



UNIVERSITÀ DI PISA



# Involving the New Generations in Fermilab Endeavors

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# Outline

## FERMI NATIONAL ACCELERATOR LABORATORY

- Italy @Fermilab

## THE SUMMER STUDENTS PROGRAM

- Students' Recruitment
- Training Programs
- Costs and Sponsorships
- Statistics (1984–2022)
  - 2020 Program (sadly) cancelled
  - 2021 Program replaced with a 3-day Workshop at LNF
  - **2022 Back To Work, 21 Summer Students flying to Fermilab soon**
- Internships at Space Science Labs

## CONCLUSIONS

# 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

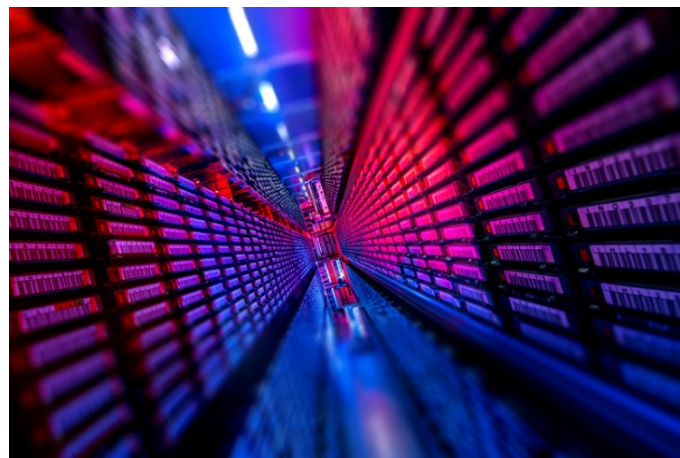
- Develop technologies for particle experiments

## 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)**

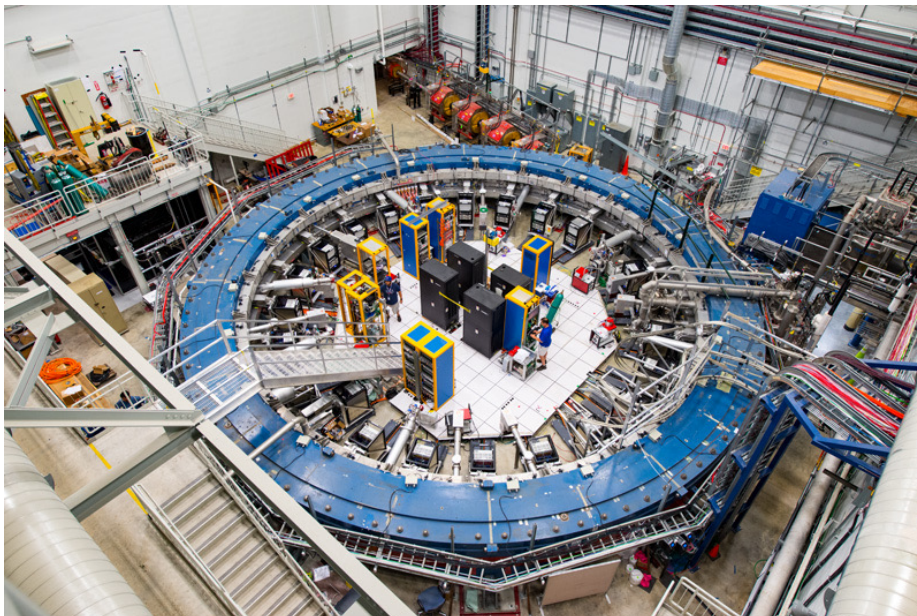


# Italy @Fermilab, as of today

## NEW LAB's ENDEAVOURS

- **Muon (g-2)**: Measurement of the anomalous muon magnetic moment
- **Mu2e**: Muon to electron conversion experiment
- **Icarus, 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, UDINE (INFN DEPARTMENTS and UNIVERSITIES)**



# Students' Recruitment

## INTERNATIONAL PROGRAM

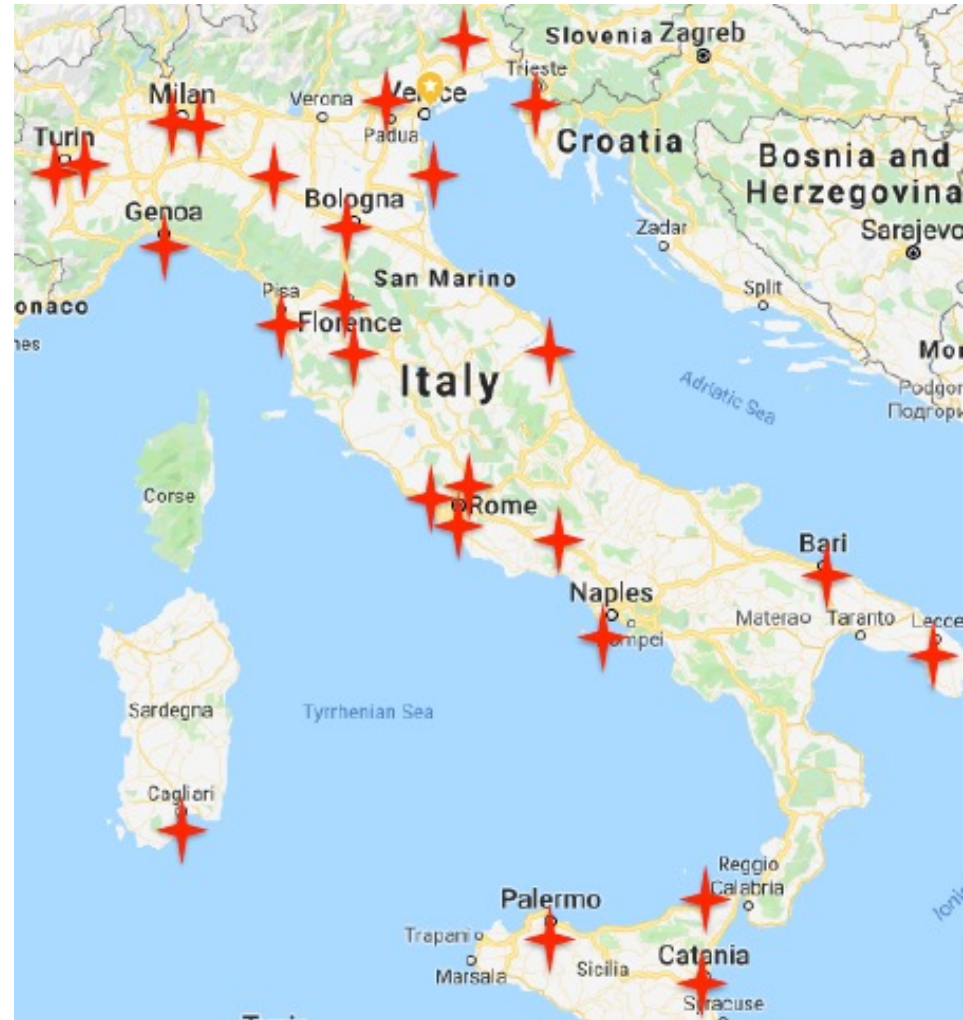
- Applications from most Italian and some European Universities

## 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

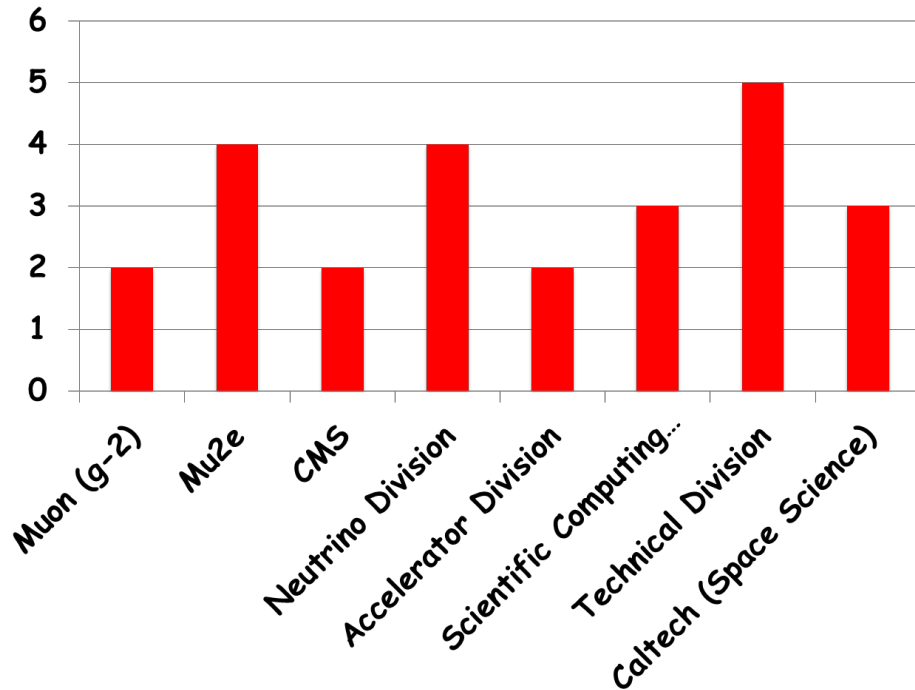
- Design/Test of particle detectors/accelerator components
- Design/Test of superconducting materials and magnets for particle accelerators
- Development of fast electronics components/high precision mechanics
- Development of advanced computing infrastructures

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

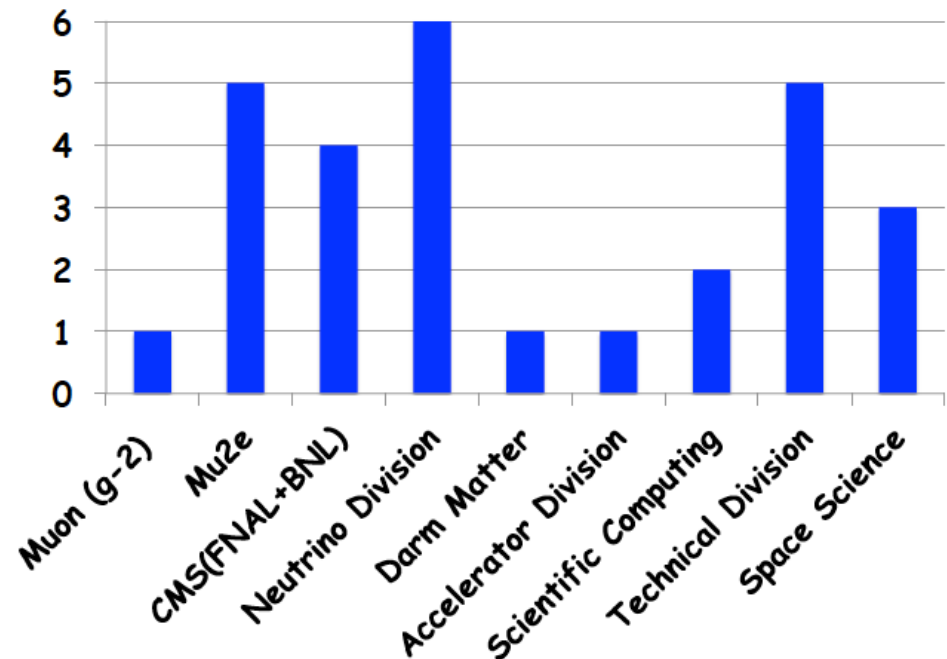
- 6 ECTS credits (ECTS, European Credit Transfer and Accumulation System)

# 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 (for internships at US Space Science Labs)
- University of Pisa

# Costs

## WHAT FERMILAB PROVIDES

- Weekly salary: ~600 \$
- Free housing in Fermilab Dorms
- Shared rental car
- Total cost ~9000 \$/student

## WHAT FERMILAB DOES NOT PROVIDE

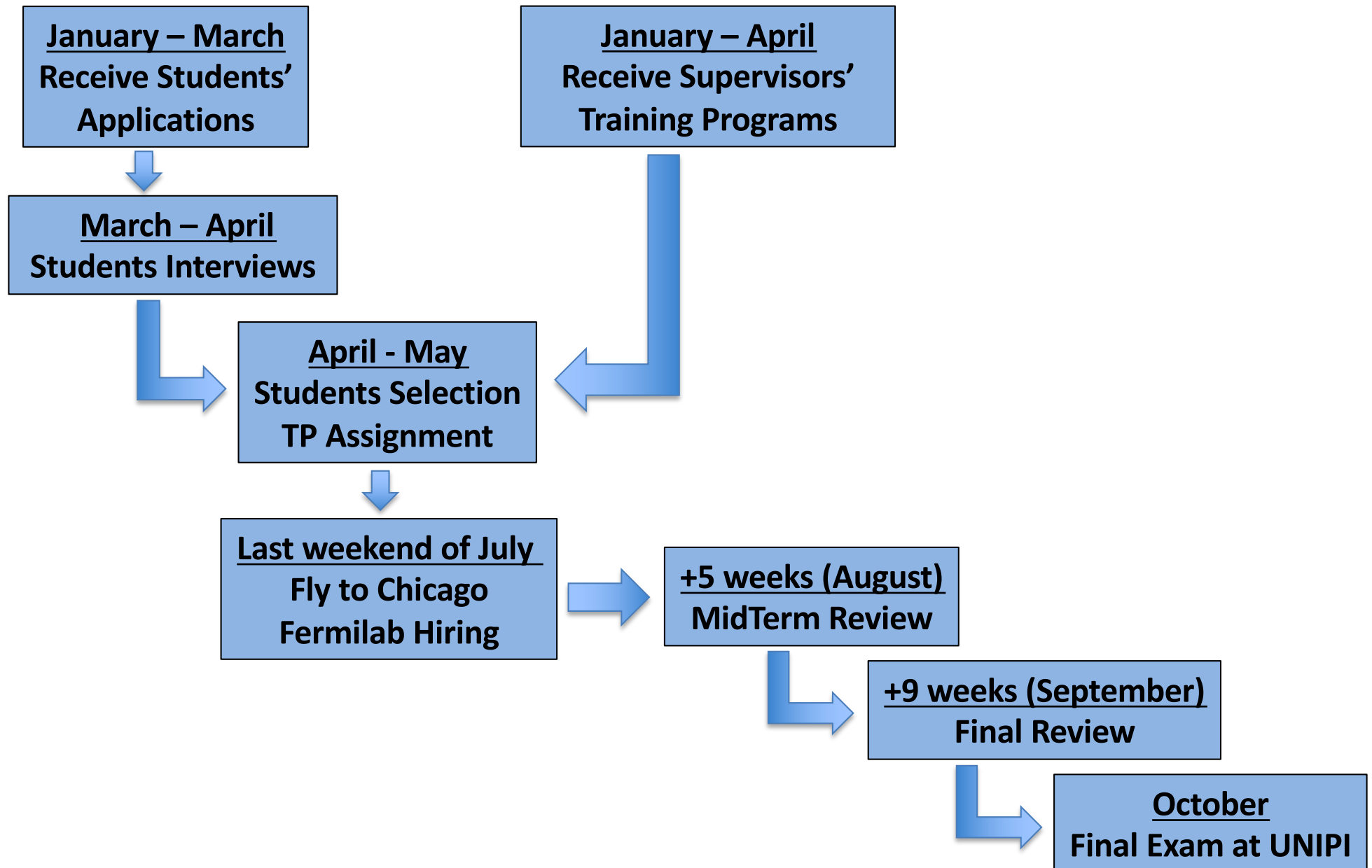
- Round-trip journey from Italy to Chicago
- Health insurance: mandatory

## STUDENTS' TO-DO LIST

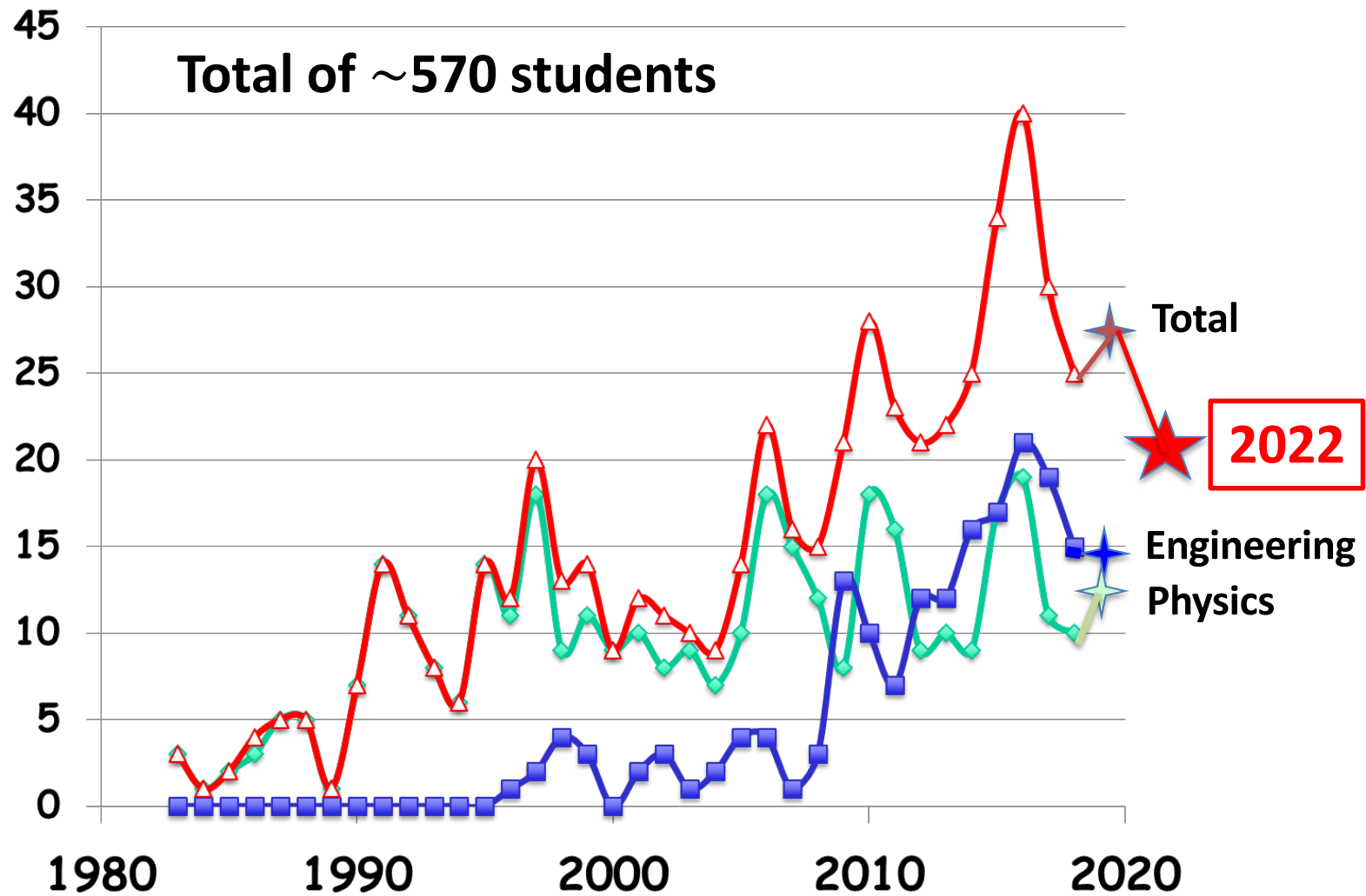
- Valid passport
- Employment and J1 Visa bureaucracy with the help of Fermilab administrative offices



# Important Actions/Dates



# Summer Students Statistics (1984 – 2022)



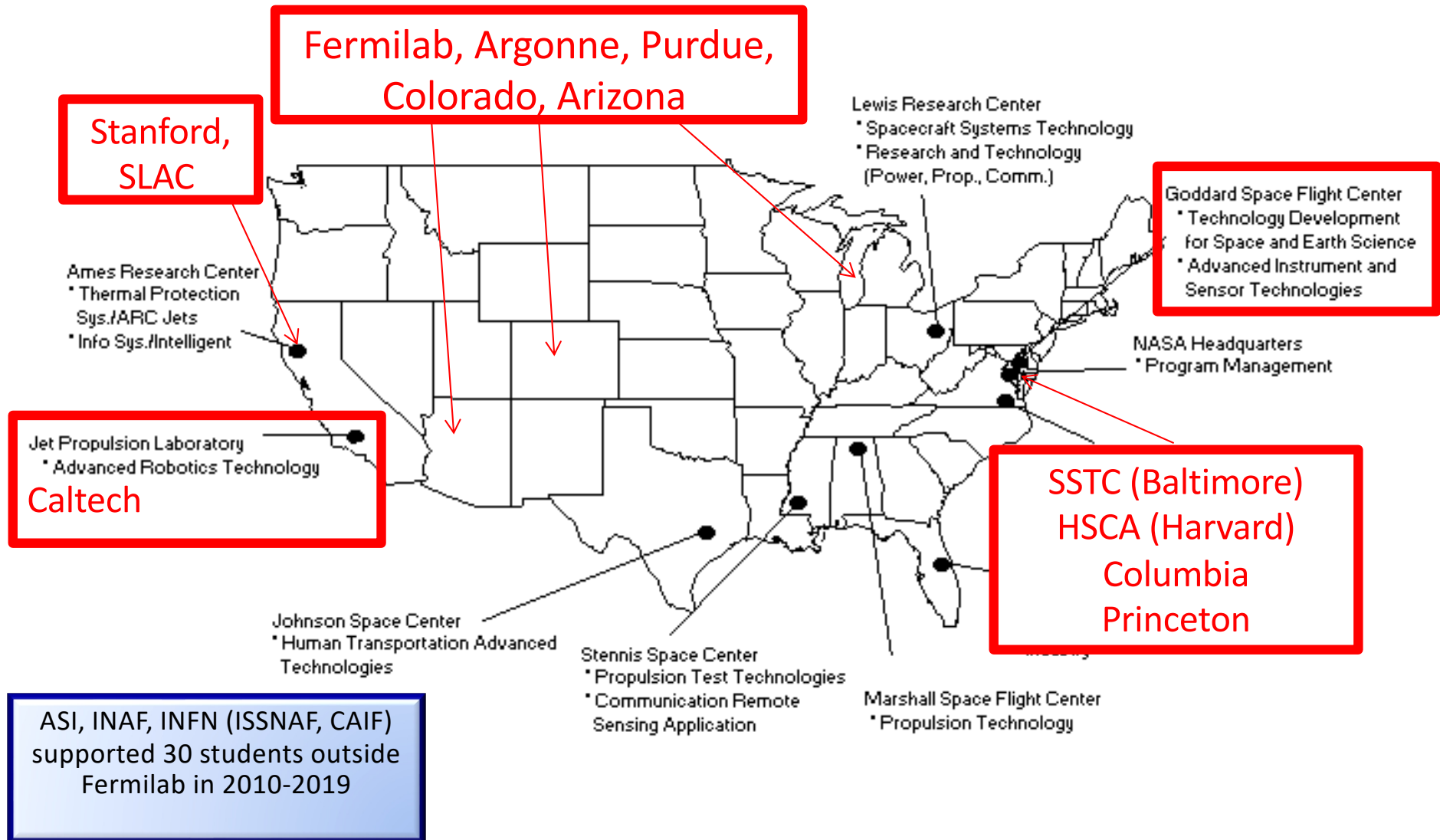
# Summer Students Statistics (1984 – 2022)

<b>Involved Universities (1984-2022)</b>	<b>570 students</b>
Pisa	52%
Roma	10%
Padova	8%
Milano	8%
Bologna	7%
Torino	2%
Trieste	2%
Napoli	2%
Ferrara	1%
Cassino	<1%
Udine	<1%
Siena	<1%
Firenze	<1%
Parma	<1%
Messina	<1%
Lecce	<1%
L'Aquila	<1%
Ancona	<1%
Bari	<1%
International	1%



<b>Training Programs (2008-2022)</b>	<b>290 students</b>
Particle Physics Division	62%
Technical Division	20%
Accelerator Division	10%
Scientific Computing Division	8%

# Internships at Space Science Labs



## Topical Workshop

*Involving the new generations in  
the future Fermilab endeavors*

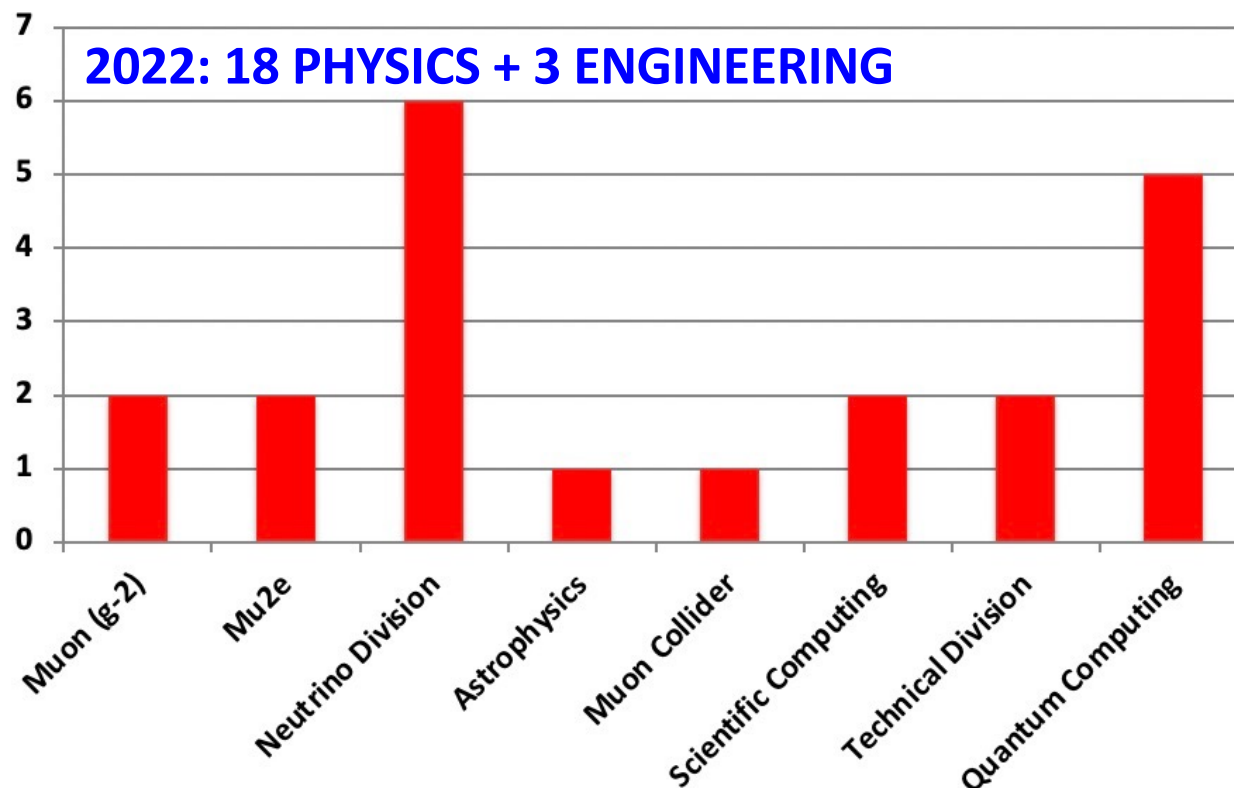
(August 2-4, 2021)

### **3-DAY FULL IMMERSION WORKSHOP**

- **25 PHYSICS/ENGINEERING STUDENTS HOSTED AT INFN – LNF**
- **SEMINARS OF FERMILAB EXPERIMENTS / TECHNOLOGIES**
- **VISITS TO LNF INFRASTRUCTURES / HANDS-ON TRAINING BY INFN EXPERTS**

# Year 2022, Fermilab, we are back

- 21 SUMMER STUDENTS WILL BE AT FERMILAB ON JULY 25 FOR 9 WEEKS  
3-DAY FULL IMMERSION WORKSHOP AT UNIPI AND INFN PISA  
(JULY 18-20, 2022)
- SEMINARS OF FERMILAB EXPERIMENTS / TECHNOLOGIES AND ORGANIZATION
- VISIT TO THE EUROPEAN GRAVITATIONAL OBSERVATORY AND VIRGO



Pisa	9
Padova	3
Napoli	3
Bologna	2
Catania	1
Trieste	1
Milano	1
Amsterdam	1



# Conclusions

## THE ITALIAN SUMMER STUDENTS PROGRAM AT FERMILAB

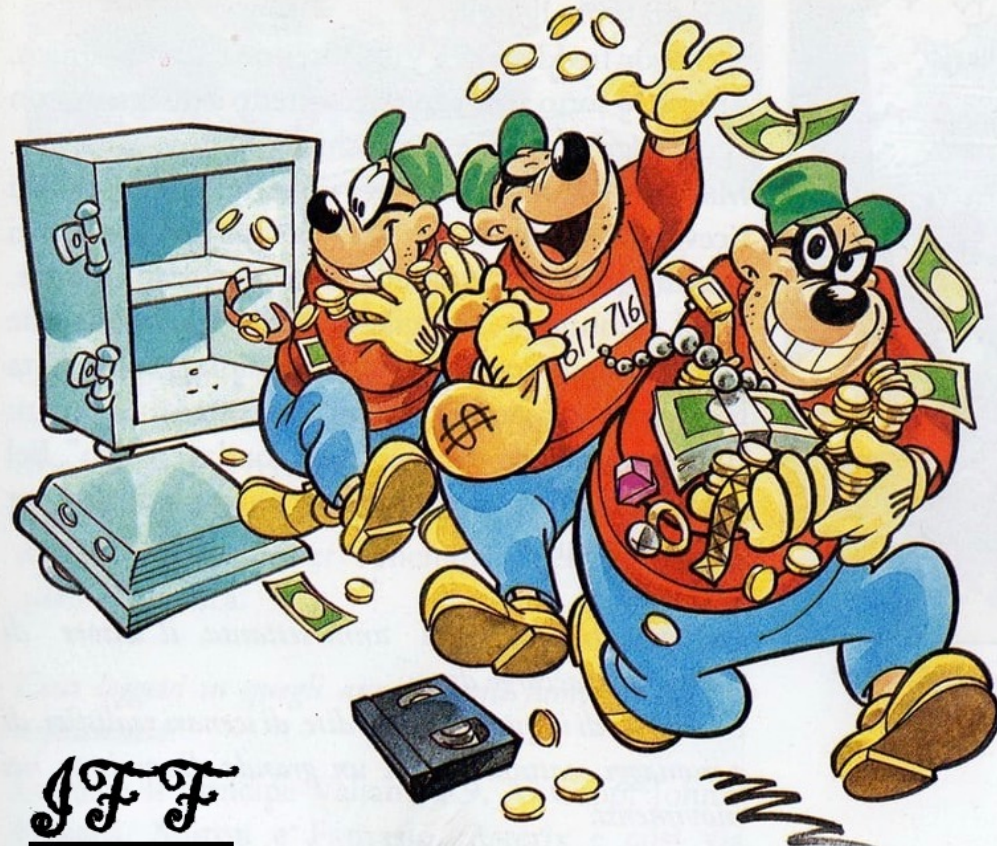
- A multi-disciplinary 9-week internship for Physics and Engineering students
- Hands-on training on Fermilab high-tech research

## ~570 ITALIAN SUMMER STUDENTS SINCE 1984

- Many former Summer Students then developed their career at Fermilab with a Master Thesis and a PhD



That's  
all  
folks



FFF

I Bassotti di Cavazzano - Learn more at [afnews.info](http://afnews.info)