

ICB PhD public presentations**CATALYTIC TECHNOLOGIES TOWARDS
THE GLYCEROL BIOREFINERY****Giacomo Marco Lari**

Advanced Catalysis Engineering Group
Supervisor: Prof. Dr. Javier Pérez-Ramírez
Co-examiner: Prof. Dr. Christoph Müller



ETH Hönggerberg, 12/09/2017
HCI H 8.1, 15.00 h

Project Summary: Sustaining the future needs of a fast-growing society using renewable feedstocks primarily depends on the establishment of technologies enabling their efficient transformation. Biodiesel is produced by transesterification of vegetable oils, but its competitiveness versus fossil fuel-derived diesel is hampered by the burgeoning amounts of waste glycerol generated along this route. In this context, the PhD study focused on the development of novel heterogeneously-catalyzed technologies for the valorization of glycerol into a spectrum of added-value chemicals, namely, lactic acid, glycerol carbonate, epichlorohydrin, allyl alcohol, and acrylic acid. Based on molecular-scale understanding of the transformations, catalysts were designed to maximize activity, selectivity, and stability. Emphasis was put on the application of scalable methods for the synthesis of the active materials, as well as on their preparation in technical form. Processes were modelled for each route based on the catalytic systems identified and evaluated by life-cycle analysis, which enabled a comparison with conventional technologies used to produce the same chemicals and the definition of an optimal integration of the new processes within a prospective glycerol bio-refinery.

CV. G. M. Lari graduated in 2012 with a MSc in Industrial Chemistry at the University of Milan. After earning a MPhil in Catalysis in the group of Prof. G. J. Hutchings at Cardiff University, he started his PhD in 2013 in the 'advanced Catalysis engineering' group led by Prof. J. Pérez-Ramírez at ETH Zurich.