Distributed Systems Group

Research Areas

High Performance Computing (HPC)

- Static, Dynamic and Adaptive Scheduling
- Multi-Core and Many-Core Scheduling
- High Performance Operating Systems and VMMs
- Computational and Programming Models for HPC Workloads
- Virtual HPC Clusters
- HPC in Clouds
- HPC on Many-Core Systems
- Scalable HPC Load Manager and Job Scheduling
- Performance Portability

Exascale Computing

- Operating System Support for Exascale Computing
- Energy-Aware Exascale Computing
- Parallel Programming in Exascale Computing
- Scalable Scheduling for Many-Core systems

Cloud Computing Environment

- Virtual Machine Scheduling in Support of Cloud Computing Environments
- Resource Management at Virtual Machine Monitor Level
- Network Service Provisioning at Virtual Machine Monitor Level
- Complex Event Processing in Cloud Computing Platforms (e.g. Elasticity and Parallelism)

Operating Systems Design and Performance Evaluation

- Kernel-Level Performance Evaluation Techniques
- Kernel-Level Techniques for Improving IO Performance Workload-Aware Task Scheduling
- Cloud-Aware/Real-Time/ Energy-Aware Operating Systems
- Application of Machine Learning to Performance Diagnosis

Distributed Systems

- Distributed Computational Models in Support of New High-Performance Computing Applications
- Distributed Programming Models in Support of New Computational Models

- Practical Realizations of Computational and Programming Models of HPC Applications
- Scalable Stream Processing
- Very Large Databases
- In-Memory Column-Store Distributed Databases
- Transaction Support for Distributed Event-Based Systems

System Software Security

- Proactive Detection of Distributed Denial of Service Attacks
- Digital Money Challenges and Opportunities

Software System Dependability

- Dependability Through Virtualization
- Fault Tolerant Virtualized Systems

Data Stream Processing (DSP)

- Matching Facilitation
- Moving Object Data Streams
- Scalability of Operators in Data Stream Processing Systems

Complex Event Processing (CEP)

- High Availability in Complex Event Processing Systems
- Predictive Analytics and Complex Event Processing Systems
- Uncertainty in Complex Event Processing Systems
- Scalability and Parallelism in Complex Event Processing Systems
    - Event Dispatching
    - Rule Decomposition
    - Rule Distribution
- Network Usage Optimization in Complex Event Processing Systems
- Deep Learning

Business Process Management (BPM)

- Process Mining
- Business Activity Monitoring
- Model-Execution Conformance Checking
- Model-Execution deviation Monitoring
  Process-Oriented Execution in Event-Based or Distributed Systems