

International Conference 2004

Transportable Environments III

April 28-30, 2004 Toronto Canada
www.ryerson.ca/portable

Abstract Submission

To be completed by author/s interested in submitting a full paper or poster. If you are submitting more than one abstract, please complete a 'cover letter' form for each submission.

Author/s: Michael Philetus Weller, Mark D. Gross and Ellen Yi-Luen Do

Affiliation: Design Machine Group, Department of Architecture

Institution: University of Washington

Address: 3949 15th Ave NE, Gould Hall Room 208

Seattle, WA 98195-5720 USA

Telephone: 206.543.1604

Fax:

Email: philetus@u.washington.edu

Title of submission:

Baristas Unite! Reclaim Urban Spaces with Espresso Blocks!

Format (Paper or poster):

Paper

Keywords: (Approximately 5 words)

modular robotics, dynamic structures, self-configuring, espresso

Bibliography of key references for paper submissions:

Please follow <http://www.wisc.edu/writing/Handbook/DocAPAResources.html>

- (1) Rus, Daniela, Zack Butler, Keith Kotay, and Masette Vona (2002). Self-reconfiguring Robots. *Communications of the ACM*, 45(3), 39-45.
- (2) Weller, Michael (2003) Espresso Blocks: Self-configuring Building Blocks (Master of Architecture thesis, University of Washington, 2003).
- (3) Weller, Michael, Mark D. Gross and Ellen Yi-Luen Do (in press) *EspressoCAD: A System to Support the Design of Dynamic Structure Configurations*. Paper to be presented at the 2004 Generative CAD Systems Symposium, Pittsburgh, Pennsylvania.

Email Abstract to:

Associate Professor Filiz Klassen

School of Interior Design
Faculty of Communication and Design
Ryerson University

Email: portable@ryerson.ca

Deadline for submission: To be received no later than **September 15, 2003**

Baristas Unite!

Reclaim Urban Spaces with Espresso Blocks!

1: The Espresso Block Module

Robotics researchers have recently developed several modular robotics systems with groups of identical tiny robotic modules that reconfigure themselves to take on a variety of forms. [1] The Espresso Block module [2] (Figure 1) we are developing adapts the design of modular robotics systems to create a platform for the exploration of the design possibilities of dynamic structures. This self-configuring building block is a module on the scale of a brick or concrete masonry unit that can be stacked to create a load-bearing structure. Unlike a traditional masonry unit, a self-configuring building block has latches, actuators and a control system. Blocks can latch to neighboring blocks and use their actuators to push each other around. Through the blocks' control systems, these movements are coordinated to produce dynamic structures.

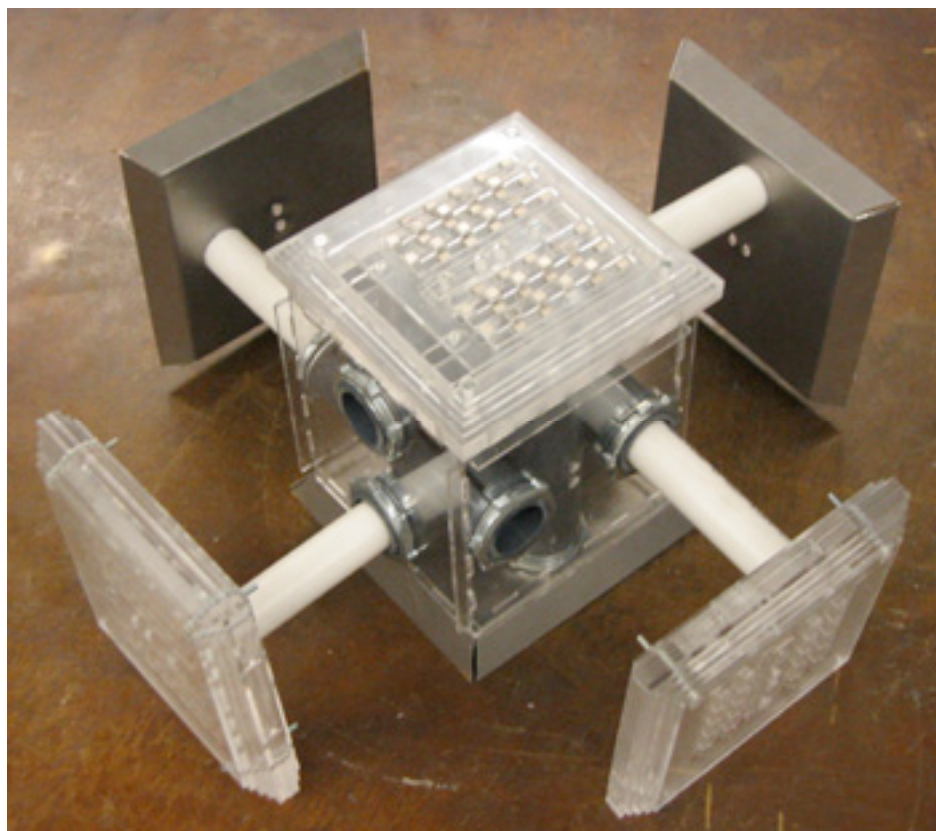


Figure 1 Prototype Espresso Block module

2: Dynamic Structures

To build a dynamic structure it will only be necessary to get a sufficient number of blocks and the desired accessories to the site, fire up the fuel cell generator or other power source, and the structure will erect itself. Blocks and accessories will be purchased at a building supply retailer, or ordered online and delivered to the site on pallets by a truck. With a palm pilot or cell phone running the block control software to serve as a remote control, the occupant will be able to switch between configurations throughout the day. New configurations can be designed with the included EspressoCAD software, [3] and will be able to be traded between remote controls or posted on the internet for others to download. The ability to quickly change the configuration of the structure obviates the need to have a separate space for each activity supported by a building. Instead a dynamic structure accommodates a variety of uses within one space, making more efficient use of expensive urban land and allowing the development of urban infill on sites too small

to support a traditional multi-room structure. Dynamic structures also reduce the environmental impact of development, when given the command blocks load themselves onto pallets so that they can be re-used in other buildings rather than thrown into a landfill or downcycled into another building material.

3: The Live/Work Espresso Stand

A dynamic structure's portability and adaptability allows the creation of a variant of the espresso stand typology, the live/work espresso stand. Like a typical espresso stand, a live/work espresso stand would be erected on semi-public land, either empty space in front of a building set back from the street or space in a pay parking lot, rented from the landlord. In enlightened municipalities dynamic structures may even be erected in on-street parking spaces rented directly from the city. During the day these spaces would function as owner-operated businesses that can quickly change locations to take advantage of shifting economic conditions. At night they would house residential communities in otherwise abandoned commercial districts, or provide affordable housing in high-rent residential neighborhoods where the demand for services is high but there are few housing options for service workers. These Espresso Block structures would allow the members of the spatially disenfranchised urban service class to reclaim the urban spaces where they live and work.