K. Dana Chadwick

Water & Ecosystems Group (329F) *email:* dana.chadwick@jpl.nasa.gov
Jet Propulsion Laboratory *web*: https://science.jpl.nasa.gov/people/dana-chadwick

EDUCATION

2017 Ph.D., Earth System Science, Stanford University
Dissertation: Geomorphically driven biogeochemical gradients & their influence on tropical forest canopies

2008 B.S., Environmental Economics and Policy, University of California, Berkeley
Honors Thesis: Imperfect information and market failures in Lao livestock markets

2008 B.A., Molecular & Cell Biology, University of California, Berkeley
Genetics & Development track. Distinction: College of Letters & Sciences

RESEARCH POSITIONS

2021-	Scientist | Water & Ecosystems Group (329F), Jet Propulsion Laboratory
2021	Research Associate | Integrative Biology & Geological Sciences, UT Austin
2020	Postdoctoral Researcher| Dept. Earth System Science, Stanford University
2018 – 2019	NSF Postdoctoral Fellow | Stanford & Lawrence Berkeley National Lab
2017	Postdoctoral Researcher | Dept. of Global Ecology, Carnegie Institution
2011 – 2016	Graduate Researcher | Dept. of Global Ecology, Carnegie Institution
2011	Research Intern | Dept. of Global Ecology, Carnegie Institution

AWARDED GRANTS & FELLOWSHIPS

NSF Research Coordination Networks (2021): Patterns, Places, People: A Network for Scalable Airborne Observation of Socio-Environmental Systems. PI: A. Elmore. Role: Sr. Scientist

DOE Joint Genome Institute Community Science Program (2020). Title: Scaling microbial traits from genomes to watersheds through combined airborne hyperspectral imaging, soil biogeochemistry, and metagenome assembled genomes. PI: E. Brodie. Role: Listed co-lead investigator. *250 metagenomic reconstructions*

NSF Signals in the Soils EAGER (2018-2020). Title: Can remotely imaged vegetation characteristics provide a window into soil nutrient cycles? PI: K. Maher, Role: Sr. Scientist *$300,000*

Canadian Light Source, X-Ray absorption spectroscopy beamtime (2018-2020), *16 8-hour shifts awarded.*

NSF Earth Sciences Postdoctoral Fellowship (2018-2019) *$87,000 annually*

NASA Earth and Space Science Graduate Fellowship (2014-2016) *$30,000 annually*

PEER-REVIEWED PUBLICATIONS (* mentee)

Blonder, B., R. P.G. Brodrick, J.A. Walton, **K.D. Chadwick**, I. Breckheimer, S. Marchetti, C. Ray, K. Mock. Remote sensing of cytotype and its consequences for canopy damage in quaking aspen. *Global Change Biology*, 2022.

McCormick*, E., D. Dralle, W.J. Hahm, A. Tune, L. Schmidt, **K.D. Chadwick**, D. Rempe. Evidence for widespread woody plant use of water stored in bedrock. *Nature*, 2021.

Nagy R.C., et al. (inc. **K.D. Chadwick**). Harnessing the NEON Data Revolution to Advance Open Environmental Science with a Diverse and Data-Capable Community. *Ecosphere*, 2021. (*In Press*)

Blonder, B., C. Ray, K. Mock, M. Castaneda, **K.D. Chadwick**, M. Clyne, P. Gaüzère, L. Iversen, M. Lusk, G.R. Strimbeck, S. Troy, J.A. Walton. Environmental impacts on mortality and recruitment depend on genotype and ploidy level in quaking aspen. *Ecological Applications,* 2021.

Thompson, D.R., P.G. Brodrick, K. Cawse-Nicholson, **K.D. Chadwick**, R.O. Green, B. Poulter, S. Serbin, A. Shiklomanov, P. Townsend, K. Turpie. Spectral Fidelity of Earth's Terrestrial and Aquatic Ecosystems. *JGR: Biogeosciences* 2021. 10.1029/2021JG006273

Ordway, E.M, A.J Elmore., S. Kolstoe, J.E. Quinn, R. Swanwick, M. Cattau., D. Taillie., S.M. Guinn, **K.D. Chadwick**, J. Atkins, et al. Leveraging the NEON Airborne Observation Platform for socio-environmental systems research. *Ecosphere*, 2021. doi: 10.1002/ecs2.3640

Dralle, D. N., W.J. Hahm, **K.D. Chadwick**, E. McCormick*, D. Rempe. Technical note: Accounting for snow in the estimation of root-zone water storage capacity from precipitation and evapotranspiration fluxes, *Hydrology and Earth System Sciences*, 2021. doi: 10.5194/hess-25-2861-2021

Damerow J., C. Varadharajan, K. Boye, E. Brodie, M. Burrus, **K.D. Chadwick**, et al. Sample identifiers and metadata to support efficient data management, integration, and reuse in multidisciplinary ecosystem sciences. *Data Science Journal*, 2021. doi: 10.5334/dsj-2021-011

Maavara T, E.R. Sirila-Woodburn, R.M. Maxwell, F. Maina, J. Sample, **K.D. Chadwick**, R. Carroll, M. Newcomer, R.M. Couture, K.H. Williams, C.I. Steefel, N.J. Bouskill. Mechanistic modeling of geogenic and atmospheric nitrogen through the East River Watershed, Colorado Rocky Mountains. *PLOS ONE*, 2021. doi: 10.1371/journal.pone.0247907

Chadwick, K.D., P. Brodrick, K. Grant*, T. Goulden, A. Henderson*, N. Falco, H. Wainwright, K.H. Williams, M. Bill, I. Breckhiemer, E. Brodie, H Steltzer, C.F.R. Williams, B. Blonder, J. Chen, B. Dafflon, M. Hancher, A. Khurram, J Lamb, C Lawrence, M McCormick*, J Musinsky, S. Pierce, A. Polussa, M. Hastings Porro*, A. Scott*, H. Wu Singh, P. Sorensen, C. Varadharajan, B. Whitney, K. Maher. Integrating airborne remote sensing and field campaigns for ecology and Earth system science. *Methods in Ecology and Evolution*, 2020. doi: 10.1111/2041-210X.13463

Chadwick, K.D., G.P. Asner. Geomorphic transience moderates topographic controls on tropical canopy foliar traits. *Ecology Letters*, 2020. doi: 10.1111/ele.13531

Wainwright, H., C. Steefel; S. Trutner, A. Henderson*, E. Nikolopoulos, C. Wilmer, **K.D. Chadwick**, N. Falco, K. Schaettle, J. Brown, H. Steltzer, K. Williams, S. Hubbard, B. Enquist. Satellite-derived foresummer drought sensitivity of plant productivity in Rocky Mountain headwater catchments: spatial heterogeneity and geological-geomorphological control. *Environmental Research Letters*, 2020. doi: 10.1088/1748-9326/ab8fd0

Chadwick, K.D., G.P. Asner. Landscape evolution and nutrient rejuvenation reflected in Amazon forest canopy chemistry. *Ecology Letters*, 2018. doi: 10.1111/ele.12963

Martin, R.E., **K.D. Chadwick**, P.G. Brodrick, L. Carranza-Jimenez, N.R. Vaughn, G.P. Asner. An approach for foliar trait retrieval from airborne imaging spectroscopy of tropical forests. *Remote Sensing*, 2018. doi: 10.3390/rs10020199

Johnstone, S.A., **K.D. Chadwick**, M. Frias, G. Tagliaro, and G.E. Hilley. Soil development over mud-rich rocks produces landscape-scale erosional instabilities in the northern Gabilan Mesa, California. *Geological Society of America Bulletin*, 2017. doi: 10.1130/B31546.1

Chadwick, K.D., G.P. Asner. Organismic-scale remote sensing of canopy foliar traits in lowland tropical forests. *Remote Sensing*, 2016. doi: 10.3390/rs8020087.

Chadwick, K.D., G.P. Asner. Tropical soil nutrient distributions determined by biotic and hillslope processes. *Biogeochemistry*, 2016. doi: 10.1007/s10533-015-0179-z

Cleveland, C.C., P. Taylor, **K.D. Chadwick**, K. Dahlin, C.E. Doughty, Y. Malhi, W.K. Smith, B.W. Sullivan, W.R. Wieder, and A.R. Townsend. A comparison of plot-based, satellite and Earth system model estimates of tropical forest net primary production. *Global Biogeochemical Cycles*, 2015. doi: 10.1002/2014GB005022.

Asner, G.P., D.E. Knapp, R.E. Martin, R. Tupayachi, C. B. Anderson, J. Mascaro, F. Sinca, R. Vaudry, **K.D. Chadwick**, M. Higgins, W. Farfan, W. Llactayo, and M.R. Silman. Targeted carbon conservation at national scales with high-resolution monitoring. *Proceedings of the National Academy of Sciences*, 2014. doi: https://doi.org/10.1073/pnas.1419550111.

Mascaro, J., G.P. Asner, D.E. Knapp, T. Kennedy-Bowdoin, R.E. Martin, C.B. Anderson, M. Higgins, **K.D. Chadwick.** A tale of two "forests": random forest machine learning aids tropical forest carbon mapping. *PLOS ONE*, 2014. doi: 10.1371/journal.pone.0085993.

Asner, G.P., J.K. Clark, J. Mascaro, R. Vaudry, **K.D. Chadwick**, G. Vieilledent, M. Rasamoelina, A. Balaji, T. Kennedy-Bowdoin, L. Maatoug, M.S. Colgan, and D.E. Knapp. Human and environmental controls over aboveground carbon storage in Madagascar. *Carbon Balance and Management*, 2012. doi: 10.1186/1750-0680-7-2.

Asner, G.P., J.K. Clark, J. Mascaro, G.A. Galindo Garcıa, **K.D. Chadwick**, D.A. Navarrete Encinales, G. Paez-Acosta, E. Cabrera Montenegro, T. Kennedy-Bowdoin, A. Duque, A. Balaji, P. von Hildebrand, L. Maatoug, J.F. Phillips Bernal, D.E. Knapp, M.C. García Dávila, J. Jacobson, M.F. Ordóñez. High-resolution mapping of forest carbon stocks in the Colombian Amazon. *Biogeosciences*, 2012. doi: 10.5194/bg-9-2683-2012.

OTHER PUBLICATIONS

Chadwick O.A., J. Chorover, **K.D. Chadwick**, J. B. Bateman, E.W. Slessarev, M. Kramer, A. Thompson, P.M. Vitousek. Soil Development within the Hawaiian Time-Climate Matrix. in *Biogeochemistry of the Critical Zone*, eds: A. Wymore and J. Chorover. Springer Nature, 2021 (*In Press*).

Asner, G.P., S.L. Ustin, P.A. Townsend, R.E. Martin, **K.D. Chadwick**. Forest biophysical and biochemical properties from hyperspectral and LiDAR remote sensing. *Land Resources Modeling, Monitoring, and Mapping with Remote Sensing*, 2015. ISBN: 978-1-4822-1795-7.

Asner, G.P., D.E. Knapp, R.E. Martin, R. Tupayachi, C.B. Anderson, J. Mascaro, F. Sinca, **K.D. Chadwick**, S. Sousan, M. Higgins, W. Farfan, M.R. Silman, W.A.L. León, A.F.N. Palomino. The High-Resolution Carbon Geography of Perú, 2014. ISBN: 978-0-9913870-7-6.

PUBLISHED DATASETS (* mentee)

Chadwick K.D., P.G. Brodrick, K. Grant*, A. Henderson*, M. Bill, I. Breckheimer, C.F.R. Williams, T. Goulden, N. Falco, M. McCormick*, J. Musinsky, S. Pierce, M. Hastings Porro*, A. Scott*, E.L. Brodie, M. Hancher, H. Steltzer, H. Wainwright, K. Maher (2020): NEON AOP foliar trait maps, maps of model uncertainty estimates, and conifer map. *A Multiscale Approach to Modeling Carbon and Nitrogen Cycling within a High Elevation Watershed*. doi: 10.15485/1618133

Chadwick K.D., K. Grant*, A. Henderson*, I. Breckheimer. C.F.R. Williams, N. Falco, J. Chen, H. Henry, A. Khurram, J. Lamb, M. McCormick*, H. McOmber, S. Pierce, A. Polussa, M Hastings Porro*, A. Scott*, H. Wu Singh, B. Whitney, E. Brodie, R. Carroll, C. Dewey, L. Kueppers, T. Maavara, H. Steltzer, K. Williams, K. Maher (2020): Locations, metadata, and species cover from field sampling survey associated with NEON AOP survey, East River, CO 2018. *Watershed Function SFA*. doi: 10.15485/1618130

Chadwick K.D., K. Grant*, A. Henderson*, A. Scott*, M. McCormick*, S. Pierce, M. Hastings Porro*, K. Maher (2020): Leaf mass per area and leaf water content measurements from field survey in association with NEON AOP survey, East River, CO 2018. *A Multiscale Approach to Modeling Carbon and Nitrogen Cycling within a High Elevation Watershed*. doi: 10.15485/1618132

Chadwick, K.D., K. Grant*, M. Bill, A. Henderson*, A. Scott*, K. Maher (2020). Site-level Foliar C, N, delta13C data from samples collected during field survey associated with NEON AOP survey, East River, CO 2018. *A Multiscale Approach to Modeling Carbon and Nitrogen Cycling within a High Elevation Watershed*. doi:10.15485/1631278

Chadwick K.D., S. Pierce, M. Sirles, C. Lawrence, J. Cullen, K. Grant*, N. Falco, K. Maher, B. Dafflon (2020). Soil bulk density and texture data collected during field survey associated with NEON AOP survey, East River, CO 2018. *A Multiscale Approach to Modeling Carbon and Nitrogen Cycling within a High Elevation Watershed*. doi:10.15485/1671826

Brodrick P.G., T. Goulden, **K.D. Chadwick** (2020): Custom NEON AOP reflectance mosaics and maps of shade masks, canopy water content. *Watershed Function SFA*. doi: 10.15485/1618131

Goulden T., B. Hass, E.L. Brodie, **K.D. Chadwick**, N. Falco, K. Maher, H. Wainwright, K. Williams (2020): NEON AOP Survey of upper East River CO watersheds: LAZ files, LiDAR surface elevation, terrain elevation, and canopy height rasters. *Watershed Function SFA*. doi: 10.15485/1617203

Goulden T, D. Hulslander, B. Hass, E.L. Brodie, **K.D. Chadwick**, N. Falco, K. Maher, H. Wainwright, K. Williams (2020): NEON AOP imaging spectroscopy survey of Upper East River Colorado watersheds: Raw-space radiance and observational variable dataset. *Watershed Function SFA*. doi: 10.15485/1617204

FIELD SAMPLING CAMPAIGNS

SBG HIgh Frequency Timeseries (SHIFT) Campaign at Sedgwick Reserve & Dangermond Perserve, California (Febuary – May 2022). Field team lead for trait sample collection. *Data collection ongoing.*

Rocky Mountain Biological Laboratory, Gothic, Colorado (July 2019). Completed crown delineation ground-truth work for collaboration with B. Blonder on aspen ploidy mapping using NEON AOP surveys from 2018. *Co-author manuscript published, co-author manuscript in review.*

Rocky Mountain Biological Laboratory, Gothic, Colorado (June-October 2018). Led field ground-truth sampling campaign and coordination with flight team for first task-able National

Ecological Observatory Network Airborne Observation Platform aerial surveys. *First author manuscript published, 3 co-author manuscripts published, coauthor manuscripts in prep, analyses ongoing.*

Rocky Mountain Biological Laboratory, Gothic, Colorado (July, 2017). Foliar collection, vegetation surveys, biomass surveys, and soil sample collection. *Analysis ongoing, coauthor manuscript in prep.*

Kosñipata Valley, Peru (January-February 2017). Soil sampling, GPS data collection along an elevation gradient from the Amazon basin to Andean tree-line to complement Carnegie Airborne Observatory (CAO) imaging spectroscopy and LiDAR data. *Analysis ongoing.*

Danum Valley, Danau Girang Field Centre, Sepilok; Sabah, Malaysia (May, July 2016). Tree crown geolocation, and foliar sampling in support of CAO airborne assessment of state-wide foliar characteristics. *Co-author manuscript published & second in review.*

Mt. Kinabalu Park; Sabah, Malaysia (March-April, 2016). Soil and foliar sampling and tree crown geolocation in support of landscape scape study on distributions of biogeochemical properties along substrate-elevation matrix utilizing imaging spectroscopy data from CAO. *First-author manuscript published.*

Gabilan Mesa, California (brief, 2015). Assisted soil sampling and geomorphic assessment. *Co-author manuscript published.*

Los Amigos Biological Station, Madre de Dios, Peru (July-August 2013, July-August 2014). Soil sampling, foliar sampling, GPS data collection in support of airborne assessment of landscape scale biogeochemical properties. *Three first-author manuscripts published.*

Tarapoto, Peru (August-September 2012). Assisted in on-board data collection, progress tracking, and data post-processing for Carnegie Airborne Observatory northern Peru campaign. *Two co-author manuscripts published.*

Vientiane, Laos (June-August 2007). Market and household surveys in support of honors thesis.

INVITED PRESENTATIONS AND SEMINARS

Chadwick, K.D. 2020. Filling in the gaps: Utilizing high-resolution remote sensing to understand ecosystem development. *Ecological Society of America Meeting, Virtual.*

Chadwick, K.D. 2020. Utilizing imaging spectroscopy for characterizing environmental properties and the potential for synthesis. *People, Land, & Ecosystems: Leveraging NEON for Socio-Environmental Synthesis Workshop, SESYNC, University of Maryland.*

Chadwick, K.D. 2019. Landscape evolution as a driver of ecosystem organization. *Water, Climate, and Environment seminar series, University of Texas at Austin.*

Chadwick, K.D & K. Maher**.** 2019. Utilizing hyperspectral characterization of vegetation to estimate soil properties across landscapes. *Soil Science Society of America Meeting, San Antonio, TX.*

Chadwick, K.D. 2019. Landscape-Scale biogeochemistry with the NEON AOP: ground truthing, collaboration, and accessibility. *NEON Science Summit Plenary, Earth Lab, CU Boulder.*

Chadwick, K.D. 2019. Landscape evolution as a driver of ecosystem organization. *Institute of Ecology and Evolution seminar series, University of Oregon.*

Chadwick, K.D. 2019. Predicting soil carbon organization & drivers across landscapes. *Soil Science Society of America Meeting, San Diego, CA.*

Chadwick, K.D. 2018. Utilizing remotely sensed foliar characteristics to understand landscape-scale critical zone processes. *Biogeosciences seminar series, University of California, Santa Barbara.*

Chadwick, K.D. 2018. Getting to basin scale: building surface-subsurface predictive relationships. *DOE Watershed Function Special Focus Area 2018 Retreat, Crested Butte, CO.*

Chadwick, K.D. & G.P. Asner. 2018. Understanding foliar trait distributions across a tropical substrate-elevation matrix using integrated imaging spectrometer and LiDAR datasets. *Ecological Society of America Meeting, New Orleans, LA.*

Chadwick, K.D. 2017. Geomorphically driven biogeochemical gradients and their influence on tropical canopies. *Department of Biology seminar series, Sonoma State University.*

Chadwick, K.D. & G.P. Asner. 2016. Using imaging spectroscopy to assess geomorphically driven gradients in canopy traits within a tropical terrace landscape. *Ecological Society of America Meeting, Fort Lauderdale, FL.*

Chadwick, K.D. & G.P. Asner. 2014. Exploring patterns of rock derived nutrient availability and soil chemistry along hillslopes in the Peruvian Amazon. *Goldschmidt2014 Sacramento, CA.*

Chadwick, K.D. & G.P. Asner. 2013. Linking terrace geomorphology and nutrient availability using high-resolution airborne remote sensing. *American Geophysical Union Fall Meeting, San Francisco, CA.*

SELECTED PRESENTATIONS (* mentee)

Bloom D.E.*, **K.D. Chadwick**, N. Falco, A. Henderson*, C. Ulrich, K. Maher, M. Bill, K. Grant*, H.M. Wainwright. 2020. Functional Vegetation Trait Trends between Five Vegetation Types and Environmental Covariations in the East River Watershed, CO. *American Geophysical Union Fall Meeting, Virtual.*

Chadwick, K.D. & G.P. Asner. 2019. Hillslope controls on tropical canopy characteristics are moderated by transient landscape evolution across an elevation gradient. *American Geophysical Union Fall Meeting, San Francisco, CA.*

Wilmer, C*., A. Henderson*, H. Steltzer, **K.D. Chadwick**, Y. Wu, E. Brodie, K. Williams, S. Hubbard. 2019. Hyperspectral sensing, evapotranspiration, and harvests of plant canopies in a mountain watershed help to understand what part plants play in seasonal water budget. *American Geophysical Union Fall Meeting, San Francisco, CA.*

McCormick, M*., **K.D. Chadwick**, M. Winnick, K. Maher. 2019. Breathing soils: implications of small-scale spatial variations in seasonal soil CO_2 respiration in a Rocky Mountain subalpine meadow. *American Geophysical Union Fall Meeting, San Francisco, CA.*

Chadwick, K.D. & G.P. Asner. 2018. Utilizing remotely sensed foliar characteristics to understand landscape-scale critical zone processes. *Goldschmidt2018 Boston, Massachusetts.*

Chadwick, K.D. L. Bentley, B. Enquist, V. Savage, G.P. Asner. 2017. Hillslope nutrient distributions across an Andean elevation gradient. *Ecological Society of America Meeting, Portland, OR.*

Chadwick, K.D. & G.P. Asner. 2015. Imaging spectroscopy of canopy nutrients on complex Amazonian landscapes. *HyspIRI Science and Applications Workshop, Pasadena, CA.*

Chadwick, K.D. & G.P. Asner. 2012. Landscape scale tropical forest dynamics: relating canopy traits and topographically derived hydrologic indices in a lowland system using CAO-AToMS. *American Geophysical Union Fall Meeting, San Francisco, CA.*

TEACHING AND MENTORSHIP ACTIVITIES

Stanford Earth Summer Undergraduate Research Program Mentor. Stanford University, 2020

Stanford Earth Summer Undergraduate Research Program Mentor. Stanford University, 2018

Co-Instructor, EARTHSYS 111: Biology and Global Change. Instructor for half of the course focused on terrestrial ecosystems. Stanford University, 2018

Mentor to six undergraduate students. Department of Biology, Sonoma State University, 2017

Stanford Earth Summer Undergraduate Research Program Mentor. Stanford University, 2015

Head Teaching Assistant, EARTHSYS 306: An Earth System Perspective to Global Challenges. Stanford University, 2014

Teaching Assistant, EARTHSYS 155: Science of Soils. Stanford University, 2014

Stanford Earth Systems Undergraduate Internship Mentor. Stanford University, 2014-2015

SERVICE, LEADERSHIP, AND DEVELOPMENT

Member, Airborne Sampling Design Technical Working Group, National Ecological Observatory Network (2018-present)

Member, Foliar Sampling Technical Working Group, National Ecological Observatory Network (2017-present)

Plenary Speaker, NEON Science Summit Workshop, Earth Lab, Boulder, CO (2019)

Participant, NCAR-NEON Workshop: Predicting Life in the Earth System – linking the geosciences and ecology, Boulder, CO (2019)

Working Group Participant, Leveraging Distributed Research Networks to Understand Watershed Systems, DOE Biological and Environmental Research Program, Washington DC (2019)

Student, Advancing Learning Through Evidence-Based STEM Teaching, Center for Integrated Research Teaching and Learning, Stanford (2018)

Member, Biogeochemistry Technical Working Group, National Ecological Observatory Network (2017-2018)

Graduate Voice & Influence Program Fellow, Clayman Institute for Gender Research, Stanford University (2015-2016)

Graduate Student Representative. Hiring committee Water and Land Resources faculty search. Stanford University (2015)

Committee member, student committee for improving first year graduate core curriculum in Dept. of Environmental and Earth System Science. Stanford University (2014)

Stanford Reactive Transport Summer School (StaRT) Participant, Stanford University (2014).

Participant, Revisiting nutrient limitation in tropical forests working group, National Center for Ecological Analysis, Santa Barbara, CA (2013)

GRADUATE MENTEES

Kathleen Grant, USC

UNDERGRADUATE & POSTGRADUATE MENTEES

Scott Roycroft, Stanford University
Lucas Del Toro, Stanford University
Heather Herman, Stanford University
Anthony Chui, Sonoma State University
Dino Sbardellati, Sonoma State University
Maceo Hastings Porro, Stanford University
Maeve McCormick, Stanford University
Douglas Ovick, Sonoma State University
Makenzie Crews, Sonoma State University
Bailey Crocker, Sonoma State University
Emily Humphree, Sonoma State University
Andea Scott, Stanford University
Amanda Henderson, RMBL
Mitchell Zimmerman, Stanford University
Chelsea Wilmer, CSU
Dellena Bloom, LBNL