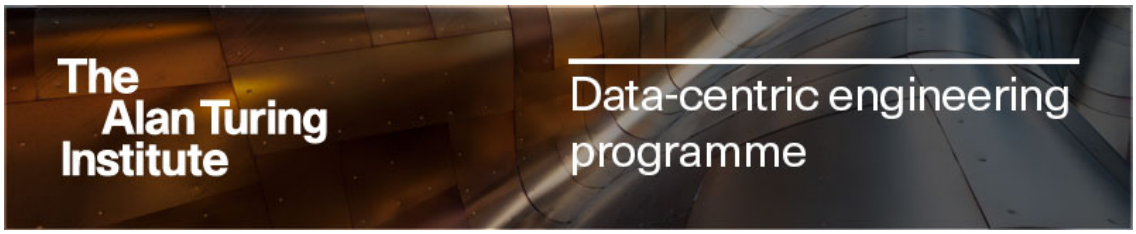
DCE Community Update May 2023

DCE Programme <dceprogramme@turing.ac.uk>
Wed 17/05/2023 5:27 PM
To:Alice Budden <abudden@turing.ac.uk>

Click here if you are having trouble viewing this message.



If you're a Turing Slack user follow #data-centric-eng for information and reminders about DCE activity between these monthly updates. To submit any items in future updates please contact Alice Budden.

We Are Hiring!

Join Us!

As the Data-Centric Engineering programme steers towards its second phase, we are now recruiting for four Theme Leads to drive forward work on our priority themes. These roles are all for 1 year in the first instance at 04-0.6 FTE, with the potential for extension. *Application deadline 4 June*.

Theme Lead - Maritime Cybersecurity

This post will work closely with the Defence and Security team here at the Turing to address the growing threat to shipping and global supply chains: the security of its systems. New AI approaches need to be developed to protect maritime assets, to improve security and reduce the cost of monitoring these critical systems. This post will develop and oversee a programme of activity to deliver critical improvements for the sector.

Details here.

Theme Lead - Digital Manufacturing

As the manufacturing and supply process becomes increasingly congested and complex, manufacturers are looking towards AI to assist in the recognition, avoidance and prediction of potential health and safety risks. There are multiple areas AI can be applied to aid in increasing the safety of the workplace. This post will develop and oversee a programme to deliver this critical technology.

Details here.

Theme Lead - Critical Infrastructure

There is a large body of work underpinning the need for depoloying digital twins for safety applications, with multiple potential use cases for applications of digital twin technology within critical infrastructure. Applicants should have a significant track record in development of AI, ML and/or data science for applications in critical infrastructure, civil engineering, electronic and electrical engineering and/or nuclear or fusion reactors.

Details here.

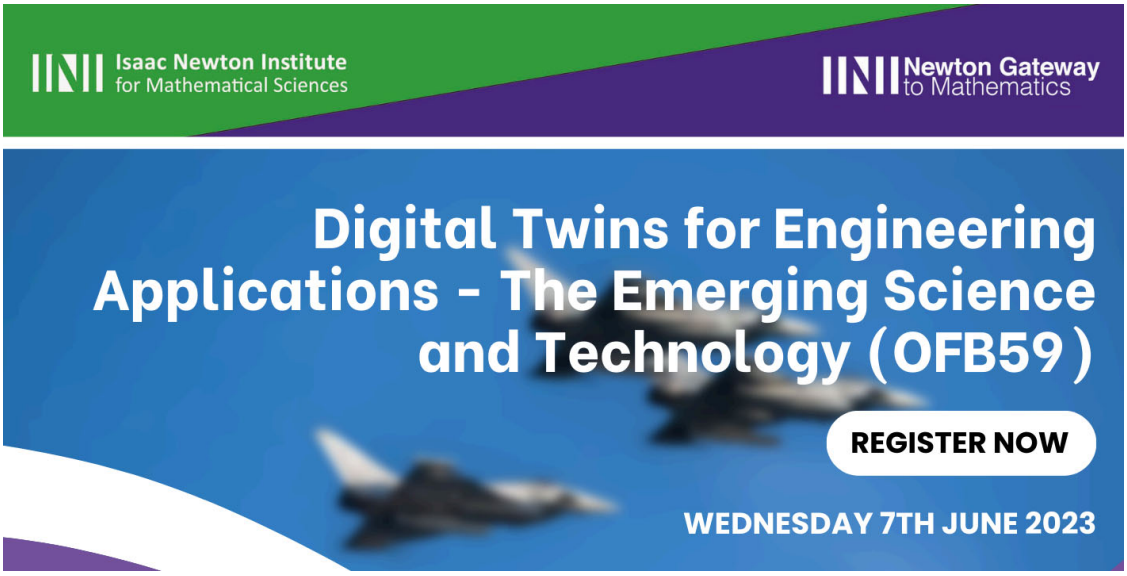
Theme Lead - Humanities, Arts and Social Sciences in Data-Centric Engineering

This post will enable the data-centric engineering communities to understand the methods and values of arts, humanities, and social sciences research and vice versa. It will aim to develop radical interdisciplinary methods for sharing and producing data between these communities.

Details here.

We welcome applications for all four of these posts from an array of starting positions, so if any of these sound of interest to you, follow the links above and ***apply now***! Please also feel free to circulate the adverts to anyone who may be interested. If you would like to have an informal chat about any of these roles please contact the DCE programme team.

News



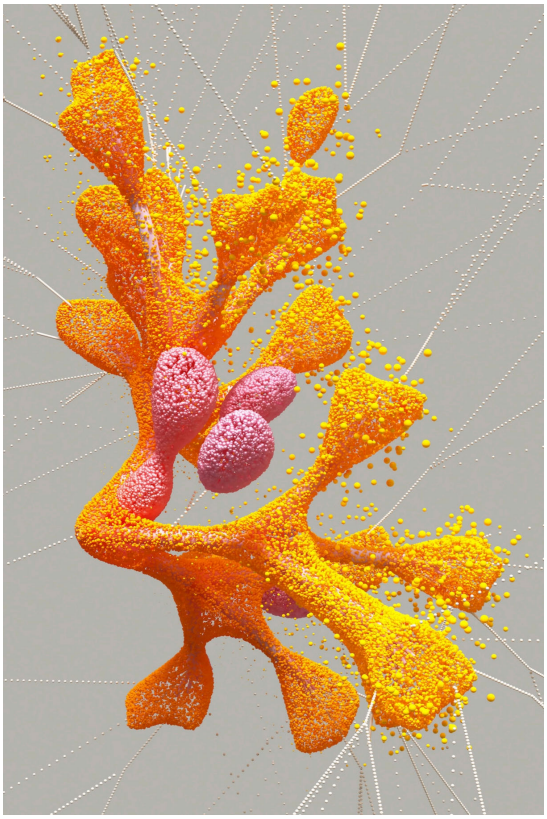
Digital Twins for Engineering Applications Event

The Emerging Science and Technology

Wednesday 7 June, Isaac Newton Institute (INI)

This Open for Business event is part of an INI programme on the mathematical and statistical foundation of future-driven engineering and aims to bring together the community to discuss the latest research and innovation in digital twinning for engineering, providing an opportunity for networking and help foster cross-disciplinary connections.

If this sounds of interest to you, follow the links to sign up for the event and see the full days agenda.



Quaisr Raises $3.1 Million to Develop Digital Twins for Industry

Data-Centric Engineering Researchers Professor Omar Matar, Dr Indranil Pan and Dr Lachlan Mason teamed up with Professor Richard Crastor, Imperial's Dean of Natural Sciences to set up Quaisr back in 2020. Quaisr founders set out to develop an easier and more cost-effective approach that enables multinationals to harness the power of digital twins, buolding the modular infrastructure components for the full digital-twin lifecycle.

Quaisr has now raised $3.1 million to further develop its work on digital twins. The money will be used to expand the team, with a focus on software engineering and business development.

To read the full Turing News piece, follow the link here.

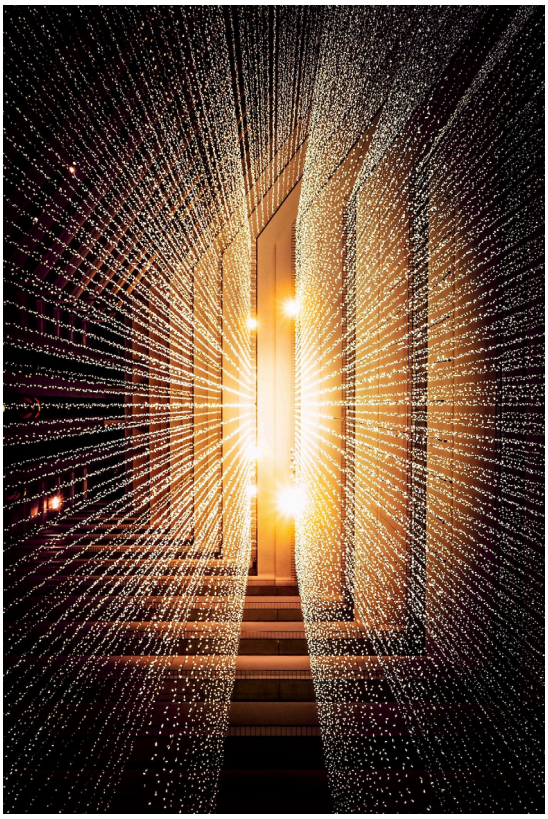
Distance-Based Methods in Machine Learning

Workshop 27-28 June 2023, UCL

Distance-based methods represent a varied and extensively used set of techniques for performing statistical learning by minimising the distance or discrepancy between probability distributions. One key advantage of distance-based techniques is that the resulting model's properties are dependent on the underlying distance selected. Crafting distances that encode desirable properties, such as stability and robustness, is a promising area of research.

This workshop will cover a broad range of statistical and machine learning methods, so if this sounds of interest to you, be sure to secure your place now!

Submission Deadline - 1 June 2023
Registration Deadline - 23 June 2023



Publication Hightlight

Epigenetic opportunities for evolutionary computation

Royal Society Open Science, May 2023

Sizhe Yuen, Thomas H. G. Ezard & Adam Sobey

Evolutionary computation is a group of biologically inspired algorithms used to solve complex optimization problems. It can be split into evolutionary algorithms, which take inspiration from genetic inheritance, and swarm intelligence algorithms, that take inspiration from cultural inheritance. However, much of the modern evolutionary literature remains relatively unexplored. To understand which evolutionary mechanisms have been considered, and which have been overlooked, this paper breaks down successful bioinspired algorithms under a contemporary biological framework based on the extended evolutionary synthesis, an extension of the classical, genetics focused, modern synthesis. The framework shows a gap in epigenetic inheritance for evolutionary computation, despite being a key building block in modern interpretations of evolution. This leaves a diverse range of biologically inspired mechanisms as low hanging fruit that should be explored further within evolutionary computation and illustrates the potential of epigenetic based approaches through the recent benchmarks in the literature.

To read the full open access article follow the link here.

DATA-CENTRIC ENGINEERING

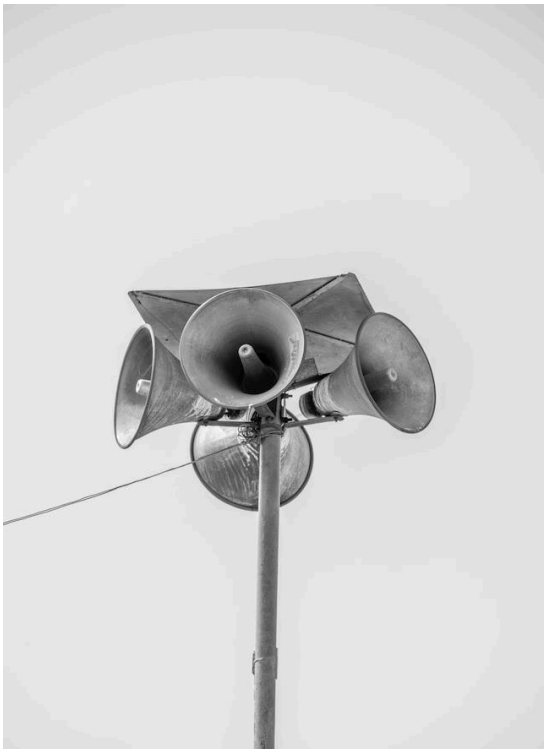
Data-Centric Engineering Journal

Call for Papers!

Machine Learning for Control Systems Engineering. *Submission deadline 23 June 2023.*

Don't miss your chance to be a part of this Special Edition of the DCE Journal, looking to include work exploring the use of AI and machine learning to improve automation in engineering. This special issue will highlight work which is impactful in areas such as control systems theory, process automation, and reinforcement learning for Engineering applications.

For more information on topics of interest and submission guidelines, please follow the link here.



Publication Highlight

A physics-based domain adaptation framework for modeling and forecasting building energy systems - *April 2023.*

Zack Xuereb Conti, Ruchi Choudhary & Luca Magri

IThis paper addresses generalization limitations with traditional data-driven modeling methods applied to building energy forecasting by introducing a transfer-learning approach that combines physics-based lumped-parameter models in the form of linear state-space models (SSMs) and unsupervised reduced-order modeling methods. Instead of learning black-box models whose generalizability to forecast for unobserved timesteps depends wholly on the representativeness of underlying dynamics in the data, our aim is to leverage the governing structure of low-rank SSMs in a domain adaptation framework. SSMs are well established for building energy forecasting and control purposes and are straightforward to derive from well-known energy transfer ordinary differential equations.

To read the full open access article follow the link here.

Events

Physics-informed Machine Learning (Φ-ML) Meets Engineering Seminar Series: upcoming dates (online)

25 May, 13:00-14:00 - Dr. Qiaofeng Li, Promoting data-efficiency of deep learning for dynamical systems

8 June, 13:00-14:00 - Dr. Jordi Bolibar, Universal Differential Equations for glacier ice flow modelling using ODINN.jl

20 June, 13:00-14:00 - Prof. Alessandro Golkar, title TBA

22 June, 13:00-14:00 - Mathis Bode, title TBA

How to join, talk abstracts and future details on future seminars.

Jobs

DCE jobs at the Turing

Please see the top of the newsletter for information about the Theme Lead posts currently advertised for the DCE Programme.

Additionally, don't forget to check the Turing's recruitment page for positions available within other programmes and within the business team.

DCE jobs elsewhere

Process Systems Engineer / Data Scientist, Intermediate/Senior

Quaisr is currently recruiting for a Process Systems Engineer / Data Scientist to aid in their mission to unlock interactive digital twins. They are in the process of building out an industrial platform that empowers engineers and research scientists to solve pressing problems in energy efficiency, product design and reliability. With a customer base of early-adopter multinational organisations in the fast-moving consumer goods, defence, energy, and insurance sectors.

Full Details

Please e-mail Alice Budden with any external opportunities you wish to be circulated in future DCE Newsletters.

Notifications

Communicating about your project

The DCE programme is always looking to communicate the impact of its projects and research activity. If your project is achieving some interesting real-world applications or impact and you are interested in communicating this to a wider audience please contact Alice Budden. The Turing hosts a Blog and a Podcast and publishes regular Impact Stories on activity. The Turing Communications team can also help support you on any related media activity.

Attribution in Publications

A reminder that all publications resulting from work on the programme should acknowledge the Lloyd's Register Foundation and The Alan Turing Institute Data-Centric Engineering Programme or the AI for Science and Government funding as appropriate. More detailed information can be found under 'Acknowledging the Turing in Publications' on the Turing Intranet, or by contacting publications@turing.ac.uk.

Updated Office Access

The Institute's offices are now fully open. The different spaces have been configured to support different types of working:

First floor: This is the collaboration hub of the Turing and is intended for project/team working, training, workshops, group meetings, presentations and visitor hosting.

Second floor: This space supports individual working at standard desking/workstations in a traditional office environment. Additionally, there is a signposted area to the rear of the office for quiet working. Please refer to the floor plan to identify this area.

Fourth floor: We have meeting rooms located on this floor, please refer to the floor plan for further information. Our colleagues at ARIA now exclusively use the office space on this floor.

Further details and office floor plans can be found on Mathison.

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