ARJUN CHAKRAWAL

Department of Physical Geography
Stockholm University, Sweden
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Education

2017–present: **Ph.D., Water, Permafrost and Environmental systems unit**,
Department of Physical Geography, Stockholm.

2016–2017: **Groundwater and Global Change - Impacts and Adaptation (GroundwatCH)**,
Joint Masters Programme: Instituto Superior Tecnico, Lisbon, Portugal (Sept 2016–Jan 2017); UNESCO-IHE Institute for Water Education, Delft, Netherlands (Feb 2016–July 2017).

2015–2016 : **Master of Science (Major: Earth and Environmental Science)**,
Indian Institute of Science , Bangalore.

2011–2015 : **Bachelor of Science (Major: Earth and Environmental Science)**,
Indian Institute of Science , Bangalore.

Research Experience

Department of Physical Geography, Stockholm

September 2017–present ***Ph.D. thesis: Novel approaches in modeling of soil carbon cycling–Upscaling theories and energetics***.

Advisor : **Dr. Stefano Manzoni**, *Associate Professor, Department of Physical Geography, Stockholm University* (*Homepage*)

March 2018 ***Modeling of chemotactic behavior of microbes in soil carbon cycling processes***.
Developed a Matlab based code for four pool microbial explicit soil C cycle model and used it to study chemotaxis in 1D

Advisor : **Dr. Stefano Manzoni**

Indian Institute of Science, Bangalore

August 2015–July 2016 ***Master thesis: Modeling of nitrous oxide emissions from a maize cropland using***.
Calibrated Ceres crop model for soil moisture and temperature to study N_2O emissions from agricultural soil

Advisor : **Dr. Sekhar Muddu**, *Professor, Department of Civil Engineering*, IISc (*Homepage*)

January 2015–May 2016 ***Bachelor thesis: Two-phase flow modeling in unsaturated porous media***.
Developed of a two phase (air-water) flow model using COMSOL Multiphysics to study air flux from the top of soil profile

Advisor : **Dr. Sekhar Muddu**

Indian Institute of Technology, Madras

Summer 2015 ***Estimation of permeability field from the observed water table variation during fluid injection***.

Advisor : **Dr. Abhijit Chaudhuri**, *Associate Professor, Department of Applied Mechanics*, IIT-Madras (*Homepage*)

Peer Reviewed Articles

Colombi, T., **Chakrawal, Arjun**, & Herrmann, A. M. (2021). Carbon supply–consumption balance in plant roots: Effects of carbon use efficiency and root anatomical plasticity. *New Phytologist*. https://doi.org/10.1111/nph.17598

Manzoni, S., **Chakrawal, Arjun**, Spohn, M., & Lindahl, B. D. (2021). Modeling Microbial Adaptations to Nutrient Limitation During Litter Decomposition. *Front. For. Glob. Change*, *4*. https://doi.org/10.3389/ffgc.2021.686945

Shi, A., **Chakrawal, Arjun**, Manzoni, S., Fischer, B. M. C., Nunan, N., & Herrmann, A. M. (2021). Substrate spatial heterogeneity reduces soil microbial activity. *Soil Biology and Biochemistry*, *152*, 108068. https://doi.org/10.1016/j.soilbio.2020.108068

Chakrawal, Arjun, Herrmann, A. M., & Manzoni, S. (2021). Leveraging energy flows to quantify microbial traits in soils. *Soil Biology and Biochemistry*, *155*, 108169. https://doi.org/10.1016/j.soilbio.2021.108169

Manzoni, S., **Chakrawal, Arjun**, Fischer, T., Schimel, J. P., Porporato, A., & Vico, G. (2020). Rainfall intensification increases the contribution of rewetting pulses to soil heterotrophic respiration. *Biogeosciences*, *17*(15), 4007–4023. https://doi.org/10.5194/bg-17-4007-2020

Chakrawal, Arjun, Herrmann, A. M., Koestel, J., Jarsjö, J., Nunan, N., Kätterer, T., & Manzoni, S. (2020a). Dynamic upscaling of decomposition kinetics for carbon cycling models. *Geoscientific Model Development*, *13*(3), 1399–1429. https://doi.org/10.5194/gmd-13-1399-2020

Chakrawal, Arjun, Herrmann, A. M., Šantrčková, H., & Manzoni, S. (2020b). Quantifying microbial metabolism in soils using calorespirometry—a bioenergetics perspective. *Soil Biology and Biochemistry*, *148*, 107945. https://doi.org/10.1016/j.soilbio.2020.107945

Chaudhuri, A., **Chakrawal, A**., Naigaonkar, P., Franssen, H.-J. H., & Sekhar, M. (2018). Estimation of permeability field from sparse measurements of local permeability and water table fluctuations [Num Pages: 10]. *Deep Rock Mechanics: From Research to Engineering*. CRC Press.

Conferences and other presentations

2021 **Arjun Chakrawal, Salvatore Calabrese and Stefano Manzoni**, Coupled thermodynamic and stoichiometric controls on microbial growth , AGU Fall Meeting 2021.

2021 **Chakrawal, A., Herrmann, A. M., & Manzoni, S.**, Can we use heat flows to quantify microbialtraits in soils?, EGU General Assembly Conference Abstracts, EGU21–4191 (Poster).

2020 **Chakrawal, A., Herrmann, A. M., & Manzoni, S.**, Leveraging energy flows to quantify functional traits of soil microorganisms, Ph.D. Day, Climate Research School, Bolin Centre for Climate Research.

2020 **Chakrawal, A., Herrmann, A. M., & Manzoni, S.**, New insights on carbon use efficiency using calorespirometry-a bioenergetics-based model, EGU General Assembly Conference Abstracts, EGU 5450 (Poster).

2019 **Chakrawal, A., Herrmann, A. M., Jarsjö, J., Koestel, J., Nunan, N., Kätterer, T.,& Manzoni,S.**, How does soil spatial heterogeneity affect decomposition kinetics?, EGU General Assembly Conference Abstracts, EGU21 (Poster).

2018 **Chakrawal, A., Herrmann, A. M., Koestel, J., Jarsjö, J., Lindahl, B., & Manzoni, S.**, How does spatial heterogeneity affect microbial decomposition dynamics?, 3^{rd} Conference on Ecology of Soil Microorganisms.

Fellowships & Awards

2019 The Bolin Centre for Climate Research travel grant for attending the conference Ecology of Soil Microorganisms, Helsinki, Finland

2016–2017 Recipient of **Erasmus Mundus** fellowship for GroundwatCH program.

2015 Received 20K INR from IISc for an internship at IIT-Madras.

2011–2016 Recipient of **INSPIRE** fellowship, *Department of Sci. & Technology (DST), India.*

Academic Achievements & Recognitions

2020 ***"Quantifying microbial metabolism in soils using calorespirometry—A bioenergetics perspective"*** selected as the Editor's choice paper in Soil Biology and Biochemistry journal

2019 Recipient of Outstanding Student Poster and PICO (OSPP) Award contest at the EGU General Assembly

Computer skills

Coding Python, Matlab, R

Writing Office, Texstudio/Overleaf

Graphics PowerPoint, Inkscape

Web Github, Github pages (*Personal webpage*), Plotly-Dash

Teaching Assistantship

Master level, Department of Physical Geography, Stockholm

Autumn (2018-2021) **Information and modeling-systems for land and water resources**.
Responsibilities included: Development of introductory Matlab and python exercises, tutorials, and teaching python using open source software Spyder (both in person and online)

Spring (2019-2021) **Advanced Hydrogeology**.
Responsibilities included: Development of groundwater flow and transport modeling exercises, tutorials and project, and teaching groundwater modeling using open source software ModelMuse-USGS (both in person and online)

Summer (2020-2021) **Tellus I**.
It is a virtual course which mainly involves correcting student's assignment and exams

Professional Membership

2021 **American Geophysical Union**.

2019–present **European Geophysical Union**.

2020–present **The International Soil Modeling Consortium**.