Curriculum Vitae

Mohamed Mahmoud, PhD

Water Pollution Research Department, National Research Centre
33 El-Buhouth St., Dokki, Cairo 12622, Egypt
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EDUCATION:

Doctor of Philosophy in Civil, Environmental, and Sustainable Engineering — **Fall 2016**
School of Sustainable Engineering and The Built Environment
Arizona State University, Tempe AZ, USA

Master of Science in Chemistry/Environmental Sciences — **August 2009**
Faculty of Science
Cairo University, Cairo, Egypt

Bachelor of Science in Chemistry — **May 2004**
Faculty of Science
Cairo University, Cairo, Egypt

RESEARCH INERSESTS:

- Anaerobic metabolism of bacteria and Archaea
- Thermodynamic/kinetic analysis on microbial metabolisms
- Microbial Electrochemistry
- Microbial ecology in engineered biological systems
- Bio-energy capture from industrial waste streams
- Biological nutrient removal and recovery
- Advanced oxidation processes

RESEARCH EXPERIENCE:

Graduate Research Associate – Arizona State University — August 2012 to December 2016

Assistant Researcher – National Research Centre (Egypt) — Dec. 2009 – July 2012

Visiting researcher (UNESCO fellow) – Arizona State University — March 2011 – Sept. 2011

Graduate Research Assistant – National Research Centre — Nov. 2005 – Nov. 2009

HONORS, AWARDS, AND GRANTS:

1. The 2017 Graduate Student Awards in Environmental Chemistry, Division of Environmental Chemistry, American Chemical Society (ACS).
2. Graduate Completion Fellowship – Arizona State University (Fall 2016).
3. Faculty Emeriti Fellowship – Arizona State University (2016-2017).
4. Travel grant – The Graduate and Professional Student Association (GPSA) at Arizona State University, Spring 2016.
5. Arizona Water Association Scholarship (2015).
6. Travel grant – American Chemical Society, the 2015 Summer School on Green Chemistry & Sustainable Energy, the Colorado School of Mines, Colorado, USA
7. Graduate Research Support Program (GRSP) fellowship, the Graduate and Professional Student Association (GPSA) at Arizona State University, Spring 2013.
8. Misr El-Kheir Publication Award for the best scientific article in Egypt for year 2012.
9. PhD fellowship – The Egyptian Ministry of Higher Education, 2012-2016.
10. UNESCO/Keizo Obuchi research fellowship (UNESCO/Japan Young Researchers' Fellowship Programme) for cycle 2010 (March – September 2011).
11. Master Scholarship – Water Pollution Research Department, National Research Centre (2006–2009).
12. Outstanding student, Cairo University (award to top 5%) (2004).
13. The State Award for Outstanding Undergraduate Students in Egypt (2001–2004).

TEACHING INERSESTS:

Environmental biotechnology and waste management, in particular:

- Introduction to Environmental Engineering
- Environmental Microbiology and Biotechnology
- Biotransformation of Hazardous Wastes
- Biological Processes and Wastewater Treatment
- Microbial Electrochemistry

MENTOR & TEACHING EXPERIENCE:

Guest lecturer – Arizona State University **Fall 2016**
CEE 565 – Advanced Environmental Biotechnology

Mentor – Arizona State University **2013–Present**
I mentor junior researchers at different levels of academic expertise: undergraduates and graduate students.

Instructor – National Research Centre, Egypt **2005–2011**
I organized and developed the following training courses: Wastewater and sludge management, and low-cost wastewater treatment technologies.

Mentor – National Research Centre **2008–2012**
I mentor junior researchers at different levels of academic expertise: undergraduates and graduate students.

PUBLICATIONS:

(I) Peer-review journal publications: (h-index: 7 – Google Scholar, February 2017)

Mahmoud, M., Torres, C.I., and Rittmann, B.E., 2016. Changes in glucose fermentation pathways in response to increase the free ammonia concentration in microbial electrochemical cells. *Environmental Science & Technology* (Major revision).

Mahmoud, M., Parameswaran, P., Torres, C.I., and Rittmann, B.E., 2016. Electrochemical techniques reveal that total ammonium stress increases electron flow to anode respiration in mixed-species bacterial anode biofilms. *Biotechnology and Bioengineering* (Accepted; DOI: 10.1002/bit.26246).

Mahmoud, M., Parameswaran, P., Torres, C.I., and Rittmann, B.E., 2016. Relieving the fermentation inhibition enables high electron recovery from landfill leachate in a microbial electrolysis cell. *RSC Advances*, 6, 6658 – 6664.

Mahmoud, M., Parameswaran, P., Torres, C.I., and Rittmann, B.E., 2014. Fermentation pre-treatment of landfill leachate for enhanced electron recovery in a microbial electrolysis cell (MEC). *Bioresource Technology*, 151, 151 – 158.

El-Gohary, F.A., El-Kamah, H.M., Abdel Wahaab, R.A., **Mahmoud, M**., and Ibrahim, H.A., 2012. Management of wastewater from the vegetable dehydration industry in Egypt – a case study. *Environmental Technology*, 33 (2), 211 – 219.

El-Kamah, H. and **Mahmoud, M**., 2012. Performance evaluation of sequencing batch reactor treating beverage industrial wastewater. *Water Environment Research*, 82 (2), 155 – 161.

El-Kamah, H., **Mahmoud, M**., and Tawfik, A., 2011. Performance of down-flow hanging sponge (DHS) reactor coupled with up-flow sludge anaerobic blanket (UASB) reactor for treatment of onion dehydration wastewater. *Bioresource Technology*, 102 (22), 10459 – 10464.

Mahmoud, M., Gad-Allah, T.A., El-Khatib, K.M., and El-Gohary, F., 2011. High performance of spinel Manganese-Cobalt oxide as a cathode catalyst for microbial fuel cell applications. *Bioresource Technology*, 102 (14), 7029 – 7035.

Mahmoud, M., Tawfik, A., and El-Gohary, F., 2011. Use of down-flow hanging sponge (DHS) reactor as a promising post-treatment system for municipal wastewater. *Chemical Engineering Journal*, 168 (2), 535–543.

El-Kamah, H., Tawfik, A., **Mahmoud, M**., and Abdel Halim, H., 2010. Treatment of high strength industrial wastewater using integrated anaerobic/aerobic system. *Desalination*, 253 (1/3), 158–163.

Mahmoud, M., Tawfik, A., and El-Gohary, F., 2010. Simultaneous organic and nutrient removal in a naturally ventilated bio-tower treating pre-settled municipal wastewater. *Journal of Environmental Engineering – ASCE*, 136 (3), 301–307.

Mahmoud, M., Tawfik, A., Samhan, F., and El-Gohary, F., 2009. Sewage treatment using an integrated system consisting of Anaerobic Hybrid Reactor (AHR) and Downflow Hanging Sponge (DHS). *Desalination and Water Treatment*, 4, 168–176.

(II) Articles submitted or in preparation to publish in journals with peer review:

Mahmoud, M., Torres, C.I., and Rittmann, B.E., 2016. Alterations in the fermentation rate as a response to changes in organic matter composition of landfill leachate. *Waste Management* (Submitted).

Mahmoud, M. and Rittmann, B.E., 20XX. Characteristics and fates of soluble microbial products in microbial electrochemical cells under stress conditions (In preparation).

Mahmoud, M., Marcus, A.K., and Rittmann, B.E., 20XX. Dynamic modelling approach explains metabolites yielding in anaerobic mixed-culture fermentations (In preparation).

(III) Presentations:

Mahmoud, M.*, 2016. Microbial Electrochemical Cells: A Novel platform for renewable energy recovery from wastewater. Civil and Environmental Engineering Department, University of Michigan, Ann Arbor, MI; November, 2016

Mahmoud, M.*, Parameswaran, P., Torres, C.I., and Rittmann, B.E., 2016. The response of anode-respiring bacteria to high ammonia concentration in a microbial electrolysis cell (MEC). 251st American Chemical Society Annual Spring Meeting, San Diego, CA, March 2016 (Podium presentation).

Mahmoud, M.*, Parameswaran, P., Torres, C.I., and Rittmann, B.E., 2016. Electrochemical techniques reveal that ammonia stress stimulates high respiration rates in bacterial anode biofilm: What does not kill them makes them stronger. Fusion 2016: A Biodesign Scientific Retreat, Carefree, AZ, March 2016 (Poster presentation).

Mahmoud, M.*, Parameswaran, P., Torres, C.I., and Rittmann, B.E., 2015. Landfill Leachate Treatment: How to Turn Problems into Opportunities. 88th AZ Water Conference, May 1, Glendale, AZ (Podium presentation).

Mahmoud, M.* and El-Gohary, F., 2015. Simultaneous organic matter removal and nutrient recovery in a naturally ventilated down-flow hanging sponge (DHS) reactor treating municipal wastewater. 88th AZ Water Conference, May 1, Glendale, AZ (Poster presentation).

Mahmoud, M.*, Parameswaran, P., Torres, C.I., and Rittmann, B.E., 2014. Boosting the performance of microbial electrochemical cells fed with landfill leachate using Fenton pre-oxidation. The 2nd North American– International Society for Electrochemistry and Microbiology (NA-ISMET). Pennsylvania State University, May 13-15, University Park, State College, PA (Poster presentation).

Mahmoud, M.*, Parameswaran, P., Torres, C.I., and Rittmann, B.E., 2014. Recovering resources from landfill leachate. 3rd Annual Graduate Research Symposium, School of Sustainable Engineering and the Built Environment, Arizona State University, Tempe, AZ, March 2014.

Mahmoud, M.*, 2013. Pre-treatment of Landfill Leachate for Enhanced Electron Recovery in a Microbial Electrochemical Cell. Environmental Engineering seminar, School of Sustainable Engineering and the Built Environment, Arizona State University, Tempe, Arizona (Invited presentation).

Mahmoud, M.*, Parameswaran, P., Torres, C.I., and Rittmann, B.E., 2013. Fermentation pre-treatment of landfill leachate for enhanced electron recovery in a microbial electrolysis cell (MEC). 86th AZ Water Conference, May 1, Glendale, AZ (Poster presentation).

Mahmoud, M.*, Tawfik, A., and El-Gohary, F., 2010. Appropriate wastewater treatment for rural areas and small communities. In Proceedings of the 1st International conference and exhibition on Sustainable Water and Sanitation 2010, Holding Company for Water and Wastewater, July, 25-27, Cairo, Egypt (Podium presentation).

El-Gohary, F., Tawfik, A., Samhan, F., and **Mahmoud, M.***, 2008. Municipal wastewater treatment using a combined system consisting of an anaerobic hybrid reactor followed by a down-flow hanging sponge reactor. In Proceedings of the 3rd International conference of Environmental Research Division on Environmental Science and Technology, National Research Centre, April 1–4, Cairo, Egypt (Podium presentation).

Mahmoud, M., Tawfik, A., Samhan, F., and El-Gohary, F.*, 2007. Sewage treatment using an integrated system consisting of anaerobic hybrid reactor (AHR) and downflow hanging sponge (DHS). In Proceedings of the 2nd International Congress Smallwat07, November 11-15, Seville; Spain (Podium presentation).

(presenter)*

(IV) Other publications

Mahmoud, M. "*Sustainable approach for landfill leachate treatment using microbial fuel cell (MFC) with bioelectricity production*, project funded by UNESCO through UNESCO/Keizo Obuchi research grant, 2012 – **PI**.

Final report of the U.S.–Egypt joint research project "*Landfill leachate treatment: Anammox combined with advanced oxidation*", project funded by the United States Agency for International Development (USAID) and the Egyptian Ministry of Scientific Research (MOSR).

The program is implemented in the U.S. by the National Academy of Sciences and in Egypt by the Science and Technology Development Fund (STDF), 2012 – **team member**.

Final report of the project "Imperative technologies for hospital wastewater treatment", project funded by The Egyptian Science and Technology Development Fund (STDF), (2012) – **team member**.

Final report of the project "*Fungal membrane bioreactor for the treatment of textile wastewaters*", project funded by The Egyptian Academy of Scientific Research and Technology in cooperation with Tunisian ministry of higher education, 2010 – **team member**.

Final report of the project "*Sustainable technologies for domestic wastewater treatment in rural areas and small communities for appropriate agricultural use*", project funded by National Research Centre, Egypt, 2009 – **team member**.

RESEARCH GRANTS:

PI – Project title: Sustainable approach for landfill leachate treatment using microbial fuel cell (MFC) with bioelectricity production; Funding agency: UNESCO through UNESCO/Keizo Obuchi research grant; total fund: US$ 10,000.

PI – Project title: Sustainable Technology for Recovery of Energy from Wastewater using Microbial Fuel Cell; Funding agency: Graduate and Professional Student Association (GPSA) at Arizona State University; total fund: US$ 750.

PI – Project title: Towards improving electron recovery and coulombic efficiency of microbial electrochemical cells fed with fermentable electron donors; Funding agency: The Egyptian Ministry of Higher Education International PhD fellowship; total fund: US$ 200,000.

Technical leader and key personal – Project title: Wastewater Treatment Using Microbial Fuel Cells with Peroxide Production; Funding agency: The United States DOD-SERDP; total fund: US$ 690,000.

Technical leader and key personal – Project title: Landfill leachate treatment: Anammox combined with advanced oxidation; Funding agency: The United States Agency for International Development (USAID) and the Egyptian Ministry of Scientific Research (U.S.–Egypt joint research project); total fund: US$ 100,000.

Technical leader and key personal – Project title: Landfill leachate treatment: Anammox combined with advanced oxidation; Funding agency: The United States Agency for International Development (USAID) and the Egyptian Ministry of Scientific Research (U.S.–Egypt joint research project); total fund: US$ 100,000.

Technical leader and key personal – Project title: Imperative technologies for hospital wastewater treatment; Funding agency: The Egyptian Science and Technology Development Fund (STDF); total fund: 1,000,000 L.E.

Technical leader and key personal – Project title: Fungal membrane bioreactor for the treatment of textile wastewaters; Funding agency: The Egyptian Academy of Scientific Research

and Technology in cooperation with Tunisian ministry of higher education; total fund: 50,000 L.E.

Technical leader and key personal – Project title: Sustainable technologies for domestic wastewater treatment in rural areas and small communities for appropriate agricultural use; Funding agency: National Research Centre, Egypt.

PROFESSIONAL MEMBERSHIP:

- American Chemical Society (ACS) (2015—present)
- The Electrochemical Society (ECS) (2012—present)
- Association of Environmental Engineering and Science Professors (AEESP) (2014—present)
- American Academy of Environmental Engineers and Scientists (AAEES) (2015—present)
- International Society of Microbial Electrochemical Technologies (ISMET) (2012—present)
- WateReuse Arizona (2014—present)
- AZ Water Association (2014—present)
- Egyptian Syndicate of Scientific Professions (ESSP) (2005—present)

PROFESSIONAL SERVICES AND DEVELOPMENT:

***Ad–hoc* reviewer** **2009 – Present**
Water Research, Bioresource Technology, Chemical Engineering Journal, Journal of Environmental Management; Chemical Technology and Biotechnology, Environmental Science: Water Research & Technology, Desalination, Desalination and Water Treatment, Environmental Technology, Renewable and Sustainable Energy Reviews, International Journal of Hydrogen Energy, Water Environment Research, Water Science and Technology, and Water SA.

Grants reviewer **2012 – 2016**
Graduate & Professional Student Association at Arizona State University.

Grand awards judge **May 2016**
Intel International Science and Engineering Fair (ISEF) 2016 in Phoenix, AZ

Board committee Member **Spring 2015**
Travel Grant committee, Graduate & Professional Student Association at Arizona State University.

Wastewater treatment committee member **Feb. 2015 – Present**
Arizona Water Association, AZ, USA.

Instructor **Fall 2012**
Environmental Engineering session, Fundamentals of Engineering (FE) exam review sessions at Arizona State University.

Media committee member **Fall 2015**
Organizing committee of the 5th International Meeting on Microbial Electrochemistry and Technologies, October 1–4, 2015; Tempe, Arizona, USA.

Media committee member **Summer 2010**
Organizing committee of the 1st international conference and exhibition on Sustainable Water and Sanitation 2010, Holding Company for Water and Wastewater, 25–27 July; Cairo, Egypt.

Reviewer and research advisor **March 2015 – Present**
Egypt Scholars Inc.

Demonstration volunteer **2013 – 2016**
Biodesign Institute's Night of the Open Door at ASU.