



## 1<sup>st</sup> Thin Film Technology Forum



1-day forum on advances in printed electronics, digital direct printing for industry 4.0 and battery processing

May 12, 2016

KIT-Tagungszentrum (FTU), Lecture hall

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



Organisation: Prof. Dr.-Ing. Dr. h. c. Wilhelm Schabel  
Dr.-Ing. Philip Scharfer  
with 9 experts from industry and academia

## TFT Forum program

### Schedule 11.05.2016 – Get-together

**19:30** *Get-together BESITOS (at market place KA centre)*  
Karl-Friedrich-Straße 9, 76133 Karlsruhe

### Schedule 12.05.2016 – 1<sup>st</sup> TFT Forum

**08:15** *Forum registration and materials handout*  
**08:30** *Welcome & Introduction to TFT Forum*  
Prof. Dr.-Ing. Dr. h. c. W. Schabel / Dr.-Ing. P. Scharfer  
**08:40** *Welcome address to the 1<sup>st</sup> TFT Forum at KIT*  
Prof. Dr. Thomas Hirth, Vice President (KIT)  
Innovation and International Affairs

### Printed and organic electronics processing

**08:45** **Keynote 1:**  
*Processing of organic & printed electronics*  
Ir. Ike de Vries (Holst Centre, NL)  
**09:45** *Printed optoelectronic devices from solution*  
Prof. Dr. Uli Lemmer (KIT)  
**10:15** *Discussion and coffee break*  
**10:45** *Industrial R2R processing of organic electronics*  
Dr. Michael Niggemann (Eight19, UK)  
**11:10** *Multilayer coating of organic electronics*  
Dipl.-Ing. Sebastian Raupp (KIT)  
**11:40** *Drying and diffusion in printed nanofilms*  
Dr.-Ing. Philip Scharfer (KIT)  
**12:00** *Lunch and coffee break*

### Battery processing

**13:00** **Keynote 2:**  
*Industrial production of Li-ion battery cells*  
Dr. André Mecklenburg (Litarion)  
**14:00** *Challenges and limitations in industrial coating and drying of battery electrodes*  
Prof. Dr.-Ing. Dr. h. c. Wilhelm Schabel (KIT)  
**14:30** *Drying of Li-ion battery electrodes*  
Dipl.-Ing. Stefan Jaiser (KIT)  
**15:00** *Discussion and coffee break*

### Digital direct printing for industry 4.0

**15:30** **Keynote 3:**  
*Digital Direct Printing*  
Prof. Fritz Bircher (iPrint, CH)  
**16:30** *Vista Digital Coating for Industry 4.0*  
Dr. Peter Brown (TTP, UK)  
**17:00** *Functional Inkjet Printing for Industry 4.0*  
Dr. ir. Wouter J.M. Brok (PiXDRO Meyer Burger, NL)

## Introduction

The 1<sup>st</sup> Thin Film Technology Forum will take place in collaboration and linked to the 8<sup>th</sup> Short Course Thin Film Technology. Renowned scientists will present and discuss new trends in industry and academia with a focus on [Printed and Organic Electronics](#), [Direct Printing for Industry 4.0](#) and [Battery Processing](#). For each topic there will be a special session initiated with an overview keynote contribution. This schedule offers sufficient time for a desired interactive and open forum discussion of participants, experts and forum speakers right at the beginning of each session.



**Ir. Ike de Vries (HOLST CENTRE)** studied Chemistry and Agricultural Science at the Wageningen University, Netherlands. After graduation in 1985 he was for a period of 3 years a researcher at the Wageningen University. From 1988 to 2006 Ike de Vries 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, The Netherlands. He utilizes his experience to develop new (R2R) processes which enable large scale production of organic light emitting diodes (OLEDs) and photovoltaic (PV). He is a board member of the European Coating Symposium (ECS) and the International Coating Science and Technology Symposium (ISCST).



**Prof. Dr. Uli Lemmer (KIT)** received the diploma degree in physics from RWTH Aachen University in 1990 and a Ph.D. from the University of Marburg in 1995. From 1995 to 1996, he held a postdoctoral position with the University of California at Santa Barbara. He was with the University of Munich from 1996 to 2002. In 2002, he was appointed a full Professor and director of the Light Technology Institute, Karlsruhe Institute of Technology (KIT). Since 2006 he is also the coordinator of the Karlsruhe School of Optics & Photonics (KSOP) and he is also heading the device physics competence center within the InnovationLab in Heidelberg. His research interests are in the technology and the applications of printable organic and inorganic semiconductors.



**Dr. Michael Niggemann (Eight19)** has more than 10 years of experience in the development, investigation and scale-up of organic solar cells and was previously heading the organic photovoltaics activity at the Fraunhofer Institute for Solar Energy Systems (ISE) in Freiburg, Germany. He holds a Doctorate in Natural Sciences from the Faculty of Applied Sciences at the Albert-Ludwigs-University of Freiburg, Germany. In 2009 he was involved with the technology development of organic solar cells in the Optoelectronics Group of the Cavendish Laboratory at the University of Cambridge. Since 2010 he is CTO of Eight19 Ltd in Cambridge. Eight19 develops and manufactures flexible solar cells for indoor and off-grid applications.

## Registration fee for 1-day TFT Forum

**Early Bird (until 01.04.16)** **later**

1-day TFT Forum participation	€ 250.–	€ 350.–
Exhibition booth (incl. participation)	€ 500.–	€ 600.–

## Payment

The registration fee is purchase tax free. It includes a printed copy of presentations, coffee, refreshments, lunch and the TFT Forum get-together on Wednesday 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.tft.kit.edu](http://www.tft.kit.edu) – TFT Courses

## Contact

Registration:

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TFT Forum organisation:

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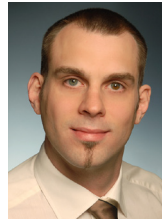
Office TFT: [margit.morvay@kit.edu](mailto:margit.morvay@kit.edu)

## Further information and registration:

<http://www.tft.kit.edu/745.php>  
<http://www.gvt.org/Hochschulkurse.html>



**Dipl.-Ing. Sebastian Raupp (KIT)** completed his studies in Chemical Process Engineering at KIT in 2012, majoring in Technical Thermodynamics and Thermal Process Engineering. He was a scholarship holder of the foundation of the German Economy while studying at KIT and at the Royal Institute of Technology (KTH) in Stockholm. At graduation, he was awarded with the Hans Rumpf and Emil Kirschbaum price for his excellent achievements in his studies. Since 2013 he is working as research assistant at the KIT/TFT. In his PhD he works on solution processing of organic electronics including fundamental research on diffusion and drying processes in thin multilayer films. Mr. Raupp is expected to finish his PhD in summer 2017.



**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. Since 2009, Dr. Scharfer is member of the scientific committee of the European Coating Symposium (ECS), since 2012 member of the Board of Directors 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.



**Dr. André Mecklenburg (Litarion)** graduated in Chemical Engineering at University of Technology in Clausthal in 1997, followed by a doctoral degree in 2001 (design of components for direct methanol fuel cells). He started his career in the chemical industry at Evonik Industries (former Degussa AG) in 2000, working at different positions and chemsites. From 2008 to 2015 he was head of process technology and later of operations at Evonik Litarion GmbH (a then 100 percent subsidiary of Evonik Industries) and responsible for electrode and separator production for large format lithium ion cells at both sites Kamenz and Marl. 2015, Dr. Mecklenburg moved to the newly formed Electrova Litarion and took over responsibility as CTO.



**Prof. Dr.-Ing. Dr. h. c. Wilhelm Schabel (KIT)** holds a professorship in Thin Film Technology at KIT. He studied process engineering, his doctor thesis in the field of film drying was honored with the Carl-Freudenberg Award in 2006. He gained industrial experiences in coating technology as R&D engineer at LOFO High Tech Film/Basel (2007-2008). He received the Arnold Eucken Award from VDI in 2007 and the L.E. Scriven Award in 2008 from the ISCST (International Society of Coating Science and Technology). Prof. Schabel is active in the international ISCST and ECS committees as past chairman, director and vice president and is author and co-author of more than 60 publications in the field of coating and drying of thin films.



**Dipl.-Ing. Stefan Jaiser (KIT)** graduated in Process Engineering from KIT in 2011. Already during his studies he started to specialize on thin-film-related topics when researching OPV processing during a stay at the HOLST Centre in Eindhoven. Within the scope of his research at the TFT group he primarily illuminates the film solidification mechanism of convectively dried lithium-ion battery electrodes. His work pursues the creation of a fundamental understanding of the underlying drying processes to provide a basis for the improvement of state-of-the-art and development of disruptive drying processes. His work was honored with the ECS award at the 2015 European Coating Symposium. Mr. Jaiser is expected to receive his PhD in 2016.



**Prof. Fritz Bircher (iPrint)** 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 in Burgdorf, 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 technology park blueFACTORY of Fribourg. Fritz's main research interests based on inkjet include: packaging printing with optic and haptic effects, material printing including 3D and bio printing.



**Dr. Peter Brown (TTP)** is a Consultant with 13 years experience at The Technology Partnership (TTP). After graduating from St Andrews University in 1996 with a 1st class MSci degree in Physics, Peter moved to the University of Cambridge to study for a PhD in the optoelectronics of semiconducting polymers under Prof. Sir Richard Friend. Peter joined TTP in 2002 to help develop its two proprietary digital printing technologies. Now embedded in the Applied Science group, today Peter's role has evolved to that of a senior consultant with duties including business development and project leadership. Interests include TTP's Vista Inkjet technology, plus spray coating, nanostructured coatings and optics.



**Dr. ir. Wouter J.M. Brok (PiXDRO Meyer Burger)** is Research Manager at PiXDRO, the inkjet printing division of Meyer Burger. He studied applied physics and earned a Ph.D. in gas discharge physics. In 2007 Wouter joined OTB Engineering, which later became Meyer Burger (Netherlands) B.V. At this company he worked on systems and processes for manufacturing of different solar cell concepts. His present focus is on industrial inkjet printing for applications in various fields, such as photovoltaics, semiconductors, displays and touch sensors.