant biological literature 	<ul style="list-style-type: none"> • Define, learn, experiment with additional science tools customized to project for creating source material or adaptive process to use in art project 	<ul style="list-style-type: none"> • ADAPTIVE TINKERING: Repurposing image, process and/or structure for artistic end. • The modular print • The print as infinitely variable • Conceptual prints 	ADDITIONAL TECHNICAL OPTIONS: <ul style="list-style-type: none"> • Photopolymer gravure • Cyanotype • Collagraph/photo collagraph • Waterless lithography EXPANSIONS: <ul style="list-style-type: none"> • Alternative variables: matrices, Inks, supports (fabric, glass) • Print as means to another end (e.g. stop-motion animation, installation, etc)
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Note: Specific deadlines will be given in a calendar for each project. While we hope to keep to this schedule as much as we can, invariably there will be adjustments as the needs of the class and project become known. Updates to the schedule will be announced in class and posted on Sakai.

COURSE LOGISTICS, REQUIREMENTS, & EXPECTATIONS

Information and Communication

Sakai: This class has a Sakai site that contains course documents (readings, links to online resources, technical handouts and informational handouts), links to relevant websites and video tutorials, and a forum for announcements. Project e-/portfolios (see below) are submitted in your individual Drop box folder on Sakai.

One-to-one communication: Given that the class meets for 5 1/2 hours weekly, it is often possible to carve a few minutes out during lab or studio time for simple matters. You have required consultations associated with each project (see below) and both professors are available for additional help as needed. Please contact them directly to make an appointment for outside-of-class consultation.

Contact Info for after-hours emergencies:

Life-threatening situations dial 911.

Print Studio: Contact print Lab Manager, Mark Soderstrom (masoders@email.unc.edu) for facilities issues.

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 placed on the nature of observation and interpretation of visual information.
2. The second project introduces concepts of biological motion and time with 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 you. This project asks you to apply and expand on previous learning of concept and/or methodology, toward a project of your own design.

PROJECT CONFERENCES

For each project you'll have short (about 10 minutes) 1 to 1 conversations with each instructor to help you identify a plan as a place to depart from and for setting goals. You must also schedule in-progress consultations. In other words, this amounts to two meetings with each instructor (4 total) for each project.

READINGS/RESEARCH

Readings, video tutorials, podcasts and other forms of information come from both scientific literature and art sources relevant to each unit. Some of these are assigned to the class as a whole to support whole-class conversations, but most will be individually determined in the planning conferences.

PROJECT DOCUMENTATION/ePORTFOLIOS

At the end of each project you will produce an "ePortfolio" that documents and reflects on the work done in the project. **You will create one of these files for each project (3 total).** The ePortfolio consists of two sections; one for Science and one for Art. Using a program such as PowerPoint, InDesign or another program that allows you to include both image and text, you will collect:

1. **Visual documentation** of science images and finished artwork (you will need to document your best work before the critique)
2. **Responses to a set of specific questions for both the art and science.** These questions and specific requirements in terms of documentation will be posted on Sakai in the Course Documents section at the end of each project.
3. **Supporting materials (optional):** You may also provide documentation of anything that led to the end product if it helps make a point. This includes inspiration, in-progress shots, sketches, photographs, or other collateral that informed your work. This is optional EXCEPT if you use any secondary source material (images from online, ephemera, etc.) In that case, you must show the original and cite its source (provide any identifying information, proof of public domain status and/or comment on appropriation strategy).

Note: As required for courses satisfying General Education requirements, the writing component of this portfolio amounts to a minimum of 2000 words of writing (about 10 pages), distributed between the three projects. Folks generally don't have a problem meeting this requirement. You can distribute it in any way, but it is up to you to keep track. This writing allows us to assess your learning with regard to both Art and Science and their intersections.

Tip: It might be useful to use a text-editing program for initial writing, then once finalized, import it to the portfolio.

The ePortfolio is prepared after you have received feedback during the project critique, your responses describe what you learned and how the project evolved. You can respond to these directly or embed your comments as annotations with the visual documentation. In addition to responding to specific questions, this is an opportunity to augment our understanding of your efforts. This is especially important if the project did not quite work out as expected. In other words, "failure" can still be a valuable learning experience, you just need to tell us what you learned!

Optional Project Revisions: Often, the critiques provide useful feedback that enables a revision strategy. If you decide to revise, you must present the original along with a statement explaining your concept of what has improved the solution. Revisions may be submitted at any time before the end of the semester. Any late work or work not previously submitted are not eligible for revision.

Procedure for submitting the e-Portfolio:

Submit this file to your individual Drop Box folder on Sakai within 1 week of the critique. Late evaluations receive partial credit. Sakai records when items are posted and this time-stamp determines whether items have been submitted on time.

PUBLIC FORUM

One of the requirements of this class is to share our work in a public forum. This can take the form of an exhibition, or a public presentation of finished work or a demonstration of technique. We will determine this venue collectively.

Attendance / Workload / Participation

Attendance

Expectations for attendance in this course is governed by the [UNC Attendance Policy](#), which states:

Regular class attendance is a student obligation. Students are responsible for all of their work, including assessments, tests, and written work, and for all class meetings. If a course instructor chooses to take attendance and sees that a student misses three or more consecutive class meetings or misses more classes than the course instructor thinks advisable, the instructor may report the facts to the student's advisor and/or academic dean. No right or privilege exists that permits a student to be absent from any class meetings, except for these University Approved Absences

Since this semester we are conducting the class as a hybrid course, we will always have a Zoom participation option. Everyone should log in to Zoom—even if you are physically in the classroom, since some demos may be live-streamed, just to be in compliance with the physical distancing rules.

This will allow us to stay in touch even if we have very short Zoom interactions. We expect to check in with you minimally every week, but hopefully every class period.

Critiques Formal critiques are scheduled at the conclusion of each project assignment. This semester, these 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 as far in advance as possible. If your reason for missing a critique is not one of the 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: Readings, preparatory work, etc. done, materials on hand, ideas in *visual* form, and work in progress. We expect you to build an understanding of your creative process and to see evidence of it throughout the course. (We'll discuss what this means at the beginning of the semester.)
- Participate in critiques with (finished) work and voice
- Cooperate with the demands of a communal shop and lab. Abide by all clean-up rules—THIS IS ESPECIALLY IMPORTANT THIS SEMESTER WITH THE EXTRA SAFETY HEALTH PRECAUTIONS. A list of protocols for the print studio and lab are on Sakai. 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. Report any problems to the Lab manager or your instructor.

Materials

A basic materials list will be provided and reviewed on the first day. You'll be expected to secure basic materials, but because solutions to assignments might vary amongst class members—especially with the final project, you might be getting materials as needed. Each assignment handout will also have a list of material recommendations.

ASSESSMENT/GRADING

All work done in this class contributes to a comprehensive course grade. In other words, you will get the same end-of-semester letter grade for both ARTS 409H and BIOL 409L. We use the percentages listed below to arrive at the final course grade. Letter grades are based 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 timely submission of the e-portfolios.

Grade Breakdown:

Project #1	30%
Project #2	30%
Project #3	30%
Bonus.....	10%

Project grades are determined by evaluating the e-portfolio complemented by our understanding of your efforts as we experience them in the class.

Bonus This 10% component of the course grade allows us to assess the overall trajectory of work done in the class. For most students, this can account for growth across the semester. It can also reflect work “above and beyond” in scale, complexity or quantity for any project or acknowledge extra work of revision (see below). It can also reflect a superlative commitment to enhancing the overall learning experience of the class community. You will have an opportunity to make a case for this 10% component of your course grade in the final project self-evaluation.

Optional Revisions: Critiques can sometimes provide useful feedback that enables a revision strategy. Although not required, you are encouraged to follow up on feedback if time allows. If you decide to revise, you must present the revision along with documentation of the original and a statement explaining your concept of what has improved the solution. Revisions may be submitted at any time before the final exam (critique) date for this class. Revision is not an option for any work that was late not previously submitted.

Rubric: A grading rubric developed specifically to guide our assessment of your work in this class is available in the Course Documents section of the class Sakai site.

COURSE POLICIES & RESOURCES

Health and safety

All students taking classes in the art department are required to take the following online training on health and safety: <https://apps.fo.unc.edu/ehs/training/art-safety/>. To proceed in this class, you must:

1. Take this training and pass the accompanying test with a score of 70 or better.
2. Submit the proof of having successfully taken the test to both your instructor and to appropriate Area Lab Technicians: Mark Soderstrom (printmaking and darkroom photography), Joy Drury Cox (digital labs) and/or Pat Day (Art Lab). *Note: If you are taking multiple art classes, you only need to take the training once, but make sure to send the verification to all your instructors and appropriate lab managers.*

In addition to the training module, please read the handout on Safety (posted on Sakai) and review the shop rules below. The handout emphasizes health and safety issues most relevant to working in this class. Additional instruction for printmaking specific procedures will be given during technical demonstrations throughout the semester.

General:

- NEVER COME TO CLASS UNDER THE INFLUENCE OF DRUGS OR ALCOHOL.
- Avoid routes of inhalation and ingestion exposure: Do not smoke. Do not eat or drink while working.
- If you do not understand something, ask for help.
- Do not attempt work that is beyond your physical capacity; ask for help.
- Think through an operation before beginning and anticipate what could go wrong. Stay attentive as you work.
- Dress for success! Wear clothes that can get dirty or wear an apron. Avoid loose clothing or jewelry that can be dangerous when working with power tools or presses. No sandals or bare feet in the Printshop.

Tools & Equipment

- Use any tool or machinery in the shop only after you have received appropriate training/instruction.
- Do not use power tools or presses if you are on any medications that affect your ability to focus.
- Wear dust, hearing, and eye protection when necessary. Keep long hair tied back and/or tucked in.

- Be sure on/off switch is in off position before plugging in power hand tools or electrical equipment.
- Be alert for loose parts and/or dull blades. Report damaged equipment to faculty, shop manager or monitors.
- Be alert for unusual sounds when turning on or operating tools.
- Never talk to or distract someone who is working with power tools or machines.

Hazardous Materials

- Use the least toxic solvent for the purpose at hand. Often this is soap and water.
- Wear nitrile gloves to protect hands when working with acids or solvents. Barrier cream can provide additional protection. Do not forget gloves during clean-up operations!
- Use solvents, sprays or any toxic substances ONLY at the exhaust ventilation stations. (use such solvents only with permission and avoid excessive use while classes are in session) Dispose of solvent-soaked rags in the covered containers: Useable soiled rags in the purple cans so marked or in the red safety containers for spent rags. Note: Orange-top purple cans are for water-based useable rags only (screen -printing)
- Use caution with acids: in Lithography, use only at press stations or at the etch-mixing area. Do not set acid dropper bottles on stools! Etching copper intaglio plates must take place ONLY in the acid room

Medical/security/safety:

- Know where the first aid kit is.
- Know the fire escape route.
- Call for 911 emergencies. If you are in doubt always call 911.
- The studio is available 24/7, except during other scheduled classes. Access is only for print students and is controlled by a combination lock on the main door. It is an honor violation to give this code to anyone else.
- Always have your UNC one card available. Campus security can ask unauthorized persons to leave the lab.
- More information on safety measures: <https://safe.unc.edu/learn-more/campus-safety/>

Special Fall 2020 COVID Responsibilities

- Masks at all times when in University buildings
- 6' physical distancing at all times
- Follow occupancy guidelines. The main space in the print lab is limited to 6 people at a time. Sign up for outside of class work-time in the print shop via: <https://bit.ly/HAC301signup>. Note also that smaller spaces such as the darkroom and digital lab space have lower limits. Occupancy limits are posted on all doors.
- Follow traffic patterns in buildings- during building hours: 7:30 AM- 8 PM (Building maps available on Sakai)
- Wipe down workspaces and any communal tools with sanitizer spray before returning tools to their places.
- DO NOT come to campus or into buildings/labs if you are feeling unwell or if for any other reason suspect you might be exposed and therefore a potential vector for the coronavirus.

Community Responsibility

Honor Code

The University of North Carolina at Chapel Hill has had a student-led honor system for over 100 years. Academic integrity is at the heart of Carolina and we all are responsible for upholding the ideals of honor and integrity. The student-led Honor System is responsible for adjudicating any suspected violations of the Honor Code and all suspected instances of academic dishonesty will be reported to the honor system. Information, including your responsibilities as a student is outlined in the Instrument of Student Judicial Governance. Your full participation and observance of the Honor Code is expected. Consult the Honor or further information:

<https://studentconduct.unc.edu/>

Most people understand the ideas that define transgressions of academic integrity; concepts such as lying, stealing, cheating, or plagiarism are well defined in typical academic courses. In art classes, sometimes these concepts need further articulation. A document with specific information regarding academic integrity in studio art classes is available on Sakai. Be sure to read this to understand how the honor code applies to your work in this course.

Maintaining a positive classroom environment

In addition to issues of academic integrity, the University expects all students, faculty and staff to conduct themselves in a manner that supports a positive learning environment. The [Policy on Prohibited Discrimination, Harassment and Related Misconduct](#) outlines the specific behaviors and actions that would undermine this environment. Take a moment to follow the link above to familiarize yourself with this policy.

Technology Use

I generally allow computers to be used in class, especially if an assigned reading was available electronically. I reserve the ability to disallow the use of computers when I feel doing so will enhance discussion. If you choose to use your laptop, I expect you to be 100% “with us,” which means no e-mail, no Facebook, no Twitter, no ESPN, and so on.

UNC Resources

Accessibility Resources

UNC-Chapel Hill facilitates the implementation of reasonable accommodations for students with learning disabilities, physical disabilities, mental health struggles, chronic medical conditions, temporary disability, or pregnancy complications, all of which can impair student success. See the ARS website for contact and registration information: <https://ars.unc.edu/about-ars/contact-us>

University Testing Center

The College of Arts and Sciences provides a secure, proctored environment in which exams can be taken. The center works with instructors to proctor exams for their undergraduate students who are not registered with ARS and who do not need testing accommodations as provided by ARS. In other words, the Center provides a proctored testing environment for students who are unable to take an exam at the normally scheduled time (with pre-arrangement by your instructor). For more information, visit <http://testingcenter.web.unc.edu/>.

Counseling & Psychological Services

CAPS is strongly committed to addressing the mental health needs of a diverse student body through timely access to consultation and connection to clinically appropriate services, whether for short or long-term needs. Go to their website: <https://caps.unc.edu/> or visit their facilities on the third floor of the Campus Health Services building for a walk-in evaluation to learn more.