MAR
07

PIZZA

PIETER SIJPKES + ERIC BARNETT

5 PM | CENTRE SPACE | JOHN A. RUSSELL BUILDING

5 PM - 8 PM
March 7, 2019
Centre Space
John A. Russell Building
Pizza

ADDITIVE MANUFACTURING AT DIFFERENT SCALES USING ICE, FOAM, AND CONCRETE

SYNOPSIS | Ice will be introduced as a building and modeling material by first providing an overview of ice palaces built in Montreal and other cities in North America in the 1880s. Then, several large-scale ice construction projects on the McGill campus will be described, including a 1/5-scale model of the Pantheon with a 32-foot diameter dome. The presentation will then transition to automated ice construction, focusing on the robot-assisted 3D ice printer developed at McGill University, which includes a unique laser feedback system that guarantees dimensional accuracy of any model. The large-scale cable-suspended 3D foam printer developed at Laval University will also be described, which includes many of the innovative features developed for the 3D ice printer. The lecture will conclude with some examples of recent, large-scale Additive Manufacturing processes using concrete. Many of these processes are now reaching the full-size architectural scale, which was---and still is---our goal for automated ice construction.

BIO | Pieter Sijpkes has taught at the McGill School of Architecture since 1976, and, even though he has retired from full-time teaching, he is still active in the School in various functions. One of his key interests has always been the behavior of structures and the nature of structural materials. Experimenting with ice structures on the McGill Campus since his student days, he has given himself and many students a chance to experience the inherent strength and stiffness of large-scale double-curved thin ice shells reinforced with nylon. When global warming made the Montreal weather too unpredictable for outdoor experiments, he moved his ice construction research indoors into a -22C freezer, at the suggestion of his colleague Mechanical Engineering Professor Jorge Angeles. With the use of a computer-controlled robot designed and built by his close collaborator of many years, Dr. Eric Barnett, a unique system was developed that allows any 3D model to be printed in ice. The aim is to scale this method up to the architectural scale, using more permanent materials.

Eric Barnett is a robot software developer at Robotiq in Lévis, Quebec where he works primarily on force control and trajectory planning. He was previously a research associate in the Robotics Laboratory in the Department of Mechanical Engineering at Laval University, Quebec, QC, Canada. There, he developed a cable-suspended 3D foam printer and worked on human-robot interaction. He received B.Eng. and Ph.D degrees from McGill University in 2007 and 2012, respectively, with his PhD research focusing on the development of a 3D ice printer.

Sponsored by:

Centre for Architectural Structures & Technology (C.A.S.T.)

FABLab

For upcoming events please visit:
www.umanitoba.ca/architecture/events

FAUM Architecture University of Manitoba
Faculty of Architecture | University of Manitoba

@faumanitoba

University of Manitoba | Faculty of Architecture

Cultural Events 2018-2019