Art Lab: Artistic Investigation of the Biological Sciences.

Fall Semester, Studio Course
RISD Digital + Media Program,
Course number: 7045-01
Location and time: MONDAY•1:10-6:10 • CIT 407
Question/direct registration: **sawylie@MIT.EDU** or **smazzucc@risd.edu**

What are the relationships between art and science? How have these two pursuits interacted historically and how are they transforming each other now? Examining and participating in the contemporary interest in BioArt, this class looks at how recent advances in biology, including genetics, epigenetics, synthetic biology and DIYbio, are transforming our lived experiences both in terms of our bodies and our environments. Within biology, particularly synthetic biology, which aims to engineer organisms from the ground up, we are developing the tools to build and transform organisms. In the process we have transformed humans, creating immortal cell lines of human tissues, *in vitro* fertilized embryos, and transgenic organisms that bear human genes. With the resurgence of epigenetics, our environments, what we eat and chemicals that we are exposed to, are being found to influence our reproductive, neurological and immunological development. How are these transformations changing the relationships between ourselves and other life-forms, and transforming our lived experiences of our bodies and environments? How have artists and designers participated in and investigated these changes? How might that participation be enriched to develop a critical dialog between arts and sciences? To begin answering these questions, this course develops an experimental laboratory for artists and designers, a laboratory in which the biological sciences are themselves the subject of study. Through visiting and working in laboratories as well as developing tools for Do It Yourself (DIY) biology, this course will familiarize art and design students with the environment and tools of the laboratory. It will offer students conceptual tools for understanding the relationship between art and science and challenge students to participate in shaping how biology is practiced and understood. Students from both Design and Fine Arts Divisions are encouraged to participate in the class. Students will work in their own media to express the scientific, historical, and ethnographic concepts explored in the class. Students from science and technology studies, anthropology, history and science backgrounds are also encouraged to participate.

Reading: is limited to 20-40 pages per student per week! Actually learning theory with this limit on readings will be an experiment in itself: an experiment in collective reading and teaching. It is incumbent upon each and everyone of you to read and consider your section thoroughly as you will be team teaching your material to the rest of the group. (It is incumbent upon me to read all of the sections). Two to three of you will take ownership of one reading per week. You will divvy up presentation of the reading, one reader will give background on the author, the second reader will present the argument of the piece and a third presenter will describe the evidence/method employed by the author. During these presentations everyone else is expected to listen carefully and take notes since the material will be unfamiliar. When listening, you should be thinking about points of connection and parallels to the piece you have read. The readings should be regarded as a material from which to glean images and concepts to work with. Read for these things and read generously.

Making: There will be two required large scale projects in the course, the first will be due on **November 31st**. The second and final project will be due on the final class session or **December 5th**.

Grading: This is a studio and collaborative research process. Participants are encouraged to take risks in their work, concepts, and explorations. I am here to see what each participant brings to the course and what each wants to get out of it, and to help with the goals set by the participants. Directed and sustained effort and engagement is required. While it will be important to have elements drawn from the STS literature incorporated into your work, it is also vital that you stay true to your voice and your media, so that concepts do no overwhelm and drive your work.
30% presence and participation in studio projects
20% reading presentations
20% Project 1
20% Project 2
10% Laboratory Notebook
Lab fee: $150

Schedule:

Research Project 1: Molecular Craft.

Employing or commenting upon the visualization techniques we have developed -- electrophoresis, time-lapse photography, cell motion studies, electron microscopy, fluorescence microscopy -- examine one of these questions:
What part does scale play in laboratories? Why is manipulation of this socially relevant?
How is time manipulated in laboratories? Why is manipulation of this socially relevant?
What senses are developed within laboratories? Why is manipulation of this socially relevant?

I. Rewriting Life? Laboratories as sites of Experimental Manufacture.

Week 1 **Sept. 19** **Introduction**

Activity: Brain Dump exercise in how to analyze a technology's material, political, social, cultural and economic dimensions: DNA

Reading:
Close, generous, ethical, positive

Teach thoughtfully: 1) who is the author, 2) what is their argument, 3) what is their evidence/data/method.

Don't let the concepts get away with you

Brief break for DIY Bio: we will extract DNA. Bring your own substance to extract DNA from!
http://www.instructables.com/id/5_minute_DNA_Extraction_in_a_Shot_Glass/
http://www.instructables.com/id/How-To-Extract-DNA-From-A-Strawberry/

Week 2 **Sept 26** **Laboratories and Politics**

Readings:
Simon and Schaffer: *The Leviathan and the Air-pump*
Latour, Bruno: *Give me a Laboratory and I will Raise the World*

Sophia Roosth Talk on Synthetic Bio:
http://diybio.org/wp-content/uploads/2009/11/Crafting_the_Biological-Roosth-9Nov2009.mp3

STS Themes: How the laboratory became an obligatory point of passage and what are some of the consequences. What are the material, literary and social technologies of science?
The importance of witnessing

Set up our own lab:
In class project DIY electrophoresis:
http://openwetware.org/wiki/DIYbio:Notebook/Keiki_Gels
http://www.sciencebuddies.org/science-fair-projects/project_ideas/BioChem_p028.shtml
http://cheapassscience.wordpress.com/2011/09/11/lego-electrophoresis-box-and-gel-cast-prototype/
http://www.instructables.com/id/Gel-electrophoresis-system-mini/

Week 3 **Oct 3rd** **Genetics**

Taussig, Michael: *Mimesis and Alterity*
Rheinberger, Hans Jorg: *Toward a History of Epistemic Things*
Lily, Kay: *Who Wrote the Book of Life?*
Mackenzie, Arian: *Transductions*

STS Themes:
CREATING and INVESTIGATING EXTREMES
Extending and containing our bodies
Making technology invisible

http://www.nyu.edu/projects/xdesign/biotechhobbyist/

Today we will be developing a set of concepts about how laboratories work we will look at the question of surprise in laboratories, thinking through Rheinberger's concept of experimental conditions. We will think about mimesis in laboratories using Micheal Taussig's argument that "mimesis is the tool culture uses to create second natures". We will examine Kay and Mackenzie's arguments about the role of genetics in contemporary life.

In class project: running gels in our gel boxes.

II. Sense and Sensibility: How Laboratories Make Knowledge

Week 4 **Oct. 10th** **Standardization and Classification**

Readings:
Scott, James: *Seeing like a State*
Bowker and Star: *Sorting Things Out*
Thompson Claris: *Confessions of a Bioterrorist*
Alinsky, Saul: *Rules for Radicals.*

Meet in the RISD Nature Lab

In Class project: Torque: Using inspiration from the Nature Lab design something working with the concept of torque.

Week 5 **Oct 17th** **Film and Biology**

Readings:
Francis Bacon: *New Atlantis*
Landecker, Hannah: *Culturing Life*

Meet in the RISD Nature Lab--We will also develop and discuss project ideas.

We will perform cell motion studies and discuss the role of film, control of temperature creating liveliness in difference scales within laboratories.

Week 6 **Oct 24th** **Surprise Machines*: Senses and Science***

Connor, Steven*: The Menagerie of the Senses*
Connor, Steven*: Edison's Teeth*

Meet in the RISD Nature Lab

We will experiment with the laboratory as an extended sensorium examining electron microscopy and fluorescence imagining. Bring tools for Field trip: camera (with video), notebooks, voice recorder to record sounds.

Reviewed works: screaming yeast, Watching movie of cell division, glo-nads mice (mice with GFP added to the germ cells).

Week 7 **Nov 31st** **FIRST PROJECT DUE**

Research Project 2: Becoming Animal

Based on the Companion Species Manifesto, design something that builds upon a relationship with a companion species. Examples: Beatriz da Costa's Pigeon Blog, Natalie Jeremijenko's Feral Robotic Dogs.

III. Limitation of the Laboratory

Week 8 **Nov 7th** **Relations of Becoming: Hela Cells and Transgenic Animals--Laboratories and Kinship relationships**

Readings:
Haraway, Donna: *The Companion Species Manifesto*
Kohler, Robert E.: *The Lords of the fly*
Haraway, Donna: *Modest Witness...*,
Deleuze and Guattari: *1000 Plateaus*

Field trip to Animal House.

Bring tools for Field trip: camera (with video), notebooks, voice recorder to record sounds.

Week 9. **Nov 14th** **Modeling**

Readings:
TBA
Bergson, Henri: *Matter and Memory*
Latour, Bruno: *Laboratory Life/Science in Action*

Field trip to Brown Confocal Facility and Mowry LAB--we will explore three dimensional imaging and modeling

Week 10. **Nov 21st** **The Body and its environment: Genomics and Epigenetics: Popular health?**

Readings:
Michelle Murphy*: Sick Building Syndrome*
Foucault, Michel: *Lectures on Governmentality.*
Beck, Ulrich: *Risk Society*
Dumit, Joe: *Pharmaceutical Reasoning*

Examine: 23andMe, EWG: Human Toxecome Project, something on pharmaceutical drug trials, something on pharmaceuticals in water supply.

Reviewed work: Edward Burtynsky: *Oil, SourceMap, Louisiana Bucket Brigade,*

Project: TBA--something to do with disrupting/revealing these tense relationships

Week 11. Nov. 28th Mapping and Field Science

Readings:
Corburn, Jason: *Street Science*
Latour, Bruno: 'Drawing Things Together..'
Stefan Helmreich: *Alien Oceans*
Allen, Barbara: *Uneasy Alchemy*

Works Reviewed: Travor Paglen and ExtrAct project,

Week 12. Dec 5th Final Projects and Class Wrap-up!