



The event was held in the center of Cologne, Germany on 27-29 June 2022.

The scientific programme provided a recent and comprehensive overview of:

- Discovery and design of microbes and enzymes for polymer synthesis and depolymerization,
- Computational understanding of polymer – enzyme interactions,
- Building blocks from renewable resources to biobased polymers,
- Biocatalysis in a circular economy of polymers.



Scientific Programme

27 June 2022

Session 1: Building blocks from renewable resources to biobased polymers (Synthetic Biology)

Session Chair:

Jan Marienhagen, Forschungszentrum Jülich GmbH, Germany

- 11:00-11:10 Welcome and introduction to the session
- 11:10-11:40 **Per-Olof Syrén**, KTH, Sweden
Biocatalytic synthesis and recycling of polymers
- 11:40-12:10 **Tanja Narancic**, University College Dublin, Ireland
Pseudomonas umsongensis GO16: a platform for PET bio-upcycling
- 12:10-12:20 Flash talks selected from submitted abstracts
- 12:20-14:00 Lunch and **poster session**
- 14:00- 14:30 **Andrew Carnell**, University of Liverpool, United Kingdom
Enzyme cascades for conversion of 5-hydroxymethylfurfural (HMF) to bioplastics precursors

Session 2: Discovery and design microbes and enzymes for polymer synthesis and depolymerisation

Session Chairs:

Karl Erich Jaeger, Forschungszentrum Jülich GmbH, Germany

Jeffrey Cole, EFB President

- 14:30-14:40 Welcome and introduction to the session
- 14:40-15:10 **Rajni Hatti Kaul**, Lund University, Sweden
Closing the loop: biocatalytic synthesis of polymer building blocks from renewable feedstock and recycled plastic

- 15:10-15:20 **Rebecka Molitor**, Heinrich Heine University Düsseldorf, Germany
Marine resources for polyester degrading enzymes
- 15:20-15:30 **Doris Ribitsch**, ACIB, Austria
Biorecycling of fibre and films
- 15:30-16:00 **Wolfgang Streit**, University of Hamburg, Germany
Functional metagenomics to identify plastic degrading enzymes
- 16:00-16:30 *Coffee break*
- 16:30-16:45 Flash talks selected from submitted abstracts
- 16:45-16:55 **Jo-Anne Verschoor**, Leiden University, the Netherlands
Back to the future. Ancestral sequence reconstruction for the identification of novel plastic degrading enzymes.
- 16:55-17:25 **Stefaan de Wildemann**, Be4Plastics, Belgium
Biobased building blocks for plastics
- 17:25-17:55 **Nick Wierckx**, Forschungszentrum Jülich GmbH, Germany
Engineering *Pseudomonas* to use plastic waste as carbon source for biotechnology

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**Session 3: Computational understanding of polymer – enzyme interactions
(recognition/binding/depolymerisation)**

Session Chair:

Andrea Mattevi, University of Pavia, Italy

- 9:30-9:40 Welcome and introduction to the session
- 9:40-10:10 **Ligia Martins**, ITQB NOVA, Portugal
Engineering oxidoreductases for industrial biotechnology
- 10:10-10:40 **Valerio Ferrario**, BASF, Germany
Synthesis and functionalization of biopolymers
- 10:40-11:00 *Coffee break*

Session 4: Glycopolymers: enzymatic synthesis, depolymerisation and application

Session Chairs:

Maria Josefa Hernaiz Gomez-Degano, Universidad Complutense de Madrid, Spain

Magali Remaud-Simeon, Institut National des Sciences Appliquées de Toulouse, France

- 11:00-11:10 Welcome and introduction to the session
- 11:10-11:40 **Bernd Nidetzky**, Graz University of Technology, Austria
Building up and breaking down cellulose using multienzyme systems
- 11:40-11:50 **Thibaud Laffargue**, TBI, France
Enzymatic routes towards α -glucan phosphorylation
- 11:50-11:55 Flash talks selected from submitted abstracts
- 11:55-12:25 **Lothar Elling**, RWTH Aachen University, Germany
Enzyme cascades for the synthesis of hyaluronic acid
- 12:25-13:45 Lunch and **poster session**

Session 5: Biocatalysis in a circular economy of polymers

Session Chairs:

Manfred Zinn, HES-SO Valais-Wallis, Sion, Switzerland

Francisca Contreras Leiva, RWTH Aachen University, Germany

- 13:45-13:55 Welcome and introduction to the session
- 13:55-14:25 **Maria Reis**, NOVA School of Science & Technology, Portugal
Challenges on the production and purification of biopolymers from wastes
- 14:25-14:55 **Florent Allais**, AgroParisTech, France
Combining biomass-derived synthons and biocatalysis to access novel monomers and polymers
- 14:55-15:05 **Natalia Hernández**, CIB-CSIC, Spain
Cupriavidus necator H16 as a cell catalyst for the transformation of industrial wastewater effluents into polyhydroxybutyrate-co-lactate
- 15:05-15:15 **Seyed Amirabbas Nazemi**, University of Applied Sciences Northwestern Switzerland (FHNW), Switzerland
Biocatalytic degradation of polyether polyurethanes with an enzyme/redox-mediated system

- 15:15-15:25 Flash talks selected from submitted abstracts
- 15:25-15:55 **Kevin O'Connor**, BiOrbic, Bioeconomy SFI Research Centre, Ireland
The conversion of non-degradable polymers into biodegradable polymers using a combination of chemistry and biotechnology
- 15:55-16:10 *Coffee break*
- 16:10-16:20 **Martin Nagl**, University of Natural Resources and Life Sciences, Vienna/Institute of Environmental Biotechnology, Austria
A mechanistic study of enzymes used for energy saving in pulp refining
- 16:20-16:30 **Sebastian Mayr**, University of Natural Resources and Life Sciences, Department of Agrobiotechnology; Institute of Environmental Biotechnology, Austria
Functionalization of technical lignins using various laccases of different origin
- 16:30-17:00 **Tom Farmer**, University of York, United Kingdom
Functional, bio-based and degradable polymers – opportunities and challenges for biocatalysis
- 17:00-17:30 **Frank Hollmann**, TU Delft, the Netherlands
Biocatalytic oxyfunctionalisation of renewable feedstock
- 17:30-18:00 **Anne Meyer**, Technical University of Denmark
Biocatalysts for the degradation of plastics

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Session 6: Biofunctionalization of polymers

Session Chairs:

Tetiana Kurkina, Innovationlabs ProtLab & PlastiQuant-SF, Germany

- 9:00-9:10 Welcome and introduction to the session
- 9:10-9:40 **Francisca Contreras Leiva**, RWTH Aachen University, Germany
Adhesion-promoting peptides for surface functionalization
- 9:40-9:50 **Miguel Jimenez Bartolome**, University of Natural Resources and Life Sciences (BOKU), Vienna, Austria
Improving the water resistance of starch-based adhesives using laccase polymerized lignosulfonates
- 9:50-10:20 **Alessandro Pellis**, University of Genoa, Italy
Chemo-enzymatic strategies for polymers circularity

- 10:20-10:30 Flash talks selected from submitted abstracts
- 10:30-11:00 **Jasmina Nikodinovic-Runic**, University of Belgrade, Serbia
Adding functionality to polyhydroxyalkanoates (PHAs)
- 11:00-11:30 **Nils Hanik**, HES-SO Valais-Wallis, Switzerland
Electroplating and environmentally friendly pre-treatment processes for biodegradable materials
- 11:30-11:45 *Coffee break*

Session 7: Current European R&D activities and case studies

Session Chairs:

Georg Gübitz, University of Natural Resources and Life Sciences Vienna, Austria

- 11:45-11:55 Welcome and introduction to the session
- 11:55-12:25 **Tetiana Kurkina**, Innovationlabs ProtLab & PlastiQuant-SF, Germany
ProtLab and PlastiQuant: two Innovation Labs for protein-based solutions in the Model Region Bioeconomy Revier with a focus on agriculture and food industry
- 12:25-12:55 **Mehdi Davari**, Leibniz Institute of Plant Biochemistry, Germany
Designing enzyme-polyelectrolyte complexes for boosting the catalytic performance of enzymes
- 12:55-13:25 **Tim Börner**, Applied University of Western Switzerland, HES-SO Valais-Wallis, Switzerland
Life-cycle-engineered products and processes through biopolymers and biotechnology: opportunities and challenges
- 13:25-13:35 Closing remarks