

<p>SYLLABUS</p> <p><i>Responsiveness and Resilience in the Built Environment - Understanding and Impacting the Physical Dimensions of Sustainability</i></p> <p>SUMA PS5162, Fall 2017</p> <p>Fulfills graduation requirement for: <i>Area 3, Physical Dimensions of Sustainability</i></p>	<p>Professor Lynnette Widder</p>
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Introduction

Statistics indicate that for the first time in history, urban populations comprise more than 50% of all human beings on the planet. But statistics also indicate that cities and their larger populations are subject to potentially catastrophic risks associated with climate change.

This course considers how 21st century civic infrastructure can contribute to improving the way cities respond to long-term and catastrophic climate events while also enhancing their citizens' daily lives. In the past, students in this course have developed solutions for sites in Brooklyn and Bronx, NY; Newark, NJ; Butte, Montana; and Bridgeport, Ct. This year, we will be collaborating with the city of Blue Island, Il, just south of Chicago, which is coming to terms with severe flooding from surface water not accommodated by an aging waste water system. It is also part of the region susceptible to flooding from the Calumet River, a former industrial waterway that still carries significant contaminates.

A sustainable and resilient built environment is part of a dynamic system. To shift our thinking away from oppositional terminology like nature/culture, we will work to understand how manmade conditions can better respond to non-anthropogenic forces. Rather than focus on *resisting* forces – potentially adverse effects of climate, weather, and material properties in the environment – we will discuss solutions that allow us to be **responsive and adaptive** to change.

Each of us has first-hand, daily experience with the built environment. This experience can be used to demonstrate and communicate **how the physical dimensions of sustainability can be located, understood, analyzed, modeled, addressed, and appreciated**. Looking to our shared physical world as an embodiment of our values brings to life the complex ideas we are studying. This class will teach you how to visualize, diagram and convey these vital ideas.

Ultimately, we will look for ways to work with anthropogenic processes that will allow our physical environment to attain and maintain **resilience**, from the scale of the product all the way up to the scale of a city. We will consider cultural shifts required for delivery systems to become sustainable. And we will ask fundamental questions about how resilience and sustainability can be made relevant to social, spatial and technological approaches to the physical world.

By the end of this course, you will be able to:

- Describe the basic concepts by which the legacy built environment functions;

- Understand and use the terms that govern our discourse on sustainability and resiliency in the built environment;
- Describe the ways material, water, energy, labor and cultural practice interact with and upon the built environment;
- Understand current models for assessing, benchmarking and communicating sustainability and resiliency of the anthropogenic environment;
- Use creative methods to communicate outcomes and propose alternatives to standard practices in managing the built environment.
- Develop and use highly effective visual communication techniques.

Course Format, Weekend Field Trip and Term Project

This course is taught using both active and passive methods. Active methods include class discussion, student presentations, longer-term group research projects, in-class lab time (to confer with Professor Widder, the TA, and other student groups), and an elective weekend design workshop. Outside experts will occasionally lecture; their profiles are provided at the end of this syllabus. Readings and lectures leverage passive learning techniques. These different modalities will culminate in an interdisciplinary term project:

Blue Island was first incorporated in the early 20th century. First formally settled by German immigrant farmers, by the 1880s, its economy was dominated brick production and its population reflected the new wave of immigrants from Southern and Eastern Europe. Its current population is still more than 22% foreign-born, with nearly 40% of the total population self-identifying as Latino. The city government is a participant in the Calumet Stormwater Collaborative, which brings together academics, governmental organizations and communities to deal with increasingly frequent flooding, resulting from a combination of overtaxed stormwater sewers, climate change and river level rise. Your term project will be an opportunity to integrate all that you learn this semester in a proposal for the physical and environmental betterment of a site in Blue Island.

We have the opportunity to visit Blue Island and to participate in a design workshop there together with students from Illinois Institute of Technology's Landscape Architecture masters program and from University of Illinois – Chicago's Urban Planning program. We will meet with representatives from the city and from the Metropolitan Planning Council which is convening the Calumet Stormwater Collaborative. The results from this workshop will form the basis for your term projects.

Required Course Work and Evaluation

- *Readings and Written Discussions (individual assignment, 20% of grade) -*
 - *Part A:* key readings will be assigned with a reading guide to frame central questions. Responses to the readings, although not necessarily specific answers to the questions, must be posted to CourseWorks by noon prior to that day's class. I expect students to respond to one another's comments.
 - *Part B:* you must also submit a critical, 1,500-word response to one week's readings as individual work. You will choose the reading(s) you will address. Note that this will be formal writing, not an informal opinion piece.

- “*Students Have to Eat*” (group assignment, 10% of grade) - Form a group of 3-5 and cook a meal together. The assignment is to quantify and track material, labor, energy and waste; and to diagram the meal’s production and consumption. Results will be presented by each group.
- *Precedent Studies* (group assignment, 30% of grade) - Work in new groups of 3-5 to research an aspect of the urban systems that make the city around you into historical, technical and cultural entities. Results will be presented by each group and posted to CourseWorks.
- *Blue Island, II Term Project* (group assignment, 40% of grade) - Urban systems design and proposal; working in groups of 3-5, you will develop integrated strategies for development and revitalization of our site in Blue Island. Lab time in the second portion of the semester will be used for interactive consultation with Professor Widder.
- *Special consideration of individual effort* - If you believe that your contribution to a project is not fairly represented by the grade given to you group, you have the option of submitting evidence of your individual effort as described below (in *Assignments and Submissions*).

The criteria for grading will value deep, open-minded engagement with course material. Active class participation is expected, as well as evidence of solid preparation and willingness to invest personal expertise into group work. The work submitted should be graphically clear and free of careless errors. For example, your term projects will be graded using the following rubric:

- research evidence - 20%
- analysis - 20%
- synthesis and mission statement - 20%
- thoughtful presentation - 10%
- creativity and integrative thinking - 30%

Feedback on projects will include both letter grades and comments to help you consistently improve performance through the semester. However, *final* work may not be redone and resubmitted for a new grade. Requests for extensions will only be granted if made in advance and warranted by extenuating circumstances (*e.g.*, sickness, personal or family matters). Failure to submit an assignment will result in an F for that portion of the grade. Plagiarism is an academic offense that will result in automatic failure for the course. Grading concerns and clarifications can be discussed through email or during office hours.

Assignments and Submissions

We meet once a week for just under two hours. During the first part of the semester we will have a lecture lasting about an hour, and spend the rest of the period reviewing readings and discussing questions. If you have questions or concerns that could impact or are of interest to the class as a whole we will cover them during the discussion, as needed.

All in-class presentations must be emailed to the TA by noon on the day of the class in which the presentations will occur. If files are too large for email, please contact the TA in advance to make other arrangements.

In the latter part of the semester, we will devote more time to consultation and group discussion about your Blue Island proposals. Lectures at the beginning of the period will cover topics related directly to the term project, and the remainder of class will be dedicated to lab time and consultations. To aid review and discussion of your group's term project, a panel of guest experts will be present during presentation of both your proposal and its results.

Fair grading of group work has its challenges. If you would like your individual contributions considered for grading, it is your responsibility to document carefully both process and product, and submit it. Your work should be well organized in a digital or physical folder that includes research notes, sketches, notes from brainstorming sessions, and your individual input into the group's work. (If it's more convenient, you can submit your course notebook, including any other class materials, as long as the work you want reviewed is clearly marked.)

Blue Island Tour and Workshop, Weekend of October 3-5

Professor Widder, in collaboration with Profs. Ron Henderson (IIT) and Moira Zellner (UIC), will offer an optional interdisciplinary workshop in October. We will have the opportunity to tour Blue Island, meet with a variety of experts and stakeholders, and develop initial ideas for response to the problems raised. Participants from Columbia, IIT and UIC will work together to develop an initial diagnosis of Blue Island's resiliency challenges and to brainstorm potential solutions. Attendance is not mandatory, but is *strongly* recommended. Rooms have been reserved for ten attendees on a first come-first served basis. Detailed information will be shared separately.

Required Books

- Adrian Parr, *Hijacking Sustainability* (Cambridge: MIT Press, 2009)
- William McDonough and Michael Braungart, *The Upcycle* (NY: North Point Press, 2013)

Available at:

- Book Culture, 536 West 112th St/ between Broadway & Amsterdam
- Avery and/ or Butler Library

Readings

Required readings are listed in the schedule below. In addition to selected chapters from *Hijacking Sustainability* and *The Upcycle*, other readings are required and all are provided on CourseWorks. Please prepare questions and comments on each reading, and have the readings (paper or digital) available for reference during class. A *Reading Guide* is provided on CourseWorks. Note, however, that the guide is intended to help structure our discussions, and is not a replacement for your independent preparation. Supplemental optional readings (listed after the schedule, below) are available in the library.

Schedule

Part I:

Overview and Central Concepts: Understanding the Physical Dimensions

Lecture and discussion of readings

September 7

Lecture - Where are the physical dimensions of sustainability? Why resiliency?

September 14

Lecture - Settlements and Agglomerations: legacy and new, systems and stand-alones

Readings -

- Raven Cretney, 'Resilience for Whom? Emerging Critical Geographies of Socio-ecological Resilience,' *Geography Compass* (2014) 8/9: 627-640
- Adrian Parr, *Hijacking Sustainability* (Cambridge: MIT Press, 2009), Ch 1 'The Greening of Junkspace' pp 15-31, and Ch 6 'Trash' pp 95-107
- William McDonough and Michael Braungart, *The Upcycle* (NY: North Point Press, 2013), Introduction and Ch 1-2, pp 3-83

Assignment – Group mapping exercise 'Students Have to Eat' will be initiated

September 21

Discussion - Cities and their Metabolism

Readings -

- Adrian Parr, *Hijacking Sustainability* (Cambridge: MIT Press, 2009), Ch 8 'Slums' pp 127-146
- Christopher Kennedy *et al.*, 'The Changing Metabolism of Cities,' *Journal of Industrial Engineering*, (2007) 11/2: 43-59
- Christopher Kennedy, *The Evolution of Great World Cities: Urban Wealth and Economic Growth* (Toronto: University of Toronto Press, 2011), Ch 6 'The Ecology of Urban Economies' pp 139-166

Presentations - Results of 'Students Have to Eat'

Assignment - Precedent Studies in anticipation of term project will be initiated

September 28

Lecture - Thermal and Electrical Energy: system and stand-alone alternatives

Readings:

- Bill Bryson, *At Home: A Short History of Private Life* (New York: Anchor Books, 2011), Ch VI 'The Fuse Box' pp 131-159
- Amy Seidl, *Finding Higher Ground: Adaptation in the Age of Warming* (Boston: Beacon, 2011), Ch 5 'Our Oldest and Newest Energy' pp 89-112
- Adrian Parr, *Hijacking Sustainability* (Cambridge: MIT Press, 2009), Ch 4 'The Greening and De-Greening of the White House' pp 65-78

October 5

Lecture – Resiliency, sustainability and building construction

Lab Time - Precedent Studies in anticipation of term project

October 5-7 Blue Island Excursion

Tour and Workshop, Blue Island, Ill: information will be provided separately

Part II:

Resilience and Sustainability at the Building and Settlement Scale: Self-Reliance or Network?

Lectures and lab time

October 12

Guest Lecture - Identifying and Mapping NYC's Food Systems, **Kubi Ackerman**, Project Director, Future of the City Lab at Museum of the City of New York

Readings -

- Carolyn Steele, *Hungry City: How Food Shapes Our Lives* (London: Random House UK, 2013) pp ix-xiii, 1-52
- Carolyn Steele, "How food shapes our cities," *TEDGlobal 2009*, Jul 2009 (15:40 video) at https://www.ted.com/talks/carolyn_steel_how_food_shapes_our_cities?language=en
- Christian Peters *et al.*, 'Foodshed Analysis and its Relevance to Sustainability,' *Renewable Agriculture and Food Systems* (2009) 24: 1-7
- Brett Milligan, 'Landscape Migration: Environmental design in the Anthropocene,' *Places Journal*, 2015 (online)

Lab Time - Precedent Studies in anticipation of term project

October 19

Presentations - Precedent Studies presented

Submittals - Precedent Study slide decks

Assignment – Blue Island term project initiated

October 26

Lecture - IT, Smart Cities and Feedback for Responsiveness and Resilience

Lab Time - Initial analyses and hypotheses, Blue Island term projects

Assignment – Submit slides due for November 2nd class via email to Prof. Widder before Oct. 30, comments will be returned within 24 hours for integration into November 2nd submission

November 2

Presentations - Proposals for Blue Island projects; guest discussants

Submittals - Proposal slide decks.

November 9

Guest Lecture – Jae Shin, co-founder Hector Designs

Lab Time - Develop hypothesis, develop visualization concept, develop design proposal

November 16

Guest Lecture - Carter Craft, Senior Economic Officer, Consulate General of the Netherlands, NY

Lab Time - Consultation with Professor and TA

November 30

Lab Time - Consultations with Professor and TA

December 7

Presentations - Final term project presentations; guest discussants

Submittals - Final term project slide decks **and** longer reading response

Optional Readings/Resources

Topic: Blue Island

- Joel Greenberg, *A Natural History of the Chicago Region* (Chicago: University of Chicago Press, 2002), Chapter 1: The Great Forces p. 1-15
- Background on the Calumet Stormwater Collaboration: <http://www.metroplanning.org/work/project/23/subpage/1> and useful information to the monthly meetings/agendas/presentations: <http://www.metroplanning.org/news/7077/Calumet-Stormwater-Collaborative-meeting-materials>
- The larger, regional initiative run by the Calumet Collaborative, which catalyzes innovative partnerships between Illinois and Indiana community, government, business and nonprofit stakeholders to advance a thriving Calumet region. : <http://www.calumetcollaborative.org/about-us.html>
- An initiative being run out of the University of IL Chicago that might be pertinent to know about: http://www.metroplanning.org/uploads/cms/documents/eda_fact_sheet.pdf
- Entry on Blue Island, Encyclopedia of Chicago <http://www.encyclopedia.chicagohistory.org/pages/150.html>
- City of Blue Island webpage <http://www.blueisland.org>
- Blue Island City Demographics, etc <http://www.city-data.com/city/Blue-Island-Illinois.html>
- Blue Island Resident Action Group <http://blueislandresidents.org/>
- Calumet Community Leaders Meet to Discuss Flooding <http://www.chicagotribune.com/suburbs/daily-southtown/news/ct-sta-flooding-meeting-st-1019-20161017-story.html>
- FEMA Guidance for Flood Risk Analysis and Mapping https://www.fema.gov/media-library-data/1449866037723-3eca22b9c4401c2ec2eb63fa07b2c7df/Profile_Baseline_Guidance_Nov_2015.pdf
- UN Guidelines for Reducing Flood Loses https://sustainabledevelopment.un.org/content/documents/flood_guidelines.pdf
- RainReady Blue Island http://www.cnt.org/sites/default/files/publications/CNT_RainReadyPlan_CalumetCorridor_BlueIsland_Plan.pdf

Topic: Resiliency

- HUD 2015a, Harnessing Ecosystem Services for Water Management, Part 1, Overview of Floodplain Management, slide deck at <https://www.hudexchange.info/course-content/ndrc-harnessing-ecosystem-services-for-water-management-webinar/Harnessing-Ecosystems-Services-for-Water-Management-Webinar-Slides-2015-01-08-Part-1.pdf>
- HUD 2015b, Harnessing Ecosystem Services for Water Management, Part 2, Structural Measures at a Glance, slide deck at <https://www.hudexchange.info/course-content/ndrc-harnessing-ecosystem-services-for-water-management-webinar/Harnessing-Ecosystems-Services-for-Water-Management-Webinar-Slides-2015-01-08-Part-2.pdf>
- HUD 2015c, Harnessing Ecosystem Services for Water Management, Part 3, Permeable Pavement Parking, slide deck at <https://www.hudexchange.info/course-content/ndrc-harnessing-ecosystem-services-for-water-management-webinar/Harnessing-Ecosystems-Services-for-Water-Management-Webinar-Slides-2015-01-08-Part-3.pdf>
- HUD 2015d, Critical Infrastructure Resilience Webinar at <https://www.hudexchange.info/training-events/courses/critical-infrastructure-resilience/>
- HUD 2015e, Energy Investments for Disaster Resilience, slide deck at <https://www.hudexchange.info/course-content/energy-investment-for-disaster-resilience/Energy-Investments-for-Disaster-Resilience-Webinar-Slides-2015-02-03.pdf>
- HUD 2014a, Equity and Achieving Equitable Outcomes, slide deck at <https://www.hudexchange.info/course-content/ndrc-equity-and-achieving-equitable-outcomes-webinar1/NDRC-Equity-and-Equitable-Outcomes-Slides-2014-11-04.pdf>
- HUD 2014b, Climate Adaptation Planning, slide deck at <https://www.hudexchange.info/course-content/ndrc-climate-adaptation-planning-101-webinar1/NDRC-Climate-Adaptation-Planning-Slides-2014-11-20.pdf>
- HUD 2014c, National Disaster Resilience Competition, Innovative and Inclusive Citizen Engagement Webinar at <https://www.hudexchange.info/training-events/courses/ndrc-innovative-and-inclusive-citizen-engagement-webinar/>
- IPCC 2011, Renewable Energy Sources and Climate Change Mitigation, report at <http://srren.ipcc-wg3.de/report>
- WRI 2005, Millennium Ecosystem Assessment, General Synthesis Report On Ecosystems And Human Well-Being, report at <http://www.millenniumassessment.org/documents/document.356.aspx.pdf>
- WWF 2011, The Energy Report- 100% Renewable Energy by 2050, report at http://wwf.panda.org/what_we_do/footprint/climate_carbon_energy/energy_solutions22/renewable_energy/sustainable_energy_report/

Topic: General Culture and History, Built Environment (available through CLIO, or at Avery or Butler Library)

- Cecil D. Elliott, *Technics and Architecture* (MIT Press: Cambridge, Ma and London, 1992): an historical overview of the production processes and technological advances over the course of construction history relative to both materials (wood, masonry, terracotta, metals, glass, cements, reinforced concrete), systems (lightning protection, sanitation, lighting, heating and ventilation, a/c, elevators, fire protection, structural engineering and acoustics), labor and technology.

- Siegfried Giedion, *Mechanization Takes Command* (Oxford University Press: London, 1948): a cultural history of mechanization, including bathing, cooking, cleaning, and food production.
- Andreas Huyssen, ed., *Other Cities, Other Worlds: Urban Imaginaries in a Globalizing Age* (Duke University Press: Durham and London, 2008): a fascinating set of essays on global cities and the cultural, economic and political imaginaries that drive their growth and perception.
- John McPhee, *The Control of Nature* (Farrar Strauss Giroux: New York, 1989): three essays on heroic engineering projects and their ambiguous outcomes, including the rerouting of the Mississippi at Atchafalaya, the use of sprayed ocean water on an erupting Icelandic volcano, and Los Angeles' battle against cyclical mountain fires.
- David Sanborn Scott, *Smelling Land: The Hydrogen Defense Against Climate Catastrophe* (Crown Publications: British Columbia, 2008): Part II is a clear, differentiated discussion of thermodynamics and offers a precise vocabulary for discussing energy.

Profiles for Guest Lecturers

Kubi Ackerman

Project Director, Future of the City Lab at Museum of the City of New York
New York, New York

<https://www.linkedin.com/pub/kubi-ackerman/6/538/559>

Kubi's background is architecture and design, and for the past decade he has been engaged in research around sustainable planning and development, including urban climate change adaptation, green infrastructure, and food systems. His work incorporates data visualization and spatial analysis as a means of understanding these issues. He has extensive experience in applying design thinking to the complex social and environmental problems that cities face in the 21st century.

Kubi has presented his work at numerous conferences, symposia, and public events. He has received the *Lucille Smyser Lowenfish Memorial Prize for Design*, the *Ali Jawad Malik Honor Award for Excellence in History/ Theory*, and the *Catherine Hoover Voorsanger Writing Prize* from Columbia University in 2007. Kubi is a *U.S. Green Building Council LEED Accredited Professional*, and holds a Master of Architecture from Columbia's *Graduate School of Architecture, Planning and Preservation*.

Jae Shin

Founding Partner, Hector

<http://hectordesignservice.com>

Jae Shin is a partner at Hector, an urban design, planning and civic arts practice she founded with Damon Rich. She has recently served as an Enterprise Rose Architectural Fellow at the New York City Housing Authority (NYCHA), where she facilitated efforts to define and implement design principles for preserving and rehabilitating New York City's public housing. With Hector, her current projects include a park & neighborhood plan for Mifflin Square in Philadelphia and

participatory exhibition and workshop design for the Museum of Modern Art in New York City. She holds degrees from Rhode Island School of Design and Princeton University and her projects have received support from the MacDowell Colony and the National Endowment for the Arts. Jae has led architecture and planning studios at New Jersey Institute of Technology and the Harvard Graduate School of Design.

Carter Craft

Senior Economic Officer at Consulate General of the Netherlands in New York
New York, New York

<https://www.linkedin.com/pub/carter-craft/0/224/532>

Carter is an urban planner with over 20 years of experience in waterfront and transportation issues. Carter has been involved in creating and growing more than two dozen water-related non-profit organizations. Almost every one has benefited from innovative waterfront designs and programs and, often, a high degree of public participation. Through his planning and project management firm, *Outside New York*, Carter helps public and private organizations understand the complex ecological and political issues inherent in waterway planning. The *Consulate General of the Netherlands in New York* sought Carter for an objective assessment of impacts to people and property from Superstorm Sandy.

Carter has consistently helped people rethink their relationship to the waterways of New York and New Jersey through more active use and interaction. For example, he helped to create the “Harbor Loop” ferry plan in 2001, a forerunner to today’s highly successful East River Ferry service. He also conceived of the “Hudson-Harbor Greenway Plan” in 1999, and led efforts to have the route designed at a National Millennium trial, tracing the Hudson River Walkways and Greenways in NY and NJ, and ringing the harbor via the Verrazano Bridge. Examples of Carter’s innovative projects include:

- 1st use of biodiesel fuel in an Historic Ship in NYC
- 1st large-scale use of recycled plastic lumber for floating dock construction, and development of ASTM’s guidelines for construction
- 1st multipurpose “living bulkhead” design development in NYC
- 1st “Eco-dock” construction, including a floating upwelling system to foster growth of shellfish
- 1st oyster hatchery developed in NY Harbor in almost 100 years
- 1st green building on Governors Island
- 1st group swim event around the Statue of Liberty and first City of Water Day festival
- 1st experiment with ecological concrete to help foster growth of marine life in the Hudson River Estuary

Carter holds a graduated Masters of Urban Planning from New York University, and B.A. in Economics from UNC-Chapel Hill.