

STEPHAN C. HAMMER

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Emmy Noether Research Group Leader

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EDUCATION AND CAREER

Professor (W3) - Bielefeld University, Faculty of Chemistry - Organic Chemistry and Biocatalysis	since 01-2025
Emmy Noether Research Group Leader - Deutsche Forschungsgemeinschaft - Project number 420112577 - New catalytic reaction development by directed enzyme evolution	since 05-2019
Junior-Professor (W1 tt W2) - Bielefeld University, Faculty of Chemistry - Organic Chemistry and Biocatalysis	2019–2025
Junior Research Group Leader - University of Stuttgart, DE - Topic: Design and evolution of new enzyme function	2017–2019
Postdoctoral research with Prof. Dr. Frances H. Arnold - California Institute of Technology, USA - Topic: Directed evolution of enzymes	2015–2017
PhD in Chemistry with Prof. Dr. Bernhard Hauer - University of Stuttgart, DE (doctorate with honors) - Topic: Biocatalysis	2010-2014
Studies of Chemistry - Philipps University of Marburg, DE - University of Cambridge, UK - Diploma (Philipps University of Marburg, 11.06.2010, grade 1.1)	2005–2010
Chemical Laboratory Assistant - BASF SE, Ludwigshafen - Topic: Process development for new pesticides - Vocational training from 1997-2001 (chemical laboratory assistant) - Advanced training from 2001-2005 (state-certified technician for laboratory technology)	1997–2005

FELLOWSHIPS

• DFG Emmy Noether Fellowship	since 2019
• DFG Research Fellowship	2016–2017
• FCI Kekulé PhD Fellowship	2011–2014

32. Biocatalytic Alkylation of Ambident Nucleophiles Enables Selective N-Functionalization of Heterocycles and Late-Stage Modifications

Ospina F, Schülke KH, Schnutenhaus M, Klein A, Desai O, Jain S, Krofta C, Yang J, Gröger H, Hammer SC
[Angewandte Chemie International Edition](#) **2025**, *64*, e202510300.

Selected as HOT Topic in Biocatalysis by *Angewandte Chemie*.

31. Directed Evolution Enables Dynamic Control of Transient Intermediates for Anti-Markovnikov Wacker-Tsuji-Type Oxidation of Unactivated Alkenes

Klaus C, Soler J, Kubik G, Gumulya Y, Hui Y, Watkins-Dulaney EJ, Heitland M-L, Sommer M, Klein A, Kowal JL, Niemann HH, Arnold FH, Garcia-Borràs M, Hammer SC
[ChemRxiv](#) **2024**, doi:10.26434/chemrxiv-2024-j0229-v2. *This content is a preprint and has not been peer-reviewed.*

30. A New Age of Biocatalysis by Generic Activation Modes

Jain S, Ospina F, Hammer SC
[JACS Au](#) **2024**, *4*, 2068-2080.

29. Efficient Transferase Engineering for SAM Analog Synthesis from Iodoalkanes

Schülke KH, Fröse J, Klein A, Garcia-Borràs M, Hammer SC
[ChemBioChem](#) **2024**, *25*, e202400079.

Highlighted in *ChemistryViews*: Efficient Access to S-Adenosylmethionine Analogs.

28. Efficient Molecular Basis for Chemoselectivity Control in Oxidations of Internal Aryl-Alkenes Catalyzed by Laboratory Evolved P450s

Soler J, Gergel S, Hammer SC, Garcia-Borràs M
[ChemBioChem](#) **2024**, *25*, e202400066.

27. Controlling Monoterpene Isomerization by Guiding Challenging Carbocation Rearrangement Reactions in Engineered Squalene-Hopene Cyclases

Ludwig J, Curado-Carballada C, Hammer SC, Schneider A, Diether S, Ruiz-Barragán S, Osuna S, Hauer B
[Angewandte Chemie International Edition](#) **2024**, *63*, e202318913.

26. Engineered P450 for direct arylalkene-to-ketone oxidation via highly reactive carbocation intermediates

Gergel S, Soler J, Klein A, Schülke KH, Hauer B, Garcia-Borràs M, Hammer SC
[Nature Catalysis](#) **2023**, *6*, 606-617.

News & Views by E. O'Reilly and M. Haarr, *Nature Catalysis* **2023**, *6*, 561-562.

Highlighted by L. Bara in *Nachrichten aus der Chemie*, **2023**, *71*(11), 48-51.

Highlighted by B. List and S. Brunen in *Synfacts* **2023**, *19*, 1030.

25. Methylation of unactivated alkenes with engineered methyltransferases to generate non-natural terpenoids

Aberle B, Kowalczyk D, Massini S, Egler-Kemmerer A, Gergel S, Hammer SC, Hauer B
[Angewandte Chemie International Edition](#) **2023**, *62*, e202301601.

Selected as VIP Paper and HOT Topic in Biocatalysis by *Angewandte Chemie*.

Highlighted by B. List and L.M. Debie in *Synfacts* **2023**, *19*, z0709 and selected by the editors as "Synfact of the Month".

24. Chiral alcohols from alkenes and water: Directed evolution of a styrene hydratase

Gajdoš M, Wagner J, Ospina S, Köhler A, Engqvist MKM, Hammer SC
[Angewandte Chemie International Edition](#) **2023**, *62*, e202215093.

Highlighted by J. Andexer and P. Germer in "Trendbericht Organische Chemie 2024", *Nachrichten aus der Chemie*, **2024**, *72*(3), 44-67.

23. Engineering cytochrome P450s for selective alkene to carbonyl oxidation

Klaus C, [Hammer SC](#)

[Methods in Enzymology](#) **2023**, *693*, 111-131.

22. A Career in Catalysis: Bernhard Hauer

Nebel BA, Breuer M, Schneider S, Aberle B, [Hammer SC](#), Syrén PO, Weissenborn MJ, Nestl BM

[ACS Catalysis](#) **2023**, *13*, 8861-8889.

21. Comparative S-adenosyl-L-methionine analogue generation for biocatalytic Friedel-Crafts alkylation

Hoffmann A, Schülke KH, [Hammer SC](#), Rentmeister A, Cornelissen NV

[Chemical Communication](#) **2023**, *59*, 5463-5466.

20. Selective biocatalytic N-methylation of unsaturated heterocycles

Ospina S, Schülke KS, Klein A, Prosenc B, Garcia-Borràs M, [Hammer SC](#)

[Angewandte Chemie International Edition](#) **2022**, *61*, e202213056.

Selected as VIP Paper and HOT Topic in Biocatalysis by *Angewandte Chemie*.

Highlighted by B. List and M. Turberg in *Synfacts* **2023**, *19*, 0080.

19. Enzymatic control over reactive intermediates enables direct oxidation of alkenes to carbonyls by a P450 iron-oxo species

Soler J, Gergel S, Klaus C, [Hammer SC](#), Garcia-Borràs M

[Journal of the American Chemical Society](#) **2022**, *144*, 15954-15968.

18. New catalytic reactions by enzyme engineering

Klaus C, [Hammer SC](#)

[Trends in Chemistry](#) **2022**, *4*, 363-366.

17. Substrate profiling of anion methyltransferases for promiscuous synthesis of S-adenosylmethionine analogs from haloalkanes

Schülke KH, Ospina F, Hörnschemeyer K, Gergel S, [Hammer SC](#)

[ChemBioChem](#) **2022**, *23*, e202100632.

Selected as VIP Paper by *ChemBioChem* and highlighted in the ChemBioTalents 2022/23 collection.

16. Biocatalytic alkylation chemistry: Building molecular complexity with high selectivity

Ospina F, Schülke KH, [Hammer SC](#)

[ChemPlusChem](#) **2022**, *87*, e202100454.

Selected as VIP Paper by *ChemPlusChem*.

15. Engineered enzymes enable selective N-alkylation of pyrazoles with simple haloalkanes

Bengel LL, Aberle B, Egler-Kemmerer A, Hauer B, [Hammer SC](#)

[Angewandte Chemie International Edition](#) **2021**, *60*, 5554-5560.

Selected as VIP Paper by *Angewandte Chemie*.

Highlighted by B. List and J.L. Kennemur in *Synfacts* **2021**, *17*, 0322.

14. Asymmetric enzymatic hydration of unactivated, aliphatic alkenes

Demming RM, [Hammer SC](#), Nestl BM, Gergel S, Fademrecht S, Pleiss J, Hauer B

[Angewandte Chemie International Edition](#) **2019**, *58*, 173-177.

Highlighted by B. List and J.L. Kennemur in *Synfacts* **2018**, *14*, 1300.

13. Design and evolution of enzymes for non-natural chemistry

[Hammer SC](#), Knight AM, Arnold FH

[Current Opinion in Green and Sustainable Chemistry](#). **2017**, *7*, 23-30.

12. Anti-Markovnikov alkene oxidation by metal-oxo-mediated enzyme catalysis

Hammer SC, Kubik G, Watkins E, Huang S, Mingos H, Arnold FH

Science **2017**, *358*, 215-218.

Highlighted by S. Bormann in C&EN.

Highlighted by B. List and G.A. Shevchenko in *Synfacts* **2018**, *14*, 0083.

Highlighted by ACS in "Chemistry Research of the year 2017".

11. Selectivity in the cyclization of citronellal introduced by squalene hopene cyclase variants

Bastian SA, Hammer SC, Kreß N, Nestl BM, Hauer B

ChemCatChem **2017**, *9*, 4364-4368.

10. Substrate Pre-Folding and Water Molecule Organization Matters for Terpene Cyclase Catalyzed Conversion of Unnatural Substrates

Hammer SC, Syrén PO, Hauer B

ChemistrySelect **2016**, *1*, 3589-3593.

9. Squalene hopene cyclases are protonases for stereoselective Brønsted acid catalysis

Hammer SC, Marjanovic A, Dominicus JM, Nestl BM, Hauer B

Nature Chemical Biology **2015**, *11*, 121-126.

8. Imine reductase-catalyzed intermolecular reductive amination of aldehydes and ketones

Scheller PM, Lenz M, Hammer SC, Hauer B, Nestl BM

ChemCatChem **2015**, *7*, 3239-3242.

7. Emerging Enzymes

Faber K, Glueck SM, Hammer SC, Hauer B, Nestl BM

Science of Synthesis - Biocatalysis in Organic Synthesis **2015**, *3*, 547-578.

6. Entropy is key to the formation of pentacyclic terpenoids by enzyme-catalyzed polycyclization

Syrén PO, Hammer SC, Claasen B, Hauer B

Angewandte Chemie International Edition **2014**, *53*, 4845-4849.

5. New generation of biocatalysts for organic synthesis

Nestl BM, Hammer SC, Nebel BA, Hauer B

Angewandte Chemie International Edition **2014**, *53*, 3070-3095.

4. Biokatalysatoren für die organische Synthese - die neue Generation

Nestl BM, Hammer SC, Nebel BA, Hauer B

Angewandte Chemie **2014**, *126*, 3132-3158.

3. Schlummerndes Synthesepotenzial in Enzymen: Wie können wir es wecken?

Hammer SC, Nestl BM, Hauer B

BIOspektrum **2013**, *19*, 574-576.

2. Squalene hopene cyclases: highly promiscuous and evolvable catalysts for stereoselective CC and CX bond formation

Hammer SC, Syrén PO, Seitz M, Nestl BM, Hauer B

Current opinion in chemical biology **2013**, *17*, 293-300.

1. Stereoselective Friedel–Crafts alkylation catalyzed by squalene hopene cyclases

Hammer SC, Dominicus JM, Syrén PO, Nestl BM, Hauer B

Tetrahedron **2012**, *68*, 7624-7629.

LECTURES AND INVITATIONS (SELECTED HIGHLIGHTS)

07-2025	TU München, <i>Colloquium Organic Chemistry and Biochemistry</i> , München, DE
06-2025	RepArtZymes 2025, Basel, CH
05-2025	Leibniz Universität Hannover, Hannover, DE
11-2024	Metabolic and Protein Engineering for Biosynthesis, Frankfurt, DE
05-2024	4 th NextGenBiocat, Heraklion, GR
02-2024	36 th Irsee Natural Product Symposium, Irsee, DE
01-2024	Universität Konstanz, <i>GDCh colloquium</i> , Konstanz, DE
09-2023	Osaka University, Department of Applied Chemistry, Osaka, JP
06-2023	Swedish Symposium on Enzyme Engineering, Stockholm, SE
03-2023	Chemiedozententagung 2023, Dresden, DE
10-2022	RWTH Aachen, <i>Organic chemistry colloquium</i> , Aachen, DE
09-2022	Albert-Ludwigs-Universität Freiburg, <i>RTG1976 Retreat</i> , Freiburg, DE
06-2022	Girona Seminar: Biocatalysis, Girona, ES
04-2022	University of California Santa Barbara, <i>Organic Chemistry Seminar</i> , Santa Barbara, US
10-2021	Leibniz Institute for Catalysis, <i>Catalysis Across Borders</i> , Rostock, DE
07-2021	Universität Münster, <i>Organic chemistry colloquium</i> , Münster, DE
03-2021	National Academy of Engineering & Alexander von Humboldt Foundation – 2021 German-American Frontiers of Engineering
10-2020	Bayer AG, Leverkusen, DE
07-2020	Technical University Munich, <i>TUM-JST symposium “Catalysis Science – Quo Vadis”</i> , Munich, DE
01-2020	Universität Greifswald, <i>GDCh colloquium</i> , Greifswald, DE
03-2019	52. Jahrestreffen Deutscher Katalytiker, Weimar, DE
04-2018	Universität Regensburg, Center for Biochemistry, Regensburg, DE
04-2017	Max-Planck-Institute for terrestrial Microbiology, Marburg, DE
03-2016	Bridging Chemistry and Biology, Schwarzenberg, AT
07-2014	Gordon Research Conference – Biocatalysis Seminar, Smithfield, US

FUNCTIONS AND MEMBERSHIPS IN SCIENTIFIC SOCIETIES

since 01-2024	Appointed member of the selection committee for the GDCh Prize for Biocatalysis
since 2024	American Chemical Society (ACS)
since 2015	Gesellschaft für Chemische Technik und Biotechnologie (DECHEMA)
since 2015	Gesellschaft für Biochemie und Molekularbiologie (GBM)
since 2006	Gesellschaft Deutscher Chemiker (GDCh)