OMLAB®

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NEMO SUMMER SCHOOL SERIES

Next-Generation Enterprise: Modelling in the Digital Age

TRANSFORMING ENTERPRISES **FOR THE DIGITAL AGE**

NEMO SUMMER SCHOOL SERIES

DIGITALISATION NEEDS HIGH POTENTIALS,
THAT'S WHAT THE NEMO SUMMER SCHOOL PRODUCES.

Prof. Dr. Dimitris Karagiannis, Prof. Dr. Heinrich C. Mayr,
Initiators of the NEMO SUMMER SCHOOL

The BENEFITS

WHO?

NEMO graduates represent a large international network striving towards academic and professional excellence, who are linked by a common experience and cooperation platform.

WHY?

NEMO enables participants to meet a large number of international renowned academics, discuss current research topics with them and actively participate to an international community of peers.

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The FOCUS

Conceptual Modelling in the Digital Age

Today's students will work in and for digitized organizations where smart devices, digital artefacts, intelligent machines and robots, data streams and connectivity are ubiquitous. In their work, they will face human challenges (e.g. human-machine/system interaction), lifecycle challenges (e.g. ICT embedded in the lifecycle of consumer products like cars, industry machinery, and energy provision systems etc.), business challenges (e.g. new business models to exploit value from new applications and domains), and regulatory challenges (e.g. privacy, security, etc.). Additionally, a higher level of automated processing of digital information as well as the "end-to-end" integration of processes across multiple organizations and customers will be required by users.

One way to conceptually manage such complex ecosystems is by means of modelling, both in the form of theory and practice. How to define and combine modelling methods with the 'right' level of abstraction and how to engineer corresponding modelling tools is at the center of conceptual modelling education.

The NEMO Summer School Series brings together renowned researchers and academics together with students to explore current research challenges and future development of conceptual modelling with special focus on the digital age.

NEMO exposes students to a wide diversity of lectures, covering manifold aspects of conceptual modelling. It facilitates peer exchange in working groups. Besides it supports networking in an international environment with colleagues and professors. And last but not least it encourages participants to enjoy culture and the beautiful city of Vienna.

HOW?

The summer school provides a highly-interactive experimental environment where students and teachers focus on "modelling".

WHAT?

Small international student teams work to create practical solutions to real-world problems. They use the OMiLAB environment to access open community artefacts and co-design their solutions.

NEMO Summer School Series

OMiLAB®

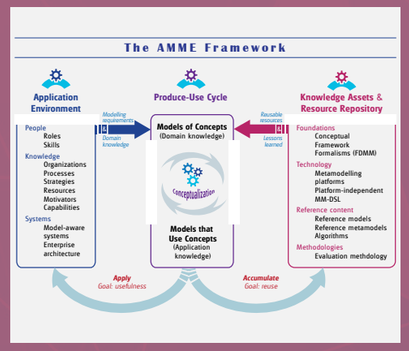
The CONTENT

AN INTERACTIVE COMBINATION OF THEORY AND PRACTICE

Foundations of Conceptual Modelling

Abstraction is used to represent the real world in models for a specific purpose. This is necessary in order to reduce and manage complexity. Models incorporate, beyond syntax and notation, also the semantics of the domain they address.

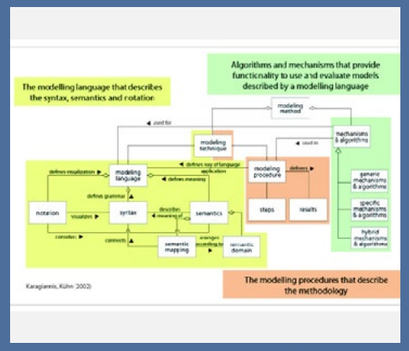
This stream deals with scientific and philosophical principles for modelling, fundamental notions of conceptual models, goals, as well as scoping of design methodologies for modelling languages and –methods. In addition, it presents formal methods which are necessary in method engineering frameworks. Lastly the fundamentals of the creative conceptualization process are dealt with using the example of the AMME Conceptualization Lifecycle.



Technologies for Conceptual Modelling

Domain-specific tools support digitizing the relevant parts of the real-world into conceptual models and applying processing mechanisms and algorithms on the models for problem resolution.

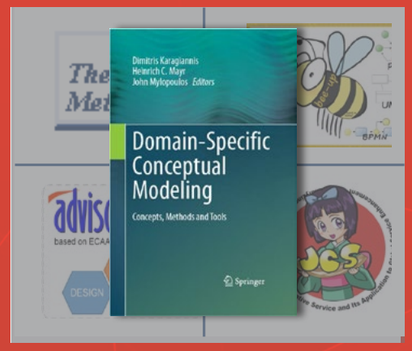
Content included in this stream addresses advanced aspects of meta-modelling, ontologies, and generally semantic technologies focusing on domain-specific requirements. Technologies may range from lightweight modelling to formal algebra. Mechanisms and algorithms which enable processing of models by means of e.g., assessment, evaluation, prediction, planning, analysis and simulation are introduced. Advanced technologies increase model value and user interaction both, on enterprise and on individual level.



Application Domains

Agile modelling method engineering is used to develop model-based domain-specific applications as well as to derive increased value from such domain-specific models.

This stream presents modelling languages for specific domains, like: capability management, enterprise information systems, health care management, immigration management, industrial management, model-driven software engineering, product-service-systems, production management, requirements engineering, service management, transportation as well as energy management, and more generally semantic-driven applications.

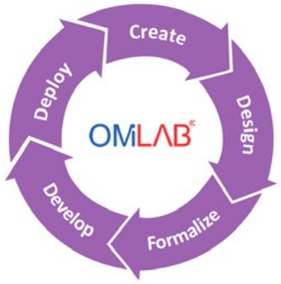


Cross-cutting Issues

A key challenge in conceptual modelling is the design process in which real world artefacts are abstracted into concepts of a modelling language. This process is based on creativity, human interpretation of the real world and the capability to transform this knowledge into a conceptual model representation.

Content included in this stream deals with issues like interaction and abstraction required to create and manipulate models, to verify models, to incorporate possible processing of models in form of algorithms into modelling methods, to evolve and migrate models and modelling languages, to integrate model processing in service-oriented tool chains as well as to perform knowledge interpretation.

OMiLAB - the Open Models Laboratory



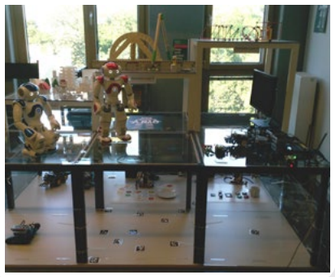
The Open Models Laboratory (OMiLAB) is a dedicated research and experimentation space for modelling method engineering. Both a physical and virtual place, it is equipped with tools to explore method creation and design, experiment with method engineering and deploy software tools for modelling. Open to all those interested, the laboratory is a platform where all participants can bring in ideas related to modelling and engage in the exploration process.

THE OMILAB IS A SPACE TO:

Collaborate – with peers, academics and experts from all over the world on topics related to conceptual modelling and modelling tool engineering.

Innovate – experiment with novel ideas, extend existing concepts, methods and tools, work together applying modelling knowledge to new domains, innovative designs or technologies.

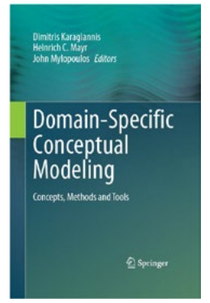
Engineer – modelling methods, tools and apply models using the OMiLAB technological environment. An industry-grade meta-modelling platform, i.e. ADOxx, is available as well as a wide-variety of open-source services.



VISIT: WWW.OMILAB.ORG

Domain-Specific Conceptual Modelling –

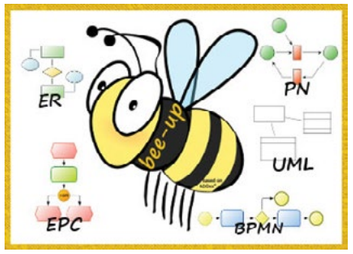
Concepts, Methods and Tools



This book draws new attention to domain-specific conceptual modeling by presenting the work of thought leaders who have designed and deployed specific modeling methods. It provides hands-on guidance on how to build models in a particular domain, such as requirements engineering, business process modeling or enterprise architecture. In addition to these results, it also puts forward ideas for future developments. All this is enriched with exercises, case studies, detailed references and further related information. All domain-specific methods described in this volume also have a tool implementation within the OMiLAB Collaborative Environment - a dedicated research and experimentation space for modeling method engineering at the University of Vienna, Austria - making these advances accessible to a wider community of further developers and users.

Bee–Up

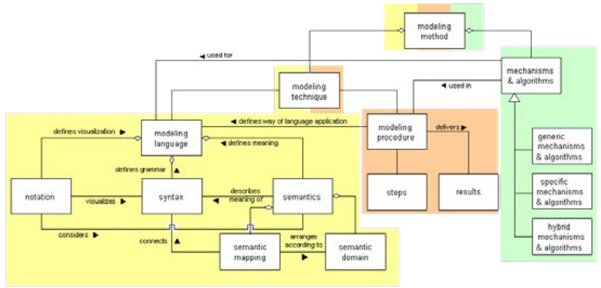
hybrid modelling tool



Bee-Up hybridizes several modelling languages in one prototypical implementation/tool. It allows the creation of models in modelling languages commonly used in different domains: Business Process Model and Notation (BPMN), Event-driven Process Chains (EPC), Entity-Relationship models (ER), Unified Modeling Language (UML) and Petri Nets. Processing capabilities, like process simulation or SQL generation, are also available in Bee-Up. They provide additional showcases on how models can be used.

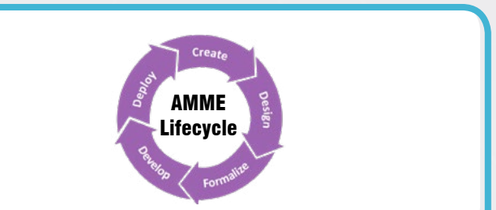
VISIT: BOOK.OMILAB.ORG

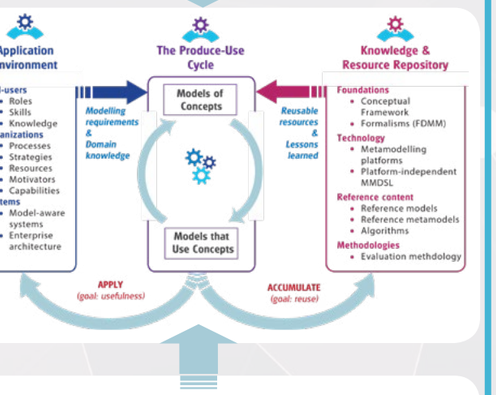
Metamodel Designer responsible for the modelling language definition and usage.

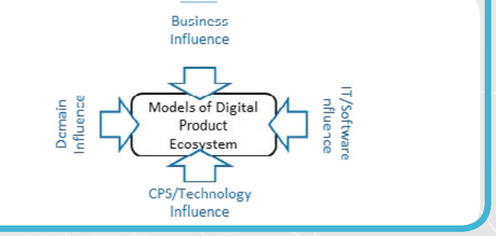


Foundation for Modelling of Concepts

Modelling Method Engineer - uses AMME to build the method artefacts.

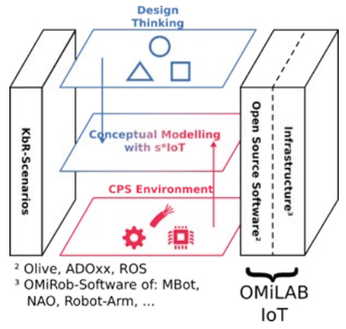




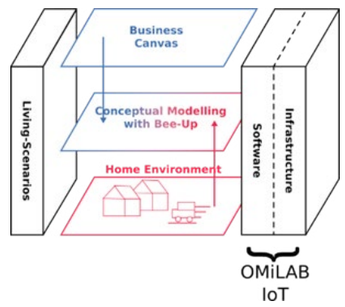


Input for Digital Laboratory

The KbR-Initiative

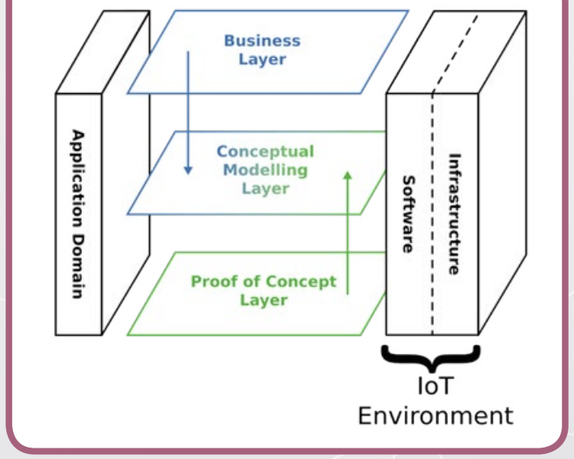


The Smart Object-Initiative



The End-users experience the modelling tool in the digital lab Environment.

Instance of Digital Laboratory



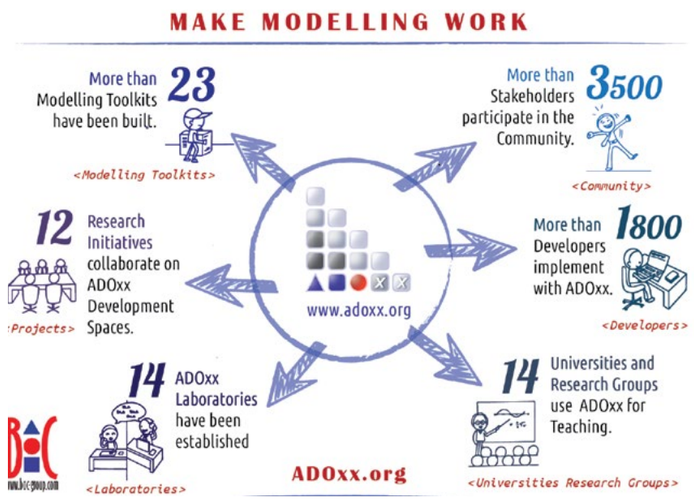
Digital Product Designer - applies the method for a selected domain.

NEMO Summer School Series

ADOxx – the platform for engineering modelling tools

Practical work during NEMO is done using ADOxx, a meta-modelling development and configuration platform for implementing modelling methods. ADOxx supports/provides:

- The realization of full-fledged personalized modelling tools following a configuration approach (re-use of existing implementations and functionality on platform level)
- A click-based approach for developing individual notation, syntax and semantic without programming effort.
- Vast pre-developed functionalities, like algorithms and mechanisms, to enrich modelling languages.
- The creation of individually installable and distributable software packages.



Visit: **www.adoxx.org**

OMiLAB

Modelling Method Projects based on ADOxx

For Enterprise Modeling (4EM)	ADVISOR	ArchiMate 3.0	BD-DS	Bee-Up
Business Engineering Navigator	Business Process Feature Model	Business Process Risk management – Integrated Method	Capability Oriented Enterprise Knowledge Modelling	ComVantage
Data Integration for Business	Data Integration and Cleansing Environment	DICER	Decision Model and Notation	Evaluation Chains
exemplarische Geschäftsprozess-modellierung	Enterprise Knowledge Development	ENTERKNOW	eduWeaver	Human Cognitive Model Language Modeler
Hermxx	ADOxx Horus Method	iStar	Japanese Creative Services	KAMET
Knowledge Work Designer	Learn PAd - Model-Based Social Learning for Public Administrations	MoSeS4eGov	Large Scale Collaborative Processes	Multi-Perspective Enterprise Modeling (MEMO)
Conceptual Design of Multi-View Modeling Tools	Open Knowledge Models	Process-Goal Alignment modeling and analysis technique	PSS Scenario Modeller	PetriNets
Regensburg University Process Excellence and Reengineering Toolkit	SAVE	Semantic Database Design	Secure Tropos	Semcheck
Semantic-based Modeling Framework for Information Systems	Structured Entity Relationship Modeling Method on ADOxx	SIMchronization	Modelling Framework for a Semantic Internet of Things	Scene2Model
	Semantic Object Model (SOM)	TOGAF based Enterprise Architecture Management	User Story Mapping	

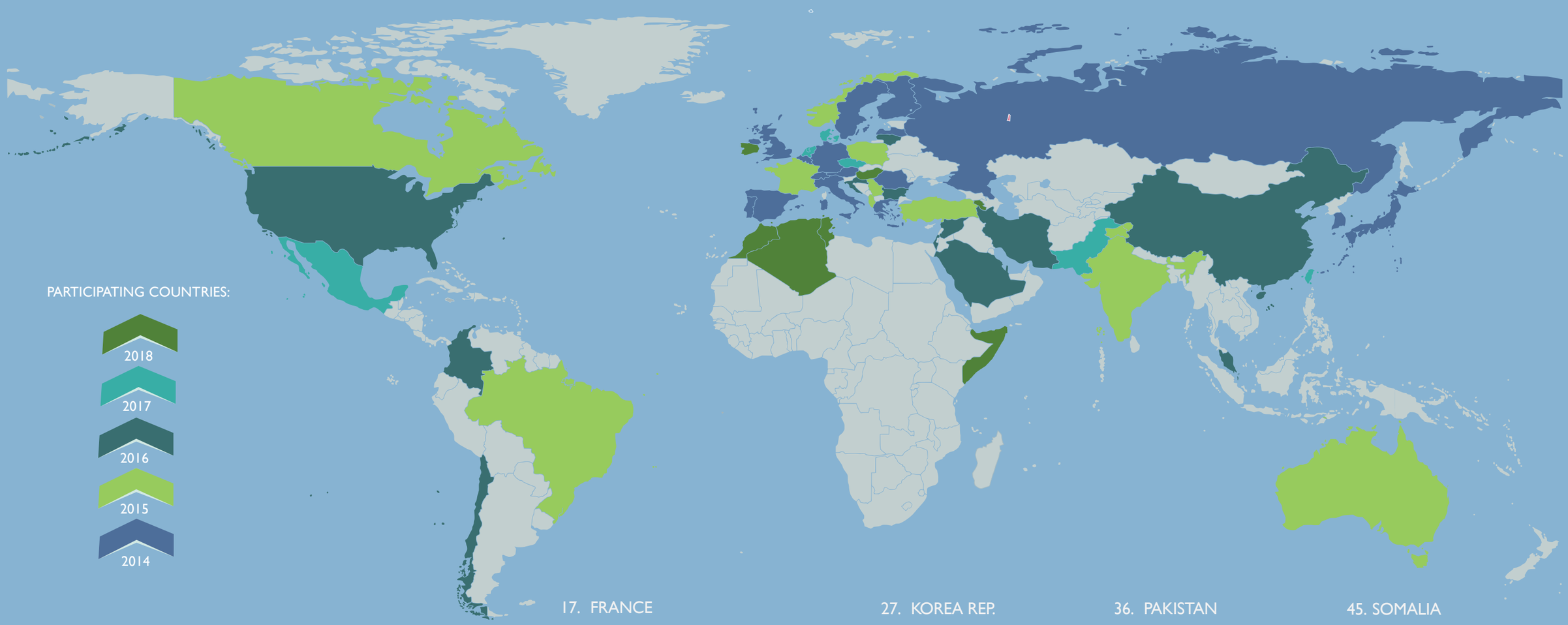
NEMO SUMMER SCHOOL SERIES

The SUCCESS

OMiLAB®

OMILAB FACILITATES A COMMUNITY WHICH SHARES KNOWLEDGE, TECHNOLOGIES, PLACES AND VALUES AND WHICH ENABLES US TO REALIZE OUR OWN IDEAS.

Prof. Moonkun Lee, Ph.D.
Chonbuk National University



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2. ALGERIA
3. ARMENIA
4. AUSTRALIA
5. AUSTRIA
6. BELGIUM
7. BRAZIL
8. BULGARIA
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10. CHILE
11. CHINA
12. COLOMBIA
13. CROATIA
14. CZECH REP.
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50. TUNISIA
51. TURKEY
52. UK
53. USA

NEMO SUMMER SCHOOL SERIES

The PARTICIPANTS

OMLAB®

STUDENTS

	STUDENTS	INSTITUTIONS	COUNTRIES
2014	50	29	15
2015	55	26	16
2016	67	43	28
2017	57	39	25
2018	55	37	24

TEACHERS

	TEACHERS	INSTITUTIONS	COUNTRIES
2014	33	26	15
2015	38	32	20
2016	43	35	19
2017	45	33	18
2018	38	31	19

THE UNIVERSITY OF VIENNA

650

YEARS OF ACADEMIC EXCELLENCE

9

NOBEL PRIZE LAUREATES

1st

UNIVERSITY IN AUSTRIA

Founded in 1365 as Alma Mater Rudolphina Vindobonensis by Rudolph IV the University of Vienna is the oldest higher education institution in Austria and one of the oldest in Europe. In 1848 article 17 of the Austrian Basic Law, which is still valid today, was instituted stating that "Science and teaching are free." In 1897, 532 after its foundation the University of Vienna permitted women to enrol, although initially only at the faculty of Philosophy.

The university's current main building was built between 1877 and 1884 by Heinrich von Ferstel in the city centre of Vienna. Currently the university distributes the activities of its 17 faculties and centres as well as those of the central administration on more than 60 locations. A total of 9.600 employees work for the university, about 70% of them in research and teaching.

Nine scientists associated with the University of Vienna, through either research or teaching, have been awarded the most prestigious distinction in science: the Nobel Prize.

- Robert Bárány , otology - 1914: Nobel Prize for Medicine
- Julius Wagner-Jauregg, psychiatry - 1927: Nobel Prize for Medicine
- Hans Fischer, chemistry - 1930: Nobel Prize for Chemistry
- Karl Landsteiner, immunology - 1930: Nobel Prize for Medicine
- Erwin Schrödinger, physics - 1933: Nobel Prize for Physics
- Viktor Franz Hess, physics - 1936: Nobel Prize for Physics
- Otto Loewi, physiology and pharmacology - 1936: Nobel Prize for Medicine
- Konrad Lorenz, biology - 1973: Nobel Prize for Medicine
- Friedrich A. von Hayek, economics - 1974: Nobel Memorial Prize in Economic Sciences

Besides being Austria's oldest university, the University of Vienna is also the biggest one. More than 6.600 scientists research in 19 faculties and centres, from humanities to computer science.

They teach the more than 94.000 students in 174 different study programs. 28.000 or about 27.2% of all students enrolled at the University of Vienna come from abroad. About 10.000 of the total student population graduates each year from either Bachelor, Master or PhD studies.

The University of Vienna strives to be a top-research and teaching university. It promotes international research and teaching cooperation on the basis of strong disciplinary research and identifies cross-sectional topics that can be worked on beyond the boundaries of disciplines and faculties.

THE CITY OF VIENNA

no. 1

IN INTERNATIONAL QUALITY OF LIVING

no. 2

THE WORLD'S MOST REPUTABLE CITIES 2016

no. 3

INNOVATION CITIES WORLDWIDE 2015

In 2017, Mercer has again ranked Vienna first in its international quality of living survey as the city with the highest quality of living worldwide. The study compares 230 cities worldwide based on 39 criteria such as political, social, economic, and environmental factors.

The survey, which included a separate ranking of each city's infrastructure for the first time this year, called the category "pivotal" in determining overall quality of living for expats. Factors assessed included: reliable electricity; drinkable water; the availability of telephone and mail services, and international flights from local airports; traffic congestion; and access to public transportation.

Source: https://www.forbes.com/sites/tanyamohn/2017/03/14/vienna-ranks-highest-for-quality-of-living-8th-year-in-a-row/#7fc3370e1153

The City RepTrak study from the global Reputation Institute ranks the world's 100 most reputable cities based on factors such as trust, esteem, admiration and respect. Among the attributes used for ranking, the two most important are whether the city is considered beautiful, and whether it is viewed as a safe place for visitors and residents.

A city's ranking is believed to be linked to the amount of support that a city can generate from its reputation in the form of business, travel, tourism and investment.

The Reputation Institute also tracks the reputations of global brands and companies across important international markets, interviewing 55,000 consumers across 15 countries.

Source: https://www.thelocal.at/20141128 vienna-has-worlds-best-reputation

The Innovation Cities Index measures the quantifiable drivers of innovation, which all form the pre-conditions for an innovation ecosystem. A total of 162 indicators is used for ranking 500 cities from all over the world. They are grouped in 3 main categories: Cultural Assets, Human Infrastructure and Networked Markets. This maps the process of innovation, from idea to implementation and communication. In 2015 Vienna was ranked the 3rd most innovative city in the world.

In the current "Innovation Cities Global Index 2016/2017" by the Australian innovation agency 2thinknow, Vienna reached the tenth place. On European level Vienna was ranked third most innovative city behind London (first place) and Paris (ninth place).

Source: https://placebrandobserver.com/insights-innovation-cities-index-2016-2017/

WITH THEIR SUPPORT

The SPONSORS

THANK YOU!

Hilti Group

As a leading-edge provider of solutions and services to the professional construction industry Hilti drives the digital transformation enabling Hilti customers to be more productive while observing highest health and safety standards. Hilti IT is a key pillar of the digital activities of the Hilti group, running a single-instance global ERP system and providing with the Hilti Cloud a common application platform for all internal and customer-facing digital activities. Global IT is a valued business partner in the Hilti Group that is business driven, value focused and competitively strives for customer satisfaction, business and operational excellence in every area.

FOR MY SOLUTION ARCHITECTS AND ENTERPRISE ARCHITECTS IT IS INSPIRING TO EXCHANGE LATEST INSIGHTS IN ENTERPRISE MODELLING WITH OTHER PRACTITIONERS AND TALENTED STUDENTS PARTICIPATING IN THE NEMO SUMMER SCHOOL.

Martin Petry, CIO, Hilti

City of Vienna

Vienna is the first European city with an digital agenda, which has been developed by a crowdsourcing process together with citizens and local experts. Especially the cities have to meet big challenges: On the one hand through the urbanisation. More and more people move to the cities. Otherwise through the climate change. Vienna solve the coherent tasks using digital solutions, as like as Artificial Intelligence (AI), Internet of Thinks (IoT), Blockchain technology, Chatbot, Live Apps, participation and eGovernment-Services.

Vienna started a cooperation with IT-companies and created the Digital City. The goals are supporting Vienna's ICT companies, increasing the quality of ICT-education and the number of women working in the ICT sector, using disruptive technologies, and strengthening the reputation Vienna as a digital hot spot, particularly for start-ups.

INFORMATION TECHNOLOGY IS THE NERVOUS SYSTEM OF THE SMART CITY ACCEPTING THE NEW CHALLENGES FOR THE CONTINUED HIGH LEVEL OF QUALITY LIFE IN VIENNA.

Ulrike Huemer, CIO of the City of Vienna

Fujitsu

Fujitsu is a global ICT company originated in Japan with over 80-year history. We are the world's fifth-largest IT services provider and No.1 in Japan.

Today digital technology is transforming business, society and everyday lives of people. In this digital era, we want to be a trusted technology partner of enterprises and public institutions to help them drive their growth. To co-create new value with our customers, Fujitsu focuses on providing breakthrough digital technologies including AI and IoT, and works on shaping open-innovation ecosystems with enterprises, startup companies, academic institutions and governments. Through co-creation, we aim to realize a better future for everyone.

IT IS VERY IMPORTANT FOR US TO HAVE A GOOD PARTNERSHIP WITH WORLD-LEADING ACADEMIC INSTITUTIONS AND CONTRIBUTE TO DEVELOPING NEXT GENERATION TALENT.

Yoshikuni Takashige, Vice President, Marketing Strategy and Vision, Fujitsu Limited

Atos

As a pioneer of digital transformation, innovation and value creation, both for our own company and for our clients, we have cemented our position as a trusted partner with resources, the scale and know-how that our clients need. We are leaders in digital services with more than 100,000 employees in 73 countries, serving a global client base. We are experts in Big Data & Security, Business & Platform Solutions, Digital payments and e-Transactions, Infrastructure & Data Management, and Unified Communications & Collaboration.

SEEING DIGITALIZATION AS A KEY FACTOR IN THE SUCCESS OF OUR ENTIRE ECONOMY, WE ARE PROUD TO BE PART OF THE NEMO SUMMER SCHOOL WITH ITS GOAL OF TRANSFORMING BUSINESSES FOR THE DIGITAL AGE..

Marko Wildhaber, Head of Marketing & Communications Austria, Atos

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NEMO SUMMER SCHOOL SERIES

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Chonbuk National University

CAU Christian-Albrechts-Universität zu Kiel

MINES Saint-Étienne

EPFL École Polytechnique Fédérale de Lausanne

FernUniversität in Hagen

nw Fachhochschule Nordwestschweiz Hochschule für Wirtschaft

FORTH-ICS

Humboldt-Universität zu Berlin

JAIST Japan Advanced Institute of Science and Technology

KAIST

KIT Karlsruher Institut für Technologie

Korea University

Katholieke Universiteit Leuven

Kyoto University Kyoto Japan Founded 1897

Luxembourg Institute of Science and Technology LIST

NTNU

Politecnico Milano

1862 Riga Technical University

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Erasmus+

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