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My research aims to better understand and quantify patterns in biodiversity and ecosystem function through the application of emerging technologies, including aircraft- and space-borne remote sensing and statistical modeling. I am currently interested in tropical forests and coral reefs where patterns are difficult to observe and interpret due to their high diversity and inaccessibility. My approach integrates field and laboratory measurements of functional traits of trees and corals with observational data to understand the evolutionary, phylogenetic, and environmental controls on plant and coral biochemistry and physiological functioning of forests and reefs to aid in conservation and management decisions.

My main objective for teaching is to help students experience the vast biological diversity of our Earth and give them the knowledge and real-world skills needed to help manage and conserve it. I will do this through a set of courses that are online with intensive field components and place-based projects. This model will support a diversity of students from traditional university students to those who seek to incorporate an academic degree into a working life schedule.

EDUCATION

- Ph.D. Department of Geological Sciences: Biogeochemistry and Remote Sensing; University of Colorado, May 2003.
- M.S. Department of Rangeland Ecosystem Science: Biogeochemistry and Atmospheric Chemistry; Colorado State University; 1996.
- B.A. Department of Environmental, Population and Organismic Biology; University of Colorado, 1993.

FACULTY and PROFESSIONAL POSITIONS

- 2021-present *Global Futures Scientist*, Julie Ann Wrigley Global Futures Laboratory, Tempe, AZ
- 2019-present *Associate Professor*, Arizona State University, School of Geographical Sciences and Urban Planning, Tempe, AZ.
- 2019-present *Faculty*, Arizona State University, Center for Global Discovery and Conservation Science, Tempe, AZ.
- 2008 - 2019 *Scientist*, Carnegie Institution for Science, Department of Global Ecology, Stanford, CA.
- 2007 – 2008 *Environmental consultant*, US Division of Forestry and Wildlife, HI.
- 2005 - 2007 *Post-Doctoral Researcher*, Department of Geography, University of Hawaii, Manoa, HI.

- 2003 - 2005 *Post-Doctoral Researcher*, Carnegie Institution for Science, Department of Global Ecology, Stanford, CA.
- 1997 - 1999 *Research Assistant*, Complex Systems Research Center, University of New Hampshire, Durham NH.
- 1996 - 1997 *Research Assistant*, National Center for Atmospheric Research, Boulder, CO.
- 1993 - 1994 *Student Research Assistant*, National Center for Atmospheric Research, Boulder, CO.

PEER-REVIEWED PUBLICATIONS

Google Scholar H-index: 59 overall; 49 last five years

Since arriving at ASU in 2019

122. Ordway, E.M., Asner, G.P., Burslem, D.F.R.P., Lewis, S.L., Nilus, R., **Martin, R.**, O'Brien, M.J., Phillips, O.L., Qie, L., Vaughn, N., Moorcroft, P.R. *In review*. Mapping tropical forest functional variation at satellite remote sensing resolutions depends on key traits. *Commun Earth Environ* **3**, 247 (2022). <https://doi.org/10.1038/s43247-022-00564-w>.
121. Wiczynski, D.J., S. Diaz, S.M. Duran, N.M. Fyllas, N. Salinas, **R.E. Martin**, A. Shenkin, M.R. Silman, G.P. Asner, L. P. Bentley, Y. Malhi, B.J. Enquist, and V.M. Savage. Improving landscape-scale productivity estimates by integrating trait-based models and remotely-sensed foliar trait and canopy-structural data. *Ecography* e06078 doi:10.1111/ecog.06078.
120. Aguirre-Gutierrez, J., et al. Functional susceptibility of tropical forests to climate change. (2022) *Nature Ecology and Evolution* doi:10.1038/s41559-022-01747-6.
119. Asner, G.P., N.R. Vaughn, **R.E. Martin**, S.A. Foo, J. Heckler, B.J. Neilson, and J.M. Gove. Mapped coral mortality and refugia in an archipelago-scale marine heat wave. (2022) *Proceedings of the National Academy of Sciences* 119(9):e2123331119.
118. Asner, G.P.; Giardina, S.F.; Balzotti, C.; Drury, C.; Hopson, S.; **Martin, R.E.** (2022) Are Sunken Warships Biodiversity Havens for Corals? *Diversity*. 14, 139. <https://doi.org/10.3390/d14020139>.
117. Drury, C., **R.E. Martin**, Knapp, D., Levy, J., Gates, R., Asner, G.P. (2022). Ecosystem-scale mapping of coral species and thermal tolerance. *Frontiers in Ecology and the Environment*. <https://doi.org/10.1002/fee2483>.
116. Weingarten, E., **Martin, R.E.** F. Hughes, F., Vaughn, N., Shafron, E., Asner, G.P. (2022). Early Detection of a Tree Pathogen using Airborne Remote Sensing. *Ecological Applications*, e2519. <https://doi.org/10.1002/eap.2519>.
115. Luiz, B.C., Giardina, C.P., Keith, L.M., Jacobs, D.F., Snieszko, R.A., Hughes, M.A., Friday, J.B., Cannon, P., Hauff, R., Francisco, K., Chau, M.M., Dudley, N., Yeh, A., Asner, G., **Martin, R.E.**, Perroy, R., Tucker, B.J., Evangelista, A., Fernandez, V., Martins-Keli'ihō'omalū, Santos, K., Ohara, R. *In review*. A framework for establishing a Rapid 'Ōhi'a Death resistance program. *New Forests* doi:10.1007/s11056-021-09896-5.

114. Das, A.; Slaton, M., Mallory, J., Asner, G., **Martin, R.**; Hardwick, P. (2022). Empirically Validated Drought Vulnerability Mapping in the Mixed Conifer Forests of the Sierra Nevada. *Ecological Applications*, e2514. <https://doi.org/10.1002/eap.2514>.
113. Baeza-Castro, A., **Martin, R.E.**, Stephenson, N., Das, A., Hardwick, P., Nydick, K., Mallory, J., Slaton, M. Evans, K., Asner, G.P. (2021). Mapping the Vulnerability of Giant Sequoias after Extreme Drought in California using Remote Sensing. *Ecological Applications*. 31(7):e02395. 10.1002/eap.2395.
112. Asner, G. P., Vaughn, N. R., Grady, B.W., Foo, S. A., Anand, H., Carlson, R.R., Shafron, E., Teague, C. & **Martin, R. E.** (2021). Regional Reef Fish Survey Design and Scaling Using High-Resolution Mapping and Analysis. *Frontiers in Marine Science*, 8:683184. <https://doi.org/10.3389/fmars.2021.683184>.
111. Asner, G. P., Vaughn, N. R., Foo, S. A., Shafron, E., Heckler, J., & **Martin, R. E.** (2021). Abiotic and Human Drivers of Reef Habitat Complexity Throughout the Main Hawaiian Islands. *Frontiers in Marine Science*, 8, 90. <https://doi.org/10.3389/fmars.2021.631842>.
110. Fine, P. V. A., Salazar, D., **Martin, R. E.**, Metz, M. R., Misiewicz, T. M., and Asner, G. P. (2021). Exploring the links between secondary metabolites and leaf spectral reflectance in a diverse genus of Amazonian trees. *Ecosphere* 12(2):e03362.
109. Forest Plots Network Research Scientists (Led by Philips O. including **R.E. Martin**). (2021). Taking the pulse of Earth's tropical forests using networks of highly distributed plots. *Biological Conservation*, 260, 108849. <https://doi.org/10.1016/j.biocon.2020.108849>.
108. Cawse-Nicholson, K., Townsend, P.A., Schimel, D., Assiri, A. M., Blake, P. L., Buongiorno, M.F., Campbell, P., Carmon, N., Casey, K.A., Correa-Pabón, R.E., Dahlin, K.M. Dashti, H. Dennison, P.E., 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, Fl.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 SBG Algorithms Working Group. (2021). NASA's surface biology and geology designated observable: A perspective on surface imaging algorithms. *Remote Sensing of Environment*, 257, 112349. <https://doi.org/10.1016/j.rse.2021.112349>
107. Antveredi, L. G. P., Chen, Z., Anand, H., **Martin, R.**, Arrowsmith, R., & Das, J. (2021). Terrain-Relative Diver Following with Autonomous Underwater Vehicle for Coral Reef Mapping. In 2021 IEEE 17th International Conference on Automation Science and Engineering (CASE) (pp. 2307-2312). IEEE.
106. **Martin, R.E.** 2020. Lessons learned from Spectranomics: wet tropical forests. Edited by J. Cavender-Bares, J. Gamon, P. Townsend Remote Sensing of Plant Biodiversity. Springer International Publishing. https://doi.org/10.1007/978-3-030-33157-3_5.

105. Asner, G.P., Vaughn, N.R., Heckler, J., Knapp, D.E., Balzotti, C., Shafron, E., **Martin, R.E.**, Neilson, B., Gove, J.M., 2020. Large-scale Mapping of Live Corals to Guide Reef Conservation. *Proceedings of the National Academy of Sciences*. 117(52), 33711-18. <https://doi.org/10.1073/pnas.2017628117>.
104. Aguirre-Gutierrez, J., Rifai, S., Alexander Shenkin, A., Imma Oliveras, I., Riutta, T., Berenger, E., Baumann, D., Raab, N., Bentley, L.P., Moraes de Seixas, M.M., Barlow, J., Joice Ferreira^f, Joly, C., Toby Gardner, Quesada, C.A., Figueiredo, A., Farfan-Rios, W., **Martin, R.**, Asner, G., Silman, M., Salinas, N., Enquist, B., Both, S., Abernethy, K., White, L.J.T., Marimon, B.H., Schwantes Marimon, B., Ewers, R.M., Burslem, D.F.R.P., Teh, Y.A., Svátek, M., Kissling, W.D., Cernusak, L.A., Adu-Bredu, S., Phillips, O.L., Coomes, D.A., Malhi, Y. 2020. Pantropical modelling of forests functional traits using Sentinel-2 remote sensing data. *Remote Sensing of Environment*. <https://doi.org/10.1016/j.rse.2020.112122>.
103. Xu, Y., Vaughn, N.R., Knapp, D.E., **Martin, R.E.**, Balzotti, C., Li, J., Foo, S.A., Asner, G.P. 2020. Coral bleaching detection in the Hawaiian Islands using spatio-temporal standardized bottom reflectance and Planet Dove satellites. *Remote Sensing*. <https://doi.org/10.3390/rs12193219>.
102. **Martin, R.E.**, Asner, G.P., Bentley, L.P., Shenkin, A., Salinas, N., Huaypar, Quispe Huaypar, K., Montoya Pillco, M., Ccori Álvarez, F.D., Enquist, B., Diaz, S., Malhi, Y. 2020. Covariance of Sun and Shade Leaf Traits Along a Tropical Forest Elevation Gradient. *Frontiers in Plant Science*, 10. <https://doi.org/10.3389/fpls.2019.01810>.
101. Draper, F.C., Baker, T.R., Baraloto, C., Chave, J., Costa, F., **Martin, R.E.**, Pennington, R.T., Vicentini, A., Asner, G.P. 2020. Quantifying Tropical Plant Diversity Requires an Integrated Technological Approach. *Trends in Ecology & Evolution*. <https://doi.org/10.1016/j.tree.2020.08.003>
100. Meireles, J. E., Cavender-Bares, J., Townsend, P. A., Ustin, S., Gamon, J. A., Schweiger, A.K., Schaepman, M.E., Asner, G.P., **Martin, R.E.**, Singh, A., Schrod, F., Chlus, A., O'Meara, B. C. (2020). Leaf reflectance spectra capture the evolutionary history of seed plants. *New Phytologist*, np.16771. <https://doi.org/10.1111/nph.16771>
99. Philipson, C.D., M.E.J. Cutler, P.G. Brodrick, G.P. Asner, D.S. Boyd, P.M. Costa, J. Fiddes, G.M. Foody, G.M.F. van der Heijden, A. Ledo, P.R. Lincoln, J.A. Margrove, **R.E. Martin**, Sol Milne, M.A. Pinard, G. Reynolds, M. Snoep, H. Tangki, J. Tay, Y. Sau Wai, C.E. Wheeler, D.F.R.P. Burslem. 2020. Restoration accelerates the carbon recovery of human modified tropical forests. *Science*, 369(6505), 838 LP – 841. <https://doi.org/10.1126/science.aay4490>
98. Baker, P.A., S.C. Fritz, D.S. Battisti, C.W. Dick, O.M. Vargas, G.P. Asner, **R.E. Martin**, A. Wheatley, I. Prates. 2020. Beyond Refugia: New insights on Quaternary climate variation and the evolution of biotic diversity in tropical South America. Edited by Rull, V. and Carnaval, A., *Climate, Refugia, and Origins of Biodiversity in the Neotropics*. Springer.

97. Oliveras I., L.P. Bentley, N.M. Fyllas, A. Gvozdevaite, A. Shenkin, T. Peprah, P.S. Morandi, K. Peixoto, M. Boakye, S. Adu-Bredu, B.S. Marimon, B.H. Marimon-Junior, **R.E. Martin**, G.P. Asner, S. Díaz, B.J. Enquist, Y. Malhi. 2020. The influence of taxonomy and environment on leaf trait variation along tropical abiotic gradients. *Frontiers in Forests and Global Change*, 3:18. <https://doi.org/10.3389/ffgc.2020.00018>.
96. Duran, S.A., **R.E. Martin**, S. Díaz, B.S. Maitner, Y. Malhi, N. Salinas, A. Shenkin, M.R. Silman, D.J. Wiczynski, G.P. Asner, L.P. Bentley, V.M. Savage, and B.J. Enquist. 2019. Informing trait-based ecology by assessing remotely-sensed functional diversity across a broad tropical temperature gradient. *Science Advances* 5(12) <https://doi.org/10.1126/sciadv.aaw8114>.
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95. **Martin, R.**, Chadwick, K., Brodrick, P., Carranza-Jimenez, L., Vaughn, N., Asner, G. 2018. An Approach for Foliar Trait Retrieval from Airborne Imaging Spectroscopy of Tropical Forests. *Remote Sensing*, 10(2), 199. <https://doi.org/10.3390/rs10020199>
94. Asner, G., **Martin, R.**, Keith, L., Heller, W., Hughes, R.F., Vaughn, N., Balzotti, C., 2018. A Spectral Mapping Signature for the Rapid Ohia Death (ROD) Pathogen in Hawaiian Forests. *Remote Sensing*, 10(3), 404. <https://doi.org/10.3390/rs10030404>
93. Vaughn, N., Asner, G., Brodrick, P., **Martin, R.**, Heckler, J., Knapp, D., Hughes, R.F., 2018. An Approach for High-Resolution Mapping of Hawaiian *Metrosideros* Forest Mortality Using Laser-Guided Imaging Spectroscopy. *Remote Sensing*, 10(4), 502. <https://doi.org/10.3390/rs10040502>.
92. McManus Chauvin, K., Asner, G. P., **Martin, R. E.**, Kress, W. J., Wright, S. J., & Field, C. B. (2018). Decoupled dimensions of leaf economic and anti-herbivore defense strategies in a tropical canopy tree community. *Oecologia*, 186(3), 765–782. <https://doi.org/10.1007/s00442-017-4043-9>.
91. Blonder, B., Salinas, N., Bentley, L. P., Shenkin, A., Chambi Porroa, P. O., Valdez Tejeira, Y., Boza Espinoza, T.E., Goldsmith, G.R., Enrico, L., **Martin, R.**, Asner, G.P., Diaz, S., Enquist, B.J., Malhi, Y., 2018. Structural and defensive roles of angiosperm leaf venation network reticulation across an Andes–Amazon elevation gradient. *Journal of Ecology*, 106(4). <https://doi.org/10.1111/1365-2745.12945>.
90. **Martin, R. E.**, Asner, G. P., Francis, E., Ambrose, A., Baxter, W., Das, A. J., Vaughn, N. R., Paz-Kagan, T., Dawson, T., Nydick, K., Stephenson, N. L., 2018. Remote measurement of canopy water content in giant sequoias (*Sequoiadendron giganteum*) during drought. *Forest Ecology and Management*. <https://doi.org/10.1016/J.FORECO.2017.12.002>.
89. Ambrose, A.R., W.L. Baxter, **R.E. Martin**, E. Francis, G.P. Asner, K.R. Nydick, and T.E. Dawson. 2018. Leaf- and crown-level adjustments help giant sequoias maintain favorable water status during severe drought. *Forest Ecology and Management* 419-420:257-267.

88. Nydick, K.R., N.L. Stephenson, A.R. Ambrose, G.P. Asner, W.L. Baxter, A.J. Das, T. Dawson, **R.E. Martin**, and T. Paz-Kagan. 2018. Leaf to landscape responses of giant sequoia to hotter drought: An introduction and synthesis for the special section. *Forest Ecology and Management*. 419-420:249-256.
87. Paz-Kagan, T., N.R. Vaughn, **R.E. Martin**, P.G. Brodrick, N.L. Stephenson, A.J. Das, K.R. Nydick, and G.P. Asner. 2018. Landscape-scale variation in canopy water content of giant sequoias during drought. *Forest Ecology and Management* 419-420:291-304.
86. Asner, G.P., **R.E. Martin**, and J. Mascaro. 2017. Coral reef atoll assessment in the South China Sea using Planet Dove satellites. *Remote Sensing for Ecology and Conservation* doi:10.1002/rse2.42
85. Asner, G.P., **Martin, R.E.**, Knapp, D.K., Tupayachi, R., Anderson, C.B., Sinca, F., Vaugh, N.R., Llactayo, W., 2017. Airborne laser-guided imaging spectroscopy to map forest trait diversity and guide conservation. *Science*, 355(6323).
84. Asner, G.P., **Martin, R.E.**, Anderson, C.B., Kryston, K., Vaughn, N., Knapp, D.E., Bentley, L.P., Shenkin, A., Salinas, N., Sinca, F., Tupayachi, R., Quispe Huaypar, K., Montoya Pillco, M., Ccori Álvarez, F.D., Díaz, S., Enquist, B., Malhi, Y., 2017. Scale dependence of canopy trait distributions along a tropical forest elevation gradient. *New Phytologist*. doi:10.1111/nph.14068.
83. Asner, G.P., **R.E. Martin, R.** Tupayachi, and W. Llactayo. 2017. Conservation assessment of the Peruvian Andes and Amazon based on mapped forest functional diversity. *Biological Conservation* 210:80-88.
82. Asner, G.P., P.G. Brodrick, C. Philipson, N.R. Vaughn, **R.E. Martin**, D.E. Knapp, J. Heckler, L.J. Evans, T. Jucker, B. Goossens, D.J. Stark, G. Reynolds, R. Ong, N. Renneboog, F. Kugan, and D.A. Coomes. 2017. Mapped aboveground carbon stocks to advance forest conservation and recovery in Malaysian Borneo. *Biological Conservation* 217:289-310.
81. Bahar, N.H.A., Ishida, F.Y., Weerasinghe, L.K., Guerrieri, R., O'Sullivan, O.S., Bloomfield, K.J., Asner, G.P., **Martin, R.E.**, Lloyd, J., Malhi, Y., Phillips, O.L., Meir, P., Salinas, N., Cosio, E.G., Domingues, T.F., Quesada, C.A., Sinca, F., Escudero Vega, A., Zuloaga Ccorimanya, P.P., del Aguila-Pasquel, J., Quispe Huaypar, K., Cuba Torres, I., Butrón Loayza, R., Pelaez Tapia, Y., Huaman Ovalle, J., Long, B.M., Evans, J.R., Atkin, O.K., 2017. Leaf-level photosynthetic capacity in lowland Amazonian and high-elevation Andean tropical moist forests of Peru. *New Phytologist*. doi:10.1111/nph.14079.
80. Wu, M.S., S.J. Feakins, **R.E. Martin**, A. Shenkin, L. Patrick Bentley, B. Blonder, N. Salinas, G.P. Asner, and Y. Malhi. 2017. Altitude effect on leaf wax carbon isotopic composition in humid tropical forests. *Geochimica et Cosmochimica Acta* 206:1-17. doi:10.1016/j.gca.2017.02.022.
79. Chavana-Bryant, C., Malhi, Y., Wu, J., Asner, G.P., Anastasiou, A., Enquist, B.J., Cosio Caravasi, E.G., Dougherty, C.E., Saleska, S.R., **Martin, R.E.**, Gerard, F.F., 2017. Leaf aging

- of Amazonian canopy trees as revealed by spectral and physiochemical measurements. *New Phytologist*. doi:10.1111/nph.13853.
78. Goldsmith, G.R., Bentley, L.P., Shenkin, A., Salinas, N., Blonder, B., **Martin, R.E.**, Castro-Ccosco, R., Chambi-Porroa, P., Diaz, S., Enquist, B.J., Asner, G.P., Malhi, Y., 2017. Variation in leaf wettability traits along a tropical montane elevation gradient. *New Phytologist*. doi:10.1111/nph.13861.
77. Doughty, C.E., Santos-Andrade P.E., Goldsmith, G.R., Bloder, B., Shenkin, A., Bentley, L.P., Chavana-Bryant, C., Huaraca Huasco, W., Salinas, N., Enquist, B., **Martin, R.**, Asner, G.P., Mahli, Y. 2017. Can leaf spectroscopy predict leaf and forest traits along a Peruvian tropical forest elevation gradient? *Journal of Geophysical Research: Biogeosciences*, 122. <https://doi.org/10.1002/2017JG003883>.
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75. Fyllas N., Bentley L., Shenkin A., Asner G., Atkin O., Diaz, S., Enquist, B., Farfan-Rios, W., Gloor, E, Guerrieri, R., Huaraca Huasco, W., Ishida, Y., **Martin, R.**, Meir, P., Phillips, O., Salinas Revilla, N., Silman, M., Weerasinghe, L., Zaragoza-Castells, J., Malhi, Y. 2017. Solar radiation and functional traits explain the decline of forest primary productivity along a tropical elevation gradient. *Ecology Letters*. 20, 730-740.
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73. Asner, G.P., Brodrick, P.G., Anderson, C.B., Vaughn, N., Knapp, D.E., **Martin, R.E.** 2016. Progressive forest canopy water loss during the 2012-2015 California drought. *Proceedings of the National Academy of Sciences* 113, 249-55.
72. Asner, G.P., Knapp, D.E., Anderson, C.B., **Martin, R.E.**, Vaughn, N., 2016. Large-scale climatic and geophysical controls on the leaf economics spectrum. *Proceedings of the National Academy of Sciences* 113, 4043-51.
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69. Asner, G.P., Sousan, S., Knapp, D.E., Selmants, P.C., Martin, R.E., Hughes, R.F., Giardina, C.P., 2016. Rapid forest carbon assessments of oceanic islands: a case study of the Hawaiian archipelago. *Carbon Balance and Management* 11, 1.

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67. Barbosa, J.M., Sebastián-González, E., Asner, G.P., Knapp, D.E., Anderson, C., **Martin, R.E.**, Dirzo, R., 2016. Hemiparasite-host plant interactions in a fragmented landscape assessed via imaging spectroscopy and LiDAR. *Ecological Applications* 26, 55–66.
66. Barbosa, J., Asner, G., **Martin, R.**, Baldeck, C., Hughes, F., Johnson, T., 2016. Determining Subcanopy *Psidium cattleianum* Invasion in Hawaiian Forests Using Imaging Spectroscopy. *Remote Sensing* 8, 33.
65. Clark, K.E., West, A.J., Hilton, R.G., Asner, G.P., Quesada, C.A., Silman, M.R., Saatchi, S.S., Farfan-Rios, W., **Martin, R.E.**, Horwath, A.B., Halladay, K., New, M., Malhi, Y., 2016. Storm-triggered landslides in the Peruvian Andes and implications for topography, carbon cycles, and biodiversity. *Earth Surface Dynamics* 4, 47–70.
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62. Graves, S., Asner, G., **Martin, R.**, Anderson, C., Colgan, M., Kalantari, L., Bohlman, S., 2016. Tree Species Abundance Predictions in a Tropical Agricultural Landscape with a Supervised Classification Model and Imbalanced Data. *Remote Sensing* 8, 161.
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21. Huang, C., Asner, G.P., **Martin, R.E.**, Barger, N.N., Neff, J.C., 2009. Multiscale analysis of tree cover and aboveground carbon stocks in pinyon juniper woodlands. *Ecological Applications* 19, 668–681.
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17. Asner, G.P., Jones, M.O., **Martin, R.E.**, Knapp, D.E., Hughes, R.F., 2008. Remote sensing of native and invasive species in Hawaiian forests. *Remote Sensing of Environment* 112, 1912–1926.
16. Asner, G.P., Knapp, D.E., Kennedy-Bowdoin, T., Jones, M.O., **Martin, R.E.**, Boardman, J., Hughes, R.F., 2008. Invasive species detection in Hawaiian rainforests using airborne imaging spectroscopy and LiDAR. *Remote Sensing of Environment* 112, 1942–1955.
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12. Carlson, K.M., Asner, G.P., Hughes, R.F., Ostertag, R., **Martin, R.E.**, Hughes, F.R., Ostertag, R., Martin, R.E., 2007. Hyperspectral remote sensing of canopy biodiversity in Hawaiian lowland rainforests. *Ecosystems* 10, 536–549.
11. **Martin, R.E.**, Asner, G.P., Sack, L., 2007. Genetic variation in leaf pigment, optical and photosynthetic function among diverse phenotypes of *Metrosideros polymorpha* grown in a common garden. *Oecologia* 151, 387–400.

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8. Asner, G., Carlson, K., **Martin, R.**, 2005. Substrate age and precipitation effects on Hawaiian forest canopies from spaceborne imaging spectroscopy. *Remote Sensing of Environment* 98, 457–467.
7. **Martin, R.E.**, Asner, G.P., 2005. Regional estimate of nitric oxide emissions following woody encroachment: Linking imaging spectroscopy and field studies. *Ecosystems* 8, 33–47.
6. Matsubara, S., Naumann, M., **Martin, R.**, Nichol, C., Rascher, U., Morosinotto, T., Bassi, R., Osmond, B., 2005. Slowly reversible de-epoxidation of lutein-epoxide in deep shade leaves of a tropical tree legume may “lock-in” lutein-based photoprotection during acclimation to strong light. *Journal of Experimental Botany* 56, 461–468.
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4. **Martin, R.E.**, Asner, G.P., Ansley, R.J., Mosier, A.R., 2003. Effects of woody encroachment on soil nitrogen oxide emissions in a temperate Savanna. *Ecological Applications* 13, 897–910.
3. Parton, W.J., Holland, E. A., Del Grosso, S.J., Hartman, M.D., **Martin, R.E.**, Mosier, a. R., Ojima, D.S., Schimel, D.S., 2001. Generalized model for NO_x and N₂O emissions from soils. *Journal of Geophysical Research* 106, 17403.
2. **Martin, R.E.**, Scholes, M.C.C., Mosier, A.R.R., Ojima, D.S., Holland, E.A.A., Parton, W.J., 1998. Controls on annual emissions of nitric oxide from soils of the Colorado shortgrass steppe. *Global Biogeochemical Cycles* 12, 81–93.
1. Scholes, M.C., **Martin, R.**, Scholes, R.J., Parsons, D., Winstead, E., 1997. NO and N₂O emissions from savanna soils following the first simulated rains of the season. *Nutrient Cycling in Agroecosystems* 48, 115–122.

PAPERS in REVIEW

- 1R. Seeley, M., **Martin, R.E.**, Vaughn, N., Thompson, D.R., Dai, J., Asner, G.P. *In review*. Quantifying the spectral variation of *Metrosideros polymorpha* canopies across environmental gradients. *Ecological Applications*.
- 2R. Stork, N. Mainzer, A. **Martin, R.E.**, *In review*. Native and non-native plant recovery in the Santa Monica Mountains National Recreation Area following fire. *Macrosystems Ecology*.
- 3R. Brodrick, P.G., L.J. Evans, **R.E. Martin**, K.D. Chadwick, N.R. Vaughn, J.R. Heckler, D.E. Knapp,

G.P. Asner. *In review*. Strategic conservation: integrating forest carbon and biodiversity protection. *Proceedings of the National Academy of Sciences*.

PAPERS in PREPARATION

- **Martin, R.E.**, *In prep*. Taxonomic Patterns in Coral Bleaching during an Ocean Heatwave in Hawai'i. *Coral Reefs*.
- Mainzer, A., Stork, N. and **Martin, R.E.**, *In prep*. Human influence on patterns of native and non-native plant communities in the Santa Monica Mountains National Recreation Area following fire. *Ecological Applications*.
- **Martin, R.E.**, Kay, E., Silman, M., Asner, G.P. *In prep*. Mapping mangroves species from foliar functional traits. *Remote Sensing*.

BOOK CHAPTERS

Martin, R.E. 2020. Lessons learned from Spectranomics: wet tropical forests. Edited by J. Cavender-Bares, J. Gamon, P. Townsend *Remote Sensing of Plant Biodiversity*. Springer International Publishing

. https://doi.org/10.1007/978-3-030-33157-3_5.

Asner, G.P., S.L. Ustin, P.A. Townsend, **R.E. Martin**, K.D. Chadwick 2015: *Forest biophysical and biochemical properties from hyperspectral and LiDAR remote sensing*. In *Land Resources Monitoring, Modeling and Mapping with Remote Sensing*, Edited by P.S. Thenkabail. Forest biophysical and biochemical properties from hyperspectral and LiDAR remote sensing: pages 429-448; CRC Press., ISBN: 9781482217957

Asner, G.P. **R.E. Martin**, 2014: *Ecology of Lianas*. *Ecology of Lianas*: pages 299-308; ISBN: 9781118392492

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. Llactayo, and A.F. Neyra. 2014. *The High-resolution Carbon Geography of Perú*. Minuteman Press, Berkeley, CA. 69 pp. ISBN: 978-0-9913870-7-6 (English edition) and ISBN: 978-0-9913870-6-9 (Spanish edition).

Asner, G.P. and **R.E. Martin**. 2004. Biogeochemistry of desertification and woody encroachment in grazing systems. *Ecosystems and Land Use Change*. R. Defries, G.P. Asner, R.A. Houghton (eds.) American Geophysical Union, Washington, DC.

PRESENTATIONS

(Protagonist) Off The Fence and Laudato Si Movement: The Letter (<https://theletterfilm.org/>). Speaking as the voice of wildlife.

(Organizer) TEDx County of Hawaii, Climate Countdown Speakers Series Topic: Local Insights Grow Global Solutions. 13 November 2021.

(Invited) Pa'a Pono Milolii Community, Hoku Nights. Topic: Near Shore Natural Resources. 21 September 2021.

- (Invited) County of Hawaii Sustainability Summit. Preserving the Environment. Panelist. 04 March 2021.
- (Invited) Hawaii Department of Land and Natural Resources, Hawaii Invasive Species Council. Airborne Mapping for Science and Management. Officially listed as Airborne mapping to understand Rapid Ohia Death. 04 February 2021.
- (Invited) University of Hawaii at Hilo, Tropical Conservation Biology and Environmental Science Seminar: Unlocking the Functional Biogeography of Forests: Lessons Learned from Spectranomics. 20 November 2020.
- (Invited) World Biodiversity Forum, Davos Switzerland: Unlocking the Functional Biogeography of Forests: Lessons Learned from Spectranomics. 26 February 2020. Did not attend due to COVID.
- (Invited) Commonwealth Club of California: Using New Technologies to Create Safe Marine Environments: There is an accelerating effort among ocean scientists, advocates and technologists to harness new technologies for marine conservation. [Link](#) 04 September 2018.

CONFERENCE PROCEEDINGS

- Stork, N., A. Mainzer, R.E. Martin. 2021. Analysis of native and non-native plant recovery in the Santa Monica Mountains National Recreation Area after the 2018 Woolsey Fire. *American Geophysical Union*, Winter 2021.
- Somers, B., G.P. Asner, R.E. Martin, C.B. Anderson, D.E. Knapp, S.J. Wright, and R. Van de Kerchove. 2015. Assessing tropical forest canopy diversity across a bioclimatic gradient using imaging spectroscopy. *2015 IEEE International Geoscience & Remote Sensing Symposium*, July 26-31, Milan, Italy.
- Tochon, G., J.-B. Féret, R.E. Martin, R. Tupayachi, J. Chanussot, and G.P. Asner. 2012. Binary partition tree as a hyperspectral segmentation tool for tropical rainforests. *IEEE International Geoscience and Remote Sensing Symposium* 6368-6371.
- Féret, J.-B., G.P. Asner, C. Francois, R. Martin, S.L. Ustin, and S. Jacquemoud. 2007. An advanced leaf optical properties model including photosynthetic pigments. *10th Intl. Symposium on Physical Measurements and Signatures in Remote Sensing*. Davos, Switzerland.
- Martin, R.E. and G.P. Asner. 2005. New insight to carbon and nutrient cycles from airborne imaging spectroscopy. *Proceedings of the 14th Annual JPL Airborne Earth Science Workshop*. Pasadena, CA.
- Martin, R.E., and G.P. Asner. 2003. Ecosystem impacts of woody encroachment in Texas: A spatial analysis using AVIRIS. *Proceedings of the 12th Annual JPL Airborne Earth Science Workshop*. Pasadena, CA.

AWARDS

CURRENT

Curriculum Vitae

- NASA OCEANS: Quantifying vulnerability to sea level rise across multiple coastal typologies; Lead PI w/ H. Kane-ASU and J. Burns-University of Hawaii-Hilo. ASU 2021-2024: \$225,000; UHH \$385,654.
- NOAA Coral Reef Conservation Program: Capacity-building for Division of Aquatic Resources to integrate 3D mapping techniques into monitoring of Hawaiian nearshore coral reef ecosystems. Co-I; w. A. Fugunaga, ASU; J. Burns UH Hilo; Total \$89,9999; ASU \$30,000 2022-2023
- USDA/USFS: *Rapid Ohia Death: A model disease system for building forest resilience*. Co-PI w/ PI C. Giardina and others IPIF-USFS \$1,065,000: ASU \$400,000, 2020-2023
- USDA/USFS: *Decision Support to Improve Ridge-to-Reef Stewardship in an Era of Rapid Global Change*; Co-PI; w/ PI C. Giardina, IPIF-USFS Total \$1,065,000: ASU \$625,000 2021-2024

PENDING/SUBMITTED

- NSF-PACSP: Identifying and conserving the evolutionary engines for climate adaptation in corals; Co-PI; w/J. Li, ASU and M. Pinsky, UC Santa Cruz Total \$992,869: ASU \$586,000, 2023-2026

Submitted but not funded

- Women and Philanthropy: *Where We Meet: Aligning western science with local traditional Hawaiian knowledge in the marine realm*; Sole PI \$78,192.
- NASA Earth Science: *Scaling the biochemical signal of photosynthesis in highly diverse and complex ecosystems: tropical forests and reefs*; Sole PI w/ G. Asner as co-investigator: \$546,215.
- NSF-NRT: Earth System Science for the Anthropocene. Senior Personnel; w/PI N. Grimm and others, ASU 2021-2026: \$2,997,484.
- NSF-NRI: *By air or by sea - holistic coral health monitoring through amphibious drone operations*; Co-I with J. Das-ASU and J. Burns-University of Hawaii-Hilo, ASU 2021-2024: \$831,072; UHH 2021-2024 \$149,367.

COMPLETED

- David and Lucile Packard Foundation: *Mapping and Assessment of Forest and Mangrove Composition in California and Mexico*; Co-PI w/ G. Asner, 2017-2021: \$250,000.
- United States Department of Interior and National Parks Service: *Leaf to Landscape*; Co-PI. w/ G. Asner, 2016- 2020: \$112,499.
- USDA/USFS: *Mapping the Onset of Rapid Ohia Death ROD Using Remote Sensing*; Co-I w/ F. Hughes and G. Asner, 2018-2020: \$75000.
- NASA Earth Science Graduate Fellowship (2000-2003)

TEACHING

- GCU 494: *Preparation for Geographical Research Methods* (ASU-online Fall A 2021); new course development.
- GPH 422: *Plant Geography* (ASU-online Spring A 2021 and Spring A 2022); new course development.

Curriculum Vitae

- GCU 496: *Geographical Research Methods* (ASU-online Fall B 2019, 2020 and Spring B 2020, 2021 & 2022).
- Coral Atlas; in preparation (ASU-online Fall 2024)
- Coastal and Marine Stewardship; in preparation (ASU-online Fall 2024)
- GPH 491: Global Intensive Experience: *Ecological Vegetation Field Survey in Hawaii* (ASU-online Spring B 2021 following 10-day field course in HI); new course development. Cancelled due to COVID. Considering resubmission for Spring 2023.

OTHER EDUCATIONAL ACTIVITIES

- NASA-DEVELOP Fall 2022; ASU-Hawaii Node and Partnership with Hawaii County and Hawaii Department of Land and Natural Resources. *Utilizing Earth Observations to Delineate Wetland Extents, Model Sea-Level Rise Inundation Risk, and Assess Impacts on Historic Hawaiian Lands*. Mentored 4 interns; Lisa Tanh, Matilda Anokye, Ian Lee, and Connor Racette. Virtual.
- NASA-DEVELOP Fall 2021; Created ASU-Hawaii Node and Partnership with Hawaii County. *Using NASA Earth Observations to Establish a Sea Surface Height and a Coastal Habitat Vulnerability Index for Adaptation and Mitigation Planning in Hawai'i Island*. Mentored 5 interns; Garren Kalter, Sanketa Kadam, Anna Mikkelson, Erin Azuma, Rose Eichelmann. Virtual.
- Hawai'i PK-12 Research & Development Consortium; Lead Marine Advisor for Hui Kia'i Wai o Ka'ū to develop Hawai'i-based science curriculum resources, provide professional development in Hawai'i phenomena and conservation problems for 20 charter and Department of Education schools across the Hawaiian Islands, and expand Citizen Science opportunities for students and research.
- Lawai'a Camp 2022; Aumakua: Sharks and Octopus. 64 students as well as 11 teachers and community members. Miloli'i, Hawaii
- Lawai'a Camp 2021; Reef Ecology: Keeping the Balance, Algae, Fish and Coral; Created the theme of this year's camp. 81 students as well as 15 teachers and community members. Miloli'i, Hawaii
- Lawai'a Camp 2020; Coral Reef Ecology; 10 students, teachers and community members in person as well as 50+ people online. Miloli'i, Hawaii
- Spectranomics Field Methods: Over 100 students and volunteers in 7 countries (2006 – present). Currently active in Hilo, Hawaii

MENTORING

Since coming to ASU 2019

Postdoc

- Andres Baez-Castro (2019 – 2020); Postdoc – SGSUP, Arizona State University, AZ; Drought Vulnerability in California.
- Crawford Drury (2017-2020); Postdoc – Marine Science, University of Hawaii – Manoa, HI; Coral Resistance.

Graduate

- Megan Seeley (2020 – present); PhD – SGSUP, Arizona State University, AZ; Remote Sensing of *Metrosideros* Forests in Hawaii.
- Kimberly Fuller (2020 – present); MS – SGSUP, Arizona State University, AZ; Distributions and Ecological Significance of Native and Invasive Limu (Algae) in the Hawaiian Islands.
- Annie-Weaver Bryant (2021 – present); PhD – SOLS, Arizona State University, Biogeography of the genus *Prunus*.
- Peter Price (2022 – Present); PhD – Design School, Arizona State University, AZ; Desert Plants as Green Roof Materials.
- Nicoletta Stork (2022 – present) – Arizona State University, AZ; Remote sensing of native and non-native plant species in Southern California for ecological restoration and resilience.
- Dominica Harrison (2022 – present); PhD – University of Victoria, BC; Remote sensing of coral species on Hawaiian reefs.
- Nicoletta Stork (2021 – 2022); MS – California State University, Northridge, CA; Assessment of native and non-native plant recovery in the Santa Monica Mountains National Recreation Area after the 2018 Woolsey Fire.
- Rakshith Vishwanatha (2021-2022); MS – SESE, Arizona State University, AZ; Real-Time Semantic Mapping of Trees Using Deep Learning and Multi-Modal Odometry for UAV Applications.
- Lakshmi Gana Prasad Antervedi (2020 – 2021); MS – SESE, Arizona State University, AZ; Coral Reef Mapping using Autonomous Underwater Vehicles.

Undergraduate

- Jes Patterson (2022 – present); Intern Arizona State University, AZ; School for Geographical Sciences and Urban Planning. Coral Reef Biogeography.
- Lea Kekuewe (2021 – 2022); Intern Arizona State University, AZ; School of Sustainability Capstone project advisor.
- Kiana Heimlich (2020 – 2021); Undergraduate honors – Arizona State University, AZ; Using twitter to examine animal sightings in urban areas during COVID-19 shut-downs during 2020
- Victoria Vandekop (2019 – 2020); Undergraduate honors – Arizona State University, AZ; A Science Communicator's Guide to Social Media Engagement
- Erin Weingarten (2019 – 2020); Intern – Arizona State University-Hawaii, HI; Early detection of Rapid Ohia Death using Remote Sensing in Hawaii

High School

- High School Students in 2020 (7), Kelsielynn Casuga, Kaillee Llanes-Kelekolio, Sariah Kuahuaia-Pabre, Nyles Martinez, Caleb Labo, Elijah Labo, Leah Labo), Workstudy Fall 2020-Spring 2021; Integrating western science with traditional Hawaiian knowledge, Coral Reef Research; HawaiiMERC/Milolii HI.
- High School Students in 2021 (9), Nathaniel Crivello, Taha'a H. Kahele, Makana Kaupiko,

Curriculum Vitae

Kailee Llanes-Kelekolio, Nyles Martinez, Faavesi Kelekolio-Samoa, Elijah Labo, Caleb Labo, Nainoa Martinez, Workstudy Summer-Fall 2021; Integrating western science with traditional Hawaiian knowledge, Site Survey of Pāpā Shoreline, integrating technology with cultural knowledge. Report provided to Mayor Roth of Hawaii County as well as distributed in both the traditional Hawaiian village and new subdivision. Leading to request from Na Ala Hele Trails Association who manage trails for Hawaii county for additional project assistance. HawaiiMERC/Milolii HI.

Past

- Dana Chadwick (2014 – 2018; PhD-postdoc – Stanford University, Carnegie Institution. CA)
- Loreli Carranza-Jimenez (2008 - 2018; Intern – Spectranomics Lab, CA)
- Kelly McManus (2014-2016; PhD – Stanford University, CA)
- Kathleen Kryston (2001 – 2014; Intern – Spectranomics Lab, CA)
- Christopher Anderson (2008 – 2011; Intern – Spectranomics Lab, CA)
- Kealoha McKinney (2008; Intern – Carnegie Institution, Hawaii)
- Natalie Boelman (2007; Post-doc - Carnegie Institution, Hawaii)
- Kim Carlson (2005-2007; MS - Stanford University, Hawaii)
- Timothy Varga (2004; MS - Stanford University, Utah)

SERVICE

ASU

- Lead Developer; ASU SGSUP-SST-SOS-SHESC-SESE Graduate Certificate in Coastal and Marine Science and Management (2020 – present)
- Faculty, Center for Global Discovery and Conservation Science (2019-present)
- Global Futures Scientist, Julie Ann Wrigley Global Futures Laboratory (2020-present)
- Member; ASU CLAS SGSUP Director Search Committee (2020-2021)
- Chair; ASU SESE/SOLS/SCAS Search Committee for Jiwei Li (2021)
- Member; ASU SGSUP Search Committee for Haunani Kane (2020)
- Co-Developer; ASU SGSUP-SESE Earth Observation Certificate Development Committee (2019-present)
- Member; ASU-SGSUP Personnel Committee (2019-2020)
- Member; ASU-SGSUP Undergraduate Committee (2019-2021)

Professional

Curriculum Vitae

- Protagonist as the “Voice of Wildlife” in *The Letter* with Pope Francis on YouTube Originals (<https://theletterfilm.org/>). Produced by Off The Fence and Laudato Si Movement
- Member; County of Hawaii Climate Action Working Group (2020-present)
- Board member, Mongabay.org, an Environmental Journalism and Education Non-Profit (2020-present)
- Member; NASA Surface Biology and Geology Satellite Mission Working Group (2009-present)
- Member; NASA Earth Sciences (2003-present)
- Panelist; NASA AVIRIS Next Generation in India Review (2017)
- Panelist; NASA HypIRI Science Review (2009)
- Panelist; NASA Northern Eurasia Environmental Science Program Initiative (NEESPI), Yalta, Ukraine (2003)
- Assistant to Project Scientist; NASA Large-scale Biosphere-Atmosphere Experiment in Amazônia (1997-1999)
- Member; American Geophysical Union
- Member; Association for Tropical Biology and Conservation
- Member; Ecological Society of America
- Member; International Society for Reef Studies