

TOMORROW'S INDUSTRY HANNOVER MESSE APRIL 1–5, 2019



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You can also visit us online at **fraunhofer.de/hm2019** to learn more about Fraunhofer exhibits and other trade fair highlights.

EVENTS

MONDAY APRIL 1 TUESDAY APRIL 2

Fraunhofer-Gesellschaft Press tour "Tomorrow's Industry: What's next?"

Time

1.30 p.m. – 2.30 p.m.

Location

Hall 2, Booth C22 (joint Fraunhofer booth)

Organizer

Fraunhofer-Gesellschaft

"Digital Solutions and New Materials"		
Time		
10.00 a.m. – 11.00 a.m.		

Fraunhofer-Gesellschaft

Press breakfast

Hall 6, Booth A30 (joint

Fraunhofer booth)

Speakers

Location

Dr. Simone Kondruweit Fraunhofer IST Thomas Bendig Fraunhofer ICT Group

Organizer

Fraunhofer-Gesellschaft

Digital press kit

Our digital press kit includes information about all press events, as well as press releases, images and videos of our exhibits at the HANNOVER MESSE 2019 trade fair.

Our experts will gladly be available for interviews. Please get in touch!

Contact

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https://s.fhg.de/hm19e



TOMORROW'S INDUSTRY: WHAT'S NEXT?

The future has always been the force that drives the Fraunhofer-Gesellschaft, Europe's largest applied research organization. Understanding the complex effects of new technologies is vital to the success of entire industries and national economies. Our researchers ask the right questions – and find new answers: solutions that bring companies immediate benefits.

How can we use learning systems and smart machines without losing control over our data? How do quantum effects help us communicate more securely and measure things more accurately? How can we harness nature's ingenuity to develop better and more sustainable technology? How can we transform materials in such a way that they alter their properties on demand? How can we preserve our jobs when the vehicles of the future run on electricity? How do we find a responsible way to ensure that everyone feels safe? And how do we know which idea is the right one? As researchers, entrepreneurs and visionaries, we see ourselves as pacesetters and innovation drivers for the economy. Not only do we conduct research with excellence, we also identify new topics at an early stage and set things in motion for the future. As a result, we respond quickly and efficiently to market demands and our customers' needs.

Our employees are the key to our success. Just as our namesake did, they strike the right balance between research and entrepreneurship, take responsibility for the future and develop solutions for tomorrow's challenges. With more than 26,600 employees at 72 institutes and research institutions, we work across borders, sectors and disciplines in teams that are precisely tailored to the task at hand. Our customers benefit directly from our unique systems expertise across all fields of research.

Whether the topic is machine learning and artificial intelligence, data sovereignty and sensor technology, digital engineering and human-machine interaction, smart materials and resource efficiency or predictive maintenance and augmented reality: at the HANNOVER MESSE 2019, we will showcase the technologies that will truly shape the production of the future. **What's next?** 70 YEARS OF FRAUNHOFER 70 YEARS OF FUTURE #WHATSNEXT

FOCUS TOPICS IN HALL 2

HALL 2 | BOOTH C22

Customer Exchange and Interaction

Producing customized products, especially in batch sizes of one, is a central component of today's Industrie 4.0. Agile transformation processes enable companies to implement customer requirements quickly and precisely. However, they must have perfect quality management and secure data transmission systems in place, as this is the only way to ensure that, for instance, complete product tracking with cognitive sensor technology, voice assistants and image-based quality control function reliably. In this regard, the International Data Spaces initiative creates a secure data space that enables companies to independently manage their data assets.

Planning and Processes

5G localization, predictive maintenance, machine learning, planning assistance and resource optimization using data-driven models are key terms for forward-looking digitally connected manufacturing. In the meantime, digital twins help manufacturers evaluate machinery, production plants and processes. Fraunhofer will be presenting "Process documentation in the age of the digital twin."



FOCUS TOPICS IN HALL 2

HALL 2 | BOOTH C22

Machines and Materials

Even as digitalization continues its forward march, the key questions in manufacturing remain the same: Which material is most suitable? What machinery do I need? What does the ideal production process look like? Fraunhofer offers a number of answers and will, for instance, present an innovative technological approach to smart and sustainable process design. Status monitoring in industrial applications will also be addressed. Smart acoustic sensor technology facilitates real-time inspection of plants and machinery.

Manufacturing and Human-Machine Interaction

Humans will play a key role in the production of the future. They will retain control even in the age of artificial intelligence, which is why gesture-based human-machine interaction – through speech recognition, for instance – is such a decisive factor. Other important topics, besides the control aspect, are stress monitoring and potential operator fatigue. We will also present information on smart sensors, digitally functionalized automotive components and a novel hybrid drive technology that offers high precision, dynamics and efficiency.



FOCUS TOPICS IN HALL 2

HALL 2 | BOOTH C22



New Jobs and Skills

Digitalization offers a wealth of opportunities, but also numerous challenges. What kind of technological future can we expect? What qualifications will we need to have in order to succeed in this future? Using augmented reality, we provide a first glance into the crystal ball to identify technological trends and to boldly look beyond our current horizons. We offer information on our extensive training programs, and we invite you to stop and take a look at the multifaceted career opportunities available at Fraunhofer.

Logistics and Technologies

The Internet of Things takes supply chain management to the next level. We are seeing entirely new ways to track and identify goods, for instance using RFID technology. Today, not only do we know where goods are located, we also know exactly what they are composed of. In addition, packaged goods can be screened in real time using millimeter-wave radar. Discover a wide range of new tracking and organization options for revolutionizing your logistics with a view to the future.

HALL 2 | BOOTH C22

Fraunhofer Adaptronics Alliance

Smart structures | Monitoring | Energy harvesting | Active systems | Intelligent materials | Vibration reduction | Sound reduction | Sensor nodes | Actuators | Intelligent lightweight design adaptronik.fraunhofer.de

Fraunhofer Cluster of Cognitive Internet Technologies (CCIT)

Cognitive Internet | Machine learning | IoT solutions | Trusted IoT connector | Secure connectivity | Connected manufacturing | Physical safety mechanisms for devices | Data sovereignty | Cyber security | International Data Space | Industrie 4.0 cit.fraunhofer.de

Fraunhofer Institute for Applied Information Technology FIT

Planning support and resource optimization through datadriven models | Human support – Al-based situational recognition **fit.fraunhofer.de**

Fraunhofer Institute for Applied Solid State Physics IAF

Radar sensors for contactless materials testing and high-precision distance measurement | 100% control in logistics and production | Industrie 4.0 | Human-machine collaboration | High-frequency systems **iaf.fraunhofer.de**

Fraunhofer Institute for Digital Media Technology IDMT

Acoustic quality and process monitoring | Machine learning |

Acoustic condition monitoring | Acoustic event detection | Signal analysis and processing | Speech recognition and voice control | Speech-to-text | Speech-based documentation | Mobile neurotechnologies to evaluate cognitive load at work (EEG) idmt.fraunhofer.de

Fraunhofer Institute for Environmental, Safety and Energy Technology UMSICHT

Bipolar plate | Redox flow battery | Electrochemical energy storage | Electrically conductive polymers | Bipolar battery systems umsicht.fraunhofer.de

Fraunhofer Institute for Experimental Software Engineering IESE

Industrie 4.0 | Automated manufacturing | Changeable

manufacturing processes | Digital-twin technology | Virtual engineering | Asset administration shells | BaSys4.0 | RAMI 4.0 | FERAL **iese.fraunhofer.de**

Fraunhofer Institute for Factory Operation and Automation IFF

Process design | Sustainable manufacturing | Energy efficiency | Digital transformation | Sensor-based automation | Technological innovation **iff.fraunhofer.de**

Fraunhofer Institute for Integrated Circuits IIS

Cognitive sensor technologies for assembly, storage and picking | Positioning for production and warehouse applications | RFID motion tracking | Smart object technologies for storage and production | 5G positioning | Man-machine



HALL 2 | BOOTH C22

interaction for Industrie 4.0 using postioning | Process analysis and controllin | process mining

iis.fraunhofer.de

Fraunhofer Institute for Intelligent Analysis and Information Systems IAIS / Fraunhofer Center for Machine Learning

Artificial intelligence | Informed machine learning | Knowledge graphs | Dialog systems | Question answering | Speech assistant | Human-machine interaction | Image-assisted quality control **iais.fraunhofer.de**

cit.fraunhofer.de/ml

Fraunhofer Institute for Machine Tools and Forming Technology IWU

Smart production system | Granule-based high-speed 3D printing (1 m/s) | Multi-axial 3D printing | Resource efficiency (recycling material) | Rapid prototyping and rapid tooling | Online process monitorin **iwu.fraunhofer.de**

Fraunhofer Institute for Software and Systems Engineering ISST

Data ecosystems | International Data Space | Data sovereignty | Cognitive Internet technologies | Digital cleanup | Inventory and valuation of data | Digital supply chains | Digital company networks **isst.fraunhofer.de**

Fraunhofer Institute for Technological Trend Analysis INT

Futures studies | Industrie 5.0 | Cognitive computing | Technology consulting | Technology foresight | Innovation management | Technology scanning | Machine learning | Technology scouting | Data mining | Data-driven foresight int.fraunhofer.de

14 Fraunhofer Academy

Part-time training made by Fraunhofer | Skill development for future jobs | Artificial intelligence | Experiential learning academy.fraunhofer.de

Fraunhofer-Gesellschaft, Recruiting

Career | Job offers | Apprenticeships | Internships | Bachelor's and master's theses | Doctoral programs | Young talent programs fraunhofer.de/carrier

3Dsensation Alliance (represented by Fraunhofer IOF) Human-machine interaction | Advanced 3D sensing | Secure communication **3d-sensation.de**

Berlin Center for Digital Transformation

Digital transformation for industry | Digitally integrated production | Industrial Internet of Things (IIoT) | Fog/edge/ cloud computing infrastructures | Machine-to-machine communication | 5G communication and network | Visible light communications | hHrdware for cyber-physical systems (CPS) | Machine learning | Digital twin

digitale-vernetzung.org

¹⁸ High-Performance Center DYNAFLEX[®]

Flexible solutions for the energy transition and raw materials shift | Sector coupling | Integrated energy | Cross-

HALL 2 | BOOTH C22

industry networking | Energy in production | Power-to-X | Renewable energy | Process dynamics, adaptivity and flexibility | Dynamic development methods | Digitalization **dynaflex.de**

Info point FUTURAS IN RES conference "What's the IQ of AI?"

November 21–22, 2019, Berlin | Trade fair discount for the conference tickets | Artificial Intelligence | Informed Machine Learning | Cognitive phenomena in machines | Bio-inspired and neuromorphic computing | Human-machine interaction | Social robotics **s.fhg.de/whats-the-iq-of-ai** Fraunhofer-Gesellschaft
 What's next?
 70 years of Fraunhofer
 70 years of future
 Technologies of the future |
 Global connectivity | History of the Fraunhofer-Gesellschaft
 fraunhofer.de

7 Other exhibition

partners

Otto von Guericke University of Magdeburg Institute of Manufacturing Technology and Quality Management IFQ ifq.ovgu.de

LGL Leichtmetallgießerei Bad Langensalza GmbH die-komplettgiesserei.de

Promeos GmbH promeos.com

FLOOR PLAN



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Fraunhofer-Gesellschaft | Hansastrasse 27 c | 80686 München | Germany | **fraunhofer.de**

FOCUS TOPIC IN HALL 6

HALL 6 | BOOTH A30



Digital solutions and new materials

When it comes to the industry of the future, two of the biggest topics are digital solutions and new materials. In Hall 6, Fraunhofer experts will present tailor-made surfaces equipped with a wide array of functions as well as forward-looking solutions in the fields of digitalization and artificial intelligence.

We will show how sensors can be used for adaptive manufacturing and what role 5G already plays today as well as showcasing a variety of sensor manufacturing technologies.

On the promising topic of customized surfaces, we will be presenting an exact simulation of coating processes – as well as a dust particle simulation that says a lot about dust contamination in plasma coating systems. Using such examples as a battery factory, we let visitors experience material simulations along the entire process chain.

HALL 6 | BOOTH A30

Fraunhofer Blockchain Community

Blockchain | Data and process integrity | Smart contracts | Machine economy | Automated process chains | Distributed ledgers | Ethereum | Hyperledger Fabric **fit.fraunhofer.de/blockchain**

Fraunhofer-Chalmers Research Centre for Industrial Mathematics FCC

Engineering industry | Point cloud achievements | Intelligently moving manikin | Design and assembly analysis of flexibles | Virtual paint shop – spray painting and sealing | Automatic path planning and line balancing

fcc.chalmers.se

Fraunhofer ICT Group

Manufacturing | Logistics | Mobility | Transportation | Energy | Sustainability | Safety | Security | Cybersecurity | Virtual reality | Augmented reality | Simulation | Big data | Artificial intelligence

iuk.fraunhofer.de

Fraunhofer Group for Light & Surfaces

Lasers | Optics | Measurement technology | Coating technology | Laser manufacturing | Beam sources | Optical systems and manufacture of optical systems | EUV technology | Process and system simulation | Materials technology | Microand nanotechnology | Microand nanotechnology | Thin-film technology | Plasma technology | Electron beam technology **light-and-surfaces. fraunhofer.de**

5 Fraunhofer Institute for Computer Graphics Research IGD

Visual Computing as a Service | Additive manufacturing | Interactive multimaterial Modeling and simulation | Geometric modeling | Virtual & augmented reality | Cyberphysical equivalence | Assistance systems in production | Visual control center igd.fraunhofer.de

Fraunhofer Institute for Industrial Mathematics ITWM

Digital environmental data for ADAS/AD testing | Digital human models | Real-time simulation of flexible components | Real driving emission and consumption | Simulation of materials, products and processes itwm.fraunhofer.de

7 Fraunhofer Institute for Interfacial Engineering and

Biotechnology IGB Affine sensor surfaces for measurement of environmental gases and VOCs | Plasma weathering: rapid testing method for material characterization | Anti-ice coatings | Plasma-functionalized and coated materials | Surface analysis

igb.fraunhofer.de/en.html

HALL 6 | BOOTH A30

Fraunhofer Institute for Laser Technology ILT

Embedded sensors | Coating technology | Thick-film technology | Thin-film technology | Functional layers for electronic applications |Corrosion protection | Lasers | Laser-based manufacturing processes for battery technology | Measurement technology | Measurement technology | Microelectronics | Micro- and nanotechnologies | Process and system simulation | Tribology | Wear protection **ilt.fraunhofer.de**

Fraunhofer Institute for Material and Beam Technology IWS

Additive manufacturing | Laser cladding with powder and wire | Rapid prototyping | Material technology | Joining | Special joining technologies | Thermal direct joining technique of thermoplastics and metals

iws.fraunhofer.de

Fraunhofer Institute for Secure Information Technology SIT

Cyber security | Softwaredefined networking | Secure remote maintenance channels | Authentication and encryption technologies | Protecting remote maintenance interfaces **sit.fraunhofer.de**

11 Fraunhofer Institute for Surface Engineering and Thin Films IST

Customized surfaces and thin films for Industrie 4.0 | Plasma technology | Thin-film sensors | Intelligent shims | Antifouling | Friction reduction | Wear protection | Cold plasma spraying | Surface functionalization | Modeling and simulation of coating processes, product and production systems | analytics | Test engineering | Battery systems **ist.fraunhofer.de**

¹² International Center for Networked, Adaptive Production (ICNAP)

Networked, adaptive production | Technologies for Industrie 4.0 | Digital twin in the product life cycle | Predictive power for adaptive process chains | Big data analytics in complex production environment | Cloud technologies and edge computing | High speed data transmission in production using 5G **icnap.de**

HALL 6 | BOOTH A30

External partner

13 fleXstructures GmbH

From concept phase to aftersales | IPS cable simulation – real-time simulation of flexible components (cables, wiring harnesses and hoses) | IPS IMMA – digital human model | Process process and robot path optimization with IPS robotics | Winner of the robotics award at HANNOVER MESSE 2017

flexstructures.de

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"New Materials"

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FLOOR PLAN



FOCUS TOPIC IN HALL 17

HALL 17 | BOOTHS C24 AND C83



Production and Automation

The digital transformation is in full swing in the business world. One key factor involved here is the cooperation between machines and humans. In Hall 17, the Fraunhofer Group for Production will present specific application examples, especially from the fields of human-machine interaction, robotics, smart maintenance, additive manufacturing and wireless connectivity.

We will present a novel system for gesture control in heavy-duty robotics, an application for motion assistance and a collaborative robot. Augmented reality is also playing an increasingly important role. Visitors will be able to experience this firsthand on sample applications, such as digital assistance for offshore wind park maintenance or for assembly support. In addition, we will present concrete potential applications for additive component manufacturing.

In the field of smart maintenance, we offer a customized workshop concept for all relevant topics – and we assist our customers in transferring the latest strategies and technologies.

HALL 17 | BOOTHS C24 AND C83

Fraunhofer Group for Production

Smart maintenance | innovation network | Community research and seminars | Maintenance technologies | assistance systems | predictive analytics | Data-based maintenance | Strategies and business models produktion.fraunhofer.de

2 Fraunhofer Institute for Integrated Circuits IIS

Critical machine-type communication | Real-time wireless communication system | Wired fieldbus and TSN compatibility | URLLC **iis.fraunhofer.de**

Fraunhofer Institute for Machine Tools and Forming Technology IWU

Human-robot collaboration | Heavy-duty robots | 3D dynamic safety system | Gesture control | Flexible automation | Vision systems | Ergonomics **iwu.fraunhofer.de**

Hall 17, Booth C83 Fraunhofer Institute for Manufacturing Engineering and Automation IPA

Cleanroom to go | Cost efficiency in maintenance and servicing | Flexible, mobile production | Individual solutions | Fast installation | Dimensions on request: XS–XXL | Combinable with existing manufacturing equipment **ipa.fraunhofer.de**

Fraunhofer Institute for Mechatronic Systems Design IEM

Worker assistance system | Production automatization | Batch size one | Humanmachine interaction | Robotics | Scientific automation | Systems engineering **iem.fraunhofer.de**

Fraunhofer Institute for Production Systems and Design Technology IPK

Ergonomics support | Movement monitoring | Real-time motion analysis | Soft robotics | Wearable robotics | Health and geriatric care | Robotics **ipk.fraunhofer.de**

Fraunhofer Research Institution for Casting, Composite and Processing Technology IGCV

Testing specimens to investigate the effects of cleaning technologies | Investigation of contamination occurring in additive manufacturing [Reproducible cleaning tests | Detection and analysis of contamination | Predictive quality and risk management | Cooperating robotics | Intelligent multi-material solutions | Customer-oriented lightweight design | Casting technology | Additive manufacturing | Laser beam melting (LBM) | Maintenance via augmented reality igcv.fraunhofer.de

HALL 17 | BOOTHS C24 AND C83

Fraunhofer Research Institution for Large Structures in Production Engineering IGP

Mobile assistance systems | Maintenance | Digital life cycle documentation | Manufacturing engineering for large structures | Maritime industry 4.0 | Demand-oriented supply of information **igp.fraunhofer.de**

Other exhibition partners

Fraunhofer Institute for Factory Operation and Automation IFF iff.fraunhofer.de

Fraunhofer Institute for Material Flow and Logistics IML iml.fraunhofer.de Fraunhofer Institute for Production Technology IPT ipt.fraunhofer.de

Fraunhofer Austria Research GmbH fraunhofer.at

Fraunhofer Institute for Industrial Engineering IAO iao.fraunhofer.de

Fraunhofer Institute for Nondestructive Testing IZFP izfp.fraunhofer.de

Fraunhofer Institute for Structural Durability and System Reliability LBF Ibf.fraunhofer.de

FLOOR PLAN BOOTH C24



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EDITORIAL NOTES

FRAUNHOFER

Fraunhofer Institute for Ceramic Technologies and Systems IKTS

Hall 3, Booth L08 Hall 27, Booth E45 **ikts.fraunhofer.de**

Fraunhofer Institute for Manufacturing Engineering and Automation IPA Hall 2, Booth C28 Hall 12, Booth C57

ipa.fraunhofer.de

Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM Hall 27, Booth E45 ifam.fraunhofer.de

Fraunhofer Institute for Material and Beam Technology IWS Hall 5, Booth A18 iws.fraunhofer.de Fraunhofer Institute for Mechatronic Systems Design IEM Hall 16, Booth A04 iem.fraunhofer.de

Fraunhofer Institute for Microengineering and Microsystems IMM Hall 27, Booth C52 imm.fraunhofer.de

Fraunhofer Institute for Optronics, System Technologies and Image Exploitation IOSB Hall 6, Booth D06 Hall 8, Booth D23 iosb.fraunhofer.de Fraunhofer Institute for Optronics, System Technologies and Image Exploitation IOSB, Industrial Automation branch Hall 16, Booth A04 iosb.fraunhofer.de

Fraunhofer Institute for Silicon Technology ISIT Hall 27, Booth K45 isit.fraunhofer.de

Fraunhofer Institute for Solar Energy Systems ISE Hall 27, Booth C58 www.ise.fraunhofer.de

Fraunhofer Venture Hall 13, Booth E27 fraunhoferventure.de

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 - Machines and materials
 - Manufacturing and Human-Machine Interaction
 - New Jobs and Skills
 - Logistics and Technologies
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- Hall 3, Booth L08Fraunhofer IKTS
- Hall 5, Booth A18Fraunhofer IWS

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 Tomorrow's Industry
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- Hall 13, Booth E27
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- Hall 16, Booth A04
 Fraunhofer IEM
 Fraunhofer IOSB,
 Industrial Automation
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WWW.FRAUNHOFER.DE



