Architecture Climate Change & Society

Buell Center
2020 Course Development Prize

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ADAPTATION TO SEA LEVEL RISE

A two semester cross-disciplinary course focussing on adapting to the impacts of sea level rise in existing urban neighborhoods in sadly soggy southeastern Virginia has been in place since 2014. In the first semester, students of architecture, engineering, and, intermittently, of pure and social sciences, hear lectures from subject matter experts on soils and hydrology, preservation, urban design, public policy, and social justice and more. Simultaneously, community engagement with stakeholders begins, as does a series of design initiatives in which the architecture students and faculty model the processes of Studio Based Learning. The latter is the subject of a current NSF program study by ethnographers. While student work has been the basis for a $115,000,000 HUD NDRC implementation grant, it is also true that, as in efforts outside academia, disciplinary silos keep professions ill-equipped to work successfully together. In a subject as vast as the planning of adaptation strategies, however, the only path forward is bringing the expertise of a wide array of knowledge types together; there is inadequate time for sequential disciplinary speculation Next year area professionals will join the design studio as well. It is hoped a new community of practice will emerge modeling effective transdisciplinarity.

Due to bad luck, accelerating subsidence, and slackening speed of the Gulf Stream, Southeastern Virginia has become a sort of canary in the coal mine, grappling with issues of recurrent flooding that will, sadly, become increasingly the norm in coastal communities globally due to climate change. Within the area, amalgams of political, community, and academic activists have begun foraging for means and methods to develop adaptation strategies, creating ad hoc interdisciplinary efforts to find solutions. One such has been developed into the subject course materials.

The course, which attempts to identify and design adaptation and mitigation strategies at the scale of urban districts or neighborhoods, has been evolving over the past five years attempting to improve the quality of education and design services offered.

In 2014, at the instigation of a small grant to a local NGO through Virginia Sea Grant, Associate Professor Mason Andrews created an elective to study and propose methods to improve the resilience of a neighborhood prior to its, sadly inevitable, confrontation with a major storm. The project area was a low to moderate income, National Register listed, primarily African American, riverfront community which was well off city radar in terms of interest in investment. The program began with significant community engagement, during which students learned specific sites of recurrent flooding, the relentless migration of water into basements, and conditions that seemed to exacerbate flooding, and general mistrust of city staff.

In 2015, a colleague from nearby Old Dominion University's School of Engineering, *Mujde Erten Unal*, brought a group of civil and environmental engineering capstone project students into the project. Engagement with city officials (Planning, Public Works, and a newly minted Resilience Office) led to a reformatting of an imminent Dutch Dialogues: Live at Sea Level to include the student project area. Students and faculty participated in the four day charrette. Andrews spent the remainder of the summer assisting in packaging a grant application for HUD's National Disaster Resilience Competition. The student project area received a $115,000,000 award and is currently approaching construction.

In subsequent years. program work has also garnered awards from the Ford Motor Company and the City of Norfolk, and has led to the selection of Andrews and the program as one of six directors of the National Resilience Initiative. Projects to date have included another National Register district, emerging arts districts in two cities, and an economically challenged center city neighborhood designated, by virtue of its relative height above sea level, by the city as a Neighborhood of the Future. Currently the studio is in the second of three years of study of an area east of downtown Norfolk that lies atop of a filled creek and whose water damaged public housing projects are targets of redevelopment.

While the projects and project areas have been of great interest and the design explorations of value, the evolution of the program has also constituted its own quest to establish a sustainable teaching paradigm and to explore potential for modeling trans-disciplinary collaboration.

As in efforts outside academia, disciplinary silos find professionals ill-equipped to work successfully together. In a subject as vast as the planning of adaptation strategies, however, the only path forward is bringing the expertise of a wide array of knowledge types together; there is inadequate time for sequential disciplinary speculation.

Early years of work showed the inevitable stress lines between architecture and engineering students and a need to give both base knowledge in a vast array of topics germane to their work. The former was eventually improved by requiring engineering students to be involved in two rather than one semester for their capstone project. This did not smooth all friction but developed higher tolerance and the beginning of the capacity to listen and appreciate another discipline's working methodologies.

The developed subject matter portions of the class are delivered on a weekly basis in the first semester, and are presented by a combination of faculty and invited subject matter specialists. Currently there are twelve topics covered to familiarize students with material and perspectives that may have influence on their design consideration. Current topics are: Preservation Strategies; Urban Design; Low Impact Development Techniques; Wetlands Design

and Shoreline Stabilization; Soils and Hydrology; Social Justice and Community Engagement; Resilience and Public Policy; Prior Work of the Coastal Community Design Collaborative (working name of program); Emerging Materials and Systems on Market/in Pipeline; Approaches in Netherlands and New Orleans; and Collaboration. At the conclusion of each lecture (being recorded this year for digital distribution next), students discuss and begin to apply that new knowledge base to their design project area. The second session of each week is a full design studio day, focussing again on the week's subject matter. The second semester (ARC 532 for the architecture students; a capstone course number for the engineering students) is an attempt to be a full studio experience, despite the limited time frame of an elective. Final deliverables are a Preliminary Engineering Report and an Executive Summary, presented to community, academic, and city staff as appropriate.

Course materials that have proved of most use are Low Impact Development as developed by the University of Arkansas Department of Architecture, and the three volumes of the Greater New Orleans Water Plan produced by Waggoner and Ball. That both are the work of folks involved in architecture speaks to the tactical utility of our discipline's generalist education in approaching problems seemingly broad and intractable.

Through the National Science Foundation, the program was directed toward emerging research by ethnographers in education on Studio Based Learning. Under a three year NSF grant, halfway through its term, the program is working with Philadelphia-based experts engaged in bringing the model of design education to social and physical sciences and collaborations between the two. Under their guidance, insights are being gained and it is hoped the study will serve as a model to moving toward the elusive goal of trans-disciplinary design work. During the study, the program has expanded to include students in marine and environmental sciences, journalism, and engineering technology.

Next year the program will expand again to include area professionals in both principal disciplines seeking to expand their understanding of issues and techniques in this emerging field fo study. Our ethnographic advisors believe this will further expand students' benefit in their movement into a Community of Practice. Established and having produced a number of beneficiaries, is a Concentration in Adaptation to Sea Level Rise within the university community, and a planned Certificate Program for area professionals through the program is in the works. A high percentage of students are now employed because of their work toward an understanding of issues related to an emerging field of inquiry and their demonstration of some success in interdisciplinary collaboration.

It is hoped that as a next horizon a program may be developed with participation by area university history and archaeology programs to establish a protocol for documenting districts whose longevity seems quite likely to be short.

The issues with which we continue to struggle are interdisciplinary tolerance and collaboration and the challenge of running a stealth studio as an elective, especially as it addresses issues not immediately apparent as architectural. To attract the best and brightest has frequently involved unearthing funding streams to provide the program as an alternative to a part-time job. The sustainability of this exercise in sustainability is unclear. The work, however, will, like many other strategies being developed for the toxic coal mine in which we canaries find ourselves, be of use, we are convinced, to others whose elevation above sea level is slightly higher than our own.

A reduced copy of the tri-fold brochure used by the program is attached below:

At Hampton University

Adaptation to Sea Level Rise is a concentration designed for students in the M.Arch program, but open to all. To earn a M.Arch with a Concentration in Adaptation to Sea Level Rise, students should complete the following classes:

ARC 531 Adaptation to Sea Level Rise I
ARC 532 Adaptation to Sea Level Rise II
MES 130 Introduction to Environmental Science
CEE 458 Sustainable Development (ODU **)

First HU students due to graduate with concentration May 2018.Six more in the pipeline.

At Old Dominion University

Currently a special full year program is available for students in their final year:

ARC 531 Introduction: Adaptation to Sea Level Rise (HU **). *pre-requisite for CEE 403W Capstone. ODU credit given as CEE elective.*

CEE 403W Capstone Design Project*

** *Cross registration available through the Virginia Tidewater Consortium*

As a Continuing Education Student/ Certificate Program

In September of 2020, practicing professionals in the area will be able to join the training and studio work. Eligible for Continuing Education credits, Course will meet for three hours weekly, with collaboration continuing via digital platforms between classes.

Funding is available for student stipends for dedicated program participants.

In search of solutions to a global issue, locally

Water recognizes no property lines or borders

Rises in sea level will affect people all over the world and have deep impacts on economies, industry, and defense. Due to this area's bad luck with accelerating physical phenomena (land subsidence, gulf stream slowing) we can serve as pioneers of adaptation strategies that can help others not yet so deeply impacted.

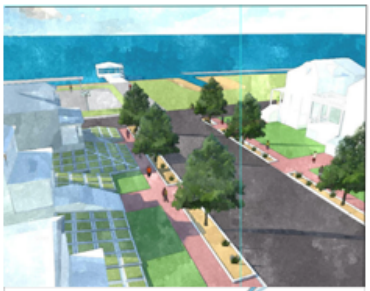
Coastal Community Design Collaborative

Our cutting edge design approach brings together the inventiveness of students with communities, professionals, and public policy makers. The CCDC offers an opportunity for real-world experience beyond the academic world, for learning the crucial capacity to collaborate with disciplines outside your own, for making a significant contribution to an emerging field, and for helping many people at home and around the world.

Adaptation to Sea Level Rise

A cross-disciplinary, cross-university concentration in an emerging field

Seas are rising and Hampton Roads is sinking. Put your design skills to work helping historic neighborhoods learn to adapt, to survive, to thrive.



Coastal Community Design Collaborative

Community Engagement

We begin with getting to know folks in the neighborhoods in which we work, interviewing, and reporting back our ideas and strategies. This is a fundamental skill set for urban design.

District Scale Design

We work at the scale of neighborhoods because we believe the most good can be thus done, and because it allows us to help a community begin to build toward resilience in the face of natural challenges.

Work with Professionals outside the Department

The CCDC consults with local professionals and city officials, to whom it also reports. Interviewing, collaboration, presentation skills are honed.

National Resilience Initiative Network

HUDA/CCDC is one of 6 design studios nationally working together to study resilience for the AIA, Rockefeller Foundation, & Clinton Global Initiative.

Cross-disciplinary design work

Building on relationships established in the 2011 Solar Decathlon, architecture students from HU and engineering students from ODU learn to work together collaboratively. As part of the Coastal Community Design Collaborative, students will master skills, sadly unusual among architects and engineers, of learning to work efficiently and productively with peers in an allied discipline. This is a significant and unusual talent, highly marketable to potential employers. Students will also consult with area landscape architecture, marine science, and engineering professionals, as well as Non-Government Organizations, and city administrators in the course of each project. The experience and the skills of effective collaboration should serve as highly marketable job skills.

Chesterfield Heights

CCDC's first project was for a low- to moderate-income Norfolk neighborhood during the 2014/15 academic year. Successful modeled solutions involved green infrastructure, a living shoreline, and a tide gate at an existing wetland. The project was adopted by the city into an international design charrette called *The Dutch Dialogues* in June 2015. It was then made part of the Commonwealth of Virginia's entry into HUD's National Disaster Resilience Competition. It was awarded a $120,000,000 implementation grant. The studio will continue to be involved in the project's design and construction development. Pretty amazing start for a student design program!