

OXIZYMES Program

Tuesday, July 5th 2022

14:00-18:00 **Registration**
16:00-18:05 **BioTop Session**

Session: BioTop

- 16:00-16:45** *Functional diversity to expanding applications of auxiliary activity oxidoreductases*
Emma Master
- 16:45-17:05** *Common Ancestor Reconstruction As A Tool For Improving Thermostability Of Bacterial Pyranose Oxidases*
Anja Kostelac, Leander Sützl, Dietmar Haltrich
- 17:05-17:25** *Localization Of Pyranose 2-Oxidase Derived From Kitasatospora Aureofaciens: A Step Closer To Elucidate The Biological Role*
L. Jessica Virginia and Clemens Peterbauer
- 17:25-17:45** *Reavealing Lytic Polysaccharide Monooxygenase Catalysis On Solid Cellulosic Substrates*
Lorenz Schwaiger, Florian Csarman, Hucheng Chang and Roland Ludwig
- 17:45-18:05** *In Vivo Enzyme Cocktails For Lignin Depolymerization*
Silja Välimets, Clemens Karl Peterbauer, Michael Sauer

Wednesday, July 6th 2022

8:30 **Registration**
8:45-9:00 **Opening**

Session: Biotech Appl. - Oxizymes in Biorefinery

Chair: Rebecca Pogni, Angel Martinez

- 9:00-9:45** *Structure, Function And Application Of Lpmos – Unique Monocopper Peroxygenases For Biomass Processing And Beyond*
Vincent G.H. Eijsink
- 9:45-10:05** *Recombinant Expression Of Polyphenol Oxidase Mtpo7 From Myceliophthora Thermophila To Fuel Lytic Polysaccharide Monooxygenase Action*
Caio de Oliveira Gorgulho Silva, Jane W. Agger, Willem J.H. van Berkel, Mirjam A. Kabel, Anne S. Meyer
- 10:05-10:25** *New Findings With Fungal Lytic Polysaccharide Monooxygenases*
Peicheng Sun, David Cannella, Leila Lo Leggio, Roland Ludwig, Willem van Berkel, Mirjam A. Kabel
- 10:25-10:45** *Investigating Lytic Polysaccharide Monooxygenase's Wood Cell Wall Mechanism With Microbiosensors*
Roland Ludwig, Hucheng Chang, Neus Gacias-Amengual, Alexander Botz, Lorenz Schwaiger, Daniel Kracher, Stefan Scheiblbrandner, Florian Csarman
- 10:45-11:15** **Coffee Break**

Session: Biotech Appl. - Oxizymes in Biorefinery

Chair: Ligia Martins, Sergio Riva

- 11:15-11:45** *New Fungal Peroxygenase For Epoxides Production From Vegetable Oil: Structural Characterization, Protein Redesign And Process Optimization*
Linde D, González-Benjumea A, Santillana E, Carro J, Aranda C, Fernández-Fueyo E, Romero A*, Gutiérrez A², Martínez AT
- 11:45-12:05** *Enzyme Engineering Driven By Distal Mutations And Machine Learning*
Lur Alonso Cotchico, Ryoji Takahashi, Marina Cañellas, Emanuele Monza, Maria Fatima Lucas
- 12:05-12:25** *Cazy Aa3 Carbohydrate Active Dehydrogenases For Upgrading Xylooligosaccharides To Added-Value Materials*
Hongbo Zhao, Johanna Karpia, Emma Master, Maija Tenkanen
- 12:25-12:45** *Tandem lignin polymerization/depolymerization by bacterial laccases towards lignin nanofibers and nanoparticles*
Claudia Crestini
- 12:45-13:05** *Lytic Polysaccharide Monooxygenases Activity And Substrate Specificity: An Atr-Ftir Assay Tested On A New Ppaa10*
Giulia Di Rocco, Ilenia Serra, Daniele Piccinini, Alessandro Paradisi, Carlo Augusto Bortolotti, Gianantonio Battistuzzi, Marco Sola

13:05-14:30

Lunch & Posters

Session: Biotech/Biomaterials

Chair: Yasmina Mackmouche, Giovanni Sannia

- 14:30-15:00** *Extremophilic Laccases Engineered By Directed Evolution For Kraft Pulp Biorefineries And Fibreboard Manufacture*
Susana Camarero, David Rodríguez-Escribano, Rocío Pliego, Felipe de Salas, Pablo Aza, Valérie Meyer, Michel Petit-Conil, Sandra Tapin-Lingua, Michael Lecourt, Marta Pérez-Boada and Angel T. Martínez
- 15:00-15:20** *Laccase-Based Improvement Of Lignocellulosic Fibres Properties*
Filippo Fabbri, Michael Cordin, Tung Pham and Georg M. Guebitz
- 15:20-15:40** *Coupling Oxidoreductases With Electrodes For Biosensing, Biofuel Cells, And Biocatalysis Applications*
Omer Yehezkeli
- 15:40-16:00** *Use of Laccases for the Functionalization of Technical Lignins*
Sebastian A. Mayr, Raditya Subagia, Renate Weiß, Nikolaus Schwaiger, Johannes Leitner, Janez Kovač, Doris Ribitsch, Gibson S. Nyanhongo, Georg M. Guebitz

16:00-16:20

Short Coffee Break

Session: Biotech/Biomaterials

Chair: Selin Kara, Willem van Berkel

- 16:20-16:40** *Role Of Loops Around The Active Site In Dye-Decolorizing Peroxidase Kadypa2*
Enikő Hermann, Carolina F. Rodrigues, Peter Herzog, Lígia O. Martins, Chris Oostenbrink, Clemens K. Peterbauer

- 16:40-17:00** *H₂O₂-Free Electrochemical Operation Of Class P And I Dye Decolorizing Peroxidases: Mechanistic Insights*
Magalí F. Scocozza, Francisco Vieyra, Carolina F. Rodrigues, Lígia O. Martins and Daniel H. Murgida
- 17:00-17:20** *Surface Enhanced Resonance Raman View Of The Active Site Architecture In Dyds - The Search For (Dis)Functional Immobilized Enzymes*
Smilja Todorovic, Catarina Barbosa, Celia M. Silveira, Nikola Lončar, Marco Fraaije, and Lígia O. Martins
- 17:20-17:40** *Oxizymes For Functional Coating Of Agrochemicals*
Renate Weiß, Sebastian Gritsch, Günter Brader, Branislav Nikolic, Marc Spiller, Julia Santolin, Hedda K. Weber, Nikolaus Schwaiger, Sylvain Pluchon, Kristin Dietel, Georg GÜbitz, Gibson Nyanhongo
- 17:40-18:00** *Laccase Polymerized Lignin Can Improve The Wet Resistance Of Starch-Based Glues*
Miguel Jimenez Bartolome, Nikolaus Schwaiger, Rene Flicker, Bernhard Seidl, Martin Kozich, Gibson S.Nyanhongo, Georg M.Guebitz
- 18:00-18:30** **Meeting of the Scientific Committee**
- 19:00** **Welcome Cocktail (Rectorate)**

Thursday, July 7th 2022

Session: Biotech Applications

Chair: Cinzia Pezzella, Roland Ludwig

- 8:45-9:30** *Flavoprotein Oxidases For Plant Biomass Valorization*
Marco Fraaije
- 9:30-9:50** *A Three-Enzyme Cascade For The Self-Sustained Production Of Fatty-Acid Epoxides From Vegetable Oils*
Juan Carro, Ángel T. Martínez
- 9:50-10:10** *The Fusion Protein Fdh_{c23s}+AzoRo As An In Situ Fuel For H₂O₂-Dependent Reactions*
Anna Christina R. Ngo, Abdulkadir Yayci, Julia E. Bandow, Martin Weissenborn, Frank Hollmann, and Dirk Tischler
- 10:10-10:30** *Selective Hydroxylation Catalysed By Unspecific Peroxygenase From Agrocybe Aegerita*
Yinqi Wu, Caroline E. Paul, Miguel Alcalde, and Frank Hollmann
- 10:30-10:50** *Unlock New Biocatalysis – Oxyfunctionalization Via Unspecific Peroxygenases*
Hannah Braß, David Schönauer
- 10:50-11:20** **Coffee Break**

Session: Newly discovered oxizymes

Chair: Claudia Crestini, C. K. Peterbauer

- 11:20-11:50** *Lifestyle Evolution And Peroxidase Diversity In Agaricales As Revealed By Comparative Genomics*
FJ Ruiz-Dueñas, JM Barrasa, MI Sánchez-Ruiz, I Ayuso-Fernández, M Sánchez-García, S Camarero, S Miyauchi, A Serrano, D Linde, R Babiker, J Rencoret, I Davó-Siguero, E Drula, R Pacheco, G Padilla, P Ferreira, J Barriuso, H Kellner, R Castanera, M Alfaro, L Ramírez, AG Pisabarro, R Riley, A Kuo, W Andreopoulos, K LaButti, J Pangilinan, A Tritt, A Lipzen, G He, M Yan, A Gutiérrez, A Romero, V Ng, IV Grigoriev, D Cullen, F Martin, M-N Rosso, B Henrissat, D Hibbett, AT Martínez

11:50-12:10 *Identification Of An Oligosaccharide Dehydrogenase From Pycnoporus Cinnabarinus Provides Insights Into Fungal Breakdown Of Lignocellulose*
Giuliano Sciara, Gabriele Cerutti, Elena Gugole, Jean-Lou Reyre, Linda Celeste Montemiglio, Annick Turbé-Doan, Dehbia Chena, David Navarro, Anne Lomascolo, François Piumi, Cécile Exertier, Ida Freda, Jean-Guy Berrin, Bastien Bissaro, Beatrice Vallone, Eric Record, Carmelinda Savino

12:10-12:30 *Tandem Metalloenzymes Gate Plant Cell Entry By Pathogenic Fungi*
Bastien Bissaro, Sayo Kodama, Takumi Nishiuchi, Anna Maria Díaz-Rovira, Hayat Hage, David Ribeaucourt, Mireille Haon, Sacha Grisel, A. Jalila Simaan, Fred Beisson, Stephanie M. Forget, Harry Brumer, Marie-Noëlle Rosso, Victor Guallar, Richard O'Connell, Mickaël Lafond, Yasuyuki Kubo and Jean-Guy Berrin

12:30-12:50 *Cephalochordata Heme Peroxidases – A Peculiar Evolutionary Clade Between Thyroid Peroxidases And Peroxidasins*
Marcel Zámocký, Jana Harichová, Paul G. Furtmüller

12:50-14:30 **Lunch & Posters**

Session: Oxizymes Engineering & Biomimetic

Chair: Susanna Camarero, Georg Guebitz

14:30-15:00 *Allosteric Mutations Shape Substrate-Binding Sites During Evolution Of A Metallo-Oxidase Into a Laccase*
Lígia O. Martins, Vânia Brissos, Patrícia T. Borges, Reyes Núñez-Franco, Maria Fátima Lucas, Carlos Frazão, Emanuele Monza, Laura Masgrau, Tiago N. Cordeiro

15:00-15:20 *Influence Of The H98y Mutation On The Redox Reactivity Of Myoglobin And Its Role In The Onset Of Myoglobinopathy, A Newly Discovered Molecular Disease*
Gianantonio Battistuzzi, Carlo Augusto Bortolotti, Stefan Hofbauer, Marcello Pignataro, Giulia Di Rocco, Paul G. Furtmuller, Gianina Ravenscroft, Marco Borsari, Christian Obinger, Marco Sola

15:20-15:40 *Exploration Of Extant And Ancestral Sequence Space Of L-Lactate Oxidase*
Leander Sützl, Lidiia Tsvik, Dominik König, Dietmar Haltrich

15:40-16:00 *Supported Pd Oxidase Hybrid Catalysts For Aerobic Alcohol Oxidation*
Fangfang Yang, Pierre Rousselot-Pailley, Cendrine Nicoletti, A. Jalila Simaan, Michel Giorgi, Bruno Faure, Elise Courvoisier-Dezord, Agnès Amouric, Yolande Charmasson, Rénal Backov, Thierry Tron and Yasmina Mekmouche

16:00-16:20 **Short Coffee Break**

Oxizymes Engineering & Biomimetic

Chair: Anna Wilkolaska, Roland Ludwig

16:20-16:40 *Molecular Lego As A Tool To Modulate The Stability And The Activity Of Human Cytochrome P450*
Gianluca Catucci, Alberto Ciaramella, Giovanna Di Nardo, Chao Zhang, Silvia Castrignanò and Gianfranco Gilardi

16:40-17:00 *Horseradish Peroxidase-Mimicking Dnazymes For Protein Modification*
Jordi F. Keijzer, Bauke Albada

17:00-17:20 *Virus-Based Enzymatic Nanoreactor For Breast Cancer Treatment*
Kanchan Chauhan and Rafael Vazquez-Duhalt

17:20

Sophie Vanhulle Prize

Chair: Giovanni Sannia

The ambivalent green role of laccase: from the production of bioinks to the design of de-inking systems

Eliana Capecechi, Valeria Gigli, Davide Piccinino, Daniele Avitabile and Raffaele Saladino

20:30

Gala Dinner (San Francesco cloister)

Friday, July 8th 2022

Session: Oxizymes in fine chemistry

Chair: Alonso Cotchico Lur, Sergio Riva

8:45-9:30

Biocatalytic Oxidations Using Oxygen From Screening To Pilot Plant Scale: Safe, Selective And Efficient

Martin Schürmann

9:30-9:50

Tunable Production Of (R)- Or (S)-Citronellal From Geraniol Using A Copper Radical Alcohol Oxidase And Old Yellow Enzyme

David Ribeaucourt, Georg T. Höfler, Mehdi Yemloul, Bastien Bissaro, Fanny Lambert, Jean-Guy Berrin, Mickael Lafond, Caroline E. Paul

9:50-10:10

Chemoenzymatic Cascades For The Enantioselective Synthesis Of B-Hydroxysulfides Bearing A Stereocentre At The C-O Or C-S Bond By Ketoreductases

Fei Zhao, Kate Lauder, Siyu Liu, James D. Finnigan, Simon B. R. Charnock, Simon J. Charnock, Daniele Castagnolo

10:10-10:30

P450 Monooxygenase Family Cyp153 As Promiscuous Catalysts: Substrate And Reaction Scope

Fabian Schultes, Carolin Mügge, Dirk, Tischler

10:30-10:50

Metal affinity enzyme (co-)immobilization for batch and continuous flow biocatalysis

Álvaro Cruz-Izquierdo, Alessandra Basso, Simona Serban

10:50-11:20

Coffee Break/Lunch

Session: Oxizymes in fine chemistry

Chair: Rafael Vazquez-Duhalt, Emma Master

11:20-11:50

Biocatalytic And Chemo-Enzymatic Cascades For The Synthesis Of Heterocycles And Sulfur Compounds By Oxidoreductase Enzymes

Daniele Castagnolo

11:50-12:10

Enzyme Engineering And Synthetic Applications Of Amine Dehydrogenases

Francesco G. Mutti, Tanja Knaus, Marcelo F. Masman, Vasilis Tseliou, Maria L. Corrado, Wesley Böhmer, Jan Vilím, Joseline A. Houwman, Magda Costa, Don Schilder

12:10-12:30

A Use Case On Unspecific Peroxygenase-Catalyzed (Photo)Biocatalytic Hydroxylations In Non-Conventional Media

Markus Hobisch, Piera De Santis, Miguel Alcalde, Chan Beum Park, Frank Hollmann, and Selin Kara

12:30-12:50

Cytochrome P450-Driven Hydroxylation Towards Medium-Chain Glycols

Carolin Mügge, Fabian Peter Josef Schultes, Myra Schmidtke

12:50-13:10

Fungal Aa5_2 Copper Radical Oxidases: From Exploration To Application

David Ribeaucourt, Maria Cleveland, Yann Mathieu, Bastien Bissaro, Victor Guallar, Georg T. Höfler, Mehdi Yemloul, Mireille Haon, Sacha Grisel, Véronique Alphand, Harry Brumer, Caroline E. Paul, Fanny Lambert, Jean-Guy Berrin and Mickael Lafond

13:10

Closing remarks