

Mostafa Dadashi Firouzjaei

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Tom Bevell Energy Building, University of Alabama, Tuscaloosa, Alabama, US 35487

EDUCATION

University of Alabama, Tuscaloosa, AL, USA

Ph.D., Civil and Environmental Engineering, 2018-2022

Dissertation Title: *Environmental Application of Two-and Three-Dimensional Nanomaterials for Wastewater Treatment*; Advised by Mark Elliott

M.S., Environmental Engineering, 2018-2020

Thesis Title: *The Water Purification Robustness of Metal-organic Framework-polyamide Nanocomposite Thin Films Toward Long Term Organic, Inorganic, and Bacterial Contamination*; Advised by Mark Elliott

Sharif University of Technology, Tehran, Iran

M.S., Material Science and Engineering, 2015-2017

Iran University of Science and Technology, Tehran, Iran

B.S., Material Science and Engineering, 2011-2015

PROFESSIONAL EXPERIENCES

Assistant Professor, University of Alabama, August 2024-Present

Research Scientist, University of Alabama, October 2022-August 2024

Visiting Research Scientist, Purdue University, Department of Materials Science and Engineering, April 2023-July 2023

Postdoctoral Research Associate, University of Alabama, May 2022-October 2022

Graduate Research Assistant, University of Alabama, Civil and Environmental Engineering Department, January 2020-May 2022

Visiting Ph.D. Student, Purdue University, Department of Mechanical Engineering, June 2020-May 2021

Graduate Teaching Assistant, University of Alabama, Chemical Engineering Department, May 2018-December 2019

PUBLICATIONS

38. Ahmad Rahimpour, Mohammadreza Shirzad Kebria, **Mostafa Dadashi Firouzjaei**, Mohammad Mozafari, Mark Elliott, Mohtada Sadrzadeh, Nonsolvent-induced phase separation, Polymeric Membrane Formation by Phase Inversion, Elsevier, **2024**
37. Taghipour, Amirhossein, **Mostafa Dadashi Firouzjaei**, Carolin Ammann, Mark Elliott, Pooria Karami, Ahmad Rahimpour, and Mohtada Sadrzadeh. "Unveiling the impact of monomer reactivity on the morphology and functionality of thin-film composite membranes." *Chemical Engineering Journal* 480 (**2024**): 148028.
36. Moradi, Kazem, **Mostafa Dadashi Firouzjaei**, Mark Elliott, and Mohtada Sadrzadeh. "Lifecycle assessment of membrane synthesis for the application of thermo-osmotic energy conversion process." *Case Studies in Chemical and Environmental Engineering* 10 (**2024**): 100847.
35. Yousefi, Afrouz, Kazem Moradi, Pooria Karami, **Mostafa Dadashi Firouzjaei**, Mark Elliott, Ahmad Rahimpour, and Mohtada Sadrzadeh. "Evaluating the efficiency of modified hydrophobic PVDF membrane for the removal of PFOA substances from water by direct contact membrane distillation." *Desalination* 579 (**2024**): 117509.

34. Zandi, Zahra, Masoud Rastgar, Mojtaba Mohseni, **Mostafa Dadashi Firouzjaei**, Waralee Dilokekunakul, Babak Anasori, Chad D. Vecitis et al. "Electro-Conductive Ti₃C₂ MXene Multilayered Membranes: Dye Removal and Antifouling Performance." *Advanced Functional Materials* (2024): 2401970.
33. Aktij, Sadegh Aghapour, **Mostafa Dadashi Firouzjaei**, Seyyed Arash Haddadi, Pooria Karami, Amirhossein Taghipour, Mehrasa Yassari, Asad Asad Asad et al. "Metal-organic frameworks' latent potential as High-Efficiency osmotic power generators in Thin-Film nanocomposite membranes." *Chemical Engineering Journal* 481 (2024): 148384. **(Contributed as Corresponding Author)**.
32. Grube, Alyssa, Ahmad Arabi Shamsabadi, **Mostafa Dadashi Firouzjaei**, Syed Ibrahim Gnani Peer Mohamed, Laurel Hilger, Mark Elliott, Kaitlin McKenzie, and Mona Bavarian. "Emperor's new clothes: Novel textile-based supercapacitors using sheep wool fiber as electrode substrate." *Nano Trends* 3: 100014, 2023.
31. Gnani Peer Mohamed, S. I., Arabi Shamsabadi, A., Kavousi, S., **Mostafa Dadashi Firouzjaei**, Elliott, M., Yazdanparast, S., ... & Bavarian, M. (2023). Metal Ions Removal from Organic Solvents using MXene-Based Membranes. *ACS Applied Engineering Materials*, 2023.
30. Seidi, F., Arabi Shamsabadi, A., **Mostafa Dadashi Firouzjaei**, Elliott, M., Saeb, M. R., Huang, Y., ... & Anasori, B. (2023). MXenes Antibacterial Properties and Applications: A Review and Perspective. *Small*, 2206716, 2023.
29. **Mostafa Dadashi Firouzjaei**, Ehsan Zolghadr, Ahmad Arabi Shamsabadi, Mohtada Sadrzadeh, Ahmad Rahimpour, Farhad Akbari Afkhami, Evan K. Wujcik, and Mark Elliott. "Clean water recycling through adsorption via heterogeneous nanocomposites: Silver-based metal-organic framework embellished with graphene oxide and MXene." *Case Studies in Chemical and Environmental Engineering* 7: 100296, 2023.
28. **Mostafa Dadashi Firouzjaei**, Nemani, S. K., Sadrzadeh, M., Wujcik, E. K., Elliott, M., & Anasori, B. (2023). Life Cycle Assessment of Ti₃C₂T_x MXene Synthesis. *Advanced Materials*, 2300422, 2023.
27. Jafarian, H., **Mostafa Dadashi Firouzjaei**, Aktij, S. A., Aghaei, A., Khomami, M. P., Elliott, M., ... & Rahimpour, A. (2023). Synthesis of heterogeneous metal-organic Framework-Graphene oxide nanocomposite membranes for water treatment. *Chemical Engineering Journal*, 455, 140851, 2023. **(Contributed as Corresponding Author)**.
26. Aktij, Sadegh Aghapour, Milad Hosseininejad, **Mostafa Dadashi Firouzjaei**, Saeed Farhadi, Mark Elliott, Ahmad Rahimpour, João BP Soares, Mohtada Sadrzadeh, and Yaghoob Mansourpanah. "High perm-selectivity and performance of tuned nanofiltration membranes by merging carbon nitride derivatives as interphase layer for efficient water treatment." *Journal of Water Process Engineering* 56: 104432, 2023.
25. Aghaei, A., Suresh, K., **Mostafa Dadashi Firouzjaei**, Elliott, M., Rahimpour, A., & Sadrzadeh, M. (2023). Hybrid/integrated treatment technologies for oily wastewater treatment. In *Advanced Technologies in Wastewater Treatment* (pp. 377-419). Elsevier, 2023.
24. **Mostafa Dadashi Firouzjaei**, Mohammadsepehr Karimiziarani, Hamid Moradkhani, Mark Elliott, and Babak Anasori. "MXenes: The two-dimensional influencers." *Materials Today Advances* 13: 100202, 2022.
23. **Mostafa Dadashi Firouzjaei**, Pejman, M., Gh, M. S., Aktij, S. A., Zolghadr, E., Rahimpour, A., ... & Elliott, M. (2022). Functionalized polyamide membranes yield suppression of biofilm and planktonic bacteria while retaining flux and selectivity. *Separation and Purification Technology*, 282, 119981, 2022.
22. Zolghadr, E., **Mostafa Dadashi Firouzjaei**, S. Aghapour Aktij, A. Aghaei, E. K. Wujcik, M. Sadrzadeh, A. Rahimpour, F. A. Afkhami, P. LeClair, and M. Elliott. "An ultrasonic-assisted rapid approach for sustainable fabrication of antibacterial and anti-biofouling membranes via metal-organic frameworks." *Materials Today Chemistry* 26: 101044, 2022. **(Contributed as Corresponding Author)**.
21. Karami, Pooria, Sadegh Aghapour Aktij, Behnam Khorshidi, **Mostafa Dadashi Firouzjaei**, Asad Asad, Mark Elliott, Ahmad Rahimpour, João BP Soares, and Mohtada Sadrzadeh. "Nanodiamond-decorated thin film composite membranes with antifouling and antibacterial properties." *Desalination* 522: 115436, 2022.
20. Nejad, S. Mohammad, S. F. Seyedpour, S. Aghapour Aktij, **Mostafa Dadashi Firouzjaei**, M. Elliott, A. Tiraferri, M. Sadrzadeh, and A. Rahimpour. "Loose nanofiltration membranes functionalized with in situ-synthesized metal organic framework for water treatment." *Materials Today Chemistry* 24, 2022.
19. Rezaei-pour, Yashar, Ehsan Zolghadr, Parvin Alizadeh, Ghazal Sadri, Evan K. Wujcik, Farhad Akbari Afkhami, Mark Elliott, and **Mostafa Dadashi Firouzjaei**. "The anticancer properties of metal-organic frameworks and their heterogeneous nanocomposites." *Biomaterials Advances* 139: 213013, 2022 **(Contributed as Corresponding Author)**.
18. Aghaei, Amir, **Mostafa Dadashi Firouzjaei**, Pooria Karami, Sadegh Aghapour Aktij, Mark Elliott, Yaghoob Mansourpanah, Ahmad Rahimpour, João BP Soares, and Mohtada Sadrzadeh. "The implications of 3D-printed membranes

for water and wastewater treatment and resource recovery." *The Canadian Journal of Chemical Engineering* 100, no. 9: 2309-2321, **2022**.

17. **Mostafa Dadashi Firouzjaei**, Ehsan Zolghadr, Shahin Ahmadalipour, Nastaran Taghvaei, Farhad Akbari Afkhami, Siamak Nejati, and Mark A. Elliott. "Chemistry, abundance, detection and treatment of per-and polyfluoroalkyl substances in water: a review." *Environmental Chemistry Letters*: 1-19, **2021**.

16. Bazrafshan, Nasim, **Mostafa Dadashi Firouzjaei**, Mark Elliott, Amitis Moradkhani, and Ahmad Rahimpour. "Preparation and modification of low-fouling ultrafiltration membranes for cheese whey treatment by membrane bioreactor." *Case Studies in Chemical and Environmental Engineering* 4: 100137, **2021 (Contributed as Corresponding Author)**.

15. Zolghadr, Ehsan, **Mostafa Dadashi Firouzjaei**, Ghoncheh Amouzandeh, Patrick LeClair, and Mark Elliott. "The Role of Membrane-Based Technologies in Environmental Treatment and Reuse of Produced Water." *Frontiers in Environmental Science* 9: 71, **2021. (Contributed as Corresponding Author)**.

14. Pejman, Mehdi, **Mostafa Dadashi Firouzjaei**, Sadegh Aghapour Aktij, Ehsan Zolghadr, Parnab Das, Mark Elliott, Mohtada Sadrzadeh, Marco Sangermano, Ahmad Rahimpour, and Alberto Tiraferri. "Effective strategy for UV-mediated grafting of biocidal Ag-MOFs on polymeric membranes aimed at enhanced water ultrafiltration." *Chemical Engineering Journal* (2021): 130704 (**Same Contribution as First Author**).

13. **Mostafa Dadashi Firouzjaei**, Seyedpour, S.F., Aktij, S.A., Giagnorio, M., Bazrafshan, N., Mollahosseini, A., Samadi, F., Ahmadalipour, S., Firouzjaei, F.D., Esfahani, M.R., and Tiraferri, A., 2020. Recent advances in functionalized polymer membranes for biofouling control and mitigation in forward osmosis. *Journal of Membrane Science*, **2020**.

12. **Mostafa Dadashi Firouzjaei**, Afkhami, F.A., Esfahani, M.R., Turner, C.H., and Nejati, S., 2020. Experimental and molecular dynamics study on dye removal from water by a graphene oxide-copper-metal organic framework nanocomposite. *Journal of Water Process Engineering*, **2020**.

11. Pejman, M., **Mostafa Dadashi Firouzjaei**, Aktij, S.A., Das, P., Zolghadr, E., Jafarian, H., Shamsabadi, A.A., Elliott, M., Esfahani, M.R., Sangermano, M., and Sadrzadeh, M., Improved antifouling and antibacterial properties of forward osmosis membranes through surface modification with zwitterions and silver-based metal organic frameworks. *Journal of Membrane Science*, **2020 (+Same Contribution as First Author)**.

10. Seyedpour, S.F., **Mostafa Dadashi Firouzjaei**, Rahimpour, A., Zolghadr, E., Arabi Shamsabadi, A., Das, P., Afkhami, F., Sadrzadeh, M., Tiraferri, A., and Elliott, M., 2020. Toward Sustainable Tackling of Biofouling Implications and Improved Performance of TFC FO Membranes Modified by Ag-MOF Nanorods. *ACS Applied Materials & Interfaces*, **2020 (+Same Contribution as First Author)**.

9. Pejman, M., **Mostafa Dadashi Firouzjaei**, Aktij, S., Das, P., Zolghadr, E., Jafarian, H., Arabi Shamsabadi, A., Elliott, M., Sadrzadeh, M., Sangermano, M., and Rahimpour, A., 2020. In Situ Ag-MOF Growth on Pre-Grafted Zwitterions Imparts Outstanding Antifouling Properties to Forward Osmosis Membranes. *ACS Applied Materials & Interfaces*, **2020 (+Same Contribution as First Author)**.

8. Seyedpour, S.F., Arabi Shamsabadi, A., Salestan, S., **Mostafa Dadashi Firouzjaei**, Sharifian Gh, M., Rahimpour, A., Afkhami, F., Kebria, M.R., Elliott, M.A., Tiraferri, A., and Sangermano, M., 2020. Tailoring the Biocidal Activity of Novel Silver-Based Metal Azolate Frameworks. *ACS Sustainable Chemistry & Engineering*, 8(20), **2020 (+Same Contribution as First Author)**.

7. Esfahani, M.R., Aktij, S.A., Dabaghian, Z., **Mostafa Dadashi Firouzjaei**, Rahimpour, A., Eke, J., Escobar, I.C., Abolhassani, M., Greenlee, L.F., Esfahani, A.R., and Sadmani, A., 2019. Nanocomposite membranes for water separation and purification: Fabrication, modification, and applications. *Separation and Purification Technology*, **2019**.

6. Esfahani, M.R., Koutahzadeh, N., Esfahani, A.R., **Mostafa Dadashi Firouzjaei**, Anderson, B., and Peck, L., 2019. A novel gold nanocomposite membrane with enhanced permeation, rejection, and self-cleaning ability. *Journal of Membrane Science*, **2019**.

5. Mozafari, M., Seyedpour, S.F., Salestan, S.K., Rahimpour, A., Shamsabadi, A.A., **Mostafa Dadashi Firouzjaei**, Esfahani, M.R., Tiraferri, A., Mohsenian, H., Sangermano, M., and Soroush, M., 2019. Facile Cu-BTC surface modification of thin chitosan film coated polyethersulfone membranes with improved antifouling properties for sustainable removal of manganese. *Journal of Membrane Science*, **2019**.

4. **Mostafa Dadashi Firouzjaei**, Shamsabadi, A.A., Aktij, S.A., Seyedpour, S.F., Sharifian Gh, M., Rahimpour, A., Esfahani, M.R., Ulbricht, M., and Soroush, M., 2018. Exploiting synergetic effects of graphene oxide and a silver-based metal-organic framework to enhance antifouling and anti-biofouling properties of thin-film nanocomposite membranes. *ACS Applied Materials & Interfaces*, **2018**.

3. **Mostafa Dadashi Firouzjaei**, Shamsabadi, A.A., Sharifian Gh, M., Rahimpour, A., and Soroush, M., 2018. A novel nanocomposite with superior antibacterial activity: a silver-based metal-organic framework embellished with graphene oxide. *Advanced Materials Interfaces*, **2018**.

2. Rahimpour, A., Seyedpour, S.F., Aktij, S., **Mostafa Dadashi Firouzjaei**, Zirehpour, A., Arabi Shamsabadi, A., Salestan, S., Jabbari, M., and Soroush, M., 2018. Simultaneous improvement of antimicrobial, antifouling, and transport properties of forward osmosis membranes with immobilized highly compatible polyrhodanine nanoparticles. *Environmental Science & Technology*, **2018**.

1. Zirehpour, A., Rahimpour, A., Khoshhal, S., **Mostafa Dadashi Firouzjaei**, and Ghoreyshi, A.A., 2016. The impact of MOF feasibility to improve the desalination performance and antifouling properties of FO membranes. *RSC Advances*, **2016**.

PUBLICATION ON THE COVER



Mostafa Dadashi Firouzjaei, Nemani, S. K., Sadrzadeh, M., Wujcik, E. K., Elliott, M., & Anasori, B. (2023). Life Cycle Assessment of Ti_3C_2Tx MXene Synthesis. *Advanced Materials*, 2300422, 2023.

Featured by Wiley...

In this article, Mostafa Dadashi Firouzjaei, Mark Elliott, Babak Anasori, and co-workers study the life-cycle assessment of the Ti_3C_2Tx MXene's synthesis. The cumulative energy demand and overall environmental impacts of synthesis for electromagnetic interface shielding applications are investigated. In addition, the environmental impacts and energy demand of each primary parameter playing a role in the synthesis of MXene are quantified. This study will aid in the industrialization of MXene.

SELECTED HONORS & AWARDS

- Awarded the "**Outstanding Research by Ph.D. Student**" distinction in Civil Engineering by the **University of Alabama** in 2022.
- Recognized as the "**Graduate Student of the Year**" by the **Engineering Council of Birmingham**, 2021.
- Recipient of the prestigious "**Graduate Council Fellowship (GCF)**" at the **University of Alabama**, with a total award value of \$52,000, 2020.
- Achieved **10th** place among over 7,000 candidates in the **National Entrance Exam** for Master of Science and Engineering in Material Science and Engineering, 2015.

TEACHING AND MENTORING EXPERIENCE

Teaching Assistantship Experience at the University of Alabama:

- Process Dynamics & Control (CHE 493)
- Unit Operations Laboratory (CHE 322)
- Heat Transfer Operations (CHE 306)
- Fluid Flow Operations (CHE 304)

Teaching Experience at the University of Alabama:

- Introduction to Environmental Engineering (CE 320)
- Water and Wastewater Treatment (CE 424)
- Environmental Measurements (CE 420)

Undergraduate Alumni Advisees and Current Positions:

- **Rilyn Todd**: Ph.D. Student in Chemical and Environmental Engineering, Yale University
- **Delanie Williams**: M.S. Student in Civil and Environmental Engineering, University of Alabama

- **Will Moseley:** Environmental Engineer, Washington State Department of Ecology
- **Sam Prather:** Engineer III, Mott MacDonald
- **Karin Britt:** Engineer I, North Carolina Department of Environmental Quality
- **Westley McKane:** Toxics Reduction Engineer, Washington State Department of Ecology
- **Elizabeth Connick:** Senior Associate Scientist, Elektrofi
- **Caroline Chunn:** Production Engineer, Venture Global LNG
- **Jacob Brockwell:** Process Engineer, INEOS
- **Caroline Fourroux:** Advanced Quality Engineer, 3M
- **Elizabeth McDonough:** Engineer II, Raytheon Intelligence & Space
- **Christopher Gothman:** Process Engineer, Intelligent Epitaxy Technology
- **Briana Madden:** Civil Analyst I, Kimley-Horn

Graduate Advisees and Current Positions:

- **Ehsan Zolghadr:** Ph.D., Graduated Summer 2022, Process Engineer IV at Mattson Technology
- **Reza Behzadnia:** M.S., Graduated Summer 2024, Lab Coordinator at the University of Alabama Civil Engineering Department
- **Mohsen Pilevar:** Ph.D. Candidate, Expected Graduation Spring 2025
- **Hesam Jafarian:** Ph.D. Student, Expected Graduation Summer 2026
- **Vivian Abungu:** Ph.D. Candidate, Expected Graduation Summer 2025
- **Mahshid Mardani:** Ph.D. Student, Started Summer 2024
- **Parastoo Taheri:** Ph.D. Student, Started Summer 2024

PROFESSIONAL AFFILIATIONS

- American Society of Civil Engineers (ASCE)
- Materials Research Society (MRS)
- American Institute of Chemical Engineers (AIChE)
- American Chemical Society (ACS)
- American Water Works Association (AWWA)
- Alabama Water Institute (AWI)
- Alabama Materials Institute (AMI)
- The Minerals, Metals & Materials Society (TMS)