**UNIVERSITY OF WATERLOO**
**SCHOOL OF ARCHITECTURE**

**ARCH 684-003**
**Amphibious Architectures: The Buoyant Foundation Project and Alternative Flood Mitigation Strategies in Post-Katrina New Orleans**

**Spring 2011**
Tuesday 7:00 - 9:50 pm, Room 2026

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**The Premise**

In the aftermath of Hurricanes Katrina and Rita, many homeowners in South Louisiana are required to comply with new government regulations in order to retain their eligibility for flood insurance. For most, this means elevating their houses to comply with the new Base Flood Elevation (BFE) requirements issued by FEMA. Furthermore, in the absence of substantially improved levees, many New Orleanians who do not face official requirements to elevate their houses remain concerned about their safety and wish to improve their resistance to flooding.

Permanently elevating houses, in some areas by as much as 12-15 feet, may be FEMA's solution to the problem of flooding but it creates new problems, such as difficult access to living areas, loss of neighborhood character and increased vulnerability of the structure to wind damage. With permanent static elevation, even if a house is raised to the BFE or higher, it can still flood in an extreme event. In the meantime, residents must live with daily inconvenience and a reduced quality of life in the hope of avoiding flooding in a future event that is statistically very rare indeed. A look at floating docks and houseboats suggests that there may be an alternative approach, one that would allow the house to remain close to the ground under normal conditions but rise as much as necessary, even above the BFE, when flooding occurs.

There are existing precedents of cost-effective amphibious houses, or houses that normally rest on the ground but float on buoyant foundations during a flood, both abroad and along the rivers and bayous of South Louisiana. In the Netherlands, amphibious housing is found along the Maasbommel River and in South Louisiana, at Raccourci Old River in Point Coupee Parish.

**Course Objective**

The Amphibious Architectures research seminar involves students in research and design projects that directly support the development of the Buoyant Foundation Project (BFP) (www.buoyantfoundation.org). The BFP is a non-profit research initiative with the goal of designing and implementing retrofittable amphibious foundations for New Orleans "shotgun" houses. We will use a case study approach to investigate precedents of floating and amphibious architecture and the adaptation of both precedented and unprecedented solutions to the BFP.

**Completion Requirements**

Each student will select an overall research topic related to the themes of the course and an unresolved BFP design issue that requires development or improvement. As the term progresses, it is expected that students' investigations in both areas will move from the general to the progressively more specific. Typical weekly assignments will involve conducting research on the chosen topic or design issue and/or developing design solutions. Students will be expected to make short presentations of the week's work at each class meeting, including discussion of obstacles encountered and issues resolved. Course work thus includes precedent research (with full documentation of sources), web-based literature searches, in-class presentations, development of solutions to design issues, construction of physical or digital models as appropriate, and the compilation of all work in a documentary booklet with a summary report at the conclusion of the term. Attendance at all class meetings is required unless excused in advance. N.B.: There will be no class on June 9 and June 23.

Research topics for investigation could include, for example, existing amphibious housing, projects for amphibious communities, houseboats, floating docks, floating communities, flood-prone communities in need of mitigation, etc. Case studies developed for the course may be placed on the BFP website.

Design issues for investigation may include such unresolved aspects of the Buoyant Foundation Project as the telescopic mechanism for the vertical guidance poles; a moment-resistant frame for improved lateral stability; removable/movable Phase 1 & Phase 2 caps and connections for the guidance poles, which must be coordinated with the development of the moment-resistant frame; the investigation of protective coatings for EPS buoyancy blocks, or alternative materials or methods to achieve buoyancy; issues related to utility connections, such as umbilical connections, self-sealing break-away connections and regulatory issues; and other possible topics that may be identified during the course of the seminar.

**Grading**

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| Attendance & class participation | 20% |
| Weekly assignments | 20% |
| Case studies & documentation | 20% |
| Design solution, model(s) & presentation | 20% |
| Final report & documentation booklet | 20% |

**Afterword**

Six months after Hurricane Katrina, in February 2006, I found myself asking, "Isn't there something I can do from my position as research professor at the LSU Hurricane Center to counteract the dissolution of New Orleans culture?" For me this meant, how could my work in hurricane damage mitigation help to reverse the diaspora that had siphoned away the population that was New Orleans' heart and soul, the city's authentic cultural source? On my part it became an effort, a mission really, to devise a way to make the shotgun houses in the old New Orleans neighborhoods truly protected from flooding, so that the people who used to live in them would feel that it was safe to come back to them, so that the old neighborhoods could be reestablished, so that New Orleans' unique culture, currently displaced, fragmented and endangered, would not become extinct.

Hence my slogan, Save the Shotgun. The shotgun houses themselves are critical players in this project, because the uniqueness of New Orleans culture is in no small part due to shotgun house typology. The strong sense of community at the heart of New Orleans cultural life is a direct response to the lack of privacy in a shotgun house that serves to foster social interaction, both within the house and among the houses in a neighborhood of shotguns. Shotgun houses need a flood-proofing strategy that does not compromise the relationship of the house to the street or to the other houses in the neighborhood. What they do not need is permanent static elevation, which is occupant-unfriendly, neighborhood-disruptive and insufficient flood protection anyway, but is currently the only elevation strategy approved by FEMA. A buoyant foundation is a relatively inexpensive, unobtrusive retrofit to a shotgun house that provides it with buoyancy blocks and a vertical guidance system connected by a light steel frame, so that the house rises to float on the water when flooding occurs and settles back into its original place when the water recedes.

So, you may be asking, what is a shotgun house? For descriptions and images, please go to:
http://bywater.org/Arch/shotgun.htm

http://en.wikipedia.org/wiki/Shotgun_houses

http://www.asergeev.com/php/searchph/links.php?keywords=shotgun+house