MetaInfrastructure.org

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Issue: 05

NEWSLETTER

our mission

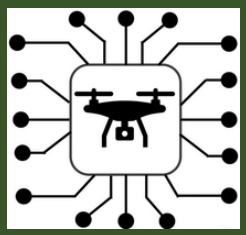
We innovate to deliver future built ecosystems—cities, infrastructure, buildings, and services—through people-centric, sustainable, and resilient design. Our work advances equitable infrastructure aligned with UN SDGs and Net Zero ambitions, embedding state-of-the-art robotics, agentic AI systems, digital construction, and autonomous technologies across design, delivery, and operation. We assess cyber-physical infrastructure exposure to natural, climate, and anthropogenic threats—from sea-level rise to conflicts—through threat-agnostic, conflict-resilient frameworks. Leveraging AI, Generative Design, Digital Twins, IoT, immersive environments, and intelligent robotic platforms, we develop data-driven, agent-based solutions enhancing lifecycle decision-making.

Our approach promotes sustained resilience and long-term bounceability through continuous adaptation. Through Counterfactual Engineering and Engineering for People, we future-proof infrastructure, enabling communities to adapt, prosper and thrive.

top news

New UCL Bartlett Centre for Global Infrastructure Resilience

Led by Professor Stergios-Aristoteles Mitoulis, the new Centre will advance sustainable, people-centred infrastructure and strengthen global research on resilience under climate change, conflict, and infrastructure vulnerability.



New Horizon Europe success:

REASON – Robotic Exploration and Autonomous Systems for Operational Navigation in Disaster Zones is a newly funded €5 million Horizon Europe project that received a perfect evaluation score of 100%. Bringing together 17 partners across Europe, it will advance AI-enabled robotic systems for disaster response in high-risk and conflict-affected environments.

our expertise

threat-agnostic resilience

- Real-time, resilience-based response framework and metrics
- AI-driven integration and digital twin technology
- Automated decision support systems for complex infrastructure systems
- Proactive mitigation of cascading failures

AI & digital transformation

- Advanced data integration and analysis
- Innovative monitoring and predictive technologies
- AI-driven digital twins for infrastructure
- Ethical and explainable AI for crisis management

sustainable development

- Comprehensive Life Cycle Assessment (LCA) frameworks
- Predictive and risk-integrated models
- Multi-criteria optimisation for circularity
- Time-dependent circular intervention planning

metaCity

- Resilient urban systems
- Coupled urban risk mitigation
- Innovative technologies for smart cities
- Sustainable and equitable urban environments

Counterfactual Engineering

- Hazard intensity assessment
- Fragility and recovery modeling
- Sustainability analysis
- Resilience quantification and cost assessment
- Resilience and sustainability trade-offs

engineering4people

- Integrated people-centric risk models
- Data-driven calibration
- People-centric strategies

- Education & capacity building
- Massive Open Online Courses
- Continuous Professional Development (CPD)

featured topic - Publication in Nature Cities: A new paradigm for resilient and equitable post-war recovery of cities

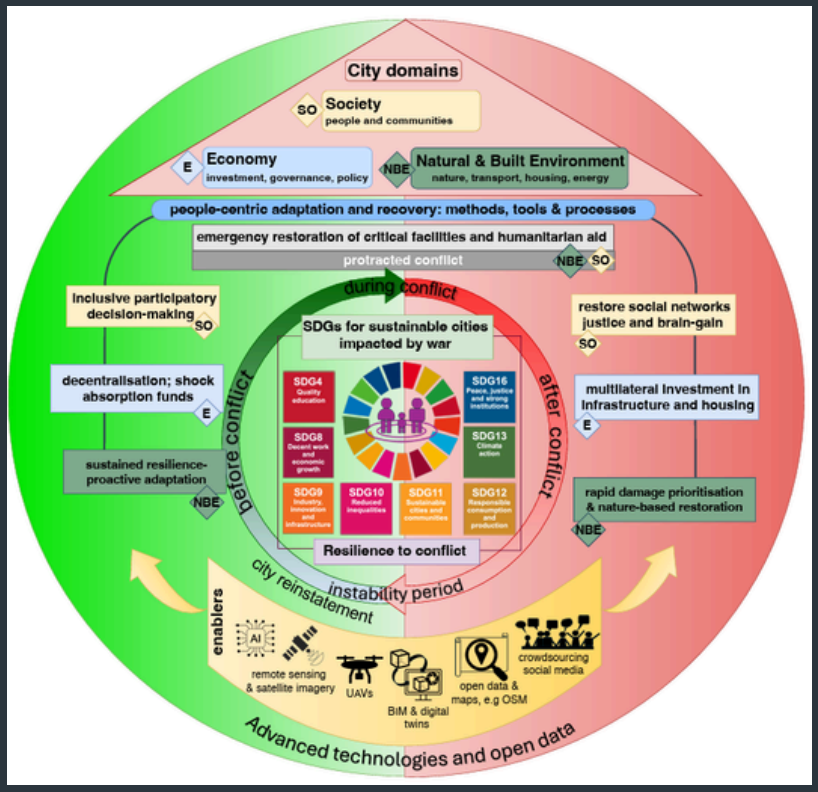
Nadiia Kopiika, Sotirios Argyroudis, Min Ouyang & Stergios-Aristoteles Mitoulis

This paper was authored by Nadiia Kopiika (University College London, Lviv Polytechnic National University, bridgeUkraine.org and MetaInfrastructure.org), Sotirios Argyroudis (Brunel University of London, bridgeUkraine.org and MetaInfrastructure.org), Min Ouyang (Huazhong University of Science and Technology), and Stergios-Aristoteles Mitoulis (University College London, bridgeUkraine.org and MetaInfrastructure.org), reflecting a strongly interdisciplinary collaboration across resilience, infrastructure, and urban recovery

Rebuilding cities after conflict often prioritizes political or economic interests at the expense of long-term resilience, equity and inclusion. Post-war recovery must break away from traditional, interest-driven patterns. Instead, reconstruction should be redefined through a science-driven, multidisciplinary lens that has people and communities, social justice, and sustainability at its heart.

Sustained resilience- a new property of the built environment:
This paper introduces a transformative, science-driven framework for post-war reconstruction, moving beyond fragmented, top-down approaches towards a people-centric, multidisciplinary, and digitally enabled model of sustained resilience. It integrates society, economy, and the natural and built environment across all phases of conflict—before, during, and after—leveraging AI, digital twins, and participatory platforms to empower communities and enable equitable recovery .

At its core, this work reframes reconstruction not as rebuilding what was lost, but as reimagining cities through resilience, sustainability, and social justice.
Today, more than ever, we need countries affected by war not only to recover—but to lead.



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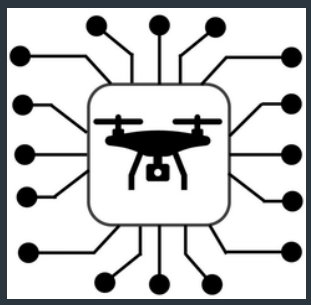
our news Jan-Mar 2026

March, 2026: The Bartlett Review Podcast. The Power of Reconstruction: How does reconstruction take shape in contexts marked by economic uncertainty, political instability, and the realities of conflict? In this episode of The Bartlett Review Podcast, Professor Priti Parikh, Dr Samuel Godfrey, and Professor Stergios-Aristoteles Mitoulis explore the challenges of international construction and post-crisis reconstruction, with particular attention to regions where projects are shaped by conflict, fragile economies, social disruption, and complex political conditions.

26 March, 2026: Professor Stergios-Aristoteles Mitoulis took part in the UK-Ukraine ResearchBridge Conference: Accelerating Reconstruction through Science & Innovation, convened at the Royal Society. Bringing together researchers, policymakers, and institutional leaders from the UK and Ukraine, the event showcased the power of science and innovation in advancing recovery, resilience, and renewal. The conference featured discussions on digital innovation, reconstruction, green recovery, and future research collaboration, while also identifying pathways for strengthening long-term UK–Ukraine partnerships.

24 March, 2026: New Centre for Global Infrastructure Resilience 🌐 Led by Professor Stergios-Aristoteles Mitoulis, the new UCL Centre for Global Infrastructure Resilience at The Bartlett School of Sustainable Construction aims to advance sustainable, people-centred infrastructure and strengthen global efforts to address climate change, conflict, and other major societal challenges. Bringing together interdisciplinary expertise, the Centre builds on more than a decade of research excellence and international collaboration, supported by over £9 million in funding.

March, 2026: We are delighted to share the success of REASON – Robotic Exploration and Autonomous Systems for Operational Navigation in Disaster Zones, a new €5 million Horizon Europe project under HORIZON-CL3-2025-01-DRS-04. The project received a perfect evaluation score of 100%, reflecting its excellence in a highly competitive call. It will advance AI-enabled autonomous and robotic systems for disaster response in complex, high-risk, and conflict-affected environments, bringing together a strong consortium of 17 partners across Europe.



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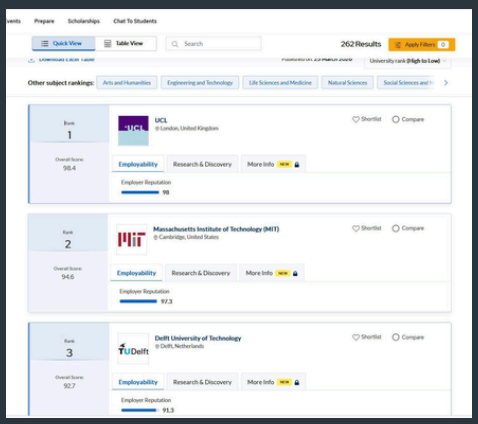
March, 2026: ReCharged MSCA Staff Exchanges meeting at UCL
A productive meeting took place last week במסגרת the ReCharged MSCA Staff Exchanges project, hosted by Stergios-Aristoteles Mitoulis at The Bartlett School of Sustainable Construction UCL. The meeting brought together colleagues from The Equator Company, ETH Zürich, and Brunel University of London to exchange ideas and discuss ongoing research.

March, 2026: Professor Stergios-Aristoteles Mitoulis speaks at the UK-Ukraine Research Bridge meeting
At the Royal Society in London, Professor Stergios-Aristoteles Mitoulis presented the vision of Bridge Ukraine for resilient and equitable post-war reconstruction. From innovative shelter reuse and prefabrication to new educational programmes and major funding successes, the initiative is helping shape a bold new model for sustainable reconstruction in Ukraine.



February, 2026: The UCL Bartlett Faculty of the Built Environment has been ranked #1 in the world for Architecture and Built Environment studies in the QS World University Rankings by Subject 2026, retaining its global top position for the fourth consecutive year and remaining #1 in the UK for the twelfth year in a row. This achievement reflects the strength of its community in advancing research, education, and real-world impact in the built environment.

February, 2026: UCL experts to speak at ICONHIC 2026
Professor Qiuchen Lu and Professor Stergios-Aristoteles Mitoulis, both from University College London, will deliver invited talks at ICONHIC 2026. Professor Lu will present her work on digital innovation for the built environment, showing how digital twins, multi-modal data, and AI-driven modelling can support more resilient and adaptive cities.

Professor Mitoulis, Head of the Centre for Global Infrastructure Resilience at UCL, will speak on the shift from component failure to sustained systemic resilience in built environments. His talk brings together engineering, climate adaptation, digital infrastructure systems, and policy to advance more holistic approaches for infrastructure facing complex and evolving risks.

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February, 2026: Leading members of MetaInfrastructure.org, Stergios-Aristoteles Mitoulis and Sotirios Argyroudis, participated in the International Conference on Resilient Systems (ICRS) at Delft University of Technology, alongside leading researchers in the field. The event featured important discussions on resilience in complex systems, including cascading failures, decision-making under uncertainty, and the logistical challenges associated with Ukraine. A particular highlight was the presentation by Igor Linkov, which reinforced the need to move beyond traditional risk-based approaches towards truly dynamic, system-level resilience thinking.

February, 2026: Roadmap: AI in SHM for Built Environments
A new roadmap paper addresses a critical gap in AI for Structural Health Monitoring (SHM): while many methods are widely researched, very few are deployed in real-world, safety-critical infrastructure. The paper moves beyond algorithm development to focus on system-level integration, highlighting key challenges such as transparency, interpretability, security, certifiability, and decision-ready implementation.


IOP Publishing Meas. Sci. Technol. 37 (2026) 103001 https://doi.org/10.1088/1361-6501/ae3dbb

Measurement Science and Technology

ROADMAP

Roadmap: Integrating artificial intelligence in structural health monitoring systems

OPEN ACCESS

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February, 2026: Stergios-Aristoteles Mitoulis, representing The Bartlett School of Sustainable Construction UCL, the Centre for Global Infrastructure Resilience, MetaInfrastructure.org, and bridgeUkraine.org, attended a reception hosted by the Ukraine Britain Business Council at the UK House of Lords, bringing together leaders and organisations committed to Ukraine's reconstruction and long-term resilience. The event highlighted the strong and growing partnership between the UK and Ukraine in support of rebuilding, resilient infrastructure, and sustainable recovery, while reinforcing the role of research, innovation, and collaboration in shaping Ukraine's future.

February, 2026: Stergios-Aristoteles Mitoulis participated in the Ukraine–UCL discussion on Sustainable Reconstruction for Ukraine at the UCL Institute for Global Prosperity, contributing perspectives from bridgeUkraine.org and The Bartlett School of Sustainable Construction UCL. The discussion highlighted how UCL's interdisciplinary expertise can support democratic cities, digital transformation, inclusive urban systems, entrepreneurial innovation, and citizen-led recovery in Ukraine.

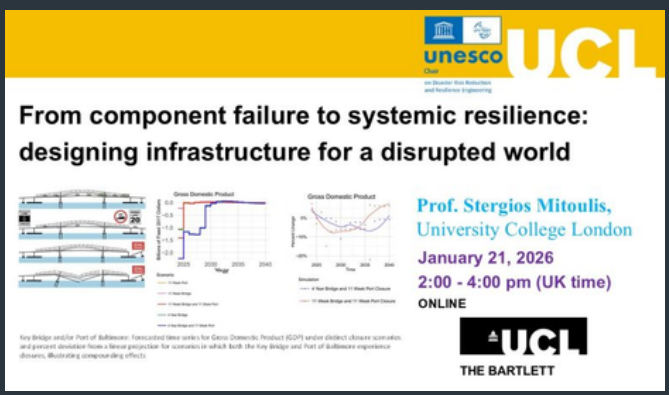
our news Jan-Mar 2026

February, 2026: Stergios-Aristoteles Mitoulis organised and hosted a Strategic Workshop on Horizon Europe, Partnerships and AI for Infrastructure at UCL East (Marshgate), The Bartlett, within the framework of the ReCharged MSCA Staff Exchanges. The workshop focused on collaboration for 2026–2029, the translation of R&D into resilient infrastructure solutions, and the responsible use of AI and digital twins, alongside concrete Horizon Europe opportunities in climate adaptation and disaster resilience.

February, 2026: Stergios-Aristoteles Mitoulis and Sotirios Argyroudis attended RTR 2026 – Results from Road Transport Research in Brussels, where EU-funded and Horizon Europe projects showcased advances in safety, intelligent transport systems, automated mobility, batteries, and resilient infrastructure. These themes closely aligned with the work of MetaInfrastructure.org, particularly its focus on the democratisation of infrastructure and mobility to ensure innovation delivers inclusive, accessible, and people-centred impact.

February, 2026: The ZEBAI consortium met in Madrid for its 3rd General Assembly, hosted by CSIC at the Eduardo Torroja Institute for Construction Sciences. The meeting highlighted progress in AI-enabled innovation for zero-emission buildings, advanced materials, performance-driven design, and integrated assessment and simulation, reinforcing ZEBAI's contribution to Europe's transition towards high-quality, zero-emission buildings.

January, 2026: The UNESCO Chair in Disaster Risk Reduction and Resilience Engineering will host a webinar by Prof. Stergios-Aristoteles Mitoulis of UCL on "From component failure to systemic resilience: designing infrastructure for a disrupted world." The talk will explore why infrastructure must be understood and designed as an interconnected socio-technical system, where localised failures can lead to wider and longer-term societal disruption.



main projects

REASON	Robotic exploration and autonomous systems for operational navigation in disaster zones Funding: HORIZON-CL5-2025-DRS-04	
PORTAL	Adaptive strategies for enhancing threat-agnostic resilience of port ecosystems Funding: HORIZON-MSCA-SE-2024	
R Charged	Climate-aware resilience for sustainable critical and interdependent infrastructure systems enhanced by emerging digital technologies Funding: HORIZON-MSCA-SE-2021	
AI4BSSC	Artificial Intelligence for BSSC Undergraduate Programmes Funding: UCL/Bartlett School of Sustainable Construction	
RISKADAPT	Asset-level modelling of risks in the face of climate-induced extreme events and adaptation Funding: HORIZON-MISS-2021-CLIMA-02	
ZEBAI	Innovative methodologies to design zero-emission and cost-effective buildings based on AI Funding: HORIZON-CL5-2023-D4-01-01	
FIREWISE	Proactive wildfire resilience assessment and management Funding: UKRI/HORIZON-MSCA-PF-2023	
R.E.A.C.T	Reusing steel for emission reduction through AI-driven cutting-stock tool Funding: HORIZON-MSCA-PF-2024	
META GRID	Climate resilience assessment and adaptation of the European power grid Funding: HORIZON-MSCA-PF-2024	
AI4SURE	AI-empowered data-mining techniques for sustainable and climate-resilient infrastructure peacebuilding Funding: British Academy-2023	
bridgeAdapt	Sustainable adaptation of bridges deteriorated to climate and human-induced damage Funding: British Academy-2023	
WINDTUNE	Efficiency of natural ventilation toward zero-energy residential buildings Funding: British Academy-2023	
Educate Ukraine	Empower Ukraine: Capacity building for critical infrastructure restoration in Ukraine Funding: UK Charity-2024	
MOOC	Massive Open Online Course: Resilience, Sustainability & Digitalisation in Critical Infrastructure Funding: HORIZON-MSCA-SE-2021	
completed		
DiRect	Digitally enhanced resilience of critical transport infrastructure Funding: HORIZON-TMA-MSCA-PF-EF-2021	
ReBounce	Integrated resilience assessment framework for bridges and transport networks exposed to hydraulic hazards Funding: H2020-MSCA-IF-2019	
BriFace	Novel assessment of bridge retrofitting measures through interface efficiency indices using a guided wave-based monitoring method Funding: H2020-MSCA-IF-2018	
TRANSRISK	Vulnerability and risk assessment of transportation systems of assets exposed to geo-hazards Funding: H2020-MSCA-IF-2016	

Prof Stergios Aristoteles Mitoulis, *Head*
The Bartlett School of Sustainable Construction (BSSC), University College London (UCL) and Honorary Professor, University of Birmingham
Founder and Head of the UCL Centre for Global Infrastructure Resilience
PhD, DiplEng, MSc, CEng MICE, M.ASCE, M.EAEE, FHEA
resilience of transport assets; monitoring-driven resilience of infrastructure; damage-free; zero-maintenance bridges; Eurocode expert

Prof Sotirios Argyroudis, *Global Deputy Head*
Professor (Reader), Brunel University of London, PhD, DiplEng, BSc, CEng MICE, FHEA
risk and resilience assessment of critical infrastructure and networks; multiple hazards & climate change effects

Nadiia Kopiika, *BSSC, UCL Deputy Head*
Research Fellow, BSSC, UCL, British Academy/CARA
strength and reliability; strengthening; retrofitting, material properties; probabilistic approaches; non-destructive methods

Dr Ivan Izonin, *AI/ML Lead*
Associate Professor, British Academy/CARA
S.M.IEEE, M.ACM, M.INNS
AI/ML; high-speed computational intelligence; neural-like structures; non-iterative training algorithms; ensemble models; meta learning and small data analysis

Dr Khrystyna Myroniuk, *Building Physics Lead, Dissemination Operations*
Associate Professor, British Academy/CARA
heating, ventilation, and air conditioning; energy-saving buildings; EU standards; resource-saving technologies

Dr Raffaele Cucuzza, *Circularity in Structures Lead*
Postdoctoral Research Fellow (Marie-Curie), BSSC, UCL, PhD, DiplEng
structural optimisation; data-driven design; LCA-driven design; eco-design; steel structures; reusing steel

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wildfires simulation and management; GIS & remote sensing; spatial resilience, planning and climate change

Dr Shchasiana Arhun, *Education & Energy Efficiency Lead*
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Dr Roberta Di Bari, *R&D and Sustainable Buildings Lead*
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resilience and adaptation strategies; critical infrastructure

Alstoteles
AI-powered research assistant based on large language models supporting literature review, drafting, data interpretation, and project coordination

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AI/design for construction, sustainable constructions; energy efficiency; LCA

Dariia Berestok, *Operations Lead*
Project Manager, BSSC, UCL
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John Adah Agbo, *Event Organisation Lead*
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Doctoral researcher, architecture & building science, BSc, MSc
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threat-agnosticity, vulnerability and fragility assessment, port-city system analysis, reliability

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