2024 PROFESSIONAL PRIX DE ROME
IN ARCHITECTURE PRIZE

PAST/FORWARD

ROBOTIC FABRICATION AT THE SCALE OF ARCHITECTURE

MODERN
OFFICE of
DESIGN +
ARCHITECTURE

+ Canada Council
for the Arts

YOU ARE CORDIALLY INVITED TO ATTEND THE PAST/FORWARD WORKSHOP #2, NETHERLANDS EDITION. WE WOULD LIKE TO EXTEND A HEARTFELT THANK YOU FOR TAKING TIME OUT OF YOUR BUSY SCHEDULES TO SHARE IN THIS EXCITING RESEARCH WITH US. BELOW ARE SOME IMPORTANT HOUSEKEEPING ITEMS:

WORKSHOP #2: DATE/VENUE

DATE: Friday October 18th, 9–12PM

VENUE: AECTUAL Headquarters, H.J.E. Wenckebachweg 48, 1096 AN Amsterdam, Netherlands. Please see map below.

HOST: Hedwig Heinsman, Co-Founder and Creative Director, AECTUAL.

WORKSHOP #2: THEME

THEME A: Robotic Entrepreneurship: How can we democratize the act of 'making' in an effort to better align with urgent social, cultural and environmental concerns?
This theme is trying to tease out who's responsibility is it to leverage the inherent benefits in robotic automation – with respect to construction – and does it represent a generational opportunity for architects to perhaps, once again, re-enter the field of construction.

BACKGROUND:

– Modernism was a defining moment in the history of world architecture; the one point in time when – bolstered by the technological developments of the 2nd industrial revolution (ie. mass production) - the design profession rose up to the task of shaping the totality of the built environment; to "share the benedictions of science and technology universally."

-For many governments, public institutions, developers and contractors, Modernism became a convenient alibi to be build quicker, faster, cheaper in the name of progress, yet to the detriment of social, cultural and environmental sustainability.

-4th industrial revolution: arrival of robotics and A.I., Machine Learning and Big Data. Through linking body (robotics) and mind (A.I.) - from a construction point of view - Robotic Automation has the potential to radically alter how we create our built environments to be more Affordable, Equitable, Diverse and Inclusive.

-Robotic Automation, coupled with A.I., provides a generational opportunity to perhaps re-tool or expand upon some of the modernist's early aspirations, but who's responsibility is this? Kanterra, Google's Sidewalk Labs, Amazon? It is important to understand that if we as architects do no develop and question the different approaches to robotic fabrication/automation quickly – embedding it with critical social, cultural and environmental sustainability – then the big tech companies will do it.

WORKSHOP DISCUSSION, CHALLENGES/OBSTACLES:

-Automating construction processes involves significant upfront investments in both equipment and software. Small firms or independent architects may struggle with the financial burden of acquiring robotic systems, especially when these technologies are not yet fully adopted in the industry. The cost of integrating robotic entrepreneurship into construction may limit accessibility, reinforcing current disparities in the profession.

-The construction industry is traditionally slow to adopt new technologies, often due to its risk-averse nature and reliance on well-established practices. Architects may encounter resistance from construction companies, contractors, and labor unions who may fear job displacement or disruption of established workflows. Overcoming this resistance is a key challenge for architects wanting to bring automation into the construction process.

WORKSHOP #2:

WORKSHOP DISCUSSION, CHALLENGES/OBSTACLES CON'T:

-As construction becomes increasingly automated, architects may face a gap in knowledge when it comes to robotics, digital fabrication, and automation technologies. Most architectural training focuses on design rather than the technical or operational skills needed for the construction processes that are now becoming automated. Learning the skills necessary to control or design for automated systems (e.g., robotics, 3D printing, CNC machinery) is a challenge for architects looking to re-enter the field.

-Legal frameworks for construction are often based on traditional building methods, and introducing automation may run into regulatory challenges. For example, there may be uncertainty around building codes, health and safety regulations, liability and contractual relations when using robotic automation for construction tasks. How can these legal and regulatory hurdles be 're-addressed' for architects to re-enter the field of construction?

-Historically, the profession of architecture has been divided between design and execution (construction). As architects contemplate re-entering the field of construction (through automation), what challenges might we encounter related to balancing both roles? Is there a risk that architects might lose focus on their traditional role as "designers" while becoming more involved in construction management and robotic execution? Is this an issue?

-The use of automation in construction raises ethical concerns regarding job displacement, especially in labor-intensive economies. Architects, in their effort to leverage robotics, must grapple with the broader implications of automation on employment and equity. Additionally, while automation has the potential to improve efficiency and reduce waste, there are concerns about the environmental footprint of manufacturing robotic systems and the materials used in automated construction processes.

-Successful integration of automation into construction often requires collaboration with engineers, software developers, and robotics specialists. Architects may struggle to develop the necessary interdisciplinary partnerships to effectively implement robotic systems. This is particularly true in a field where 'silos' of expertise have traditionally been maintained between different professions. How can architects over-come this?

Sources:

-Mahbub, Rohana. "An investigation into the barriers to the implementation of automation and robotics technologies in the construction industry." PhD diss., Queensland University of Technology, 2008.
-Buchli, Jonas, Markus Giftthaler, Nitish Kumar, Manuel Lussi, Timothy Sandy, Kathrin Dörfler, and Norman Hack. "Digital in situ fabrication-Challenges and opportunities for robotic in situ fabrication in architecture, construction, and beyond." Cement and Concrete Research 112 (2018): 66-75.
-Gramazio, Fabio, and Matthias Kohler. "Digital materiality in architecture." (No Title) (2008).
-Oxman, Rivka, and Robert Oxman. "New structuralism: design, engineering and architectural technologies." Architectural Design 4, no. 80 (2010): 14-23.
-Linner, Thomas, and Thomas Bock. "Evolution of large scale industrialization and service innovation in Japanese prefabrication industry." Construction innovation 12, no. 2 (2012): 156-178.

BELOW IS A LIST OF FELLOW COLLEAGUES WHO HAVE AGREED TO JOIN US FOR WORKSHOP#2, NETHERLANDS EDITION. SOME HAVE AGREED TO A SHORT, 15 MIN. PRESENTATION, INTRODUCING THEMSELVES AND DISCUSSING THE KEY THEME(S) OF THE WORKSHOP THROUGH THEIR OWN UNIQUE LENS OF EXPERIENCE, INTEREST AND EXPERTISE:

DUSTIN COUZENS - PRESENTER/ORGANIZER - 9AM

Dustin Couzens is a registered architect, Co-Founder of **MoDA** and an Adjunct Professor at the University of Calgary's SAPL. Areas of scholarship include infrastructural urbanism, robotic automation, A.I./big data and innovative approaches to the 'making' of architecture. **Dustin will be the main point of contact for Workshop #2 should you have any questions or require further accommodations**.

BEN KLUMPER - MODERATOR

Ben Klumper is a registered architect and Co-Founder of **MoDA**. Areas of scholarship include the history of Modernism, digital design and fabrication, scaling-up robotic automation and the return of craft in the 'making' fr architecture. **Ben will be the moderator of the discussion that follows the individual presentations**.

LEON SPIKKER - PRESENTER - 9:30AM

Léon Spikker is a Dutch computational designer known for his innovative work at the intersection of architecture, digital design, and robotic fabrication. A co-founder of **Studio RAP** and its spin-off RAP Technologies, Spikker has been instrumental in pioneering the use of advanced digital tools in building practices. After leaving Studio RAP in 2020, he transitioned to developing building configurations for modular social housing with **'In The Middle of Our Street'** in Amsterdam. His work focuses on making architecture more sustainable and efficient, leveraging new technologies like 3D printing and parametric design.

GIJS VAN DER VELDEN - PRESENTER - 9:45AM

Gijs van der Velden is the CEO and co-founder of **MX3D**, a company known for pioneering large-scale 3D printing, particularly their groundbreaking 3D-printed steel bridge in Amsterdam. Under his leadership, MX3D has become a leader in the field of robotic additive manufacturing, applying their technology to various industries such as construction, oil and gas, and tooling. Van der Velden's work focuses on pushing the boundaries of what is possible with 3D printing in metal, aiming to reduce material use and create more sustainable construction practices. He has a Masters degree from Erasmus University Rotterdam.

ALEXANDER KALACHEV - PRESENTER - 10AM

Alexander Kalachev is a Senior Architect and Associate at **UNStudio**, where he has been a key team member since joining in 2014. He holds a Master of Architecture degree from Dessau International Architecture School in Germany and a Diploma in Architecture from Kuban State University in Russia. At UNStudio, Kalachev has contributed significantly to various cultural projects, including the Beethoven Concert Hall in Bonn and the Theatre on the Parade in Den Bosch. He is also actively involved in the Parameters Knowledge Platform, focusing on computational design.

WESSEL VAN BEERENDONK - PRESENTER - 10:15AM

Wessel van Beerendonk is a co-founder and leading architect at **Studio RAP**, an architectural firm based in Rotterdam. Established in 2015, Studio RAP is renowned for its pioneering approach to integrating computational design with digital fabrication methods, particularly using robotic arms. Van Beerendonk, who holds a master's degree in architecture from Delft University of Technology, strongly focuses on parametric design and sustainable architecture. His work at Studio RAP is characterized by unique, expressive forms, with projects ranging from 3D-printed ceramic facades in Amsterdam to acoustically optimized theater interiors in Rotterdam.

HEDWIG HEINSMAN - PRESENTER - 10:30AM

Hedwig Heinsman is the co-founder and creative director at **AECTUAL**, an Amsterdam-based company known for its innovative use of 3D printing to create large-scale, sustainable architectural solutions. Heinsman holds a degree in architecture from Delft University of Technology and has extensive experience in the design and technology sectors. At AECTUAL, she plays a key role in driving the company's commercial strategy and partnerships, focusing on integrating digital tools with sustainable materials to make architecture more accessible. One of her notable projects is the 3D Print Canal House, an exhibition, research, and building site for 3D printing architecture.

LEO STUCKARDT - PRESENTER - 10:45AM

Leo Stuckardt and Sanne van der Burgh are key figures at **MVRDV**, a leading architecture firm known for its innovative and sustainable designs. Leo Stuckardt, a German architect, is the co-founder of MVRDV Next, the firm's R&D group that focuses on experimental technologies and parametric design. He plays a pivotal role in integrating cutting-edge methodologies across MVRDV's projects, contributing to global initiatives from Amsterdam to Mumbai. He holds a Master of Science degree in architecture from Delft University of Technology.

HENRIETTE BIER - PRESENTER - 11AM

Henriette Bier is an Associate Professor at TU Delft, where she specializes in Robotic Building and digitally-driven architectural design. After earning her architecture degree in 1998 from the University of Karlsruhe, Germany, she worked with Morphosis on prominent projects in the U.S. and Europe. Since 2004, Bier has focused on teaching and research at TU Delft, coordinating several European Union projects and leading initiatives like Adaptive Joints and RDCB. Her work bridges the gap between traditional architecture and advanced robotic technologies, and she has published extensively in international journals and conferences.

VOLKER RUITINGA - PRESENTER - 11:15AM

Volker Ruitinga is the founder of **Vertico**, a Netherlands-based startup specializing in 3D concrete printing. Vertico utilizes advanced robotic technology to create intricate and optimized concrete structures, significantly contributing to the 3D printing industry. In 2018, he founded Vertico with the goal of upscaling 3D printing processes for the construction industry. His passion for additive manufacturing and architecture has driven Vertico to develop proprietary hardware and software solutions.

TIJMEN HUETINK - PRESENTER - 11:30AM

Tijmen Huetink is the founder and CEO of **Shape Service**, a Dutch company specializing in digital fabrication and 3D printing technologies. With a strong background in mechanical engineering, Huetink has led Shape Service in delivering cutting-edge solutions for architecture and industrial design. Huetink's leadership has been instrumental in expanding the use of 3D printing across various sectors, from prototyping to large-scale production, making Shape Service a key player in the industry.

PANOS SAKKAS - PRESENTER - 11:45AM

Panos Sakkas is a co-founder and designer at **The New Raw**, an award-winning design studio based in Rotterdam. At The New Raw, Sakkas leads initiatives aimed at transforming waste materials into usable products through 3D printing, with a particular emphasis on circular economy principles. Notable projects include the Zero Waste Lab in Thessaloniki and Print Your City, an initiative that turns plastic waste into urban furniture.

FOLLOWING THE PRESENTATIONS, BEN KLUMPER AND BROGAN GORDON-COOPER OF MODA WILL MODERATE A 1 HOUR ROUND-TABLE DISCUSSION PERTAINING TO THE KEY THEMES, AS WELL AS ANY OTHER THEMES/IDEAS THAT EMERGE OUT OF THE PRESENTATIONS. WE WILL BE RECORDING THIS WORKSHOP TO AID IN OUR DISSEMINATION.