**Karun Pandit, Ph.D.**

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# EDUCATION

## State University of New York, College of Environmental Science and Forestry Syracuse, NY

Ph.D. Monitoring, Analysis & Modeling 2016

Dissertation topic: [*“Changes in Forest Biomass and Overstory-Understory Species Similarities in the context of Changing Land Ownerships*”](https://www.researchgate.net/publication/321295315_Changes_in_Forest_Biomass_and_Overstory-Understory_Species_Similarities_in_the_context_of_Changing_Land_Ownerships?_sg=EGVw8eypS0eKkKsVWR8ClMIm-GmTjygFgkDHpHNeBU-QJEaBZ1avfE0oW7Gvl-5GcHWGkSO2qecMPxo3x4txoXvpSLg6_j9sW90W8d0X.Nj6GlVyTmZmI4S7yVlh_BJSJ_E9ut1yEJjjMmhXfmIZPWcn7jRiRy09KNzG4fxhVzH-FTcfpX2LhnGR90lOXFw).

## Tribhuvan University, Institute of Forestry Pokhara, Nepal

M.Sc. in Forestry 2003

Thesis topic: [“*An assessment of variation of major soil properties for efficient soil management and crop productivity in Pokhare Khola Sub-watershed, Dhading, Nepal”*.](https://www.researchgate.net/publication/272328816_An_assessment_of_variation_of_major_soil_properties_for_efficient_soil_management_and_crop_productivity_in_Pokhare_Khola_Sub-watershed_Dhading_Nepal?_sg=EGVw8eypS0eKkKsVWR8ClMIm-GmTjygFgkDHpHNeBU-QJEaBZ1avfE0oW7Gvl-5GcHWGkSO2qecMPxo3x4txoXvpSLg6_j9sW90W8d0X.Nj6GlVyTmZmI4S7yVlh_BJSJ_E9ut1yEJjjMmhXfmIZPWcn7jRiRy09KNzG4fxhVzH-FTcfpX2LhnGR90lOXFw)

B.Sc. in Forestry 2000

# PROFESSIONAL EXPERIENCE

## Department of Forestry and Environmental Resources, North Carolina State University Raleigh, NC

Research Scholar 2022 - current

* Develop model integrating forest growth and yield models with economic and soil variables to predict stand value and forest carbon sequestration for alternate management and climate scenarios.
* Explore pathways for post-harvest forest products to understand fate and longevity of carbon stored in various forest products.

## School of Forest, Fisheries & Geomatic Sciences, University of Florida Gainesville, FL

Postdoctoral Assistant 2020 - 2022

* Explore forest ecosystem response (in terms of mortality, basal area, species composition, biomass, and seedling count) after stand-replacing disturbances (fire, insects, diseases, and harvests) across the coterminous United States using FIA data, remote sensing data, and machine learning algorithms.
* Understand tree, stand, and landscape level variables associated with fusiform rust in the pines in southeastern United States and forecast spatiotemporal distribution of the disease for future alternate climate change scenarios (CMIP5 RCP 4.5 and 8.5), using random forest, support vector machine, gradient boosting machine, and neural networks.
* Develop model for an early detection of change in southern pines due to common diseases (such as fusiform rust and pitch canker) using forest inventory data, field observation, and latest remote sensing technologies (hyperspectral images and LiDAR).
* Investigate tree traits and climatic variables associated with foliar disease in pine trees in southern United States by applying generalized linear mixed model (GLMM) and Maximum Entropy approach.

## Department of Geosciences, Boise State University Boise, ID

Postdoctoral Research Assistant 2016 – 2019

* Application of Random Forest approach to update allometric and physiological parameters of *Juniper occidentalis* in Ecosystem Demography (EDv2.2) model by comparing model predicted aboveground biomass with remote sensing products for juniper dominated woodlands in the southern Idaho.
* Explore the performance of fire module in EDv2.2 model at different temporal and spatial scales for alternate fire scenarios using MODIS-derived Gross Primary Productivity in the Great Basin of the western United States.
* Perform sensitivity and optimization analysis of sagebrush Plant Function Type (PFT) parameters, related to photosynthesis, stomatal conductance, and allocation to improve ecosystem flux estimation in Ecosystem Demography (EDv2.2) model
* Establish allometric relationships between height, volume, woody biomass, leaf biomass, canopy area, and root depth for sagebrush based on field observation and LiDAR data.
* Collaborate on projects funded by Joint Fire Science Program, National Aeronautics and Space

Administration – Terrestrial Ecology Program, and United States Department of Agriculture, Forest Service, Western Wildland Environmental Threat Assessment Center.

## Research Foundation at State University of New York Syracuse, NY

Research Assistant 2013 - 2015

* Research study in collaboration with USDA, Forest Service, and Northeastern States Research Cooperative (NSRC)
* Perform geospatial and statistical modeling of change in timberland ownerships in

Northeastern United States, using Kriging, Ripley’s K Function, and Multiple Logistic Regression

* Explore relationships among change in aboveground biomass, timberland ownerships and social-ecological factors
* Assess spatiotemporal changes in overstory-understory tree species composition

## State University of New York, College of Environmental Science and Forestry Syracuse, NY

Teaching Assistant 2010 - 2012

* Assist graduate and undergraduate students in the two different courses i) *Natural Resources Measurements and Sampling*, and ii) *Introduction to Geospatial Information Technology*, mostly assisting in their lab works and field works
* Support students in learning statistical and geospatial tools

## Chitwan National Park, Department of National Parks and Wildlife Conservation Chitwan, Nepal

Conservation Officer 2006 - 2009

* Prepare forest management plans with the application of inventory, growth modeling and harvest scheduling.
* Implement park and forest management plans with actions for grassland management, habitat conservation, forest management, and antipoaching related activities
* Perform wildlife survey and habitat assessment surveys

# PUBLICATIONS

**Pandit K.**, Johnson, D., Domke, G, Smith, J. and Lichstein, J. Aboveground biomass and seedling density responses to stand-replacing disturbances across the United States’ forests. (in review.).

**Pandit K**., and Johnson, D. Recent spatiotemporal dynamics and potential future hotspots of fusiform rust in southern pine species. (in review.)

**Pandit K**., and Johnson, D. 2022. Probability of fusiform rust in southern pines varies with pine species, management, stand age, and oak species. Submitted to *Canadian Journal of Forest Research*.

Magee, L., **Pandit, K.** Flory, S.L., Crandall, R. M., Broadbent, E.N., Prata, G.A., Dillon, W., Bohlman, S. and Johnson, D. J. 2021. Life stage and neighborhood-dependent survival of longleaf pine after prescribed fire. *Forests*, *13*, 117. https://doi.org/10.3390/f13010117.

**Pandit, K.**, Bevilacqua, E., Newman, D. H. and Butler, B. J. 2021. Understanding the spatial pattern and driving factors associated with the timberland ownerships’ change in the Northern United States. *Journal of Forestry*, fvab017, [https://doi.org/10.1093/jofore/fvab017.](https://doi.org/10.1093/jofore/fvab017)

Johnson, D.J., Magee, L., **Pandit, K.**, Bourdon, J., Broadbent, E. N., Glenn, K., Kaddoura, Y., Machado, S., Nieves, J., Wilkinson, B., Zambrano, A.M.A., and Bohlman, S. 2021. Canopy tree density and identity influence tree regeneration patterns and woody species diversity in a longleaf pine forest. *Forest Ecology and Management,* 490, 119082, [https://doi.org/10.1016/j.foreco.2021.119082.](https://doi.org/10.1016/j.foreco.2021.119082)

**Pandit, K**., Dashti, H., Hudak, A. T., Glenn, N. F., Flores, A. N., and Shinneman, D. J. 2021. Understanding the effect of fire on vegetation composition and gross primary production in a semi-arid shrubland ecosystem using the Ecosystem Demography (EDv2.2) model, *Biogeosciences*, 18, 2027–2045, https://doi.org/10.5194/bg-18-2027-2021.

Dashti, H., **Pandit, K.**, Glenn, N. F., Flores, A.N, Shinneman, D. J., and Hudak, A.T. 2021. Performance of the ecosystem demography model (EDv2.2) in simulating gross primary production capacity and activity in a dryland study area, *Agricultural and Forest Meteorology*, 297, 108270.

https://doi.org/10.1016/j.agrformet.2020.108270.

**Pandit, K**. Smith, J., Quesada, T., Villari, C. and Johnson, D. 2020. Association of recent incidence of foliar disease in pine species in the southeastern United States with tree-level and climate variables. *Forests* 2020, *11*, 1155. https://doi.org/10.3390/f11111155.

**Pandit, K.**, Dashti, H., Glenn, N. F., Flores, A. N., Maguire, K. C., Shinneman, D. J., Flerchinger, G. N., and Fellows, A. W. 2019. Developing and optimizing shrub parameters representing sagebrush (Artemisia spp.) ecosystems in the northern Great Basin using the Ecosystem Demography (EDv2.2) model, *Geosci. Model Dev*., 12, 4585–4601, . [https://www.geosci-model-dev.net/12/4585/2019/.](https://www.geosci-model-dev.net/12/4585/2019/)

**Pandit, K**., Bevilacqua, E., Mountrakis, G. and Malmsheimer, R.W. 2016. Spatial Analysis of Forest Crimes in Mark Twain National Forest, Missouri. *Journal of Geospatial Applications in Natural Resources*. 1(1): 39-53.

http://scholarworks.sfasu.edu/j\_of\_geospatial\_applications\_in\_natural\_resources/vol1/iss

1/3

Awasthi K.D., Tiwari, K.R., Balla, M.K., Sitaula, B.K., Singh, B.R. and **Pandit K**. 2007. Plot level runoff, soil and nutrient loss in upland rainfed terraces (bari) and aspect-wise soil quality of different land uses in pokhare khola watershed, Nepal. *International Journal of Ecology and Environmental Sciences*. 33 (2-3), 105-14

**Pandit, K**. and Balla, M.K. 2006. An Assessment of Soil Fertility Management Issues in Pokhare Khola Watershed, Dading. *Nepal Journal of Science and Technology.* Vol.7:89-96.

**Pandit, K**. and Balla, M.K. 2004. Indigenous knowledge of terrace management and improvement in Paundi Khola watershed, Lamjung district. *Himalayan Journal of Sciences*. 2(3): 33-36

# TEACHING EXPERIENCE

## *Guest Lecturer*

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## North Carolina State University, College of Natural Resources

Growth & Yield Models, Advanced Silviculture (graduate) 2022 Remote Sensing, AI, and Forest Management, Advanced Silviculture (graduate) 2022

## State University of New York, College of Environmental Science and Forestry

Forest Sampling, Natural Resources Measurements and Sampling (undergraduate) 2013

GIS data models, Introduction to Geospatial Information Technologies (undergraduate) 2012

Introduction to image processing, Introduction to Geospatial Information Technologies

(undergraduate) 2012

Log and standing tree volume estimation, Natural Resources Measurements (undergraduate) 2011

***Co-instructor***

**Tribhuvan University, Kathmandu Forestry College**

Wildlife Biology (undergraduate) 2009

**Tribhuvan University, Institute of Forestry**

GIS for Natural Resources (undergraduate) 2003

# TEACHING INTEREST

Natural Resources Measurements

Forest Disturbances and Resilience

Forest Ecosystem Modeling

Geospatial Analysis

Data visualization

# COMPUTER / CODING SKILLS

Geospatial software: ArcGIS, ArcInfo, QGIS, ERDAS Imagine, IDRISI, ENVI

Coding languages: R, Python, Fortran, MATLAB

Statistical programming: SAS, SPSS.

Microsoft Office and Projects: Word, Excel, Access, PowerPoint, Microsoft Projects.

Operating systems: Microsoft windows and Linux

Artificial Intelligence: Trained on deep learning (deep neural network, convolutional neural network, recurrent neural network)

Cloud computing: Google earth engine

Parallel / Cluster computing: HiPerGator (University of Florida), R2 (Boise State University)

# SELECTED RESEARCH GRANTS / AWARDS

*Saving trees and money by detecting forest pests and pathogens from remote sensing and forest inventories using AI tools.* University of Florida Informatics Institute, Role: CO-PI with Daniel Johnson (Lead PI), $28,000, 2022

*Albert L. Leaf Memorial Award.* Department of Forests and Natural Resource Management. State University of New York College of Environmental Science and Forestry. 2015

*C. Eugene Farnsworth Memorial Fellowship for excellence in graduate studies*. Department of Forests and Natural Resource Management. State University of New York College of Environmental Science and Forestry. 2014

*Dynamics of institutional timberland ownership and its impact on forest management in Northern Forest Region, US.* Northeastern States Research Cooperative, Role: CO-PI with Eddie Bevilacqua (Lead PI), $10,000, 2013

*An Analysis of growth prediction of forest attributes using Forest Vegetation Simulator (FVS)*. Internship award from The Edna Bailey Sussman Foundation. Syracuse, NY, $5,580, 2011

# PROFESSIONAL SERVICE

Member, proposal review panel, Wildfire and Floods Science research, Environmental System Science Funding Opportunity, *Department of Energy*, 2022

Manuscript review, *Journal of Forestry, Frontiers in Environmental Science, Forests, Journal of Environmental Management, Ecological Indicators, Plos One, Journal of Natural Resources and Development*

Judge, Third Annual Student Showcase, Boise State University, 2019

Member, editorial advisory board, *Journal of Natural Resources and Development,* 2013

Team leader, 24th Annual Warden Seminar at Chitwan National Park, Nepal. February 4-10, 2008

Team leader, *Gharial (Gavialis gangeticus) Monitoring Program in Chitwan National Park*, a collaborative study between Chitwan National Park and Bird Conservation Nepal, 2007

# SELECTED TALKS / PRESENTATIONS

Pandit, K., Johnson, D.J., Smith, J., Domke, G., and Lichstein, J.W. *Near-term aboveground biomass and regeneration responses to severe disturbances across the United States forests*. Paper presented at FIA 2022 - The 2022 Forest Inventory and Analysis Science Stakeholder Meeting. November 15-17, 2022. Online.

Pandit, K. and Johnson, D. 2021. Recent spatiotemporal dynamics and potential future hotspots of fusiform rust in southern pine species, Forest Biology Research Cooperative, 25th Annual Advisory Council Meeting, December 01-02, 2021, Austin Cary Learning Center, Gainesville, FL.

Pandit, K., Hudak, A., Glenn, N., and Flores, A.N. 2020. *Evaluating allometric and physiological parameters to improve aboveground biomass estimation of Juniper occidentalis at South Mountain, Idaho using the ED2 model*. Paper presented at 2020 Land Model and Biogeochemistry Working Group Meetings. National Center for Atmospheric Research. February 11-13, Boulder, CO.

Pandit, K., Dasthi, H, Glenn, N., Flores, A., Shinneman, D.J. and Hudak, A. 2019. *Understanding the uncertainties in estimating post-fire recovery of biomass using the Ecosystem Demography (EDv2.2) model*. Lightening talk at Ecological Forecasting Initiative Conference, May 13-15, D. C.

Pandit, K., Dasthi, H, Glenn, N., Flores, A., Shinneman, D.J. and Hudak, A. 2019. [*Modeling vegetation composition and biomass of the sagebrush ecosystem in the Reynolds Creek Experimental*](http://www.cesm.ucar.edu/events/wg-meetings/2019/presentations/landBGC/pandit.pdf)

[*Watershed (RCEW) for different CO2 and fire conditions, using the Ecosystem Demography (EDv2.2) Model*.](http://www.cesm.ucar.edu/events/wg-meetings/2019/presentations/landBGC/pandit.pdf) Paper presented at Land Model and Biogeochemistry Working Group Meetings. National Center for Atmospheric Research. February 11-13, Boulder, CO.

 Pandit, K., Dasthi, H, Glenn, N., Flores, A.N., Maguire, K., and Shinneman, D.J. 2018. *Assessing the dynamics of the sagebrush ecosystem under different conditions of initial vegetation, ambient CO2, and fire.*

Poster presented at 2018 AGU Fall Meeting. December 10-14, D. C.

Pandit, K., Dasthi, H, Glenn, N., Flores, A.N., Maguire, K., and Shinneman, D.J. 2018. *Assessing the response of sagebrush ecosystem to initial ecosystem and altered climate conditions.* Paper presented at 9th Annual Northwest Climate Conference. October 9-11, Boise, ID.

Pandit, K. 2016. *A seminar on research and teaching in geospatial technologies and biometrics*. Presented at the Department of Forestry, Mississippi State University. 20 January 2016, Mississippi State, MS.

Pandit, K., Bevilacqua, E. and Newman, D.H. 2015. *Evaluating net growth in aboveground tree biomass among land ownerships across Northern United States using FIA data*. Paper presented at New York Society of American Foresters annual meeting. 22 January 2015. Syracuse, NY.

Pandit, K. and Bevilacqua, E. 2014. *Effects of land ownership and forest management activities on overstory-understory tree species composition across major forest types in Northeastern US*. Paper presented at Joint Mensurationists 2014 Annual Meeting. November 2-4, 2014, Raleigh, NC.

Pandit, K. and Bevilacqua, E. 2014. *Spatial pattern of aboveground biomass change across Northeastern U.S.* Paper presented at 6th annual Forest Resources and Environmental Conservation graduate research symposium. Virginia Tech. April 1st, 2014. Blacksburg, VA.

Pandit, K. and Bevilacqua, E. 2013. *Quantification of aboveground forest biomass in relation to forest land characteristics using Forest Inventory and Analysis Data*. Paper presented at 17th Annual Northeastern Mensurationists Organization (NEMO) meeting. November 4-5, 2013, York Harbor,

ME.

Pandit, K., Bevilacqua, E and Perry, J. A. 2012. *Evaluating Forest Vegetation Simulator in predicting basal area and diameter growth of major forest types within New York State*. Paper presented at 16th Annual Northeastern Mensurationists Organization (NEMO) meeting. October 1-2, 2012, State College, PA.