

## Hossain M Azam

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### EDUCATION

- PhD, Environmental Engineering** **May 2012**  
*University of Illinois at Urbana-Champaign (UIUC), Urbana, IL*
- Master of Science, Civil Engineering** **August 2007**  
Specialized in Water Resources and Environmental Eng.  
*North Carolina State University (NCSU), Raleigh, NC*
- Bachelor of Science, Civil Engineering** **February 2003**  
*Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh*

### PROFESSIONAL LICENSE

- Fundamentals of Engineering Exam (EIT) (Passed) **April 2007**  
Professional Engineering (PE) License Exam (Passed) **October, 2018**

### TEACHING EXPERIENCE

- **Assistant (Tenure Track) Professor of Environmental Engineering** **Aug 2019– Present**  
*Dept. of Civil Engineering*  
**University of the District of Columbia (UDC), Washington, DC**
- Undergraduate Course:**
- Hydrology and Hydraulics (Junior Course): Fall 2019
  - Hydrology and Hydraulics Lab (Junior Course): Fall 2019
  - Environmental Engineering and Science (Senior): Fall 2019
  - GIS Fundamentals and Engineering Applications (Sophomore): Spring 2020
- Graduate Course:**
- Environmental Engineering and Science: Fall 2019
  - Water and Wastewater Engineering: Spring 2020
- ABET accreditation:** Conducting assessment and evaluation of courses for upcoming **ABET accreditation** visit of the civil engineering program. This is based on program objectives and related student outcomes, with the goal of pursuing continuous improvement.
- **Assistant (Tenure Track) Professor** **Aug 2014 – June 2019**  
*Dept. of Civil and Environmental Engineering*  
**Manhattan College (MC), Riverdale, Bronx, New York City, NY**
- Undergraduate Courses:**
- Introduction to Engineering (Freshman Course): Fall 2015
  - Introduction to Engineering Computation (Freshman Course): Spring 2015, 2016, 2017
  - Environmental Engineering Principles I (Sophomore Course): Fall 2016, 2017, 2018, Spring 2019
  - Fluid Mechanics (Sophomore/Junior Level Course): Spring 2018
  - Energy and the Environment (Junior Level Course): Fall 2014, 2015, 2018, Spring 2015, 2016
- Graduate Courses:**
- Water Chemistry [Aquatic and Sediment Chemistry]: Fall 2014
  - Environmental Chemistry: Fall 2015, 2016, 2017, 2018
  - Environmental Biotechnology: Spring 2017, 2018

▪ **Visiting Assistant Professor and Adjunct Professor/Post-Doctoral Scientist**

*Dept. of Civil and Environmental Engineering*

**Jan 2013 – Aug 2014**

**George Washington University (GWU), Washington, DC [Affiliation: DC Water]**

**Undergraduate Courses:**

- a. Environmental Engineering I (Water Resources and Water Quality): Spring 2013
- b. Environmental Engineering Laboratory: Spring 2013 and Spring 2014
- c. Introduction to Geo-environmental Engineering: Spring 2014

**Graduate Courses:**

- a. Microbiology for Environmental Engineers: Spring 2013 and Spring 2014
- b. Environmental Chemistry: Fall 2013
- c. Industrial Waste Treatment: Fall 2013

**ABET accreditation:** Conducted assessment and evaluation of courses for **ABET accreditation** of the civil engineering program. This was based on program objectives and related student outcomes, with the goal of pursuing continuous improvement.

▪ **Graduate Teaching Assistant**

*Dept. of Civil and Environmental Engineering*

**Spring 2011**

**University of Illinois at Urbana-Champaign (UIUC)**

**Course:** "Engineering Risk and Uncertainty"; Approx. 130 students.

▪ **Graduate Teaching Assistant**

*Dept. of Civil and Environmental Engineering*

**Fall 2007 & 2010**

**University of Illinois at Urbana-Champaign (UIUC)**

**Course:** "Introduction to Environmental Engineering and Science"; Approx. 80 students.

▪ **Graduate Teaching Assistant**

*Dept. of Civil, Construction and Environmental Engineering*

**Fall 2006**

**North Carolina State University (NCSU)**

**Course:** "Hydrology and Urban Water Systems"; Approx. 50 students.

▪ **In-Class Teaching and Lecture Preparation (UIUC): Selected Lectures**

**Aug 2007-Aug 2011**

*Water Quality Control Proc II: Wastewater*

*Biological Principles of Environmental Engr.*

*Water Quality Engineering*

*Introduction to Environmental Engineering*

▪ **Lecturer**

*Dept. of Civil Engineering*

**Feb 2003-July 2005**

**Univ. of Asia Pacific (UAP) & Military Institute of Sc. & Technology (MIST), Bangladesh**

**Selected Environmental Engineering Courses:** Environmental Pollution and its Control, Fluid Mechanics, Environmental Lab & Hydraulics Lab.

**Other Courses:** Engineering Materials, Engineering Geology and Geomorphology, Mechanics of Solids, Structural Analysis I, Geotechnical Engineering, Project Planning and Management

**Key Responsibilities:**

- Currently teaching 4 undergraduate courses and 2 graduate courses related to water resources and environmental engineering at UDC.
- Developed and taught 5 undergraduate/3 graduate civil and environmental engineering courses at Manhattan College.
- Developed and taught a number of graduate/undergraduate civil and environmental engineering courses at GWU in USA, as well as at UAP and MIST in Bangladesh.
- Developed and taught specific course contents (lecture notes, PPT, exam questions) for environmental engineering courses (e.g. 'BIOWIN' tutorial, Nitrification, AQUASIM modeling, Virus, Regulation of water and wastewater) at University of Illinois at Urbana Champaign

(UIUC).

- Presented lectures and explained challenging quantitative, chemical, physical and biological concepts to different level of students (undergraduate/graduate) at MC, GWU, UIUC, NCSU, UAP and MIST.
- Advised students personally for four semesters about course progress, future career plans and effective techniques for studying in Bangladesh. Worked actively with four PhD students at DC Water. Advised 9 graduate students (4 are part-time) and 7 undergraduates at MC. Currently advising 2 MSc level students and 3 undergraduate students at UDC during Spring, 2020.
- Developed 'term projects', 'assignments'; led 'field trips'; conducted 'office hour', 'grading' etc.
- Worked in various university committees both in USA (MC, GWU, UIUC) and Bangladesh (UAP and MIST).

## RESEARCH EXPERIENCE

### **Assistant (Tenure Track) Professor of Environmental Engineering**

**University of the District of Columbia (UDC), Washington, DC**

*Dept. of Civil Engineering*

**Aug 2019 – Present**

**Summary:** Starting on several research projects related to **Water & Wastewater Treatment** and **Water-Energy-Food-Climate nexus**. Developing an active research group at the University of the District of Columbia (UDC). Furthermore, 4 different types of environmental engineering research laboratory are under development. Additionally, there are few active collaborative projects ongoing within and outside of USA. Two current active research projects are anaerobic digestion/co-digestion with CH<sub>4</sub> & H<sub>2</sub> recovery and struvite inhibition/dissolution with recovery. Working on several proposals and submitted several proposals for funding.

#### **Proposals (funded at UDC):**

**a) Project/Proposal 01 (wastewater/anaerobic digestion/energy):** *Impact of high strength wastes (HSW) co-digestion with sludges on the performance of lab-scale anaerobic digesters and biogas methane potential (BMP) assays with potential to generate H<sub>2</sub>, Hossain Azam (PI)*, Sponsor: Water Research Resources Institute (WRRI), Funding duration: 03/01/20-02/28/21, Status: Funded(\$9,933)

**b) Project/Proposal 02 (water & wastewater/scale removal/energy/resources recovery):** *Performance evaluation of membrane bioreactor (MBR) in sustainable buildings for potable water in DC area, Hossain Azam (Co-PI)*, Sponsor: Water Research Resources Institute (WRRI), Funding duration: 03/01/20-02/28/21, Status: Funded (\$9,980)

#### **Proposals (submitted and pending at UDC):**

**c) Project/Proposal 03 (advanced analytical tools/scale removal/energy/resources recovery):** NSF Major Research Instrumentation: Acquisition of Dual Beam FIB/SEM to Enable New Capability for Research, Education and Training at UDC [Biodegradable chelating agent assisted inhibition and dissolution of struvite and vivianite for subsequent recovery as fertilizers at water resources recovery facilities (WRRFs)/ FIB/SEM Characterization of Precipitation Quality of Bio-Mediated Soil] **Hossain Azam (Co-PI)**, Sponsor: National Science Foundation (NSF), Funding duration: 07/01/20-06/30/21, Status: Pending (\$511,707)

**d) Project/Proposal 04 (advanced analytical tools/mineral precipitation/anaerobic digestion):** NSF Major Research Instrumentation: Acquisition of GPU Accelerated Micro-CT Imaging System for Research and Education [GPU Accelerated Micro-CT Imaging of Mineral Precipitation Growth in Bio-Mediated Soil], **Hossain Azam (Co-PI)**, Sponsor: National Science Foundation (NSF), Funding duration: 06/22/20-06/22/21, Status: Pending (\$412,000)

**e) Project/Proposal 05 (sea-level rise/modeling/climate change):** HBCU-RISE: Establishment of Educational and Research Infrastructure - Sea Level Rise (SLR) Analytics Center for Coastal Communities, **Hossain Azam (Co-PI)**, Sponsor: National Science Foundation (NSF), Funding

duration: 09/01/20-08/31/23, Status: Pending (\$999,978)

**f) Project/Proposal 06 (nutrient removal/modeling and machine learning/harmful algal bloom):** Next Generation Modeling Techniques for Determining N & P from Point & Non-Point Sources and for Predicting & Controlling Harmful Algal Blooms (HAB) in the US, **Hossain Azam (PI)**, Sponsor: United States Geological Survey (USGS), Funding duration: 09/01/2020-08/31/2023, Status: Pending (\$249,901)

#### **Proposals (Unsuccessful Submission):**

**g) Project/Proposal 07 (wastewater reuse/mineral precipitation/anaerobic digestion):** Performance enhancement of current MICP, MIDP & EICP techniques with alternative mineral precipitation techniques for bio-mediated ground improvement utilizing anaerobic digestion effluent of water resources recovery facility (WRRF), **Hossain Azam (Co-PI)**, Sponsor: Water Research Resources Institute (WRRRI), Funding duration: 03/01/20-02/28/21, Status: Unsuccessful (\$9,980)

**h) Project/Proposal 08 (nutrient removal/modeling and machine learning/harmful algal bloom):** Next Generation Modeling Techniques and Innovative Nutrient Technologies from Point & Non-Point Sources to Predict and Control Harmful Algal Blooms (HAB) in the US, **Hossain Azam (PI)**, Sponsor: Environmental Protection Agency (EPA), Funding duration: 05/18/20-05/17/23, Status: Unsuccessful (\$999,968)

#### **Assistant (Tenure Track) Professor**

**Manhattan College, Riverdale, Bronx, NYC, New York**

*Dept. of Civil and Environmental Engineering*

**Aug 2014 – June 2019**

**Summary:** Completed several internally and externally funded research projects related to **Water & Wastewater Treatment** and **Water-Energy-Food nexus**. Developed an active research group at Manhattan College. There were few active collaborative projects ongoing within and outside of USA.

#### **Four recently completed projects (Manhattan College):**

**Project Type 01 (wastewater/nitrogen removal/energy):** Short cut nitrogen removal process evaluation for MSW landfill leachate treatment, **Hossain Azam (PI)**, Sponsor: Geosyntec Consultants, USA & Waste Management (WM), Funding duration: January, 2017-August, 2018, Status: Completed (\$60,000)

#### **Project Type 02 (water & wastewater/scale removal/energy/resources recovery):**

- *Kinetic studies to optimize chemical dissolution and inhibition of common and exotic oilfield scales, **Hossain Azam (Co-PI)**, Sponsor: American Chemical Society Petroleum Research Fund (ACS PRF), Funding duration: September, 2015-August, 2018, Status: Completed (\$55,000)*
- *Precipitation, inhibition and dissolution characteristics of important phosphate minerals (struvite and vivianite) and their recovery potential in water and wastewater systems, **Hossain Azam (PI)**, Sponsor: Start-up funding/Internal summer grant of Manhattan College (Ongoing at UDC).*

**Project Type 03 (wastewater/anaerobic digestion/energy):** Effects of co-digestion on energy production at a NY wastewater treatment plant, **Hossain Azam (PI)**, Sponsor: Start-up funding of Manhattan College and Energy Systems Group (ESG) (completed). A supplementary food waste/FOG project of another wastewater treatment plant, **Hossain Azam (Co-PI)**, Sponsor: Hazen and Sawyer (ongoing) (\$16,000 + Materials/logistical support + Start-up Grant)

**Project Type 04 (water/nanomaterials/emerging contaminants):** Disinfection (sterilization) of microorganisms together with degradation of emerging contaminants in hydroponic systems using photosensitizers, **Hossain Azam (PI)**, Sponsor: Korean Institute of Science and Technology (KIST), Funding duration: October, 2015-September, 2018 (completed) (\$66,600)

**Collaborative Projects (Completed/Ongoing):**

**A) Projects with Geosyntec Consultants, USA and Waste Management (wastewater/energy/solid waste management):** Hossain Azam (PI)-\$80,000

- *Short-term industrial project 01 (completed):* Tracer study of an industrial wastewater treatment plant (pulp and paper industry).
- *Short-term industrial project 02 (completed):* Identification of optimum chemical dosages for the treatment of color and TSS on the raw leachate and SBR decant sample of two landfill leachate treatment plants (two different projects).
- *Short-term industrial project 03 (completed):* Biological treatability of landfill leachate to reduce CBOD<sub>5</sub>, sCOD & ammonia and troubleshooting poor performance of their leachate treatment plants (two different projects).
- *Short-term industrial project 04 (completed):* Zinc treatability of wastewater from a hauling station.
- *Short-term industrial project 05 (completed):* Bio-evaluation of NO<sub>2</sub><sup>-</sup> accumulation in a leachate treatment plant.
- *Short-term industrial project 06 (completed):* Arsenic removal study of two different leachate treatment plant.

**B) Projects with Bradley University, IL, USA (emerging contaminants/transportation):** Hossain Azam (Co-PI)

- *Research project (completed):* Fate and formation mechanism of polycyclic aromatic hydrocarbons (PAHs) in asphalt concrete pavement using molecular dynamic (MD) simulation.

**C) Projects with University of Asia Pacific (UAP), Bangladesh (water/wastewater/food):** Hossain Azam (Co-PI)

- *Research project 01 (completed):* Food contamination and adulteration in Bangladesh.
- *Research project 02 (ongoing at UDC):* Life cycle assessment of water and wastewater treatment.

**D) Projects with the City College of New York, USA (water/food):** Hossain Azam (Co-PI)

- *Research project 01 (ongoing at UDC):* Aiding food and water security utilizing climate informed predictive systems.

**E) Projects with the State University of New York (SUNY), Canton, USA (energy/building):** Hossain Azam (Co-PI)

- *Research project 01 (ongoing at UDC):* Effects of prime movers in combined cooling, heat and power (CCHP) systems on energy efficiency in different buildings.

**F) Projects with Korean Institute of Science and Technology (KIST), Korea (wastewater/food):** Hossain Azam (Co-PI)

- *Research project 01 (completed):* Nutrient monitoring and nutrient removal from hydroponic systems.

**Visiting Assistant Professor and Adjunct Professor/Scientist**

**George Washington University, Washington, DC [Affiliation: DC Water]**  
Dept. of Civil and Environmental Engineering

**Jan 2013 - Aug 2014**

**Summary:** Worked at DC Water on funded projects with the PI, Prof. Riffat. Performed pilot and full scale wastewater treatment plant research at DC Water (Blue Plains Advanced Wastewater Treatment Plant, Washington, DC). Worked as a member of high rate carbon team in DC Water research lab to maximize COD adsorption for energy optimization, minimize oxygen use and mitigate odor problems in activated sludge process. Additionally, worked on pilot aeration reactor to investigate the fouling characteristics and efficiency of fine/coarse bubble diffusers to minimize energy use in aeration process. Led the effort of sequencing batch reactors for testing COD adsorption to biomass, modeling, LABVIEW and other performance based tests such as OUR test, decay test, adsorption test, hydrolysis test, rhodamine-bicarbonate test, odor test etc.

#### **Graduate Research Assistant/Post-Doctoral Research Associate**

**University of Illinois at Urbana-Champaign, Urbana, IL**

*Dept. of Bioengineering and Micro and Nanotechnology Lab. (MNTL)* **Sep 2011- Feb 2012 (RA)**  
**Feb 2011- Dec 2012 (Post-Doc)**

**Summary:** Application of IR and Raman spectroscopy for environmental/agricultural engineering problems. Worked on several environmental/agricultural engineering (food) projects (Compositional analysis of soybean grain by transmission Raman spectroscopy, IR imaging of soybean SDS toxin, Effects of TGF $\beta$  and BPA on human prostate tissue). Also explored and identified research ideas and solutions for phosphorus removal & recovery from wastewater, membrane processes for drinking water & wastewater treatment, algae for wastewater treatment, photo catalysis, solar energy utilization etc together with IR and Raman spectroscopy as investigative tools.

#### **Graduate Research Assistant (PhD Research)**

**University of Illinois at Urbana-Champaign, Urbana, IL**

*Dept. of Civil and Environmental Engineering*

**Aug 2007–Aug 2011**

**PhD Project:** Phosphorus removal in retrofitted on-site anaerobic wastewater systems by stimulating Fe (III) reduction: insoluble mineral precipitation (vivianite)

**Research Project (Short Term):** RDX remediation from groundwater and sediment

**Summary:** Researched anaerobic processes of wastewater treatment specially focusing on the effects of iron reduction processes on carbon oxidation, microbial diversity and phosphorus removal using chemical and biological tools. Additionally, developed a model system for phosphorus removal as vivianite (iron mineral) for different types of iron compounds.

**Techniques/Instrumentation:** Used radiolabelled  $^{14}\text{C}$  carbon molecules, Applied molecular tools such as Q-PCR, ARDRA and Identified vivianite minerals using TEM-EDS, FTIR and XRD in addition to basic wastewater assays. Hands on experience of using GC (TCD and FID), GC-GPC, Scintillation Counter, LC-MS, HPLC, IC, TOC Analyzer, Anaerobic Gassing Stations, Anaerobic Glove Bag, etc.

**Applications:** Design of water and wastewater treatment processes, anaerobic digestion/treatment, nutrient removal, treatment of emerging contaminants, phosphorus and energy recovery (struvite, methane), corrosion and scaling, groundwater remediation design, etc.

**Proposal/Graduate Student Grant:** *Pharmaceuticals Removal from Onsite Wastewater System, Hossain Azam (PI)*, Development Proposal, Illinois-Indiana Sea Grant, 2010 (\$6000)

#### **Graduate Research Assistant (MSc Research)**

**North Carolina State University, Raleigh, NC**

*Dept. of Civil, Construction and Environmental Engineering*

**Aug 2005–July 2007**

**MSc Project:** Oxidation of methane in landfill covers: a strategy to maximize energy revenue

**Research Project (Short Term):** Chemical/biological performance analysis of bioreactor landfills

**Summary:** Performed laboratory assessments of landfill biocovers to evaluate its methane oxidation

potential in different pressure gradient, moisture and variable flow of landfill gases produced. Also studied the effects of varying climate and gas collection vacuum through field evaluation of landfill biocover to maximize energy revenue. Additionally, worked on a EPA project about performance evaluation of five North American bioreactor landfills addressing biological and chemical aspects of bioreactor performance (includes gas production and management, leachate quality).

**Laboratory Experiences:** Designed experimental setup, built laboratory columns with necessary connections, prepared biocover, operated methane flow/monitored methane oxidation potential etc.

#### LIST OF PUBLICATION (PEER REVIEWED JOURNAL ARTICLES)

- Hossain, M. I.; Yadavalli, J. P. S.; Pan, J and **Azam, H** (2019) *Molecular dynamics simulation approach to identify release of Polycyclic Aromatic Hydrocarbons (PAHs) from asphalt concrete pavements due to mechanical and environmental factors*, Journal of Transportation Engineering, Journal of Transportation Engineering, Part B: Pavements, Volume 145 Issue 3 - September 2019 (Joint Project)
- Coll, D; Horai, E; Real, M. I.; Castro, S; Dunn F.; Gunawan, G.; **Azam, H** & Wilson, J (2019) *Chemical dissolution of oilfield strontium sulfate (SrSO<sub>4</sub>) scale by chelating agents*, Applied Geochemistry, 106 (2019), 134-141 (Azam, H and Wilson, J are corresponding authors) (Joint Project)
- **Azam, H**; Alam, S T; Hasan, M; Stéphane, D. D.; Kannan, A; Rahman, A and Kwon, M (2019) *Phosphorous in the Environment: Characteristics with Distribution and Effects, Removal Mechanisms, Treatment Technologies, and Factors Affecting Recovery as Minerals in Natural and Engineered Systems*, Environ. Sci. Pollut. Res. Int. 2019 Jul;26(20):20183-20207. doi: 10.1007/s11356-019-04732-y. Epub 2019, May 22.
- Lee, J; Rahman, A; Behrens, J; Brennan, C; Ham, B, Kim, H; Nho, J; **Azam, H** and Kwon, M (2017) *Nutrient removal from hydroponic wastewater by a microbial consortium and a culture of Paracercomonas saepeantans*, New Biotechnology (Published: <https://doi.org/10.1016/j.nbt.2017.11.003>) (Joint Project)
- Real, M; **Azam, H** and Majed, N (2017) *Heavy metal contaminated food consumption and associated risks in Bangladesh*, Environmental Monitoring & Assessment, 189: 651, Springer International Publishing (Published: <https://doi.org/10.1007/s10661-017-6362-z>) (Joint Project)
- Lee, J; Rahman, A; **Azam, H**, Hyung Seok Kim and Kwon, M (2017) *Characterizing nutrient uptake kinetics for efficient crop production during Solanum lycopersicum var. cerasiforme Alef. growth in a closed indoor hydroponic system*, PLOS ONE (Published: <https://doi.org/10.1371/journal.pone.0177041>) (Joint Project)
- Majed, N.; Real M.; Akter, M. and **Azam, H** (2016) *Food adulteration and bio-magnification of environmental contaminants: a comprehensive risk framework for Bangladesh*, Review paper, Frontiers in Environmental Science, Volume 04, Article 34, doi: 10.3389/fenvs.2016.00034 (Joint Project)
- **Azam, H** and Finneran, K (2014) *Fe(III) Reduction-mediated phosphate removal as vivianite (Fe<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>.8H<sub>2</sub>O) in septic system wastewater*, Chemosphere, Vol. 97, 1-9
- **Azam, H** and Finneran, K (2013) *Ferric iron amendment increases Fe(III)-reducing microbial diversity and carbon oxidation in on-site wastewater systems*, Chemosphere, Vol. 90, Issue 4, 1435-1443.
- Schumerich, M; Gelber, M; **Azam, H**; McKinney, J; Thompson, D; Harrison, S; Kull, L and Bhargava, R (2013) *Amino acid quantification in bulk soybeans by transmission Raman spectroscopy*, Analytical Chemistry, 85, 11376-11381.
- Barlaz, M; Bareither, C; **Azam, H**; Saquing, J; Mezzari, I; Benson, C; Tolaymat, T; and Yazdani, R (2010) *Performance of North American bioreactor landfills.II: chemical and biological characteristics*, J of Environmental Engineering, ASCE, August 10, Vol. 136, No. 8, pp 839 – 853.
- **Azam, H** and Amanat, K (2005) *Effect of infill as a structural component on the column design of Multi-storied building*, UAP Journal of Civil and Environmental Eng., Vol1, No1, March 05, ISSN 1813-1093.

#### LIST OF PUBLICATION (JOURNAL ARTICLES) [SUBMITTED/COMPLETED]

- Majed, N; Real, M; Redwan, A and **Azam, H** (2020) *Dynamics of Heavy Metal Pollution and Associated*

*Environmental Indices in Buriganga River of Bangladesh*, Environmental Monitoring & Assessment (Manuscript completed, pending revision, submission by March 15, 2020: Joint Project)

- Bolen, T; Hasan, M.; Conway, T, Rahman, A and **Azam, H** (2020) *Anaerobic co-digestion of cheese whey, FOG and pulp waste with municipal primary and secondary waste activated sludge: Performance evaluation* (Manuscript completed, pending revision, submission by March 30, 2020)
- Real, M; Conway, T; Hasan, M.; Bolen, T; Panayiotou, T; Weeks, A; Horai, E; Tah, T; Rahman, A; Cleary, J and **Azam, H** (2020) *Optimization of physical (Odor), chemical (As, Zn, Color) and biological (COD, NH<sub>3</sub>) treatment of landfill leachate* (Manuscript completed, pending revision, submission by April 15, 2020)
- **Azam, H**; Hasan, M.; Lirane, M.; William, T. and Roman, K (2020) Impact of climate zone on selection of prime mover in combined cooling, heating, and power systems (Manuscript completed, pending revision, submission by May 15, 2020)
- Stéphane, D. D.; Blate, M; Abu-Orf, M; Real, M; Conway, T; Curran, D; Sharp, R and **Azam, H** (2020) *Energy sustainability: how a small utility in PA develops sustainable future through beneficial biogas utilization and codigestion* (Manuscript completed, pending revision, submission by June 15, 2020)
- Hossain, M. I; Yadavalli, J. P. S.; Pan, J and **Azam, H** (2020) *Leaching Potential of polycyclic aromatic hydrocarbons from asphalt concrete pavements due to environmental and mechanical condition* (Manuscript completed, pending revision, submission by June 30, 2020)

#### LIST OF PUBLICATION (JOURNAL ARTICLES) [IN-PREPARATION]

- Kannan, A; Real, K; Conway, T; Carbonaro, R and **Azam, H** (2020) *Dissolution of struvite from wastewater systems* (Manuscript completed, pending revision, expected submission by August 15, 2020)
- Conway, T; Bolen, T; Stéphane, D. D.; Horai, E; Real, K; Pursoo, D; Cleary, J and **Azam, H** (2020) *Short cut nitrogen removal process evaluation for MSW landfill leachate treatment* (Manuscript under preparation, expected completion and submission by September 15, 2020)
- Conway, T; Mabey, H; Kannan, A; McDonough, B; Makram, M and **Azam, H** (2020) *Disinfection (SODIS) of E. Coli and Degradation of Pharmaceuticals in the Presence of Photosensitizers* (Manuscript under preparation, Expected completion and submission by October 15, 2020)

#### LIST OF PUBLICATION (CONFERENCES)

- Kannan, A; Real, K; Conway, T; Carbonaro, R and **Azam, H** (2018) *Chelating agent-assisted inhibition and dissolution of struvite for subsequent recovery: experimental and modeling analysis*, WEFTEC, 2018, New Orleans, LA
- Bolen, T; Conway, T; Rahman, A and **Azam, H** (2017) *Co-digestion of “cheese Whey” as food waste with primary or waste activated sludge maximizes the biogas production*, World Environment & Water Resources Congress, ASCE EWRI (Abstract submission ID#263056, abstract accepted, paper submitted on 01/20/2017 and presented in the EWRI conference on May, 2017)
- Roman, K; Alvey, J; Tvedt, W and **Azam, H** (2017) *Effect of prime movers in CCHP systems for different building types on energy efficiency*, Proceedings of the International Conference on Power Engineering, American Society of Mechanical Engineers (ASME), PowerEnergy2017, June 26-30, 2017, Charlotte, NC, USA (Abstract submission ID#263056, abstract accepted, paper submitted on 11/21/2016 and presented in the ASME conference on June, 2017 )
- Hossain, M; Yadavalli, J; **Azam, H** and Pan, J (2017) *Release of polycyclic aromatic hydrocarbon from hot-mix asphalt pavements*, International Conference on Highway Pavements & Airfield Technology, ASCE T&DI, (Abstract submission ID#232479, abstract accepted, paper submitted on 12/9/2016 and presented in the ASCE T&DI conference on June, 2017)
- Yadavalli, J; Hossain, M; **Azam, H** and Pan, J (2017) *Influence of climatic conditions on releasing polycyclic aromatic hydrocarbons from asphalt concrete pavements*, World Environment & Water Resources Congress, ASCE EWRI, (Abstract submission ID#249203, abstract submitted on 10/16/2016 and presented in the EWRI conference on May, 2017)



- **Azam, H** and Finneran, K (2012) *Iron reduction mediated increases in carbon oxidation and phosphorus removal in on-site wastewater systems*, WEFTEC, 2012, New Orleans, LA
- Anam, I and **Azam, H** (2006) *Seismic behaviour of non-linear RC frames with masonry infills*, 10<sup>th</sup> East Asian Structural Engineering Conference, August 06, Bangkok, Thailand
- Ferdousi, S; **Azam, H**; Abdullah, K and Hossain, M (2005) *Institutional development and people's participation of the catchment area of Baggar Dona river*, International River symposium 05, Australia

#### BOOK CHAPTERS (PUBLISHED/ACCEPTED FOR PUBLICATION)

- Roman, K; Hasan, M and **Azam, H** (2018) *Selection of Prime Mover for CCHP system based on energy, economics and environmental parameters*, Book Chapter (Published), Energy Systems and Environment, ISBN 978-953-51-6008-3
- Real M.I.H., Redwan A., Shourov M.M.R., **Azam H.**, Majed N. (2019) *Heavy Metal Contamination in Environmental Compartments of Buriganga River in Dhaka City*. In: Pradhan B. (eds) GCEC 2017. GCEC 2017. Lecture Notes in Civil Engineering, vol 9. Springer, Singapore

#### PLATFORM PRESENTATIONS (INVITED)

- **Invited platform presentation** on “*Optimization of chemical, physical and biological treatment of leachate through laboratory bench scale treatability studies*”, Hossain Azam, Timothy Conway, Md. Isreq Real, Thomas Bolen, Thrassivoulos Panayiotou, April Weeks, Edward Horai, Tapashree Tah and Joe Cleary, Water Environment Federation Technical and Exhibition Conference, Sept 29-October 03, 2018.
- **Invited platform presentation** on “*Sustainable Wastewater Treatment: Applications of Innovative Techniques, Process Control Strategies and Analytical Tools*” **Hossain Azam**, American Academy of Environmental Engineers and Scientists (AAEES) Breakfast at the NYWEA annual conference, 2018.
- **Invited platform presentation** on “*Environment-Engineering Perspective with Specific Focus on Treatment*” by **Hossain Azam**, International Conference on Business and Applied Sciences Academy of North America, NYC, NY, August, 2016.

#### PLATFORM PRESENTATIONS

- **Platform presentation** and **Conference paper** on “*Chelating agent-assisted Inhibition and Dissolution of Struvite for Subsequent Recovery: Experimental and Modeling analysis*” Arvind Kannan, Timothy Conway, Sebastian Gerlak, Richard Carbonaro and **Hossain Azam**, Water Environment Federation Technical and Exhibition Conference, Sept 29-October 03, 2018.
- **Platform presentation** on “*Turning Waste into Energy-Anaerobic Co-Digestion of Food Wastes to Enhance Energy Recovery through Methane Production*” TJ Bolen, Timothy Conway, Arifur Rahman, and **Hossain Azam**, **3<sup>rd</sup> Prize**, Environmental and Water Resources Institute (EWRI) of ASCE Congress 2017, Sacramento, CA, USA, May 21-25, 2017.
- **Platform presentation** on “*Upgrading an Existing Wastewater Treatment Plant to Perform Co-Digestion of Different Food Wastes*” Thomas Bolen, Tim Conway and **Hossain Azam**, **3<sup>rd</sup> Prize**, NY Water Environment Federation (NYWEA) Annual Conference, February, 2017.
- **Platform presentation** on “*Precipitation, Inhibition and Dissolution Characteristics of Struvite in Wastewater Systems: Experimental and Modeling Studies*” Arvind Kannan, Sebastian Gerlak, Rich Carbonaro and **Hossain Azam**, **1<sup>st</sup> Prize**, NY Water Environment Federation (NYWEA) Annual Conference, February, 2017.

- **Platform presentation** on “*Production of Magnetic Core/Metal Oxide Shell Nanoparticles for Water Purification*” by Jasmine Parks, Adanfa He, Arvind Damodara Kannan, **Hossain Azam**, and Alexander C. Santulli, Undergraduate Research Symposium, NY American Chemical Society, May 2016.
- **Platform presentation** on “*Biochemical Methane Potential of Sludge and Food Waste for an Existing Wastewater Treatment Plant’s Co-Digestion Upgrade*” by Thomad Bolen, Timothy Conway and **Hossain Azam**, International Lasallian Research Symposium, Minnesota, September, 2016.
- **Platform presentation** on “*Iron Reduction Mediated Increases in Carbon Oxidation and Phosphorus Removal in On-Site Wastewater Systems*”, WEFTEC, 2012, New Orleans, LA.
- **Webinar** on “*Chemical Analysis and Imaging of Seeds, Grains, and Plant Tissue*”, Center for Agricultural, Biomedical and Pharmaceutical Nanotechnology (CABPN), University of Illinois at Urbana Champaign, October, 2012.
- **Platform presentation** and **Design report** on “*Retrofit of Wastewater Treatment Plant for Biological Nitrogen Removal*”, *Student Competition*, WEFTEC, 2008, Chicago, IL.
- **Platform presentation** on “*Oxidation of Methane in Landfill Covers: a Strategy to Maximize Energy Revenue*”, Annual Spring Tech. Conference, SWANA NC Chapter, 2007, Wrightsville Beach, NC.

## POSTER PRESENTATIONS/REPORTS

- **Poster presentation** on “*Solar Disinfection (SODIS) of E. coli and Degradation of Pharmaceuticals in Presence of Photosensitizers/Photocatalysts*” Hannah Mabey, Mohamed Makram, Brendan McDonough, Terence Coppinger, Adanfa He, Arvind Kannan, Alexander Santulli and **Hossain Azam**, Environmental and Water Resources Institute (EWRI), ASCE Congress 2018, Minneapolis, MN, USA, June 03-07, 2018.
- **Poster presentation** on “*Upgrading an Existing Wastewater Treatment Plant to Perform Co-Digestion of Different Food Wastes*” Thomas Bolen, Tim Conway and **Hossain Azam**, **2<sup>nd</sup> Prize**, NY Water Environment Federation (NYWEA) Annual Conference, February, 2018.
- **Poster presentation** on “*Chelant-Assisted Struvite Dissolution and Inhibition Potential in Wastewater Systems: Experimental and Modeling analysis*” Arvind Kannan, Tim Conway, Sebastian Gerlak, Rich Carbonaro and **Hossain Azam**, NY Water Environment Federation (NYWEA) Annual Conference, February, 2018.
- **Poster presentation** on “*Phosphorus Removal, Scale Inhibition/Dissolution and Resource Recovery as Struvite and Vivianite in Anaerobic Digestion Systems: Modeling and Experimental Analysis*” by Conor Brennan, Juliana Behrens, Thomas Bolen, Adanfa He, Richard Carbonaro, and **Hossain Azam**, **1<sup>st</sup> Prize**, NY Water Environment Federation (NYWEA) Annual Conference, February, 2016.
- **Poster presentation** on “*Solar Disinfection (SODIS) of E. Coli in the Presence of Photosensitizers*” by Adanfa He, Arvind Damodara Kannan, Jasmine Parks, Alexander Santulli and **Hossain M. Azam**, NY American Water Works Association (AWWA) Annual Poster Competition, April, 2016.
- **Poster presentation** on “*Precipitation, Inhibition and Dissolution Characteristics of Important Phosphate Minerals (Struvite and Vivianite) in Water and Wastewater Systems*” by Conor Brennan, Juliana Behrens, Adanfa He, Thomas Bolen and **Hossain Azam**, **3<sup>rd</sup> place** in NY American Water Works Association (AWWA) annual poster competition, 2015.

- **Poster presentation** on “*Modeling of Precipitation, Inhibition, and Dissolution Characteristics of Struvite and Vivianite in Wastewater Systems*” by Conor Brennan, Juliana Behrens, Adanfa He, Thomas Bolen, Richard F. Carbonaro, and **Hossain M. Azam**, New England Graduate Student Water Symposium, September, 2015.
- **Final project report** on “*Compositional Analysis of Whole Soybean Grain by Transmission Raman Spectroscopy: A Pilot Study*”, United Soybean Board, USB Project #9282, 2012.
- **Poster presentation** on “*Ferric Iron Amendment Increases Carbon Oxidation and Limits Methane Production in On-Site Wastewater (Septic Systems)*”, WEFTEC, 2010, New Orleans, LA.

## RELEVANT COURSEWORK AT UIUC/NCSSU

- |  |  |
|--|--|
| ▪ Drinking Water Treatment and Case Histories  | ▪ Bioprocess Design and Wastewater Treatment |
| ▪ Solid & Hazardous Waste, Bioreactor Landfill | ▪ GW Hydraulics, Remediation Design          |
| ▪ Environmental Organic Chemistry              | ▪ Modeling & Analysis of Env. Systems        |

## COMPUTER EXPERIENCE

- |   |                                    |
|---|------------------------------------|
| ▪ LandGEM, BioWin 3.0, AQUASIM, MODFLOW | ▪ Arc GIS 9.0, Sigma Plot, AUTOCAD |
| ▪ FORTRAN, Visual Basic, MATLAB         | ▪ MINEQL, ENVI, LabVIEW, PHREEQC   |

## LABORATORY EXPERIENCE/TECHNIQUES

- GC (TCD and FID), GC-GPC, Scintillation Counter, LC-MS, HPLC, IC, ICP, TOC Analyzer, Zeta-Sizer, CE etc.
- Anaerobic Gassing Stations and Anaerobic Glove Bag.
- Wet chemistry methods for analysis of COD/TOC, TSS, VSS, Fe (II), Fe (III)  $\text{SO}_4^{2-}$ ,  $\text{NO}_3^-$ ,  $\text{PO}_4^{3-}$  etc.
- Cell suspension experimentation, growth experimentation, DNA extraction, PCR, Q-PCR, ARDRA.
- X-Ray Diffraction (XRD) Technique, Transmission Electron Microscopy (TEM)-EDS.
- Column and Reactor Studies: Assembled and Conducted Experiment in Flow through System.
- Hands on experience of IR and Raman spectroscopy.

## SELECTED CLASS FINAL PROJECTS AT UIUC/NCSSU

- Design Solutions-Multiple US Water Facilities & Water Prob. of Developing Countries (Dr. Snoeyink)
- Modeling of Phosphorus Removal from Retrofitted Wastewater Systems using CSTR, Ideal Plug Flow and Axial Dispersion Reactor (Dr. Marinas)
- Investigation of Site & Design of Ground Water Treatment System Using MODFLOW (Dr. Borden)
- Remediation Design for a Remediation Site, Indiana (Dr. Werth)
- Sustainable Remodel of Stone Creek Subdivision, Urbana, IL (Dr. Werth)
- Comprehensive Study of Air Pollution from Motor Vehicles (Dr. Donald van der Vaart)
- Dioxin Emission in the Environment: a known Carcinogen Emitted from Incinerator (Dr. Barlaz)
- Effects of Parameters on Methane Oxidation of Methanotrophs in Landfill Bio-Cover (Dr. de les Reyes)
- Investigation of Ground Water Arsenic Pollution in NC (Dr. Borden)

## PROFESSIONAL MEMBERSHIPS, SERVICES AND ACTIVITIES

- **Faculty Advisor:** WEF Student Chapter at the Univ. of the Dist. of Columbia (UDC), Sp. 2020 to Present.
- **Member:** Association of Environmental Engineering and Science Professors (AEESP).
- **Member:** Water Env. Federation (WEF) [**Member:** Industrial Wastewater Committee (IWC), Municipal Resources Recovery Design Committee (MRRDC) and Technical Publication Committee (TPC), WEF].
- **Chair:** Upstream Oil and Gas Subcommittee under the Industrial Wastewater Committee of WEF.
- **Chair:** Publication Subcommittee under the Municipal Resources Recovery Design Committee (MRRDC) of WEF and **Vice-Chair:** Publication Subcommittee under Industrial Wastewater Committee of WEF

- **National Science Foundation (NSF) Proposal Reviewer:** Served as NSF reviewer in the Environmental Engineering program, 2015.
- **Water Environment & Reuse Foundation (WERF) Proposal Reviewer and Technical Review Committee Member:** NTRY12R16, *Unintended Consequences of Resource Recovery & Overall Plant Performance: Solving the Impacts on Dewaterability Properties* & NTRY13R16, *Understanding the Impacts of Low-Energy & Low-Carbon “N” Removal Technologies on Bio-P & Nutrient Recovery Processes*.
- **Journal Research Paper/Article Reviewer:** Water Research, Water, Air, & Soil Pollution and Journal of Geochemical Exploration.
- **Vice-Chair:** Workshop on “Fundamentals of Produced Water Treatment in the Oil and Gas Industry (W 14)”, Water Environment Federation Technical Conference, September, 2018 (WEFTEC).
- **Chair:** Water Environment Federation (WEF) Workshop on “Energy Use/Recovery at Municipal Resource Recovery Facilities: Fundamentals, Conservation, and Recovery Technologies”, Water Environment Federation Technical Conference (WEFETC), September, 2016.
- **Vice-Chair:** Workshop on Modeling 101 Modeling Basics and “Hands on Experience” on Modeling Software (Modeling 101), Water Env. Federation Technical Conference, September, 2014 (WEFTEC).
- **Faculty Host for Seminars** at Dept. of Civil and Environmental Eng., Manhattan College.
- **Faculty Participant:** STAR program/day/training [NSF Project by Sr. MaryAnn Jacobs and Zahra Shahbazi of Manhattan College] to train high school teachers on “Environmental Engineering Projects/Lesson Plan”.
- **Workshop Participant:** ASCE ExCEED Teaching Workshop: Week long training on effective teaching in Civil and Environmental Engineering, Summer, 2015.
- **Faculty Advisor:** NY Water Environment Association (NYWEA) Student Chapter at Manhattan College, May, 2015 to Present.
- **Faculty Co-Advisor:** Engineers Without Borders (EWB), Manhattan College Chapter, Spring, 2015 to Spring, 2016.
- **Member:** Smart Eval Committee, A subcommittee of the Educational Affairs Committee (EAC) of Manhattan College -Spring 2015 to Present.
- **Member:** Library Committee of Manhattan College May, Spring 2017-Present.
- **Member:** Judiciary Committee on Student Affairs of Manhattan College May, 2015-Present.
- **Steering Committee Member:** Center for Urban Resilience and Environmental Sustainability (CURES) of Manhattan College, September, 2014-Present.
- **Judge:** Westchester Science and Engineering Fair, Sleepy Hollow High School, March, 2016
- **Chair:** Environmental Engineering Advisory Committee, Fall 2008-Fall 2009, UIUC.
- **Member:** Design Team, Metcalf and Eddy Design Competition on Wastewater, UIUC, Spring, 2008.
- **Winner:** Student Competition on Wastewater, CSWEA conference, 2008, Minneapolis, MN and **Design Team Member:** Student Design Competition, WEFTEC 2008.
- **Team Member and Winner (2<sup>nd</sup> and 3<sup>rd</sup>):** Design of Water Filtration System for Developing and Water Treatment Systems for Developed Countries at UIUC Engineering Open House: 2008/09.
- **Member:** Engineers Without Borders (EWB)-NCSU and Worked in the “**Bolivia Water Sanitation Project**” and a Team Member of the **First Assessment Trip to Bolivia** in December 2006.
- **Captain:** Bangladesh University of Engineering and Technology (BUET) Cricket Team, **Vice-President:** BUET Debating Club; **Active Member:** BUET Civil Engineering Student Association.