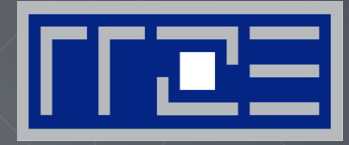


# ERLANGEN REGIONAL COMPUTING CENTER



<http://tiny.cc/NLPE-LaRC>

## Node-Level Performance Engineering

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Three-day short course  
NASA Langley Research Center  
November 7-9, 2018





	Day 1
0830	Welcome & Intro
0900	Introduction to node-level computer architecture
1000	Coffee break
1015	Tools: topology, affinity, clock speed
1100	Hands-On
1200	Lunch
1300	Microbenchmarking for architectural exploration
1345	Hands-On
1445	Coffee break
1500	The Roofline performance model: basics
1630	End of day 1



	Day 2
0830	Tools: hardware performance counters (+demo)
1000	Coffee break
1015	Hands-On
1115	Programming for ccNUMA
1200	Lunch
1300	Single Instruction Multiple Data (SIMD) parallelism
1400	Simultaneous Multi-Threading (SMT)
1430	Coffee break
1445	Case study: stencil algorithms
1545	Hands-On
1630	End of day 2



Day 3	
0830	Case study: sparse matrix-vector multiplication (and friends)
1015	Hands-On & coffee break
1115	Case study: tall & skinny matrix-matrix multiplication
1200	Lunch
1300	The Execution-Cache-Memory (ECM) performance model
1400	Case study: conjugate-gradient solver
1500	Coffee break
1515	Hands-On
1630	End of day 3

Optionally we can use the afternoon of day 3 to cover special topics:

- Architecture and performance of the NEC SX-Aurora „Tsubasa“ vector processor
- Power and energy consumption aspects of computation