
Publications and conference papers. First funding period SPP 2170 published:

Peer reviewed Publications

2020

1. Dusny, C., Grünberger, A. (2020). Microfluidic single-cell analysis in biotechnology: from monitoring towards understanding. *Current Opinion in Biotechnology*. Volume 63, 2020, Pages 26-33 <https://doi.org/10.1016/j.copbio.2019.11.001>
2. David JR., Noack S. (2020). Editorial overview: Causes and biotechnological application of microbial metabolic specialization. *Curr. Opin. Biotechnol* 62.
3. Noack S., Baumgart M. (2019.) Communities of Niche-Optimized Strains: Small-Genome Organism Consortia in Bioproduction. *Trends Biotechnol* 37(2):126-139.
4. Rosenbaum, M. et al. (2020). Consolidated bioprocessing of cellulose to itaconic acid by a co-culture of *Trichoderma reesei* and *Ustilago maydis*", Publication in *Biotechnology for Biofuels*
5. Schmieder, S., Müller, H., Barthel, L., Friedrich, T., Niessen, L., Meyer, V., & Briesen, H. (2020). Universal law for diffusive mass transport through mycelial networks. *Biotechnology and Bioengineering*, 118(2), 930–943. <https://doi.org/10.1002/bit.27622>

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6. Burmeister, B., Akhtar, Q., Hollmann, L., Tenhaef, N., Sokolowsky, S., Marienhagen, M., Noack, S., Kohlheyer, D., Grünberger, A. (2021). (Optochemical) control of synthetic microbial co-culture interactions on a microcolony level. *ACS Synth. Biol.* 2021, 10, 6, 1308–1319 <https://doi.org/10.1021/acssynbio.0c00382>
7. Schlembach, I., Grünberger, A.; Rosenbaum, M.A.; Regestein, L. (2021). Measurement Techniques to Resolve and Control Population Dynamics of Mixed-Culture Processes. *Trends in Biotechnology* 2021 <https://doi.org/10.1016/j.tibtech.2021.01.006>
8. Kappelmann J., Klein B., Papenfuß M., Lange J., Blombach B., Takors R., Wiechert W., Polen T., Noack S. (2021). Comprehensive Analysis of *C. glutamicum* Anaplerotic Deletion Mutants under Defined D-Glucose Conditions. *Front Bioeng Biotechnol* 8, 1549.
9. Stella RG., Gertzen CG., Smits SH., Gätgens C., Polen T., Noack S., Frunzke J. (2021). Biosensor-based growth-coupling and spatial separation as an evolution strategy to improve small molecule production of *Corynebacterium glutamicum*. *Metab Eng*, 68, 162-173.
10. Kremling, A. (2021). A counting-strategy together with a spatial structured model describes RNA polymerase and ribosome availability in *Escherichia coli*, *Metabolic Engineering* 67, pp 145.

11. Heins, A.L. Manh Dat Hoang, Weuster-Botz, D. (2021). Advances in automated real-time flow cytometry for monitoring of bioreactor processes. *Eng Life Sci*; 00, 1-20, <https://doi.org/10.1002/elsc.202100082>
12. Schneider M., Bäumler M., Lee NM, Weuster-Botz, D., Ehrenreich A., Liebl, W. (2021). Monitoring co-cultures of *Clostridium carboxidivorans* and *Clostridium kluuyveri* by fluorescence in situ hybridization with specific 23S rRNA oligonucleotide probes. *System Appl Microbiol* 44: 126271.
13. Bäumler M., Schneider M., Ehrenreich A., Liebl W., Weuster-Botz D. (2021). Synthetic co-culture of autotrophic *Clostridium carboxidivorans* with chain elongating *Clostridium kluuyveri* monitored by flow cytometry. *Microb Biotechnol* <https://doi.org/10.1111/1751-7915.13941>
14. Rosenbaum, M. et al. (2021). Measurement Techniques to Resolve and Control Population Dynamics of Mixed-Culture Processes", *Trends Biotechnology*.
15. Fütting, P., Barthel, L., Cairns, T., Briesen, H., & Schmideder, S. (2021). Filamentous fungal applications in biotechnology: a combined bibliometric and patentometric assessment. *Fungal Biology and Biotechnology* 8, 23 (2021). <https://doi.org/10.1186/s40694-021-00131-6>
16. Meyer V., Cairns T., Barthel L., King R., Kunz P., Schmideder S., Müller H., Briesen H., Dinius A., Krull R. (2021). Understanding and controlling filamentous growth of fungal cell factories: novel tools and opportunities for targeted morphology engineering. *Fungal Biol Biotechnol*. 23;8(1):8. <https://doi.org/10.1186/s40694-021-00115-6>
17. Fitschen, J., Hofmann, S., Wutz, J., Kameke, A., Hoffmann, M., Wucherpennig, T., Schlüter, M. (2021). Novel evaluation method to determine the local mixing time distribution in stirred tank reactors *Chemical Engineering Science: X* 10: 100098 (2021-05-01). <https://doi.org/10.15480/882.3551>
18. Anna-Lena Heins, Manh Dat Hoang, Dirk Weuster-Botz (2021) Advances in automated real-time flow cytometry for monitoring of bioreactor processes. *Eng Life Sci*; 00, 1-20, DOI: 10.1002/elsc2021100082

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19. Kratzl, F., Kremling, A. & Pflüger-Grau, K. (2022). Streamlining of a synthetic co-culture towards an individually controllable one-pot process for polyhydroxyalkanoate production from light and CO₂. *Eng Life Sci* (2022) doi:10.1002/elsc.202100156
20. Kheirkhah, T., Neubauer, P. and Junne, S. (2022). Controlling *Aspergillus niger* morphology in a rocking motion bioreactor: An alternative investigation platform for fungi. *Chemie Ingenieur Technik*, 94: 1236-1237. <https://doi.org/10.1002/cite.202255283>

21. Finger, M., Sentek, F., Hartmann, L., Palacio-Barrera, AM., Schlembach, I., Rosenbaum, MA., Büchs, J. (2022). "Insights into *Streptomyces coelicolor* A3(2) growth and pigment formation with high-throughput online monitoring", *Engineering in Life Sciences*, DOI: 10.1002/elsc.202100151
22. Palacio-Barrera, AM., Schlembach, I., Finger, M., Büchs, J., Rosenbaum, MA. (2022). "Reliable online measurement of population dynamics for filamentous co-cultures", *Microbial Biotechnology*, <https://doi.org/10.1111/1751-7915.14129>.
23. Finger, M., Palacio-Barrera, AM., Richter, P., Schlembach, I., Büchs, J., Rosenbaum, MA. (2022). "Tunable population dynamics in a synthetic filamentous coculture", *Microbiology Open*, <https://doi.org/10.1002/mbo3.1324>
24. Müller, H., Barthel, L., Schmideder, S., Schütze, T., Meyer, V., & Briesen, H. (2022). From spores to fungal pellets: A new high-throughput image analysis highlights the structural development of *Aspergillus niger*. *BIOTECHNOLOGY and BIOENGINEERING*, 119(8), 2182–2195. <https://doi.org/10.1002/bit.28124>
25. Manh Dat Hoang, Dieu Thi Doan, Andreas Kremling, Anna-Lena Heins (2022) Application of a multiple *Escherichia coli* reporter strain to study population heterogeneity in a novel two-compartment bioreactor, *Chemie Ingenieur Technik*, DOI: 10.1002/cite.202255092, 94(9): 1238-1238
26. Dieu Thi Doan, Manh Dat Hoang, Anna-Lena Heins, Andreas Kremling (2022) Applications of Coarse-grained models in Metabolic Engineering. *Front Mol Biosci*, DOI: 10.3389/fmolb.2022.806213
27. Manh Dat Hoang, Dieu Thi Doang, Andreas Kremling, Anna-Lena Heins (2022) Application of an *Escherichia coli* triple reporter strain for at-line monitoring of single-cell physiology during L-phenylalanine production. *Eng Life Sci*, DOI: 10.1002/elsc.202100162
28. Andreas Kremling (2021) A counting strategy together with a spatial structured model describes RNA polymerase and ribosome availability in *Escherichia coli*. *Metabolic Engineering* 67, 145 DOI: 10.1016/j.ymben.2021.06.006
29. Schito S., Zuchowski R., Bergen D., Strohmeier D., Wollenhaupt B., Menke P., Seiffarth J., Noh K., Kohlheyer D., Bott M., Wiechert W., Baumgart M. & Noack S., (2022) Communities of Niche-optimized Strains (CoNoS) - Design and creation of stable, genome-reduced co-cultures. *Metab. Eng.* 73: 91-103. (<http://dx.doi.org/10.1016/j.ymben.2022.06.004>)
30. Bäumler M, Schneider M, Ehrenreich A, Liebl W, Weuster-Botz D (2022): Synthetic co-culture of autotrophic *Clostridium carboxidivorans* with chain elongating *Clostridium kluyveri* monitored by flow cytometry. *Microb Biotechnol* 15: 1471–1485.
31. Mittermeier F, Bäumler M, Arulrajah P, García Lima JJ, Hauke S, Stock A, Weuster-Botz D (2022): Artificial microbial consortia for bioproduction processes. *Eng Life Sci* DOI: 10.1002/elsc.202100152.
32. Herzog J, Mook A, Guhl L, Bäumler M, Beck MH, Weuster-Botz D, Bengelsdorf FR, Zeng A-P (2022): Novel synthetic co-culture of *Acetobacterium woodii* and *Clostridium drakei* using CO₂

and *in situ* generated H₂ for the production of caproic acid via lactic acid. *Eng Life Sci* DOI: 10.1002/elsc.202100169

33. Rehnert, M., Takors, R. (2022). FAIR research data management as community approach in bioengineering. *Eng. Life Sci.* DOI 10.1002/elsc.202200005.
34. Mook, A., Beck, M.H., Baker, J.P. et al. (2022). Autotrophic lactate production from H₂ + CO₂ using recombinant and fluorescent FAST-tagged *Acetobacterium woodii* strains. *Appl. Microbiol Biotechnol* 106, 1447-1458.

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35. Müller, T., Schick, S., Beck, J., Sprenger, G., Takors, R. (2023). Synthetic mutualism in engineered *E. coli* mutant strains as functional basis for microbial production consortia. *Eng Life Sci.*; 23:e2100158.
36. Gaugler, L., Mast, Y., Fitschen, J., Hofmann, S., Schlüter, M., Takors, R. (2023). Scaling-down biopharmaceutical production processes via a single multi-compartment bioreactor (SMCB). *Eng Life Sci.*; 23:e2100161.

Conference contributions

2020

1. Müller, H., Schmideder, S., Barthel, L., Niessen, L., Meyer, V., & Briesen, H. (2020). Optimized X-ray microcomputed tomography and 3D volumetric image processing of filamentous fungal pellets. Conference Talk ProcessNet. Abstract appeared in *Chemie Ingenieur Technik*, 92(9), 1201. doi.org/10.1002/cite.202055040
2. Schmideder S., Barthel, L., Müller, H., L., Meyer, V., & Briesen, H. (2020). On the three-dimensional morphology and substrate-diffusion in filamentous fungal pellets. 15th European Conference on Fungal Genetics, Rom. Presentation.
3. Briesen, H., Schmideder, S. & Müller, H. (2020). Morphological characterization and modeling of filamentous fungi. 4th Indo-German Workshop on Advances in Reaction and Separation processes. Conference Talk.
4. Rosenbaum, M. (2019). Consolidated bioprocessing of cellulose to itaconic acid by a co-culture of *Trichoderma reesei* and *Ustilago maydis*", Lecture. Conference contribution, PYFF 2019
5. Rosenbaum, M. (2019). Filamentous microbial co-culture for biotechnological production of natural products" Poster. Conference contribution, PYFF 2019.

6. Wollenhaupt, B. et al. (2020). Microbial single-cell analysis under microfluidic batch cultivation. Conference: Microfluidics: Designing the Next Wave of Biological Inquiry. Online Poster.
7. Schlüter, M. et al. (2020). Multiscale Experimental Analysis of Lifelines in Bioreactors (1. Hamburg-Bochumer Mehrphasensymposium, Hamburg/Bochum, conference contribution, Online Poster.
8. Schlüter, M. et al. (2020). Measurement of Lagrangian Tracks in a 3 L Stirred Tank Reactor using 4D Particle Tracking Velocimetry with Shake-the-Box, 14th International Symposium on Particle Image Velocimetry – ISPIV, Lecture, Online conference.
9. Takors R. (2020). Transferring microbial processes from lab to industrial scale: Lessons learned for strain engineering and large-scale modeling. September 28th, symposium at University of Liège accompanying a PhD defense, Belgium (online).
10. Takors R. (2020). Scaling up microbial processes: Data-driven modeling and strain engineering for robust performance in large bioreactors. October 28th, Lectures at the Leading Edge, invited, University of Toronto, Canada, online.

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11. Müller, H., Schmideder, S., Barthel, L., Hammel, J., Meyer, V., & Briesen, H. (2021). Inside mycelium - synchrotron radiation and image processing to unveil the time-resolved three-dimensional growth of filamentous fungal pellets. at 13th European Congress of Chemical Engineering and 6th European Congress of Applied Biotechnology Berlin. Keynote presentation. Online conference.
12. Khajehesamedini, A., Müller, H., Yan, J., Schmideder, S., Barthel, L., Meyer, V., Briesen, H. (2021) Coupled Population Balance Models for the Aggregation/Growth of *Aspergillus Niger* Spores and Formation of Pellets. Presentation at 13th European Congress of Chemical Engineering and 6th European Congress of Applied Biotechnology, Berlin. Lecture, Online conference.
13. Schmideder, S., Briesen, H. (2021). Following fungal features - Micromorphology and diffusivity of filamentous fungal pellets revealed by three-dimensional imaging and simulation. Annual Conference of the Association for General and Applied Microbiology. *Lecture*, Online conference.
14. Kheirkhah, T., Neubauer, P., Junne, S., (2021). Control of macromorphology and the implications on product formation in *Aspergillus niger*. 6th BioProScale Lecture, Conference, Berlin.
15. Kheirkhah, T., Neubauer, P., Junne, S. (2021). Controlling *Aspergillus niger* morphology under low shear forces in a wave-mixed bioreactor. Presentation at 13th European Congress of Chemical Engineering and 6th European Congress of Applied Biotechnology, Berlin, Lecture. Online Conference.

16. Zuchowski, R. (2021). Communities of niche-optimized strains (CoNoS) for production of value-added compounds. 7-9 Jul 2021, EMBO EMBL Symposium: New Approaches and Concepts in Microbiology. Lecture, Online conference.
17. Schito, S, Zuchowski, R. (2021). Communities of Niche-optimized Strains (CoNoS) for production of value-added compounds. ECCE & ECAB, 20-23.9.2021, Lecture. Online conference.
18. Bäuml M., Schneider M., Ehrenreich A., Liebl W., Weuster-Botz, D. (2021). Fluorescence in-situ hybridization combined with flow cytometry for monitoring of clostridial co-cultures during syngas fermentation. 6th European Congress of Applied Biotechnology (ECAB), 20.-23.09.2021, Lecture. Online conference.
19. Rehnert, M., Takors, R. (2021). Novel eLearning concepts in cross-discipline engineering tandem projects. 6th European Congress of Applied Biotechnology (ECAB), 20.-23.09.2021, Online Poster
20. Mook, A. et al. (2021). Autotrophic lactate production using engineered *A. woodii* strains and quantification via fluorescence based methods. Workshop Biological Carbon Capture, 27.04.21, online.
21. Mook, A. et al. (2021). Caproate production from CO₂/H₂ in synthetic co-culture employing the key metabolite lactate. 6th European Congress of Applied Biotechnology (ECCE & ECAB), 20.-23.09.21, Lecture, Online conference.
22. Kratzl, F., Kremling, A., Pflüger-Grau, K. (2021). Synthetic Co-Culture for the Production of Bioplastics from Light and CO₂: Deciphering the Interplay of *Synechococcus elongatus* and *Pseudomonas putida*. 6th European Congress of Applied Biotechnology (ECCE & ECAB), 20.-23.09.21, Lecture. Online conference.
23. Kratzl, F., Kremling, A., Pflüger-Grau, K. (2021). Light-driven mcl-PHA production with genetically engineered *Pseudomonas putida* in a synthetic co-culture with *Synechococcus elongatus* PCC7942 *cscB* 03.-04.03.2021 Fachtagung Bioplastics "Science Meets Industry", Talk. Online conference.
24. Kratzl, F., Kremling, A., Pflüger-Grau, K. (2021). Synthetic co-culture for the Production of Bioplastics from Light and CO₂: Deciphering the Interplay of *S. elongatus* and *P. putida*. 15.-17.11 Cyano2021: Early Career Researcher Symposium on Cyanobacteria - "Photosynthesis – from its origin to applications" Poster, Online conference.
25. Büchs, J. (2021). High-throughput online-monitoring helps to uncover pigment production mechanisms in *Streptomyces coelicolor*", Lecture. Online conference contribution ECAB 2021.
26. Hoang, M. D., Heins, A.L., Weuster-Botz, D. (2021). Analysis of population heterogeneity applying multiple reporter strains in a two-compartment system, 6th European Congress of Applied Biotechnology (ECAB), 20.-23.09.2021, Lecture. Online conference.

27. Hofmann, S., Gaugler, L., Fitschen, J., Kameke, A., Schlüter, M., Takors, R. (2021). Lagrangian Particle Tracking and Bioreactor Compartmentalization as Novel Scale-up Tools for Biopharmaceutical Processes. 13th European Congress of Chemical Engineering, 6th European Congress of Applied Biotechnology (ECCE & ECAB), Lecture, Online conference.
28. Takors R. (2021). Exploiting Scale-down Tests for Engineering a Robust *E. coli* Host as a Platform for Industrial Production Processes, keynote, March 3rd, BioProScale, Berlin (online).
29. Takors R. (2021). Scaling up from lab to industrial scale minimizing performance loss. Invited talk, June 23rd, BioTech, Paris, France (online).
30. Takors R. (2021). Strains and modeling tools for scaling up microbial bioprocesses. October 15th, ProSYS meeting, keynote, Copenhagen, Denmark.
31. Takors, R. (2021). Scale-down in practice. December 5th, Advanced Course 'Multiscale Computational Methods in Bioprocesses', Delft, The Netherlands
32. Manh Dat Hoang, Dieu Thi Doan, Andreas Kremling, Anna-Lena Heins (2021). Analysis of population heterogeneity applying multiple reporter strains in a two-compartment system, , 13th European Congress of Chemical Engineering & 6th European Congress of Applied Biotechnology, 20.-23.09.2021, online Conference.
33. Miriam Bäumler & Martina Schneider (2021): Fluorescence *in situ* hybridization combined with flow cytometry for monitoring of clostridial co-cultures during syngas fermentation. 6th European Congress on Applied Biotechnology, 17-21 September 2021, virtual conference.

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34. Kheirkhah, T., Neubauer, P., Junne, S., (2022). Controlling *Aspergillus niger* morphology in a rocking motion bioreactor. 7th International BioProScale Symposium, 28.03-05.04.2022, Poster, Berlin. Germany.
35. Kheirkhah, T., Neubauer, P., Junne, S., (2022). Controlling *Aspergillus niger* morphology in a rocking motion bioreactor: an alternative investigation platform for fungi. 13th European Congress of Chemical Engineering and 6th European Congress of Applied Biotechnology, 12-15.09.2022, Lecture, Aachen. Germany.
36. Kratzl, F., Kremling, A., Pflüger-Grau, K. (2022). Synthetic Co-Culture for the Production of Bioplastics from Light and CO₂:Deciphering the Interplay of *Synechococcus elongatus* and *Pseudomonas putida*, VAAM Jahrestagung 21-23-Februar, Oral presentation.
37. Kratzl, F., Kremling, A., Pflüger-Grau, K. (2022). Synthetic Co-Culture for the Production of Bioplastics from Light and CO₂:Deciphering the Interplay of *Synechococcus elongatus* and *Pseudomonas putida*, Biopolymer Fachtagung 23-Februar, Poster.

38. Pflüger-Grau, K. (2022). From sunlight to bioplastics: a synthetic mixed culture between *Synechococcus elongates* and *Pseudomonas putida*, EFB Spring congress: From CO₂ to materials with the power of microbes, 10-13 Mai 2022. Presentation.
39. Manh Dat Hoang, Dieu Thi Doan, Andreas Kremling, Anna-Lena Heins (2022). Application of a multiple *Escherichia coli* reporter strain to study population heterogeneity in a novel two-compartment bioreactor, (Bio)Process Engineering – a Key to Sustainable Development, ProcessNet and DECHEMA BioTechNet Jahrestagung & 13th European Society of Biochemical Engineering Sciences, 12.-15.09.2022, Aachen
40. Zuchowski, R., Schito, S., Neuheuser, F., Bott, M., Noack, S., Baumgart, M. (2022) Communities of Niche-optimized Strains (CoNoS) for production of value-added compounds. VAAM Annual Conference 21.-23.02.2022. Poster, Online-Conference
41. Simone Schito, Rico Zuchowski, Daniel Bergen, Bastian Wollenhaupt, Johannes Seiffarth, Katharina Nöh, Dietrich Kohlheyer, Michael Bott, Wolfgang Wiechert, Meike Baumgart, Stephan Noack. Communities of niche-optimized strains (CoNoS) - A novel concept for improving biotechnological production of small molecules. 13th European Congress of Chemical Engineering and 6th European Congress of Applied Biotechnology, online conference, presentation
42. Simone Schito, Rico Zuchowski, Friederike Neuheuser, Philipp Menke, Daniel Berger, Srushti Gujar, Christina Mack, Astrid Wirtz, Tino Polen, Wolfgang Wiechert, Michael Bott, Stephan Noack, Meike Baumgart. CoNoS – a novel concept for biotechnological production - Evolution-guided metabolic engineering for improving synthetic, genome-reduced co-cultures of *C. glutamicum*. SECTOR conference Biotech France 2022, Paris, presentation
43. Miriam Bäumlner (2022): Autotrophic alcohol production with a synthetic co-culture of *Clostridium carboxidivorans* and *Clostridium kluyveri*. (Bio)Process Engineering - a Key to Sustainable Development, 12-15 September 2022, Aachen, Germany.
44. Martina Schneider (2022): Overcoming restriction barriers in the secondary fermenter *Clostridium kluyveri*. Clostridium XVI Conference, 14-17 September 2022, Toulouse, France.
45. Mook, A. et al. (2022). Synthetic co-culture of *A. woodii* and *C. drakei* for the production of caproate from H₂ + CO₂. Annual Conference VAAM 20-23.02.2022, Online Conference.
46. Mook, A. et al. (2022) Production of caproate from H₂ + CO₂ via lactate-mediated co-cultivation of *Acetobacterium woodii* and *Clostridium drakei*. Emerging Microbial Technologies Conference Delft, 27.05.22, poster presentation
47. Herzog, J. et al. (2022) Process control of autotrophic *Acetobacterium woodii* culture via lactate dependent in situ water electrolysis. 4th Microbial, Enzymatic & Bio-Photovoltaic Electrochemical Reactors, Fuel Cell & Electrolyser Systems Symposium Luzern, 06. – 07.07.2022, oral presentation

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48. Herzog, J. et al. (2022) Caproate production from CO₂ and H₂ in synthetic co-culture with lactate dependent process control. (Bio)Process Engineering – a Key to sustainable Development DECHEMA conference Aachen, 12. – 15.09.2022, oral presentation
 49. Mook, A., Herzog, J. et al. (2022) Synthetic co-cultivation of *A. woodii* and *C. drakei* for production of medium-chain organic acids from H₂ and CO₂. Clostridium XVI Toulouse. 14.-17.09.22, oral presentation
 50. Mook, A. et al. (2022) Lactate-mediated co-Cultivation of *A. woodii* and *C. drakei* for Production of Medium-Chain Organic Acids. 2nd International Chain Elongation Conference 02.-04.11.22, oral presentation
 51. Müller, T. et al. (2022). Introduction of mutual interdependencies as a relational framework of synthetic co-cultures. DECHEMA Himmelfahrtstagung on Bioprocess Engineering Mainz, 23. – 25.05.2022, oral presentation