M254 Arts & Engineering Research

Fall 2014, Studio 2611, Elings Hall
Tues-Thurs 12:00 to 1:50pm

legrady@mat.ucsb.edu
saharss2533@yahoo.ca

Experimental Visualization Lab
Media Arts & Technology Program
UC Santa Barbara
M254 Course

Address methodologies in art production and engineering/scientific research.

**Tuesdays:** Discuss artistic methods

**Thursdays:** Visits to Engineering or Science Labs

**Student Work:** Do some research, create a project where you will address your methodologies
Research Definitions

Any gathering of data for the advancement of knowledge

- **Basic Research**: Driven by interest to increase understanding about fundamental principles

- **Applied Research**: A form of systematic inquiry involving literature study, methodologies, with the goal of solving practical problems
Art Methodologies Topics:

- Proportion, Balance, Symmetry/Asymmetry (Rudolf Arnheim)
- The Design Process
- Physics/Simulation
- Modularity, patterns, simplicity/complexity
- Attraction/Repulsion
- Motion/Time/Delay
- Sequence/InterRelationship
- Site-Specificity
Research Definitions

Any gathering of data for the advancement of knowledge

§ Basic Research: Driven by interest to increase understanding about fundamental principles

§ Applied Research: A form of systematic inquiry involving literature study, methodologies, with the goal of solving practical problems
Scientific Research

Information and theories about the properties of the world

- **Hypothesis**: A testable prediction
- **Conceptual definition**: Description of a concept
- **Gathering Data**: Selecting samples (with instruments)
- **Analysis of Data**: To draw conclusions
- **Verification of Hypothesis**
- **Communication of Results**
Art Methodologies Topics:

- Proportion, Balance, Symmetry/Asymmetry (Rudolf Arnheim)
- The Design Process
- Physics / Simulation
- Modularity, patterns, simplicity/complexity
- Attraction/Repulsion
- Motion/Time/Delay
- Sequence / InterRelationship
- Site-Specificity
Lab Visits:

A mixed selection of research labs on campus. The big questions to ask:

§ How do scientists get from analysis of data to discovery?

§ What is the methodology and what is the process by which that happens?

§ Do artists proceed in a similar or different way?

§ What are the methods of representation?

§ To what degree does aesthetics play a role in the process of scientific discovery and representation?
Lab Visits:

A mixed selection of research labs on campus. The big questions to ask:

- How do scientists get from analysis of data to discovery?
- What is the methodology and what is the process by which that happens?
- Do artists proceed in a similar or different way?
- What are the methods of representation?
- To what degree does aesthetics play a role in the process of scientific discovery and representation?
Lab Visits:

A mixed selection of research labs on campus. The big questions to ask:

§ How do scientists get from analysis of data to discovery?

§ What is the methodology and what is the process by which that happens?

§ Do artists proceed in a similar or different way?

§ What are the methods of representation?

§ To what degree does aesthetics play a role in the process of scientific discovery and representation?
First Lab Visits & Syllabus URL:

- Yasamin Mostofi Mobile Sensors Lab | X-Ray Vision
- Doyle Systems Biology Lab | Circadian Rhythms
- Francesco Bullo: robotics
- http://www.mat.ucsb.edu/~g.legrady/academic/courses/14f254/14f254.html
Artistic Research

- **Creative works** are considered both the research and the object of research.

- Usually **practice based** but some artists bring analytical methods (semantics, semiotics, etc.).

- **Methodologies** can be individually defined rather than discipline prescribed.

- **Value**: To what degree does the artistic approach create meaning that could not have been addressed otherwise?
Humanities Research

- Interpretation is determined by **Context**: Social, historical, cultural, political, etc.
- Argue that data is never neutral. Its meaning is always determined by interpretation
- Focus is on the process of interpretation
- **Culture and ideology** determine the meaning of data
Some Basic Definitions

- Science relies on **methodology**: A set of methods, principles, rules for regulating a discipline
- **Aesthetics**: Perception, the senses, what feels coherent, insightful, etc.
- **Metaphor**: Something is like something else. Learn from *Nature*
- **Indexicality**: Points to something else
- **Serendipity in Science**: To what degree does aesthetics and chance have a role in decision-making?
Questions to explore:

- Science is a procedural process so what are the methods by which data becomes discovery?
- The artistic process is an open system. Flexibility in exploration.
- What are the metrics for evaluation in each?
Project inspiration: Calder Mobile for Kavli Center for Theoretical Physics

Alexander Calder (1898-1976)
Artist trained as mechanical engineer
Artwork integrates movement based on physics, sub-division of elements, interplay of elements

What is a site-specific work?
Project inspiration: Calder Mobile for Kavli Center for Theoretical Physics

Alexander Calder (1898-1976)

Artist trained as mechanical engineer

Artwork integrates movement based on physics, sub-division of elements, interplay of elements

What is a site-specific work?
Project inspiration: Calder Mobile for Kavli Center for Theoretical Physics

Alexander Calder (1898-1976)
Artist trained as mechanical engineer
Artwork integrates movement based on physics, sub-division of elements, interplay of elements

What is a site-specific work?
Frank Zappa Quote:

- In my compositions, I employ a system of weights, balances, measured tensions and releases—in some ways similar to Varèse’s aesthetic.
- The similarities are best illustrated by comparison to a Calder mobile.
- I say: “A large mass of any material will “balance” a smaller, denser mass of any material, according to the length of the gizmo it’s dangling on, and the “balance point” chosen to facilitate the danglement.”
Project inspiration: Calder Mobile for Kavli Center for Theoretical Physics

Alexander Calder (1898-1976)
Artist trained as mechanical engineer
Artwork integrates movement based on physics, sub-division of elements, interplay of elements

What is a site-specific work?
Components in a Calder Mobile:

- In my compositions, I employ a system of weights, balances, measured tensions and releases—in some ways similar to Varèse's aesthetic.
- The similarities are best illustrated by comparison to a Calder mobile.
- I say: "A large mass of any material will "balance" a smaller, denser mass of any material, according to the length of the gizmo it's dangling on, and the "balance point" chosen to facilitate the danglement."
Calder PhotoBiography
Art Methodologies Topics:

- Proportion, Balance, Symmetry/Asymmetry (Rudolf Arnheim)
- The Design Process
- Physics / Simulation
- Modularity, patterns, simplicity/complexity
- Attraction/Repulsion
- Motion/Time/Delay
- Sequence / InterRelationship
- Site-Specificity
Course Questions: Research to Discovery

- To map out the process by which research results in discovery
- To study the role of tools, technologies as means of discovery expressions
- Once discovery occurs,
  - how is it expressed,
  - what are the conditions of how it is represented,
  - is the representation a neutral process?
What is a site-specific project?

- Site-specific art is an artwork created to exist in a specific place. The artist takes into consideration the conditions of the site while planning the work.
What is a systems based art?
The artwork as proposition or analysis or definition (Joseph Kossuth):
Research Questions to ask at the end: (from Prof. J.Gibson, ECE)

- Define what you did and why was it worth it?
- What is the state-of-the art and where does your work fit in?
- What were the key decisions that you made and why did you make those choices?
- What are the results and how does your work compare with others in the field?
- How did the decisions that you made impact your results and performance?
- What future research should be pursued to build on your work?
George Legrady
Director, Experimental Visualization Lab
Media Arts & Technology PhD program
University of California, Santa Barbara
http://vislab.mat.ucsb.edu
http://www.georgelegrady.com