Welcome to the AD4HEP Workshop at Columbia University's Nevis Labs!

ALFRED P. SLOAN FOUNDATION

Welcome to Nevis Labs!

Nevis Science Center

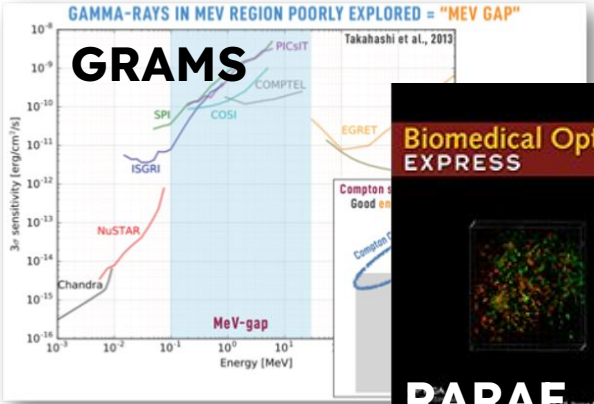
Brief History of the Nevis Science Facility

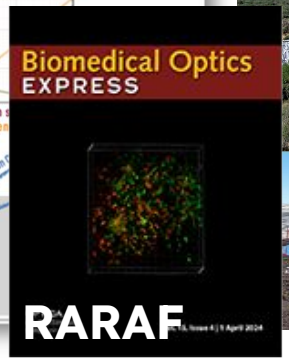
- The facility uses the 74 acre site from the 1836 estate of James Hamilton (son of Alexander Hamilton) that was donated to Columbia University in the 1930's
  - Named after the island of Nevis, Alexander Hamilton's birthplace
  - Over 200 types of trees on the property
- The current Nevis science facility is a legacy from the 400 MeV Nevis cyclotron project initiated in 1947 and retired in 1978.
- After the cyclotron era, the role of Nevis Labs transitioned to an R&D, construction, and physics analysis center.

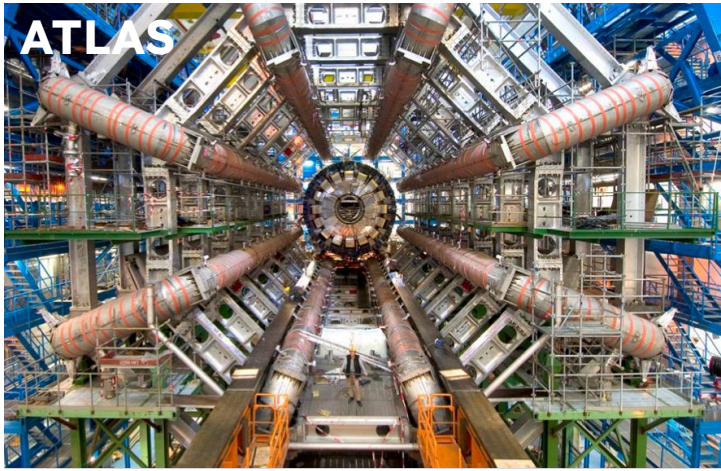
Dedication of the Nevis Cyclotron, May 2, 1950. Left to right: Columbia's President Dwight D. Eisenhower, Prof. I. I. Rabi, Visiting Prof. Hideki Yukawa, and Prof. John R. Dunning.

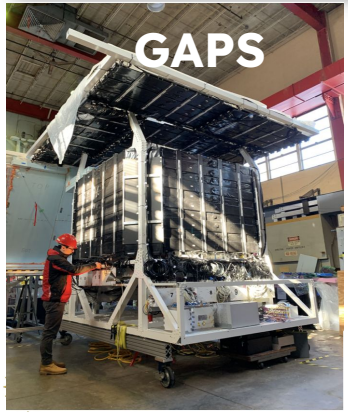
Nevis Labs Today

Provides support for experiments in particle physics, nuclear physics, astrophysics, and medical physics.

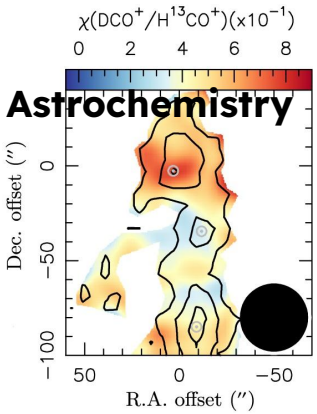


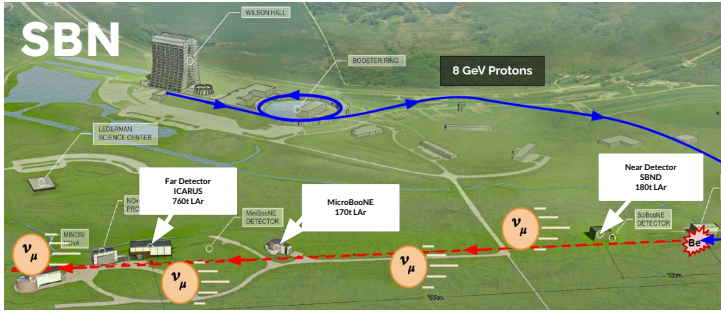


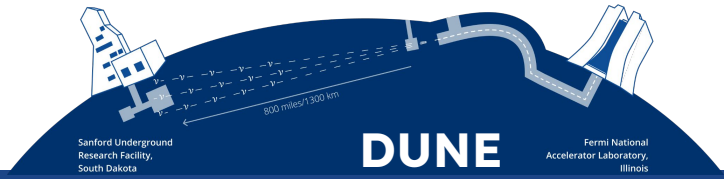




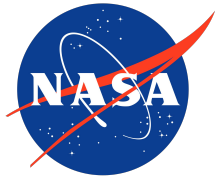
8 X-ray optics focus signal onto low-background detectors







Current Research Programs at Nevis Labs



- **Experimental Particle Physics**
  - **Collider physics: ATLAS**
  - **Neutrino physics: MicroBooNE, SBN(D) and DUNE, CCM**
  - 6 faculty, 5 postdocs, ~10 students, 7 technical and admin. staff
- **Particle-/Astrophysics:**
  - **Astro-particle physics: GAPS, IAXO, GRAMS, VERITAS, CTAO**
  - **Astrochemistry and Planetary Science**
- **RARAF**
  - **Radiological studies of living cells** using Nevis 5.5 MeV “Singletron” accelerator

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Real-time Anomaly Detection
RAD
Discoveries in Fundamental Physics

… aims to "transform fundamental discoveries in particle and astro-particle physics by developing new cyberinfrastructure and AI-powered techniques that can uncover "unknown" physics through rare, unpredictable phenomena".

Collaborative project under NSF CSSI
PIs: Georgia Karagiorgi (**Columbia**, Neutrino/SBND)
Isobel Ojalvo (**Princeton**, Collider/CMS)
For more details:
https://www.nevis.columbia.edu/rad-in-fundamental-physics.html

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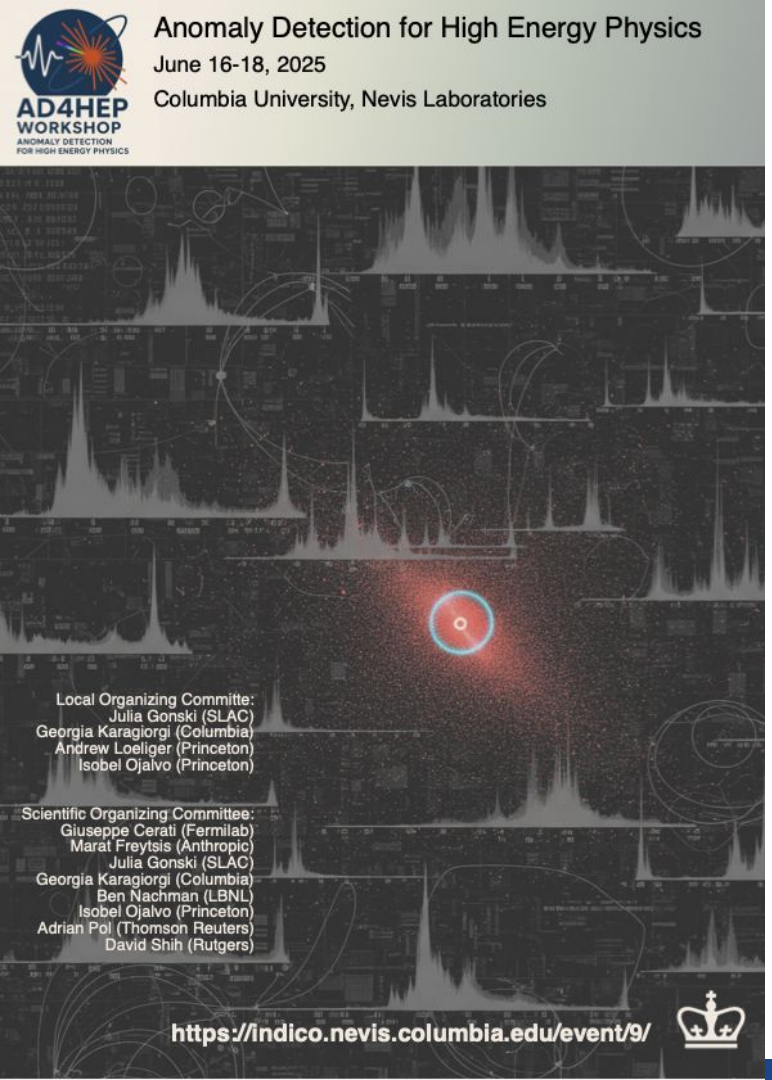


AD4HEP 2025

Brings together people working on and/or interested in **experimental and theoretical/phenomenology aspects of anomaly detection** in high energy physics or closely related fields.

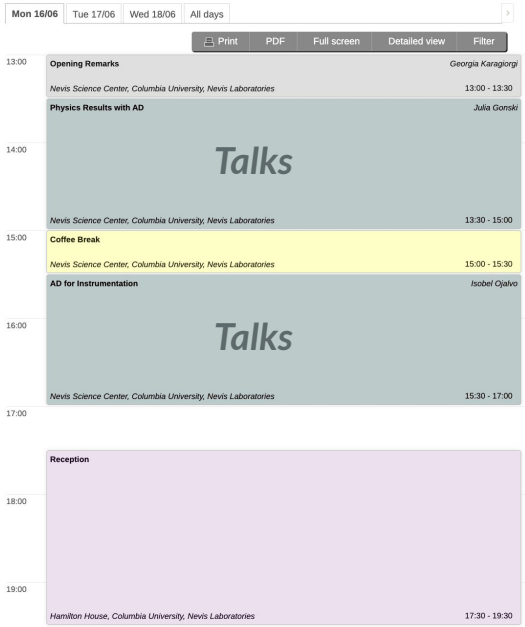
Includes:

- invited plenary talks,
- plenary early career-contributed lightning talks,
- panel discussion,
- hands-on tutorials for anomaly detection applications,
- lots of breaks for discussions.

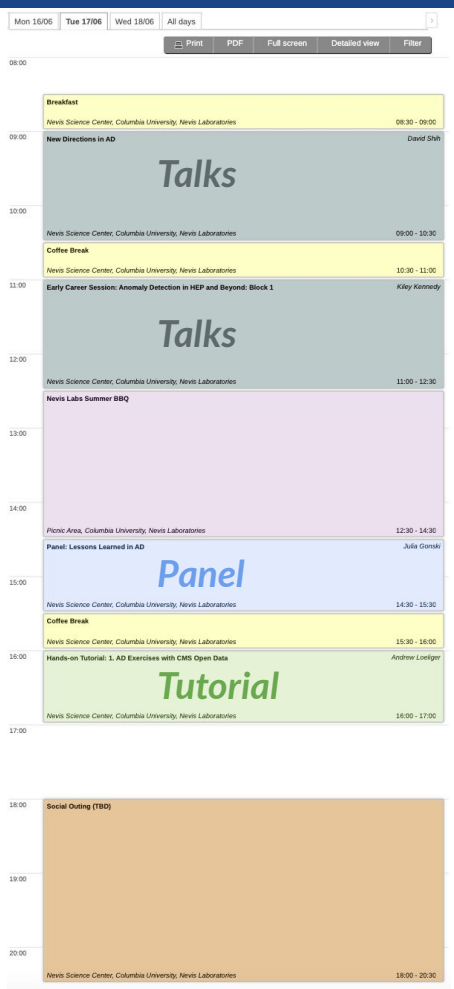
Aims to:

- **connect/ brew a community** of scientists spanning experiment, theory and industry who are interested in a new paradigm for physics discoveries in particle physics and beyond
- **catalyze collaboration** to develop new frameworks and tools for model-agnostic searches for new physics.

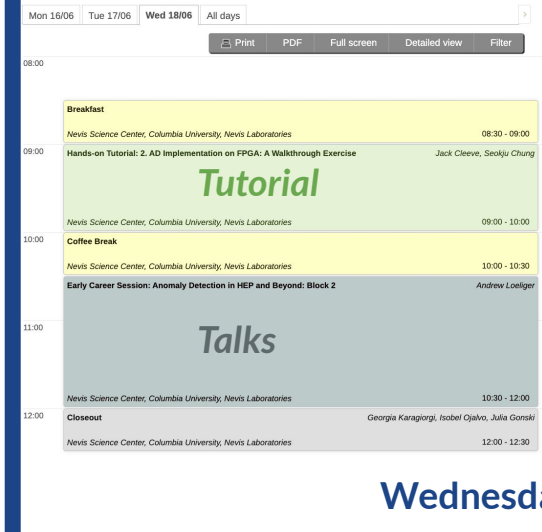
Agenda at a glance



Monday



Tuesday

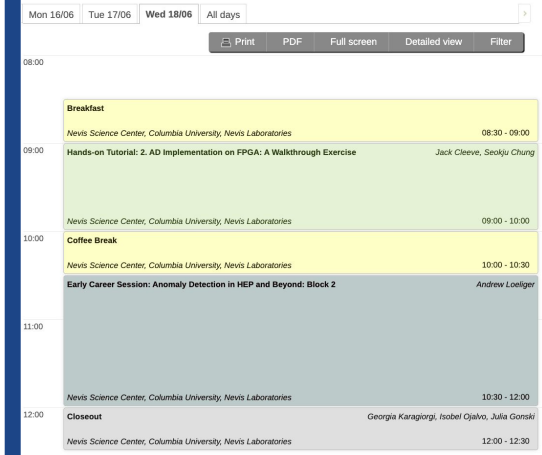


Wednesday

Agenda at a glance

Monday

Tuesday



Wednesday

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A huge thanks to:

Scientific Organizing Committee:

Giuseppe Cerati, Fermi National Accelerator Laboratory
Marat Freytsis, Anthropic
Julia Gonski, SLAC National Accelerator Laboratory
Georgia Karagiorgi, Columbia University
Ben Nachman, Lawrence Berkeley National Laboratory
Isobel Ojalvo, Princeton University
Adrian Pol, Thomson Reuters
David Shih, Rutgers University

Local Organizing Committee:

Julia Gonski, SLAC National Accelerator Laboratory
Georgia Karagiorgi, Columbia University
Andrew Loeliger, Princeton University
Isobel Ojalvo, Princeton University
Jon Sensenig, Columbia University

Nevis Administrative and Technical Support:

Amy Garwood
Asia Latt
Bill Seligman
Grace Ho

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And now... logistics!

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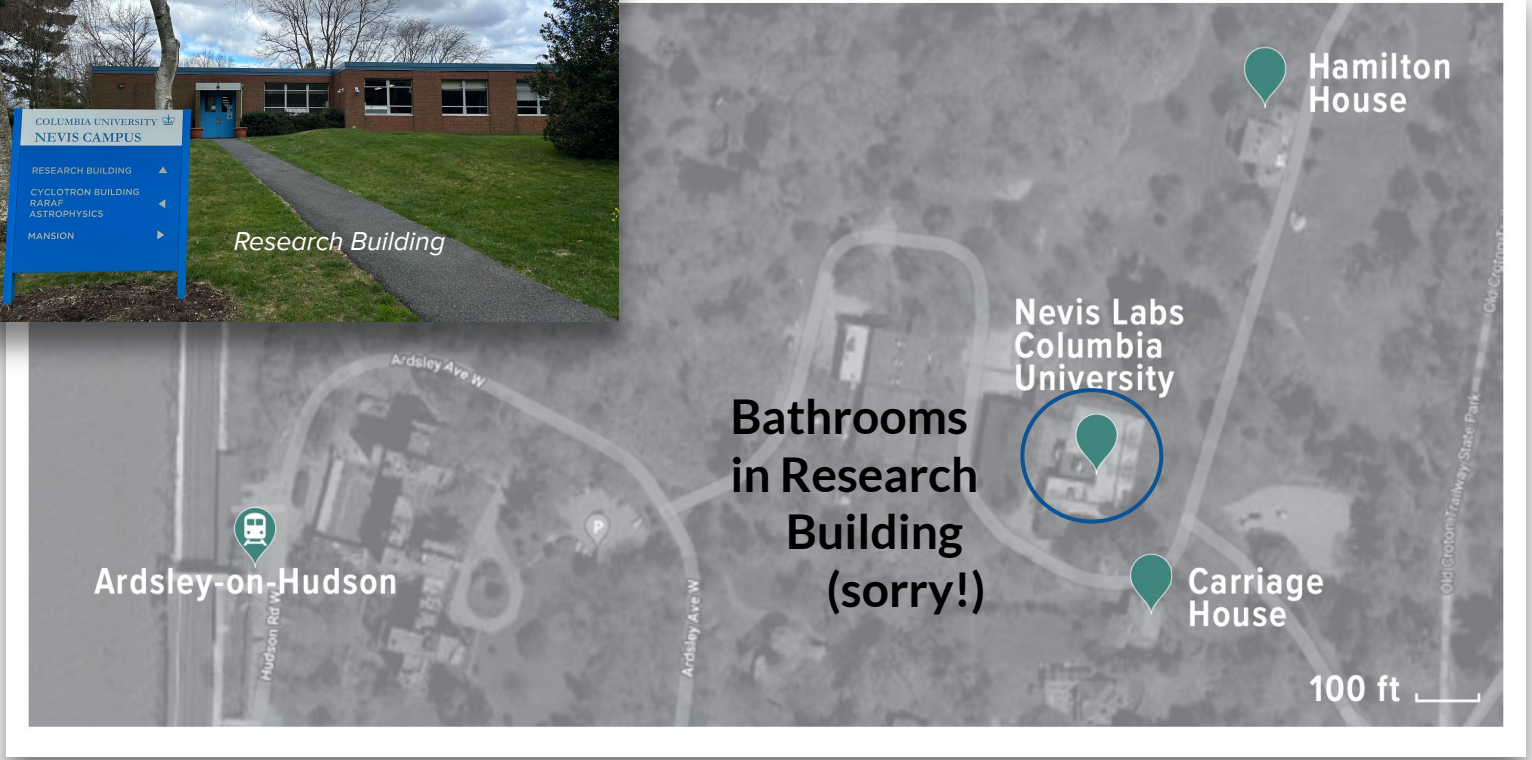

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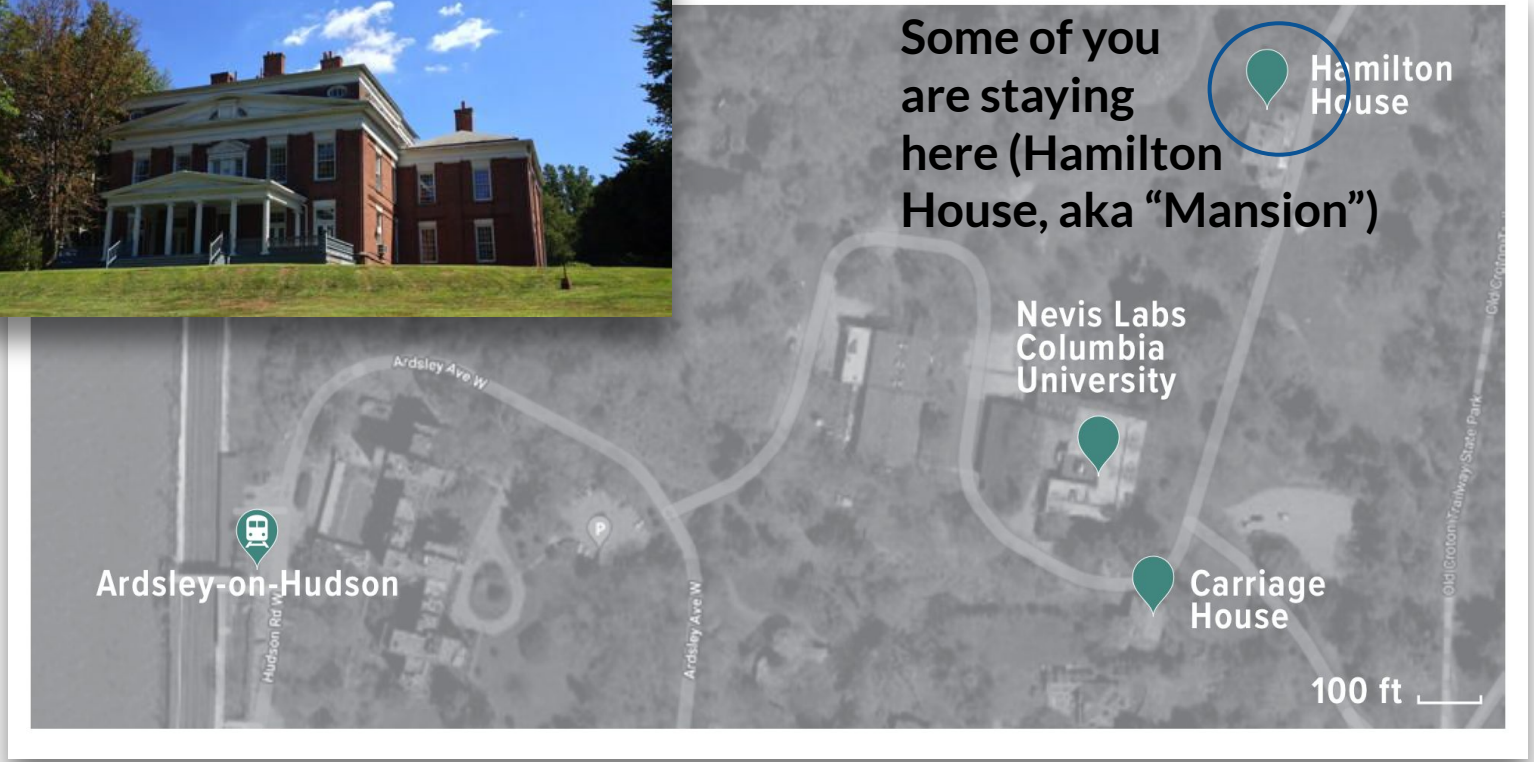

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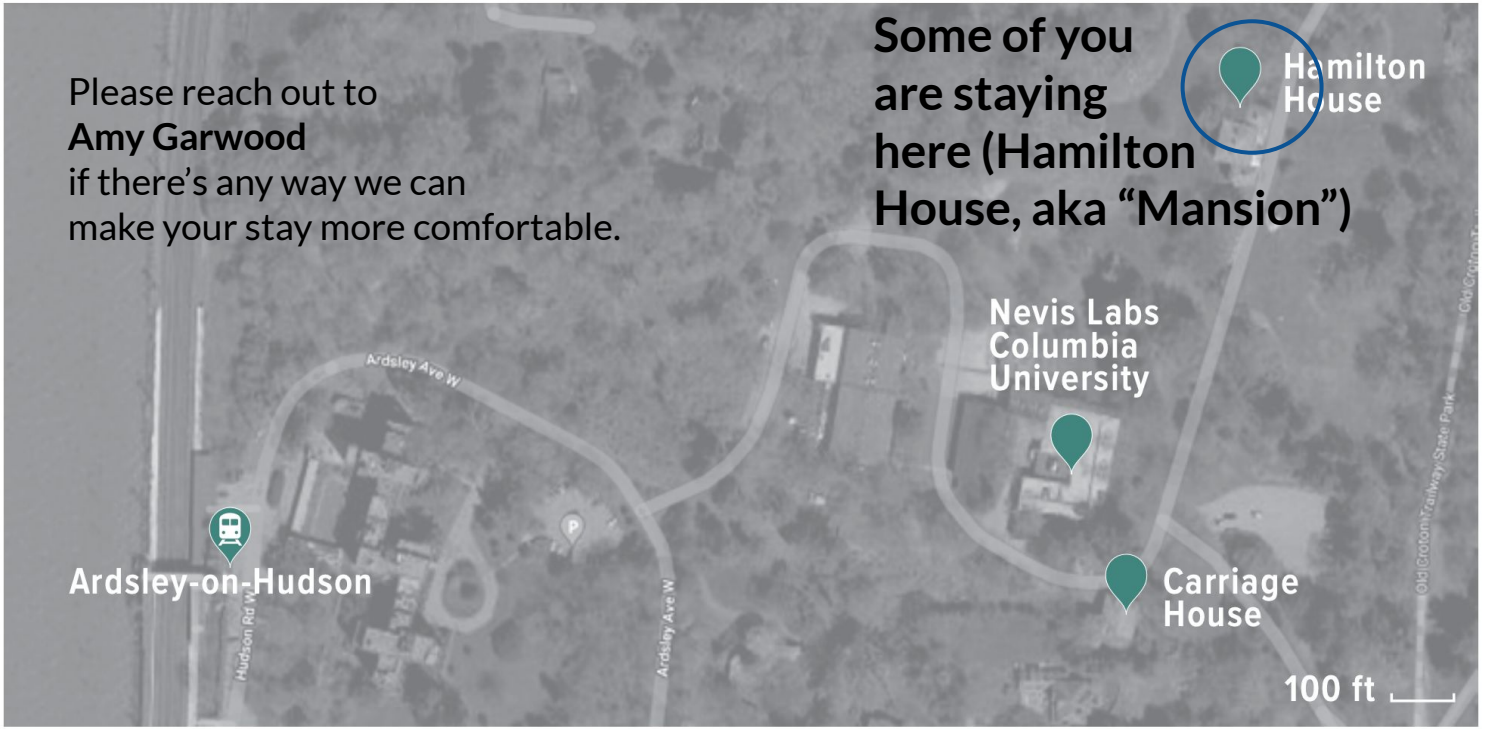

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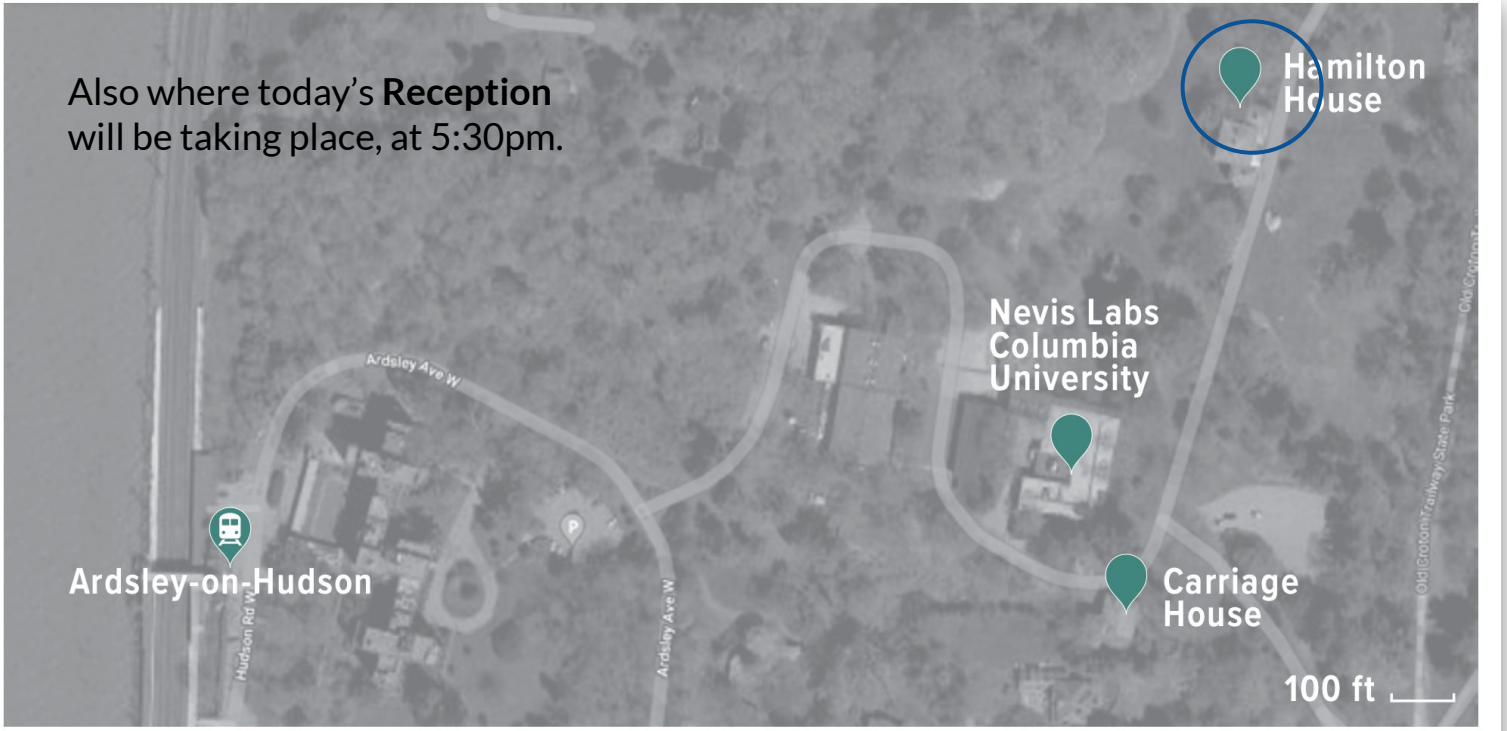

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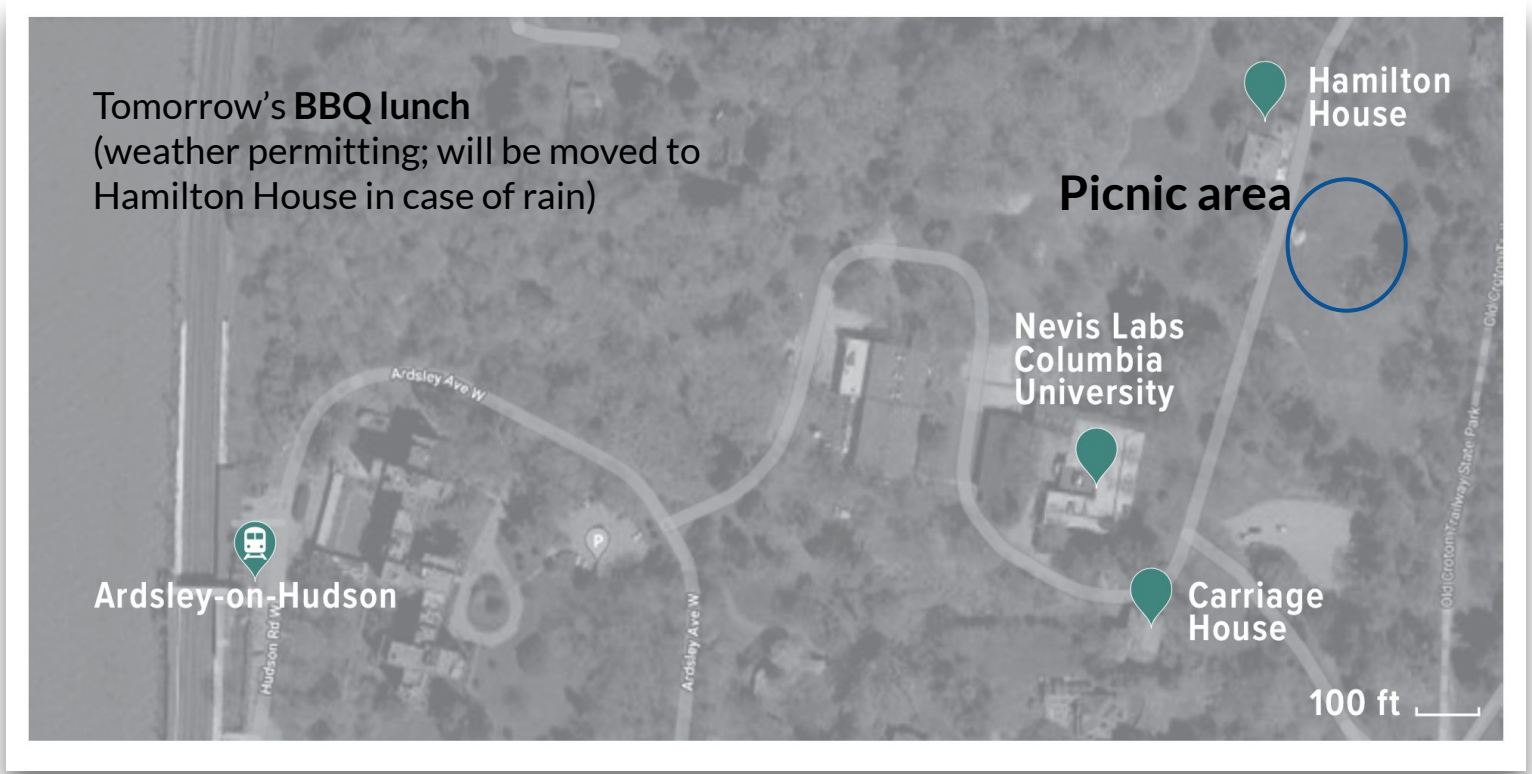
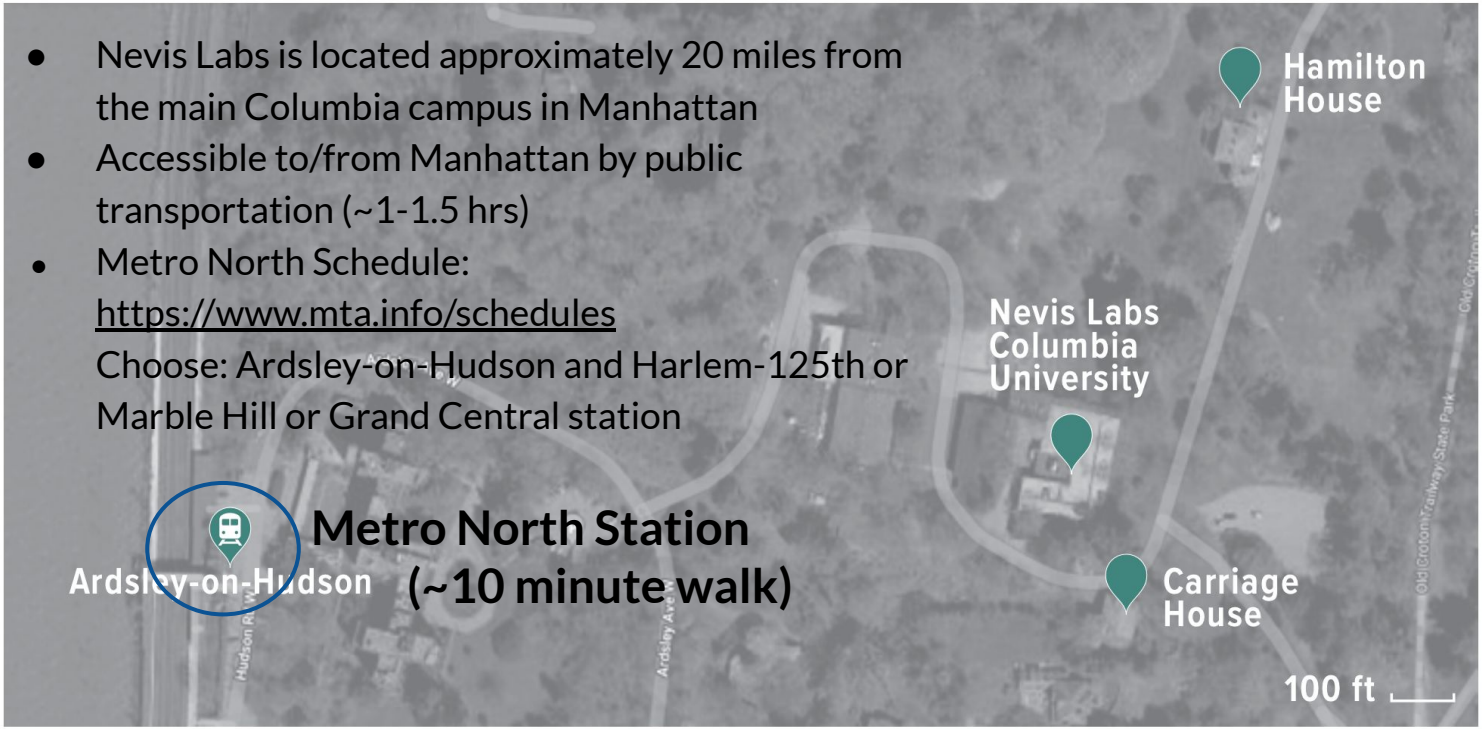


Transportation to/from Manhattan

- Nevis Labs is located approximately 20 miles from the main Columbia campus in Manhattan
- Accessible to/from Manhattan by public transportation (~1-1.5 hrs)
- Metro North Schedule: https://www.mta.info/schedules
  Choose: Ardsley-on-Hudson and Harlem-125th or Marble Hill or Grand Central station



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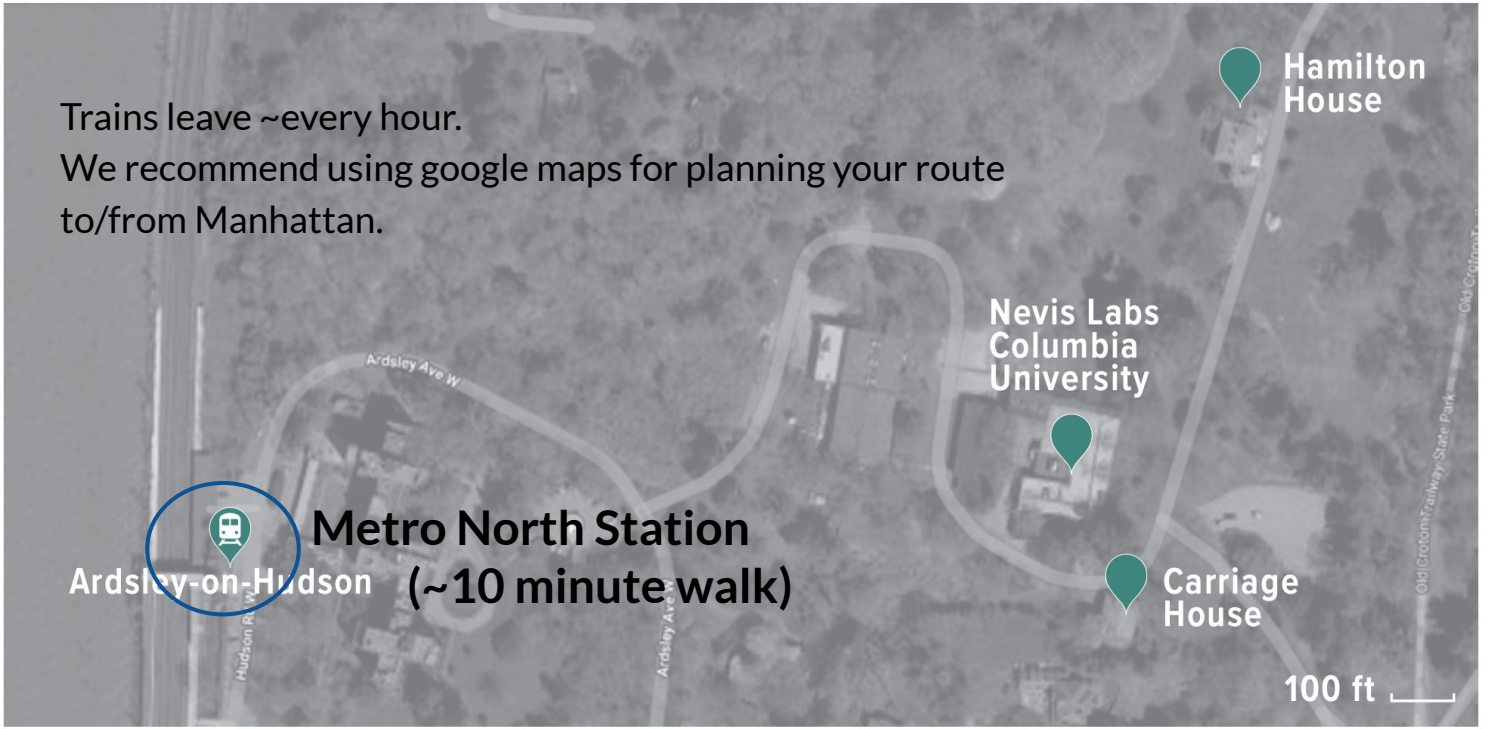


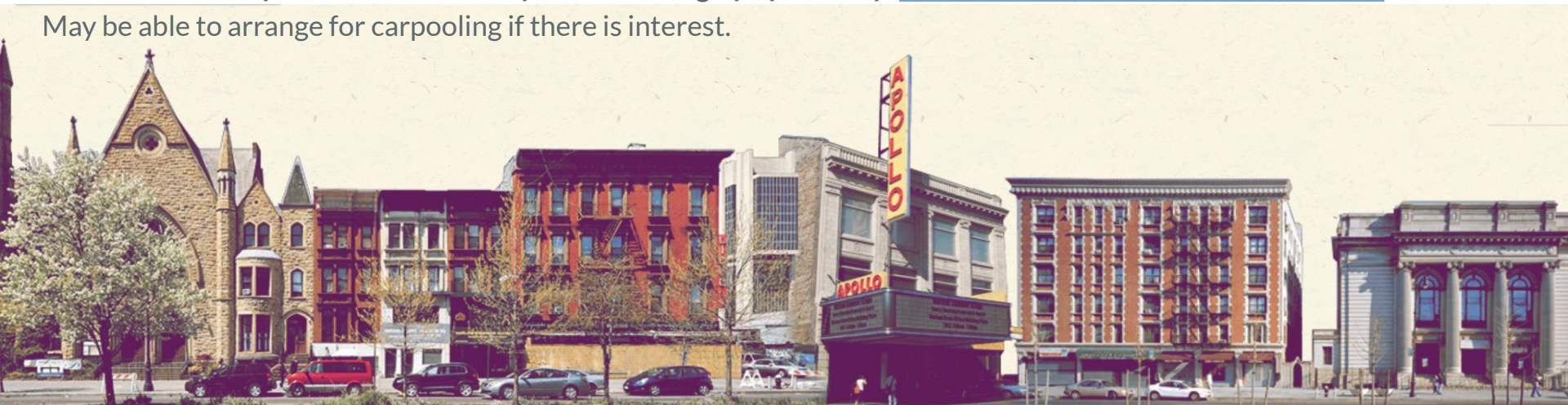
Social outing on Tuesday

We will be headed to **Harlem, NYC.** Dinner reservation at **Sylvia's (soul food restaurant) at 7pm**: https://sylviasrestaurant.com/ Lots of things to explore nearby: Apollo Theater, "party boat" (ask Julia), jazz at local venues like Sugar Monk (call to check, may need reservations), ...

Departure: 5:30 pm sharp from in front of the Nevis Research Building, to catch the 5:48pm Metro North train to Harlem/125th Street. Then ~10 minute walk.

Directions: https://maps.app.goo.gl/PCzjezrKor8xqqMW6

Please **fill out the poll to let us know if you are coming by 5pm today:** https://forms.gle/AardoPXHuejsus3M8
May be able to arrange for carpooling if there is interest.



Additional information

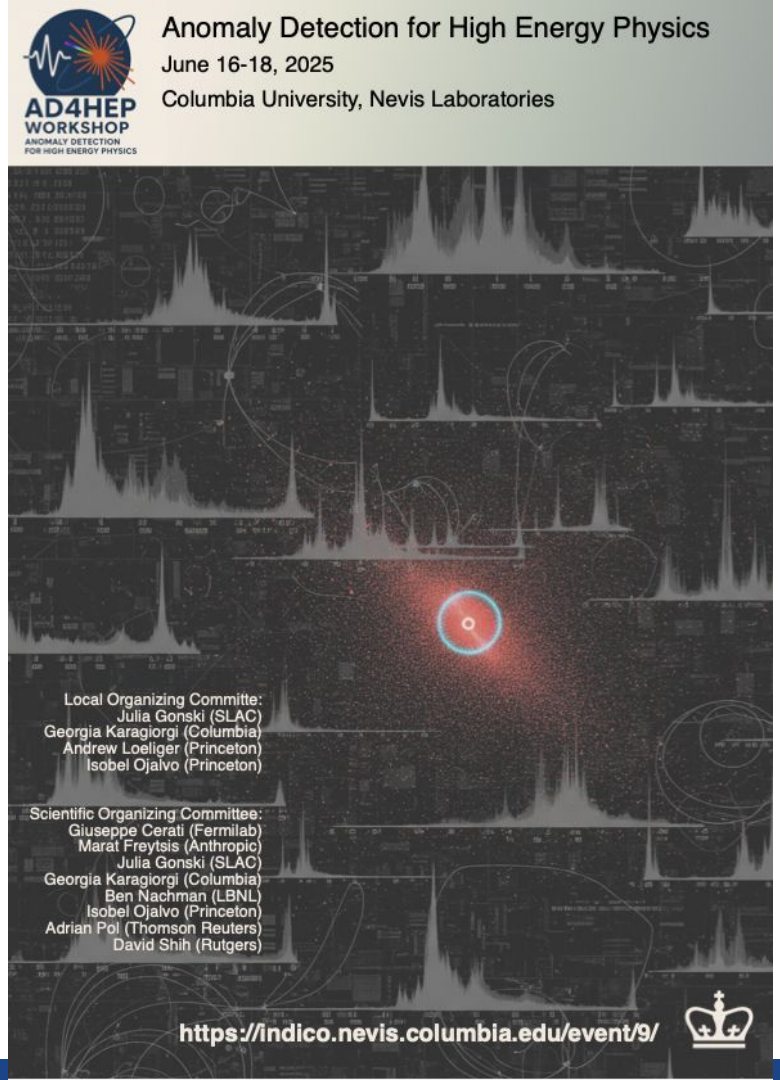
Wifi: Research Building or Research Building 5G **Wifi Password:** [on the wall]

Food: Breakfast/Coffee breaks will be provided by Nevis. No cafeteria on-site.

Workshop photo: At the end of the BBQ lunch/before panel on Tuesday, at the front of the Research Bldg.

Slides/notes/workshop materials: Please be sure to post slides on the indico *the day before* your talk.

Let's have a great workshop!



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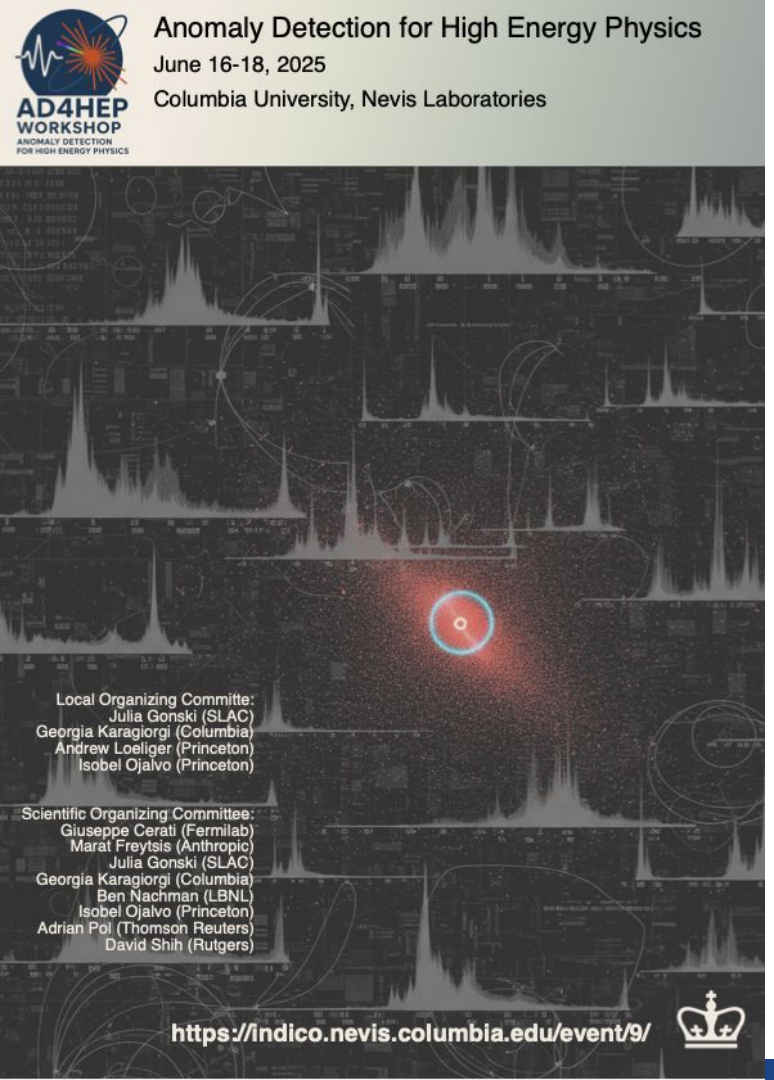

Reminder!

If you haven't already, please don't forget to pay for your **registration fee** using the following webform: https://securepay.cuit.columbia.edu/payment/pub/AD4HEP/ (or in person to Amy Garwood in the Research Building, or using the QR code below)