Da Huo

Curriculum Vitae

Contact Information

Website dh107.github.io
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Research and Teaching Interests

Current Research Fossil fuel CO_2 Emission Monitoring, Decarbonization Pathways, Low Carbon Cities
Previous Research Geophysics, Climate-Glacier Modeling, Geospatial Data Science, GIS, Remote Sensing

Education

Ph.D. in Geography, *Texas A&M University* — Aug. 2020
M.S. in Geoscience, *Rice University* — May 2015
B.S. in Geophysics, *Tongji University* — Jul. 2012

Experience

Rising Stars in Clean Energy Post-doctoral Fellow — **Aug. 2022 — Present**
University of Toronto — *Toronto, ON*

- Modeling electric and hydrogen fuel cell pathways for light-duty vehicles, to meet climate targets using life cycle assessment.

Post-doctoral Fellow / AI Applications in Low-Carbon Mining — **Jul. 2021 — Aug. 2022**
Queen's University — *Kingston, ON*

- Developed OpenPit-AI: an AI-powered fleet management system for emission reduction in mining operations.
- Studied low carbon transitions of cities in China.

Shuimu Scholar, Project Leader / Carbon Monitor Cities (cities.carbonmonitor.org) — **Jun. 2021 — Present**
Tsinghua University — *Beijing, China*

- Developed Carbon Monitor Cities, the first near-real-time daily CO2 emission dataset for 1500 cities worldwide.
- Led a city-level carbon neutrality project in collaboration with Alibaba Cloud.

Research and Teaching Assistant — **Sep. 2016 — Aug. 2020**
Texas A&M University GEOSAT Center (advisor: Dr. Michael Bishop) — *College Station, TX*

- Developed data processing software to support geospatial applications and climate-glacier simulation models.
- Funded by the Department of Energy of United States.
- Taught lab sections of remote sensing and geographic information system (GIS) courses.

Geoscientist — **Aug. 2015 — May 2016**
Shaanxi Geology and Mining Group — *Shaanxi, China*

- Developed geophysical data processing workflows and drafted project proposals.

Geoscientist (Intern) — **May 2014 — Nov. 2014**
Halliburton/Landmark Graphics Corp — *Houston, TX*

- Developed software workflows for DecisionSpace Geosciences and DecisionSpace Well Seismic Fusion.

Research Assistant — **Jun. 2012 — Jun. 2013**
Tongji University — *Shanghai, China*

- Investigated Earth ambient noise using statistical and spatial analysis.
- Published research paper on academic journal.

Awards

Shuimu Scholarship — 2021
Baker Hughes Scholarship — 2013
Tongji Scholarship for Outstanding Social Works — 2012
Certificates: Machine learning (Stanford University), Deep Learning for Computer Vision (Nvidia) — 2015/2020

Teaching

- GEOG 475: Advanced GIS (lab sections) — Jan.2020–May.2020
- GEOG 477/677: Terrain Analysis Mapping (lab sections) — Aug.2019–Dec.2019
- GEOG 391: Geodatabases (lab sections) — Aug.2019–Dec.2019

Da Huo

Curriculum Vitae

Grants and Students Advised

City-Level Carbon Neutrality Pathway Modeling **2021**
- Funded by Alibaba Group
- Student advised: Xiaoting Huang (Tsinghua University), Yun Li (KU Leuven)

Carbon Monitor Cities **2021**
- In collaboration with City Climate Intelligence, Nexqt France, and CDP Worldwide
- Student advised: Xiaoting Huang (Tsinghua University), Yun Li (KU Leuven)

Journal Reviewer

- Journal of Geophysical Research: Earth Surface 2022
- Transactions in GIS 2020
- Stochastic Environmental Research and Risk Assessment (SERRA) 2020

Professional Memberships

- American Geophysical Union (AGU)
- American Association of Geographers (AAG)
- Geological Society of America (GSA)
- Society for Mining Metallurgy and Exploration (SME)

Professional References

Dr. Zhu Liu **Tsinghua University**
- Associate Professor
- Email: zhuliu@tsinghua.edu.cn

Dr. Qian Zhang **Queen's University**
- Assistant Professor
- Email: qian.zhang@queensu.ca

Dr. Philippe Ciais **LSCE**
- Professor
- Email: philippe.ciais@lsce.ipsl.fr

Da Huo

Curriculum Vitae

Publications

- 0. **Huo, D.**, Huang, X., Dou, X., Ciais, P., ... & Liu, Z. (2022). Carbon Monitor Cities Near-Real-Time Daily Estimates of CO2 Emissions from 1500 Cities Worldwide. *Scientific Data*, 9, 533. https://doi.org/10.1038/s41597-022-01657-z
- 1. **Huo, D.**, Liu, K., Liu, J., Huang, Y., ... & Liu, Z. (2022). Near-Real-Time Daily Estimates of Fossil Fuel CO2 Emissions from Major High-Emission Cities in China. *Scientific Data*, (under review).
- 2. **Huo, D.**, Sari, Y. A., Zhang, Q., & Kealey, R. (2022). Reinforcement Learning-Based Fleet Dispatching for Greenhouse Gas Emission Reduction in Open-Pit Mining Operations. *Resources, Conservation & Recycling*, (under review).
- 3. **Huo, D.**, Zhang, Q., Dong, Y., Kennedy, C., & Zhang, C. (2022). Charging Towards Decarbonized Electrification: Revisiting Beijing's Power System. *Sustainable Cities and Society*, (under review).
- 4. Dou, X., Wang, Y., Ciais, P., Chevallier, F., Davis, S. J.,... **Huo, D.**, ... & Liu, Z. (2022). Near-Real-Time Global Gridded Daily CO2 Emissions. *The Innovation*, 3(1), 100182. https://doi.org/10.1016/j.xinn.2021.100182
- 5. Liu, Z., Sun, T., Yu, Y., Ke, P., Deng, Z., Lu, C., **Huo, D.**, & Ding, X. (2022). Real-Time Carbon Emission Accounting Technology Towards Carbon Neutrality. *Engineering*. https://doi.org/10.1016/j.eng.2021.12.019..
- 6. **Huo, D.**, Kealey, R., Sari, Y. A., & Zhang, Q. (2021). Greenhouse Gas (GHG) Reduction Potential in the Mineral Industry through Smart Fleet Management. *Proceedings of the SME Annual Conference*
- 7. **Huo, D.**, & Bishop, M. P. (2021). Modeling Supraglacial Ponding and Drainage Dynamics: Responses to Glacier Surface Topography and Debris Flux Conditions. *Earth Surf. Dynam. Discuss.*, 2021, 1-26. https://doi.org/10.5194/esurf-2021-53
- 8. **Huo, D.**, Bishop, M. P., & Bush, A. B. G. (2021). Understanding Complex Debris-Covered Glaciers: Concepts, Issues, and Research Directions. *Frontiers in Earth Science*, 9. https://doi.org/10.3389/feart.2021.652279
- 9. **Huo, D.**, Bishop, M. P., Young, B., & Chi, Z. (2021). Modeling the feedbacks between surface ablation and morphological variations on debris-covered Baltoro Glacier in the central Karakoram. *Geomorphology*, 389, 107840. https://doi.org/10.1016/j.geomorph.2021.107840
- 10. **Huo, D.**, Chi, Z., & Ma, A. (2021). Modeling Surface Processes on Debris-Covered Glaciers: A Review with Reference to the High Mountain Asia. *Water*, 13(1), 101. https://www.mdpi.com/2073-4441/13/1/101
- 11. Ma, A., Filippi, A. M., Wang, Z., Yin, Z., **Huo, D.**, Li, X., & Güneralp, B. (2021). Fast Sequential Feature Extraction for Recurrent Neural Network-Based Hyperspectral Image Classification. *IEEE Transactions on Geoscience and Remote Sensing*, 59(7), 5920-5937. https://doi.org/10.1109/TGRS.2020.3018449
- 12. Bishop, M. P., Young, B. W., **Huo, D.**, & Chi, Z. (2020). Spatial Analysis and Modeling in Geomorphology. *Treatise on Geomorphology*, Second Edition. In Reference Module in Earth Systems and Environmental Sciences. Elsevier. https://doi.org/10.1016/B978-0-12-409548-9.12429-7
- 13. Bush, A. B. G., Bishop, M. P., **Huo, D.**, Chi, Z., & Tiwari, U. (2020). Issues in Climate Analysis and Modeling for Understanding Mountain Erosion Dynamics. *Treatise on Geomorphology*, Second Edition. In Reference Module in Earth Systems and Environmental Sciences. Elsevier. https://doi.org/10.1016/B978-0-12-818234-5.00022-5
- 14. **Huo, D.**, Bishop, M. P., Young, B. W., Chi, Z., & Haritashya, U. K. (2020). Numerical Modeling Issues for Understanding Complex Debris-Covered Glaciers. *Treatise on Geomorphology*, Second Edition. In Reference Module in Earth Systems and Environmental Sciences. Elsevier. https://doi.org/10.1016/B978-0-12-818234-5.00019-5
- 15. Li, X., **Huo, D.**, Goldberg, D. W., Chu, T., Yin, Z., & Hammond, T. (2019). Embracing Crowdsensing: An Enhanced Mobile Sensing Solution for Road Anomaly Detection. *ISPRS International Journal of Geo-Information*, 8(9), 412. https://www.mdpi.com/2220-9964/8/9/412
- 16. Bishop, M. P., Young, B. W., & **Huo, D.** (2018). Geomorphometry: Quantitative Land-Surface Analysis and Modeling. In *Reference Module in Earth Systems and Environmental Sciences*. Elsevier. https://doi.org/10.1016/B978-0-12-409548-9.11469-1
- 17. Bishop, M. P., Bagavathiannan, M. V., Cope, D. A., **Huo, D.**, Murray, S. C., Olsenholler, J. A., Rooney, W. L., Thomasson, J. A., Valasek, J., Young, B. W., Filippi, A. M., Hays, D. B., Malambo, L., Popescu, S., Rajan, N., Singh, V., McCutchen, B., Avant, B., & Vidrine, M. (2018). "High-resolution UAS imagery in agricultural research: Concepts, issues, and research directions", *High Resolution Remote Sensing: Data, Analysis, and Applications*, pp. 3-32. CRC Press.
- 18. **Huo, D.**, Bishop, M. P., & Young, B. W., (2018). Geomorphometric Assessment of Glacier State in the Karakoram, Himalaya. *Proceedings of the 2018 Geomorphometry Conference*.
- 19. Xiao, H., Xue, M., Yang, T., Liu, C., Hua, Q., Xia, S., Huang, H., Le, B. M., Yu, Y., **Huo, D.**, Pan, M., Li, L., & Gao, J. (2018). The Characteristics of Microseisms in South China Sea: Results From a Combined Data Set of OBSs, Broadband Land Seismic Stations, and a Global Wave Height Model. *Journal of Geophysical Research: Solid Earth*, 123(5), 3923-3942. https://doi.org/10.1029/2017JB015291
- 20. Liu, C., Hua, Q., Pei, Y., Yang, T., Xia, S., Xue, M., Le, B. M., **Huo, D.**, Liu, F., & Huang, H. (2014). Passive-source ocean bottom seismograph (OBS) array experiment in South China Sea and data quality analyses. *Chinese Science Bulletin*, 59(33), 4524-4535. https://doi.org/10.1007/s11434-014-0369-4
- 21. **Huo, D.**, & Yang, T. (2013). Seismic ambient noise around the South China Sea: seasonal and spatial variations, and implications for its climate and surface circulation. *Marine Geophysical Research*, 34(3), 449-459. https://doi.org/10.1007/s11001-013-9176-6

Da Huo

Curriculum Vitae

Conference Presentations

- **Huo, D.**, Benkhelifa, F., &Liu, Z. (2022). Near-Real-Time Estimates of Daily Fossil-Fuel CO2 Emissions from Cities Worldwide. Metrology for Climate Action Workshop 2022, 26-30, September, 2022, Online.
- **Huo, D.**, Sari, Y., Zhang, Q., Kealey, R., & Tokac, B. (2022). Greenhouse Gas Emission Reduction for Mining Fleets via Smart Dispatching Based on Deep Reinforcement Learning. 2022 Annual Convention of the Canadian Institute of Mining, Metallurgy and Petroleum (CIM), 1-4, May, 2022, Vancouver, BC, Canada.
- **Huo, D.**, Bishop, M. P., Young, B. W., & Chi, Z. (2019). Understanding Climate-Glacier Dynamics in the Karakoram Himalaya using Debris-Flux and Ablation Modeling. American Geophysical Union Fall Meeting, 9-13, December, 2019, San Francisco, California.
- Young, B., Bishop, M. P., **Huo, D.**, & Chi, Z. (2019). Geomorphometric Characterization of Topographic Structure for Evaluation of Glaciers in the Central Karakoram Himalaya. American Geophysical Union Fall Meeting, 9-13, December, 2019, San Francisco, California.
- Singh, V., Martin, D., Chi, Z., **Huo, D.**, Latheef, M., Sapkota, B., ... & Bagavathiannan, M. (2019). Effectiveness of Weed Classification and Spray Application Using an Unmanned Aerial System. ASA, CSSA and SSSA International Annual Meetings.
- **Huo, D.**, Bishop, M. P., Delgado, A., Dobreva, D., Hays, D., Wang, X., & Teare, B. (2018). Evaluation of a 2 GHz Prototype Ground Penetrating Radar System for Estimating Cassava Root Biomass. American Geophysical Union Fall Meeting, 10-14, December, 2018, Washington, D.C.
- Bishop, M. P., Hays, D., Wolfe, M., **Huo, D.**, Delgado, A., Dobreva, D., & Wang, X. (2018). Assessment of Sorghum Perennial Grass Root Biomass Using a Prototype 1.9 GHz Ground Penetrating Radar. American Geophysical Union Fall Meeting, 10-14, December, 2018, Washington, D.C.
- Young, B., Bishop, M. P., & **Huo, D.** (2018). Utilizing topographic structure for characterizing and understanding process-form relationships of mountain geodynamics in the central Karakoram Himalaya. American Geophysical Union Fall Meeting, 10-14, December, 2018, Washington, D.C.
- **Huo, D.**, Bishop, M. P., & Young, B. (2018) Modeling Glacier Surface Ablation Dynamics for Investigating Debris-Covered Glacier Sensitivity to Climate Change in the Karakoram Himalaya. Geological Society of America Annual Meeting, 4-7 November, 2018, Indianapolis, Indiana.
- Bishop, M. P., Young, B. W., & **Huo, D.** (2018). Characterization and Utilization of Topographic Anisotropy and Geomorphometric Signatures for Investigating Mountain Geodynamics in the Karakoram Himalaya. Geological Society of America Annual Meeting, 4-7 November, 2018, Indianapolis, Indiana.
- Young, B. W., Bishop, M. P., & **Huo, D.** (2018). Geomorphometric Analysis for Characterization and Mapping of Crustal Deformation in The Karakoram Himalaya. Geological Society of America Annual Meeting, 4-7 November, 2018, Indianapolis, Indiana.
- Teare, B. L., Delgado, A., Hays, D. B., Dobreva, I., & **Huo, D.** (2018). Ground Penetrating Radar for Root Crop Phentotyping. ASA, CSSA, and CSA International Annual Meeting.
- Wolfe, M., Dobreva, I. D., Delgado, A., Hays, D. B., Bishop, M. P., **Huo, D.**, Wang, X., Teare, B. L., & Burris, S. (2017). Ground Penetrating Radar For Estimating Root Biomass Through Empirical Analysis. American Geophysical Union Fall Meeting, 11-15 December, 2017, New Orleans, Louisiana.
- **Huo, D.**, Bishop, M. P., & Young, B. (2017). Wavelet Analysis of Glacier Topographic Properties for Characterizing Glacier Dynamics in the Karakoram, Himalaya. Geological Society of America Annual Meeting, 22-25 October, 2017, Seattle, Washington.
- Young, B., Bishop, M. P., **Huo, D.**, & Owen., L. A. (2017). Geomorphometric Characterization of Topographic Structure and Tectonics in the Karakoram Himalaya, Pakistan. Geological Society of America Annual Meeting, 22-25 October, 2017, Seattle, Washington.
- Bishop, M. P., Bush A., Dobreva, I., Young, B., & **Huo, D.**, (2017). Climate-Topographic Forcing and Mountain Geodynamics in the Central Karakoram Himalaya. Geological Society of America Annual Meeting, 22-25 October, 2017, Seattle, Washington.
- **Huo, D.**, Bishop, M. P., & Young, B. (2017). Geomorphometric characterization of debris covered glaciers in the Karakoram, Himalaya. Himalaya. American Association of Geographers Annual Meeting, 5-9 April, 2017, Boston, Massachusetts.
- Young, B., Bishop, M. P., & **Huo, D.** (2017). Geomorphometric characterization of topographic and lithological variations in the Karakoram, Himalaya. American Association of Geographers Annual Meeting, 5-9 April, 2017, Boston, Massachusetts.