

Reading List

Model building

1. Types of problems encountered in building metabolic models: [1]
2. A review of the issues involved in generating genome scale models of metabolism. The reference list refers to some of the original examples from the Palsson group: [2]

Mathematics of Stoichiometric Analysis

An accessible account: [3]

Elementary Modes Analysis

1. The original publication introducing elementary modes analysis: [4]
2. A more advanced description of elementary modes [5]
3. EMA reviewed [6]

Linear Programming/ Flux Balance Analysis

1. An example of genome scale modelling for analysis of eukaryotic metabolism: [7]
2. Using a genome-scale model to find drug targets: [8]
3. Diatom metabolism for lipid production: [9,10]
4. LP analysis of a GSM to determine a defined minimal medium for growth [11]

Designs for Metabolic Engineering

1. Assessment of biotechnological potential of *Zymomonas mobilis* using LP/FBA: [12]
2. Use of metabolic modelling (elementary modes analysis and kinetic modelling) to consider options for metabolic engineering of *Zymomonas mobilis*: [13]
3. Elementary modes analysis to designing a knock-out strategy to force ethanol production in *E. coli*: [14]
4. Potential products from rice straw hydrolysate: [15]
5. Chemicals from CO assimilation in *C. autoethanogenum* by LP/FBA analysis [16]
6. Design for increasing alkane production for biofuels in *E. coli* [17]

References

- [1] POOLMAN, M. G. ; BONDE, B. K. ; GEVORGYAN, A. ; PATEL, H. H. ; FELL, D. A.: Challenges to be faced in the reconstruction of metabolic networks from public databases. In: *IEE Proceedings Systems Biology* 153 (2006), Nr. 5, S. 379–384. <http://dx.doi.org/10.1049/ip-syb:20060012>. – DOI 10.1049/ip-syb:20060012
- [2] FELL, D. A. ; POOLMAN, M. G. ; GEVORGYAN, A.: Building and analysing genome-scale metabolic models. In: *Biochem. Soc. Trans.* 38 (2010), 1197–1201. <http://dx.doi.org/10.1042/BST0381197>. – DOI 10.1042/BST0381197
- [3] CORNISH-BOWDEN, A. ; HOFMEYER, J.S.: The role of stoichiometric analysis in studies of metabolism: an example. In: *J. Theor. Biol.* 216 (2002), S. 179–191. <http://dx.doi.org/10.1006/jtbi.2002.2547>. – DOI 10.1006/jtbi.2002.2547
- [4] SCHUSTER, S. ; DANDEKAR, T. ; FELL, D. A.: Detection of Elementary Flux Modes in Biochemical Networks: a Promising Tool for Pathway Analysis and Metabolic Engineering. In: *Trends. Biotechnol.* 17 (1999), Nr. 2, S. 53–60. [http://dx.doi.org/10.1016/S0167-7799\(98\)01290-6](http://dx.doi.org/10.1016/S0167-7799(98)01290-6). – DOI 10.1016/S0167-7799(98)01290-6
- [5] SCHUSTER, S. ; FELL, D. A. ; DANDEKAR, T.: A General Definition of Metabolic Pathways Useful for Systematic Organization and Analysis of Complex Metabolic Networks. In: *Nat. Biotechnol.* 18 (2000), S. 326–332. <http://dx.doi.org/10.1038/73786>. – DOI 10.1038/73786
- [6] TRINH, C.T. ; SRIENC, F.: Metabolic engineering of *Escherichia coli* for efficient conversion of glycerol to ethanol. In: *Appl. Environ. Microbiol.* 75 (2009), S. 6696–705. <http://dx.doi.org/10.1128/AEM.00670-09>. – DOI 10.1128/AEM.00670-09
- [7] POOLMAN, Mark G. ; KUNDU, Sudip ; SHAW, Rahul ; FELL, David A.: Responses to light intensity in a genome-scale model of rice metabolism. In: *Plant Physiol* 162 (2013), June, Nr. 2, 1060–72. <http://dx.doi.org/10.1104/pp.113.216762>. – DOI 10.1104/pp.113.216762. – ISSN 1532-2548
- [8] HARTMAN, H. B. ; FELL, D. A. ; ROSSELL, S. ; JENSEN, P. R. ; WOODWARD, Martin J. ; THORND AHL, L. ; JELSB AK, L. ; OLSEN, J. E. ; RAGHUNATHAN, A. ; DAEFLER, S. ; POOLMAN, M. G.: Identification of potential drug targets in *Salmonella enterica* sv. Typhimurium using metabolic modelling and experimental validation. In: *Microbiology* 160 (2014), June, Nr. Pt 6, S. 1252 – 1266. <http://dx.doi.org/10.1099/mic.0.076091-0>. – DOI 10.1099/mic.0.076091-0
- [9] SINGH, Dipali ; CARLSON, Ross ; FELL, David ; POOLMAN, Mark: Modelling metabolism of the diatom *Phaeodactylum tricorutum*. In: *Biochemical Society Transactions* 43 (2015), Nov, Nr. 6, 1182–1186. <http://dx.doi.org/10.1042/bst20150152>. – DOI 10.1042/bst20150152. – ISSN 1470-8752

- [10] VILLANOVA, Valeria ; SINGH, Dipali ; PAGLIARDINI, Julien ; FELL, David ; LE MONNIER, Adeline ; FINAZZI, Giovanni ; POOLMAN, Mark: Boosting Biomass Quantity and Quality by Improved Mixotrophic Culture of the Diatom *Phaeodactylum tricornutum*. In: *Frontiers in Plant Science* 12 (2021), Apr. <http://dx.doi.org/10.3389/fpls.2021.642199>. – DOI 10.3389/fpls.2021.642199. – ISSN 1664–462X
- [11] TEJERA, Noemi ; CROSSMAN, Lisa ; PEARSON, Bruce ; STOAKES, Emily ; NASHER, Fauzy ; DJEGHOUT, Bilal ; POOLMAN, Mark ; WAIN, John ; SINGH, Dipali: Genome-Scale Metabolic Model Driven Design of a Defined Medium for *Campylobacter jejuni* M1cam. In: *Frontiers in Microbiology* 11 (2020), Jun. <http://dx.doi.org/10.3389/fmicb.2020.01072>. – DOI 10.3389/fmicb.2020.01072. – ISSN 1664–302X
- [12] PENTJUSS, Agris ; ODZINA, Ilona ; KOSTROMINS, Andrejs ; FELL, David A. ; STALIDZANS, Egils ; KALNENIEKS, Uldis: Biotechnological potential of respiring *Zymomonas mobilis*: A stoichiometric analysis of its central metabolism. In: *J. Biotechnology* 165 (2013), S. 1–10. <http://dx.doi.org/10.1016/j.jbiotec.2013.02.014>. – DOI 10.1016/j.jbiotec.2013.02.014
- [13] KALNENIEKS, U. ; PENTJUSS, A. ; RUTKIS, R. ; STALIDZANS, E. ; FELL, D. A.: Modeling of *Zymomonas mobilis* central metabolism for novel metabolic engineering strategies. In: *Front. Microbiol.* 5 (2014), February, Nr. 42. <http://dx.doi.org/10.3389/fmicb.2014.00042>. – DOI 10.3389/fmicb.2014.00042
- [14] TRINH, C. T. ; UNREAN, P. ; SRIENC, F.: Minimal *Escherichia coli* cell for the most efficient production of ethanol from hexoses and pentoses. In: *Appl. Environ. Microbiol.* 74 (2008), S. 3634–43. <http://dx.doi.org/10.1128/AEM.02708-07>. – DOI 10.1128/AEM.02708-07
- [15] AHMAD, Ahmad ; HARTMAN, Hassan B. ; KRISHNAKUMAR, S. ; FELL, David A. ; POOLMAN, Mark G. ; SRIVASTAVA, Shireesh: A Genome Scale Model of *Geobacillus thermoglucosidasius* (C56-YS93) reveals its biotechnological potential on rice straw hydrolysate. In: *JOURNAL OF BIOTECHNOLOGY* 251 (2017), JUN, S. 30–37. <http://dx.doi.org/10.1016/j.jbiotec.2017.03.031>. – DOI 10.1016/j.jbiotec.2017.03.031
- [16] NORMAN, Rupert O. ; MILLAT, Thomas ; SCHATSCHNEIDER, Sarah ; HENSTRA, Anne M. ; BREITKOPF, Ronja ; PANDER, Bart ; ANNAN, Florence J. ; PIATEK, Pawel ; HARTMAN, Hassan B. ; POOLMAN, Mark G. ; FELL, David A. ; WINZER, Klaus ; MINTON, Nigel P. ; HODGMAN, Charlie: Genome-scale model of *C. autoethanogenum* reveals optimal bioprocess conditions for high-value chemical production from carbon monoxide. In: *Engineering Biology* 3 (2019), Jun, Nr. 2, 32–40. <http://dx.doi.org/10.1049/enb.2018.5003>. – DOI 10.1049/enb.2018.5003. – ISSN 2398–6182
- [17] FATMA, Zia ; HARTMAN, Hassan ; POOLMAN, Mark G. ; FELL, David A. ; SRIVASTAVA, Shireesh ; SHAKEEL, Tabinda ; YAZDANI, Syed S.: Model-assisted metabolic engineering of *Escherichia coli* for long chain alkane

and alcohol production. In: *Metabolic Engineering* 46 (2018), Mar, 1–12. <http://dx.doi.org/10.1016/j.ymben.2018.01.002>. – DOI 10.1016/j.ymben.2018.01.002. – ISSN 1096–7176