STFC Astronomy and AI Summer School – Timetable

Time (BST)	Wed 03 July ONLINE **Astronomy and AI – where are we now, and what is the future?**	Mon 08 July ONLINE **Big Questions stimulus and introductions**	Tue 09 July ONLINE **A multidisciplinary arena**	Wed 10 July HYBRID **Welcome to LASAR at CCCU**	Thu 11 July CAMPUS **Research future of knowledge / Public engagement activities**	Fri 12 July CAMPUS **Research future of knowledge / Outreach activities**
09.30-10.45	**Online Event** 09:15-15:30 *Hosts: Berry Billingsley, Marc Sarzi, James Pearson* *Organised by James Pearson (The Open University)*	**Opening Session: GenAI Skills and Epistemic Insight*** *Workshop Lead: Berry Billingsley* We will discuss what the strengths and weaknesses of GenAI are for astronomers as a tool for writing, knowledge-creation, networking, critical thinking, etc, and discuss 'what is epistemic insight'. We then give GenAI a road-test through a number of activities. We will review the practical activities that will be presented to school students on Friday to encourage them to embrace their diverse perspectives on life and step into the shoes of being an astronomer in the era of GenAI.	**Review and agenda-setting for Day 2** *Berry Billingsley and Mina Cullimore*	Time for travel / project work	**Guide to promoting yourself and your research** *Berry Billingsley, Sam Clarke, Elfneh Bariso* A guide for journalistic writing, e.g., creating a webpage or blog to promote your expertise and your research to the public. Followed by a practical task to create a blog or article for our journal (will be loaded onto Zenodo) about you – your research and your perspectives on an expert topic.	**Schools on campus** *Berry Billingsley and Elfneh Bariso* The schools are doing activities with GenAI. Expert group with them are researching the possibility that the next big discovery comes from a classroom, where students are adept at using GenAI to think like astronomers about Big Questions.
11.00-12.15		**Practical interlude** 11.00-17.00 During this time, you are invited to workshop with GenAI - to explore the future from your own position as an astronomer today - and/or to try out the student activities to adapt them to work well for you.	**Thinking about astronomy and art – virtual spaces – and how to share ideas and pics with the team** *Mina Cullimore* May also include information for those travelling here tomorrow.		**Preparing for tomorrow's outreach activity "Becoming an Astronomer"** *Joe Shimwell*	**"Becoming an Astronomer" and VR experience** *Marc Sarzi, Zuri Gray, Sharron MacKenzie, Martin Watts* Year 9s and 10s – 'Becoming an Astronomer' and space station with VR goggles.
12.15-13.15			Lunch Break		Lunch Break	Lunch Break
13.15-14.30			**Cultural views of astronomy and archeoastronomy** *Elfneh Bariso and Kevin Walsh*	**Explainable AI (XAI): AI for tomorrow's scientific computing*** (HYBRID) *Kostas Sirlantzis*	**Workshop on augmented reality (AR) in preparation for tomorrow**	**AR escape room activities** *Berry Billingsley and Elfneh Bariso*

14.45-16.00			**Working with GenAI and your tutor** *Will Beckwith-Chandler and Kevin Walsh*	**The future of AI** (HYBRID) *Philippe de Wilde*		**Year 10 workshop** *Berry Billingsley and Elfneh Bariso* Filming day ends at 6pm, but schools and some contributors leave before this time.
16.15-17.30		**Plenary Session** 17.00-18.00 *Workshop Lead: Mina Cullimore and Berry Billingsley* In this wrap-up session for today we will discuss three Big Questions that take on new meaning and relevance in the age of GenAI: 1. Is it real or fake? 2. Can a robot (e.g. a remote telescope in space) have its own sense of curiosity? 3. What is the future of knowledge? And we'll think about ways to stimulate students' curiosity about these Big Questions in Friday's Q&A session on 'Becoming an Astronomer'.	**Power & Problems of the Search and Generative AI Scenarios*** *Ted Selker*	**Big data** (HYBRID) *Matthew Graham (online)*		
17.30			**Welcome to CCCU** (possible tour) *Mina Cullimore*	**Closing the day** (CAMPUS) *Mina Cullimore*		

***For some sessions, more details are available in the day-by-day breakdown schedule below.**

STFC Astronomy and AI Summer School – Schedule

Times are given in British Summer Time (BST).

Wednesday 03 July (ONLINE) – Online Event

Hosts: Berry Billingsley, Marc Sarzi, James Pearson

Organised by James Pearson (The Open University)

09.15-09.25 Welcome *by Berry Billingsley*

09.25-10.15 Introductory Talk *by Marc Sarzi*

10.15-10.30 Break

10.30-12.00 Panel Discussion I – What is the Future of Astronomy with AI?

Host: Marc Sarzi

Panellists: Ingo Waldmann, Xinyue Sheng, Benjamin Joachimi

12.00-13.00 Lunch Break

13.00-14.00 Talk on Generative AI *by Berry Billingsley*

14.00-15.30 Panel Discussion II – What Relevance can Generative AI have within Astronomy?

Host: Berry Billingsley

Panellists: Josh Wilde, Weiguang Cui, Kevin Walsh

Monday 08 July (ONLINE) - Big Questions stimulus and introductions

09.30-10.45 Opening session: GenAI Skills and Epistemic Insight

Workshop lead: Berry Billingsley

We will discuss what the strengths and weaknesses of GenAI are for astronomers as a tool for writing, knowledge-creation, networking, critical thinking, etc. Getting the best from GenAI means being open to thinking in new ways. We rationalise what this means in practice by discussing 'what is epistemic insight'. We then give GenAI a road-test:

- As a writing companion to co-author papers, research bids, riddles and project titles.
- As a research assistant to trawl a plethora of potential sources for useful questions, methodologies and norms of thought and boost your interdisciplinary epistemic insight.
- As a co-creator of a novel approach to discovering new knowledge in astronomy to boost your epistemic agency.
- As a stimulus for your imagination to nurture your epistemic curiosity and encourage interdisciplinary dialogue about questions we didn't know to ask.

We will review the practical activities that will be presented to school students on Friday to encourage them to embrace their diverse perspectives on life and step into the shoes of being an astronomer in the era of GenAI.

11.00-17.00 Practical interlude

During this time, from the end of the starter session until we meet again in the afternoon, you are invited to workshop with GenAI - to explore the future from your own position as an astronomer today - and/or to try out the student activities to adapt them to work well for you.

17.00-18.00 Plenary Session

Workshop lead: Mina Cullimore and Berry Billingsley

In this wrap-up session for today we will discuss three Big Questions that take on new meaning and relevance in the age of GenAI:

1. Is it real or fake?
2. Can a robot (e.g. a remote telescope in space) have its own sense of curiosity?
3. What is the future of knowledge?

And we'll think about ways to stimulate students' curiosity about these Big Questions in Friday's Q&A session on 'Becoming an Astronomer'.

Tuesday 09 July (ONLINE) - A multidisciplinary arena

09.30-10.45 A review of yesterday and setting the agenda for today
Berry Billingsley and Mina Cullimore

11.00-12.15 Thinking about astronomy and art – virtual spaces – and how to share ideas and pics with the team (Also, more information for those travelling here tomorrow.)
Mina Cullimore

13.15-14.30 Cultural views of astronomy and archeoastronomy
Elfneh Bariso and Kevin Walsh

14.45-16.00 Working with GenAI and your tutor
Will Beckwith-Chandler and Kevin Walsh

16.15-17.30 Power & Problems of the Search and Generative AI Scenarios
Ted Selker

> We are now talking to Generative AI (GenAI) systems that have general knowledge in Large Language Models (LLMs). We lay out questions by explaining the problems and how we want them framed. Generative AI responses feel natural. The socially-presented responses speak to profound user experience needs. But we are still learning how to consider computers, that, like people, respond to questions without being able to answer with a reliable persona.
>
> As well, value of aggregate knowledge of GenAI systems using Large Language Models (LLMs) has different strengths and weaknesses relative to the curated knowledge of the web. We compared product searches using ChatGPT, Google search engine, or both to help us understand more about the compelling nature of generated responses. Our probes showed the value for curated web provides for very specific, less popularly-known knowledge. Generative AI excelled at bringing together knowledge for broad, well-known and language centric topics. Emerging knowledge paradigms can help knowledge exploration in different ways.

17.30 Welcome to CCCU (possible tour)
Mina Cullimore

Wednesday 10 July (HYBRID / CAMPUS) - Welcome to LASAR at CCCU

09.30-12.15 Time for travel / project work

13.15-14.30 Explainable AI (XAI): AI for tomorrow's scientific computing (HYBRID)
Kostas Sirlantzis

> Why Explainable AI (XAI) Matters: XAI methods are revolutionizing how we understand and trust AI models. Imagine a world where complex computing systems can explain their decisions—like having a conversation with your AI assistant! XAI bridges the gap between black-box models and human interpretability. In this lecture we will discuss key concepts such as Interpretable Models, Feature Importance, Visual Explanations, and Gradient-based Visualizations.
>
> As scientific computing evolves to include Generative AI (GenAI), XAI will be its guiding star in exploring the fascinating world of interpretable (Artificial) Intelligence: the future isn't just about predictions—it's about understanding why.

14.45-16.00 The future of AI (HYBRID)
Philippe de Wilde

16.15-17.30 Big data (HYBRID)
Matthew Graham, Caltech (online)

17:30 Closing the day (CAMPUS)
Mina Cullimore

Thursday 11 July (CAMPUS) - Research future of knowledge / Public engagement activities

09.30-10.45 Guide to promoting yourself and your research
Berry Billingsley, Sam Clarke, Elfneh Bariso

A guide for journalistic writing, e.g., creating a webpage or blog to promote your expertise and your research to the public. Followed by a practical task to create a blog or article for our journal (will be loaded onto Zenodo) about you – your research and your perspectives on an expert topic.

11.00-12.15 Preparing for tomorrow's outreach activity "Becoming an Astronomer"
Joe Shimwell

13.15-17.30 Workshop on augmented reality (AR) in preparation for tomorrow

Friday 12 July (CAMPUS) - Research future of knowledge / Outreach activities

09.30-10.45 Schools on campus
Berry Billingsley and Elfneh Bariso

The schools are doing activities with GenAI. Expert group with them are researching the possibility that the next big discovery comes from a classroom, where students are adept at using GenAI to think like astronomers about Big Questions.

11.00-12.15 "Becoming an Astronomer" and VR experience
Marc Sarzi, Zuri Gray, Sharron MacKenzie, Martin Watts

Year 9s and 10s – 'Becoming an Astronomer' and space station with VR goggles.

13.15-14.30 AR escape room activities
Berry Billingsley and Elfneh Bariso

14.45-18.00 Year 10 workshop
Berry Billingsley and Elfneh Bariso

Filming day ends at 6pm, but schools and some contributors leave before this time.

STFC Astronomy and AI Summer School – Speakers

Berry Billingsley: Berry Billingsley specialises in Science Education and leads the LASAR (Learning about Science and Religion) Research Centre at Canterbury Christ Church University (CCCU). Berry's interests include Epistemic Insight, young people's engagement in science, artificial intelligence, Big Questions bridging science, religion and the wider humanities and also the communication of science and technology news in the media. Berry's first career was with the BBC where she produced and presented television and radio programmes including BBC World Service's 'Science in Action', BBC TV's 'Tomorrow's World' and BBC Education's 'Search out Science'.

James Pearson: I am an early career researcher at the Open University with a background in astronomy that includes developing deep learning methods (e.g. Bayesian convolutional neural networks) for classifying and modelling strong gravitational lenses. I am now working on developing and supporting citizen science projects, both inside and outside of astronomy, using the popular Zooniverse citizen science platform. I have been leading the work on one such project, Galaxy Zoo Cosmic Dawn, which is creating crowdsourced classifications of galaxies in images from the 8.2-metre Subaru telescope. To aid researchers in managing their own Zooniverse projects, I have also created tutorials documenting advanced project building techniques, including integrating citizen science with deep learning frameworks such as setting up an active learning cycle.

Mina Cullimore: I am a research fellow and educator, with expertise in resource development and public engagement activities for school, higher education, and community settings. My projects with the LASAR Research Centre develops the use of Big Questions to encourage interdisciplinary dialogue, through the arts, sciences, and humanities, to build and apply knowledge in wise, compassionate, and sustainable ways. As part of a recent STFC-funded public engagement project with Diamond Light Source, I have worked with scientists, teachers, and children to create multimedia resources that explore aspects of heritage, life on Earth, and astronomy.

Elfneh Bariso: I am a Senior Lecturer in Further Education and Skills in the School of Teacher Education at CCCU. I am the lead for the Math's specialist pathway and the Developing Practice Module. I also serve as an academic link tutor with partner FE colleges.

Kevin Walsh: I am Astronomer-in-Residence at Westminster School, UK and professor of Science Education, Shaanxi Normal University, PRC. My research area is Astronomy Education with a focus on ArchaeoAstronomy and Interdisciplinary Teaching and Learning. I do a lot of outreach work with the Royal Astronomical Society and am editor of the Bulletin of the Society for the History of Astronomy.

William Beckwith-Chandler: I am a third-year PhD student at the University of Exeter, studying Astrophysical Fluid Dynamics. I work within the Mathematics department studying flows and oscillations in solar prominences. My experience is predominantly in timeseries analysis and image data handling. I have recently been incorporating AI into my work for automated object detection from satellite images.

Ted Selker: Ted Selker is BayCHI Chair. He is known for demonstrating and testing new ways of using technology and designing products. He works to create and guide strategic emerging technology opportunities. Ted has helped create many companies and is a founder of Moto Carma. Ted lectures internationally on innovation/invention, design, and User eXperience. He currently holds adjunct professor positions at several universities and has been a professor at CMU and MIT Media Lab. Prior to joining the MIT faculty, he gained the title of IBM Fellow, where he directed the User Systems Ergonomics Research Lab. He has served as a consulting professor at Stanford University, taught at University of Massachusetts at Amherst and Hampshire and Brown Universities, and worked at Xerox PARC and Atari Research Labs. Ted's innovations have contributed to products including medical devices, notebook computers, operating systems, and more. His work has resulted in numerous awards, patents, and papers and has often been featured in the national and international press.

Konstantinos Sirlantzis: Konstantinos Sirlantzis is currently a Professor of Applied Artificial Intelligence with the School of Engineering, Technology and Design at CCCU. He leads the AI and Intelligent Systems Research Group. Previously, he was an Associate Professor of intelligent systems with the School of Engineering, University of Kent, where he was the Head of the Robotics and Assistive Technologies Research Group and the Founding Director of the Kent Assistive RObotics Laboratory (KAROL). He has a strong track record in artificial intelligence and neural networks for image analysis and understanding, and robotic systems, with an emphasis on assistive technologies and pattern recognition for biometrics-based security applications. He has authored over 130 peer-reviewed papers in journals and conferences. He has organized and chaired a range of international conferences and workshops.

Phillippe de Wilde: Professor of Artificial Intelligence in the Division of Natural Science of the University of Kent. I have done machine learning research for 37 years. My current projects are in machine learning for image processing. I have a keen interest in small AI models, and in the philosophy of AI.

Matthew Graham: I'm a research professor in astronomy at the California Institute of Technology and the Project Scientist for the Zwicky Transient Survey (https://ztf.caltech.edu) - I'm also a long term research in the use of machine learning in astronomy, the Vice Chair of the AAS Working Group on Data Science, and the Chair of the La Serena Data Science School, which has been running for over ten years now.

Martin Watts: After a career as a navigator in the Merchant Navy, I took a part time history degree and then a PhD (First World War) 20 years ago. Since then, I have taught with the Open University and at CCCU, where I have authored several inter-disciplinary modules.

Sharron MacKenzie: Sharron Mackenzie is the Course Director for the PGCE Secondary Course and Lead Tutor for Secondary Science at CCCU. She has been teaching science and physics for 25 years working in schools in London, Kent and Medway. Sharron also worked with the Institute of Physics for 6 years, as a Teaching and Learning Coach and Consultant on the Stimulating Physics project, supporting science departments to build confidence in their approach to teaching physics and on the Improving Gender Balance RCT project.

Marc Sarzi:

Sam Clarke:

Joe Shimwell:

Zuri Gray: Zuri Gray is a final year PhD student at the Armagh Observatory and Planetarium. Her research focusses on small bodies of the solar system, such as asteroids and comets, and uses big telescopes around the world to observe and study these celestial objects. A notable highlight of her career so far has been her roles as a support astronomer at the 2.5m Nordic Optical Telescope, a world-renowned telescope in the Canary Islands.