In developing this year’s ACADIA Conference, the organizing committee spent much time discussing the various streams of papers, projects and contributions that form its content. Often these questions have focused on what disciplines can be defined as being “allied” to architecture and more specifically to the particular obsessions that have historically been presented here. Questions of appropriateness and legibility are difficult to grasp in the context of a community whose research focus is being pulled in many directions. Technological advances (software, robots, bioengineering) and the push towards emergent systems or parametricism as theoretical frameworks, are providing us with an interesting moment in which to ask the question: who are appropriate allies in the development of architectural projects?

What is interesting to see is how the theoretical embrace of emergent systems theory in architecture is giving rise to a more collaborative approach that has coincided with the development of a set of tools that enables formal and assembly logics to become more clearly linked to, and influenced by, performative criteria. The potential for evolutionary computational strategies to be combined with advanced structural and material simulations - that Michael Weinstock alluded to at the ACADIA 2008 conference - are increasingly being presented here.1 This level of engagement with disciplines that have traditionally sought optimization (programming, fabrication robotics) is challenging architects to find ways to describe their work as being about more than the set of protocols and technical advances that enable them to move forward, and instead find a way to position the work within a larger set of narratives.

Works in (of) Progress

It is in this context I would like to present some of the design research being undertaken in the Laboratory for Integrative Design (LiDi).2 For the last three years we have been collaborating with researchers in the fields of computer science, engineering, L-systems theory, robotics, urban infrastructure and medicine, to name a few. Projects have not only made use of the tools and procedures of these disciplines but also pushed, through these procedures, certain aesthetic values that are transformed by the processes. Swarming behaviours become structural (and even infrastructural) articulation, weather patterns develop formal logics, and kinetic response absorbs and influences behaviour.

In the Structurally Intelligent Swarms (SIS) project, agents produced in Processing become the skeletal underpinning for a series of structural and surface developments that are iteratively generated and evaluated using Maya, Rhino, Grasshopper, Galapagos, and finite element method (FEM) software. Loading and material constraints are used in combination with complex geometric formations to arrive at new models of efficiency and form (Figures 1-3). These techniques take aesthetic, procedural and structural cues from medical techniques such as grafting and stitching.
This project builds on prior work where we investigated the potential for swarms to produce a “heterogeneous landscape through the manipulation of sets of cells by actively altering their symmetry across scales” in an infrastructural context. Re:Connect Devington deployed swarms as connective trajectories through a cellular field in the development of an urban agricultural park (Figures 4-5).

Shifting Terrain (Figure 6) deploys a field of kinetic ribbons into a public space and encourages passersby to “learn” techniques for its manipulation and draws them to find connections between themselves, strangers and the robotic field. The connections between the user and the field are not immediately apparent and require repeated attempts to decipher and master.

iConic, (Figure 7) imagines a building facade system comprised of conic modules that rotate at differential intervals and speeds, responding to light and views in a bottom up approach. It can be manipulated from top-down controls to produce patterns across a continuously changing building skin. The result is an eerie and unsettled surface condition, due to the irregular truncation of the cones and the speed at which they rotate.

The final project presented here explores weather systems as the basis for the distribution and disruption of ambient conditioning devices. Calgary sits in a highly active meteorological zone capable of rapid formation and disappearance of clouds; it is possible to stand in a hailstorm and see bright sunlight just one block away. This condition of highly localized pattern dissipation is explored through the production of distributed particle systems that interact with localized disruptions. A prototype of this project will be a part of the exhibits at ACADIA. (Figure 8).

These projects present what we hope is an attitude towards the production of architecture, that sees its tools and processes and the generative ideologies that direct it as an outgrowth of the pursuit of inappropriate bedfellows. They seek, to varying degrees, to integrate the anomalous into the known and fabricate the unknownness that E.E. Cummings describes as the purpose of desire.4
Figure 3. Shifting Terrain (Parrac 2010)

Figure 4. Re:Connect Devington Agricultural Park (Johnson + Taron 2010)

Figure 5. iConic, field condition (Kolarevic 2010)

Figure 6. iConic, assembly detail (Kolarevic 2010)

Figure 7. Re:Connect Devington Agricultural Park (Johnson + Taron 2010)

Figure 8. S.I.S. Structure and surface deployed into an existing condition (Taron 2011)

Figure 9. Cloud Wall (Johnson 2011)
Notes


2. The Laboratory for Integrative Design is co-directed by Jason S. Johnson, Branko Kolarevic, Vera Parlac and Joshua M. Taron.


Project Credits:

S.I.S. 2011
Design: Joshua M. Taron
Project Team: Matthew Parker, Jodi James

Re:Connect Devington, 2010
Design: Jason S. Johnson, Joshua M. Taron
Project Team: Jodi James, Matthew Parker

Shifting Terrain, 2010
Design: Vera Parlac
Project Team: Brett Osness, Mike Kryski

iConic
Project Supervisor: Branko Kolarevic
Design: Matt Knapik
Technical Team: Eric Kryski, Mike Kryski

Cloud Wall
Design: Jason S. Johnson
Project Lead: Jodi James
Project Team: Kurtis Nishiyama