Northumbria University NEWCASTLE

L-R: Dr Mohammadali Rezazadeh, Assistant Professor of Structural Engineering at Northumbria University; Natalie Wadley, Co-founder and CEO at ChangeMaker 3D; Ahmed Mahil, President and CEO at Luyten 3D

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Building the future: UK's first-of-its-kind 3D concrete printer to power sustainable construction research

Northumbria University has announced the installation of new cutting-edge 3D construction printing technology that can print concrete structures faster, cheaper and more sustainably than conventional methods. This advanced technology will enable the testing and validation of concrete elements which could be adopted by industry, positioning Northumbria as a leading hub for sustainable construction innovation in the North East.

The University has teamed up with world-leading 3D construction printer manufacturer, Luyten 3D, and UK-based, award winning sustainable technology company, ChangeMaker 3D, to establish the new capability within Northumbria's Structures Laboratory within its Mechanical and Construction Engineering department. The addition of the new technology was supported by a Royal Society Research grant - a prestigious funding opportunity for scientists in the UK.

Transforming the way we build is a vital factor in reaching net zero commitments in the UK and around the world. According to a 2024 UN Environment Programme report, the buildings and construction sector contributes significantly to global climate change, accounting for around 21 per cent of global greenhouse gas emissions. With widespread use across the construction industry, concrete is a major source of carbon dioxide, generating around 8 per cent of all emissions globally.

3D concrete printing boasts time, energy, resource and money-saving credentials, with Luyten 3D's projects in Australia showing it can enable up to 60 per cent reduction of construction waste, 70 per cent reduction of production time, and 80 per cent reduction of labour costs when compared to hands-on construction projects.

Northumbria's Assistant Professor of Structural Engineering, Dr Mohammadali Rezazadeh, who is the Principal Investigator of this Royal Society Research grant, said: "At Northumbria University, our team is leading research in 3D concrete printing technology to develop sustainable infrastructure. We are developing eco-friendly concrete mixes, reinforcing them with corrosion-resistant composite materials, and optimising their designs to reduce material usage, shaping a more sustainable future in construction."

The adoption of 3D concrete printing poses exciting opportunities, yet given the relative novelty of this construction technique, many companies have questions about how they could make best use of the technology. The installation of the 'Platypus' 3D concrete printer at Northumbria University will not only enable advanced research, but also opportunities for industry collaboration.

Luyten 3D's Platypus concrete printer can produce complex geometrical structures in a short amount of time, using biomimicry to create better weight to strength ratios with less concrete. The technology will allow companies to

work with Northumbria to innovate more quickly and at cheaper cost by pilot-testing smaller-scale versions of build elements for long-term performance and durability with this before investing in full-scale projects.

Scientists at the University are already exploring partnerships with leading health, water and civil engineering organisations to support the development of sustainable hospital buildings, water tanks and green infrastructure.

In addition to infrastructure applications, the printer's abilities to print complex structures can also explore how fluid and organic structures in housing have a significantly higher energy efficiency.

Luyten 3D's President and CEO Ahmed Mahil said, "this is among the first Luyten 3D construction 3D printers to arrive in the United Kingdom.

"Our printers are amongst the fastest selling construction robots worldwide and we look forward to seeing how they can address the challenges in the UK, especially in the housing industry," Mahil said.

Luyten 3D's new printing technology could also help address the low supply of housing in the market and in social housing, with the company affirming its printers can construct the majority of a three-bedroom house structure in matter of weeks rather than months.
Such solutions are welcome to the housing crisis debate, especially in North East England where social housing waiting lists are at their highest level since 2012, according to charity Shelter. The waiting list in the region hit 75,985 in 2023, which is a fifty-one per cent increase from the year prior.

Non-social housing shortages are also putting pressure on rents and housing prices. In 2022, 82 per cent of the region's landlords reported a rise in demand for rented housing with only 5 per cent planning to increase the number of rented properties in the following year.

"Luyten3D is ready to contribute to increasing housing supply in the United Kingdom through their technology and are open to any discussions with those in the industry to help tackle the crisis at hand," Mahil said.

ChangeMaker 3D leverage 3D concrete printing to unlock greener, faster solutions for the UK construction sector through Printfrastructure™ - their

trademarked identity for 3D concrete printed infrastructure components, together with the end-to-end supply capability that supports production.

ChangeMaker 3D facilitated the selection and installation of the Luyten 3D Platypus into Northumbria University. ChangeMaker 3D's co-founder and CEO, Natalie Wadley, will be supporting the University on the execution of civil infrastructure projects. She said: "In addition to the R&D opportunities that access to 3D concrete printing technology will provide, it will also offer students the opportunity to expand their skills and increase diversity in the construction industry.

"Working together with Northumbria University and Luyten 3D we're supporting our mission to deliver social value through skill development and preparing our future designers and engineers to integrate 3D concrete printing into all aspects of our UK construction sector."

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Notes to editors

About Northumbria University
Northumbria is a research-intensive university that unlocks potential for all, changing lives regionally, nationally and internationally.

Named Modern University of the Year 2025 by The Times and The Sunday Times, Northumbria is based in Newcastle upon Tyne, with an additional campus in London.

Two thirds of Northumbria's undergraduate students come from the North East region and go into employment in the region when they graduate, demonstrating Northumbria's significant contribution to social mobility and levelling up in the North East of England.

Find out more about us at www.northumbria.ac.uk

About Luyten
Luyten 3D designs, manufactures and sells custom large-scale three-dimensional concrete printers that cater for all project needs on site from

conceptual design through to the final product. The business offers 3D concrete printing solutions for the incorporation of three-dimensional membranes on traditional construction sites, as well as on-site concrete printing consultations, operational assistance, and rental service offerings. The Australian Platypus series 3D printers are deemed fastest selling worldwide.

Luyten 3D's cutting edge 3D printer technology enables builders to transform construction projects that would traditionally take months or years to complete and instead finish them within a number of days. The 3D concrete printing revolutionary technology enables 60 percent reduction of construction waste, 70 percent reduction of production time, and 80 percent reduction of labour costs when compared to hands-on construction projects. https://www.luyten3d.com

For demonstrations of various Luyten 3D printers operating, please see the links below:
- First Ever 3D Printed Double Storey Structure in Australia And Southern Hemisphere
- Luyten 3D construction printers Australia
- 3D Printed Acoustic Wall - Freedom of design with Concrete
- LUYTEN Platypus 3D Concrete print wall using Parametric Architecture | 3DCP

About ChangeMaker 3D
ChangeMaker 3D www.changemaker3d.co.uk

Printfrastructure is our trademarked identity for 3D concrete printed infrastructure components, together with the end-to-end supply capability that supports production. By 2030, we aim for Printfrastructure to capture a 2% share of the market, removing 5% of all carbon from the sector. It is a sustainable building company, aiming to save the planet, one 3D layer at a time.

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UNIVERSITY OF THE YEAR 2022 (Times Higher Education Awards)

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Find out more about us at www.northumbria.ac.uk

--- Please contact media.communications@northumbria.ac.uk with any media enquiries or interview requests ---

Contacts

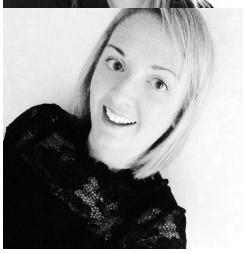
Rik Kendall
Press Contact
PR and Media Manager
Business and Law / Arts, Design & Social Sciences
rik.kendall@northumbria.ac.uk
07923 382339

Andrea Slowey
Press Contact
PR and Media Manager
Engineering and Environment / Health and Life Sciences
andrea.slowey@northumbria.ac.uk
07708 509436

Rachael Barwick
Press Contact
PR and Media Manager
rachael.barwick@northumbria.ac.uk
07377422415

James Fox
Press Contact
Student Communications Manager
james2.fox@northumbria.ac.uk

Kelly Elliott
Press Contact
PR and Media Officer
kelly2.elliott@northumbria.ac.uk



Gemma Brown
Press Contact
PR and Media Officer
gemma6.brown@northumbria.ac.uk