

The Italian Summer Students Program at Fermilab and other US Laboratories



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UNIVERSITÀ DI PISA

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**2019 MEETING OF THE DIVISION OF PARTICLE AND FIELDS
OF THE AMERICAN PHYSICAL SOCIETY**

July 29 – August 2, 2019 Northeastern University, Boston MA (US)

Outline

FERMI NATIONAL ACCELERATOR LABORATORY

- Italy @Fermilab

THE SUMMER STUDENTS PROGRAM

- Recruitment
- Training Programs
- Costs and Sponsorships
- Statistics (1984 – 2019)
- Internships at Space Science Labs

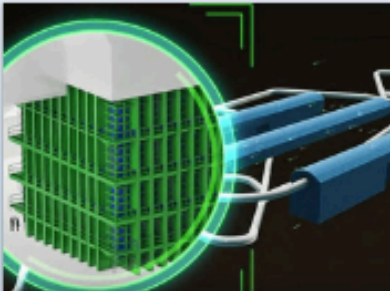
CONCLUSIONS



Fermilab is America's particle physics and accelerator laboratory

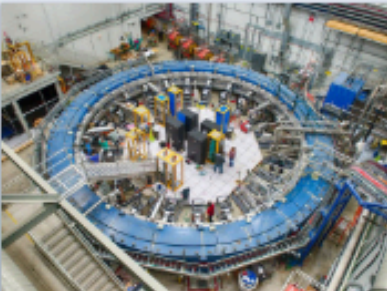
We bring the world together to solve the mysteries of matter, energy, space and time.

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.

Fermilab Organization

PARTICLE PHYSICS & NEUTRINO DIVISIONS

- Design Lab's particle physics & neutrino experiments

ACCELERATOR DIVISION

- Develop new accelerator techniques
- Provide beams for Lab's experiments

TECHNICAL DIVISION

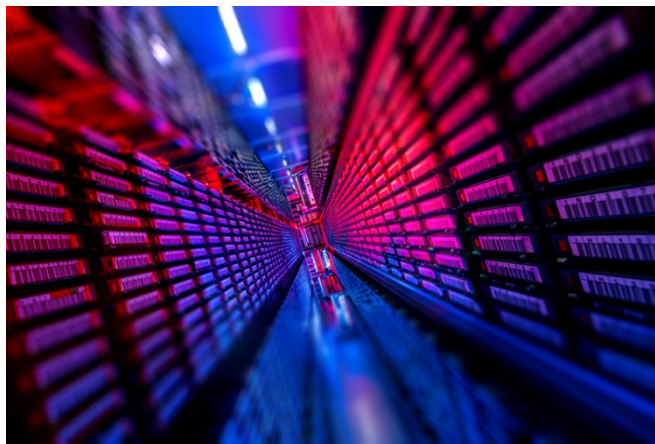
- Develop technologies for particle experiments

SCIENTIFIC COMPUTING DIVISION

- Provide infrastructures for data handling/analysis

~1800 EMPLOYEES + THOUSANDS OF VISITORS

Feynman
Computer
Center



Italy @Fermilab, some history

COLLIDER DETECTOR AT FERMILAB (CDF), SINCE 1984

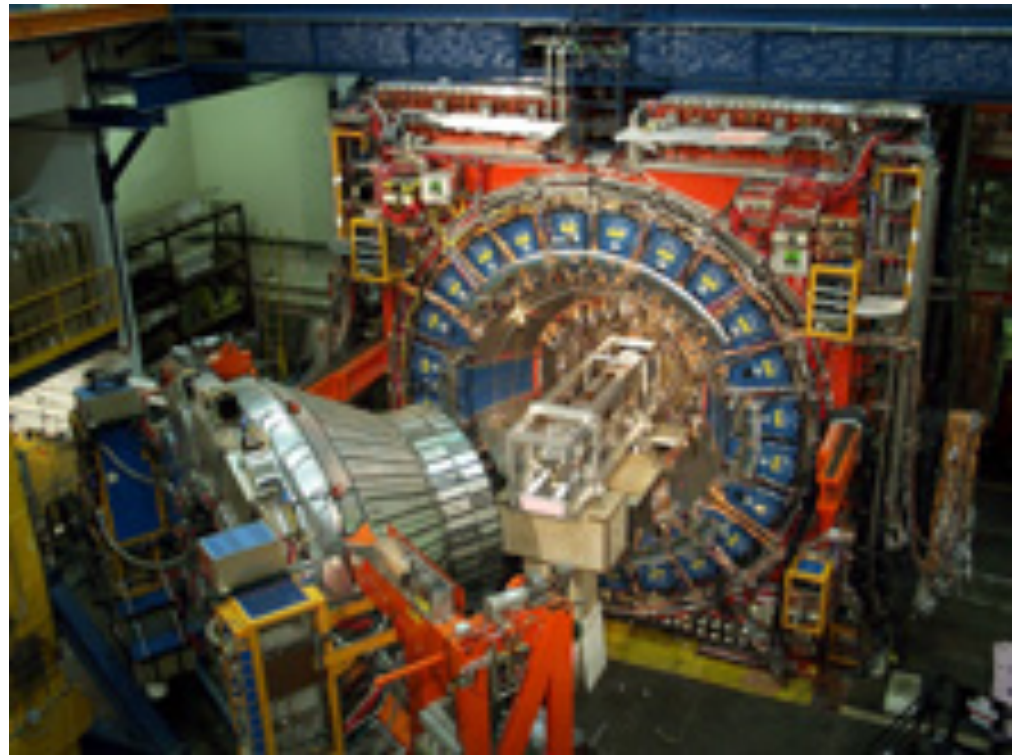
- ~100/600 Italian scientists in the years 2000-2010

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)

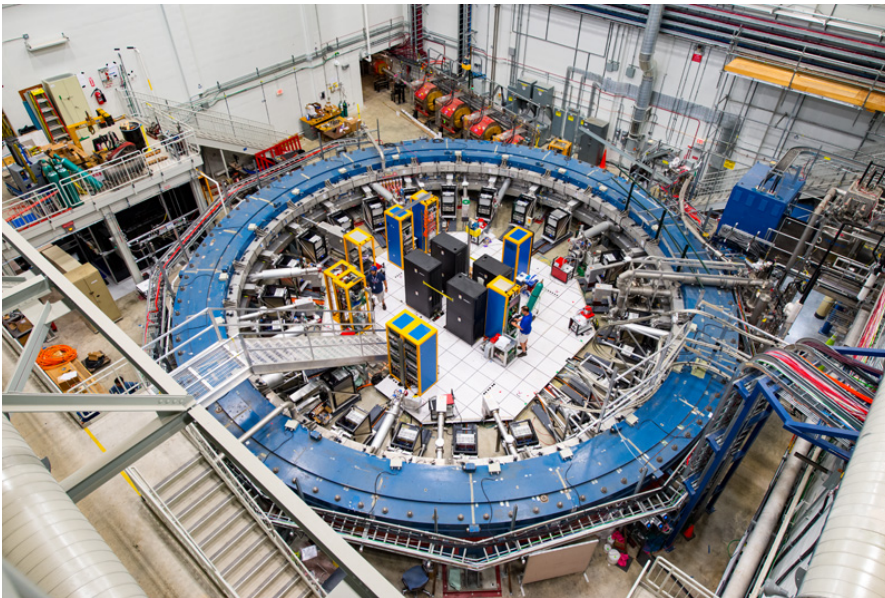


Italy @Fermilab, as of today

NEW LAB's ENDEAVOURS

- **Muon (g-2)**: Measurement of the anomalous muon magnetic moment
- **Mu2e**: Muon to electron conversion experiment
- **Icarus, DUNE**: Short/Long-baseline neutrino experiments
- ~140 Italian scientists

BOLOGNA, CATANIA, FERRARA, FRASCATI, GENOVA, GRAN SASSO, LECCE, MILANO, NAPOLI, PAVIA, PADOVA, PISA, ROMA, TRIESTE (INFN 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

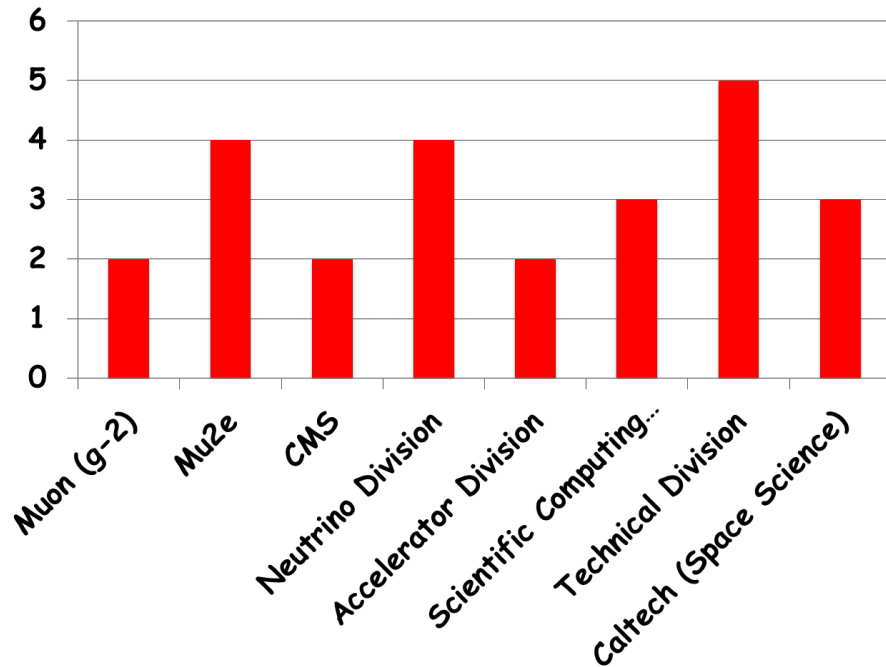
- Design/Test of particle detectors/accelerator components
- Design/Test of superconducting materials and magnets for particle accelerators
- Development of fast electronics components/high precision mechanics
- Development of advanced computing infrastructures

UNIVERSITY CREDITS (since UNIPi Summer School creation in 2015)

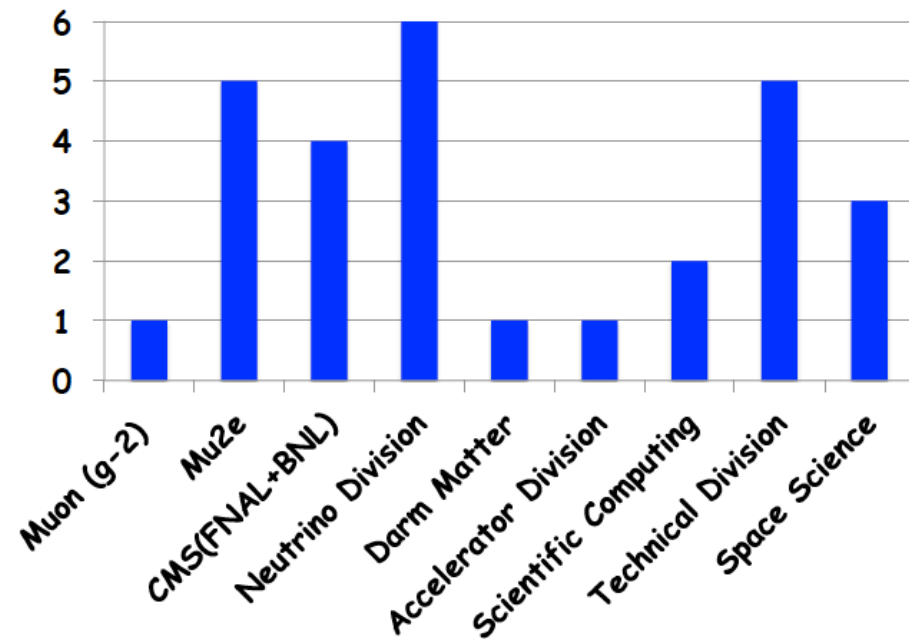
- 6 ECTS credits (ECTS, European Credit Transfer and Accumulation System)

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

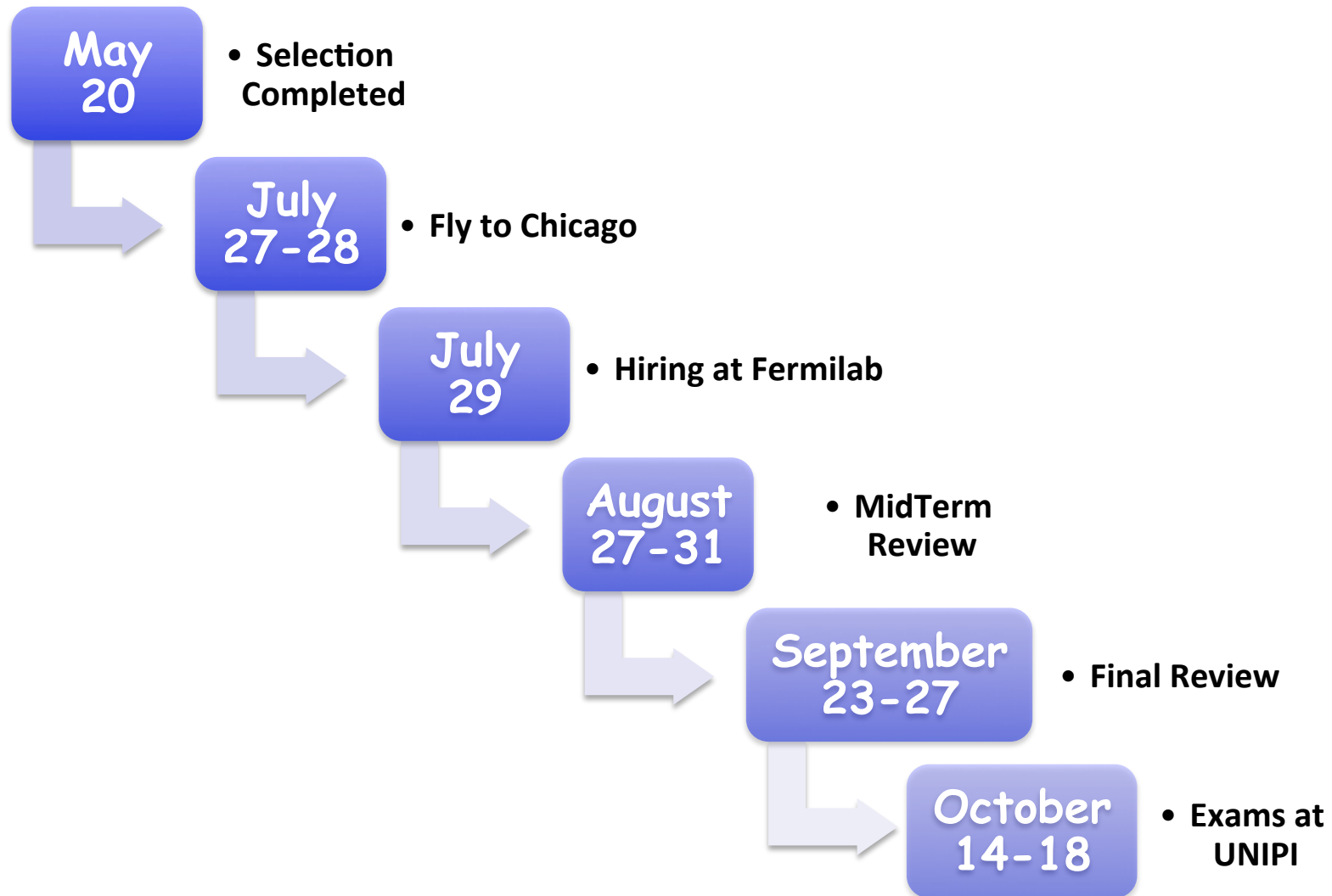
- Round-trip journey from Italy to Chicago
- Health insurance: mandatory

STUDENTS' TO-DO LIST

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

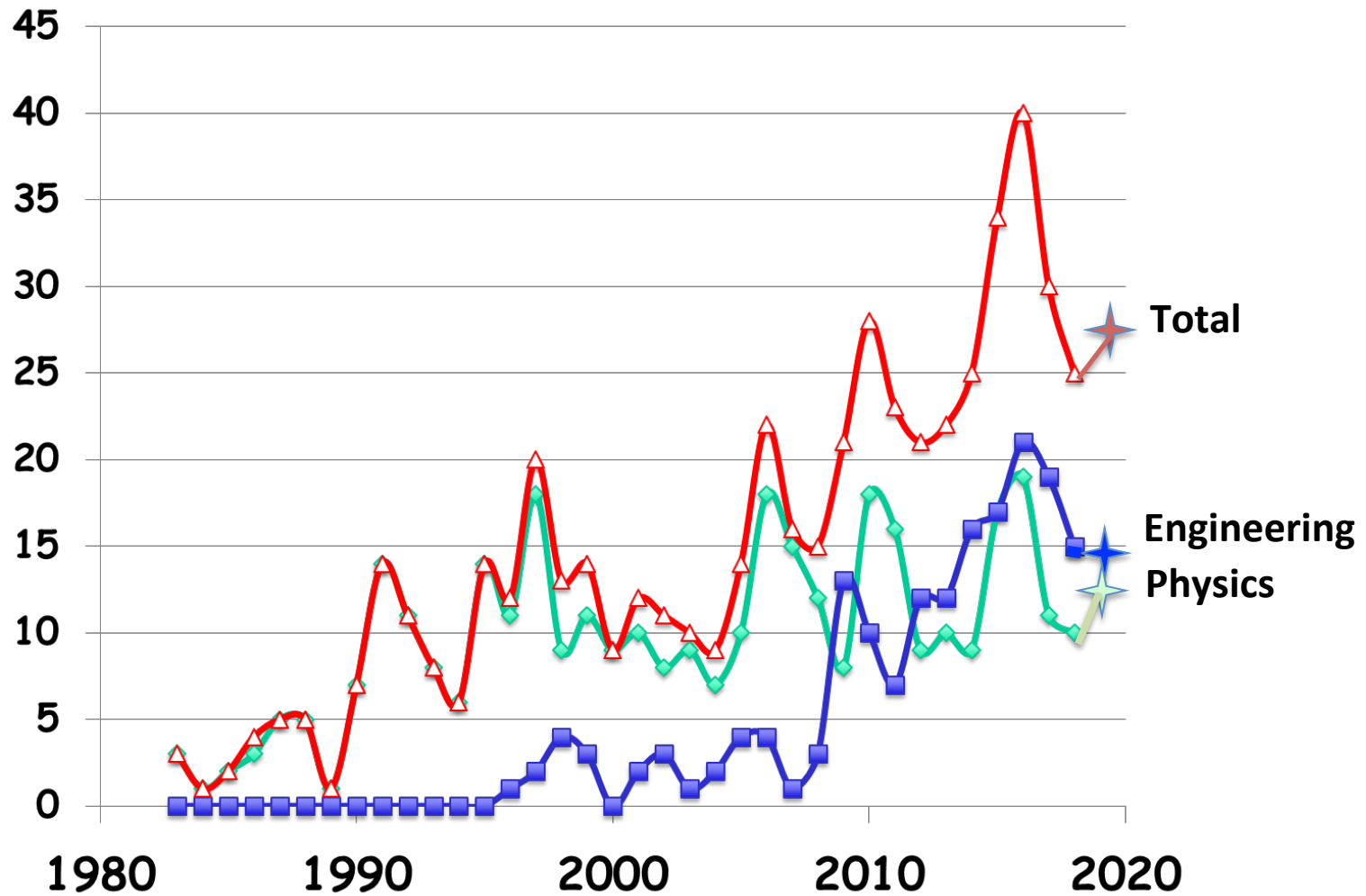


Important Dates (2019)



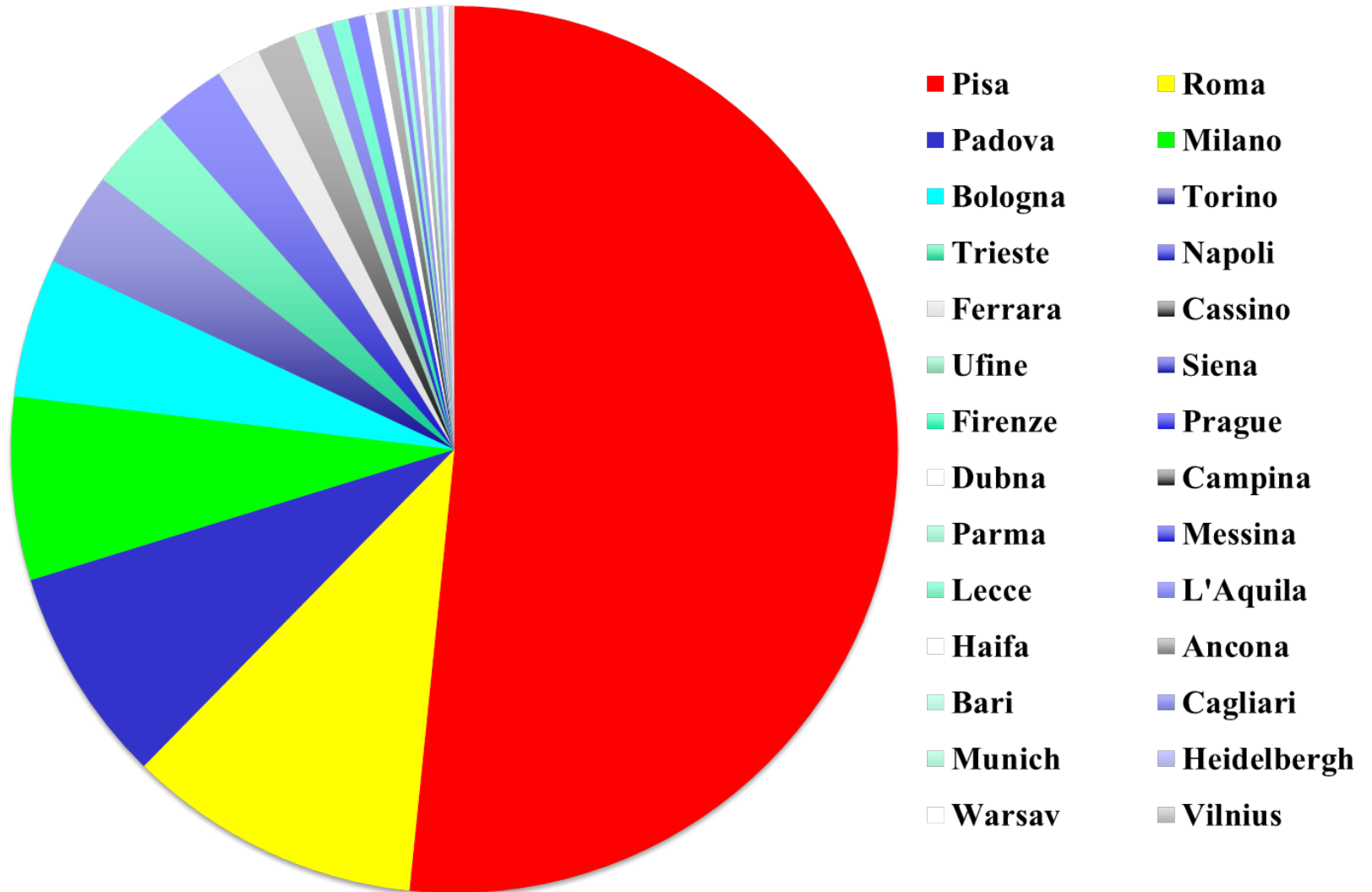
Students Statistics 1984 - 2019

~550 students



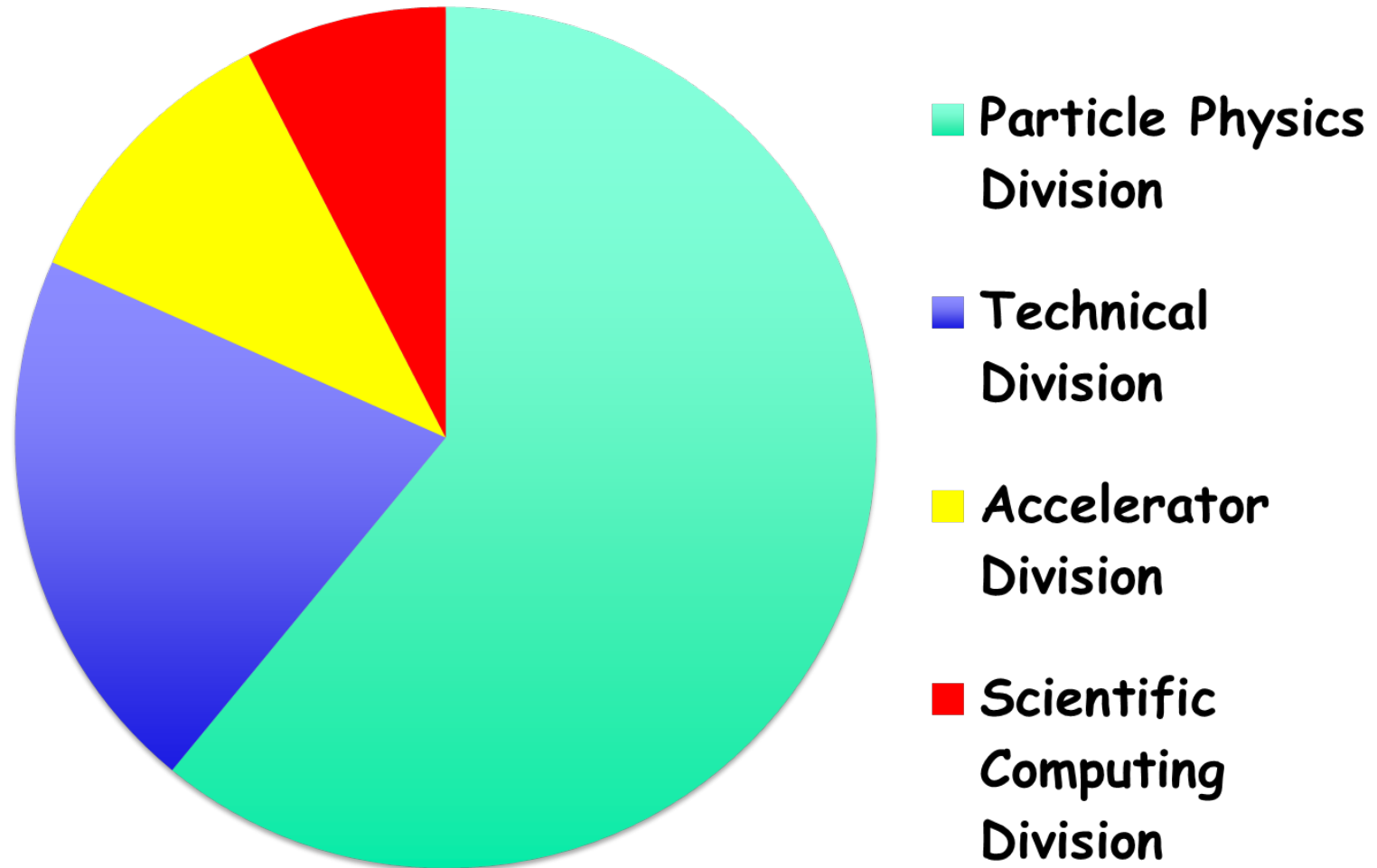
Involved Universities 1984 – 2019

~550 students



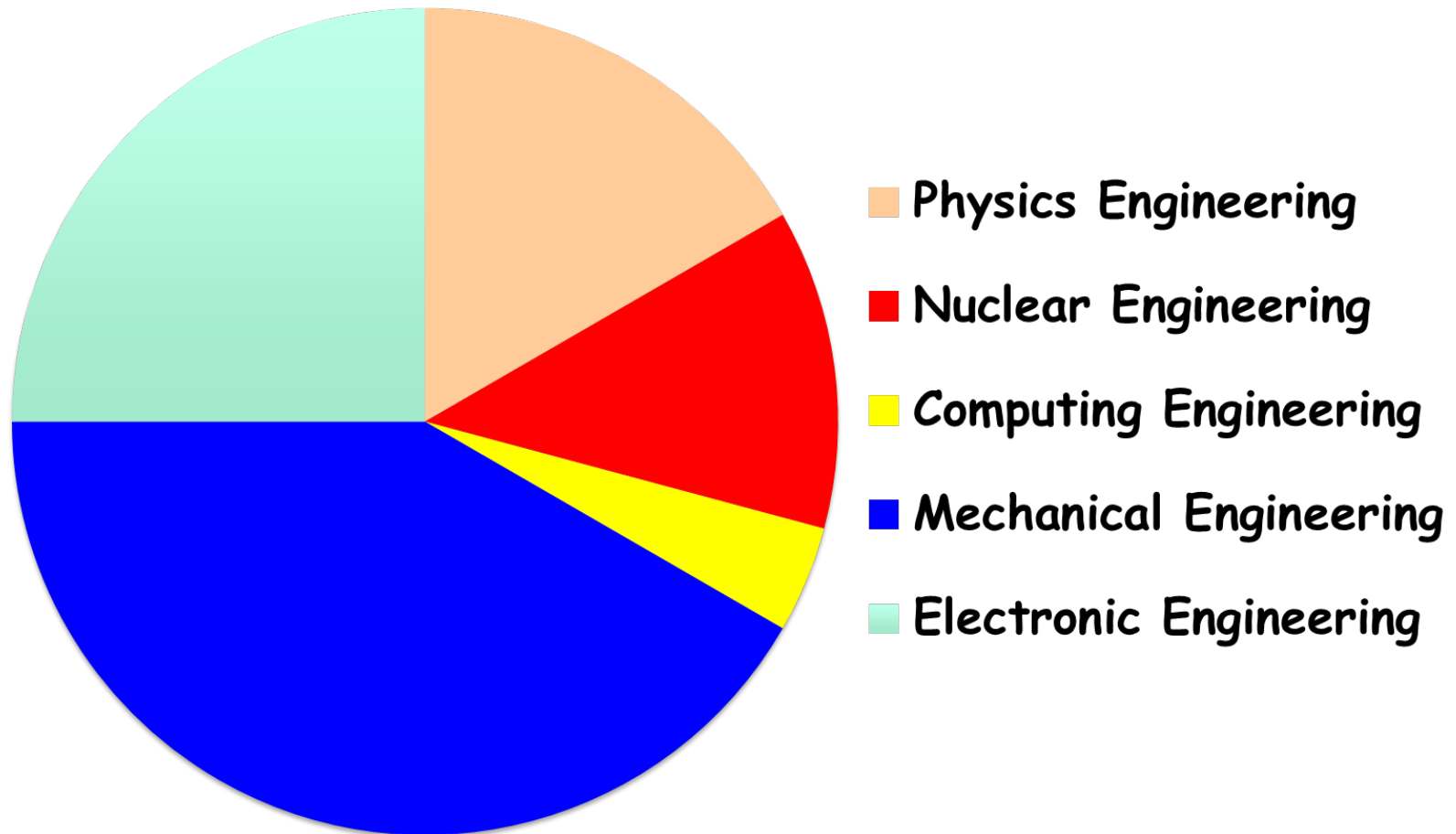
Training Programs 2008-2019

~270 students

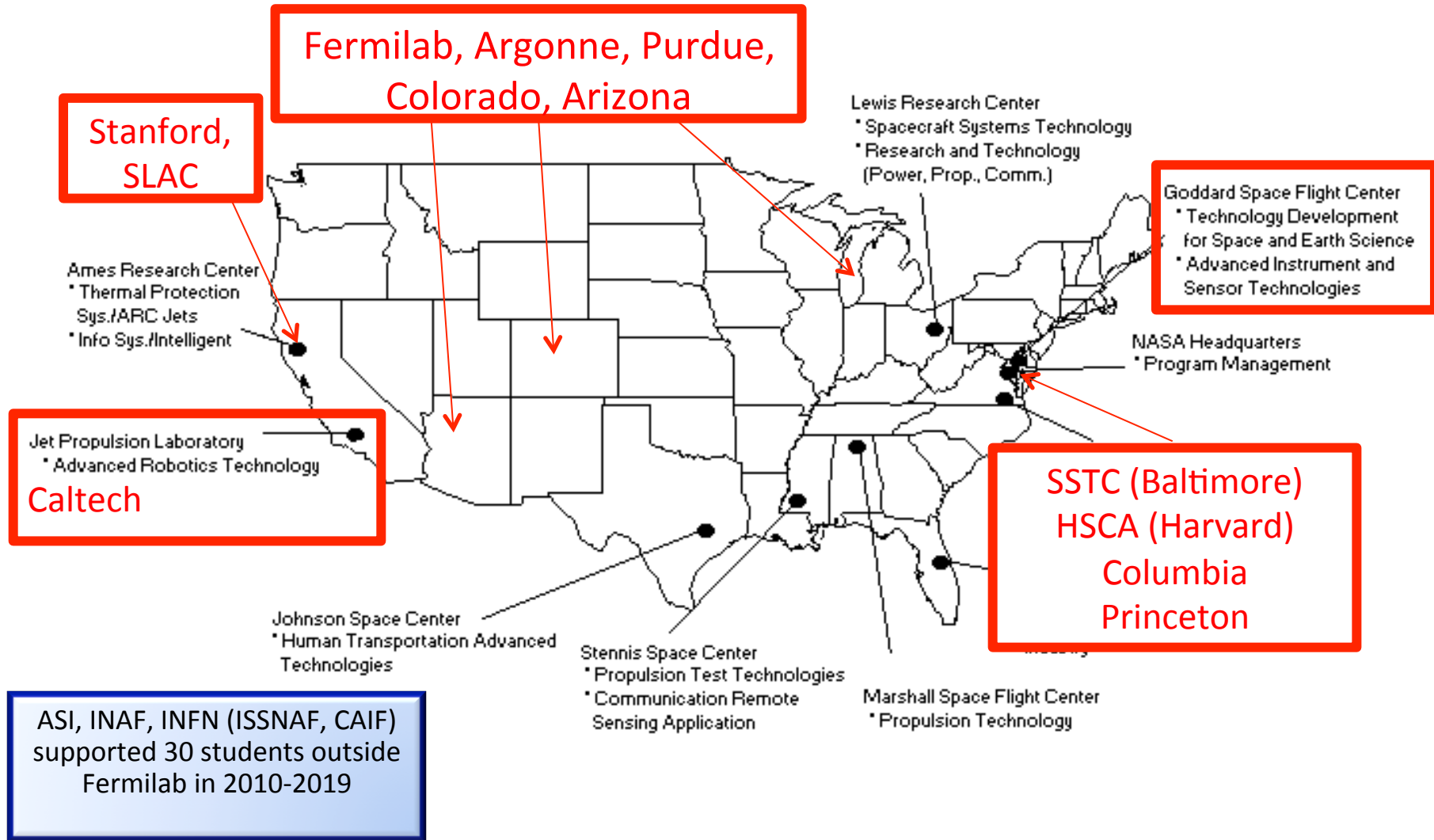


TD Laurea Program 1999 – 2016

24 students had full financial support for 8 months



Internships at Space Science Labs



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

