Daryl (Dedi) Yang

Distinguished Staff Fellow

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RESEARCH INTERESTS

I am a broadly trained ecosystem ecologist and remote sensing scientist studying climate change impacts terrestrial ecosystems. The overarching goal of my research is to integrate Earth observations, ecological theories, and process models to advance our understanding of the interconnections between ecosystem dynamics and climate change. My research combines a diversity of approaches from ecology, remote sensing, biogeography, and numerical modeling, and develops cutting-edge technologies to monitor plant ecosystems across scales, improve model representation of vegetation function, biophysical processes, and structure, as well as evaluate model predictions.

EDUCATION

2017 - 2023 **Ph.D. in Ecology and Evolution**; Stony Brook University, Stony Brook, NY; Brookhaven National Laboratory, Upton, NY, USA.

2014 - 2017 **M.S. in Global Environmental Change**, Beijing Normal University, Beijing, China

2010 - 2014 **B.S. in Surveying and Mapping Engineering**, Central South University, Changsha, China

PROFESSIONAL APPOINTMENTS

Distinguished Staff Fellow, Oak Ridge National Laboratory. Since 2024

NASA FINESST Fellow, Stony Brook University, Brookhaven National Laboratory. 2022-2023

Research Assistant, Stony Brook University, Brookhaven National Laboratory. 2018-2022

Research assistant on Department of Energy's Next Generation Ecosystem Experiment Arctic project supervised by Dr. Shawn Serbin

Teaching Assistant, Stony Brook University 2017-2018

Teaching assistant on Landscape Ecology for Dr. Resit Akcakaya

Teaching assistant on Biology for Dr. John True and Ross Nehm

PUBLICATIONS

In Review, Revision, or Preparation

Berner, T.L., Orndahl M.K., Rose. M., Tamstorf. M., Arndal. F.M., **Yang, D**., … Goetz, J.S., The Arctic Plant Aboveground Biomass Synthesis Dataset. Scientific Data (Under review)

Wang, X., Guo, Z., Zhang, K., Fu, Z., Lee, C.K.F., **Yang, D**., Detto, M., Ryu, Y., Zhang, Y., Wu, J. Evaluating the sensitivity of satellite-derived gross primary productivity to combined atmospheric dryness and soil water deficit. Global Change Biology (Under review).

Song, G., Wang, J., Zhao, Y., **Yang, D**., Lee, K.F.C., Guo, Z., Detto, M., Alberton, B., Morellato, P., Nelson, B., Wu, J. Scale matters: spatial resolution impacts tropical leaf phenology characterized by multi-source satellite remote sensing with an ecological-constrained deep learning model. Remote Sensing of Environment (In revision).

Zhao, Y, Wang, Z., Yan, Z., Moon, M., **Yang, D**., Meng, L., Bucher, S.F., Wang, J., Song, G., Guo, Z., Su, Y., Wu, J. Exploring the role of biotic factors in regulating the spatial variability in land surface phenology across four temperate forest sites. New Phytologist (Under review).

Lin, Z., Cheng K.H., Meng, R., Ng, M., Song G., Wang, J., Wu, J., Xu, Fei., **Yang, D**., Zhu, X. Transferable fractional composition mapping of temperate mixed forests based on mixture analysis of spectral and radar variability with time-series Sentinel-1&2 data. Remote Sensing of Environment (In revision).

Yang, D., Hantson, W., Morrison, B.D., Davidson, K.J., Lamour, J., Salmon, V.G., Charles, E. M., Rogers, A., Serbin, S.P. Environmental Controls of Alnus and Salix Tall Shrub Distribution in Shrub Tundra Ecosystems in Western Alaska. (In Preparation, Target Journal: Global Change Biology)

Yang, D., Hantson, W., McMahon, A., Anderson, J., Hayes, D.J., Wang, J., Wu, J., Serbin S.P. Fine-scale Landscape Characteristics, Vegetation Composition, and Snow Timing Derives Phenological Heterogeneity across Arctic Tundra Landscapes. (In Preparation, Target Journal: Global Change Biology)

Serbin, S.P., **Yang, D**., Erb, A., Schaaff, C., Fine-scale Vegetation Composition and Structure Drives Variation in Spatial and Temporal Dynamics of Surface Albedo in Low Arctic Tundra. (In preparation, Target Journal: Environmental Research Letters)

Published

Frost, G.V., Macander, M.J., Bhatt, U.S., Berner, L.T., Bjerke, J.W., Epstein, H.E., Forbes, B.C., Lara, M.J., Magnússon R.Í., Montesano, P.M, Phoenix, G.K., Serbin, S.P., Tømmerik, H., Waigl, C., Walker, D.A., and **Yang, D**. 2023. Tundra Greenness. Arctic Report Card 2023, R.L. Thoman, T.A. Moon, and M.L. Druckenmiller (eds.). https://doi.org/10.25923/s86a-jn24

Schore, A. I. G., Fraterrigo, J. M., Salmon, V. G., **Yang, D**., & Lara, M. J. (2023). Nitrogen fixing shrubs advance the pace of tall-shrub expansion in low-Arctic tundra. Communications Earth & Environment, 4(1), 421. https://doi.org/10.1038/s43247-023-01098-5

Yang, D., McMahon, A., Hantson, W., Anderson, J., & Serbin, S. P. (2023). PiCAM: A Raspberry Pi-based open-source, low-power camera system for monitoring plant phenology in Arctic environments. Methods in Ecology and Evolution. https://doi.org/10.1111/2041-210x.14231

Frost, G.V., Macander, M.J., Bhatt, U.S., Berner, L.T., Bjerke, J.W., Epstein, H.E., Forbes, B.C., Goetz, S.J., Lara M.J., Park, T., Phoenix, G.K., Serbin, S.P., Tommervik, H., Walker, D.A., **Yang, D**., 2023. State of the Climate in 2022 – The Arctic. Bulletin of American Meteorological Society. https://doi.org/10.1175/BAMS-D-23-0079.1

Wang, J., Song, G., Liddell, M., Morellato, P., Lee, C., **Yang, D**., Alberton, B., Detto, M., Ma, X., Zhao, Y., Yeung, H., Zhang, H., Ng, M., Nelson, B., Heute, A. An ecologically-constrained

deep learning model for tropical leaf phenology monitoring using PlanetScope satellites. Remote Sensing of Environment. https://doi.org/10.1016/j.rse.2022.113429

Yang, D., Morrison, B.D., Hanston, W., McMahon, A., Baskaran, L., Hayes, D.J., Miller, C.E., Serbin, S.P., 2023. Integrating very-high-resolution UAS data and airborne imaging spectroscopy to map the fractional composition of Arctic plant functional types in Western Alaska. Remote Sens Environ 286, 113430. https://doi.org/10.1016/j.rse.2022.113430

Frost, G.V., Macander, M.J., Bhatt, U.S., Berner, L.T., Bjerke, J.W., Epstein, H.E., Forbes, B.C., Goetz, S.J., Lara M.J., Park, T., Phoenix, G.K., Serbin, S.P., Tommervik, H., Walker, D.A., **Yang, D**., 2022, NOAA 2022 Arctic Report Card – Tundra Greenness. 10.25923/mhrv-gr76

Frost, G.V., Macander, M.J., Bhatt, U.S., Berner, L.T., Bjerke, J.W., Epstein, H.E., Forbes, B.C., Goetz, S.J., Lara M.J., Park, T., Phoenix, G.K., Serbin, S.P., Tommervik, H., Walker, D.A., **Yang, D**., 2022. State of the Climate in 2021 – The Arctic. Bulletin of American Meteorological Society. https://www.ametsoc.org/index.cfm/ams/

Yang, D., Morrison, B.D., Davidson, K.J., Lamour, J., Li, Q., Nelson, P.R., Hantson, W., Hayes, D.J., Swetnam, T.L., McMahon, A., Anderson, J., Ely, K.S., Rogers, A., Serbin, S.P., 2022. Remote Sensing from Unoccupied Aerial Systems: Opportunities to Enhance Arctic Plant Ecology in a Changing Climate. Journal of Ecology. https://doi.org/10.1111/1365-2745.13976

Nelson, P.R., Maguire, A.J., Pierrat, Z., Orcutt, E.L., **Yang, D**., Serbin, S.P., Frost, G.V., Macander, M.J., Magney, T.S., Thompson, D.R., Wang, J., Oberbauer, S.F., Zesati, S.A.V., Davidson, S.J., Epstein, H., Unger, S., Campbell, P.K.E., Carmon, N., Velez-Reyes, M., Huemmrich, K.F., 2022. Remote Sensing of Tundra Ecosystems using High Spectral Resolution Reflectance: Opportunities and Challenges. https://doi.org/10.1002/essoar.10508585.1

Frost, G.V., Macander, M.J., Bhatt, U.S., Berner, L.T., Bjerke, J.W., Epstein, H.E., Forbes, B.C., Goetz, S.J., Lara M.J., Park, T., Phoenix, G.K., Serbin, S.P., Tommervik, H., Walker, D.A., **Yang, D**., 2021, NOAA 2021 Arctic Report Card – Tundra Greeness. DOI: 10.25923/8n78-wp73

Yang, D., Morrison, B.D., Hantson, W., Breen, A.L., McMahon, A., Li, Q., Salmon, V.G., Hayes, D.J., Serbin, S.P., 2021. Landscape-scale characterization of Arctic tundra vegetation composition, structure, and function with a multi-sensor unoccupied aerial system. Environ Res Lett. https://doi.org/10.1088/1748-9326/ac1291

Wang, J., **Yang, D**., Chen, S., Zhu, X., Wu, S., Bogonovich, M., Guo, Z., Zhu, Z., Wu, J., 2021. Automatic cloud and cloud shadow detection in tropical areas for PlanetScope satellite images. Remote Sens Environ 264, 112604. https://doi.org/10.1016/j.rse.2021.112604

Burnett, A.C., Anderson, J., Davidson, K.J., Ely, K.S., Lamour, J., Li, Q., Morrison, B.D., **Yang, D**., Rogers, A., Serbin, S.P., 2021. A best-practice guide to predicting plant traits from leaf-level hyperspectral data using partial least squares regression. J Exp Bot erab295-. https://doi.org/10.1093/jxb/erab295

Liu, X., Guo, L., Cui, X., Butnor, J.R., Boyer, E.W., **Yang, D**., Chen, J., Fan, B., 2021. An Automatic Processing Framework for In Situ Determination of Ecohydrological Root Water Content by Ground-Penetrating Radar. Ieee T Geosci Remote PP, 1–15. https://doi.org/10.1109/tgrs.2021.3065066

Burnett, A.C., Serbin, S.P., Lamour, J., Anderson, J., Davidson, K.J., **Yang, D**., Rogers, A., 2021. Seasonal trends in photosynthesis and leaf traits in scarlet oak. Tree Physiol. https://doi.org/10.1093/treephys/tpab015

Ely, K.S., Rogers, A., Agarwal, … **Yang, D**., 2021. A reporting format for leaf-level gas exchange data and metadata. Ecol Inform 101232. https://doi.org/10.1016/j.ecoinf.2021.101232

Yang, D., Meng, R., Morrison, B.D., McMahon, A., Hantson, W., Hayes, D.J., Breen, A.L., Salmon, V.G., Serbin, S.P., 2020. A Multi-Sensor Unoccupied Aerial System Improves Characterization of Vegetation Composition and Canopy Properties in the Arctic Tundra. Remote Sens-basel 12, 2638. https://doi.org/10.3390/rs12162638

Wang, J., **Yang, D**., Detto, M., Nelson, B.W., Chen, M., Guan, K., Wu, S., Yan, Z., Wu, J., 2020. Multi-scale integration of satellite remote sensing improves characterization of dry-season green-up in an Amazon tropical evergreen forest. Remote Sens Environ 246, 111865. https://doi.org/10.1016/j.rse.2020.111865

Meng, R., **Yang, D**., McMahon, A., Hantson, W., Hayes, D., Breen, A., Serbin, S., 2019. A UAS Platform for Assessing Spectral, Structural, and Thermal Patterns of Arctic Tundra Vegetation. Igarss 2019 - 2019 Ieee Int Geoscience Remote Sens Symposium 9113–9116. https://doi.org/10.1109/igarss.2019.8897953

Liu, X., Cui, X., Guo, L., Chen, J., Li, W., **Yang, D**., Cao, X., Chen, X., Liu, Q., Lin, H., 2019. Non-invasive estimation of root zone soil moisture from coarse root reflections in ground-penetrating radar images. Plant Soil 436, 623–639. https://doi.org/10.1007/s11104-018-03919-5

Guo, Z., **Yang, D**., Chen, J., Cui, X., 2018. A new index for mapping the 'blue steel tile' roof dominated industrial zone from Landsat imagery. Remote Sens Lett 9, 578–586. https://doi.org/10.1080/2150704x.2018.1452057

Yang, D., Chen, J., Zhou, Y., Chen, Xiang, Chen, Xuehong, Cao, X., 2017. Mapping plastic greenhouse with medium spatial resolution satellite data: Development of a new spectral index. Isprs J Photogramm 128, 47–60. https://doi.org/10.1016/j.isprsjprs.2017.03.002

Yang, D., Chen, X., Chen, J., Cao, X., 2017. Multiscale Integration Approach for Land Cover Classification Based on Minimal Entropy of Posterior Probability. Ieee J Sel Top Appl 10, 1105–1116. https://doi.org/10.1109/jstars.2016.2615073

Yang, D., Sun, S., Chen, J., Liu, X., 2016. Analysis for the spatial and temporal patterns of plasticulture in Shandong province, China with remotely sensed data. 2016 Fifth Int Conf Agro-geoinformatics Agro-geoinformatics 1–4. https://doi.org/10.1109/agro-geoinformatics.2016.7577663

Chen, X., **Yang, D**., Chen, J., Cao, X., 2015. An improved automated land cover updating approach by integrating with downscaled NDVI time series data. Remote Sens Lett 6, 29–38. https://doi.org/10.1080/2150704x.2014.998793

Cai, Q., Liu, N., Dai, W., **Yang, D**., 2015. The Robust Kalman Filtering with Continuous Variable Equivalent Weight Function. Journal of Geodesy and Geodynamics.

SHARED DATA PRODUCTS

Yang, D., Serbin, S.P. (2023). UAS remote sensing (3DR SOLO platform): multispectral reflectance, canopy height model, normalized difference vegetation index, Seward Peninsula, Alaska, 2021. Next Generation Ecosystem Experiments Arctic Data Collection, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, USA. Dataset accessed on [INSERT_DATE] at https://doi.org/10.5440/2205338.

Yang, D., Davidson, K.J., Anderson, J., Hanston W., Serbin, S.P. (2023). UAS remote sensing (3DR SOLO platform): multispectral reflectance and normalized difference vegetation index, Seward Peninsula, Alaska, 2022. Next Generation Ecosystem Experiments Arctic Data Collection, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, USA. Dataset accessed on [INSERT_DATE] at https://doi.org/10.5440/2205336.

Yang, D., McMahon, A., Anderson, J., Hanston, W., Ely, K., Serbin, S.P. (2023). Digital camera imagery for vegetation phenology, Seward Peninsula, Alaska, 2021-2022. Next Generation Ecosystem Experiments Arctic Data Collection, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, USA. Dataset accessed on [INSERT_DATE] at https://doi.org/10.5440/1992840.

Yang, D., Hantson, W., Hayes, D.J., Serbin, S.P. (2023). UAS remote sensing (DJI Phantom 4 RTK platform): RGB orthomosaic, digital surface and canopy height models, plant functional type map, Seward Peninsula, Alaska, 2019. Next Generation Ecosystem Experiments Arctic Data Collection, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, USA. Dataset accessed on [INSERT_DATE] at https://doi.org/10.5440/1906348.

Yang, D., Serbin, S.P. (2023). Integrating Very-High-Resolution UAS Data and Airborne Imaging Spectroscopy to Map the Fractional Composition of Arctic Plant Functional Types in Western Alaska: Supporting Data. Next Generation Ecosystem Experiments Arctic Data Collection, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, USA. Dataset accessed on [INSERT_DATE] at https://doi.org/10.5440/1906278.

Yang, D., Ken Davidson., Yanlan Liu., Hantson, W., Serbin, S.P (2023). Leaf area index (LAI), Teller site, Seward Peninsula, Alaska, 2022. Next Generation Ecosystem Experiments Arctic Data Collection, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, USA.

Hantson, W., **Yang, D.**, Hayes, D.J., Serbin, S.P. (2023). Thaw depth, soil moisture, and vegetation height, Teller and Kougarok sites, Seward Peninsula, Alaska, 2022. Next Generation Ecosystem Experiments Arctic Data Collection, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, USA.

Serbin, S.P., **Yang, D.** (2022). Maps of Arctic vegetation leaf nitrogen concentration, albedo and plant functional type (PFT) derived from imaging spectroscopy data, Council watershed, Seward Peninsula, Alaska, 2019. Next Generation Ecosystem Experiments Arctic Data Collection, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, USA. https://doi.org/10.5440/1838174.

Serbin, S.P., **Yang, D.**, McMahon, A. (2021). Landscape-scale Characterization of Arctic Tundra Vegetation Composition, Structure, and Function with a Multi-sensor Unoccupied Aerial System: Supporting Data. Next Generation Ecosystem Experiments Arctic Data Collection, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, USA. https://doi.org/10.5440/1778212

Serbin, S.P., **Yang, D.**, McMahon, A. (2020) A multi-Sensor Unoccupied Aerial System improves characterization of vegetation composition and canopy properties in the arctic tundra: supporting data. Next generation Ecosystem Experiments - Arctic data collection, Oak ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, USA. https://doi.org/10.5440/1647365.

Serbin, S.P., Meng, R., McMahon, A., Hanston, W., Hayes, D.J., **Yang, D.**, Ely, K., Rogers, A. (2021). Full Spectrum (350 - 2500 nm) Leaf and Canopy Spectral Reflectance, Seward Peninsula, Alaska, 2017. Next Generation Ecosystem Experiments Arctic Data Collection, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, USA. Dataset accessed on [INSERT_DATE] at https://doi.org/10.5440/1783190.

Serbin, S.P., Ran Meng., McMahon, A., **Yang, D.**, Ely, K., Rogers, A. (2021). Leaf Nitrogen, Leaf Mass Area, Leaf Water Content, Seward Peninsula, Alaska, 2017. Next Generation Ecosystem Experiments Arctic Data Collection, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, USA. Dataset accessed on [INSERT_DATE] at https://doi.org/10.5440/1783188.

Serbin, S.P., **Yang, D.**, Ely, K. 2021. Full spectrum (350-2500 nm) canopy spectral reflectance, Seward Peninsula, Alaska, (2018). Next Generation Ecosystem Experiments Arctic Data Collection, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, USA. Dataset accessed on [INSERT_DATE] at https://doi.org/10.5440/1783191.

Serbin, S.P., Rogers, A., **Yang, D.**, Davidson, K.J., Ely, K. (2021). Leaf structural and chemical traits, and vegetation temperature and height, Seward Peninsula, Alaska, 2019. Next Generation Ecosystem Experiments Arctic Data Collection, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, USA. Dataset accessed on [INSERT_DATE] at https://doi.org/10.5440/1783192.

Serbin, S.P., **Yang, D.**, Ely, K. (2021). Full spectrum (350-2500 nm) leaf and canopy spectral reflectance, Seward Peninsula, Alaska, 2019. Next Generation Ecosystem Experiments Arctic Data Collection, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, USA. Dataset accessed on [INSERT_DATE] at https://doi.org/10.5440/1783193.

Serbin, S.P., **Yang, D.**, Ely, K. 2020. Leaf Nitrogen and Carbon Content, and Leaf Mass Per Area, Kougarok Road, Seward Peninsula, Alaska, (2018). Next Generation Ecosystem Experiments Arctic Data Collection, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, USA. Dataset accessed on [INSERT_DATE] at https://doi.org/10.5440/1631419.

PRESENTATIONS

Invited Talks

Yang, D (2023). Understanding the Complexity of Arctic Ecosystem Change: Improve Arctic Ecology and Process Modeling with Multi-scale Remote Sensing. Environmental and Climate Science Department Seminar, BNL.

Yang, D (2022). Integrating field observations and multiscale remote sensing to understand arctic tall shrub distribution. Environmental System Science Program – Principal Investigator (ESS-PI) Meeting.

Yang, D (2022). From Site to Biome: Vegetation Distribution, Traits and Environmental Filtering in the Arctic. Dr. Mow Lin Award Ceremony at BNL.

Yang, D (2021). Integrating Very-High-Resolution UAS and Hyperspectral Airborne Data to Estimate the Fractional Cover of Arctic Plant Functional Types in Western Alaska. NASA's Surface Biology and Geology (SBG) Community Workshop.

Yang, D (2020). Remote Sensing of Plant Biodiversity and Traits in the Arctic Tundra. Department of Energy's Remote Sensing -Trait project Meeting.

Yang, D (2019). From plot to pixel: scaling up vegetation spectral and biophysical properties in western Alaska. The American Geophysical Union (AGU) Fall Meeting

Conference Oral Presentations

Yang, D (2023). From Pixel to Ecosystem: Understanding Shrubification and Vegetation Dynamics in Arctic Tundra across Scales. Defense Public Talk, Stony Brook University.

Yang, D (2022). Monitoring Arctic Plant Phenology across Scales: The good, The bad, and The Ugly. Department of Energy (DOE)'s Next Generation Ecosystem Experiment project AllHands Meeting. Rising Leaders.

Yang, D (2022). A Multi-Sensor Unoccupied Aerial System Improves Characterization of Vegetation Composition, Structure, and Function in the Arctic Tundra. Environmental System Science Program – Principal Investigator (ESS-PI) Meeting.

Yang, D (2022). Integrating field observations and multiscale remote sensing to understand arctic tall shrub distribution. Department of Energy (DOE)'s Next Generation Ecosystem Experiment project AllHands Meeting.

Yang, D (2021). Integrating field observations and multiscale remote sensing to understand arctic tall shrub distribution. The American Geophysical Union (AGU) Fall Meeting.

Yang, D (2021). Multi-scale remote sensing of plant biodiversity and functional traits in the Arctic tundra. Department of Energy (DOE)'s Next Generation Ecosystem Experiment project AllHands Meeting. Rising Leaders.

Yang, D (2016). Analysis for the spatial and temporal patterns of plastic-covered agriculture in handong province, China with remotely sensed data. The 5th International Conference on Agro-Geoinformatics.

Yang, D (2015). A Multi-scale integration approach for land cover classification based on minimal entropy of posterior probability. International Society for Photogrammetry and Remote Sensing (ISPRS) Workshop on Mobility and Land Cover Change Mapping.

Yang, D (2015). An integrated pixel-based and object-based method for land cover mapping. The 23th International Conference on Geoinformatics (CPGIS). (Best oral presentation).

Conference Poster Presentations

Yang, D (2023). Characterizing Fine-scale Landscape Controls on Patterns of Arctic Plant Phenology using High-resolution Remote Sensing. Environmental System Science Program – Principal Investigator (ESS-PI) Meeting.

Yang, D (2023). Tall shrub species distribution in the Arctic: patterns, drivers, and limits. Arctic-Boreal Vulnerability Experiment (ABoVE) Science Team Meeting.

Yang, D (2020). Using imaging spectroscopy to predict fractional cover of twelve Arctic plant functional types in western Alaska. Arctic-Boreal Vulnerability Experiment (ABoVE) Science Team Meeting.

Yang, D (2021). High throughput UAS remote sensing improves characterization and scaling-up of vegetation property and diversity in Arctic tundra systems. Department of Energy (DOE)'s Next Generation Ecosystem Experiment project AllHands Meeting.

Yang, D (2019). Characterizing plant canopy properties in the Arctic biome with a novel multi-senor unmanned aerial system. The 21st William T. Pecora Memorial Remote Sensing Symposium (Pecora 21) and the 38th International Symposium on Remote Sensing of Environment (ISRSE-38) Conference. (Best poster presentation)

Yang, D (2018). Experimental warming in the Arctic can alter vegetation phenology. Brookhaven National Lab Early Career Researcher Symposium.

PROJECTS INVOLVED

Understanding the patterns and mechanisms of Alder shrub expansion in Arctic tundra using dendrochronology and very-high-resolution UAS remote sensing **Since 2023**

The expansion of tall shrubs into northern high-latitude ecosystems is driving widespread changes in tundra ecosystems that may fundamentally modify land-atmosphere interactions and feedback to global climate change. However, the patterns of shrub recruitment and expansion, and the fundamental mechanism that drives this change remain largely unknown. In this project, we investigate the potential of combining dendrochronological and UASs to study the patterns and mechanisms of alder shrub expansion in a representative low-Arctic study site.

Future Investigators in NASA Earth and Space Science and Technology (FINESST) Award to Daryl Yang **Since 2022**

The climate-driven rapid expansion of tall shrub species into northern high-latitude tundra has important implications for the structure and functioning of Arctic ecosystems and their feedbacks to the global carbon cycle and climate system. Through this project, I am developing novel understandings of the environmental and biological controls of Arctic tall shrub distribution and expansion by integrating novel field observations and multi-scale remote sensing.

DOE's Next-Generation Ecosystem Experiment – Arctic (NGEE-Arctic) **Since 2018**

The NGEE-Arctic is a 10-year project to improve predictive understanding of carbon-rich Arctic ecosystem processes and feedbacks to climate. This is achieved through experiments, observations,

and synthesis of existing datasets that strategically inform model process representation and parameterization, and that enhance the knowledge base required for model initialization, calibration, and evaluation.

NASA's Arctic Boreal Vulnerability Experiment (ABoVE). **Since 2018**

ABoVE is a 10-year project across Alaska and western Canada and seeks a better understating of the vulnerability and resilience of ecosystems and society to this changing environment.

Defense Advanced Research Projects Agency Project Awarded to BNL **2018 – 2019**

This project aims to develop the capability to detect clandestine activities, such as tunneling, by identifying relationships between physiological and biochemical indicators of plant health in overlying vegetation as proxies for perturbations to their environment and the optical, structural and thermal properties of that vegetation.

DOE's Next-Generation Ecosystem Experiment – Tropics (NGEE-Tropics). **2018-2019**

NGEE-Tropics a large collaborative project between five National Laboratories and the Smithsonian. Tropical Research Institute, aiming to develop a new, mechanism-rich tropical forest ecosystem model.

The Global Land Surface Satellite (GLASS) Products Project. **2014-2017**

The Science: This project focus on producing surface radiation and vegetation variables with long-term time series (from 1981 or 2000 to the present), high resolutions (500 m, 1 km and 0.05°), and high qualities and accuracies.

FELLOWSHIPS AND AWARDS

Department of Energy's NGEE-Arctic project Early Career Excellence Award	2022
Future Investigator in NASA Earth and Space Science and Technology ($98,800).	2022
BNL S&P fund ($1500)	2022
BNL Dr. Mow Shiah Lin Scholarship ($2000)	2021
John Dunn Award, Stony Brook University ($500)	2021
1st place for PECORA 21/ISRSE 38 Conference, USGS & NASA ($150)	2019
Professional Development Fund, Stony Brook University ($270)	2019
Recruitment Fellowship, Stony Brook University ($2000)	2017
"Zhou Ting Ru" Academic Excellence Award, Beijing Normal University ($1800)	2017
First Academic Scholarship Beijing Normal University ($2000)	2014–2017
Excellent Graduation Thesis, Central South University	2014
National Undergraduate Scholarship, Ministry of Education of China ($1500)	2010–2014

COLLABORATORS AND CO-EDITORS

Iversen, C (ORNL); Serbin, S (NASA Goddard); Miller, C (NASA JPL); Hayes, D (UM), Wu, J (HKU), Liu, Y (OSU); Frost, J (ABR); Townsend P (UW-Madison); Breen, A (UAF); Wang, J (HKU), Salmon (ORNL); Hantson, W (UM), Nelson, P (UM), Morrison, B (UC Merced), Rogers, A (BNL), Lara, M (UIUC), Members of the DOE NGEE-Arctic (www.ngee-arctic.ornl.gov), Members of the NASA ABoVE project (https://above.nasa.gov/)

SCIENCE SERVICE, COORDINATION & COMMUNICATION

Reviewer for Global Change Biology, Remote Sensing of Environment, Global Ecology and Biogeography, Earth's Future, ISPRS Journal of Photogrammetry and Remote sensing, International Journal of Applied Earth Observation and Geoinformation, Polar Research, Geoscience and Remote Sensing

Co-lead of the Terrestrial Ecosystem Community of Practice for Interagency Arctic Research Policy Committee (IARPC).	Since 2023
Author of BAMS's State of the Climate Report – Tundra Greenness	2022 - 2023
Author of NOAA's Arctic Report Card – Tundra Greenness	2021 - 2022
Member of NASA's Arctic Boreal Ecosystem Vulnerability Experiment (ABoVE)	Since 2022
Member of NASA ABoVE's Spectra Imaging Working Group	Since 2019
Member of NASA ABoVE's Disturbance Working Group	Since 2022
Member of The American Geophysical Union	Since 2016
Member of The Ecology Society of America	Since 2017
Member of Research Data Alliance	Since 2022
Member of Interagency Arctic Research Policy Committee (IARPC)	Since 2022
Committee Member for NGEE-Arctic "Ecosystem Type" workshop	2020
Mentor for DOE's Science Undergraduate Laboratory Internship program	2019, 2022

DOE's Science Highlight: Drone Flights Give Scientists Better Data on Vegetation in the Arctic Tundra