



# Fermilab Accelerator Division Co-op Program Overview

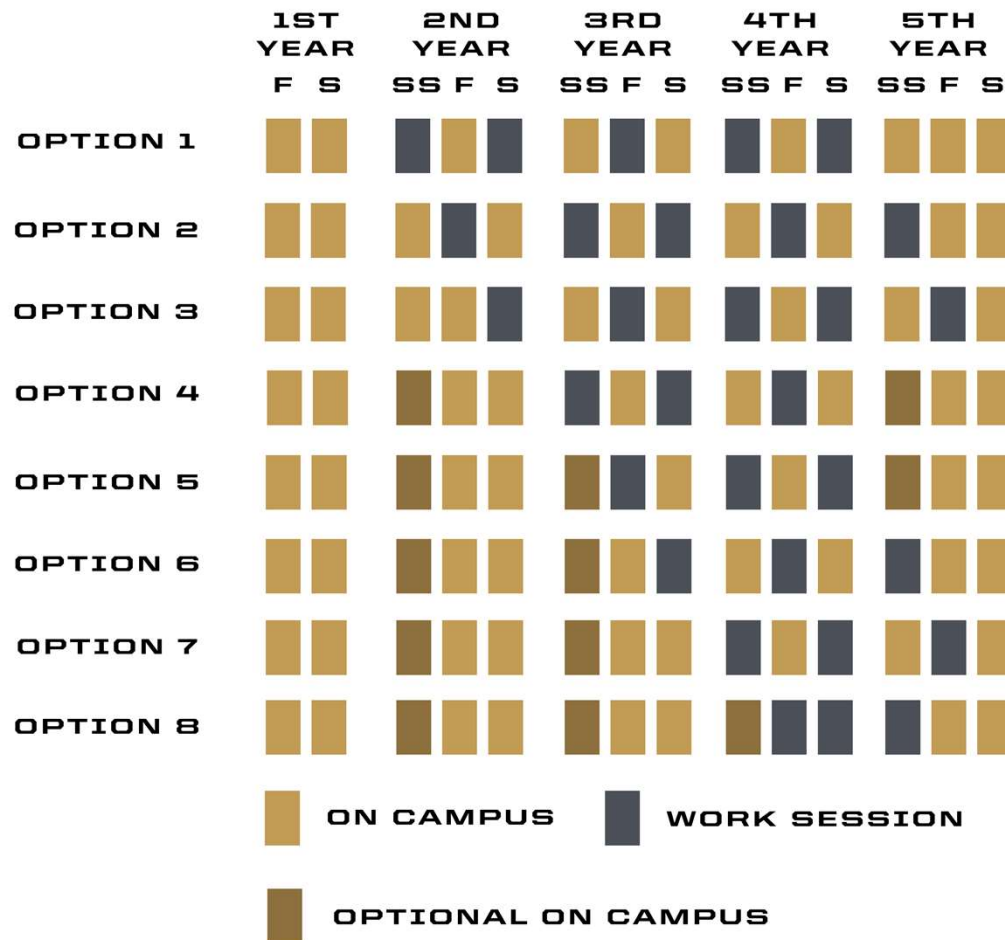
George Lolov, Quinn Peterson

11/17/22

# What is a Co-op Program?

- A cooperative (co-op) education program allows students to gain valuable real-world work experience in-between taking classes at school. Students typically come out of co-op programs with at least 1 full year of work experience. Pay is increased with each co-op session/school semester completed.
- **Structure**
  - Agreement between the student's university and Fermilab for the student to alternate between working at Fermilab and attending school on a semester/trimester/quarter basis
  - Students must spend a minimum of 3 semesters (or equivalent) working at Fermilab before they graduate

# Example Co-op Schedule



*Purdue University*

# Co-op Program Benefits

- Can be thought of as an extended internship
- Students will be able to get a year's worth of experience working on cutting edge technology at Fermilab
- Students can either continue work from previous session or take on new work with each new session
- Projects can include work in: mechanical design (fixturing/supporting equipment) and analysis, mechatronics/robotics, machine learning (physics based model creation), hands on prototype fabrication, and much more!
- Project work can be used for a thesis
- Access to a community of very intelligent and friendly mentors
- **Consideration**
  - Participation in a co-op program often delays your graduation date

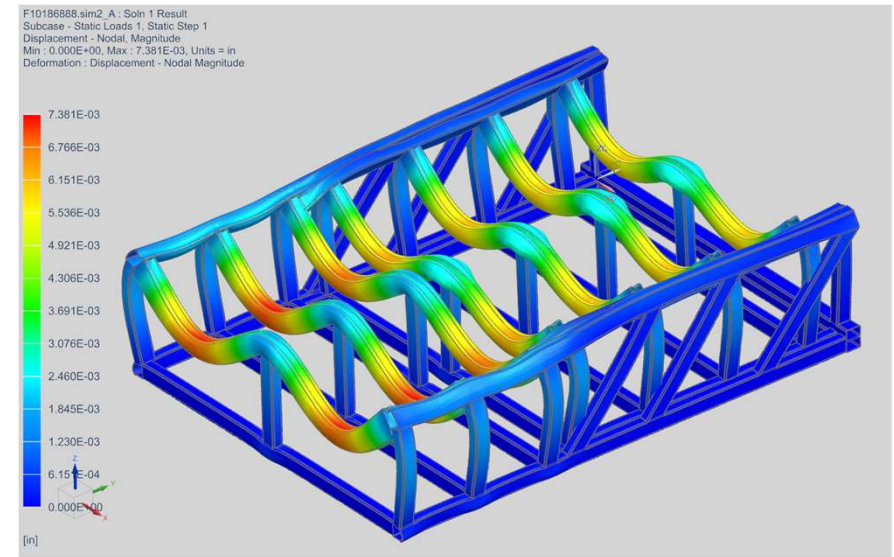
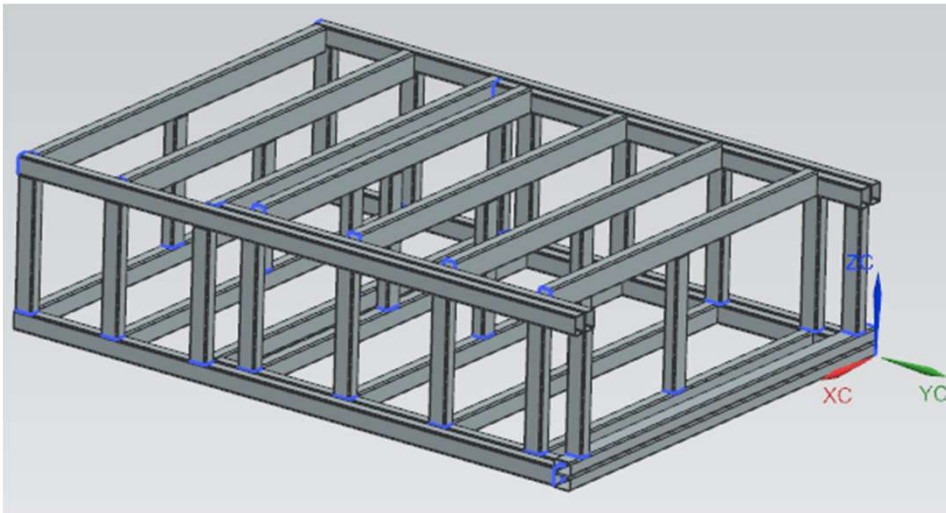
# Majors Considered for Fermilab Co-op Program

- Mechanical Engineering
- Physics
- Engineering Physics
- Computer Science Engineering
- Electrical & Electronics Engineering
- Environment Safety & Health
- Finance & Accounting
- Project Management
- Human Resources
- Communications

Desirable majors for  
Accelerator Division Co-  
op program

# Example Co-op Project: Structural Design

- Support stand design and simulation
- 2<sup>nd</sup> year university student

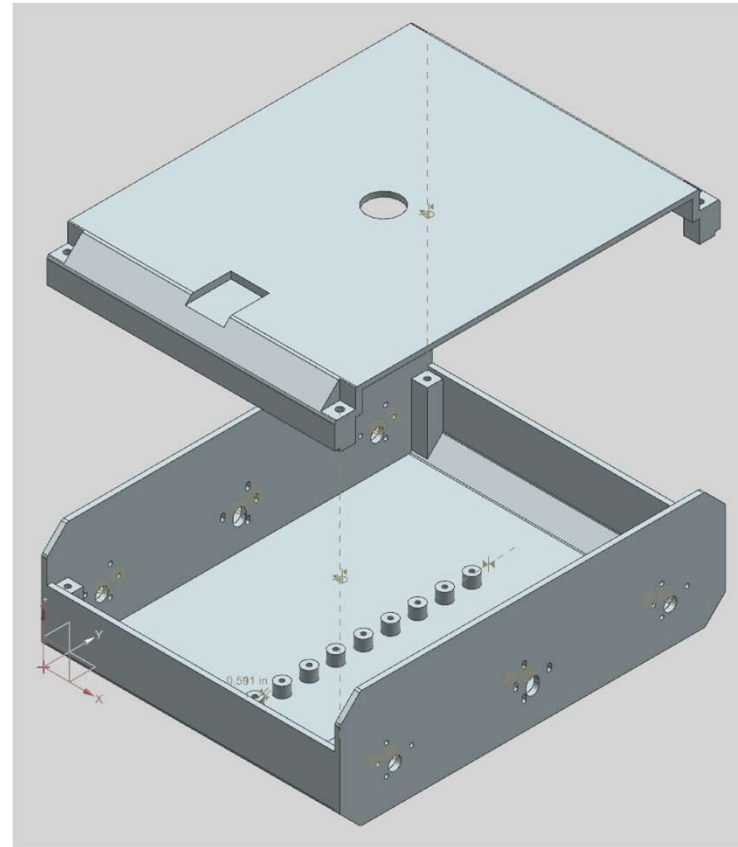


- Application of Statics coursework
- Student learned Nastran simulation software on the job



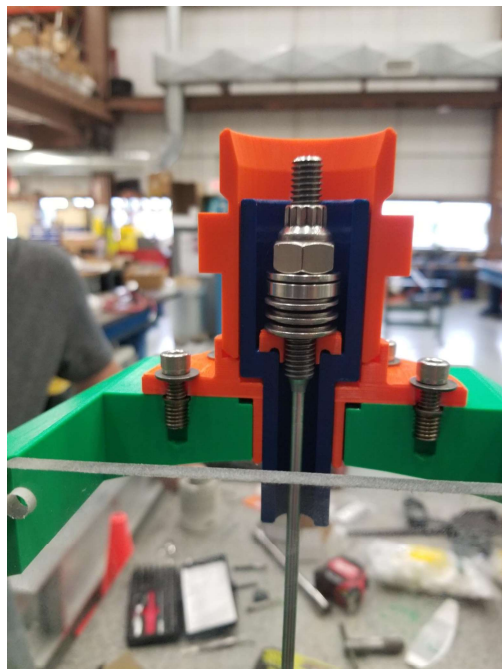
# Example Co-op Project: Robotic Chassis Design for 3D Printing

- Robotic rover chassis design
- Design must be waterproof
- Next session student will finalize design + 3D print and design 3D printed gaskets for water tightness



# Example Co-op Project: LBNF Horn A Spider Support 3D Assembly

- Build 3D Modeled assembly of the new LBNF Horn A Spider Support Assembly.
- Used Prusa's for all printing
- 164 total printing hours





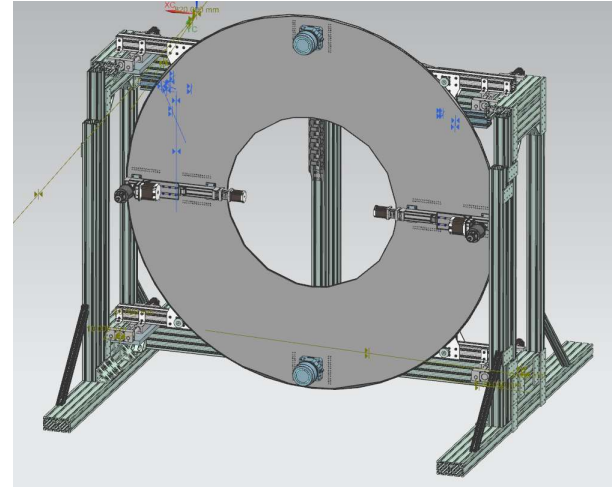
# Example Co-op Project: LBNF Decay Pipe Window Remote Handling

**Objective:** Design mechanism that is capable of accessing the Decay Pipe Window and remotely removing and replacing it in the event of seal leakage. Chamber is highly radioactive after beam on activity, so no human contact is allowable.

- Thesis project

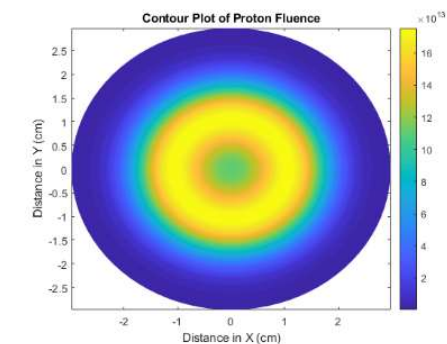
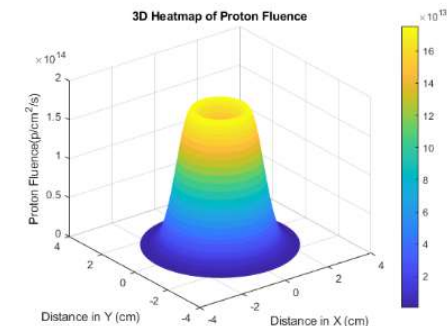
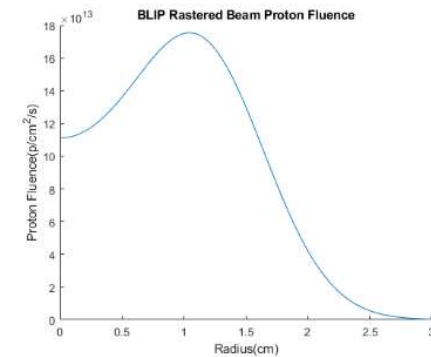
## Parameters:

- Must maintain pressurized helium in decay pipe
- Be able to reach optimal seal compression on window
- Fit within tight space of shaft leading into target chase
- Components survive 100 hours of radiation exposure
- Must be remotely operable

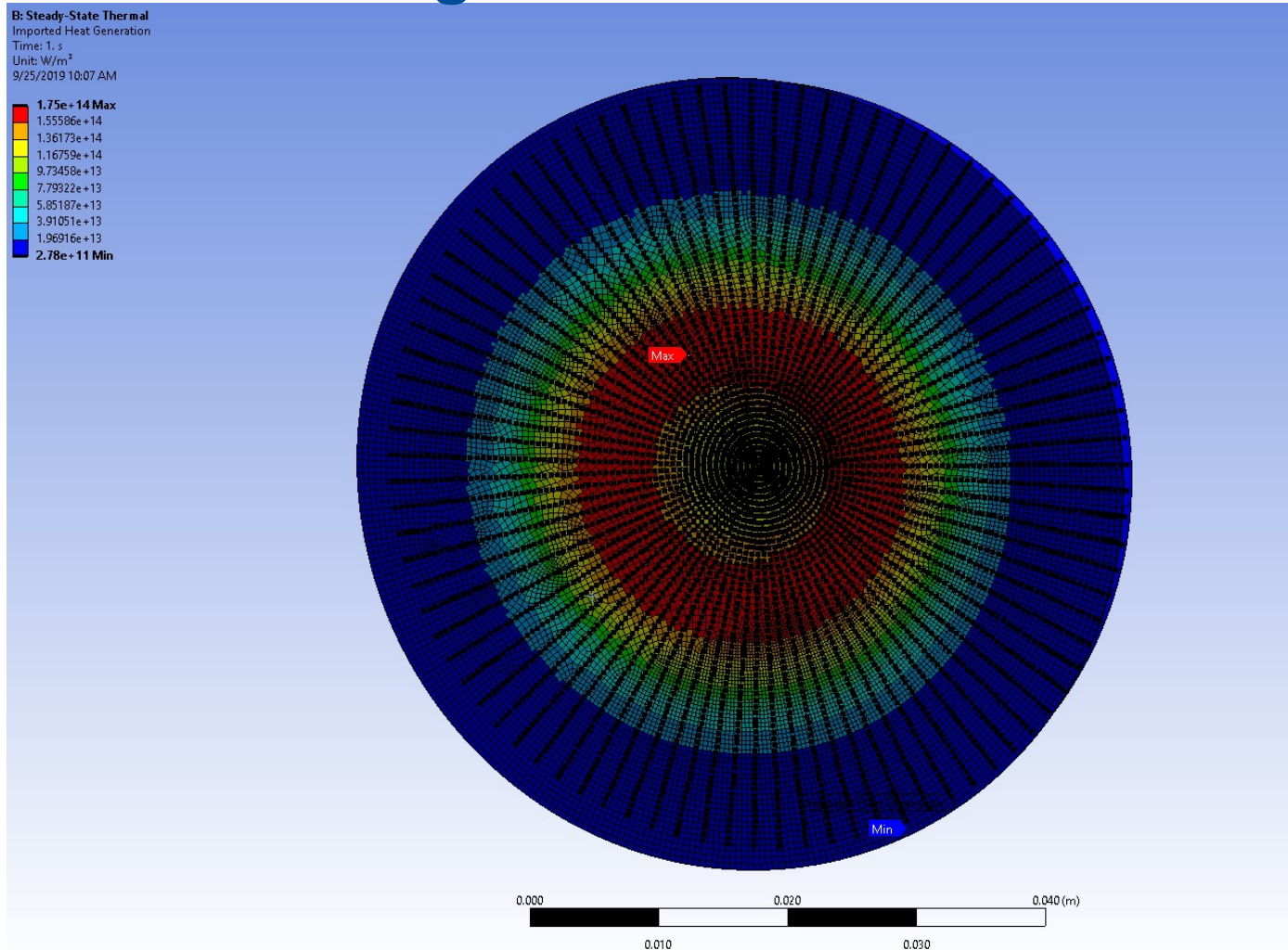


# Example Co-op Project: BLIP Rastered Beam Proton Fluence Program

- Using 2D axisymmetric data, create a program that outputs a 3D heatmap of the proton fluence.
- Program:
  - Intakes data
  - Converts it to a 3D surface
  - Provides Contour plot
  - Outputs to file to be imported into ANSYS
- Data is mapped to 3D model in ANSYS to look at radiation damage of specimens.

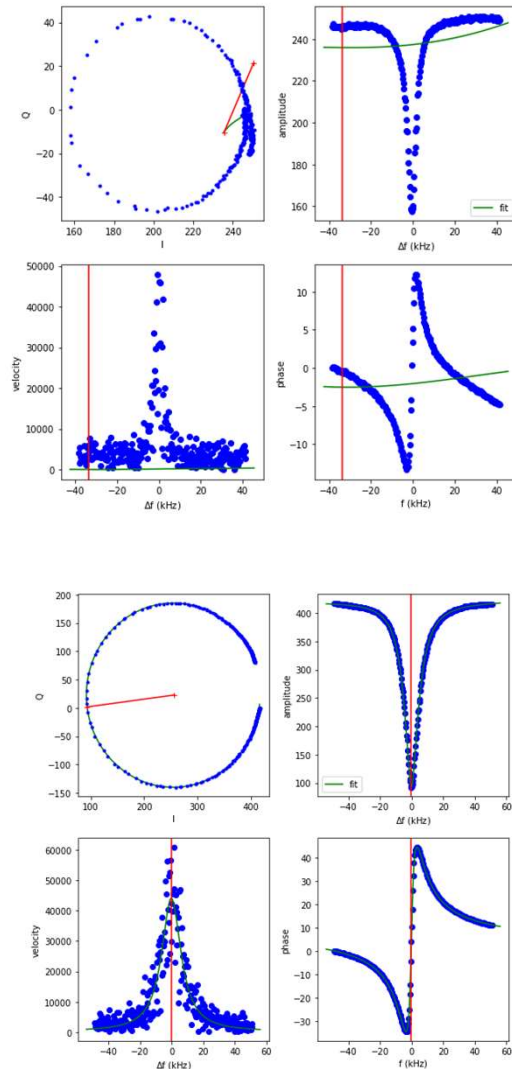


# Example Co-op Project: BLIP Rastered Beam Proton Fluence Program

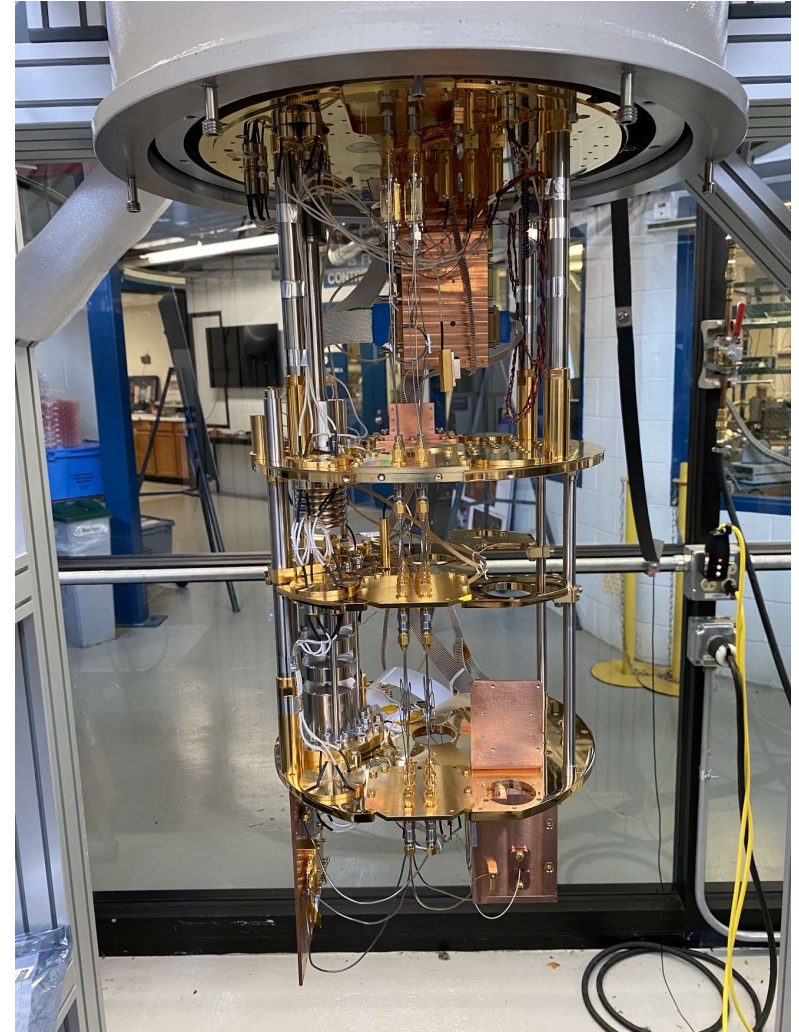




# Example Co-op Project: Laser Based Experiment for Dark Matter Research



- Student designed laser mirror/scanning cryogenic system with the end goal of Dark Matter detection
- Thesis project



# Eligibility Requirements

- Full-time undergraduate enrollment in a 4-year program at a U.S. college or university for the duration of program participation
- Registered in academic institution's cooperative education program
- Sophomore academic standing
- 18 years of age at time of employment
- Minimum cumulative grade point average of 3.0 on a 4.0 scale
- Proof of health insurance
- Commitment to completing a minimum of three semesters or four quarters of work at Fermilab with alternating periods of full-time study

Students can apply on the Fermilab Job Opportunities Site:

<https://fermilab.wd5.myworkdayjobs.com/en-US/FermilabCareers>

Keyword: co-op



# Application Requirements

- Online application with resume
- Unofficial transcript
- Proposed Cooperative Education schedule (required at time of application submission)

## Other Program Considerations

- Housing is not included. Onsite and area contact listings can be provided (currently working on improving this)
- Travel not included
- Student must stick to agreed schedule from beginning to end. Changes require Fermilab and university approval
- Student must have proof of health insurance.
- Partial tuition reimbursement, up to \$1000 per calendar year

# Additional Program Information

- <https://internships.fnal.gov/undergraduate-cooperative-education-program/>

## **For any questions please reach out to:**

- George Lolov (AD Co-op Program Supervisor)
  - [glolov@fnal.gov](mailto:glolov@fnal.gov)
- Quinn Peterson (AD Co-op Program Supervisor)
  - [quinnp@fnal.gov](mailto:quinnp@fnal.gov)
- Mallory Bowman (Co-op Program Administrator)
  - [mbowman@fnal.gov](mailto:mbowman@fnal.gov)