

# MD ABDUL HALIM

Schmidt AI in Science Fellow, University of Toronto  
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## RESEARCH INTERESTS

Remote sensing & GIS, Machine Learning, Biometeorology, Biogeochemistry, Climate change, Urban forestry, Forest ecology, Affordable & open-source environmental sensor-logger systems.

## CITIZENSHIP

I am a Permanent Resident of Canada and a Bangladeshi citizen.

## EDUCATION

Faculty of Forestry, University of Toronto, Canada

*Ph.D.* 2020

*Thesis:* Forest disturbances and climate feedbacks in a mixedwood boreal forest.

*Supervisor:* Dr. Sean Thomas

Dept. of Forestry & Environmental Science, Shahjalal University of Science & Technology, Bangladesh

*M.Sc. (with distinction and Chancellor & Vice-chancellor Gold medals)* 2009

*Thesis:* Application of Artificial Neural Network in multispectral satellite image classification.

*Supervisor:* Dr. Swapan Sarker

*B.Sc. (with distinction)* 2007

*Project:* Detection of vegetation cover change in west Bhanugach reserved forest using remote sensing and GIS techniques.

*Supervisor:* Dr. Romel Ahmed

## ACADEMIC APPOINTMENTS<sup>1</sup>

**Postdoctoral Fellow** *Dec 2019–Present*

*Schmidt AI in Science Fellowship:* Schmidt AI in Science Fellowship, University of Toronto (Mar 2023–Ongoing)

*Urban Challenge Grant:* School of Cities, University of Toronto (May 2022–Jun 2023)

*NSERC CREATE:* Daniels Forestry, University of Toronto (Dec 2019–Nov 2021)

**Associate Professor** *May 2022–Sep 2023*

Department of Forestry & Environmental Science

Shahjalal University of Science & Technology, Bangladesh

**Sessional Lecturer** *Jan 2020–May 2021*

Faculty of Forestry, University of Toronto, Canada

**Lecturer and Assistant Professor** *Jun 2009–Aug 2013*

Department of Forestry & Environmental Science

Shahjalal University of Science & Technology, Bangladesh

<sup>1</sup>*Career interruption* (Jun 2021–Jun 2022): my ability to perform normal academic activities was affected (~60%) primarily by COVID-19-related health complications and partly by parental (first baby) responsibilities.

## RESEARCH EXPERIENCE

### Postdoctoral fellow/Principal investigator

Mar 2023–Present

*Institute:* Eric and Wendy Schmidt AI in Science Postdoctoral Fellowship, University of Toronto, Canada.  
*Project:* A deep-learning strategy to determine point-source emissions of methane in urban settings from satellite data.

### Postdoctoral fellow/Principal investigator

May 2022–Jun 2023

*Institute:* School of Cities, University of Toronto, Canada.  
*Project:* Developing remote sensing tools (using artificial intelligence) for monitoring the success of Toronto's green roofs.

### Consultant/Research collaborator

Aug 2022–Jul 2023

*Institute:* SUST Research Centre, Shahjalal University of Science & Technology, Bangladesh.  
*Project:* Land-use driven climate change in Bangladesh.

### Co-principal investigator

Aug 2022–Ongoing

*Institute:* SUST Research Centre, Shahjalal University of Science & Technology, Bangladesh.  
*Project:* Patterns and drivers of stem and foliage methane fluxes from an upland tropical forest in Bangladesh.

### Consultant/Research collaborator

Jun 2021–Jun 2022

*Institute:* Asia-Pacific Network for Global Change Research.  
*Project:* Protecting ecosystems and livelihoods of the Sundarbans, a World Heritage site: Assessing the impact of natural hazards on forest-based ecosystem services.

### Co-principal investigator

Apr 2022–Mar 2023

*Institute:* National Geographic Society.  
*Project:* Unlocking the potentials of Sundarbans mangrove forest as nature-based climate solution.

### Postdoctoral fellow

Dec 2019–Apr 2022

*Institute:* Institute of Forestry & Conservation, Daniels Faculty of Architecture, Landscape, and Design, University of Toronto, Canada.  
*Project:* NSERC CREATE for design of living infrastructure for living ecosystem (specifically: quantifying CO<sub>2</sub> and CH<sub>4</sub> fluxes from green roofs and ways to enhance the carbon benefits of green roofs.

### Field assistant

Aug 2013–Dec 2020

*Institute:* Thomas Lab, Faculty of Forestry, University of Toronto, Canada.  
*Project:* [Halliburton Forest Mega-Plot \(Ontario\)](#), which is a long-term stand-level plot network for better scientific understanding and solving applied problems in temperate forest ecosystems.

### Research assistant

2017–2019

*Institute:* Thomas Lab, Faculty of Forestry, University of Toronto.  
*Project:* Restoration of Musselwhite mine tailings (biogeophysical components).

### Principal investigator

2016–2017

*Institute:* An independent project supported by the [Rufford Small Grants](#).  
*Project:* Tree species diversity as a driver of above-ground tree carbon and soil carbon fluxes in the tropics: implications for REDD+ in Bangladesh.

### Co-principal investigator

2015–2016

*Institute:* An independent project supported by [Crowd Funding](#).

*Project:* Combating climate change with biochar in beautiful Bangladesh.

## Co-principal investigator

2011–2014

*Institute:* Dept. of Forestry & Environmental Science, Shahjalal University of Science & Technology (projects funded by the University Grant Commission of Bangladesh).

*Projects:*

- 1) Relationship of forest canopy openness and height with some selected soil chemical properties in a tropical forest of Bangladesh.
- 2) Relationship between insect folivores and some physical and chemical properties of leaves of some selected tree species at Ratargul fresh water swamp forest, Bangladesh.
- 3) Modelling endangered plant species distribution in future climate scenarios at the Satchari national park, Bangladesh.

## PUBLICATIONS

### Journal articles

29. Madsen, S., Wu, D., **Halim, M.A.**, Wunch, D. 2024. CO<sub>2</sub> fluxes of vegetation in the Greenbelt of Ontario and increased net ecosystem emissions associated with its removal. Accepted in *Elementa: Science of the Anthropocene*.
28. **Halim, M.A.**, Bieser, J.B., Thomas, S.C. 2024. Large, sustained soil CO<sub>2</sub> efflux but rapid recovery of CH<sub>4</sub> oxidation in post-harvest and post-fire stands in a mixedwood boreal forest. Accepted in *Science of the Total Environment*.
27. Dey, B., Ferdous, J., **Halim, M.A.**, Ahmed, Romel. 2024. Biomass or LPG? A case study for unraveling cooking fuel choices and motivations of rural users in Maheshkhali island, Bangladesh. Accepted in *Sustainable Futures* 7(100152). DOI: <https://doi.org/10.1016/j.sft.2024.100152>
26. Liao, W., **Halim, M.A.**, Kayes, I., Drake, J.A.P., Thomas, S.C. 2023. Biochar Benefits Green Infrastructure: Global Meta-Analysis and Synthesis. *Environmental Science & Technology* 57(41):15475-15486. DOI: <https://doi.org/10.1021/acs.est.3c04185>
25. **Halim, M.A.**, Vantellingen, J., Gorgolewski, A.S., Rose, W., Drake, J., Margolis, L., and Thomas, S.C. 2022. Greenhouse gases and green roofs: carbon-dioxide and methane flux in relation to substrate characteristics. *Urban Ecosystems* 25:487–498. DOI: <https://doi.org/10.1007/s11252-021-01166-8>
24. Karim, M.R., **Halim, M.A.**, Gale, N.V., Thomas, S.C. 2020. Biochar effects on soil physiochemical properties in degraded managed ecosystems in northeastern Bangladesh. *Soil Systems* 4(4):69. DOI: <https://doi.org/10.3390/soilsystems4040069>.
23. Hasan, A., Girona, M.M., Grosbois, G., Saha, N., and **Halim, M.A.**, 2020. Land sparing can maintain bird diversity in northeastern Bangladesh. *Sustainability* 12, 6472. DOI: <https://doi.org/10.3390/su12166472>.
22. **Halim, M.A.**, Chen, H.Y.H., and Thomas, S.C. 2019. Stand age and species composition effects on surface albedo in a mixedwood boreal forest. *Biogeosciences* 16, 4357–4375, DOI: <https://doi.org/10.5194/bg-16-4357-2019>.
21. Thomas, S.C., **Halim, M.A.**, Gale, N.V., and Sujeeun, L. 2019. Biochar enhancement of facilitation effects in agroforestry: early growth and physiological responses in maize-leucaena model system. *Agroforestry Systems*, 93(6): 2213-2225, DOI: <https://doi.org/10.1007/s10457-018-0336-1>.
20. **Halim, M.A.**, Chen, H.Y., Thomas, S.C. 2019. Stand age and species composition effects on surface albedo in a mixedwood boreal forest. *Biogeosciences Discussion*, DOI: <https://doi.org/10.5194/bg-2018-501>.

19. Halim, M.A., Thomas, S.C. 2018. A proxy-year analysis shows reduced soil temperatures with climate warming in boreal forest. *Scientific Reports*, DOI: <https://doi.org/10.1038/s41598-018-35213-w>.
18. Gale, N.V., Halim, M.A., Horsburgh, M., and Thomas, S.C. 2017. Comparative responses of early-successional plants to charcoal soil amendments. *Ecosphere* 8(10): e01933, DOI: <https://doi.org/10.1002/ecs2.1933>.
17. Deb, J.C., Salman, M.H.R., Halim, M.A., Chowdhury, M.Q., and Roy, A. 2014. Characterizing the diameter distribution of sal plantations by comparing Normal, Lognormal, and Weibull distributions at Tilagarh eco-park, Bangladesh. *Southern Forests* 76(4): 201–208, DOI: <https://doi.org/10.2989/20702620.2014.947077>.
16. Deb, J.C., Halim, M.A., Rahman, H.M.T., and Al-Ahmed, R. 2013. Density, diversity, composition, and distribution of street trees in Sylhet metropolitan city of Bangladesh. *Arboricultural Journal: The International Journal of Urban Forestry* 35(1): 1–14, DOI: <https://doi.org/10.1080/03071375.2013.770656>.
15. Deb, J.C., Halim, M.A., Ahmed, M.E. 2012. An allometric equation for estimating stem biomass of *Acacia auriculiformis* in the northwestern region of Bangladesh. *Southern Forests* 74(2): 103–113, DOI: <https://doi.org/10.2989/20702620.2012.701429>.
14. Sarker, S.K., Deb, J.C., Halim, M.A. 2011. A diagnosis of existing logging bans in Bangladesh. *International Forestry Review* 13(4): 461–475, DOI: <https://doi.org/10.2307/24310768>.
13. Chowdhury, M.S.H., Rahman, M.M., Koike, M., Muhammed, N., Salahuddin, K.M., Halim, M.A., Saha, N., Rana, M.P., and Islam, M.J. 2010. Small-scale mehedhi (*Lawsonia inermis* L.) farming in the central Bangladesh: a promising NTFP-based rural livelihood outside the forests. *Small-scale Forestry* 9: 93–105, DOI: <https://doi.org/10.1007/s11842-009-9104-4>.
12. Chowdhury, M.S.H., Koike, M., Muhammed, N., Halim, M.A., Saha, N., and Kobayashi, H. 2009. Use of plants in healthcare: a traditional ethno-medicinal practice in rural areas of southeastern Bangladesh. *International Journal of Biodiversity Science & Management* 5(1): 41–51, DOI: <https://doi.org/10.1080/17451590902771342>.
11. Chowdhury, M.S.H., Halim, M.A., Muhammed, N., Koike, M., and Biswas, S. 2009. Indigenous knowledge in natural resource management by the hill people: a case of the Mro tribe in Bangladesh. *Forests, Trees and Livelihoods* 19: 129–151, DOI: <https://doi.org/10.1080/14728028.2009.9752660>.
10. Halim, M.A., Shahid, A., Chowdhury, M.S.H., Sohel, M.S.I., Nahar, M.N., and Jhangir, N.M. 2008. Evaluation of landuse pattern change in west Bhanugach reserve forest, Bangladesh, using remote sensing and GIS techniques. *Journal of Forestry Research* 19(3): 193–198, DOI: <https://doi.org/10.1007/s11676-008-0044-1>.
9. Halim, M.A., Chowdhury, M.S.H., Muhammed, N., Rahman, M., and Koike, M. 2008. Sap production from khejur palm (*Phoenix sylvestris* Roxb.) husbandry: a substantial means of seasonal livelihood in rural Bangladesh. *Forest, Trees and Livelihoods* 17: 305–318, DOI: <https://doi.org/10.1080/14728028.2008.9752638>.
8. Chowdhury, M.S.H., Halim, M. A., Muhammed, N., Haque, F., and Koike, M. 2008. Traditional utilization of wild date palm (*Phoenix sylvestris* Roxb.) in rural Bangladesh: an approach to sustainable biodiversity management. *Journal of Forestry Research* 19(3): 245–251, DOI: <https://doi.org/10.1007/s11676-008-0036-1>.
7. Akhter, S., Halim, M.A., Sohel, M.S.I., Sarker, S.K., Chowdhury, M.S.H., and Sonet, S.S. 2008. A review on the use of non-timber forest products in beauty-care in Bangladesh. *Journal of Forestry Research* 19(1): 72–78, DOI: <https://doi.org/10.1007/s11676-008-0014-7>.
6. Ahmed, R., Hasan, M.S., Halim, M.A., and Alam, M. 2008. State of urban nurseries in Bangladesh: a case study from the north-eastern region. *Small-scale Forestry* 3(4): 275–283, DOI: <https://doi.org/10.1007/s11842-008-9062-2>.

5. Halim, M.A., Chowdhury, M.S.H., Wadud, A.I., Uddin, M.S., Sarker, S.K., and Uddin, M.B. 2007. The use of plants in traditional health care practice of the *Shaiji* community in southwestern Bangladesh. *Journal of Tropical Forest Science* 19(3): 168–175, DOI: <https://doi.org/10.2307/43594532>.
4. Ahmed, R., Islam, A.N.M.F., Rahman, M., and Halim, M.A. 2007. Management and economic value of *Schumannianthus dichotoma* (murta) on rural homesteads in the Sylhet region of Bangladesh. *International Journal of Biodiversity Science and Management* 3(4): 252–258, DOI: <https://doi.org/10.1080/17451590709618178>.
3. Chowdhury, M.S.H., Halim, M.A., Miah, M.D., Muhammed N., and Koike, M. 2007. Biodiversity use through harvesting faunal resources from forests by the *Mro* tribe in the Chittagong hill tracts, Bangladesh. *International Journal of Biodiversity Science and Management* 3: 1–7, DOI: <https://doi.org/10.1080/17451590709618162>.
2. Chowdhury, M.S.H., Halim, M.A., Biswas, S., Haque, S.M.S., Muhammed, N., and Koike, M. 2007. Comparative evaluation of physical properties in soils of orange orchard and bushy forest in Chittagong hill tracts, Bangladesh. *Journal of Forestry Research* 18(3): 245–248, DOI: <https://doi.org/10.1007/s11676-007-0050-8>.
1. Chowdhury, M.S.H., Biswas, S., Halim, M.A., and Haque, S.M.S. 2007. Comparative analysis of some selected macronutrients of soil in orange orchard and degraded forests in Chittagong hill tracts, Bangladesh. *Journal of Forestry Research* 18(1): 27–30, DOI: <https://doi.org/10.1007/s11676-007-0005-0>.

#### Peer-reviewed book chapters

3. Sivarajah, S., Halim, M.A., Butt, S., Kayes, I. 2023. Encountering the Hidden Bounty of the Urban Forest: Community Foraging Practices and Policies in Canada. Accepted as a book chapter in: S. Dhayani et al. (eds.). *Urban Foraging in the Changing World*. Publisher: Springer Nature, Singapore Pte Ltd.
2. Halim, M.A., Gale, N.V., Thomas, S.C. 2022. Drivers of soil CO<sub>2</sub> and CH<sub>4</sub> fluxes in a semi-evergreen tropical forest in northeast Bangladesh. Accepted as a book chapter in: Mukul S.A. (ed.). *Forest Management in Bangladesh - Biodiversity, Carbon and Livelihood Outcomes*. Advances in Global Change Research Series. Publisher: Springer Nature, Berlin/New York.
1. Mukul, S.A., Halim, M.A., Herbohn, J. 2020. Forest carbon stock and fluxes: distribution, biogeochemical cycles, and measurement techniques. In Book: W. Leal Filho et al. (eds.), *Life on Land, Encyclopedia of the UN Sustainable Development Goals*. Publisher: Springer Nature, Switzerland AG.

#### Conference papers/posters/talks

16. Madsen S., Wu D., Hutyra L., Smith I.A., Halim M.A., Arain M.A., Staebler R.M., Wunch D. 2023. Biogenic Fluxes of Carbon Dioxide in and Around the Greater Toronto and Hamilton Area. *Poster presented at AGU23, San Francisco, CA, USA, 11–15 Dec 2023*.
15. Alim, M.A., Abdullah, M.Z., Aziz, M.S.A., Islam, M.A., Halim, M.A. 2022. [A novel LED encapsulation process for low viscous epoxy](#) (Track Name: Industrial and Production Engineering; Paper ID: 176). *Paper accepted in the 5<sup>th</sup> International Conference on Mechanical, Industrial and Materials Engineering, Rajshahi, Bangladesh, 20–22 December, 2022*.
14. Alim, M.A., Rahman, M.W., Faik, M.A., Halim, M.A. 2022. [UV-LED: a real crisis solutionist](#) (Track Name: ICMIEE2022; Paper ID: 177). *Paper accepted in 7<sup>th</sup> International Conference on Mechanical, Industrial and Energy Engineering, Khulna, Bangladesh, 22–24 December 2022*.
13. Ali, M.R., Halim, M.A., Raihan, M.F. 2022. [Estimation of tree and soil organic carbon stock and their variation along with stand parameters in Ratargul Swamp Forest Ecosystem, Bangladesh](#) (Abstract ID: 1231952). *Contributed talk accepted for Ecological Society of America, 2022 Annual Meeting, Montreal, Canada, 14–19 August 2022*.
12. Halim, M.A., Sifton, M., Liao, W., Kayes, I., Drake, J., Margolis, L., Thomas, S.C. 2022. [Biochar boosts methane consumption by green roof substrates](#). *Talk accepted for Inspired Session at Ecological Society of America,*

2022 Annual Meeting, Montreal, Canada, 14–19 August 2022.

11. Halim, M.A., Gale, N.V., Thomas, S.C. 2021. [Patterns and drivers of soil greenhouse gas fluxes from a semi-evergreen tropical forest](#). *Contributed talk at TASME (Technological Advances in Science, Medicine, and Engineering) 25<sup>th</sup> annual conference (virtual)*, 3–4 July 2021.
10. Kayes, I., Ali, M.A., Halim, M. A. 2021. [Native fruit trees are still popular among urban gardeners: A case study from a sub-tropical city](#). *Contributed talk at TASME (Technological Advances in Science, Medicine, and Engineering) 25<sup>th</sup> annual conference (virtual)*, 3–4 July 2021.
9. Halim, M.A. et al. 2020. [Greenhouse gas fluxes from green roof substrates & biochar as a mitigation tool](#). *Contributed talk (GC130 - Urban Areas and Global Change II) at the AGU Fall Meeting (Online Everywhere)*, 1–17 December 2020.
8. Hasan, M.A., Halim, M.A. 2019. [Land sparing enhances bird diversity and abundance in eastern Bangladesh](#). *Poster presented in Nepal Owl Festival, Jalapa, Khotang, Nepal*, 1–2 February 2019.
7. Halim, M.A., Thomas, S.C. 2017. [Surface albedo in relation to disturbance and early stand dynamics in the boreal forest: Implications for climate models](#). *Poster presented at The American Geophysical Union Fall Meeting, New Orleans, USA*, 11–15 December, 2017.
6. Gale, N., Halim, M.A., Thomas, S.C. 2017. [Biochar and Ecosystem Restoration: Plant Ecophysiological Responses](#). *Poster presented at The American Geophysical Union Fall Meeting, New Orleans, USA*, 11–15 December, 2017.
5. Gale, N., Halim, M.A., Thomas, S.C. 2015. [Charcoal soil amendments increase growth, physiological, and reproductive performance in early successional temperate pioneers](#). *Contributed Talk (COS 90-6), 100<sup>th</sup> meeting of Ecological Society of America, Baltimore, USA*, August 9–14, 2015.
4. Halim, M. A., Bieser, J., Thomas, S.C. 2014. [Influences of land-use change on radiative forcing in city of Toronto during 2001-2011](#). *Poster presented at The 2<sup>nd</sup> Annual Ontario Climate Consortium Symposium, London, ON, Canada*, May 14, 2014.
3. Gale, N., Halim, M. A., Thomas, S.C. 2014. [Restoring \(urban\) landscapes with pyrogenic carbon](#). *Poster presented at The 2<sup>nd</sup> Annual Ontario Climate Consortium Symposium, London, ON, Canada*, May 14, 2014.
2. Halim, M. A., Thomas, S.C. 2014. [Quantitative tools for modeling coarse woody debris dynamics](#). *Poster presented at the UseR 2014 Conference at University of California, LA, USA*, July 1–3, 2014.
1. Halim, M.A., Deb, J.C., Sarker, S.K., and Chowdhury, M.Q. 2011. [Allometric model for estimating stem biomass of Karach \(\*Pongamia pinnata\*\) in Ratargul freshwater swamp forest, Bangladesh](#). *Paper presented at the First Bangladesh Forestry Congress, Bangladesh Forest Department, Ministry of Environment and Forest, Dhaka, Bangladesh. (Proceedings: 61–62p)*.

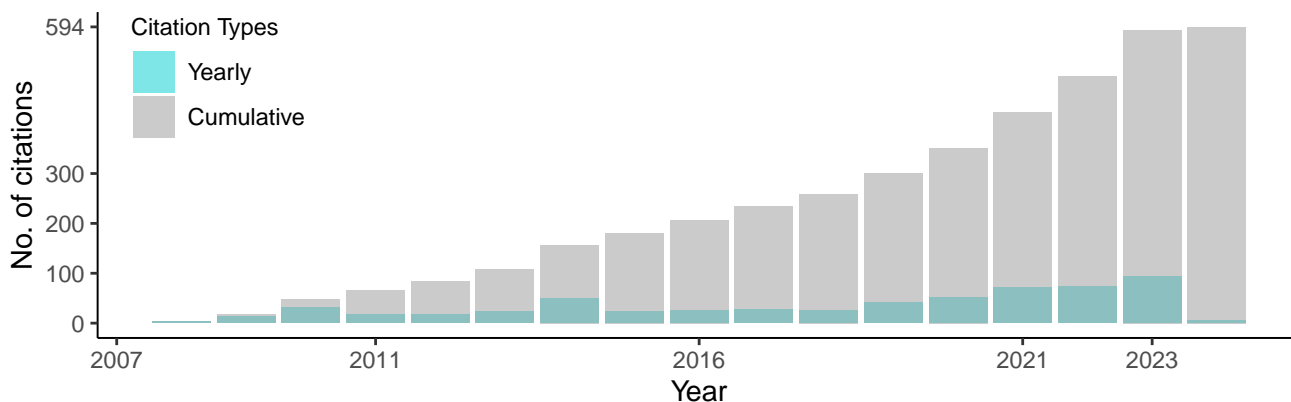
#### Articles/book chapters under preparation/review and accepted

5. Halim, M.A., Kayes, I., Shivarajah, J., Wunch, D., Thomas, S.C. 2024. [Machine Learning-Driven Analysis of Particulate Matter: Magnitude, Distribution, and Predictive Modeling in Dhaka, Bangladesh](#). *Manuscript under preparation for Atmospheric Chemistry and Physics*.
4. Halim, M.A., Liao, W., Drake, J., Liat M., Wunch, D., Thomas, S.C. 2024. [Developing a Machine Learning-Based Tool for Detection and Monitoring of Green Roofs in Toronto from Aerial Images](#). *Manuscript under preparation for the Urban Forestry & Urban Greening*.
3. Dey, B., Ador, M.A.H., Haque, M.M.U., Halim, M.A., Ahmed, R. 2024. [Strategic Insights for Sustainable Growth of Mushroom Farming Industry in Bangladesh: A Comprehensive Evaluation Using SWOT-AHP and TOPSIS Frameworks](#). *Manuscript submitted in Sustainable Cities and Society (Manuscript Number: SCSI-D-24-00884)*.

2. **Halim, M.A.**, Liao, W., Karim, K.M.R., Kayes, I., Wunch, D., Thomas, S.C. 2024. Unsupervised shadow detection for vegetated urban landscapes from RGB aerial images. *Manuscript under preparation for ISPRS Journal of Photogrammetry and Remote Sensing*.

1. **Halim, M.A.**, Faik, A.A., Liao, W., Kayes, I., Prottoy, M.W.R., Alim, M.A., Thomas, S.C. 2023. Development of an easy-to-build and low-cost solar radiation shield for air temperature and relative humidity measurements. *Manuscript under preparation for Agricultural and Forest Meteorology*.

### Number of citations



## AWARDS & GRANTS

### Canada Foundation for Innovation - John R. Evans Leaders Fund

*April 2023–Ongoing*

*Project:* Urban Forestry Climate-Adaptive Resilience Laboratory (*Value:* \$310K including 50% contributions from The Government of Quebec)

*Hosting Institute:* Laval University, Canada.

*Contribution:* Industrial partner (via CredoSense Inc.) with the principal applicant Dr. Sivajanani Sivarajah, Assistant Professor, Laval University.

### Schmidt AI in Science Fellowship

*Mar 2023–Ongoing*

*Project:* A deep-learning strategy to determine point-source emissions of methane in urban settings from satellite data (*Value:* \$170,000 for two years, with additional \$30,000 support for research)

*Institute:* [University of Toronto](#)

*Contribution:* Principal investigator

### Urban challenge grant

*May 2022–Jun 2023*

*Project:* Developing remote sensing tools for monitoring the success of Toronto's green roofs (*Value:* \$72,900, including \$28,000 from co-investigators)

*Institute:* [School of Cities, University of Toronto](#)

*Contribution:* Principal investigator

### Shahjalal University Research Centre, Bangladesh funding

*Jun 2022–Jun 2023*

*Projects:* Patterns and drivers of stem and foliage methane fluxes from an upland tropical forest in Bangladesh. (*Total Value:* \$5000)

*Contribution:* Co-principal investigator

### National Geographic Society grant

*Apr 2022–Mar 2023*

*Project:* Unlocking the potentials of Sundarbans mangrove forest as nature-based climate solution (Grant reference # NGS-78528R-22) (*Value:* \$35,989.82)

*Contribution:* Co-principal investigator

### NSERC CREATE

*2019–2025*

*Project:* Design of Living Infrastructure for Ecosystem Services (DesignLIFES) (*Value:* \$1,600,000)

*Contribution:* As a potential postdoctoral fellow with Dr. Sean Thomas (my Ph.D. supervisor), I partook in the proposal writing

- Doctoral completion award** 2017–2019  
*Purpose:* To support my Ph.D. study beyond the funding cohort (Value: \$5,500)  
*Institute:* Faculty of Forestry, University of Toronto
- Student scholarship** 2017  
*Purpose:* To attend CIF 109<sup>th</sup> Annual General Meeting and Conference in Ottawa, Canada (Value: \$1,500)  
*Institute:* Canadian Institute of Forestry
- Graduate student award** 2017  
*Purpose:* To attend the American Geophysical Union Fall Meeting 2017 (Value: \$3,600)  
*Institute:* Centre for Global Change Science, University of Toronto
- The Rufford small grants for nature conservation** 2016  
*Project:* [Tree species diversity as a driver of above ground tree carbon and soil carbon fluxes in the tropics: Implications for REDD+ in Bangladesh.](#) (Value: £6,000)  
*Contribution:* Principal investigator
- Graduate student award** 2016  
*Project:* Effects of biochar on soil greenhouse gas fluxes along a gradient of tropical forest disturbance in Bangladesh (Value: \$4,500)  
*Institute:* Centre for Global Change Science, University of Toronto  
*Contribution:* Principal investigator
- Crowd funding** 2015  
*Project:* [Combating climate change with biochar in beautiful Bangladesh](#) (Value: \$4,052)  
*Platform:* [www.experiment.com](http://www.experiment.com)  
*Contribution:* Co-principal investigator
- Jeanne F. Goulding fellowship** 2014  
*Purpose:* A merit-based fellowship as an additional support for my Ph.D. study (Value: \$5,000)  
*Institute:* University of Toronto
- Connaught international scholarship for doctoral students** 2013–2017  
*Purpose:* A prestigious scholarship to support my Ph.D. study (Value: \$35,000/year (4 years))  
*Institute:* University of Toronto
- Ontario Trillium Scholarship (OTS)** 2013  
*Purpose:* A prestigious scholarship to support my Ph.D. study (Declined) (Value: \$40,000/year for 4 years)  
*Institute:* Ontario provincial fund
- The University Grant Commission (UGC), Bangladesh funding** 2011–2013  
*Projects:* *i)* Relationship of forest canopy openness and canopy height with some selected soil chemical properties in a tropical forest of Bangladesh (in 2013). *ii)* The relationship between insect folivores and some selected properties of leaves of abundant tree species at Ratargul Freshwater Swamp Forest, Bangladesh (in 2012). *iii)* Modelling endangered plant species distribution in future climate scenarios in the Satchari national park, Bangladesh (in 2012). *iv)* Study of forest cover dynamics and consequent global warming using remotely sensed data: A case study from Ratargul swamp forest, Bangladesh (2011) (Total Value: \$7,500)  
*Contribution:* Co-principal investigator

## TEACHING EXPERIENCE

- Dept. of Forestry & Environmental Science, Shahjalal University of Science & Technology, Bangladesh**  
*Assistant/Associate Professor* 2021–2023  
*Description* — I partially designed and developed course materials for *Forest Mensuration and Inventory* course and co-taught it to a class of 60 students (4<sup>th</sup> year 1<sup>st</sup> semester) in a hybrid setting to offer flexible learning environment.
- Graduate Department of Forestry, University of Toronto, Canada**  
*Sessional Lecturer (Conservation of Tropical & Subtropical Forests)* Winter 2020



*Description* — This comprehensive undergraduate course caters to multidisciplinary students (~200 in class size). I partially designed the syllabus and learning materials using the Universal Design for Learning (UDL) framework. I have taught the course in-person and online (due to COVID-19), using various active learning techniques. Additionally, I led a team of five TAs who assisted with tutorials and grading assignments and examinations.

**Faculty of Forestry, University of Toronto, Canada**

*Teaching Assistant* (*Conservation of Tropical & Subtropical Forests*) (*Undergraduate course*) 2016–2019

*Teaching Assistant* (*Applied Forest Ecology*) (*Graduate course*) 2014–2019

*Description* — The Faculty of Forestry at the University of Toronto offers these two essential ecology courses, which encompass diverse ecological, conservation, and management aspects of tropical, temperate, and boreal forests. In my role as a TA, my primary responsibilities included conducting labs, leading tutorials, and guiding field trips.

**Dept. of Forestry & Environmental Science, Shahjalal University of Science & Technology, Bangladesh**

*Lecturer/Assistant professor* 2009–2013

*Description* — Due to outstanding academic and publication records, I was offered a faculty position without a Ph.D. During my tenure at this university, I designed and developed three courses: *Remote Sensing and GIS*, *Forests and Climate Change*, and *Tropical Forest Ecology*. The average class size for these courses was ~40 students. During this period, one of the crucial pedagogical challenges I addressed was maintaining high-quality education while minimizing the financial burden on both the university and students.

## EDUCATIONAL LEADERSHIP & CURRICULUM DESIGN

### Centre for Teaching Support & Innovation (CTSI), University of Toronto, Canada

*Teaching fellow and trainer* 2018–2020

*Description* — During my time with the Centre for Teaching Support & Innovation for the Teaching Assistants' Training Program (TATP), I have received comprehensive pedagogical training while supporting science TAs across three campuses. As part of the science training team, I have designed training sessions and created resources for TAs, conducted on-site TA training sessions for departments, led micro-teaching workshops and sessions. I have assessed several teaching dossiers and in-class observations for the TATP professional development certificate programs. I have also developed and facilitated workshops on open educational resources and effective science communication strategies.

### Professional development

*Teaching in Higher Education* 2016

*Description* — Completed the semester-long [Teaching in Higher Education \(THE500H\)](#) course and earned certification from the University of Toronto, Canada.

*Open Educational Resources (OER)* 2018–2020

*Description* — With a passion for OER, I possess the skills to develop resources that not only reduce educational costs but also encourage “student-centered” learning. At the CTSI, I led two OER-focused workshops.

*EdTech (Educational Technology)* 2018–2020

*Description* — Possessing a strong pedagogical foundation and experience in employing EdTech for fostering collaboration and cooperation in higher education, I designed and conducted two workshops on OER at the CTSI, University of Toronto.

*Virtual Teaching and Learning Studio* 2020

*Description* — In order to adapt my teaching for future scenarios like the COVID-19 pandemic, I am enthusiastic about embracing technology-driven, personalized learning that emphasizes cognitive abilities

and genuine learning experiences. To refine these skills, I attended a month-long online workshop in July 2020 titled “Retooling your classroom: active and evidence-based teaching for conservation educators,” provided by the Network of Conservation Educators & Practitioners, American Museum of Natural History in New York, USA.

### ***Pedagogical Workshops***

**2013–2017**

*Description*– I attended several workshops to hone my pedagogical skills offered by the TATP, University of Toronto, including *Finding your teaching style*, *Equity, power and diversity in the classroom*, *Politicizing sciences: Addressing socio-scientific issues in university classes*, *Teaching with online tools: Strategies and best practices*, *Creative pedagogical uses of media*, *Supporting students in distress*, *Active learning*, and *Effective grading and feedback*.

## **INVITED TALK**

***Invited talk for Daniels Faculty Research Pecha Kucha Event “Intelligences”*** **29 Sep 2023**

*Location:* DA200 (1 Spadina Building ), University of Toronto

*Topic:* A Deep-learning Strategy to Determine Point-source Emissions of CH<sub>4</sub> in Urban Settings from Satellite Data.

***Guest lecture for indoor plant enthusiasts*** **21 Mar 2023**

*Location:* Student Family Housing, University of Toronto (Online)

*Topic:* Grow your own seedlings indoor.

***Guest lecture for OMNRF Monthly Science Talk*** **28 Nov 2022**

*Location:* Ontario Ministry of Natural Resources and Forestry (Online)

*Topic:* Forest disturbances and climate feedbacks in a mixedwood boreal Forest

***Tri-campus TA Day, University of Toronto*** **28 Aug 2019**

*Location:* Bahen Centre for Information Technology, University of Toronto

*Topic:* Your teaching persona as an international TA.

***Guest lecture in Forests and Global Processes (M.Sc. course)*** **30 Sep 2016**

*Location:* ES 4001, Faculty of Forestry, University of Toronto.

*Topic:* Impacts of fire and logging on biogeophysical and biogeochemical cycles in relation to global warming.

## **STUDENT SUPERVISION**

### **Mentoring PhD projects:**

33) Rezaul Karim. 2022–ongoing. *Methane and nitrous oxide dynamics in tropical and temperate urban tree foliage*. University of Toronto.

32) Imrul Kayes. 2021–ongoing. *Methane emission and mitigation in urban environments*. University of Toronto.

31) Wenxi Liao. 2020–ongoing. *Green roof and biochar: towards sustainable cities*. University of Toronto.

### **Graduate Projects:**

30) Farhana Bintay Hye. 2019. *Can biochar increase crop performance in arsenic-contaminated tropical soils?* Shahjalal University of Science & Technology (SUST), Bangladesh. (co-supervised as an external graduate faculty).

29) Nabila Hasan. 2013. *Spatial distribution of plant species richness in a national park of Bangladesh*. SUST, Bangladesh.

28) Farzana Akhter. 2013. *Relationship between forest canopy openness and canopy height with some selected soil chemical properties in a tropical forest of Bangladesh*. SUST, Bangladesh.

27) Shukla Sinha. 2013. *Tree-habitat association in a tropical forest of Bangladesh*. SUST, Bangladesh.

- 26) Debashish Roy. 2011. *Relationship between canopy openness and tree species diversity of an old-growth patch at Lawachara national park, Bangladesh*. SUST, Bangladesh.
- 25) Md Arif Ferdous. 2011. *Quantification of vertical strata and structural dominance in Rema-Kalenga Wildlife Sanctuary*. SUST, Bangladesh.
- 24) Tutul Saha. 2011. *Relationship of undergrowth coverage with available understory light condition measured with hemispherical photographs in Lawachara national park*. SUST, Bangladesh.
- 23) Fokruddin Ali Ahmed. 2010. *Determining economically sustainable landuse practice in high Barind Tract: A case study from Porsha upazila*. SUST, Bangladesh.
- 22) Asad Ali. 2010. *Quantitative structure of urban homegardens in Sylhet City Corporation*. SUST, Bangladesh.
- 21) Emran Hossain. 2010. *Arsenic contamination in drinking water and impact on human health: A case from southeastern Bangladesh*. SUST, Bangladesh.
- 20) Suma Dutta. 2010. *Assessment of naturalness in Khadim Nagar national park*. SUST, Bangladesh.

#### **Undergraduate Projects:**

- 19) Akib Hasan. 2019. *Land sparing enhances bird diversity and abundance in eastern Bangladesh*. Shahjalal University of Science & Technology (SUST), Bangladesh. (co-supervised as an external graduate faculty).
- 18) Md. Rezaul Karim. 2019. *Biochar enhances soil fertility in degraded managed systems in northeastern Bangladesh: short-term effects on physicochemical properties*. SUST, Bangladesh. (co-supervised as an external graduate faculty).
- 17) Shonchita Biswas. 2019. *The effects of biochar of Acacia auriculiformis on seed germination and early growth performance of five agricultural crops*. SUST, Bangladesh. (co-supervised as an external graduate faculty).
- 16) Syed Tuhin Ali. 2017. *Growth responses of tropical leguminous and non-leguminous tree species to biochar additions in a nursery trial*. SUST, Bangladesh. (co-supervised as an external graduate faculty).
- 15) S. M. Lovely Akther. 2013. *Modelling spatial distribution of plant species richness in a biodiversity hotspot of Bangladesh*. SUST, Bangladesh.
- 14) Md Haque. 2013. *Modelling the distribution of threatened plant species in the northeastern region of Bangladesh*. SUST, Bangladesh.
- 13) Golam Mustafa Chowdhury. 2013. *Influence of canopy gap and height on the abundance and richness of plant species in old-growth and plantation forests of Lawachara national park, Bangladesh*. SUST, Bangladesh.
- 12) Murshida Jahan. 2013. *Plant species-area relationship of Lawachara national park, Bangladesh*. Shahjalal University of Science & Technology, Bangladesh.
- 11) Sanjib Chowdhury. 2013. *Distribution of DBH and height of three dominant tree species in plantation and old-growth forests of Lawachara national park, Bangladesh*. SUST, Bangladesh.
- 10) Nabila Hasan. 2012. *Status and performance of soil seed bank of Tectona grandis at Khadim Nagar national park, Bangladesh*. SUST, Bangladesh.
- 9) Merina Akhter. 2012. *Status and performance of soil seed bank of Xylia Dolabriformis at Khadim Nagar national park*. SUST, Bangladesh.
- 8) Farzana Akhter. 2012. *Status and performance of soil seed bank of Dipterocarpus turbinatus at Khadim Nagar national park*. SUST, Bangladesh.
- 7) Shukla Sinha. 2012. *Ethno-medicinal Knowledge of the Manipuri (Bishnupriya) Community in the Sylhet region of Bangladesh*. SUST, Bangladesh.

- 6) Ami Akhtar. 2011. *Measuring public perception on global warming: a willingness-to-pay (WTP) approach from the bus passengers' of northeastern Bangladesh*. SUST, Bangladesh.
- 5) Md Kamrul Islam. 2011. *Deadwood in relation to national park management of Bangladesh*. SUST, Bangladesh.
- 4) Farzana Ferdous. 2011. *Likelihood of using different parameters of living trees as the indicators of naturalness at Khadimnagar national park, Bangladesh*. SUST, Bangladesh.
- 3) Mahedi Hassan. 2011. *Microhabitat in relation to national park management in Bangladesh*. SUST, Bangladesh.
- 2) Rubel Hasan. 2011. *Estimation of some canopy structural parameters and light-environment using hemispherical photographs in a natural forest of Bangladesh*. SUST, Bangladesh.
- 1) Salman Habib. 2011. *Relationship between insect folivores and some selected physical and chemical properties of leaves of some selected tree species at Ratargul freshwater swamp forest, Bangladesh*. SUST, Bangladesh.

## ACADEMIC & ADMINISTRATIVE SERVICES

### Peer reviewer for journals

Nature Climate Change	Ann. For. Sci.	Ecology and Evolution	J. of Forestry Research
Int. Forestry Review	J. of Tropical Forest Science	Tree Physiology	J. Appl. Ecol.
Agronomy	Ecologies	Sustainability	PeerJ

### Peer reviewer for grants

*Reviewer Geosciences*. (2024). Natural Sciences and Engineering Research Council of Canada (NSERC) Discovery Grant proposal.

### Journal editor

*Guest editor* **Mar 2023–Sep 2023**  
 A Special Issue on *Biochar and Ecosystem Function: Applications in Agroforestry, Urban, and Peri-Urban Soils* in the *Agronomy* journal.

### CUPE 3902 Unit 5 departmental steward **Nov 2021–Dec 2022**

*Description* — An elected position at the CUPE 3902 Unit 5 (Postdoc) as a Departmental Steward for the Daniels Faculty of Architecture, Landscape & Design, University of Toronto, Canada.

### Research-stream student & alumni representative **Sep 2018–Aug 2019**

*Description* — An elected position in the Forestry Graduate Students' Association (FGSA) at the Faculty of Forestry, University of Toronto, Canada.

### Assistant hall provost **Jan 2010–Jun 2012**

*Description* — As a part of administrative duty I managed students' ( $n = 750$ ) residence at the Shahjalal University of Science & Technology, Bangladesh.

### Curriculum design and thesis evaluation committee member **Jan 2011–Aug 2013**

*Description* — I served on the curriculum design and thesis evaluation committees at the Shahjalal University of Science & Technology, Bangladesh.

### Executive member **Jan 2003–Jan 2005**

*Description* — A selected position at the Shahjalal University Professional Photographers' Association (SUPA), Bangladesh.

## Professional memberships

<i>American Geophysical Union</i>	<i>2017–Present</i>
<i>European Geophysical Union</i>	<i>2024–present</i>
<i>Ecological Society of America</i>	<i>2022–Present</i>
<i>Ontario Professional Foresters' Association (OPFA)</i>	<i>2014–Present</i>
<i>Bangladesh Professional Forestry Students' Association (BPFSA)</i>	<i>2001–Present</i>

## Chief executive officer (CEO)

*Jan 2020–Present*

*Description* — Co-founder and CEO of [CredoSense Inc.](#) — a startup company with a philosophy to manufacture affordable environmental monitoring systems. CredoSense is specialized in designing cutting-edge sensor-logger systems for monitoring an array of environmental conditions.

## MEDIA COVERAGE OF TEACHING & RESEARCH

<i>The role of compassion and understanding in online teaching during the COVID-19 pandemic.</i> <i>Published as an "experience" in the University of Toronto's ReTHINK magazine</i>	<i>2020</i>
<i>Crowd-funded research work on biochar profiled on UofT News</i>	<i>2016</i>
<i>My Ph.D. research as a Connaught Fellow featured on the Edge Magazine, University of Toronto</i>	<i>2014</i>

## REFERENCES

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