Parallel Programming of High-Performance Systems

A collaborative course of NHR@FAU and LRZ
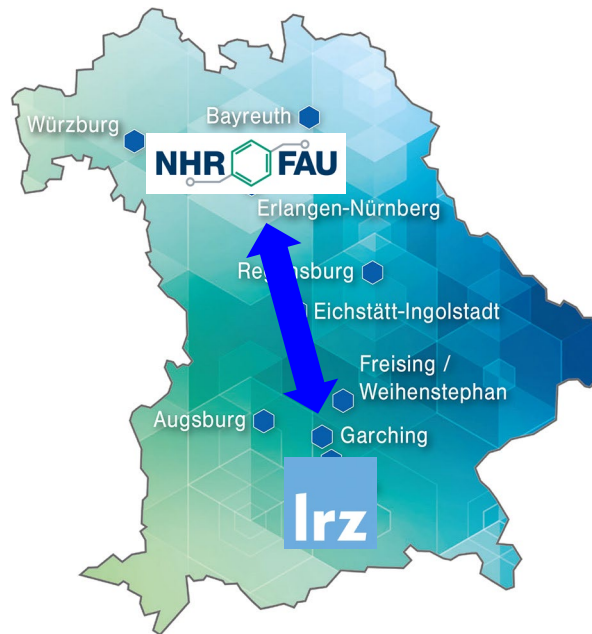18 – 20 February 2025

Information

- **Topics covered include:**
  - HPC Introduction, Systems in Germany
  - Elements of MPI and OpenMP
  - OpenMP in Depth
  - MPI in Depth
  - Performance Pitfalls and Program Optimisation
  - Profiling Tools
  - Parallel Computer Architecture

- **Hands-On Session:**
  Every day, interleaved with lectures

Lecturers

- Lecturers:

  - Dr. Alireza Ghasemi (NHR@FAU)
  - Dr. habil. Georg Hager, NHR@FAU
  - Dr. Volker Weinberg, LRZ

Tentative Schedule (all Times in CET)

Day 1	
10:30 - 10:50	Welcome & Introduction (VW)
10:50 - 12:00	HPC Introduction, Systems in Germany (GH)
12:00 - 13:00	**Lunch Break**
13:00 - 13:30	Hands-On: Logging in, running jobs, working with code examples
13:30 - 14:30	Elements of OpenMP and MPI (VW)
14:30 - 14:45	**Coffee Break**
14:45 - 17:00	Hands-On: OpenMP and MPI basics

Tentative Schedule (all Times in CET)

Day 2	
09:00 - 10:15	OpenMP in Depth (VW)
10:15 - 10:45	Hands-On: OpenMP
10:45 - 11:00	**Coffee Break**
11:00 - 11:30	Hands-On: OpenMP
11:30 - 12:00	Performance pitfalls and program optimisation (GH)
12:00 - 13:00	**Lunch Break**
13:00 - 13:45	Performance pitfalls and program optimisation (GH)
13:45 - 14:30	MPI in Depth (I) (AG)
14:30 - 14:45	**Coffee Break**
14:45 - 15:30	MPI in Depth (II) (AG)
15:30 - 17:00	Hands-On: MPI (and OpenMP)
17:00 - 18:00	Pizza Talk: New ways to fool the masses with performance results on parallel computers (GH)

Tentative Schedule (all Times in CET)

Day 3	
09:00 - 10:00	Profiling Tools (GH + AG)
10:00 - 10:45	Hands-On: Profiling with perf
10:45 - 11:00	**Coffee Break**
11:00 - 12:00	Hands-on: Performance analysis with Intel Trace Analyzer/Collector
12:00 - 13:00	**Lunch Break**
13:00 - 14:30	Parallel computer architecture (GH)
14:30 - 14:45	**Coffee Break**
14:45 - 15:45	Hands-On
15:45 - 16:00	Wrap-up & adjourn

Course Webpage

- "Moodle" is a learning management platform at NHR@FAU

- http://tiny.cc/PPHPS

- Further information on:
  - Agenda
  - Slides
  - Exercises
  - Survey

Social Event: Pizza Talk

- Wednesday, 19 February, 17:00 – 18:00 CET
- Pizza Talk: "New ways to fool the masses with performance results on parallel computers" by Georg Hager

- Pizza from "La Pergola - cucina italiana", Garching
- Available Pizzas: https://lapergola.igetnow.com/menu
- We will make a group order.

- Please note your selection until today 17:00 under https://tinyurl.com/PPHPS25-pizza
- Possibly pay via PayPal to vwweinberg@gmail.com

Social Event: Pizza Talk

And now …

Enjoy the course!