

# SBS poster session

convener: Bogdan Wojtsekhowski

slides from advisers

# Intro to Saint Mary's University

*(and current student: Rémy Aresenault)*

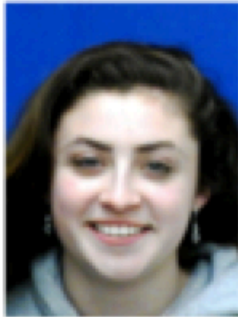
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- **The University:** small undergrad-focused university
  - one of oldest in Canada, founded 1802
  - ~7000 students total; 27 grad programs (~650 students)
- **Connection to Hall A / SBS:** 1 faculty (**Adam Sarty**), since 2000
  - Sarty shifted to Admin (AssocDean 2010-17, Dean/Assoc VP 2017- )
- **Student contributions to Hall A:**
  - Ugrads: 14 students – 23 4-month work terms, 10 BSc theses
  - Grads: 3 (+1) PhD theses , 1 MSc thesis
- **SBS Focused contributions:** CDet over last few years
  - this summer (with Rémy), ECAL construction
- **Introducing Rémy:**
  - finished just 1 year (!) of Astrophysics BSc degree
  - previously did 2 years in Quebec's CÉGEP system
- Thanks to BOGDAN and Doug over the years overseeing students!



## SULI program, with GEn-RP

# Assembling and Assessing Hodoscope Arrays for a Hall A Neutron Polarimeter



- Carly Weaver
  - CNU Undergrad



- Tanner Hawk
  - CNU Undergrad

- Brad Sawatzky (supervisor)

# North Carolina Central University (NCCU)

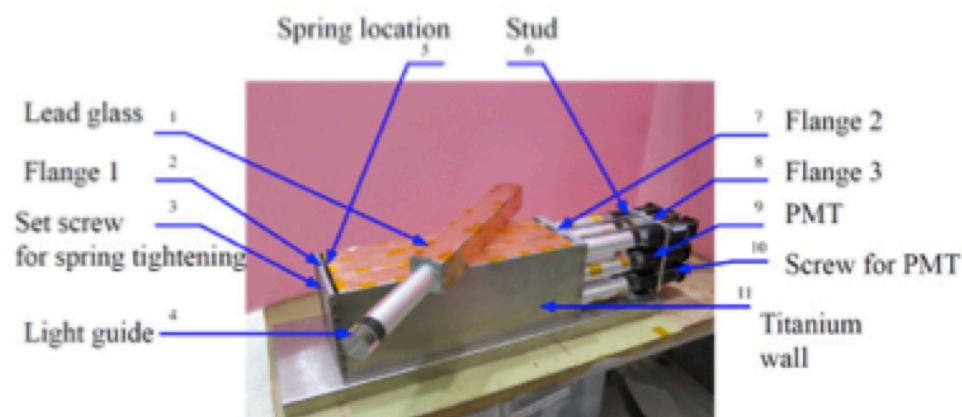
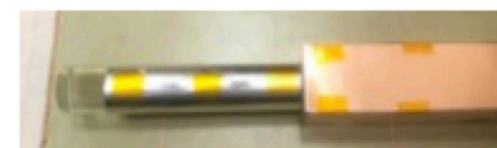
Binh Ton, NCCU master's student

- BS, Physics, NCCU
- Advisors: C. Jackson & B. Crowe (NCCU)
  - A. Shahinyan (Yerevan);
  - B. Woitsekhowski (JLab)
- Completed research internship at JLab from Aug, 2018-June 2019



## Major Accomplishments:

1. Cut and shaped aluminum sheets (~1700 ea) & squares (~3400 ea) and copper strips (~6800 ea)
2. Wrapped lead glass and light guide in aluminum and affixed copper strips to lead glass (~1000 ea).
3. Assembled ~50% of the needed super modules. Each super module is designed to contain 9 lead glass bars (wrapped in copper) with support attachments (Flange 2 and 3) for the light guides and photomultiplier tube bases.





# INFN Rome/Catania

## Front Tracker GEM students

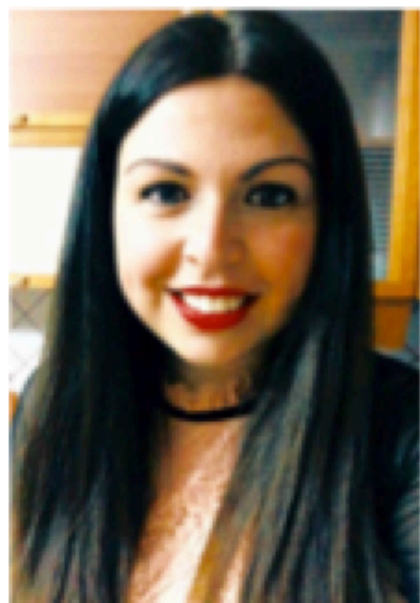
**Leonard Re** (PhD Student from University of Catania, formally end November this year); working on GEM foil quality checks, GEM modules assembling, HV training and testing; GEM chamber integration and cosmic test; development of a method for data rate suppression in firmware, based on a Genetic Programming/AI approach.

**Vanessa Brio** (PhD Student from University of Catania, temporarily suspended); partial involvement on the development of a microscopic Garfield++ simulator of a multi GEM chamber.

**Karolina Kmiec** (Master student Sapienza University of Rome, internship completed): contributed to the development and analysis of the microscopic GEM simulation.

# The Hadron Calorimeter HCAL-J: test, data analysis and commissioning

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**Vanessa Brio**

**Email address:** [vanessa.brio@ct.infn.it](mailto:vanessa.brio@ct.infn.it)

[briovanessa@gmail.com](mailto:briovanessa@gmail.com)

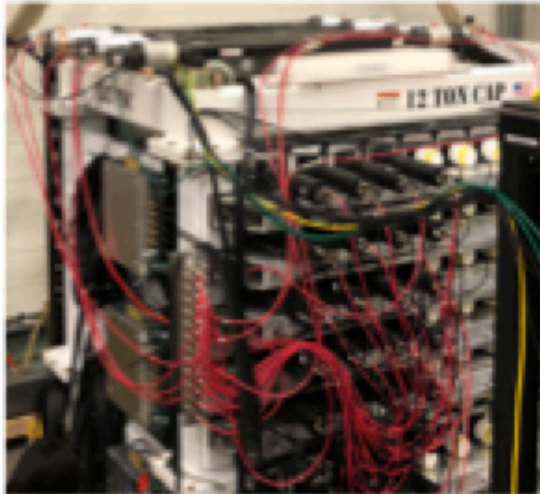
**PHD Student**

(end of PHD course scheduled for June 2021)

**Affiliation:** University of Catania / INFN Catania section

# HCAL-J

## July 2018 - Cosmic Ray Test at JLAB



24 signal long cables and 24 HV short cables  
(8 for the 4 paddles and 16 for the modules).

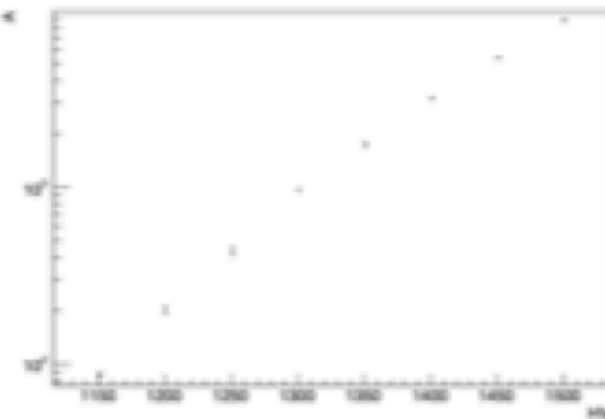
Ch.	HV	Ch.	HV
0	1349	8	1341
1	1337	9	1337
2	1305	10	1314
3	1397	11	1340
4	1316	12	1405
5	1301	13	1287
6	1330	14	1297
7	1280	15	1401

HV value used  
during the test for  
each phototube

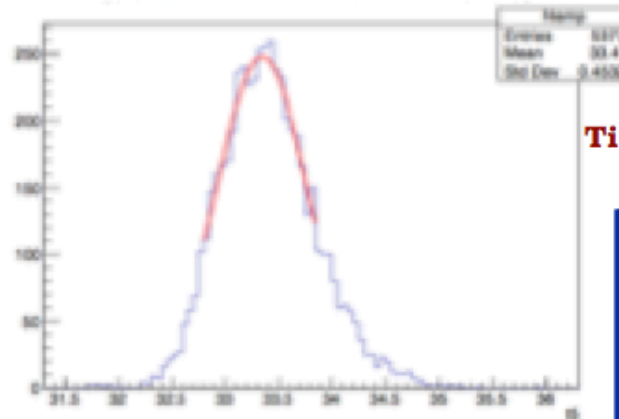
Module 0	Module 1	Module 2	Module 3
Module 4	Module 5	Module 6	Module 7
Module 8	Module 9	Module 10	Module 11
Module 12	Module 13	Module 14	Module 15

“Good event” = cosmic ray  
that crosses 4 modules in the  
same vertical path

### Avg. Amplitude vs. HV study



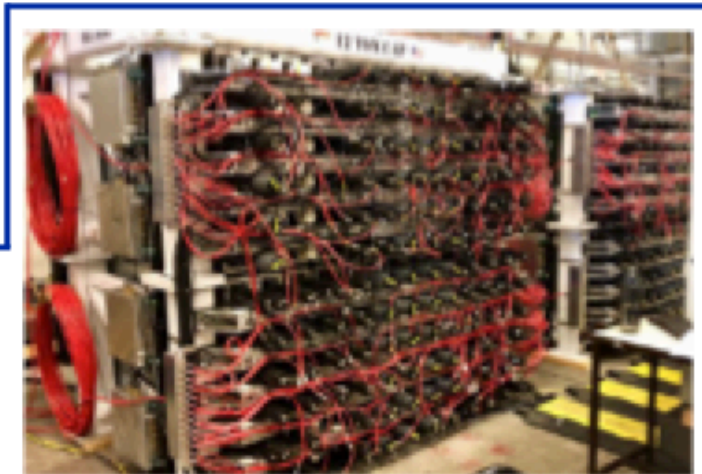
### Preliminary Time Resolution Study



$0.45 \times 4 = 1.8$  ns - trigger jitter contribution:

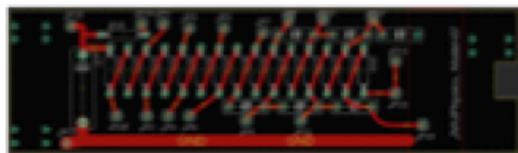
Time resolution about 1.4 ns in 15 cm path in  
module

**February 2019 - HCAL-J connections to the front-end**  
(in collaboration with other PHD students)

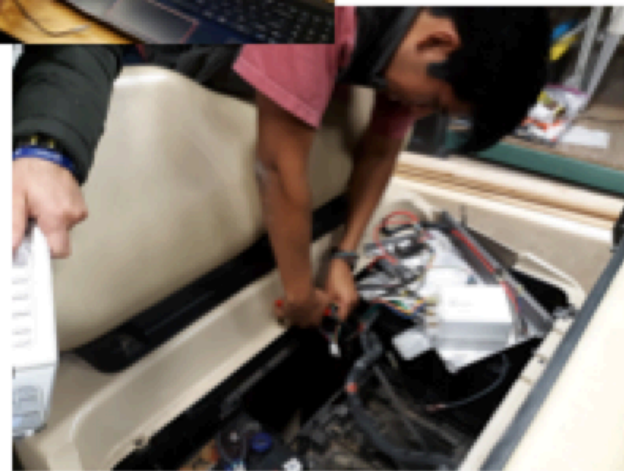
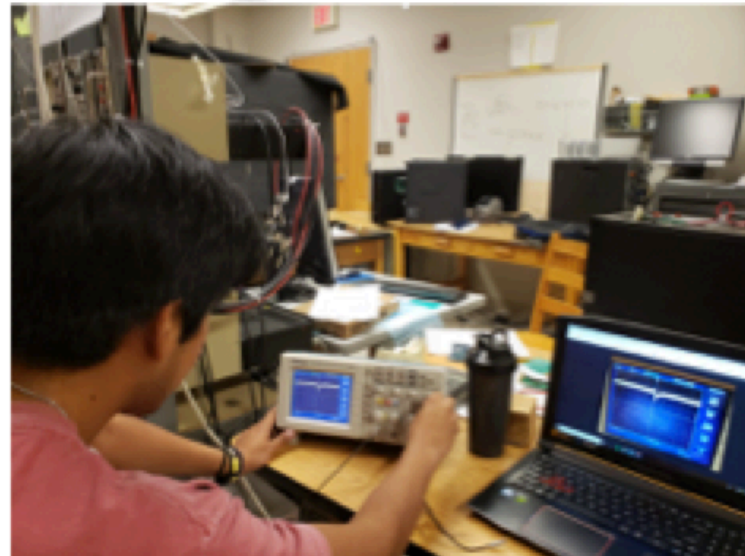


## **JMU PnP Group,** *in collaboration with JLab, Hall A, and SBS introduces...*

- ✦ **JMU Physics Senior**
- ✦ **w/ an engineering background**
- ✦ **GN's student in many classes** (4+2?)
- ✦ **IN & GN research student**
- ✦ ***in-situ* (JLab) SBS work this summer**
- ✦ **designed/built JMU's version of the ECAL base** (which actually works!)



## **Jorge Luis Peña**





## “Commissioning the Coordinate Detector for the Super Bigbite Spectrometer Program”

by Taylor Edwards

- Supervisor: Peter Monaghan
- Taylor is a junior, starting her 3<sup>rd</sup> year at CNU
  - Major: Physics
  - Minor: Mathematics
- Member of the CNU Marching Band and the Kappa Kappa Psi ( $\kappa\kappa\psi$ ) Music Fraternity
- Joined my research group at JLab in May, along with Ashley Yoon and Kara Ferner (all SBS)





# Cates' Group: graduate students

Projects to which each student is contributing:



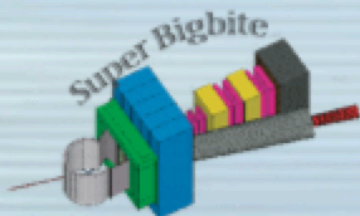
Sumudu Katugampola

- Development of the SBS  $G_E^n$  target cells including studies of nuclear spin relaxation on metal surfaces.
- Development, production and testing of Hall C  $A_1^n$  target cells.
- Ultra-low noise NMR studies relevant to  $^3\text{He}$  polarimetry and measuring the atomic enhancement parameter  $K_0$  (see poster).
- Assembling and commissioning ECAL and HCAL



Chris Jantzi

- Development of the SBS  $G_E^n$  target cells including the thin metal end windows.
- Development, production and testing of Hall C  $A_1^n$  target cells.
- Developed the single-frequency laser and optics system we use to characterize target cells (internal pressures and alkali densities).
- Assembling and commissioning ECAL and HCAL



SBS Collaboration Meeting - August 5-6, 2019



## Anuruddha Rathnayake– University of Virginia

- Anuruddha is a rising 3<sup>rd</sup> year graduate student in physics at UVa.
- Current Projects:
  - SBS GEM layer assembly, testing and commissioning.
- Possible thesis experiment: GMn
- Advisors: Nilanga Liyanage and Kondo Gnanvo.
- Poster title : SBS GEM Commissioning for GMn/GEN-RP (with Malinga Rathnayake and Thir Gautam)

## John Boyd – University of Virginia



- John is a rising 3<sup>rd</sup> year graduate student in physics at UVa.
- Current Projects:
  - SBS GEM module construction;
  - design and development of U-V GEM modules for SBS front tracker.
- Possible thesis experiment: GEn-RP
- Advisors: Nilanga Liyanage and Kondo Gnanvo.
- Poster title : U-V GEM Modules for SBS Front Tracker



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of VIRGINIA

## Sean Jeffas – University of Virginia



- Sean is a rising 2<sup>nd</sup> year graduate student in physics at UVa.
- Current Projects:
  - Optics analysis for APEX experiment.
  - Will participate in the construction and testing of U-V GEM modules for SBS.
- Possible thesis experiment: GEn
- Advisor: Nilanga Liyanage



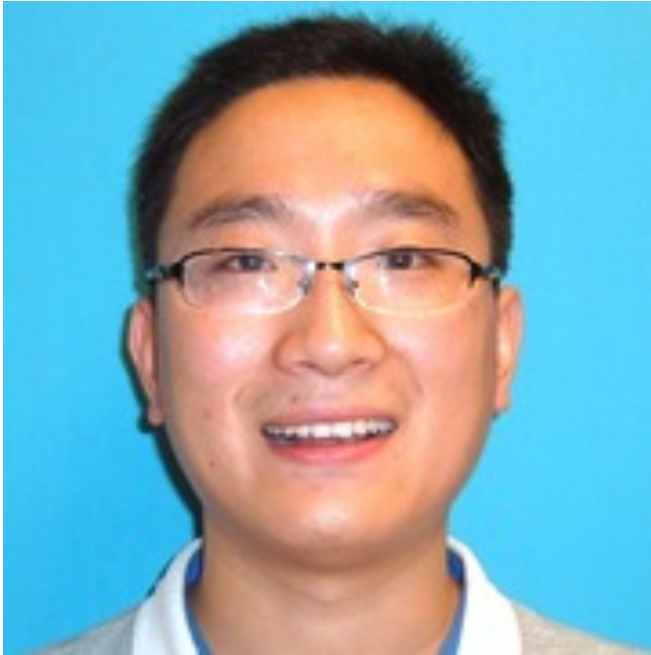


## **John Matter– University of Virginia**

- John is a rising 6<sup>th</sup> year graduate student in physics at UVa.
- John took thesis data from hall C color transparency experiment, completing analysis now.
- John contributed to SBS Hadron Calorimeter work earlier.
- Will work on SBS module testing and GEM readout
- Advisor: Nilanga Liyanage



## **Siyu Jian – University of Virginia**



- Siyu is a rising 5th year graduate student in physics at UVa.
- Siyu made major contributions to the development and installation and testing of SBS GEM layers.
- Siyu prepared and installed the two SBS GEM module packages for the PRex experiment.
- Siyu is currently taking data for for his thesis from the PRex experiment.
- Advisor: Nilanga Liyanage

## Danning Di– University of Virginia

- Danning is a 7<sup>th</sup> year graduate student in physics at UVa.
- Danning made major contributions to:
  - testing of SBS GEM modules.
  - Installation, testing and commissioning of GEM readout system.
  - Development and testing of hardware level data suppression for GEMs.
  - Bigbite tracking simulation for GMn
- Advisor: Nilanga Liyanage



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# College of William and Mary



- Undergrad @ St. Norbert's College, Mike Olson advisor (Hall A user)
- Beginning her 2<sup>nd</sup> year, 2019-20
- Qualifying exam in 1 week = no poster today
- Worked on GRINCH summers 2018 and 2019
- Plan: GRINCH commissioning and analysis
- Thesis on  $G_M^n$

***Maria Satnik***

**Skills/Experience:** FPGA and Arduino controllers, electronics, ROOT, C++, C#, C, Java, Python, xml, VHDL, Assembly Language, Linux, Excel, Mathematica, MATLAB, and LaTeX

# Josh McMullen (Northern Michigan University)

- SULI Student Summer 2019
  - JLab Mentor Douglas Higinbotham
  - NMU Mentor William Tireman
- Cabling and setup of the BigBite spectrometer in the TED building
- Has written the skeleton for a new BigBite NIM paper
  - Meant to be a group paper documenting all our new equipment
  - Thank you to Josh for getting it started!
- Poster summarizes the material that should go in our new NIM paper.



SBS Collaboration meeting, JLAB, Aug. 5-6, 2019

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## Introduction of working group

**Michael Kohl <kohl@jlab.org> \***

**Hampton University, Hampton, VA 23668**  
**Jefferson Laboratory, Newport News, VA 23606**



\* Presently supported by DOE DE-SC0013941, NSF HRD-1649909, PHY-1812402



# Present working group \*

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# Present working group \*



Postdoc (**Thir** Gautam: TREK/E36; SBS GEMs)  
funded presently by DOE

Nepal



Postdoc (**Ishara** Fernando: MUSE, JLAB)  
funded presently by NSF and Jlab

Sri Lanka



PhD student (**Bishoy** Dongwi: TREK/E36)  
funded presently by DOE

Namibia



PhD student (**Jesmin** Nazeer: DarkLight, MUSE, GEMs)  
funded presently by NSF

Sri Lanka



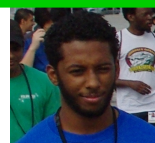
Master's student (**Tanvi** Patel: MUSE, GEMs)  
funded presently by NSF

India / USA



Master's student (**Malinga** Rathnayake: SBS GEMs)  
funded presently by DOE

Sri Lanka



Undergraduate student (**Letrell** Harris: TREK)  
funded presently by DOE

USA



Undergraduate student (**Angel** Christopher: GEMs)  
funded presently by NSF

Nigeria

\* Supported by DOE DE-SC0013941, DOE-SCGSR2018, NSF HRD-1649909, and PHY-1812402



## **Dr. Thir Gautam– Hampton University**

- Thir graduated in Spring 2019 on GMp (Advisor: Eric Christy)
- Current Projects:
  - SBS GEM layer assembly, testing and commissioning; GEN-RP
  - TREK (J-PARC) data analysis
- Advisor: Michael Kohl
- Poster title : SBS GEM Commissioning for GMn/GEN-RP (with Malinga Rathnayake and Anuruddha Rathnayake)





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