

Carnegie Mellon University
Statistics & Data Science

STAMPS@CMU
RESEARCH CENTER

WORKSHOP ON NEURAL SIMULATION-BASED INFERENCE

*ORGANIZED BY THE STATISTICAL METHODS FOR THE
PHYSICAL SCIENCES RESEARCH CENTER*

**OCTOBER
4TH-5TH 2025**

STAMPS@CMU Research Center

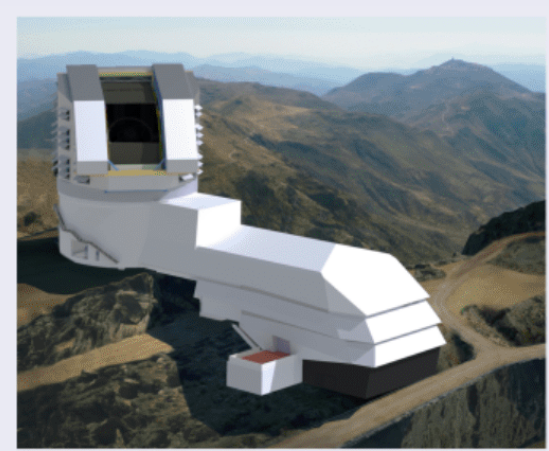
STAtistical **M**ethods for the **P**hysical **S**ciences

Foundational Methodology

Statistics
Data Science
Machine Learning / AI

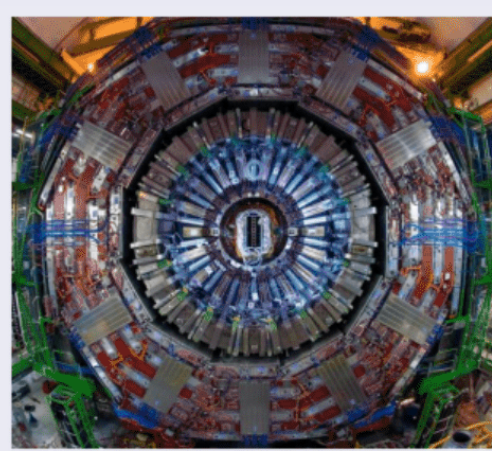
Astronomy & Particle Physics

Astronomy



LSST

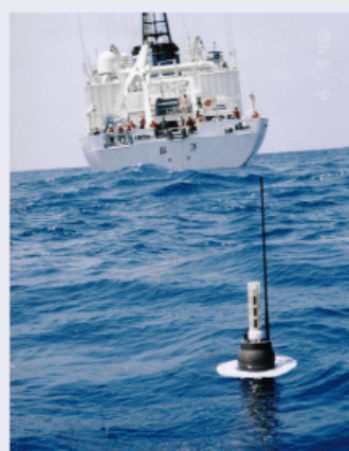
Particle Physics



LHC

Climate & Environment

Oceanography



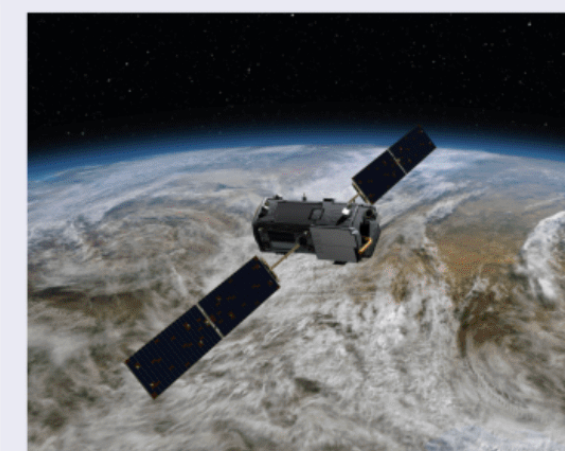
Argo floats

Meteorology



GOES

Remote Sensing



OCO-2

Environmental Science



Wildfires

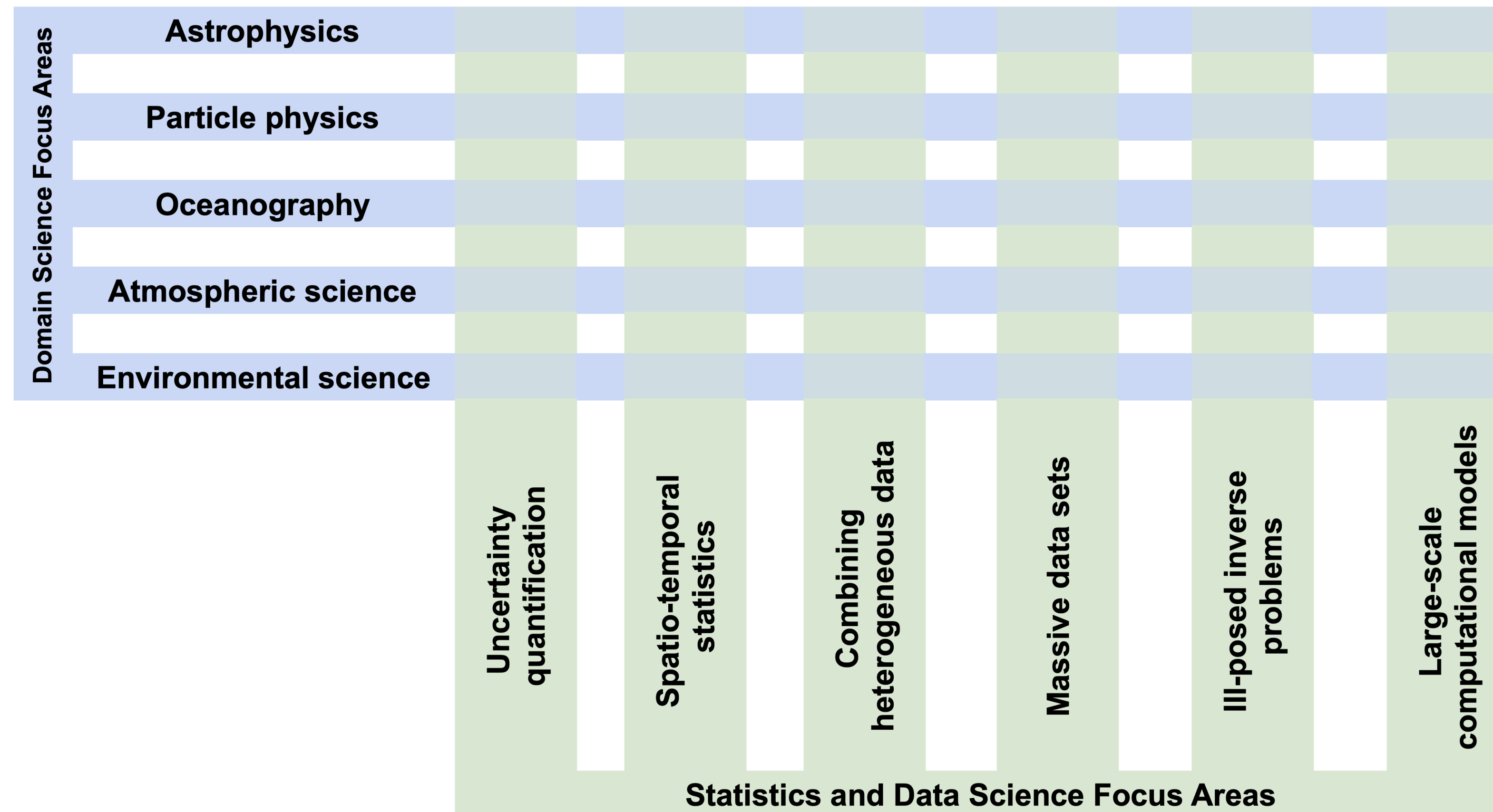
Why STAMPS?

Problems in the physical sciences come with a new set of statistical challenges in terms of **data complexity, models, simulation and experimental design** that are not easily addressed by existing statistical inference methodology.

These challenges are *different* from what we typically see in e.g. social sciences, biostatistics, actuarial science/finance, and more traditional statistical fields.

Core Concept Behind STAMPS: “The Matrix”

Problems in the physical sciences have similar statistical challenges in terms of **data complexity, models, simulation and experimental design.**



STAMPS@CMU Research Center

STatistical **M**ethods for the **P**hysical **S**ciences

- STAMPS was founded in 2018 as a research group and became a CMU Research Center in fall 2024.
- **STAMPS is one of only a few research centers specializing in foundational statistics and ML research for the physical sciences.**



Many problems in the physical sciences share common statistical challenges including heterogeneous data from multiple probes, uncertainty quantification, ill-posed inverse problems, spatio-temporal data and complex simulations.

In 2018, a group of faculty and students at Carnegie Mellon University (CMU) started the STAMPS

For information on [STAMPS public events](#):

[Subscribe to our webinar mailing list](#)

<http://stat.cmu.edu/stamps/>

Carnegie Mellon University
Dietrich College

STAMPS@CMU Activities

Are you a student or faculty at CMU or Pitt?

- **Weekly local group meetings**
- **Subscribe to our center d-list**



[Sept 2024, photo courtesy to Kyle Cranmer]

For all members of the scientific community

- **Monthly webinar/hybrid events**
- **Subscribe to our webinar mailing list**

STAMPS@CMU > Events > Public Webinars & Hybrid Events <http://stat.cmu.edu/stamps/>

Public Webinars & Hybrid Events

Webinars are held monthly and are open to all interested members of the scientific community.

Unless otherwise stated, these webinars will take place on Zoom Fridays once a month at 1:30-2:30 PM ET. Some webinars will be hybrid events with an in-person component at the CMU campus.

To join, you must be subscribed to our [webinar mailing list](#). You can also add the webinars to your calendar by subscribing to the Google Calendar below. Past webinar recordings and information are available in the online archive and on the [STAMPS YouTube Channel](#).

[Join our webinar mailing list](#)

Webinar Archive

- [Spring 2025](#)
- [Fall 2024](#)
- [Spring 2024](#)
- [Fall 2023](#)
- [Spring 2023](#)
- [Fall 2022](#)
- [Spring/Summer 2022](#)
- [Fall 2021](#)
- [Spring 2021](#)
- [Summer/Fall 2020](#)

MON	TUE	WED	THU	FRI	SAT	SUN
29	30	1	2	3	4	5
6	7	8	9	10	11	12

Workshop on Neural Simulation-Basi

Now also: **Yearly Summer Workshops**

Statistical methods that solve scientific problems across the physical sciences

NSBI is our first STAMPS workshop at CMU

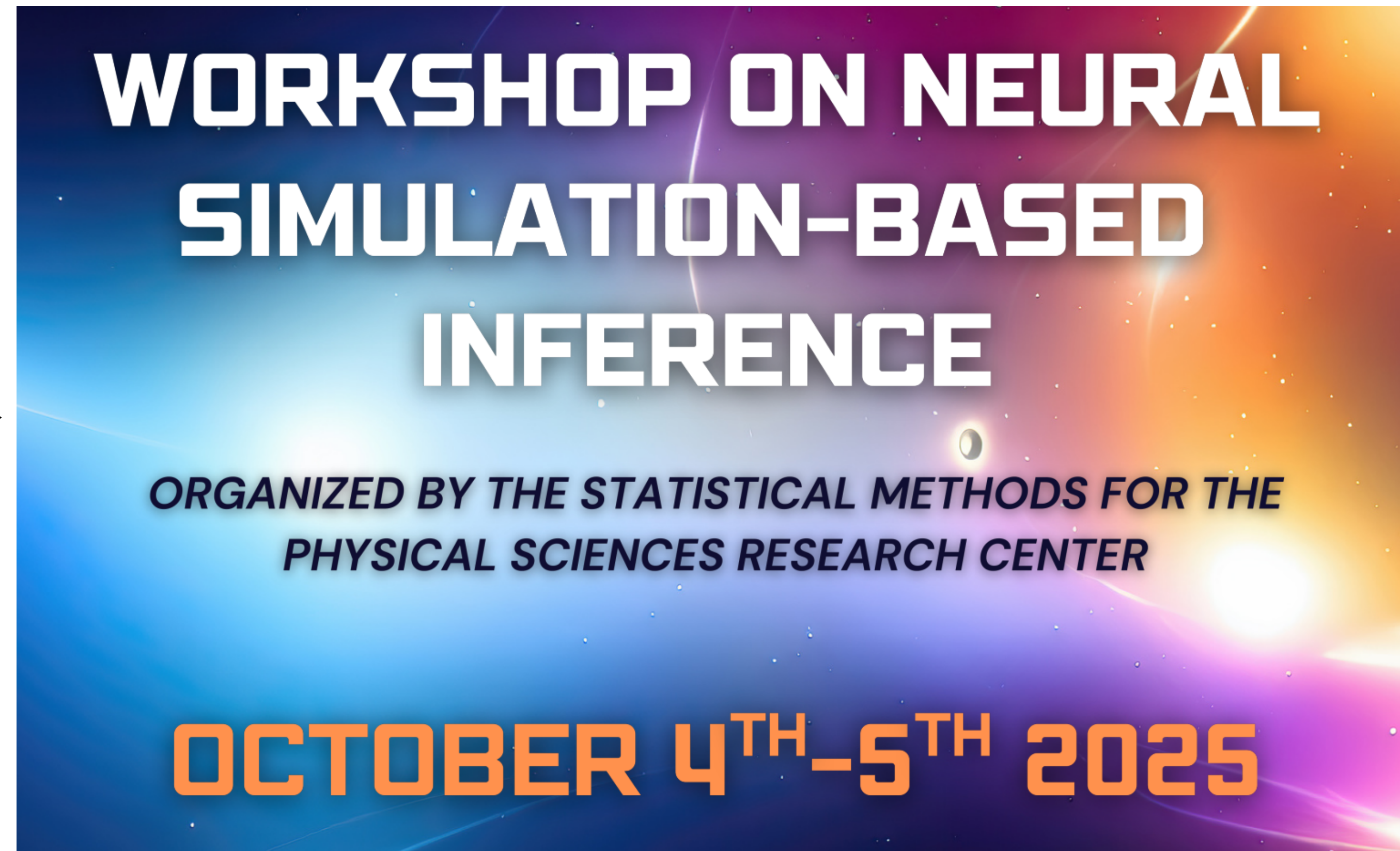
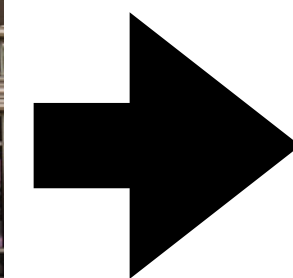
- Two-day weekend event (Oct 4-5)

Save the-date: **Starting 2026, three-day events in mid-May...**

- Keynote and participant talks
- Poster sessions and lightning talks
- Break-out sessions and small-group meetings
- **May 13-15, 2026**, “*Trustworthy Statistical Inference for the Physical Sciences*”

2025: Neural Simulation-Based Inference

Next frontier in the methods evolution of statistical practice in the sciences




PHYSTAT-SBI May 2024 (Max Planck Institute for Physics)
“Simulation-Based Inference in Fundamental Physics”
Organized by Lukas Heinrich, Louis Lyons et al

[designed by Kelsey Burtner]

Workshop schedule

Saturday October 4th, 2025

8:30 AM	Registration
9:00 AM	Welcome & Introductory Remarks
9:15 AM	Keynote Talk - Kyle Cranmer , <i>University of Wisconsin Madison</i> Title: "Navigating the design space of SBI"
10:15 AM	Coffee Break
10:45 AM	Invited Talk - Stefan Radev , <i>Rensselaer Polytechnic Institute</i> Title: "Composing the score for stable and simulation-efficient amortized inference at scale"
11:25 AM	Invited Talk - Barnabas Poczos , <i>Carnegie Mellon University</i> Title: "Diffusion Models for Science: Progress, Challenges, and Open Questions"
12:05 PM	Lunch
1:25 PM	Keynote Talk - Andrew Zammit-Mangion , <i>University of Wollongong</i> Title: "Neural SBI for spatial and spatio-temporal statistical models"
 2:25 PM	Workshop Group Photo
2:35 PM	Poster Session 1 & Coffee Break
3:50 PM	Invited Talk - Minge Xie , <i>Rutgers University</i> Title: "Repro Samples and Fisher Inversion: A Framework for Solving Finite-Sample and Irregular Inference Challenges"

<http://stat.cmu.edu/stamps/>

Sunday October 5th, 2025

9:00 AM	Keynote Talk - Joel Leja , <i>The Pennsylvania State University</i> Title: "Rapid inference of galaxy properties in the age of deep and large-scale surveys of the universe"
10:00 AM	Coffee Break
10:30 AM	Invited Talk - Bingjie Wang , <i>Princeton University</i> Title: "Simulation-based Inference for Galaxy Properties: Speed, Coverage, and New Physics"
11:10 AM	Invited Talk - Reetam Majumder , <i>University of Arkansas</i> Title: "Vecchia approximated density regression for spatial models with intractable likelihoods"
11:50 AM	Lunch
1:15 PM	Keynote Talk - Larry Wasserman , <i>Carnegie Mellon University</i> Title: "SBI at CMU"
2:15 PM	Poster Session 2 & Coffee Break
3:30 PM	Invited Talk - Patrick Heimbach , <i>University of Texas at Austin</i> Title: "Leveraging Hessian information for ocean observing system design"
4:10 PM	Invited talk - Gaia Grosso , <i>Massachusetts Institute of Technology</i> Title: "From high dimensions to statistical discovery: anomaly detection at scale in the era of latent spaces".

Workshop Logistics

- Everyone should have received an invitation to **Slack**, and a link to the workshop **Google Drive** for speakers and poster presenters to share slides and posters if they wish to do so.
- The talks will be *recorded* and might be posted publicly. You may be recorded during the sessions. Please mute your audio if you are on Zoom. If you are remote, you can type your questions into the chat box or use the raise hand feature.
- Email stamps@stat.cmu.edu with any *logistical* questions or issues.
- For *technical* discussion, we have Slack channels for each talk and the poster sessions.