



# USCMS - PURSUE

## Program for Undergraduate Research Summer Experience

# Welcome to the Webinar!

## Website link for [USCMS PURSUE](https://indico.cern.ch/event/1219244/)

The screenshot shows the U.S. CMS PURSUE website. At the top left is the U.S. CMS PURSUE logo, and at the top right are 'Home' and 'Schedule' links. The main heading reads 'WELCOME TO U.S. CMS PURSUE' followed by 'Program for Undergraduate Research Summer Experience'. Below this, the dates 'June 6, 2022 - Aug 22, 2022' are listed. A section titled 'Who are we?' contains several paragraphs of text describing the program's goals, the types of projects students will work on, the mentors involved, and the funding sources. At the bottom of this section are two small images: one showing a person in a lab coat working with equipment, and another showing a group of people in a meeting room.

- Agenda
- <https://indico.cern.ch/event/1219244/>



## Meenakshi Narain

*Professor and Chair of Physics  
Brown University  
meenakshi\_narain@brown.edu*

### **My research:**

I am interested in searching for new particles, studying properties of known particles (top quark, Higgs Bosons etc).

I am also involved in R&D and construction of Silicon detector based tracker detectors.

### **I enjoy:**

teaching; problem solving; working in collaborative environments; learning new and innovative ideas from my students; cooking and exchanging recipes.

### **Challenges I like to tackle:**

promoting Diversity, Equity and Inclusion practices in research, teaching and learning.  
promoting dialogues to create awareness of underrepresented groups in Physics / STEM

### **I've got my eyes on:**

learning to sail; organize events which meld science with arts and music; spend more time in-person with family and friends.





# Agenda

## USCMS PURSUE webinar

Wednesday 30 Nov 2022, 16:00 → 18:00 US/Central

Virtual

Videoconference

zoom USCMS PURSUE webinar

Join

- |                                                                                                          |                                                     |       |   |
|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-------|---|
| <b>16:00</b> → 16:05                                                                                     | <b>Opening Remarks</b>                              | 🕒 5m  | ✎ |
| <b>Speakers:</b> Meenakshi Narain (Brown University (US)), Sudhir Malik (University of Puerto Rico (US)) |                                                     |       |   |
| <b>16:05</b> → 16:20                                                                                     | <b>Overview of the Program</b>                      | 🕒 15m | ✎ |
| <b>Speaker:</b> Meenakshi Narain (Brown University (US))                                                 |                                                     |       |   |
| <b>16:20</b> → 17:00                                                                                     | <b>Shared Experiences by Interns and Mentors</b>    | 🕒 40m | ✎ |
|                                                                                                          | Intern Alumni 1                                     | 🕒 10m | ✎ |
|                                                                                                          | <b>Speaker:</b> Holly Wingren                       |       |   |
|                                                                                                          | US CMS PURSUE Su...                                 |       |   |
|                                                                                                          | Intern Alumni 2                                     | 🕒 10m | ✎ |
|                                                                                                          | <b>Speaker:</b> Sneha Vireshwar Dixit               |       |   |
|                                                                                                          | Mentor Speaker                                      | 🕒 10m | ✎ |
|                                                                                                          | <b>Speaker:</b> Darin Acosta (Rice University (US)) |       |   |
| <b>17:00</b> → 17:15                                                                                     | <b>Application Process and Timelines</b>            | 🕒 15m | ✎ |
| <b>Speaker:</b> Sudhir Malik (University of Puerto Rico (US))                                            |                                                     |       |   |
| <b>17:15</b> → 17:30                                                                                     | <b>Q&amp;A</b>                                      | 🕒 15m | ✎ |



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Program for Undergraduate Research Summer Experience

- Dates:
  - June 5, 2023 until Aug 11, 2023 (10 weeks)
  - We require at least 40 hours of work week
  - Stipend - \$6000 (600\$/week for 10 weeks)
- Mode:
  - in-person (default/preferred)
  - a few positions which can be partially virtual
    - ★ to accomodate special situations
- Program:
  - This internship offers undergraduate students an opportunity to perform a project under the mentorship of scientists working at the discovery frontier in Particle Physics.
  - The scientists are associated with the U.S. CMS Collaboration and performing cutting-edge research with the CMS experiment at Large Hadron Collider located in Switzerland.
  - Our expectation is that the students will complete this program, with the help of the research mentors.





# The U.S. CMS Collaboration

- U.S. CMS is a collaboration of about ~1200 members from 54 Universities institutes including Fermilab.
- It is one of the largest collaborations of in the US particle physics community.
  - It trains ~200 students/yr, ~100 postdocs/yr,
  - produces ~45 Ph.Ds/yr,
  - published ~1000 scientific papers; and
  - provides significant leadership of the LHC

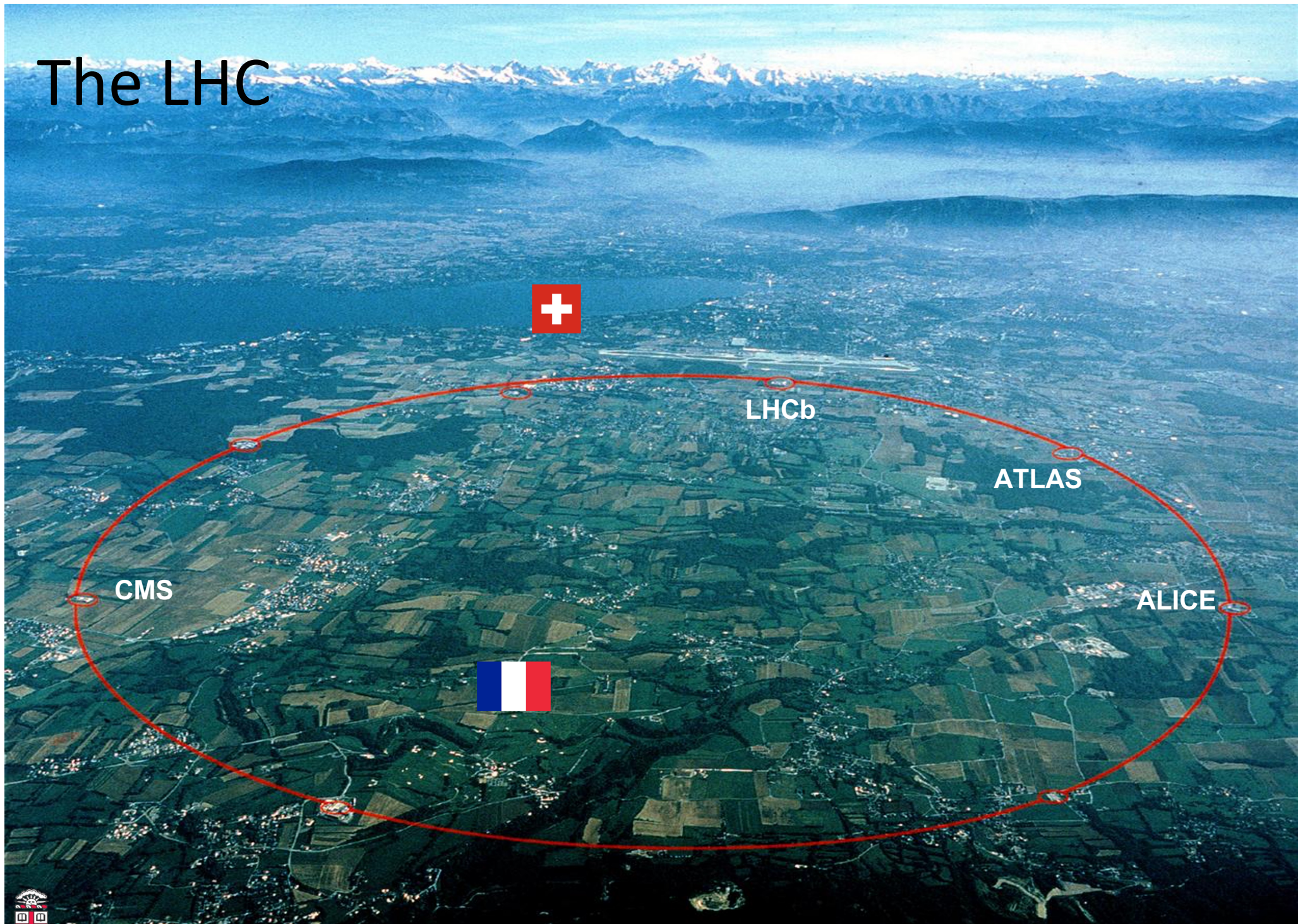


- Many Activities in support of Physics & DEI listed in the recent review slides:

<https://drive.google.com/file/d/1m4OnrT-CggyVYdc4hNB1hrNn60Rr3j1A/view?usp=sharing>



# The LHC



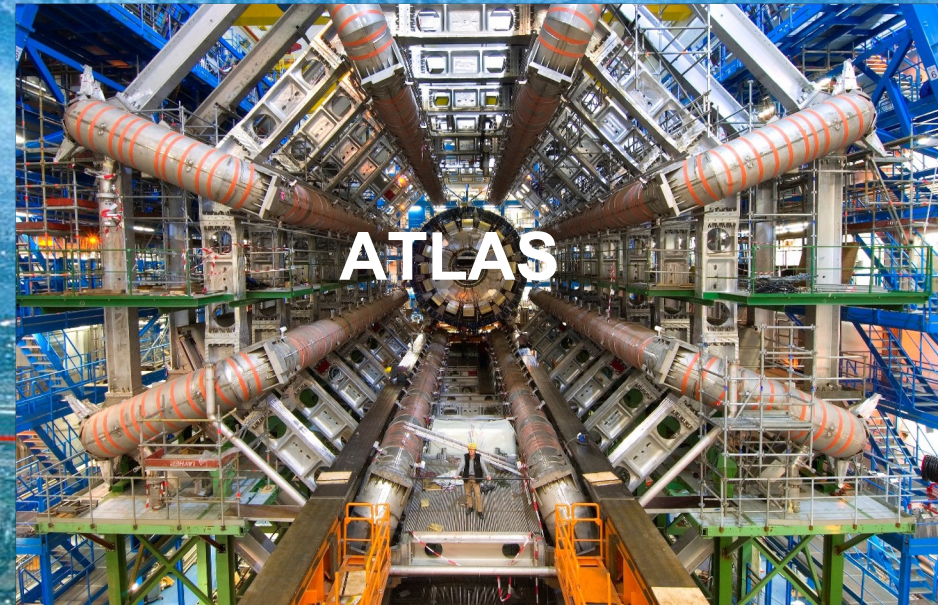
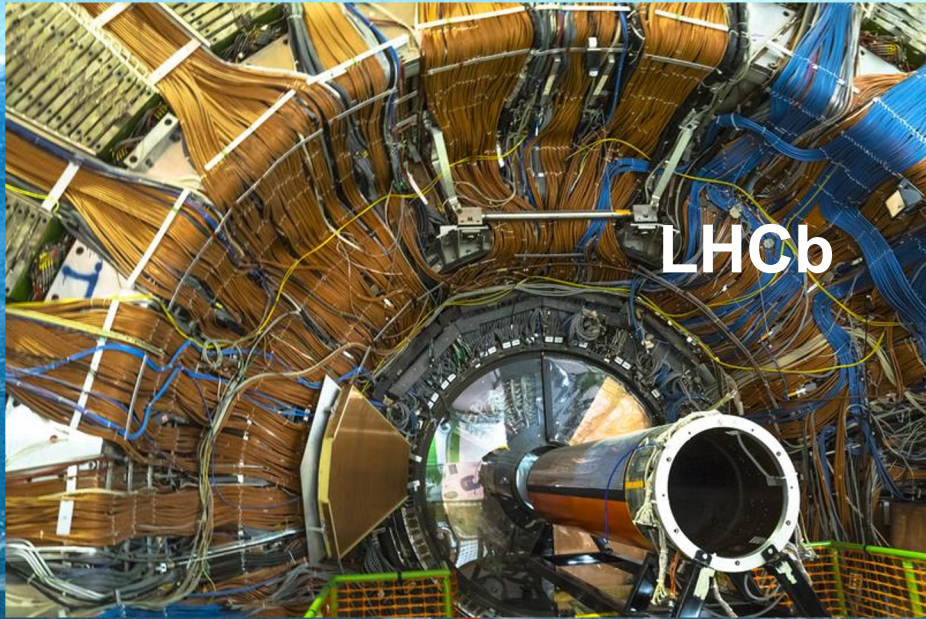


# LHC Parameters



The proton beams are structured into 2808 bunches  
Each bunch consists of about  $10^{11}$  protons  
circles it around the ring 11245 times per second  
Collisions between bunches occur every 25 ns









# The Goal of the USCMS - PURSUE Program

- As part of our commitment to diversity and inclusion this program maps to the USCMS DEI Action Plan “Identity formation and community engagement”.
- Students will use computational tools, data-science methods and various instrumentation methods to learn about fundamental particles and their interactions.
- Students will analyze data obtained from the CMS experiment at the Large Hadron Collider located at CERN, Switzerland.
- Our aim is to strengthen our research by building an inclusive and diverse community with a wide range of perspectives.
- In addition, the research internships will possibly help and encourage the students to persist in a STEM major through college and train them in skills needed for a future career in the STEM workforce.



# USCMS - PURSUE

Program for **U**ndergraduate **R**esearch **S**ummer Experience

- **Format of the program in 2023**
  - Dates June 5, 2023 until Aug 11, 2023 (10 weeks)

Summer - 10 weeks	<b>PURSUE -School (2 weeks)</b>		<p><b>Lectures (2 per week)</b></p> <ul style="list-style-type: none"> <li>○ Physics Concepts</li> <li>○ Physics Analysis Results</li> <li>○ Physics Techniques</li> <li>○ Detector Techniques</li> </ul> <p><b>Networking &amp; Professional Development</b> (summer - 1 per week) (semester - 2 per month)</p> <ul style="list-style-type: none"> <li>○ Meet U.S. CMS               <ul style="list-style-type: none"> <li>■ Students</li> <li>■ Scientists</li> <li>■ Professors</li> <li>■ Engineers/Techs</li> </ul> </li> <li>○ Building networks</li> <li>○ Graduate school appl.</li> <li>○ Resume writing</li> <li>○ Interviewing skills</li> <li>○ Soft skills</li> <li>○ DEI topics</li> </ul>
	Fermilab	<ul style="list-style-type: none"> <li>● Hands-on Skills               <ul style="list-style-type: none"> <li>○ Software</li> <li>○ Computational</li> <li>○ Detector</li> </ul> </li> </ul>	
	<b>Physics Research Projects (8 weeks)</b>		
	Research institution	<ul style="list-style-type: none"> <li>● Physics Analysis Projects</li> <li>● Advanced Training (as required)               <ul style="list-style-type: none"> <li>○ Lab skills and software modules</li> </ul> </li> </ul>	



# USCMS - PURSUE Format

Program for **U**ndergraduate **R**esearch **SU**mmers **E**xperience

- Start with PURSUE-school at Fermilab, Illinois
  - 2 week “training”
  - Housing and travel to Fermilab will be provided

## PURSUE -School (2 weeks)

Fermilab

- Hands-on Skills
  - Software
  - Computational
  - Detector

- Learn common tools which will be used by all during the internship
- An opportunity for all students and research mentors to network with each other before branching off to research projects.
- Build a cohort of students who can help each other during the internship!





# USCMS - PURSUE Format

Program for **U**ndergraduate **R**esearch **SU**mmmer **E**xperience

- Next - engage with the research projects at various institutions
  - 8 week “research internship”
  - Each student will be matched with a research mentor and project at a USCMS institution
  - Housing and travel to host institution/project site will be provided

Physics Research Projects (8 weeks)	
Research institution	<ul style="list-style-type: none"><li>● Physics Analysis Projects</li><li>● Advanced Training (as required)<ul style="list-style-type: none"><li>○ Lab skills and software modules</li></ul></li></ul>



# USCMS - PURSUE Format

Program for **U**ndergraduate **R**esearch **SU**mmer **E**xperience

- Each week students will also attend various lectures and professional development activities

## Lectures (2 per week)

- Physics Concepts
- Physics Analysis Results
- Physics Techniques
- Detector Techniques

## Networking & Professional Development

- (summer - 1 per week)
- (semester - 2 per month)
- Meet U.S. CMS
  - Students
  - Scientists
  - Professors
  - Engineers/Techs
- Building networks
- Graduate school appl.
- Resume writing
- Interviewing skills
- Soft skills
- DEI topics



# USCMS - PURSUE - 2022

Program for Undergraduate Research Summer Experience

## Zoom Screenshot - 6 June (Day1)

Recording...

Nathan Tercero	[Blurred]	David Velasco	[Blurred]	[Blurred]
[Blurred]	Patrick Gartung	[Blurred]	[Blurred]	[Blurred]
[Blurred]	[Blurred]	[Blurred]	Sneha Vireshwar Dixit	Kayla Harmon
Ana Maria de Sousa...	[Blurred]	Kevin Black	[Blurred]	Andrew Fonseca
Francisco Laris Gonz...	Sergei Gleyzer	[Blurred]	Charis Kleio Koraka	Jingyu Luo

Participants (32)

Search

- Sudhir Malik (Host, me)
- PG Patrick Gartung (Co-host, Guest)
- KB Ken Bloom (Guest)
- Agni Bethani
- Aliyah Montgomery (Guest)
- A Amani Midgette (Guest)
- AM Ana Maria de Sousa Slivar (Guest)
- AF Andrew Fonseca (Guest)
- Ben Tovar (he/they) (Guest)
- CK Charis Kleio Koraka
- Chris Palmer (he/him) (Guest)
- DV David Velasco (Guest)
- Doug Berry (Guest)
- FL Francisco Laris Gonzalez Mo... (Guest)
- GS Gabriel Soto (Guest)
- Guillermo Antonio Fidalgo Rodriguez

Invite Mute All More