TECHNISCHE UNIVERSITÄT WIEN
Vienna | Austria

Technology for People

Facts & Figures
Research Strategy

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Vice-Rector for Research and Innovation

www.tuwien.ac.at

Facts & Figures

Finances	
ca. 233 Mio. €	**global budget**
ca. 89 Mio. €	**third party funds**
Staff	
3.643	**scientific staff (ca. 50% third-party funded)**
thereof 143	**professors**
1.140	non-scientific (administrative & technical) staff
4.783	**total staff**
Students	
ca. 30.000	8 Faculties: Archit&Planning, Mech./Electr./Civil. Engin., Techn. Chem., Physics, Informatics, Math&Geoinform.
thereof ca. 28% thereof ca. 30%	women foreigners
Graduations	
3.098	**First, second and third degrees, Bologna System**
thereof	1.496 BSc, 1.100 MSc, 190 Diploma Engineers 312 PhD

Research at TUW ….

…. along the Value Chain from Basic Research via Applied Research to Innovation

Five Research Focal Areas:

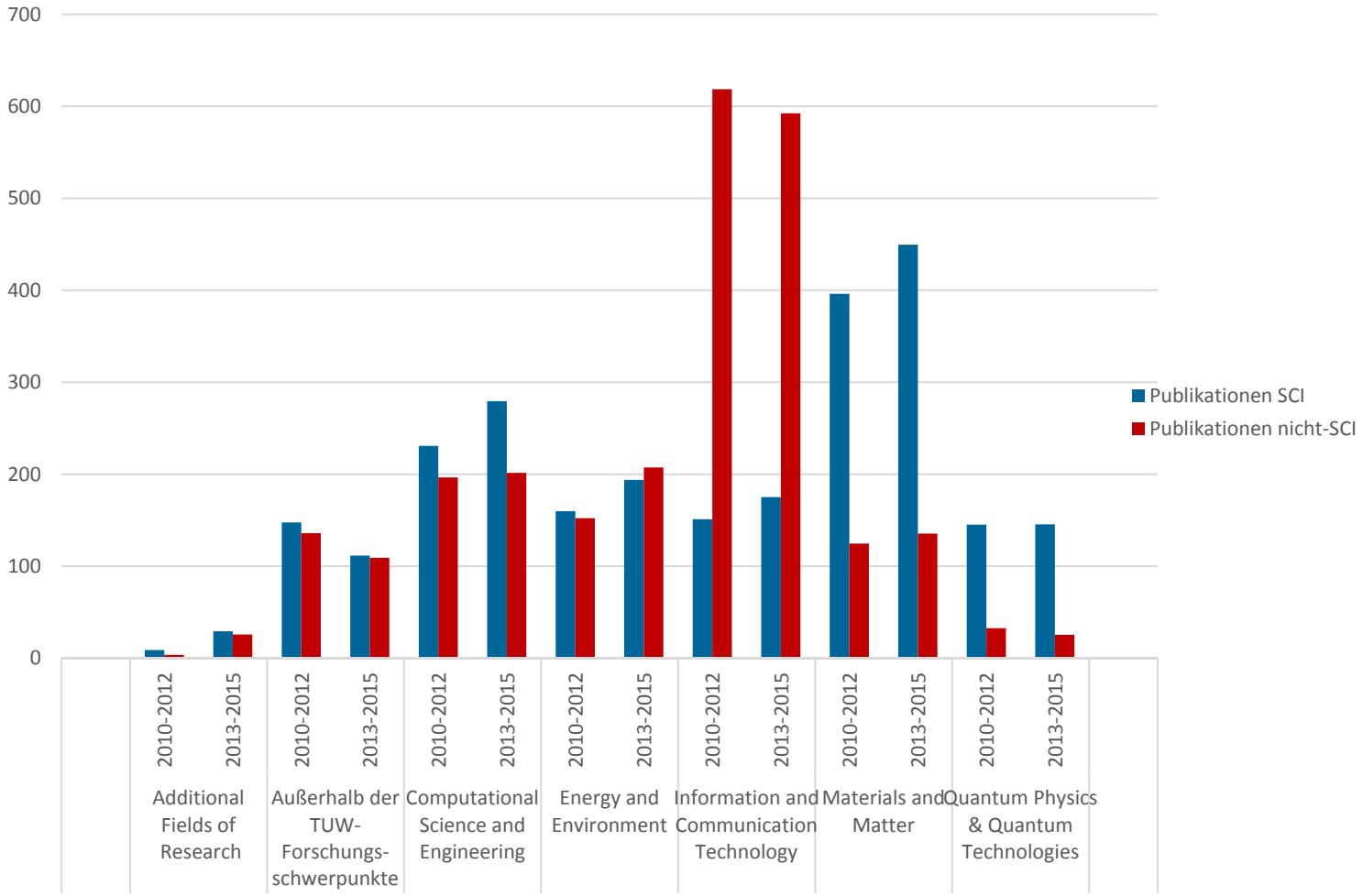
- Computational Science and Engineering
- Quantum Physics and Quantum Technologies
- Materials and Matter
- Information and Communication Technology
- Energy and Environment
  Research Centre E+E: energiewelten.tuwien.ac.at

TUW-Research Matrix: Focal Areas and Fields

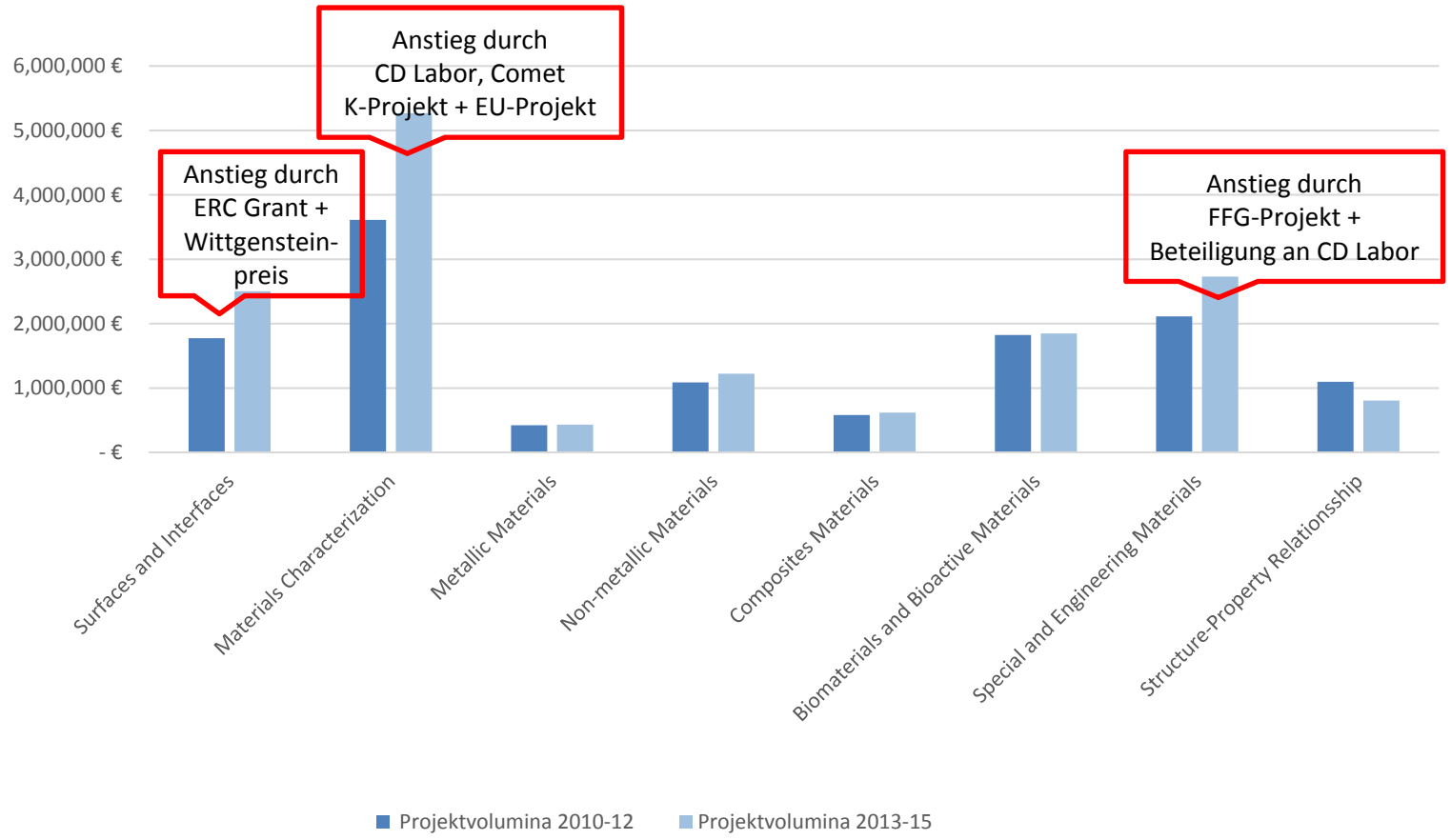
Assignment of Projects & Output to Research Fields, Periodical Analysis of Focal Areas

Computational Science and Engineering	Quantum Physics and Quantum Technologies	Materials and Matter	Information and Communication Technology	Energy and Environment	Additional Fields of Research
Computational Materials Science	Photonics	Surfaces and Interfaces	Logic and Computation	Energy Active Buildings, Settlements and Spatial Infrastructures	Development and Advancement of the Architectural Arts
Computational Fluid Dynamics	Quantum Metrology and Precision Measurements	Materials Characterization	Computer Engineering and Software-Intensive Systems	Sustainable and Low Emission Mobility	Urban and Regional Transformation
Computational System Design	Quantum Modeling and Simulation	Metallic Materials	Automation and Robotics	Climate Neutral, Renewable and Conventional Energy Supply Systems	Fundamental Mathematics Research
Mathematical and Algorithmic Foundations	Nanoelectronics	Non-metallic Materials	Information Systems Engineering	Environmental Monitoring and Climate Adaptation	Mathematical Methods in Economics
Computer Science Foundations	Design and Engineering of Quantum Systems	Composite Materials	Visual Computing and Human-Centered Technology	Efficient Utilisation of Material Resources	
Modeling and Simulation	Quantum Many-body Systems Physics	Biological and Bioactive Materials	Digital Transformation in Manufacturing	Sustainable Production and Technologies	
		Special and Engineering Materials	Telecommunication		
		Structure-Property-Relationship	Sensor Systems		

Forschungsoutput - Publikationen
Vergleich ø 2010-2012 mit ø 2013-2015



Materials and Matters
Vergleich Projektvolumina ø 2010-2012 mit ø 2013-2015



Research – Strategic Elements

- **Bundling of Resources**: Budget, Infrastructure, „Ideas“
- **Cooperation**: intern / national / international, Academia / Business
- **Internal support programs for interdisciplinary research**
- **Knowledge and Technology Transfer** for fostering Innovation: „Entrepreneurial University“ (IPR, Spinoffs ….)

Research Funding: TUW Programs

TUW Internal Competitive Programs (launched by the Rectorate)

TU Interfacultary or Interuniversity Cooperation Centers: “incentive program” for initiating interdisciplinary cooperation platforms between researchers, up to € 20k “knock-on”-financing. CC’s often have proven as “seed crystals” for PhD-School applications, Special Research Program Application etc.

Innovative Projects for Infrastructure: up to ca. EUR 300k per project, usually biennial, available budget: € 1-1.5 Mio

Innovative Projects for Personnel: 1 PhD student (25hrs/week) funded per project for three years; max. 10 projects granted per call; required budget ca. EUR 350k per project-year, i.e. 1 call equiv. to ca. €1 Mio

> *For both calls*: 2 stage process: 1st round selects max. 16 projects, 2nd round selection via external peer reviewing; interdisciplinary/interfacultary projects preferred;

Top / Emerging Fields Programs for developing research fields of the TUW research matrix: € 300k per project (for funding of invest. and/or personnel); duration of projects 3-4 years; 1 application per faculty allowed per call, chosen by the Dean: max. 4 awarded projects per call

TUW Science Award (once per Rectorate period): € 500k for an excellent young scientist: selection by an external Jury, based on external Peer Reviews

TUW-DokKoll-Program (in-house funded PhD-Colleges in analogy to FWF-DKs): up to 10 part-time employed PhDs (Praedocs: 25hrs/week) for 3 years per project (50% female candidates obligatory for full occupation with 10 PhDs); annual calls, 1-2 granted applications per year; budget per DokKoll (10 PhDs / 3 years): ca. € 1 Mio

TUW-internal DokKollegs:

active:

- Catalysis Materials and Technology (CatMat)
- Vienna Graduate School on Computational Materials Science
- Adaptive Distributed Systems
- Environmental Informatics
- MEIBio Molecular and Elemental Imaging in Bioscience
- URBEM Urbanes Energie- und Mobilitätssystem (*PPP with Wr. Stadtwerke*)
- CPPS (Cyber-Physical Production Systems)
- Computational Design (DC: CD)
- BIOINTERFACE - Frontier Research in Nanotechnology and the Life Sciences
- Unravelling Advanced 2D Materials TU-D

completed:

- EWARD Energiebewusste Stadt- und Regionalentwicklung
- Partielle Differentialgleichungen in technischen Systemen
- AB-Tec Applied Bioscience Technology
- Computational Perception
- ENSYS Energiesysteme 2030
- Functional Matter
- Mathematical Logics in Computer Science

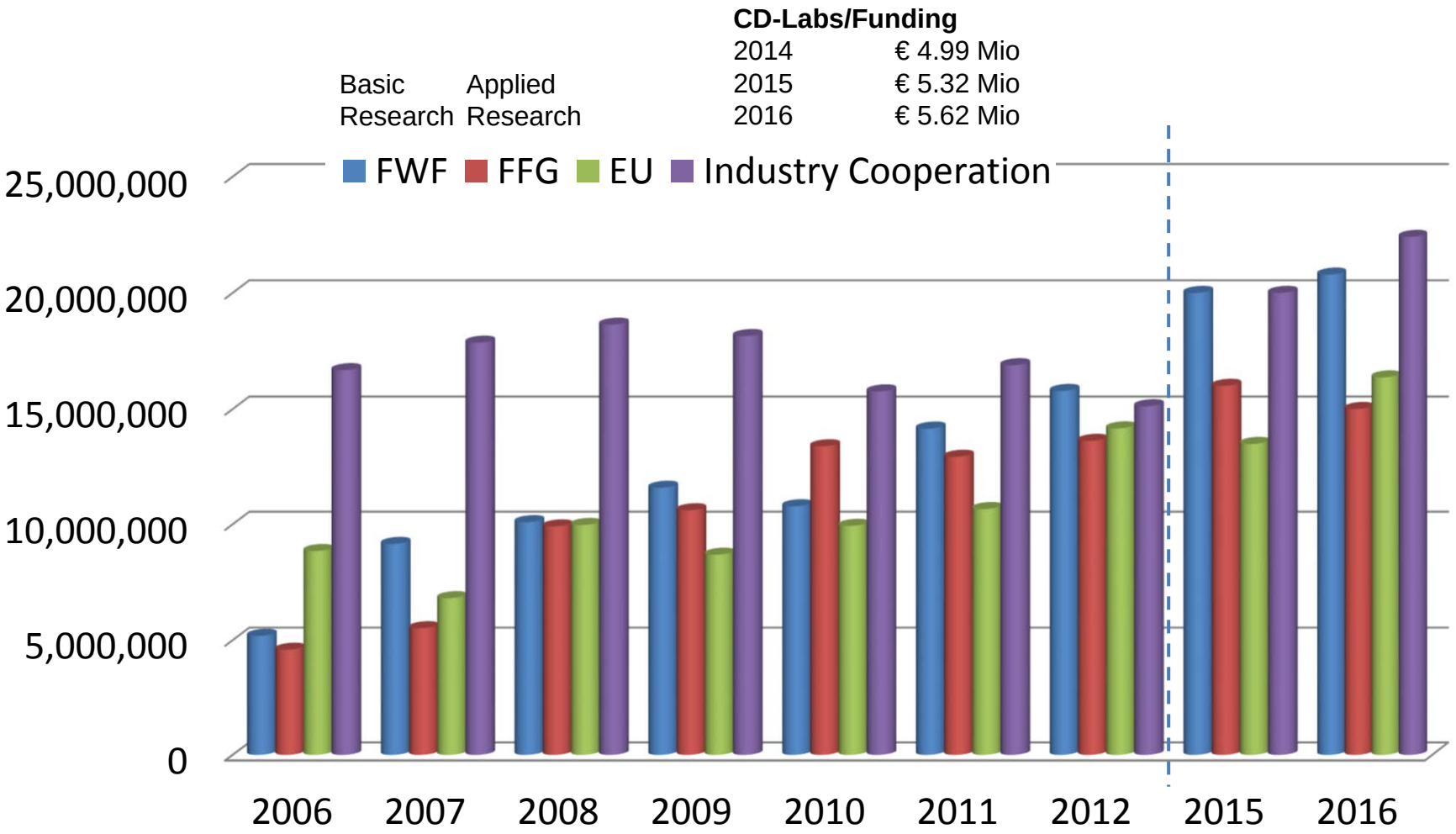
Research Infrastructure: Core Shared Facilities

- **ZMNS**: Center for Micro- and Nanostructures
- **USTEM** – University Service Center for E-Microscopy
- **XRC**: X-Ray Center
- **AIC**: Analytical Instrumentation Center
- **NMR-Z**: NMR-Center (Liquid and Solid NMR: 200 - 600 MHz)
- **Pilot Factory** - Industry 4.0
- **TRIGA Mark-II Nuclear Reactor**: Research-Neutron Source
- **VSC** - Vienna Scientific Cluster, High Performance Computing

VSC-2
(150 Teraflops)

VSC-3 (600 Teraflops)
32300 Cores
innovative green oil cooling
Investment: € 7 Mio
Rank 246 in Top500 HPC-List worldwide, Nov. 2016
Rank 158 in Green Top500, June 2016
System in Operation sind early 2015

Third Party Funds (Distribution/Sources)



Quelle: Erlöse/Wissensbilanzen

TUW Participation in FWF Flagship Programs

9 SFBs (Special Research Areas – „Spezialforschungsbereiche“)

- Algorithmische und enumerative Kombinatorik
- FoQuS - Foundations and Applications of Quantum Science
- FOXSI - Functional Oxide Surfaces and Interfaces
- IR-ON - Nanostrukturen für Infrarot-Photonik
- Next Lite - Next Generation Light Synthesis and Interaction
- Transmembrane transporters in health and disease
- ViCoM - Vienna Computational Materials Laboratory
- Quasi Monte Carlo Methods Theory and Applications
- Taming Complexity in Partial Differential Systems

9 DKs (PhD-Schools – „Doktoratskollegs“)

- CoQuS - Complex Quantum Systems
- Dissipation und Dispersion in Differentialgleichungen
- Solids4Fun - Funktionelle Festkörper
- Wasserwirtschaftliche Systeme
- Particles and Interactions
- NanoCell - Nano-Analytics of Cellular Systems
- Logische Methoden in der Informatik
- Ion Channels and Transporters as Molecular Drug Targets (MolTag)
- Vienna Graduate School On Computational Optimization

TECHNISCHE UNIVERSITÄT WIEN
Vienna University of Technology

Research Support @ FWF projects

Research and Transfer Support

…supports individual scientists and research teams at TU Wien in various research and transfer activities.

R&D Contracts and Procurements

Consultation of R&D, cooperation and license agreements, procurements

Patent and License Management

Consulting of inventors
Patenting and Technology Assessment

Funding Support and Industry Relations

Support of pre-award phase at national funding programmes
support of initiating R&D cooperations with industry

National Funding Support and Industry Relations

- individual consultation in pre-award or re-submission
- Information and networking Events
- E-Mail-Newsletter
  Edition October 2017
- Online-Information: www.rt.tuwien.ac.at
  Calls, guides, master data TU Wien, FAQs, ...

Dr. Elisabeth Schludermann
DI Petra Rössner
Mag. Astrid Stakne

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foerderberatung@tuwien.ac.at

TU WIEN R&T
Forschungs- und Transfersupport
Research and Transfer Support

... Once it‘s granted

- financial management of FWF-projects
- eligibility of the individual types of costs
- preparation of the annual and final accounts

Department für Finanzen, Projektcontrolling und –support

(Head: Mag. Eldina Halvadzija)

https://www.tuwien.ac.at/dle/finanzen/projektcontrolling_und_support/fwf_support/

Verena Mayr

Andreas Lipp (personal costs)

Research Funding: National Programs

Christian Doppler Laboratories:
Joint Research between Universities and Companies

Target group: universities and non-university research institutions. Compact research groups (5-15 people).

Subject Area: all disciplines; application-oriented research

Length: 7 years (with two stop/go evaluations after 2 and 5 years)

Budget: min. 110.000 up to 700.000 EUR per year per CD Laboratory

Costs: personal costs, equipment/leasing, material, third-part payment, patent costs, travel costs, workshops, scientific guest talks, scientific literature and access to online-media

50% funded by the companies

50% funded by the Christian Doppler Society (governmenal agency under the governance of BMWFW – Federal Ministry for Science, Research and Economy)

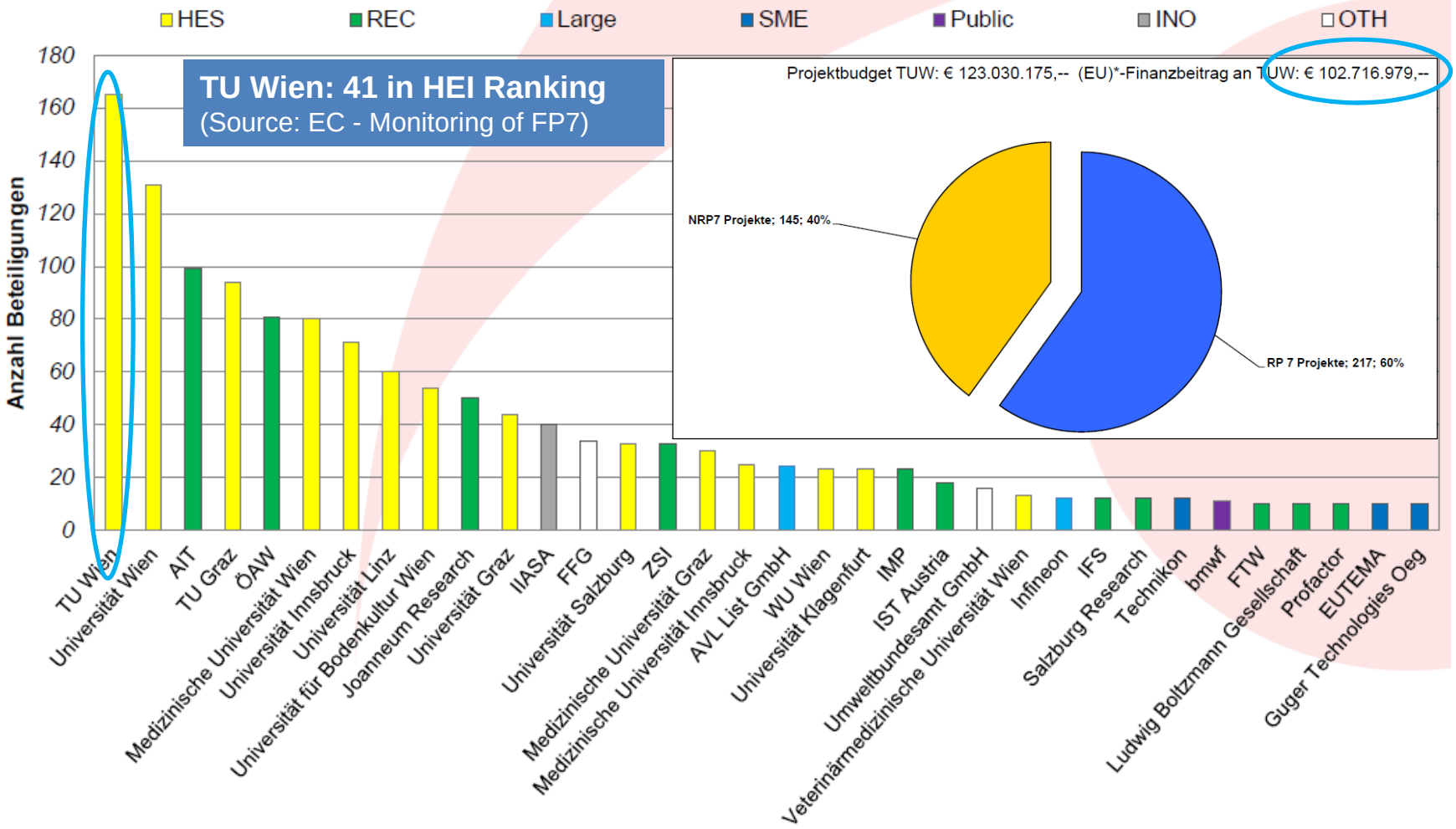
Along the value chain: TUW Participation in Christian-Doppler-Program

13 CD Laboratories active in 2017 (most sucessful university in CD-Programme)	RFA*
***) Innovative Regelung und Überwachung vom Antriebssystemen** (E325, Christoph Hametner): 2017-23	CSE
***) Modellintegrierte intelligente Produktion** (E188, Manuel Wimmer): 2017-23	ICT
***) Optimierte Expression von Kohlehydrat-aktiven Enzymen** (E166, Astrid Mach-Aigner): 2016-22	MM *TU-Bio*
***) Zuverlässige drahtlose Kommunikation für eine Gesellschaft in Bewegung** (E389, Stefan Schwarz): 2016-22	ICT
***) Lebensdauer und Zuverlässigkeit vom Grenzflächen in komplexen Mehrlagenstrukturen der Elektronik** (E164, Golta Khatibi): 2015-22	MM
***) Präzisionstechnologie für automat. In-Line-Messtechnik** (E376, Georg Schitter): 2015-22	ICT
***) Hochleistungs TCAD** (E360, Josef Weinbub): 2015-22	CSE
***) Modellbasierte Prozessregelung i.d. Stahlind.** (E367, Andreas Kugi): 2014-20	MM
***) Thermoelektrizität** (E166, Ernst Bauer): 2013-20	MM
***) Mechanistische und physiologische Methoden für leistungsfähigere Bioprozesse** (E166, Christoph Herwig): 2013-20	MM *TU-Bio*
***) Photopolymere in der digitalen und restaurativen Zahnheilkunde** (E308, Jürgen Stampfl; E163, Robert Liska): 2012-19	MM *TU-Bio*
***) Anthropogene Ressourcen** (E226, Johann Fellner): 2012-19	EE
***) Laboratory for Application Oriented Coating Development** (E308, Paul Mayrhofer): 2011-18	MM

* Assignment to Research Focal Areas

Research Funding: European Programs

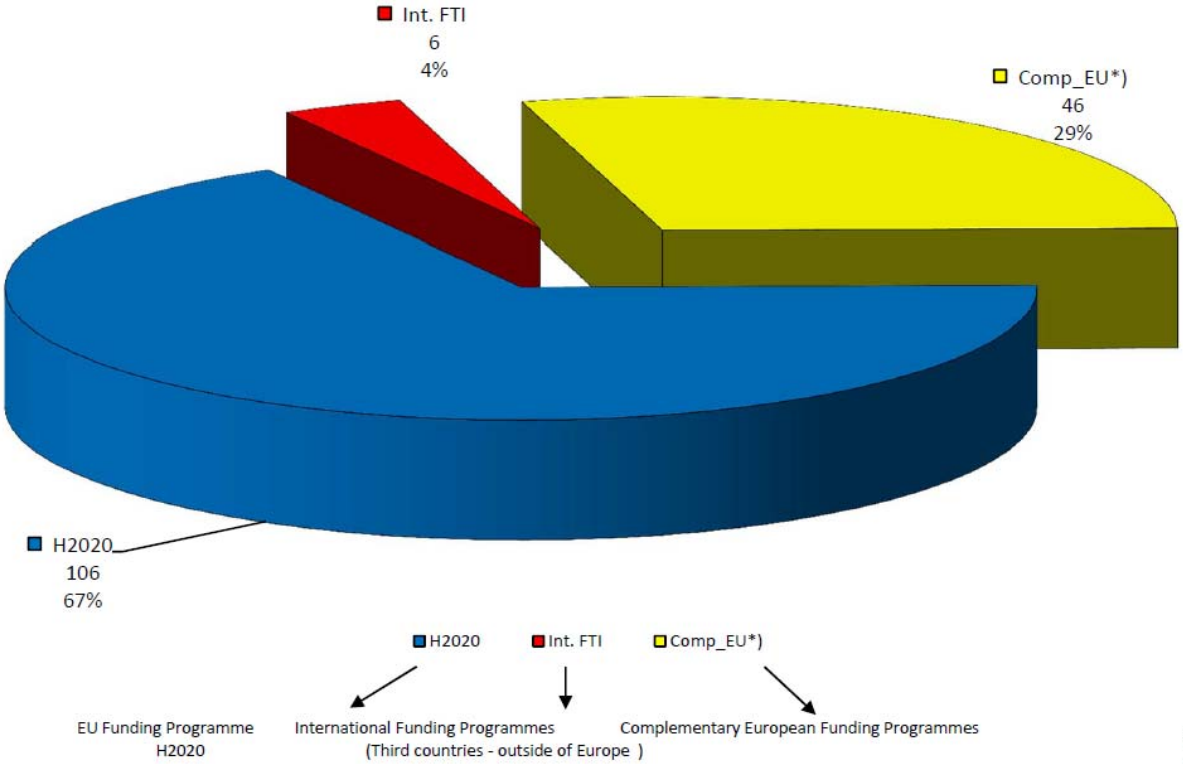
Internationalisation of Research:
in FP7 TU Wien was the only Austrian University in Top50



TUW in the European Research Area: Status H2020 per Q2/2017

158 European and international Research Projects of TU Wien 2014-2020

TUW Costs : € 50.766.945,-- Total Funding Contribution : € 49.621.648,--

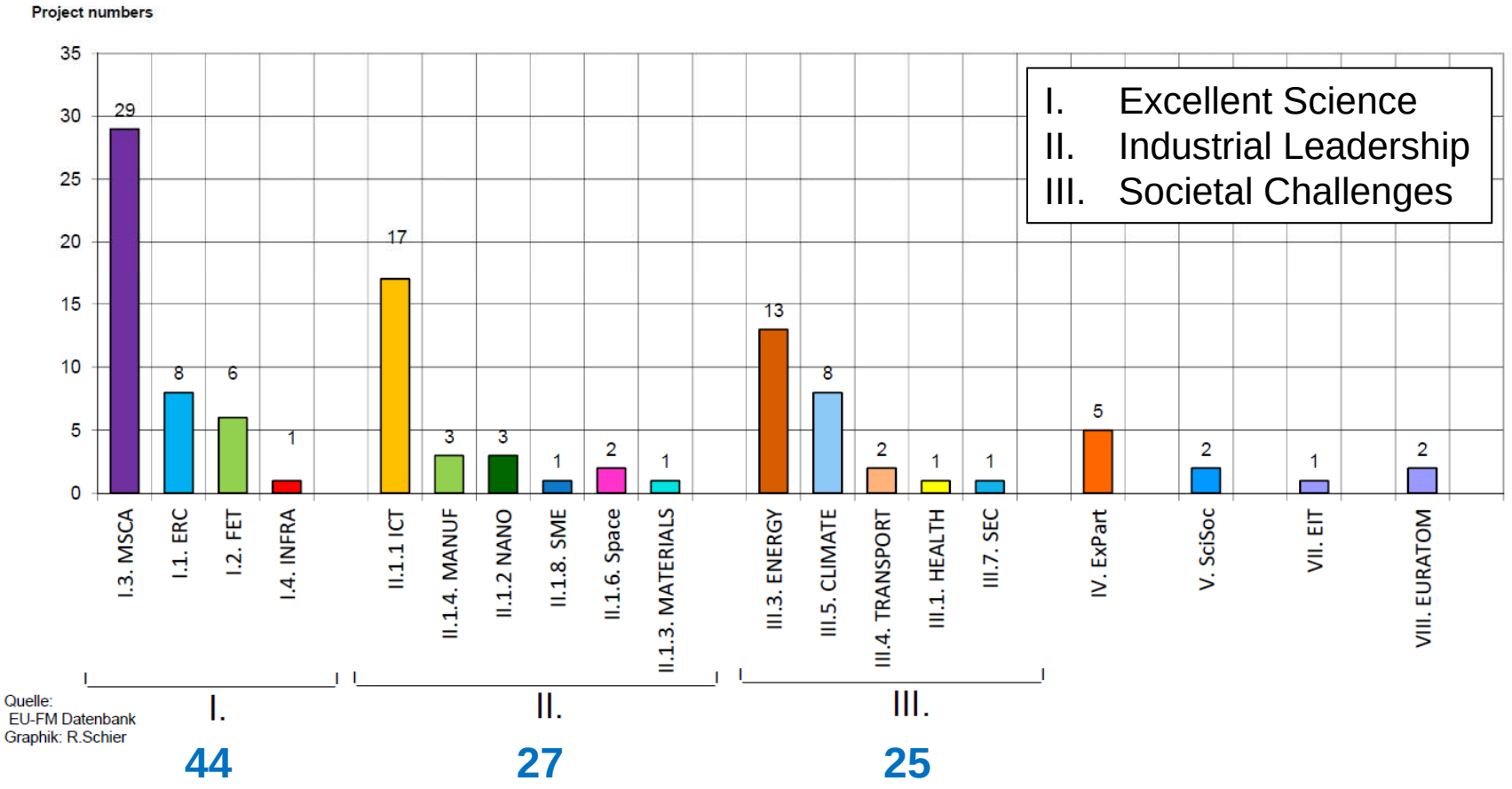


Quelle: EU-FM Datenbank
Graphik: R.Schier
Geprüft: S. Huemer

TUW im Europäischen Forschungsraum: Status H2020 per Q2/2017

106 H2020 Projects: Research Programmes

TUW Costs : € 42.029.462,-- **EU Contribution TUW: € 41.483.334,--**



Quelle:
EU-FM Datenbank
Graphik: R.Schier

Scientific Excellence: 25 ERC* Grants ….

















Andrius Baltuska, **Cycle-Sculpted Strong Field Optics**

Günter Blöschl, **Deciphering River Flood Change**

Silke Bühler-Paschen, **Quantum Criticality, The Puzzle of Multiple Energy Scales**

Ulrike Diebold, **Oxide Surfaces, Microscopic Processes and Phenomena at Oxide Surfaces and Interfaces**

Georg Gottlob, **Domain-centric Intelligent Automated Data Extraction Methodology**

Christian Hellmich, **MICROBONE**, **Multiscale poro-micromechanics of bone materials, with links to biology and medicine**

Thorsten Schumm**, Nuclear Atomic Clock**

Siegfried Selberherr, **Modeling Silicon Spintronics**

Stefan Szeider, **The Parameterized Complexity of Reasoning Problems**

Franz Schuster, **Isoperimetric Inequalities and Integral Geometry**

Karsten Held, **Ab initio Dynamical Vertex Approximation**

Jörg Schmiedmayer, **QuantumRelax: Non Equilibrium Dynamics and Relaxation in Many Body Quantum**

Aleksandr Ovsianikov, **Laser-engineered Biomimetic Matrices with Embeddes Cells**

Arno Rauschenbeutel, **NanoQuaNt - Nanofiber Quantum Networks**

Silvan Schmid, **PLASMECS - NanoPlasmoMechanical Systems**






Scientific Excellence: 25 ERC* Grants ….






Laura Kovacs, **Symbolic Computation and Automated Reasoning for Program Analysis**

Jan Kunes – **Excitonic Magnetism in Strongly Correlated Materials**

Tenio Popmintchev, **Xray-waveforms at the Spatio-Temporal Resolution Extreme for Atomic-scale Movies**

Neven Barišić, **TheONE – Janus-face of the localized carrier in cuprates: generating pseudogap and high temperature superconductivity**

Christoph Rameshan**, TUCAS - Tuneable Catalyst Surfaces for Heterogeneous Catalysis-Electrochemical Switching of Selectivity and Activity**

Simon Stellmer**, qMercury: Ultracold mercury for high-precision measurements**

Andreas Grüneis, **CC4SOL - Towards chemical accuracy in computational materials science**

Markus Valtiner, **CSI.interface** - **A molecular interface science approach: Decoding single molecular reactions and interactions at dynamic solid/liquid interfaces**

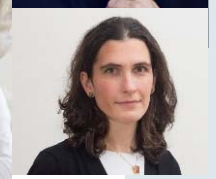
Aleksandr Ovsianikov**, THIRST: Third Strategy in Tissue Engineering – Functional microfabricated multicellular spheroid carriers for tissue engineering and regeneration**

Matteo Maffei**, Browsec: Foundations and Tools for Client-Side Web Security**







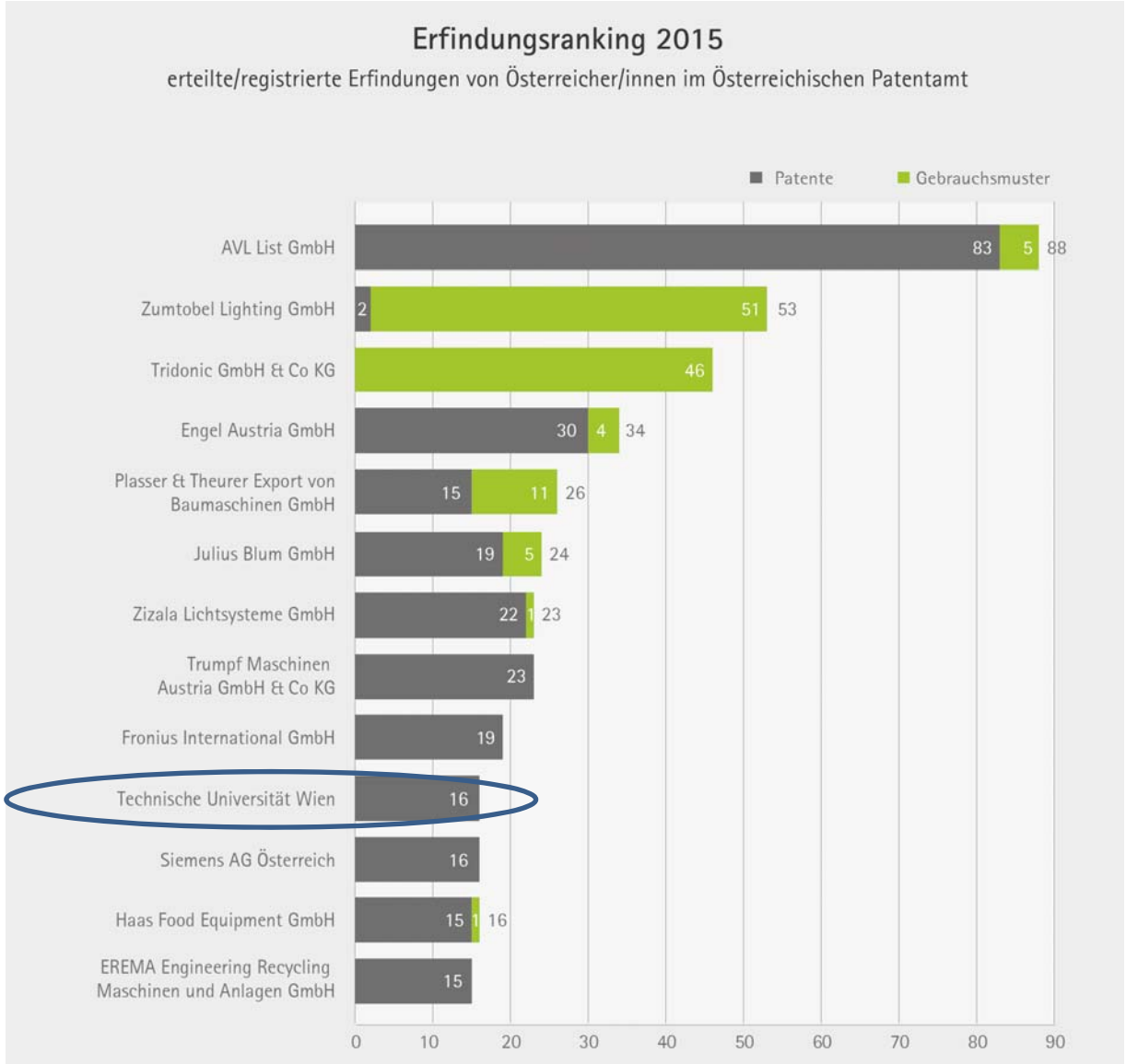
…. in all 5 TUW Research Focal Areas

* ERC= European Research Council, Starting/Consolidator/Advanced Grants

Along the value chain from Research to Innovation: Technology Transfer through Patents ….and

Yearly Ranking of Inventions by the Austrian Patent Office:

2013, 2014, 2015 and 2016: TUW in Top10 regarding Patents (grey bar)



Along the value chain from Research to Innovation: Technology Transfer through …. Exhibition at Fairs

TUW at Hannover Messe: wordwide leading industry fair Technologies ready for the market

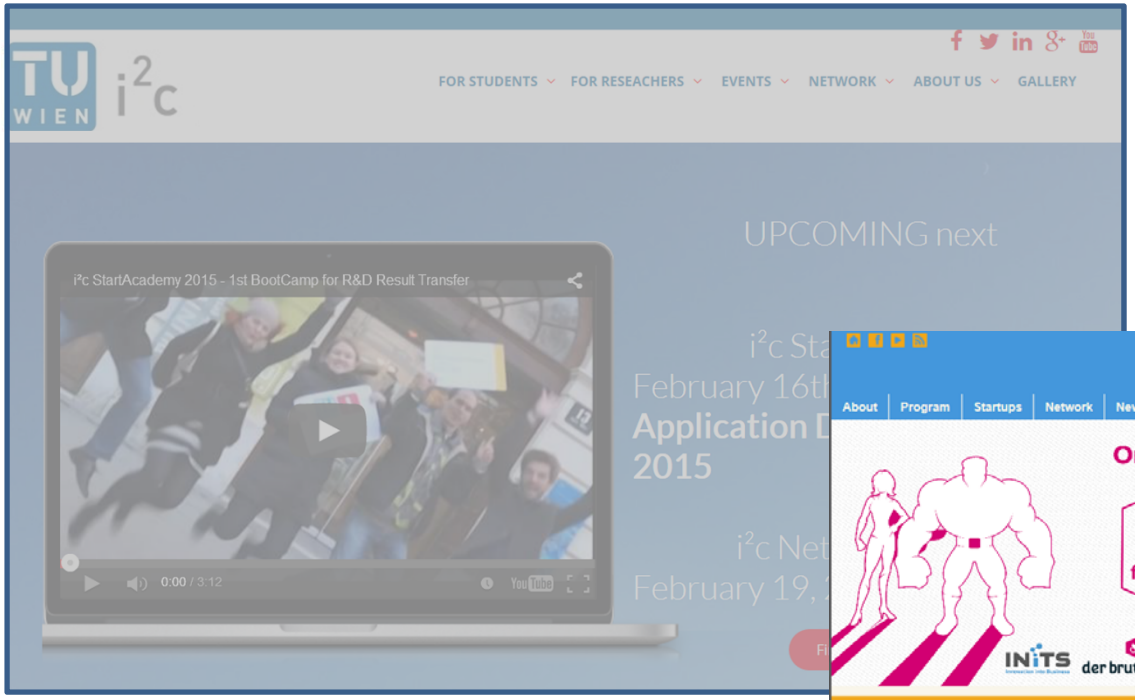
- Under the motto **„Innovations to go“** TUW presented 12 exhibits in 3 focal areas: **„Biorefinery of tomorrow“**, **„New designed materials“** and **„Innovative Analytical Techniques“** at the **Industrial GreenTec** Fair
- 10 TUW-**Start-ups** present at the **tech transfer** exhibition their products and services: marketing of Know-how and/or inventions of TUW researchers and graduates

www.tuwien.ac.at/HM2014 www.tuwien.ac.at/HM2015 www.tuwien.ac.at/HM2016 www.tuwien.ac.at/HM2017

Knowledge/TechTrans through… SpinOffs, StartUps

TUW Innovation Incubation Center (i²c) with Innovation Diploma Supplement, TUW Founder Space and StartAcademy:

i2c.ec.tuwien.ac.at



INiTS: **Business Incubator** of TU Wien, Univ. Wien and Business Agency Vienna:

„Entrepreneurial University“

Innovation Incubation Center (i²c)

der Technischen Universität Wien

Inspire. Educate. Innovate. Connect

TUW i2ncubator

i2c.tuwien.ac.at

TUW i²nkubator Startups

byrd

prewave
predicting supply chain risks from social media data

evologic
Technologies

contextflow

sonicatch
accurate measuring solutions
by USEPAT

PROCEDURAL DESIGN

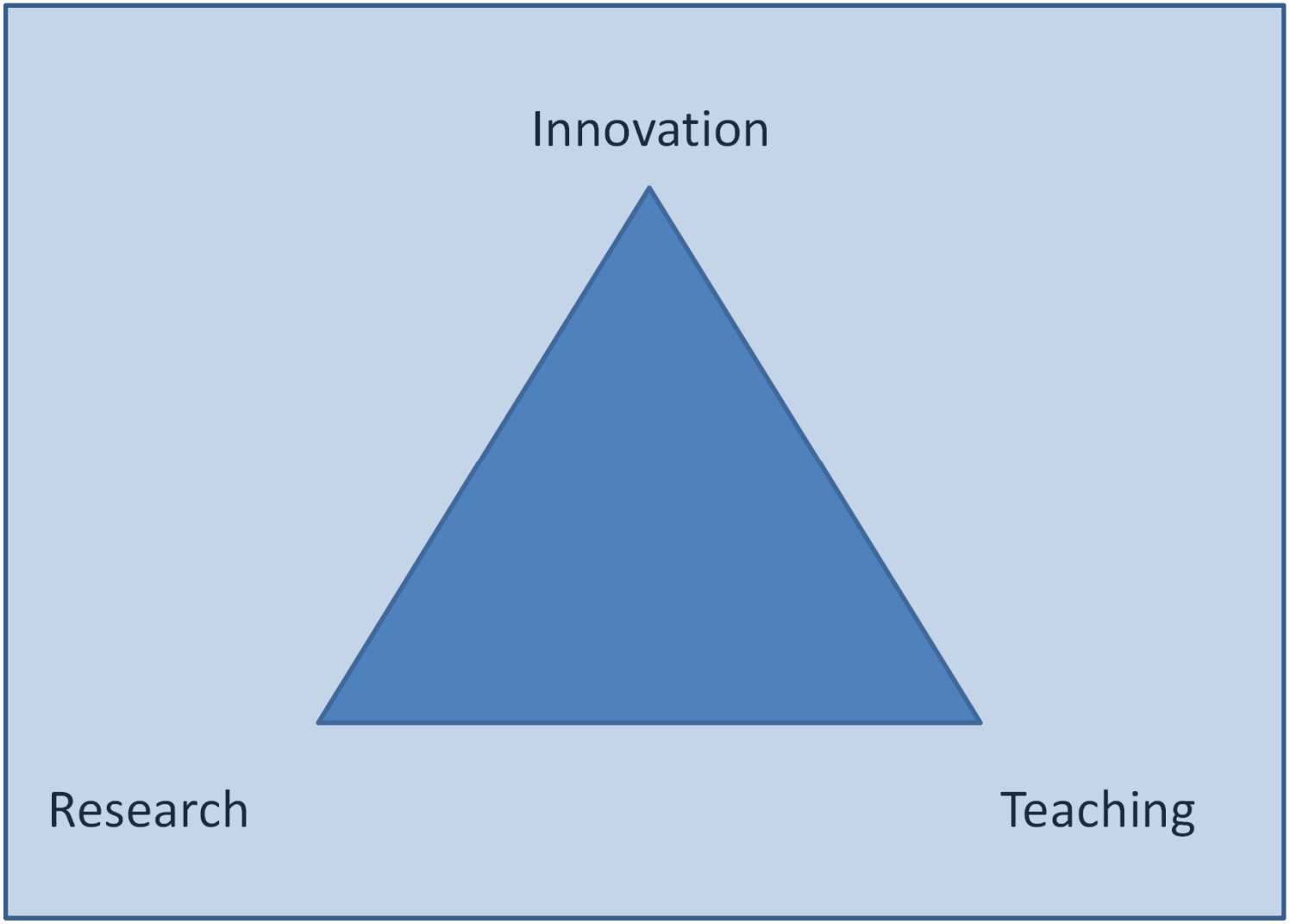
UGP
materials

huber
scientific
do the experiments
you never dreamed possible

nanographics

ARIOT

TUW-Mission: **Innovation from Research** by Combining Strenghts of Academia and Industry for the Benefit of Society



https://www.tuwien.ac.at/forschung/