

# The Italian Summer Students Program at Fermilab and other US Laboratories



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UNIVERSITÀ DI PISA

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**2021 Meeting of the Division of Particles and Fields  
of the American Physics Society (DPF2021)**  
July 12 - 14, 2021, Virtual Event, Florida State University

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# Outline

## FERMI NATIONAL ACCELERATOR LABORATORY

- Italy @Fermilab

## THE SUMMER STUDENTS PROGRAM

- Students' Recruitment
- Training Programs
- Costs and Sponsorships
- Statistics (1984–2019)
  - 2020 Program (sadly) cancelled
  - 2021 Program replaced by a 4-day Workshop at INFN (Italy)
- Internships at Space Science Labs

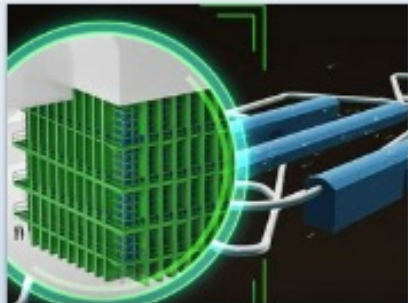
## CONCLUSIONS



## Fermilab is America's particle physics and accelerator laboratory

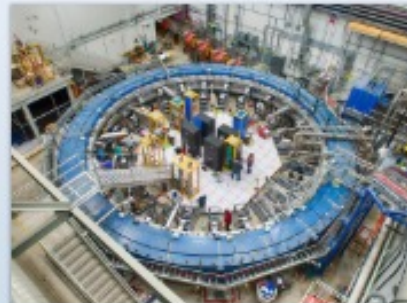
We bring the world together to solve the mysteries of matter, energy, space and time.

### What we do



#### Deep Underground Neutrino Experiment

Fermilab hosts DUNE and the Long-Baseline Neutrino Facility, being built by scientists and engineers from more than 30 countries.



#### Particle physics

Fermilab explores the universe at the smallest and largest scales, studying the fundamental particles and forces that govern our universe.



#### Accelerator science and technology

Fermilab designs, builds and operates powerful accelerators to investigate nature's building blocks, advancing technology for science and society.



#### Detectors, computing and quantum science

Fermilab pioneers the research and development of particle detection technology and scientific computing applications and facilities.

# Italy @Fermilab, some history

## COLLIDER DETECTOR AT FERMILAB (CDF), SINCE 1984

- ~100/600 Italian scientists in the years 2000-2010

**BOLOGNA, FRASCATI, PADOVA, PAVIA, PISA, ROMA, SIENA, TRENTO, TRIESTE, UDINE (INFN and UNIVERSITIES)**

- 5 co-spokesperson from Pisa

**~100 MASTER + 35 PhD THESES**

**The 2019 HEP prize of the EPS was awarded to the CDF and D0 Collaborations for the discovery of the top quark (1995)**

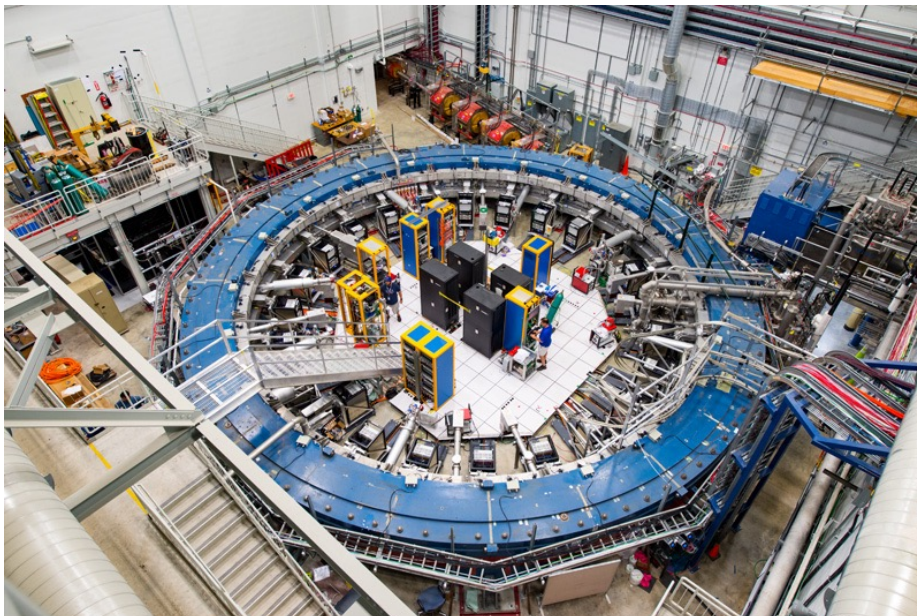


# Italy @Fermilab, as of today

## NEW LAB's ENDEAVOURS

- **Muon (g-2)**: Measurement of the anomalous muon magnetic moment
- **Mu2e**: Muon to electron conversion experiment
- **Icarus, SBN, DUNE**: Short/Long-baseline neutrino experiments
- ~150 Italian scientists

**BOLOGNA, CATANIA, FERRARA, FRASCATI, GENOVA, GRAN SASSO, LECCE, MILANO, NAPOLI, PAVIA, PADOVA, PISA, ROMA, TRIESTE (INFN DEPARTMENTS and UNIVERSITIES)**



# Students' Recruitment

## INTERNATIONAL PROGRAM

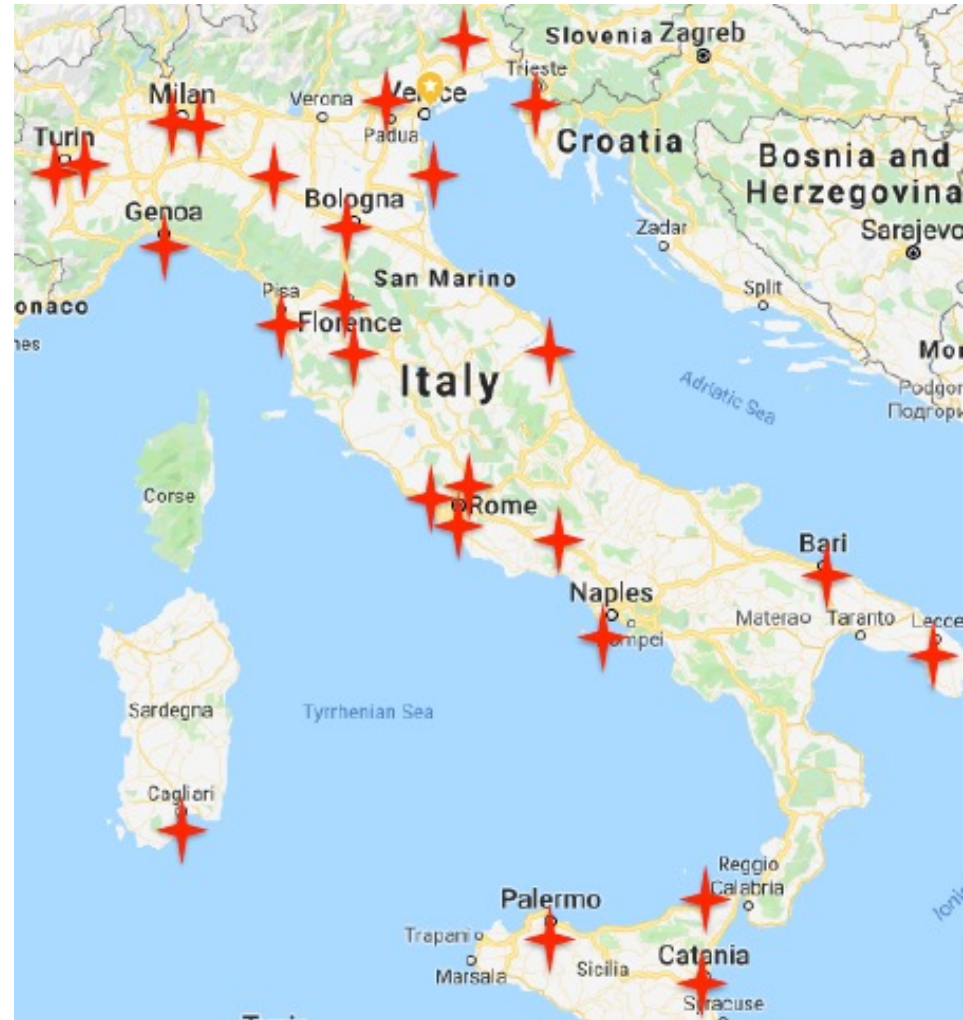
- Applications from most Italian and some European Universities

## MASTER STUDENTS

- Physics/Applied Physics
- Engineering, Materials Science
- Computer Science

## ADMISSION

- Curriculum Vitae
- Recommendation Letters
- Interview
- Good knowledge of English



# Training Programs

**AUGUST – SEPTEMBER (9 WEEKS)**

## **PROGRAMS FOR PHYSICISTS**

- Design, construction, commissioning of particle detectors/accelerators
- Simulation of particle detectors/accelerators and particle physics experiments
- Analysis of data collected by particle physics experiments

## **PROGRAMS FOR ENGINEERS**

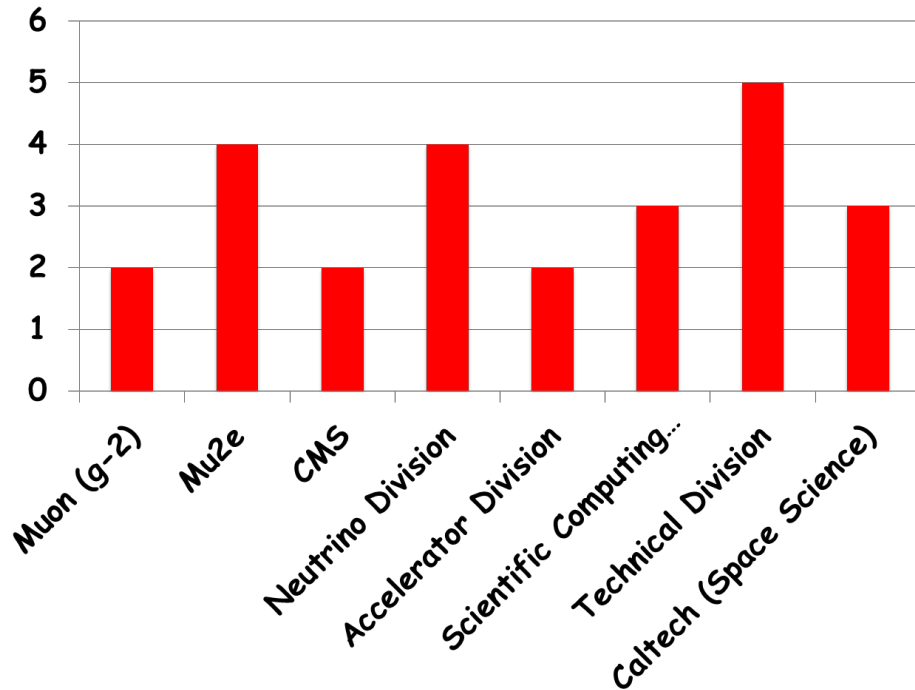
- Design/Test of particle detectors/accelerator components
- Design/Test of superconducting materials and magnets for particle accelerators
- Development of fast electronics components/high precision mechanics
- Development of advanced computing infrastructures

## **UNIVERSITY CREDITS (acknowledged by the UNIFI Summer School)**

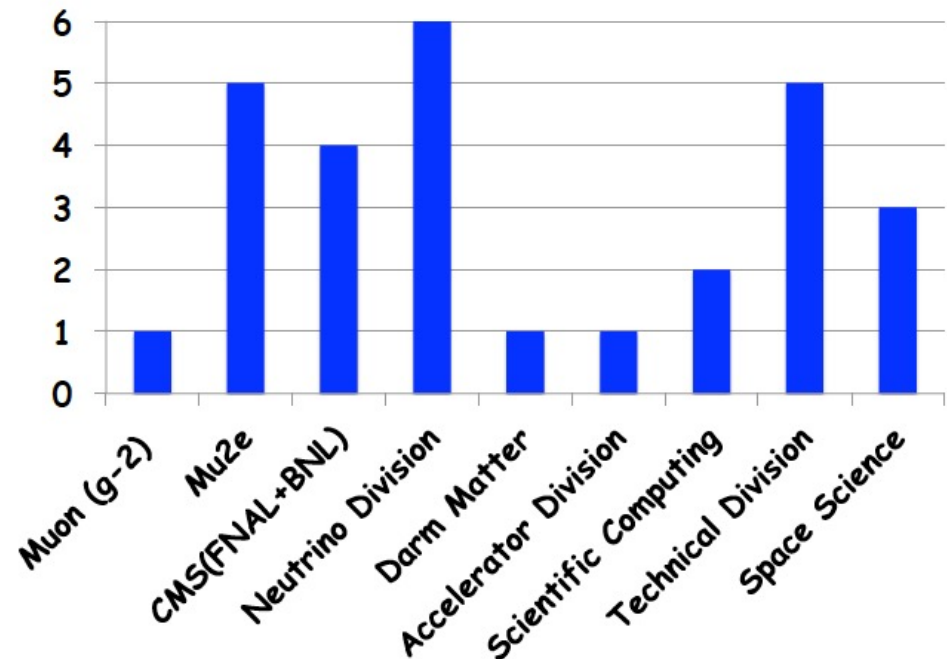
- 6 ECTS credits (ECTS, European Credit Transfer and Accumulation System)

# Training Programs (2018-2019)

## 2018: 10 PHYSICS + 15 ENGINEERING



## 2019: 13 PHYSICS+15 ENGINEERING





# Sponsorships

**0\$ COST FOR THE STUDENT, ~9,000\$ FOR THE SPONSOR**

- Department Of Energy at Fermilab
- Italian National Institute of Nuclear Physics
- Sant'Anna School of Advanced Studies (Pisa)
- Italian Space Agency (ASI), and Italian National Institute of Astrophysics (INAF, in 2010-2011) sponsors internships at US Space Science Labs
- University of Pisa

# Costs

## WHAT FERMILAB PROVIDES

- Weekly salary: ~400 \$
- Free housing in Dorm
- Shared rental car
- Total cost ~9000 \$/student

## WHAT FERMILAB DOES NOT PROVIDE

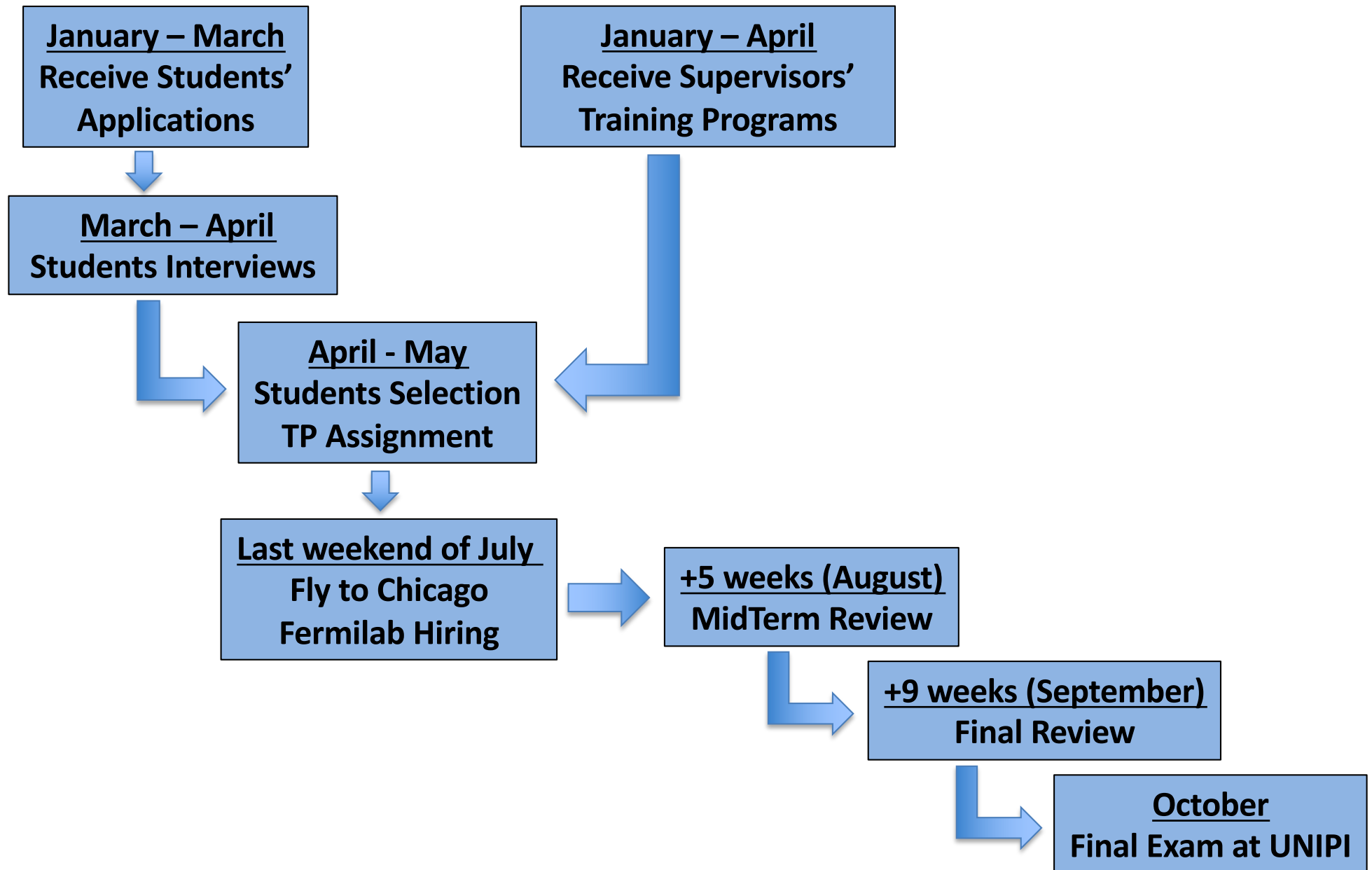
- Round-trip journey from Italy to Chicago
- Health insurance: mandatory

## STUDENTS' TO-DO LIST

- Valid passport
- Employment and J1 Visa bureaucracy with the help of Fermilab administrative offices

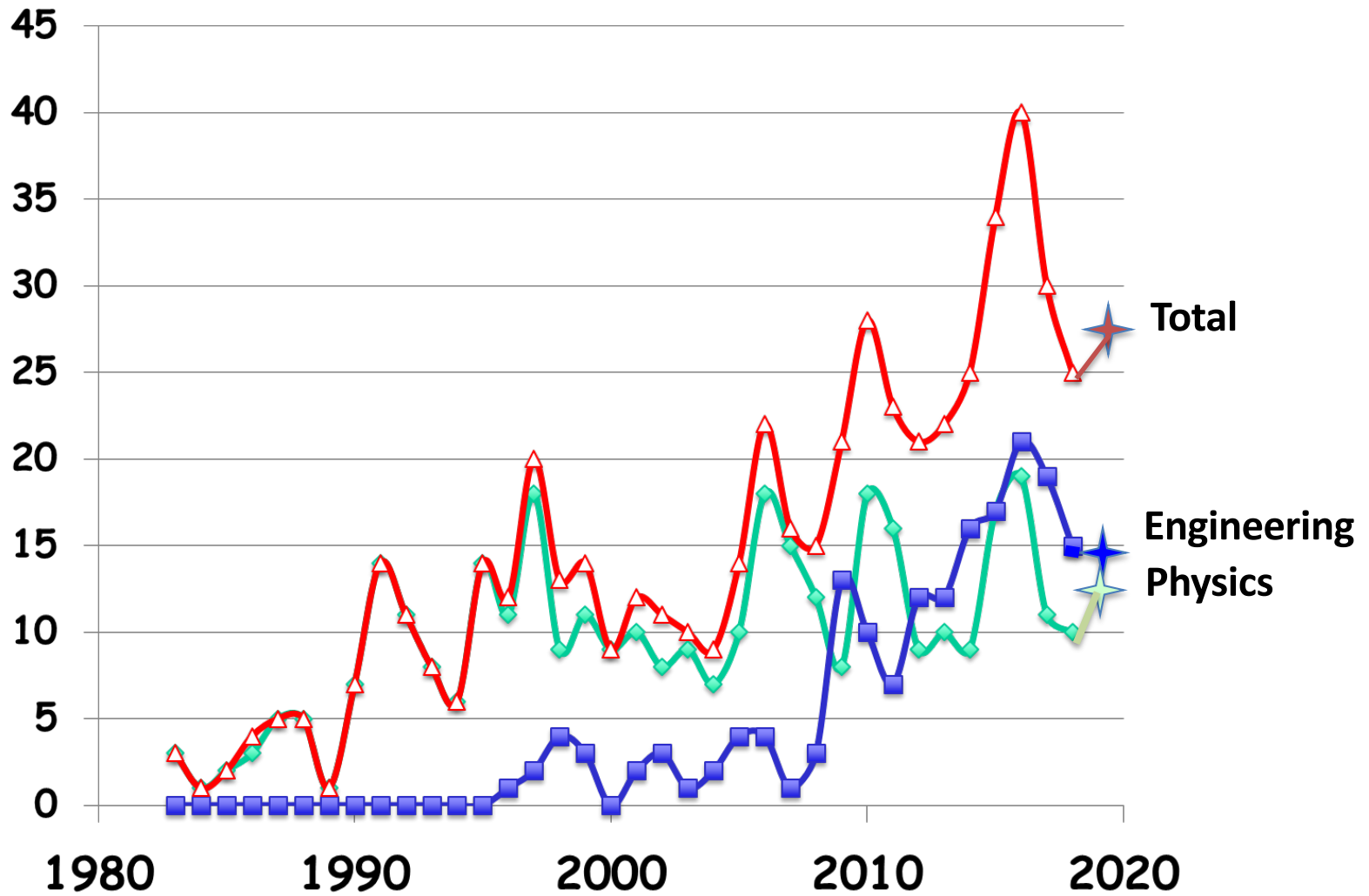


# Important Actions/Dates



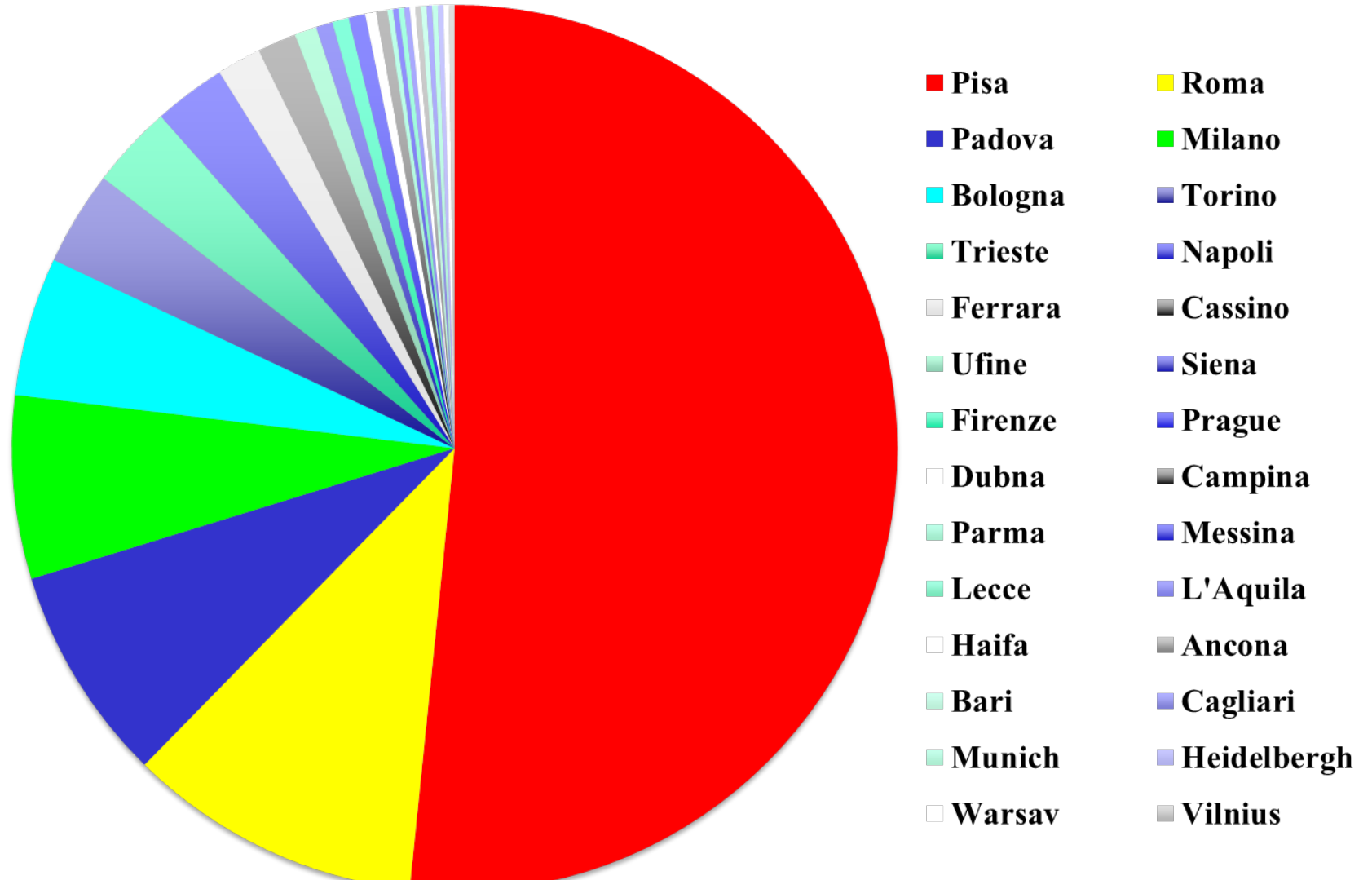
# Students Statistics 1984 - 2019

~550 students



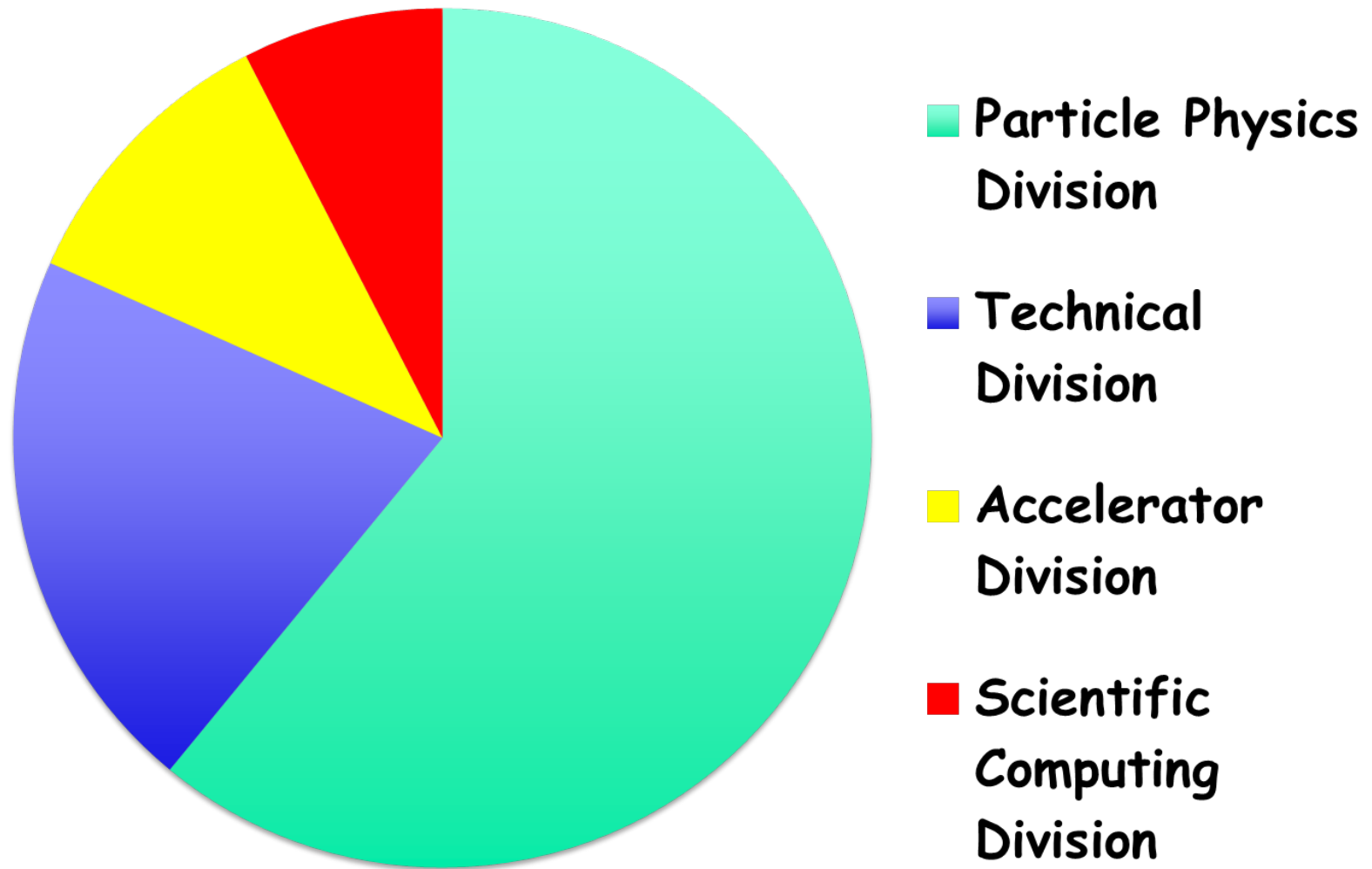
# Involved Universities 1984 – 2019

~550 students

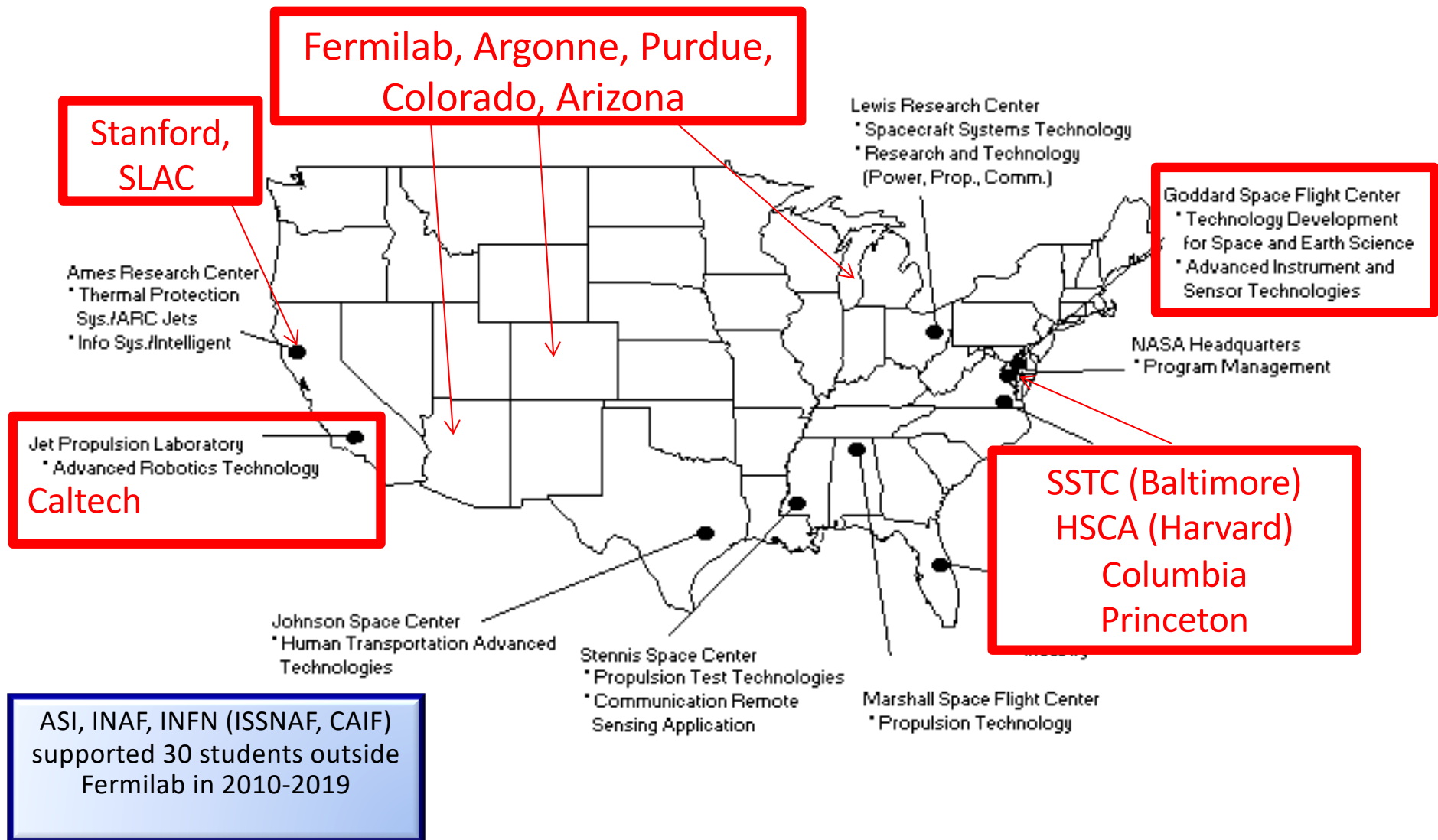


# Training Programs 2008-2019

~270 students



# Internships at Space Science Labs





# Topical Workshop

*Involving the new generations in  
the future Fermilab endeavors*

(August 2-5, 2021)

## **4-DAY FULL IMMERSION WORKSHOP**

- 20 Physics/Engineering students from Italian Universities hosted at INFN - LNF
- Seminars on Fermilab experiments (Muon (g-2), Mu2e, SBN, DUNE and more) and technologies (accelerators, detectors, computing and more)
- Hands-on training by INFN experts / Visits to LNF infrastructures

**A 9-WEEK INTERNSHIP AT FERMILAB WOULD BE BETTER  
BUT IT IS NOT POSSIBLE YET**

**WE ARE DOING OUR BEST TO KEEP THE CONNECTION WITH STUDENTS ALIVE**



# Conclusions

## THE ITALIAN SUMMER STUDENTS PROGRAM AT FERMILAB

- A multi-disciplinary 9-week internship for Physics and Engineering students
- Hands-on training on Fermilab high-tech research

## ~550 ITALIAN SUMMER STUDENTS SINCE 1984

- Many summer students developed their career at Fermilab with a Master Thesis and a PhD

