Curriculum Vitae –Prof. Dr. Robert Kourist

Full Professor for Molecular Biotechnology
Graz University of Technology
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Date of Birth: 20th April 1980
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Education History

04/2006 – 09/2008	**Doctoral studies (Ph.D.) in Biotechnology** at Greifswald University. Title: *Studies on the Enzymatic Synthesis of Optically Pure Tertiary Alcohols* (supervisor: Prof. Dr. Uwe Bornscheuer).
10/2000-03/2006	**German Diploma in Biochemistry**.
07/2003-05/2004	**ERASMUS scholarship** at the University of Oviedo, Spain. (Prof. Dr. Vicente Gotor). Chemoenzymatic preparation of optically pure building blocks.

Employment History

Since 01/2017	**Full Professor for Molecular Biotechnology,** Graz University of Technology. Head of Institute.
04/2012-12/2016	**Junior professor (W1) with Tenure Track Option for Microbial Biotechnology** at the Ruhr-Universität Bochum, Faculty of Biology and Biotechnology..
01/2011-04/2012	**Research Assistant** at the Chair of Chemistry of Biogenic Resources, Technical University of Munich, Germany (Prof. Volker Sieber).
07/2009-12/2010	**Junior researcher** with a grant from the Venture Cup Mecklenburg Vorpommern at the Greifswald University (Prof. Uwe Bornscheuer).
07/2009-07/2010	Japanese Society for the Promotion of Science (JSPS) **Fellowship** at the Department of Bioscience and Informatics, Keio University, Japan (Prof. Kenji Miyamoto).
06/2008-07/2009	**Research assistant** in the Biotechnology and Enyzme Catalysis group, Greifswald University.
07/2004-10/2004	**Internship** at the Service Center Biocatalysis of Degussa AG, Hanau, Germany. Immobilization of enzymes.

Scholarships and awards

2015	Member of the **Young College** of the Academy of Sciences of the state of North-Rhine Westfalia
2013	Member of the **Global Young Faculty** of the Mercator Research Center Ruhr, Mercator Foundation.
2011	**Starting allowance** of € 10.000.- for young researchers from the Fonds der Chemischen Industrie, FCI
2009	**JSPS fellowship** for a research stay at Keio University, Yokohama.
2009	**VentureCup Mecklenburg Vorpommern**. First prize of € 130.000 as junior researcher.
2009	**DSM Science and Technology Award North.**

Activities for the scientific community

- Co-organizer of the conference “New Reaction Concepts for Industrial Biotechnology”, Bielefeld, April 2018.

- Coordinator of the MSCA-EID “BIOCASCADES“ www.Biocascades.eu

- Coordinator of the MSCA-EJD “PhotoBioCat”.

- Member of the Early-Career-Researchers Board of the RUB Research School +

Memberships

DGF – Deutsche Gesellschaft für Fettwissenschaften e.V.

Dechema – Gesellschaft für Chemische Technik und Biotechnologie e.V.

Society of the German JSPS-Fellows e.V.

Austrian Society of Chemistry (GÖCh)

List of Publiations

1. Publications in peer-reviewed journals

1. S. Böhmer, K. Köninger, Á. Gómez-Baraibar, S. Bojarra, C. Mügge, S. Schmidt, M. M. Nowaczyk, R. Kourist, (2017), Enzymatic Oxyfunctionalization Driven by Photosynthetic Water-Splitting in the Cyanobacterium *Synechocystis* sp. PCC 6803, *Catalysts*, **7**, 240.
2. O. N. Kracht, A.-C. Ammann, J. Stockmann, D. Wibberg, J. Kalinowski, M. Piotrowski, R. Kerr, T. B. Brück and R. Kourist (2017). Transcriptome Profiling of the Australian arid-land Plant Eremophila serrulata for the Identification of Monoterpene synthases. *Phytochemistry*, **136**, 15-22.
3. Assmann M, Mügge C, Gassmeyer SK, Hilterhaus L, Kourist R, Liese A, Kara S (2017) Reaction engineering of biocatalytic (*S*)-naproxen synthesis integrating in-line process monitoring by Raman spectroscopy. *React. Chem. Eng.*: in press
4. Á. Gómez-Baraibar, D. Reichert, C. Mügge, S. Seger, H. Gröger and R. Kourist (2016). "A sequential one-pot cascade reaction combining an encapsulated decarboxylase with metathesis for the synthesis of bio-based antioxidants." *Angew. Chem., Int. Ed.*: **55**, 14823–14827.
5. J. Maimanakos, J. Chow, S. Gaßmeyer, R. Kourist, W. R. Streit, (2016). "Sequence-based screening for rare enzymes: new insights into the world of AMDases." *Front. Microbiol.*: DOI: 10.3389/fmicb.2016.01332.
6. Miyamoto, K. and R. Kourist (2016). "Arylmalonate decarboxylase – a highly selective bacterial biocatalyst with unknown function." *Appl. Microbiol. Biotechnol.*: DOI: 10.1007/s00253-016-7778-z
7. Köninger, K., A. Gomez-Baraibar, C. Mügge, C. Paul., F. Hollmann, M. Nowaczyk and **R. Kourist*** (2016). "Recombinant cyanobacteria as tools for asymmetric C=C bond reduction fueled by biocatalytic water oxidation." *Ang. Chem., Int. Ed.*: **55**, 5582-5585.
8. Busch, F., N. Hülsemann, J. Enoki, K. Miyamoto, M. Bocola* and **R. Kourist*** (2015). "Semiempirical QM/MM calculations reveal a step-wise proton transfer and an unusual thiolate pocket in the mechanism of the racemizing mutant G74C of arylmalonate decarboxylase." *Cat. Sci. Technol.*: **6**, 4937-4944.
9. Enoki, J., J. Meisborn, A. Müller and **R. Kourist*** (2016). "A multi-enzymatic cascade reaction for the stereoselective production of γ-oxyfunctionalyzed amino acids." *Front. Microbiol.: DOI: 10.3389/fmicb.2016.00425.*
10. Schrepfer, P., A. Buettner, C. Goerner, M. Hertel, J. van Rijn, F. Wallrapp, W. Eisenreich, V. Sieber, R. Kourist and T. Brück (2016). "Identification of amino acid networks governing catalysis in the closed complex of class I terpene synthases." *Proc. Natl. Acad. Sci. U.S.A.*: DOI 10.1073/pnas.1519680113
11. Köninger, K., M. Grote, I. Zachos, F. Hollmann and **R. Kourist** (2016). "Light-driven Enzymatic Decarboxylation." JoVE (111).
12. S. K. Gaßmeyer, J. Wetzig, C. Mügge, M. Assmann, J. Enoki, L. Hilterhaus, R. Zuhse, K. Miyamoto, A. Liese and **R. Kourist***. Arylmalonate decarboxylase-catalyzed asymmetric synthesis of both enantiomers of optically pure flurbiprofen. (2015) *ChemCatChem*: **8**, 916-921.
13. **R. Kourist**, F. Bracharz, J. Lorenzen, O. Kracht, M. Chovatia, C. Daum, S. Deshpande, A. Lipzen, M. Nolan, R. A. Ohm, I. V. Grigoriev, S. Sun, J. Heitman, T.

Brück, and M. Nowrousian, Genomics and transcriptomics of the oil-accumulating basidiomycete yeast Trichosporon oleaginosus: insights into substrate utilization and alternative evolutionary trajectories of fungal mating systems (2015) *mBio*: **6**, *e00918-15.*

14. S. K. Gaßmeyer, H. Yoshikawa, J. Enoki, N. Hülsemann, R. Stoll, K. Miyamoto and **R. Kourist***, STD-NMR based protein engineering of the unique arylpropionate-racemase AMDase G74C (2015), *ChemBioChem,* **16**, 1943-1949.
15. M. Bartsch, S. K. Gaßmeyer, K. Köninger, K. Igarashi, P. Liauw, N. Dyczmons-Nowaczyk, K. Miyamoto, M. M. Nowaczyk, **R. Kourist***, Photosynthetic Production of Enantioselective Biocatalysts (2015) *Microb. Cell Fact.*: **14**, 53.
16. S, Yoshida, J. Enoki, **R. Kourist**, K. Miyamoto, Engineered hydrophobic pocket of (*S*)-selective arylmalonate decarboxylase variant by simultaneous saturation mutagenesis to improve catalytic performance, *Biosc. Biotechnol, Biochem*: 1965-1971.
17. **R. Kourist**, A New Class of Enzymes Discovered: Non-heme Oxidase Produces Medium-chain 1-Alkenes (2015) *Angew. Chem., Int. Ed.*: **54**, 4156-4158.
18. T. Masuch, A. Kusnezowa, S. Nilewski, J. T. Bautista, **R. Kourist** and L. I. Leichert (2015). "A combined bioinformatics and functional metagenomics approach to discovering lipolytic biocatalysts." *Front. Microbiol.*: **6**, DOI: 10.3389/fmicb.2015.01110
19. S. Yoshida, J. Enoki, R. Hemmi, **R. Kourist**, N. Kawakami, and K. Miyamoto, Draft genome sequence of *Bordetella bronchiseptica* KU1201, the first isolation source of arylmalonate decarboxylase (2015) *Genome Ann.,* **3**, e00373-15.
20. I. Zachos, S.K. Gaßmeyer, D. Bauer, V. Sieber, F. Hollmann, **Robert Kourist**,* Photobiocatalytic decarboxylation for olefin synthesis (2015) *Chem. Commun.*: **51**, 1918-1921.
21. **R. Kourist**, J.-K. Guterl, K. Miyamoto, V. Sieber, Enzymatic decarboxylation—an emerging reaction for chemicals production from renewable resources (2014) *ChemCatChem*, **6**, 689-701.
22. T. Brück, **R. Kourist**, B. Loll, Production of Macrocyclic Sesqui and Diterpenes in Heterologous Microbial Hosts: A Systems Approach to Harness Nature's Molecular Diversity (2014) *ChemCatChem*, **6**, 1142-1165.
23. R. Wada, T. Kumon, **R. Kourist**, H, Ohta, D. Uemura, S. Yoshida, K. Miyamoto, Thermally driven asymmetric domino reaction catalyzed by a thermostable esterase and its variants (2013) *Tetrahedron Letters* (IF 2.8), **15**, 1921-1923.
24. H. Brundiek, A.S. Evitt, **R. Kourist**, U.T. Bornscheuer, Creation of a lipase highly selective for trans fatty Acids by protein engineering (2012) *Angewandte Chemie International Edition* (IF: 11.3), **51**, 412-414.
25. H. Brundiek, S.K. Padhi, A. Evitt, **R. Kourist**, U.T. Bornscheuer, Altering the scissile fatty acid binding site of Candida antarctica lipase A by protein engineering for the selective hydrolysis of medium chain fatty acids (2012) *European Journal of Lipid Science and Technology* (IF 2.0), **114**, 1148-1153.
26. H. Brundiek, S. Sass, A.S. Evitt, **R. Kourist**, U.T. Bornscheuer, The short form of the recombinant CAL-A-type lipase UM03410 from the smut fungus *Ustilago maydis* exhibits an inherent trans fatty acid selectivity (2012) *Applied Microbiology and Biotechnology* (IF 3.8), **94**, 141-150.
27. J. Rehdorf,G.A. Behrens, G.S. Nguyen, **R. Kourist**, U.T. Bornscheuer, Pseudomonas putida esterase contains a GGG(A)X-motif confering activity for the

kinetic resolution of tertiary alcohols (2012) *Applied Microbiology and Biotechnology* (IF 3.8), 1119-26.

28. **R. Kourist**, Y. Miyauchi, D. Uemura, K. Miyamoto, Engineering the promiscuous racemase activity of arylmalonate decarboxylase (2011) *Chemistry – A European Journal* (IF 5.7)*,* **17**, 557-563.
29. Y. Miyauchi, **R. Kourist**, D. Uemura, K. Miyamoto, Dramatically improved catalytic activity of an artificial (*S*)-selective arylmalonate decarboxylase by structure-guided directed evolution (2011), *Chemical Communications* (IF: 6.8), **47**, 7503-7505.
30. S. Herter, G.S. Nguyen, M.L. Thompson, F. Steffen-Munsberg, F. Schauer, U.T. Bornscheuer, **R. Kourist***, Comparative analysis of tertiary alcohol esterase activity in bacterial strains isolated from enrichment cultures and from screening strain libraries (2011) *Applied Microbiology and Biotechnology* (IF 3.8)*,* **90**, 929-939.
31. G.S. Nguyen, M.L. Thompson, G. Grogan, U.T.Bornscheuer, **R. Kourist***, Identification of novel esterases for the synthesis of sterically demanding chiral alcohols by sequence-structure guided genome mining (2011) *Journal of Molecular Catalysis B: Enzymatic* (IF 2.8), **70**, 88–94.
32. K. Engelmark Cassimjee, **R. Kourist**, G, D. Lindberg, M. Wittrup Larsen, N. H. Thanh, M. Widersten, U. T. Bornscheuer and P. Berglund, One-Step Enzyme Extraction and Immobilisation for Biocatalysis Applications (2011) *Biotechnology Journal* (IF 3.7), **6**, 463–469.
33. **R. Kourist***, Pablo Domínguez de María, Kenji Miyamoto, Biocatalytic approaches for a sustainable synthesis of profens – recent trends and developments (2011), *Green Chemistry* (IF 6.8), 2607-2618.
34. **R. Kourist**, U.T. Bornscheuer, Biocatalytic synthesis of optically active tertiary alcohols (2011) *Applied Microbiology and Biotechnology* (IF 3.8), **91**, 505-517.
35. **R. Kourist**, H.Jochens, S. Bartsch, S. K. Padhi, M. Gall, D. Böttcher R. Kuipers, H.-J. Joosten, U. T. Bornscheuer, ABHDB – A molecular class specific information system as a tool for the protein engineering of α/β-fold hydrolases – principle and applications (2010) *ChemBioChem* (IF 3.0), **11**, 1635-1643.
36. Bassegoda, G.S. Nguyen, M. Schmidt, **R. Kourist**, P. Diaz, U. T. Bornscheuer, Rational protein Design of *Paenibacillus barcinonensis* esterase EstA for kinetic resolution of tertiary alcohols (2010) *ChemCatChem* (IF 5.0), **2**, 962-967.
37. G.S. Nguyen, **R. Kourist**, M. Paravidino, A. Hummel, J. Rehdorf, R. V. A. Orru, U. Hanefeld and U. T. Bornscheuer (2010) An enzymatic toolbox for the kinetic resolution of 2-(pyridinyl)but-3-yn-2-ols and tertiary cyanohydrins (2010) *European Journal of Organic Chemistry* (IF 3.1), 14, 2753-2758.
38. M. Gall, **R. Kourist**, M. Schmidt, U. T. Bornscheuer, The role of the GGGX-motif on activity and enantioselectivity of pig liver esterase towards tertiary alcohols (2010) *Biocatalysis and Biotransformation* (IF 1.1), **28**, 201-208.
39. M. Theurer, P. Fischer, A. Baro, G.S. Nguyen, **R. Kourist**, U.T. Bornscheuer, S. Laschat, Formation of chiral tertiary homoallylic alcohols via Evans aldol reaction or enzymatic resolution and their influence on the Sharpless asymmetric dihydroxylation (2010) *Tetrahedron* (IF 2.8), **66**, 3814-3823.
40. E. Fernandez-Alvaro, **R. Kourist**, J. Winter, D. Böttcher, K. Liebeton, Jürgen Eck, Christian Naumer, Karl-Erich Jäger, Wolfgang Streit, U. T. Bornscheuer, Enantioselective kinetic resolution of phenylalkyl carboxylic acids using metagenome-derived esterases (2009) *Microbial Biotechnology* (IF 3.0), **3**, 59-64.

41. M. Wiggers, J. Holt, **R. Kourist**, S. Bartsch, I. Arends, A. J. Minnaard, U. T. Bornscheuer, U. Hanefeld, Probing the enantioselectivity of *Bacillus subtilis* esterase BS2 for tert. alcohols (2009) *Journal of Molecular Catalysis B: Enzymatic* (IF 2.8), **60**, 82-86.
42. **R. Kourist**, H. Brundiek, U. T. Bornscheuer, Protein engineering and discovery of lipases (2009) *European Journal of Lipid Science and Technology*, 112, 64-74.
43. **R. Kourist**, P. Domínguez de María and U. T. Bornscheuer, Enzymatic synthesis of optically active tertiary alcohols: expanding the biocatalysis toolbox (2008) *ChemBioChem*, 9, 4, 491-498.
44. **R. Kourist**, M. Höhne, U. T. Bornscheuer, Protein Design: Im Spannungsfeld zwischen gerichteter Evolution und rationalen Design (2009) *Chemie in unserer Zeit*, 43, 132-14.
45. S. Bartsch, **R. Kourist**, and U. T. Bornscheuer, Complete inversion of enantioselectivity towards acetylated tertiary alcohols by a double mutant of a *Bacillus subtilis* esterase (2008) *Angewandte Chemie International Edition*, **47**, 8, 1508-1511.
46. **R. Kourist**, G.S. Nguyen, D. Strübing, D. Böttcher, K. Liebeton, C. Naumer, J. Eck, U. T. Bornscheuer, Hydrolase-catalysed stereoselective preparation of protected α,α-dialkyl-α-hydroxycarboxylic acids (2008) *Tetrahedron: Asymmetry*, **19**, 5, 1839-1843.
47. **R. Kourist**, S. Bartsch, L. Fransson, K. Hult, and U. T. Bornscheuer, Understanding promiscuous amidase activity of an esterase from *Bacillus subtilis* (2007) *ChemBioChem*, **9**, 1, 67-69.
48. **R. Kourist**, S.H. Krishna, J. S. Patel, F. Bartnek, T. S. Hitchman, D. P. Weiner and U. T. Bornscheuer, Identification of a metagenome-derived esterase with high enantioselectivity in the kinetic resolution of arylaliphatic tertiary alcohols (2007) *Organic and Biomolecular Chemistry*, **5**, 20, 3310-3313.
49. **R. Kourist**, S. Bartsch, and U. T. Bornscheuer, Highly enantioselective synthesis of arylaliphatic tertiary alcohols using mutants of an esterase from *Bacillus subtilis* (2007) *Advanced Synthesis and Catalysis*, **349**, 8-9, 1393-1398.
50. B. Heinze, **R. Kourist**, L. Fransson, K. Hult and U. T. Bornscheuer, Highly enantioselective kinetic resolution of two tertiary alcohols using mutants of an esterase from *Bacillus subtilis* (2007) *Protein Engineering Design & Selection*, **20**, 125-131.
51. M. Schmidt, E. Henke, B. Heinze, **R. Kourist**, A. Hidalgo, Uwe T. Bornscheuer, A versatile esterase from *Bacillus subtilis*: cloning, expression, characterization, and its application in biocatalysis (2007) *Biotechnology Journal*, **2**, 2, 249-253.
52. **R. Kourist**, J. Gonzales-Sabín, R. Liz Guiral, F. Rebolledo, Kinetic resolution of 1-biaryl- and 1-(pyridylphenyl)alkan-1-ols catalysed by the lipase B from *Candida antarctica*, (2005) *Advanced Synthesis and Catalysis*, **347**, 5, 695-702.

2. Book chapter

53. **R. Kourist**, U.T. Bornscheuer*, Biocatalysis (2014), in: Applied Homogenous Catalysis with Organometallic Compounds: A Comprehensive Handbook in Three

Volumes. Editors: B. Cornils, W.A. Hermann, M. Beller, A. Renken, R. Paciello. ISBN: **978-3-527-32897-0**

54. K. Miyamoto*, S. Yoshida, **R. Kourist** and H. Ohta, Asymmetric Decarboxylation of Arylmalonates and Racemization of Profens by Arylmalonate Decarboxylase and its Variants (2012) in: C–C Bond Formation and Decarboxylation, Practical Methods in Biocatalysis. John Whittall, Peter Sutton (Editors), Wiley VCH
55. **R. Kourist***, S. Herter, U.T. Bornscheuer (2015) Identification of new biocatalysts for the enantioselective conversion of tertiary alcohols in "Practical Methods in Biocatalysis and Biotransformations" Editor: Wolfgang Kroutil. *in press*
56. **R. Kourist***, S. Gassmeyer, (2015) Biocatalysis and Protein Engineering, in: Biotechnology. Editors: U. Kück, Nicole Frankenberg-Dinkel.
57. U.T. Bornscheuer and **R. Kourist*** (2016), in: Evolving Enzymes for Biocatalysis, Handbook of Hydrocarbon and Lipid Microbiology Series. Consequences of Microbial Interactions with Hydrocarbons, Oils and Lipids, edited by Sang Yup Lee, doi:10.1007/978-3-319-31421-1_217

3. Patents

58. Kourist, R., Zuhse, R. Verfahren zur Herstellung von 2-Aryl-2-Allyl-malonsäuren, Patent application Nr. P04224, April 2014.

59. Bornscheuer, U., Brundiek, H., Evitt, A., Sass, S., Boenisch, F., Kourist, R. (2013), Polynucleotides, vectors, and host cells expressing improved lipase variants, US Patent Application, US 20130196411.

60. Bornscheuer, U., Brundiek, H., Evitt, A., Sass, S., Boenisch, F., Kourist, R. (2013), Reduced-fat foodstuffs and cooking oils, and methods for making the same, US Patent Application, US 20130171321.

61. Bornscheuer, U., Brundiek, H., Evitt, A., Sass, S., Boenisch, F., Kourist, R. (2012), Lipase variants, US Patent Application, US 20120276247.

62. Bornscheuer, U., Brundiek, H., Evitt, A., Sass, S., Boenisch, F., Kourist, R. (2012), Lipase variants having increased enzyme specificity or enhanced trans-selectivity, and methods of use, PCT Patent Application, WO 2012146935.

63. Bornscheuer, U., Brundiek, H., Evitt, A., Sass, S., Boenisch, F., Kourist, R. (2012), Lipase variants of ustilaginaceae, PCT Patent Application, WO 2012146937

4. Other Publications

64. Á. Gómez-Baraibar, F. Busch, C. Mügge, R. Kourist, (2017), Combining Two “Catalytic Worlds”, GIT Laborjournal, *in press*
65. Enzyme Encapsulation to Produce Bio-Based Antioxidants

66. **R. Kourist**, K. Miyamoto, Protein engineering of Arylmalonate Decarboxylase G74C, an artificial racemase (2011) *BioTech International* 23, 12573.
67. **R. Kourist**, F. Hollmann, G.S. Nguyen, Lipases as Sustainable Biocatalysts for the Sustainable Industrial Production of Fine Chemicals and Cosmetics, (2014) *JSM Biotechnology and Bioengineering*, **2**, 1029
68. Licht veredelt nachwachsende Rohstoffe – Interview with the German Radio Station *Deutschlandfunk on July 16th, 2015.* http://www.deutschlandfunk.de/biologische-synthese-maschine-licht-veredelt-nachwachsende.676.de.html?dram%3Aarticle_id=325683
69. Book Review: Science of Synthesis compendium *Biocatalysis for Organic Synthesis* edited by Kurt Faber, Wolf-Dieter Fessner and Nicolas J. Turner. *Angewandte Chemie International Edition*, 2016.
70. Katharina Köninger, Robert Kourist, Fine chemical production by photosynthesis, *Atlas of Science,* https://atlasofscience.org/finechemical-production-by-photosynthesis/