



THE BEAUTY OF A MOSAIC MURAL WAS ONLY ENHANCED BY THE INHERENT UNDERSTANDING OF THE PAINSTAKING EFFORT BEHIND ITS CREATION. THAT IS, UNTIL **ARTAIIC** CAME ALONG.

Mosaic techniques are thought to be as old as the ancient ziggurats of Mesopotamia—and equally as labor intensive. “In the early history of mosaic production, artists would design and slaves would implement,” says Paul Reiss, co-founder of Boston-based mosaic fabricator Artaic. As it happens, the modern term robot is derived from the ancient Slavic words for *drudgery* and *slavery*. So perhaps it was only a matter of time before someone—in this case, Artaic—built a labor-saving robot that automates the assembly of mosaics. After juror Lawrence Scarpa deemed this project a “natural” application of existing robotic technology, he asked, “Why didn’t I think of that?”

In 2007, Artaic began developing software and a robotic arm to automatically—and quickly—assemble tile mosaic walls and floors based on any image. The designer or client begins by selecting or generating a digital image along with the desired tile palette. Artaic’s software then translates the image into pixels that will correspond to each physical mosaic tile of a given color and size. Similar to painting by

numbers, the robot in Artaic’s shop picks up and positions the corresponding, individual mosaic tile into a square-foot grid. With a placement rate that Artaic claims can exceed one tile per second, the feed system for the automated tile assembly “is a tricky, interesting beast,” juror Bill Zahner said.

The square-foot grids are turned into mosaic tile sheets, which are then shipped to the project site and assembled into the full, seamless image. Producing the tiles for a mosaic mural at Iowa State University measuring 75 feet long by 18 feet tall took about two weeks, according to the company.

The visual complexity of an Artaic mosaic is limited only by the size and color of the individual mosaic tiles available. The company currently offers tiles in three types of glass, plus stone and unglazed porcelain. Most come as half-inch or 1-inch squares, although the vitreous glass tiles come as small as ⅜-inch square. Designers have no shortage of color options for the glossy- or matte-finished tiles: about 50 hues for each type.





Artaic's robot, which is named Arty, picks up and assembles individual mosaic tiles into 1-square-foot grids that are derived from the tessellated image file created in the company's software. These grids of tiles are then anchored to backing to become a mosaic tile sheet. One large mosaic can comprise roughly 1,500 such sheets, which are installed on site.



# CREDITS

## Morphfaux PAGE 98

**Project** Morphfaux

**Design Firm** Archolab, Ann Arbor, Mich.

**Primary Investigators** Steven Mankouche, Joshua Bard, Matthew Schulte

**Project Team** Claire Sheridan, Michael Senkow, Andrew Thompson, Richard Tursky, Jono Sturt, Robert Yuen, Efrie Friedlander  
**Consultants** University of Michigan College of Engineering, Ann Arbor, Mich.—Edwin Olson; Spider Technologies, Ann Arbor, Mich.—Gary Schultz; SuperMatter Tools, Sydney and Boston—Wes McGee; Hofmann Plastering, Saline, Mich.

**Special Thanks** Jonathan Puff, Abigail Murray, and the Carnegie Museum of Art | Hall of Architecture; USG Corp.

**Funding** Taubman College of Architecture and Urban Planning, University of Michigan, Research Through Making Grant, 2011; University of Michigan's office of the vice president for research Small Projects Grant, 2011

## Electroform(alism) PAGE 106

**Project** Electroform(alism)

**Design Firm** Anya Sirota + Akoaki, Ann Arbor, Mich.

**Primary Investigators** Anya Sirota (assistant professor, Taubman College of Architecture and Urban Planning, University of Michigan), Jean Louis Farges (principal, Akoaki), Patrick Beaucé (associate professor, École Supérieure des Beaux-Arts de Valenciennes)

**Research and Design Team** Nathan Doud, Assoc. AIA, John Guinn

**Electroform Consultant** Galvanique, Providence, R.I.—Alex Belykh

**Funding** Taubman College of Architecture and Urban Planning Research Through Making Grant

## EcoMod PAGE 108

**Project** EcoMod South: High Performance Affordable Housing

**Client** Southside Outreach, South Boston, Va.—Earl Howerton, Earlene Powell; People Inc., Abingdon, Va.—Mike Rush, Michael Weaver

**Primary Investigators** University of Virginia, School of Architecture, School of Engineering and Applied Science

**Project Team** John Quale (associate professor and EcoMod project director); Michael Britt, AIA (project manager); Elizabeth Rivard, Assoc. AIA, Erik de los Reyes (research assistants: architecture); Beth Bailey (research assistant: landscape architecture); Barbara Gehrung (Passive House consultant); Paxton Marshall (engineering director); Nancy Takahashi (landscape architecture adviser); Eric Field (digital simulation adviser); Galen Staengl, Staengl Engineering (mechanical design); Phil Parrish (associate vice president for research)  
**Prototype Design Team** The EcoMod South design is based in part on EcoMod4, a modular home completed in 2009 for Habitat for Humanity of Greater Charlottesville; the design and construction team included more than 70 architecture, engineering, landscape architecture, planning, and commerce students.

**Off-Site Construction** Cardinal Homes, Wylliesburg, Va.—Bret Berneche (president)  
**On-Site Construction** Allen Stevens Construction (site in South Boston, Va.); People Inc., C.W. Denton Construction (site in Abingdon, Va.)

**Funding** Tobacco Indemnification and Community Revitalization Commission of Virginia

## Wireless Sensor Network PAGE 112

**Project** Wireless Sensor Network

**Design Firm** KieranTimberlake, Philadelphia

**Project Team** Roderick Bates, Richard Clark, Peter Curry, Eric Eisele, Billie Faircloth, AIA, Stephen Kieran, FAIA, Taylor Medlin, Alex Roscoe, James Timberlake, FAIA, Ryan Welch

## NUM NUM Flatware PAGE 114

**Project** NUM NUM Flatware

**Design Firms** NADAAA, Boston;

Office dA, Boston

**Principal in Charge** Nader Tehrani

**Project Coordinators** Brandon Clifford, Parke MacDowell

**Project Team** Catie Newell, Monica Ponce de Leon, AIA

**Fabricator** NADAAA (R+D prototyping);

GPI Prototype and Manufacturing Services (metal prototyping)

## Innovative Mosaic PAGE 118

**Project** Innovative Mosaic

**Design Firm** Artaic, Boston

**Primary Investigator** Paul Reiss (co-founder and creative director)

**Research and Design Team** Ted Acworth (founder and CEO), Blake Goodwin (director of operations)

## AEC-Apps PAGE 120

**Project** AEC-Apps (aec-apps.com)

**Design Firm** Skidmore, Owings & Merrill, New York; Case Design, New York

**Project Leaders** Nicholas Holt, AIA (director, Skidmore, Owings & Merrill); David Fano (partner, Case Design)

**Project Team** Skidmore, Owings & Merrill—Jason Chen, Robert Yori, Assoc. AIA, Robert Mencarini, AIA, Nick Scalco; Case Design—Mike McDearmon, Angel Ceballos, Jose Capelan, Diego Sapriza, Jorge Sierra

## Green Roof Vegetation Study PAGE 122

**Project** Green Roof Vegetation Study

**Design Firm** KieranTimberlake, Philadelphia

**Project Team** Roderick Bates, Stephanie Carlisle, Billie Faircloth, AIA, Stephen Kieran, FAIA, Taylor Medlin, Assoc. AIA, Max Piana, James Timberlake, FAIA, Ryan Welch

Volume 102, number 7, July 2013. ARCHITECT® (ISSN 0746-0554; USPS 009-880) is published monthly by Hanley Wood, LLC, One Thomas Circle, NW, Suite 600, Washington, DC 20005. Copyright 2013 by Hanley Wood, LLC. Opinions expressed are those of the authors or persons quoted and not necessarily those of the American Institute of Architects. Reproduction in whole or in part prohibited without written authorization. All rights reserved. Printed in the USA.

Periodicals postage paid at Washington, DC, and at additional mailing offices. POSTMASTER: Send address changes to ARCHITECT P.O. Box 3494, Northbrook, IL 60065-9831.

Canada Post Registration #40612608/G.S.T. number R-120931738. Canadian return address: Pitney Bowes Inc., P.O. Box 25542, London, ON N6C 6B2.

**DISCLOSURE** ARCHITECT® will occasionally write about companies in which its parent organization, Hanley Wood, LLC, has an investment interest. When it does, the magazine will fully disclose that relationship.

**PRIVACY OF MAILING LIST** Sometimes we share our subscriber mailing list with reputable companies we think you'll find interesting. However, if you do not wish to be included, please call us at 888.269.8410.