

## • PERSONAL INFORMATION



Family name, first name: Jacobi von Wangelin, Axel  
Researcher ID: F-9312-2010  
Publications: 61, Citations: 1801; Citations per article: 29.1; H Index 23  
Nationality: German  
Date of birth: 13. 05. 1974  
URL of web site: <http://www-oc.chemie.ur.de/jacobi/>

## • EDUCATION

2002 Ph.D., Leibniz Institute of Catalysis, University of Rostock, D (*summa cum laude*)  
1998 Diplom, Department of Chemistry, University of Erlangen-Nürnberg, D

## • CURRENT POSITION

2011 – Professor of Organic Chemistry, University of Regensburg, D

## • PREVIOUS POSITIONS

2005 – 2010 Research group leader, Department of Chemistry, University of Cologne, D  
2003 – 2004 Postdoc w/ Prof. Barry M. Trost, Stanford University, USA  
2003 Postdoc w/ Prof. Kingsley J. Cavell, Cardiff University, UK  
2002 – 2003 Research scientist, ProjectHouse Catalysis, Degussa AG, Frankfurt, D  
1999 Visiting Scholar w/ Prof. John A. Gladysz, University of Utah, USA

## • FELLOWSHIPS & AWARDS

2012 ORCHEM Award of the Liebig Association of Organic Chemistry  
2011 Heisenberg Fellow of the DFG  
2009 – 2010 Emmy-Noether Fellow of the DFG  
2009 Science Award of the Industrie-Club e.V. Düsseldorf  
2007 Thieme Synlett-Synthesis Journal Award  
2005 – 2010 Emmy-Noether Fellow of the DFG  
2003 – 2004 DAAD Post-Doctoral Fellow, Stanford University  
2003 Joachim-Jungius Dissertation Award, University of Rostock

## • SUPERVISION OF GRADUATE STUDENTS, POSTDOCS

2005 – 2015 3 Postdocs, 17 Ph.D. students, 25 Master/diploma students at U's of Cologne/Regensburg

## • TEACHING

Since 2005 Teaching chemistry at all levels in B.Sc. and M.Sc. curricula and Ph.D. programmes  
2013 – Dedicated teaching cluster "Technikum" on synthesis techniques & high-pressure reactions (2013 Prize of the Fond der Chemischen Industrie, FCI)

## • INSTITUTIONAL RESPONSIBILITIES & COMMISSIONS OF TRUST

2014 – Board member of the German Catalysis Society (GeCatS)  
2013 – Chairman of the German Chemical Society (GDCh), Section Regensburg  
2012 – Chair of the annual "Anton Vilsmeier Award Lecture", Regensburg  
2012 – Board member, Carl von Carlowitz Center of Sustainable Chemistry, Regensburg  
2012 – 2018 Independent P.I. of the DFG Graduate College "Photocatalysis" (GRK 1626)

- 2012 Organizer of the Symposium “Iron: Earth’s Favourite Metal for Synthesis, Catalysis & Energy Supply”
- 2011 – 2014 GDCh author of a monthly research column “Chemienotizen” in *Nachr. Chem.*
- 2011 Organizer of the Symposium “Academia meets Industry”
- 2010 Organizer of the Symposium “Emmy Noether fellows in Chemistry”

#### • MEMBERSHIPS OF SCIENTIFIC SOCIETIES

German Chemical Society (GDCh), American Chemical Society (ACS), German Catalysis Society (GeCats), Gesellschaft für Chemische Technik und Biotechnologie (DECHEMA)

#### • MAJOR COLLABORATIONS

Prof. Robert Wolf, Institute of Inorganic Chemistry, University of Regensburg, D  
 Prof. Bernhard Dick, Institute of Physical Chemistry, University of Regensburg, D  
 Dr. Martin H. G. Prechtel, Department of Chemistry, University of Cologne, D  
 Prof. Corinne Gosmini, Ecole Polytechnique, Palaiseau, F  
 Prof. Rhett Kempe, Institute of Inorganic Chemistry, University of Bayreuth, D  
 Prof. Audrey Moores, Mc Gill University, Montreal, CAN

#### • RESEARCH PROFILE

1. *Iron Catalysis*. We have significantly expanded the scope of reductive iron catalysis applied to C-C and C-H bond-forming reactions as a sustainable alternative to noble metal catalysed reactions. New protocols were developed for hitherto unreactive substrate classes (organic acetates) and new activation modes were discovered ( $\pi$ -olefin coordination within the electrophile). The mechanistic dichotomy of homogeneous and heterogeneous catalyst species was studied under identical reaction conditions and applied to selective cross-coupling, isomerization, hydrodefunctionalization and hydrogenation reactions. Industrial applications of such processes are currently being evaluated in pilot-plant settings with industrial collaborators. These activities are supported by two DFG projects, several doctoral fellowship programmes (Evonik, DAAD, FCI etc.), and a 6-year industrial partnership.

2. *Photoredox Catalysis*. Our group has significantly advanced the art of metal-free visible-light driven aromatic substitutions. Major emphasis was laid upon mechanistic studies including transient spectroscopy, electrochemical analysis, and DFT calculations of key electron transfer steps. We have reported the first metal-free catalytic carbonylation to benzoates. This work is supported by the DFG Graduate College 1626, the FCI, and a Marie Curie IEF project.

3. *N-Heterocyclic Carbene Catalysis*. We have reported the first concise series of Deoxy-Breslow intermediates derived from alkyl halides and evaluated their reactivity profiles. We currently study electronic Umpolung reactions based upon *in situ* prepared carbonyl derivatives. This strategy provides bifunctional molecules which are precursors to drugs and are otherwise inaccessible.

4. *Stabilized Metal Nanoparticles*. In this programme, we study various synthetic routes and stabilization modes of iron(0) nanoparticles. We have reported the first application of recyclable iron nanoparticles which catalyze the stereoselective semi-hydrogenation of alkynes. Further investigations include the precipitation of metal(0) species on extended aromatics and the use of biodegradable ionic liquids as electrosteric surfactants. Our activities are supported by the Deutsche Bundesstiftung Umwelt (DBU), the Fonds der Chemischen Industrie (FCI), and the Evonik Foundation.

#### 1. Five representative publications

- 1 *Angew. Chem. Int. Ed.* **2009**, *48*, 607. Domino Iron Catalysis: Direct Aryl-Alkyl Cross-Coupling, W. M. Czaplik, M. Mayer, A. Jacobi von Wangelin, “Very Important Paper“. Highlight in *Chem. Eng. News* **2009**, *87*, 6. (Citations: 126)
- 2 *Angew. Chem. Int. Ed.* **2012**, *51*, 1357. Chlorostyrenes in Iron-Catalyzed Biaryl Coupling Reactions, S. Gülak, A. Jacobi von Wangelin. (Citations: 37)
- 3 *ChemCatChem* **2012**, *4*, 1088. Iron(0) Particles: Catalytic Hydrogenations and Spectroscopic Studies, A. Welther, M. Bauer, M. Mayer, A. Jacobi von Wangelin. (Citations: 31)

- 4 *Angew. Chem. Int. Ed.* **2014**, *53*, 3722. Heteroatom-Free Arene Cobalt and Iron Catalysts for Hydrogenations, D. Gärtner, A. Welther, B. R. Rad, R. Wolf, A. Jacobi von Wangelin. (Citations: 7)
- 5 *Angew. Chem. Int. Ed.* **2015**, *54*, 2270. Metal-Free Carbonylations by Photoredox Catalysis, M. Majek, A. Jacobi von Wangelin. (Citations: 5)

## 2. Granted patents

- 1 DE 102008062690(A1), **2010**. Preparing organic compounds, e.g. funct. aryl compounds, comprises reacting aryl compounds with halide-containing alkyl compounds in the presence of elem. Mg, TM compd. and N-containing additive, M. Sundermeier, M. Gotta, A. Jacobi von Wangelin, W. M. Czaplik.
- 2 ES 2369961(T3), **2011**. Preparing organic compounds, e.g. cyclohexylbenzenes, comprises reacting organic compounds with another organic compound in the presence of stoich. amounts of elem. Mg and cat. amounts of TM compd., M. Sundermeier, M. Gotta, A. Jacobi von Wangelin, W. M. Czaplik.
- 3 US 2012046471(A1), **2012**. Process for preparing organic compounds by a TM catalysed cross-coupling reaction of an aryl-X, heteroaryl-X, cycloalkenyl-X, or alkenyl-X compound with an alkyl, alkenyl, cycloalkyl, or cycloalkenyl halide, M. Sundermeier, M. Gotta, A. Jacobi von Wangelin, W. M. Czaplik.
- 4 US 2013324745(A1), **2013**. Process for preparing styrene derivatives, M. Gotta, B.-W. Lehnemann, A. Jacobi von Wangelin, S. Güllak.
- 5 US 2013184485(A1), **2013**. Method for allylating and vinylating aryl, heteroaryl, alkyl, and alkenyl halides using TM catalysis, M. Gotta, B.-W. Lehnemann, W. M. Czaplik, M. Mayer, A. Jacobi von Wangelin.
- 6 DE 102014211373.3, **2014** (pending). Light-induced catalytic carbonylation of aromatic electrophiles.

## 3. Invited presentations to internationally established conferences / international advanced schools.

HLN Colloquium Series, Bochum (D), 2.2.2009. ESOC-16, Prague (CZ), 13.7.2009. EuCheMS Young Investigators, Liblice (CZ), 17.7.2009. ISHHC-14, Stockholm (S), 14.9.2009. 3<sup>rd</sup> Sino-German Frontiers of Chemistry Symposium, Seon Monastery (D), 13.8.2010. EUChemS, Nürnberg (D), 1.9.2010. 14<sup>th</sup> Belgian Sigma-Aldrich Organic Synthesis Meeting, Spa (B), 2.12.2010. CAT-a-flu Organocatalysis Symposium, Bologna (I), 24.3.2011. GDCh Science Forum Chemistry, Bremen (D), 7.9.2011. 15<sup>th</sup> ICC, Munich (D), 4.7.2012. 25<sup>th</sup> ICOMC, Lisbon (P), 3.9.2012. ORCHEM Conference, Weimar (D), 24.9.2012. DECHEMA Catalysis Meeting, Weimar (D), 16.3.2013. RSC Synthesis Meeting, Gregynog (UK), 14.9.2013. Binational Organic Chemistry Conference (BOCC), Tutzing (D), 2.10.2013. GDCh Sustainable Chemistry Conference, Erlangen (D), 29.9.2014. GDCh Photochemistry Conference, Cologne (D), 30.9.2014. Evonik Symposium, Bochum (D), 12.2.2015. GDCh ScienceForum, Dresden (D), 31.8.2015. International School of Organometallic Chemistry (ISOC-10), Camerino (I), 6.9.2015. Naked Iron & Cobalt: The Case of Homogeneous vs. Heterogeneous, Pacificchem, Honolulu (USA), 15.12.2015.