

## 4<sup>th</sup> Thin Film Technology Forum

with 10 years TFT anniversary



The 4<sup>th</sup> Thin Film Technology Forum will take place linked to the 11<sup>th</sup> Short Course Coating and Drying of Thin Films. Renowned scientists will present and discuss new trends in industry and academia with a focus on **Printing, Batteries, Smart Processes & Coatings**.

**May 16-17, 2019**

**KIT-Tagungszentrum (FTU)**

**Hermann-von-Helmholtz-Platz 1  
76344 Eggenstein-Leopoldshafen**

Organization: Prof. Dr.-Ing. Wilhelm Schabel  
Dr.-Ing. Philip Scharfer

## TFT Forum program

### Schedule 16.05.2019 – TFT Forum Thursday

- 12:40** *TFT Forum get-together with finger food*
- 13:10** *Forum registration and materials handout*
- 13:40** *Welcome with TFT anniversary intro (2009 - 2019)*  
Prof. Dr.-Ing. W. Schabel / Dr.-Ing. P. Scharfer
- 14:00** *Welcome address to the 4<sup>th</sup> TFT Forum at KIT*  
Prof. h.c. Dr. Joachim Knebel (KIT)  
Head of Division 3 (Mechanical & Electrical Engineering)
- 14:10** *Presentations of TFT research highlights & discussion*  
- Marangoni flows in films (M. Tönsmann)  
- Drying of particle polymer composite films (V. Gracia)  
- Processing of perovskite PV films (S. Ternes)  
- Multilayer printing and interdiffusion in films (L. Merklein)
- 15:20** *Coffee break (with exhibition)*
- Printed and organic electronics processing**
- 16:00** *Advances in organic & printed electronics processing*  
Ir. Ike de Vries (Holst Centre, NL)
- 16:45** *Advances in digital direct printing*  
Prof. Fritz Bircher (iPrint, CH)
- 19:30** *Get-together at BESITOS (Karlsruhe town square)*

### Schedule 17.05.2019 – TFT Forum Friday

#### Batteries

- 09:00** *Challenges and advances in processing of battery cells*  
Prof. Dr.-Ing. Arno Kwade (TU Braunschweig)
- 09:30** *Industrial production of lithium-ion battery cells*  
Dr. Armin Modlinger (Volkswagen AG)
- 10:00** *Simulation approaches in mixing of battery slurries*  
Prof. Dr.-Ing. habil. Hermann Nirschl (KIT)
- 10:30** *Advances in coating and drying of multilayer Li-ion battery electrodes*  
Dipl.-Ing. Ralf Diehm, Jana Kumberg M. Sc. (KIT)
- 11:10** *Coffee break (with posters and exhibition)*

#### Smart Coatings

- 11:50** *Applications in solution-processed functional films*  
Prof. Dr. Frank Kleine Jäger (BASF SE)
- 12:20** *Shear-induced wetting phenomena of interfaces*  
Prof. Dr.-Ing. Cameron Tropea (TU Darmstadt)
- 12:50** *Microfluidic and coating technology for biomedical film applications*  
Prof. Dr. An-Bang Wang (NTU, Taiwan)
- 13:20** *TFT Forum closing session lunch (Finger Food)*

The **Thin Film Technology Forum** brings together researchers, scientists and experts, dealing with coating and drying of thin films. The idea of the forum is to present and discuss latest developments and new research results in a casual atmosphere. Taking place for the 4<sup>th</sup> time in a row, this year the forum is open for proposed contributions of other groups and topics for the first time. There will be space for a limited amount of **"open oral or poster presentations"**, addressing recent highlights in coating & drying technology. Contributions can be introduced to the auditorium in a 5 -15 min. short presentation at the very beginning of the symposium with 5 min. discussion. If you are interested to contribute to the TFT Forum with a short presentation, please send an informal short abstract and possible title to schabel@kit.edu until the end of early bird registration deadline. If your contribution is selected, you will get a discount on the registration fee and the opportunity to present your highlight work to the TFT Forum participants.

**Prof. Dr.-Ing. Dr. h. c. Wilhelm Schabel (KIT)** received his doctoral degree in the field of film drying. He worked as R&D engineer at Lonza High Tech Film GmbH in 2007 and was honored with esteemed awards such as Carl-Freudenberg Award 2006 by the University of Karlsruhe (TH), Arnold-Eucken Award 2007 by the VDI-GVC and the L. E. Scriven Y. I. Award 2008 by the ISCST. Within the KIT Elite Future Concept he was appointed in 2009 to the first Professorship in Thin Film Technology in Germany, financially supported by an industrial consortium of BASF, BAYER and ROCHE. In 2014 he refused a Professorship offer (W3) to TU Dresden. Since 2018 Prof. Schabel is Vice President of the new European Coating Society and in 2019 the Chairman of the next ECS Conference in Heidelberg-Karlsruhe.



**Dr.-Ing. Philip Scharfer (KIT)** is head of the TFT group at KIT together with Prof. Schabel. He received his PhD in process engineering from the University of Karlsruhe (TH) in 2009. Dr. Scharfer is an expert in the fields of drying and thermodynamics of thin films. He deals with measuring methods for the investigation of polymer film drying and develops numerical simulation tools for industrial dryer applications. Dr. Scharfer is member of the scientific committee of the European Coating Symposium (ECS) and of the International Society of Coating Science and Technology (ISCST). In 2014, he was awarded with the L. E. Scriven Young Investigator Award by the ISCST. In 2019, Dr. Scharfer will be one of the Chairmen of the next ECS Conference in Heidelberg-Karlsruhe.



**Lisa Merklein M. Sc. (KIT)** completed her studies in Chemical Process Engineering at KIT in 2015, majoring in Thermal and Mechanical Process Engineering. Topic of her master's thesis was solution processing of nanolayers for organic electronics. Since 2016 she is working as research assistant at the KIT/TFT group, focusing on multilayer concepts for slot die coated OLEDs and the development of a fundamental understanding of interdiffusion in multilayer systems.



## Registration fee for 2-day Forum

	Early Bird (until 01.03.19)	later
2-day TFT Forum participation (GVT discount is 50 €)	€ 350.–	€ 450.–
Poster Presentation (limited space)	€ 250.–	
Please send a 1-page abstract within early bird period		
Exhibition booth	€ 550.–	€ 650.–
Exhibition booth (incl. participation)	€ 750.–	€ 850.–

## Payment

According to §4 Nr. 22a UStG the registration fee is purchase tax free. Registration fees include a printed copy of presentations, coffee, refreshments, lunch and the TFT Forum get-together on Thursday evening. The TFT Forum is included in the Short Course registration.

## Venue

The TFT Forum takes place at the KIT-Tagungszentrum (FTU), Lecture hall, Hermann-von-Helmholtz-Platz 1 in 76344 Eggenstein-Leopoldshafen.

## Hotel recommendations

Hotel Kaiserhof, Hotel Novotel Karlsruhe City, City Partner Hotel Berliner Hof, Hotel Rio

## Further information

[www.thin-film-technology.de](http://www.thin-film-technology.de)

## Contact and Registration:

Organisation: [tobias.boernhorst@kit.edu](mailto:tobias.boernhorst@kit.edu)

Office: [margit.morvay@kit.edu](mailto:margit.morvay@kit.edu)

Registration: [gvt-hochschulkurse@gvt.org](mailto:gvt-hochschulkurse@gvt.org)

## Further information and registration:

<http://www.tft.kit.edu/745.php>



**Ir. Ike de Vries (HOLST CENTRE, NL)** studied Chemistry at the Wageningen University, Netherlands. From 1988 to 2006 Ike was a project leader and process/research engineer in the field of extrusion coating and substrate development for ink jet and photographic paper at Fuji Photo Film. Since 2006, he is a research scientist at the Holst Centre in Eindhoven. Inventing and developing new (R2R) processes and slot die coating technologies, especially intermittent coating, are his main core competences. This to enable large scale production for flexible electronics, like for example organic light emitting diodes (OLEDs) and photovoltaic (PV).



**Prof. Fritz Bircher (iPrint, CH)** studied electrical engineering at ETH Zurich. After graduating he worked as an R&D engineer for different companies developing mechatronic system solutions. In 1993 he was appointed professor at Bern University of Applied Sciences, where he started his research in inkjet printing, studying and exploring all possible jetting and dispensing principles with all kinds of materials in a wide range of applications. In 2012 he joined the University of Applied Sciences Western Switzerland in Fribourg, where he founded iPrint institute and iPrint Center for Digital Printing on the Marly Innovation Center. Fritz's main research interests based on inkjet printing include: packaging printing, direct-to-shape printing, (3D) material printing and bio printing.



**Prof. Dr.-Ing. Arno Kwade (TU Braunschweig)** graduated from the Institute of Mechanical Engineering, TU Braunschweig and received his doctor's degree (PhD) in 1996. Until 2005, he was Executive Director of Betonwerke Emsland GmbH and Kwade+Schweddes Zerkleinerungstechnik. He is Professor at Technische Universität Braunschweig, head of the Institute for Particle Technology and one of the founders of the BLB (Battery lab Braunschweig). Prof. Kwade is a leading expert in battery processing technology, coordinator of the BMBF cluster "ProZell" and initiator of the annual International Battery Production Conference (IBPC).



**Dr. Armin Modlinger (Volkswagen AG)** graduated in Chemistry at the University of Bayreuth in 2000, followed by a doctoral degree in 2004 at the Technical University Munich. After a Postdoctoral fellowship at the University of Bristol he started his career in the chemical industry at Evonik Industries in 2006, working at different positions in R&D departments associated with Li-Ion Technology. 2013 he became head of process technology at Litarion GmbH and later in 2017 he took over responsibility for Product and Process Development at Litarion GmbH. In April 2018 he joined the Center of Excellence Batteriezelle within the Volkswagen Group.



**Prof. Dr.-Ing. habil. Hermann Nirschl (KIT)** received his Ph.D. in Fluid Mechanics from the Technical University of Munich in 1994. For his Habilitation in 1997 he worked on the numerical simulation of the particle laden flows. He joined the 3M company in the dental division as the head of process engineering in the years between 1997 and 2002 where he worked as a project manager for different projects in Munich and St. Paul/Minnesota. Since 2003 he is Professor for Mechanical Process Engineering at the KIT in Karlsruhe. The focus of the research is on particle technology with a special emphasis on separation processes, numerical simulations and the development of particle analysis technologies.



**Dipl.-Ing. Ralf Diehm (KIT)** graduated in Process Engineering at KIT in 2014. Already during his studies, he specialized on thin film coatings for organic electronics and Li-Ion batteries. Since 2014 he is working as research assistant at the KIT/TFT group, focussing on (intermittent) slot die coating to provide a fundamental understanding of the process and its limitations. In 2015 he was awarded with the first prize of the KIT "Neuland" award for his innovations in high speed intermittent slot die coating.



**Jana Kumberg M. Sc. (KIT)** graduated in Process Engineering at KIT in 2015, majoring in Thermal Process Engineering and Mechanical Process Engineering. During her studies she started to focus on processing of thin films, investigating thermal treatment of polymer solar cells in her bachelor's thesis at TFT. She further specialized on drying technology in her master's studies. Since 2016 she is working as research assistant at the KIT/TFT group, investigating drying behavior of lithium ion battery electrodes.



**Prof. Dr.-Ing. Frank Kleine Jäger (BASF SE)** is currently Senior Research Manager and Head of Solids Formulation and Handling Group at BASF SE in Ludwigshafen. In this role, he manages the global R&D activities in this field of Solids and Film Processing ranging from development of new process technologies and optimization to trouble shooting and debottlenecking in BASF's global production plants. He is Chemical Engineer with Diploma and PhD degrees from RWTH Aachen University, Germany. He also received his Habilitation from RWTH Aachen in 2004. Since 2011 he holds a Professorship as apl. Prof. Dr.-Ing. at RWTH Aachen.



**Prof. Dr.-Ing. Cameron Tropea (TU Darmstadt)** received his Masters degree in Mechanical Engineering from University of Toronto (1977). He completed his Dr.-Ing. in Civil Engineering at TU Karlsruhe (1982) and his Habilitation in Fluid Mechanics at the University of Erlangen-Nürnberg (1991) where he was appointed as Professor of Fluid Mechanics until 1997. This was followed by an appointment to his current position at the Institute of Fluid Mechanics and Aerodynamics at the TU Darmstadt. Currently Editor-in-Chief of Experiments in Fluids and past Director of the Center of Smart Interfaces (CSI) in the period 2007-2014, his research interests include Optical Measurement Techniques in Fluid Mechanics, Interfacial Transport Phenomena, Atomization and Spray Processes and Unsteady Aerodynamics. He has recently been appointed a member of the Scientific Commission of the Council of Science and Humanities in Germany.



**Prof. Dr. An-Bang Wang (NTU, Taiwan)** received the Dr.-Ing.-degree at the Institute of Fluid Mechanics (LSTM), University of Erlangen-Nürnberg in 1991 and is a full professor at the Institute of Applied Mechanics at NTU Taiwan. He has served as the director of Optomechatronics Education Resource center, chairman of the display technology Education Program and counselor of advisory office, Ministry of Education, Taiwan; vice president of International Society of Coating Science and Technology. He was honored with the Distinguished Engineering Professor Award of Chinese Institute of Engineers, Taiwan. His current research interests include advanced coating & microfluidic platform for biomedical/industrial applications and biomimetics.