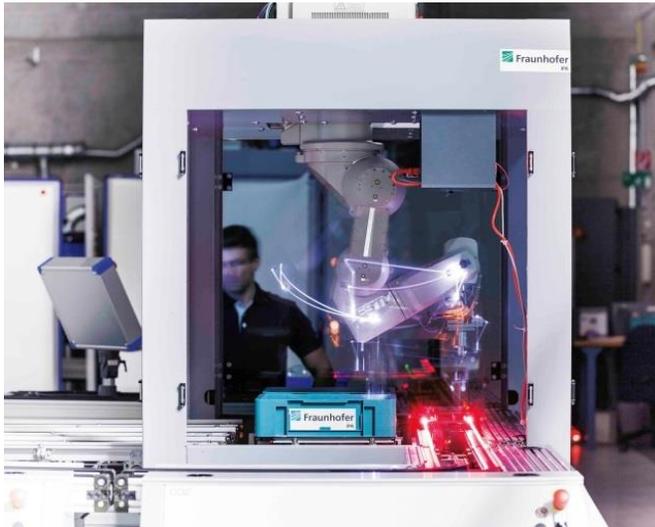

FRAUNHOFER INSTITUTE FOR MANUFACTURING ENGINEERING AND AUTOMATION IPA

in cooperation with the institutes EEP and IFF of the University of Stuttgart



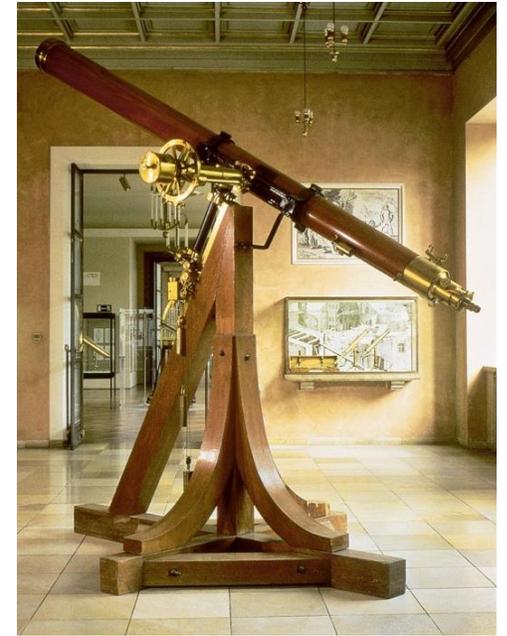
Future is our product
Sustainable. Personalized. Smart.

Namesake: Joseph von Fraunhofer (1787 – 1826)



© Deutsches Museum

- **Researcher**
Discovered the “Fraunhofer Lines”
in the solar spectrum
- **Inventor**
Developed a new method for processing lenses
- **Entrepreneur**
Director and partner of a glassworks



© Fraunhofer-Gesellschaft



Who we are



Fraunhofer IPA

Researchers. Developers. Pioneers.



Source: ARENA2036, Photo: Deniz Calagan



Source: Universität Stuttgart IFF / Fraunhofer IPA, Photo: Rainer Bez

Fraunhofer IPA

Researchers. Developers. Pioneers.



Source: ARENA2036, Photo: Christian Hass

Fraunhofer IPA

Technology consultant and innovation driver since 1959

in Million EUR	2018	2017
Budget total	74	67
Operating budget	68	63
Investment budget	6	4
Industrial revenues	28	24

- More than 1,000 employees
- Over 1,000 projects with industrial customers each year
- Strategy: mass sustainability and mass personalization



New technical center "Gebäude D" in Stuttgart

Note: all locations (Stuttgart, Mannheim, Bayreuth and Vienna)



The Production of the future: Humans and Robots are working hand in hand



Service robot Care-O-bot@ 4

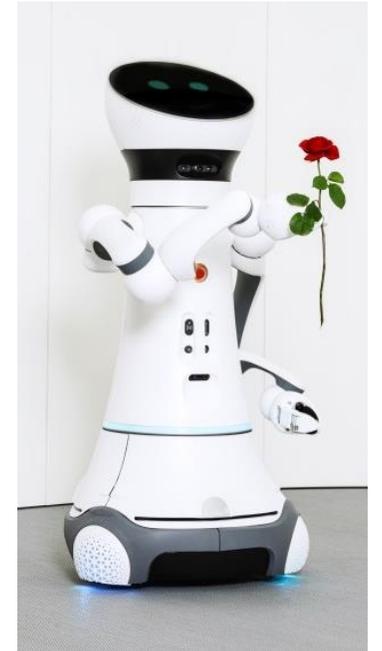
Fraunhofer IPA

Technology consultant and innovation driver since 1959

Key Indicators	2018
Patents granted	24
Licensing contracts	8
New spin-offs	2
IPA spin-off sold	1
Dissertations	13
Publications	775



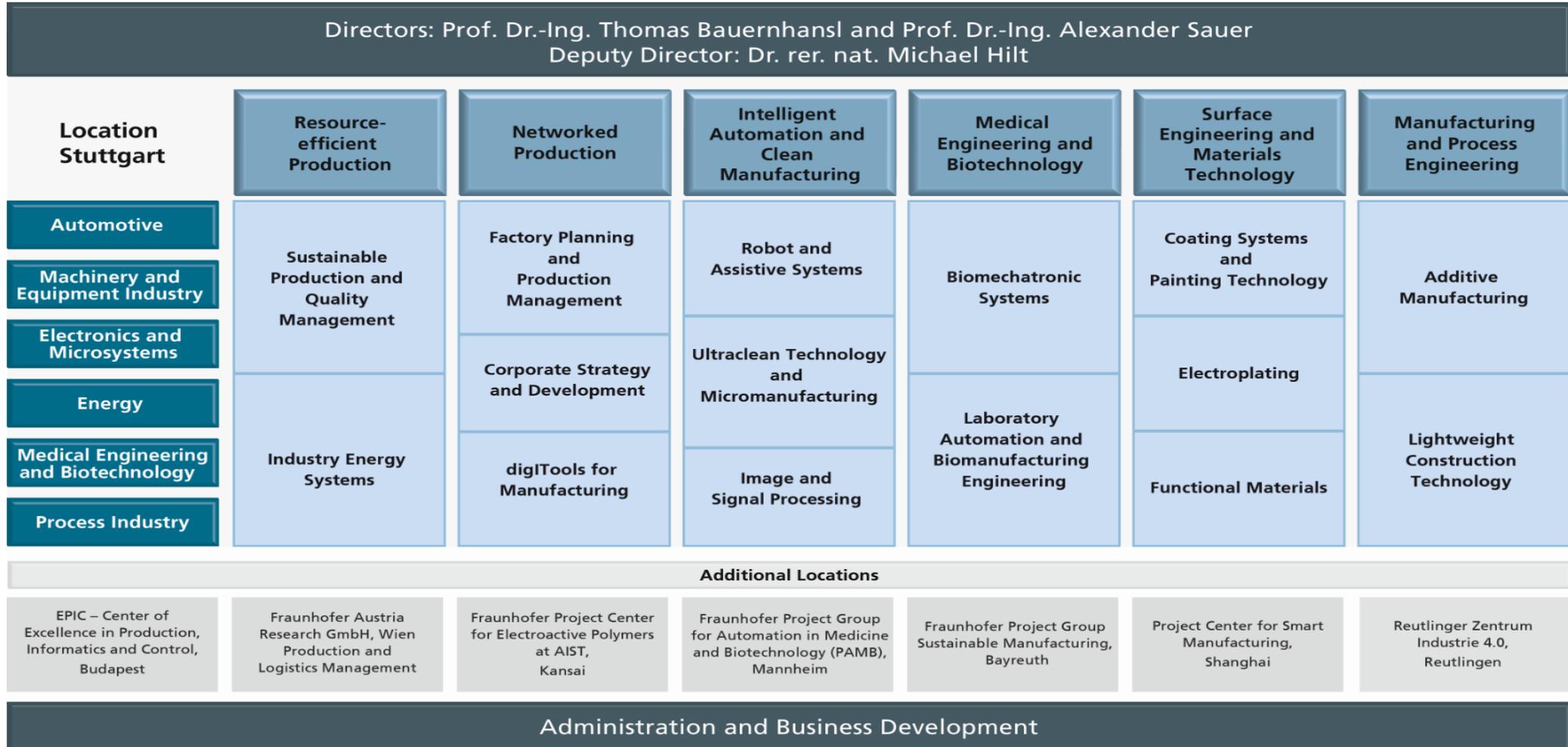
The Production of the future: Humans and Robots are working hand in hand



Service robot Care-O-bot@ 4

Fraunhofer IPA

with an interdisciplinary organization



Version as of: 01.2020

Fraunhofer IPA

with an interdisciplinary management board



Prof. Dr.-Ing. Thomas Bauernhansl

- Director of Fraunhofer IPA
- Director of Institute of Industrial Manufacturing and Management (IFF) of the University of Stuttgart
- Division Director "Networked Production"



Prof. Dr.-Ing. Alexander Sauer

- Director of Fraunhofer IPA
- Director of Institute for Energy Efficiency in Production (EEP) of the University of Stuttgart
- Division Director "Resource-efficient Production"

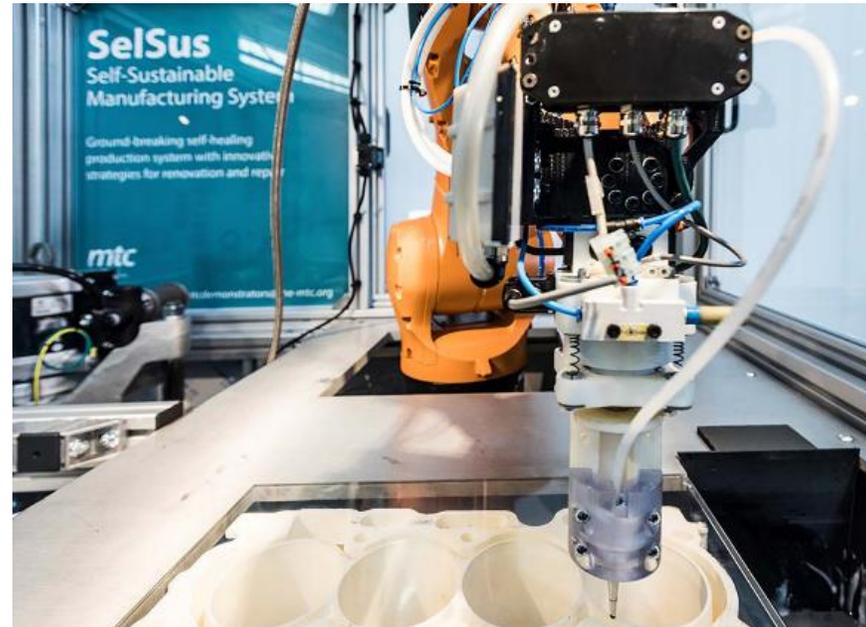


Dr. rer. nat. Michael Hilt MBA

- Deputy Director of Fraunhofer IPA
- Division Director "Surface Engineering and Materials Technology"
- Head of department "Coating systems and painting technology"

Fraunhofer IPA with an international network

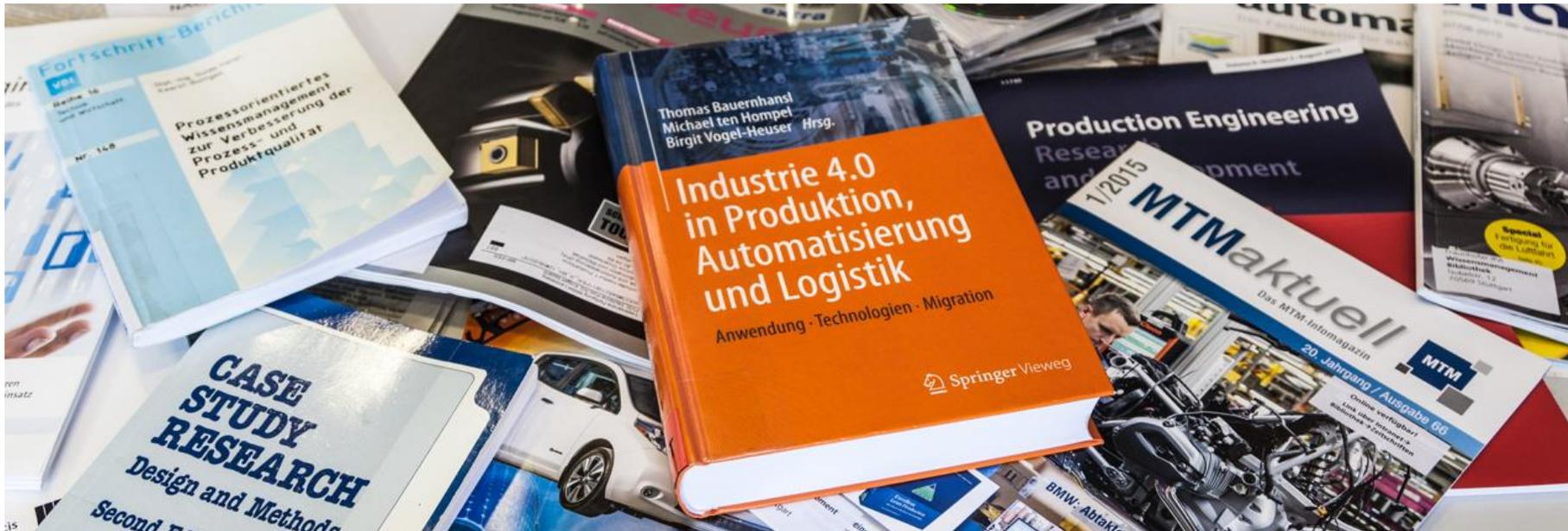
- Field offices and project centers in Germany, Austria, Hungary and Japan
- Further partnerships under development in the USA and China
- Approximately a fifth of all projects are outside Germany



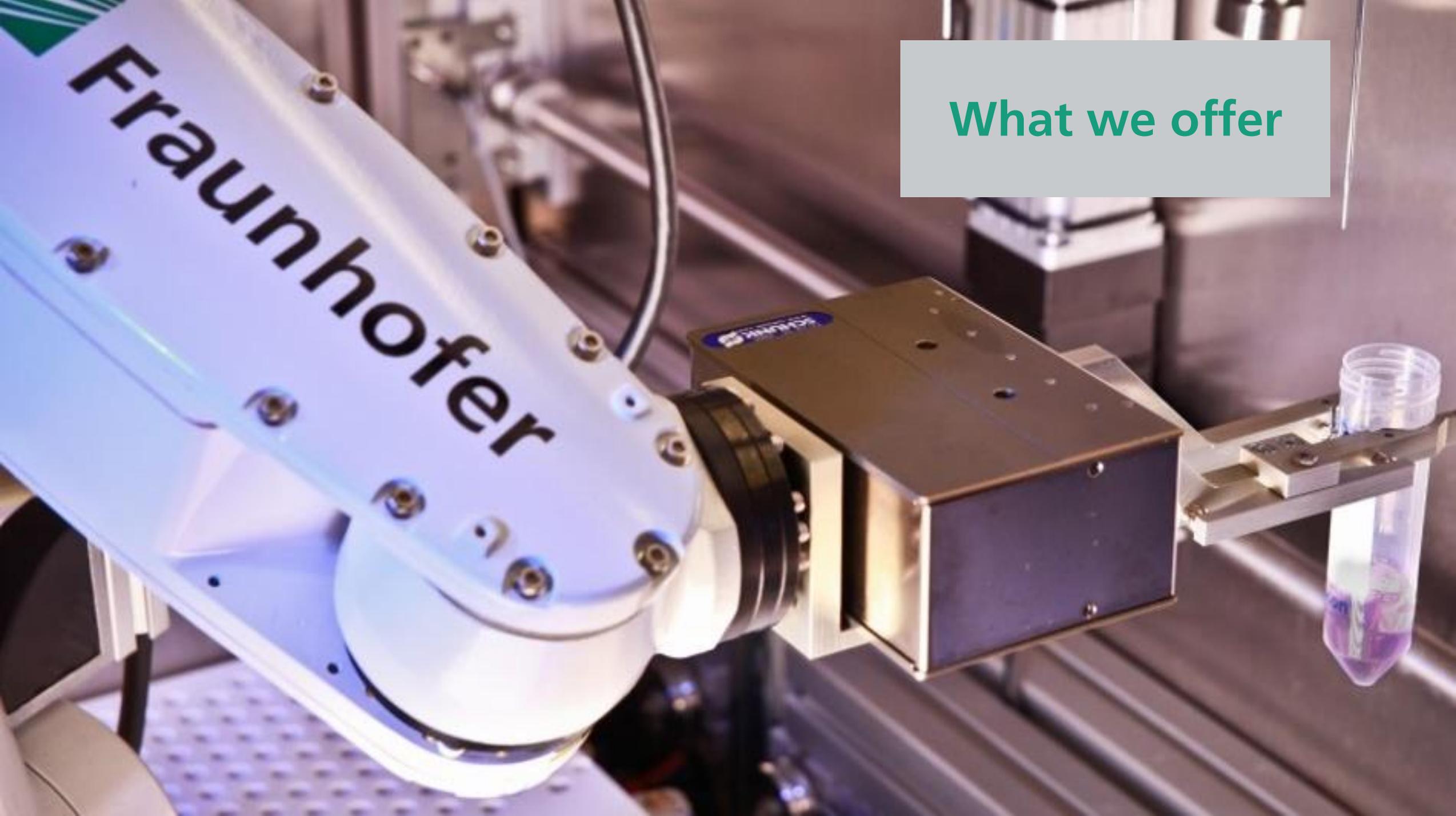
Source, left-hand photo: School of Mechanical Engineering, Shanghai JiaoTong University

Fraunhofer IPA with a scientific reputation

- 30 in-house inventions
- 40 newly-published patent specifications
- 775 publications



Note: key figures for 2018



What we offer

Manufacturing topics of today and tomorrow

Trends influencing our work

Manufacturing organization

- Service engineering and hybrid business models for decentralized production and complex value systems
- Adaptable manufacturing systems
- Highly-efficient energy usage and energy management
- Resource and quality management

Manufacturing operations

- Generative processes
- Machining fiber and composite materials
- Processing functional and nano materials
- Coating technologies and materials
- Flexible machines and handling systems

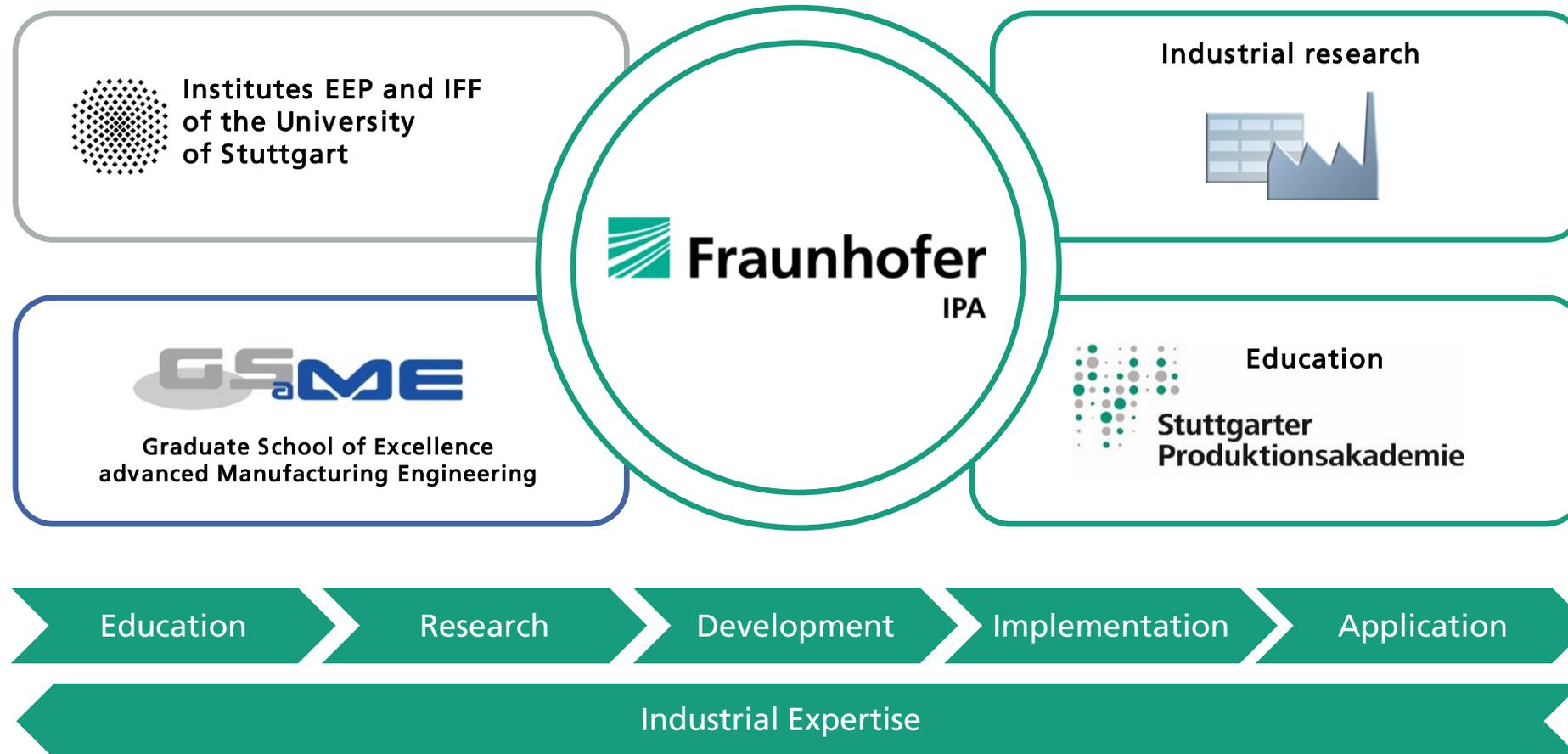
Information and communication technology, automation

- Data-based and knowledge-based systems and processes
- Cyber-physical manufacturing systems, decentralized automation solutions
- Robotics and assistive systems
- Human-factory interaction
- Laboratory automation
- Production of / with biological systems

Source: BMBF-Foresight-Zyklus II, search phase 2012-2014, 3rd interim result; selected research and technology perspectives 2030

Networking science and practice

Fraunhofer IPA as a center for knowledge transfer



Technical equipment and laboratories

In tune with the times



Application Center
Industrie 4.0



Motion laboratory



Machine vision laboratories



Biomanufacturing
laboratory



Factory planning and
production laboratory



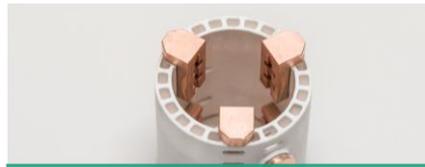
Future Work Lab



Electroplating laboratory



Intervention room



Labs for additive
manufacturing



Labs for cutting, joining and
sawing



Coating technology center



nCLAS
Laboratory automation



Cleanrooms & cleanliness
rooms



Robotics experimentation
area



Model factory for functional
coatings



Virtual Orthopedic Lab

Cooperating at the highest level

What we do

Product development and optimization

Process development and optimization

Technology development and optimization

Assessments, tests and certifications

Organization and process optimization

Market analyses and innovation consulting



Cooperating at the highest level

What we offer

- Single orders
- Large-scale projects with numerous partners
- International collaborations
- Strategic partnerships
- Innovation clusters
- Spin-off companies
- Licenses
- Further training



Cooperating at the highest level

What sets us apart

- Innovation transfer to applications
- Objective consulting services as an independent contact partner
- Project teams tailored to specific requirements
- Excellent research and industrial network
- Topic-related seminars, events and study programs



**Work together
on future topics**

40

Cooperating at the highest level

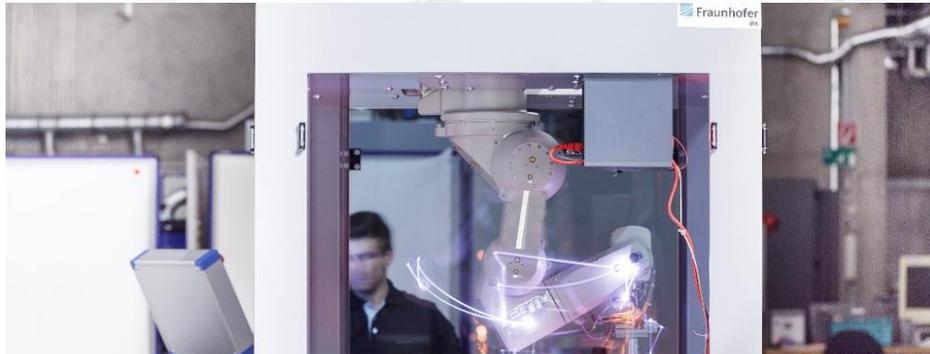
Application Center Industrie 4.0



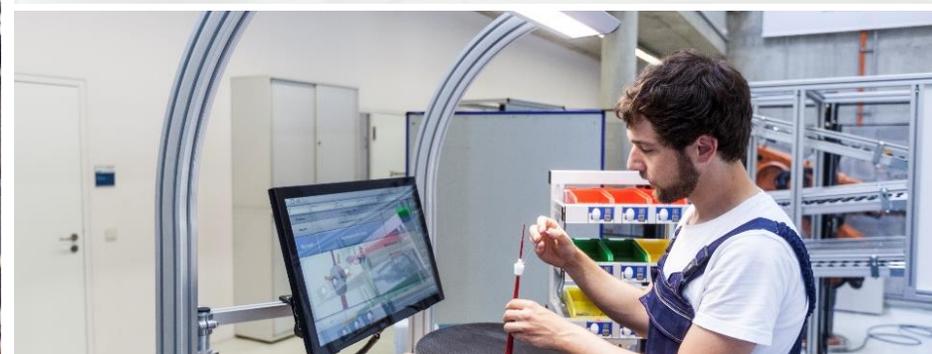
Showcase: Autonomous Production
Self-controlled operation and autonomous optimization



Showcase: Digitizing Value-Adding
Rule-based production through data connectivity



Showcase: The Personalized Product
Additive manufacturing technologies and data analytics



Showcase: Humans as Conductors
Cyber-physical systems for personalized assistance

Cooperating at the highest level

Future topic “Mass Personalization”



Character of the performance center in Stuttgart

Development of cross-industry technologies, processes, manufacturing systems and new business models for manufacturing personalized products cost-efficiently in collaboration with industry

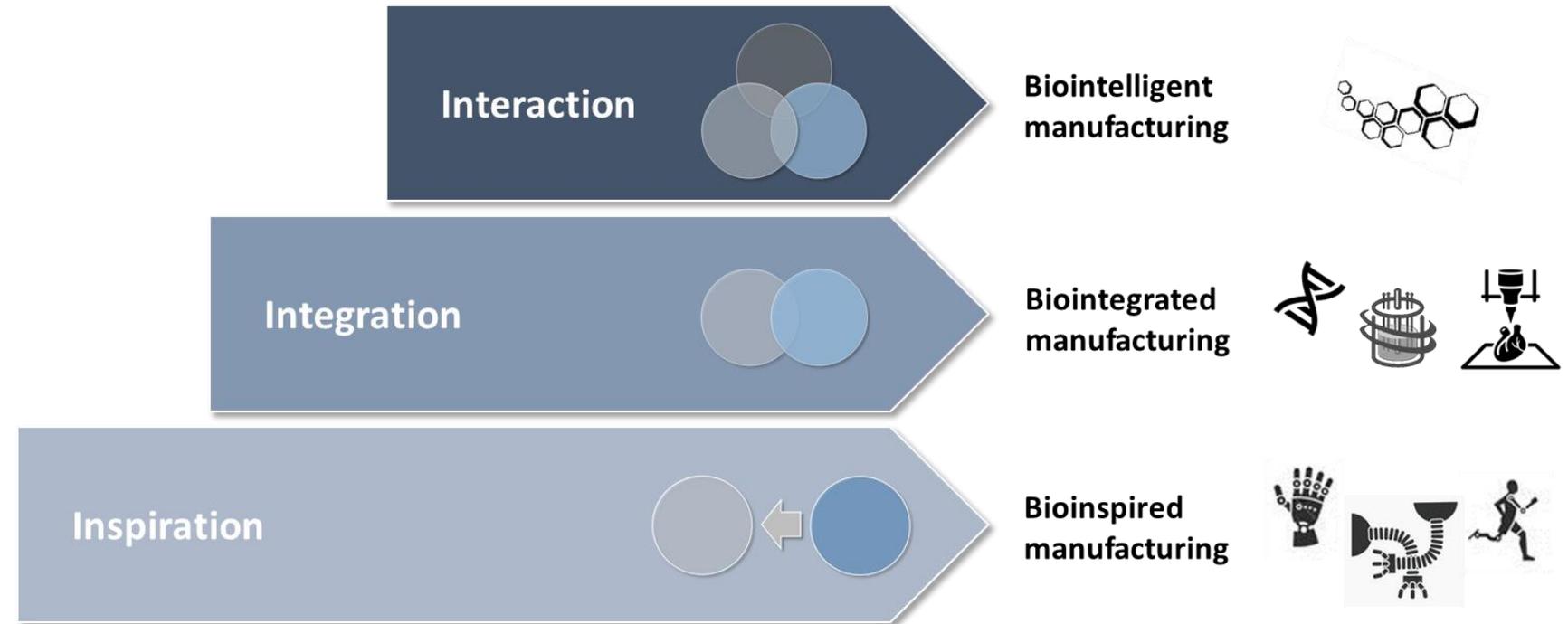
- for personalized assistive systems, medical and sports products
- In the field of modularized construction, transformable vehicle concepts, as well as consumer products and services
- in quality assurance, logistics and the manufacture of personalized therapeutic products

Cooperating at the highest level

Future topic "Adding value through biointelligence"

In the future, biological transformation will merge nature with technology, i.e. the biosphere and technosphere.

Optimized during a period of evolution of over three and a half billion years, principles, processes and organisms will increasingly find their way into the industrial value chain.



Cooperating at the highest level

“Industry on Campus” with centers and labs



Automotive:
“ARENA2036”



Work 4.0:
“Future Work Lab”



Machines: “Metal
processing of the future”



Laboratory:
“nICLAS”

Note: selected current lighthouse projects

Cooperating at the highest level

S-TEC Stuttgarter Technologie- und Innovationscampus

S-TEC Stuttgarter Technology and Innovation Campus



Cluster Mass Personalization		Cluster Mass Sustainability	Cluster Business Innovation	Cluster Biointelligence	S-TEC Foundation
Performance Center Mass Personalization	Center for Additive Manufacturing	Center for Ultraefficiency	Business Innovation Engineering Center BIEC	Competence Center for Biointelligence	SPA Stuttgart Production Academy
Center for Cyber Cognitive Intelligence	Center for Battery Cell Manufacturing	Center for Frugal Products and Manufacturing Systems	Center for Entre- und Intrapreneurship STARTEC		S-TEC Innovation Services GmbH
Center for Cyber Physical Systems		Center for Lightweight Engineering			...

Fraunhofer IPA

Your contact partner

Dr. Ahmad Issa
Senior Scientist
Competence Centre DigITools for Manufacturing

Phone +49 711 970-1779
Ahmad.Issa@ipa.fraunhofer.de

www.ipa.fraunhofer.de
www.wir-produzieren-zukunft.de
www.die-uebermorgen-macher.de

Future is our product

Sustainable. Personalized. Smart.

Giving you a competitive edge

Sustainable. Flexible. Cost-effective.