GPU HACKATHONS UPDATE

Julia Levites, OpenACC Marketing Chair, NVIDIA
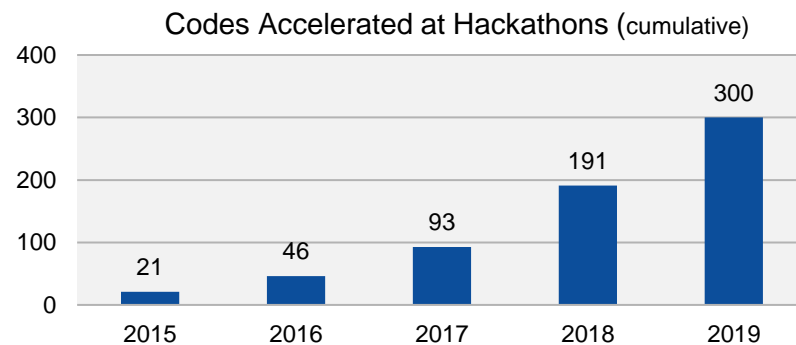
OpenACC
More Science, Less Programming

TRAINING AND EDUCATION
GPU Hackathons and Bootcamps

Learn

GPU Bootcamps

- 1 or 2-day event
- Labs and a mini-app challenge
- 50 people with 2-3 mentors
- Gain confidence in GPU programming

Hackathons

- 4-day event
- Users bring their own codes or data
- Up to 10 teams with 3+ people per team
- 2 mentors per team

Optimize Accelerate

Number of Hackathons

2014	2015	2016	2017	2018	2019	2020
1	3	4	5	8	15	20
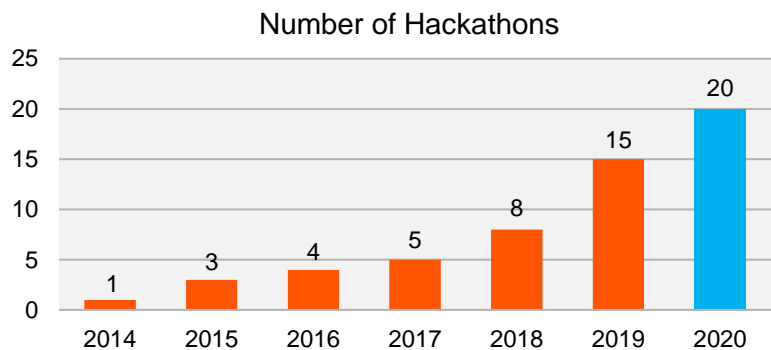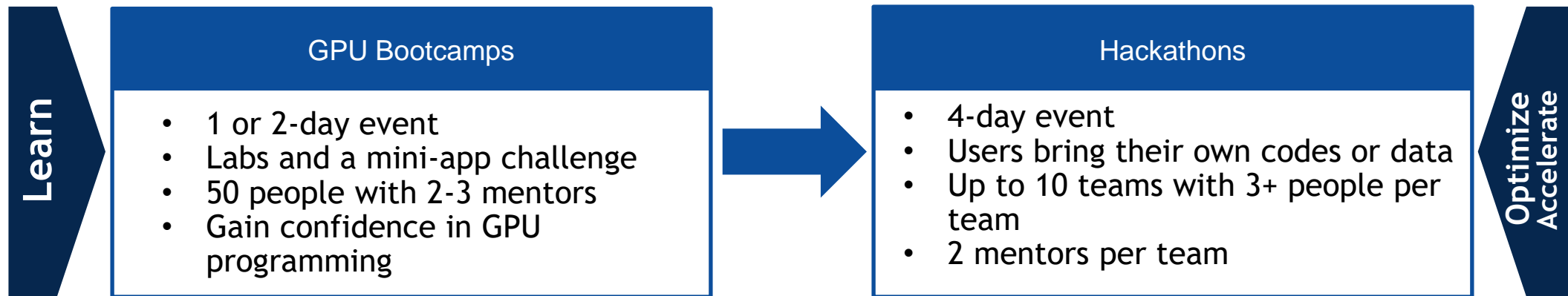
23 Bootcamps in 2019

30 Bootcamps in 2020

Codes Accelerated at Hackathons (cumulative)

2015	2016	2017	2018	2019
21	46	93	191	300

www.gpuhackathons.org

HACKATHONS: NEW IN 2020

- New www.GPUHackathons.org website

- 1st GPU Hackathon Summit in Europe

- Converted all Hackathon and Bootcamps to online events.

- New Hackathon format – shorter and more productive

- New AI Hackathons with Competition

- New AI Bootcamps
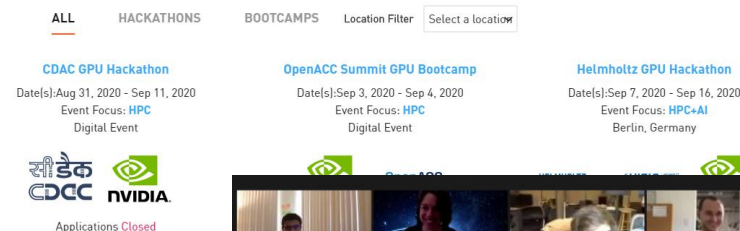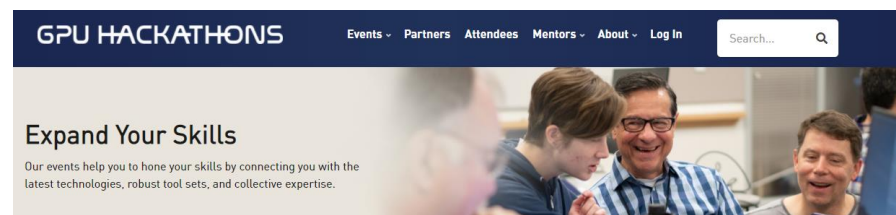
SELECTED HACKATHONS HIGHLIGHTS

Code	Domain	Result in 5 days
CHARMM	MD	7.5x on a kernel
LAVA(NASA)	CFD	10x on a mini-app
HiFUN	CFD	3.2x on a full app, 100x on a kernel
Yambo	QC	6x on a full app
CASTRO	Astro	14x on mini-app
Garnet	Earth Sciences	40x on mini-app
CGYRO	Physics	10x on a mini-app
CASTEP	QC	2.7x and 11x on 2 parts
SPECFEM-X	Geophysics	205x vs single CPU core
GTS	Fusion	25x for the kernel and 3x for the overall app
Quantum Espresso	QC	6x on a part of the code
DFT-FE	Quantum Mechanics	40x on kernels

" I'm a firm believer in **collaborative science**, and it was wonderful to see several of my graduate students and postdocs deeply engaged. The team made tremendous progress during the week, and that momentum has carried the project forward ever since. **In four days they managed to obtain a two-orders-of-magnitude increase in performance, and since then they've made further optimizations** that gained them another order of magnitude. This speedup has opened up an entirely new class of problems in quasistatic global geophysics. From my perspective, this was a very successful event! "

Jeroen Tromp, Blair Professor of Geology and Professor of Applied & Computational Mathematics at Princeton University