

Mohammad Ostadi

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KEY QUALIFICATIONS

- **Process Modelling, Optimization and Integration**
- **Low Carbon Processes and Renewable Energy**
- **Techno-Economic Analysis (TEA) and Life Cycle Analysis (LCA)**

SOFTWARE SKILLS

- **Process Simulation:** Aspen Plus, Aspen HYSYS, Aspen Custom Modeler, UniSim, CAPE-OPEN, PRO/II
- **Programming languages:** MATLAB, Python, GAMS, C++, C#, VBA
- **Other:** L^AT_EX, Microsoft Office Package, Math Type

EDUCATION

- **Massachusetts Institute of Technology (MIT)** Cambridge, Massachusetts
Postdoctoral Associate in Energy Systems June. 2020 – Now
- **Norwegian University of Science and Technology (NTNU)** Trondheim, Norway
Postdoctoral Fellow in Chemical Engineering Sept. 2017 – Dec. 2019
- **Norwegian University of Science and Technology (NTNU)** Trondheim, Norway
Ph.D. in Chemical Engineering Jan. 2014 – July. 2017
- **Norwegian University of Science and Technology (NTNU)** Trondheim, Norway
M.Sc. in Natural Gas Technology Aug. 2011 – July. 2013
- **Petroleum University of Technology (PUT)** Ahwaz, Iran
B.Sc. in Chemical Engineering Aug. 2007 – July. 2011

WORK EXPERIENCE

- **Reinertsen New-Energy** Trondheim, Norway
Hydrogen production process with zero carbon emission, modeling and optimization Dec. 2019 - June. 2020
 - Unisim Flowsheet model development
 - Techno-economic evaluation of the process
 - Filing a patent
- **Nordic Blue Crude** Oslo, Norway
Power to Liquid (PTL) process modeling and optimization June. 2019 - Aug. 2019
 - Unisim Flowsheet model development
 - Technical evaluation of the process
 - Parametric optimization of the PTL process
 - Reporting the developed model with its uncertainties
- **FMC Technologies** Asker, Norway
Flow assurance and multiphase flow modeling June. 2012 - Aug. 2012
 - Review on the interfacial friction models in laminar flow
 - Implementation and testing of the models in a C++ framework
 - Training on FlowManagerTM software

Postdoc researcher at MIT*Flexible methanol production process modeling and optimization*

June. 2020 - Now

- * Flexible methanol production from renewable sources
- * TEA analysis for Sustainable Energy System Analysis Modelling Environment (SESAME) software
- * Decarbonisation pathways for Germany by 2050

Postdoc researcher at NTNU*Power and Biomass to Liquid (PBTL) process modeling and optimization*

Sept. 2017 - Dec. 2019

- * Improving carbon efficiency and profitability of the BTL process with hydrogen from renewable power
- * Hydrogen production via Solid Oxide Electrolysis Cells (SOEC) by applying renewable power
- * Hydrogen production via Reverse Electro-Dialysis (RED) by use of low grade heat in the PBTL process
- * Aspen HYSYS integration of SOEC and RED models into the PBTL process through programming in MATLAB CAPE-OPEN unit operation
- * Parametric optimization of the PBTL process via derivative-free algorithm (Nelder-Mead) through MATLAB/HYSYS integration by Object Linking and Embedding (OLE) automation server
- * Heat integration and Exergetic evaluation of the PBTL process

Ph.D. thesis*New and innovative conceptual designs of gas to liquid processes*

Jan. 2014 - July 2017

- * Conceptual design, optimization and integration of a once-through Gas-to-Liquid (GTL) process plant suitable for placement on a Floating Production, Storage and Offloading (FPSO) vessel
- * Techno-economic and Exergetic analysis of the proposed process
- * Process concept and economic evaluation of co-generation of ammonia and Fischer-Tropsch products
- * Evaluations of kinetic models for Fischer-Tropsch (FT) synthesis on cobalt catalysts
- * Development of new FT chain growth equation based on model fitting to experimental data by use of MATLAB and Python
- * Techno-economic analysis of using pure oxygen or enriched-air as oxidant in the reforming step of a GTL plant
- * Custom model development by use of MATLAB CAPE-OPEN, Aspen Custom Modeler (ACM), VBA and C#

M.Sc. thesis*Surrogate models development for integrated reforming combined cycle (IRCC) optimization*

Jan. 2013 - July 2013

- * Generation of Polynomial and Kriging surrogate models for the process
- * Surrogate model optimization of process in GAMS
- * Comparison of optimization results based on generated models considering computational cost versus accuracy

PUBLICATIONS

- 1- **M. Ostadi**, New and innovative conceptual designs of gas to liquid processes, *Ph.D. thesis at NTNU*, 2017.
- 2- **M. Ostadi**, Surrogate models for integrated reforming combined cycle optimization, *M.Sc. thesis at NTNU*, 2013.
- 3- **M. Ostadi**, The effect of Nickel promoter on Mo-Al₂O₃ based catalyst of reverse water gas shift reaction, *B.Sc. thesis at PUT*, 2011.
- 4- **M. Ostadi**, E. Gencer, M. Hillestad, Integration of Green Power in a Gas to Liquid Process, *Proceedings of the 31st European Symposium on Computer Aided Process Engineering*, 2021.
- 5- **M. Ostadi**, K. G. Paso, S. Rodriguez-Fabia, L. E. Oi, F. Manenti, M. Hillestad, Process Integration of Green Hydrogen: Decarbonization of Chemical Industries, *Energies*, 2020.
- 6- **M. Ostadi**, E. Rytter, M. Hillestad, Boosting the carbon efficiency of the biomass to liquid process with hydrogen from renewable power: The effect of H₂/CO ratio to the Fischer-Tropsch reactors, *Biomass & Bioenergy*, 2019.
- 7- **M. Ostadi**, B. Austbo, M. Hillestad, Parametric optimization of a power and biomass to liquid process, *Computer Aided Chemical Engineering*, 2019.
- 8- **M. Ostadi**, B. Austbo, M. Hillestad, Exergetic evaluation of a process converting power and biomass to liquid fuel, *Chemical Engineering Transactions*, 2019.
- 9- M. Hillestad, **M. Ostadi**, G.d. Alamo Serrano, E. Rytter, B. Austbo, J.G. Pharoah, O.S. Burheim, Improving carbon efficiency and profitability of the biomass to liquid process with hydrogen from renewable power, *Fuel*, 2018.

- 10- **M. Ostadi**, M. Hillestad, Conceptual design of a once-through gas to liquid process combined with ammonia synthesis, *Chemical Engineering & Technology*, 2018.
- 11- **M. Ostadi**, M. Hillestad, Enriched air or pure oxygen as oxidant for gas to liquid process with microchannel Reactors, *Chemical Engineering & Technology*, 2017.
- 12- **M. Ostadi**, M. Hillestad, Conceptual design of an autonomous once-through gas to liquid process with microchannel Fischer-Tropsch reactors, *Chemical Engineering Transactions*, 2016.
- 13- **M. Ostadi**, E. Rytter, M. Hillestad, Evaluation of kinetic models for Fischer-Tropsch cobalt catalysts in a plug flow reactor, *Chemical Engineering Research & Design*, 2016.
- 14- **M. Ostadi**, K. Dalane, E. Rytter, M. Hillestad, Conceptual design of an autonomous once-through gas to liquid process - comparison between fixed bed and microchannel reactors, *Fuel Processing Technology*, 2015.
- 15- A. Kharaji, A. Shariati, **M. Ostadi**, Development of Ni-Mo/Al₂O₃ catalyst for reverse water gas shift (RWGS) reaction, *Journal of Nanoscience and Nanotechnology*, 2015.
- 16- **M. Ostadi**, J. Pharoah, B. Austbo, M. Hillestad, O. Burheim, Fundamentals of Fuel-Assisted Solid Oxide Electrolysis Cell, *Ready for submission to Fuel*.
- 17- **M. Ostadi**, E. Gencer, M. Hillestad, CO₂ Emission Reduction in a Gas-To-Liquid Production Process by Integration of Green Power, *Ready for submission to Energy & Environmental Sciences*.

CONFERENCE PRESENTATIONS

- 1- **M. Ostadi**, E. Gencer, M. Hillestad, Integration of Green Power in a Gas to Liquid Process, *31st European Symposium on Computer Aided Process Engineering*, Istanbul, Turkey, 2021.
- 2- **M. Ostadi**, B. Austbo, M. Hillestad, Parametric optimization of a power and biomass to liquid (PbTL) process, *Foundations of Computer-Aided Process Design (FOCAPD)*, Colorado, United States, 2019.
- 3- **M. Ostadi**, E. Rytter, M. Hillestad, Kinetics for cobalt Fischer-Tropsch synthesis: a multi-dimensional task, *12th Natural Gas Conversion Symposium*, San Antonio, Texas, United States, 2019.
- 4- **M. Ostadi**, B. Austbo, M. Hillestad, Exergetic optimization of a process converting power and biomass to liquid fuel, *Conference on Process Integration, Modelling and Optimization for Energy Saving and Pollution Reduction (PRES)*, Crete, Greece, 2019.
- 5- M. Hillestad, **M. Ostadi**, G.d. Alamo Serrano, E. Rytter, B. Austbo, J.G. Pharoah, O.S. Burheim, Boosting the profitability of the biomass to liquid process with hydrogen from renewable power, *26th European Biomass Conference and Exhibition*, Copenhagen, Denmark, 2018.
- 6- M. Hillestad, **M. Ostadi**, G.d. Alamo Serrano, E. Rytter, B. Austbo, J.G. Pharoah, O.S. Burheim, Renewable hydrogen needs in the biomass to liquid process, *International Hydrogen and Fuel Cells Conference*, Trondheim, Norway, 2018.
- 7- **M. Ostadi**, E. Rytter, M. Hillestad, Conceptual design and cost estimation of an offshore autonomous once-through gas-to-liquid process combined with ammonia synthesis, *AIChE Spring Meeting and 13th Global Congress on Process Safety*, San Antonio, Texas, United States, 2017.
- 8- **M. Ostadi**, M. Hillestad, Conceptual design of an autonomous once-through Gas-to-Liquid (GTL) process with microchannel Fischer-Tropsch reactors, *19th Conference on Process Integration, Modelling and Optimization for Energy Saving and Pollution Reduction (PRES)*, Prague, Czech Republic, 2016.
- 9- **M. Ostadi**, M. Hillestad, Verification of a macro kinetic model and development of a product distribution model for a commercial Co/Re/Al₂O₃ Fischer-Tropsch catalyst in microchannel reactor, *22nd International Congress of Chemical and Process Engineering (CHISA)*, Prague, Czech Republic, 2016.

HONORS AND AWARDS

- Postdoc research fellowship, MIT, 2020-2021
- Co-authored a patent application on "HYDROGEN AND/OR AMMONIA PRODUCTION PROCESS", UK Patent Application No. 2010174.7, July-2020
- Received the **third rank** in data mining challenge held by Equinor BRAIN NTNU - AI Hackathon, March-2020

- Co-authored a successful grant submitted to Norwegian Research Council involving theoretical and experimental investigations of reactor staging in Fischer-Tropsch process, 2018
- Postdoc research fellowship, NTNU, 2017-2019
- PhD research fellowship, NTNU, 2014-2017
- Tuition free MSc studies, NTNU, 2011-2013
- Awarded the tuition scholarship for BSc in Chemical Engineering from PUT (Petroleum University of Technology)
- Always standing among the top 5% of class members in Chemical Engineering throughout my education
- Member of the American Institute of Chemical Engineers (AIChE)

ACADEMIC TEACHER TRAINING CERTIFICATES

- **Leadership and Professional Strategies and Skills Course (LEAPS 8.397)** Spring 2021
A semester-long course designed to give insight into effective leadership MIT
- **Teacher Training Seminar** Spring 2016
A week-long seminar with individual feedback to strengthen the lecturing and supervision skills NTNU

ACADEMIC EXPERIENCE

- * **Co-supervisor** Jan. 2021 - Now
Supervising master student working on her master thesis MIT
- * **Lecturer** Aug. 2018
Lecturing a crash course on the use of Aspen HYSYS to master students NTNU
- * **Co-supervisor** Sept. 2017 - Sept. 2019
Supervising master students working on their master theses NTNU
- * **Teaching assistant** Aug. 2016 - Dec. 2016
"Chemical Reaction Engineering" and "Separation Engineering" NTNU
- * **Co-supervisor** Jan. 2014 - Dec. 2016
Supervising master students working on their master theses NTNU
- * **Research assistant** Aug. 2013 - Dec. 2013
Development of flow assurance software written in Qt which has the same syntax as C++ NTNU
- * **Teaching assistant** Jan. 2013 - Jun. 2013
"Fluid Mechanics" NTNU
- * **Teaching assistant** Aug. 2012 - Dec. 2012
"Energy from Environmental Flows" NTNU
- * **Teaching assistant,** Jan. 2010 - Dec. 2010
"Thermodynamics" and "Fluid Mechanics" PUT, Iran
- * **Summer intern** Jun. 2010 - Aug. 2010
Operational measurements in sulfur recovery unit and gas processing unit Gas refinery, Iran

LANGUAGES

- **English & Norwegian:** Fluent
- **Persian:** Native
- **French & German:** Basic knowledge