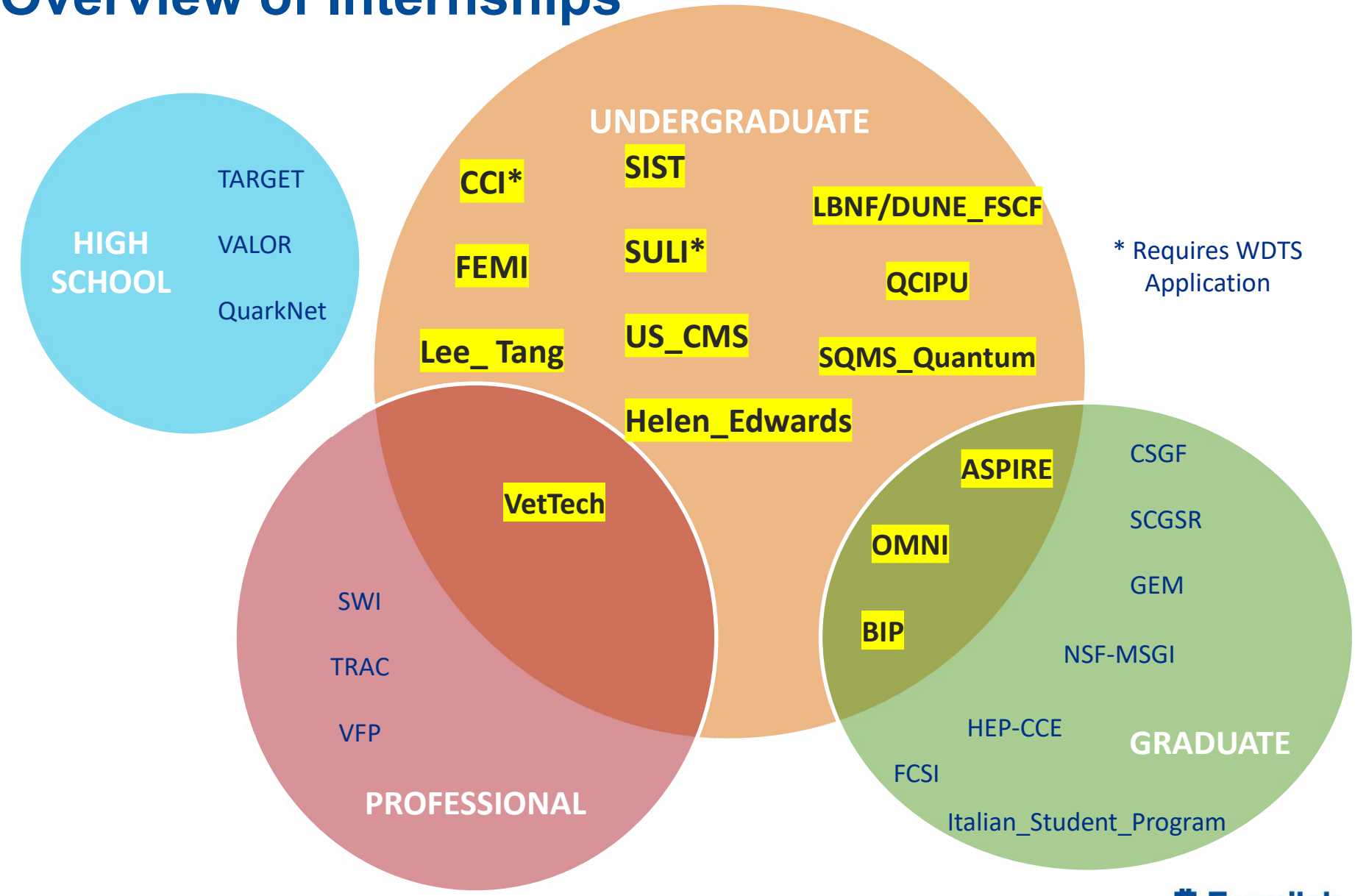
Undergraduate Internship Programs

2022 Fermilab Collegiate Pipeline Program Pilot

Hosted by Fermilab Society of Women Engineers (fSWE)

Overview of Internships



* Requires WDTS Application

Undergraduate Internship Programs

1. ASPIRE: Accelerator Engineering Fellowships for Underrepresented Minorities
2. BIP: Business Intern Program
3. CCI: Community College Internships
4. FEMI: Fermilab Environmental Management Internship
5. Helen Edwards Summer Internship
6. LBNF/DUNE in South Dakota FSCF Internship
7. Lee Teng Internship
8. Omni Technology Alliance Internship Program
9. QCIPU: Quantum Computing Internship for Physics Undergraduate Program
10. SIST: Summer Internships in Science & Technology
11. SULI: Science Undergraduate Laboratory Internships
12. SQMS Quantum Undergraduate Internship
13. VetTech Internship Program
14. US CMS Undergraduate Internship

Which Program Aligns With My Career?

INTERNSHIP PROGRAM	FIELD/DISCIPLINE
ASPIRE: Accelerator Engineering Fellowships for Underrepresented Minorities	Accelerator Engineering fields
BIP: Business Intern Program	Business, Accounting, Economics, Policy, & Computer Science
CCI: Community College Internships	Instrumentation, technology, and computing projects
FEMI: Fermilab Environmental Management Internship	Environmental Studies, Environmental Management, Environmental Engineering, Environmental Science, or Geoscience
Helen Edwards	Physics & Particle Accelerator Technology
LBNF/DUNE in South Dakota FSCF Internship	Engineering, Mining and related fields
Lee Teng Internship	Accelerator Science, Engineering, Particle Accelerator Physics and Technology
Omni Technology Alliance Internship Program	Cybersecurity, Information Technology, and other related fields

Which Program Aligns With My Career? (con't)

INTERNSHIP PROGRAM	FIELD/DISCIPLINE
QCIPU: Quantum Computing Internship for Physics Undergraduate Program	Physics and Quantum Computing for the simulation of physics
SIST: Summer Internships in Science & Technology	Physics, Engineering (Mechanical, Electrical and Computer), Materials Science, Mathematics and Computer Science
SULI: Science Undergraduate Laboratory Internships	Physics or Engineering
SQMS Quantum Undergraduate Internship	Physics and Engineering
VetTech Internship Program	Computing, Mechanical, Electrical, & Procurement
VFP: Visiting Faculty Program	Physics, Mathematics, Mechanical Engineering, Electrical Engineering, Computer Engineering, Materials Sciences, Computational Sciences, or Environmental Sciences
US CMS Undergraduate Internship	STEM fields, in particular Physics

Eligibility Requirements Table

INTERNSHIP PROGRAM	ELIGIBLITY REQUIREMENTS
ASPIRE: Accelerator Engineering Fellowships for Underrepresented Minorities	1. Undergraduate junior and senior or post-graduate (masters) engineering students who are historically and contemporarily under-represented in accelerator engineering fields, including Black, LatinX, Indigenous identities, and women 2. U.S. citizen or permanent resident at time of application 3. Full-time enrollment in a 4-year program of study (for undergraduates) at all US colleges or universities for the duration of appointment 4. Minimum cumulative grade point average of 3.0 on a 4.0 scale
BIP: Business Intern Program	1. Junior and Senior undergraduate and master's degree students obtaining relevant business degrees from local colleges and universities or recently graduated 2. Undergraduate cumulative minimum GPA of 3.0 (4.0 scale)/3.5 (5.0 scale) or greater 3. Must be at least 18 years of age 4. Must have US Work Authorization

Eligibility Requirements Table (con't-1)

INTERNSHIP PROGRAM	ELIGIBLITY REQUIREMENTS
CCI: Community College Internships	1. Current, full-time community college enrollment 2. Completion of at least 6 credit hours in science, mathematics, engineering, or technology course 3. Overall completion of at least 12 credits hours 4. 3.0 grade point average or above on a 4.0 scale 5. At least 18 years of age 6. U.S. citizenship or permanent resident status 7. Proof of identity and eligibility to work in the United States *8. Students may participate in the CCI program twice and can apply to the CCI program a maximum of three times.*
FEMI: Fermilab Environmental Management Internship	1. Enrollment in a U.S. Community College or 4-year university 2. Majoring in Environmental Studies, Environmental Engineering, Environmental Management, Environmental Science, Conservation, Geoscience or a related field 3. 3.0 grade point average or above on a 4.0 scale 4. Able to conduct field work in an outdoor setting 5. Eligible to work in the United States

Eligibility Requirements Table (con't-2)

INTERNSHIP PROGRAM	ELIGIBLITY REQUIREMENTS
Helen Edwards	1. Current accredited European university/college enrollment and completion of at least one full year at the time of application 2. Minimum 4.0 GPA on a 5 point scale 3. At least 18 years of age 4. Conversational and written English fluency 5. Evidence of identity and eligibility to work in the United States 6. Non-US citizens will usually require a visa to be eligible to work. Once accepted to the program, Fermilab's Visa Office will assist with obtaining the appropriate United States visa. 7. Proof of medical insurance while at Fermilab
LBNF/DUNE in South Dakota FSCF Internship	1. Undergraduate sophomore or junior at time of application 2. 4-year U.S. college or university enrollment 3. 3.0 grade point average or above on a 4.0 scale 4. Eligible to work in the United States

Eligibility Requirements Table (con't-3)

INTERNSHIP PROGRAM	ELIGIBLITY REQUIREMENTS
Lee Teng Internship	1. Junior academic standing at the time of application; outstanding sophomores may be considered 2. U.S. citizen or foreign national* enrolled full-time at a U.S. university **Applicant is fully responsible for completing all visa formalities prior to the start of the program.* 3. Must be at least 18 years of age by program start date 4. Proof of identity and eligibility to work in the United States 5. Proof of medical insurance for the duration of the internship
DOE Omni Technology Alliance Internship Program	1. Undergraduate or graduate student or recent graduate (within 2 years). Pursuing or having a degree in cybersecurity, information technology (IT), engineering or other IT-related fields) 2. GPA of at least 3.0/4.0 3. 18 years of age by June 1 2023 4. US citizen

Eligibility Requirements Table (con't-4)

INTERNSHIP PROGRAM	ELIGIBLITY REQUIREMENTS
QCIPU: Quantum Computing Internship for Physics Undergraduate Program	1. Enrollment in a U.S. college or university in Physics 2. Completed year of introductory level Physics course 3. Eligible to work in the United States
SIST: Summer Internships in Science & Technology	1. Undergraduate sophomore or junior at time of application 2. 4-year U.S. college or university enrollment 3. 3.0 grade point average or above on a 4.0 scale 4. Eligible to work in the United States
SULI: Science Undergraduate Laboratory Internships	1. Full-time undergraduate enrollment at an accredited institution *and* completion of at least one year as a matriculating undergraduate 2. Undergraduate cumulative minimum GPA of 3.0 on a 4.0 scale 3. 18 years of age 4. U.S. citizen or lawful permanent resident 5. High school diploma or certificate of General Education Development (GED) 6. May participate in the SULI program twice and can apply to the SULI program a maximum of three times.

Eligibility Requirements Table (con't-5)

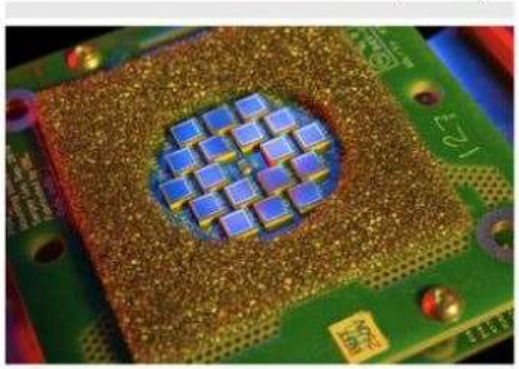
INTERNSHIP PROGRAM	ELIGIBLITY REQUIREMENTS
SQMS Quantum Undergraduate Internship	1. Full-time undergraduate enrollment at an accredited institution in the United States 2. Minimum 18 years of age 3. High school diploma or certificate of General Education Development (GED)
VetTech Internship Program	1. Military experience 2. Proof of identity and eligibility to work in the U.S.
US CMS Undergraduate Internship	1. Be full-time undergraduate students enrolled at an accredited U.S.institution and have completed at least one year as a matriculating student 2. Be at least 18 years of age 3. Be able to work remotely

Internship Projects

Working alongside our scientific, engineering, computing, and operations experts, our interns support and advance particle physics and accelerator research.

Fermilab Science

Detectors, Computing and Quantum



CMS Experiment

Neutrino experiment

Mu2e will search for μ to e

Construction of the Mu2e detector

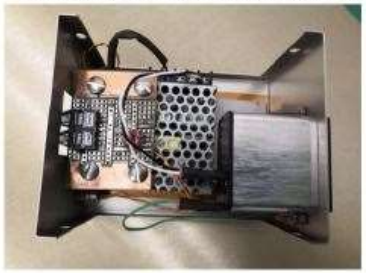
Dark Energy Search

Testing and Building Electronics for Experiments

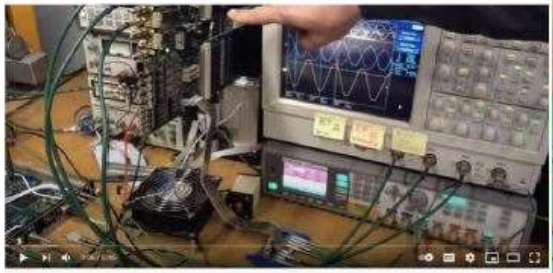
- Electrical engineers at Fermilab work on challenging projects to make detector electronics or tests key components of the experiments
  - Detector electronics: how to detect and readout particle hits, design and testing

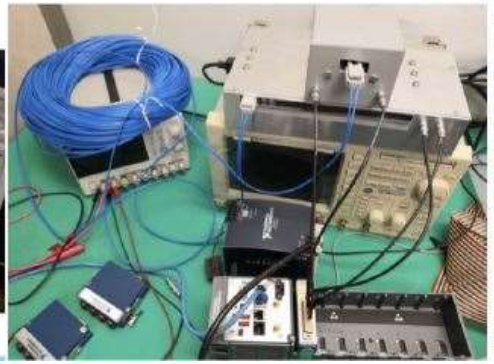
Detector electronics

30kA power supply control and current distribution

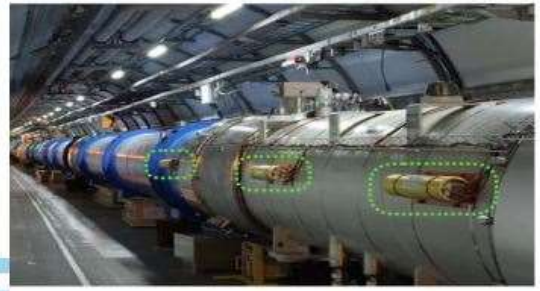


Superconducting



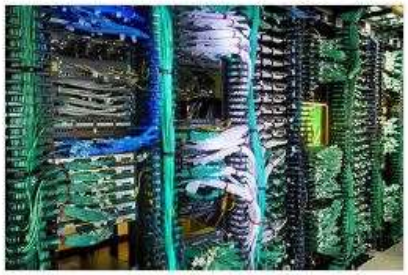


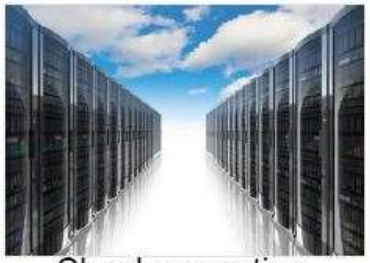
Beam Loss Monitoring System



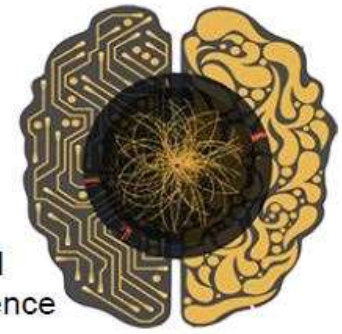
Software and Computing for Experiments

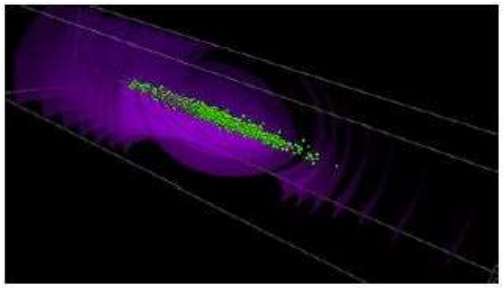
- Fermilab develops software to operate accelerators, detectors, and process physics data in modern computing systems
- Examples:
  a. Data acquisition and controls
  b. Cloud storage
  c. Software to extract physics results
  d. Data transport (networking)
  e. Big data analysis
  f. Artificial intelligence applications
  g. Quantum computing for HEP


Networking


Cloud computing


R&D


Artificial Intelligence


Accelerator beam simulation

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Binary Neutron Star rate predictions from observations of dwarf galaxies

Karen Pérez Sarmiento, *Macalester College*
Supervisors: Alex Drlica-Wagner and Marcelle Soares-Santos

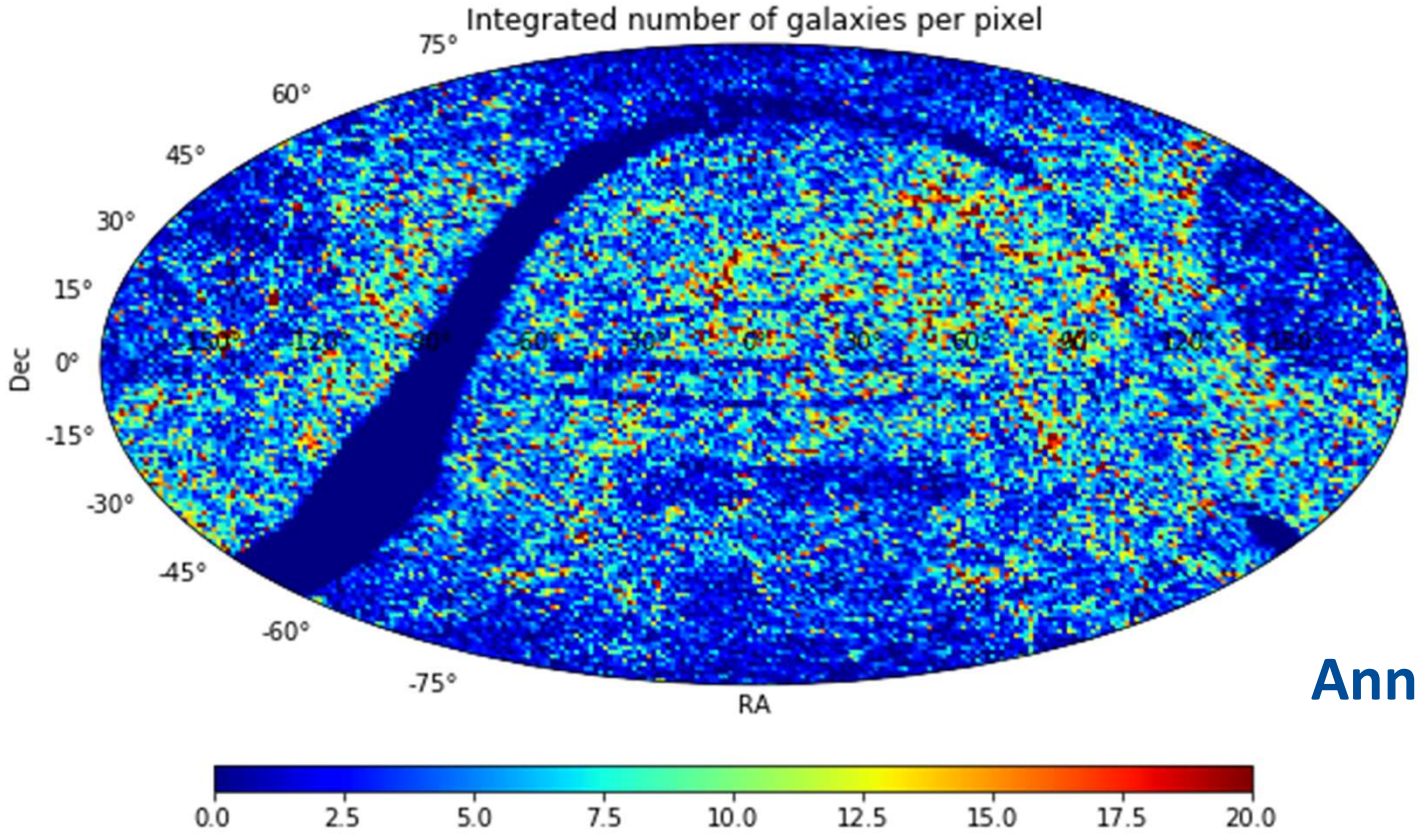
SIST Final Presentations

15 August 2017

MACALESTER COLLEGE

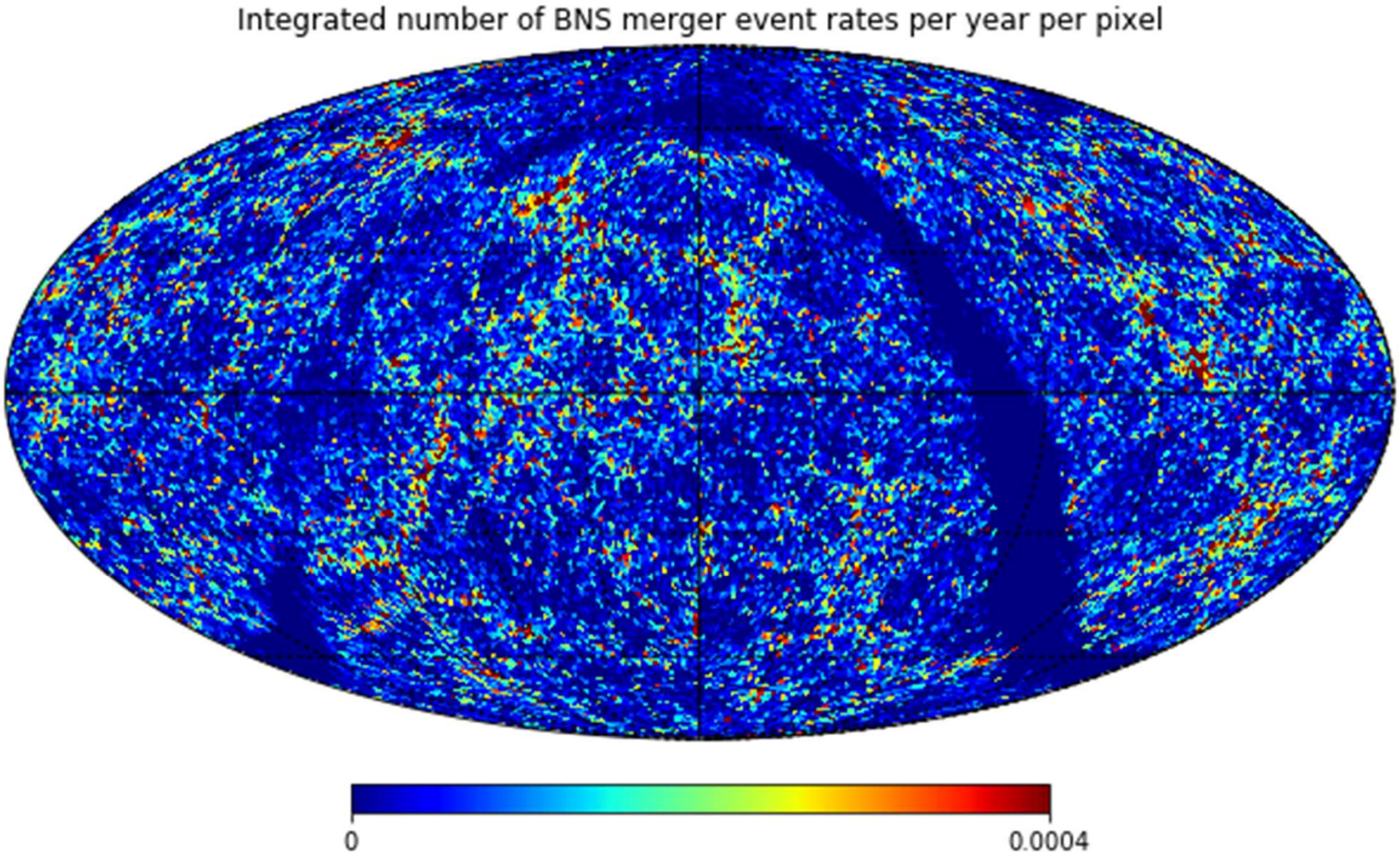
Building galaxy catalog to estimate stellar mass

Artificial features around galactic plane and SDSS footprint due to difference in catalog source for redshift and color.



Annis 2016

Results from New Galaxy Catalog

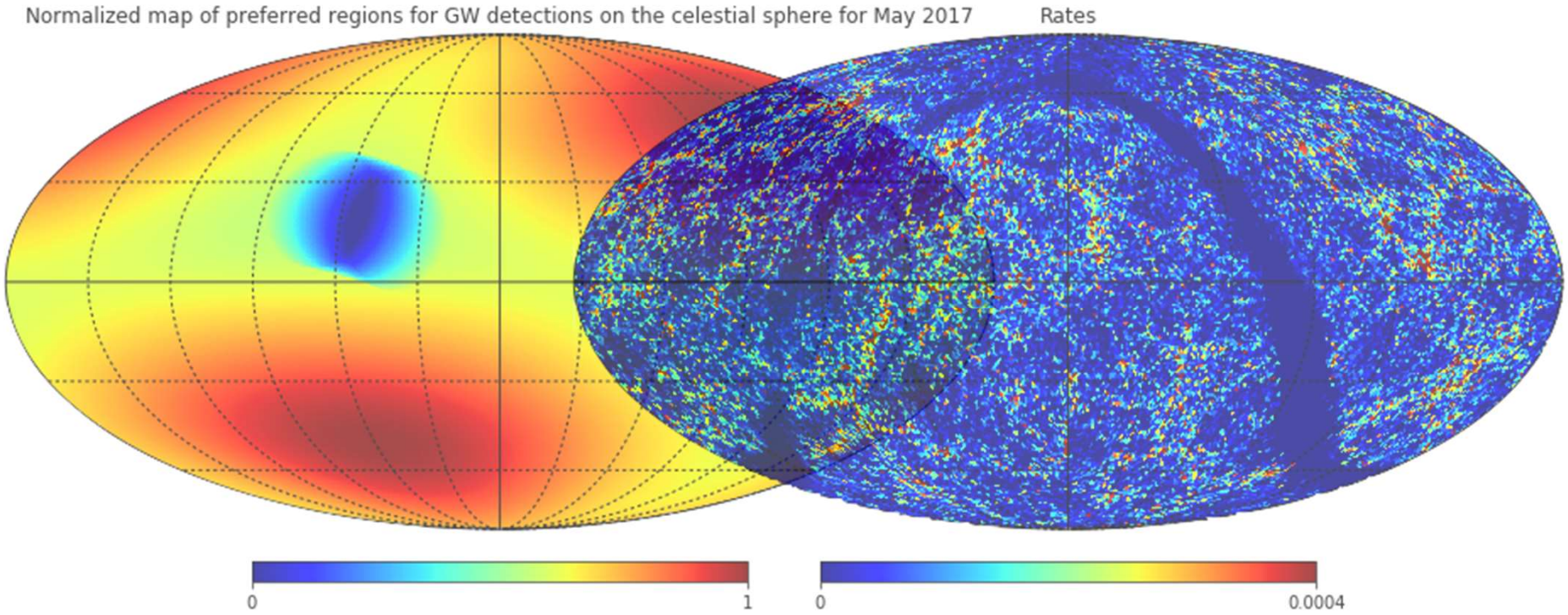


BNS event rates ($yr^{-1}pixel^{-1}$)

Fermilab

Predicting observable rates of BNS with LIGO

Multiply LIGO sensitivity map (for every month and rates map.



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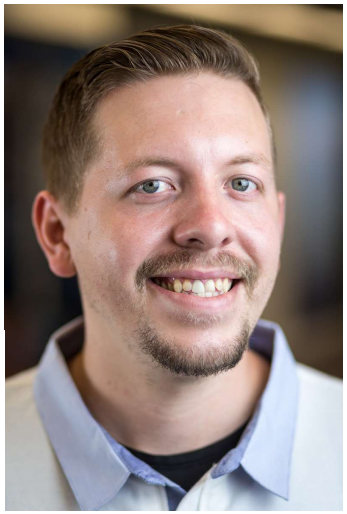
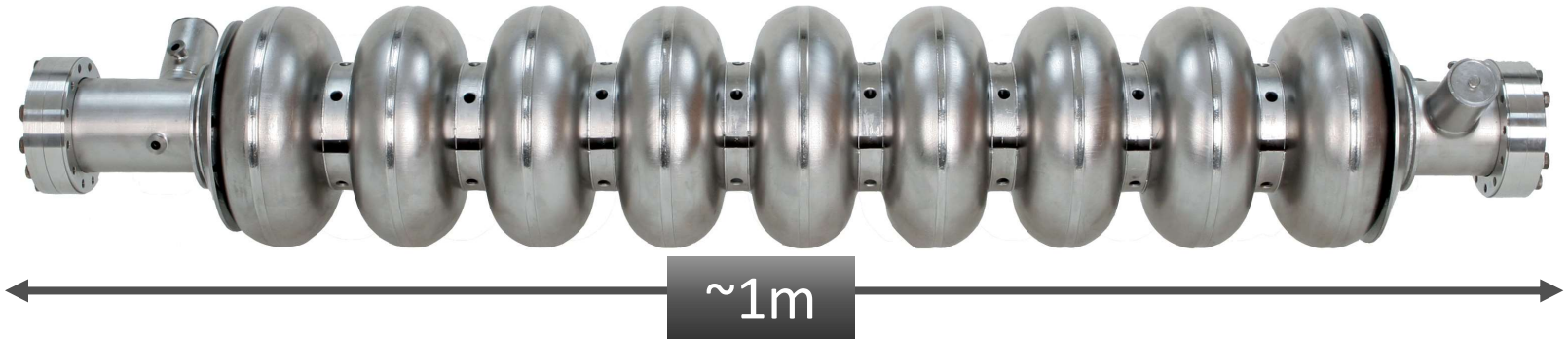
Making Nb_3Sn Film (Triniobium-tin)

Robert Ridgway
SIST Intern – Technical Division – Material Science Lab
Supervisor – Sam Posen, Associate Scientist at Fermilab
Summer 2017

UIC

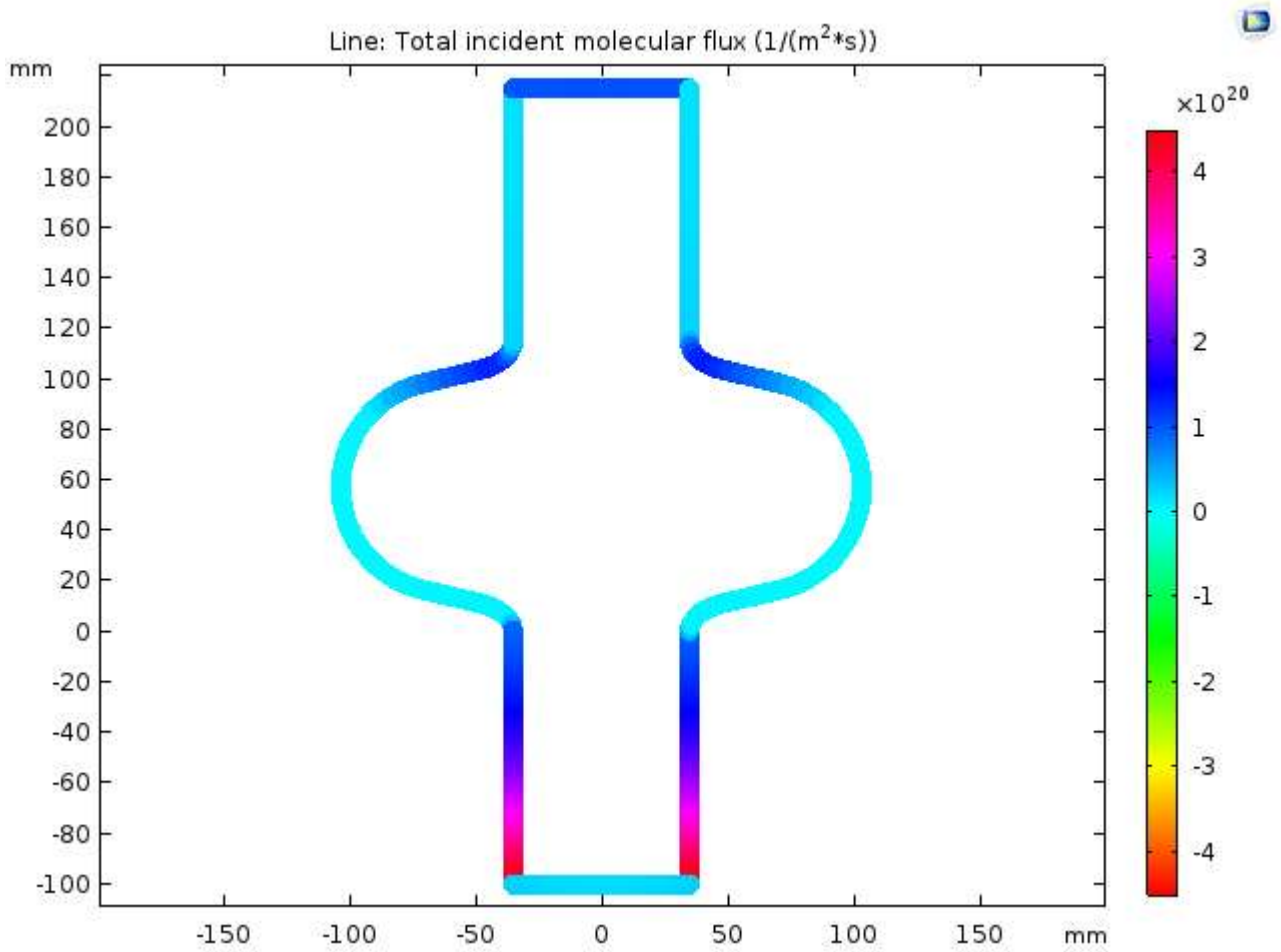


My Project Goals

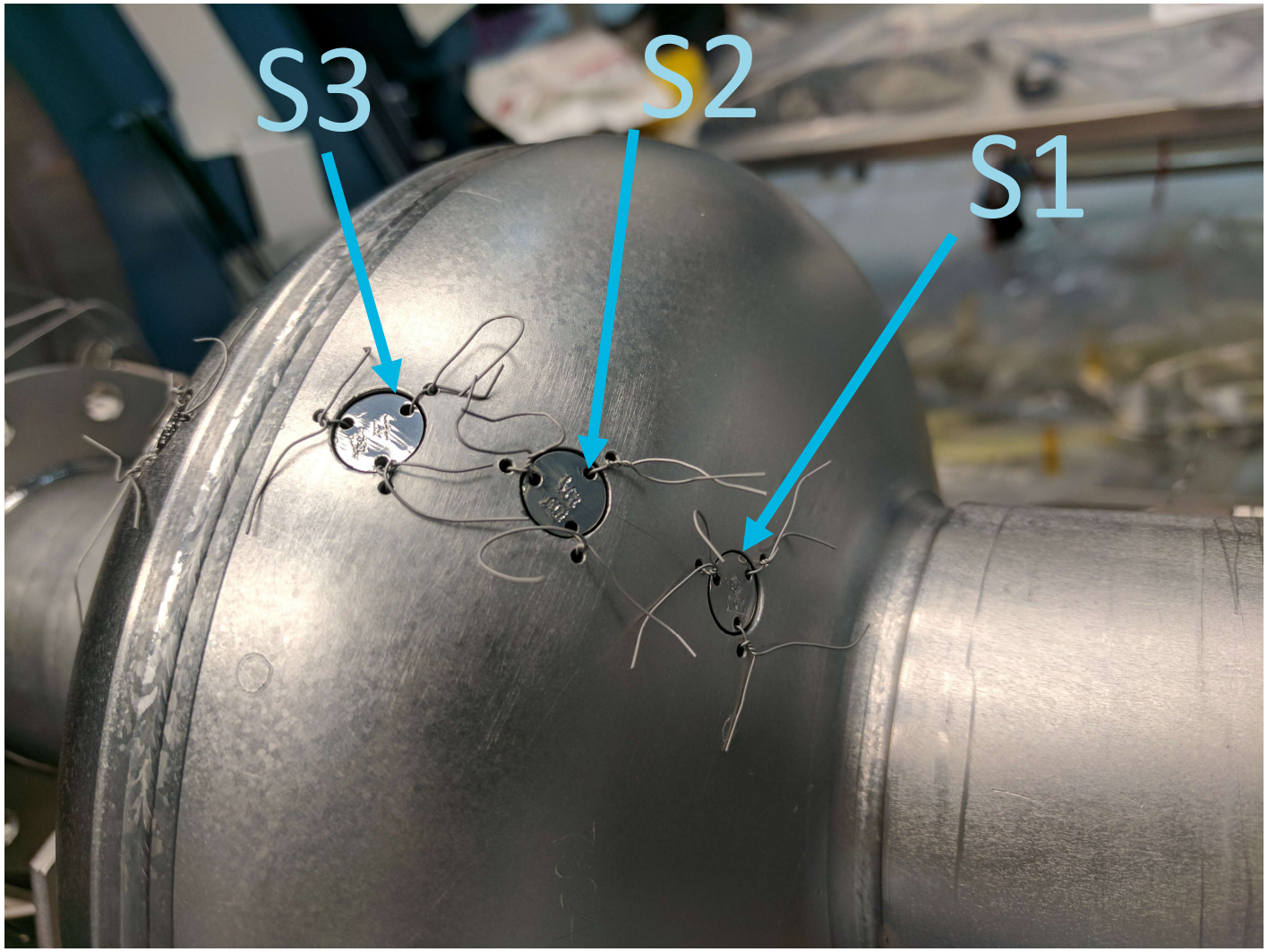


- Use COMSOL simulations to better understand the physics of the coating process.
- Using experimental data, find a parameter defined as the “Sticking Coefficient” which tells us that probability that a tin molecule will stick to the niobium surface.
- Combining the simulation data and the experimental results we can accurately obtain the “Sticking Coefficient” which will allow for more accurate simulations that will better predict future outcomes.

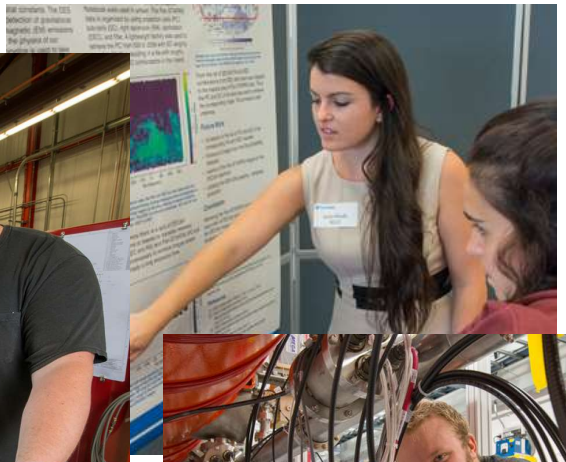
TOTAL INCIDENT FLUX ON WALL

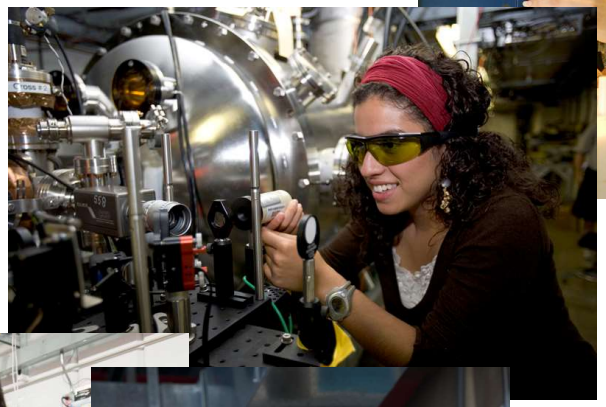


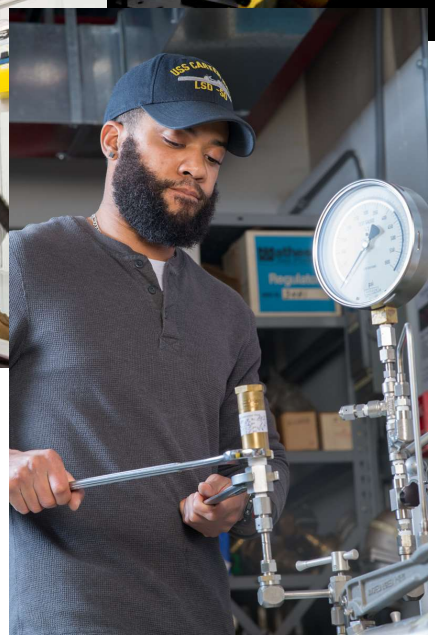
SAMPLE SITES ON CAVITY



Frequently Asked Questions
https://internships.fnal.gov/faqs/







Contact Us

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