

Md. Mainul Hossain, Ph. D.

Department of Biology & Chemistry
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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)
Graduate CGPA: 3.25
M.Sc. Chemistry: Jahangirnagar University, Bangladesh 2000
B.Sc. (Honors) Chemistry, Jahangirnagar University, Bangladesh 1999

Teaching Interests

General Chemistry, General Organic and Biochemistry, Analytical Chemistry, Environmental Chemistry, Inorganic Chemistry, Organometallic Chemistry.

Teaching experience

Current Position

Assistant Professor since May, 2015
Department of Biology & Chemistry
North South University
Bashundhara, Dhaka

Teaching Assistant:

Six and half years' experience as a teaching assistant in the Department of Chemistry and Biochemistry at the University of Montana, Missoula, USA. During my graduate study I had the opportunity to teach General Chemistry (I and II), Organic Chemistry, General Organic and Biochemistry. The General Chemistry I & II were delivered using the peer-led team learning approach.

General chemistry Lab I (CHMY 141)

(Spring 14, fall 12, fall 08, fall 09, spring 11, fall 10)

Responsibilities

- Lab supervision
- Explain basic operating principles of necessary instruments in lab and safety precautions associated with them – Vernier LabQuest digital interface system
- Evaluate lab reports and exams
- Office hours for students
- Introductory lab lectures and demonstrations- if needed.

General chemistry Lab II (CHMY 143)

(Spring 12, spring 13, spring 08, spring 10, fall 11)

Responsibilities

- Lab supervision
- Explain basic operating principles of necessary instruments in lab and safety precautions associated with – Vernier LabQuest digital interface system
- Evaluate lab reports and exams
- Office hours for students
- Introductory lab lectures and demonstrations- if needed

Organic Chemistry Lab (CHMY 222)

(Spring 2009)

Responsibilities

- Introductory lab lectures and demonstrations
- Lab supervision
- Explain basic operating principles of necessary instruments in lab with microscale glassware
- Help students to record IR, UV/Vis and GC analysis
- Evaluate lab reports and exams
- General office hours for students

General Organic and Biochemistry (CHMY 121- recitation)

(Fall 2013)

Responsibilities

- Weekly problem solving sessions of an average of 70 students per section for 3 sections. Each session starts with a brush up from lecture, then solving a problem set and finally proctoring a quiz.
- Office hours for students
- Grading exams
- Personal meeting with students who needed more care

Research Experience

Six years of mathematical modeling and experimental confirmation of aqueous equilibrium chemistry at the University of Montana, Missoula. Design and implementation of Visual Basic programs embedded in Excel worksheets. 3-Dimensional surface plots in wire-frame and contour map presentations. Design and operation of pH-statted, CO₂-free, thermostatted potentiometric measurements (ion-selective electrodes) at fixed ionic strength. Thermal desorption/GCMS analysis of organic air pollutants captured in sorption traps and on SPME fibers.

One and half a years as a research chemist at Exonics Technology Center, Uttara, Dhaka, Bangladesh under the supervision of Dr. Alauddin from the Department of Chemistry, Wagner College, New York, USA. Primary responsibility was to analyze water samples from arsenic

contaminated areas of Bangladesh by atomic absorption spectrometry and ion chromatography. These projects were mostly funded by WHO, UNICEF and CDC (Atlanta). We investigated the health effects resulting from drinking of arsenic-contaminated water in various areas of Bangladesh and West Bengal, India in collaboration with Dipankar Chakraborty of Jadavpur University, Kolkata, India.

One year experience as a synthetic inorganic chemist in the field of cluster chemistry with the inorganic research laboratory of Prof. Shariff Kabir, Jahangirnagar University:

- Designing customized low cost reaction set ups and conducting research in environmental and physical research labs
- Problem solving, analytical skills and strong communication skills
- Synthesizing novel organometallic mononuclear and cluster compounds
- Sample analysis with ion selective electrodes (ISEs), AAS, GC/MS, ion chromatography, HPLC, hydrogen-generated atomic fluorescence spectroscopy (HG-AFS) and associated software for data processing.

Publications

1. Smith, Garon C. and Hossain, Md Mainul, 2015, "3-D Visualization of Buffer Capacity Topos: Buffer Ridges, Equivalence Point Canyons and Dilution Ramps", *J. Chem Educ.*, *Chem. Educ.*, Article ASAP DOI: 10.1021/acs.jchemed.5b00439
2. G.C. Smith, M.M. Hossain, P. MacCarthy, "3-D Visualization of pH Titration "Topos": Equivalence Point Cliffs, Dilution Ramps and Buffer Plateaus", *J Chem. Educ.* **2014**, *91* (2), 225–231.
3. G.C. Smith, M.M. Hossain, P. MacCarthy, " Why Batteries Deliver a Fairly Constant Voltage until Dead", *J Chem Educ.* **2012**, *89* (11), 1416–1420.

Posters presented at Meetings and Conferences

1. 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.
2. **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.
3. **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.
4. 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 242th National Meeting of the American Chemical Society, Denver, CO, Aug 28 – Sep 1, 2011.

5. 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 and Memberships

- 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 for the purpose of implementing new regulations and policy for improving air quality.
- American Chemical Society (2010 - present)
- Bangladesh Chemical Society (Life member)

References

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Dr. Richard J. Field

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