

Curriculum vitae: Aditya Singh

Contact

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| Caesar Kleberg Wildlife Research Institute | Tel (M): +1 (352) 222-6038 |
| Department of Rangeland and Wildlife Sciences | ORCID: 0000-0001-5559-9151 |
| Texas A&M University, Kingsville, TX 78363 | Website: https://ecodynlab.org |

Professional Appointments

- 2024 – Assistant Professor – Geospatial Sciences, Caesar Kleberg Wildlife Research Institute, Texas A&M University, Kingsville.
- 2017 – 2024 Assistant Professor - Remote Sensing, Department of Agricultural and Biological Engineering, University of Florida, Gainesville.
- 2022 – 2024 Affiliate Faculty, UF School of Fisheries, Forestry, and Geomatic Sciences.
- 2015 – 2017 Assistant Research Scientist, Department of Forest and Wildlife Ecology, University of Wisconsin-Madison.
- 2014 – 2015 Postdoctoral Research Assistant, Department of Forest and Wildlife Ecology, University of Wisconsin-Madison.
- 2005 – 2006 Senior research associate, Eco-Informatics Centre, Ashoka Trust for Research in Ecology and the Environment (ATREE), Bangalore, India.
- 2002 – 2003 Project coordinator: Regional planning and GIS/RS specialist, CEPT, Ahmedabad, India.

Professional preparation

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- Ph.D. Forestry (2008 –2014)
University of Wisconsin-Madison, WI
 - M.S. Wildlife Ecology and Conservation (2006 –2008)
University of Florida, Gainesville FL
 - Post Graduate Diploma: Geoinformatics applications for environmental assessment and disaster management (2003-2004), Indian Institute of Remote Sensing, Dehradun, India
 - Post Graduate Diploma (PGD, US equiv. MS): Planning (2000 –2002)
Centre for Environmental Planning and Technology (CEPT), Ahmedabad, India
 - Bachelor of Architecture (1994 –2000)
Madhav Institute of Technology and Science, Gwalior, India

Peer-reviewed publications (Google Scholar [link](#))

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1. A.K. Sharma, S.K. Sidhu, **A. Singh**, L. Zotarelli, L.K. Sharma (2024) Optimizing UAV Hyperspectral Imaging for Predictive Analysis of Nutrient Concentrations, Biomass Growth, and Yield Prediction of Potatoes. *Journal of Potato Research*. DOI: <https://doi.org/10.1007/s12230-024-09966-2>
 2. A. Lago, S. Patel, **A. Singh** (2024) Low-cost real-time aerial object detection and GPS location tracking pipeline. *ISPRS Open Journal of Photogrammetry and Remote Sensing*. <https://doi.org/10.1016/j.ophoto.2024.100069>
 3. B.G. Weinstein, S. Marconi, A. Zare, S.A. Bohlman, **A. Singh**, S.J. Graves, L. Magee, D.J. Johnson, S. Record, V.E. Rubio, N.G. Swenson, P. Townsend, T.T. Veblen, R.A. Andrus, E.P. White (2024) Individual canopy tree species maps for the National Ecological Observatory Network. *PLOS Biology*. <https://doi.org/10.1371/journal.pbio.3002700>
 4. A.K. Sharma, **A. Singh**, S.K. Sidhu, L. Zotarelli, L.K. Sharma (2024) Fresh leaf spectroscopy to estimate the crop nutrient status of potato (*Solanum tuberosum*) *Potato Research*. <https://doi.org/10.1007/s11540-024-09766-5>
 5. S. Kaur, V.G. Kakani, B. Carver, D. Jarquin, **A. Singh** (2024) Hyperspectral imaging combined with machine learning for high-throughput phenotyping in winter wheat. *The Plant Phenome Journal*. <https://doi.org/10.1002/ppj2.20111>

6. F.T. Teshome, H.K. Bayabil, B. Schaffer, Y. Ampatzidis, G. Hoogenboom, **A. Singh** (2024) Simulating soil hydrologic dynamics using crop growth and machine learning models, *Computers and Electronics in Agriculture*, <https://doi.org/10.1016/j.compag.2024.109186>
7. T. Zheng, Z. Ye, **A. Singh**, A.R. Desai, N.S.R. Krishnayya, M.G. Dave, P.A. Townsend (2024) Variability in Forest Plant Traits Along the Western Ghats of India and Their Environmental Drivers at Different Resolutions. *Journal of Geophysical Research: Biogeosciences*. <https://doi.org/10.1029/2023JG007753>.
8. J.A. Peeling, C. Chen, J. Judge, **A. Singh**, S. Achidago, A. Eide, K. Tarrío, P. Olofsson (2024) Applications of Remote Sensing for Land Use Planning Scenarios with Suitability Analysis. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*. <https://doi.org/10.1109/JSTARS.2024.3370379>.
9. D. Arruda Huggins de Sá Leitão, A.K. Sharma, **A. Singh**, and L.K. Sharma (2023) Yield and plant height predictions of irrigated maize through unmanned aerial vehicle in North Florida. *Computers and Electronics in Agriculture*. <https://doi.org/10.1016/j.compag.2023.108374>
10. S. Lantin, K. McCourt, E. Larkin, N. Butcher, V. Puri, E. McLamore, M. Correll, **A. Singh** (2023) Scanning Plant IoT (SPOT) Facility for High-Throughput Plant Phenotyping, *HardwareX*. <https://doi.org/10.1016/j.ohx.2023.e00468>
11. J.B. Carter, R. Huffaker, **A. Singh**, E.Z. Bean (2023) HUM: A review of hydrochemical analysis using ultraviolet-visible absorption spectroscopy and machine learning, *Science of The Total Environment*. <https://doi.org/10.1016/j.scitotenv.2023.165826>
12. F. Tishome, G. Hoogenboom, B. Schaffer, **A. Singh**, Y. Amaptzidis, H. Bayabil (2023) Unmanned Aerial Vehicle (UAV) Imaging and Machine Learning Applications for Plant Phenotyping. *Computers and Electronics in Agriculture*. <https://doi.org/10.1016/j.compag.2023.108064>
13. F. Tishome, H. Bayabil, B. Schaffer, Y. Amaptzidis, G. Hoogenboom, **A. Singh** (2023) Exploring deficit irrigation as a water conservation strategy: Insights from field experiments and model simulation. *Agricultural Water Management*. <https://doi.org/10.1016/j.agwat.2023.108490>
14. J.B. Carter, A. Sarkees, **A. Singh**, E.Z. Bean (2023) Evaluation of Low-Cost UV-Vis Spectroscopy for Measuring Nitrate using Synthetic Water Samples. *Journal of the American Society of Agricultural and Biological Engineering*. doi: 10.13031/ja.15502
15. S. Shin, Y. Her, R. Muñoz-Carpena, X. Yu, C. Martinez, **A. Singh** (2023) Climate change impacts on water quantity and quality of a watershed-lake system using a spatially integrated modeling framework in the Kissimmee River – Lake Okeechobee system. *Journal of Hydrology*. <https://doi.org/10.1016/j.ejrh.2023.101408>
16. B.G. Weinstein, S. Marconi, S.J. Graves, A. Zare, **A. Singh**, S.A. Bohlman, L. Magee, D.J. Johnson, P.A. Townsend, E.P. White (2023) Capturing long-tailed individual tree diversity using an airborne multi-temporal hierarchical model. *Remote Sensing in Ecology and Conservation*. <https://doi.org/10.1002/rse2.335>.
17. **A. Singh**, P. Townsend (2022) Influence of foliar traits, watershed physiography, and nutrient subsidies on stream water quality in the Upper Midwestern United States. *Frontiers in Environmental Science-Environmental Informatics and Remote Sensing*. <https://doi.org/10.3389/fenvs.2022.974206>
18. E. Morton, S.K. Robinson, F. Mulindahabi, M. Masozera, **A. Singh**, M.K. Oli (2022) Spatiotemporal patterns in an Afrotropical montane forest bird community. *Global Ecology and Conservation*. <https://doi.org/10.1016/j.gecco.2022.e02333>
19. S. Marconi, B.G. Weinstein, S. Zou, S.A. Bohlman, A. Zare, **A. Singh**, D. Stewart, I. Harmon, A. Steinkraus, E.P. White (2022) Continental-scale hyperspectral tree species classification in the United States National Ecological Observatory Network. *Remote Sensing of Environment*. <https://doi.org/10.1016/j.rse.2022.113264>
20. B. Bessell, **A. Singh** (2022) A low-cost open-source handheld LiDAR-based automated understory timber stand surveying device. *HardwareX*. <https://doi.org/10.1016/j.ohx.2022.e00339>.

21. J. Peeling, **A. Singh**, J. Judge (2022) A structural equation modeling approach to disentangling regional-scale landscape dynamics in Ghana. *Frontiers in Environmental Science*. <https://doi.org/10.3389/fenvs.2021.729266>.
22. I. Harmon, S. Marconi, B. Weinstein, S. Graves, D.Z. Wang, A. Zare, S. Bohlman, **A. Singh**, E. White (2022) Injecting Domain Knowledge Into Deep Neural Networks for Tree Crown Delineation. *IEEE Transactions on Geoscience and Remote Sensing*. DOI: 10.1109/TGRS.2022.3216622
23. A. Biswas, M.H.M.L. Andrade, J.P. Acharya, C.L. De Souza, Y.Lopez, G. De Assis, S. Shirbhate, **A. Singh**, P.R. Munoz, E. Rios (2021) Phenomics-Assisted Selection for Herbage Accumulation in Alfalfa (*Medicago sativa* L.) *Frontiers in Plant Science*. DOI: <https://doi.org/10.3389/fpls.2021.756768>
24. D. Stewart, A. Zare, S. Marconi, B.G. Weinstein, E.P. White, S.J. Graves, S.A. Bohlman, **A. Singh** (2021) RandCrowns: A Quantitative Metric for Imprecisely Labeled Tree Crown Delineation. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing* (14) pp 11229-11239 DOI: 10.1109/JSTARS.2021.3122345.
25. M. Arasumani, **A. Singh**, M. Bunyan, V.V. Robin (2021) Testing the efficacy of hyperspectral (AVIRIS-NG), multispectral (Sentinel-2) and radar (Sentinel-1) remote sensing images to detect native and invasive non-native trees. *Biological Invasions*. DOI: 10.1007/s10530-021-02543-2.
26. B. Weinstein, S.J. Graves, S. Marconi, **A. Singh**, A. Zare, D. Stewart, S. A. Bohlman, E.P. White (2021) A benchmark dataset for canopy crown detection and delineation in co-registered airborne RGB, LiDAR and hyperspectral imagery from the National Ecological Observation Network, *PLOS Computational Biology*. <https://doi.org/10.1371/journal.pcbi.1009180>.
27. P.A. Townsend, J.D. Clare, N. Liu, J.L. Stenglein, C. Anhalt-Depies, T.R. Van Deelen, N.A. Gilbert, **A. Singh**, K.J. Martin, B. Zuckerberg (2021) Snapshot Wisconsin: networking community scientists and remote sensing to improve ecological monitoring and management, *Ecological Applications*. <https://doi.org/10.1002/eap.2436>.
28. N. Liu, M. Garcia, **A. Singh**, J.D.J. Clare, J.L. Stenglein, B. Zuckerberg, E.L. Kruger, P.A. Townsend (2021) Trail camera networks provide insights into satellite-derived phenology for ecological studies, *International Journal of Applied Earth Observation and Geoinformation*. DOI: 10.1016/j.jag.2020.102291
29. B. Weinstein, S. Marconi, S.A. Bohlman, A. Zare, **A. Singh**, S.J. Graves, E.P. White (2021) A remote sensing derived data set of 100 million individual tree crowns for the National Ecological Observatory Network, *eLife*. DOI: 10.7554/eLife.62922.
30. I. Ahmad, **A. Singh**, M. Fahad, M.M. Waqas (2020) Remote sensing-based framework to predict and assess the interannual variability of maize yields in Pakistan using Landsat imagery. *Computers and Electronics in Agriculture*. DOI: 10.1016/j.compag.2020.105732
31. Z. Wang, A. Chlus, R. Geygan, Z. Ye, T. Zheng, **A. Singh**, J.J. Couture, J. Cavender-Bares, E.L. Kruger, P.A. Townsend (2020) Foliar functional traits from imaging spectroscopy across biomes in eastern North America. *New Phytologist*. DOI: 10.1111/nph.16711
32. J.E. Meireles, J. Cavender-Bares, P.A. Townsend, S.Ustin, J.A. Gamon, A.K. Schweiger, M.E. Schaepman, G.P. Asner, R.E. Martin, **A. Singh**, F. Schrodtt, A. Chlus Brian C. O'Meara (2020) Leaf reflectance spectra capture the evolutionary history of seed plants, *New Phytologist*, DOI: 10.1111/nph.16771.
33. A.N. Chaurasia, M.G. Dave, R.M. Parmar, B. Bhattacharya, P.R. Marpu, **A. Singh**, N.S.R. Krishnayya (2020) Inferring Species Diversity and Variability over Climatic Gradient with Spectral Diversity Metrics. *Remote Sensing*. 12 2130.
34. M. Lien, R. Barker; Z. Ye, M. Westphall, R. Gao, **A. Singh**, S. Gilroy, P. Townsend (2019) A Low-cost and Open-Source Platform for Automated Imaging. *Plant Methods* 15 (6). DOI: 10.1186/s13007-019-0392-1
35. J. Clare, P. Townsend, C. Anhalt-Depies, C. Locke, J. Stenglein, S. Frett, K. Martin, **A. Singh**, T. Van Deelen, B. Zuckerberg (2019) Making inference with messy (citizen science) data: when

are data accurate enough and how can they be improved? *Ecological Applications*. DOI: 10.1002/eap.1849

36. Z. Wang, P. A. Townsend, A. K. Schweiger, J.J. Couture, **A. Singh**, S.E. Hobbie, J. Cavender-Bares (2019) Mapping foliar functional traits and their uncertainties across three years in a grassland experiment. *Remote Sensing of Environment*. (221) 405-416. DOI: 10.1016/j.rse.2018.11.016.
37. A. Sharma, K.K. Bohn, J. McKeithen, **A. Singh** (2019) Effects of conversion harvests on light regimes in a southern pine ecosystem in transition from intensively managed plantations to uneven-aged stands. *Forest Ecology and Management*. (432) 140-149. DOI: 10.1016/j.foreco.2018.09.019
38. S. Dubois, A. Desai, **A. Singh**, S.P. Serbin, M. Goulden, D. Baldocchi, S. Ma, W. Oechel, S. Wharton, E.L. Kruger, P.A. Townsend (2018) Using imaging spectroscopy to detect variation in terrestrial ecosystem productivity across a water-stressed landscape. *Ecological Applications*. 28(5) 1313-1324. DOI: 10.1002/eap.1733.
39. J.J. Couture, **A. Singh**, A.O. Charkowski, R.L. Groves, S.M. Gray, P.C. Bethke, P.A. Townsend (2018) Integrating spectroscopy with potato disease management. *Plant Disease*. DOI: 10.1094/PDIS-01-18-0054-RE
40. I. Herrmann, S.K. Vosberg, P. Ravindran, **A. Singh**, H. Chang, M.I. Chilvers, S.P. Conley, P. Townsend (2018) Leaf and Canopy Level Detection of *Fusarium Virguliforme* (Sudden Death Syndrome) in Soybean. *Remote Sensing*. 10(3) 426. DOI:10.3390/rs10030426
41. R. Kolka, B.R. Sturtevant, J.R. Miesel, P. Wolter, S. Fraver, T.D. DeSutter, **A. Singh**, P.T. Wolter, S. Fraver, T.M. DeSutter, P.A. Townsend (2017) Emissions of Forest Floor and Mineral Soil Carbon, Nitrogen and Mercury Pools and Relationships with Fire Severity for the Pagami Creek Fire in the Boreal Forest of Northern Minnesota. *International Journal of Wildland Fire*. 26(4) 296-305. DOI:10.1071/WF16128
42. F. Lacasella, S. Marta, **A. Singh**, K. S. Whitney, K. Hamilton, P. Townsend, C.J. Kucharik, T.D. Meehan and C. Gratton (2017) From pest data to abundance-based risk maps combining eco-physiological knowledge, weather and habitat variability. *Ecological Applications*. 27(2) 575-588 DOI: 10.1002/eap.1467
43. J. J. Couture, **A. Singh**, K.F. Rubert-Nason, S.P. Serbin, R.L. Lindroth, P.A. Townsend (2016) Spectroscopic determination of ecologically relevant plant secondary metabolites. *Methods in Ecology and Evolution*. (7) 1402-1412. DOI: 10.1111/2041-210X.12596
44. S.C. Zipper, J. Schatz, **A. Singh**, C.J. Kucharik, P.A. Townsend, S.P. Loheide II (2016) Urban heat island impacts on plant phenology: intra-urban variability and response to land cover. *Environmental Research Letters*. 11 (5).
45. C.J. Kucharik, A.C. Mork, T.D. Meehan, S.P. Serbin, **A. Singh**, P.A. Townsend, K.S. Whitney, C. Gratton (2016) Evidence for Compensatory Photosynthetic and Yield Response of Soybeans to Aphid Herbivory. *Journal of Economic Entomology*. DOI: 10.1093/jee/tow066
46. J. Cavender-Bares, J.E. Meireles, J.J. Couture, M.A. Kaproth, C.C. Kingdon, **A. Singh**, S.P. Serbin, A. Center, E. Zuniga, G. Pilz, P.A. Townsend (2016) Associations of Leaf Spectra with Genetic and Phylogenetic Variation in Oaks: Prospects for Remote Detection of Biodiversity. *Remote Sensing*. DOI: 10.3390/rs8030221
47. S.P. Serbin, **A. Singh**, A.R. Desai, S.G. Dubois, A.D. Jablonski, C.C. Kingdon, E.L. Kruger, P.A. Townsend (2015) Remotely estimating photosynthetic capacity, and its response to temperature, in vegetation canopies using imaging spectroscopy. *Remote Sensing of Environment*. DOI:10.1016/j.rse.2015.05.024
48. H. Gu, **A. Singh**, P.A. Townsend (2015). Detection of gradients of forest composition in an urban area using imaging spectroscopy. *Remote Sensing of Environment*. DOI:10.1016/j.rse.2015.06.010
49. **A. Singh**, S.P. Serbin, B.E. McNeil, C.C. Kingdon, P.A. Townsend (2015) Imaging spectroscopy algorithms for mapping canopy foliar chemical and morphological traits and their uncertainties. *Ecological Applications*. DOI: 10.1890/14-2098.1

50. A.C. Perillo, C.J. Kucharik, T.D. Meehan, S.P. Serbin, **A. Singh**, P.A. Townsend, K.S. Whitney, C. Gratton (2015) Use of insect exclusion cages in soybean creates an altered microclimate and differential crop response. *Agricultural and Forest Meteorology* 208 50-61. DOI: 10.1016/j.agrformet.2015.04.014
51. M.E. Fagan, R.S. DeFries, S.E. Sesnie, J.P. Arroyo-Mora, C. Soto, **A. Singh**, P.A. Townsend, R.L. Chazdon (2015) Mapping species composition of forests and tree plantations in northeastern Costa Rica with an integration of hyperspectral and multitemporal Landsat imagery. *Remote Sensing*. 7(5), 5660-5696; doi:10.3390/rs70505660
52. M. Bunyan, S. Bardhan, **A. Singh**, S. Jose (2015) Effect of topography on the distribution of tropical montane forest fragments: a predictive modelling approach. *Journal of Tropical Forest Science*. 27(1) 30-38.
53. S.P. Serbin, **A. Singh**, B.E. McNeil, C.C. Kingdon, P.A. Townsend (2014) Spectroscopic determination of leaf morphological and biochemical traits for northern temperate and boreal tree species. *Ecological Applications*. DOI: 10.1890/13-2110.1
54. M.D. Madritch; C.C. Kingdon; **A. Singh**; K.E. Mock, R.L. Lindroth, P.A. Townsend (2014) Imaging spectroscopy links aspen genotype with below-ground processes at landscape scales. *Philosophical transactions of the Royal Society of London. Series B, Biological sciences* 369: 20130194.
55. L. Brottem, M.D. Turner, B. Butt, **A. Singh** (2014) Biophysical variability and pastoral rights to resources: West African transhumance revisited. *Human Ecology*, DOI:/10.1007/s10745-014-9640-1
56. M.D. Turner, B. Butt, **A. Singh**, L. Brottem, A. Ayantunde, B. Gerard (2014) Variation in Vegetation Cover and Livestock Mobility Needs in Sahelian West Africa. *Journal of Land Use Science*. DOI: 10.1080/1747423X.2014.965280
57. **A. Singh**, A.R. Jakubowski, I. Chidister, P. A. Townsend (2013) A MODIS approach to predicting stream water quality in Wisconsin. *Remote Sensing of the Environment* 128:74-86.
58. P.G. Shankar, **A. Singh**, S. R. Ganesh, R. Whitaker (2013) Factors influencing human hostility to King Cobras (*Ophiophagus hannah*) in the Western Ghats of India. *Hamadryad* 36:91-100.
59. M. Z. Islam, **A. Singh**, M. P. Basheer, J. Judas and A. Boug (2012) Differences in space use and habitat selection between captive-bred and wild-born Houbara bustards in Saudi Arabia: results from a long-term reintroduction program. *Journal of Zoology* 289:251-261.
60. P.T. Wolter, E.A. Berkley, S.D. Peckham, **A. Singh**, and P.A. Townsend (2012). Exploiting tree shadows on snow for estimating forest basal area using Landsat data. *Remote Sensing of the Environment* 121:69-79.
61. P. A Townsend, **A. Singh**, J. R. Foster, N. J. Rehberg, C. C. Kingdon, K. N. Eshleman, S. W. Seagle (2012) A general Landsat model to predict canopy defoliation in broadleaf deciduous forests, *Remote Sensing of the Environment* 119:255-265.
62. L. N. Deel, B. E. McNeil, P. G. Curtis, S. P. Serbin, **A. Singh**, K. N. Eshleman, P. A. Townsend (2012) Relationship of a Landsat cumulative disturbance index to canopy nitrogen and forest structure. *Remote Sensing of the Environment* 118:40-49.
63. B. Butt, M. D. Turner, **A. Singh**, L. Brottem (2011) Use of MODIS NDVI to evaluate changing latitudinal gradients of rangeland phenology in Sudano-Sahelian West Africa, *Remote Sensing of the Environment* 115: 3367-3376.
64. **A. Singh**, S.P.S. Kushwaha (2011) Refining logistic regression models for wildlife habitat suitability modeling—A case study with muntjak and goral in the Central Himalayas, India. *Ecological Modelling* 222: 1354-1366.
65. **A. Singh**, T. C. Hines, J. A. Hostetler, H. F. Percival & M. K. Oli (2011) Patterns of space and habitat use by northern bobwhites in South Florida, USA. *European Journal of Wildlife Research* 57: 15-26.
66. **A. Singh**, T. C. Hines, H. Franklin Percival and M. K. Oli (2010) Does nest-site selection influence bobwhite nesting success in south Florida? *CSIRO Wildlife Research* 37: 489-496.

67. E. Imam, S.P.S. Kushwaha, **A. Singh** (2009) Evaluation of suitable tiger habitat in Chandoli National Park, India, using multiple logistic regression. *Ecological Modelling* 220: 3621–3629.
68. A. A. Zarri, A. R. Rahmani, **A. Singh** and S. P. S. Kushwaha (2008) Habitat suitability assessment for the endangered Nilgiri Laughingthrush: A multiple logistic regression approach. *Current Science*, 94 (11) 1487 – 1494.
69. S.P.S. Kushwaha, A. Khan, B. Habib, A. Quadri and **A. Singh** (2004). Evaluation of sambar and muntjak habitats using geostatistical modeling. *Current Science*, 86 (10) 1390-1400.

Extension publications

70. J. Fletcher, **A. Singh** (2020) Applications of unmanned aerial systems in agricultural operation management: Part-I: Overview. *EDIS*. <https://doi.org/10.32473/edis-ae541-2020>.
71. **A. Singh**, J. Fletcher (2020) Applications of unmanned aerial systems in agricultural operation management: Part-II: Platforms and payloads. *EDIS*. <https://doi.org/10.32473/edis-ae552-2021>.
72. **A. Singh**, J. Fletcher (2020) Applications of unmanned aerial systems in agricultural operation management: Part-III: Best practices for efficient aerial surveying. *EDIS*. <https://doi.org/10.32473/edis-ae553-2021>.
73. J. Chintanadilok, S. Patel, Y. Zhuang, **A. Singh** (2022) Mission Planner: an open-source alternative to commercial flight planning software for unmanned aerial systems. *EDIS*. <https://doi.org/10.32473/edis-AE576-2022>.
74. C. Fraisse, Y. Ampatzidis, S. Guzmán, W. Lee, C. Martinez, S. Shukla, **A. Singh**, Z. Yu (2022) Artificial Intelligence (AI) for crop yield forecasting. *EDIS*. <https://doi.org/10.32473/edis-AE571-2022>.

Grants and awards

| Role | Agency | Title | Funding | Period |
|------|-------------|---|-------------|-----------|
| PI | NASA-SERVIR | Integrating socio-economic and remotely sensed information to characterize conflict precursors and land degradation dynamics in Ghana | \$659,773 | 2023-2026 |
| Co-I | NASA-LCLUC | South Asian smallholder forests and other tree-based systems: synthesizing LCLUC data and approaches to foster a natural climate solution that improves livelihoods | \$326,805 | 2023-2026 |
| Co-I | USDA | Area-Wide Project for Integrated Management Addressing Water hyacinth (<i>Pontederia Crassipes</i>) | \$110,330 | 2022-2025 |
| Co-I | DOE-EERE | Evaluation of Energycane for Bioenergy and Sustainable Agriculture Systems | \$2,192,526 | 2022-2026 |
| Co-I | USDA-NIFA | Using unmanned aerial systems to detect nitrogen stress in Alfalfa | \$77,494 | 2022-2023 |
| Co-I | NASA-SERVIR | Linking deforestation, urbanization, and agricultural expansion for land use decisions in Ghana | \$660,286 | 2020-2023 |
| Co-I | NSF-MRA | Disentangling cross-scale influences on tree species, traits, and diversity from individual trees to continental scales | \$1,215,240 | 2019-2022 |
| Co-I | NSF-EEC | Planning Grant: Engineering Research Center for Intelligent Sensing, Mapping, and Forecasting of Water Quality for Sustainable Coastal Ecosystems (iCoast) | \$100,000 | 2019-2020 |
| Co-I | USDA-CPS | Collaborative Research: Robust and Intelligent Optimization of Controlled-environment | \$437,517 | 2020-2023 |

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|------|----------------|--|-------------|-------------|
| | | Agriculture System for Food Productivity and Nutritional Security | | |
| PI | NASA-LCLUC | Landscapes in flux: The influence of demographic change and institutional mechanisms on land cover change, climate adaptability and food security in rural India | \$589,285 | 2017-2020 |
| Co-I | NSF-MSB-ENSA | Foliar traits and terrestrial ecosystem variability across NEON domains | \$1,497,780 | 2016-2021 |
| Co-I | NASA-AVIRIS-NG | Vegetation functional amplitudes along a rainfall gradient in Indian ecosystems using AVIRIS-NG | \$149,125 | 2018 – 2019 |
| Co-I | FDACS | Aerial mapping in agriculture in support of water management and improved efficiency | \$40,629 | 2018 |
| Co-I | UF/IFAS | Sensor imaging pod mounted to an overhead rail system for 2D scanning coupled with nanosensor IoT platform for root/shoot/soil analysis | \$75,000 | 2018 |
| Co-I | UF/IFAS | Agricultural damage assessment in Hurricane affected areas | \$3,500 | 2018 |

Professional activities

2024 – Present

Assistant Professor, Geospatial Sciences, Caesar Kleberg Wildlife Research Institute, Texas A&M University, Kingsville.

2017– 2024

Assistant Professor, Department of Agricultural and Biological Engineering, University of Florida, Gainesville.

- Mathematical modeling and sensor development in a framework geared towards generating an understanding of the impacts of land management and environmental change on the provisioning of ecosystems goods and services. Focus primarily on utilizing remote sensing techniques to answer basic and applied questions in ecosystem science.
- Research activities range from 1) assessing the functional ecology of forested and/or human-dominated landscapes via multi-modal remote sensing and statistical, artificial intelligence and machine vision algorithms, 2) development of novel optical instrumentation and uncrewed aerial imaging systems (UASs), and, 3) institutional capacity building, outreach, and applied research in developing countries on intersectional issues of land cover change, food insecurity, livelihoods, and forest degradation (India, Ghana), precision agriculture, UASs, and agroclimatology (India).

2015 – 2017

Assistant Research Scientist, Department of Forest and Wildlife Ecology, UW – Madison

- Lead quantitative ecologist and remote sensing scientist, responsible for developing quantitative techniques for ingesting and interpreting airborne, proximal, and contact spectroscopic data for mapping forest functional traits. Research also focused on generating techniques for enabling pre-visual detection of disease in crops, developing statistical models for discriminating between crop genotypes/varieties and relating remotely sensed spectral measures with crop stress and yields across scales ranging from individual plants to landscapes, and incorporating response mechanisms in ecosystem process models.

2014 – 2015

Postdoctoral research associate, Department of Forest and Wildlife Ecology, UW – Madison

- Assessing the influence of soybean aphid infestation and climatic variability on spatio-temporal patterns of soybean yields in Wisconsin using remote sensing, spectroscopy and crop ecophysiological models (USDA AFRI grant to C. Gratton, C. J. Kucharik, and P. A. Townsend).
- Relating spatio-temporal dynamics of wildlife populations to spatial patterns of vegetation phenology derived from satellite and camera trap data (NASA Ecological forecasting grant to P.A. Townsend, B. Zuckerberg, T. Van Deelen, K. Martin).

2008 – 2014

Graduate research assistant, Department of Forest and Wildlife Ecology, UW – Madison

- Assessing drivers of landscape-scale nutrient export detected from satellite remote sensing and imaging spectroscopy.
- Developing analysis techniques and high-throughput data processing algorithms for Landsat and MODIS satellite data for assessing forest disturbance severity in the Greater Yellowstone ecosystem.

2006 –2008

Graduate assistant, Department of Wildlife Ecology and Conservation, UF - Gainesville

- Assessment of patterns of space use and habitat selection by northern bobwhite quail at the Babcock-Webb Wildlife Management Area, Punta Gorda, Florida.
- Developing spatially explicit individual-based population models of yellow-bellied marmot metapopulation dynamics in Colorado.

2005 –2006

Senior research associate, Eco-Informatics Centre, Ashoka Trust for Research in Ecology and the Environment (ATREE), Bengaluru, India.

- GIS, Remote sensing and quantitative analysis specialist responsible for developing high throughout satellite data processing algorithms for conservation planning applications using IDL and Python
- Biodiversity and invasive species surveys in the Western Ghats of India, built and analyzed spatial databases, assisted in web GIS interface design. Technical resource person for the Landscape Ecology curricula at the National Centre for Biological Sciences, Bangalore.

2004 –2005

Project manager and Senior Research Associate, regional planning and GIS/RS specialist, CEPT, Ahmedabad, India.

- Remote sensing and quantitative analysis lead, responsible for designing and leading socio-economic surveys, designing and implementing spatial decision support systems for Agro-ecological land use planning for the Ahmedabad and Surendranagar Districts in Gujarat, India. Responsibilities also included coordinating and formulating strategies for communicating best practices in watershed management and planning.

Book chapters

S.P.S. Kushwaha, A. Quadri, **A. Singh**, A. Khan (2008). Habitat preference assessment of the tiger and its prey ungulates in Corbett Tiger Reserve. In: Fauna of Corbett Tiger Reserve. Eds: Vinod Khanna and P.C. Tak. Conservation Series No. 35, Zoological Survey of India, Kolkata. ISBN 978-81-8171-186-1.

Conference presentations

1. **A Singh**, A Dutt, Deep learning assisted downscaling of national-scale socioeconomic data for assessing poverty-biodiversity relationships in India. AGU Fall meeting 2022, Chicago IL.
2. M Mahamane, AD Gregorio, M Henry, F Mensah, P Bartel, B Mamane, E Cherrington, R Muench, J Abramowitz, P Olofsson, **A Singh**, J Judge, A Brink, A Dieye, K Hackman, M Dawson, O Neya. West Africa Land Use/Land Cover Harmonisation Task Force for ECOWAS, AGU Fall meeting 2021 New Orleans LA.
3. F Mensah, P Bartel, B Mamane, M Mahamane, E Cherrington, R Muench, J Abramowitz, P Olofsson, **A Singh**, J Judge, D Muchoney, M Henry, A Brink, A Dieye, K Hackman, O Neya, E Zoungrana, F Mar. Building a Collaborative Network for Supporting Regional Capacity Development in Harmonizing Land Use and Land Cover Mapping and Monitoring in West Africa: Initiatives by the West Africa Land Use/land Cover Task Force. AGU Fall meeting 2021 New Orleans LA.
4. **A. Singh**, Remote sensing of forest canopy biochemistry and function, recent advances and applications in India. Sustainable Forestry in South Asia – Current Status, Science and Conservation Priorities, 2019, New Delhi, India.
5. **A. Singh**, Disentangling Facets of Food Insecurity in Economically Depressed Regions of India. 2019 NASA Land Cover Land Use Change Science Presentation, Johor Bahru, Malaysia.
6. S Mittra, PA Townsend, **A. Singh**. Factors influencing food security in rural India: a case study from Rajasthan. 2019 NASA Annual Land Cover Land Use Change Science Meeting, Rockville, MD.
7. **A. Singh**, Mittra, S., Townsend, P.A., Etten, J.E. Landscapes in flux: the influence of demographic change and institutional mechanisms on land cover change, climate adaptability and food security in rural India. 2018 NASA Annual Land Cover Land Use Change symposium, Gaithersburg, MD.
8. S Marconi, SJ Graves, SA Bohlman, JW Lichstein, **A. Singh**, EP White, Scaling up remote sensing fundamental unit: from pixel to crowns. Inferring forest structure and traits syndromes for each individual tree within NEON forest sites. 2018 ESA Annual Meeting (New Orleans, LA).
9. PA Townsend, A Chlus, Z Wang, **A. Singh**, Remote sensing spectroscopy to discriminate plant functional types and physiological function 2017 IEEE International Geoscience and Remote Sensing Symposium (Fort Worth, TX).
10. PA Townsend, E. Kruger, Z. Wang, **A. Singh**, Linking imaging spectroscopy and trait data to better understand spatial and temporal variability in functional traits. 2017 European Geophysical Union Annual meeting, Vienna, Austria.
11. L Cotrozzi, E Pellegrini, JJ Couture, C Kingdon, **A. Singh**, B Fallon, G Pilz, J Cavender-Bares, C Nali, G Lorenzini. Spectroscopy: an efficacious approach for better understanding of stress responses of Mediterranean plants. 2016 2nd Committee on Air Pollution Effects Research on Mediterranean Ecosystems meeting, Brescia, Italy.
12. PA Townsend, **A. Singh**, Z Wang. Mapping Foliar Traits Across Biomes Using Imaging Spectroscopy: A Synthesis. 2016 AGU Fall meeting (San Francisco, CA).
13. SP Serbin, **A. Singh**, JJ Couture, AN Shiklomanov, A Rogers, AR Desai, EL Kruger, PA Townsend. Linking vegetation structure, function and physiology through spectroscopic remote sensing, 2015 AGU Fall meeting (San Francisco, CA).
14. Desai, AR. S DuBois, **A. Singh**, SP Serbin, M Goulden, DD Baldocchi, WC Oechel, EL Kruger, PA Townsend, Detection of Extreme Climate Event Impacts to Terrestrial Productivity from Airborne Hyperspectral Imagery. 2015 AGU Fall meeting (San Francisco, CA).
15. Townsend, PA, JJ Couture, EL Kruger, SP Serbin, **A. Singh**, Mapping Variation in Vegetation Functioning with Imaging Spectroscopy. 2015 AGU Fall meeting (San Francisco, CA).
16. **Singh, A.**, S.P. Serbin, C.C. Kingdon, E.L. Kruger, P.A. Townsend. Mapping biochemistry and photosynthetic metabolism in ecosystems using imaging spectroscopy (Imaging spectroscopy in California and the Midwest) 2015 HypSIRI Science Symposium, NASA Goddard Space Flight Center, Greenbelt MD.

17. Townsend, PA., EL Kruger, A. Singh, Aditya, AD Jablonski, S Kochaver, SP Serbin, HypsIRI Measurements of Agricultural Systems in California: 2013-2015. 2015 AGU Fall meeting (San Francisco, CA).
18. Gu, H., PA Townsend, **A. Singh**. Assessment of urban tree growth from structure, nutrients and composition data derived from airborne lidar and imaging spectroscopy. 2014 AGU Fall meeting (San Francisco, CA).
19. **Singh, A.**, S.P. Serbin, K. Stack-Whitney, A. Perillo, C. Gratton, C. Kucharik, P. A. Townsend, Spectroscopic measurements of soybeans used to parameterize soybean aphid stress in the Agro-IBIS ecosystem model. 2014 AGU Fall meeting (San Francisco, CA).
20. Gu, Huan, P. A. Townsend, **Singh, A.**, Assessment of urban tree growth from structure, nutrients and composition data derived from airborne lidar and imaging spectroscopy. 2014 AGU Fall meeting (San Francisco, CA).
21. Townsend, P.A., S.P. Serbin, E.L. Kruger, S. Dubois, A. Desai, A. Jablonski, **A. Singh**, Imaging spectroscopy of plant physiology. HypsIRI Airborne Science Team Meeting, March 2014 (NASA HQ, Washington DC).
22. Townsend, PA; SP Serbin, C Kingdon, **A. Singh**, JJ, JA Gamon, Spectral Data Captures Important Variability Between and Among Species and Functional Types. American Geophysical Union Fall Meeting, December 2013 (San Francisco, CA).
23. **Singh, A.**, S.P. Serbin, C.C. Kingdon, P.A. Townsend, Scaling, propagating and mapping uncertainty in spectroscopy-derived foliar traits from the leaf to the image, American Geophysical Union Fall Meeting, December 2012 (San Francisco, CA).
24. Townsend, P.A., **A. Singh**, Improving BASINS/HSPF predictions of nitrogen export to improve TMDL accuracy using NASA imagery, NASA Water Resources Program Strategy and Investigator Meeting 2013, October 23 (Remote).
25. **Singh, A.**, P.A. Townsend, K. N. Eshleman, Continuous-time modeling of streamwater nutrient loading from forested watersheds in the Chesapeake Bay using MODIS and meteorological data, ASPRS 2013, March 26-29 (Baltimore, MD).
26. Serbin, S.P., **A. Singh**, C.C. Kingdon and P.A. Townsend, Mapping forest functional traits using imaging spectroscopy, 2012, HypsIRI Science Workshop, October 16-18 (Washington, DC).
27. Townsend, P.A., S.P. Serbin, **A. Singh**, B.E. McNeil, E.L. Kruger, J.J. Couture, AVIRIS Studies in the ChEAS ecosystem region, ChEAS 2012 Workshop, June 26-30 (Woodruff, WI).
28. **Singh, A.**, P.A. Townsend, 3 years, 150 AVIRIS images: Practical considerations for analyses of large hyperspectral datasets for ecosystem studies. 2012 NASA HypsIRI Products Symposium, May 16-17 (Greenbelt, MD).
29. Townsend, P.A., **A. Singh**, C.C. Kingdon, M. Simard and W. Fox, Change detection and insect disturbance: synthesis from five systems, ForestSAT 2012, September 11-14 (Corvallis, OR).
30. **Singh, A.**, S.P. Serbin, C.C. Kingdon, H. Gu and P.A. Townsend, Issues in scaling forest functional traits across space and time: Inter-comparability in multi-date and multi-date airborne spectroscopic imagery, ForestSAT 2012, September 11-14 (Corvallis, OR).
31. Gu, H, **A. Singh** and P.A. Townsend. Using functional data analysis to estimate urban forest structure from discrete lidar data and hyperspectral imagery, ForestSAT 2012, September 11-14 (Corvallis, OR).
32. Serbin, S.P., **A Singh**, J.J. Couture, C.C. Kingdon, E.L. Kruger and P.A. Townsend, Characterization of forest ecosystem functioning using imaging spectroscopy and thermal IR imagery, ForestSAT, 2012, September 11-14 (Corvallis, OR).
33. Townsend, P.A., S.P. Serbin and **A. Singh**, HypsIRI: Temperature and the measurement of ecosystem processes, 2011 NASA HypsIRI Science Workshop (Washington, DC), August 23-25 (Washington, DC).
34. Townsend, P.A., S.P. Serbin, **A. Singh** and E.L. Kruger, Detection of key leaf physiological traits using spectroscopy and hyperspectral imagery, 2011 NASA Carbon Cycle and Ecosystems Joint Science Workshop (Biodiversity and Ecological Forecasting), October 3-6 (Alexandria, VA).

35. Isaacson, B.N., S.P. Serbin, **A. Singh**, and P.A. Townsend. Utilization of Landsat-scale phenology products to map ash trees (*Fraxinus* spp) for improved management of the emerald ash borer (*Agilus planipennis* Fairmaire), 2010 Ecological Society of America, 8/6/2010 (Pittsburgh, PA).
36. Townsend, P.A., S.P. Serbin, **A. Singh**, B.E. McNeil and K.N. Eshleman. Linking forest function, disturbance and watershed ecology using field measurements and imaging spectroscopy, 2010 NASA Terrestrial Ecology Science Team Meeting, March 15-17, 2010 (La Jolla, CA).
37. Serbin, S.P., D. Dillaway, P.A. Townsend, E.L. Kruger and **A. Singh**. Use of imaging spectroscopy to detect plant physiological traits. 2009 NASA HypSIRI Workshop, August 11-13, 2009 (Pasadena, CA).
38. Isaacson, BN; **A. Singh**, SP Serbin, PA Townsend. Phenologically informed re-ordering of Landsat to account for inter-annual variability: a method to map Ash trees (*Fraxinus* spp.) using remotely sensed imagery. 2009 Annual AGU meeting (San Francisco, CA).

Extension presentations and In-Service trainings

1. A. Singh “Collection and analysis of drone image data using open-source hardware” 2022, Apoka, FL.
2. A. Singh “Applications of UASs and field spectroscopy in precision agriculture” 2019 Precision Agriculture IST, Gainesville, FL.
3. Zhaohui Tong, I. Ampatzidis, A. Singh: “Intelligent Materials and Technologies for Agriculture”. 4-H Workshop, 2019.
4. Aditya Singh “Advances in Remote Sensing Techniques for Measuring and Mapping Nutrients at Field Scales” 2018 Certified Crop Adviser CEU Session, Gainesville FL.
5. Aditya Singh “Remote sensing applications in crop management -- Sensors, satellites, and UASs” 2018 Precision Agriculture IST, Straughn Center, Gainesville FL.
6. Aditya Singh, Aerial Mapping with sUAS: Grower outreach, Kenansville and Hastings FL 2018.
7. Aditya Singh “Utilizing UAS Imagery and Spectroscopy for Crop Nutrient Assessment” 2018 Florida Agricultural Expo. UF/IFAS GCREC Balm FL.
8. Aditya Singh “Advances in Remote Sensing Techniques for Measuring and Mapping Nutrients at Field Scales” 2018 Certified Crop Adviser CEU Session, Gainesville FL.
9. Aditya Singh “Remote sensing applications in crop management -- Sensors, satellites, and UASs” 2018 Precision Agriculture IST, Straughn Center, Gainesville FL.
10. Aditya Singh, Aerial Mapping with sUAS: Grower outreach, Kenansville FL 2018.
11. Aditya Singh, Aerial Mapping with sUAS: Grower outreach, Hastings FL 2018.

Manuscript reviews

Agricola, Agroforestry, American Journal of Potato Research, Animal Conservation, Journal of the American Society of Agricultural and Biological Engineers, Biological Conservation, Ecological Applications, Ecology, European Journal of Wildlife Research, Forest Systems, Journal of Arid Environments, ISPRS Journal of Photogrammetry and Remote Sensing, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, Journal of Mammalogy, Nature Geosciences, Remote Sensing, Remote Sensing of Environment

Membership in professional organizations

1. American Geophysical Union
2. American Society of Agricultural and Biological Engineers
3. Ecological Society of America
4. Council of Architecture (CoA, India)
5. Society of American Foresters

Extension Activities (University of Florida)

UF Research and Extension faculty: Development of remote sensing-based tools and techniques for assessing landscape function and productivity with a focus on land and water resource conservation. Research involves working with extension scientists and stakeholders on developing sensor systems and analytical techniques for investigating forest and agricultural ecosystem responses to environmental stresses such as drought, pests and diseases.

Professional Service

- Director, UF ProForest Forest Health and Resilience Group (<http://proforesthealth.org/>).
- Vice Chair, Applied Ecology Section, Ecological Society of America
- Core member: UF Nelms Institute of the Connected World, Global Food Sciences Institute
- Member, NEON Airborne Observation Platform, Foliar Sampling Technical Working Groups
- NASA Science teams: NASA LCLUC South Asia Research Initiative, SERVIR West Africa
- Proposal Review Panels: USDA-NIFA: SBIR, Foundational; NASA: Biodiversity, LCLUC
- Editorial Board Member: Remote Sensing, Forests, Frontiers in Environmental Science.

International

- External PhD Evaluator:
 - University of Agriculture, Faisalabad, Pakistan
 - Monash University, Australia Joint PhD program with IIT Mumbai, India
 - University of Pisa, Department of Agriculture, Pisa, Italy
- External Proposal Reviewer
 - US-Israel Binational Agricultural Research and Development Fund
 - Canada Foundation for Innovation
- International research collaboration MoUs facilitated:
 - Vasantrao Naik Marathwada Agriculture University, Parbhani, India
 - Vidya Bhavan Society Agricultural Research Center, Udaipur India
 - People Science Institute, Dehradun, India

Awards

Professional:

- 2018 Outstanding Young Researcher: Florida chapter of the American Society of Agricultural and Biological Engineers.
- 2018 International Educator of the Year: College of Agricultural and Life Sciences, University of Florida.

Academic:

- 2010 - 2014 Graduate assistantship, NASA Decisions program
- 2008 - 2010 Graduate assistantship, NASA Terrestrial Ecology program
- 2006-2008 Graduate Assistantship, School of Natural Resources and Environment, University of Florida
- 2007 Grinter fellow, University of Florida Graduate School (USD 2500 p.a.)
- 2006 Grinter fellow, University of Florida Graduate School (USD 3000 p.a.)
- 2006 Lewis Anthony Dexter fellow, Program for Studies in Tropical Conservation, University of Florida (USD 9000 p.a.)
- 2004 In-service training scholarship for the post-graduate diploma course in Geoinformatics at IIRS, Dehradun. Sponsored by CEPT, Ahmedabad (INR 60,000)
- 2000 Graduate Aptitude Test Examination Scholarship, India (INR 30,000 p.a.)

Other:

- 2023 Univ. of Florida Water Institute Photo Contest Winner, "At Large" Category.
- 2022 Univ. of Florida International Center Global Photo Contest, 1st Prize Staff and Alumni Category.