



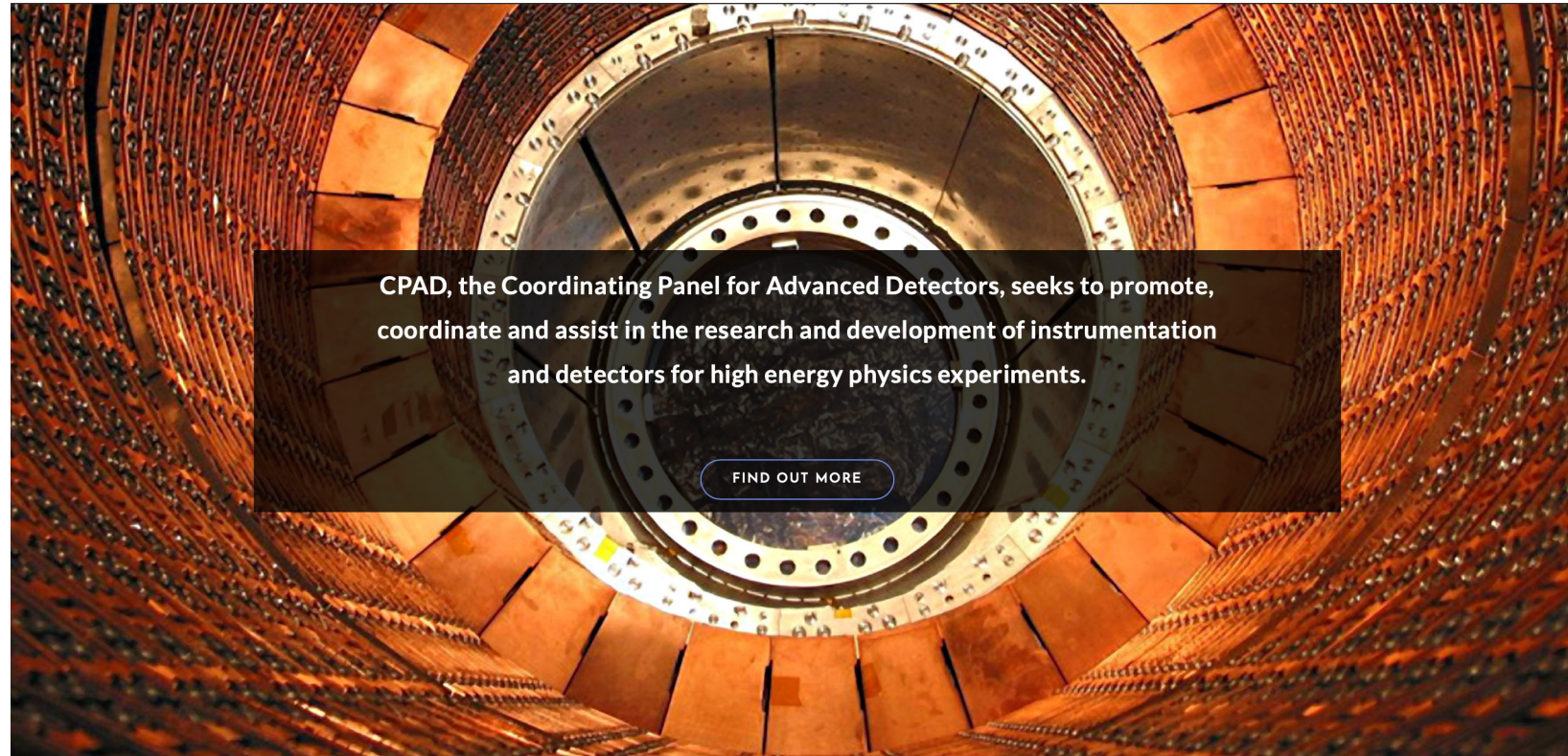
**Center for Frontiers  
in Nuclear Science**

# Welcome

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Abhay Deshpande

Nov. 29 - Dec. 2, 2022



**Stony Brook University**

CPAD @ Stony Brook University



**Brookhaven**  
National Laboratory

# Welcome to CPAD 2022 at Stony Brook University

Locally led by  
Dr. Klaus Dehmelt & Dr. Prakhar Garg for  
the Center for Frontiers in Nuclear Science  
(CFNS)



# Stony Brook University

State University of New York (SUNY) at Stony Brook



- Public research university, a flagship institution (with U. at Buffalo) out of ~70 university and colleges under SUNY
- Founded in 1957, moved to current location in 1962
- Elected to the Association of American Universities (AAU) – a selective group of major research universities in the US, Universities Research Association (URA), Sea/Land-Grant U.
- Classified as “R1 : Doctoral Universities – Very high research Activity”
- SBU in partnership with Battelle, manages [Brookhaven National Laboratory](#) for the US Department of Energy (DOE)
- 18k Undergraduate students, 9k Graduate students, \$2.8k faculty
- University’s impact: \$7.2B, \$230M+ research expenditure (and growing)
- Faculty & Alumni include 7 Nobels, 2 Abel Prizes, 2 Pulitzer Prize, 5 Field Medalists, 5 living billionaires.... *Large fraction of our students are 1<sup>st</sup> generation in families to go to college*
- Amongst top 100 in universities in the US and top 50 public universities, Physics in the top 20, and Nuclear Physics in the top 3 ranked groups.



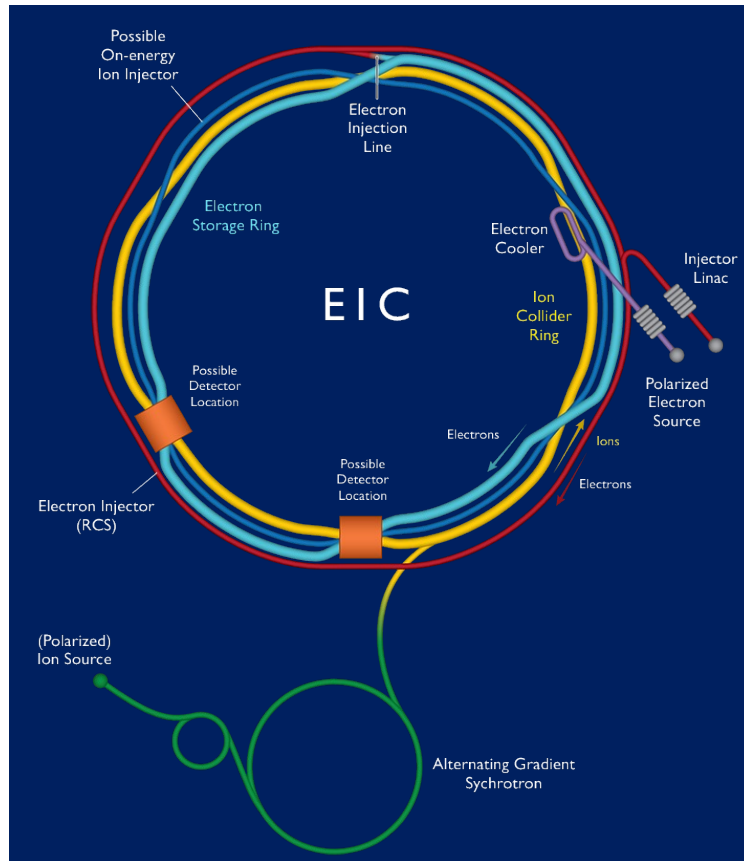
# Brookhaven National Laboratory

## [This is Brookhaven Lab](#)

- Delivers discovery science and transformative technology to power and secure the nation's future. Primarily supported by the US Department of Energy (DOE) Office of Science, BNL is a **multidisciplinary laboratory** with seven Nobel Prize winning discoveries, 37 R&D 100 Awards and more than 70 years of pioneering research.
- BNL is managed for the Office of Science by Brookhaven Science Associates (BSA), partnership between **Stony Brook University and Battelle** and six core universities: Columbia, Cornell, Harvard, MIT, Princeton & Yale
- **Research Themes**
  - Nuclear Physics, Clean Climate & Energy, Quantum, Artificial Intelligence, High Energy Physics, Medical Isotopes & National Security
- **Facilities Hosted at BNL:**
  - Accelerator Test Facility, Center for functional Nanomaterials, Laboratory for BioMolecular Structure, National Synchrotron Light Source (II), NASA Space Radiation Lab, and **Relativistic Heavy Ion Collider (RHIC) → Future Electron Ion Collider (EIC)**

# The US Electron Ion Collider at BNL

Realization: jointly by BNL and Jefferson Lab



## Physics of EIC:

Understand the role of gluons in QCD

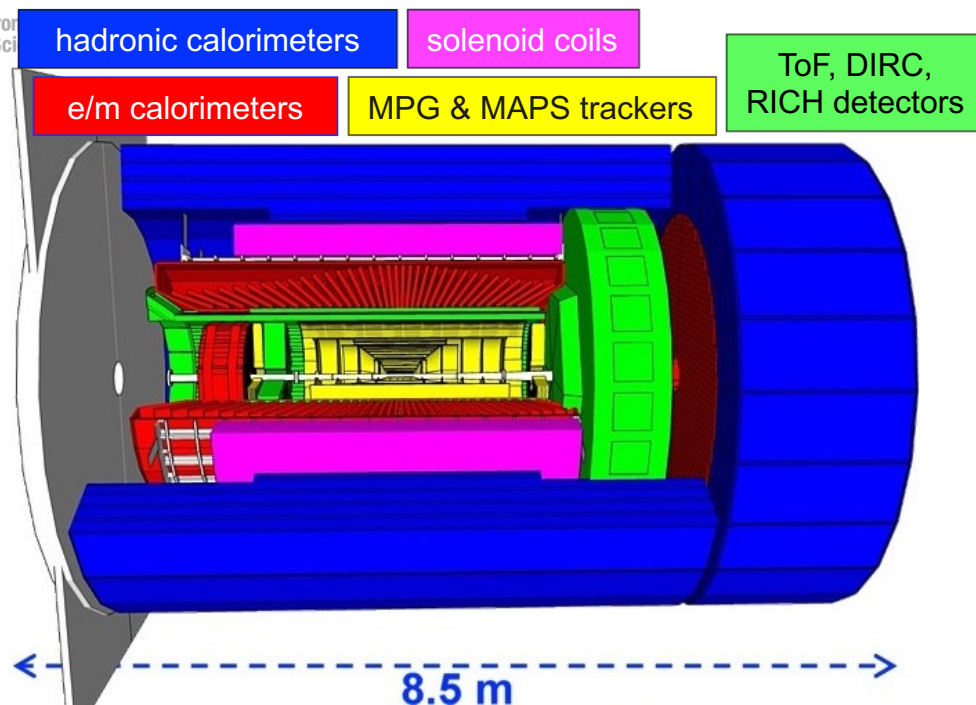
- Origin of Mass
- Origin of Spin
- Search and study of novel dense saturated gluonic matter

A new tool for precision QCD

World's **first** Polarized electron-proton/light ion,

Also, world's **first** electron-Nucleus collider

Uses DOE's significant investments in infrastructure (RHIC: Relativistic Heavy Ion Collider)



### Electron Proton Ion Collider (EPIC) Detector

State of the art detector systems for tracking, Particle ID, Calorimetry being discussed. Significant R&D effort needed

### EIC Users Group:

International collaboration on Accelerator & Detector  
1350+ Users from ~36 countries, 266 institutions – and growing

Great synergy in the detector and corresponding R&D requirements (and scientists!) amongst **High Energy and Nuclear Physicists** apparent in the discussion of Snowmass 2021 & various ICFA documents



**Center for Frontiers  
in Nuclear Science**

<https://www.stonybrook.edu/cfns/>

**Founded in September 2017**

Simons Foundation support till 2027/8  
+ NY State SUNY 2020 initiative  
+ Stony Brook & BNL

# Vision:

A “Home” for all interested in the US Electron Ion Collider

❖ Scientific discourse

➤ Workshops, seminars, conference support etc.

❖ Attract & support young scientists

➤ Postdoctoral, joint-postdocs, visitors program

❖ Help seed detector collaborations

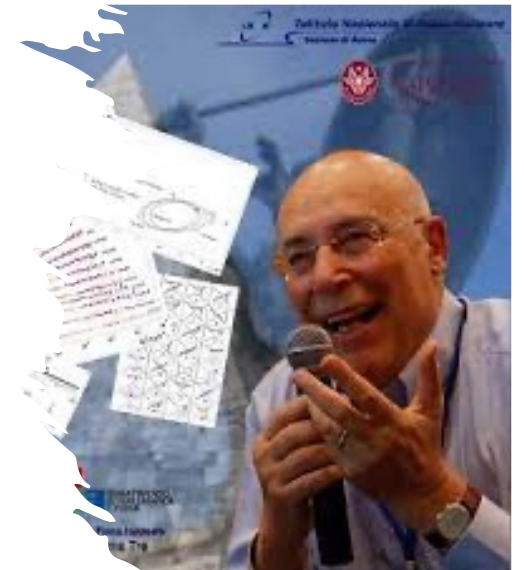
❖ Make scientific contacts for international collaborations

Work with the EIC Users Group & the two Labs, to help realize the US Electron Ion Collider.

Future goals: Scientific activities beyond **EIC synergies with HEP physics and physicists.**

*“The Standard Model of physics would not have been possible without many decades of synergetic & complimentary measurements amongst:*

- *e-e, e-p, p-p/pbar scattering around the world”*
- LEP, SLAC, KEK, TEVATRON, SpS, HERA and recently RHIC, CEBAF & LHC.



It is only natural that this quest for understanding nature continues in the future for precision QCD, EW and Beyond SM physics with the prospect of

- the Electron Ion Collider (EIC), LHC upgrades, future lepton-hadron machines, higher energy e-e, hadron and muon colliders
- Detector technologies and scientists are an integral part of that effort

Center for Frontiers in NUCLEAR Science (CFNS) hence proposed to host CPAD 2022 – I hope the cross fertilization between HEP and NP emerges & flourishes and thrives, because nature does not distinguish between HEP and NP

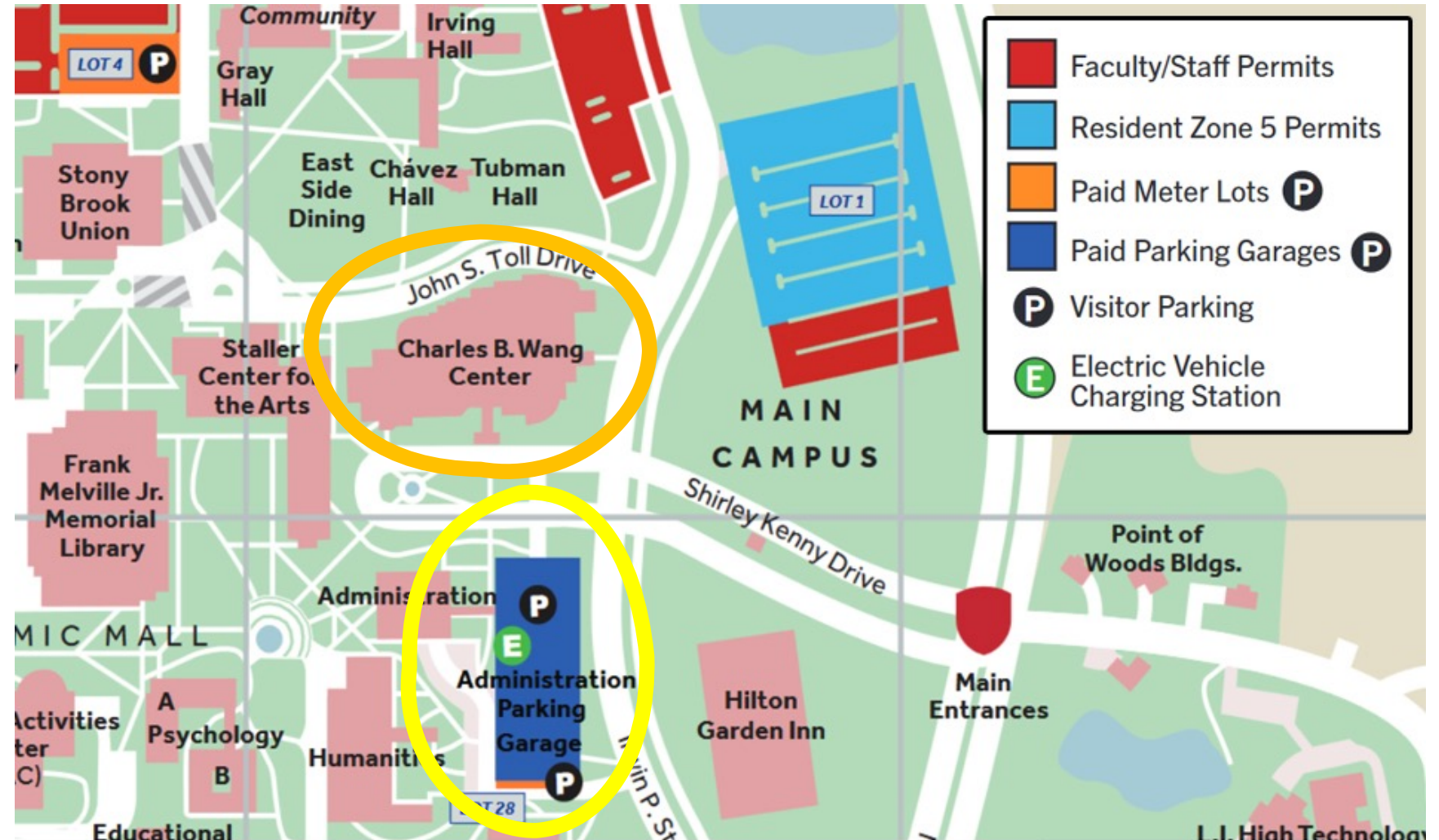


# Welcome to Stony Brook/CFNS

# NEEDFUL THINGS

1

- Wang Center
- Parking Garage
  - Please bring your parking ticket and get a sticker



# NEEDFUL THINGS

2

- Wireless Network → **WOLFIENET-GUEST**
- Wireless Network → **EDUROAM**
- Workshop rooms
  - Theater → around the Theater Gallery
  - Lecture Hall 1
  - Lecture Hall 2 } Across the Theater
- Rm 201 → North of Wang Center
- Daily coffee breaks in the Theater Gallery → in front of the Theater
- Daily lunches in the Zodiac Gallery → West of Theater Gallery
- Welcome Reception tonight in the Theater Gallery
- Workshop Dinner in the Zodiac Gallery → Thursday night
- Reception & Dinner → Please bring tickets for alcoholic beverages