



# THE MASONRY CENTRE

## NEWSLETTER | VOL. 3

## SUMMER 2025

### UNIVERSITY OF ALBERTA

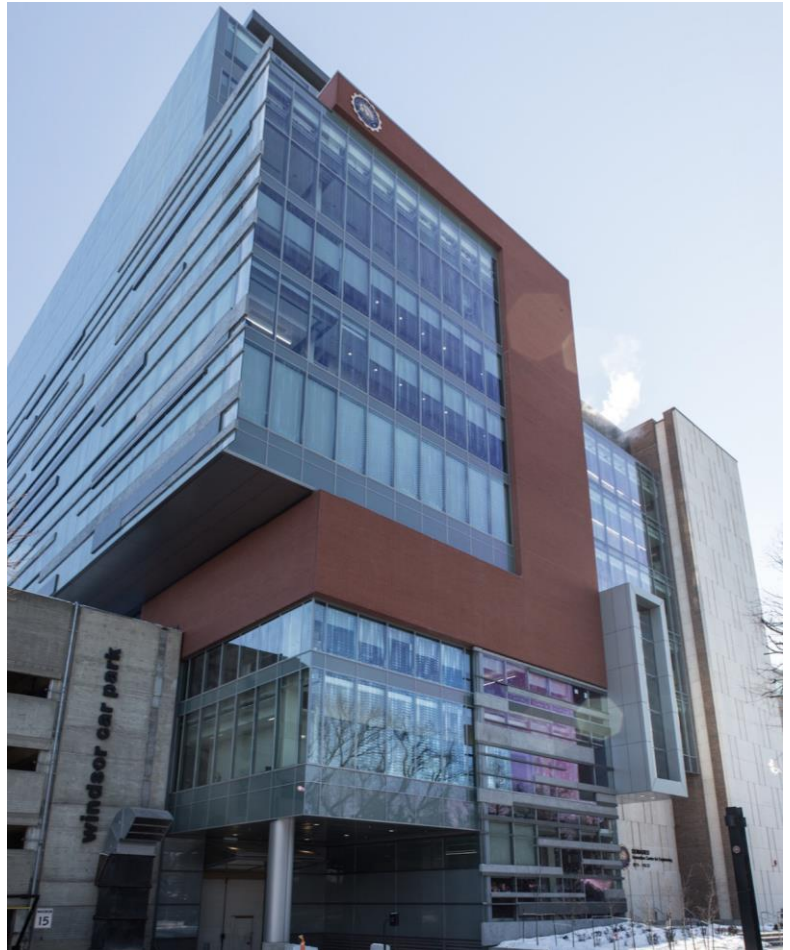
Department of Civil &  
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### WHO WE ARE

The Masonry Centre is the premier North American hub for Masonry Research, Education, and Technology Development. We develop state-of-the-art masonry systems aiming to develop cost-effective and affordable infrastructure.

Our professors have an active voice in the development of the building and energy codes in North America, and our students go on to shape the future of Canadian infrastructure.



## A MESSAGE FROM THE CHAIR

**DR. CARLOS "LOBO" CRUZ NOGUEZ**

It feels like yesterday when we founded The Masonry Centre at the University of Alberta in January 2019, powered with the strong and unwavering support of the Masonry Contractors Association of Alberta – North, and our scientific and industry advisors. Since then, we have delivered impactful research that now informs the development of the masonry standards in Canada and the U.S., we have made exciting inroads into the thermal, energy, and building science, and we have acquired significant momentum on the areas of robotics, 3D printing, and artificial intelligence.

From the start, we set out to make The Masonry Centre the premier hub of masonry education and research in North America, and we have delivered in our promise. Our scientific and technical output has been top notch: besides numerous papers published in leading journals, more than 45 engineers have taken our masonry design course; we have graduated 15 MSc students and 9 PhD students; and 2 alumni from our Centre have become faculty members in the field of Structural Engineering in leading universities. We have won the TMS Best Thesis Award two times in a row from The Masonry Society in the U.S., and we have been awarded two Best Paper Awards at prestigious masonry conferences in North America, with the last of them at received recently at the 13<sup>th</sup> Canadian Masonry Symposium.

In this newsletter, we share the latest of the exceptional work carried out by our students and my fellow colleagues at the Masonry Centre. I am very humbled and grateful for the privilege of working with such a talented and dedicated team. A new generation of students tackles the challenges and opportunities in our vibrant masonry field, and we remain committed to excellence in our mission.

A handwritten signature in black ink that reads "Carlos Cruz Noguez".

## GRANTS AND NEW ACHIEVEMENTS

We're excited to share recent accomplishments and milestones within the Masonry Centre community:

- **NSERC Alliance grant:** Dr. Clayton Pettit was awarded an NSERC Alliance Grant in collaboration with the Alberta Masonry Council (AMC) this past spring. The \$225,000 grant will support research focused on testing masonry veneer shelf angle systems. More details on the project will be shared in future updates.
- **Campus Sustainability Grant:** Master's student Charlie Shields secured a 2024 Campus Sustainability Grant for his project titled "Utilizing Advanced Drone and Thermal Imaging Technologies for Campus Building Energy Efficiency Mapping." This is a very well deserved recognition for impactful work toward smarter and greener infrastructure.
- **M. Hatzinikolas Paper Award at the Canadian Masonry Symposium:** Congratulations to Mahmoud Elsayed and his co-authors, who received recognition for his innovative work at the 2024 Canadian Masonry Symposium.
- **International Presentation at TMS Annual Meeting:** Master's Student Cory Scott was selected as one of only three researchers to present their work at the upcoming TMS Annual Meeting in Oklahoma this fall—a significant recognition of his contributions to the field.
- **Major Publication and Career Milestone:** Rafael had a peer-reviewed journal article published recently in Engineering Structures, highlighting results from his full-scale wall testing research. In addition, Rafael gave an insightful presentation at CMS this summer and has recently accepted a full-time position while completing his thesis. We wish him all the best for his future endeavors!



## HQP SPOTLIGHT

MAHMOUD ELSAYED

Mahmoud Elsayed has recently completed his Ph.D. in Civil and Environmental Engineering at the University of Alberta.



Originally from Cairo, Egypt, Mahmoud's early fascination with construction—sparked by watching concrete being poured in the bustling streets of his hometown—led him to pursue a career in structural engineering. He holds a Bachelor's degree in Civil Engineering and began exploring masonry in depth during his Master's studies, where he examined the effects of infill walls on reinforced concrete frames. This curiosity evolved into a focused research journey in masonry structures.

Mahmoud's doctoral work, titled *"Experimental and Analytical Studies of an Innovative System for Segmental Masonry Wall Construction,"* introduced a prefabricated, post-tensioned segmental wall system aimed at advancing off-site construction. His full-scale testing demonstrated performance on par with conventional masonry systems, and his validated non-linear finite element models have informed practical design guidelines for engineers.

His recent achievements include receiving the Best Paper Award at the 15th Canadian Masonry Symposium in Ottawa for his work on innovative masonry systems. He also has a peer-reviewed article currently under revision at the ASCE Journal of Structural Engineering.

Mahmoud continues to be driven by a passion for innovation, sustainability, and elevating the role of masonry in structural design—especially in regions where its potential remains underutilized.



## PROJECT UPDATES

### Global Leadership and Innovation

**Dr. Carlos 'Lobo' Cruz Noguez** continues to champion masonry innovation on the world stage, delivering keynote addresses at major conferences across Egypt, China, and Mexico over the past year. His presentations focus on sustainability and cutting-edge construction practices. Closer to home, Dr. Cruz's team has developed comprehensive guidelines for an innovative prefabricated masonry system that promises to revolutionize construction efficiency and safety standards.

### Next-Generation Masonry Units

**Dr. Yong Li's** team is reimagining concrete masonry for the future of construction. Antoon's recently completed work explored innovative block topologies and larger unit sizes specifically designed for robotic construction, enhancing both structural performance and installation speed. Meanwhile, Umer's ongoing numerical studies demonstrate the significant potential of ungrouted reinforced concrete masonry walls for in-plane loading and retrofit applications. The team is also developing proposals for masonry-based hybrid building structures.

### Sustainable Future Materials

**Dr. Vivek Bindiganavile's** team pioneers sustainable masonry through advanced 3D printing techniques. Their research focuses on developing geopolymers masonry units from combustion ash and other industrial precursors, carefully optimizing formulations to achieve superior durability, rheology, and thermal-acoustic performance while significantly reducing carbon emissions.

### Expanding Research Horizons

**Dr. Clayton Pettit** is building the next generation of masonry researchers, welcoming nine undergraduate students to his research group—many of whom are planning to pursue advanced degrees. His team is co-leading a substantial NSERC Alliance grant proposal worth \$225,000 to investigate shelf angles through both experimental and numerical testing, with initial test specimens already under construction.



**Dr. Douglas Tomlinson** has returned to full research capacity following his medical leave, with his team making significant practical advances. Rafael's research indicates promising potential for reducing splice lengths in masonry walls, while Kingsley addresses a critical design gap by investigating partition wall connections through comprehensive finite element modeling and testing protocols.

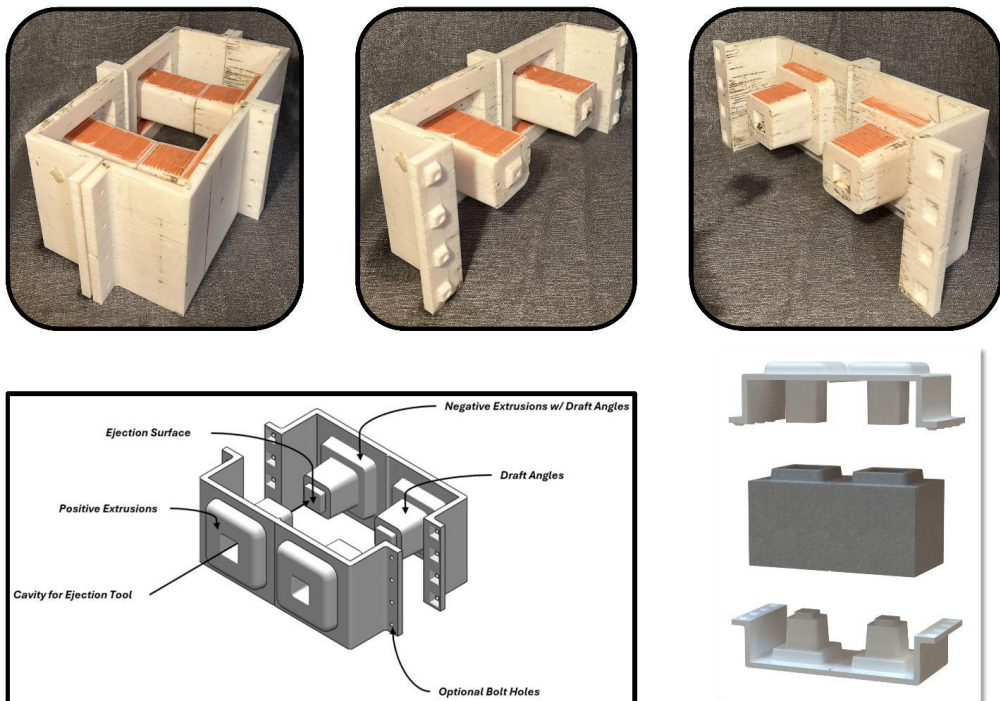
# PROJECT UPDATES

## Industry Ready Solutions

Dr. Farook Hamzeh's recent graduates have delivered practical tools directly applicable to industry. Karl Keyrouz developed a comprehensive framework to improve efficiency and reduce waste in masonry construction through lean principles and simulation modeling. Samaneh Momenifar created MasonryPartition Pro, a hybrid Decision Support System that streamlines partition wall design while optimizing structural performance and reducing costs..

## Digital Manufacturing Advances

Dr. Rafiq Ahmad's SMART LAB leads the charge in 3D printing applications for masonry construction. Current projects include developing sustainable 3D printing processes for masonry blocks using diverse eco-friendly materials, and creating durable 3D-printed plastic molds for construction blocks—molds that have exceeded 1,000 testing cycles and been validated through advanced simulations.



Design of Plastic 3D Printed Mold for Construction Masonry Blocks

## PROJECT UPDATES

### Environmental Testing

Dr. Yuxiang Chen is developing the groundbreaking Structural and Thermal Evaluation in Extreme Environments (STEEE) testing system—a \$760,000 facility designed to test building components under controlled extreme conditions. Despite construction challenges, the environmental chamber and overhead crane are expected to be operational by early 2025, with the structural testing frame following in Spring 2025.



The environmental chamber with the thermal testing frame (green frame)



The environmental chamber with the thermal testing frame (green frame)



# OUTREACH ACTIVITIES

## TECHNICAL MEETING & STUDENT PRESENTATIONS

7 AUGUST 2024 | UNIVERSITY OF ALBERTA



Our 2024 Technical Meeting was held as a lead-up to the symposium, providing students with the opportunity to present their ongoing research to industry partners. Attendees included Bennett Banting (CMDC), Mark Hagel (AMC), and Monica Guzman (CMDC), who offered valuable feedback and insights. The meeting also featured a hands-on training session led by Dr. Carlos 'Lobo' Cruz Noguez and Dr. Farook Hamzeh, designed to prepare students for the new "Tech Pitch" module introduced at this year's symposium. In this format, students were challenged to distill and pitch their research ideas in just three minutes to the broader masonry community—an exciting initiative aimed at enhancing communication and engagement across academia and industry.



# INDUSTRY ALIGNMENT MEETING

5 NOVEMBER 2024 | UNIVERSITY OF ALBERTA



The UofA Masonry Industry Alignment Meeting is a yearly event that brings together professors and industry partners from CCMPA, CMDC, and AMC for a half-day of collaboration. Faculty members presented project updates and gathered valuable feedback to help align ongoing research with industry priorities. Let us know if you would like to be invited to this very interesting event, which happens right before the Masonry Symposium at the UofA.

# 11<sup>TH</sup> MASONRY MINI-SYMPOSIUM

6 NOVEMBER 2024 | UNIVERSITY OF ALBERTA

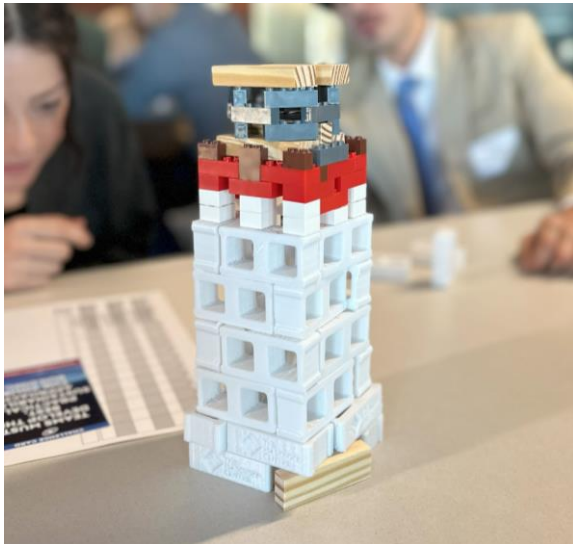


The 11th Annual Masonry Symposium brought together professionals, researchers, and students from the Masonry community. The event featured a rich blend of presentations, keynote speeches, and games sessions, providing a platform for in-depth knowledge exchange and valuable networking opportunities. This year's event introduced the Tech Pitch Module, a dynamic new segment featuring 3-minute student presentations where participants shared innovative ideas and fresh perspectives on the future of masonry construction. The top three winners of the Tech Pitch session were Jian Zhu (University of Calgary), Charlie Shields (University of Alberta), and Camila Patino (University of Alberta).



# 11<sup>TH</sup> MASONRY MINI-SYMPOSIUM

6 NOVEMBER 2024 | UNIVERSITY OF ALBERTA





## UPCOMING EVENTS

Looking ahead, the Masonry Centre is excited to continue its outreach and engagement efforts with a full lineup of events this fall.

- July 29, 2025 – **Visit to University of Calgary** to strengthen our research collaboration.
- September 22, 2025 – **Masonry Technical Meeting** to be held at University of Alberta.
- October, 2025 – **Masonry Mixer Event**
- November 4, 2025 - **Industry Alignment Meeting**, to be held at University of Alberta.
- November 5, 2025 - **12th Annual Masonry Symposium**, held at University of Alberta





We encourage you to stay engaged with the Masonry Centre through our events, workshops, and seminars. Your contributions and active participation are integral to our shared success.

For updates, resources, and event details, stay connected:



Website: visit [www.masonrycentre.ca](http://www.masonrycentre.ca)

## OUR PARTNERS



**FACULTY OF  
ENGINEERING**  
UNIVERSITY OF ALBERTA