

By implication, the development of experimental architecture that is responsive to the local context can have sustainable benefits for the natural environment and adjacent community. Here, architect and writer **Terri Peters**, who has a PhD in sustainable building transformation, picks up the gauntlet and asks how the notion of localness might be able to advance sustainable design. Focusing on a qualitative rather than quantitative interpretation of sustainability, she describes projects by New York-based studio **The Living**, the Chinese architect **Li Xiaodong** and Toronto architects **Superkül**, highlighting the importance of ecology, social sustainability and context-specific design in the treatment of their work.

Architects learn by putting things together: constructing arguments, building prototypes, adding layers of meaning, material and culture to a place. This Δ provides a provocative discussion of the role of experimental constructions in architecture by connecting to the highly relevant concept of localness. Architecture is always in some way locally responsive, but here guest-editors Michael Hensel and Christian Hermansen Cordua examine a certain kind of context-specific architecture that is both about and of the local. As a response to globalisation, to the unchecked capitalism that makes global cities so similar, the issue reveals a broad range of approaches to experimentation, sometimes connecting the construction of these structures beyond themselves, in ways that might influence mainstream practice. It does not, however, explicitly pursue how localness can further sustainable design. Here it misses an opportunity to highlight ways the local can provide the seeds for a compelling and alternative approach to sustainable design.

Intensely local approaches to sustainable design can benefit architecture in all stages of the design process. For example, considering the broader ecology of the building process, using local materials can reduce the embodied energy in materials and component manufacture and transport. Relating to social sustainability, using local labour and expertise or providing local training opportunities adds a social and economic benefit to the larger community. Context- and climate-specific approaches

Sustaining the Local



Terri Peters

An Alternative Approach to Sustainable Design





The Living

Hy-Fi

MoMA PS1

New York

2014

left: Hy-Fi was a temporary summer pavilion installed in the MoMA PS1 courtyard as part of the Young Architects Program. The architectural experience was heightened by the choice of material. The small modules are stacked to form a complex roof space, while at ground level visitors experienced filtered daylight and a distinctive smell in the sculptural interior.

above: Hy-Fi compostable bricks. The organic tower was designed to be planted, to grow and die, composed of biodegradable, compostable modules formed from farm waste, mushroom roots and corn stalks grown in steel brick moulds. Researchers at Ecovative developed the material in 2007 and typically use it for packaging.

could include integrating with the existing architectural surroundings, and developing a place-based approach to the specific site. The concept of 'localness' has the power to bridge current discussions about sustainability in architecture, and potentially offers new ways of talking about and thinking about inherently non-architectural concepts. Sustainability is currently largely measured and discussed in quantitative terms such as LEED, BREEAM and other checklist systems that do not consider renovation potential, a building's age or its capacity for improvement. What is difficult to measure – experience, behaviour, context, architectural quality, heritage – gets ignored. There are some experimental offices that are proposing alternative approaches to green architecture, especially through architectural research in this area.¹

Concepts in Architectural Sustainability

At the 2014 Venice Architecture Biennale, Stig L Andersson argued that experiential, architectural qualities must be paired

with the rational and that each is exactly as important as the other.² He calls this 'complementarity'.³ Many architects are now attempting to engage with sustainability through new language and priorities that are more humanistic and holistic. According to Simon Guy:

We must fundamentally revise the focus and scope of the debate about sustainable architecture and reconnect issues of appropriate technological change to the social and cultural processes and practices within which a specific design is situated. Drawing upon more critical, interpretive, participative, and pragmatic approaches to sustainable design would involve researchers both in defining the nature of the environmental challenge while encouraging a wider range of context-specific responses.⁴

Guy and Steven A Moore argue that green buildings are situationally specific 'contingent hybrids'⁵ inseparable from their context of sustainability, place, technology and the future.

Key concepts from *Δ Constructions* can be extracted to explicitly propose new ways for architects to engage with the distinctly non-architectural language of 'sustainability' through reflection upon 'the local'. Here, three examples are analysed relating to ecology, social sustainability and context-specific design that draw on the local to experimentally consider architectural qualities and connect to current trajectories in experimental green practice. Hy-Fi is a temporary pavilion that provides 1:1 testing of a completely organic building material. Complementary to this technological challenge is an intensely local one: the building's cradle-to-cradle concept largely responds to a 240-kilometre (150-mile) radius. The Liyuan Library is a small-scale community-run building that was designed as a social-architectural experiment. The award-winning project subverts expectations in terms of architectural recognition, environmental concepts and experimental building. The final example is the Great Gulf Active



House, a sustainable building prototype with the capacity to disrupt mainstream building practice due to the partnership with a commercial housing developer. This project is able to balance, not just include, architectural experience as a sustainability parameter.

An Ecological Perspective: Hy-Fi

Almost all architects now work internationally, and most projects, even intensely local ones, are supported by consultants, materials, staff, labourers and building technologies that do not come from the place where the building is located. A project that aspires to be both intensely local and scalable to a permanent building is the Hy-Fi installation by The Living. The experimental pavilion is a unique project commissioned for the Museum of Modern Art (MoMA) and MoMA PS1 Young Architects Program and installed in New York at PS1 in summer 2014.⁶ Architect David Benjamin created a cathedral-like form for the 12-metre (40-foot) tall structure and partnered with

local material designers Ecovative who grew the bricks from corn stalks mixed with fungal mycelium. As part of their process, the team decided where the raw materials came from, considered what kind of energy and labour were required, imagined how the building would change over time, and planned where the building materials would go when it was deconstructed.

Benjamin saw Hy-Fi as a test bed of how architects could design for these larger ecosystems in permanent building projects. The local food movement has food miles and Benjamin wanted to start an awareness within architecture about the concept of architecture miles in terms of embodied energy and sustaining the community. The plant materials were grown in upstate New York and the building blocks are harvested agricultural waste. Then, to complete the cycle, after the building was deconstructed and composted the soil was used by Build It Green in the Queens Community Gardens. The experimental structure relates

to concepts in this Δ in that it tests unique technical and spatial possibilities while aiming to communicate a way of working beyond itself. The engineers for the project, Arup in New York, were so intrigued by it that they built another temporary structure as a party pavilion in their New York office. During the Hy-Fi installation at MoMA PS1 it was announced that software giant Autodesk was acquiring The Living for its research division.⁷ Two more iterations of the brick structure are planned for 2015: an indoor application and a building scale. The focus on natural building materials and cradle-to-cradle thinking makes this an important benchmark in sustainable design and in bringing architectural and materials research into future practice.

Social Sustainability: Liyuan Library

Another influential experimental structure is the Liyuan Library by Li Xiaodong located in a village near Beijing. The library is designed as a part of the local



Li Xiaodong

Liyuan Library

Jiaojiehe, China

2012

opposite: The main space is large and bright, with integrated furniture, book stacks and steps. The library is building its collection by asking borrowers to leave two books and take one home.

above: The community-run library is located on a beautiful site and the designers aimed to draw as much from the local environment as possible. It is not connected to the village electricity grid so passive strategies are used for lighting and ventilation. The distinctive cladding is local firewood.

physical and cultural environment from the scale of material to site planning to the design of a system of book lending. Li Xiaodong aimed to use architecture to enhance appreciation of the site's natural landscape qualities. He relates to 'sustainability' in terms of sustainable siting and local context.⁸ The building has won numerous architectural awards, most recently the inaugural Moriama RAIC International Prize of CAD\$100,000, which is significant because the architect worked pro-bono on the project and the construction budget was about CAD\$185,000.

The library is small, about 175 square metres (1,885 square feet), and is not connected to the local electricity grid so it uses all passive solar and ventilation strategies. The building is naturally daylight, and was inexpensive to build using local labour. At first glance, it seems to be all timber with vertical strips, but is actually glazed on the walls and roof

with an exposed wood frame. The Modernist glass box is subverted by the arrangement of twigs, hand collected on site, that screen the volume. The reflecting pool in front is actually part of a passive ventilation system of operable facade elements that move air through the library, and to cool the building, the air is chilled over the pond.

When the community-run facility opened, it was empty because there was no budget for books. Opened in 2012, it has built its collection by asking visitors to donate two books for each one they borrow. The Moriama RAIC International Prize is for a 'single, transformative work of architecture',⁹ and this modest, intensely local project makes a big impact as a benchmark in social sustainability and as a demonstration that even a tiny budget can allow for a quality architectural experience.

Climate- and Context-Specific Low-Energy or No-Energy Solutions: Active House

Active Houses are a series of global sustainable demonstration projects that aim to balance energy efficiency, low environmental impact and superior indoor air quality.¹⁰ As buildings that aim to give more than they take, they follow an approach of performance-driven sustainability and have a formal certification system. The Great Gulf Active House, the first such project in Canada, is a prototype designed by Danish designers and Toronto architects Superkül. Completed in 2013, it is located in a typical suburban subdivision, surrounded by detached, single-family homes each with similar houses and yards. This house, however, has some almost hidden sustainable features: a double-height living room that is flooded with natural light, multiple operable skylights, high-performing windows, and



Superkül

Great Gulf Active House

Thorold, Ontario

2013

The house was designed for Great Gulf, one of Canada's largest home builders, to meet the construction metrics outlined by the European Active House programme. The exterior walls, roof and floor systems were prefabricated in Toronto at Brockport Home Systems, expediting the process such that the house framing was completed in a week. Doing it this way also reduced material waste, energy use, and risks of on-site accidents during the construction process, and improved the accuracy and quality of typical suburban construction.



rainwater collection on site. The building's air and light qualities were tuned using daylight analysis simulation tools for the positioning of windows and rooflights.

Far from being imagined as a one-off, this house was built by local developer Great Gulf Group and used various industry-standard sizes, fittings and materials. The idea is not to showcase the house's technology as ideal or 'sustainable', but rather as a higher-quality product that consumers might pay more for. In the brochure it is even compared to a smartphone – consumers do not understand the technology behind it and they do not need to in order to want one. There are some clues on the outside that this is an Active House, but it does not aim to transform the suburban housing typology. It also faces somewhat inwardly, largely drawing light and air from the roof, and in some ways functions as a courtyard house with its predominantly open-plan main space.

What makes this Active House a good architecturally relevant example of localness and sustainability is its dual focus on the architectural qualities of daylight and thermal comfort, which are measured quantitatively and qualitatively, and its formal response to local environmental and social conditions, including building orientation and the suburban vernacular.¹¹

Sustaining the Local

Δ Constructions does not go far enough in promoting the local as a way of pushing forward an alternative approach to sustainable design. How a building's local focus addresses the lifecycle design of the building; the attitudes to community building and social sustainability; and the ways that local context can be balanced with performance criteria are some starting points for how the local can engage

progressively with the sustainable. This *Δ* calls for a 'productive pluralism' that allows for a multiplicity of approaches to address a design's local specificity. A similar approach is needed for sustainable architecture. High-profile and well-published, the three examples here communicate within and beyond the profession to critique the status quo. Works such as these have the potential to contribute to a new school of thought relating to constructions that are intensely local and place-based and at the same time embrace concepts of 'complementarity' in sustainable architecture to privilege quality of experience. *Δ*

opposite right: The open-plan interior has integrated lighting and ventilation systems. A dual-zone HVAC system connected to a SomfyTaHomA Smart House system uses sensors to automate the windows, blinds and 14 skylights to open and close in response to the interior temperature and air quality. Two heat-recovery ventilation (HRV) units supply the house with fresh air.

Notes

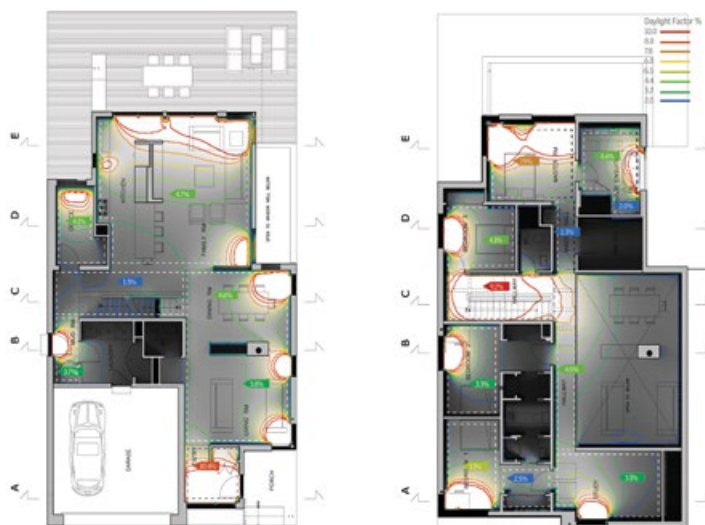
1. Terri Peters (ed), *Δ Experimental Green Strategies: Redefining Ecological Design Research*, November/December (no 6), 2011.
2. Stig L Andersson, *Empowerment of Aesthetics: Catalogue for the Danish Pavilion at the 14th International Architecture Exhibition La Biennale di Venezia 2014*, p 5: http://issuu.com/sla_architects/docs/empowerment_cover_inclusive_lowres.
3. *Ibid*, p 10.
4. Simon Guy, 'Pragmatic Ecologies: Situating Sustainable Building',

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5. Simon Guy and Steven A Moore (eds), *Sustainable Architectures: Critical Explorations of Green Building Practice in Europe and North America*, Spon Press (New York), 2005, p 3.
6. Terri Peters, 'Hy-Fi', *Mark*, 56, March/April 2015.
7. 'What's a Software Company Doing Buying an Architecture Firm?', 10 September 2014: [www.forbes.com/sites/bruceupbin/2014/09/10/whats-a-software-company-doing-buying-an-architecture-](http://www.forbes.com/sites/bruceupbin/2014/09/10/whats-a-software-company-doing-buying-an-architecture-firm/)

[firm/](http://www.forbes.com/sites/bruceupbin/2014/09/10/whats-a-software-company-doing-buying-an-architecture-firm/).

8. Conversation with Li Xiaodong, 11 October 2014.
9. Terri Peters, 'Reporting from Toronto: Li Xiaodong Wins Inaugural Moriyma RAIC International Prize for the Liyuan Library', 13 October 2014: <http://archinect.com/news/article/111179592/reporting-from-toronto-li-xiaodong-wins-inaugural-moriyma-raic-international-prize-for-the-liyuan-library>.
10. Active House: <http://activehouse.info>.
11. Conversation with Meg Graham of Superkül, 18 November 2014.



The Danish design team at VELUX used computer simulations to optimise daylighting in the home, to allow the architects to select the most efficient sizes and the most effective locations for the skylights. The architects used these to maximise direct and indirect light that is reflected off walls, ceilings and even off the engineered white hardwood strip flooring to help increase light reflectivity throughout.

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