Curriculum Vitae of Md Mainul Hossain, Ph.D.

Department of Biochemistry and Microbiology
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Work Experience

2022- Present Chair, Department of Biochemistry and Microbiology, NSU

2021- Present Research coordinator, School of Health & Life Sciences (SHLS), NSU

2019- Present Associate Professor, Department of Biochemistry and Microbiology, North South University, Bashundhara, Dhaka-1229, Bangladesh

2015-2019 Assistant Professor, Department of Biochemistry and Microbiology, North South University, Bashundhara, Dhaka-1229, Bangladesh

2012-2014 Member of AQAC (Air Quality Advisory Council) of Missoula City County Air Pollution Control Board, Missoula, Montana, USA

2008 -2014 Graduate Teaching Assistant, Chemistry and Biochemistry, University of Montana, Missoula, MT 59812, USA

Education

Ph. D. Analytical/ Environmental Chemistry 01 August 2014
University of Montana, Missoula, USA
Advisor: Prof. Garon C. Smith
Dissertation Title: Modeling of Aqueous Equilibria: Three-Dimensional Trend Surfaces (TOPOS)
Bachelor of Science (1999) and Master of Science (2000) from Jahangirnagar University, Dhaka, Bangladesh

Teaching Interests

General Chemistry, General Organic and Biochemistry, Analytical Chemistry, Environmental Chemistry, Physical Chemistry

Research and professional Experiences

16 years of mathematical modeling and experimental confirmation of aqueous equilibrium chemistry at the University of Montana, Missoula, USA and North South University, Dhaka combined. Design and implementation of Visual Basic programs embedded in Excel

worksheets. 3-Dimensional surface plots in wireframe and contour map presentations. Design and operation of pH-statted, CO_2-free, thermostatted potentiometric measurements (ion-selective electrodes) at fixed ionic strength. Thermal desorption/GC/MS analysis of organic air pollutants captured in sorption traps and on SPME (solid-phase micro-extraction) fibers.

Membership in professional organizations

1. American Chemical Society (ACS)
2. Bangladesh Chemical Society (BCS)

Publications

1. Khan F, Saha K, Rahaman MM, Sadique A, Murshid M, Alam J, Shams F, Hossain MM, Ru mman K, Hossain M. 0. Draft genome sequence of *Proteus sp*. strain NGCRVN-01, isolated from a tertiary care hospital in Bangladesh. Microbiol Resour Announc 0:e00175-25.https://doi.org/10.1128/mra.00175-25

2. Rahaman MM, Sadique A, Rahman A, Khan F, Alam J, Rafsan R, Abir S, Tabassum N, Oishi MM, Chowdhury AR, Sharmin A, Hossain MM, Alam M, Hossain M. 2025. Draft genome sequence of XDR *Aeromonas caviae* strain NGCRVN-08 isolated from diarrheal patient in Bangladesh. Microbiol Resour Announc 14:e01261-24. https://doi.org/10.1128/mra.01261-24

3. Rahaman MM, Sadique A, Alam J, Khan F, Ayesha Z, Islam S, Murshid M, Rafsan R, Islam S, Iqbal HB, Das TK, Ahmed O, Rumman K, Sharmin A, Hossain MM, Alam M, Hossain M. 2025. Draft genome sequence of *Pseudomonas aeruginosa* strain maqsudiensis isolated from cattle swab in Dhaka, Bangladesh. Microbiol Resour Announc 14:e01190-24. https://doi.org/10.1128/mra.01190-24

4. Rahaman MM, Akter S, Asrafie S, U ZZ, Rafsan R, Sadique A, Alam J, Khan F, Tonny NH, H ossain R, Rahman MM, Zisan AN, Billah MB, Uddin KM, Rahman MM, Ahmed O, Shams F , Sharmin A, Hossain MM, Hossain M. 0. Draft genome sequence of *Pseudomonas aeruginosa* strain NGMBE-25A isolated from fecal samples of migratory birds at Jahangirnagar University, Bangladesh. Microbiol Resour Announc 0:e01160-24. https://doi.org/10.1128/mra.01160-24

5. Masum MIK, Rahi MH, Jahan R, Shahel F, Hasanat H, Jime JS, Bulbul N, Fakruddin M, Hos sain MM, Hossain M, Sadique A, Safa A. 2025. Draft Genome Sequence of *Kurthia* Strain ISK08 Isolated from Shrimp in Bangladesh. Microbiol Resour Announc 14:e01337-24. https://doi.org/10.1128/mra.01337-24

6. Bushra Zaman, Irona Mostafa, Tazree Hassan, Shamim Ahmed, Nusrat Jahan Ikbal Esha, Fowzia Afsana Chowdhury, Tory Bosu, Humayra Noor Chowdhury, Anup Mallick, MM Shanjid Islam, Ayesha Sharmin, Kabir M. Uddin, Md. Mainul Hossain, Mahbubur Rahman,Tolperisone hydrochloride improves motor functions in Parkinson's disease via

MMP-9 inhibition and by downregulating p38 MAPK and ERK1/2 signaling cascade,Biomedicine & Pharmacotherapy, Volume 174,2024,116438,ISSN 0753-3322. https://doi.org/10.1016/j.biopha.2024.116438

7. Suha, H.N., Hossain, M.S., Rahman, S., Alodhayb, A., Hossain, M.M., Kawsar, S.M., Poirier, R. and Uddin, K.M. In Silico Discovery and Predictive Modeling of Novel Acetylcholinesterase (AChE) Inhibitors for Alzheimer's Treatment. *Medicinal Chemistry* (Shariqah (United Arab Emirates)). 2024 May. DOI: 10.2174/0115734064304100240511111926 19.

8. Hossain, M. S., Al Abbad, S. S., Alsunaidi, Z. H., Rahman, S., Alodhayb, A. N., Hossain, M. M. & Uddin, K. M. Evaluation of novel pyridoxal isonicotinoyl hydrazone (PIH) derivatives as potential anti-tuberculosis agents: An in-silico investigation. *International Journal of Quantum Chemistry*, 2024,*124*(9), e27381. https://doi.org/10.1002/qua.27381.

9. Rahman A, Akter S, Sadique A, Alam J, Asrafie S, Tabassum A, Hossain SA, Rahman MM, Billah MB, Huq TS, Uddin KM, Rahman MM, Sharmin A, Hossain MM, Alam SMD, Hossain M. 0. Whole genome sequence of denitrifying bacterium Stutzerimonas stutzeri strain NGHE31, collected from an eutrophic wetland in Sunamganj, Bangladesh, following the 2017 flash floods. Microbiol Resour Announc 0:e00001-24. https://doi.org/10.1128/mra.00001-24.

10. Rahman, M; Omar F., M; Waliul I., M; Akter, M; Saha, Joyanta K.; Ahmed, N; Sharmin, A.; Azizul H., M; Afroze, M; Khan, M.; Akhtar U., Umme, and Hossain, Md Mainul., 2023, Comparison of the Effect of Kaolin and Bentonite Clay (Raw, Acid-Treated, and Metal-Impregnated) on the Pyrolysis of Waste Tire, *ACS Omega* 2024 *9* (1), 474-485. https://doi.org/10.1021/acsomega.3c05951.

11. Sharmin, M. Hai, M.M. Hossain, M.M. Rahman, M.B. Billah, S. Islam, M. Jakariya, and G.C. Smith, 2020, Reducing Excess Phosphorus in Agricultural Runoff with Low-Cost, Locally Available Materials to Prevent Toxic Eutrophication in Hoar Areas of Bangladesh, *Groundwater for Sustainable Development*, *10*, 100348, 1-8. https://doi.org/10.1016/j.gsd.2020.100348.

12. Afrida Binth Iqbal, Mohammad Moshiur Rahman, Dhiman Ranjan Mondal, Nadim Reza Khandaker, Haniyum Maria Khan, Gias Uddin Ahsan, Md. Jakariya, Md. Mainul Hossain, "Assessment of Bangladesh groundwater for drinking and irrigation using weighted overlay analysis" *Groundwater for Sustainable Development*, 2020, 10, 100312. ISSN 2352-801X, https://doi.org/10.1016/j.gsd.2019.100312.

13. Mahmudur Rahman, Bidhan Chandra Paul, Ayesha Sharmin, Mohammad Lokman Hossain, Subrata Chandra Roy, Mala Khan, Md Juwel Hosen, Md Mainul Hossain, "Analysis of Fatty Acid Composition in Chicken Fast Foods of Dhaka City" *Journal of Bangladesh Academy of Sciences*,2019, 43(1), 39-45. https://doi.org/10.3329/jbas.v43i1.42232

14. G.C. Smith, M.M Hossain and D.D. Barry, 2018, 3-D Topo Surface Visualization of Metal Anti-Buffering: An Unexpected Behavior in Complexometric Titrations, *J. Chem. Educ*., *95*(12), 2182-2190. https://pubs.acs.org/doi/10.1021/acs.jchemed.8b00292

15. G.C. Smith and M.M. Hossain, 2017, Visualization of Metal Ion Buffering via Three-Dimensional Topographic Surfaces (TOPOS) of Complexometric Titrations, *J. Chem. Educ*., *94*(12), 1911–1917. http://pubs.acs.org/doi/10.1021/acs.jchemed.7b00411

16. G.C. Smith and M.M. Hossain, 2017,3-D Topo Surface Visualization of Acid-Base Species Distributions: Corner Buttes, Corner Pits, Curving Ridge Crests and Dilution Plains, *J. Chem. Educ., 94*(5), 598-605. http://pubs.acs.org/doi/10.1021/acs.jchemed.6b00682

17. Rahman, M., Rana, M., Nasreen, Z., Hossain, M. M., & Sharmin, A. (2018). Treatment of Reactive Dye Containing Textile Wastewater using Microwave Assisted Synthesized Poly (Diallyldimethylammonium Chloride). *Journal of Bangladesh Academy of Sciences*, *41*(2), 165-174. https://doi.org/10.3329/jbas.v41i2.35495

18. G.C. Smith and M.M. Hossain, 2015, Visualization of Buffer Capacity with 3-D Topo Surfaces: Buffer Ridges, Equivalence Point Canyons and Dilution Ramps. Submitted to *J. Chem Educ. 93*(1), 122–130. http://pubs.acs.org/doi/abs/10.1021/acs.jchemed.5b00439

19. G.C. Smith, M.M. Hossain, P. MacCarthy, 2014, 3-D Surface Visualization of pH Titration "Topos": Equivalence Point Cliffs, Dilution Ramps and Buffer Plateaus, *J. Chem Educ*.,91(2): 225-231. Also http://pubs.acs.org/doi/10.1021/ed400297t

20. G.C. Smith, M.M. Hossain, P. MacCarthy, 2012, Why Batteries Deliver a Fairly Constant Voltage until Dead, *J Chem Educ*, 89(11): 1416-1420. Also http://dx.doi.org/10.1021/ed200211s.

Book Chapters

The following book chapters are from the developing book "WATER TOPOS: A 3-D TREND SURFACE APPROACH TO VIEWING AND TEACHING AQUEOUS EQUILIBRIUM CHEMISTRY" which uses a completely new approach to describe aqueous equilibrium through 3D representation of the concepts.

1. Smith, Garon C. and Hossain, Md Mainul, "Chapter 4.1: Visualizing the Solubility of Salts Via 3-D Topo Surfaces: Pyramids with Ridges and Plateaus" (2023). *Water Topos: A 3-D Trend Surface Approach to Viewing and Teaching Aqueous Equilibrium Chemistry*. 10. https://scholarworks.umt.edu/topos/10

2. Smith, Garon C.; Hossain, Md Mainul; and MacCarthy, Patrick, "Chapter 3.2: Why Batteries Deliver a Fairly Constant Voltage Until They Suddenly Die: An Application of Nernst Topo Surfaces" (2022). *Water Topos: A 3-D Trend Surface Approach to Viewing and Teaching Aqueous Equilibrium Chemistry*. 9. https://scholarworks.umt.edu/topos/9

3. Smith, Garon C. and Hossain, Md Mainul, "Chapter 3.1: Visualization of the Nernst Equation Via 3-D Topo Surfaces: E^o Plateaus, Left-Hand Bluffs, Front Cliffs and Reaction Paths" (2021). *Water Topos: A 3-D Trend Surface Approach to Viewing and Teaching Aqueous Equilibrium Chemistry*. 8. https://scholarworks.umt.edu/topos/8

4. Sharmin, Ayesha; Huda, Md Mainul; Islam, Mahabub; Hossain, Md Mainul; Smith, Garon C.; Islam, Sohidul; Rahman, Mohammad Moshiur; Shahriare, Mohammad Hossain; Kazi, Mohsin; and Jakariya, Mohammad, "Chapter 2.3: Natural Attenuation of Chromium and Manganese from a Bangladesh Tannery Effluent Via Humic Substance Complexation: Field, Laboratory and Modeling Studies" (2021). *Water Topos: A 3-D Trend Surface Approach to Viewing and Teaching Aqueous Equilibrium Chemistry*. 7. https://scholarworks.umt.edu/topos/7

5. Smith, Garon C.; Hossain, Md Mainul; and Barry, Daniel D., "Chapter 2.2: 3-D Topo Surface Visualization of Metal Ion Anti-Buffering: An Unexpected Behavior in Metal–Ligand Complexation Systems" (2021). *Water Topos: A 3-D Trend Surface Approach to Viewing and Teaching Aqueous Equilibrium Chemistry*. 6. https://scholarworks.umt.edu/topos/6

6. Smith, Garon C. and Hossain, Md Mainul, "Chapter 2.1: Visualization of Metal Ion Buffering Via 3-D Topo Surfaces of Complexometric Titrations" (2021). *Water Topos: A 3-D Trend Surface Approach to Viewing and Teaching Aqueous Equilibrium Chemistry*. https://scholarworks.umt.edu/topos/5

7. Smith, Garon C. and Hossain, Md Mainul, "Chapter 1.3: 3-D Topo Surface Visualization of Acid-Base Species Distributions: Corner Buttes, Corner Pits, Curving Ridge Crests and Dilution Plains" (2021). *Water Topos: A 3-D Trend Surface Approach to Viewing and Teaching Aqueous Equilibrium Chemistry*. 4. https://scholarworks.umt.edu/topos/4

8. Smith, Garon C. and Hossain, Md Mainul, "Chapter 1.2: Visualization of Buffer Capacity with 3-D Topos: Buffer Ridges, Equivalence Point Canyons and Dilution Ramps" (2020). *Water Topos: A 3-D Trend Surface Approach to Viewing and Teaching Aqueous Equilibrium Chemistry*. 3. https://scholarworks.umt.edu/topos/3

9. Smith, Garon C.; Hossain, Md Mainul; and MacCarthy, Patrick, "Chapter 1.1: 3-D Surface Visualization of pH Titration “Topos”: Equivalence Point Cliffs, Dilution Ramps and Buffer Plateaus" (2020). *Water Topos: A 3-D Trend Surface Approach to Viewing and Teaching Aqueous Equilibrium Chemistry*. 2. https://scholarworks.umt.edu/topos/2

10. Smith, Garon C. and Hossain, Md Mainul, "Prologue: An Overview to Water Topos: A 3-D Trend Surface Approach to Viewing and Teaching Aqueous Equilibrium Chemistry" (2020). Water Topos: A 3-D Trend Surface Approach to Viewing and Teaching Aqueous Equilibrium Chemistry. 1. https://scholarworks.umt.edu/topos/1

Presentations at Scientific Meetings and conferences

1. **Mainul Hossain** and Garon C., Smith., "Water Topos: an online resource for visualizing aqueous equilibrium chemistry through 3-D trend surfaces" poster presentation in ICGNB2, North South University, June 26-28, 2022. (**Best Poster Award in ICGNB-2**)
2. Aura Rahman, Abdus Sadique, Jahidul Alam, Sumaiya Akter, Muhammad Maqsud Hossain and **Md. Mainul Hossain**., "Draft genome of denitrifying bacterium Pseudomonas stutzeri isolated from a wetland in Sunamganj, Bangladesh" poster presentation in ICGNB2, North South University, June 26-28, 2022. (**Best Poster Award in ICGNB-2**)
3. Sumaiya Akter, Aura Rahman, Abdus Sadique, Jahidul Alam, Muhammad Maqsud Hossain and **Mainul Hossain**., "Evaluating lipase producing capability of bacterial strains isolated from food waste dumping sites in Dhaka, Bangladesh" poster presentation in ICGNB2, North South University, June 26-28, 2022. (**Best Poster Award in ICGNB-2**)
4. Ayesha Sharmin, **Mainul Hossain** and Garon C. Smith., "Tracking the isosbestic point of a nitrogen-containing dye during an NaOH titration" poster presentation in ICGNB2, North South University, June 26-28, 2022.
5. **Md Mainul Hossain** and Smith, Garon C., "On-the-Fly 3-D Visualization of pH and Buffering", 16th Asian Chemical Congress, Bangladesh University of Engineering and Technology, Dhaka, Bangladesh, March 16 -19, 2016. (oral)
6. Garon C. Smith, **Hossain, Md Mainul** and MacCarthy, Patrick, "Teaching pH and Buffer Concepts Using 3-Dimensional Topo Surfaces Computed On-the-Fly in the Classroom", oral presentation in the Active Learning Symposium at the 246th National Meeting of the American Chemical Society, San Francisco, CA, Aug 13, 2014.
7. **Md Mainul Hossain**, Smith, Garon C. and MacCarthy, Patrick, "Metal Anti-Buffering: When Free Metal Concentrations Soar Upon Dilution", poster presented as ANYL-98 and at Sci-Mix (invited) at the 244th National Meeting of the American Chemical Society, Philadelphia, PA, Aug 19 – 23, 2012.
8. **Md Mainul Hossain**, Smith, Garon C., Hossain, and MacCarthy, Patrick, "Metal Anti-Buffering: When Free Metal Concentrations Soar Upon Dilution", poster presented at Faculty-Graduate Student Research Conference, UM, Missoula, MT, Apr 13, 2013.
9. Smith, Garon C., **Hossain, Md Mainul**, and MacCarthy, Patrick, "Visualizing the Nernst Equation and Galvanic Cells via 3-D Surfaces", poster presented as CHED-102 and at Sci-Mix (invited) at the 242nd National Meeting of the American Chemical Society, Denver, CO, Aug 28 – Sep 1, 2011.
10. Alauddin, Mohammad and **Md Mainul Hossain**, "Determination of key arsenic metabolites in patient urine from 20 upazilas in Bangladesh by high performance by high performance liquid chromatography and hydride generation atomic fluorescence spectroscopy." At the Chemical Congress, Dhaka, Bangladesh 2004.

Professional Service

2012- 2014: Served 18 months as a member of AQAC (Air Quality Advisory Council) of Missoula City County Air Pollution Control Board, Missoula, Montana, USA. The AQAC is a volunteer council of technical experts, business, and industry professionals and citizens-at-large, providing consultation to the Air Pollution Control Board to implement new regulations and policy for improving air quality.

Grants and Fellowships

1. **Special Allocation for Science & Technology, Ministry of Science and Technology:** 2022-2023, 2023-2024, 2024-2025.

2. **North South University research grant:** 2016-2017, 2018-2019, 2019-2020 & 2020-2021, 2021-2022, 2022-2023, 2023-2024, 2024-2025.

3. **R & D Grants, Ministry of Science and Technology, Government of Bangladesh:** 2018-2019, 2019-2020, 2020-2021, 2021-2022.

References

1. **Dr. Garon C. Smith**
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2. **Dr. Mark Cracolice**
Professor of Chemistry and Biochemistry
University of Montana
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3. **Dr. J. B. Alexander Ross**
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Professor of Chemistry and Biochemistry
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