Abdelmalek Bellal

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LINKS

Linkedin, Google scholar

PROFILE

- Dr. Abdelmalek currently works as a Research Engineer/Scientist level II at the University of North Dakota. His role includes developing research data and technical write-ups for proposal opportunities and performing techno-economic feasibility studies.
- Experienced and dedicated researcher in a variety of engineering aspects, notably the production of clean fuels using Fischer-Tropsch synthesis, flare mitigation, minerals extraction, and CO2 capture.
- Experienced in designing and fabricating laboratory-scale carbon capture testing rigs and large chemical processes at the pilot scale.
- Key researcher in the development and operation of the $8 million TRL 6 pilot scale demonstration for rare earth elements extraction from coal.
- Co-inventor of a novel adsorbent for CO2 capture synthesized from coal (provisional patent).
- He is the key process simulator of a 100 KW methane pyrolysis plasma pilot plant for technology evaluation and development.
- 1 year of work experience as a laboratory manager at an industrial scale.
- Able to effectively self-manage during independent projects or research proposal writing, as well as collaborate as part of a productive team.

INVENTIONS

Hou, X., **Bellal, A.,** Nasah, J., Van der Watt. 2014. A Potassium Carbonate-Based Sorbent for CO2 Capture. *Provisional patent*.

TECHNICAL SKILLS

- **Adept in general materials characterization techniques, including TGA, XRF, SEM, FTIR, and Surface Analysis (BET).**
- **Proficient in an assortment of chemical plant modeling and optimization technologies, including Aspen Plus, Aspen Custom Modeler.**
- **Familiar with most coding software, including Python, MATLAB, and Excel-VBA.**

EDUCATION

May 2020 — Dec 2023 — **Ph.D. in Energy Engineering, University of North Dakota** — Grand Forks, United States

- Worked on a CO2 capture research project. A funded project by the U.S. Department of Energy (ID number: 06-UND-Z1-13).
- Invented a novel adsorbent for CO2 capture.

Jun 2017 — Jan 2021 — **Ph.D. in Chemical Engineering, Ferhat Abbas University** — Setif, Algeria

- Research topic: Simulation Study of Membrane Reactor for In-situ Purification and Production of Clean Fuel via Fischer-Tropsch Synthesis.

Jun 2017 — Sep 2017 — Summer break.

Sep 2015 — Jun 2017 — **M.Sc. in Petrochemical Engineering, University of Skikda** — Skikda, Algeria

- Graduated first in the class.
- Dissertation topic: Wet hydrogen peroxide catalytic oxidation of malachite green over Fe2O3/Kaolin catalyst.

Jun 2015 — Sep 2015 — Summer break.

Sep 2012 — Jun 2015 — **B.S. in Oil Refining and Petrochemistry , University of Skikda** — Skikda, Algeria

- Graduated with High Honors.

Jun 2012 — Sep 2012 Summer break.

Sep 2009 — Jun 2012 **Baccalaureate degree, Ibn Rachik High School** Setif, Algeria

EMPLOYMENT HISTORY

Dec 2023 — Present **Research Engineer/Scientist II, University of North Dakota** Grand Forks, United States

- Key process simulator of a 100 KW methane pyrolysis plasma pilot plant for technology evaluation and development.

May 2023 — Dec 2023 **Research Engineer/Scientist I, University of North Dakota** Grand Forks, United States

- Designing and fabricating laboratory-scale carbon capture testing rigs and large chemical processes at the pilot scale.

Sep 2021 — Mar 2023 **Graduate Research Assistant , University of North Dakota, Institute For Energy Studies** Grand Forks, United States

- Produced process drawings for an adsorbent manufacturing plant and carbon capture plant.
- collected, reduced, and analyzed data from carbon dioxide capture tests and ran statistical correlations on measured parameters to interpret reduced data.

Jan 2021 — Sep 2021 **Graduate Teaching Assistant, University of North Dakota, Department of Petroleum Engineering** Grand Forks, United States

- Taught Undergrad Reservoir Simulation Course.

Feb 2020 — Jan 2021 Preparation of doctorate degree dissertation.

Sep 2019 — Feb 2020 **Temporary Lecturer, Ferhat Abbas University** Setif, Algeria

- Taught Undergrad Math and Engineering Courses.

Jun 2019 — Sep 2019 Vacation.

Apr 2018 — Jun 2019 **Laboratory head , SIPLAST Company (Plastic Injection and Blow)** Setif, Algeria

- Worked closely with the CEO of the company to do research at Ferhat Abbas University and conduct the development of newly commercialized products.
- Accurately interpreted laboratory results and made decisions accordingly.

CERTIFIED TRAINING

Sep 2021 — Sep 2021 **Fundamentals of Data Analytics, Schlumberger NExT, in-person at University of North Dakota**

INTERNSHIPS

Feb 2017 — Mar 2017 **Catalytic Reforming of Heavy Fuels, Sonatrach (RA1K)** Skikda, Algeria

Mar 2015 — Apr 2015 **Dehydration and Liquefaction of Natural Gas, Sonatrach (GL1K)** Skikda, Algeria

Jun 2014 — Jul 2014 **Paraffins Isomerization for the Production of High-Quality Fuels, Sonatrach (RA1K)** Skikda, Algeria

JOURNAL PUBLICATIONS

Bellal, A., Hou, X., Nasah, J., Van der Watt, J., Laudal, D., Hoffman, J. Under review. Synthesis of a Novel Microspherical Cost-Effective and High-Performing Sorbents for Carbon Dioxide Capture via a Spray Drying Technique. *Journal of Environmental Chemical Engineering*.

Bellal, A., Hou, X., Nasah, J., Van der Watt, J., Laudal, D., Hoffman, J. Under review. Performance and Economic Viability Assessment of a Novel CO2 Adsorbent for Manufacturing and Integration with Coal Power Plants". *Chemical Engineering Journal*.

Bellal, A., Hou, X., Nasah, J., Van der Watt, J., Xu, X., Laudal, D. Under review. Kinetic and Numerical modeling of Fixed-Bed Post-Combustion CO2 Capture on Novel Microspherical K2CO3/Humic-Acid Adsorbent. *Chemical Engineering Journal*.

Hou, X., Pushparji, R.I., Xu, S., Zhang, X., **Bellal, A.**, Zhang, R. 2024. Coal-derived porous carbon anodes for Na-ion batteries. *Renewable & Sustainable Energy. 2(1):0004.*

Bellal, **A.**, 2021. Wet hydrogen peroxide catalytic oxidation of malachite green over Fe2O3/Kaolin catalyst: optimization of reaction parameters. *International Journal Of Engineering Research And Development, 17(10), 01-07*.

Bellal, A., Chibane, L. 2020. A new concept for control and orientation of the distribution of clean hydrocarbons produced by Fischer–Tropsch synthesis over an industrial iron catalyst. *Reaction Kinetics, Mechanisms Catalysis. 129, 725–742*.

Bellal, A., Chibane, L. 2020. Fischer-Tropsch reaction mixture permeation through a silicalite-1 membrane reactor and its effect on the produced hydrocarbons distribution. *International Journal of Chemical Reactor Engineering, 18(9), 20200062*.

Bellal, A., Chibane, L., 2020. On the Effect of the Inlet Hydrogen Amount on Hydrocarbons Distribution Produced via Fischer-Tropsch Synthesis. *Advances in Renewable Hydrogen and Other Sustainable Energy Carriers, Springer Proceedings in Energy. Springer Singapore, Singapore, 451–458*.

Bellal, **A.**, Hou, X., Nasah, J., Van der Watt, J., Laudal, D. 2022. Synthesis of a Novel K2CO3/Humic Acid Microspherical Adsorbent for Post-Combustion CO2 Capture. *Paper presented at the 46th International Technical Conference on Clean Energy, Clearwater, Florida, United States. Coal Technologies Associates Proceedings, 066314-0074, 401-4011.*

Bellal, A., Khetib, Y. 2022. Prediction of Discrete and Continuous Wellbore Logs Values Using Artificial Neural Network, Decision Trees and Support Vectors Machine Algorithms. *Paper presented at the 56th U.S. Rock Mechanics/Geomechanics Symposium, Santa Fe, New Mexico, United States. ARMA-2022-0031.*

Bellal, A., Assady, A. 2022. Molecular Simulation of Adsorption and Diffusion Behavior of CO2 in Bakken Nano-Porous Media for Enhanced Oil Recovery Assessment. *Paper presented at the 56th U.S. Rock Mechanics/Geomechanics Symposium, Santa Fe, New Mexico, United States. ARMA-2022-0336.*

Assady, A., **Bellal**, **A.**, Rasouli, V., Jiang. T. 2021. Effect of Stress Dependent Permeability Evolution on CO2 EOR in Unconventional Reservoirs. *Paper presented at the ARMA/DGS/SEG International Geomechanics Symposium, Virtual- . ARMA-IGS-21-041.*

Assady, A., Sagar, S., **Bellal**, **A.**, Jabbari, H. 2021. Application of Digital Rock Analysis (DRA) in Pore-Scale Characterization of the Bakken Formation. *Paper presented at the 55th U.S. Rock Mechanics/Geomechanics Symposium, Virtual- . ARMA-2021-1245.*

Bellal, A., Chibane, L. 2019. New clean fuels generation by BTL technology. *Poster presentated at the 1st International Seminar on Green Chemistry and Sustainable Engineering ISGCSE, El Oued, Algeria*.

CONFERENCE PROCEEDINGS AND PARTICIPATIONS

Bellal, A., Chibane, L. 2019. On the effect of inlet hydrogen amount on hydrocarbons distribution produced via Fischer-Tropsch synthesis. *Poster presentation at the 3rd International Symposium on Sustainable Hydrogen ISSH2, Algiers, Algeria.*

Bellal, A., Chibane, L. 2019. Temperature control of Fischer-Tropsch reactor for eco-friendly hydrocarbons products synthesis. *Poster presented at the 1st International Workshop on Environmental Engineering IWEE, Setif, Algeria*.

Bellal, A., Chibane, L. 2018. Parametric study of Fischer-Tropsch synthesis for the production of clean hydrocarbons in a conventional fixed bed reactor. *Paper presented at the 5th International Seminar on New and Renewable Energy SIENR, Ghardaia, Algeria*.

LANGUAGES

Arabic	Native speaker	French	B2
English	C1		

HOBBIES

Tennis, Biking, Hiking, and Travel.