# Venkata Shashank Konduri

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Research Intern, Oak Ridge National Laboratory, TN

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## EDUCATION

**Northeastern University** — Boston, MA
PhD, Interdisciplinary Engineering — 2015 - present
Dissertation: Understanding the Pattern and Drivers of Vegetation Distribution using Remote Sensing Data and Machine Learning Approaches

**Indian Institute of Technology Kharagpur** — Kharagpur, India
Five year dual degree program of B.Tech (Hons.) in Agricultural and Food Engineering and M.Tech in Financial Engineering — 2010 - 2015

## AWARDS/ACHIEVEMENTS

**First place poster presentation** among student entries — 2020
Hydrology section of the American Meteorological Society (AMS) annual meeting, Boston 2020

**Distinguished Dean's Fellowship**, College of Engineering, Northeastern University, Boston — 2015-'16
This prestigious fellowship is awarded to the most exceptional PhD applicants.

**Graduate student Scholarship** — 2014-'15
Ministry of Human Resource Development, Government of India

**Ranked among top 1% of the students**, Joint Entrance Examination — 2010
the most competitive Engineering entrance exam conducted (in Physics, Chemistry and Math) for undergraduate admissions in India

## DOCTORAL RESEARCH

Topic 1: **Within-season crop identification using satellite data analytics**
Collaborators: Scientists from **Oak Ridge National Laboratory, TN and USDA Forest Service, NC**
Won the **Best Student Poster award** in the hydrology section, AMS annual meeting, 2020

- Timely and accurate knowledge about the geospatial distribution of crops at national scales is crucial for forecasting crop production and estimating crop water use.
- Developed a MODIS NDVI-based semi-supervised machine learning classifier to enable near-real-time monitoring of crops at continental scales.
- This work involved processing of large geospatiotemporal datasets in an HPC environment.

Topic 2: **Mapping vegetation using high-resolution airborne hyperspectral imagery**
Collaborators: Scientists from **Oak Ridge National Laboratory, TN and University of Alaska, AK**

- Created high-resolution (5m) watershed-scale plant community maps using Deep Neural Network-based classification of airborne hyperspectral imagery collected from NASA AVIRIS-NG.
- Developed an environmental niche model to understand the drivers (climatological, topographic and hydrologic) of plant community distribution.

Topic 3: **Impact of mean and extreme weather on crop yield using machine learning methods**
Collaborators: Scientists from **NASA Ames Research Center/BAERI, CA**

- Private businesses as well as public sector and federal agencies are interested in the predictive understanding of weather impacts on crop yield.
- Employed linear and nonlinear methods for pairwise dependence and regression for improved scientific understanding and enhanced predictive modeling.

## PUBLICATIONS

### PEER-REVIEWED JOURNALS

**Konduri, V. S.**, Kumar, J., Hargrove, W., Hoffman, F. M., Ganguly, A. R. Mapping Crops Within the Growing Season Across the United States. *Remote Sensing of Environment*. doi: https://doi.org/10.1016/j.rse.2020.112048

**Konduri, V. S.**, Thomas J. Vandal, Sangram Ganguly, and Auroop R. Ganguly. "Data Science for Weather Impacts on Crop Yield." *Frontiers in Sustainable Food Systems (2020): 52.* doi: https://doi.org/10.3389/fsufs.2020.00052

**Konduri, V. S.**, Kumar, J., Hoffman, F. M., Salmon, V. G., Iversen, C. M., Breen, A. L. Hargrove, W. W. Understanding the Pattern and Drivers of Plant Communities across the Arctic Tundra Landscape. *Manuscript in Preparation*

### PEER-REVIEWED CONFERENCE WORKSHOPS

**Konduri, V. S.**, Kumar, J., Hoffman, F. M., Gouhier T. C., Ganguly, A. R. (2018). Physics-Guided Data Science for Food Security and Climate. *Fragile Earth: Theory Guided Data Science to Enhance Scientific Discovery Workshop*, Knowledge Discovery and Data Mining (KDD) Conference, London, August 2018.

**Konduri, V. S.**, Vandal, T., Ganguly, S., Ganguly, A. (2018). Data Mining for Weather Impacts on Crop Yield. *Fragile Earth: Theory Guided Data Science to Enhance Scientific Discovery Workshop*, Knowledge Discovery and Data Mining (KDD) Conference, London, August 2018.

## PROGRAMMING/SOFTWARE SKILLS

- Experience in handling multi-temporal moderate to high resolution remote sensing data in netCDF/GeoTIFF formats in Python and GRASS GIS
- **Programming**: Python (proficient), bash scripting and R
- **Deep learning Frameworks**: Tensorflow, Keras
- **GIS software**: GRASS GIS (proficient), QGIS and ArcGIS
- **Geospatial Libraries**: GDAL/OGR
- **Version Control**: Git, Mercurial
- **OS**: Linux, Windows
- **Document Preparation Software**: LaTeX, MS office

## RELEVANT GRADUATE-LEVEL COURSES TAKEN

- **Remote Sensing**, Prof. R. Edward Beighley, Grade: A
- **Hydrologic Modeling**, Prof. R. Edward Beighley, Grade: A
- **Applied Time Series/Spatial Stats**, Prof. Auroop Ganguly, Grade: A
- **Pattern Recognition/Machine Learning**, Prof. Jennifer Dy, Grade: A
- **Critical Infrastructure Resilience**, Prof. Auroop Ganguly, Grade: A

## POSITIONS OF RESPONSIBILITY

**Teaching Assistant, Fluid Mechanics** **Spring 2018**
Graded assignments and quizzes and held office hours for answering students' queries on the subject.

**Student Chair, International Conference on Networked Digital Earth** **March 2018**
In-charge of developing and maintaining the website for the research conference.

**Teaching Assistant, Probability and Statistics** **Fall 2016, Spring 2017**
Taught lectures, created study material, designed and graded assignments and conducted tutorial sessions for undergraduate students. Received excellent reviews from students in the anonymous feedback collected at the end of the semester.

**Teaching Assistant, Civil and Environmental Engineering (CEE)** **Spring 2017**
Helped in organizing the CEE Distinguished Seminar Series and responsible for the upkeep of the CEE design studio

## FIELD WORK EXPERIENCE

Selected for the **Arctic Alaska Vegetation Field Course** June, 2020
This field course, organized by the University of Alaska Fairbanks, includes 2 days of classroom instruction followed by a 13-day excursion to learn about the vegetation, geology, permafrost, landforms, soils and wildlife of boreal, alpine and arctic environments in the state of Alaska.

**Alaska Field Trip** July 2019
Was part of a 4-member team that was tasked with collecting observations for various plant and soil properties from field plots spread across the Seward Peninsula, Alaska. This research is being funded by the Next-Generation Ecosystem Experiments **(NGEE) Arctic project of the US Department of Energy (DOE)**.

**Internship, Iowa State University** May 2013
Collected data for water quantity and quality from subsurface drainage flow monitoring stations at the university-owned field plots. This internship helped enhance understanding of water quality issues in agricultural landscapes and potential best management practices to mitigate water quality problems.

## PAST PROJECTS

**Enhanced Stock Index Tracking Using Genetic Algorithms and Fuzzy Clustering**
*Masters Thesis, Dept. of Financial Engineering, IIT Kharagpur* *June 2014 - May 2015*

Index tracking is a popular form of passive fund management, which describes the process of attempting to track the performance of a benchmark index. The goal of this study was to create an enhanced stock index tracking portfolio with a dual objective of maximizing the outperformance (excess return) and minimizing the risk (tracking error) with respect to a stock index. Portfolio weights were determined using Genetic Algorithm while selection of optimal stocks was performed using Fuzzy c-means clustering algorithm.

## HOBBIES/INTERESTS

Enjoy doing theatre, hiking, yoga, listening to music and volunteering