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Academic Appointments

Assistant Professor of Microbial Metabolism, University of Wisconsin-Madison 1/2021- present
Department of Bacteriology, Madison, WI

Assistant Professor of Biochemistry, SUNY ESF 8/2019-12/2020
College of Environmental Science & Forestry, Department of Chemistry, Syracuse, NY

Education and Training

Post-Doctoral Research Associate, The Scripps Research Institute, La Jolla, CA 8/2018-7/2019

- Mentor: Gary Siuzdak, Center for Metabolomics and Mass Spectrometry
- Integration of metabolomics into systems biology of microbial communities, sulfur metabolism

Post-Doctoral Fellow, University of Missouri, Columbia, MO 8/2015-7/2018

- Mentor: Judy D. Wall, Department of Biochemistry
- Physiology, genetics, and proteomics of uranium-reducing anaerobic bacteria

Ph.D. Chemistry, Washington University in St. Louis, MO 8/2010-5/2015

- Mentor: Robert E. Blankenship, Departments of Chemistry and Biology
- Structure and function of cyclic electron transport chain proteins from anoxygenic phototrophs

B.A. ACS Chemistry with Honors, Drury University, Springfield, MO 8/2006-5/2010

- *summa cum laude***,** Minors in Global Studies, Spanish, Math and Physics

Publications

Submitted:

1. Thorgersen, M.P., Xue, J.C., Majumder, E.L.W., Trotter, V.V., Price, M.N., Ge, X.X., Poole II, F.L., Owens, T.K., Lui, L.M., Nielsen, T.N., Arkin, A.P., Deutschbauer, A.M., Siuzdak, G., Adams, M.W.W. Deciphering Microbial Metal Toxicity Defense Mechanisms using RB-TnSeq and Activity-Based Metabolomics. Under review, *mSystems*.
2. V.V. Trotter, M. Shatsky, M. N. Price, T. R. Juba, GM. Zane, K.B. De León, **E.L.W. Majumder**, Qin Gui, R. Ali, M. Prince, K.M. Wetmore, J.V. Kuehl, A.P. Arkin, J.D. Wall, A.M. Deutschbauer, J.M. Chandonia, G.P. Butland. Large-scale Genetic Characterization of a Model Sulfate-Reducing Bacterium. *bioRxiv* 2021.01.13.426591. Under review, *mSystems*. https://doi.org/10.1101/2021.01.13.426591

Published:

1. Lui LM, **Majumder EL-W**, Smith HJ, Carlson HK, von Netzer F, Fields MW, Stahl DA, Zhou J, Hazen TC, Baliga NS, Adams PD and Arkin AP. Mechanism Across Scales: A Holistic Modeling Framework Integrating Laboratory and Field Studies for Microbial Ecology. *Front. Microbiol.* **12,** 642422. (2021). https://doi.org/10.3389/fmicb.2021.642422
2. AV Carr, A Otwell, **E Majumder**, M Ruiz-Watkins, L Hoang, B Webb, S Turkarslan, F Von Netzer, S Gibbons, R Chakraborty, G Siuzdak, D Stahl, and NS Baliga. Sulfur metabolites play key system-level roles in modulating denitrification. *mSystems*. 6(1), e01025-20 (2021). https://doi.org/10.1128/mSystems.01025-20
3. Hou, L., and **Majumder, E.L.W.** Potential for and Distribution of Enzymatic Biodegradation of Polystyrene by Environmental Microorganisms. *Materials*, **14**, 3, 503 (2021). https://doi.org/10.3390/ma14030503

4. Elnahas, M.O., Hou, L., Wall, J.D., **Majumder, E.L.W.** Bioremediation potential of *Streptomyces* sp. MOE6 for toxic metals and oil. *Polysaccharides* **2**,1, 47-68, (2021). https://doi.org/10.3390/polysaccharides2010004
5. **Majumder, E.L.W.,** Billings, E.M., Benton, H.P. Martin, R.L., Palermo, A., Guijas, C. Rinschen, M.M., Domingo-Almenara[1], X., Montenegro-Burke, J.R., Siuzdak, G. Cognitive Analysis of Metabolomics Data for Systems Biology. *Nature Protocols*. (2021). https://doi.org/10.1038/s41596-020-00455-4 ***Nature*** technology news feature 9/24/19 https://www.nature.com/articles/d41586-019-02853-5
6. Hou, L., Kumar, D., Yoo, C.G., Ivanov, I.G., **Majumder, E.L.W.** Removal Strategies for Microplastics in Wastewater Treatment Plants and Landfills. *Chemical Engineering Journal*. 406, 126715, (2021). https://doi.org/10.1016/j.cej.2020.126715
7. Guijas, C., Montenegro-Burke, J.R., Cintron-Colon, R., Domingo-Almenara, X., Sanchez-Alavez, M., Aguirre, C., Shankar, K., **Majumder, E.L.W.,** Billings, E.M., Siuzdak, G., Conti, B. Metabolic adaptation to calorie restriction. *Science Signaling.* **13,** 648 (2020). https://doi.org/10.1126/scisignal.abb2490
8. JW Moon, CJ Paradis, DC Joyner, F Von Netzer, **EL Majumder**, ER Dixon, M Podar, X Ge, PJ Walian, HJ Smith, X Wu, GM Zane, KF Walker, MP Thorgersen, FL Poole II, LM Lui, BG Adams, KB De León, SS Brewer, DE Williams, KA Lowe, M Rodriguez, TL Mehlhorn, SM Pfiffner, R Chakraborty, AP Arkin, JD Wall, MW Fields, MWW Adams, DA Stahl, DA Elias, TC Hazen. Characterization of subsurface media from locations up- and down-gradient of a uranium-contaminated aquifer. *Chemosphere*. **255,** 126951 (2020). https://doi.org/10.1016/j.chemosphere.2020.126951
9. Domingo-Almenara, X., Montenegro-Burke, J.R., Guijas, C. **Majumder, E.L.W.,** Benton, H.P., Siuzdak, G. Autonomous METLIN-guided in-source fragment detection increases annotation confidence in untargeted metabolomics. *Anal. Chem.* 91,5 3246-3253 (2019). https://doi.org/10.1021/acs.analchem.8b03126
10. Krantz, G.P., Lucas, K., **Majumder, E.L.W.,** Hoang, L.T., Avci, R., Siuzdak, G., Fields, M.W. Bulk phase resource ratio alters metal corrosion rates and extracellular electron transfer mediators in a sulfate-reducing biofilm. *Biofouling*. 35, 6 (2019). https://doi.org/10.1080/08927014.2019.1646731
11. Ge, X., Vaccaro, B.J., Thorgersen, M.P., Poole II, F.L., **Majumder, E.L.,** Zane, M.G., De León, K.B., Lancaster, W.A., Moon, J.W., Paradis, C.J., von Netzer, F., Stahl, D.A., Adams, P.D., Arkin, A.P., Wall, J.D., Hazen, T.C., Adams, M.W.W. Iron- and Aluminum-Induced Depletion of Molybdenum in Acidic Environments Impedes the Nitrogen Cycle. *Environmental Microbiology*. **21**, 1, 152-163 (2019). https://doi.org/10.1111%2F1462-2920.14435
12. **Majumder, E.L.W.,** Wall, J.D. Bio-transformations of Uranium: Chemical or Biological Processes? *Open Journal of Inorganic Chemistry* **7**, 28-60 (2017). https://doi.org/10.4236/ojic.2017.72003
13. Huan, T., Forsberg, E. M., Rinehart, D., Johnson, C. H., Ivanisevic, J., Benton, H. P., Fang, M., Aisporna, A., Hilmers, B., Poole, F. L., Thorgersen, M. P., Adams, M. W. W., Krantz, G., Fields, M. W., Robbins, P. D., Niedernhofer, L. J., Ideker, T., **Majumder, E. L.,** Wall, J. D., Rattray, N. J. W., Goodacre, R., Lairson, L. L., Siuzdak, G. Systems Biology Guided by XCMS Online Metabolomics. *Nature Methods* **14**, 461-462 (2017). https://doi.org/10.1038/nmeth.4260
14. **Majumder, E.L.W**., Wolf, B.M., Liu, H.J., Berg, R.H., Timlin, J.A., & Blankenship, R.E. Subcellular Pigment Distribution is Altered under Far Red Light Acclimation in Cyanobacteria that Contain Chlorophyll *f*. *Photosynthesis Research* **134**, 183-192 (2017). https://doi.org/10.1007/s11120-017-0428-1
15. **Majumder, E. L**. Olsen, J. D., Qian, P., Collins, A. M., Hunter, C. N., Blankenship, R. E. Supramolecular organization of photosynthetic complexes in membranes of *Roseiflexus castenholzii*. *Photosynthesis Research* **127**, 117-130, (2016). https://doi.org/10.1007/s11120-015-0179-9

16. **Majumder, E. L.-W.** & Blankenship, R. E. The Diversity of Photosynthetic Cytochromes in *Cytochrome Complexes: Evolution, Structures, Energy Transduction, and Signaling* Vol. 41 (eds William A Cramer & Kallas Toivo) Ch. 2, 25-50 (Springer, 2016). https://doi.org/10.1007/978-94-017-7481-9_3
17. Zhang, Y., **Majumder, E. L.-W.,** Yue, H., Blankenship, R. E. & Gross, M. L. Structural Analysis of Diheme Cytochrome *c* by Hydrogen–Deuterium Exchange Mass Spectrometry and Homology Modeling. *Biochemistry* **53**, 5619-5630 (2014). https://doi.org/10.1021/bi500420y
18. **Majumder, E. L.,** King, J. D. & Blankenship, R. E. Alternative Complex III from Phototrophic Bacteria and its Electron Acceptor Auracyanin. *Biochimica et Biophysica Acta -Bioenergetics* **1827**, 1383-1391 (2013). https://doi.org/10.1016/j.bbabio.2013.01.008
19. Gao, X., **Majumder, E. L.-W.,** Kang, Y., Yue, H. & Blankenship, R. E. Functional Analysis and Expression of the Mono-Heme Containing Cytochrome *c* Subunit of Alternative Complex III in *Chloroflexus aurantiacus*. *Archives of Biochemistry and Biophysics* **535**, 197-204 (2013). https://doi.org/10.1016/j.abb.2013.04.002
20. Badhwar, J., Karri, S., Cass, C. K., **Wunderlich, E. L.** & Znosko, B. M. Thermodynamic characterization of RNA duplexes containing naturally occurring 1× 2 nucleotide internal loops. *Biochemistry* **46**, 14715-14724 (2007). https://doi.org/10.1021/bi701024w

Grants

Awarded Research Grants- Past

Mizzou Advantage Interdisciplinary Research Grant, postdoc 2018-2019
- Yearlong collaborative grant with Hu Lab in civil and environmental engineering
- Internal University of Missouri grant program, $50,000
- Studying improvement of wastewater treatment in microbial fuel cell with optogenetically controlled sulfate-reducing and nitrate-reducing bacteria

Marie Sklodowska-Curie Actions, Seal of Excellence, Grant Writer 2018
- This high quality label is awarded to all proposals submitted to the MSCA Individual Fellowships 2017 Call that scored 85% or more but could not be funded from the call budget.

Proteomics Center Mini-Grant, PI 2017-2018
- Grant from University of Missouri Proteomics Core to study the thioredoxin interactome *in vivo* of sulfate-reducing bacteria via mutated thioredoxin proteins, $4,000

Excellence in Electron Microscopy Award, PI Summer 2017, Renewed Fall 2017
- Short-term grant from University of Missouri Electron Microscopy Core to try new EM techniques for biogeochemical studies using EM imaging and electron spectroscopy, $2,000

ENIGMA Discovery Proposal Grant, Co-PI 2016-2017
- Year-long grant from research center to study high risk questions. We are researching if and how microbes associate and form communities in ground water flocculants. $100,000

Photosynthetic Antenna Research Center (PARC) Scientific Exchange Grant, Co-PI 2013
- Grant from DOE-EFRC PARC to learn crystallography & AFM with collaborators in UK

PARC Educational Outreach Mini-Grant 2011, renewed 2012
- Grant from research center to develop and conduct renewable energy outreach program at summer camp, focused on hands-on experiential learning using outdoors as resource

Fellowships and Scholarships

Career Development Grant for Postdoctoral Women, American Society for Microbiology 2017
- Won national award to use for recipient's choosing to further career goals $1500

P.E.O. Scholar Award, P.E.O. International Sisterhood 2014-2015
- Won national merit-based dissertation fellowship for women from the P.E.O. $15,000

Mr. and Mrs. Spencer T. Olin Fellow, Washington University 2010-2015

- Awarded four-year merit-based fellowship for women in higher education

Dr. Bruce R. and Jean E. Erdal Scholar, Washington University 2011-2012

- Awarded one year tuition scholarship based on departmental nomination

Trustee Scholar, Drury University 2006- 2010

- Awarded four year full-ride academic merit, leadership and service based scholarship

Honors and Awards

Best Overall Poster, 5th International Symposium on Microbial Sulfur Metabolism 2018

- Received award for research poster presentation on Sulfur Metabolomics in DvH

Elevator Pitch Contest Winner, PARC All-Hands Meeting 2013

- Won contest for best two minute explanation of my research to the general public

Best Graduate Student Poster, Midwest/Southeast Regional Photosynthesis Meeting 2012

- Received the award for research poster presentation of ACIII reconstitution studies

Chemistry Department Teaching Assistant Award, Washington University 2011-2012

- Awarded annually to outstanding TA based on faculty and student evaluation

Teaching Experience

Classroom Courses Taught

MICRO526 Microbial Physiology (UW-Madison) beginning Spring 2022
FCH 796 Introductory Biochemical Informatics (SUNY ESF) Fall 2020
FCH 431 & FCH 531 Biochemistry Laboratory (SUNY ESF) Falls 2019, 2020
FCH 430 & FCH 530 Biochemistry Lecture I (SUNY ESF) Fall 2019

Certifications

Teaching and Learning Academy, SUNY ESF 2019

- Semester long program in course design for new faculty

Teaching Citation, Washington University 2013

- Completed future faculty preparation program by teaching 5 semesters of STEM classes
- Attended 12+ workshops on Active Learning and Scholarship of Teaching and Learning
- Achieved community member level in CITRL program

Teaching Assistantships

American Society for Mass Spectrometry Advanced Metabolomics Short Course, Instructor 2019

- Facilitate program and taught systems biology and isotope sections of workshop

Matter and Energy Transformations, T.A. & content expert, University College at WUSTL 2014

- Taught masters of biology class to high school biology teachers
- Emphasis on connecting teaching content to current research and real-world applications

Mentoring Experience and Former Students

Current at UW-Madison:

- Postdoctoral Fellow
    - Liyuan (Joanna) Hou (Ph.D. University of Missouri, Columbia) Started August 2019
- Graduate Students
    - Ph.D.
        - Fuad Shatara (B.S. Biochemistry, University of Florida), August 2020
        - Damayanti Rodriguez-Ramos (B.S. Biotechnology, Puerto Rico), March ‘21
- Research Technician
- Undergraduate Students
- Graduate Student Steering Committees

- David Rivera-Kohr (UW-Madison, Biochemistry)
- Meegan Sleeper (SUNY ESF, Biochemistry)
- Sarah Caltabiano (SUNY ESF, Biochemistry)

Students with Completed Degrees:

- M.S. Daniel Q. Kalina (B.S. Chemistry, Clarkson University) Defended Sept 2020 SUNY ESF
  - Thesis title: *Engineering a Novel, Non-Antibody PD-1/PD-L1 Inhibitor Using High-Throughput Fluorescence Polarization Screening*
  - Research work performed at Ichor Therapeutics
  - Scientist I at WuXi in New Jersey

Past Undergraduate Projects:

SUNY ESF

Protocol development for biosynthesis of metal oxide nanoparticles 2020

- Diego Beltran, Thi Lam, Rosemarie Daoud, Ben Irwin

University of Missouri 2016-2018

Characterization of putative metal reducing operon in sulfate-reducing bacteria

- Mentored undergraduate in learning research techniques (Sharien Fitriasari, PhD student Stowers)

Molybdate uptake and specificity in nitrate-reducing bacteria

- Mentoring students in undergraduate independent project (Jennifer Zulovich)

Oxidative stress response in sulfate-reducing bacteria

- Mentoring student taking research for class credit (Fawn Whittle, NIH Postbac)

Washington University in St. Louis 2012-2014

Carotenoid variation under native-like growth conditions in *Roseiflexus castenholzii*

- Mentored undergraduate student in research for two years, guiding senior research project
- Found variability of pigment expression and energy transfer efficiency with different growth conditions in an early-evolving photosynthetic bacterium (Abigail Dommer, PhD student UCSD)

Residential Peer Mentor Coordinator 2013- 2015

- Instruct undergraduate chemistry peer mentors on teaching review sessions
- Organize program logistics and coordinate across departments

Science Outreach Experience

BeSTEM, Facilitator 2019

STEM exploration program for K-12 girls in the San Diego area

- Lead lab tours and imaging experiments

Magic of Chemistry, Facilitator 2015-2018

Program for Girl Scouts grades 3-8 to have hands-on experience with chemistry labs

- Wrote soil analysis laboratory and absorbent polymer laboratory experiments
- Teach and facilitate laboratory experiments

Science on Wheels, Speaker 2017

- Speaking tour about our research at University of Missouri Extension offices in rural MO

Catalysts for Change, Facilitator & Lab Coordinator 2012-2015

Program to encourage high school freshman girls to pursue careers in science

- Plan and organize hands-on chemistry labs, coordinate volunteers, invite speakers

Discovering Renewable Energy at Camp, Developer & Facilitator 2011-2012

Program engaging summer campers in renewable energy science without classroom pressure

- Developed and taught hands-on inquiry activities on solar and biomass energy

Professional Service

Publication Reviewer

- Critical Reviews in Microbiology, Associate Editor 2021-present

- Environmental Science and Pollution Research 2020-present
- Metabolites (MDPI), Reviewer Board 2020-present
- Materials (MDPI) 2020-present
- Polymers (MDPI) 2020-present
- Frontiers in Microbiology 2019-present

Grant Reviewer

- Department of Energy, Biological and Environmental Research, Subsurface Biogeochemical Research, Science Focus Area- Reviewer on Panel June 2020
- University of Missouri System Research Board (Fast Track and faculty grants) 2015-2018
- BALSA Foundation Seed Innovation Grants 2015-present
- European Research Council ERC Starting, Consolidator and Advanced Grant Calls 2016

Committees

- ASM Microbe National Meeting Program Committee 2020-2023
  Applied and Environmental Science Track
- SUN ESF Chemistry Seminar Committee 2020
- Hiring Committee for Mizzou Venture Mentoring Service Director 2016

Poster and Presentation Judge

- Annual Biomedical Research Conference for Minority Students Conference, Tampa, FL 2016
- University of Missouri Life Sciences Week Annually 2016-2018
- University of Missouri Spring Undergraduate Research Forum Annually 2016-2018

Abstracts and Presentations

Invited Seminar Speaker

New Jersey Institute of Technology Chemistry & Environmental Science Department February 2020
AI-assisted prediction and testing of metabolite activity in environmental bacteria
Indiana University SPEA Environmental Sciences Departmental Seminar March 2018
Activity of Sulfate-Reducing Bacteria in Oak Ridge Reservation Subsurface
ASM Missouri Valley Branch Meeting, Springfield, MO March 2017
Role of Thioredoxin in Sulfate and Uranium Reduction in Sulfate-Reducing Bacteria

Conference Selected Speaker

ASMS 2019, Atlanta, GA June 2019
Cognitive re-analysis of metabolomics data reveals newly-associated metabolite biological functions and mechanistic predictions of activity
ISSM Symposia 2017, Rotorua, New Zealand November 2017
Activity of Sulfate-Reducing Bacteria in the Subsurface: Sulfur Metabolism and Uranium Reduction
ASM Microbe 2017, New Orleans, LA June 2017
Global Stable Isotope Metabolomics of Sulfate-Reducing Bacteria Reveals Unique Sulfur Metabolome
Metals in Biology Gordon Research Seminar, Ventura, CA January 2016
Involvement of thioredoxins from Sulfate Reducing Bacteria in heavy metal reduction
Latin American Chemistry Congress (CLAQ), Lima, Peru October 2014
Cosechando la luz por conversion de la energía solar: Conectando científicos con maestros (Light Harvesting for Solar Energy Capture and Conversion: Connecting research scientists to educators)
Christmas Bioenergetics Meeting, London, UK December 2013
The Electron Transport Chain in the photosynthetic bacteria Chloroflexus aurantiacus and Roseiflexus castenholzii: Novel mechanisms in the early evolution of photosynthesis
Midwest/Southeast Regional Photosynthesis Meeting, Turkey Run, IN November 2013
Structure/function insights of the cyclic electron transport chain of Roseiflexus castenholzii: The Light Harvesting Reaction Center complex and the Alternative Complex III
ACS Midwest Regional Meeting, Springfield, MO October 2013

Structure and Function of the Cyclic Electron Transport Chain in Chloroflexus aurantiacus and Roseiflexus castenholzii: Novel mechanisms in early evolution of photosynthesis
International Congress on Photosynthesis Research, St. Louis, MO August 2013
Teaching Renewable Energy at Camp Demonstration- Broader Impacts in Photosynthesis

Live Stream Seminars
XCMS Basics with a Touch of the Complex (YouTube) December 2018

Business and Leadership Experience

Angel Investor Technology Analyst, Tech Coast Angels Volunteer Analyst Program 2018-2019
Volunteer analyst to assess start-up technology feasibility, patentability and market potential

Start-Up Business Mentoring, Mizzou Venture Mentoring Service 2015-2019
Founding Mentor, University sponsored mentoring service for start-up companies with university IP

Start-up Business Consulting, The BALSA Group 2012-2015
Vice President, Director of Human Resources, Project Manager, Consultant
Business management and technology development consulting for start-up companies

- Worked on eleven consulting projects (3 consultant, 1 project manager, 7 adviser)
- One year as Vice President recruiting clients and advising projects
- Served one year as Director of Human Resources: recruited & managed 80 consultants

Science Policy, Promoting Science Policy, Education, Research 2012-2015
Founding member, Member Education Director
Science policy and science literacy outreach and advocacy graduate student group

- Organized Science Policy 101 Summer Series for three years
- Participated in AAAS Congressional Visit Day

Community Service and Efforts in Diversity and Inclusion (most recent)

Onondaga Civic Symphony Orchestra, Cellist 2019-2020
Saudi Research Science Institute, Tutor Summer 2015
King Abdullah University of Science & Technology, Thuwal, Saudi Arabia
Summer program for high school students to engage in research and English emersion

- Mentored students in research projects and science communication, college preparation

ASM ABRCMS Judges Stipend 2016

- Grant from American Society of Microbiology to attend and volunteer as judge at the Annual Biomedical Research Conference for Minority Students

ACS International Office Travel Award 2014

- Grant from American Chemical Society to attend Latin American Chemistry Congress and present outreach activities in Spanish at the Festival de Quimica

Memberships (current)

American Society for Mass Spectrometry (ASMS) 2019-present
American Association for the Advancement of Science (AAAS) 2017-present
American Society of Microbiology (ASM) 2016-present
American Chemical Society (ACS) 2007-present

Languages

English (Native Proficiency)
Spanish (Minimum Professional Proficiency)