








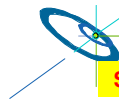


5-Day-PATC-Course — *Beginners* — 1st day (Monday)

Message Passing Interface (MPI-1, part 1)

- 8:30 Registration
- 9:00 Introduction [1] (talk)  
- 9:10 Parallel Architectures and Programming Models [2] (talk) 
- 10:30 Coffee
- 10:45 MPI-1 – 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) 
- 14:45 Coffee
- 15:00 Chap. 4 Non-Blocking Communication (talk+practical) 
- 16:15 Coffee
- 16:30 Chap. 5 Derived Datatypes (talk+practical) 
- 18:00 End






















Introduction Rolf Rabenseifner
 [1] Slide 9 (5 days) Höchstleistungsrechenzentrum Stuttgart

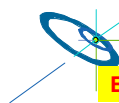
HLRIS 

Stuttgart-City-Tour and Social Event (Restaurant to be announced, self paying)

5-Day-PATC-Course — *Beginners* — 2nd day (Tuesday)

Message Passing Interface (MPI-1, part 2, and MPI-2 for beginners)

- 8:30 Access to the federal high-performance computing-centers [9] (talk)  
- 9:00 Chap. 6 Virtual Topologies [3, continued] (talk+practical) 
- 10:10 Coffee
- 10:25 Chap. 7 Collective Communication (talk+practical) 
- 11:00 Coffee
- 11:15 Chap. 8 Other MPI-1 features (talk) 
- 12:00 Heat conduction program, a parallelization example with MPI [6] (talk)  
- 12:30 Lunch
- 13:30 Domain decomposition of structured and unstructured grids [31] (talk) 
- 14:30 Coffee
- 14:45 Load balancing [32+32a] (talk) German:   English:  
- 15:15 MPI-2 overview [10] (talk)   
- 15:45 Coffee
- 16:00 MPI-2 one-sided Communication [12+12a] (talk+practical) 
- 17:15 Parallel debugging [5] (talk+practical)   
- 18:00 End











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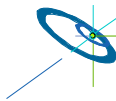
Excursion to the world's 1st TV tower / States Gallery – Exhibition of Modern Art

5-Day-PATC-Course — *Beginners* — 3rd day (Wednesday)

Shared Memory Parallelization with OpenMP

- 8:30 **OpenMP – Overview and execution model** [7+7a] (talk+practical) 
- 9:30 **OpenMP – Work sharing directives** (talk+practical) 
- 10:30 **Coffee**
- 10:45 **OpenMP – Data environment** (talk+practical) 
- 11:30 **OpenMP – Summary and Pitfalls** (talk) 
- 12:30 **Lunch**
- 13:30 **Verifying an OpenMP parallelization with the Intel Thread Checker** [8a] (t+p) 
- 14:30 **Coffee**
- 14:45 **OpenMP – heat example** [7, slide 92ff] (practical) 
- 16:00 **Coffee**
- 15:15 **OpenMP – Performance tuning and OpenMP** [22] (talk+practical) 
- 17:30 **Visualization: Hybrid prototypes** [30] (talk and demo in the "cave")
- 18:00 **End** 

After the course: You can visit the Cave and the computer room











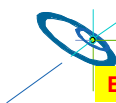
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[1] Slide 12 (5d) Höchstleistungsrechenzentrum Stuttgart

HLRS 

5-Day-PATC-Course — *Advanced* — 4th day (Thursday)

Advanced MPI and OpenMP programming

- 8:30 **Parallel programming models on hybrid systems / MPI + OpenMP** [23] (talk) 
- 9:45 **Coffee** 
- 10:00 **Parallel programming models on hybrid systems / MPI + OpenMP** (continued)
- 10:45 **Coffee**
- 11:00 **Parallel Performance Analysis and profiling** [16] (talk+practical) 
- 12:00 **MPI-2 parallel file I/O (basics)** [11+11a] (talk+practical) 
- 13:00 **Lunch**
- 14:00 **MPI-2 parallel file I/O (fileviews)** (talk+practical) 
- 15:00 **Coffee**
- 15:15 **MPI-2 parallel file I/O (access methods)** (talk) 
- 15:45 **Coffee**
- 16:00 **Memory Checking & Single-Processor Optimization using Valgrind** [05b] (talk)
- 16:45 **MPI-3.0 Overview** [10a] (talk) 
- **Services at HLRS** [18a] (handouts only) 
- 17:30 **End**














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[1] Slide 13 (5d) Höchstleistungsrechenzentrum Stuttgart

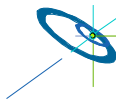
HLRS 

Excursion to the world's 1st TV tower / States Gallery – Exhibition of Modern Art

5-Day-PATC-Course — *Advanced* — 5th day (Friday)

Parallelization in General

- 8:30 **Parallelization of Explicit and Implicit Solvers** [38a] (talk) 
- 9:45 **Coffee**
- 10:00 **PETSc Tutorial** [41] (talk)   
- 10:45 **Laplace-Example with PETSc** [42a+C] (talk+practical)   **old**
- :--- **Laplace-Example with MPI** [42b] (handouts only)
- 11:30 **Coffee**
- 11:45 **Numerical and parallel libraries** [33] (talk) 
- 12:15 **Parallel numerics (part1)** [34] (talk) 
- 13:00 **Lunch**
- 14:00 **Parallel numerics (part2)** (talk) 
- 14:45 **Coffee**
- 15:00 **Particle based domain decomposition** [35] (talk) 
- 15:45 **Summary and Q&A** (talk+discussion) 
- 16:30 **End**



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[1] Slide 14 (5d) Höchstleistungsrechenzentrum Stuttgart

H L R I S 

1st day 4th day