

Amr Refay Abdelghany

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SUMMARY

- 14 years of experience in instructing engineering courses on four different continents.
- Extensive experience in academic and research of Chemical Engineering, Biotechnology, and Metallurgical Engineering.
- 10 years of experience in using Computational Fluid Dynamics (CFD) software in research and industrial projects.

EDUCATION

Ph.D. Metallurgical Engineering

August 2018

University of Utah, U.S.A

GPA 3.96

Dissertation: “*Design of Flash Ironmaking Reactors with Computational Fluid Dynamics Modeling*”

Advisor: Prof. Hong Y. Sohn

Master of Sciences in Chemical Engineering

August 2011

Cairo University, Egypt

GPA 3.5

Thesis: “*Simulation of producing methanol from syngas in fixed bed reactor using LURGI process.*”

Advisor: Dr. Ahmed Nassar

Chemical Engineering Courses

August 2009- April 2011

North Carolina State University

GPA 3.78

Graduate coursework, including Modeling, Chemical Reactions, Thermo-dynamics, Biotechnology, and Transport Phenomena.

Bachelor of Sciences in Chemical Engineering

August 2006

Cairo University, Egypt

GPA 3.8

Ranked # 1

EXPERIENCE/PROJECTS

Founder, AIST-MENA Chapter, Association for Iron and Steel Technology

August 2019- Present

- Gathering the leaders from the industry of the Iron and Steel Technology in the Middle East Region.
- A new chapter with supervision from AIST in the U.S.A and made the first forum 10-12/Nov./2020
- I am the only academic member in the founding team with major steel producers in Egypt (EZZ & Egyptian Steel) and the whole Arab world (Saudi Arabia, UAE, Bahrain, Oman, Morocco....etc.)

Assistant Professor, Cairo University

November 2018- Present

- Instructor of the Chemical Reactions Engineering, Renewable Energy, EIA, Modeling, and simulation using finite element method courses for graduate students at the Chemical Engineering Department at Cairo University.
- Instructor for the inorganic technology course for Chemical Engineering Students.
- Instructor for the Energy Efficiency and Renewable Energy course (New General Course) for the Faculty of Engineering, Cairo University.
- Builder of new research focuses on using CFD in Chemical Engineering Applications with a registered 5 Ph.D. candidates and 8 Masters's students under my supervision in different applications of Chemical Engineering.

Graduate Research Assistant & Simulation Engineer, University of Utah – U.S.

May 2014- July 2018

- Modeling development and validation of ANSYS CFD results for the complex mini-pilot reactor with swirl burner combustion at high temperatures for the novel flash ironmaking plant.
- Simulated Gas-Solid chemical reaction in a turbulent system using ANSYS Fluent software with the UDF.
- Post-processed solid particles profile in the mini-pilot reactor using ANSYS products and Matlab analysis test methods.
- Design and scale-up of an industrial plant for the production of **0.3-1 million tons/yr.** of iron using the novel technology.
- Troubleshooting of a mini-pilot plant system handles the reduction of magnetite concentrate using syngas at high temperature during the construction, cold then hot commissioning (a **\$5,000,000** process) to ensure project workflow.
- Engaged in technical discussion and writing progress reports to AISI and funding agencies during the **\$10,600,000** project (DE-EE0005751) funded by AISI, ArcelorMittal, Timken, U.S. Steel, DOE, BMC, and University of Utah.
- Execution of the project and collaboration with technicians to achieve this more clean energy based on synthesis gas.
- Performed laboratory experiments to get reduction kinetics of magnetite particles with hydrogen at 1150 – 1600 °C

R&D Engineer, European Union FP7 project (ERAfrica) - Norway

June 2014- Dec. 2018

- Design and develop a model for simulating a novel metal hydride (MH) system for R&D project to store hydrogen to be used in daily life operations using COMSOL Multiphysics.
- Modeling and validation with experimental results through a technical collaboration with the South Africa research team.
- Optimized the reaction parameters (Arrhenius constant & activation energy) using optimization package in COMSOL.
- Cooperation work with R&D teams from Norway, South Africa, Turkey, and Egypt in this €633,000 (\$772,000) project.

Regional Application Engineer, COMSOL Multiphysics– Middle East Region

June 2013- June 2014

- Conducted training for customers, presentations, webinars, On-line follow up, and presales support for the potential customer using my strong technical skills to ensure customers satisfaction with products, On-line technical support and customer support for users during trial periods at presales, presentations in English at marketing events and professional conferences for technical marketing of COMSOL Multiphysics product to both large and small groups in the following countries: Egypt, Kuwait, Saudi Arabia, Emirates, Bahrain, and Algeria.
- Used my verbal communication skills and strong presentation skills for conducting proof of concept flexible models that show features and numerical capabilities of COMSOL Multiphysics as applied physics software in the in-depth simulation of complex and/or different phenomena in broad disciplines of sciences including Heat transfer, Mass transfer, CFD, Physics, Electromagnetics, Mechanical, Aerospace, Fluid mechanics, chemistry, and Chemical reaction engineering for COMSOL clients from Chemicals, Petrochemical, Oil, and Gas technologies.
- Consulting services and problem-solving for COMSOL Multiphysics users and customers in their technical problems.
- My impact and teamwork resulted in sales enablement of **€500,000 (\$610,000)** COMSOL products in the Middle East.

Lecturer Assistant, Cairo University, and North Carolina State University

September 2006- June 2013

- Conducted training in HYSYS use for Chemical Engineers in process design of petrochemical technologies
- Mentoring and coaching 1500+ engineering students in the following undergraduate and graduate academia courses:
 - 1- Chemical Reactions kinetics and conversion
 - 2- Mass transfer and distillation operations
 - 3- Heat Transfer and heat exchanger design

Intern, Engineering for the Petroleum and Process Industries (ENPPI) - Egypt

June 2005 - September 2005

- Studied several Process Flow Diagrams (PFD) and Piping and Instrumentation Diagrams (P&ID) for manufacturing of projects in the Petrochemical Industry in the Middle East initially designed by UOP.
- Used PRO/II and HYSYS for designing technologies and process development.

SERVICE/LEADERSHIP

- **Golden Seat Winner, 2020**, Arab Fertilizers Association (AFA) forum, Cairo, Egypt, for outstanding technical knowledge during the forum sessions.
- **Homecoming Royalty Court Scholarship** represents the University of Utah in the Homecoming events because of my academic performance, passion, innovation activities on campus, service commitment, and school pride 2016/2017.
- **Union Student Leader Scholarship** of the University of Utah for interpersonal skills, highly motivated, self-driven, and outstanding leadership involvement 2016/2017.

PUBLICATIONS

- H. Y. Sohn, De-Qiu Fan, and **Amr Abdelghany**, “Design of Novel Flash Ironmaking Reactors for Greatly Reduced Energy Consumption and CO₂ Emissions,” *Metals*, 2021, 165, pp. 405-419.
- Ahmed Medhat, Heba H. El-Maghrabi, **Amr Abdelghany**, Nabil M. Abdel Menem, Patrice Raynaud, Yasser M. Moustafa, Mohamed A. Elsayed, Amr A. Nada “Efficiently activated carbons from corn cob for methylene blue adsorption”, 2021, *Applied Surface Science Advances*, Vol. 3, pp.100037.
- Mai O. Abdelmigeed, Eslam G. Al-Sakkari, Mahmoud S. Hefney, Fatma M. Ismail, **Amr Abdelghany**, Tamer S. Ahmed, Ibrahim M. Ismail, “Magnetized ZIF-8 impregnated with sodium hydroxide as a heterogeneous catalyst for high-quality biodiesel production,” *Renewable Energy*, 2021, 165(1), pp.405-419.
- Omnia A El-shafie, Rehab El-Maghraby, Jonathan Albo, Seif-Edeen K. Fateen, and **Amr Abdelghany**, “Modeling and numerical investigation of the performance of gas diffusion electrodes for the electrochemical reduction of carbon dioxide to methanol,” *Industrial & Engineering Chemistry Research*, 2020, 59(47), pp. 20929-20942.
- Mohamed El Bouraei, and **Amr Abdelghany**, “Sorption features of Polyurethane Foam Functionalized with Salicylate for Chlorpyrifos: Equilibrium, kinetic models, and thermodynamic studies,” *Polymers*, 2020, 12(9), pp.2036.
- **Amr Abdelghany**, De-Qiu Fan, and H. Y. Sohn, “Novel Flash Ironmaking Technology Based on Iron Ore Concentrate and Partial Combustion of Natural Gas: A CFD Study,” *Metallurgical and Materials Transactions B*, 2020, 51(5), pp. 2046-2056.
- **Amr Abdelghany**, De-Qiu Fan, Mohamed Elzohiery, and H. Y. Sohn, “Experimental investigation and CFD simulation of a novel flash ironmaking process based on partial combustion of natural gas in a large bench reactor,” *Steel Research International*, 2019, 90(9), pp.1900126
- **Amr Abdelghany**, De-Qiu Fan, Mohamed Elzohiery, and H. Y. Sohn, “Flash Ironmaking from Magnetite Concentrate using a Large-scale Bench Reactor: Experimental and CFD Work,” *AISTech 2018 Proceedings*, AIST, pp. 683-690, 2018.
- **Amr Abdelghany**, De-Qiu Fan, and H. Y. Sohn, “CFD Simulations of a Large-scale Bench Reactor Relevant to a Novel Flash Ironmaking Process,” *AISTech 2018 Proceedings*, AIST, pp. 765-772, 2018.
- Y. Mohassab, Feng Chen, Mohamed Elzohiery, **Amr Abdelghany**, Shengqin Zhang, and H. Y. Sohn, “Reduction Kinetics of Hematite Concentrate Particles by CO+H₂ Mixture Relevant to a Novel Ironmaking Process,” 7th Int’l Symp. on High-Temperature Metallurgical Processing, ed. by: J.-Y. Hwang et al., TMS (The Minerals, Metals & Materials Society), pp. 221-228, 2016.
- Mohamed Elzohiery, Y. Mohassab, **Amr Abdelghany**, Shengqin Zhang, Feng Chen, and H. Y. Sohn, “Reduction Kinetics of Magnetite Concentrate Particles with Hydrogen at 1150 – 1600 °C Relevant to a Novel Ironmaking Process,” *EPD Congress 2016*, ed. by A. Allanore et al., TMS (The Minerals, Metals & Materials Society), pp. 41-49, 2016.
- H. Y. Sohn, Y. Mohassab, M. Elzohiery, D.-Q. Fan, and **A. Abdelghany**, “Status of the Development of Flash Ironmaking Technology,” *Applications of Process Engineering Principles in Materials Processing, Energy and Environmental Technologies*, S. Wang et al. (eds.), The Minerals, Metals & Materials Series, The Minerals, Metals & Materials Society, pp. 15-23, 2017. DOI 10.1007/978-3-319-51091-0_2
- H. Y. Sohn, M. Elzohiery, D.-Q. Fan, and **Amr Abdelghany**, “Development of a Flash Ironmaking Technology Based on Hydrogen or Natural Gas - Implications on Energy and Greenhouse Gas Emissions,” in *Proceedings of the 3rd World Congress on Mechanical, Chemical, and Material Engineering (MCM’17)*, Rome, Italy, June 9 – 10, 2017.