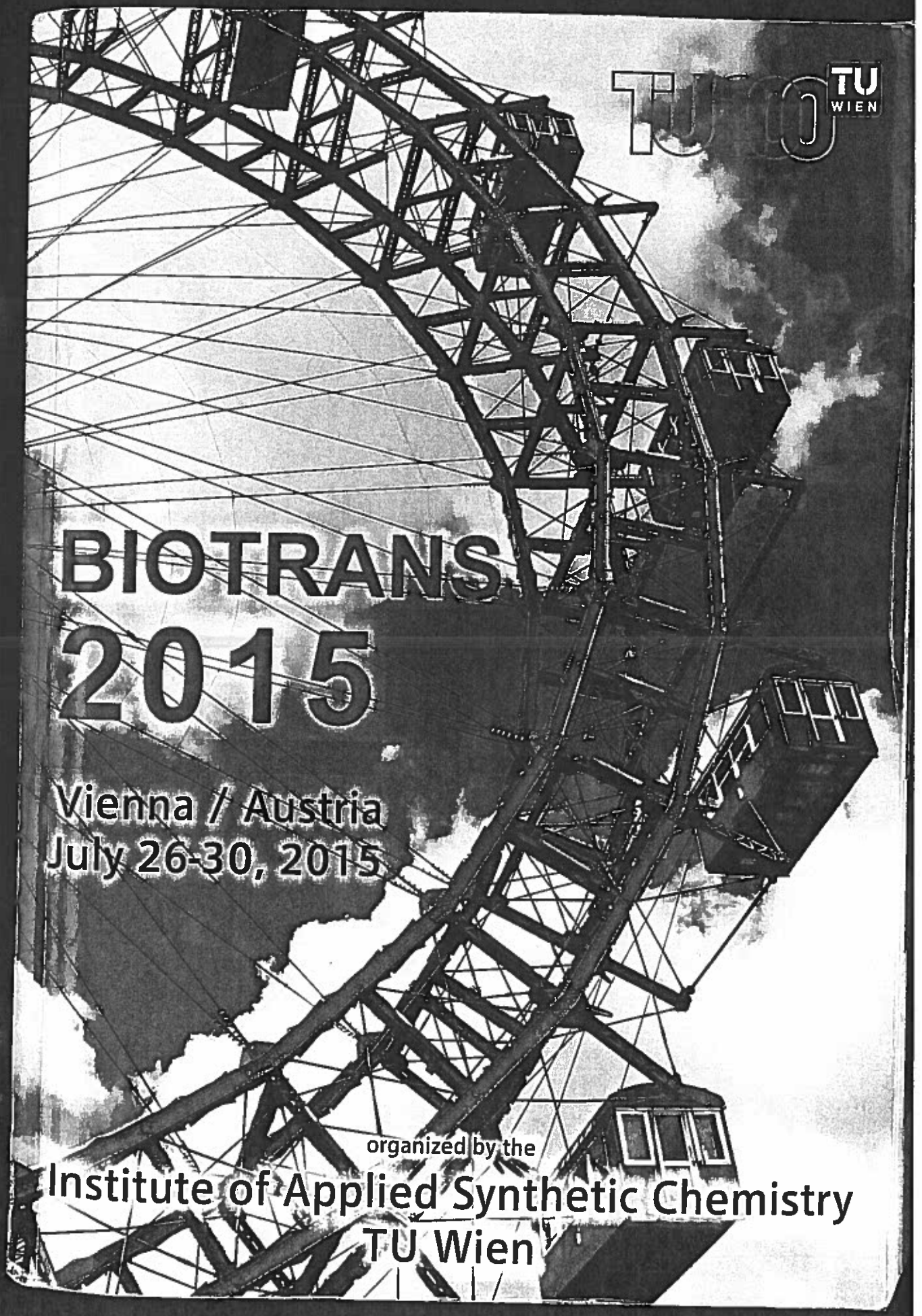
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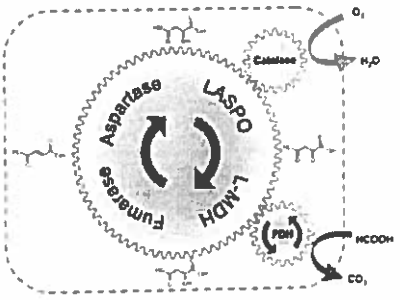
A METABOLIC-LIKE CYCLE FOR SYNTHETIC APPLICATIONS

Davide Tessaro[a,c,*], Paola D'Arrigo[a,c], Andrea Fiorati[a,c], Loredano Pollegioni[b,c], Luciano Piubelli[b,c] and Stefano Servi[c]

[a] Department of Chemistry, Materials, and Chemical Engineering "Giulio Natta", Politecnico di Milano, Piazza Leonardo da Vinci 32, 20133 Milano, Italy
[b] Dipartimento di Biotecnologie e Scienze Molecolari, Università degli Studi dell'Insubria, Via Dunant 3, 21100 Varese, Italy
[c] The Protein Factory, Centro Interuniversitario di Biotecnologie Proteiche, Politecnico di Milano, Università degli Studi dell'Insubria, via Mancinelli 7, 20131 Milano, Italy
* Partecipant in the frame of COST Action CM1303

Systems Biocatalysis is a new approach consisting of organizing enzymes in vitro to generate an artificial metabolism for synthetic purposes. The interconversion of functional groups is the main objective of biocatalysis, and systems organizing a series of enzymes to achieve a multi-step reaction have been reported. The assembly of essentially the same enzymes utilized in Nature to drive the transformation of carbohydrates towards useful synthetic intermediates [1] has been referred to as an artificial metabolism. SysBiocat aims at a similar goal addressing the generalization and organization of group of enzymes (a tool-box) able to perform a series of reactions of general synthetic utility where the feasibility is connected with the obtainment of enzymes of wide substrate specificity or in a rich array of variable common catalytic functions. [2] As a demonstration of this concept, we have recently assembled a biochemical like cycle (Asp-cycle) connecting among them an unsaturated carboxylate (fumaric acid), an alpha-amino acid (L-aspartic acid), a keto acid (oxalacetic acid) and the corresponding alpha-hydroxyacid (D- or L-malic acid). [3]

In this view, the obtained cycle may be exploited by coupling it with synthetically relevant reactions which are driven to completion thanks to one or more irreversible steps in the reaction sequence.



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