



Overview PRACE OpenACC Course 2020

9-11 November 2020 | Andreas Herten | Forschungszentrum Jülich, Jülich Supercomputing Centre

Jülich Supercomputing Centre

- Forschungszentrum Jülich
- Part of Institute for Advanced Simulation (IAS), Gauss Centre for Supercomputing (GCS), PRACE, ...
- Operates supercomputers and connected infrastructure
- Researches in next-gen supercomputers
- Supports applications leveraging machines
- Supercomputers
 - **JUWELS Cluster, JUWELS Booster**
 - **JURECA/JURECA DC, JURECA Booster**
 - **DEEP**
 - **JUSUF**

OpenACC Course

About

- Since 2014
- First time: [online course](#)
- Interactive course – many hands-ons 

- There are other *many-core* courses
 - CUDA: [December 2020](#)
 - HPC Python: [next week](#)
 - → See JSC [training program](#)

Tutors



Kaveh Haghghi-Mood

Application-Oriented
Technology Development, JSC



Andreas Herten

NVIDIA Application Lab
at Jülich, JSC



Jiri Kraus

NVIDIA Application Lab
at Jülich, NVIDIA



Thorsten Hater

High Performance Computing
in Neuroscience, JSC



Markus Hrywniak

NVIDIA Application Lab
at Jülich, NVIDIA



Anke Kreuzer

Division Technology
JSC

Timetable

- Every day from 9:00 until 13:00
- 30 minute break around 10:45

Day 1 Basics

- Welcome
- GPU Introduction
- OpenACC Introduction

Day 2 Tools, Interoperability

- Debugging
- Profiling, Performance Optimization
- Interoperability

Day 3 Multi-GPU

More Technicalities

- Supercomputer for this course: **JUSUF**
- Infrastructure for tasks
 - Already done for *Magic Number Challenge*
 - Jupyter-JSC: <https://jupyter-jsc.fz-juelich.de>
 - Project: training2019
 - Remember to **bootstrap** – or manually source the environment (tasks rely on environment variables)
- Tasks
 - Sorted by session
 - Solutions are always given, you decide how long you tinker before peaking into solutions
(Hint: The longer, the more benefit you will get from this course!)
 - Re-sync once might be needed now, call `jsc-material-sync`

Let's Get Started!

Questions?

My favorite programming language is:

C	C++	Fortran	Python
Java	JavaScript	Julia	Haskell
Go	Rust	Bash	Assembly

I've used OpenMP before

Yes

No

I've used MPI before

Yes

No

I've used a GPU before

Yes

No

I programmed a GPU before

Other SYCL, HIP, OpenGL, ...	OpenACC	
Yes		No
OpenCL	CUDA	

I currently work from home

Yes

No



I dial in from

I dial in with

Linux

macOS

Windows

other

4, 8, 15, 16, 23, 42

Yes

No

Distribute yourselves evenly!

1	2	3	4
5	6	7	8