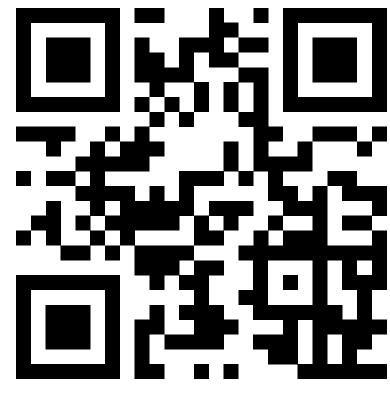


# 703650 VO Parallel Systems WS2019/2020 Introduction & Administrative Stuff

Philipp Gschwandtner

## Where are the Slides?

https://github.com/philippgs/uibk parsys 19



https://git.io/fjjw0

## Organizational Stuff

#### lecturer information

- Philipp Gschwandtner PhD
- philipp.gschwandtner@uibk.ac.at
- room 2W05, ICT building
- no fixed office hours (send an e-mail, I'm quite responsive)

#### dates and location

- see <u>lfu:online</u> for exact dates
- generally:
  - lecture every Thursday08:15-10:00 in HS B 8
  - proseminar every Wednesday13:15-16:00 in RR 22

## More Organizational Stuff

### prerequisites

- interest in parallel programing and high performance computing
- lecture: very little beyond that
- proseminar: programming in C/C++

## language

English-ish?

#### content

- general concepts of parallel programming and its intricacies
  - concepts apply to almost all parallel programming models
  - as an example, we will mainly discuss MPI
  - there are countless others (OpenMP, OpenCL, CUDA, TBB, Cilk, Pthreads, C++ STL, Charm++, X10, PGAS, ...)

# Grading: Lecture

- no mandatory attendance
  - Note: not everything I say will be on the slides...
- single, written exam on January 30<sup>th</sup> 2019
  - multiple exercises with multiple points
  - standard grading scheme, ≥ 50 % for positive grade

## Grading: Proseminar

- weekly assignments, published on GitHub
  - https://github.com/philippgs/uibk parsys 19
- teamwork is permitted and encouraged
  - 3 people max. per team
  - every team member must be able to present and discuss solution
- solutions have to be handed in before the PS starts!
  - solutions must work on the LCC2 cluster
  - copying solutions (e.g. off the Internet) is acceptable if cited properly
  - grade is 50 % solutions, 50 % presentations/discussion both must be ≥ 50 %!

#### Literature

#### www.internet.com

- MPI: A Message-Passing Interface Standard, Version 3.1 (hardcover book, PDF available via <a href="https://www.mpi-forum.org/">https://www.mpi-forum.org/</a>)
- stackoverflow
- Google
- ...

#### old school: Printed books

▶ Let me know and I will look up some references...

## What do I do when I am not teaching?

- Senior Scientist at Research Center HPC (Forschungszentrum Hochleistungsrechnen)
  - www.uibk.ac.at/fz-hpc
  - aid researchers at UIBK in developing and optimizing parallel applications
  - formerly Distributed and Parallel Systems Group (DPS), <a href="https://dps.uibk.ac.at">https://dps.uibk.ac.at</a>
- research interests in and around HPC
  - measurement/optimization/modeling of performance, energy, efficiency, ...
  - APIs, programming models, runtime systems, compilers, ...
  - interested in master thesis topics?

## What are we all doing here?

- discuss key concepts of parallel computing
  - hardware and software aspects
  - multiple non-functional aspects there's more than just speed
  - portability, usability, maintainability, sustainability
- we still need to actually do some concrete work
  - (mostly) MPI for implementing and evaluating distributed-memory parallelism concepts
  - we'll use LCC2 for running experiments



## What are we Going to Discuss?

- crash course on hardware and programming models
- introduction to MPI
- tons of generic concepts at the example of MPI programs
  - metrics: performance, efficiency, scalability
  - problem partitioning, scheduling and load balancing
  - programmer productivity
  - ...

Note: This schedule will probably become invalid and be abandoned after a few weeks...

# Hints (not only) for this Course

- choose a suitable source code editor/ IDE and choose it wisely!
- get acquainted with your toolchain
  - debuggers, version control (git), etc.
- use common sense and sanity checks!





# Questions?

# Image Sources

- ▶ LCC2: <a href="https://www.uibk.ac.at/zid/systeme/hpc-systeme/lcc/hardware/">https://www.uibk.ac.at/zid/systeme/hpc-systeme/lcc/hardware/</a>
- ► Sandbox: <a href="http://www.googblogs.com/open-sourcing-sandboxed-api/">http://www.googblogs.com/open-sourcing-sandboxed-api/</a>