Prof. Dr.
**Martin J. Lercher**

Heinrich-Heine- University
Universitaetsstr. 1
D-40225 Duesseldorf
Tel: +49 211 81-10546
lercher [at] cs.uni-duesseldorf.de

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**Evolution of Molecular Networks**

How do complex molecular systems evolve? Which types of genes are gained and lost in response to environmental changes? How are such new genes integrated into the regulatory circuits of an organism? Horizontal gene transfer among bacteria provides a rich data source for the study of these phenomena. We found that genes gained or lost by the metabolic network of E. coli act mostly at the cell's interface to the environment, and are generally environment specific. Constraining evolution to gene losses, as has happened in endosymbionts, even allows the model-based prediction of evolutionary outcomes. While newly added components need to be active immediately to provide selective advantages, their regulatory fine-tuning proceeds surprisingly slowly, often spanning millions of years.

## CV

### Education

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|---|---|
| 1988 - 1992 | University of Cologne / Max-Planck-Institute for Neurological Research<br>**Diplom in Physics**<br>Additional studies in Mathematics, Medicine, Philosophy |
| 1992 - 1996 | University of Cambridge (UK)<br>**Ph.D. in Theoretical Physics** |
| 2005 | University of Cologne<br>**Habilitation in Genetics**: "The evolution of human genomic anatomy" |

### Professional Experience

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|---|---|
| 09/1986 - 04/1988 | Community service instead of military service |
| 04/1996 - 12/1999 | Matratzen Concord AG, Cologne (retail chain) |
| from 05/1998 | CEO of three international subsidiary companies |
| from 10/1998 | Global Sales Manager (managing 270 stores) |
| 01/2000 - 09/2000 | Max-Planck-Institute for Neurological Research, Cologne<br>Research scientist (Medical Informatics) |
| 09/2000 – 12/2006 | University of Bath (UK) |
| until 08/2003 | Wellcome Trust Advanced Training Fellow |
| from 09/2003 | Royal Society University Research Fellow |
| 09/2004 – 08/2006 | European Molecular Biology Lab (EMBL), Heidelberg<br>Guest-Groupleader/DFG Heisenberg-Fellow |
| from 01/2007 | Full Professor of Bioinformatics, University of Duesseldorf, Germany |