

Curriculum Vitae

Fabian Daniel Schneider

Nationality: Swiss
Institution: California Institute of Technology / NASA Jet Propulsion Laboratory, M/S 233-300,
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Date of birth: 9 February 1987

Education

2014-2018 **PhD candidate at the Remote Sensing Laboratories, University of Zurich**
University Research Priority Program on Global Change and Biodiversity URPP GCB
PhD Thesis: Remotely sensing functional diversity of temperate forest ecosystems

2011-2013 **Master of Science, University of Zurich**
Major: Geography with specialization in Remote Sensing
MSc Thesis: Simulating imaging spectrometer data – 3D forest modeling based on lidar and in situ data

2007-2011 **Bachelor of Science, University of Zurich**
Major: Geography
BSc Thesis: Evaluation aktueller Fernerkundungsansätze zur Schätzung der Bruttoprimärproduktion auf kontinentaler und globaler Ebene
Minor: Computer Science
Term Paper: Automatic generalization and simplification of massive vector and network maps

Professional Experience

2018-present **Postdoctoral Research Associate, NASA Jet Propulsion Laboratory, California Institute of Technology**

Teaching, Seminars and Supervision

2018 - 2019 Seminar talks at University of Wisconsin-Madison, namely in the Forest and Wildlife Ecology Seminar, and California Institute of Technology / Jet Propulsion Laboratory, namely in the Carbon Club and Imaging Spectroscopy Science Algorithms and Calibration Seminar

2017 - 2018 MSc co-supervision, Isabelle Helfenstein. Title: Mapping functional diversity from physiological forest traits at different spatial scales - upscaling from airborne imagery to satellite remote sensing

2014 - 2017 Teaching assistant for various courses within the Department of Geography, University of Zurich. Namely: *GEO113* Fernerkundung und Geographische Informationswissenschaft I - Earth Perspectives, *GEO123* Fernerkundung und Geographische Informationswissenschaft II - Introduction to Cartography and Geovisualisation, *GEO229* Small Group Teaching in Geography, *GEO233* Fernerkundung und Geographische Informationswissenschaft III - Grundlagen Fernerkundung;
Seminar talk in *GEO441* Colloquium in Remote Sensing;
Lead of the biodiversity journal club at the University of Zurich, URPP Global Change and Biodiversity

Awards

- 2018 Distinction of the Natural Science Faculty of the University of Zurich for the PhD thesis
2014 Karl Kraus-Nachwuchsförderpreis, Karl Kraus Young Scientist Award (second place)
2013 Distinction of the Natural Science Faculty of the University of Zurich for the MSc thesis

Grants

- 2021 Awarded NASA ROSES A.7 Biodiversity**
Science-PI BioCube: Integrating remote sensing and in-situ dimensions of biodiversity to understand plant and animal community composition and dynamics at large scales (**\$853K**)
- 2021 Awarded NASA ROSES A.8 GEDI Science Team**
Co-I Functional diversity-biomass relationships across continents and intactness gradients (**\$467K**)
- Pending NASA ROSES A.5 Carbon Cycle Science**
Co-I Functional diversity and the response of tropical forests to climate change (**\$969K**)

Invited Oral Presentations

- 2020 Biodiversity monitoring from space – towards large-scale mapping of functional diversity with imaging spectroscopy and lidar. Ecological Society of America Annual Meeting, Salt Lake City / Virtual Meeting, USA.
- 2020 The future of remote sensing of biodiversity. World Biodiversity Forum, Davos, Switzerland.
- 2017 Remote sensing of functional diversity using morphological and physiological forest traits. British Ecological Society - Ecology Across Borders, Ghent, Belgium.

Invited Workshops and Synergistic Activities

- 2020 World Bank International Workshop of Experts, Disrupting Carbon Stock Dynamics Estimation for results-based payments, Participant
- 2020 National Science Foundation (NSF, award #1924942): Forest Structural Diversity, Participant
- 2018 Keck Institute for Space Studies (KISS): Unlocking a New Era in Biodiversity Science: Linking Integrated Space Based and In-Situ Observations, Participant
- 2015 National Center for Ecological Analysis and Synthesis (NCEAS): Prospects and priorities for satellite monitoring of global terrestrial biodiversity, Working group participant

Journal Reviewer for: Nature Communications, Nature Ecology and Evolution, Nature Geoscience, Global Change Biology, Environmental Research Letters, Remote Sensing of Environment, Remote Sensing, Methods in Ecology and Evolution, Ecological Applications, Biogeosciences, Applied Sciences, eLife Sciences

Subject Matter Editor for: Ecological Applications

Proposal Reviewer for: Expert Review Panel for the NASA Terrestrial Ecology and Ecological Forecasting Program

Conference Session Organizer for: Ecological Society of America Annual Meeting, organized session “Advances in Biodiversity Science with Remote Sensing” reviewed and accepted for the 2021 Annual Meeting

Additional information

Mother tongue German
Additional languages English (proficient), French (basic)

List of Publications

Published, Peer-Reviewed Articles

- Cawse-Nicholson, K., Townsend, P.A., Schimel, D., Assiri, A.M., Pamela, L.B., Buongiorno, M.F., Campbell, P., Nimrod, C., Casey, K.A., Correa-Pabón, R.A., Dahlin, K.M., Dashti, H., Dennison, P., Dierssen, H., Erickson, A., Fisher, J.B., Frouin, R., Gatebe, C.K., Gholizadeh, H., Gierach, M., Glenn, N.F., Goodman, J.A., Griffith, D.M., Guild, L., Hakkenberg, C.R., Hochberg, E.J., Holmes, T.R.H., Hu, C., Hulley, G., Huemmrich, K.F., Kudela, R.M., Kokaly, R.F., Lee, C.M., Martin, R., Miller, C.E., Moses, W.J., Muller-Karger, F.E., Ortiz, J.D., Otis, D.B., Pahlevan, N., Painter, T.H., Pavlick, R., Poulter, B., Qi, Y., Realmuto, V.J., Roberts, D., Schaepman, M.E., **Schneider, F.D.**, Schwandner, F.M., Serbin, S.P., Shiklomanov, A.N., Stavros, E.N., Thompson, D.R., Torres-Perez, J.L., Turpie, K.R., Tzortziou, M., Ustin, S., Yu, Q., Yusup, Y., Zhang, Q., & the Algorithms Working Group Community (2021). A compilation of surface imaging algorithms: NASA's Surface Biology and Geology Designated Observable. *Remote Sensing of Environment*, 257, 112349. <https://doi.org/10.1016/j.rse.2021.112349>
- Rocchini, D., Thouverai, E., Marcantonio, M., Iannacito, M., Da Re, D., Torresani, M., Bacaro, G., Bazzichetto, M., Bernardi, A., Foody, G.M., Furrer, R., Kleijn, D., Larsen, S., Lenoir, J., Malavasi, M., Marchetto, E., Messori, F., Montagni, A., Moudrý, V., Naimi, B., Ricotta, C., Rossini, M., Sanit, F., Santos, M.J., Schaepman, M.E., **Schneider, F.D.**, Schuh, L., Silvestri, S., Símová, P., Skidmore, A.K., Tattoni, C., Tordoni, E., Vicario, S., Zannini, P., & Wegmann, M. (2021). Rasterdiv – an Information Theory tailored R package for measuring ecosystem heterogeneity from space: to the origin and back. *Methods in Ecology and Evolution*, Accepted Author Manuscript. <https://doi.org/10.1111/2041-210X.13583>
- Rocchini, D., Marcantonio, M., Da Re, D., Bacaro, G., Feoli, E., Foody, G.M., Furrer, R., Harrigan, R.J., Kleijn, D., Iannacito, M., Lenoir, J., Lin, M., Malavasi, M., Marchetto, E., Meyer, R.S., Moudrý, V., Payne, D., **Schneider, F.D.**, Símová, P., Thornhill, A.H., Thouverai, E., Vicario, S., Wayne, R.K., & Ricotta, C. (2021). From zero to infinity: minimum to maximum diversity of the planet by spatio-parametric Rao's quadratic entropy. *Global Ecology and Biogeography*, 00, 1– 10. <https://doi.org/10.1111/geb.13270>
- Zheng, Z., Zeng, Y., **Schneider, F.D.**, Zhao, Y., Zhao, D., Schmid, B., Schaepman, M.E., & Morsdorf, F. (2021). Mapping functional diversity using individual tree-based morphological and physiological traits in a subtropical forest. *Remote Sensing of Environment*, 252, 112170. <https://doi.org/10.1016/j.rse.2020.112170>
- Kükenbrink, D., **Schneider, F.D.**, Schmid, B., Gastellu-Etchegorry, J.-P., Schaepman, M.E., & Morsdorf, F. (2021). Modelling of three-dimensional, diurnal light extinction in two contrasting forests. *Agricultural and Forest Meteorology*, 296, 108230. <https://doi.org/10.1016/j.agrformet.2020.108230>
- Schneider, F.D.**, Ferraz, A., Hancock, S., Duncanson, L.I., Dubayah, R.P., Pavlick, R.P., & Schimel, D.S. (2020). Towards mapping the diversity of canopy structure from space with GEDI. *Environmental Research Letters*. <https://doi.org/10.1088/1748-9326/ab9e99>
- Morsdorf, F., **Schneider, F.D.**, Guillén-Escribà, C., Kükenbrink, D., Leiterer, R., & Schaepman, M.E. (2020). The Laegeren Site: An Augmented Forest Laboratory. In J. Cavender-Bares, J.A. Gamon & P.A. Townsend (Eds.). *Remote Sensing of Plant Biodiversity* (pp. 83-104). https://doi.org/10.1007/978-3-030-33157-3_4
- Czyż, E.A., Guillen Escriba, C., Wulf, H., Tedder, A., Schuman, M.C., **Schneider, F.D.**, & Schaepman, M.E. (2020). Intraspecific genetic variation of a *Fagus sylvatica* population in a temperate forest derived from airborne imaging spectroscopy time series. *Ecology and Evolution*, 10 (14), 7419-7430. <https://doi.org/10.1002/ece3.6469>

- Paul-Limoges, E., Wolf, S., **Schneider, F. D.**, Longo, M., Moorcroft, P., Gharun, M., & Damm, A. (2020). Partitioning evapotranspiration with concurrent eddy covariance measurements in a mixed forest. *Agricultural and Forest Meteorology*, 280, 107786. <https://doi.org/10.1016/j.agrformet.2019.107786>
- Thonicke, K., Billing, M., Bloh, W., Sakschewski, B., Niinemets, Ü., Peñuelas, J., Cornelissen, J.H.C., Onoda, Y., van Bodegom, P., Schaepman, M.E., **Schneider, F.D.**, & Walz, A. (2020). Simulating functional diversity of European natural forests along climatic gradients. *Journal of Biogeography*, 47 (5), 1069-1085. <https://doi.org/10.1111/jbi.13809>
- Schneider, F. D.**, A. Ferraz, & Schimel, D. (2019). Watching Earth's interconnected systems at work, *EOS*, 100. <https://doi.org/10.1029/2019EO136205>
- Schneider, F. D.**, Kükenbrink, D., Schaepman, M. E., Schimel, D. S., & Morsdorf, F. (2019). Quantifying 3D structure and occlusion in dense tropical and temperate forests using close-range LiDAR. *Agricultural and Forest Meteorology*, 268, 249–257. <https://doi.org/10.1016/j.agrformet.2019.01.033>
- Schimel, D., **Schneider, F. D.**, & JPL Carbon and Ecosystem Participants (2019). Flux towers in the sky: global ecology from space. *New Phytologist*, 224 (2), 570–584. <https://doi.org/10.1111/nph.15934>
- Kükenbrink, D., Hueni, A., **Schneider, F. D.**, Damm, A., Gastellu-Etchegorry, J.-P., Schaepman, M. E., & Morsdorf, F. (2019). Mapping the Irradiance Field of a Single Tree: Quantifying Vegetation-Induced Adjacency Effects. *IEEE Transactions on Geoscience and Remote Sensing*, 57 (7), 4994-5011. <https://doi.org/10.1109/TGRS.2019.2895211>
- Damm, A., Paul-Limoges, E., Haghighi, E., Simmer, C., Morsdorf, F., **Schneider, F. D.**, van der Tol, C., Migliavacca, M., & Rascher, U. (2018). Remote sensing of plant-water relations: An overview and future perspectives. *Journal of Plant Physiology*, 227, 3-19. <https://doi.org/10.1016/j.jplph.2018.04.012>
- Fawcett, D., Verhoef, W., Schläpfer, D., **Schneider, F. D.**, Schaepman, M. E., & Damm, A. (2018). Advancing retrievals of surface reflectance and vegetation indices over forest ecosystems by combining imaging spectroscopy, digital object models, and 3D canopy modelling. *Remote Sensing of Environment*, 204, 583–595. <https://doi.org/10.1016/j.rse.2017.09.040>
- Morsdorf, F., Kükenbrink, D., **Schneider, F. D.**, Abegg, M., & Schaepman, M. E. (2018). Close-range laser scanning in forests: towards physically based semantics across scales. *Interface Focus*, 8(2), 20170046. <https://doi.org/10.1098/rsfs.2017.0046>
- Schneider, F. D.**, Morsdorf, F., Schmid, B., Petchey, O. L., Hueni, A., Schimel, D. S., & Schaepman, M. E. (2017). Mapping functional diversity from remotely sensed morphological and physiological forest traits. *Nature Communications*, 8 (1), 1441. <https://doi.org/10.1038/s41467-017-01530-3>
- Yamasaki, E., Altermatt, F., Cavender-Bares, J., Schuman, M. C., Zuppinger-Dingley, D., Garonna, I., **Schneider, F.D.**, Guillén Escribà, C., van Moorsel, S.J., Hahl, T., Schmid, B., Schaepman-Strub, G., Schaepman, M.E., & Shimizu, K. K. (2017). Genomics meets remote sensing in global change studies: monitoring and predicting phenology, evolution and biodiversity. *Current Opinion in Environmental Sustainability*, 29, 177–186. <https://doi.org/10.1016/j.cosust.2018.03.005>
- Morsdorf, F., Eck, C., Zraggen, C., Imbach, B., **Schneider, F. D.**, & Kükenbrink, D. (2017). UAV-based LiDAR acquisition for the derivation of high-resolution forest and ground information. *Leading Edge*, 36 (7), 566-570. <https://doi.org/10.1190/tle36070566.1>

Kükenbrink, D., **Schneider, F. D.**, Leiterer, R., Schaepman, M. E., & Morsdorf, F. (2017). Quantification of hidden canopy volume of airborne laser scanning data using a voxel traversal algorithm. *Remote Sensing of Environment*, 194, 424–436. <https://doi.org/10.1016/j.rse.2016.10.023>

Jetz, W., Cavender-Bares, J., Pavlick, R., Schimel, D., Davis, F. W., Asner, G. P., Guralnick, R., Kattge, J., Latimer, A.M., Moorcroft, P., Schaepman, M.E., Schildhauer, P., **Schneider, F.D.**, Schrod, F., Stahl, U. & Ustin, S. L. (2016). Monitoring plant functional diversity from space. *Nature Plants*, 2 (3), 16024. <https://doi.org/10.1038/nplants.2016.24>

Schaepman, M.E., Jehle, M., Hueni, A., D'Odorico, P., Damma, A., Weyermann, J., **Schneider, F.D.**, Laurent, V., Popp, C., Seidel, F.C., Lenhard, K., Gege, P., Küchler, C., Brazile, J., Kohler, P., De Vos, L., Meuleman, K., Meynart, R., Schläpfer, D., Kneubühler, M. & Itten, K.I. (2015). Advanced radiometry measurements and Earth science applications with the Airborne Prism Experiment (APEX). *Remote Sensing of Environment*, 158 (1), 207–219. <https://doi.org/10.1016/j.rse.2014.11.014>

Schneider, F. D., Leiterer, R., Morsdorf, F., Gastellu-Etchegorry, J.-P., Lauret, N., Pfeifer, N., & Schaepman, M. E. (2014). Simulating imaging spectrometer data: 3D forest modeling based on LiDAR and in situ data. *Remote Sensing of Environment*, 152, 235–250. <https://doi.org/10.1016/j.rse.2014.06.015>

Accepted Articles

Lin, M., Simons, A.L., Curd, E.E., Harrigan, R.J., **Schneider, F.D.**, Ruiz-Ramos, D. V., Gold, Z., Osborne, M.G., Shirazi, S., Schweizer, T.M., Moore, T.N., Fox, E.A., Turba, R., Garcia-Vedrenne, A.E., Helman, S.K., Rutledge, K., Mejia, Maura P., Ramos, M.N.M., Wetzler, R., Pentcheff, D., McTavish, E.J., Dawson, M.N., Shapiro, B., Wayne, R.K., & Meyer, R.S. (accepted). A Biodiversity Map of California Derived from Environmental DNA Metabarcoding and Earth Observation. *Ecological Applications*, Available as Preprint: <https://doi.org/10.1101/2020.06.19.160374>

Articles in Review

Guillén Escribà, C., **Schneider, F.D.**, Tedder, A., Schmid, B., Furrer, R., Niklaus, P.A., Hueni, A., & Schaepman, M.E. (in review). Remotely sensed within-species functional trait variation of a temperate forest. *Ecology and Evolution*.