

SA'AD ABD AR RAFIE

University of Tennessee, Knoxville

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OBJECTIVE

I seek opportunities to grow and learn new skills that complement my existing experiences in wastewater treatment, environmental biotechnology, site remediation, and analytical techniques.

EDUCATION

The University of Tennessee, Knoxville, TN

Master of Science (MSc) in Environmental Engineering (August 2022)

PhD in Civil Engineering (Major: Environmental Engineering) (August 2017-Present),

Degree Expected: Spring 2023

Bangladesh University of Engineering and Technology, Dhaka, Bangladesh

Bachelor of Science in Civil Engineering (February 2011 - August 2016) , Major: Environmental Engineering,

Minor: Structural Engineering

GRANTS/AWARDS AND HONORS

CNMS Rapid Access User Grant (Summer 2021)

Oak Ridge National Laboratory, Oak Ridge, TN

Graduate Student Senate Travel Award (Summer 2019)

The University of Tennessee, Knoxville, TN

Tennessee Fellowship for Graduate Excellence (August 2017 –August 2021)

The University of Tennessee, Knoxville, TN

University Technical Scholarship (February 2011 – August 2016)

Bangladesh University of Engineering and Technology, Dhaka

The Duke of Edinburgh's Award: Bronze Level (2014)

Bangladesh Youth Climate Fellowship (April 2013)

Journeys for Climate Justice, Victoria, Australia

SKILLS

- *Lab:* Calorimetry, Elemental Analysis using XRF Spectroscopy and Combustion Analysis, Low Temperature X-Ray Powder Diffraction, Gravimetry, Low and High-Resolution Hydrocarbon NMR Spectroscopy, Optical /Fluorescent Microscopy, Titrimetry, Turbidimetry, Environmental DNA Extraction and Purification, Acridine-Orange Direct Count, 16s rDNA Gene Amplicon Sequencing, Qubit, Nano-drop, Agilent Microchip Bioanalysis, Transmission Electron Microscopy, Scanning Electron Microscopy (trained user), Gel Electrophoresis, High-Performance Ion Chromatography, Stable Isotope Geochemistry,
- *Field Work:* Sediment/Soil Sampling, Groundwater Sampling, Surface Water Sampling, Wastewater Sampling, Surveying, Air Sampling, Pump and Slug Tests, Tracer Tests, Participatory Rural Appraisal, Focus Group Discussions, Key informant interviews (semi-structured, unstructured), Shallow Core Sampling, Controlled Burn Treatment.
- *Computational:* Microsoft Office, Autodesk Inventor, AutoCAD, Adobe Photoshop, Illustrator and Premiere Pro, CorelDraw, EPANET, ArcMap,

- *Coding*: Python, R, MATLAB, SQL, C++, RClimDex.
- *Bioinformatics*: KBase, CLC Genomics Workbench, QIIME/QIIME2.
- *Languages*: Bilingual in English and Bengali, Moderate Proficiency in Spoken Hindi and Urdu.

CERTIFICATIONS

- Radiation Worker I&II for ORNL (up to date)
- OSHA HAZWOPER 40 hours (up to date)

PROFESSIONAL EXPERIENCE

Department of Civil and Environmental Engineering, University of Tennessee, Knoxville

Doctoral Research, Research Advisor: Dr. [Terry C. Hazen](#)

Graduate Research Assistant (August 2017 – Present)

- Constructed a detailed environmental sampling/field test plan to study subsurface microbial response to wildfire/prescribed fire
- Analysis of changes microbial community structure and recovery after controlled burn treatment of temperate broadleaf and mixed forests
- Investigating PAH degradation and changes in the soil biogeochemistry after controlled fire and wildfire events
- Developed methodology for assessing pyrogenic carbon degradation and changes in the soil biogeochemistry after controlled and wildfire events and utilized scientific resources for data validation and experimental optimization.
- Extensive practice in characterization and analytical techniques, along with the performance of wet-lab and biological techniques
- Conducted bioinformatics research on large genomic datasets, from experimental design, data collection, QC, and Analysis
- Report writing, manuscript preparation, writing research grant proposals, mentoring and supervision of undergraduate students

DOE ENIGMA Project at Oak Ridge National Laboratory

- Field work for soil core collection, groundwater sampling and continuous monitoring of groundwater wells.
- Setup of infield bioreactors to simulate Groundwater flow and quantifying microbial activity via fluorescent cell counts
- Implementation of machine learning approaches for predictive modeling of hydrogeochemical parameters at the Y-12 Complex in Oak Ridge, TN

Methane Hydrates for Wastewater Desalination

Co-mentor: Dr. [Claudia J. Rawn](#)

- Low Temperature X-Ray Diffraction of Hydrate Samples at the Center for Nanophase Material Sciences, ORNL
- Powder Diffraction data analysis and Rietveld Refinement using GSAS -II

Center for Climate Change and Environmental Research (C3ER),

BRAC University, Dhaka, Bangladesh

Research Associate (November 2016 – July 2017)

- Analyzed RClimDex generated indices and assessed the risk, vulnerability and integrated risk for the climate affected regions
- Assessed the feasibility and need for community-Based Flood Resilience Innovations in Bangladesh and policy implications of multilateral transboundary water resources agreements

- Prepared project and design feasibility reports and proposals focused on engineered solutions to facilitate adaptation initiatives in the coastal and climate affected regions

Kingsley™ Group

Dhaka, Bangladesh

Environmental Engineer (September 2016 – October 2016)

- Checking designs of effluent treatment plants and sewage treatment plants including multi module sewage treatment facilities.
- Detailed documentation of projects along with reconnaissance studies and mapping
- Design of Up-flow Anaerobic Sludge Blanket (UASB) based Effluent Treatment System for Cotton Knit-Dyeing Factory
- Site assessment, Reconnaissance, Project Implementation and coordinating plant installation

Bureau of Research Testing and Consultancy,

Bangladesh University of Engineering and Technology, Dhaka, Bangladesh

Undergraduate Research Assistant (May 2016 – July 2016)

- Field assessment of air quality at cement sheet factories (worker safety evaluation)
- Review of industrial application, risks and prospects of chrysotile asbestos in Bangladesh.

Department of Civil Engineering,

Bangladesh University of Engineering and Technology, Dhaka, Bangladesh

Undergraduate Student Researcher (January 2015- February 2016)

- Characterization of sewage sludge as well as mixtures with coal on the basis of thermal, physical and chemical (proximate as well as ultimate analysis) attributes.
- Development of relationships between and the evaluation of chemical characteristic parameters and the calorific value of Coal-Sludge mixtures.
- Assessment of the combustion efficiency and the effect of ash quality parameters of Sludge-Coal mixture with respect to usability in large scale combustion reactors.

PUBLICATIONS

Conference Publications:

- **Saad. A. A. Rafie**, N. Haider, M.N. Islam, A.B.M. Badruzzaman (2016), “Assessing the Energy Values of Sewage Sludge from Pagla Sewage Treatment Plant”. BUET-ANWAR ISPAT 1st Bangladesh Civil Engineering SUMMIT 2016, BUET, Dhaka, Bangladesh. ([Link](#))
- S. Hossain, A. T. Sarkar, **Saad. A. A. Rafie** and S. H. Rahat, (2014), “Waste Management Models (WMM) and Their Application to Sustainable Waste Management in a Mega City like Dhaka” ([Link](#)).
- S. H. Rahat, A. T. Sarkar, **Saad. A. A. Rafie**, S. Hossain (2014), “Prospects of Diaper Disposal and Its Environmental Impacts on Populated Urban Area Like Dhaka City” ([Link](#))

Peer- Reviewed Journal Publications:

- Putt, A. D., Rafie, Sa’ad Abd Ar, Hazen, T.C. (2022). "Large-Data Omics Approaches in Modern Remediation." Journal of Environmental Engineering 148(9): 02522001.
- S Wilpiszkeski, R. L., Gionfriddo, C. M., Wymore, A. M., Moon, J. W., Lowe, K. A., Podar, M., **Rafie, S.**, ... & Elias, D. A. (2020). In-field bioreactors demonstrate dynamic shifts in microbial communities in response to geochemical perturbations. PloS one, 15(9), e0232437.

CONFERENCES

American Society for Microbiology (ASM) Microbe 2022

Poster Presentation, June 20-24, 2019 in San Francisco, CA

“Methanotrophs and Methane Hydrates for Wastewater Desalination: Forming Methane Hydrates in Salt Solutions”, **Saad A. A. Rafie**, M.F. Campa, C.J. Rawn, Terry C. Hazen

World Microbe Forum 2021, American Society for Microbiology (ASM) and Federation of European Microbiological Societies (FEMS)

Poster Presentation, June 20-24, 2021 in Online Worldwide

“Soil Bacterial Response to Prescribed Fires in a Southern Appalachian Clear Cut with Fuel Manipulations”, **Saad A. A. Rafie**, Kevin P. Hoyt, Martin R. Schubert, Matthew T. Kerr, Luke R. Blentlinger, Anthony M. Faiia, Anna Szykiewicz, Jennifer F. Franklin, Sally P. Horn, Terry C. Hazen

American Society for Microbiology (ASM) Microbe 2019

Poster Presentation, June 20-24, 2019 in San Francisco, CA

“Changes in Microbial Community Structure after Controlled Burn Treatment of Temperate Hardwood and Mixed Forests”, **Saad A. A. Rafie**, Kevin P. Hoyt, Martin R. Schubert, Sally P. Horn, Terry C. Hazen

American Society for Microbiology (ASM) Microbe 2018

Student Participant, June 8-10 in Atlanta, GA

International Conference on Advances in Civil Engineering (ICACE) 2014

Presentation, 26-28 December 2014, Chittagong, Bangladesh

“Prospects of Diaper Disposal and its Environmental Impacts on Populated Urban Area Like Dhaka City”, Saiful Haque Rahat, Anika Tabassum Sarkar, **Saad A. A. Rafie**, Shahadat Hossain

MENTORSHIP/SUPERVISION

- **Alcime, Plutney** | B.S. Biology | Benedict College | Summer REU Program 2022 | **NSF REU** Undergraduate
- **Thomas Geissberger** | B.S. Geology | University of Tennessee, Knoxville | May 2018- July 2019
 - Geissberger, T.*, Putt, A.D., **Rafie, S.A.A.**, Joyner, D., Hazen, T.C. Poster. “What Microbes are in Recreational and Urban Park Streams in Knoxville?” 26 March 2019. Knoxville, TN. Watershed Symposium.
 - Geissberger, T.*, Putt, A.D., **Rafie, S.A.A.**, Joyner, D., Hazen, T.C. Poster. “What Microbes are in Recreational and Urban Park Streams in Knoxville?” 17 April 2019. Knoxville, TN. EURECA - Exhibition of Undergraduate Research and Creative Achievement.

MEMBERSHIP AND AFFILIATIONS

- *The Institution of Engineers, Bangladesh*
Associate Member (July 2017 – Present) Membership No. A-19010
- *American Society of Civil Engineers*
Student Member (April 2018 – Present) Membership ID. # 11367308
- *American Society for Microbiology*
Student Member (April 2018 – Present)
- *Bangladesh Students Association at The University of Tennessee, Knoxville*
President (March 2019 – March 2020), Member (August 2017 – Present)

OUTREACH ACTIVITIES AND LEADERSHIP EXPERIENCE

Bangladesh Youth Movement for Climate (BYMC)

Outreach and Volunteer Coordinator (January 2013 – August 2016),

Bangladeshi Students Association –The University of Tennessee, Knoxville
President (March 2019 – March 2020)

Ask Scientists, The Daily Beacon
Columnist (August 2019 – December 2019)

- Write bi-monthly columns for the university’s student newspaper: The Daily Beacon

SCIENCE COMUNICATION MASS MEDIA

Rafie, S. (November 6, 2019) “Ask Scientists: Dead Zones and Hurricanes” The Daily Beacon.
Retrieved from [link](#)

Rafie, S. (September 25, 2019) “Ask Scientists: The Car Whomp” The Daily Beacon. Retrieved from [link](#)