5-Day-Course — ZIH, TU Dresden — 1st day

Message Passing Interface (part 1)

8:30 **Registration**
9:00 **Introduction** [1] (talk)
9:15 **Parallel Architectures and Programming Models** [2] (talk)
10:15 Coffee
10:30 **MPI – Introduction to the Message Passing Interface** [3+3a] (talk)
10:45 **Chap. 1 MPI Overview** (talk)
11:15 **Chap. 2 MPI Process model** (talk+practical)
12:30 Lunch
13:30 **Chap. 3 Messages and Point-to-Point Communication** (talk+practical)
15:00 Coffee
15:15 **Chap. 4 Non-Blocking Communication** (talk+practical)
16:30 Coffee
16:45 **Chap. 6 Collective Communication** (talk+practical)
17:45 **Chap. 7 Error handling** (talk)
18:00 **Chap. 5 The new Fortran module mpi_f08** (talk – only for Fortran participants)
18:30 End

19:00 Luther-Denkmal vor Frauenkirche (Neumarkt) – kleine Führung durch die Altstadt
20:30 Augustinern an der Frauenkirche (auf „Schmidt“ reserviert)

5-Day-Course — ZIH, TU Dresden — 2nd day

Message Passing Interface (part 2) and OpenMP

8:30 **Access to the federal high-performance computing-centers** [9] (talk)
and **Computing Resources at ZIH, TU Dresden** [9a] (talk)
9:00 **Parallelization of Explicit and Implicit Solvers** [38a] (talk)
9:45 Coffee
10:00 **Parallelization of Explicit and Implicit Solvers** [38a] (talk, continued)
10:30 **Chap. 8 Groups & Communicators, Environment Management** (talk / no prac.)
11:15 Short Break
11:30 **OpenMP – Overview and execution model** [7+7a] (talk+practical 15min)
12:30 Lunch
13:30 **OpenMP – Work sharing directives** (talk+practical 25 min)
14:30 **OpenMP – Data environment** (talk+practical 10min)
15:15 Coffee
15:30 **OpenMP – Summary and Pitfalls** (talk)
16:45 **OpenMP – Heat example** (talk+homework)
17:15 Coffee
17:30 **OpenMP- 4.0 Extensions** [7a] (talk)
18:30 End

5-Day-Course — ZIH, TU Dresden — 3rd day

Message Passing Interface (part 3)

8:30 **Chap. 9-(1) Virtual Topologies** [3, continued] (talk+practical)
9:30 **Chap. 9-(2) Neighborhood Collective Communication** (talk / no practical)
9:45 Coffee
10:00 **Chap. 10 One-sided Communication** (talk+practical 35min)
11:15 Coffee
11:30 **Chap. 11-(1) Shared memory one–sided communication** (talk+practical)
12:30 Lunch
13:30 **Chap. 11-(2) Memory models and synchronization rules** (talk / no practical)
14:15 Coffee
14:30 **Chap. 12 Derived Datatypes – Part 1** (talk+practical)
15:45 Coffee
16:00 **Chap. 12 Derived Datatypes – Part 2 – Resizing, long counts…** (talk / no prac.)
16:30 **Chap. 14 MPI and Threads** (talk)
16:40 **Chap. 15 Probe, Persistent Requests, Cancel** (talk)
16:50 **Chap. 16 Process Creation and Management** (talk)
17:00 End

18:10 Treffpunkt: Mitte vor der Semperoper – (Öffnung: Haus 18:00, Saal 18:30)
19:00-21:30 Semperoper – Schwanensee (Ballett, Musik von Tschaikowsky)

5-Day-Course — ZIH, TU Dresden — 4th day

MPI (part 4) & Performance Tools for Parallel Programming [P..]

8:30 **Parallel programming models on hybrid systems / MPI + OpenMP** [23] (talk)
10:00 Coffee
10:15 **Chap. 13, Block 1 Parallel file I/O (basics)** [3, 11] (talk+practical 10min)
11:15 **Chap. 13, Block 2 Parallel file I/O (fileviews)** (talk+practical 30min)
12:00 Coffee
12:15 **Chap. 13, Block 3 Parallel file I/O (access methods)** (talk)
12:45 **Chap. 17 Other MPI features** (talk)
13:00 **Chap. 18 Best practice / Summary** (talk)
13:30 Lunch
14:30 **Introduction to Performance Engineering** [P1] (talk)
15:00 **Score-P: A Joint Performance Measurement Run-Time Infrastructure** [P2] (talk+practical)
15:30 **Profile examination with CUBE** [P3] (talk+practical)
16:00 Coffee
16:15 **Automatic Trace Analysis with Scalasca** [P4] (talk+practical)
17:00 **Interactive Trace Analysis with Vampir** [P5] (talk+practical)
18:30 End

5-Day-Course — ZIH, TU Dresden — 5th day

Debbuging Tools for Parallel Programming [D..]

08:30 **Typical Bugs in parallel Programs** [D1] (talk) ZIH D1
09:00 **Verifying an OpenMP Parallelization with the Intel Inspector XE** [D2] ZIH D2 login
(talk+practical)
09:40 **Heat Demo Intro** [D3] (talk+practical) ZIH D3
10:00 Coffee
10:15 **MPI Correctness Checking with MUST** [D4] (talk+practical) ZIH D4
11:15 **Parallel Debugging with Allinea DDT** [D5] (talk+practical) ZIH D5
12:30 End