East	Central	Mountain	Pacific	
Monday				
10:30	9:30	8:30	7:30	Registration
11:00	10:00	9:00	8:00	Lecture 1: Introduction to Scalable Algorithm Design (Hwu, 80 minutes)
				Key factors to scalability: parallelism, memory bandwidth, load balance, output interfe work efficiency
				Numeric stability in scalable algorithms
				Overview of the techniques
				CPU vs. GPU scalability
12:30	11:30	10:30	9:30	Hands-on session: Assignment 0 - vector addition in CUDA C (Stratton, TAs, 1 hour)
13:30	12:30	11:30	10:30	Lunch
14:30	13:30	12:30	11:30	Lecture 2: Tiling for Data Locality (Hwu, 80 minutes)
				Matrix multiplication pattern
				Role of barrier synchronization
				Indexing complexity
				Thread coarsening and register tiling
				DRAM bandwidth utilization
16:00	15:00	14:00	13:00	Lecture 3: Advanced Tiling Considerations (Stratton, 80 minutes)
				Stencil computation pattern
				Thread coarsening and circular buffering
				Handling halo elements
				Cache vs. shared memory tiling
17:30	16:30	15:30	14:30	Afternoon Break
17:45	16:45	15:45	14:45	Hands-on session: Assignment 1 - matrix multiplication w/wo tiling (Stratton, TAs, 1 hou
18:45	17:45	16:45	15:45	Evening: independent work time
Tuesday				
11:00	10:00	9:00	8:00	Lecture 4: Tiling in a Multi-GPU Environment (Gelado, 80 minutes)
				Halo cell data exchange
				Synchronization, double buffering, and GPU direct
				Data exchange in CUDA vs. GMAC
12:30	11:30	10:30	9:30	Hands-on session: Completing Assignment 1 (Stratton, TAs, 1 hour)

13:30	12:30	11:30	10:30	Lunch
14:30	13:30	12:30	11:30	Lecture 5: Scalable Tiling is a Heterogeneous Computing Cluster (Gelado, 80 minutes)
				Domain decomposition
				MPI review
				Data exchange in a MPI-CUDA-GMAC application
				Overlapped computation and halo communication
16:00	15:00	14:00	13:00	Lecture 6: Owner Compute for Reducing Output Interference (Hwu, 80 minutes)
				Scatter vs. Gather
				Loop transformation
				Atomic operations for output interference
17:30	16:30	15:30	14:30	Afternoon Break
17:45	16:45	15:45	14:45	Hands-on Session: Assignment 2 Stencil tiling kernel (Stratton, TAs, 1 hour)
18:45	17:45	16:45	15:45	Evening: independent work time
Wednesday				
11:00	10:00	9:00	8:00	Lecture 7: Binning for Efficient Processing of Input Data (Stratton, 80 minutes)
				Scatter vs. Gather
				Loop transformation
				Atomic operations for output interference
12:30	11:30	10:30	9:30	Hands-on Session: Assignment 2 (Stratton, TAs, 1hour)
13:30	12:30	11:30	10:30	Lunch
14:30	13:30	12:30	11:30	Lecture 8: Compaction for Sparse Data (Hwu, 80 minutes hours)
				Compaction vs. regularization
				Padding, sorting, sectioning
16:00	15:00	14:00	13:00	Keynote: Computational Thinking, Kepler, and CUDA 5.0 (Kirk, 1.5 hours)
17:30	16:30	15:30	14:30	Afternoon Break
17:45	16:45	15:45	14:45	Hands-on Session: Assignment 3 – Stencil tiling in MPI-CUDA-GAMC (Gelado, TAs, 1
18:45	17:45	16:45	15:45	Evening: independent work time
Thursday				
11:00	10:00	9:00	8:00	Lecture 9: Privatization for Dynamic Data (Hwu, 80 minutes)
				Privatized queues
				Consolidating privatized versions

				Dynamic work variation
12:30	11:30	10:30	9:30	Hands-on Session: Completing Assignment 3 (Gelado, TAs, 1 hour)
13:30	12:30	11:30	10:30	Lunch
14:30	13:30	12:30	11:30	Lecture 10: Performance, Scalability, Portability, and numerical stability (Stratton, 80 mir
				What's good for GPU scalability can also be good for CPU
				MxPA overview and user perspective
				Single kernel for high performance in both GPU and CPU
				MxPA demo and case study – Binned CutCP kernel
				Sometimes more dramatic change is needed - data layout transformation
				Data layout case study – a numerically stable tri-diagonal solver
16:00	15:00	14:00	13:00	Keynote: Broadening the Use of Scalable Kernels in NAMD/VMD (Stone, 1.5 hours)
17:30	16:30	15:30	14:30	Afternoon Break
17:45	16:45	15:45	14:45	Lab: Assignment 4 - data layout (Stratton, TAs, 1 hour)
18:45	17:45	16:45	15:45	Evening: independent work time
Friday				
11:00	10:00	9:00	8:00	Lab: Completing Assignment 4 (Stratton, Tas)
11:30	10:30	9:30	8:30	Assessment
12:00	11:00	10:00	9:00	Keynote: Frontier of Algorithm Design for Many-cores (Garland)
13:30	12:30	11:30	10:30	Lunch
				CFD Special Session
14:15	13:15	12:15	11:15	Introduction to Navier-Stokes equations
15:05	14:05	13:05	12:05	Survey of Discretization and Solution schemes
15:55	14:55	13:55	12:55	Break
16:15	15:15	14:15	13:15	A fractional step method for time-dependent flows
17:05	16:05	15:05	14:05	Demonstration of the code and lab session
17:55	16:55	15:55	14:55	End of Session

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