

## 22. Techno-Ökonomie-Kolloquium

TU Graz – Institut für Innovation und Industrie Management (IIM)

Hörsaal E, 1. Stock, Kopernikusgasse 24, 8010 Graz

27.11.2017



# Eröffnung

Dekan Prof. Franz Heitmeir

TU Graz

# Begrüßung

Prof. Christian Ramsauer

IIM, TU Graz

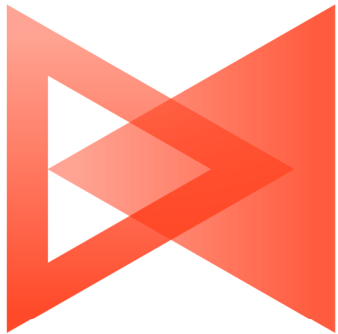
# Agenda

Uhrzeit	Programm	KP = Konzeptpräsentation EP = Ergebnispräsentation	Vortragende	Institut
09:30 – 10:00	<b>Registrierung</b> IIM, 2. Stock, Kopernikusgasse 24, 8010 Graz			
10:00 – 10:15	Eröffnung		Dekan Prof. Franz Heitmeir	TU Graz
10:15 – 10:30	Begrüßung		Prof. Christian Ramsauer	IIM TU Graz
10:30 – 11:00	KP: <i>Predictive Maintenance in Discrete Parts Manufacturing</i>		Clemens Gutschi	MBI TU Graz
11:00 – 11:30	KP: <i>Ecosystem related adaptations throughout the Start-up Life-Cycle</i>		Sebastian Stumpf	IMW TU Wien
11:30 – 12:00	KP: <i>How do business models, human capital characteristics and venture capital interact to impact startup performance?</i>		Veronika Ruthensteiner	IMW TU Wien
12:00 – 13:30	<b>Mittagspause</b> IIM, 2. Stock, Kopernikusgasse 24, 8010 Graz			

Uhrzeit	Programm	KP = Konzeptpräsentation EP = Ergebnispräsentation	Vortragende	Institut
13:30 – 14:15	EP: <i>Allokation von Ressourcen für Vertrieb, Forschung und Entwicklung in der Bahnindustrie</i>		Christian Kaltenmesser	UFO TU Graz
14:15 – 14:45	KP: <i>Der Einfluss der Ressourcenknappheit auf die Geschäftsmodell-elemente von Klein(st)unternehmen in Business-to-Business Märkten</i>		Fabian Pirker	UFO TU Graz
14:45 – 15:15	KP: <i>Fähigkeitsorientierte Arbeitsgestaltung durch Mensch-Roboter-Kollaboration</i>		Fabian Ranz	IMW TU Wien
15:15 – 15:45	<b>Kaffeepause</b> IIM, 2. Stock, Kopernikusgasse 24, 8010 Graz			
15:45 – 16:15	KP: <i>Smart Data Analytics im Supply Chain Management der automobilen Zulieferindustrie für Elektronikkomponenten</i>		Benjamin Kormann	IL MUL
16:15 – 17:00	EP: <i>Organizing and Analyzing Innovative Production in the Digital Economy</i>		Georg Reischauer	IMW TU Wien
17:00 – 17:10	VBW Dissertationspreis		Prof. Wilfried Sihn	IMW TU Wien
17:10 – 17:20	WING Kongress		Prof. Ulrich Bauer	BWL TU Graz
17:20 – 17:30	Diskussionsrunde: TÖK Entwicklungen und Ausblick		Prof. Christian Ramsauer	IIM TU Graz
ab 17:30	<b>Gemeinsames Abendessen</b> Mensa Neue Technik – 5. Stock, Stremayrgasse 16			



# Mittags- und Kaffeepausen 2. Stock



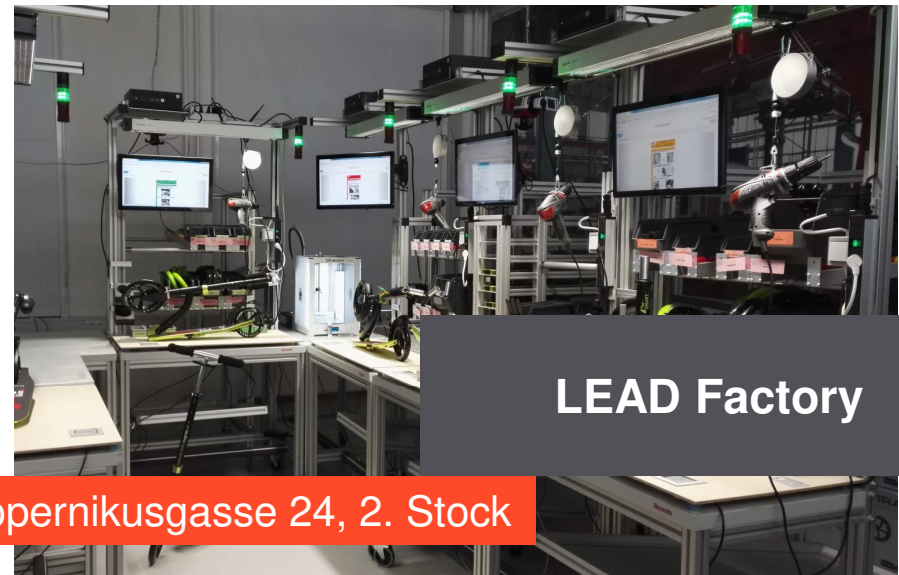
INSTITUTE OF

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AND INDUSTRIAL  
MANAGEMENT**



**IIM Seminar Room**

Kopernikusgasse 24, 4. Stock



**LEAD Factory**

Kopernikusgasse 24, 2. Stock



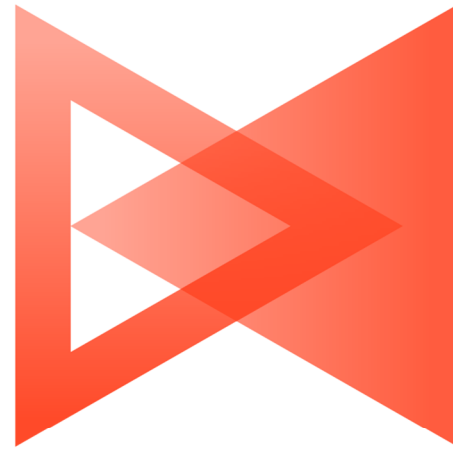
Gemeinsames Abendessen  
**Mensa Rooftop TU Graz**  
Stremayrgasse 16, 5. Stock  
8010 Graz



**INNOVATION**



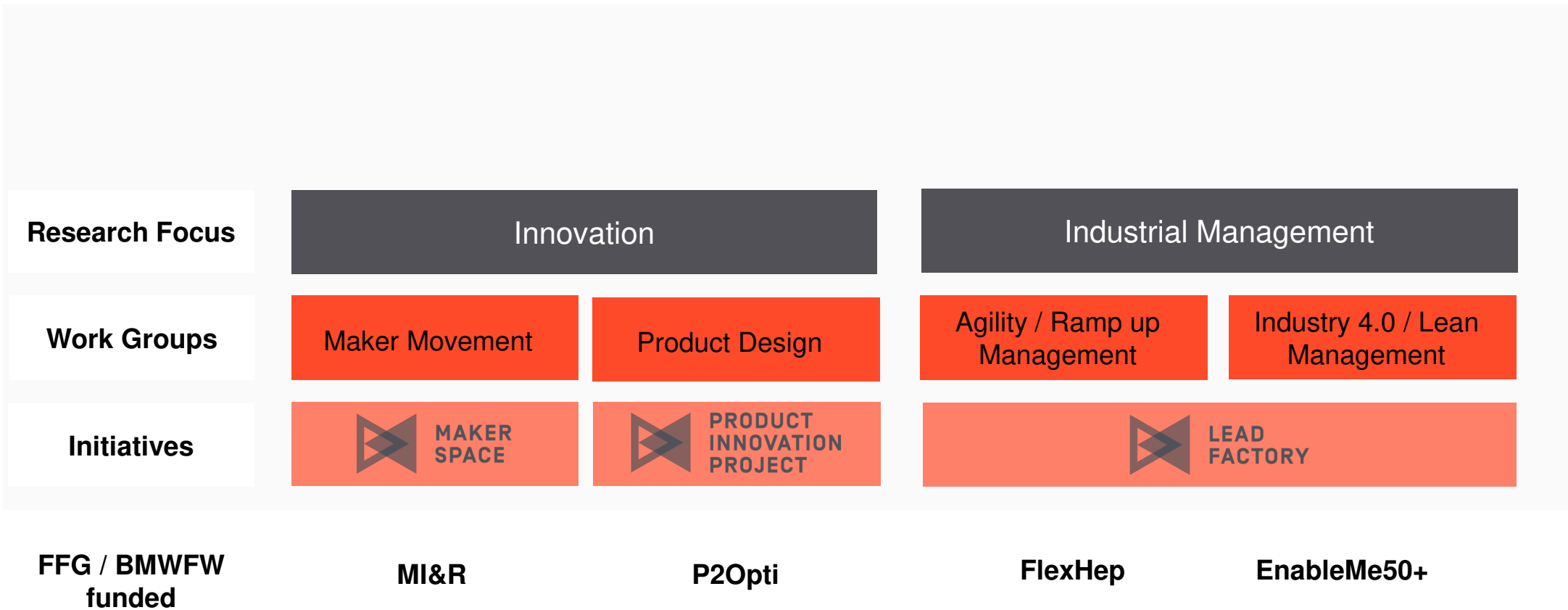
**INDUSTRIAL  
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AND INDUSTRIAL  
MANAGEMENT**

# IIM – Basic Structure



# IIM - Manpower

## Professor / Scientific Assistants



## Project Assistants



Industry partners:

Plansee

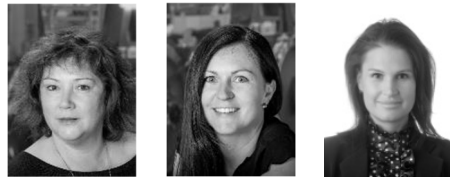
AVL List

McKinsey

BMW

AVL List

## Administration / Communication



## Junior Assistants



# IIM - Lectures by industry-experts



**Georg List**  
Dipl.-Ing. Dr.techn.

Innovation strategy  
through M&A



**Markus Hammer**  
Dipl.-Ing.

Learning Factory



**Volker Warzecha**  
Dipl.-Wi.-Ing.

Innovation strategy  
through M&A



**Karl Rose**  
Univ.-Prof. Dipl.-Ing.

Industrial  
Energy Management



**Raimund Diederichs**  
Dipl.-Ing., MBA

Manufacturing and  
Supply Chain Network



**Siegfried Wolf**  
Hon.-Prof. Ing. KR

Management Topics in  
Automotive Industry



**Roberto Piccioni**  
M.Sc.

Safety and Sustainability

































**Günther Apfalter**  
Dipl.-Ing.

Management Topics in  
Automotive Industry



(8 out of 22)

# IIM - Courses

<b>Basics</b>	<ul style="list-style-type: none"> <li>▪ Industriebetriebslehre </li> <li>▪ Industrial Management Seminar </li> <li>▪ Industrial Management and Innovation </li> </ul>	<b>Industrial Management</b>	<ul style="list-style-type: none"> <li>▪ Industrial Engineering </li> <li>▪ Arbeitssicherheit </li> <li>▪ Logistik Management </li> <li>▪ Lernfabrik - Learning Factory </li> <li>▪ Production Strategies </li> <li>▪ Manufacturing and Supply Chain Networks </li> <li>▪ Quality Management </li> <li>▪ Qualitätsmanagement </li> <li>▪ Warehouse Logistics </li> <li>▪ Operational Risk Management </li> <li>▪ Safety and Sustainability </li> </ul>
<b>Innovation</b>	<ul style="list-style-type: none"> <li>▪ Betriebliches Innovationsmanagement </li> <li>▪ Product Innovation Project I </li> <li>▪ Product Innovation Project II </li> <li>▪ Kreativitätstechniken </li> <li>▪ Creativity Techniques </li> <li>▪ Product Innovation Management </li> <li>▪ Marketing in Automotive Business </li> <li>▪ Innovation strategy through M&amp;A </li> <li>▪ Value Management I </li> <li>▪ Value Management II </li> </ul>	<ul style="list-style-type: none"> <li>▪ Career Management </li> <li>▪ Leadership and Motivation </li> <li>▪ Teambuilding </li> </ul>	
<b>Complementary Courses</b>	<ul style="list-style-type: none"> <li>▪ Energiewirtschaftslehre </li> <li>▪ Management Topics in Automotive Industry </li> <li>▪ Change Management </li> </ul>		



## Harvard Case Study Teaching

Besichtigung in den Pausen  
Kopernikusgasse 24, 4. Stock

# Overview – IIM-Institute

Maker, Industry & Research - FabLab Graz

Product Innovation Project

Agility

LEAD Factory

# Emergence of many makerspaces worldwide

## Hackerspace - 1996

- Chaos Computer Club, “c-base space station”
- Community-operated workspace, where people with focus on computers, technology and science work together on projects



## FabLab - 2002

- Founder Neil Gershenfeld (MIT)
- A FabLab is a technical prototyping platform with digital fabrication tools for innovation and invention, for learning and local entrepreneurship, open access



## TechShop - 2006

- Founders Mark Hatch, Jim Newton
- America's first nationwide open-access public workshop; for-profit organization

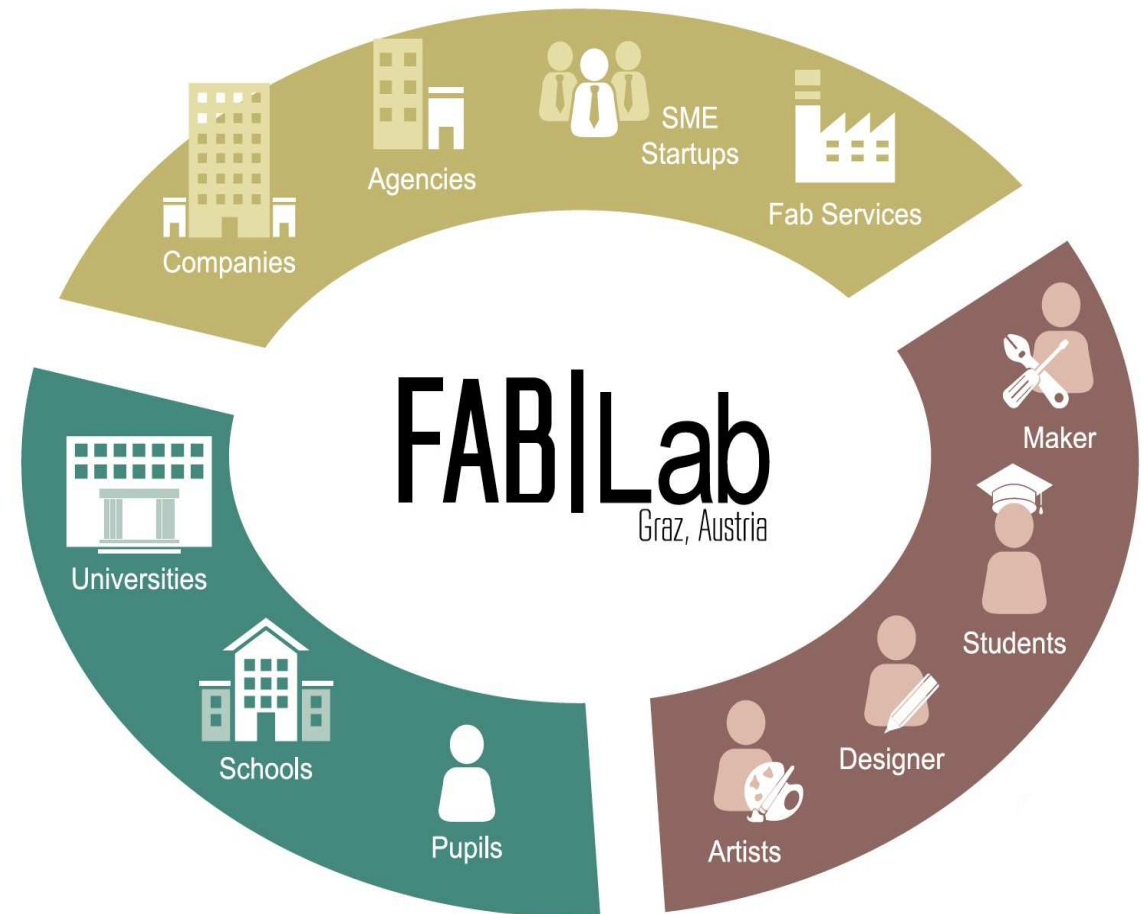


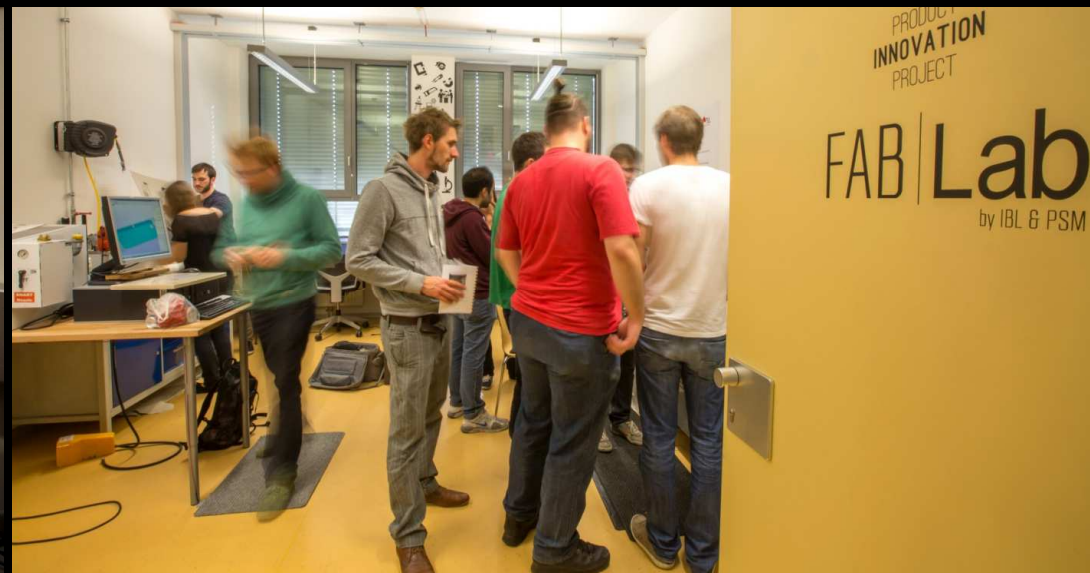
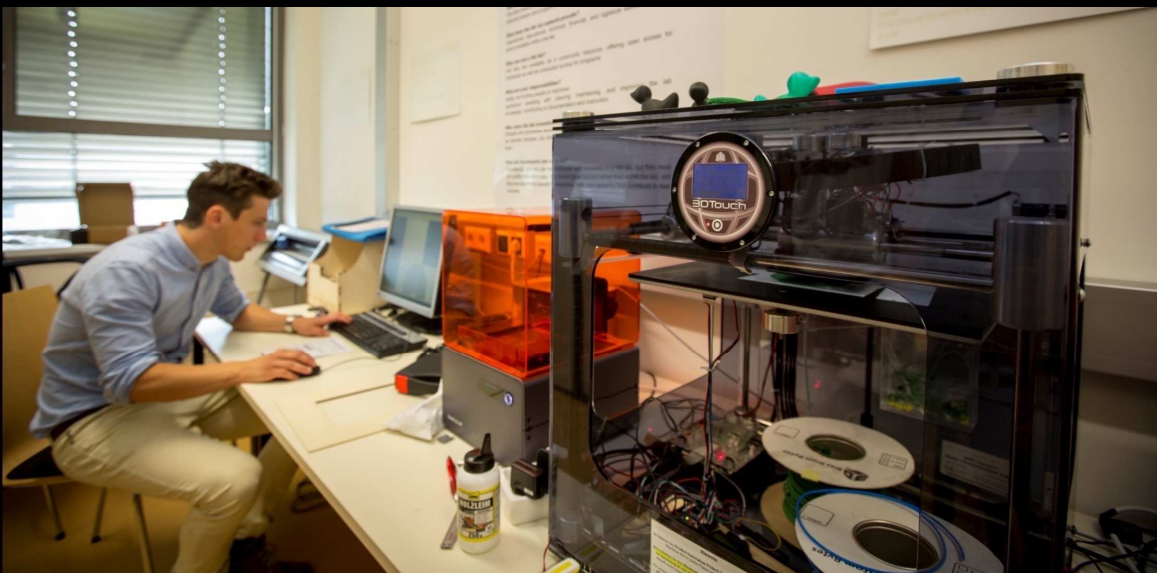
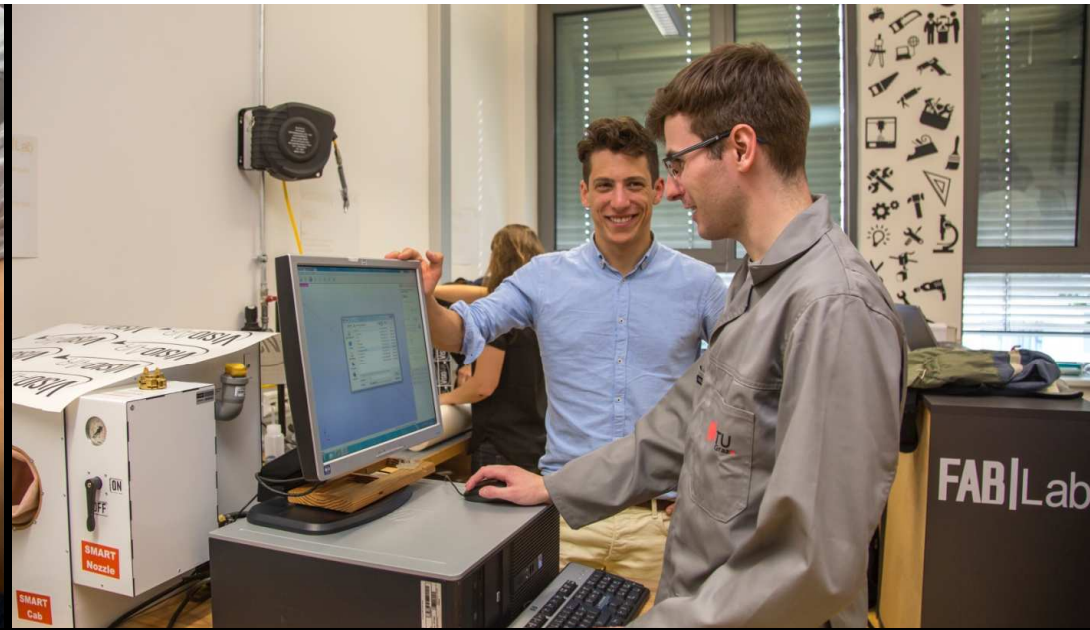
„Makerspace” is used as a sort of generic term for FabLabs, Hackerspaces or TechShops for the sake of clarity.

- The term “Makerspace” was introduced by Dale Dougherty (Make Magazine, 2005)
- Infrastructure for individuals to produce their own product ideas simple and inexpensive with digital, high-tech machines
- A place for like-minded people to exchange ideas

# FabLab Graz

- **First** academic FabLab in **Austria** in operation since **2014**
- The idea is to offer **access to digital manufacturing** for individuals
- Our mandate is to assist our **users** - **companies, SMEs, startups, Product Innovation Project teams, students** etc. - with support and solutions along the product design process from idea generation to market launch
- More than **1000 new registered users** since January 2016





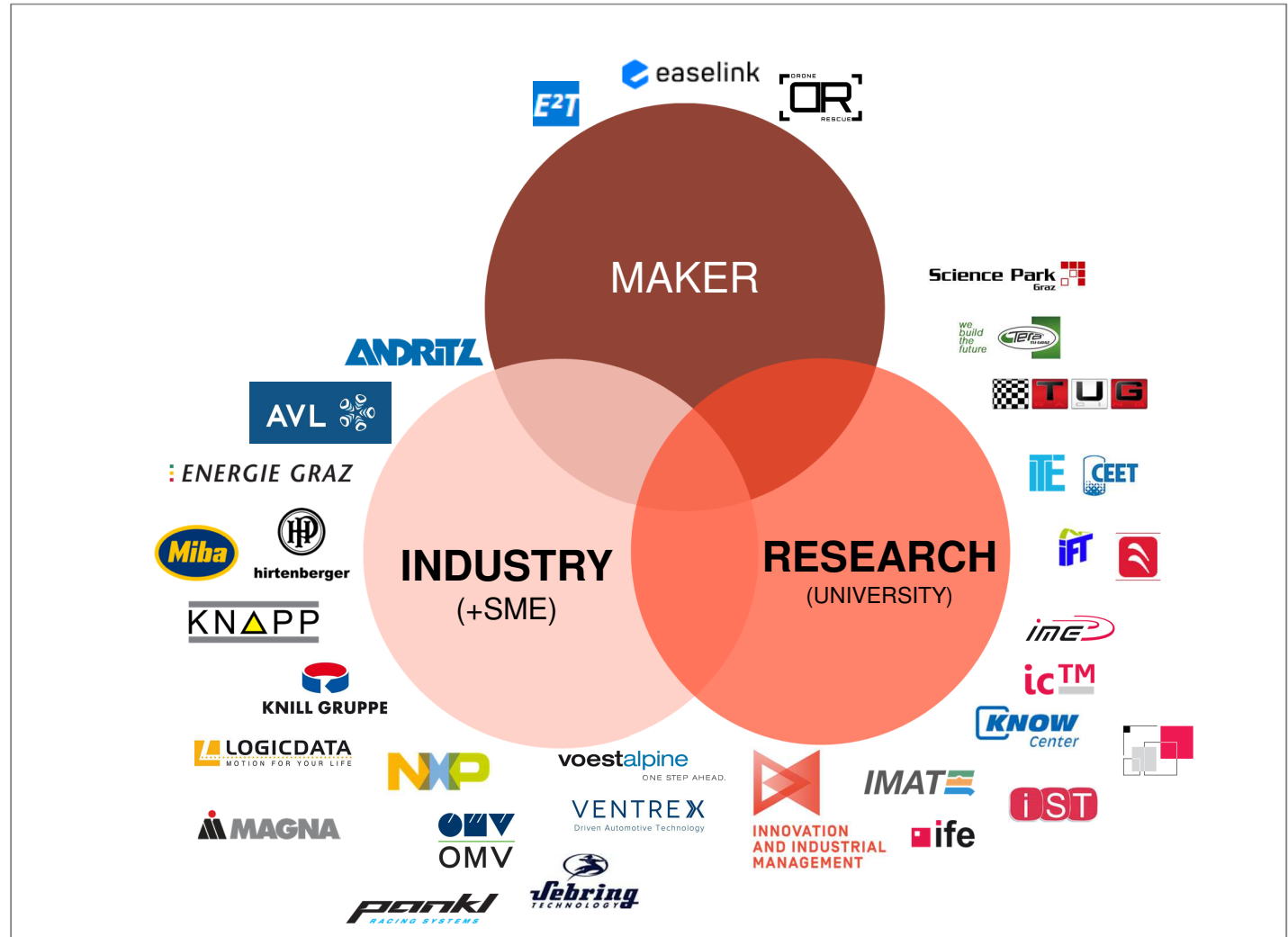
# Enforcing Innovation across Makers, Industry and Research

## Objectives

- Development of **strategies** and new **methods** to **increase cooperation** between Makers, Industry and Research
- Enhancement of “maker spirit”** in companies
- Ongoing **Research**:
  - Impact of makerspaces on the innovative capability of established companies
  - The role of Maker Movement elements in startup's product development

## Facts

- Duration **3 years**
- Funded by  Bundesministerium für Wissenschaft, Forschung und Wirtschaft
- 15 Industrial Partners**





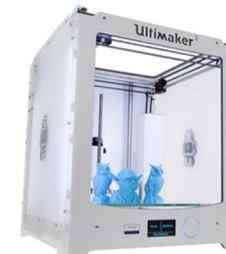
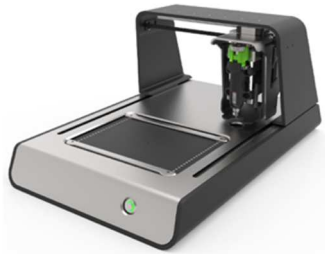
**+ 800 m<sup>2</sup>**

**new space to foster product innovation for  
students, startups and partner companies**



800m<sup>2</sup> makerspace  
where hardware meets software

# State of the art digital production equipment for prototyping and small batch size production is offered

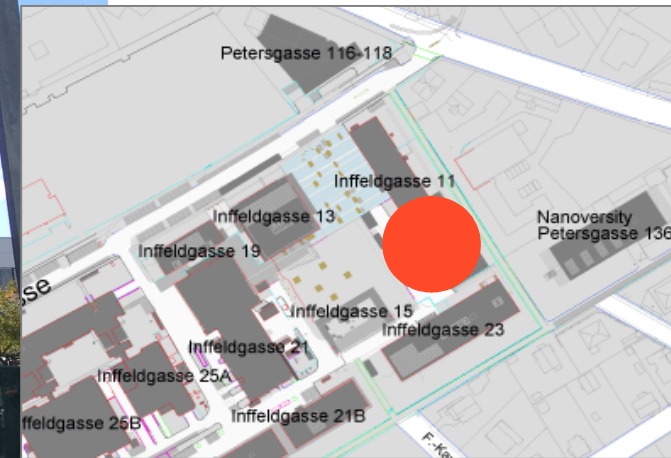


# Community Space



A wide-angle photograph of a large, modern event space. The room is filled with rows of white, modern-style chairs arranged in a semi-circle, facing a stage area at the far end. The stage features a dark, textured wall and a bright blue accent wall. The room has a high ceiling with exposed ductwork and track lighting. Large windows on the left and right sides provide natural light. A red square is visible on the right wall. The overall atmosphere is clean, bright, and professional.

# Event Space





# Overview – IIM-Institute

Maker, Industry & Research - FabLab Graz

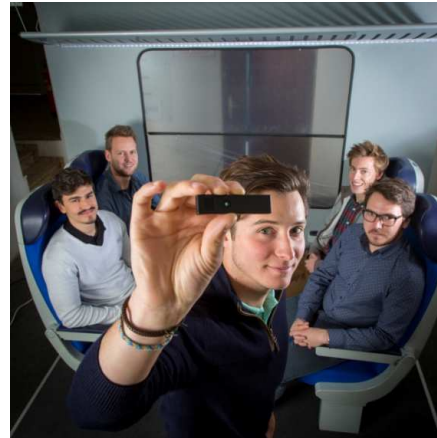
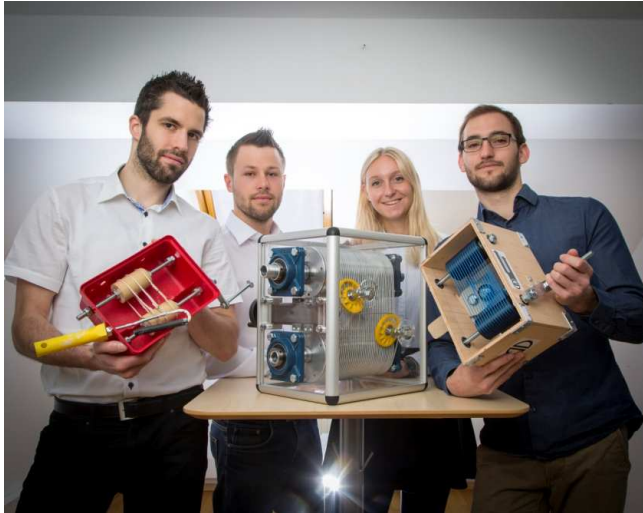
Product Innovation Project

Agility

LEAD Factory mit Digitalisierungskonzept



# Product Innovation Project – Teams 2015/2016



(4 out of 8 teams)

# Overview – IIM-Institute

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# A changing business environment requires different solutions

## Uncertain future developments

*"I believe the auto industry will change more in the next 5 to 10 years than it has in the last 50."*



Mary Barra  
CEO and Chairperson, General Motors

*»Die Märkte sind volatiler und unsicherer als bisher und darauf muss reagiert werden.«*



Karl-Friedrich Stracke  
President Fahrzeugtechnik and Engineering, Magna Steyr

*"Volatilität ist die neue Konstante – in der gesamten Geschäftswelt."*



Norbert Reithofer  
Chairman of the Supervisory Board, BMW AG

*„It has never been more difficult than today to give a precise prediction of future economic development.“*



Wolfgang Reitzle  
Chairman of the Supervisory Board, Linde AG

*"Die Märkte werden auch im kommenden Jahr noch volatil, wir müssen uns wetterfest machen."*



Wolfgang Bernhard  
Head of Bus and Truck Division, Daimler AG

*„Die schnelle strategische und operative Reaktion auf frühzeitig erkannte Marktveränderungen ist im komplexen und dynamischen Marktumfeld der Elektronikindustrie erfolgskritisch.“*



Andreas Gerstenmayer, CEO, AT&S AG

## Agility as the solution

### Central challenge for manufacturing companies

- Ensuring **sustainable economic success under uncertainty**
- **Continually adapting manufacturing companies to change** as the only option

### Integral parts of the agility concept

- Identification of **critical uncertainties**
- **Proactive preparation** of potential response measures
- **Fast and well-timed reaction** to changes
- **Profitability** in market up- and downswings
- Efficient operation over a **corridor of operating points**
- **Aligned measures** along the entire value chain and across functions for maximum efficacy



## Wie man Industrieunternehmen agil macht

"Erfolgsfaktor Agilität" zeigt Unternehmern, Managern, Geschäftsführern und Führungskräften, was "Agilität" für Mittelständler und große Industrieunternehmen bedeutet - oder zumindest bedeuten kann. Die Autoren um den Grazer Universitätsprofessor Christian Ramsauer und den McKinsey-Mann Christoph Schmitz liefern den Verantwortlichen wertvolle Hinweise auf dem Weg, Ihr Unternehmen agil zu gestalten.

- Dafür legen sie zuerst einmal eine brauchbare Definition von "Agilität" auf den Tisch. Darauf aufbauend zeigen sie, wie jeder einzelne Bereich agil gestaltet werden kann und gestaltet werden muss - von der Arbeitsorganisation über die Produktionsanlagen bis zur Beschaffung und Logistik. Ein wichtiges Buch, weil es zeigt, dass es bei "Agilität" nicht um irgendwelchen Hokuspokus geht, sondern um handfeste organisationelle Prozesse und Lösungen.

*Wolfgang Hanfstein, Management-Journal*



## Time

## Agenda

10:00 – 10:30	Coffee reception
10:30 – 10:40	Welcome by <b>Prof. Dr. Christian Ramsauer, Institute of Innovation and Industrial Management, Graz University of Technology, and Dr. Christoph Schmitz, Senior Partner, McKinsey &amp; Company</b>
10:40 – 11:00	Accelerating innovation in the digital age, <b>Prof. Dr. Christian Ramsauer</b>
11:00 – 11:20	The versatile factory – challenges and potential solutions for the car production of the future, <b>Karl-Friedrich Stracke, President, Fahrzeugtechnik &amp; Engineering, Magna Steyr</b>
11:20 – 11:40	Radical agility – how to make agile work in a large tech organization, <b>Dr. Christoph Lütke Schelhowe, Vice President of Customer Experience, Zalando</b>
11:40 – 12:00	Break
12:00 – 12:20	"Success factor agility - opportunities for companies in a volatile world", book presentation
12:20 – 12:40	Agile innovations, <b>Dr. Florian Weig, Senior Partner, McKinsey &amp; Company</b>
12:40 – 13:00	Agile fleet management in airlines, <b>Dr. Detlef Kayser, Executive Vice President for Strategy and Fleet, Lufthansa</b>
13:00 – 13:20	Swarm organization, <b>Sebastian Miller, Head of Inhouse Consulting, Daimler AG</b>
13:20 – 14:00	Lunch break
14:00 – 15:00	Agility plenary discussion
15:00 – 16:45	Breakout sessions on various agility topics (optional)* <ul style="list-style-type: none"> <li>• Agile supply chain and operations</li> <li>• Agile organization and culture</li> <li>• Agile product development</li> </ul>

Christian Ramsauer, Detlef Kayser, Christoph Schmitz (Hrsg.)

# Erfolgsfaktor Agilität

Chancen für Unternehmen  
in einem volatilen Marktumfeld



WILEY

## CROSS-INDUSTRY CONFERENCES ON AGILE OPERATIONS

Friday, February 3, 2017, at Graz University of Technology, Austria

Prof. Dr. Christian Ramsauer (Graz University of Technology), Dr. Detlef Kayser (Lufthansa), and Dr. Christoph Schmitz (McKinsey & Company) invite you to join the cross-industry conference on agile operations and introduce their new book on agility





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# LEAD Factory - Facilities

- ▶ Assembly stations
  - ▶ Packing station
  - ▶ KANBAN material slides
  - ▶ Material supermarket
  - ▶ 3D printer
  - ▶ CNC milling machine
  - ▶ Pressurized air system
  - ▶ Air conditioning system
  - ▶ Mini oven
  - ▶ Electric screw drivers
  - ▶ Milkrun wagon
  - ▶ Heijunka board
  - ▶ Shopfloor management board
  - ▶ Projector & whiteboards
  - ▶ Various tools
- ...and many more to come



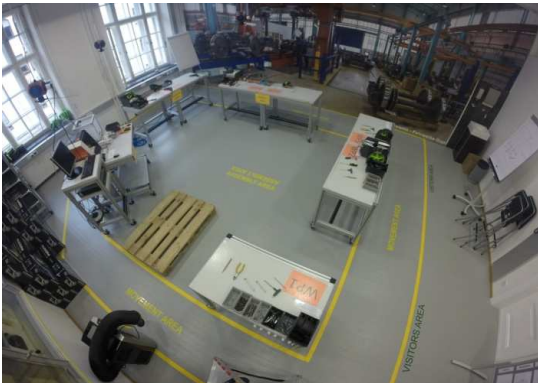
Besichtigung in den Pausen  
Kopernikusgasse 24, 2. Stock

# LEAD Factory - Teaching concept

## Current State

**Sub-optimal conditions** in terms of:

- Material and information flow
- Faulty operating Procedures
- Inappropriate tools
- Workspace organization
- Ergonomic conditions



## Future State

- Participants learn **methods to discover improvement opportunities**
- Opportunities are discussed in **intertwined, short theory sessions**
- **Solutions are directly implemented** and the improved **setup is iterated towards the future state**



## I4.0 State (+Outlook)

- **RFID System to track production flow**
- Smart shop floor management board for digital performance measurement
- Set up of **human-machine-interfaces** (e.g. gesture control, smart glasses)
- **Smart Andon** - Automated failure alert through RFID System



# KP: Predictive Maintenance in Discrete Parts Manufacturing

Clemens Gutsch

MBI TU Graz

# KP: Ecosystem related adaptations throughout the Start-up Life-Cycle

Sebastian Stumpf

IMW TU Wien

# **KP: How do business models, human capital characteristics and venture capital interact to impact startup performance?**

Veronika Ruthensteiner

IMW TU Wien

# MITTAGSPAUSE – 2. Stock

12:00 – 13:30

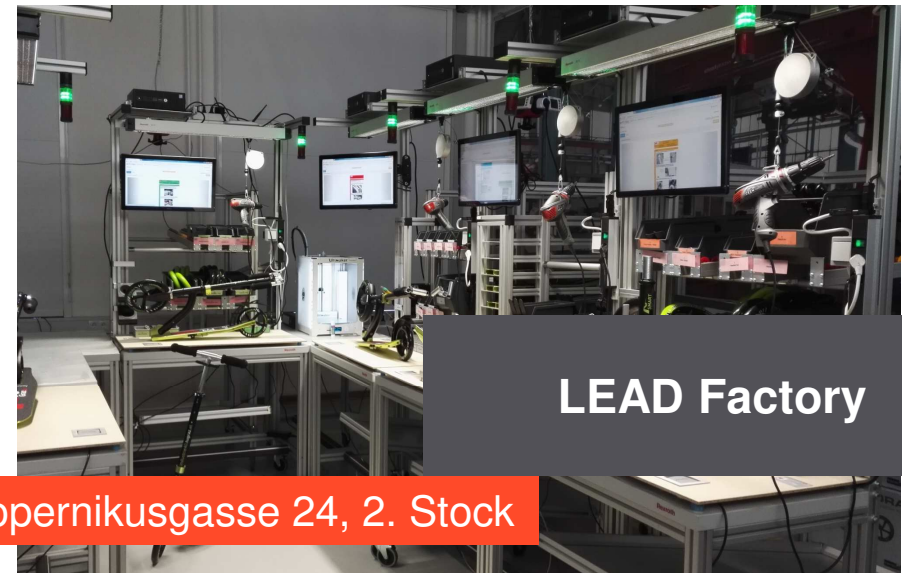


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**IIM Seminar Room**

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**LEAD Factory**

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# EP: Allokation von Ressourcen für Vertrieb, Forschung und Entwicklung in der Bahnindustrie

Christian Kaltenmesser

UFO TU Graz

# KP: Der Einfluss der Ressourcenknappheit auf die Geschäftsmodelemente von Klein(st)unternehmen in Business-to-Business Märkten

Fabian Pirker

UFO TU Graz

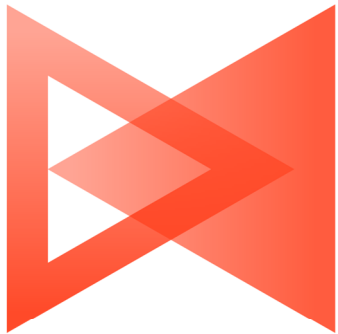
# KP: Fähigkeitsorientierte Arbeitsgestaltung durch Mensch-Roboter-Kollaboration

Fabian Ranz

IMW TU Wien

# KAFFEEPAUSE - 2. Stock

15:15 – 15:45



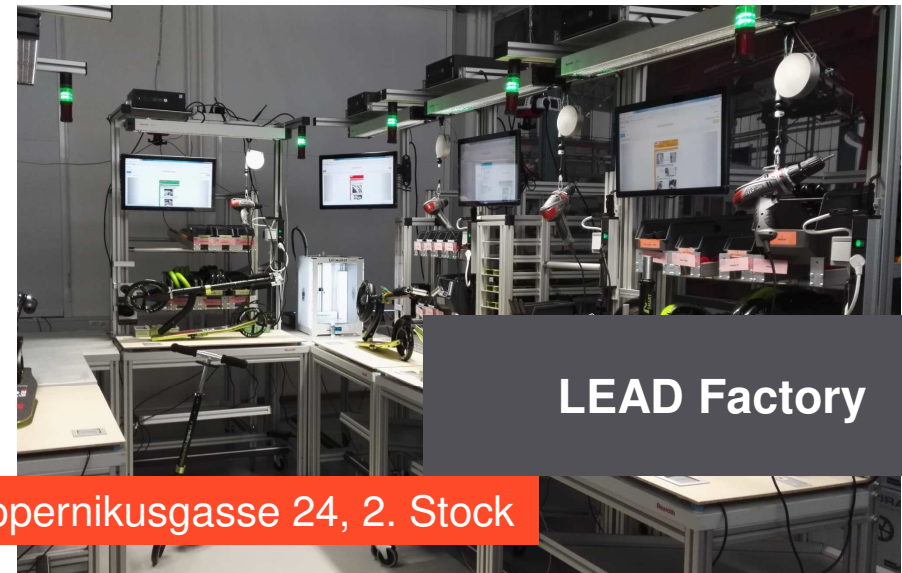
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**LEAD Factory**

Kopernikusgasse 24, 2. Stock

# KP: Smart Data Analytics im Supply Chain Management der automobilen Zulieferindustrie für Elektronikkomponenten

Benjamin Kormann

IL MUL

# EP: Organizing and Analyzing Innovative Production in the Digital Economy

Georg Reischauer

IMW TU Wien

# VBW Dissertationspreis

Prof. Wilfried Sihn

IMW TU Wien

# WING Kongress

Prof. Ulrich Bauer

BWL TU Graz

# Diskussionsrunde: TÖK Entwicklungen und Ausblick

Prof. Christian Ramsauer

IIM TU Graz



Gemeinsames Abendessen  
**Mensa Rooftop TU Graz**  
Stremayrgasse 16, 5. Stock  
8010 Graz

## Christian Ramsauer

Institute of Innovation and Industrial Management

Graz University of Technology

### Head of Institute

Christian Ramsauer

Univ.-Prof. Dipl.-Ing. Dr.techn.

### Graz University of Technology

Institute of Innovation  
and Industrial Management

Kopernikusgasse 24 / II

8010 Graz / Austria

Phone +43 316 873 7291

Fax +43 316 873 7791

E-Mail [iim@tugraz.at](mailto:iim@tugraz.at)

Web [iim.tugraz.at](http://iim.tugraz.at)



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UNIV.-PROF. DR. CHRISTIAN RAMSAUER