

Ehsan Motamedian



About

Dr. Ehsan Motamedian is working as an Assistant Professor pursuing both academic and research work in Department of Biotechnology, Faculty of Chemical Engineering, Tarbiat Modares University, Tehran, Iran. He is the principal investigator of the Systems Biology and Metabolic Engineering group at Tarbiat Modares University. His main research focuses on reconstruction of biochemical networks and development of algorithms and tools to analyze the networks.



Personal Info

Date of birth : 25th July 1982

Sex : Male

Marital status : Married

P.O.Box : 14115-143 Tehran, Iran

Telehon number: (+98)21-82883947

Mobile : (+98)9124028395

E-mail : motamedian@modares.ac.ir; emotamedian@gmail.com

Website : <http://sbme.modares.ac.ir>

<https://scholar.google.com/citations?user=XpI7tMMAAAAJ&hl=en>



Education

- **B.Sc.** in Chemical Engineering, Ferdowsi University of Mashhad (2000-2004).
Final Score: 17.05 of 20
- **M.Sc.** in Chemical Engineering, Iran University of Science and Technology (2004-2006).
Final Score: 17.98 of 20
- **Ph.D.** in Chemical Engineering, Iran University of Science and Technology (2006-2011).
Dissertation title: Investigation on growth and product formation by *Bacillus subtilis* using a metabolic model



Experience

1. **Assistant Professor**, Tarbiat Modares University of Iran, **2012-present**
2. **Postdoctoral Research Fellow**, Pasteur Institute of Iran, **2011-2012**
3. **Researcher**, Research Institute of Petroleum Industry, Tehran, Iran, **2008-2010**.
4. **Lecturer**, Mahshahr Azad University, Mahshahr, Iran, **2008-2009**.

Courses Taught in university, 2008-present:

Ph.D.: Systems Biology; Metabolic Engineering; Biochemical engineering.

M.Sc.: Biochemistry; Genetics; Enzymology; Advanced Mathematics; Microbiology; Bioseparation.

B.Sc.: Process Control; Unit Operation; Engineering Mathematics.

Executive activities and membership

- **Keynote speaker, ninth Iranian Conference on Bioinformatics**, Institute for Research in Fundamental Sciences (IPM), Tehran, Iran, (11-12 November 2020). <https://icb9.ibis.org.ir/>
- **Executive Manager and member of scientific committee, 3rd Iranian Conference on Systems Biology**, Tarbiat Modares University, Tehran, Iran (27-28 February 2018). <http://icsb2018.modares.ac.ir/>
- **Member of executive and scientific committee, 2nd Iranian Conference on Systems Biology**, Tarbiat Modares University, Tehran, Iran (23-24 December 2015).
- **Member of the Systems biology Committee, Biotechnology Development Council**, Vice Presidency for Science and Technology.
- **Member of industry and patents workgroup**, Faculty of Chemical Engineering, Tarbiat Modares University.



Interests

1. Reconstruction of metabolic networks
2. Systems metabolic engineering of microbial cell factories
3. Omics data integration and analysis
4. Biomedical applications of metabolic modeling
5. Microbial fuel cells
6. Multi-scale modeling and microbial communities
7. Adaptive evolution
8. Cell-free systems



Patent

- **Motamedian E.**, Sarmadi M., Derakhshan E., ‘Systemic process of microorganism culture generation to improve the production of a bio-based product’, Registration No.: 96042, **2018**. Evaluated by: Iranian Research Organization for Science and Technology (<http://dx.doi.org/10.22104/IROST.1397.209>).

- **Motamedian E.**, Taheri E. and Bagheri F., “Growth inhibition of a drug resistant cancer cell using drugs screened by a system-oriented strategy”, Registration No.: 91805, **2017**. Evaluated by: Iranian Research Organization for Science and Technology (<http://dx.doi.org/10.22104/TROST.1396.204>).



Journal Papers

1. Firoozabadi H., Mardanpour M. M. and **E. Motamedian (2021)**. A system-oriented strategy to enhance electron production of *Synechocystis* sp. PCC6803 in bio-photovoltaic devices: experimental and modeling insights. **Scientific Reports**, 11, 12294. <https://doi.org/10.1038/s41598-021-91906-9>.
2. Savizi I. S. P., **Motamedian E.**, Lewis N. E., Jimenez del Val I., & Shojaosadati S. A. (2021). An integrated modular framework for modeling the effect of ammonium on the sialylation process of monoclonal antibodies produced by CHO cells. *Biotechnology Journal*, 2100019.
3. Ghaffarinasab, S., & **Motamedian, E. (2021)**. Improving ethanol production by studying the effect of pH using a modified metabolic model and a systemic approach. *Biotechnology and Bioengineering*, <http://doi.org/10.1002/bit.27800>.
4. Ardalani, O., **Motamedian, E.**, & Hamed, J. (2021). Reconstruction and validation of genome-scale metabolic model of *L. lactis* subsp. *lactis* NCDO 2118 and in silico analysis for succinate and Gamma-aminobutyric acid overproduction. *Biochemical Engineering Journal*, 170, 107967.
5. Pedram N, Rashedi H, **Motamedian E. (2020)** A systematic strategy using a reconstructed genome-scale metabolic network for pathogen *Streptococcus pneumoniae* D39 to find novel potential drug targets. **Pathogens and Disease**. Aug;78(6):ftaa051.
6. Karimian, E., & **Motamedian, E. (2020)**. ACBM: An integrated Agent and constraint Based Modeling framework for Simulation of Microbial communities. *Scientific reports*, 10(1), 1-10.
7. Malek Shakhkouhi A. & **Motamedian E. (2020)** Reconstruction of a two-cell metabolic model to study biohydrogen production in a diazotrophic cyanobacterium *Anabaena variabilis* ATCC 29413, **PLOS ONE**, DOI:10.1371/journal.pone.0227977.
8. Rezazadeh M., Babaeipour V., **Motamedian E. (2020)** Reconstruction, verification and in-silico analysis of a genome-scale metabolic model of bacterial cellulose producing *Komagataeibacter xylinus*, **Bioprocess and Biosystems Engineering**, 43, 1017–1026.
9. Motamedian E., Sarmadi M., Derakhshan E. (2019) Development of a regulatory defined medium using a system-oriented strategy to reduce the intracellular constraints. **Process Biochemistry**, 2019;87:10-6.
10. Mekanik M., **Motamedian E.**, Fotovat R., Jafarian V. (2019) Reconstruction of a genome-scale metabolic model for *Auxenochlorella protothecoides* to study hydrogen production under

anaerobiosis using multiple optimal solutions. **International Journal of Hydrogen Energy**, 44,2580-2591.

11. Jelokhani niaraki S., Tahmoorespur M., Minuchehr Z., **Motamedian E.**, Nassiri M. (2019) Reconstruction and analysis of the genome-scale metabolic network of *Streptococcusbovis* B315 involved in lactic acid production in the rumen.**Animal Science Journal**, 121, 103-116.DOI: 10.22092/ASJ.2018.116808.1595
12. **Motamedian E.** and Naeimpoor F. (2018) LAMOS: a linear algorithm to identify the origin of multiple optimal flux distributions in metabolic networks. **Computers & Chemical Engineering**. <https://doi.org/10.1016/j.compchemeng.2018.06.014>
13. **Motamedian E.**, Taheri E., Bagheri F. (2017) Proliferation inhibition of cisplatin-resistant ovarian cancer cells using drugs screened by integrating a metabolic model and transcriptomic data, **Cell Proliferation**. , e12370. <https://doi.org/10.1111/cpr.12370>.
14. **Motamedian E.**, Mohammadi M., Shojaosadati S. A., Heydari M. (2017) TRFBA: an algorithm to integrate genome-scale metabolic and transcriptional regulatory networks with incorporation of expression data, **Bioinformatics**. btw772.
15. Jamialahmadi O., **Motamedian E.** and Hashemi-Najafabadi S. (2016) BiKEGG: a COBRA toolbox extension for bridging the BiGG and KEGG databases.**Molecular BioSystems**, 12, 3459-3466.
16. **Motamedian E.**, Saeidi M. and Shojaosadati S. (2016) Reconstruction of a charge balanced genome-scale metabolic model to study the energy-uncoupled growth of *Zymomonasmobilis* ZM1, **Molecular BioSystems**,12, 1241-1249.
17. **Motamedian E.**, Ghavami G. and Sardari S. (2015) Investigation on the metabolism of cisplatin-resistant ovarian cancer using a genome-scale metabolic model and microarray data.**Iranian journal of basic medical sciences**, 18, 267.
18. Irani Z.A., Maghsoudi A., Shojaosadati S.A. and **Motamedian E.**(2015) Development and in silicoanalysis of a new nitrogen-limited feeding strategy for fed-batch cultures of *Pichiapastoris*based on a simple pH-control system,**Biochemical Engineering Journal**, 98, 1-9.
19. **Motamedian E.**(2015) A new algorithm to find all alternate optimal flux distributions of a metabolic network.**Computers & Chemical Engineering**,73, 64-69.
20. **Motamedian E.** and Naeimpoor F. (2011) Prediction of proton exchange and bacterial growth on various substrates using constraint-based modeling approach.**Biotechnology and Bioprocess Engineering**,16, 875-884.
21. **Motamedian E.** and Naeimpoor F. (2011) Flux distribution in *Bacillus subtilis*: inspection on plurality of optimal solutions. **Iranian journal of biotechnology**, 9, 260-266.



Conference Papers

- 1- Maryam Mohammadi, Ehsan Motamedian, Seyed Abbas Shojaosadati **(2018)**, Adding New Constraints to Incorporate Transcriptional Regulatory and Metabolic Networks of *E. coli* on Binary Substrates, 10th international chemical engineering congress, Isfahan, Iran.
- 2- Elham Taheri, Ehsan Motamedian, Fatemeh Bagheri **(2015)**, A Bi-Level Integration Algorithm for Simultaneous Modeling of Multiple Cells, 4th Conference on Constraint-Based Reconstruction and Analysis (COBRA 2015), Heidelberg, Germany.
- 3- Maryam Mohammadi, Ehsan Motamedian, Seyed Abbas Shojaosadati **(2015)**, Integration of Metabolic and Regulatory Networks with Incorporating Gene Expression Data, 16th International Conference on Systems Biology (ICSB 2015), Singapore.
- 4- Elham Taheri, Ehsan Motamedian, Fatemeh Bagheri **(2015)**, Finding essential genes for proliferation of cancer cell by the integration of transcription data into a human metabolic model, 16th International Conference on Systems Biology (ICSB 2015), Singapore.
- 5- Mona Heydari, Ehsan Motamedian, Seyed Abbas Shojaosadati **(2014)**, Integration of Microarray Data into a Genome-Scale Metabolic Model to Study Flux Distribution after Gene Knockout, International Science Index Vol: 8 No: 11 Part XVII, Istanbul, Turkey.
- 6- Maryam Saeidi, Ehsan Motamedian, Seyed Abbas Shojaosadati **(2014)**, Reconstruction of a Genome-Scale Metabolic Model to Simulate Uncoupled Growth of *Zymomonas mobilis*, International Science Index Vol: 8 No: 11 Part XVII, Istanbul, Turkey.
- 7- Ehsan Motamedian **(2014)**, Effect of Variable Fluxes on Optimal Flux Distribution in a Metabolic Network, International Science Index Vol: 8 No: 11 Part XVII, Istanbul, Turkey.
- 8- Ehsan Motamedian, Fereshteh Naeimpoor **(2010)**, Comparison of *Bacillus subtilis* Growth on Different Nitrogen Sources using Flux Balance Analysis. 13th Iranian National Chemical Engineering Congress & 1st International Regional Chemical and Petroleum Engineering, Kermanshah, Iran, October 25-28.



Certificates

- Next-generation sequencing RNA-seq data analysis **(2017)**, National Institute of Genetic Engineering and Biotechnology, Tehran, Iran.
- Design of a functional interference RNA **(2016)**, Pasteur Institute of Iran, Tehran, Iran.

- Design of primer and probe for microRNAs in apoptosis and target (2016), Pasteur Institute of Iran The Production and Research Complex, Tehran, Iran.
- Next-Generation Sequencing: introducing clinical, diagnostic and research applications (2015), Tehran University of Medical Sciences, Tehran, Iran.
- Metabolomics and its data analysis in systems biology (2014), Pasteur Institute of Iran The Production and Research Complex, Tehran, Iran.
- Expression and production of recombinant proteins in *E. coli* (2014), Pasteur Institute of Iran The Production and Research Complex, Tehran, Iran.
- Gene Silencing Using RNA interference (2013), National Institute of Genetic Engineering and Biotechnology, Tehran, Iran.

PhD Students under supervision

- 1- Fariba Akbari, Metabolic flux analysis for prediction of molecular mechanisms involved in heavy metals uptake, transport and toxicity in maize.
- 2- Reza Peighami Ganji, Regulation of *Thioalkalivibrio versutus* metabolism to optimize the desulfurization of biogas from natural gas.
- 3- Mohammad Amin Boojari, Title: Increasing the productivity of recombinant human growth hormone in *Pichia Pastoris* by presenting a new feeding strategy with the approach of integrating the metabolic model and transcriptomics data.
- 4- Elahe Derakhshan, Title: Improvement of bacteriocin production by lactic acid bacteria using a genome-scale metabolic model.
- 5- Oveis Jamialahmadi, Title: Application of genome-scale metabolic models in growth inhibition of hepatocellular carcinoma cells.
- 6- Mahsa Mekanik, Title: Reconstruction of a genome-scale metabolic model to improve hydrogen production using green algae.
- 7- Narges Pedram, Title: Reconstruction of a genome-scale metabolic model for human pathogen *streptococcus pneumoniae*.

MSc Students under supervision

- 1- Shaghayegh Yazdanpanah, Title: Development of an evolutionary approach for improving recombinant protein production.
- 2- Hananeh Ahmadpanah, Title: Metabolic Regulation of *Zymomonas Mobilis* to Improve Microbial Fuel Cell Performance in Electricity Generation.

- 3- Mostafa Kheyri, Title: Improving bacteriocin production by *Leuconostoc mesenteroides* using a genome-scale metabolic model and identifying effective genes.
- 4- Sajad Ghafari Nasab, Title: Genetic manipulation of *Synechocystis* sp. PCC 6803 using a metabolic model to improve ethanol production.
- 5- Hossein Firoozabadi, Title: Improvement of electron production by *Synechocystis* sp. PCC6803 in photosynthetic microbial fuel cells using a genome-scale metabolic model.
- 6- Omid Ardalani, Title: Reconstruction of a metabolic model for *Lactococcus lactis* subsp. *lactis* NCDO2118 to study Bactriocin production.
- 7- Ghazaal Hayavi, Title: Early stage diagnosis of breast cancer using a systemic approach.
- 8- Mohammad Ali Babazadegan, Title: Design of Culture Medium for Improving Bioethanol Production in *Synechocystis* sp. pcc 6803 by using a metabolic model.
- 9- Mohammad Hassan Gharibi, Title: Integration of metabolic and regulatory networks to inhibit the growth of cancer cell.
- 10- Emad Karimian, Title: multi-scale modeling of the human gut microbiome by combining constraint-based and agent-based modeling approaches.
- 11- Ali Malek Shahkahi, Title: generation and evaluation of a genome scale metabolic model of *Anabaena variabilis*.
- 12- Elham Taheri, Title: Study on the metabolism of cisplatin-resistant ovarian cancer by the integration of metabolic model and microarray data.
- 13- Maryam Mohammadi, Title: Simulation of *Escherichia coli* growth by the integration of microarray data in genome-scale metabolic and transcriptional regulatory networks.
- 14- Maryam Sarmadi, Title: Design of culture medium for improving bioethanol production in *Escherichia coli* by using a metabolic model.
- 15- Saeid Tajbakhsh, Title: Reconstruction of a metabolic model for evaluation of growth in *Bacillus Thuringiensis*.
- 16- Mohammad Rezazadeh, Title: Investigation on cell growth and cellulose production by *Gluconacetobacter xylinus* BPR 2001 using a genome-scale metabolic model.



PhD student adviser

- 1- Iman Shahidi, Title: Metabolic flux analysis of glycosylation to investigate the effect of culture medium and process conditions on the pattern of recombinant protein glycoform produced by CHO.

- 2- Mahdi Soleimani, Title: Maximizing the production of human growth hormone by high cell density culture of Recombinant *Pichia Pastoris*: Practical approach and using the Genome-Scale Metabolic Model ihGlycopastoris
- 3- Zahra Azimzade, Title:Metabolic flux analysis to improve Production of Recombinant Human Albumin Serum in *Pichia Pastoris* using Fed-batch Culture associated with Feeding.
- 4- Shole Ghorbani, Title: Analysis of the metabolic pathways involved in the production of milk by cattle
- 5- Saber Jolokhani, Title:Using systems biology to study bacteria *Streptococcusbovis* and *Megasphaeraelsdenii* Bacteria Involved in the Production and Consumption of Lactic Acid in Ruminant.



MSc student adviser

- 1- Ehsan Saleh Abadi, Title: Reconstruction of a genome-scale metabolic network for chicken cell (Gallus Gallus)
- 2- Maryam Saeedi, Title: Using a metabolic model to evaluate the growth and production of bioethanol in *Zeyommunas mobilis*.



Honors and distinction

1. Outstanding researcher at Tarbiat Modares University (2018).
2. Member of Iran's National Elites Foundation.
3. One of the top three graduate students in B.Sc and M.Sc.