# ERIC L. BULLOCK, PH.D.

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## Personal Summary

Dedicated research geographer with over seven years of experience designing remote sensing applications for monitoring forest ecosystems. Proven success in integrating broad technical skills for successful project leadership. Committed to creating impactful solutions to address urgent environmental challenges.

- **Expert in forest monitoring.** Developed 5 remote sensing algorithms used in 15 countries in peer-reviewed research. Demonstrated experience analyzing optical, radar, and lidar data. Published methods for evaluating complex ecosystem dynamics through the integration of satellite and field measurements, including mangrove species zonation, changes in woody undisturbed forests, and long-term carbon fluxes.

- **Demonstrated scientific leadership.** Oversaw a multi-national team of foresters, statisticians, and remote sensing researchers to develop an approach for quantifying forest biomass by combining spaceborne lidar and field inventory data. Trained and supervised a team of 10+ researchers to study carbon dynamics in the Amazon. Serves as a Subject Matter Expert for an FIA research priority. Awarded 4 NASA research grants and 4 research consultancies.

- **Proficient in generating and managing large datasets.** Oversaw the development of a 27-year forest change dataset in the Amazon that spanned 7 million $km^2$ and required over 240,000 Landsat images. Developed tools, training material, and a database used by 20+ research assistants to collect 10,000+ training samples for global land cover classification.

- **Advanced geospatial programmer and developer.** Established an automated workflow for processing and publishing daily forest disturbance alerts using Python, JavaScript, HTML, and GitHub Pages. Scaled a machine learning model for application on regional time series satellite data using Google Cloud. Developed 4 geospatial web applications using Google Earth Engine, Project Jupyter, and Python.

- **Committed to sharing knowledge globally.** Taught at technical workshops in 14 countries on methods for mapping forest disturbances and measuring carbon emissions. Presented over 20 conference presentations. Led event breakout sessions at the 2019 Google Earth Engine Summit and 2019 GFOI Plenary. Showcased novel research at the COP26. Developed an e-Learning video course and numerous written tutorials.

- **Proven experience in applied statistics.** Published a method for forest biomass estimation using regression analysis and hybrid statistical inference. Conducted 3 workshops on statistical map accuracy assessments and area estimation. Developed a framework to evaluate forest alert systems using a Monte Carlo method. Authored R code for map accuracy assessments using two-stage stratified sampling. Developed 2 methods for detecting structural breaks in satellite time series data. Published an ensemble technique leveraging 3 statistical methods for enhanced land change mapping.

- **Focused on mission and client needs.** Serves as a Subject Matter Expert for a working group chartered with recommending clear, straightforward solutions to mitigate non-response bias for Forest Service clients. Provided technical support to Nepal's REDD+ program to tailor a self-developed forest change mapping application to national circumstances. Developed code and documentation for an accuracy assessment procedure aligning with Peru's REDD+ program. Partnered with the Inter-American Development Bank to evaluate the impact of boundary demarcation on Guatemala's protected areas.

## Professional Experience

**Research Geographer**                                                   Riverdale, UT
US Forest Service, FIA-RMRS                                          10/2020 – Present

- Designs, executes, and contributes to a broad range of research projects related to monitoring forest ecosystems across space and time.
- Develops novel techniques for mapping and quantifying land cover change.
- Provides analytical support to Forest Service projects and assists in field surveys.
- Supports international capacity building efforts.
- Writes peer-reviewed journal articles, research grants, and project reports.
- Serves as a Subject Matter Expert for an FIA research priority.

**Research Contractor**                                                      Suva, Fiji
Ministry of Forestry, Fiji                                           07/2020 – 10/2020

- Evaluated a methodology for estimating emissions from forest degradation in Fiji.
- Compared the results to results created by Fiji's monitoring agency for their REDD+ reference period.
- Submitted a project report to the World Bank and Fiji's Ministry of Forestry.

**Postdoctoral Researcher**                                               Boston, MA
Boston University                                                   08/2019 – 07/2020

- Remote sensing developer for a NASA-funded project with the goal of mapping 21st century land cover and land use change globally at 30m resolution.
- Co-developed the Google Earth Engine utilities, including a Javascript API, interactive applications, and end-to-end processing workflow, used to produce global maps of land cover change.
- Co-Developed the Python application used by 20+ research assistants to collect 10,000+ sample points used for training data.

**Research Assistant**                                                     Boston, MA
Boston University                                                   09/2014 – 09/2015

- Assisted with remote sensing research projects.
- Pre-processed imagery, wrote Python and R Code, and applied change detection algorithms to monitor land cover change.
- Participated in remote sensing-based capacity building workshops in South America, Southeast Asia, and Africa.

## Education

**Boston University**                                                     Boston, MA
Doctor of Philosophy in Geography                                   08/2015 – 09/2019

- Thesis: "Deforestation, degradation, and natural disturbance in the Amazon: using a new monitoring approach to estimate area and carbon loss"
- Advisor: Dr. Curtis E. Woodcock
- Funding: NASA NESSF Research Fellowship
- GPA: 4.0

**Boston University, Master of Arts**                                      Boston, MA
Master of Arts in Remote Sensing and GIS for the Environment        08/2013 – 09/2014

- Concentration: Remote sensing for sustainable development
- GPA: 4.0

**University of Colorado**                                        Boulder, CO
Bachelor of Arts in Sociology and Environmental Studies          09/2008 – 08/2011
- GPA: 3.4

**Relevant Coursework:**
- **B.A.:** General Biology 1, General Biology 2, Biology: A Human Approach Laboratory, Principles of Ecology, Mathematics for the Environment, Intro to Geology, Advanced Writing for Environmental Studies, Cartography: Visualization and Information Design, Environment & Society, Environmental Chemistry 1, Environmental Chemistry 2, Natural Resource Economics, Water Resources and Management of the Western U.S.
- **M.A.:** Advanced Topics in Remote Sensing, Multivariate Analysis for Geographers, Urban Ecology, Geographic Information Systems (GIS), Digital Image Processing, Spatial Analysis Using Geographic Information Systems (GIS), Environment & Development, Urbanization & Environment
- **Ph.D:** Physical Models in Remote Sensing, Ecological Forecasting, Modeling and Monitoring Terrestrial Ecosystems Processes

## Grants, Fellowships, & Consultancies

**NASA SERVIR Applied Science Team**                             **01/2023 – 12/2026**
Co-Investigator (PI: Sean Healey)
*Documenting forest emission reduction through both statistical estimation and improved resource mapping.*

**NASA Land-Cover and Land Use Change Program**                 **01/2021 – 12/2023**
Co-Investigator (PI: Christoph Nolte)
*Comparing the effectiveness of conservation instruments in the Colombian Andes biodiversity hotspot.*

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Co-Investigator (PI: Christoph Nolte)
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**GRH Consulting, LLC**                                          **10/2020 – 06/2021**
Research Consultancy
*Development of new- and collection of existing- Measurement, Reporting, and Verification related resources to support countries' MRV implementation.*

**Ministry of Forestry, Fiji**                                   **06/2020 – 10/2020**
Research Consultancy
*Methodology for estimating deforestation and forest degradation in Fiji using Landsat time-series data.*

**NASA NESSF**                                                   **09/2016 – 09/2019**
Research Fellowship (PI)

*Improved Activity Data for Carbon Emissions from Forest Degradation Through Multi-Sensor Time Series Analysis in Southeast Asia.*

**Inter-American Development Bank**                                     04/2016– 07/2016
Research Consultancy
*The Impacts of Land Tenure Clarification and Boundary Demarcation on Deforestation in Guatemala's Protected Areas.*

**GFA Consulting Group**                                                05/2016 – 08/2016
Research Consultancy
*A two-stage stratified sampling design for Ministerio del Ambiente (MINAM) land cover change map asssessment in Peru.*

## Peer Reviewed Publications

**Bullock, E.**, Healey, S. P., Zhiqiang, Y., Acosta, R., Villalba, H., Insfrán, K. P., Melo, J. B., Wilson, S., Duncanson, L., Næsset, E., Armston, J. D., Saarela, S., Ståhl, G., Patterson, P. L. & Dubayah, R. O. (2023). Estimating aboveground biomass density using hybrid statistical inference with GEDI lidar data and Paraguay's national forest inventory. Environmental Research Letters. https://doi.org/10.1088/1748-9326/acdf03

Gorelick, N., Yang, Z., Arévalo, P., **Bullock, E.**, Insfrán, K. P. & Healey, S. P. (2023). A global time series dataset to facilitate forest greenhouse gas reporting. Environmental Research Letters. https://doi.org/10.1088/1748-9326/ace2da

Tang, X., Bratley, K., Cho, K., **Bullock, E.**, Olofsson, P. & Woodcock, C. (2023). Near real-time monitoring of tropical forest disturbance by fusion of Landsat, Sentinel-2, and Sentinel-1 data. Remote Sensing of Environment, 294, 113626. https://doi.org/10.1016/j.rse.2019.02.003

**Bullock, E.**, Healey, S. P., Yang, Z., Houborg, R., Gorelick, N., Tang, X. & Andrianirina, C. (2022). Timeliness in Forest Change Monitoring: A New Assessment Framework Demonstrated using Sentinel-1 and a Continuous Change Detection Algorithm. Remote Sensing of Environment, 276, 113043. https://doi.org/10.1016/j.rse.2022.113043

Friedl, M. A., Woodcock, C., Olofsson, P., Zhu, Z., Loveland, T., Stanimirova, R., Arevalo, P., **Bullock, E.**, Hu, K.-T. & Zhang, Y. (2022). Medium spatial resolution mapping of global land cover and land cover change across multiple decades from Landsat. Frontiers in Remote Sensing, 3, 894571. https://doi.org/10.3389/frsen.2022.894571

Pasquarella, V., Arévalo, P., Bratley, K., **Bullock, E.**, Gorelick, N., Yang, Z. & Kennedy, R. (2022). Demystifying LandTrendr and CCDC temporal segmentation. International Journal of Applied Earth Observation and Geoinformation, 110, 102806. https://doi.org/10.1016/j.jag.2022.102806

Woltz, V. L., Peneva-Reed, E., Zhu, Z., **Bullock, E.**, MacKenzie, R. A., Apwong, M., Krauss, K. W. & Gesch, D. (2022). A comprehensive assessment of mangrove species and carbon stock on Pohnpei, Micronesia. PloS One, 17(7), e0271589. https://doi.org/10.1371/journal.pone.0271589

Zhang, Y., Woodcock, C., Arévalo, P., Olofsson, P., Tang, X., Stanimirova, R., **Bullock, E.**, Tarrio, K., Zhu, Z. & Friedl, M. (2022). A Global Analysis of the Spatial and Temporal

Variability of Usable Landsat Observations at the Pixel Scale. Remote Sensing, Section on Remote Sensing Time Series Analysis, 3, 894618. https://doi.org/10.3389/frsen.2022.894618

Aryal, R. R., Wespestad, C., Kennedy, R., Dilger, J., Dyson, K., **Bullock, E.**, Khanal, N., Kono, M., Poortinga, A., Saah, D. & Tenni. (2021). Lessons Learned While Implementing a Time-Series Approach to Forest Canopy Disturbance Detection in Nepal. Remote Sensing, 13(14), 2666. https://doi.org/10.3390/rs13142666

**Bullock, E.**, Healey, S., Yang, Z., Oduor, P., Gorelick, N., Omondi, S., Ouko, E. & Cohen, W. (2021). Three decades of land cover change in East Africa. Land, 10(2), 150. https://doi.org/10.3390/land10020150

**Bullock, E.** & Woodcock, C. (2021). Carbon loss and removal due to forest disturbance and regeneration in the Amazon. Science of The Total Environment, 764, 142839. https://doi.org/10.1016/j.scitotenv.2020.142839

Chen, S., Woodcock, C., **Bullock, E.**, Arévalo, P., Torchinava, P., Peng, S. & Olofsson, P. (2021). Monitoring temperate forest degradation on Google Earth Engine using Landsat time series analysis. Remote Sensing of Environment, 265, 112648. https://doi.org/10.1016/j.rse.2021.112648

Peneva-Reed, E., Krauss, K., **Bullock, E.**, Zhu, Z., Woltz, V., Drexler, J., Conrad, J. & Stehman, S. (2021). Carbon stock losses and recovery observed for a mangrove ecosystem following a major hurricane in Southwest Florida. Estuarine, Coastal and Shelf Science, 248, 106750. https://doi.org/10.1016/j.ecss.2020.106750

Arévalo, P., **Bullock, E.**, Woodcock, C. & Olofsson, P. (2020). A suite of tools for continuous land change monitoring in Google Earth Engine. Frontiers in Climate, 2, 576740. https://doi.org/10.3389/fclim.2020.576740

**Bullock, E.**, Nolte, C., Segovia, A. R. & Woodcock, C. (2020). Ongoing forest disturbance in Guatemala's protected areas. Remote Sensing in Ecology and Conservation, 6(2), 141–152. https://doi.org/10.1002/rse2.130

**Bullock, E.**, Woodcock, C. & Holden, C. (2020). Improved change monitoring using an ensemble of time series algorithms. Remote Sensing of Environment, 238, 111165. https://doi.org/10.1016/j.rse.2019.04.018

**Bullock, E.**, Woodcock, C. & Olofsson, P. (2020). Monitoring tropical forest degradation using spectral unmixing and Landsat time series analysis. Remote Sensing of Environment, 238, 110968. https://doi.org/10.1016/j.rse.2018.11.011

**Bullock, E.**, Woodcock, C., Souza, C. M. & Olofsson, P. (2020). Satellite-based estimates reveal widespread forest degradation in the Amazon. Global Change Biology, 26(5), 2956–2969. https://doi.org/10.1111/gcb.15029

Tang, X., **Bullock, E.**, Olofsson, P. & Woodcock, C. (2020). Can VIIRS continue the legacy of MODIS for near real-time monitoring of tropical forest disturbance? Remote Sensing of Environment, 249, 112024. https://doi.org/10.1016/j.rse.2020.112024

Pickett, B., Irvine, I. C., **Bullock, E.**, Arogyaswamy, K. & Aronson, E. (2019). Legacy effects of invasive grass impact soil microbes and native shrub growth. Invasive Plant Science and Management, 12(1), 22–35. https://doi.org/doi:10.1017/inp.2018.32

Tang, X., **Bullock, E.**, Olofsson, P., Estel, S. & Woodcock, C. (2019). Near real-time monitoring of tropical forest disturbance: New algorithms and assessment framework. Remote Sensing of Environment, 224, 202–218. https://doi.org/10.1016/j.rse.2019.02.003

**Bullock, E.**, Fagherazzi, S., Nardin, W., Vo-Luong, P., Nguyen, P. & Woodcock, C. (2017). Temporal patterns in species zonation in a mangrove forest in the Mekong Delta, Vietnam, using a time series of Landsat imagery. Continental Shelf Research, 148, 144–154. https://doi.org/10.1016/j.csr.2017.07.007

Olofsson, P., Holden, C., **Bullock, E.** & Woodcock, C. (2016). Time series analysis of satellite data reveals continuous deforestation of New England since the 1980s. Environmental Research Letters, 11(6), 064002. https://doi.org/10.1088/1748-9326/11/6/064002

**Bullock, E.** (2016). A two-stage stratified sampling design for Ministerio del Ambiente (MINAM) land cover change map assessment in Peru. Boston, MA: GFA Consulting Group.

## Conference Presentations

**Bullock, E.**, Healey S, Yang Z, Houborg R. & Andrianirina C. (2023, May 16-18). *The Disturbance Index Alert System: Near real-time forest change monitoring using multi-sensor data fusion* [Conference presentation]. ARD23 Satellite Data Interoperability Workshop, San Francisco, CA.

**Bullock, E.** (2023, February 22). *Monitoring Carbon Storage in Forests from Space* [Conference presentation]. Carbon Accounting: Observation from Space, Bangkok, Thailand.

**Bullock, E.**, Healey, S., Yang, Z., Acosta, C., Villalba, H., Insfrán, P., Melo, J. & Wilson, S. (2022, November 14-17). *Using GEDI and Landsat to Evaluate and Improve Paraguay's National Forest Inventory* [Conference presentation]. FIA Science Stakeholder Meeting, online.

**Bullock, E.**, Healey S., Yang Z., Houborg R. & Andrianirina C (2022, August 29 – September 3). *Near real-time deforestation alerts through fusion of Landsat, Sentinel-2, Sentinel-1, and daily Planet data: Testing the novel "Multi-Sensor Disturbance Index" in Madagascar.* Presentation at ForestSAT, Berlin, Germany.

**Bullock, E.** (2020, June 8). *Advances in time-series algorithms for tracking land cover change at global scales* [Webinar presentation]. PLACES Webinar, online.

**Bullock, E.**, Woodcock, C., Olofsson P. & Souza Jr, C. (2019, December 9-13). *Degradation Affected as much of the Amazon as Deforestation 1995-2017.* 2019 AGU Fall Meeting, San Francisco, CA.

**Bullock, E.**, Woodcock, C., Olofsson P., Souza Jr, C. (2019, October). *Degradation Affected as much of the Amazon as Deforestation 1995-2017.* Presentation at Pecora Conference, Baltimore, MD.

**Bullock, E.** (2019, September). *Continuous Degradation Detection (CODED)* [Conference breakout session]. Google Earth Engine Summit, Mountain View, CA.

**Bullock, E.**, Gorelick, N, Zhu, Z (2019, September). *Continuous Change Detection and Classification* [Conference breakout session]. Google Earth Engine Summit, Mountain View, CA.

**Bullock, E.** (2019, April 8-11). *Monitoring Forest Degradation and Deforestation on the Google Earth Engine* [Conference presentation]. GFOI Planery, Maputo, Mozambique.

**Bullock, E.**, Woodcock, C, & Olofsson, P (2018, October 1-5). *Monitoring tropical forest degradation in the Amazon Basin* [Conference presentation]. ForestSAT 2018, College Park, MD.

**Bullock, E.** & Woodcock, C. (2017, November 13-16). *Monitoring Tropical Forest Degradation Using Time Series Analysis of Landsat Data* [Conference presentation]. Pecora 20 Conference, Sioux Falls, South Dakota.

**Bullock, E.**, Woodcock, C. & Holden, C. (2017, November 13-16). *Multi-algorithm Sequencing for Land Cover Change Monitoring* [Conference presentation]. Pecora 20 Conference, Sioux Falls, South Dakota.

**Bullock, E.** & Woodcock, C. (2017, December 11-15). *Monitoring Tropical Forest Degradation Using Time Series Analysis of Landsat and Sentinel-2 Data* [Conference presentation]. 2017 AGU Fall Meeting, New Orleans, Louisiana.

**Bullock, E.** (2017, January 10-12). *Post-Processing CCDC Results Using Classical Approaches to Structural Break Detection* [Conference presentation]. 2017 Landsat Science Team Meeting, Boston, MA.

## Technical Workshops

**Bullock, E.** (2023, February 23 - March 2). *Monitoring Mangrove Forests with Continuous Change Detection and Classification (CCDC)* [Technical training presentation]. Research presentation at GISTDA-SilvaCarbon-CEOS Workshop on Uptaking Global AFOLU Datasets, Chanthaburi, Thailand. https://sites.google.com/site/gfoiseasiacapacitybuilding/gistda-silvacarbon-2023-ceos-workshop-on-uptaking-global-afolu-datasets

**Bullock, E.**, Healey, S, Zhiqiang, Y (2023, February 23 - March 2). *Biomass Estimation with GEDI and OBI-WAN* [Workshop teaching session]. GISTDA-SilvaCarbon-CEOS Workshop on Uptaking Global AFOLU Datasets, Pak Chong, Thailand. https://sites.google.com/site/gfoiseasiacapacitybuilding/gistda-silvacarbon-2023-ceos-workshop-on-uptaking-global-afolu-datasets

**Bullock, E.** (2022, October 5-11). *Detecting mangrove degradation, deforestation, and regrowth using Continuous Change Detection and Classification (CCDC)* [Technical training presentation]. SilvaCarbon Workshop on Mangrove Mapping and Carbon Estimation, Suva, Fiji. https://sites.google.com/view/gfoi-pacific-islands/home/2022/mangrove-mapping-and-monitoring

**Bullock, E.** (2022, October 5-11). *Integrating maps (mangrove-related activity data) and carbon stocks (emission factors)* [Technical training presentation]. SilvaCarbon Workshop on

Mangrove Mapping and Carbon Estimation, Suva, Fiji. https://sites.google.com/view/gfoi-pacific-islands/home/2022/mangrove-mapping-and-monitoring

**Bullock, E.** (2022, June 13). *Monitoring Forest Change Using Radar Data* [Workshop teaching session]. Capacity building webinar with the National Forestry Commission of Mexico, Ogden, Utah.

**Bullock, E.**, Healey, S, Yang, Z., Houborg, R., Gorelick, N., Tang, X., Andrianirina, C., (2021, December). *Timeliness in Forest Change Monitoring: A New Assessment Framework Demonstrated using Sentinel-1 and a Continuous Change Detection Algorithm* [Lead webinar instructor]. Sentinel-1 and Google Earth Engine Training, online. https://www.youtube.com/watch?v=JZbLokRI8as

**Bullock, E.**, Tenneson, K (2020, August 17-21). *Estimating Forest Degradation Using CODED* [Lead workshop instructor]. Estimation of Forest Degradation using CODED, Yaoundé, Cameroon.

**Bullock, E.**, Tenneson, K (2020, January 13-17). *Estimation of Forest Degradation using CODED* [Lead workshop instructor]. Estimation of Forest Degradation using CODED, Brazzaville, Republic of the Congo.

**Bullock, E.**, (2020, January 21-23). *Mapping IPCC Land Use Categories* [Lead workshop instructor]. Technical Support under the ISFL Jambi Program, Bogor, Indonesia.

**Bullock, E.**, Arevalo, P. & Woodcock, C. (2019, March). *Forest Degradation Mapping on Google Earth Engine* [Lead workshop instructor]*.* Boston University-Research Institute Of The Peruvian Amazon Workshop on Forest Disturbance Monitoring**,** Iquitos, Peru**.**

**Bullock, E.**, (2019, February 28 – March 6). *Monitoring Forest Degradation and Deforestation using Google Earth Engine* [Workshop teaching session]. Training in Google Earth Engine (GEE), Asunción, Paraguay. https://sites.google.com/site/talleresgeofct/2019/gee-infona-paraguay

**Bullock, E.**, (2019, March 6-8). *Monitoring Forest Degradation and Deforestation using Google Earth Engine* [Workshop teaching session]. USGS Silvacarbon Workshop on Monitoring Forest Degradation and Deforestation, Montevideo, Uruguay.

**Bullock, E.** (2018, July 30-31). *Monitoring Forest Degradation and Deforestation using Google Earth Engine* [Workshop teaching session]. Google Earth Engine and Degradation Training*,* San Jose, Costa Rica.

**Bullock, E.** & Gorelick, N. (2018, August 1-3). *Monitoring Forest Degradation and Deforestation using Google Earth Engine* [Workshop teaching session]. Google Earth Engine and Degradation Training, Lima, Peru.

**Bullock, E.** & Gorelick, N. (2018, July 30-31). *Monitoring Forest Degradation and Deforestation using Google Earth Engine* [Workshop teaching session]. Training Google Earth Engine and Degradation Training, Bogota, Colombia.

**Bullock, E.**, Olofsson, P (2018, March 19-23). *Statistical principles of design and analysis for accuracy assessment and area estimation* [Workshop teaching session]. SERVIR Applied Science Team Land Cover Mapping Meeting, Nairobi, Kenya.

**Bullock, E.** (2017, February 6-10). *BEEODA: a suite of open-source software and educational materials for processing Earth Observation data* [Technical training presentation]. GOFC-GOLD REDD+ Monitoring, and Measurement, Reporting and Verification Workshop, Adjiban, Ivory Coast. http://www.gofcgold.wur.nl/redd/redd_training_abidjan2017.php

**Bullock, E.** (2017, February 6-10). *Estimation of Uncertainties: Module Overview* [Technical training presentation]. GOFC-GOLD REDD+ Monitoring, and Measurement, Reporting and Verification Workshop, Adjiban, Ivory Coast. http://www.gofcgold.wur.nl/redd/redd_training_abidjan2017.php

**Bullock, E.** (2016, July 4-7). *BEEODA: a suite of open-source software and educational materials for processing Earth Observation data* [Technical training presentation]. GOFC-GOLD REDD+ Monitoring, and Measurement, Reporting and Verification Workshop, Lima, Peru. http://www.gofcgold.wur.nl/redd/redd_training_lima2016.php

**Bullock, E.** (2016, July). *Estimation of Uncertainties: Module Overview* [Technical training presentation]. GOFC-GOLD REDD+ Monitoring, and Measurement, Reporting and Verification Workshop, Lima, Peru. http://www.gofcgold.wur.nl/redd/redd_training_lima2016.php

**Bullock, E.** (2015, September 14-16). *Continuous Change Detection and Classification* [Technical training presentation]. Comparison of time series systems analysis methodologies for mapping forest cover change in Vietnam, Ho Chi Minh City, Vietnam. https://sites.google.com/site/gfoiseasiacapacitybuilding/vietnam-time-series-system-analysis-workshop

**Bullock, E.** (2015, June 1-3). *Continuous Change Detection and Classification* [Technical training presentation]. Second GFOI SilvaCarbon Workshop on Time Series Analysis for Forest Cover Change, Brazzaville, Republic of the Congo. https://sites.google.com/site/gfoiafricacapacitybuilding/home/second-gfoi-forest-monitoring-workshop

## Professional Presentations

**Bullock, E.** (2021, April 5). *Monitoring Forest Change Using Multi-Sensor Satellite Imagery* [Research presentation]. FIA Quaterly Science Series, online.

**Bullock, E.** (2018, August 7). *Earth observation data in support of carbon offset programs and conservation* [Research presentation]. State Street, Boston, MA.