**WATERSHED (or) Wrapping Sheds with Water**

The buildings that we construct today and the cities we inhabit are the products of an accumulation of knowledge over the course of history. Furthermore, the most rudimentary living being on the planet is more complex and more intelligent than any building constructed at any time in history. Thus architecture and urbanism must learn from nature in a structural way to integrate the principles and values of environmental processes, the logics of natural ecosystems, and the anatomy or physiology of living beings and their material properties, which together have demonstrated a capacity for survival throughout history.


**INTRODUCTION**

*Watershed (or) Wrapping Sheds with Water* aims to build upon ideas about network regionalism first advanced by Benton MacKaye, the conceivner of the Appalachian Trail. As it was first imagined, this ambitious endeavor would organize the eastern seaboard through a series of strategically integrated infrastructural networks. MacKaye’s approach embodied a new series of regional planning tactics that he described as “liquid” and that actively operated to establish territorial flows and relationships. Following MacKaye’s ambitions to position strategies of construction within regional economies and ecologies, *Watershed* proposes to initiate a hydro-tectonic research trajectory. In so doing, *Watershed* is positioned to spark a symbiosis between the immediacy of cross-registering scales through making and broader speculations on imagined future water regionalisms within the Great Lakes Basin.

The Research Through Making Grant offers a unique opportunity to develop new interdisciplinary synergies through the study of water related themes, while reconsidering technology and craft, materiality and process, representation and time. *Watershed* will draw upon the use of computational design, analysis and fabrication output techniques to “cross-breed” approaches typically isolated by discipline and scale. This hybridizing approach ultimately aims to contribute tectonic knowledge that is influenced by and in turn influences the ecological systems whose boundaries extend far beyond the building envelope. In this way, digital technologies facilitate fabrication and allow for the close consideration of crafted making. In turn, visualizing the largely invisible relationship between resource-conservation, pollution reduction, land use regulation and construction practices situates tectonics and the research of making squarely at the center of an updated approach to “liquid” regional planning.
At the scale of the Great Lakes Basin, Watershed will make a dynamic atlas that visualizes the territory through hydrological networks and contributes to the redefinition of a new regional order. By making visible the manifold relationships that exist between water and the constructed environment, Watershed positions quantitative analysis and relational data networks (typical of Geographic Information Systems) in the realm of design. A series of visits to target areas in the region will initiate the compilation of visual and material clues to shape a taxonomy of water typologies and their operative procedures. In providing a methodological structure for visualization, this atlas will allow the identification of trans-scalar design opportunities for water management in the Great Lakes Region.

The Watershed atlas will consist of a single, over-sized map (larger than your field of vision when looking closely) that layers time with dynamic projections overlaid onto the map. The map itself will cover the entire Great Lakes Basin watershed and will explore representation techniques that unveil multiple readings of water as influenced by policy, economic development, land use, geology, infrastructure, public health and other critical lenses. The materiality and construction of the map itself will be held accountable to a deep reading of the relationships between surface and subsurface hydrologies.
At the scale of material exploration, *Wrapping Sheds with Water* is critical for re-imagining the future of our constructed environment. By investing in prototype development, details, surface geometries and materiality become the catalysts that link large scale innovation to tactile intelligence. Ultimately, one prototype will be developed, constructed at full scale and “cultivated” at the Botanical Gardens before being installed for display in the Research Through Making Exhibition. While this living construction will play a critical role in contributing to architectural, tectonic knowledge it is not intended as “silver bullet” solution. Rather, *Wrapping Sheds with Water* will be presented as one play from a larger playbook wherein small, adroit design maneuvers can be flexibly inserted into the contextual considerations of the atlas and ultimately add up to more than the sum of the parts.

The prototype will draw upon the use of digital computation and CNC (computer numerically controlled) fabrication techniques paired with explorations in slip casting to develop a hydrological surface. Computational methods will be tooled to generate ecological performance (such as speed of percolation) and will avoid superficial visual bio-mimicry. The prototype will include a tiling facade system and a porous ceramic ground-scape that can sustain the possibility of plant growth. To do so, it will initially be constructed at a greenhouse space at the Botanical Gardens. Weathering, water performance and the growth of native plant species will be measured and documented. Data collected during this “cultivation” period will be cycled back into the methodological design processes and develop a feedback loop to contribute to a longer research trajectory.
RESEARCH THROUGH MAKING

The research through making grant offers a unique opportunity for prototypes constructed at the scale of an individual to inform a new collective imaginary of the Great Lakes watershed future. On one side, new digital technologies facilitate fabrication, and allow for the redefinition of craft-making in the construction of these prototypes, and their performance testing. On the other, pressures of development, resource-conservation and pollution-reduction strategies demand operations crossing a wide range of scales and disciplinary lenses.

Through the development of trans-scalar cartographies, this research proposes to construct an essential atlas that frames large scale land use patterns and watershed hydrologics within the broader operative environment of the Great Lakes Watershed. The research will render the environmental and infrastructural shifts that trigger urban development and their effect in the hydrological systems, unfolding the potential to reconfigure the ground through new systems and morphologies.

Materially, the project will explore ceramics techniques to pair digitally driven fabrication technologies (form-works and slip moulds) against material resistance (clay). Ceramics possess an economic advantage, the capacity for porosity and water filtration and participate in cultural and geographic histories of places tied to the sediments carried by water. Furthermore, there is a rich local community of artists, artisans and scholars actively exploring ceramics techniques who collectively represent an invaluable resource to observe and learn from and whose body of knowledge can help launch a novel approach to digital design though the traditional craft-making techniques.
WATERSHED

proposed route for road trip

BUDGET

SCHEDULE

ACTIVITY

Proposal deadline, January 8

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<tr>
<th>YEAR</th>
<th>WEEK</th>
<th>ACTIVITY</th>
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<tbody>
<tr>
<td>2010</td>
<td>may</td>
<td>student work $3,000  2 students @ $12/hour 250 hours</td>
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<td></td>
<td>june</td>
<td>materials &amp; components for prototype $9,000  outsourcing</td>
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<td>july</td>
<td>road trip $1,000  4 days/3 nights 1,500 miles + hotel “collect” contested water typologies for atlas</td>
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<td>materials for physical atlas $1,000  formatting &amp; printing $2,000  wall panels &amp; booklets paper &amp; model material</td>
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<td>model &amp; components for prototype $2,000  construction, transportation &amp; reconstruction</td>
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2011

| 2011 | january | total $20,000  Final submission, January 8 |

Site definition & GIS data collection
Contacts: "SAND Lab TCAUP [Jen Green]  ESA Lab SNRE [Shannon Blaines]

Material Study [ceramics] & CNC
Contacts: FABlab at TCAUP [Was McGee] Ceramics studio [John Leyland]

Prototype testing
Mold making, slip casting
Water flow testing, documentation

Assemble at botanical gardens (in greenhouse) Initial prototype complete

Prototype “cultivation” at botanical gardens Document growth / Measure water

Incorporate observations of prototype into atlas

Dis-assemble & Re-assemble prototype (move from Botanical Gardens to exhibit)

Exhibition
Seek other opportunities to exhibit after TCAUP

(or) Wrapping Sheds with Water

Research Through Making Grant

Proposal deadline, January 8

materials & components for prototype

MATERIAL FISHERIES & EROSION

LAND USE

ECONOMIC GROWTH

AGRICULTURE

Energy

Transportation

Aquatic Ecosystems

American Ecosystems

Proposed route for road trip