



## CECS Seminar

### *“Energy-Aware Data Center Management: Monitoring Trends and Insights via Machine Learning”*

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Friday, November 15, 2019  
11:00 a.m. – 12:00 p.m.  
Donald Bren Hall 3011



**Abstract:** The increasing demand for online resources has led to an immense energy burden on contemporary High Performance Computing (HPC) and cloud data centers. Even though each new generation of HPC systems delivers a higher power efficiency, the growth in system density and overall performance has continuously contributed to an increase in energy consumption. The mentioned energy consumption not only converts to high operational bills and affects the environment, but also influences the stability of the underlying power grid. In fact, all these have already led some governmental organizations to reconsider data center deployment procedures with an increased demand for the renewable energy utilization and waste heat recovery.

The talk will give an overview of Leibniz Supercomputing Centre (LRZ), introduce its flagship HPC systems, discuss the high-temperature direct liquid cooling solution and the waste heat reuse. These will be followed by the recent R&D results that rely on ML technologies for forecasting various energy/power consumption relevant Key Performance Indicators at a data center building infrastructure level. The talk will highlight the applications of the developed model outlining its use in proactive management of modern data centers for tackling the above-mentioned challenges.

**Biography:** Dr. Hayk Shoukourian received his M.Sc. and PhD in Computer Science from Technical University of Munich in 2012 and 2015 correspondingly. He joined Leibniz Supercomputing Centre (LRZ) in 2012 and his R&D activities mainly involve efficient energy/power consumption management of the HPC data centers. In his current role, Dr. Shoukourian is responsible for adaptive modelling of interoperability between the target HPC systems and the building infrastructure of the supercomputing site. He is also a team leader for PRACE (Partnership for Advanced Computing in Europe) work package on "HPC Commissioning and Prototyping". Since August 2018 Dr. Shoukourian is a lecturer in Computer Science at Ludwig-Maximilians-Universität München (LMU).