M254 Arts & Engineering Research

Fall 2013, Studio 2611, Elings Hall
Tues-Thurs 12:00 to 1:50pm

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M254 Study Plan & Goals

- What is Research?
- How does research take place?
- Articulate the methodologies and processes
- What are theoretical & applied directions?
- What are the intersections of arts and engineering/science?

Research Definitions

Any gathering of data for the advance-ment 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**

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** tend to be individually defined rather then 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

Generalities

- There is effort to **capture phenomena**
- Through **collection of data**
- Next step of analyzing the data leads to **Discovery. How does that happen?**
- How does one then **represent** results?
- Each discipline has **specific conventions**: papers, conferences, books, installations, visualizations, performance, etc.
- To what degree does discipline-specific conventions allow for and constrain expression?

Aesthetic Considerations

- Science relies on methodology - to what degree does aesthetics have a role in decision-making?
- Aesthetics: Perception, the senses, what feels coherent, insightful, etc.
- Metaphor: Something is like something else. *Nature does it better*
- Indexicality: Points to something else
- Serendipity in Science: Case studies

Course Goals

- To map out the process by which data collection leads to discovery
- To study the role of tools, technologies as means of discovery expressions
- To what degree is the representation a neutral process?

What we will do in the course

- Each student may have a specific research agenda: Define the agenda
- Course focus is to define methodology of discovery and representation
- We will study examples of research through science lab visits and review of UCSB research activities as listed at: http://www.ucsb.edu/news-topics/
- A presentation/short paper of conclusions of similarities/differences based on lab visits

Schedule

Wk1: Review of research definitions: What are various forms of research: science research, humanities research, and artistic research.

Wk2, 3: 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?

Wk4,5: What are the methods of representation? To what degree do Aesthetics play a role in the process of scientific representation? (rather then the look of it?)

Wk 3 to 10 intermittent: We will visit labs, study how the UCSB news has synthesized research into a form that has broad understanding

Wk 6, 7:Once discovery is achieved how is it represented, conveyed, etc. Whereas data to discovery is a process of transformation, representing knowledge involves translation.

Wk 8,9,10:The course will complete with a student presentation on the topic of research, discovery, and representation, as a paper posted at the course website

References

- *The Nature of Technology*, W. Brian Arthur (NYTimes review)
- *Ignorance: How it Drives Science*, Stuart Firestein, (NYTimes Review)
- Nature of Science
- UCSB News Topics
- List of labs to visit

Impact of your Work in the Course

Results will impact on the following:

- A **symposium** (winter 2014) which will bring together experts in the fields of Arts, Engineering and Humanities research methodologies
- An **exhibition of scientific research** scheduled for 2016 for the UCSB Art Museum

Questions to explore:

- Science is a procedural process so what are the methods by which **data becomes discovery?**
- What are the metrics for evaluation?
- To what degree does aesthetics have a role
  - a) in the discovery process and
  - b) in the experience of presenting the research?

Contributions to the field:(from 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?

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