

# Parallelware Tool Workshop

*Learning parallelization of real applications  
from the ground-up*

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**OpenACC**  
More Science. Less Programming

**OpenMP**  
Enabling HPC since 1997

# Expected workshop learning outcomes

- **Why are you attending a course about parallel computing?**
  - You get “competitive advantage” by developing high-performance applications
- **In the introductory Parallelware workshop in June 2019...**
  - Learn a practical step-by-step approach to parallelization based on code patterns
  - Learn how to decompose real codes into code patterns: hydrodynamics CORAL LULESHmk
  - Focus on the hotspots of the code by using “computation patterns”
- **What is new in this new intermediate-level course in October 2019?**
  - First, analysis of the source code to decide how to parallelize it
    - Understanding of the code as a whole, not just the hotspots isolatedly
    - Cover wider set of patterns: computation patterns, memory patterns and flow patterns
  - Second, implementation of parallel version of the code for CPU and GPU
    - Learn best practices for parallel programming using OpenMP/OpenACC for CPUs and GPUs
    - Quickly develop parallel versions using OpenMP/OpenACC for CPU/GPU
    - Learn the commonalities and differences between both parallel computing environments

# Agenda

8:15 - 8:45

*Morning refreshment and coffee*

8:45 - 9:00

*Welcome and introductions*

9:00 - 9:30

Lecture 1: An introduction to OpenMP/OpenACC optimizations for CPUs/GPUs

9:30 - 10:15

Lecture 2: A wider set of code patterns: compute patterns, memory patterns and flow patterns

10:15 - 10:30

*Break*

10:30 - 11:00

Lecture 3: Minimizing data transfers

11:00 - 11:30

Lecture 4: Optimizing memory usage

11:30 - 12:00

Lecture 5: Exploiting massive parallelism

12:00 - 13:00

*Working lunch (hands-on activities)*

13:00 - 14:00

Practical 6A-6B: Parallelizing the calculation of HEAT and MATMUL

14:00 - 17:00

Hands-on time with your code and LULESHmk, inspired in the CORAL benchmark LULESH

17:00 pm

*Close*