

## Prof. Dr.-Ing. Lars M. Blank

(\*27.11.1969, married, one child: 2006)

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<https://scholar.google.de/citations?user=tLeiH7gAAAAJ&hl=en>

### Working group vision and contribution to catalaix

We focus in our research on fundamental and applied aspects of microbial metabolism. Of specific interest is the interaction between the metabolic network and the introduced genetic and environmental perturbations. The research on in silico/in vivo metabolic network operation is aimed at a deeper understanding of cell function, with the ultimate goal of rational microbe engineering. The engineered microbes use renewable carbon sources (biomass, CO<sub>2</sub>, waste (e.g., plastic)) as substrates for the production of valuable molecules and materials. In Catalaix we foster our vision “from plastic waste to plastic value” by exploiting the metabolic funnel of microbes, e.g., for the production of novel plastic monomers and bioplastic.

### Current & Previous Positions

Since 2011	Univ.-Prof. Institute of Applied Microbiology – iAMB, at RWTH Aachen University
2010 – 2011	Group leader „Systems Biotechnology“ (Akademischer Oberrat), Chair of Chemical Biotechnology, TU Dortmund
2004 – 2010	Group leader „Systems Biotechnology“ (Akademischer Rat), Chair of Chemical Biotechnology, TU Dortmund
2002 – 2004	Postdoc Institute of Biotechnology, ETH Zurich, Switzerland
1999	Research Scientist, Institute of Microbiology, DtU, Lyngby, Denmark
1998 – 2002	PhD Student University of Queensland, Brisbane, Australia
1997	Research Student, Chemical Engineering Dept., Northwestern University, Evanston, USA
1994	Visiting Student, Kyoto University, Japan

### Education

2004 – 2010	<b>Habilitation</b> , Microbiology and Systems Biotechnology, TU Dortmund, Germany
1998 – 2002	<b>PhD</b> with Prof. Lars K. Nielsen at University of Queensland, Brisbane, Australia
1992 – 1997	<b>Diploma of Biology</b> , Ruhr University Bochum, Germany
1990 – 1997	<b>Diploma of Chemical Engineering</b> , Technical University Dortmund, Germany

### Fellowships and Awards

2014	1 <sup>st</sup> prize in the category transfer of the competition „ZukunftfindenNRW“ of PROvendis – Wichmann, R, T. Tiso, B. Küppers, F. Rosenau, A. Wittgens, and L. M. Blank
2014	Indo-German Centre for Sustainability – IGCS, travel stipend, including Hyderabad and Chennai and the IIT Madras and Anna University, India
2013	2 <sup>nd</sup> prize in the category science of the competition „ZukunftfindenNRW“ of PROvendis – Fritzsche, F, L. M. Blank, and Andreas Schmid
since 2012	<b>Guest Professor at TU Graz</b> “Systems Biotechnology”
2010	DAAD conference stipend, Metabolic Engineering Conference VIII, Jeju, Korea
2008	1 <sup>st</sup> prize and patent prize at the G-DUR ideas competition ( <a href="http://www.g-dur-online.de">www.g-dur-online.de</a> ), Kortmann, H., L. M. Blank, and A. Schmid, Dortmund

2008	DFG travel stipend, Metabolic Engineering Conference VII, Puerto Vallarta, Mexico
2007	DFG stipend for a seminar series in the USA
2007 – 2010	Erasmus stipends for exchange of teaching staff, block course: Systems Biotechnology, Graz, Austria
2007 – 2011	<b>Distinguished Lecturer at TU Graz</b>
2003 – 2004	PostDoc stipend of the Deutsche <b>Akademie der Naturforscher Leopoldina</b> (Halle, Saale), ETH Zurich, Switzerland
2003	Stipend of the Huber Kudlich foundation, Zurich, Switzerland for the conference Yeast 2003, Göteborg, Sweden
1999	Travel stipend of the University of Queensland, Brisbane, Australia
1998 – 2002	Stipend for tuition fees of Chemical Engineering Department, the University of Queensland, Brisbane, Australia
1998 – 2002	University of Queensland postgraduate research scholarship ( <b>UQPRS</b> ), Australia
1997	Martin-Schmeißer-foundation stipend, University of Dortmund, Germany

### Contributions to the science system

since 2023	Member of the <b>EU Advisory Board</b> of RWTH Aachen University
2018 – 2022	Member of the Haushalts- und Strukturkommission, RWTH Aachen University
2016 – 2018	<b>Vice-dean of ABBt</b> - Aachen Biology and Biotechnology
since 2018	Associate Editor - Metabolic Engineering
since 2015	Associate Editor - Microbial Biotechnology
since 2014	Associate Editor - Fungal Biology and Biotechnology
since 2014	Associate Editor - Metabolic Engineering Communication
since 2012	Associate Editor - Bioprocess and Biosystems Engineering
since 2011	Associate Editor - Engineering in Life Sciences
since 2011	Member „Synthetic and Systems Biology“, DECHEMA
2008 – 2013	Member, later speaker of the Zukunftsforums of the DECHEMA

### Selected Projects

2022 – 2026	Core PI DFG CRC “MibiNet“
2020 – 2024	Coordinator of the EU H2020 RIA project MIX-UP: Mixed plastic degradation and upcycling using microbial communities ( <a href="http://www.mix-up.eu">www.mix-up.eu</a> )
2020 – 2023	Coordinator of the BMBF project METAFOR - Conversion of C1 compounds into platform chemicals by the yeast <i>Ogataea polymorpha</i>
2020 – 2023	Coordinator of the BMBF Project MeY4bioPP - Metabolic engineering of baker’s yeast for the production of bio-polyphosphate
2019 – 2025	Core PI DFG Cluster of excellence “The Fuel Science Center“
2019 – 2027	Core PI DFG CRC “The gut liver axis“
2015 – 2019	Coordinator of the EU H2020 RIA project P4SB: From plastic waste to plastic value using <i>Pseudomonas putida</i> synthetic biology

### Most important scientific contributions

Publications listed reflect our contributions for the last 8 years to plastic recycling and upcycling using engineered microbes. While the focus was mainly on PET, it now is on mixed plastic monomer use.

1. Tiso T, Winter B, Wei R, Hee J, de Witt J, Wierckx N, Quicker P, Bornscheuer UT, Bardow A, Nogales J, Blank LM. The metabolic potential of plastics as biotechnological carbon sources - Review and targets for the future. *Metab Eng.* 2022;71:77-98.
2. Tiso T, Narancic T, Wei R, Pollet E, Beagan N, Schröder K, Honak A, Jiang M, Kenny ST, Wierckx N, Perrin R, Avérous L, Zimmermann W, O'Connor K, Blank LM. Towards bio-upcycling of polyethylene terephthalate. *Metab Eng.* 2021 Jul;66:167-178

3. RNC Utomo, WJ Li, T Tiso, C Eberlein, M Doeker, HJ Heipieper, A Jupke, LM Blank, Defined microbial mixed culture for utilization of polyurethane monomers, *ACS Sustainable Chemistry & Engineering* 2020, 8 (47), 17466-17474
4. Wei R., Tiso T, Bertling J, O'Connor K, Blank LM, Bornscheuer U. Possibilities and limitations of biotechnological plastic degradation and recycling. *Nat Catal.* 2020, 3, 867–871
5. Liu J, He J, Xue R, Xu B, Qian X, Xin F, Blank LM, Zhou J, Wei R, Dong W, Jiang M. Biodegradation and up-cycling of polyurethanes: Progress, challenges, and prospects. *Biotechnol Adv.* 2021;48:107730
6. Welsing G, Wolter B, Hintzen HMT, Tiso T, Blank LM. Upcycling of hydrolyzed PET by microbial conversion to a fatty acid derivative. *Methods Enzymol.* 2021;648:391-421.
7. Blank LM, Narancic T, Mampel J, Tiso T, O'Connor K. Biotechnological upcycling of plastic waste and other non-conventional feedstocks in a circular economy. *Curr Opin Biotechnol.* 2020;62:212-219
8. J Deischer, K Schute, DS Neves, BE Ebert, LM Blank, R Palkovits Aromatisation of bio-derivable isobutyraldehyde over HZSM-5 zeolite catalysts. *Green Chemistry* 21 (7), 1710-1717
9. Li WJ, Jayakody LN, Franden MA, Wehrmann M, Daun T, Hauer B, Blank LM, Beckham GT, Klebensberger J, Wierckx N. Laboratory evolution reveals the metabolic and regulatory basis of ethylene glycol metabolism by *Pseudomonas putida* KT2440. *Environ Microbiol.* 2019;21(10):3669-3682
10. Wierckx N, Prieto MA, Pomposiello P, de Lorenzo V, O'Connor K, Blank LM. Plastic waste as a novel substrate for industrial biotechnology. *Microb Biotechnol.* 2015;8(6):900-3

## Patents

For the last 20+ years we are contributing ideas that became intellectual properties. They cover changes of microbial metabolism and targets for yeast-like growth of fungi (morphology engineering).

1. Ebert BE, Blank LM. Sequence for protein decay, 2023, WO2023084011A1. Assignee: Ebert/Blank
2. Christ JJ, Blank LM. Zusammensetzung, enthaltend getrocknetes Polyphosphat und Verfahren zur Gewinnung von Polyphosphat aus polyphosphat-haltigen Hefezellen dazu, 2019, DE 10 2019 131 561.1. Assignee: RWTH Aachen University
3. Christ JJ, Blank LM, Polyphosphatreiche Hefeextrakte und Herstellverfahren dazu, 2018, DE 10 2018 130 081.6 und PCT/EP2019/082709. Assignee: RWTH Aachen
4. H. H. Tehrani, L. M. Blank, N. Wierckx. Morphologic engineering in basidiomycota, 2017, EP3578636A1. Assignee: RWTH Aachen University
5. Blank L. M., N. Wierckx, T. Zambanini, E. Sarikaya J. Buescher, G. Meurer. Process for the production of malate. 2016, WO2016103140. Assignee: BRAIN AG
6. Blank L. M., Tiso, T., Germer, A., Extracellular production of designer hydroxyalkanoyloxy alkanolic acids with recombinant bacteria, 2016, WO2017006252A1. Assignee: RWTH Aachen
7. M. Bölker, W. Buckel, E. Geiser, S. Przybilla, N. Wierckx, L.M. Blank. Means and methods for itaconic acid production. 2015 WO2015140314. Assignee: Philipps-University Marburg, RWTH Aachen University
8. Blank, L. M., F. Rosenau, S. Wilhelm, T. Tiso, A. Wittgens, Recombinant rhamnolipid production, submitted, EP 2573172 A1, 2011 (Transfer price of PROVENDIS)
9. Karau, A, V. Sieber, T. Haas, H. Häger, K. Grammann, B. Bühler, L. M. Blank, and A. Schmid,  $\omega$ -amino carboxylic acids,  $\omega$ -amino carboxylic acid esters, or recombinant cells which produce lactams thereof, 2009, WO/2009/077461. Assignee: EVONIK
10. Blank, L. M., B. J. Koebmann, and P. R. Jensen, Method of improving biomass yield of lactic acid bacterial cultures, 2002, WO 02/02747 A2