# RESEARCH ACTIVITIES AT IMID 2015 - 2018

#### Milan Omasta, PhD

INSTITUTE OF MACHINE AND INDUSTRIAL DESIGN Faculty of Mechanical Engineering Brno University of Technology

IMID seminar, 2018/11/14

INSTITUTE OF MACHINE AND INDUSTRIAL DESIGN **Position in the Tribology group** 



## **Cooperation with TRIBOTEC - Wheel-rail interface**

#### **TAČR Alfa 4** (2014 - 2017)

Research and Development of System for Top-of-Rail Friction Management in Rail Transport

**MPO Trio 3** (2018 - 2021)

Smart infrastructure for friction management in urban rail transport

#### TAČR Epsilon 4 (2019 - 2022)

Predictive system for catenary lines protection against extreme climatic conditions



### **Cooperation with TRIBOTEC - Lubrication**

#### **TAČR Epsilon 1** (2015 - 2018)

 Research and Development of Condition Based Lubrication System

**MPO Trio** (2016 - 2020)

 Research and Development of Lubrication System with Proactive Control





### Wheel-rail interface – H2020

H2020 TWINN-2015 - Twin2Rail (2016 - 2019)

• Strengthening Research and Knowledge of Wheel-Rail Tribology at Brno University of Technology

#### H2020 MSCA-RISE-2015 (2016 - 2020)

Rail Infrastructure Systems Engineering Network

H2020 Shift2Rail - InMODE4Rail (2019 - 2021)

Innovative MOnitoring DEvices for Railway Assets



### Wheel-rail interface – H2020 – RISEN project

TitleRail Infrastructure Systems Engineering NetworkDuration2016/04/01 – 2020/03/31

#### Annotation

"The proposed project: 'RISEN' is collaborative and interdisciplinary by nature, and it synergises world-class laboratories and ground-breaking technical capabilities of staff across the globe."

"New insights into rail infrastructures will be derived in RISEN to improve response and **resilience of rail infrastructure systems** to **climate change**, **extreme events** from natural and human-made hazards, and future operational demands. The highimpact outcomes will unleash significant benefits to both public and industry sectors."

- **WP2** Research Exchange on Railway Infrastructure Resilience
- **WP3** Research Exchange on Advanced Condition Monitoring

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European Commission	





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### Wheel-rail interface – H2020 – RISEN project



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# **Cooperation with FZG (TU Munich)**

#### **MŠMT Czech-Bavarian project** (2016 - 2017)

Výzkum lokálních jevů ve vysoce zatížených kontaktech ozubených kol

MŠMT Czech-Bavarian project (2018 - 2020)

Snižování tření prostřednictvím maziv na bázi vody a DLC povlaků

GAČR (2018 - 2020)

Termoelastohydrodynamika povlakovaných polymerních ozubení

**BUT** optical tribometer (2018)



## **Cooperation with UWB (Pilsen)**

#### GAČR - Standard (2017 - 2019)

• Nonlinear dynamics of rotating systems considering fluid film instabilities with the emphasis on local effects







# **Standard GAČR projects**

#### GAČR - Standard (2015 - 2017)

• Effect of High Sliding Conditions on Lubricant Film in Concentrated Contacts







### **Theses and Teaching**

#### **CKP** - Machine design and machine elements

• winter semester, lecture and seminars

#### ZKR / ZIP – Project based learning

• winter / summer semester, project

#### **Diploma and Bachelor's theses**

Year of defense	Number of diploma theses	Number of bachelor's theses
2015	2	3
2016	2	1
2017	3	1
2018	4	0
2019	3	2
2020	1	-

# Thank you ...

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