

Welcome to UW-Madison

and to the 1st CLARIPHY Collaboration Meeting



CLARIPHY Collaboration Meeting

**Tulika Bose (University of Wisconsin-Madison), Peter Elmer (Princeton University),
Verena Martinez Outschoorn (University of Massachusetts Amherst)
Sep 14th, 2026**

Sponsored by the UW-Madison Department of Physics, the UW-Madison Data Science Institute, the FAIR0S-HEP project (NSF awards OAC-2226378, OAC-2226379, and OAC-2226380), and a donor who wishes to be anonymous

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It is everyone's responsibility to:

Conduct themselves in a professional manner free from discrimination, harassment, or retaliation

Treat each other with respect and consideration

Create a supportive and inclusive environment

VIOLATIONS WILL NOT BE TOLERATED.

Logistics

All meeting rooms are in the Pyle Center

Plenary (Mon, Tues): Room 325/326

Plenary (Wed): Room 313

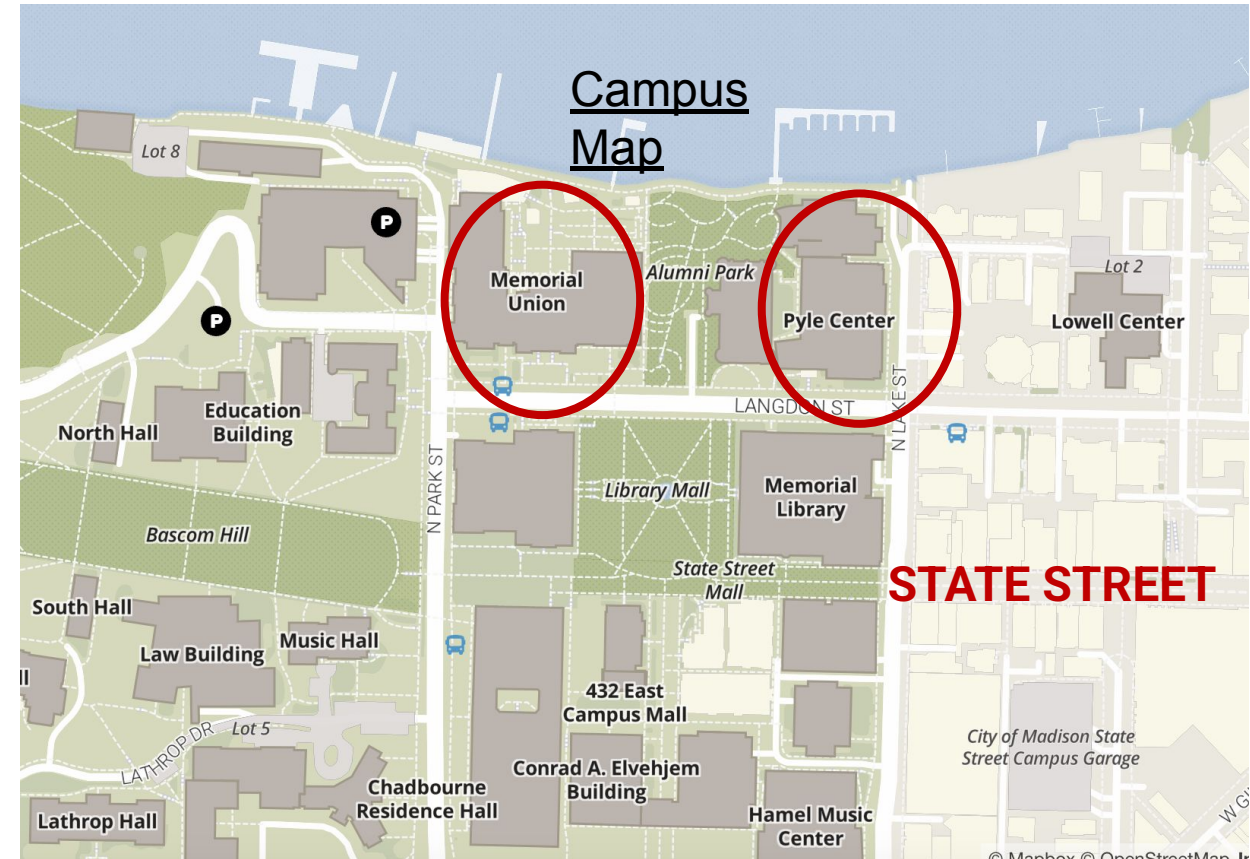
Breakout A: Room 325/326; 121 (Wed)

Breakout B: Room 313

Poster session/Reception (Mon evening):
Lee Lounge (Room 109)

Additional rooms available for ad-hoc
meetings: Room 227, 232

Coffee Breaks (light breakfast in the
mornings) are outside Room 227
(Prefunction Space)



**Workshop dinner on Tuesday at 6:30 PM in the
Memorial Union ("Tripp Commons" – 2nd floor)**

Lunch is on your own: Memorial Union, lots of places
on State Street (incl. food trucks)

Logistics

- Indico for the meeting: <https://indico.global/event/18639/>
- Slack channel for discussions and communications
 - clariphyworkspace.slack.com
 - Join link:
https://join.slack.com/t/clariphyworkspace/shared_invite/zt-3ykafo6le-37Fb5zn0TXQkfSca2AzOIA
 - Dedicated channel (#collaboration-meeting-fall2026)
 - (Some) topical channels exist, others can be created
- [Google Doc](#) for notes
- Wireless
 - [eduroam](#) is recommended
 - else, register for guest access [here](#)
- Dining in Madison
 - See suggestions [here](#)



Whitepaper: “Building an AI-Native Research Ecosystem”

arXiv > hep-ex > arXiv:2602.17582

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High Energy Physics – Experiment

[Submitted on 19 Feb 2026]

Building an AI-native Research Ecosystem for Experimental Particle Physics: A Community Vision

Thea Klaeboe Aarrestad, Alaa Abdelhamid, Haider Abidi, Jahred Adelman, Jennifer Adelman-McCarthy, Shuchin Aeron, Garvita Agarwal, Usman Ali, Cristiano Alpigiani, Omar Alterkait, Mohamed Aly, Oz Amram, Saeed Ansari Fard, Aram Apyan, John Arrington, Marvin Ascencio-Sosa, Mohammad Atif, Aneesha Avasthi, Muhammad Bilal Azam, Bhim Bam, Joshua Barrow, Rainer Bartoldus, Amit Bashyal, Aashwin Basnet, Ayse Bat, Lothar A. T. Bauerdick, John Beacom, Chris Bee, Michael Begel, Matthew Bellis, Rene Bellwied, Rakitha Beminiwattha, Gabriele Benelli, Douglas Benjamin, Catrin Bernius, Binod Bhandari, Avinay Bhat, Meghna Bhattacharya, Saptaparna Bhattacharya, Prajita Bhattarai, Sudip Bhattarai, Wahid Bhimji, Jianming Bian, Burak Bilki, Mary Bishai, Kevin Black, Kenneth Bloom, Brian Bockelman, Johan Sebastian Bonilla Castro, Tulika Bose, Nilay Bostan, Othmane Bouhali, Dimitri Bourilkov, Dominic Brailsford, Gustaaf Brooijmans, Elizabeth Brost, Maria Brigida Brunetti, Quentin Buat, Brendon Bullard, Jackson Burzynski, Paolo Calafiura, Rodolfo Capdevilla, Fabian Andres Castaño Usuga, Raquel Castillo Fernandez, Fabio Catalano, Viviana Cavaliere, Flavio Cavanna, Giuseppe Cerati, Aidan Chambers, Maria Chamizo-Llatas, Philip Chang, Andrew Chappell, Arghya Chattopadhyay, Sergei Chekanov, Jian-ping Chen, Yi Chen, Zhengyang Chen, J. Taylor Childers, Hector Chinchay, Yuan-Tang Chou, Tasnuva Chowdhury, Neil Christensen, Wonyong Chung, Rafael Coelho Lopes de Sa, Simon Corrodi, Kyle Cranmer, Matteo Cremonesi, Roy Cruz, Mate Csanad, Mariarosaria D'Alfonso, Carlo Dallapiccola, Daine Danielson, Sridhara Dasu, Gavin Davies, Kaushik De, Patrick de Perio, Klaus Dehmelt, Marco Del Tutto, Carlos Ruben Dell'Aquila, Sarah Demers et al. (359 additional authors not shown)

Experimental particle physics seeks to understand the universe by probing its fundamental particles and forces and exploring how they govern the large-scale processes that shape cosmic evolution. This whitepaper presents a vision for how Artificial Intelligence (AI) can accelerate discovery in this field. We outline grand challenges that must be addressed to enable transformative breakthroughs and describe how current and planned experimental facilities can implement this vision to advance our understanding of the vast and complex physical world from the smallest to the largest scales. We show how facilities currently under construction, such as the HL-LHC, DUNE and soon EIC, can both benefit from and serve as proving grounds for this vision, while also enabling a longer-term goal for how future experiments -- like FCC-ee at CERN, IceCube-Gen2, a Muon Collider in the U.S., and smaller to mid-scale projects -- can be fully AI-native. We describe how a truly national-scale collaboration, jointly managed across large funding partners, and involving both DOE laboratories and universities, can make this happen.

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References & Citations

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More than 500 people from 105 universities and 7 national labs from the U.S. signed the paper (40 U.S. states/territories, including 16 EPSCoR jurisdictions)

<https://arxiv.org/abs/2602.17582>

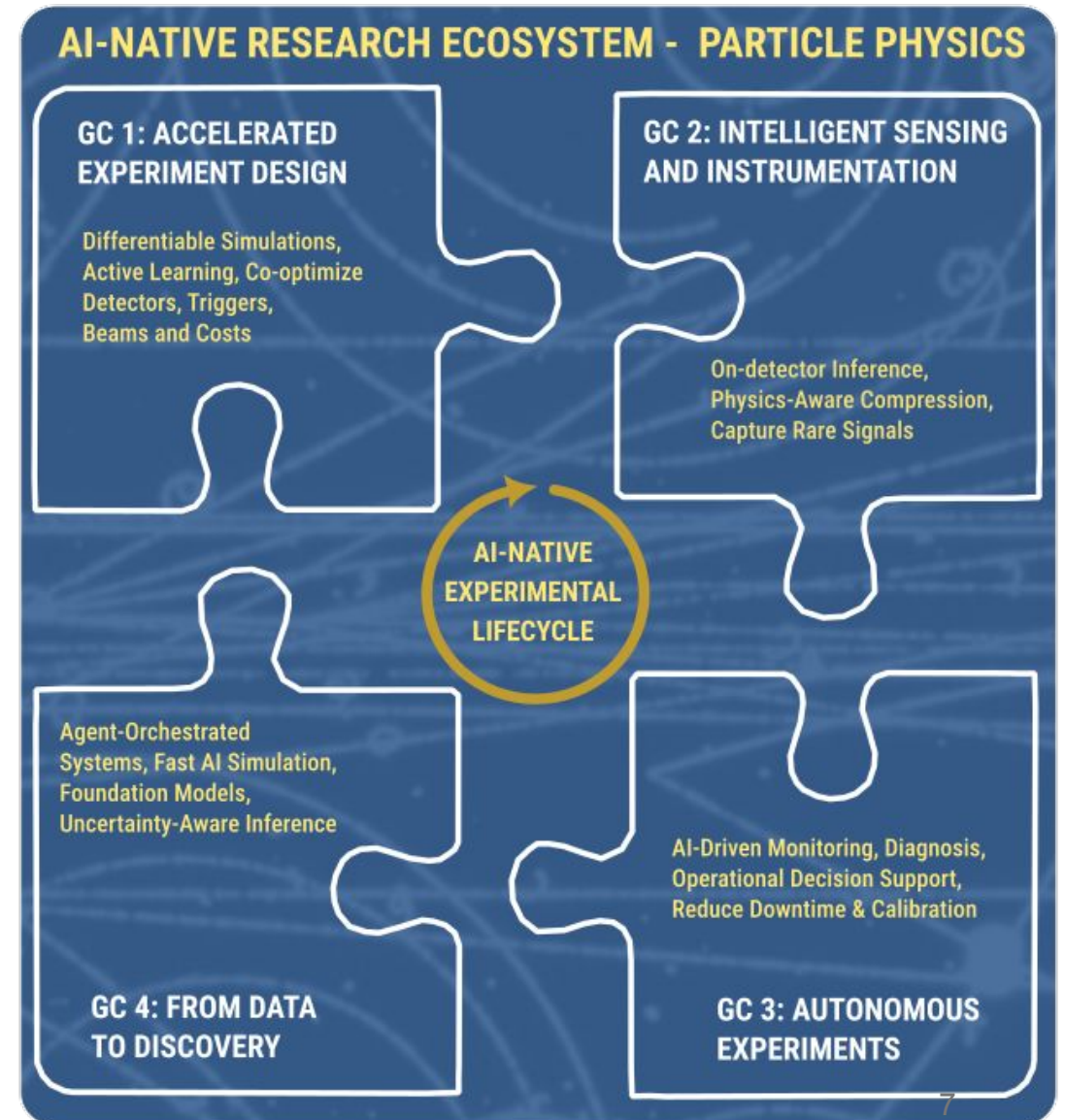
Community vision for experimental particle physics put together in close collaboration with the DPF Coordinating Panel for Software & Computing (CPSC)

“AI-Native”: From Design to Discovery

Four inter-connected Grand Challenges^{**}:

- Accelerated design informs intelligent instrumentation
- Intelligent sensing enables autonomy
- Autonomous operation feeds higher-quality data into inference
- From data to discovery closes the loop back to design
- *Together, these challenges define an end-to-end **AI-native experimental paradigm**.*

^{**}Plus some **cross-cutting themes** and emerging opportunities



What can we gain by collaborating?

Realizing fully this ambitious vision requires a **national-scale collaboration** that can:

- Bring together expertise across labs and universities,
- pool computing and data services
- align with emerging national infrastructure
- scale workforce development

enabling all of us to benefit from shared tools, sustained support, and the ability to marshal greater collective effort on every project.



*The vision: a **national-scale, multi-institutional collaboration** that unites universities, laboratories, and industry partners.*

Benefiting from multiple large funding partners -- DOE (Genesis Mission), NSF, and private foundations.

Recent “Proto-collaboration” Activities

Meeting organized to jump-start discussion towards forming a proto-collaboration (May 2026) [<https://indico.flatironinstitute.org/event/4120/>]

Wide-ranging discussion of potential areas of collaboration, including discussions w/ international partners

Continued discussion regarding the proto-collaboration at APS DPF @FNAL in July

Leading up to this first [CLARIPHY](#) “collaboration” meeting in Madison (September 14-16)

<https://indico.global/event/18639/overview>

A banner for the CLARIPHY - AI Collaboration Meeting (Sep 2026). The top half has a dark blue background with a network diagram and the title in yellow. The bottom half is white with event details and a search bar.

CLARIPHY - AI Collaboration Meeting (Sep 2026)

Sep 14 – 16, 2026
Pyle Center
US/Central timezone

Enter your search term

Overview

[Timetable](#)

[Poster Guidelines](#)

[Travel, Accommodation,
and Local Information](#)

[Registration](#)

[Organizing Committee](#)

[Meeting Participants](#)

This [CLARIPHY](#) workshop aims to seed the national-scale AI collaboration described in the whitepaper “[Building an AI-native Research Ecosystem for Experimental Particle Physics: A Community Vision](#)” (arXiv:2602.17582). The workshop brings together both participants in new or ongoing AI-related projects of relevance to High Energy and Nuclear Physics as well as interested new collaborators to build this proto-collaboration. The workshop builds on two previous community workshops: “[Open \(and Closed\) Data in the Age of AI](#)” and “[Blueprint Workshop: Towards a National-Scale AI Collaboration in HEP](#)”.

The workshop will take place at the [Pyle Center](#) at the University of Wisconsin - Madison from Monday 14 September through Wednesday 16 September, 2026.

What is CLARIPHY?

Basically it is:

- a name: “Community Laboratory for AI-native Research In PHYsics”
- a website: <https://clariphy.org/>
- a Slack workspace (request invite link from one of us via email or some other Slack/DM)
- not an entity that controls any resources itself directly.

CLARIPHY is essentially an empty box within which we can create the level of collaborative organization that fits our current goals and needs.

Goals of the meeting

- Engage with existing funded projects (and new/emerging funded projects) and create links between them and to the community
- Aim for substantive discussion and the formation of initial working groups around key areas
- Identify a set of activities and/or demonstrators that are doable on the time scale of the next ~six months
- Begin to create environments to catalyze both working collaborations and connections for eventual proposals
- Dedicated hands-on training session (Monday morning)

9:00 AM

→ 12:00 PM

Tutorial: AI agents and Large Language Models for Scientific Discovery

🕒 3h 📍 Room 325/326



Chairs: Peter Elmer, Sridhara Dasu

This tutorial provides a practical introduction to AI technologies that are transforming scientific research. Through hands-on exercises, participants will learn how to access and use large language models, work with multimodal data, build retrieval-augmented generation (RAG) systems over scientific documents, and develop AI agents capable of carrying out complex research tasks.

The tutorial will introduce modern agentic workflows for software development and scientific computing, demonstrating how specialized AI agents can collaborate to reason over information, generate code, and orchestrate multi-step tasks.

The session concludes with JFC (Just Furnish Context), a multi-agent framework for high energy physics analysis. Participants will see how an orchestrator and specialized subagents can collaborate across literature, software, data, and analysis tasks to support an end-to-end HEP workflow, illustrating the potential of agentic AI for scientific discovery.

All exercises will be carried out using resources provided by the National Research Platform (NRP), which offers managed access to advanced AI models through standard interfaces, allowing researchers to focus on applications rather than infrastructure.

Speakers: Andrzej Novak (Massachusetts Inst. of Technology (US)), Daniel Diaz (Univ. of California San Diego (US))

**Thank you to Daniel Diaz
and Andrzej Novak for
organizing the tutorial!**

Plan for the meeting

- We want this meeting to do more than just information exchange.
- We aim to have at least some actionable outcomes and/or improved organization as a result of the meeting
 - Demonstrator projects, whitepapers, topical workshops...
- Structure: Some (targeted) presentations and plenty of time for discussion.
- Discussion time is not fully pre-planned, leaving time for potential ad hoc parallel discussions.
- We aim to collect outcomes for a summary presentation at the end of the last day (Wednesday)

- Where are the most promising scientific and technical synergies across communities?
- What concrete collaborative opportunities could be pursued in the near term?
- Are there achievable goals or demonstrator projects that could help build momentum?
- What resources, infrastructure, or organizational support would be needed?
- Are there workforce development, training, or community-building needs that should be addressed?

Charge for the
breakout sessions

Plan for the meeting

Monday, September 14, 2026	Tuesday, September 15, 2026	Wednesday, September 16, 2026
8:30 AM Coffee / Light Breakfast	8:00 AM Coffee/Light breakfast	8:00 AM Coffee/Light Breakfast
9:00 AM Tutorial: AI agents and Large Language Models for Scientific Discovery - Daniel Diaz (Univ. of California San Diego (US)) Andrzej Novak (Massachusetts Inst. of Technology (US))	9:00 AM Plenary Session	9:00 AM Plenary Session: Report from Parallels
	10:00 AM Coffee Break	10:00 AM Coffee Break
	10:30 AM Parallel Sessions: Analysis Agentic Workflows	10:30 AM Parallel Sessions: Computing Infrastructure
12:00 PM Lunch Break	12:00 PM Lunch Break	12:00 PM Lunch Break
1:00 PM Plenary Session	1:00 PM Parallel Sessions: Analysis Agentic Workflows	1:00 PM Plenary Session: Report from ...
	2:00 PM Parallel Sessions: Agentic Workflows for Operations	1:30 PM Plenary Session: Next Steps & Wrap Up
3:00 PM Coffee Break	3:00 PM Coffee Break	
3:30 PM Plenary Session	3:30 PM Parallel Sessions: Agentic Workflows for Operations	
5:30 PM Poster Session & Networking		

Monday

- Plenary Sessions (short presentations, big picture overview)
 - DOE, NSF, AmSC, NAIRR/NRP
 - Large projects
 - AI for Accelerators, Theory, smaller experiments
 - Ongoing funded projects
- Poster Session
 - Newly funded Genesis Projects

Identify themes/topics for follow-on discussion, potential collaboration

Tuesday Sessions

- Plenary session
 - Looking ahead with Open AI's
 - Industry engagement (NVidia)
- Breakout sessions on key areas

Room 325/326 (Zoom: Breakout A)	Room 313 (Zoom: Breakout B)
Agentic Workflows (Analysis)	Open (and Closed) Data in the age of AI
Foundation Models	Agentic Workflows (Operations)

Rooms available (227 and 232) for additional ad-hoc discussions

- Breakouts should produce short summaries covering charge items for Wednesday AM plenary session
- Workshop dinner (Tripp Commons, Memorial Union)

Wednesday Sessions

- Plenary session
 - Short presentations (10+5 min) from each of the four breakouts addressing charge items (including resources and workforce needs)
- Breakout sessions:

Room 313 (Zoom: Breakout A)	Room 121 (Zoom: Breakout B)
Computing Infrastructure	Education, Training & Workforce Development

- Breakouts should produce short (few-slide summaries) which we will integrate into a single presentation for the closeout session
- Plenary closeout

Thanks

Program Committee:

- Tulika Bose - University of Wisconsin - Madison [Co-chair]
- Peter Elmer - Princeton University [Co-chair]
- Verena Martinez Outschoorn - University of Massachusetts, Amherst [Co-chair]
- Kazuhiro Terao - SLAC
- Torri Jeske - JLab
- Gordon Watts - University of Washington
- Ken Herner - FNAL
- Jure Zupan - University of Cincinnati
- Mia Liu - Purdue University
- Abhijith Gandrakota - FNAL
- Lu Lu - University of Wisconsin - Madison
- Aishik Ghosh - Georgia Tech
- Jianming Bian - UC Irvine

Local Organizing Committee:

- Tulika Bose - University of Wisconsin - Madison
- Sridhara Dasu - University of Wisconsin - Madison
- Dan Bradley - University of Wisconsin - Madison
- Aimee Lefkow - University of Wisconsin - Madison
- Email: "ai-collab-meeting@physics.wisc.edu"

Thank you to all the organizers!

Parallel Session Organizers:

Agentic Workflows (Analysis): Petar Maksimovic, Giordon Stark, Andrej Novak, Haicheng Wang

Agentic Workflows (Operations): Ken Herner, Walter Hopkins, Joaquin Hoya, Christoph Paus

Foundation Models, Abhijith Gandrakota, Mariel Pettee, Kazuhiro Terao

Open/Closed Data: Matthew Bellis, Jianming Bian, David Schultz

Computing Infrastructure: Daniel Diaz, Rob Gardner, Oli Gutsche, Ian Fisk

Education, Training & Workforce Development: Aaron Higuera, Kendall Mahn, Toyoko Orimoto

And thank you all for coming to/joining the meeting!