UNIVERSITY OF MIAMI
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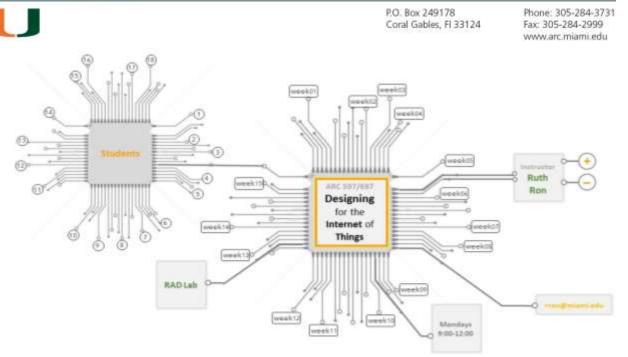
ake our buildings and our buildings make us" (Winston Churchill)
"Now we make our networks and our networks make us" (William Mitchell)

COURSE DESCRIPTION

The fourth industrial revolution accelerated the integration of digital technologies into everyday objects, blurring the boundaries between physical and digital realms. Information technology and automation converge in innovative ways and change our surrounding environment. The physical domain is increasingly augmented by online connectivity; we have sensors ="things," that measure and sense activities and changes, and broadcast them to the rest of the world via a network. We call this the "Internet of Things" [IoT].

While IoT is penetrating every aspect of our lives, we, the architects, are slow to respond to this challenge. Smart cities, smart homes and smart personal devices are surrounding us, but we have yet to create many examples of "smart spatial design" and "smart architecture".
What would the world look like if walls, windows, building systems, building materials, spaces and surfaces were able to communicate with each other? How would this change the tradition of architecture? And what does it mean? What can it do? What can we, as architects, do?

COURSE OBJECTIVES

The class will explore examples of IoT in **architectural** and **spatial** contexts: at home, in a building, in the city and landscape. Looking for past examples, current products and near-future scenarios, we will explore new IoT proposals that are not only focused on commercial goals but include social and environmental design values. The teaching methodology fosters "hands-on" iterative experiments and prototype building. Over the semester, we will read texts, watch movies, analyze design precedents, learn basic electronics and programing. We will use simulation, graphic presentation, 3D modeling and digital fabrication to build a simple sequence of working IoT prototypes. [No prior knowledge of electronics and programing is required].

Zoom & Class Recordings: The class in in-person only, there will be no zoom recordings.

EVALUATION

- <u>On-Time attendance and active class participation: 20%</u>
  Arriving on time, asking questions, giving feedback to classmates
- <u>Reading discussions and Assignments: 30%</u>
  Active reading discussions, Precedent presentation, Precedent critic, Arduino quiz
- <u>Class Project: 50%</u>
  Midterm, interim and final presentations, showing progress from class to class, iterative process of model design

SUGGESTED READINGS

De Kerckhove, Derrick, *The Architecture of Intelligence,* Birkhauser Publishers, 2001
Sadowski, Jathan*, Too smart : how digital capitalism is extracting data, controlling our lives, and taking over the world,* MIT Press 2020 [**eBook**]
Cassimalli, Hakim and McEwan, Adrian, *Designing the Internet of Things*, Wiley 2013 [**eBook**]
Pfister, Cuno, *Getting Started with the Internet of Things: Connecting Sensors and Microcontrollers to the Cloud*, 2012. [*outdated*]
Greenfield, Adam, *Everyware: the Dawining Age of Ubiquitous Computing,* New Riders Publishing, 2006
Rodolphe el-Khoury, Christos Marcopoulos and Carol Moukheiber, *The Living, Breathing, Thinking Responsive Buildings of the Future,* Thames & Hudson, 2012
Del Signore, Marcella, Riether, Gernot, *Urban Machines: Public Space in Digital Architecture,* LISTLAB 2020
Mark Shepard ed., *Sentient City: Ubiquitous Computing, Architecture, and the future of Urban Space*, The MIT Press, 2011
Lucy Bullivant, *Responsive Environments: architecture, art and design,* Victoria and Albert Museum, 2006
Moloney Jules, *Designing Kinetics for Architectural Facades: state change*, Routledge, 2011 [**eBook**]
Michael Fox, Miles Kemp, *Interactive Architecture*, Princeton Architectural Press, 2009 [**eBook**]
Michael Fox, *Interactive Architecture: Adaptive World*, Princeton Architectural Press, 2016
Fortmeyer, Russell, & Linn, Charles D., *Kinetic Architecture – Design for Active Envelopes*, Images Publishing, 2014
Picon, Antoine, *Digital Culture in Architecture*, Birkhauser, 2010
Laura Kurgan, Close up at a Distance: Mapping, Technology, and Politics, Zone Books, 2013 [**eBook**]
Dastyn Roberts, *Making Things Move - DIY Mechanisms for Inventors, Hobbyists, and Artists,* McGraw Hill NY 2011 https://mars1980.github.io/resources/making_things_move.pdf
Dan O'Sullivan & Tom Igoe *Physical Computing: Sensing and Controlling the Physical World with Computers,"* Thomson 2004.
Qiu, Kanjun, and Buechley, Leah *Sew Electric : A Collection of DIY Projects That Combine Fabric, Electronics, and Sewing,* HLT Press 2014
Norman, Donald A., *The design of everyday things,* Basic Books 2013 [**eBook**]
Grau, Oliver, *Virtual Art- From Illusion to Immersion*, The MIT Press, 2004
Ettlinger, Or, *The Architecture of Virtual Space*, University of Ljubljana, 2008
Shaw, Jeffrey, *a user's Manual- from Expanded Cinema to Virtual Reality*, Cantz, 1997
Aldersey-Williams, Hugh, Hall, Peter, et al. *Design and the Elastic Mind* MoMA, 2008 [**partial PDF**]
Leopoldseder, Hannes, *Ars Electronica*, Hatje Cantz [catalogs -various years]

Additional Reading:
Christiane, Paul, *Digital Art*, Thames and Hudson, 2003
Rath, Alan, *Robotics*, SITE, 1998

Rath, Alan, *Plants, Animals, People, Machines*, Smart Art Pr 1995

Allen, Stan, *Points and Lines: Diagrams and Projects for the City*, Princeton Architectural Press, 1999

Christov-Bakargiev, Carolyn, *Janet Cardiff: A Survey of Works, Including Collaborations with George Bures Miller*, P.S.1 2002

Castels, Manuel, *The Rise of the Network Society,* Blackwell Publishers, 2000

Chaouchi, Hakima, Ed., *The Internet of Things: Connecting Objects*, Wiley, 2010

De Landa, Manuel, *A Thousand Year of Nonlinear History,* Zone Books, 1997

Hansen, Mark, *New Philosophy for New Media,* MIT Press, 2004 [**eBook**]

Malcom McCollough, *Ambient Commons: Attention in the Age of Embodied Information*, 2013 [**eBook**]

Kolarevic, Branko, *Performative Architecture; Beyond Instrumentality,* Spon Press, 2005

Kolarevic, Branko, *Architecture in the Digital Age: Design and Manufacturing,* Spon Press, 2003