

Snowmass Early Career:

Rare Processes and Precision Frontier

Small Experiments (RF03)

Leadership...and a call for greater involvement!

BY [JOSHUA BARROW](#) & [MANOLIS KARGIANTOULAKIS](#),

W/OTHER SEC MEMBERS

SEPTEMBER 16TH, 2020

TO SUBSCRIBE TO THE SEC RPPMF MAILING LIST, SEND THE FOLLOWING EMAIL TO LISTSERV@FNAL.GOV:

SUBSCRIBE SNOWMASS-EC-RAREPROCESSES FIRSTNAME LASTNAME

General Comments from an SEC Perspective

- **Many thanks to the organizers of this workshop for considering and encouraging our input in this forum!**
 - **Great to see many early career scientists on this agenda!**
- SEC wants to encourage greater integration between early career scientists and future experimental efforts
 - Need this especially for junior professors, postdocs, and graduate students
 - Most are focused on distinguishing themselves
 - Should help in attempting to build greater structures to make it easier for early career scientists to join future-facing efforts
 - **How to build these structures now?**
 - SEC members and liasons encouraged others to submit LOIs, including those related to the future of the Fermilab Muon Campus

General Comments from an SEC Perspective (cont.)

- Currently doing rather well in informing and attracting other early career members thus far through the Snowmass Early Career channels and meetings
 - We hope we can provide valuable input for RF03 and associated current/future experiments
 - **Early career members will become the future leaders of these efforts despite (at times) little to no current Snowmass participation**
 - Need to do more! How? Who?
- **We greatly appreciate a first step in this direction, and would like you all to consider activities in these directions going forward!**

Topical Group Liaisons: RF03

Planning to serve in these capacities relatively indefinitely, *jointly* (where applicable)

JOSHUA BARROW



- PhD Candidate, University of Tennessee, Knoxville
- URA Visiting Scholar, Fermilab (remote)
- Member of...
 - DUNE
 - NNBAR
- ORNL/UTK $n \rightarrow n'$

MANOLIS KARGIANTOULAKIS



- Research Associate, Fermilab
 - Member of...
 - Muon g-2
 - Mu2e
- Background in parity violating elastic scattering

Documents, Share Drives, Meetings



Please see the [SEC Leadership Plans Google Doc](#) for a quick overview

See also the most recent [SEC General Meeting Minutes](#) for a more complete overview of all goings-on in Snowmass Early Career



Our shared Google Drive can be accessed [here](#) *with editing rights*—**BE CAREFUL**

Will contain running minutes, other documents from SEC group members' attendance at various Rare Processes and Precision Measurements Frontier subtropical group meetings, and beyond



SEC RPPMF Meetings are planned to occur once every month (or so)

Allow group members to attend workshops, meetings, etc., and report to others on continual progress throughout the Frontier

Join us!

LOTS OF NEW AND EXCITING EXPERIMENTS
HAPPENING NOW AND ON THE HORIZON!

Backup Slides

Semipermanent Points of Contact

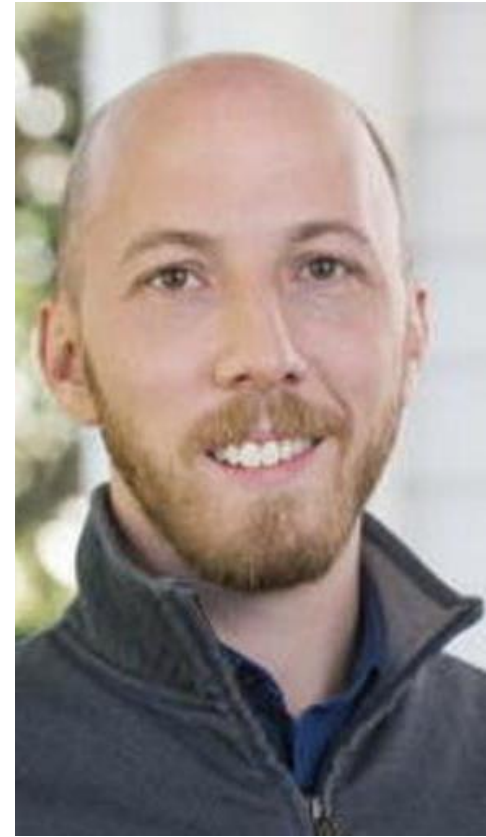
Will serve in this capacity as long as necessary, but will request SEC input one, three, and six+ months from now to see if others would like to switch into the role (*one at a time for continuity*)

JOSHUA BARROW



- PhD Candidate, University of Tennessee, Knoxville
- URA Visiting Scholar, Fermilab
- Member of DUNE, NNBAR, and ORNL/UTK $n \rightarrow n'$ Collaborations

JAKE BENNETT



- Assistant Professor, University of Mississippi
- Member of the Belle and Belle II Collaborations
- Data production coordinator for Belle II

Topical Group Liaisons

Planning to serve in these capacities relatively indefinitely (quite small SEC group...)

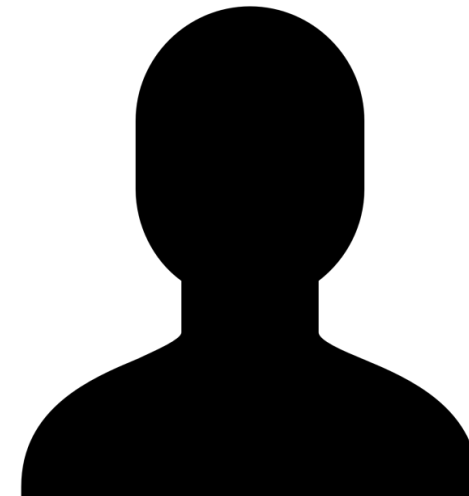
RF1: WEAK DECAYS OF B AND C QUARKS

[JAKE BENNETT](#)



RF2: WEAK DECAYS OF STRANGE AND LIGHT QUARKS

NEED SOMEONE! SEND US YOUR RECOMMENDATIONS!



Topical Group Liaisons

Planning to serve in these capacities relatively indefinitely, *jointly*

RF5: CHARGE LEPTON FLAVOR VIOLATION

1. MANOLIS KARGIANTOULAKIS



&

2. RICHIE BONVENTRE



- Staff Scientist, Berkeley Lab
- Mu2e, tracker firmware and simulation
- Particle Data Group

Topical Group Liaisons

Planning to serve in these capacities relatively indefinitely, *jointly*

RF6: DARK SECTORS AT HIGH INTENSITIES

1. YU-DAI TSAI



- Post-doctoral fellow, Fermilab
- Temporary SEC Theory Frontier Coordinator
- Studies dark matter models
- Proposes terrestrial experiments and astrophysical searches for detection of hypothetical dark sector particles
- Selected articles [here](#)

&

2. TOM EICHLERSMITH

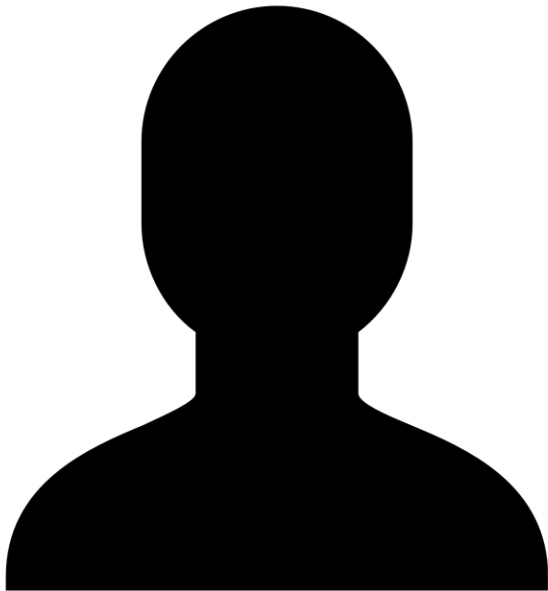
- PhD Student, University of Minnesota (he/him/his)
- SEC Computational Frontier Liaison
- Working on LDMX with analysis and software development

Topical Group and Frontier Liaisons

Planning to serve in these capacities relatively indefinitely (quite small SEC group...)

RF7: HADRONIC SPECTROSCOPY

NEED SOMEONE! SEND US YOUR RECOMMENDATIONS!



COMMUNITY ENGAGEMENT FRONTIER LIAISON

[SOPHIE MIDDLETON](#)



- Post-doctoral scholar at Caltech
- Intensity Frontier Fellow at Fermilab
- Mu2e, LDMX and Mu2e-II
- Works on: software, analysis, calorimetry, and DAQ

What do we want to do, with your help!

RF is *generally* focused on unique and powerful low energy observables with high energy scale implications

What new things can search for experimentally?

- Where did the matter-antimatter asymmetry come from? **(RF4)**
- Why is there only flavor violation in the neutrino sector? **(RF5)**
 - “Who ordered that?” → Rabi on the discovery of the muon: why are there generations?
- Are there richer phenomenologies of dark matter which are testable? **(RF6)**
- Can far reaching measurements of certain observables be made with ~table-top/cheap/quick experiments? **(RF3)**

What discrepancies are waiting to be discovered in “known” physics?

- How can we break the Standard Model? ⇒ With precision!
- Are we missing things in weak decays of b or c quarks at current facilities? **(RF1)**
- Are we missing dynamics of light or strange quarks? **(RF2)**
- What can exotic, heavy, excited hadrons and their decays tell us anew? **(RF7)**

Encouraging Early Career involvement in these experimental programs is paramount for the development and enactment over the coming decade! Get involved!