2017 IWIPP

TU Delft, Netherlands | April 5-7

International Workshop on Integrated Power Packaging 2017

SPONSORED BY THE IEEE COMPONENTS, PACKAGING, & MANUFACTURING TECHNOLOGY SOCIETY; THE IEEE DIELECTRIC & ELECTRICAL INSULATION SOCIETY; THE IEEE POWER ELECTRONICS SOCIETY; THE EUROPEAN CENTER FOR POWER ELECTRONICS; AND THE POWER SOURCES MANUFACTURERS ASSOCIATION

IEEE Catalog Number: CFP17IPP-USB | ISBN: 978-1-5090-4277-7

IEEE Advancing Technology for Humanity

PSMA Power Sources Manufacturers Association
The Multinational Power Electronics Association

IEEE COMPONENTS, PACKAGING AND MANUFACTURING TECHNOLOGY SOCIETY

pels IEEE POWER ELECTRONICS SOCIETY Powering a Sustainable Future

ECPE

DEIS

IWIPP 2017 Table of Contents

DIAMOND PARTNER

Wolfspeed™

PLATINUM PARTNER

muRata

INNOVATOR IN ELECTRONICS

SILVER PARTNERS

ISP SYSTEM

Littelfuse®

Expertise Applied | Answers Delivered

IWIPP 2017 Leadership

GENERAL CHAIR

Ty McNutt, Wolfspeed, A Cree Company

TECHNICAL PROGRAM CHAIR / CPMT STEERING ADVISOR

Patrick McCluskey, University of Maryland

FINANCIAL CHAIR

Shashank Krishnamurthy, United Technologies Research Center

PARTNERSHIP & PUBLICATIONS CHAIR

Lauren Kegley, Wolfspeed, A Cree Company

LOCAL ARRANGEMENTS CHAIR

Braham Ferreira, Delft University of Technology

DEIS STEERING ADVISOR

Thierry Lebey, University of Toulouse

PELS STEERING ADVISOR

Alan Mantooth, University of Arkansas

PSMA STEERING ADVISOR

Michael Hayes, Tyndall Institute

ECPE STEERING ADVISOR

Thomas Harder, ECPE

TECHNICAL PROGRAM COMMITTEE

Simon Ang, University of Arkansas

Louis Burgyan, LTech

Andrea Cavallini, University of Bologna

William Chen, ASE Group

Sombel Diaham, University of Toulouse

Steve Dodd, University of Leicester

Peter Friedrichs, Infineon

Mike Glover, University of Arkansas

Mike Hayes, Tyndall Institute

Ed Herbert, PSMA

Doug Hopkins, North Carolina State University

David Huitink, University of Arkansas

Masahiro Kozako, KyuTech

Peter Morshuis, University of Delft

Brian Narveson, PSMA

Khai Ngo, Virginia Tech

Kenji Okamoto, Fuji Electric

Brandon Passmore, Wolfspeed, A Cree Company

Kevin Speer, Littelfuse

Fred Wang, University of Tennessee

Ajith Wijenayake, Wolfspeed, A Cree Company

Eckhard Wolfgang, ECPE

Welcome from the General Chair

On behalf of the leadership committee, I take great joy in welcoming you the IEEE International Workshop on Integrated Power Packaging (IWIPP). The committee has worked very hard the past 2 years to broaden the exposure of IWIPP and gather together industry leading experts to discuss the pressing need for advanced packaging approaches from the die level to the system level. As an industry, we are in a critical time when wide bandgap semiconductors are requiring a paradigm shift in packaging designs and methodologies to exploit new performance advantages. As such, we have worked hard to assemble tutorial lecturers, plenary speakers and panelists from around the world, from device scientists through system engineers, all experts in their respective research areas.

IWIPP is fast becoming a premier international workshop in the area of power electronics packaging and integration. The workshop is sponsored by the IEEE's Power Electronics Society (PELS), Components, Packaging, and Manufacturing Technology Society (CPMT), and Dielectrics and Electrical Insulation Society (DEIS), as well as Power Sources Manufacturers Association (PSMA) and European Consortium on Power Electronics (ECPE). These organizations have each contributed members and resources to help steer the workshop to tackle the tough challenges being faced by power electronic engineers in today's world. We believe the technical program format will spur lively discussion across the many disciplines represented at IWIPP through a unique approach to tutorials, giving shortened morning lectures with information being directly relatable to the subsequent dialogue sessions.

Delft and the TU Delft campus should provide you with many aesthetic pleasures on your visit. The historic town centre and canal system offers many unique hotels and restaurants for your time in Delft, and our local hosts at TU Delft have planned an excursion and workshop dinner that is sure to be remembered. Please do come early and stay late.

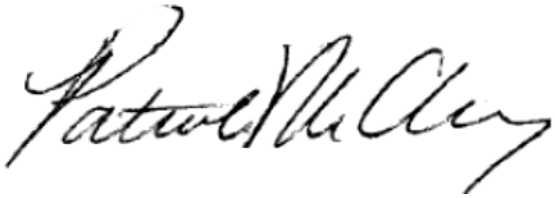
Ty McNutt, Ph.D.

General Chair

Welcome to the Second Biennial International Workshop on Integrated Power Packaging. We are very excited about the outstanding collection of speakers and presentations at the workshop. All attendees are invited to attend the tutorials that will kick off Wednesday and Thursday morning's activities. Wednesday's tutorial will cover the latest issues in developing 2.5D and 3D electronic packaging that integrates thermal management. Thursday's tutorial will focus specifically on dielectrics and their degradation.

Each morning will have two plenary talks by internationally recognized experts covering topics important to integrated power packaging, ranging from roadmapping future developments to discussing current advancements in wide bandgap semiconductor devices, integrated passives, and robustness enhancements. A panel session specifically on electro-thermal-mechanical modeling, co-design, and reliability will be held on Friday morning.

We are also very pleased to provide a full slate of contributed talks each afternoon from leaders in the field. Plenty of time has been provided during the breaks for socializing, networking, and visiting exhibitors. We are looking forward sharing with you an educational and productive time here in Delft.



Patrick McCluskey

Technical Chair

IWIPP 2017 Schedule at a Glance

WEDNESDAY, APRIL 5

8:00 AM – 8:15 AM	Welcome Remarks
8:15 AM – 10:00 AM	Packaging & Thermal Management Tutorial
10:00 AM – 10:25 AM	PowerUp & Networking Break
10:25 AM – 11:10 AM	IEEE PELS Plenary
11:10 AM – 12:00 PM	IEEE Packaging Plenary
12:00 PM – 1:00 PM	Networking Lunch
1:00 PM – 3:05 PM	Systems & Circuits Technical Session
3:05 PM – 3:30 PM	PowerUp & Networking Break
3:30 PM – 5:35 PM	Power Modules Technical Session
5:35 PM – 7:30 PM	Welcome Reception & Posters

THURSDAY, APRIL 6

8:00 AM – 8:15 AM	Welcome Remarks
8:15 AM – 10:00 AM	Electrical Insulation Tutorial
10:00 AM – 10:30 AM	PowerUp & Networking Break
10:30 AM – 11:15 AM	Integrated Passives Plenary
11:15 AM – 12:00 PM	ECPE Plenary
12:00 PM – 1:00 PM	Networking Lunch
1:00 PM – 3:05 PM	Packaging & Interconnects Technical Session
3:05 PM – 3:30 PM	PowerUp & Networking Break
3:30 PM – 5:10 PM	Thermal Management Technical Session
5:10 PM – 5:30 PM	Guided Walk from Aula to Conference Banquet Site
5:30 PM – 9:00 PM	Conference Banquet

FRIDAY, APRIL 7

8:00 AM – 8:10 AM	Welcome Remarks
8:10 AM – 8:55 AM	WBG Power Devices Plenary
8:55 AM – 9:40 AM	Modeling & Packaging Plenary
9:40 AM – 10:00 AM	PowerUp & Networking Break
10:00 AM - 11:20 AM	Modeling & Reliability Panel Session
11:20 PM – 1:00 PM	Sensors, Passives, & EMI Technical Session
1:00 PM – 2:00 PM	Networking Lunch & Closing Remarks

REGISTRATION OPEN DAILY FROM 7:30 AM — END OF TECHNICAL SESSIONS.

LOCATION COLOR KEY:

Technical Session Room (Frans Van Hassetzaal)

Exhibition Atrium (Outside of Frans Van Hassetzaal)

Offsite (Delft Canal Boat Tour + Dinner at Lijm & Cultuur, Addresses / Transportation Information can be found on page 25)

TU DELFT AULA MAP PROVIDED ON PAGE 27.

SERVING HUMANITY THROUGH A DYNAMIC PROFESSION – THE IEEE POWER ELECTRONICS SOCIETY

DR. ALAN MANTOOTH, DISTINGUISHED PROFESSOR AT THE UNIVERSITY OF ARKANSAS

WEDNESDAY, APRIL 5, 10:25 AM — 11:10 AM

THE INVENTION & COLLABORATION OF TECHNOLOGY ROADMAPS

DR. BRAHAM FERREIRA, IEEE FELLOW & PROFESSOR DOCTOR AT TU DELFT +
DR. WILLIAM CHEN, FELLOW & SENIOR TECHNICAL ADVISOR AT THE ASE GROUP

WEDNESDAY, APRIL 5, 11:10 AM — 12:00 PM

INTEGRATED POWER FOR THE INTERNET OF THINGS

DR. CIAN O'MATHUNA, HEAD OF STRATEGIC PROGRAMS & RESEARCH PROFESSOR AT THE TYNDALL INSTITUTE

THURSDAY, APRIL 6, 10:30 AM—11:15 AM

TEN YEARS OF ROBUSTNESS VALIDATION APPLIED TO POWER ELECTRONICS COMPONENTS

DR. ECKHARD WOLFGANG, PROFESSOR DOCTOR + CONSULTANT AT ECPE

THURSDAY, APRIL 6, 11:15 AM — 12:00 PM

ADVANCES IN WBG POWER DEVICES & THEIR POSITIONING IN VARIOUS APPLICATIONS

DR. PETER FRIEDRICHS, SENIOR DIRECTOR OF SILICON CARBIDE AT INFINEON

FRIDAY, APRIL 7, 8:10 AM — 8:55 AM

DESIGN TOOLS & MODELING FOR POWER ELECTRONICS PACKAGES

DR. CHRIS BAILEY, DIRECTOR OF COMPUTATIONAL MATHEMATICS & RELIABILTY GROUP + PROFESSOR AT THE UNIVERSITY OF GREENWICH EPSRC

FRIDAY, APRIL 7, 8:55 AM — 9:40 AM

SYSTEMS & CIRCUITS

Wednesday, April 5, 1:00 PM — 3:05 PM

Session Chair: Brian Narveson of PSMA

1:00 PM	**An Efficient Single Stage Boost Inverter with One Cycle Control for PV Applications**; Annapoorani S (Agni College of Technology, India), Jayaparvathy R (Sri Sivasubramaniya Nadar College of Engineering, India)
1:25 PM	**Commercializing Medium Voltage VFD Technology That Utilizes High Voltage SiC Technology [Invited]**; Pana Shenoy, Octavio Solis, Liping Zheng (Calnetix Technologies Inc., United States)
1:50 PM	**Design and Construction of a Co-Planar Power Bus Interconnect for Low Inductance Switching**; Xi Lin, Jianfeng Li, Mark Johnson (University of Nottingham, United Kingdom)
2:15 PM	**Analysis of Flyback Quasi-Z Source PFC Rectifier and its Comparison with Traditional Flyback PFC**; Fahad Alhuwaishel[1], Sinan Al-Obaidi (Texas A&M University, United States), Nabik Ahmed[1]. [1]Public Authority for Applied Education and Training, Kuwait
2:40 PM	**Toggle Rate Estimation and Glitch Analysis on Logic Circuits**; Ramesh Sr (Amrita Vishwa Vidyapeetham, India), Jayaparvathy R (Sri Sivasubramaniya Nadar College of Engineering, India)

POWER MODULES

Wednesday, April 5, 3:30 PM—5:35 PM

Session Chair: Ty McNutt of Wolfspeed

3:30 PM	**Advanced Double Sided Cooling IGBT Module and Power Control Unit Design**; S. Zhu, Y. Li, Y. Wang, Y. Ma, C. Wu, M. Jiao, Z. Zhao, J. Yu (Dynex Semiconductor LTD, United Kingdom)
3:55 PM	**Performance Analysis of a SiC MOSFET Half Bridge Power Module with a Miller Clamp**; Daniel Martin, Austin Curbow, Ty McNutt (Wolfspeed, United States)
4:20 PM	**Technique for Embedding Current Measurement and Ringing Suppression Within Multichip Modules**; Andrew Lemmon, Ali Shahabi (University of Alabama, United States)
4:45 PM	**Characterization, Mission Profile Analysis and Calorimetric Loss Measurement of a SiC Hybrid Module for Main Inverter Application of Electric Vehicles**; Ajay Poonjal Pai[1], Tomas Reiter[1], Martin Maerz[2]. [1]Infineon Technologies AG, Germany; [2]Fraunhofer Institute of Integrated Systems and Device Technology (IISB), Germany
5:10 PM	**High Accuracy Examination on Identification of Partial Discharge Location in Power Module Using Multiple Loop Sensors**; H. Mitsudome[1], Y. Akinaga[1], M. Kozako[2], M. Hikita[2], Y. Ikeda[3], K. Taniguchi[3], Y. Nakamura[3], K. Okamoto[3]. [1]Kyusyu Institute of Technology, Japan; [2]Kyushu Institute of Technology, Japan; [3]Fuji Electric Co., Ltd., Japan

PACKAGING & INTERCONNECTS

Thursday, April 6, 1:00 PM — 3:05 PM

Session Chair: Lauren Kegley of Wolfspeed

1:00 PM	**A Review of SiC Power Module Packaging Technologies: Attaches, Interconnections, and Advanced Heat Transfer [Invited]**; Brandon Passmore, Alexander Lostetter (Wolfspeed, United States)
1:25 PM	**A Study on Packaging Design of SiC Power Module Using Near-Field Magnetic Scanning Techniques**; Takaaki Ibuchi[1], Eisuke Masuda[1], Tsuyoshi Funaki[1], Hirotaka Otake[2], Tatsuya Miyazaki[2], Yasuo Kanetake[2], Takashi Nakamura[2]. [1]Osaka University, Japan; [2]Rohm Co., Ltd., Japan
1:50 PM	**Thermo-Mechanical Reliability Analysis of Flip-Chip Bonded Silicon Carbide Schottky Diodes**; Sayan Seal, Andrea Wallace, John Zumbro, Alan Mantooth (University of Arkansas, United States)
2:15 PM	**Thermal Conductivity of Cu-Sn Transient Liquid Phase Sintered Interconnects for High Power Density Modules**; Patrick McCluskey, Hannes Greve (University of Maryland, College Park, United States)
2:40 PM	**Thermal Improvement of Press-Pack Packages: Pressure Dependent Thermal Contact Resistance with a Silver Interlayer Between Molybdenum Substrate and SiC Chip [Invited]**; Zsolt Toth-Pal[1], Yafan Zhang[2], Tag Hammam[1], Hans-Peter Nee[3], Mietek Bakowski[2]. [1]Swerea AB, Sweden; [2]Acreo Swedish ICT, Sweden; [3]KTH Royal Institute of Technology EEC, Sweden.

THERMAL MANAGEMENT

Thursday, April 6, 3:30 PM—5:10 PM

Session Chair: Patrick McCluskey of the University of Maryland

3:30 PM	**Thermal Management for GaN Power Devices Mounted on PCB Substrates**; Shuangfeng Zhang[1], Eric Laboure[1], Denis Labrousse[2], Stéphane Lefebvre[2]. [1]École Supérieure d'Électricité, France; [2]École normale supérieure de Cachan, France.
3:55 PM	**Reducing Thermal Coupling Using Fluid Cooled Low-K Interposers**; Michael Fish[1], Patrick McCluskey[1], Avram Bar-Cohen[2]. [1]University of Maryland, College Park, United States; [2]Raytheon, United States;
4:20 PM	**Stacked Power Module with Integrated Thermal Management**; Lauren Boteler[1], Valerie Niemann[1], Damian Urciuoli[1], Steven Miner[2]. [1]U.S. Army Research Laboratory, United States; [2]U.S. Naval Academy, United States.
4:45 PM	**Direct Liquid Cooling of High Performance Silicon Caribide (SiC) Power Modules**; Brice McPherson, Brad McGee, David Simco, Kraig Olejniczak, Brandon Passmore (Wolfspeed, United States)

SENSORS, PASSIVES, & EMI

Friday, April 7, 11:20 AM — 1:00 PM

Session Chair: Thierry Lebey of the University of Toulouse

11:20 AM	**Suppression of Electromagnetic Interference Using Screening and Shielding Techniques Within the Switching Cells**; Zhe Zhang, Mark Johnson (University of Nottingham, United Kingdom)
11:45 AM	**Comparison of Planar and Toroidal PCB Integrated Inductors for a Multi-Cellular 3.3 kW PFC**; Remy Caillaud[1], Cyril Buttay[2], Roberto Mrad[1], Johan Le Lesle[1], Florent Morel[2], Nicolas Degrenne[1], Stefan Mollov[1]. [1]Mitsubishi Electric R&D Centre Europe / Laboratoire Ampere, France; [2]Institut national des sciences appliquées de Lyon, France.
12:10 PM	**High Frequency High Voltage Generation with Air-Core Transformer**; Saijun Mao[1], Chengmin Li[1], Tingting Song[1], Jelena Popovic[1], Jan Abraham Ferreira[1]. [1]GE Global Research, China; [2]Delft University of Technology, Netherlands.
12:35 PM	**Improved High-Temperature Dielectric Property of Epoxy Resin Composites with Nano- and Micro-Sized Magnesia Fillers**; Qian Xie[1], Yoshimichi Ohki[2], Naoshi Hirai[2], Yonghong Cheng[1]. [1]Xi'an Jiaotong University, China; [2]Waseda University, Japan;

POSTER SESSION & TECHNICAL DEMONSTRATIONS

Wednesday, April 5, 5:35 PM — 7:30 PM

Session Chair: Patrick McCluskey of the University of Maryland

Technical Poster Presentations:

1. **Epoxy/h-BN Composites Based on Oriented Boron Nitride Platelets with High Thermally Conductivity for Electronic Encapsulation**; Zhengdong Wang, Jialiang Huang, Siyu Chen, Mengmeng Yang, Jingya Liu, Qian Xie, Yonghong Cheng (Xi'an Jiaotong University, China)
2. **Lifetime Prediction of Viscoplastic Lead-Free Solder: a New Solder Material, SACQ**; Tung Ching Lui (Dialog Semiconductor GmbH, Germany)
3. **Investigation of Prototype SiC Power Module Structure for Low Inductance and High Heat Operation**; Akihiro Imakiire, Keigo Nakamura, Hayato Tanabe, Hikaru Kaisyakuji, Tomohiro Kubo, Masahiro Kozako, Masayuki Hikita (Kyushu Institute of Technology, Japan)

Technical Demonstrations:

1. **Electronic Transformer;** Martin Pavlovsky
2. **Module Integrated Power Converter**; Mark Gerber
3. **Multi-Functional Parts**; Jelena Popovic
4. **Folder Converter**; Erik de Jong
5. **Power Sandwich Inverter**; Ivan Josifovic

ALL POSTERS WILL BE AVAILABLE FOR VIEWING & DISCUSSION DURING THE WELCOME RECEPTION. AUTHORS WILL BE AVAILABLE AT THEIR POSTERS FOR TECHNICAL DISCUSSION DURING THE RECEPTION, AND SHOULD HANG THEIR POSTERS DURING THE AFTERNOON BREAK ON WEDNESDAY.

PACKAGING & THERMAL MANAGEMENT OF INTEGRATED POWER ELECTRONICS

WEDNESDAY, APRIL 5, 2017 | 8:15 AM—10:00 AM

Dr. Patrick McCluskey

Professor of Mechanical Engineering at the University of Maryland

Power electronics are becoming ubiquitous in engineered systems as they replace traditional ways to control the generation, distribution, and use of energy. This widespread incorporation has resulted in significant improvements in efficiency over previous technologies, but it also has made it essential that the reliability of power electronics be characterized and enhanced. Recently, increased power levels, made possible by new compound semiconductor materials, combined with increased packaging density have led to higher heat densities in power electronic systems, especially inside the switching module, making thermal management more critical to performance and reliability of power electronics.

Following a quick review of active heat transfer techniques, along with prognostic health management approaches to assess and ensure reliability, this tutorial will present the latest developments in the packaging, assembly, and thermal management of power electronic modules and systems. This course will emphasize thermal packaging techniques capable of addressing performance limits and reliability concerns associated with increased power levels and power density in power electronic components.

Dr. Patrick McCluskey is a Professor of Mechanical Engineering at the University of Maryland, College Park, where he conducts research in thermal management, reliability, and packaging of electronic microsystems for use in extreme temperature environments and high power applications. Dr. McCluskey has published more than 150 refereed technical articles and co-edited three books. He was the technical chairman for 3D-PEIM 2016 and IWIPP 2017, and is an associate editor of the IEEE Transactions on Components, Packaging, and Manufacturing Technology. He is a fellow of IMAPS, a senior member of IEEE, and a member of ASME and AIME-TMS.

CHARACTERIZING ELECTRICAL INSULATION FOR WIDE BANDGAP POWER PACKAGING

THURSDAY, APRIL 6, 2017 | 8:15 AM—10:00 AM

Dr. Thierry Lebey

Director of the Laboratory for Plasma and Energy Conversion

This tutorial will discuss the crucial role of insulating materials in the packaging of wide band gap semiconductor devices. In a first step, the different types of materials and their basic characterizations will be presented. More particularly, the interests of the main characteristics (such as the dielectric strength, the permittivity, the leakage currents (i.e. the resistivity)\ in such applications are discussed. In a second step, the specificities associated to wide band gap device environments (high temperature, high field, high dV/dt) are investigated and specific characterizations, like Partial Discharges and Space Charges, are proposed.

Thierry LEBEY is a CNRS Senior Research Scientist. His fields of interest concern the characterization, the modelling and the ageing of solid dielectrics and insulating materials used in electrical engineering. He is the author of more than 80 papers in International Journals and more than 150 conference papers. Since 2016, he is the Director of LAPLACE, the French largest Electrical Engineering Laboratory located in Toulouse (150 permanent staff, 150 PhD students, 30 PostDocs, 30 Masters students).

MODELING & RELIABILITY OF POWER ELECTRONICS

FRIDAY, APRIL 7, 2017 | 10:00 AM—11:20 AM

The advent of highly efficient, high power compound semiconductor devices, heterogeneous integration, and novel 3D integration and packaging techniques has made the design of power electronic systems increasingly complex. To meet this challenge, extensive use is made of modeling and reliability in all facets of the design from the electrical functionality to the package reliability. Increasingly these traditionally independent modeling and design functions are being combined into electro-mechanical-thermal co-design. In this panel session, leading experts in the areas of electrical system design, thermal management, mechanical stress analysis, and computational reliability analysis will discuss the latest developments and their predictions for the future of modeling and reliability.

MODERATOR

Eckhard Wolfgang, Consultant at ECPE

PANELISTS

Chris Bailey, Professor of Mathematical Sciences, University of Greenwich

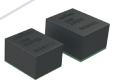
Andrew Lemmon, Assistant Professor of Electrical & Computer Engineering, University of Alabama

Patrick McCluskey, Professor of Mechanical Engineering, University of Maryland

Brice McPherson, Senior Packaging Engineer, Wolfspeed

In electronics

The best things come in little packages

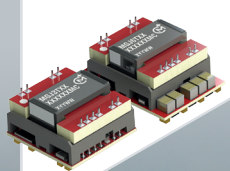


Word's smallest non-isolated DC-DC converter

10.5 x 9 x 5.6mm delivering 20A/1.8V

DC-DC Converter for Electric Superbike IGBT Gate Drive

When you are travelling at nearly 400kph you need to know that the components in your bike offer the highest performance and are, above all, reliable. When the University of Nottingham was designing their championship-winning electric superbike there was only one choice.



Word's smallest isolated 1W DC-DC converter

Featuring patented embedded substrate transformer

We should know, we manufacture 4 billion of them ...every day!

Since 1944 Murata has developed the materials, products and technologies that have driven technological advancement.

From capacitors to wireless modules, from SAW filters to power management systems, Murata products and technologies are relied upon as a vital part of today's digital lifestyle.

In our smart devices, in our homes, and on the move, Murata innovation is working tirelessly 24/7/365 for a better, safer, more energy efficient world.

For more information go to:

www.murata.com

muRata

INNOVATOR IN ELECTRONICS

European Center for Power Electronics (ECPE)

Landgrabenstrasse 94
D-90443 Nuremberg, Germany
www.ecpe.org
+49 (0)911 81 02 88-0

Contact: Thomas Harder [General Manager]
thomas.harder@ecpe.org

ECPE, the Industry-driven Power Electronics Research Network in Europe with more than 170 member organizations is promoting research, expert workshops and advanced training as well as public relations in power electronics. The ECPE Network covering the value chain from the materials and components to the systems and applications strengthens the cooperation between Power Electronics industry and university & research institutes on a European level. As a European Technology and Innovation Platform ECPE is driving precompetitive joint research and sets up research & technology roadmaps for a strategic research agenda with future research directions according to the demands of European power electronics industry.

IEEE Components, Packaging, & Manufacturing Technology (CPMT)

445 Hoes Lane
Piscataway, NJ 08854, USA
www.cpmt.ieee.org
+1.732.562.3855

IEEE COMPONENTS, PACKAGING AND MANUFACTURING TECHNOLOGY SOCIETY

Contact: Denise Manning [Executive Director]
d.hurley@ieee.org

The IEEE CPMT Society is the leading international forum for scientists and engineers engaged in the research, design and development of revolutionary advances in microsystems packaging and manufacturing. Its objectives are scientific, literary, and educational in character. The Society strives for the advancement of the theory and practice of electrical and electronics engineering and of the allied arts and sciences, and the maintenance of a high professional standing among its members and others and with special attention of such aims within the field of interest of the Society.

IEEE Dielectric & Electrical Insulation Society (DEIS)

445 Hoes Lane
Piscataway, NJ 08854, USA
www.ieeedeis.org

Contact: Thierry Lebey
thierry.lebey@laplace.univ-tlse.fr

DEIS' interests lie in materials, measurements, numerical modelling, components, applications and systems pertinent to dielectrics and electrical insulation. These include solids, liquids and gases; small-scale systems such as nano-dielectrics and bio-dielectrics; high-voltage and high-field phenomena; and large-scale systems such as high-power insulation applied to electricity generation, transmission, and distribution. DEIS supports the basic science of dielectrics and electrical insulation through practical applications and the development of relevant standards.

IEEE Power Electronics Society (PELS)

445 Hoes Lane
Piscataway, NJ 08854, USA
www.ieee-pels.org
pels-staff@ieee.org

Contact: Braham Ferreira
J.A.Ferreira@tudelft.nl

The Power Electronics Society is one of the fastest growing technical societies of IEEE. For over 20 years, PELS has facilitated and guided the development and innovation in power electronics technology. This technology encompasses the effective use of electronic components, the application of circuit theory and design techniques, and the development of analytical tools toward efficient conversion, control and condition of electric power. The Power Electronics Society's goal is to keep members current and competitive in the workplace, and provide them with the tools necessary to help them grow both personally and professionally.

ISP System

ZI la Herray BP 10047
65501 VIC EN BIGORRE
FRANCE
www.isp-system.fr
+33 (0)5 62 33 44 44
contact@isp-system.fr

Contact: Jean-Yves Bécel
jean-yves.becel@isp-system.fr

ISP System is a leading manufacturer of fully automated high precision mechatronics systems. We can provide you with a wide range of die attach systems based on leading-edge technology. The offering includes adhesive bonding, laser selective soldering, laser selective sintering, and together with our partners we have developed an innovative sintering process allowing high thermal conductivity assembly for power packaging.

Murata

Murata Electronics Europe
Wegalaan 2
2132 Hoofddorp
The Netherlands
www.murata.com
+31 23 5698410

Contact: Ann Marie Bayliss [Product Manager]
ann-marie.bayliss@murata.com

Murata is a global leader in the design, manufacture and supply of advanced electronic materials, leading edge electronic components, and multi-functional, high-density modules. Murata innovations can be found in a wide range of applications from mobile phones to home appliances, and automotive applications to energy management systems and healthcare devices.

Power Sources Manufacturers Association (PSMA)

P.O. Box 418
Mendham, NJ 07945
USA
www.psma.com
+1.973.543.9660
power@psma.com

Contact: Brian Narveson [Director]
bcnarveson@gmail.com

The Power Sources Manufacturing Association (PSMA) is a non-profit professional organization with the two-fold objective of enhancing the stature and reputation of its members and their products, and improving their technological power sources knowledge. Its aim is to educate the electronics industry, academia, government and industry communities as to the applications and importance of all types of power sources and conversion devices.

Wolfspeed

3028 E Cornwallis Rd
Durham, NC 27709
USA
www.wolfspeed.com
+1.919.287.7888
Power.Sales@Wolfspeed.com

Contact: Ty McNutt / Lauren Kegley
HighPerformanceSales@Wolfspeed.com

Wolfspeed, A Cree Company, is leading the innovation and commercialization of silicon carbide and gallium nitride, liberating designers to invent power and wireless systems for a responsible, energy-efficient future. Wolfspeed's wide bandgap semiconductor products for power and radio-frequency (RF) applications deliver new levels of performance through increased efficiency, higher switching frequency and reduced system size and weight for the transportation, industrial, energy and communications markets.

REGISTRATION & HELP DESK

Full Conference Registration admits one entrance into all technical sessions (including the tutorials), plenary sessions, panel session, the exhibition atrium, and all social / networking functions. Additional food & beverage registrations may be purchased, for exclusive access to the social and networking events, at the Registration Desk. **Attendees or attendee guests may purchase a registration for $395, which includes all conference social and networking events but does not include the technical content of the workshop.**

Tutorials will take place on Wednesday and Thursday morning, and registered conference attendees will receive the material each tutorials.

Throughout the duration of the conference, the registration desk will remain staffed for the convenience of the participants. Any conference or program questions may be directed to this help desk; when the conference is not in session, **please contact a member of the organizing committee with questions.**

REGISTRATION RATES

	Early Reg.*	Late / On-Site Reg.*
IEEE / PSMA Member	$525	$595
Non-IEEE / PSMA Member	$575	$645
Student	$295	$395
Food & Beverage	$295	$395

*Exludes 21% VAT + Processing Fees

BADGES

Badges should be worn at all official functions of the meeting. Badge checkers will be stationed throughout the meeting areas. Only those with technical registrations will be allowed into sessions. If you forget or lose your badge, you may obtain a second badge at the Registration Desk with proof of registration.

RECEIPTS

All participants who register online will receive a receipt/confirmation via email. If you need additional paperwork, please contact the event staff, located at the Registration Desk.

CONSENT TO USE OF IMAGES

Registration and attendance / participation in IWIPP constitutes an agreement by the registrant for IWIPP's use and distribution (both now and in the future) of the registrant or attendee's image or voice in photographs, videotapes, electronic reproductions and audiotapes of such events and activities. The use of cameras and/or recorders is strictly prohibited during the oral and poster sessions. Limited use is allowed for Exhibitors in their own booth area. Personal photography is allowed at social functions.

LOST & FOUND

Any lost & found items should be turned into the Conference Registration table, and will be left with The Chancellor staff if unclaimed at the end of the event.

INTERNET ACCESS

Complimentary WiFi is available throughout the entire Aula facilities. The network is called IWIPP 2017, with no password. Please notify the front desk if there are any internet issues.

LOCAL TRANSPORTATION

Taxis and public transportation is available in Delft. Taxis are available from Varia Taxi (+31 (0) 15 285 35 00), Roo taxi (+31 (0) 17 462 44 41), or Delta x(+31 (0) 15 219 19 19). Hotels are also willing to arrange car accommodations. The popular ridesharing transportation apps, Uber, is also available in Delft and offers affordable, discounted rates. 9292 is an application that can help you plan your public transportation travel (9292.nl/en). For more information on these services, please download the mobile apps.

PARKING

Parking is complimentary for all guests at TU Delft, please pay attention to any posted parking signs.

ACCESSIBILITY FOR REGISTRANTS

The meeting staff will work with attendees to provide reasonable accommodations for those who require special needs. To request assistance on-site, please check in at the Registration & Help Desk.

DISTRIBUTING COMMERCIAL MATERIAL

Distribution of commercial material in the IWIPP meeting and exhibition spaces by people or organizations not sanctioned as a Partner, Sponsor, or Exhibitor is prohibited. IWIPP reserves the right to remove without notice any materials not in compliance with this policy.

LOCATIONS

The IWIPP 2017 headquarters & technical content will be held at:

Aula Conference Center

Frans van Hasseltzall Room & Atrium

Mekelweg 5

2600 AA Delft

Nederland

+31 (0) 15 27 89111

The Wolfspeed Conference Banquet will begin with a Delft Canal Boat Trip starting at the banquet site, which is a 10 minute walk from the Aula Conference Center. TU Delft Graduate Student Volunteers will lead IWIPP participants to the banquet site, leaving the Aula at ~5:20 PM Thursday evening, after the conclusion of the technical program. Transportation will be arranged from the banquet site back to the city center, after the conclusion of the banquet (~9:00 PM):

Ljim & Cultuur

Rotterdamseweg 272

2628 AT Delft

+31 (0) 15 262 94 00

For local recommendations and additional transportation instructions, please refer to the Conference Location & Local Accommodations pages on the www.IWIPP.org website.

INVITED PRESENTATIONS

In order to provide direct access to the wisdom and knowledge of distinguished packaging industry leaders, plenary sessions are offered to kick-off the technical content each full day of the conference. On Friday morning, all conference attendees will gather for the for a panel discussion about the state of power packaging modeling and reliability throughout the supply chain.

ORAL TECHNICAL SESSIONS

The Technical Program Committee organized a rigorous peer review process and has carefully picked the papers making up the 5 focused Oral Sessions. The various technical tracks are designed to enhance the knowledge-base for practicing packaging and power electronics professionals. **All authors are expected to deliver their final technical presentations to their session chair by lunch on their presentation date. Technical presentations may be provided via USB or email.**

POSTER TECHNICAL SESSIONS

This year, the poster session will be held during the welcome reception. All poster presenters are asked to setup their poster during the Wednesday, April 5, afternoon break. Poster presenters should be available for questions at their display during the scheduled poster session time. Poster board backing material, for the provided conference poster size, and push pins will be provided. Please keep the dimensions provided to you in mind when designing and printing final content.

NETWORKING BREAKS + LUNCH

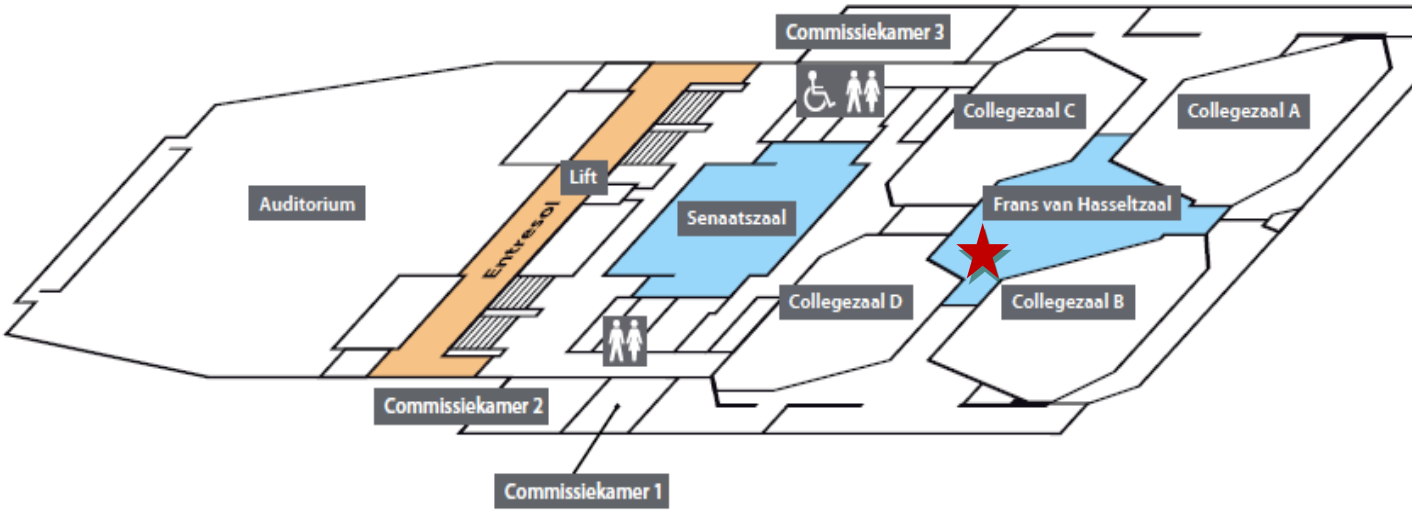
IWIPP's generous industry sponsors understand that coffee, tea, and snacks are necessary brain food to ensure each participant leaves IWIPP with as much knowledge as possible. As such, there will be beverage service and two snack breaks each day in the exhibition atrium. Each day of the conference, lunch is also provided in the exhibition atrium.

MURATA WELOME RECEPTION

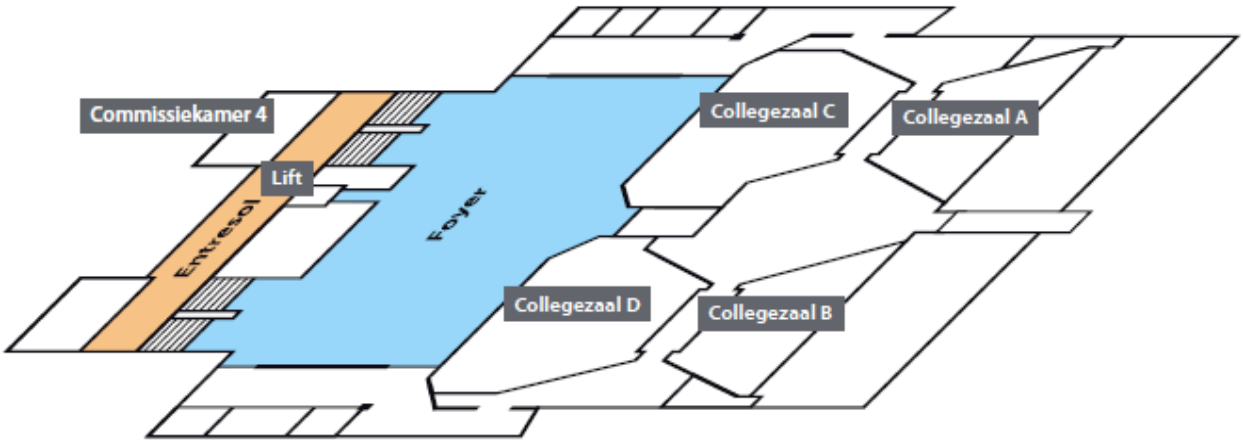
On Wednesday, April 5, Murata and the IWIPP Leadership celebrate the start of this year's workshop with a networking event following the completion of Wednesday's technical program. The event will have beverage service and hor d'oeuvres, while the conference attendees have the opportunity to network with the WiPDA exhibitors and view the technical posters.

WOLFSPEED CONFERENCE BANQUET

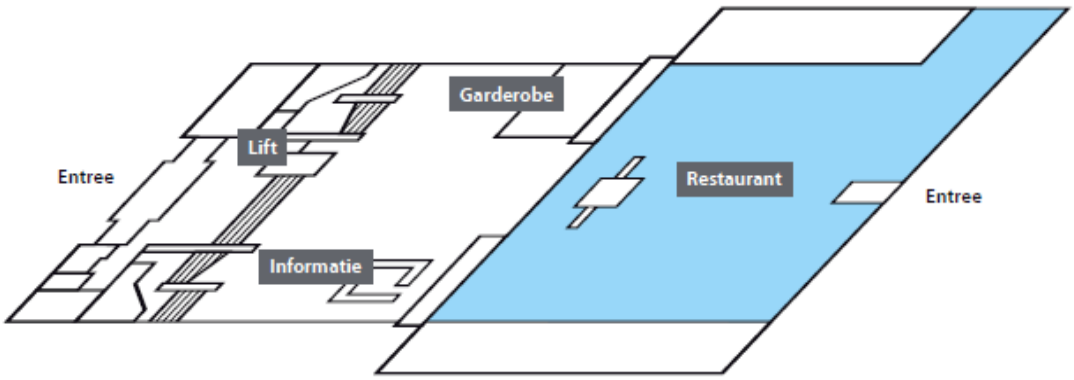
On Thursday, April 6, Wolfspeed and the IWIPP Leadership invite you to participate in a boat trip through the canals of Delft, followed by a dinner at Ljim & Cultuur. The banquet will have great food, networking opportunities, and exciting giveaway items from IWIPP's industry partners. A guided walking tour from TU Delft to Ljim & Cultuur will be provided after the end of Thursday's technical program (leaving at ~5:20 PM). Ljim & Cultuur is a short 10 minute walk from the TU Delft Aula. Transportation will be provided from Ljim & Cultuur back to the city center following the banquet.


Commissiekamer 3
Collegezaal C
Collegezaal A
Auditorium
Lift
Entresol
Senaatszaal
Frans van Hasseltzaal
Collegezaal D
Collegezaal B
Commissiekamer 2
Commissiekamer 1

01


Commissiekamer 4
Collegezaal C
Collegezaal A
Lift
Entresol
Foyer
Collegezaal D
Collegezaal B

BG


Garderobe
Lift
Entree
Restaurant
Entree
Informatie

TU Delft

Campus Map
Campusplattegrond

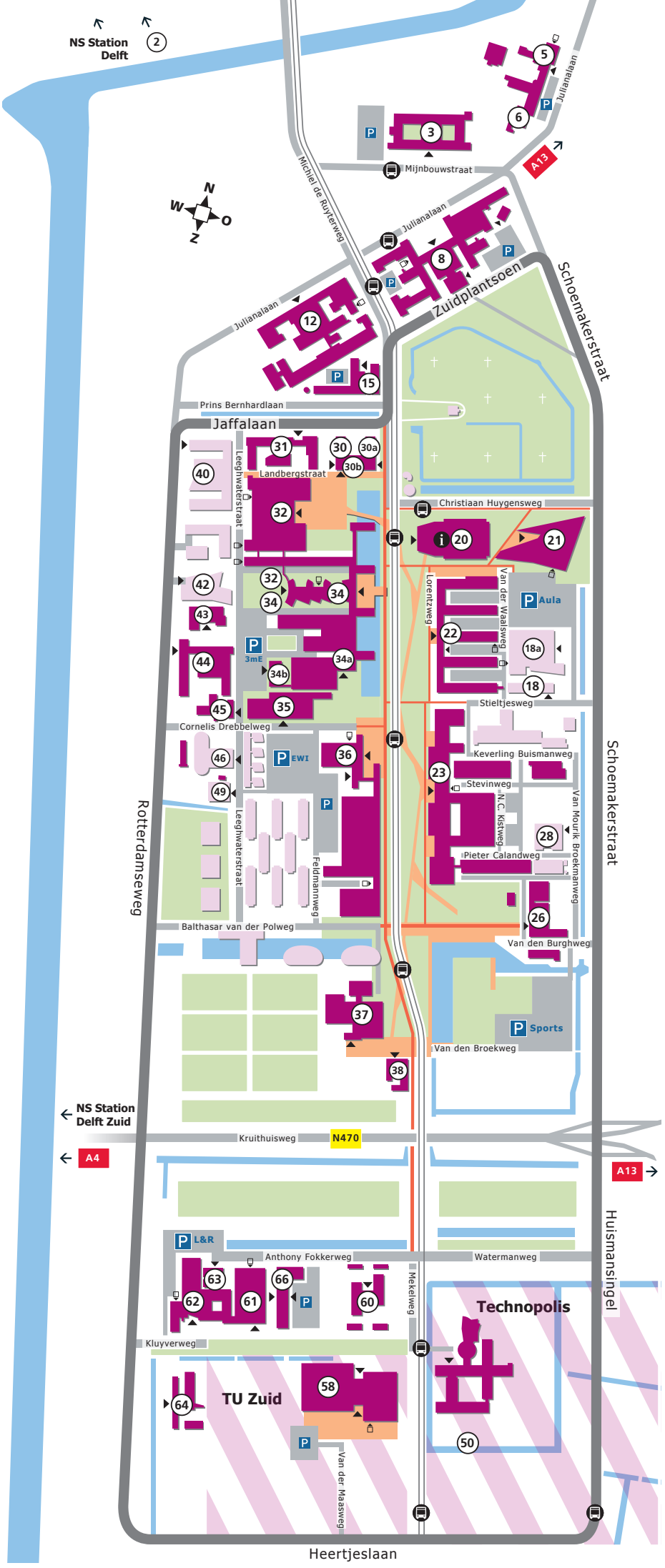
Legend / Legenda

- TU buildings
  TU gebouwen
- Other buildings / prospective buildings
  Overige gebouwen / gebouwen in aanbouw
- Building number
  Gebouwnummer
- (Main) entrance building
  (Hoofd)ingang gebouw
- Delivery entrance
  Goedereningang
- TU roundway
  TU ring
- Road
  Autoweg
- Bus track
  Busbaan
- Cycle path
  Fietspad
- Pedestrian area
  Voetgangersgebied
- Busstop
  Bushalte
- Parking
  Parkeerplaats
- Park / sports field
  Park / sportveld
- Water
- Area under construction
  Gebied in ontwikkeling
- Information Desk TU Delft
  Tel: +31 (0)15 27 88022

See page 2 for building list and addresses
Zie pagina 2 voor gebouwenlijst en adressen

3 minuten

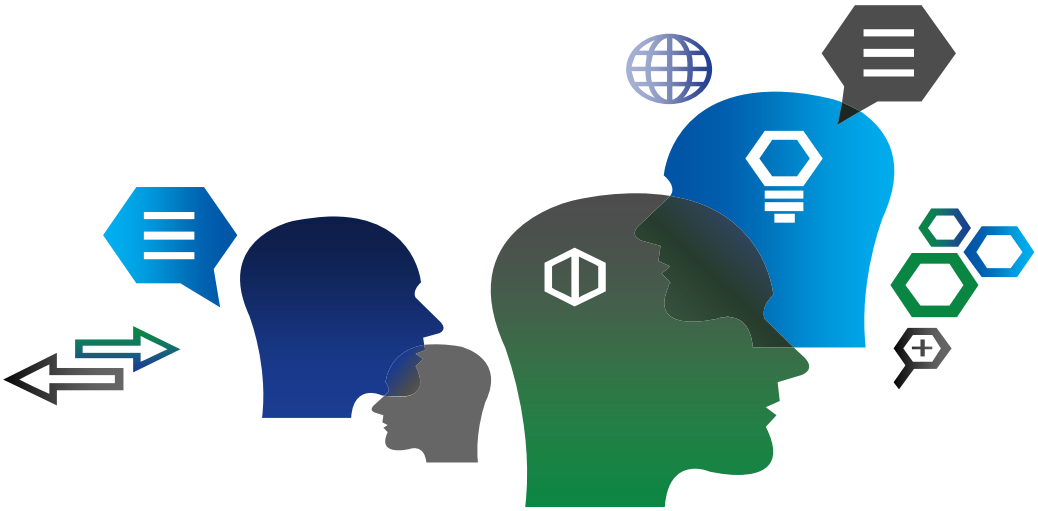
Mei 2016



TU Delft

Building list
Gebouwlijst

Nr	Name	Naam	Adress / Adres
2	City centre (former Royal Dutch Army Museum)	Centrum (voormalig Legermuseum)	Korte Geer 1
3	Science Centre Delft	Science Centre Delft	Mijnbouwstraat 120
5	Biotechnology	Biotechnologie	Julianalaan 67
6	Botanical Garden	Botanische tuin	Poortlandplein 6
8	Architecture and the Built Environment (Arch)	Bouwkunde (BK)	Julianalaan 134
12	Chemical Engineering	Chemische Technologie	Julianalaan 136
18	TNO Science and Industry	TNO Industrie en Techniek	Stieltjesweg 1
18a	Van Leeuwenhoek Laboratory	Van Leeuwenhoek Laboratorium	Van der Waalsweg 16
20	Aula Conference Centre	Aula Conferentie Centrum	Mekelweg 5
21	TU Delft Library	TU Delft Library	Prometheusplein 1
21	Communication	Communication	Prometheusplein 1
22	Applied Physics	Technische Natuurkunde	Lorentzweg 1
23	Civil Engineering and Geosciences (CEG)	Civiele Techniek en Geowetenschappen (CiTG)	Stevinweg 1
23	University Corporate Office, departmens: Finance, Human Resources and Legal Services	Universiteitsdienst, directies: Finance, Human Resources en Legal Services	Stevinweg 1
26	Multi-tenant building	Verzamelgebouw	Van der Burghweg 1
28	TNO Built Environment & Geosciences	TNO Bouw en Ondergrond	Van Mourik Broekmanweg 6
30	International School Delft	International School Delft	Jaffalaan 9
30	True Colors Delft	True Colors Delft	Jaffalaan 9
30a	Education & Student Affairs	Onderwijs & Studentenzaken	Jaffalaan 9a
30b	Facility Management & Real Estate	Facilitair Management & Vastgoed	Landbergstraat 8
31	Technology, Policy and Management (TPM)	Techniek, Bestuur en Management (TBM)	Jaffalaan 5
32	Industrial Design Engineering (IDE)	Industrieel Ontwerpen (IO)	Landbergstraat 15
32	NewMedia Centre	NewMedia Centre	Landbergstraat 15
32	Shared Service Centre ICT	Shared Service Centre ICT	Landbergstraat 15
34	Mechanical, Maritime and Materials Engineering (3mE)	Werktuigbouwkunde, Maritieme Techniek, Technische Materiaalwetenschappen (3mE)	Mekelweg 2
34	Strategic Development	Strategic Development	Mekelweg 2
34a	Executive Board / Supervisory Board	College van Bestuur / Raad van Toezicht	Cornelis Drebbelweg 9
34b	Process & Energy Laboratory	Process & Energy Laboratory	Leeghwaterstraat 39
35	Education Building 35	Onderwijsgebouw 35	Cornelis Drebbelweg 5
36	Electronic and Mechanical Support Division (DEMO)	Dienst Elektronische en Mechanische Ontwikkeling	Mekelweg 4
36	Electronic Engineering, Mathematics and Computer Sciences (EEMCS)	Elektrotechniek, Wiskunde en Informatica (EWI)	Mekelweg 4
36	Valorisation Centre	Valorisation Centre	Mekelweg 4
37	Unit Sports	Unit Sports	Mekelweg 8
38	Unit Culture	Unit Culture	Mekelweg 10
40	The Hague University of applied sciences	Haagse Hogeschool	Rotterdamseweg 137
42	Inholland University	Hogeschool Inholland	Rotterdamseweg 141
43	Combined Heat and Power Plant	Warmte Krachtcentrale	Leeghwaterstraat 36
44	Multi-tenant building	Verzamelgebouw	Rotterdamseweg 145
45	Low-speed Wind Tunnel Laboratory	Lage-snelheid Windtunnel Laboratorium	Leeghwaterstraat 42
46	TNO	TNO	Leeghwaterstraat 44
49	TNO Science and Industry, Separation Technology	TNO Industrie en Techniek, Scheidingstechnologie	Leeghwaterstraat 46
50	Reactor Institute Delftt	Reactor Instituut Delft	Mekelweg 15
58	Applied Sciences (South building)	Technische Natuurwetenschappen (TNW-Zuid)	Van der Maasweg 9
60	Logistics and Environment	Logistiek en Milieu	Anthony Fokkerweg 5
61	Delft Aerospace Structures & Materials Laboratory	Vliegtuighal	Kluyverweg 3
62	Aerospace Engineering (AE)	Lucht- en Ruimtevaarttechniek (LR)	Kluyverweg 1
63	SIMONA Research Flight Simulator	SIMONA Research Flight Simulator	Anthony Fokkerweg 1
64	Aerodynamics and Propulsion Laboratory	Laboratorium voor Aerodynamica en Voortstuwing	Kluyverweg 2
66	The Fellowship	The Fellowship	Kluyverweg 5



THANK YOU FOR YOUR ATTENTION, PARTICIPATION, & INNOVATIVE THINKING

Without you, IWIPP wouldn't be a success. Not only are we grateful for your participation, we want to hear from you about how we can improve in the future!

If you need anything throughout the conference or after it has come to an end, please feel free to reach out to the IWIPP Organizing Committee.

We hope that you fully enjoyed your time in Delft, and that you left with great knowledge to take back to your organization!

Sincerely, the 2017 IWIPP Leadership

2017 IWIPP