

CA115 Digital Innovation Management Enterprise

Week 9: Academic Research Structures

2022-03-07

Dr. Niall McMahon

These notes will be posted to Loop.

Academic Research

Academic Research > The Innovation Ecosystem

- **Academia:** research and teaching. i.e. universities and technical institutes.
↑ ↓
- **Industry:** research, development and deployment.
↑ ↓
- **Government:** finance and enterprise support. Research and development in government laboratories.

Academic Research > Pathway

Often, university lecturers conduct research as well as teaching. **Good research and good teaching often go together.** A traditional route for academics is:

- Undergraduate and (possibly) postgraduate **taught student**.
- **MSc** and/or **PhD** research candidate.
- **Postdoctoral researcher** (often called a **research fellow**).
- **Lecturer** (Assistant Professor/Associate Professor/Professor), who also conducts research *or* **researcher** (Research Fellow/Senior Research Fellow / Research Professor) who sometimes teaches.

Academic Research > Teamwork

You need to teams to achieve things at scale and academic research is no different. While many researchers work alone, most work as part of team. Teams often form organically when academics with similar interests meet. The different types of team include:

- **Research Groups:** these are **small teams** usually in a single *school*, e.g. School of Computing.
- **Research Centres:** these are **larger teams, usually with special status** in the institution, often spanning schools. Often with significant funding and dedicated staff. Some research centres span several institutions.

Academic Research › Famous Research Centres ›
MIT CSAIL - Computer Science and Artificial Intelligence Laboratory



Image from [MIT's CSAIL](#). 2022.

Academic Research › Innovation ›
MIT CSAIL

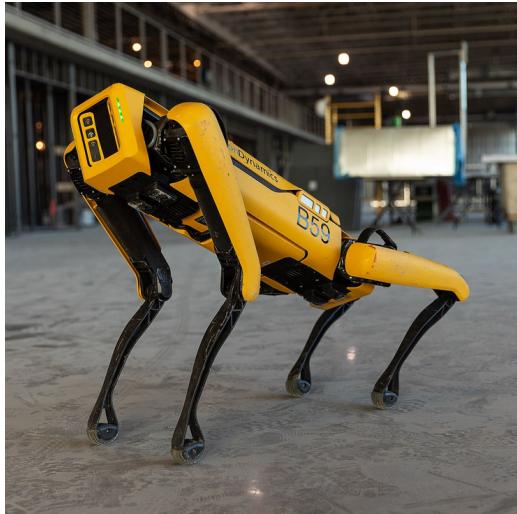


Image from [MIT's CSAIL](#). 2022.

Academic Research › Innovation ›
MIT CSAIL

- [Akamai](#): online routing, handling some 30% of web traffic.
- [Boston Dynamics](#): robots including Spot and Atlas. Owned by the Korean [Hyundai](#) and [Softbank](#), a Japanese company with a [300 year business plan](#).
- [Dropbox](#): the file transfer company.
- [iRobot](#): pioneered Roomba robotic vacuum cleaners. Their business story is an interesting one.
- [Meraki](#): owned by Cisco. Known for cloud managed routing and IT systems.
- [RSA Security](#): the famous encryption system.

**Academic Research > Innovation > MIT CSAIL >
iRobot**



My battered but fully functional 2014 Roomba. I think of it as an R2D2.

**Academic Research > Innovation > MIT CSAIL >
iRobot**

On a side-note, iRobot was criticised for data collection a few years ago. However, **my old standalone Roomba is excellent.** It's built for a **long life** with:

- **Repairable** mechanisms.
- **Modular components** that are easy to change out.
- **Easy to access** internals.

I'm able to make small repairs easily. This product, considered in isolation, is on a sustainable track.

**Academic Research > The Innovation Ecosystem >
iRobot**

- **MIT CSAIL:** (Academia) provided the environment for the formation of iRobot.
↑ ↓
- **iRobot:** (Industry) established in 1990 by MIT roboticists.
↑ ↓
- **DARPA:** (Government) funding received in 1998.

Research in DCU

Research in DCU > School of Computing > Centres

- [ADAPT](#) - AI-driven Digital Content Technology.
- [Insight](#) - SFI research centre for data analytics.
- Also [Lero](#) and, until recently, [NCLT](#) and [Sci-Sym](#). Major elements of the NCLT and Sci-Sym were incorporated into the two large research centres.

Research in DCU > ADAPT > Overview

AI-driven Digital Content Technology

Our research vision is to pioneer new forms of proactive, scalable, and integrated AI-driven Digital Content Technology that empower individuals and society to engage in digital experiences with control, inclusion, and accountability.

Institutions involved are [TCD](#), [DCU](#), [UCD](#), [TUD](#), [NUIM](#), [MTU](#), [NUIG](#), and [AIT](#).

74 researchers in DCU. 116 in TCD.

Research Themes

1. Personalising the user experience.
2. Interacting with global content.
3. Managing the global conversation.
4. Transforming global content.
5. Understanding global content.

Research Topics (1)

(Pretty broad. Main DCU interests highlighted.)

- | | | |
|---|---|---|
| <ul style="list-style-type: none">• MT.• Image and video processing.• NLP.• VR/AR. | <ul style="list-style-type: none">• Social media content analysis.• Machine learning.• Multimodal interaction.• Digital content management.• Personalisation. | <ul style="list-style-type: none">• Deep learning.• Search and information retrieval.• Ethics and privacy.• Knowledge management and extract.• FinTech. |
|---|---|---|

Research Topics (2)

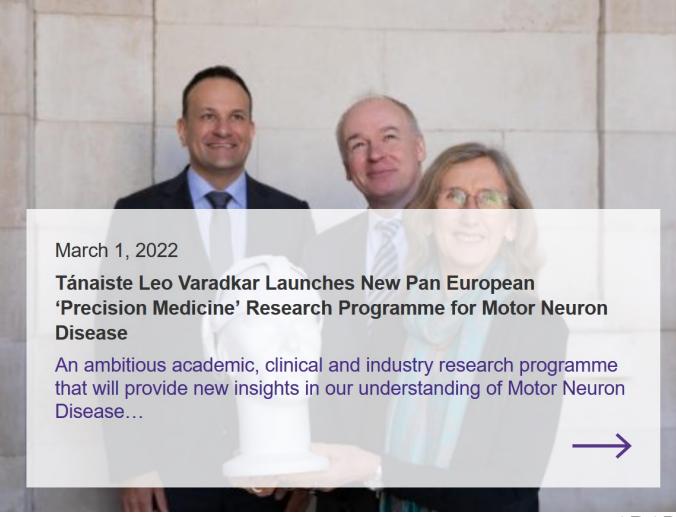
- AI.
- Sentiment analysis.
- Neural networks.
- Multimedia content summary.

DCU Research Topics

- AI: speech and gesture recognition.
- Personalisation: in learning environments.
- VR/AR.
- Ethics and privacy.
- NLP: active learning, statistical NLP, crowd-sourced annotation.
- Machine translation.

Activities

The collage consists of three separate news items arranged vertically. Each item has a small image at the top, followed by a date, a title, a brief description, and a purple arrow pointing right.

- March 1, 2022**
Tánaiste Leo Varadkar Launches New Pan European 'Precision Medicine' Research Programme for Motor Neuron Disease
An ambitious academic, clinical and industry research programme that will provide new insights in our understanding of Motor Neuron Disease...

- February 17, 2022**
ADAPT PI to Lead 'Smart Hangar' Project for Defence Forces

- February 14, 2022**
Work and Wellbeing: New Research Addresses Impact of Social Disconnection on Hybrid and Remote Workers


ADAPT News.

Research in DCU > Insight > Overview

*Insight is an SFI research centre in **data analytics**. We support 450 researchers across areas such as the Fundamentals of Data Science, Sensing and Actuation, Scaling Algorithms, Model Building, Multi Modal Analysis, Data Engineering and Governance, Decision Making and Trustworthy AI.*

Institutions: [DCU](#), [NUIG](#), [UCC](#), [UCD](#), [NUIM](#), [TCD](#), [UL](#).

Research Themes

1. **Health and Human Performance.**
2. **Enterprise and Services.**
3. **Smart Communities and IoT.**
4. **Sustainability and Operations.**

DCU Research

1. **Preservation of sports games:** motion capture and video analysis for sport games.
2. **Social media research:** understand sentiment towards brands, events and personalities.
3. **Personalised dementia care:** digital reminiscence therapy multimedia content.
4. **People's activities and behaviour:** automatic classification of events using life-logging data.
 - [Lifelogging for Memory Retention](#), Dr. Cathal Gurrin.
 - [Automated vehicles and the problems of unpredictable people](#), Dr. Suzanne Little.

More at the [Insight Centre website](#).

Research in DCU > Lero > Overview

Lero, the Irish software research centre.

Institutions include [UL](#), [DCU](#), [TCD](#), [UCD](#), [NUIM](#), [NUIG](#), [UCC](#), [DkIT](#), [MTU](#), [WIT](#) and [LIT](#).

Lero's research programme comprises *systems* (what is built), *methods* (how it's built) and *context* (how it is implemented in the world).

Research Themes and Topics

- Connected autonomous vehicles
 - Health, wellbeing & human
 - Performance
 - Smart communities/cities
 - GovTech
 - FinTech
 - AgriTech & food
- 1. Methods and Standard for High Integrity Systems
 - 2. Autonomous and Adaptive Systems
 - 3. Software Performance
 - 4. Security and Privacy

Research in DCU > NCLT > Overview

NCLT: National Centre for Language Technology. (This centre is inactive as of 2022.)

The National Centre for Language Technology is based in the [School of Computing](#) in [Dublin City University](#). The Centre carries out basic and applied research in the areas of machine translation, natural language parsing, grammar induction, question answering, sentiment analysis, computer-aided language learning, software localisation, speech recognition and speech synthesis. Its researchers are drawn from the [School of Computing](#) and collaborate with researchers in the [School of Applied Languages and Intercultural Studies](#) and the [School of Electronic Engineering](#). The Centre is affiliated with the [Centre for Next Generation Localisation](#)

Research in DCU > Sci-Sym > Overview

Sci-Sym: Centre for Scientific Computing & Complex Systems Modelling. (This centre is inactive as of 2022.)

The Centre for Scientific Computing & Complex Systems Modelling (SCI-SYM) is a centre of excellence for researchers working in high performance computing (HPC) applied to computational and mathematical models for complex systems in engineering, natural and applied sciences.

Research

- 1. Bioinformatics and Microscopic Biosystems
- 2. Social, Economical and Environmental Systems
- 3. Complexity and Computation in Physics
- 4. Theoretical Approaches and Methodologies in Complexity