

K. Dana Chadwick

Dept. Earth System Science
Stanford University

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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

- present 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

FELLOWSHIPS

- NSF Earth Sciences Postdoctoral Fellowship (2018-2019) \$87,000 annually
- NASA Earth and Space Science Graduate Fellowship (2014-2016) \$30,000 annually

AWARDED GRANTS

- NSF Signals in the Soils EAGER (2018-2020), PI: K. Maher, Sr. Scientist: K. D. Chadwick \$300,000
- Canadian Light Source, X-Ray absorption spectroscopy beamtime (2018-2020), 16 8-hour shifts awarded.
- Stanford McGee and Levorsen Research Grant (2014) \$4,000
- Travel Grant, AGU Chapman Conference on Soil-mediated Drivers of Coupled Biogeochemical and Hydrological Processes Across Scales (2013) \$1,000

PEER-REVIEWED PUBLICATIONS (* mentee)

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*, In Press.

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: 10.1186/1750-0680-7-2.
- 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 Garcia, **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.

MANUSCRIPTS IN REVIEW (* mentee)

- Brodrick P.G., L. Evans, R. Martin, **K.D. Chadwick**, N. Vaughn, J. Heckler, D. Knapp, G.P. Asner. Strategic conservation: integrating forest carbon and biodiversity protection. (*In Review*).

Blonder, B., R. Courtenay, 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. (*In Review*)

OTHER PUBLICATIONS

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 Peru, 2014. ISBN: 978-0-9913870-7-6.

PUBLISHED DATASETS

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

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

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

FIELD SAMPLING CAMPAIGNS

- 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 in review, analyses ongoing.*
- 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 in press, co-author manuscript in prep, analyses ongoing.*
- Rocky Mountain Biological Laboratory, Gothic, Colorado (July, 2017). Foliar collection, vegetation surveys, biomass surveys, and soil sample collection. *Analysis ongoing.*
- 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 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)

- 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 CO₂ respiration in a Rocky Mountain subalpine meadow. *American Geophysical Union Fall Meeting, San Francisco, CA.*
- Blonder, B., P. Brodrick, C. Ray, **K.D. Chadwick**. 2019. Ploidy level - environment interactions predict mortality and recruitment in quaking aspen. *American Geophysical Union Fall Meeting, San Francisco, CA.*

- Brodie E, et al. 2019. Hundreds and thousands of microbial genomes. What to do? How to scale? *American Geophysical Union Fall Meeting, San Francisco, California.*
- 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. *HypIRI 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
- Postdoc Teaching Certificate program participant, Stanford University (2018-present)
- 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)
- 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)

WORK EXPERIENCE

2008 – 2011 Independent Contractor; Project Manager; Analyst | 3Degrees Group, Inc.

- Managed contracting, budgeting and fulfillment on multiple consulting projects
- Researched and analyzed renewable energy regulations and market conditions to inform national and regional scale trading strategies
- Explored relationships between carbon sequestration and biomass renewable energy production strategies and regulations nationally
- Collaborated on development of environmental commodities portfolio management and market analysis database
- Assessed feasibility of proposed renewable projects for utility investment

POSTDOCTORAL ADVISORS

Kate Maher, Stanford University
Eoin Brodie, Lawrence Berkeley National Lab

GRADUATE ADVISORS

Gregory Asner, Carnegie Institution for Science
Christopher Field, Stanford University

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
Kathleen Grant, USC
Mitchell Zimmerman, Stanford University
Chelsea Wilmer, CSU
Dellena Bloom, LBNL