

## Prof. Dr. Martin Grohe

(\*10.7.1967, married, three children: 2006, 2009, 2009)

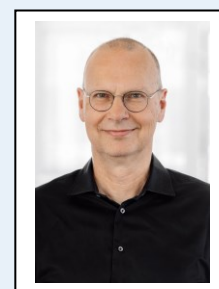
RWTH Aachen University

Department of Computer Science

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<https://scholar.google.de/citations?user=Sou5ih0AAAAJ&hl=en>

### Working group vision and contribution to catalaix

The research focus of the group is on methodological and theoretical foundations of computer science. The range of topics extends from fundamental mathematical questions to concrete applications in physics, electrical engineering, or chemical engineering. An area that has gained importance in the work of the group in recent years is the development of machine learning methods, specifically learning methods for complex structured data such as networks and graphs. These methods are the bases of our contribution to catalaix. Here we can build on a well-established collaboration with Chemical Engineering at RWTH.

### Current & Previous Positions

Since 2012	Professor (W3) for Logic and the Theory Discrete Systems, RWTH Aachen University
2003 – 2012	Professor (W3) for Theoretical Computer Science, Humboldt University Berlin
2001 – 2003	Reader, Laboratory for Foundations of Computer Science, University of Edinburgh
2000 – 2001	Assistant Professor, Department of Mathematics, University of Illinois at Chicago
1996 – 2000	Hochschulassistent, Department of Mathematics, Albert-Ludwigs University Freiburg
1995 – 1996	Visiting Scholar, Stanford University und University of California in Santa Cruz
1992 – 1995	Teaching and Research Assistant, Department of Mathematics, Freiburg

### Education

1998	Habilitation in Mathematics, Albert-Ludwigs University Freiburg
1992 – 1994	PhD in Mathematics, Freiburg
1987 – 1992	Diplom in Mathematics, Freiburg

### Fellowships and Awards

2017	ACM Fellow
1999	Heinz-Maier-Leibnitz Award of the DFG (German Research Foundation)

### Contributions to the Science System

Since 2020	Elected member of the DFG Review Board for Computer Science
2017 – 2019	Head of the Computer Science Department, RWTH Aachen
2016 – 2018	General Chair IEEE Symposium on Logic in Computer Science
2008 – 2010	Head of the Computer Science Department, Humboldt University Berlin
Since 2008	Program Committee Chair <i>International Colloquium on Automata, Languages, and Programming (ICALP 2024, Track B)</i> , <i>ACM SIGMOD-SIGACT-SIGART Symposium on</i>



*Principles of Database Systems (PODS 2014), IEEE Symposium on Logic in Computer Science (LICS 2011), Co-chair International Workshop Parameterized and Exact Computation (IPEC 2008)*

Since 2004 Editor of various journals, among them *Journal of Symbolic Logic, SIAM Journal on Discrete Mathematics, Journal of the ACM*

### Selected Projects

- Since 2022 ERC Advanced Grant “Symmetry and Similarity”  
2018 – 2023 German-Israeli Cooperation Project (DIP) “Quantitative Reasoning about Database Queries”  
2013 – 2017 DFG Koselleck Project „Logic, Structure and the Graph Isomorphism Problem”

### Most important Scientific Contributions

J. Tönshoff, B. Kisin, J. Lindner, and M. Grohe. *One Model, Any CSP: Graph Neural Networks as Fast Global Search Heuristics for Constraint Satisfaction*. In Proc. of the 32nd International Joint Conference on Artificial Intelligence, pp.4280-4288, 2023. ([Doi: 10.24963/ijcai.2023/476](https://doi.org/10.24963/ijcai.2023/476))

C. Morris, F. Geerts, J. Tönshoff, and M. Grohe. *WL meets VC*. In Proc. of the International Conference on Machine Learning, pp.25275-25302, 2023. (<https://proceedings.mlr.press/v202/morris23a.html>)

C.-F. Schön, S. van Bergerem, C. Mattes, A. Yadav, M. Grohe, L. Kobbelt und M. Wuttig. *Classification of material properties and their relation to chemical bonding: Essential steps towards the inverse design of materials with tailored functionalities*. Science Advances 47(8), 2022. ([Doi: 10.1126/sciadv.ade0828](https://doi.org/10.1126/sciadv.ade0828))

M. Grohe and P. Lindner. *Independence in Probabilistic Databases*. Journal of the ACM 69(6), 2022. ([Doi: 10.1145/3559102](https://doi.org/10.1145/3559102))

A.M. Schweidtmann, J.G. Rittig, A. König, M. Grohe, A. Mitsos, and M. Dahmen. *Graph Neural Networks for Prediction of Fuel Ignition Quality*. Energy and Fuels 34(9):11395-11407, 2020. ([Doi:10.1021/acs.energyfuels.0c01533](https://doi.org/10.1021/acs.energyfuels.0c01533))

C. Morris, M. Ritzert, M. Fey, W. Hamilton, J.E. Lenssen, G. Rattan, and M. Grohe. *Weisfeiler and Leman go neural: Higher-order graph neural networks*. In Proc. of the 33rd AAAI Conference on Artificial Intelligence, volume 4602-4609. AAAI Press, 2019 ([Doi:10.1609/aaai.v33i01.33014602](https://doi.org/10.1609/aaai.v33i01.33014602)).

M. Grohe, S. Kreutzer, and S. Siebertz. *Deciding first-order properties of nowhere dense graphs*. Journal of the ACM, 64(3), 2017 ([Doi:10.1145/3051095](https://doi.org/10.1145/3051095)).

M. Grohe. *Descriptive Complexity, Canonisation, and Definable Graph Structure Theory*. 554 pages, Cambridge University Press, 2017 ([ISBN: 9781107014527](https://doi.org/10.1017/9781107014527)).

A. Atserias, M. Grohe, and D. Marx. *Size bounds and query plans for relational joins*. SIAM Journal on Computing, 42(4):1737–1767, 2013 ([Doi:10.1137/110859440](https://doi.org/10.1137/110859440)).

M. Grohe. *The complexity of homomorphism and constraint satisfaction problems seen from the other side*. Journal of the ACM, 54(1), 2005 ([Doi:10.1145/1206035.1206036](https://doi.org/10.1145/1206035.1206036)).