A. Marx

The author presented on this page has published ***25 articles*** *since 2000 in Angewandte Chemie, most recently:*
"Dissecting Ubiquitin Signaling by Linkage-Defined and Protease Resistant Ubiquitin Chains": T. Schneider, D. Schneider, D. Rösner, S. Malhotra, F. Mortensen, T. U. Mayer, M. Scheffner, A. Marx, *Angew. Chem. Int. Ed.* **2014**, *53*, 12925; *Angew. Chem.* **2014**, *126*, 13139
This work was also featured on the cover of *Angewandte Chemie*:

Andreas Marx

Date of birth:	February 22, 1968
Position:	Professor of Organic Chemistry/Cellular Chemistry, University of Konstanz
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Education:	1994 Diploma in Chemistry after studies at the Universities of Freiburg, Sussex, and Bochum 1997 Doctorate with Professor Bernd Giese, University of Basel 1997–1999 Postdoctoral research fellow with Professor Hisashi Yamamoto, Nagoya University 2000–2003 Junior research group leader at the University of Bonn; habilitation in organic chemistry/biochemistry
Awards:	**2013** ERC Advanced Grant; **2014** Karl Heinz Beckurts Prize
Current research interests:	The aim of our research is to gain insights into mechanisms of complex biological processes through application of synthetic molecules with tailored functions and properties. Thus, our current research comprises the targeted synthesis of functional (bio)molecules (e.g., nucleotides, oligonucleotides, proteins), and their subsequent application in order to explore complex biological processes.
Hobbies:	Skiing, kayaking, photography

In a spare hour, I enjoy a good glass of red wine and Bill Evans.

My biggest inspiration is my family.

My favorite time of day is any time.

I admire altruistic people.

I get advice from my family and friends.

I advise my students to become "stewards of chemistry and chemical biology".

My favorite way to spend a holiday is with my family.

My science "heroes" are those women and men who achieved so much under miserable circumstances.

If I had one year of paid leave I would travel more with my family.

The most important thing I learned from my students is that my presence in the office is not necessarily required for innovative progress!

What I appreciate most about my friends is honesty, tolerance, and outspokenness.

My favorite musician is Bill Evans.

The book that impressed me most is *If this is a Man* (United States title: *Survival in Auschwitz*) by Primo Levi.

The natural talent I would like to be gifted with is playing the piano.

My motto is Carpe Diem.

The greatest scientific advance of the last decade was next-generation sequencing.

When I was eighteen I wanted to be a bartender.

I am waiting for the day when someone will discover the perfect peer-review system.

The biggest challenge facing scientists is the ever-growing bureaucracy.

Science is fun because something new is discovered every day.

Young people should study chemistry because it is the future.

Looking back over my career, I am a happy man.

Last time I went to the pub I stayed far too long.

My favorite drink is together with a good friend.

Has your approach to publishing your results changed since the start of your career?

Not really. Publishing is essential for bringing scientific results to the attention of a broad audience and is thus indispensable. However, I am under the impression that the amount of data that referees (and in chemistry these are usually fellow scientists) request for publication is ever increasing. On the other hand, society expects doctoral students to successfully finish their degrees within less time. For their future careers "excellent publications" are required. I wonder how these diametrically opposed developments can be matched.

What do you think the future holds for your field of research?

Great developments! Chemistry, from materials science to chemical biology, is indispensable for mastering the challenges of the future. To emphasize one particular field or even to play one field off against another is not the right way. The global challenges are huge; holistic chemistry-based approaches will be the key to mastering many of them!

My 5 top papers:

1. "Dissecting Ubiquitin Signaling by Linkage-Defined and Protease Resistant Ubiquitin Chains": T. Schneider, D. Schneider, D. Rösner, S. Malhotra, F. Mortensen, T. U. Mayer, M. Scheffner, A. Marx, *Angew. Chem. Int. Ed.* **2014**, *53*, 12925; *Angew. Chem.* **2014**, *126*, 13139.
   A robust method that allows the topology-defined generation of ubiquitin chains by means that are available in every standard molecular biology laboratory. The study describes how "click" chemistry can be used to polymerize functionalized complex biomolecules in an unprecedented and efficient manner. We show that click-generated linkages do not harm biological activity and allow studies in the presence of ubiquitin-specific proteases.
2. "Fluorogenic ATP Analogues for Online Monitoring of ATP Consumption: Observing Ubiquitin Activation in Real-Time": S. M. Hacker, D. Pagliarini, T. Tischer, N. Hardt, D. Schneider, M. Mex, T. U. Mayer, M. Scheffner, A. Marx, *Angew. Chem. Int. Ed.* **2013**, *52*, 11916; *Angew. Chem.* **2013**, *125*, 12133.
   A novel method that allows the real-time detection of ATP cleavage and is based on new ATP analogues that contain a FRET cassette. The power of this approach was validated by a benchmark study of the ATP-consuming ubiquitin/ubiquitin-like conjugating systems that regulate fundamental eukaryotic processes and, if deregulated, are involved in numerous diseases. Thereby, a new inhibitor for the ubiquitin conjugating system was discovered.
3. "Structures of *KlenTaq* DNA Polymerase Caught While Incorporating C5-Modified Pyrimidine and C7-Modified 7-Deazapurine Nucleoside Triphosphates": K. Bergen, A.-L. Steck, S. Strütt, A. Baccaro, W. Welte, K. Diederichs, A. Marx, *J. Am. Chem. Soc.* **2012**, *134*, 11840.
   Functional studies as well as six crystal structures of a DNA polymerase trapped while processing modified nucleotides are presented. This study provides novel insights into the incorporation mechanism of the analogues and suggests design principles for future developments of modified substrates for DNA polymerases.
4. "KlenTaq polymerase replicates unnatural base pairs by inducing a Watson–Crick geometry" K. Betz, D. A. Malyshev, T. Lavergne, W. Welte, K. Diederichs, T. J. Dwyer, P. Ordoukhanian, F. E. Romesberg, A. Marx, *Nature Chem. Biol.* **2012**, *8*, 612.
   Essential insights for understanding how unnatural base pairs lacking hydrogen bonds are replicated. These unnatural base pairs hold great promise for future applications.
5. "DNA Polymerase Selectivity: Sugar Interactions Monitored with High-Fidelity Nucleotides": D. Summerer, A. Marx, *Angew. Chem. Int. Ed.* **2001**, *40*, 3693; *Angew. Chem.* **2001**, *113*, 3806.
   The mechanisms of how genetic material is correctly read by the replicating DNA polymerases is/was poorly understood. We provide experimental evidence that the selectivity of this process can be altered by steric constraints of the substrates without altering the hydrogen-bonding capabilities. These results experimentally support a steric model for the selectivity of DNA replication.

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