



TECHNISCHE  
UNIVERSITÄT  
WIEN



**Auf einen Blick | At a Glance**



## Mission: Technology for People

The TU Wien is Austria's largest research and educational institution in the field of technology and natural sciences.

More than 3,000 scientists are researching "technology for people" in five main research areas at eight faculties. The content of the studies offered is derived from the excellent research. More than 27,000 students in 55 degree programmes benefit from this.

As a driver of innovation, TU Wien strengthens the business location, facilitates cooperation and contributes to the prosperity of society.

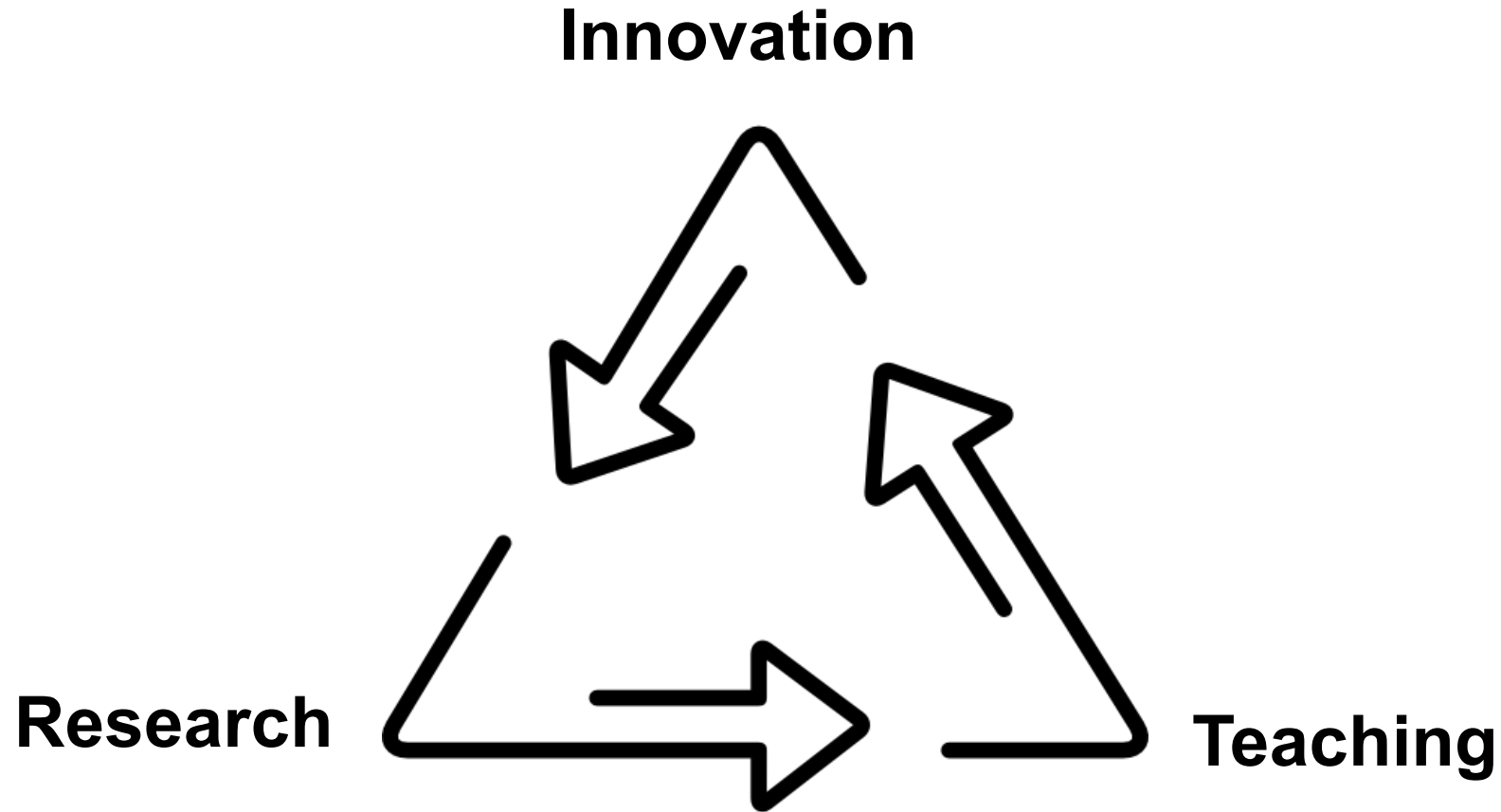
## Ambition

**Consortium *Made by Europe!* becomes Europe's leading Manufacturing innovation network**

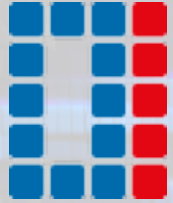
- 55 partners
- more than half industry
- 17 partners from RIS countries ("modest/moderate innovators", eastern regions)



# TUW-Mission: Research and Innovation by Combining Strengths of Academia and Industry for the Benefit of Society



# Research – Focal Areas



Computational Science  
and Engineering



Information and  
Communication Technology



Quantum Physics  
and Quantum Technologies



Energy and Environment



Materials and Matter



Additional Fields of Research



includes the research in:

- Modeling and Simulation (e.g. Process Simulation, Computational Health Care)
- Computational Materials Science (e.g. Calculations of Material Properties, Micromechanics & Micromagnetics)

## **BNN members**

- Christoph Herwig, Biochemical Engineering,  
[https://www.vt.tuwien.ac.at/bioprocess\\_engineering/EN/](https://www.vt.tuwien.ac.at/bioprocess_engineering/EN/)
- Stefan Scheiner, Strength of Materials and Biomechanics,  
<https://www.imws.tuwien.ac.at/en/research/overview/>

# COVID-19 Simulations 2020

Niki Popper, projects on COVID-19:

<http://dexhelpp.at/de/anwendungsprojekte/tmp/covid-19/>

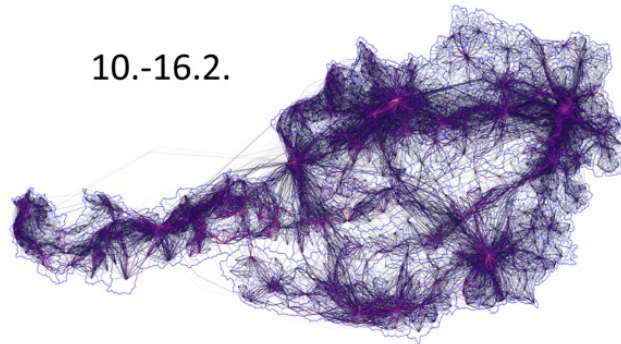


## GIS Information of Population

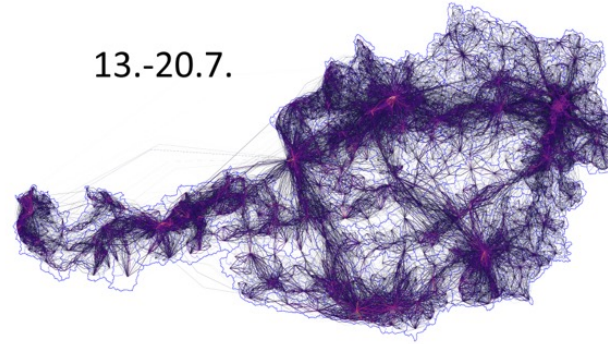


dwh  
technical solutions  
simulation services

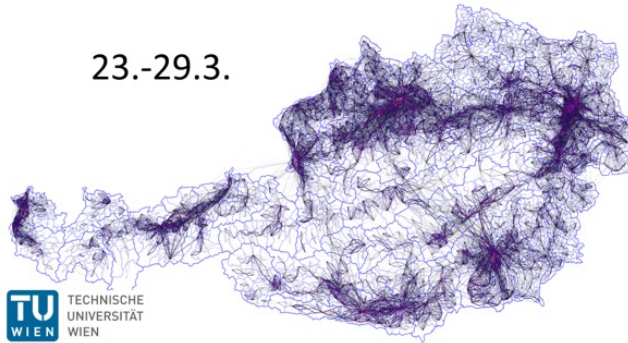
10.-16.2.



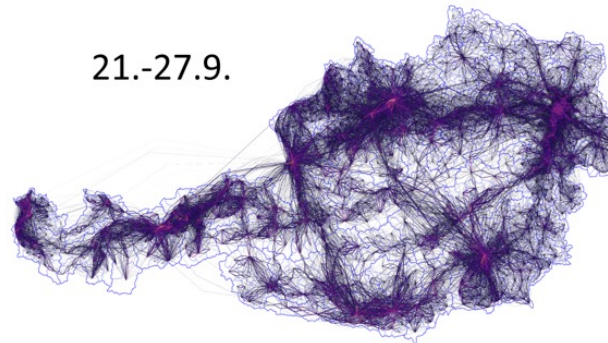
13.-20.7.



23.-29.3.



21.-27.9.





includes research in:

- Nanoelectronics
- Photonics

## **BNN members**

Heinz Wanzenböck, Nanofabrication, Biosensors, Cells-on-Chip:

[https://fke.tuwien.ac.at/forschung/direct\\_write\\_techniques/](https://fke.tuwien.ac.at/forschung/direct_write_techniques/)

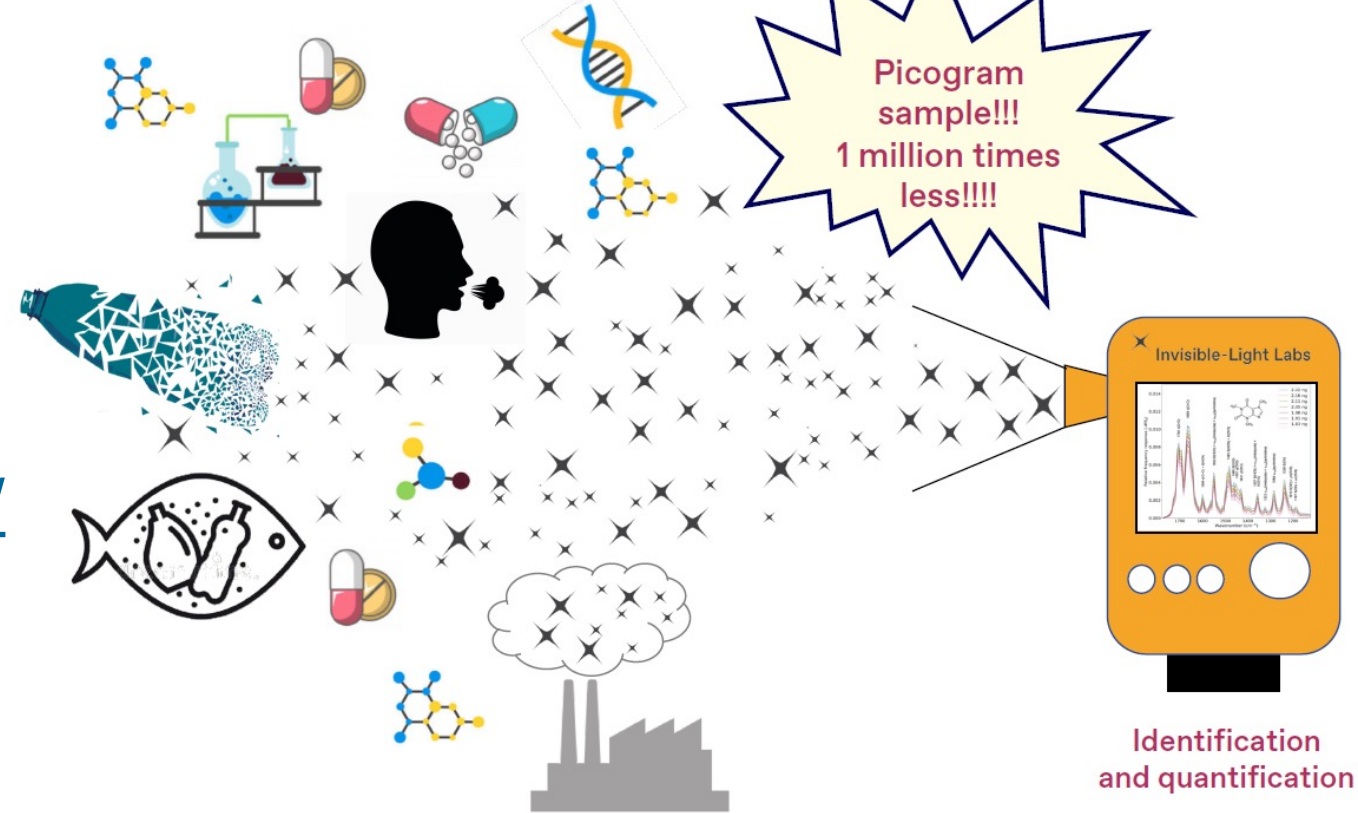
Hans Ulrich Dodt, Bioelectronics:

<http://info.tuwien.ac.at/bioelectronics/>



# Nano Detectors

Silvan Schmid,  
Micro- and Nanosensors:  
<https://mns.isas.tuwien.ac.at/home/>



## ✦ Invisible Light Labs



### PHARMACEUTICALS

What if you could speed up the analysis times of biomolecules, monitor processes online, improve quality control, identify pharmaceutical counterfeits, characterize polymorphism and more?



### FOOD AND AGRICULTURE

What if you could ensure food safety and minimize waste by monitoring gas by-products of spoilage during transport, storage or even directly on the store shelf?



### RESEARCH

What if you could achieve ultra-sensitive MIR to FIR detection without cryogenic cooling?



### ENVIROMENTAL MONITORING

What if you could detect and characterize low concentrations of environmental pollutants directly in the field?

# „BN“ in Materials and Matter

includes research in:

- Materials Characterization
- Biological and Bioactive Materials

## **BNN members (I)**

Christoph Herwig and Stefan Pflügl, Biochemical Engineering,  
[https://www.vt.tuwien.ac.at/bioprocess\\_engineering/EN/](https://www.vt.tuwien.ac.at/bioprocess_engineering/EN/)

Florian Rudroff, Bioorganic Synthetic Chemistry,  
<https://info.ias.tuwien.ac.at/bsc/rudroff-lab/>

Marko Mihovilovic, Bioorganic Synthetic Chemistry,  
<https://info.ias.tuwien.ac.at/bsc>





## BNN members (II)

Martina Marchetti-Deschmann, Mass spectrometric Bio and Polymer Analytics,  
[https://www.cta.tuwien.ac.at/division\\_instrumental\\_and\\_imaging\\_analytical\\_chemistry/omics\\_technologies/research/](https://www.cta.tuwien.ac.at/division_instrumental_and_imaging_analytical_chemistry/omics_technologies/research/)

Philipp Thurner, Biomechanics, <https://www.ilsb.tuwien.ac.at/ilsb/experimental-biomechanics/index.html>

Gerhard Schütz, Biophysics, <https://biophysics.iap.tuwien.ac.at/research/>

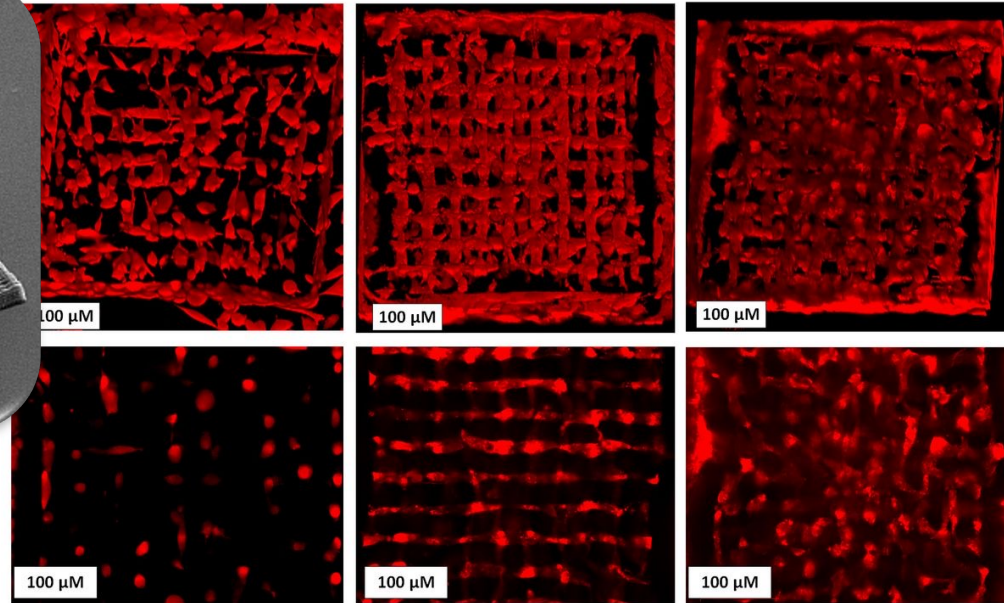
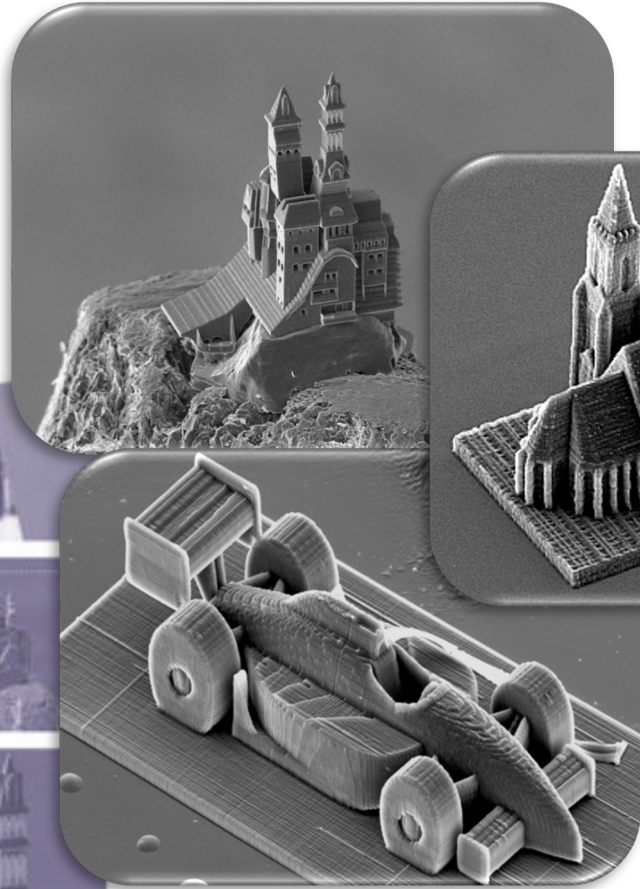
Stefan Scheiner, Strength of Materials and Biomechanics,  
<https://www.imws.tuwien.ac.at/en/research/overview/>

Aleksandr Ovsianikov, 3D Printing and Biofabrication,  
[https://www.tuwien.ac.at/research/research\\_unit\\_of\\_polymers\\_and\\_composites/3d\\_printing\\_and\\_biofabrication/EN/](https://www.tuwien.ac.at/research/research_unit_of_polymers_and_composites/3d_printing_and_biofabrication/EN/)

Edited by Jürgen Stampfl,  
Robert Liska, and Aleksandr Ovsianikov

## Multiphoton Lithography

Techniques, Materials, and Applications



## S&B Award of Rudolf Sallinger Fonds



David Wurm, Julian Quehenberger and Oliver Spadiut awarded for new methods of administering drugs by replacing injections with tablets. The drugs are to be packaged in a "protective shell" made of particularly stable lipids (produced by "extremophile" microorganisms) that can withstand the harsh conditions in the stomach.

FFG Spin-off Fellowship will now lead to the start-up company NovoArc with the support of the innovation incubation center (i<sup>2</sup>c).

youtube-Video: <https://www.youtube.com/watch?v=2-mYLT70zXk>



includes research in

- Sensor Systems
- Visual Computing and Human-Centered Technology
- Automation and Robotics

## **BNN members**

Ulrich Schmid, Microsystems Technology, <https://www.isas.tuwien.ac.at/home/>

Peter Ertl, Cell Chip, <https://www.ias.tuwien.ac.at/research-units/organic-biological-chemistry/cell-chip/research-projects>

Heinz Wanzenböck, Nanofabrication, Biosensors, Cells-on-Chip:  
[https://fke.tuwien.ac.at/forschung/direct\\_write\\_techniques/](https://fke.tuwien.ac.at/forschung/direct_write_techniques/)

## Houskapreis 2020

The research group of Peter Ertl, Institute for Applied Synthesis Chemistry, Research Area Organic and Biological Chemistry

Tiny pieces of tissue can be cultivated from stem cells on biochips, which can then be used to try out different therapeutic options in a very targeted way. In this way, the "Parkinson's-on-a-Chip" research project could replace animal testing in drug development.

Together with industrial partners in Austria and Luxembourg, a patient-oriented precision therapy is to be developed.





# „BN“ in Energy and Environment



includes research in:

- Efficient Utilisation of Material Resources
- Sustainable Production and Technologies

## **BNN members (I)**

Bettina Mihalyi, Particle Technology, Recycling Technology and Technology Assessment,

[https://www.vt.tuwien.ac.at/mechanical\\_process\\_engineering\\_and\\_clean\\_air\\_technology/EN/](https://www.vt.tuwien.ac.at/mechanical_process_engineering_and_clean_air_technology/EN/)

Christoph Herwig and Stefan Pflügl, Biochemical Engineering,

[https://www.vt.tuwien.ac.at/bioprocess\\_engineering/EN/](https://www.vt.tuwien.ac.at/bioprocess_engineering/EN/)

Florian Rudroff, Bioorganic Synthetic Chemistry,

<https://info.ias.tuwien.ac.at/bsc/rudroff-lab/>



## BNN members (II)

Hannes Mikula, Molecular Chemistry and Chemical Biology,  
<https://www.ias.tuwien.ac.at/research-units/organic-biological-chemistry/molecular-chemistry-chemical-biology/home>

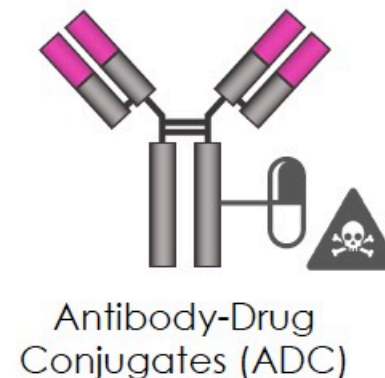
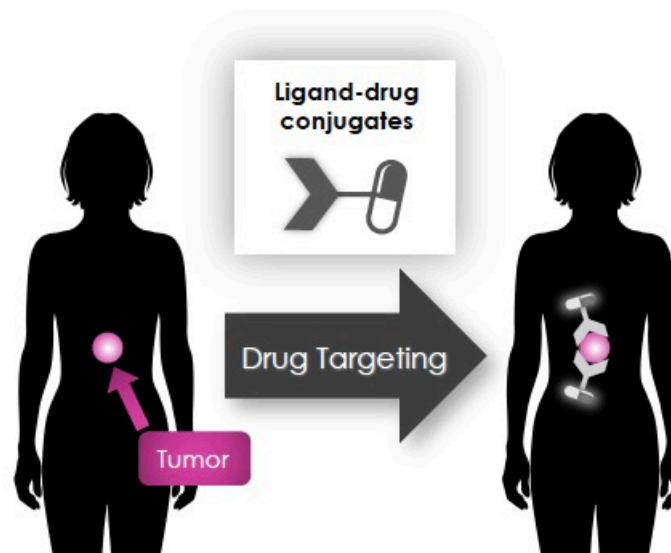
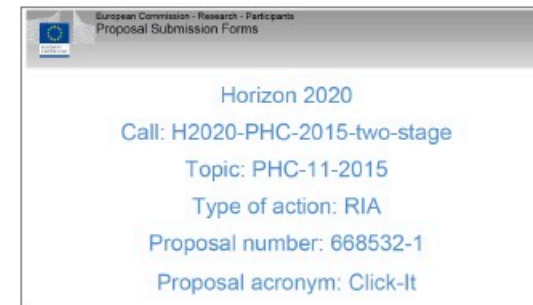
Julian Quehenberger, Integrated Bioprocess Development,  
[https://www.vt.tuwien.ac.at/biochemical\\_engineering/integrated\\_bioprocess\\_development/?L=644](https://www.vt.tuwien.ac.at/biochemical_engineering/integrated_bioprocess_development/?L=644)

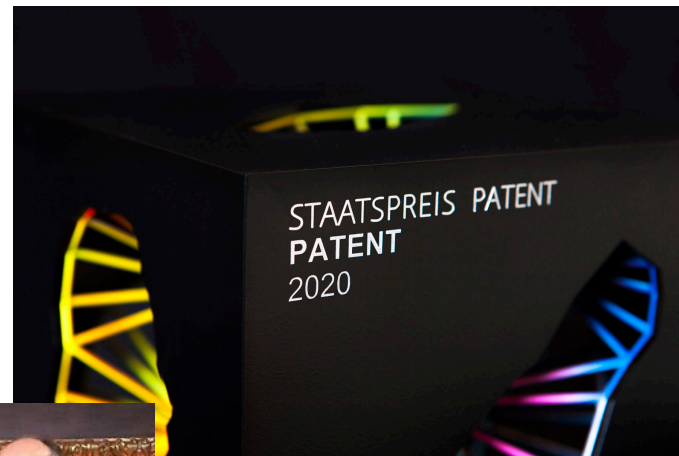
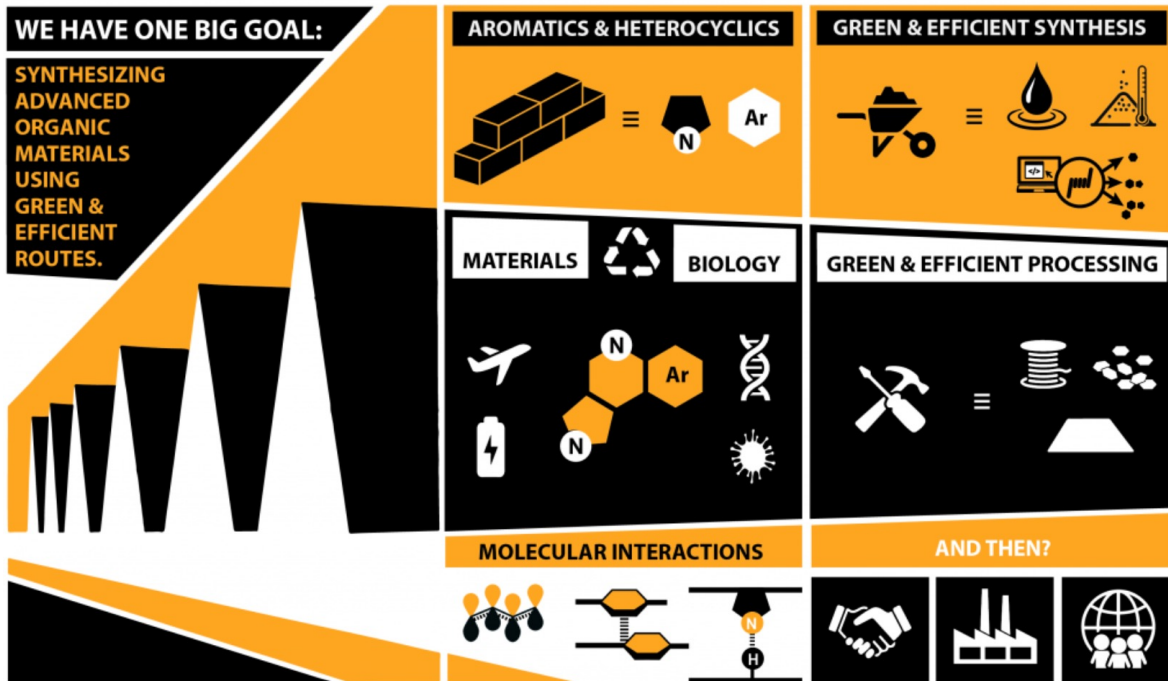
Marko Mihovilovic, Bioorganic Synthetic Chemistry,  
<https://info.ias.tuwien.ac.at/bsc>

Martina Marchetti-Deschmann, Mass spectrometric Bio and Polymer Analytics,  
[https://www.cta.tuwien.ac.at/division\\_instrumental\\_and\\_imaging\\_analytical\\_chemistry/omics\\_technologies/research/](https://www.cta.tuwien.ac.at/division_instrumental_and_imaging_analytical_chemistry/omics_technologies/research/)

### Click-It's Overall Objectives

- Development of effective companion diagnostics for the direct in vivo monitoring of slow clearing nanomedicines, with minimal patient radiation dose
- Accelerating preclinical and early clinical drug development to help pharmaceutical industry to bring nanomedicines to the market and ultimately to the patient in a more effective, faster and cheaper manner.





# Technology Offers (see online)

## ■ Pharma, Medtech & Biotech:

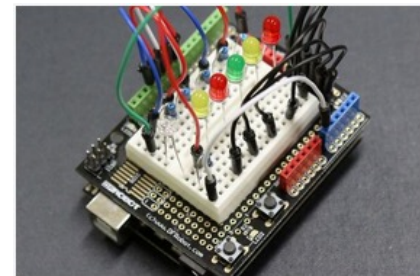
<https://www.tuwien.at/en/tu-wien/organisation/central-divisions/rts-support/research-and-transfer-support/technology-offers/pharma-medtech-biotech>

## ■ ICT, Physics, Electronics & Semiconductors:

<https://www.tuwien.at/en/tu-wien/organisation/central-divisions/rts-support/research-and-transfer-support/technology-offers/ict-physics-electronics>



Chemistry, Pharma,  
Biotech



ICT, Electronics &  
Semiconductor

# Selected Technology Offers: 7x Lab-on-a-chip



## TU Vienna Technology platforms

- Lab-on-a-chip Technologies in BioSciences – devices and applications

1. “Hydrogel Condensation Guide und Hydrogel Stopper on Chip” **EP 20173705.3** filed May 2020
  - Reliable and reproduceable establishment of 3D biological structures (*joint-on-a-chip*)
2. “Microfluidic device-midbrain” **EP 20173702.0** filed May 2020
  - Biochip for long-term cultivation and maturation of human midbrain organoids (*Parkinson’s-on-a-Chip*)
3. “Microfluidic device for applying pressure to a cell assembly” **EP18183978.8** was filed July, 2018 and **EP16165229.2** was filed April 2016
  - Method and device to induce mechanical injuries and stimuli on 2D and 3D cell cultures (*wound healing chip*)
4. “Microfluidic device comprising electrodes” **EP Nr. 19168889.4** was filed Nov 2019
  - Method for multi-parametric and multi-cell barrier integrity analysis using membrane-embedded electric microarrays (*TEER-ECIS chip*)
5. “Tensile and shear strength measurement” PCT appl Nr. **PCT/AT2019/060362** was filed Oct, 2020;
  - Methods and adapter to test tensile and shear strength by applying pressure for microfluidic composite manufacturing process Technologies (*QC tool*)
6. „Self-powered microfluidic sensor system“ **EP 20189436.7** filed August 2020
  - Fast, reliable and portable detection of viral infections (<5 min) using an embedded nanosensor array (*Sars-Cov-2 detection system*)

## PikoSens

### Multi-Axial MEMS Kraft- und Weg-Sensor

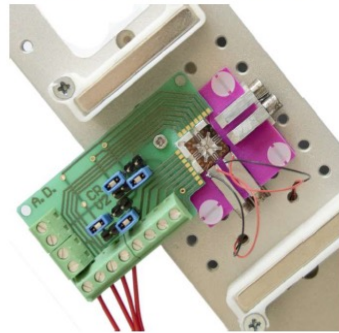
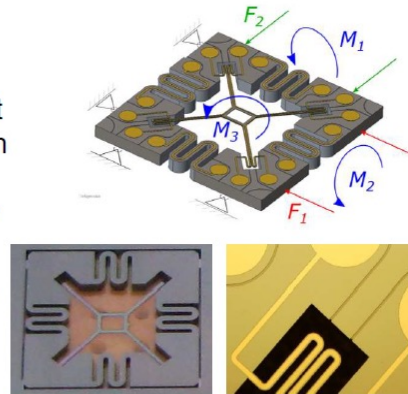
Der resonante Lorentz-Kraft-aktivierte Sensor misst die Änderung der Resonanzfrequenz, die durch den externen Lastsatz verursacht wird. Wir erreichen eine Empfindlichkeit von bis zu 100 pN/Hz. Messen die Oberflächentemperatur mit eingebauten Pt-Fühlern, zur Kompensation der Temperatureffekte.

### Kommerzielle Anwendung

Grenzwertsensoren, Robotik (Tastsensoren), Medizintechnik, Automotive

### Aktueller Stand

Proof-of-concept erbracht  
österreichisches Patent, PTC erteilt



## OASIS

### Optischer Winkelsensor für industrielle Systeme

Der optische Winkelsensor kann den Drehwinkel eines beliebigen Gerätes statisch messen. Das Messsignal ist abhängig vom Verdrehwinkel  $\varphi$  des optischen Mediums gegen das Sensorgehäuse. Kernelement des Sensors ist ein optisches Medium mit einer geätzten Struktur (4), die das Licht einer LED (3) nach der Fresnel-Gleichung beugt. Mindestens zwei Fotodioden, eine zur Winkelmessung (2) und eine als Referenz (1), führen die Messung durch.

Keine Referenzfahrt erforderlich.

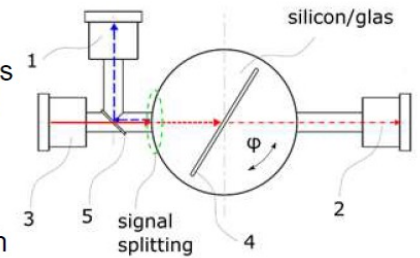
### Kommerzielle Anwendung

Automatisierung, Robotik, Automotive

### Aktueller Stand

PTC erteilt

(1) Photodiode (Referenz - R); (2) Photodiode (Measurement- IR); (3) LED (red/infrared); (4) Sensing structure (100nm) with Coating (avoid multi-reflexion); (5) Beam splitting





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**Looking forward to your cooperation!**

[wirtschaftskooperationen@tuwien.ac.at](mailto:wirtschaftskooperationen@tuwien.ac.at)

[www.tuwien.at/foewi](http://www.tuwien.at/foewi)