

State of Center for Frontiers in Nuclear Science

- Brief introduction & reminders
- Summary of Center's activities Nov. 2018 -- now
- Looking in to the (near) future

The Center: Background & Motivation

Success of the EIC, and its full exploitation as a physics facility depends critically on *strong collaboration between theory and experiment*. This is not only true for within QCD/Nuclear Science, but also beyond. → Need to continually explore avenues to **deepen and broaden** the science scope beyond the EIC White Paper.

EIC with ~10 years of time scales → creates a special need to *attract, engage and support young scientists, who will be leaders of the programs at the EIC*.

An opportunity arose to attract **non-DOE/NSF funding** for supporting such an activities to **help the EIC Users Community** → try to create a Center dedicated to the science of EIC to achieve the above two broad goals.



**Center for Frontiers
in Nuclear Science**

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

Founded in September 2017

Vision:

A Center for all scientists interested in the US Electron Ion Collider

A “home” for

- scientific discourse and
- attract & support young scientists
- help seed future collaborations

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

The Center for Frontiers in Nuclear Science

Support (Thanks!)

- The Simons Foundation (\$5M) over 10 years & NY State/SUNY (\$3M)
- Strong support from BNL, SBU and their managements

Two footprints:

- Stony Brook, Physics Building C-floor (Peter Paul Seminar Room, CFNS lounge, Visitor offices) + the labs (for detector R&D if necessary) in the basement: renovation funded by NY State funds
- BNL, Physics Building: "Library" now converted into Seminar Room & 6 visitor cubicles : renovation funded by BNL

CFNS Governance

- **International Advisory Committee: *A formal annual review & advise***

R. Milner (MIT, Chair), A. Caldwell (MPI, Munich), L. Elouadrhiri (JLab), B. Jacak (UCB/LBNL), X. Ji (Shanghai/Maryland), Y. Kovchegov (OSU), Z.-E. Meziani (ANL), W. Nazarewicz (MSU), P. Newman (Birmingham, UK), B. Pasquini (Pavia), F. Pilat (ORNL), J. Qiu (JLab), G. Sterman (SBU), W. Vogelsang (Tübingen)

Ex. Officio: R. McKeown (JLab), B. Mueller (BNL), B. Surrow (Chair, EICUG-SC)

- **Program Advisory Committee: *Review of Workshop proposals* (Recommendation from the IAC2018)**

M. Diehl (DESY, Chair), C. Keppel (JLab), K. Kumar (U. Mass), P. Shanahan (MIT), F. Yuan (LBNL)

- **Local Steering Committee (SC): *Help implement IAC and PAC recommendations***

T. Hemmick (SBU), D. Kharzeev (SBU/BNL), J. Koryluk (SBU), T. Ullrich (BNL/Yale), R. Venugopalan & A. Deshpande (SBU/BNL, Chair)

- **Scientific Coordinators (members of the SC): *Logistical implementation with scientific activities***

C. Gal (SBU), J. H. Lee (BNL)

- **Administrative support:**

S. Delquaglio (SBU), M. Vera-Viteri (SBU) and R. Nieves (BNL) [All working for CFNS partially]

- **Director: *Smooth running of all activities and new initiatives***

A. Deshpande (SBU/BNL)

CFNS Activities & Initiatives: An Overview

SBU-BNL [Joint CFNS Seminars](#) : 2/month alternate between BNL and SBU

CFNS [Workshops and Adhoc Meetings](#)

CFNS Post doctoral fellow program:

- Post doctoral fellows coordinated and funded through BNL LDRDs at BNL
- Post doctoral fellows at SBU funded through Simons Funds at Stony Brook
- Joint post doctoral fellows with remote institutions funded through Simons Funds

Supervised by CFNS associated scientists/faculty (BNL, SBU and some remote university faculty)

Topics associated with the Electron Ion Collider, but also current research activities at RHIC, Jefferson Lab, CERN

Visitor program for (mainly, but not exclusively) young scientists: short (< 7 days) and long (up to 3 months) term

CFNS [EIC QCD Summer Schools](#)

~250 Scientists have visited the Center each year for the last 2 years

CFNS Scientific Workshops 2018-2019-2020

Conferences, Workshops, and Ad-hoc Meetings in 2018

November 28-30 2018	CFNS Inaugural Meeting & International Advisory Committee Review Location: Stony Brook and Brookhaven National Lab*
October 17-19 2018	Forward Physics And Instrumentation From Colliders To Cosmic Rays Organizers: Abhay Deshpande (SBU), Nils Feege (SBU), Yuji Goto (RIKEN), Joanna Kiriuk (SBU), J.H. Lee (BNL), Christophe Royon (UKansas)
September 10-12 2018	Quantum Entanglement at Collider Energies Organizers: Keith Baker (Yale), Ian Cloet (Argonne), Abhay Deshpande (SBU/BNL), Dmitri Kharzeev (BNL/SBU), Yen-Jie Lee (MIT), Thomas Ullrich (BNL), Raju Venugopalan (BNL) Location: Stony Brook*
September 5-7 2018	Short-range nuclear correlations at an Electron-Ion Collider Organizers: Abhay Deshpande, Dmitri Kharzeev, Jianwei Qiu, Raju Venugopalan, Rik Yoshida, Thomas Ullrich, Witold Nazarewicz Location: Brookhaven National Lab*
July 23-25 2018	Probing quark-gluon Organizers: Megan C Ringer, Konrad Tywoc Location: Brookhave
June 4-6 2018	Next-generation GPI Organizers: Christia Warsaw, Marie Boel Location: Stony Broc
February 5-9 2018	Polarized light ion ph Location: Ghent Univ
April 15 2018	Pre-DIS EIC Worksh Location: Kobe Univ

Past Conferences, Workshops, and Ad-hoc Meetings

July 24-26 2019	<i>Ad-hoc: Coherent Electron Cooling -- Theory, Simulation, and Experiment</i> Location: Stony Brook University Organizers: Vladimir N Litvinenko, Gang Wang, Yichao Jing
July 9-10 2019	<i>Ad-hoc: EIC PID Workshop</i> Location: Stony Brook University Organizers: Greg Kalicy (CUA)
Jun 24-28 2019	Initial Stages 2019 Location: Columbia University Organizers: Peter Steinberg (BNL), Raju Venugopalan (BNL)
April 17-19 2019	CFNS Workshop on Lattice Parton Distribution Functions Location: Brookhaven National Lab Organizers: Taku Izubuchi (BNL/RIKEN-BNL), Xiandong Ji (University of Maryland, TD Lee Institute, Shanghai), Nikhil Karthik (BNL), Swagato Mukherjee (BNL), Peter Petreczky (BNL), Andreas Schaefer (Regensburg University), Sergey Syritsyn (SBU/RIKEN-BNL)
February 19-20 2019	<i>ad hoc: sPHENIX DAQ Workfest</i> Location: Stony Brook

CFNS PAC
approved

Upcoming Conferences, Workshops, and Ad-hoc Meetings

May 2020	Workshop: Chirality, Vorticity and Magnetic Field in Heavy Ion Collisions Location: Stony Brook University Organizers: Dmitri Kharzeev
January 2020	Workshop: Exploring QCD with light nuclei at EIC Location: Stony Brook University Organizers: A. Deshpande, R. Dupre, M. Patsyuk, M. Sargsian, M. Strikman, C. Weiss
December 5-6, 2019	Review: CFNS Annual Review Location: Brookhaven National Laboratory Organizers: A. Deshpande, C. Gal
September 24-26 2019	Joint CFNS & RBRC Workshop on Physics and Detector Requirements at Zero-Degree of Colliders Location: Stony Brook University Organizers: Yuji Goto, J.H. Lee, Barak Schmookler, Chujo Tatsuya, Itaru Nakagawa, Joanna Kiriuk, and Yuji Yamazaki
Approved; Date TBD	Workshop: Beam Polarization and Polarimetry at EIC Location: CFNS (Stony Brook University or Brookhaven National Laboratory) Organizers: E. Aschenauer, D. Gaskell, V. Morozov, V. Ptitsyn, F. Willeke, C. Gal
Approved; Date TBD	Ad-hoc meeting: Electroweak Physics at the EIC Location: CFNS (Stony Brook University or Brookhaven National Laboratory) Organizers: W. Deconinck, Y. Furlitova, C. Gal, M. Gericke
Approved; Date TBD	Ad-hoc meeting: Radiative Corrections Location: CFNS (Stony Brook University or Brookhaven National Laboratory) Organizers: J. Bernauer, J. Friedrich, H. Gao, R. Milner
Approval Pending Clarification	Ad-hoc meeting: Streaming Readout V Location: CFNS (Stony Brook University or Brookhaven National Laboratory) Organizers: J. Bernauer, M. Battaglieri, Y. Furlitova, J. Huang, M. Purschke

CFNS Post Doctoral Fellow (& Students) Program

Activities supervised by CFNS associated faculty and scientists

- **Post doctoral fellows supported at BNL** on LDRDs ~ 8
 - Kolja Kauder, Alba Soto Ontoso, Abha Rajan, Kong Tu, Renaud Boussarie, James Daniel Brandenburg, ~~Zhenyu Chen~~ → Isaac Upsal
- **Post doctoral fellows supported at SBU** by Simons Foundation funds ~ 3
 - Barak Schmookler, Mriganka Mondal, ~~Yuxiang Zhang~~, Esha Rolli
- **Joint positions with remote institutions** (Proposals come from remote PI's, CFNS pays 50% of the base salary of the post doc + 5k for travel support) ~ 5
 - With PI's: B. Jacak (UCB), Z. Kang (UCLA, Dingyu Shao), Y. Kovchegov (OSU, Andrei Terasov), C. Hyde (ODU, Vitali Baturin), K. Paschke (UVa) + ~~Silvia Dalla Torre (INFN/Trieste, Yuxiang Zhang)~~, G. Sterman (YITP/SBU, Yang-Ting Chien)
- **Graduate Student support** (partial, incidental) with scientists @BNL and SBU: SBU graduate students
 - 2019-2020 Kaushik Roy Ph.D. with Raju Venugopalan
 - Partial support for MA/MS: 2 summer students, 1 visiting student **Athira K.V.** from NISER/India with AD.

 Location: CFNS, Stony Brook
Organizers: Christine Aidala, Martha Constantinou, Abhay Deshpande, Ciprian Gal,
Yacine Mehtar, Alexei Prokudin, Matt Sievert, Jinlong Zhang



1st CFNS Summer School for EIC Science

- August 1-9, 2019 at Stony Brook University
- **Lecturers:** Z. Davoudi (Maryland), Y. Hatta (BNL), T. Horn (CUA), Z. Kang (UCLA), A. Kiselev (BNL), C. Lee (LANL), V. Morozov (Jlab), N. Sato (Jlab), M. Sievert (UIUC), A. Stasto (PSU), G. Sterman (SBU), J. Zhang (SBU)
- 25 selected students 5 countries (and 8 nationalities) + 5-7 local students and post docs attended
- Formal response from students recorded for future improvements. Over all Overwhelmingly positive.

Other initiatives under consideration:

- **CFNS Connections to International Institutions:** Exchange visitor programs for the EIC under various stages of discussion:
APCTP (South Korea), ICAS San Martin (Argentina), Institute of Physics, IIT's, NISER (India), exploring possibilities with Australia, Japan, open to other interests
- **“Edward Bouchet Initiative for QCD”** involving students and faculty from predominantly minority institutions in EIC related activities (~10 minority institutions + SBU and MIT, UVa, Yale and U. Mass)
 - Seeking funds from a Traineeship program at the NSF

From 2018 Review: Advice, Evaluation

1. Workload for supporting Center's activities was found to inadequate, in particular, Marlene Veri-Viteri could be made full time. → *Due to change in the SBU management, this has not happened yet. Please re-emphasized in your 2019 report.*
2. Set up an external program committee
Done: Diehl, Shanahan, Keppel, Yuan and Kumar, already reviewed 2019/20 proposals
3. Emphasize and encourage diversity
*Adopt a plan for fostering diversity and inclusion in their recruiting.
Advertisements emphasized these already, at the time of last selection of candidates. First new hires will be next year, and this will be done emphatically.*
4. Develop a CFNS Charter
A draft was prepared on the APS/GHP and INT/UW format and is being worked on by RM and RV and will be adopted soon.
5. Concern about CFNS post doc mentoring
*You will see clear lines of responsibilities and mentoring within the Center on 1st slides of all talks
Additional hiring of faculty at SBU was presented in the department's long range planning*
6. Non-salary support for visitors

From 2018 Review: Advice, Evaluation

1. Workload for supporting Center's activities was found to inadequate. Need additional support: →
Due to changes in the SBU management, this has not happened yet. Please re-emphasized in your 2019 report.
2. ~~Set up an external program committee~~
Done: Diehl, Shanahan, Keppel, Yuan and Kumar, already reviewed 2019/20 proposals
3. ~~Emphasize and encourage diversity~~
Adopt a plan for fostering diversity and inclusion in their recruiting.
Advertisements emphasized these already, at the time of last selection of candidates. First new hires will be next year, and this will be done emphatically.
4. Develop a CFNS Charter (underway)
A draft was prepared on the APS/GHP and INT/UW format and is being worked on by RM and RV and will be adopted soon.
5. ~~Concern about CFNS post doc mentoring~~
You will see clear lines of responsibilities and mentoring within the Center on 1st slides of all talks
Additional hiring of faculty at SBU was presented in the department's long-range planning
6. ~~Non-salary support for visitors~~

Summary

- CFNS is now a fully operational, active Center: seminars, post docs, visitors, workshops, summer schools: ~250 visitors/year
 - You will see talks by all post docs and some students (partially) and fully supported by the CFNS resources at BNL and at SBU
- Most of the recommendations from the IAC's 2018 report are implemented or well on the way to being implemented
- With the transformation of EIC in to the CD0 and beyond anticipated soon, the needs of EICUG may also evolve. The Center is ready to help the UG any way it can.
 - Advice on how best to do this from the CFNS IAC would be highly appreciated

Charge to you: Need advice & suggestions on

Integration with the EICUG activities in 2020

- How best to support the EICUG's recent initiative on the preparation of Yellow Reports (see eicug.org) aimed at detector design concepts and strategies

Activities of the CFNS over the past two years, have been completely site non-specific.

- What changes in our program, if any, would the IAC suggest after the site selection, that would complement the support for the EICUG that would be offered by the two (and other) Labs?



Thank you

