

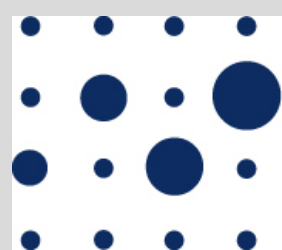


# International Workshop Ash-Related Issues in Gas Turbines

Organized by Dr. Wenjia Song (LMU Munich)  
Center for Advanced Studies, LMU Munich  
3–5 July 2017

Co-Organizers:

Prof. Donald Bruce Dingwell (LMU Munich);  
Prof. Uwe Schulz (DLR, Cologne)



VolkswagenStiftung



LUDWIG-  
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UNIVERSITÄT  
MÜNCHEN

CAS<sup>LMU</sup> CENTER FOR ADVANCED STUDIES



## ASH-RELATED ISSUES IN GAS TURBINES

International Workshop at the Center for Advanced Studies, LMU Munich

Organized by Dr. Wenjia Song (CAS Young Center)

3 to 5 July 2017

MONDAY, 3 JULY 2017

13:00 – 13:15 **Welcome Address**

(CAS, Organizers)

### Session 1: Ash-related Issues in Gas Turbines

Chair: Prof. Uwe Schulz (DLR)

13:15 – 14:15 **Dr. Rory Clarkson** (Rolls-Royce Inc.)  
Latest Understanding of Turbine Engine Durability in Volcanic  
Ash Clouds

14:15 – 15:15 **Prof. Carlos G. Levi** (California University)  
An Integrated Approach to the Degradation of High  
Temperature Coatings by Silicate Deposits

15:15 – 15:45 Coffee Break

15:45 – 16:45 **Prof. Donald Bruce Dingwell** (LMU Munich)  
Experimental Generation of Volcanic Ash

16:45 – 17:45 **Prof. Tom Fletcher** (Brigham Young University)  
Particle Deposition Behavior of Ash from Various Fuels in  
Gas Turbine Environments at Temperatures up to 1400°C

17:45 – 19:00 **Short Talks** (8 speakers, 5 mins/each)  
**Chair: Dr. Betty Scheu** (LMU Munich)

19:00 Reception

TUESDAY, 4 JULY 2017

**Session 2: The Melting Behavior of Ash**

**Chair: Prof. Donald B. Dingwell** (LMU Munich)

- 9:30 – 10:30 **Prof. Bernadett Weinzierl** (Vienna University)  
What have we learned from the airborne measurements in the Eyjafjalla volcanic ash layers in 2010?
- 10:30 – 11:30 **Dr. Wenjia Song** (LMU Munich)  
Volcanic Ash Deposition in Jet Engine
- 11:30 – 12:00 Coffee Break
- 12:00 – 13:00 **Prof. Robert Vaßen** (Forschungszentrum Jülich)  
OTA
- 13:00 – 14:00 Lunch Break

**Session 3: The Impact of Ash Droplets**

**Chair: Dr. Wenjia Song** (LMU Munich)

- 14:00 – 15:00 **Prof. Masahiro Fukumoto** (Toyohashi Uni. of Technology)  
Splat Formation Issue in Thermal Spraying
- 15:00 – 16:00 **Prof. Uwe Schulz** (DLR)  
Damage of TBCs by Volcanic Ash and CMAS: Mechanisms and Mitigation Strategies
- 16:00 – 16:30 Coffee Break
- 16:30 – 17:30 **Prof. Simon Goutier** (Université de Limoges)  
Experimental observation of high-temperature droplet impacts on solid surfaces
- 19:00 Workshop Dinner

WEDNESDAY, 5 JULY 2017

**Session 4: Resistance of the Ash Deposition**

**Chair: Dr. Ulrich Küppers** (LMU Munich)

- 9:30 – 10:30 **Youssef Assaf** – in the group of **Prof. Anne-Marie Kietzig** (McGill University)  
Laser Micromachining of Biomimetic Surfaces
- 10:30 – 11:30 **Prof. Dr. Ichiro Naruse** (Nagoya University)  
Control of Ash Deposition by Thermal Spraying Technique in Pulverized Coal Combustion Boilers
- 11:30 – 12:00 Coffee Break
- 12:00 – 13:00 **Prof. Hongbo Guo** (Beihang University)  
Protect Thermal Barrier Coatings from CMAS Infiltration
- 13:00 – 14:00 Closing of the Workshop and Lunch

**Short Talk List**

- 17:45 – 17:55 **Prof. Yancheng You** (Xiamen Uni.)  
Next generation Turbine Based Combined Cycle jet engine
- 17:55 – 18:05 **Dr. Peter Mechnich** (DLR)  
Volcanic Ash Resistance of APS  $Y_2O_3$
- 18:05 – 18:15 **Dr. Steven Whitaker** (The OHIO State Uni.)  
Deposition in Internal Turbine Cooling Passages
- 18:15 – 18:25 **Dr. Ravisankar Naraparaju** (DLR)  
Simulates Realistic Volcanic Ash Deposition in Jet Engines
- 18:25 – 18:35 **Ms. Shanjie Yang** (Beihang Uni.)  
Contact Fatigue Behavior of High Speed Train Wheel
- 18:35 – 18:45 **Dr. Ulrich Küppers** (LMU)  
Why is volcanic ash not just any solid matter dispersed in air?
- 18:45 – 18:55 **Dr. Dirk Müller** (LMU)  
Characteristics of volcanic ash in dependence of grain size
- 18:55 – 19:05 **Dr. Kai-Uwe Hess** (LMU)  
Predicting the shear viscosity of CMAS melts