

Close-out

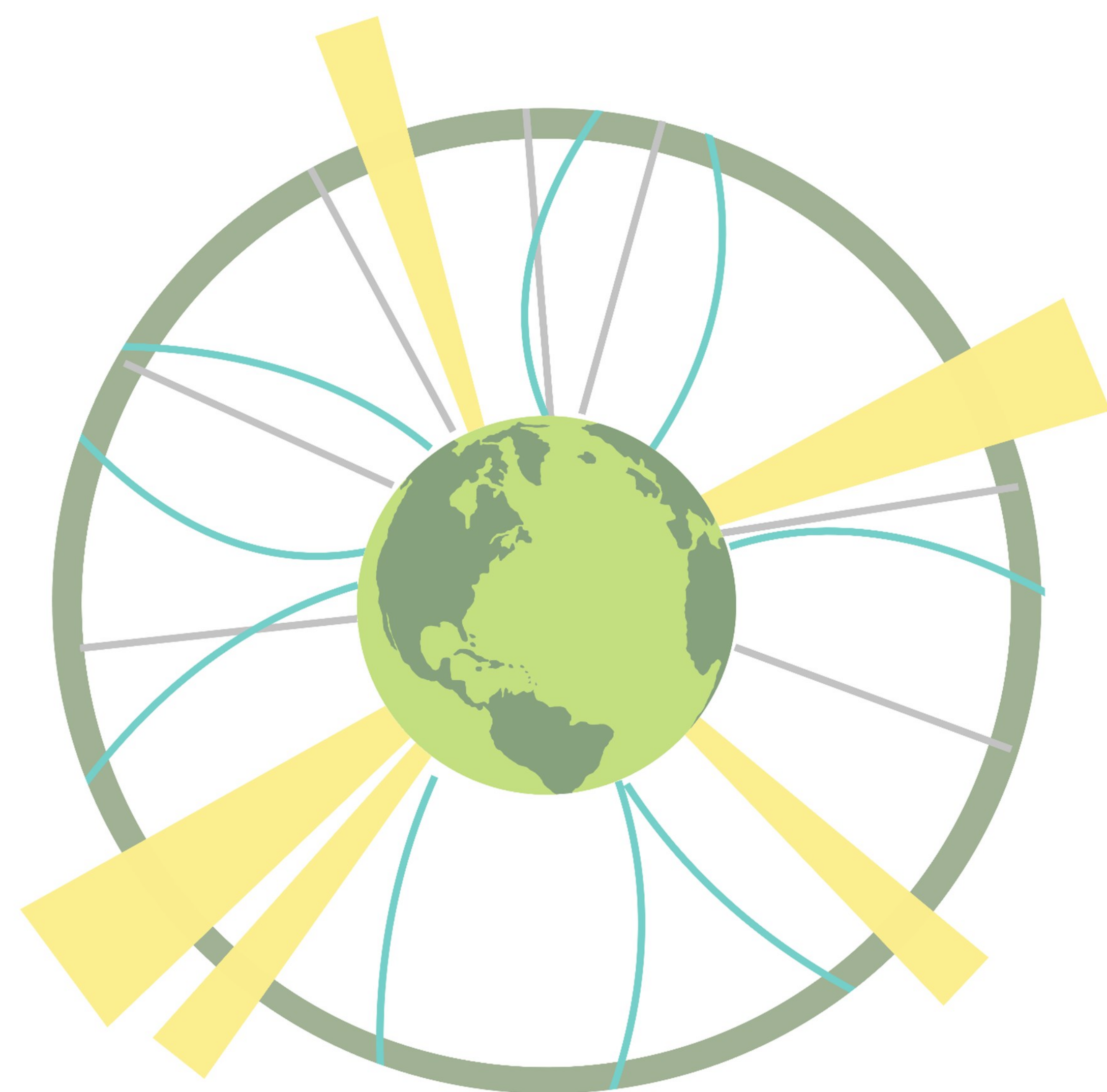
5th Edition of the

Sustainable

High Energy Physics

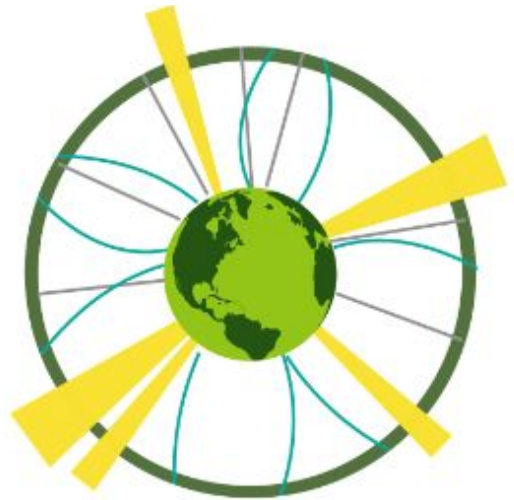
Conference 2026

8 - 10 July, 2026



Contact: [susthep26 "at" physics "dot" ox "dot" ac "dot" uk](mailto:susthep26@physics.ox.ac.uk)

Plenary talks



Dr. Jagadish Shukla



Climate Change: Science, Politics, Ethics, and Hopeful Solutions

Jagadish Shukla

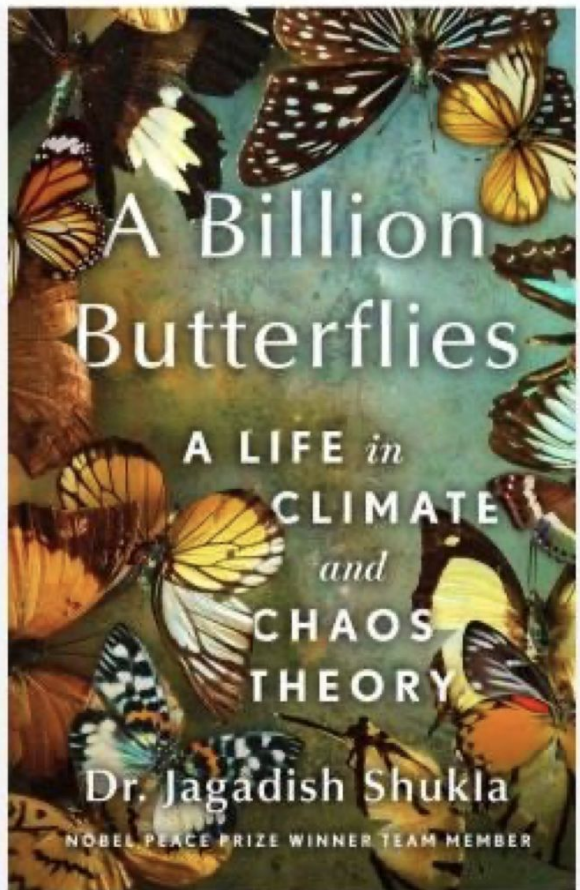
Department of Atmospheric, Oceanic and Earth Sciences (AOES),
Center for Ocean-Land-Atmosphere Studies (COLA)
George Mason University (GMU)

In spite of Chaos and the Butterfly Effect,
Seasonal Climate should be predictable

“Predictability in the midst of chaos”

Hopeful Signs for Climate Solutions

- National and International Policies and Negotiations
- Technological Advances
- Plans and Policies of Institutions and Corporations
- Individual and Collective Action



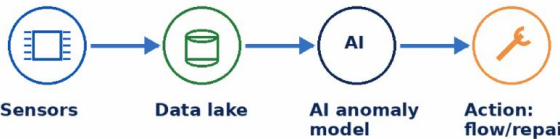
People Ask: "What Can I Do?"

- Reduce personal carbon footprint (car, house, diet, travel); Conserve energy and water
- Vote to elect climate-literate leaders
- Join protests and rallies
- Solution to climate anxiety is climate action

The Evolution of Detector Design Philosophy

- 1970s: Can we detect particles reliably?
- 1980s: Can we improve precision?
- 1990s: Can we build larger systems?
- 2000s: Can they survive the LHC?
- 2010s: Can they survive HL-LHC?
- Today: Can they survive without harming the planet?

Smart monitoring and AI-assisted gas systems



From Discovery to Sustainability:

The Green (r)Evolution of Gaseous Detectors in High Energy Physics



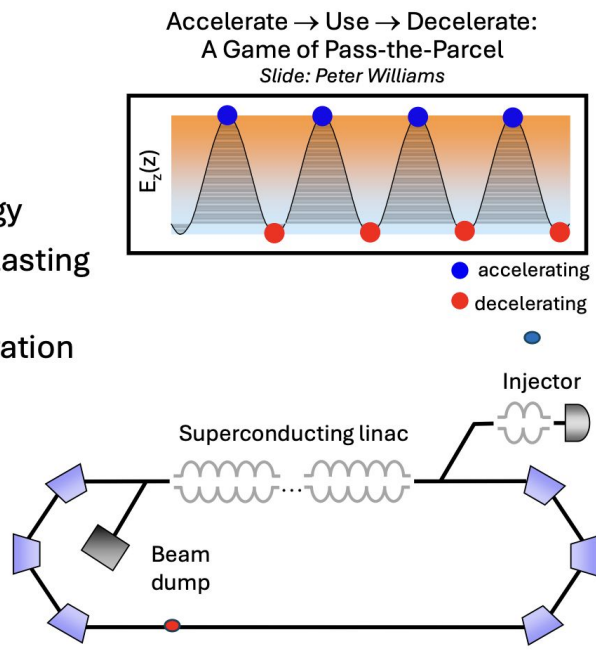
Prof. Archana Sharma

Ben Shepherd



Energy recovery

- Viable due to advances in SRF technology
- High cavity Q factors (10^{10}) enable long-lasting energy storage
- Multi-turn ERLs enable high-energy operation
 - CBETA @ Cornell: 150 MeV in 4 passes
- LHeC: ERL-based design keeps wall-plug power under 100 MW
 - PERLE: demonstrator facility under design now
- Electron-Ion Collider: ERLs to cool proton beams



Our vision for an agrifood software ecosystem



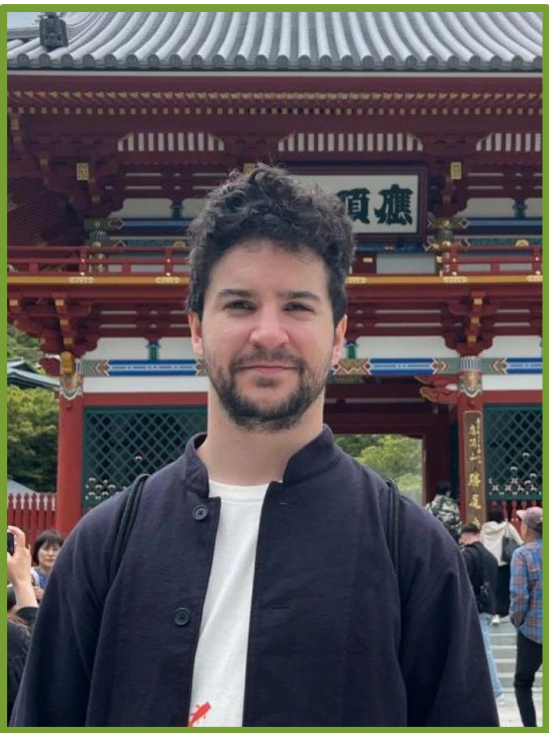
A vision for a trustable agrifood software ecosystem

From astrophysics to agrifood



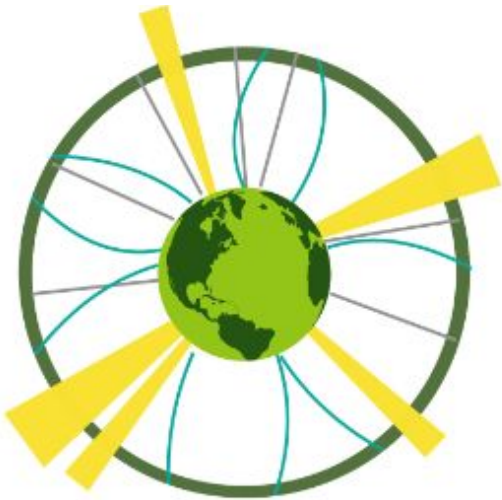
Sustainable HEP 2026

Dr. Juan Pablo Cordero
10/7/26



Dr Juan Pablo Cordero Garayar

Submitted talks



	News from SC4RC 2026	Rakhi Mahbubani
	Sustainability recommendations from the European Strategy: a historical perspective	Veronique Boisvert
	Nikhef's sustainability roadmap	Catharina Vaendel
17:00	The ULISSE Project: an Opportunity to reuse waste heat large-scale recycling	Mr William van Sprollant
	Open Event	Julie Hogan et al.
	Reducing simulation-related emissions in rare-event searches through optimized event biasing	Dr Lachlan Milligan
	Energy efficiency of a GPU-based computing system in HEP	Jiahui Zhuo
18:00	Reducing the compute used for calorimeter simulation	Henry Day-Hall

Towards Unified Power and Efficiency Monitoring Across the Worldwide LHC Computing Grid	Natalia Diana Szczepanek
Operational challenges of the Event Processing Nodes GPU-based Experiment	Federico Ronchetti
Increasing sustainability in the community of Research on Universe and Matter	Andreas Ralph Redelbach
Towards more sustainable and resilient Plate Chambers in the Compact Muon Solenoid	Joao Pinheiro
Designing the next generation of materials for rare-event searches: high-strength, ultra-pure copper-based alloys	Dimitra Spathara

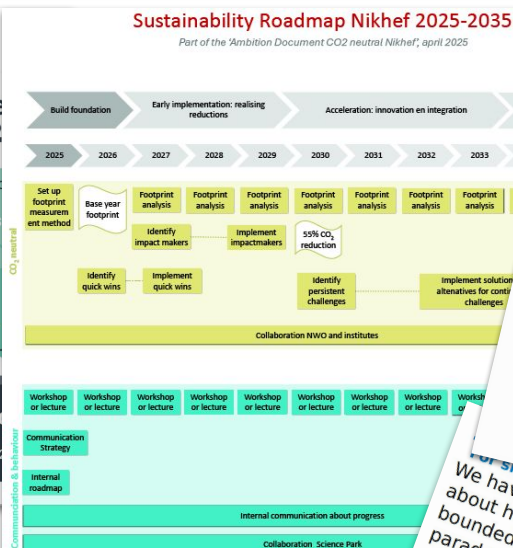
Carbon footprint assessment of the Electron-Ion Collider	Ada Collins et al.
The CH ₄ project: A Novel Approach to Methane Recovery based on CERN gas recuperation systems	Ilaria Vai
Long-Term Study on Gaseous Gas Mixtures for RPCs at CERN GIF++	Giulia Giannandrea
Ageing effects in RPC detectors with eco-friendly gas mixtures	Liliana Congedo et al.
Health Break	
Environment-friendly gas mixtures for the ATLAS Phase-2 Active Plate Chambers	Giorgia Proto
Matching sustainability and detector longevity for ATLAS RPCs HL-LHC	Sinem Simsek
Sustainable Cryogenic Infrastructure and Solid-State Millimeter-Wave Microwave Technology for Polarized Target System	Muhammad Farooq
Study of the properties of sustainable materials for shielding against ionizing radiations	Julien Faivre
Assessing Sustainability Performance in Large Research Infrastructures	Sasif
Developing a Roadmap for Sustainable Cryomodule Design	Nuno Elias
GreenPhysECS: Exploring ECS for Energy-Aware Parallel Computing	Mr Michael Sparks et al.
Life cycle assessment of the LHCb Phase-2 overall impacts & preliminary results for the HL-LHC	Mr Roman Dandoy
Carbon-Aware Scheduling for Sustainable Computing	

Why SC4RC?

PERSONAL THOUGHTS...

- Recommendations don't go as far and wide as our submitted inputs...
- But they go further than previously!
- Now the question is whether they will be implemented
- Not just by CERN
- But also by all European Labs and universities
- It is up to us to hold institutions to account
- And to individually do our parts
- Will it be enough?

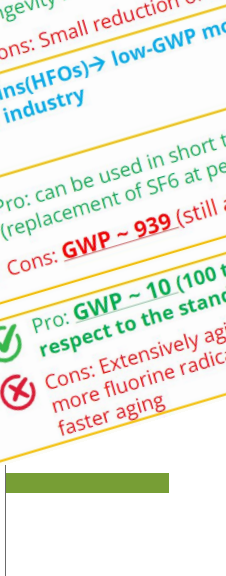
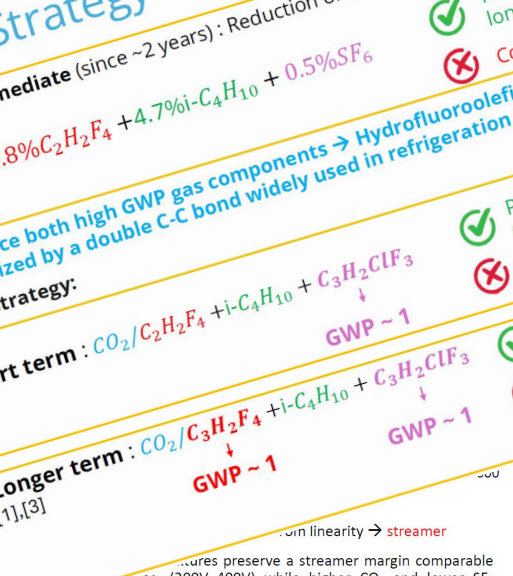
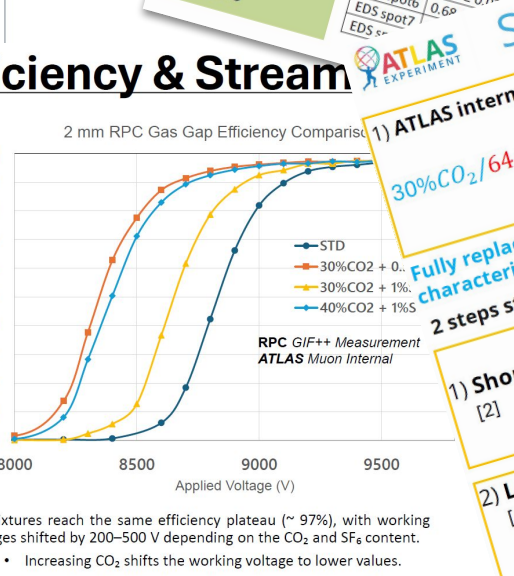
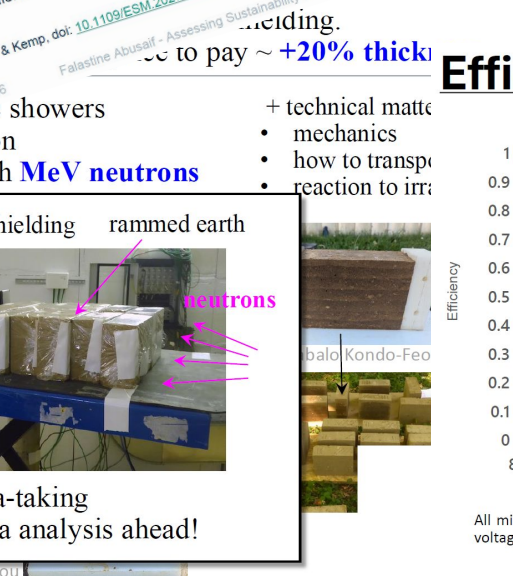
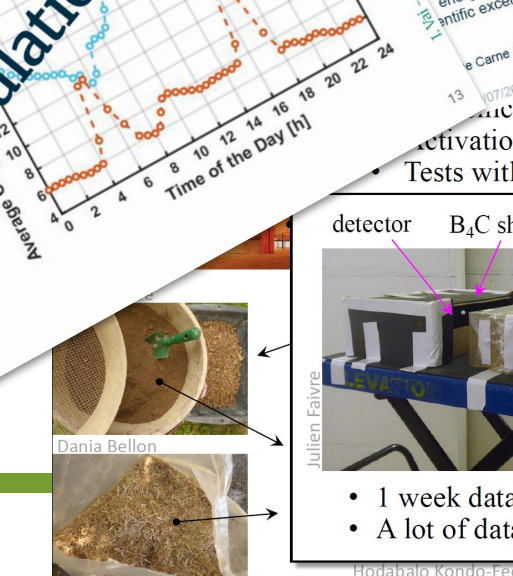
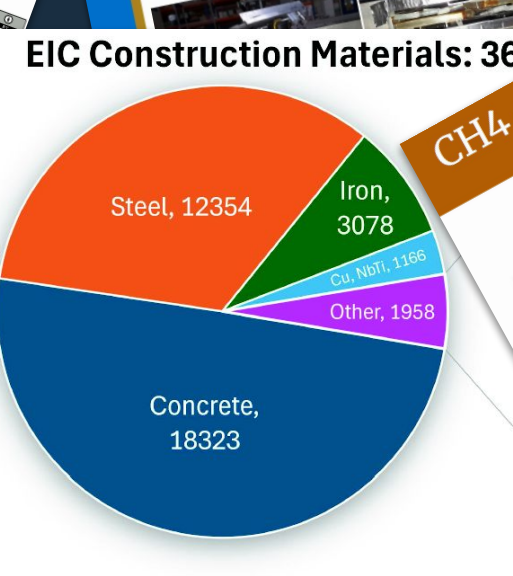
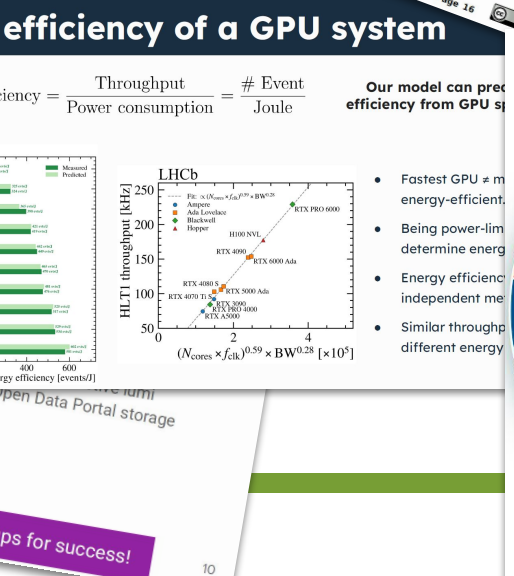
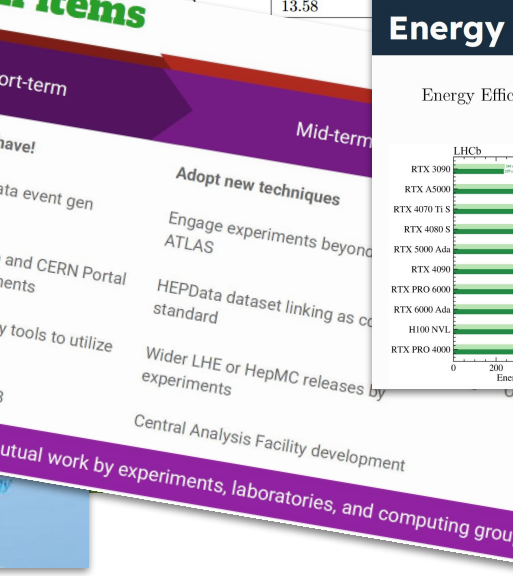
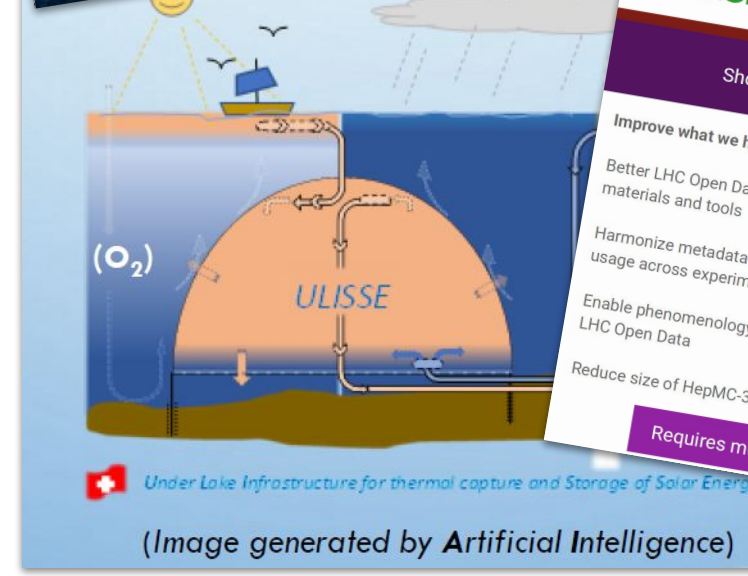
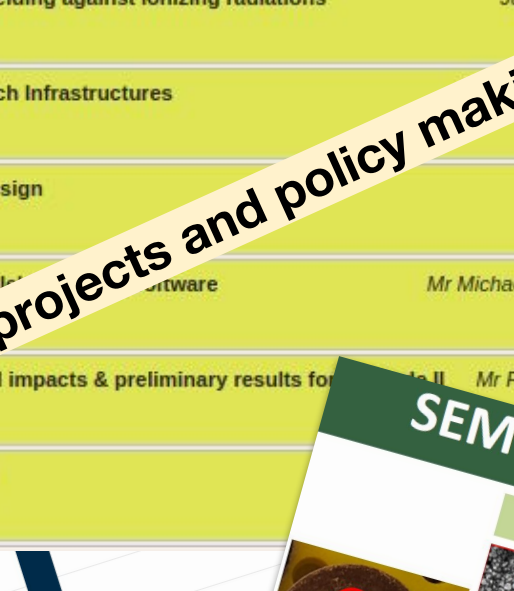
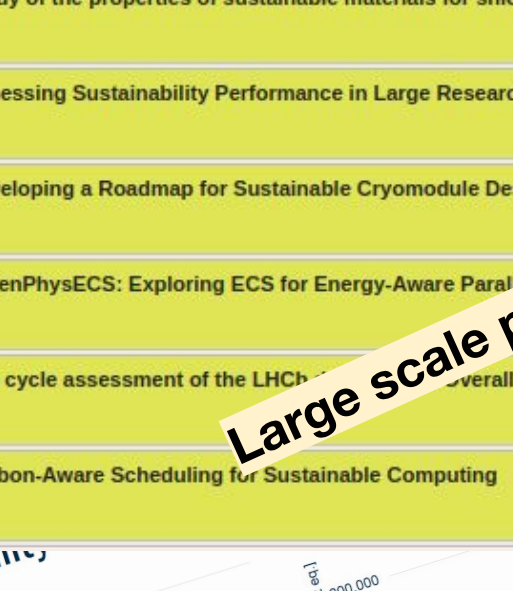
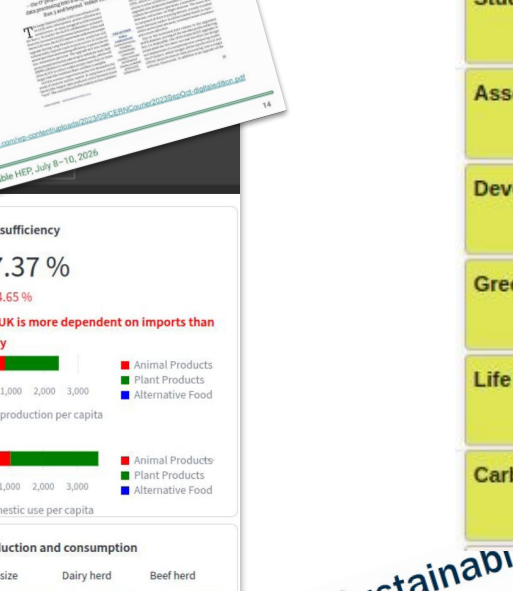
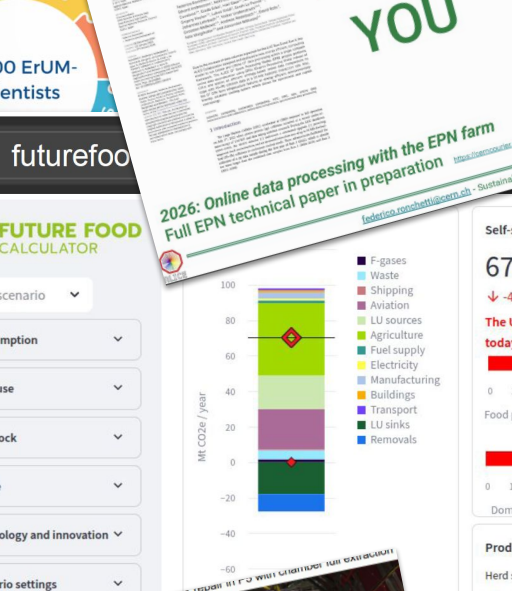
DISCUSSION/QUESTION



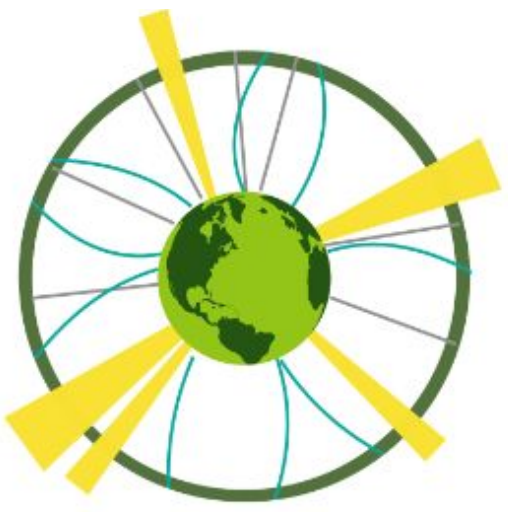
Importance of sustainability in WLCG

- HL-LHC Computing Needs:
 - Pessimistic scenario: x5 higher than in Run-3
 - Optimistic scenario: 40% higher than in Run-3
- Environmental impact of computing is strictly connected to financial savings

A better understanding of power consumption in WLCG will allow to make better, data-driven decisions.



Panel discussion

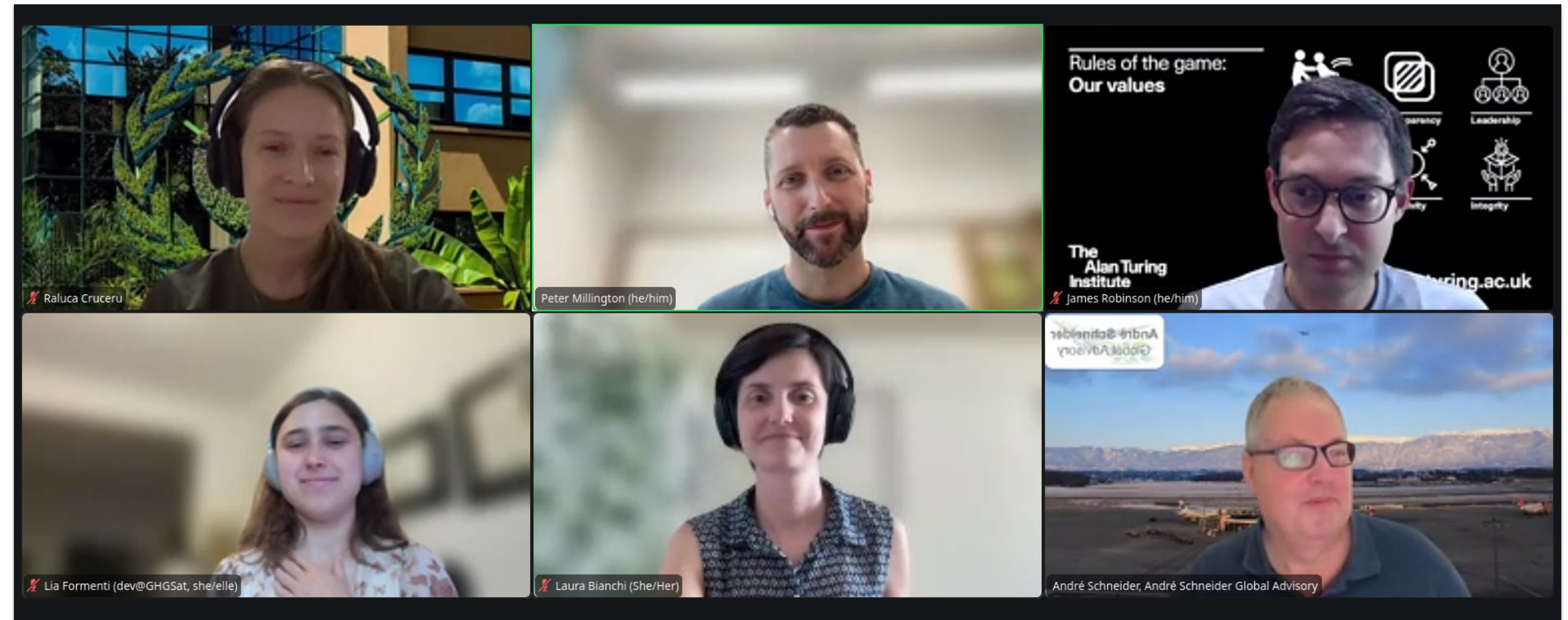


Careers from Physics to Sustainability

Bio's of our panelists

Useful links shared by our panelists:

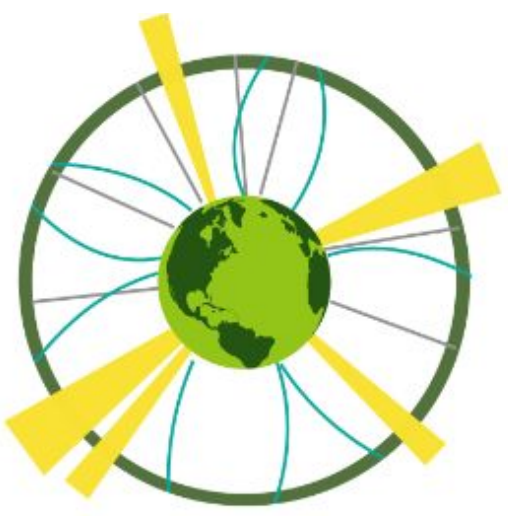
- [UN Career portal](#)
- [SDGs and MEAs strategies](#)
- [E-learning courses](#)



There are many different career paths open to those having a background in physics, including to more sustainability-related careers. These can look very different, even within the definition of sustainability-related careers, and we heard from five fantastic experiences.

“Keep curious”, there is no one career path.

Key takeaways from this conference



Prof. Jagadish Shukla



People often ask: “What can I do?”

- The most important thing we can do is **talk about climate change** and **build awareness**
- Set an example through our own efforts to reduce our carbon footprint

Meaningful change cannot be achieved through individual actions alone;
it requires **enlightened & ambitious policy changes with science+tech** and **collective action**.

- Vote to elect climate-literate leaders
- Join protests and rallies

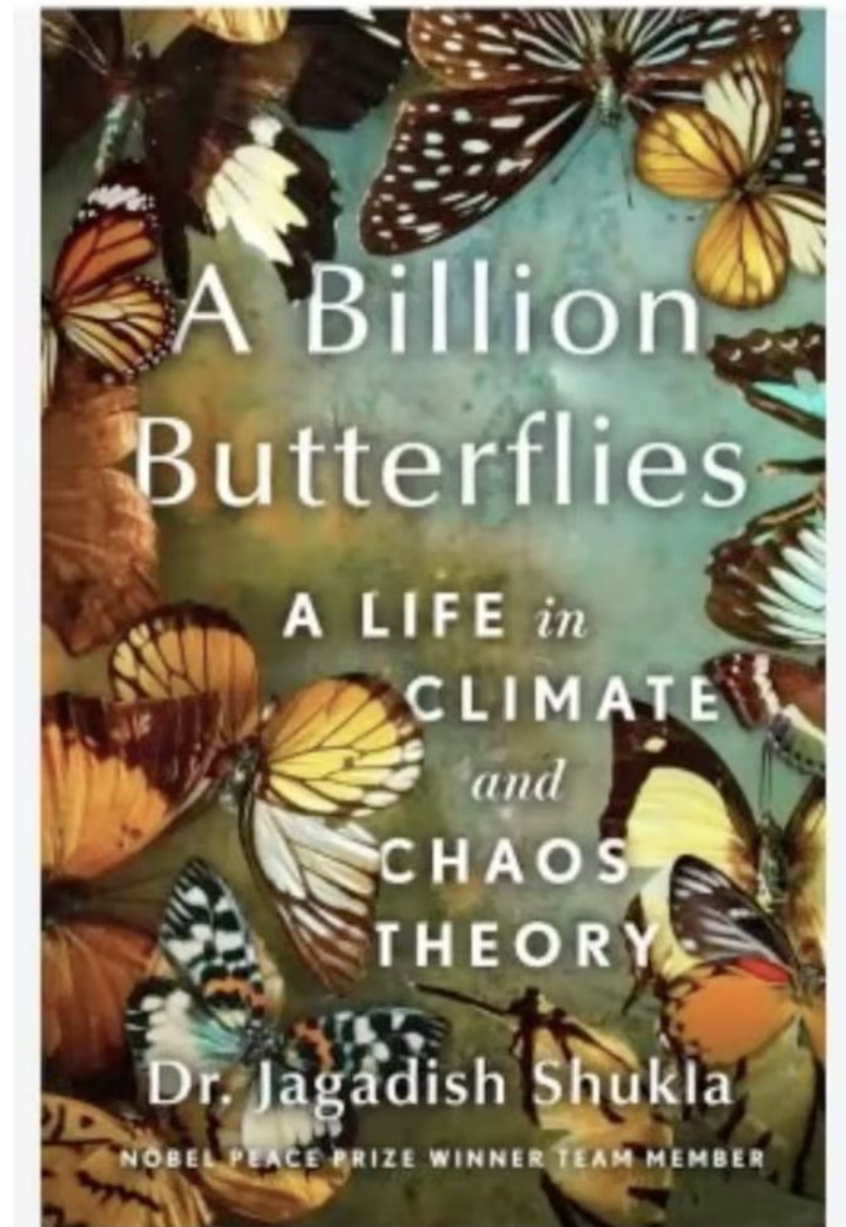
Dr Juan Pablo Cordero Garayar



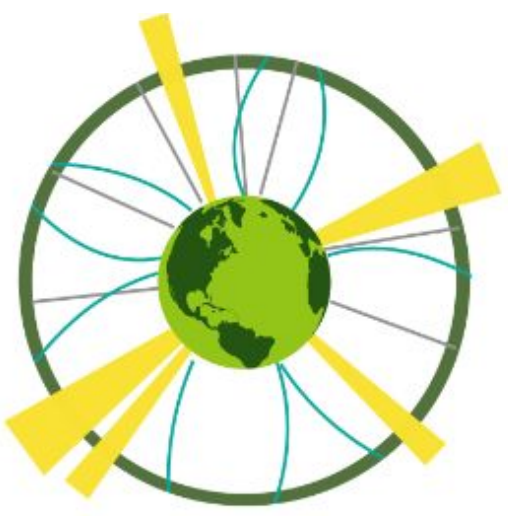
“Solution to climate anxiety is climate action”

Trustable agrifood

software ecosystem: Development of open source predictive models
to promote transparent food policy-making



Key takeaways from this conference



“Climate responsibility is entering scientific infrastructure”

SUSTAINABLE DETECTORS AND MATERIAL DEVELOPMENT



Prof. Archana Sharma

In gaseous detector systems:

- **Reduce** consumption
- **Recover** leaked gases
- **Replace** high GWP-gases
- **Redesign** systems to avoid leakage

Sustainable operation of **RPC** in the various experiment such as CMS, ATLAS, CERN EcoGas@GIF++!

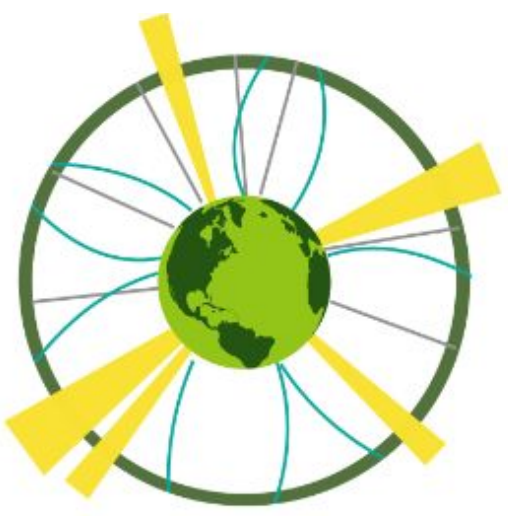
Speakers: Joao Pinheiro, Giulia Giannandrea, Liliana Congedo, Giorgia Proto, Sinem Simsek

Smarter materials design for future detector technologies, example:

- using high-strength copper alloys,
- sustainable shielding material (instead of carbon-based),
- sustainable cryogenic Infrastructure

*Speakers:
Dimitra Spathara,
Muhammad Farooq,
Julien Faivre*

Key takeaways from this conference



Ben Sheperd

The CERN Lab Directors Group (LDG) group (for large accelerators, magnets etc.)

Sustainability Panel included in 2024

Future projects such as FCC-ee, CEPC, LHeC, ILC, CLIC, C3

- Full lifecycle assessment (LCA) and LCA database
- Environmental reporting across future projects
- Sustainability must be considered alongside scientific and socio-economic value

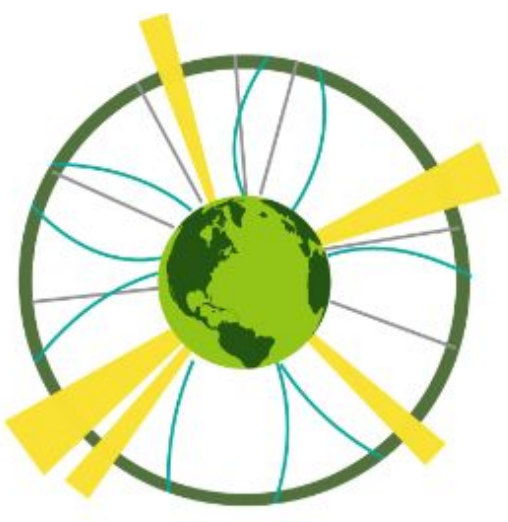
POLICY AND LARGE SCALE SYSTEMS

- The European Strategy Update (ESUPP) recommendation
- Nikhef's sustainability roadmap
- The ULISSE Project
- iSAS programme
- Electron-Ion Collider (EIC)

Speakers: Rakhi Mahbubani, Veronique Boisvert, Catharina Vaendel, William van Sprollant, Ada Collins, Ilaria Vai, Falastine Abusaif, Nuno Elias, Roman Dandoy

- How sustainability assessment for research infrastructure should be done
- News from SC4RC conference
- The CH4rLiE Project: Methane Recovery from Livestock Emission
- LCA at LHCb

Key takeaways from this conference



Optimising computing resources and improving simulation efficiency, to reduce the carbon footprint

Speakers: *Rakhi Mahbubani, Lachlan Milligan, Henry Day-Hall*

SUSTAINABLE COMPUTATION

Open event generation, smart selections & generative models

Using GPU-based computing systems

Speakers: *Federico Ronchetti, Jiahui Zhuo*

Optimising power efficiency of large-scale computing facilities:

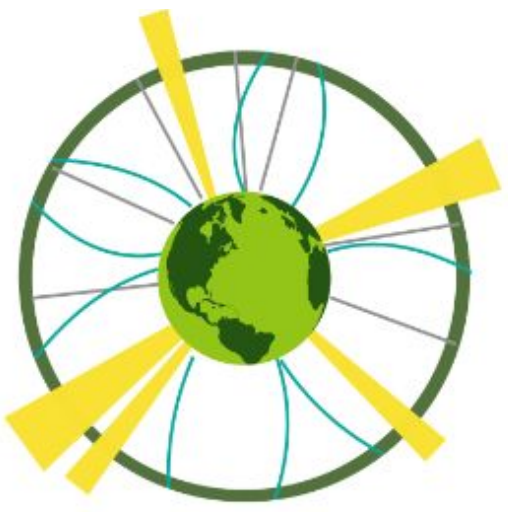
- Worldwide LHC Computing Grid (WLCG),
- Scientific community of research on universe and matter (ErUM)
- Carbon-Aware Scheduling for Sustainable Computing with ATLAS
- GreenPhysECS: Exploratory project on ECS architectural model

Speakers: *Natalia Diana Szczepanek, Andreas Ralph Redelbach, Jesica Sabau, Michael Sparks, Mattias Evans, Oluwale Delano,*



Using efficient systems in the most efficient way

Key takeaways from this conference

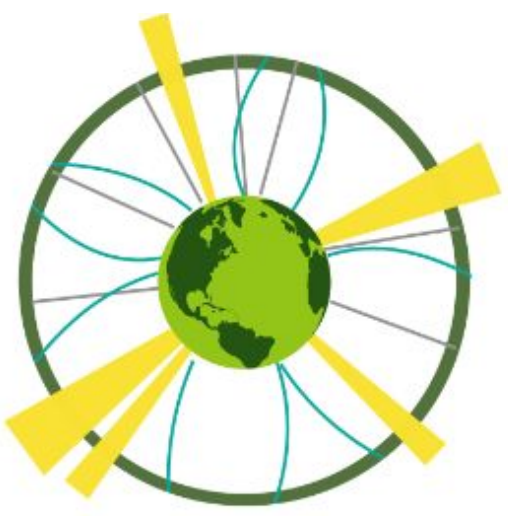


- Many varied efforts from large-scale-to-smaller projects, efforts in sustainable materials, computing, and more!
- A growing number of projects and efforts since the first edition of Sustainable HEP in 2021
- A fantastic, growing community!

Sustainability *can* be incorporated into High Energy Physics

Sustainability initiatives

[indico link](#)



- [Sustainable HECAP+ Initiative](#): Scientists in the High Energy Physics, Cosmology, Astroparticle Physics, and Hadron and Nuclear Physics (HECAP+) communities concerned about climate crisis and advocating for transition towards fairer and more sustainable practices in our fields.
 - Version 2.0 of our reflection document is [available](#).
- [Open Research Life Cycle Assessment project](#) (ORLCA): a repository of LCA data for evaluating environmental impacts in research. A new initiative still welcoming new partners!
- [CERN Alumni Sustainability Group](#) connecting current and former CERN people with a passion for sustainability
- [Plastic Fresco / Fresque du plastique](#) (also in [Switzerland](#)) to explore the issues surrounding plastic so we can take better action together
- [ULISSE@CERN](#): public event (in French) at CERN (council chamber) about the ULISSE project (discussed on Wednesday) on

16 September 2026 19:00-20:30:

"Quand les lacs alpins deviennent un atout clé de Notre Transition Énergétique"

Organisé par le CERN Solar Club (1986-2026),
en collaboration avec le CERN Alumni Sustainability Group

ULISSE@CERN

Quand les lacs alpins deviennent un atout
clé de Notre Transition Énergétique

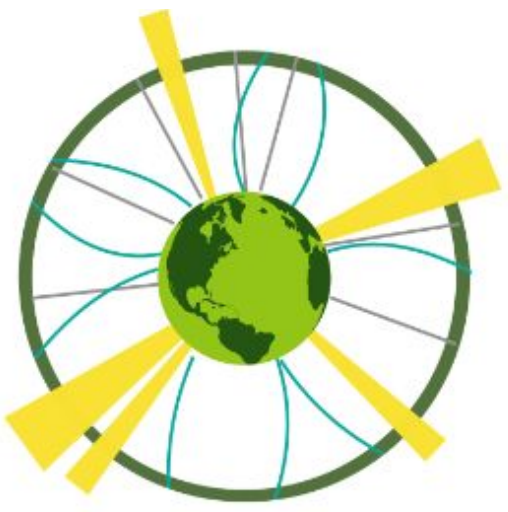
INTERVENANT	DATE ET HEURE	LIEU
William van Sprolant Cvs énergies sarl	16 sept. 2026 19:00-20:30	CERN Salle du Conseil

PRÉSENTATION SUIVIE D'UNE SÉANCE DE QUESTIONS-RÉPONSES AVEC UN PANEL D'EXPERTS
(Conférence en français avec traduction simultanée en anglais)
À l'issue de la conférence : apéritif de réseautage – Salle des Pas Perdus

CONFÉRENCE PUBLIQUE GRATUITE
INSCRIPTION OBLIGATOIRE
<https://cern.ch/conference-ulisse>

ULISSE n'est pas un projet du CERN : ses concepts ne sont pas nécessairement approuvés

Future communication



- **All sessions were recorded** and will be uploaded to YouTube as soon as possible:

- <https://www.youtube.com/@hecap-eco>

Days 1 and 2
already available!

- **Mattermost channel** for further discussion

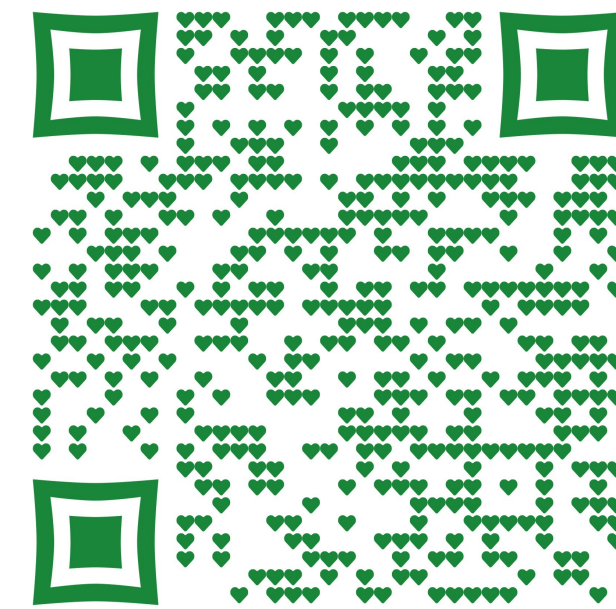
- **Linktr.ee** Sustainable HEP LinkedIn Group and social media:

- <https://linktr.ee/susthep>

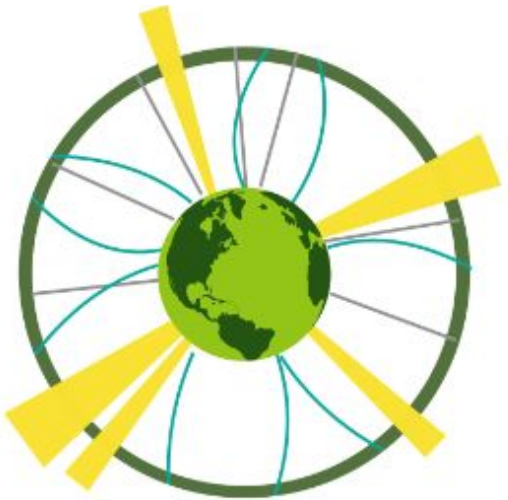
- **Feedback: help us improve Sustainable HEP**

- Please take a couple of minutes to fill this anonymous survey:

- <https://forms.gle/NVpJdFWkHVgEfRsq6>



These slides are available on the Indico schedule so that you can access the links



HISTORIC FIRST

First Published Proceedings

This edition of **Sustainable HEP** will be the very first to feature officially published proceedings!



Open-Access Partnership

All proceedings will be hosted in SciPost—a premier open-source journal platform dedicated to genuine open publishing.

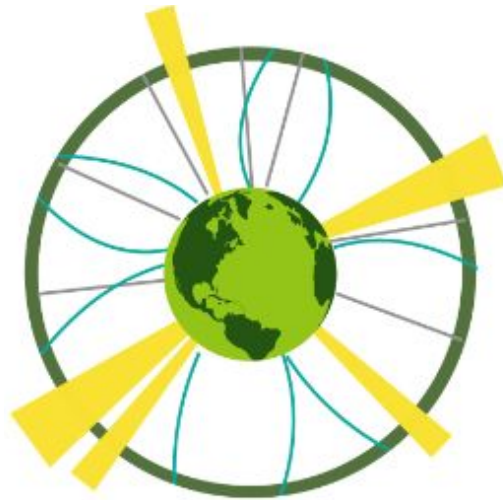
Speaker Information

Further submission details and guidelines will be sent to all speakers imminently.

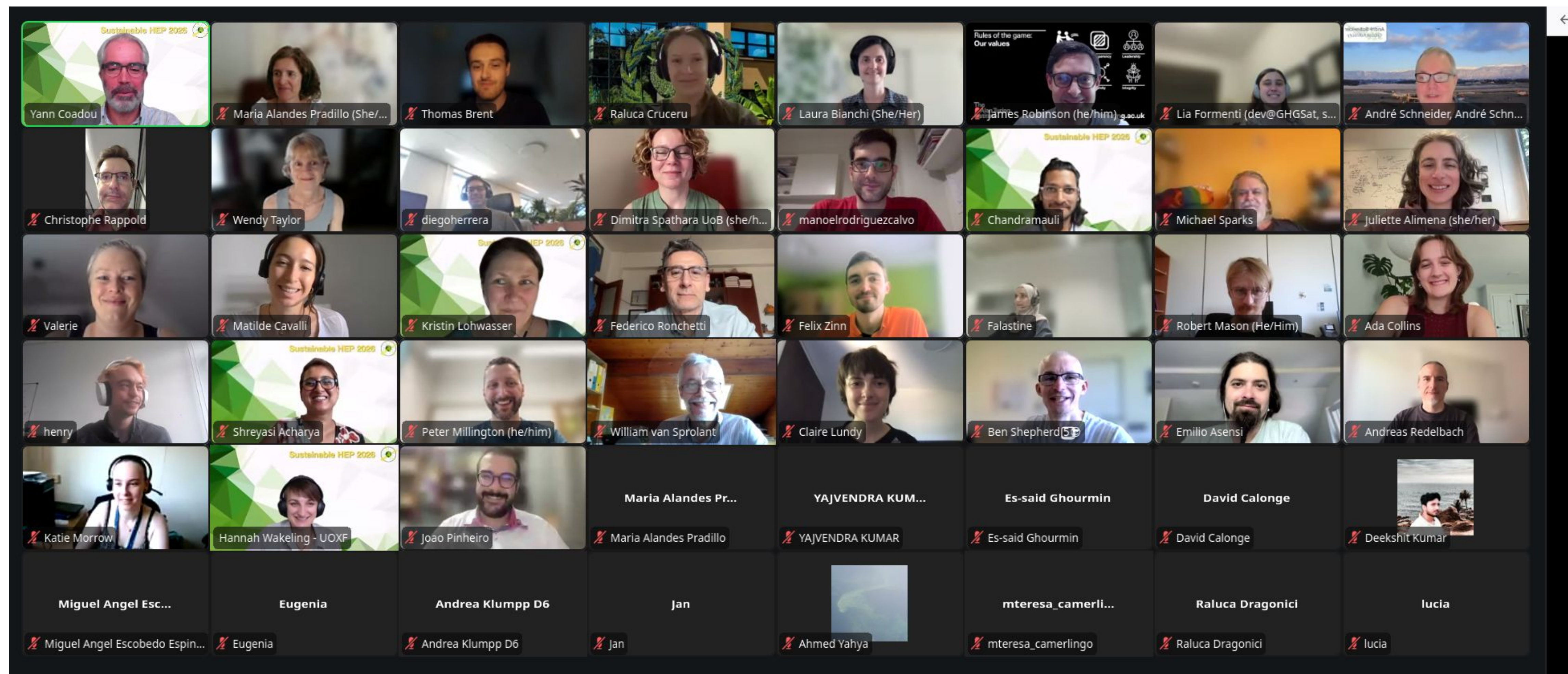
Contribution List			17:30 - 18:15
My Conference			
My Contributions			
Book of Abstracts			
Registration	19:00	Submitted talks: Sustainable detectors and material development - II	Dr Hannah Wakeling, Kristin Lohwasser
Participant List			18:15 - 19:15
Proceedings (deadline 30th September)		Health B...	19:15 - 19:30
Sustainability Initiatives		Submitted talks: Sustainable detectors and material development - III	Kristin Lohwasser, Shreyasi Acharya
Code of conduct	20:00		19:30 - 20:30
Sponsors		Submitted talks: Large scale projects and policy making - II	Dr Hannah Wakeling, Yann Coadou
SustHEP - 4th Edition			



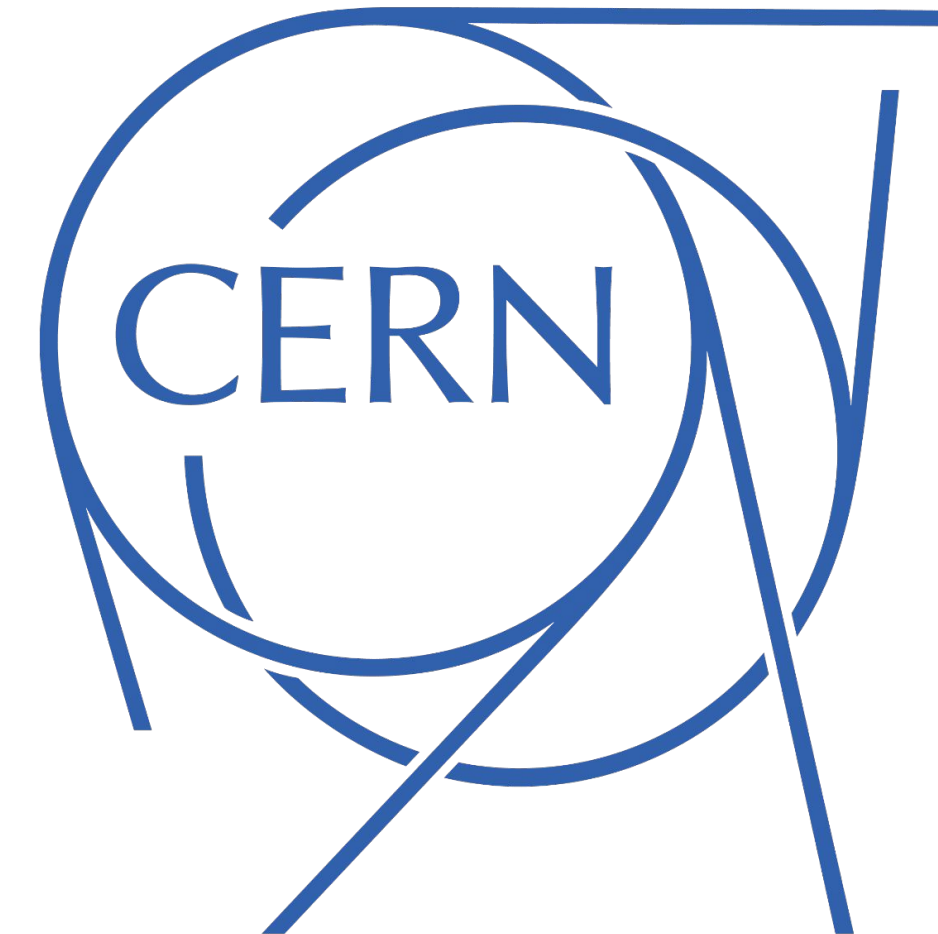
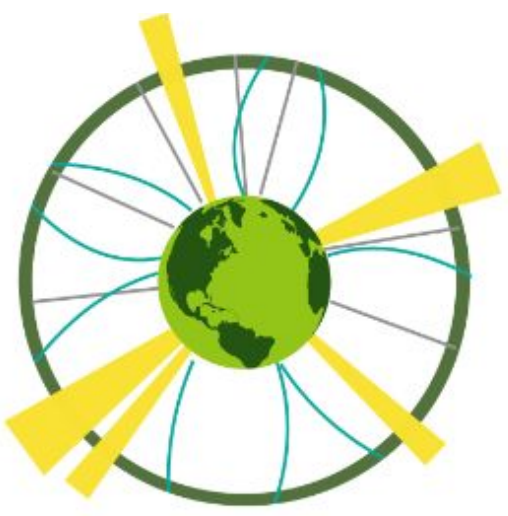
Conference photo



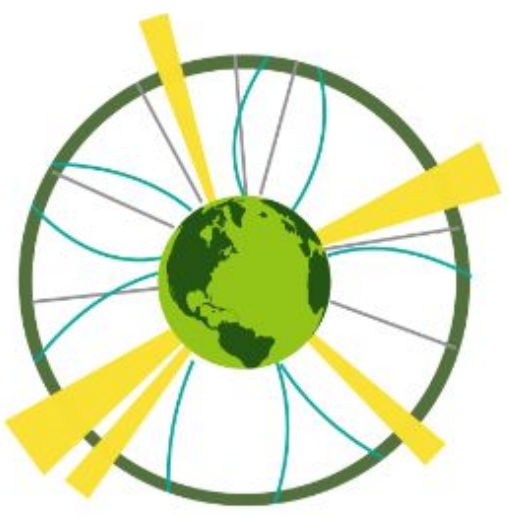
Thank you for your contributions, your participation and your questions!



Thank you to our in-kind sponsors!



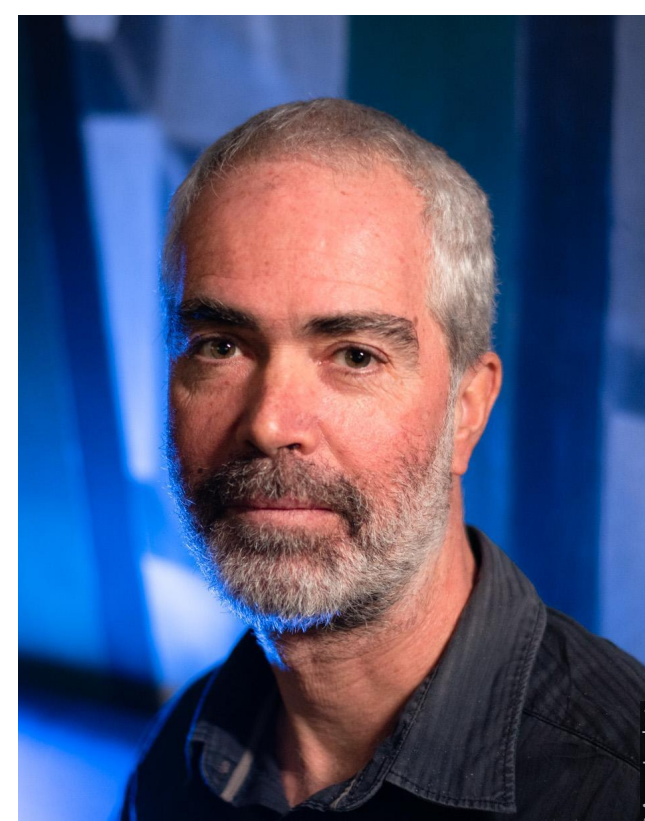
Thanks to all the Organisers



Shreyasi
Acharya



Chandramauli
Agrawal



Yann
Coadou



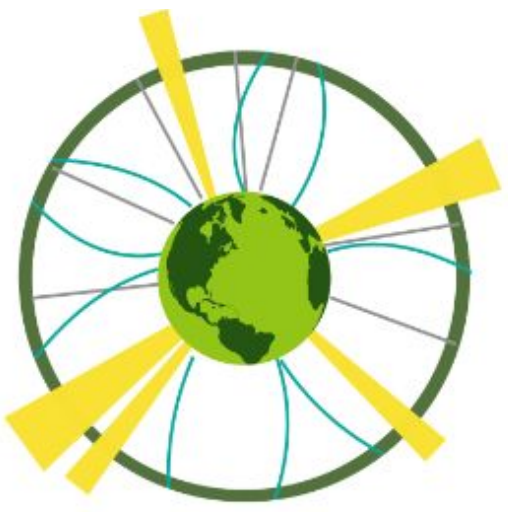
Kristin
Lohwasser



Hannah
Wakeling

Contact:
susthep26 “at” physics “dot” ox “dot” ac “dot” uk

Sustainable HEP 2027



Are you interested in adding your ideas to Sustainable HEP and
joining a great team?



You?

Would you be interested in helping us host a local hub?

**We are looking for the next organising committee for
Sustainable HEP 2027!**

Send us an email expressing your interest and any useful experience to

[susthep26 “at” physics “dot” ox “dot” ac “dot” uk](mailto:susthep26@physics.ox.ac.uk)

Finally,
Thank *you*

**We hope to see you at
future iterations of
Sustainable HEP!**

