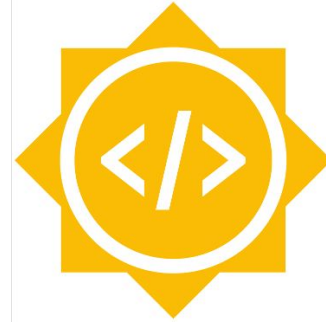


Google Summer of Code 2019 at CERN-HSF

Final Report



Javier Cervantes, Andrei Gheata
EP-SFT meeting, 21/10/2019

Google Summer of Code (GSoC)

- Created in 2005 to:
 - Expose students to real open source projects
 - Bring new talent and ideas into open source
 - Total program numbers:
 - 14,000+ students, 109 countries
 - 651 open source organizations
- EP-SFT
 - Participating since 2011 - [excellent results and mentor/student satisfaction!](#)
 - 2017 - Evolution into an umbrella organisation:
CERN-HEP Software Foundation
 - 2018: 29 students accepted (26 successful)
 - 2019: **33 students** accepted (**29** successful)



Google Summer of Code

Under the Umbrella

31 Organisations



104 Mentors



Caltech



Berkeley
UNIVERSITY OF CALIFORNIA



UCI

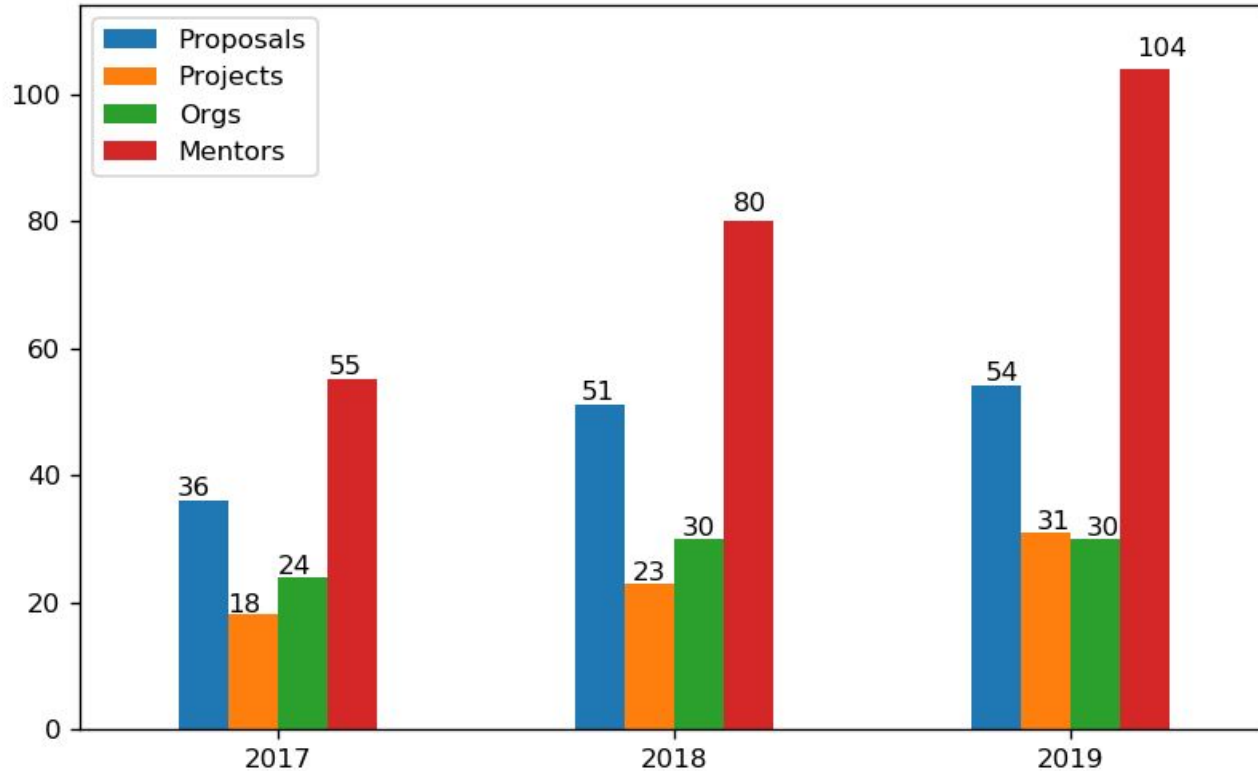


PRINCETON
UNIVERSITY

UC San Diego



Participation over the last 3 years



* Including non-selected projects

New projects and organizations in 2019

Projects	
ALICE	KM3NeT
Acts	Molr
Allen	Patatrack
AstroLab	Phoenix
DIRAC	Rucio
HTCondor	SWAN
IRIS-HEP	VecGeom

Organizations	
CC-IN2P3	University of California Berkeley
DESY	UC Irvine
Institute of Space Science (ISS)	University of California San Diego
Maison de la Simulation (MdS)	University of Massachusetts
Monash University	Université de Genève
Pittsburgh University	University of Sheffield

* Including non-selected projects

SFT and CERN Participation

- SFT participation slightly **decreased** (18 last year)
 - 16 proposals
 - ROOT (6)
 - TMVA (6)
 - GeantV (1)
 - CVMFS (1)
 - VecGeom (1)

CERN-HSF Proposals

SFT
28,6%

Other at CERN
44,6%

Other Orgs
26,8%

Total: 56

SFT and CERN Participation

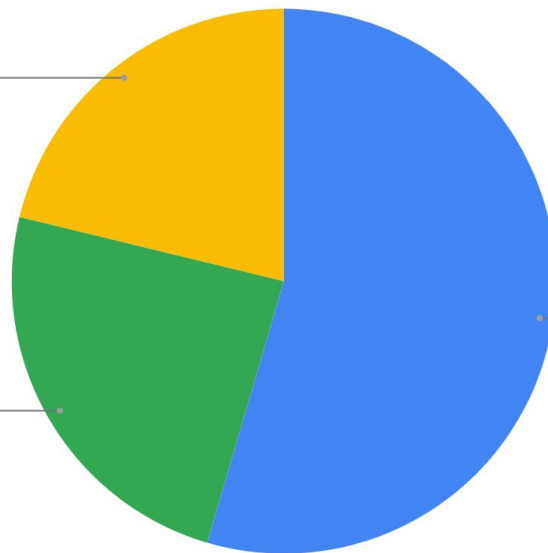
- SFT **decreased** in the number of **assigned projects**
 - 7 proposals
 - ROOT (3 / 6)
 - TMVA (3 / 6)
 - GeantV (1 / 1)
 - CVMFS (0 / 1)
 - VecGeom (0 / 1)

CERN-HSF Accepted Projects

SFT
21,2%

Other Orgs
24,2%

Other at CERN
54,5%



Total: 33

- SFT **decreased** in the number of **assigned projects**

2019

7 students

- ROOT (3 / 6)
- TMVA (3 / 6)
- GeantV (1 / 1)
- CVMFS (0 / 1)
- *VecGeom* (0 / 1)

2018

12 students

- ROOT (4 / 9)
- TMVA (5 / 5)
- GeantV (1 / 2)
- CVMFS (1 / 1)
- *Geant4* (1 / 1)

- SFT **decreased** in the number of **assigned projects**

2019

7 students

- ROOT (3 / 6)
- TMVA (3 / 6)
- GeantV (1 / 1)
- CVMFS (0 / 1)
- *VecGeom* (0 / 1)

Main reasons:

- Less students interested
- Student proposals were not good enough

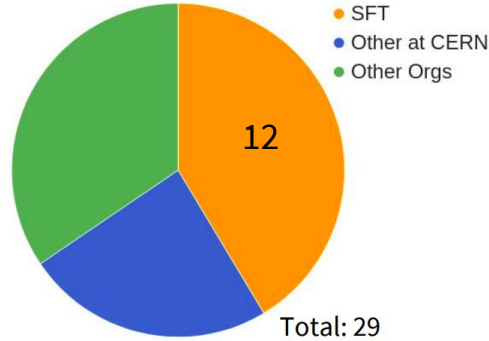
Why ?

- Consequence of having more projects?
- Complex projects?
- Other projects more attractive?

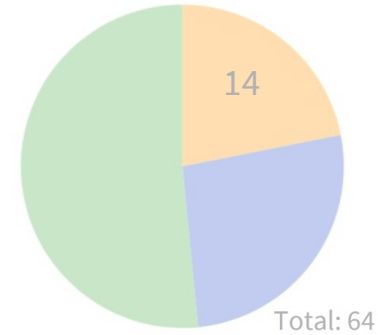
SFT and CERN Participation compared to 2018

2018

CERN-HSF Projects



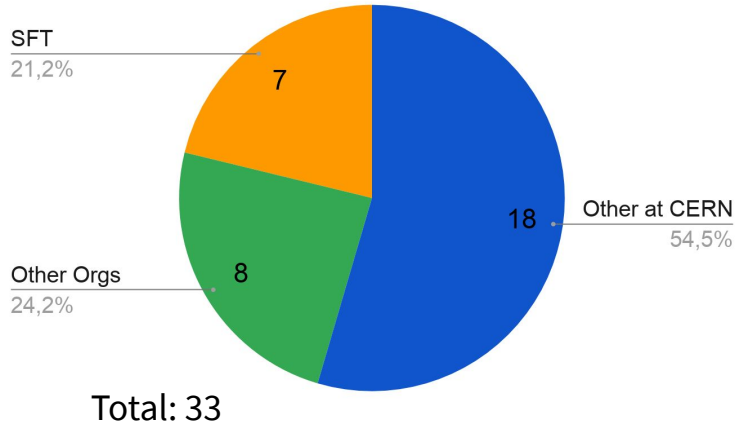
CERN-HSF Mentors



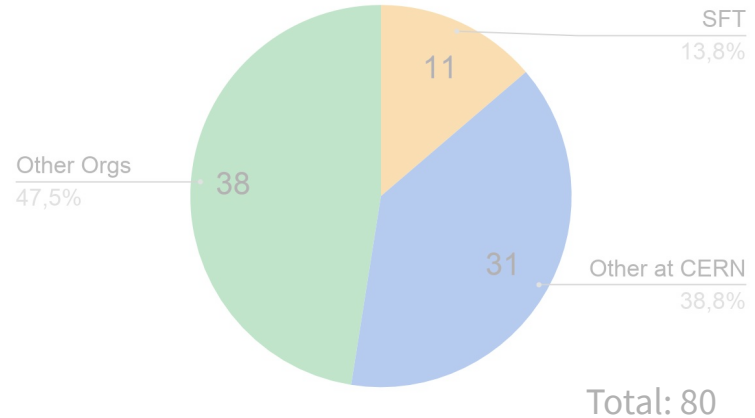
*Only assigned projects

2019

CERN-HSF Accepted Projects



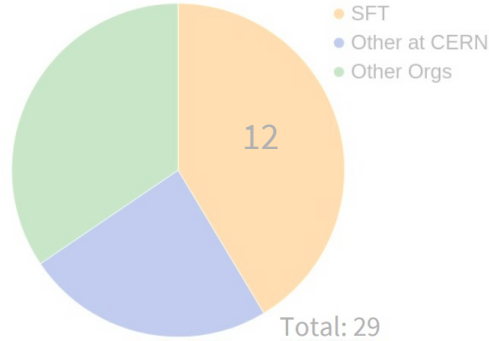
CERN-HSF Mentors



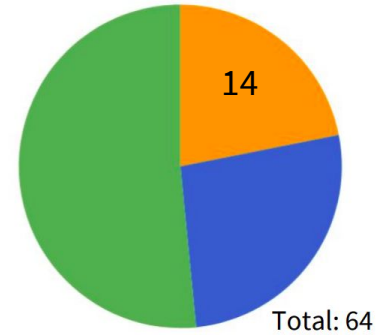
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CERN-HSF Projects



CERN-HSF Mentors

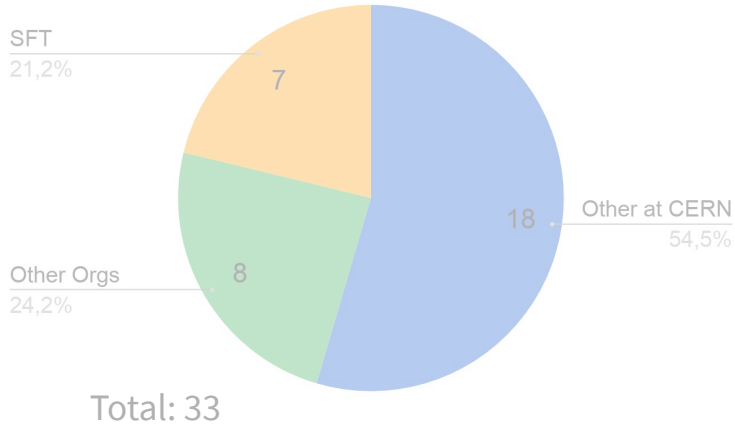


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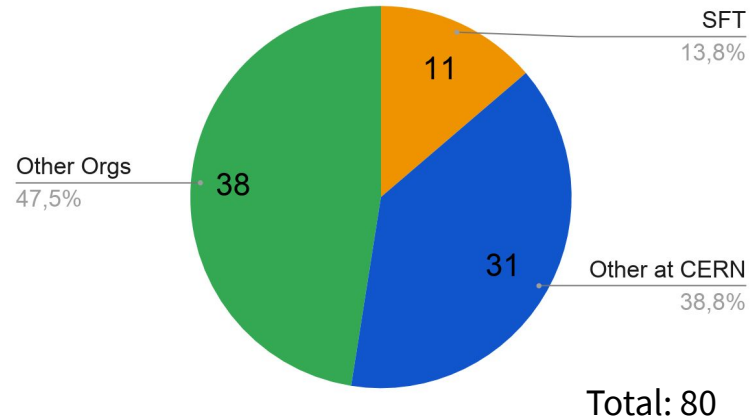
**Considerable number of SFT Members co-mentoring non-SFT projects

2019

CERN-HSF Accepted Projects



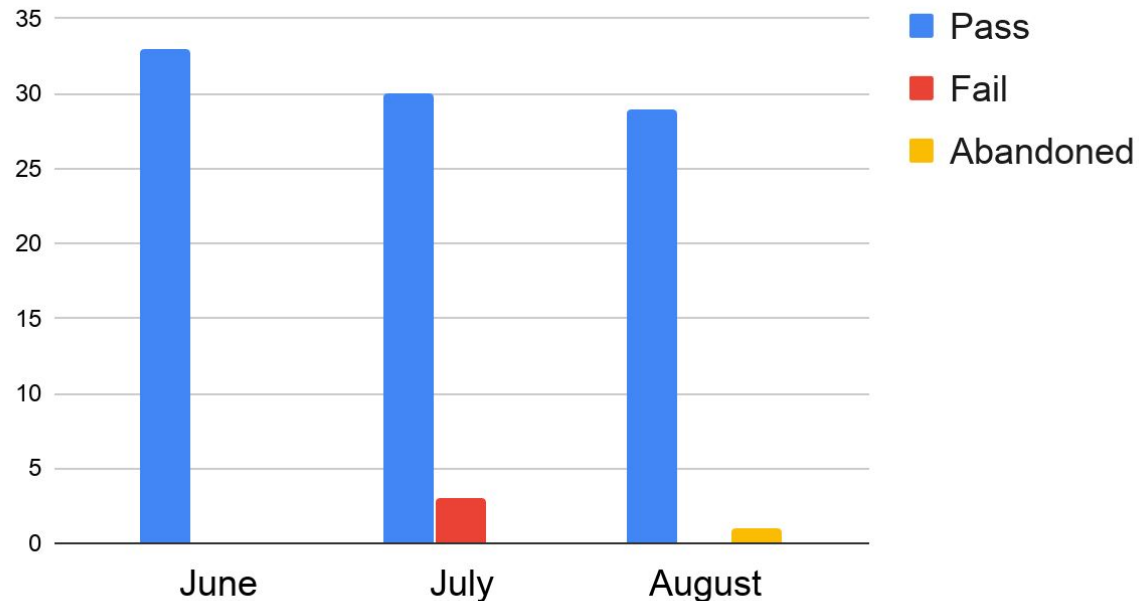
CERN-HSF Mentors



Students Evaluations

- **29 students** passed all their evaluations (out of 33)
 - **87.87%** success rate
 - Average success rate in GSoC 2019 (all orgs) is **89.05%**¹

Monthly Evaluations



¹ [Official Program Statistics](#)

SFT Projects Status

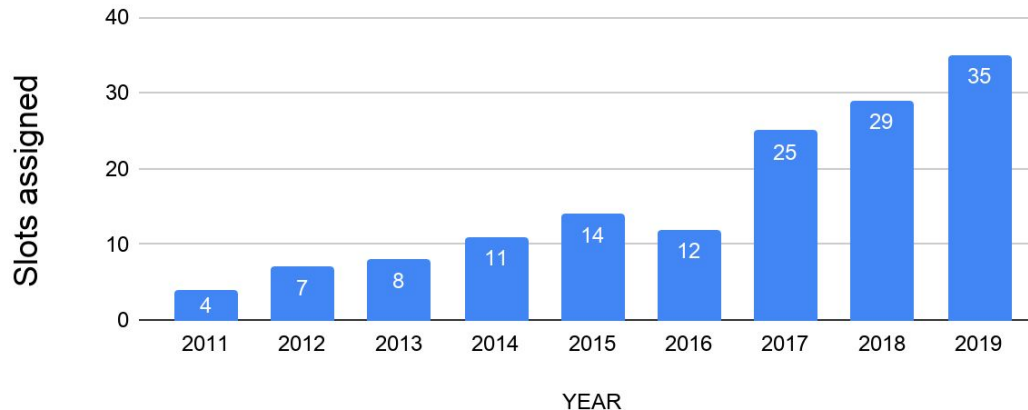
Area	Project	Status
ROOT	Extend clad - Automatic Differentiation	Completed, merged
ROOT	GlobalModuleIndex in ROOT and Cling	Completed, target 6.22
ROOT	ZSTD compression algorithm to ROOT	1st - Completed, target 6.20 2st - Partially completed, work needed before merging
TMVA	GAN for Particle Physics Applications	Partially completed, work needed before merging (target 6.22)
TMVA	Development of LSTM and GRU layers	Completed, not merged (6.22)
TMVA	Feature Extraction	Failed, student did not deliver
GeantV	VectorFlow - a vector processing service	Completed, merged

SFT-related Project Status

Area	Project	Status
SWAN	Testing framework for Jupyter notebooks	Completed, exploratory
SWAN	Package manager for SWAN / Jupyterlab	Partially completed, exploratory
SWAN	Creation and usage of disposable Spark on Kubernetes clusters from notebook service (SWAN) for distributed physics analysis	Completed, work needed before merging
Allen (LHCb)	SIMT to SPMD code translation	Completed, work needed before merging (side project)
HSF	Implementation of an HDF5 IO layer for PODIO	Completed, integration TBD

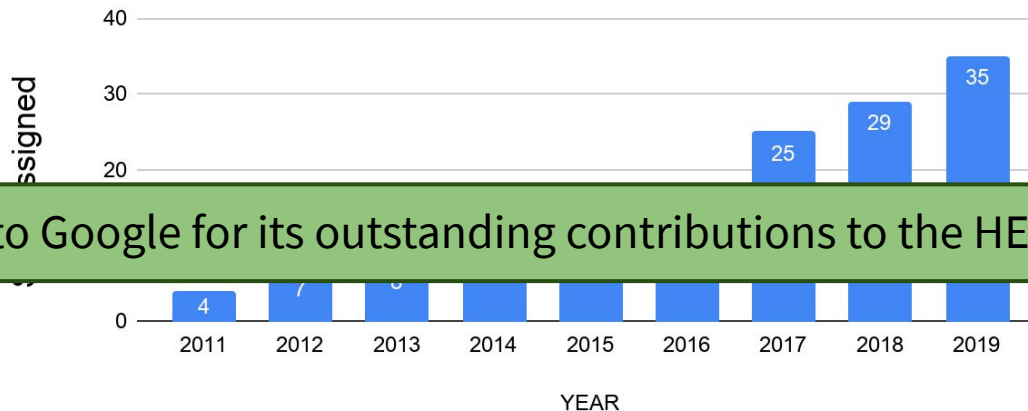
- GSoC at CERN-HSF is growing every year, important impact for HEP
 - New mentors, projects and organizations
 - Increasing number of students
- Google recognizes and rewards our efforts
 - Number of slots for students has increased: 4 (2011) → 35 (2019)

Number of slots assign per year



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Big thanks to Google for its outstanding contributions to the HEP Community

Conclusions and Future plans

- Review of the organizations under the umbrella may be needed
 - Some organizations might benefit from applying as independent orgs
 - Maximize the success of HEP-related projects
 - Ensure the quality of the coordination provided by the admins

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- **Thank you very much to Enric Tejedor** for his invaluable help and support to drive the administration of the program
 - Working on a guide for admins
- Since this year, CERN-HSF is also part of [Season of Docs](#)
 - One accepted project: *ROOT - Wonderful Documentation*