Research
at the Cluster for Research in Design & Sustainability

DEPARTMENT OF ARCHITECTURE
This handbook has been designed by

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on behalf of the Department of Architecture,
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Cluster for Research in Design & Sustainability (CRiDS)

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Cluster for Research in Design & Sustainability
Our mission is to research and implement design responses to social, environmental, and economic challenges within the built environment in both developed and developing countries.

The Cluster for Research and Design & Sustainability (CriDS) at the University of Strathclyde draws together research expertise in sustainable architecture and urbanism, studies on the identification of social ecologies and environmental systems for supporting resilient communities, innovations in solar design technology, improvements in health, and advances in education for sustainable development, to help address challenges faced by communities across the world.

Our goal is to make a difference, by producing quality research work, and research-led educational provision, that will help to improve peoples' lives today and in the future.

To do research at CRiDS contact:

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RESEARCH AT CRiDS

About us
CRiDS was established in 2010 to address improved relationships between the built and natural environment. Since then, the unit, led by Dr David Grierson and Prof Branka Dimitrijevic, has attracted over 30 postgraduate researchers from around the world. Recent work on the development of a Space/Nature Syntax Method has been presented at MIT in USA, and our research in social innovation and resilience has led to a series of annual symposiums since 2015. The cluster has a holistic approach, and a collaborative, cross-disciplinary ethos.

Our research interests
The Cluster is focussed on producing quality research outputs, engaging in useful knowledge exchange activity, and achieving meaningful impact on peoples’ lives. Our international expertise is being directly applied at the world-renowned Arcosanti urban laboratory in Arizona, USA, and in developing social innovation networks and frameworks across the world, that aim to make a difference. In collaboration with Strathclyde Engineering for Development we are currently designing and building an earthquake-resilient school in Nepal, and developing energy and resource efficient technologies for communities in developing countries.

We encourage PhD applications on a variety of topics
CRiDS encourages applications related to the following topics:
- Sustainability and the Built Environment
- Sustainable Design
- Social Innovation and Resilience
- Energy Efficiency and Indoor Air Quality
- Education for Sustainable Development.
KEY RESEARCH AREAS

**Architecture and Ecology**
Research in this area examines environmental and sociological aspects shaping the relationship between Nature, people and place. Our work considers the detrimental effects of the built environment on the natural environment, as well as impacts on human development, with the aim to support a positive transformation of this relationship through design.

**Social Innovation and Resilience**
Social innovation emerges when the existing governance systems are not capable of providing agile responses to evolving problems or sudden disruptive events. Our research explores social innovation networks, frameworks and solutions which support the resilience of communities within the context of the sustainable development of the built environment.

**Energy & Resource Efficiency and Occupant Health**
Research in this area supports design interventions that aim towards reductions in energy and resource use, and improved health. Our work has involved assessing the impact of house dust mites on asthma and providing solutions for improved thermal comfort and air quality.

**Education for Sustainable Development**
Our research explores transformative methods for cross-disciplinary education in sustainable development (ESD). The cluster has contributed to the development of curricula, teaching methods and material within Higher Education Institutions across Europe, and more recently in North Africa.
PHD TOPICS WE SUPERVISE

Past PhD theses

*Education for Sustainable Development.*
Claire Hyland

*Architecture and Ecology.*
Karen Munro

*Sustainable Architecture: the Development of a Sustainable Management System for Iran.*
Neda Poorang

*Sustainable Development Policies: the Problem of Housing Collapse in the City of Basra, Iraq.*
Qaaid Zgher Khlef Al-Saraify

*Sustainable Architecture: Environmental Analysis using Artificial Intelligence.*
Nada Khider Jassim Al-Naemyi

Current PhD topics

- The conflict between energy efficiency and indoor air quality.
- Children’s experience of nature in primary school architecture.
- Displacing air conditioning in kingdom of Saudi Arabia.
- Housing design, economic and socio-environmental dimensions for a sustainable future in Iran.
- Indoor air quality, dust mite allergens and asthma.
- Passive and active solar design to displace space heating in Greece.
- Regenerative design and sustainable development.
- Social innovation systems for building resilient communities.
- Sustainable housing in developing countries.
Architecture and Ecology: Towards a Space/Nature Syntax

The Biophilia Hypothesis describes the innate connection between humans and Nature that offers us psychological, physical, and emotional benefits. The Space/Nature Syntax offers a cross-disciplinary methodology applied through Karen’s PhD work at Arcosanti, Arizona, in the US, to address how can maintain this vital connection in an increasingly urbanising world?
2019
Lecture Presentation at Taylor’s University, Kuala Lumpur, Malaysia
“Ecology, Biophilia, and Cities of Tomorrow”
David Grierson, plenary Lecture

Presentation at Victoria Shanghai Academy, Hong Kong Island, Hong Kong
“Ecology, Biophilia, and Sustainable Architecture”
David Grierson, plenary Lecture

2018
Influence of Climate Change in Serbia in Future, Belgrade, Serbia
“Mitigation of and Adaptation to Climate Change in Glasgow”
Branka Dimitrijevic, Invited speaker

Built Heritage Management and Presentation, Nis, Serbia
“Challenges of Application of Innovative Technologies in Built Heritage Management and Presentation”
Branka Dimitrijevic, Keynote speaker

Proximate Orientalism, Vienna, Austria
“Influences of Islamic architectural styles on the architecture of Karel Parik”
Branka Dimitrijevic, Invited speaker

2017
Sustainable and Resilient Built Environment, Banja Luka, Bosnia and Herzegovina
“Sustainable Urban Development of Glasgow”
Branka Dimitrijevic, Invited speaker

2016
Invited Presentation at the 3rd World Symposium for Sustainable Development, Massachusetts Institute of Technology (MIT), Cambridge, MA, USA
“Linking Space and Nature Syntaxes”
David Grierson and Karen Munro, Invited speakers

Invited Presentation for KLABS at the Venice Biennale, Venice, Italy
“Didactical Activities Using Contemporary Learning Methodologies and Materials”
David Grierson, Invited speaker
KLABS project partners from 11 universities at TU Delft, Netherlands

Partners in the Erasmus+ funded KLABS project collaborated with members of CRiDS on the development of curricula for MSc courses at six universities in Western Balkan countries. Branka Dimitrijevic co-edited the book “Integrated Urban Planning: Territories, Resources and Directions” and co-authored a chapter in the book “Sustainable and Resilient Buildings: Approaches, Methods and Tools”, used in teaching at the MSc courses.
KNOWLEDGE EXCHANGE

Consultancy

The Cluster offers a range of consultancy work and advice to government agencies and industry partners. For example, David and Branka collaborated with ‘Zero Waste Scotland’ and ‘Ricardo Energy and Environment’ on the development of “Designing Out Construction Waste: a guide for project design teams”. David is working with Strathclyde Engineering for Development on the design and construction of earthquake-resilient schools in Nepal.

Teaching

CRiDS teaches ecology and sustainability to architecture and engineering students at undergraduate and postgraduate levels. David has led the Faculty-wide postgraduate programme in Sustainable Engineering since 2004, involving more than 900 students working on industry-based projects. The Cluster has also been invited to deliver presentations around the world on architecture and ecology, social innovation and resilience, energy and resource efficiency, and education for sustainable development.

Knowledge Exchange Events

Since 2010, the Cluster has organised annual conferences and symposia in collaboration with academics from across the University including:

• Annual student-led industry conference on Sustainable Engineering;
• Symposium on Frameworks for Social Innovation in Planning for Built Environments;
• Symposium on Social Innovation Systems in Building Resilient Communities;
• Symposium on Sustainability and Resilience of Buildings, Settlements and the Natural Environment.
Sustainability and resilience of buildings, settlements & the natural environment

A series of whole-day knowledge exchange events supported by 2020 Climate Group Scotland, Scottish Natural Heritage and Royal Society of Arts Scotland that brought together researchers from across the University, speakers from public and private sector, and other academic institutions nationally and internationally to discuss how research can support social and entrepreneurial innovation in communities to increase resilience of buildings, settlements & the natural environment.
RESEARCH GRANTS & PROJECTS

The Nepal Project: Designing and Constructing Earthquake-Resilient Schools in Nepal
Strathclyde Engineering for Development

Inclusive Tourism in the City: How Urban Tourism Can Benefit Marginalised and Vulnerable Communities
Global Challenges Research Fund, with the University of Philippines Diliman

BC-SDBE: Building Capacity for Sustainable Development of the Built Environment
British Council Institutional Links Project

Designing Out Construction Waste
Zero Waste Scotland

Sustainable and Resilient Built Environment Knowledge Labs
Erasmus+, with 10 EU and Western Balkans HEI Partners

Architecture and Planning
Erasmus+ KA107

The Development of a Micro-Solar CHP and Desalination Unit
Scottish Enterprise

Analysing and Testing the Architectural and Ecological Model Developed at Arcosanti, Arizona, USA.
The Cosanti Foundation

Sustainable Design and the Impact of Small Scale Renewable Energy Intervention in Rural West Africa
EPSRC
The Nepal Project
Following the devastating earthquake in 2015 the aim of the project, led by Dr Grierson, is to design and construct new classrooms and support facilities for Shree Bhairabi Secondary School in the Nuwakot district of Nepal, using low energy, earthquake-resilient, methods and techniques.
PUBLICATIONS BY RESEARCH AREA

Architecture and Ecology


Social Innovation and Resilience


**Energy & Resource Efficiency and Occupant Health**


Howieson S. (2017), The Great Scottish Housing Disaster: the impacts of feudalism, modernism, energy efficiency and vapour barriers on indoor air quality, asthma and public health, Sustainability.


**Education for Sustainable Development**


Grierson, D. (2016) Didactical Activities using Contemporary Learning Methods and Materials: MSc Sustainable Engineering, Faculty of Engineering, University of Strathclyde, Knowledge Labs for Sustainable and Resilient Environments, Venice, Italy.


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