Exploring Biomimetic Interfaces
CIID Summer Course 2013
Design brief

OVERVIEW

The elimination of waste is one of the basic functions of life, from single organism to interconnected ecosystem. Organic waste gets reincorporated back into the ecosystem, to fuel the life cycles of other organisms. With the rise of man-made materials, including plastics and non-biodegradable material, human and industrial waste does not always conform to this model.

Drawing on your experiences from the design thinking process, interface design, and your understanding of biomimetic systems, design a biomimetic interface that addresses waste reduction and reimagines how we deal with waste.

Build a system that explicitly draws inspiration from an example of feedback inhibition loop in biology: as more waste gets produced, some catalyst gets triggered to decrease waste production.

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DESIGN PARAMETERS

Integrate physical and digital systems.

There should be a clearly defined user or users. Who is the user? [it need not be a human user]

There should be a clearly defined input and output. What goes into your system? And what comes out?

In 7 days [next Friday], you will have a working prototype of your work, which can be exhibited on a screen, a pedestal, or on-site.

Your system must contain an interface with both a digital layer and a tangible layer. Integrating physical, digital and web components, you may design a tool for every-day use, a system for tracking or monitoring, a tool for mapping or measuring, an architectural replica, or a web interface for communication.

DOCUMENTATION

Document your work each step of the way. Documentation includes photos, videos, diagrams, code and text, posted to the class blog.

Consider scalability - can someone replicate your work based on your design and documentation? Is that the goal?

EXHIBITION

Next Friday we will have a mini exhibition of work at CIID. People will view and interact with your project.

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CONSIDERATIONS

Consider the following for your design solution:

- mimic a biological process through a technological solution: for example, replication of bio-degradation [ie the breakdown of petroleum products by microorganisms]
- the role of social and digital tools in sharing and recycling
- energy harnessing [energy from trash, from sun or wind to break it down]
- computational solutions, such as artificial intelligence or neural networks
- self-healing and repairing the environment
- feeding the world
- waste reduction
- feedback loops
- algorithms for efficiency and optimization of networks
- hacked physical and digital products

You can examine a particular type of waste:

- Organic waste
- Physical Trash
- Environmental Pollution
- Data and Digital waste/traces
- Waste Networks
- Emotional, Economic or Temporal Waste

Consider systems of waste on a particular scale:

- Micro-scale
- Personal
- Domestic
- Community
- Urban
- Global

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DIG A BIT DEEPER: WHAT IS WASTE?

METABOLIC WASTE: Excretion is the process by which waste is discarded from an organism. Bacteria and all cellular organisms excrete waste, either mechanically via their cell walls or by chemically breaking down a substance and excreting it as a gas. Plants chemically produce CO2 and water as a waste substance. But they also produce O2 gas, which is used by animals for sustaining life. Some animals excrete waste directly into the environment through their skin. Other animals have organs that chemically change the waste into another substance that can be transported outside of the body as a solid.

NETWORKS OF WASTE DISPOSAL: Where does the waste you are addressing travel to and from? What is the chain of events in its lifetime? What are its transformations? How is it produced? And how long does it live before changing into another form?

CURRENT SIGNIFICANCE: Landfills are filling up, and often leaching toxic substances into the water and soil. Bacteria that break down trash often leach hazardous chemicals or volatile organic compounds, including hydrogen sulfite. Methane gases are often released, leading to acid rain and smog. Water purification is becoming more challenging as water bodies are increasingly polluted. Carbon footprints are increasing through growing human population and urbanization. Plastic trash is piling up in the ocean, ie the Great Pacific Garbage Patch. Globally, cities are struggling to build the infrastructure for efficient sanitation systems, and many are failing.

- Bioreactor landfills, using organic materials such as bacteria to speed up the degradation of trash (ie composting)
- Thermal treatments (ie burning) of trash
- Recycling plants (which often are energy-costly as well)

E-WASTE? As old electronics become out of date, cell phones and computers pile up. What is happening to our virtual and digital replicas, and digital archives?

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GUIDING QUESTIONS?

What are the networks that waste travels through? How can we keep better track of that trajectory? What are byproducts of processes that could be repurposed?

Where does your project live? What is its environment? Is it in the water? In the home? In the gallery? On the computer or on the web?

What type of sensors or bio-sensors might be relevant or applicable?

Do we create waste from our digital interactions online? Aside from creating electronic waste from our digital devices, are we creating digital waste in the form of data traces?

How can we use technology and hardware to interface our own waste with naturally-occurring waste management systems?

How can better sensing tools help us measure pollution, or better understand our habits and patterns?

How can we use technology to create more energy efficient or sustainable waste degradation processes [using more biodegradable products; leveraging methane production from landfills; alternative packaging materials; alternative means of energy...]

How can we model biological efficiency for excretion to optimize waste degradation and waste networks?

Are there organic/creative ways to break down materials, or to encourage Re-use Re-purpose, and Remediation?

Who benefits from the system? what suffers? and what / who does your solution serve? Consider the ecosystem, not just the human user.

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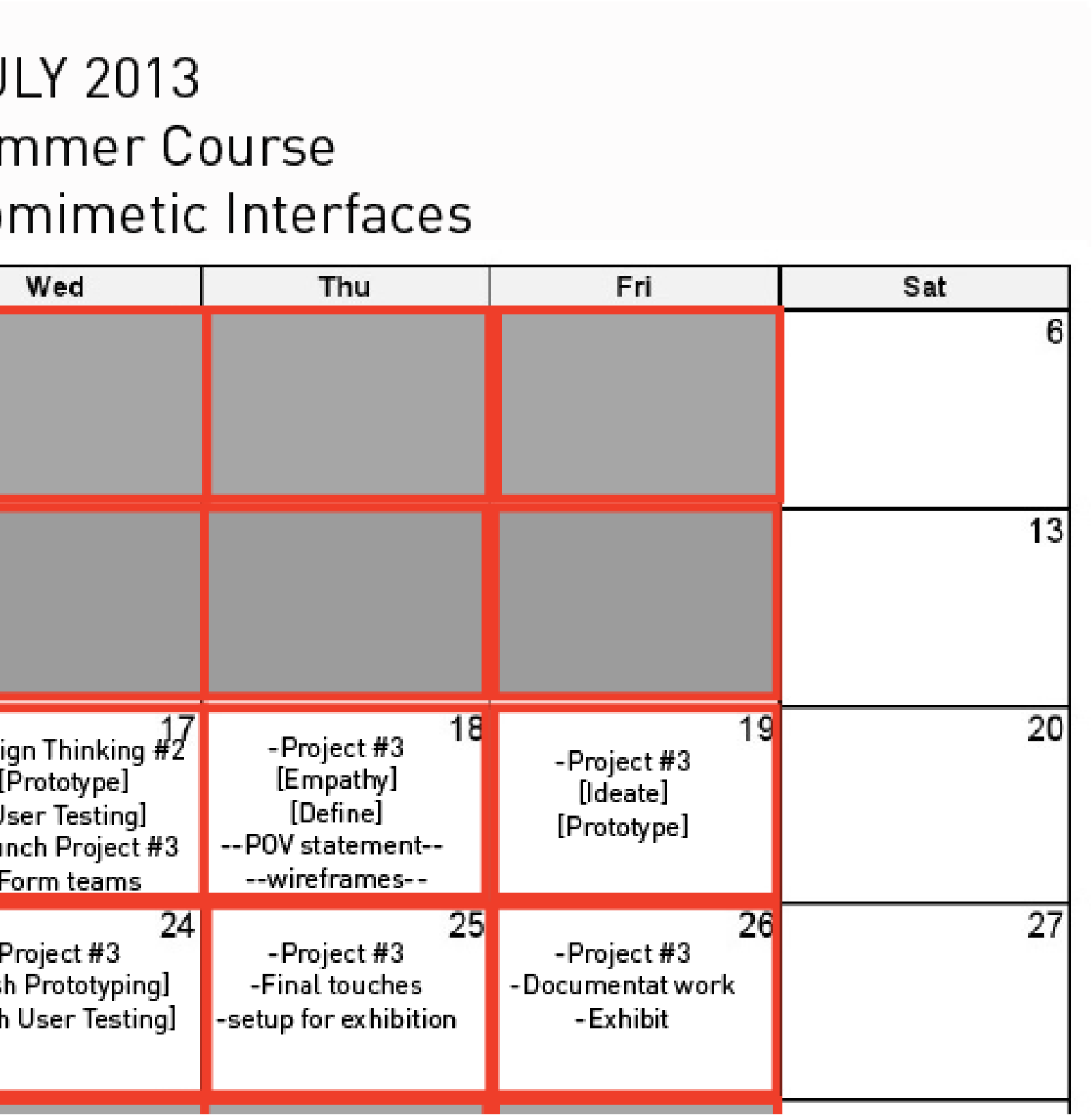
Sun	Mon	Tue	
7			
14	15 -Intros -Design Thinking #1 -Design Challenge	16 -Outdoor observation -Design Thinking #2: [Empathy] [Define] [Ideate]	-Des [-Lau -
21	22 -Project #3 [Prototype]	23 -Project #3 [Prototype] [Begin User Testing]	- [Finis [Finis


ULY 2013
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-Project #3
-Final touches
-setup for exhibition
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