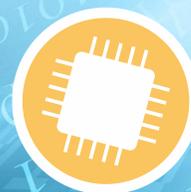


LIV.INNO

Welcome to our Data Science Summer School

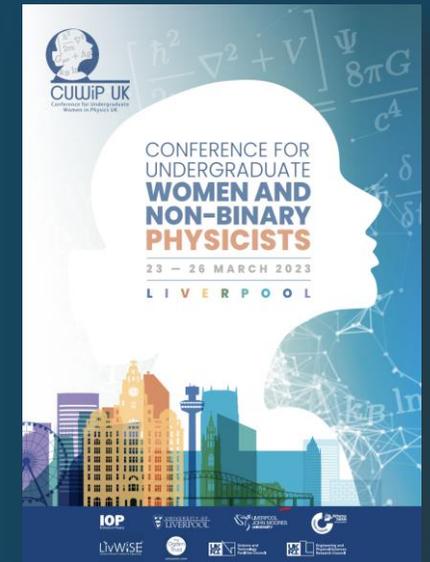
Prof Dr Carsten P Welsch, Director



Training environment



- Liverpool has outstanding track record in postgraduate training
- Cohort-based training in data science, research and innovation, complementary skills, and courses offered by partners
- Inclusive environment that offers some unique opportunities for LIV.INNO students



LIV.INNO Skills School

LIV.INNO

| LIV.INNO Introductory Skills School, Liverpool | | | | | |
|--|--|---|---|--|---|
| | Monday | Tuesday | Wednesday | Thursday | Friday |
| 9:00 - 10:00 | Introduction <i>Carsten P. Welsh</i> Paired Introductions: Participants generate flip chart poster of interview partner then present them to whole group. | Introduction to project management <i>Fistral Training and Consultancy Fraser Robertson</i> Stakeholder analysis Milestones Deliverables Task schedule Risk assessment Breakdown structure/network diagrams/Gantt chart | Presentation skills Participants give 5-minute presentation in small groups about their PhD projects All presentations will be video recorded Feedback by: presenter, fellow students and tutor | Introduction to peer review <i>Eva Vilella Figueras (tbc)</i> | Outreach project presentations <i>chaired by Carsten P Welsh</i> (Followed by Questions) |
| 10:00 - 10:45 | | | | Outreach project planning Independent teamwork Teams work on the project according to their plan. Chairs meeting Each team report to panel with project idea and structure. | Peer review preparation |
| COFFEE BREAK | | | | | |
| 11:00 - 11:45 | Presentation skills <i>Carsten P. Welsh</i> | Applying these to your PhD/research project | | Independent teamwork Teams work on the project according to their plan. | Peer review Teams present assessment and feedback |
| 11:45 - 12:30 | Basics of research presentations – an introduction to the Do's and Don'ts of conference presentations. | | | International collaboration | Forward planning of own PhD project |
| LUNCH | | | | | |
| 13:30 - 14:30 | Science communication <i>(speaker tbc)</i> Focus on writing for the general public. | Independent teamwork Teams to work on their outreach projects applying presented methodologies. | Tour of the Cockcroft Institute | Managing your PhD <i>Alex Hill (tbc)</i> A personal look back, working online and hybrid. Tips and tricks. | End of school |
| 14:30 - 15:15 | The writing process and structure Thinking about the audience Tips | | | Independent teamwork Produce proposal Create presentation | |
| COFFEE BREAK | | | | | |
| 15:30 - 16:15 | Science communication (cont.) | Teamwork (cont.) | 16:00 Transfer to Team Sport Karting | COFFEE BREAK Teamwork (cont.) | |
| 16:15-17:00 | Introduction to outreach project <i>Naomi Smith</i> | Mental health awareness <i>(UoL mental health team, speaker tbc)</i> | Team Sport Karting | Submission of final proposal | |

Wednesday: Visit of the Cockcroft Institute, bus transfer in the morning | Thursday evening: Formal dinner.

LIV.INNO

Feedback

The feedback from participants on individual sessions was very good

- The presenter, the organisation of the content, the level of interest, the clarity of the session aims, and the relevance were all evaluated.
- The average score for each of these different areas was at least 4 out of 5 averaged across all the different sessions.

Some sessions scored particularly highly

- Project Management session
- Presentation Skills session held at Daresbury Laboratory
- Both averaged over 4.5 / 5 over all areas evaluated.



MSCA Info Day in Brussels



- European Commission organizes a briefing day for Coordinators of new MSCA Doctoral Networks
- Last year's event took place on 8 and 9 November in Brussels and was streamed to more than 1,000 project coordinators, managers and researchers. It included a session to raise awareness on networking opportunities and potential synergies between projects.
- I was invited to talk about my experience in fostering networking and synergies, the additional opportunities for project partners and fellows that have arisen from these collaborations, and examples taken from our experience with LIV.INNO and the EuPRAXIA Doctoral Network.

Research environment



- LIV.INNO focuses on innovation in STFC science and industry applications.
- Well-aligned with institutional DIGITAL research themes, benefiting from Virtual Engineering Centre, new £12M Digital Innovation Facility, and LJMU's robotic telescope.
- Wider impact through placements, outreach symposium, and "*DataAid*".

Impact on research community



- > 20 International Schools...leading to this Data Science Summer School!
- > 30 Topical Workshops on focused R&D areas for 30-120 experts;
- International Conferences and Symposia

Partnership & engagement

- Long-standing collaboration between UoL and LJMU
- Strategic partnership with STFC Daresbury and the Hartree Center
- Strong links with research centres and SMEs.

Partners co-define PhD projects, act as co-supervisors and mentors, and provide important input to LIV.INNO management.



Support for LIV.INNO



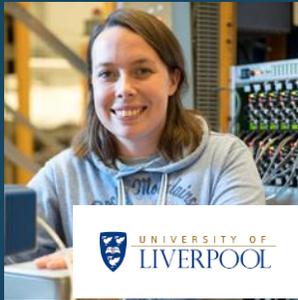
- Excellent commitments from partners and universities:
 - Large number of studentships confirmed;
 - Fantastic placement opportunities and joint projects;
 - Bespoke student areas and training spaces;
 - Centre Manager and admin support.
- Almost a dozen LIV.INNO students have started this year!



2024 Data Science Summer School

| | | | | | | |
|---------------|----------------------|--|---|--|--|---|
| 9:00 -10:00 | | Welcome Carsten Welsch (UoL) Julie Sheldon, LJMU Naomi Smith (UoL) | Lecture: AgenticAI for Data Analysis (Boris Boliet, Cambridge University) | Lecture: Open source science and making an impact (James Nightingale, Newcastle University) | Lecture: Graph Neural Nets, Application of AI to Sports (Zhe Wang, DeepMind) | Lecture: Bioinformatics and the Curse of Dimensionality (Euan McDonnell, UoL) |
| 10:00 - 10:30 | | Coffee break | Coffee break | Coffee break | Coffee break | Computer competition (Coffee in parallel) |
| 10:30 - 12:30 | | Parallel sessions: 1. Practical Guide to Data Engineering with Focus on Apache Spark (Hartree) 2. Practical Guide to Machine Learning with data collection and preparation (Hartree) 3. Practical guide to Neural Networks (Hartree) | Parallel sessions: 1. How to make ultra-fast predictions with neural network emulators (Boris Bolliet, Cambridge University) 2. GIT workshop (Joao Bento, LJMU) 3. Clustering and Data Visualisation Algorithms for Astrophysics (Adam Knowles & Dharmesh Mistry, LJMU) | Parallel sessions: 1. Probabilistic programming with PyAutofit (James Nightingale, Newcastle University) 2. SWIFT-HEP (Eduardo Rodrigues, UoL) 3. Publishing code (Ed Bennett, Swansea University) | Parallel sessions: 1. Simulated project scenarios – Real-world challenges in data science (NHS Engand) 2. Foundational AI: Into the World of Large Language Models and Transformers (Naimuri) 3. Object Oriented Python (Ed Bennett, Swansea University) to Performant numpy | |
| 12:30 - 13:30 | | Lunch | Lunch | Lunch | Lunch | Lunch |
| 13:30 - 14:30 | | Parallel sessions: 1. Practical Guide to Data Engineering with Focus on Apache Spark (Hartree) 2. Practical Guide to Machine Learning with data collection and preparation (Hartree) 3. Practical guide to Neural Networks (Hartree) | Lecture: (Machine) Learning to create artwork and quantum fields (Pavel Buividovich, UoL) | Free afternoon | Industry session Confirmed speakers: Alice Morris (the Guardian), Sarah McDonald (Dogs Trust), Jonny Pearson (NHS England), Selina Dhinsey (Multiverse), Adam Ruby (KPMG Liverpool) | Prize giving and goodbye by 14:30 |
| 14:30 - 15:30 | | 2. Practical Guide to Machine Learning with data collection and preparation (Hartree) 3. Practical guide to Neural Networks (Hartree) | Lecture: Self-supervised learning in Astrophysics (Anna Scaife, University of Manchester) | | | |
| 15:30-16:00 | | Coffee break | Coffee break | | Coffee break | |
| 16:00 - 17:00 | | Poster Session 1 | Poster Session 2 | | Industry panel (finish by 4.30pm) | |
| 17:00 - 18:00 | | | | | | |
| Evening event | Welcome drinks - 6pm | | Public Talk: Artificial Intelligence and Aliens (Anna Scaife) - 6.00pm | Astronomy evening with Liverpool Telescope - 8pm | Conference dinner - 8pm | |

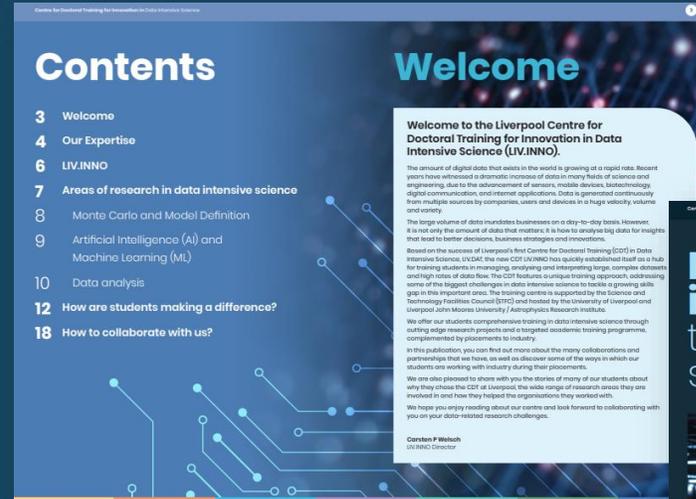
LIV.INNO Seminar Series



LIV.INNO Seminar Series: 2023/24

- **Dr Saskia Charity:** High performance computing in the muon g-2 experiment at Fermilab
- **Prof Ilya Kuprov:** Reverse-engineering deep neural networks
- **Dr Hsiang-Chih Hwang:** How does neural network help reveal the mass of (nearly) all the stars
- **Dr Yuan-Sen Ting:** Can Artificial Intelligence Generate Meaningful Scientific Hypotheses?
- **Dr Parisa Rashidi:** AI and Pervasive Sensing: The New Frontier in Acute Care
- **Prof Shannon Vallor:** Building a Responsible AI Ecosystem: Lessons from the Past and Future of Responsible Research and Innovation
- **Dr Katy Clough:** Numerical simulations of spacetime and the role of HPC
- **Dr Fabian Ruehle:** Rigorous results from machine learning
- **Dr Verena Kain:** AI for Particle Accelerators – Trends and CERN's vision

LIV.INNO Brochure



- The LIV.INNO brochure outlines the Centre's expertise and explains how data science impacts everyone's lives.
- It is used to encourage new partners to engage with the CDT.

<http://tinyurl.com/livinno-brochure>

LIV.INNO Showcase

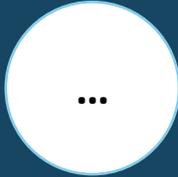
Hilton Hotel, Liverpool, 16 September 2024

<https://indico.ph.liv.ac.uk/event/1664/>

For PhD students, supervisors, and (most importantly) industry partners for a deep-dive into data-intensive science, and to find out about LIV.INNO projects and the work of our PhD students.

Opportunities for:

- **Collaborative Research:** Meet potential collaborators from the Department of Physics at the University of Liverpool to solve business challenges through collaborative research and development.
- **Research Support:** Access specific research knowledge and support to address research problems in data science.
- **Talent Recruitment:** Meet prospective data science talent for recruitment.
- **Industry Internships:** Learn about the opportunities our students have for industry internships and placements/



Summary and Outlook

- Fantastic **Data Science Summer School** ahead of you – many thanks to our lecturers and the local organizing team!
- Data Science is all about collaboration – establish new links with students and experts working in similar area to yourselves!
- **LIV.INNO Showcase** on Monday, 16 September as an opportunity to engage with our center: <https://indico.ph.liv.ac.uk/event/1664/>
- **LIV.INNO Symposium** on Friday, 10 July 2026 to communicate R&D results.

Enjoy!

LIV.INNO

