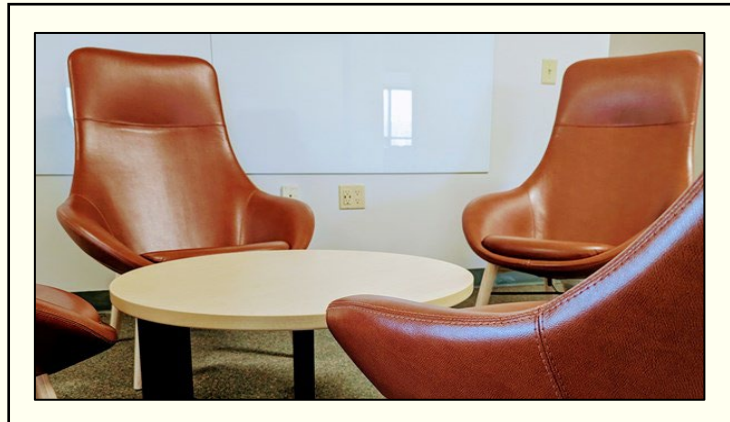


ADVANCES >>>

## The Newsletter of the Western Academy

Summer 2023



### Which of the world's most pressing problems should we tackle next?

Collaboration can lead to unexpected breakthroughs.

The Western Academy for Advanced Research connects Western faculty with global experts who are committed to discovering solutions to the world's most pressing challenges. To make these solutions a reality, the Western Academy presents interdisciplinary research themes on which Western faculty, international visiting scholars, and postdoctoral scholars may focus their intellectual energy for a year-long period of investigation.

Since its official launch in September 2022, the Western Academy has supported two themes that are working towards discovering new ways of thinking about challenging—and compelling—issues facing humanity today:

[Mathematics of Neural Networks](#) is the Western Academy's inaugural research theme. Since their launch in September 2022, this team has explored the space between math and neuroscience, artificial intelligence and medical practice, and has emerged with novel techniques for understanding the workings of human brains, both biological *and* artificial.

[Climate Resilient Infrastructure and Buildings](#), or CRIB, (launched in January 2023) urges community and corporate leaders to address the climate emergency. Working in close partnership with members of the public and private sectors, CRIB aims to identify and address the barriers that are holding back the progress of adaptive infrastructure and to promote dialogue and co-operation between competing stakeholders.

The Western Academy is excited to announce the launch dates for two new research themes. These new additions to the Academy share a common commitment to promoting social and environmental betterment through the ethical use of technologies: [Nature-Inspired Solutions for Carbon Transformation](#) (launch date: September 2023) and [Interdisciplinary Research to Address Technical and Social Barriers in Smart Cities and Communities](#) (launch date: January 2024). We look forward to sharing developments as they unfold.

#### **New developments about a rare disorder**

A crucial breakthrough from the Mathematics of Neural Networks team sheds light on a rare disorder. Rett Syndrome is a neurological condition that primarily affects young girls, leading to severe impairments in speech and motor skills. Western Fellow Dr. Lyle Muller (Mathematics) and contributing researcher Dr. Gabriel Benigno collaborated with researchers from the Brain and Mind Institute and Toronto SickKids Hospital to create a computational model that will researchers and medical providers with important insights into how the disorder disrupts neural activities. Read their findings in [Translational Psychiatry](#).

## Can music motivate us to take action on climate change?

Records show that global temperatures are rising. It is one thing to *understand* climate data, but can numbers inspire action?

Visiting Fellow Dr. Lucy Jones (Dr. Lucy Jones Center for Society and Science) transformed temperature data, recorded over the course of 138 years, into a haunting musical composition titled [In Nomine Calens: In the Name of a Warming Planet](#). In her musical work, Jones—who is also a leading seismologist based out of Southern California—aims to encourage action by appealing to the emotions as well as the intellect.

Jones is working as part of the Climate Resilient Infrastructure and Buildings (CRIB) theme to discover new ways of mobilizing communities and their leaders to adopt a co-operative and resilient approach to the changing climate.

On October 27, Jones will be organizing a special concert in partnership with the Don Wright Faculty of Music at Western University. This event is inspired by her work with the non-profit organization, [Tempo! Music for Climate Action](#).

On November 1–3 the CRIB team will be hosting a Fall Symposium that will attract leaders from the public and private sectors. This event will be co-hosted with the Institute for Catastrophic Loss Reduction (ICLR). More details to come about these exciting collaborations.

## The Academy hosts a summer residency

In Summer 2023, number theorist [Christian Maire](#) (Université de Franche-Comté, Besançon, France) joined the Mathematics of Neural Networks team for a residency that was part of the team's broader effort to generate collaborations between experts at Western and key thinkers from around the world.

Maire was named *professor classe exceptionnelle* by the French Council in Mathematics. He has held visiting positions at Cornell University and McGill University and has organized summer schools in Gabon, Bénin, and Cameroon.

The Mathematics of Neural Networks theme has also hosted Visiting Fellows [Frédéric Chavane](#) (Centre National de la Recherche Scientifique, Institut de Neurosciences de la Timone), [Maria Chudnovsky](#) (Princeton), and [Alex Lubotzky](#) (Hebrew University/Weizmann Institute). Maire was the first Visiting Fellow to stay in Malhotra House, a visitor's residence that was offered to Western University by the generous donation of Desh and Ladi Malhotra.

### Upcoming visitors

#### >>>September—November 2023

Paola Giudicianni, *Consiglio Nazionale delle Ricerche (Naples, Italy)*  
Nature-Inspired Solutions for Carbon Transformation

#### >>>October—November 2023

**Becky Denlinger**, *Ocean Networks Canada (Victoria, BC)*,  
*Ret. Deputy Minister of Emergency Management, British Columbia*  
Climate Resilient Infrastructure and Buildings  
**Lucy Jones**, *Dr. Lucy Jones Center for Science and Society*  
*(Pasadena, CA, USA)*  
Climate Resilient Infrastructure and Buildings

## Coming in September 2023:

### Turning to nature to address carbon emissions

We know that forests and plant life play an important part in mitigating climate change. Can nature provide us with the answers that we need to combat global emissions?

Chris DeGroot (Western, Mechanical and Materials Engineering), Naomi Klinghoffer (Western, Chemical and Biochemical Engineering), and Elizabeth Webb (Western, Earth Sciences) are committed to investigating this question as part of the newest research theme, [Nature-Inspired Solutions for Carbon Transformation](#).

Nature-Inspired Solutions seeks to expand upon—and improve—existing approaches to carbon capture, while also fostering engagement with community leaders and stakeholders at all levels of government.

Joining the theme are Visiting Fellows Damien Batstone (University of Queensland, Queensland, Australia) and Paola Giudicianni (Consiglio Nazionale delle Ricerche Institute of Science and Technologies for Sustainable Energy and Mobility, Naples, Italy).

For all questions, including enquiries about opportunities for community engagement, please contact Theme Leader **Chris DeGroot** at [christopher.degroot@uwo.ca](mailto:christopher.degroot@uwo.ca).

## Coming in January 2024:

### What is the future of smart cities?

Smart cities are becoming more widespread.

If used responsibly, smart city technologies can help city planners develop infrastructure that is more responsive to community need— but how do we ensure that smart cities are efficient *and* also secure? Innovative *and* also ethical?

In January 2024, a new research theme will investigate this complex issue. The theme, [Interdisciplinary Research to Address Technical and Social Barriers in Smart Cities and Communities](#), is led by Western Fellows Ayan Sadhu (Civil and Environmental Engineering), Abdallah Shami (Electrical and Computing Engineering), and Anabel Quan-Haase (Faculty of Information and Media Studies, Sociology).

This research theme will address such challenges by engaging with community organizations, industry leaders, and internationally renowned researchers including Visiting Fellows Jalel Ben-Othman (Université Sorbonne Paris Nord, L2S Lab), a leader in mobility management and traffic forecasting, and Katharine Willis (University of Plymouth), a leading Smart City researcher and member of the International Telecommunication Union, a specialized agency of the United Nations. For more information, please contact Theme Leader **Ayan Sadhu** at [asadhu@uwo.ca](mailto:asadhu@uwo.ca).

#### The Western Academy for Advanced Research

>>>Website: [uwo.ca/academy](http://uwo.ca/academy) | Twitter/X: @WesternUAcademy

>>>Contact: [wafar@uwo.ca](mailto:wafar@uwo.ca)

WAFAR Secretariat members: Fred Longstaffe (Director), Lindsey Bannister (Administrative Officer), Kristen Harris (Special Projects Coordinator). Newsletter editor: Lindsey Bannister