

# Venkata Shashank Konduri

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## EDUCATION

<b>Northeastern University</b>	Boston, MA
PhD, Interdisciplinary Engineering	2015 - 2021
Dissertation: Understanding the Distribution of Vegetation and its Environmental Drivers using Machine Learning Methods	
<b>Indian Institute of Technology Kharagpur</b>	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

<b>First place poster presentation</b> among student entries	2020
Hydrology section of the American Meteorological Society (AMS) annual meeting	
<b>Distinguished Dean's Fellowship</b>	2015-'16
College of Engineering, Northeastern University	
<b>Graduate student Scholarship</b>	2014-'15
Ministry of Human Resource Development, Government of India	
<b>Ranked among top 1% of the students</b> , 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: **Using ML approaches to study the impact of mean and extreme weather on crop yield**

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.

## PROGRAMMING/SOFTWARE SKILLS

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- Experience in handling multi-temporal moderate to high resolution remote sensing data in netCDF/GeoTIFF formats in Python and GRASS GIS and performing various operations like reprojection, affine transformations, raster clipping, masking, resampling etc.
- Proficiency in implementing GRASS commands as shell scripts and executing them on multiple cores of a compute cluster using a scheduler script. I also have experience in running deep learning models inside a container environment over multiple GPUs on an NVIDIA DGX station.
- **Programming:** Python (numpy, pandas, matplotlib, seaborn), bash scripting and R
- **Machine Learning/Deep learning Frameworks:** Keras, Tensorflow, scikit-learn
- **GIS software:** GRASS GIS, QGIS and ArcGIS
- **Geospatial Libraries:** GDAL/OGR, Rasterio, Shapely, GeoPandas
- **Version Control:** Git, Mercurial
- **OS:** Linux, Windows

## PUBLICATIONS

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### 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. and Ganguly A. R. Understanding the Distribution and Drivers of Arctic Tundra Plant Communities. *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.

### CONFERENCE PRESENTATIONS

**Konduri, V. S.**, Kumar, J., Hargrove, W., Hoffman, F. M., Ganguly, A. R. (2020). In-Season Crop Mapping for the Continental United States. Poster presentation delivered at the 100th American Meteorological Society (AMS) Annual Meeting, Boston, MA, January 2020. **(First place poster presentation award)** URL: [https://kvshashank.github.io/slides/AMS\\_2020\\_poster.pdf](https://kvshashank.github.io/slides/AMS_2020_poster.pdf)

**Konduri, V. S.**, Kumar, J., Hoffman, F. M., Salmon, V. G., Iversen, C. M., Breen, A. L. Hargrove, W. W. (2019). Understanding the Pattern and Drivers of Plant Communities across the Arctic Tundra Landscape. Oral presentation delivered at the American Geophysical Union (AGU), Annual Fall Meeting, San Francisco, CA, December 2019. URL: [https://kvshashank.github.io/slides/AGU\\_Presentation\\_2019.pdf](https://kvshashank.github.io/slides/AGU_Presentation_2019.pdf)

**Konduri, V. S.**, Kumar, J., Hargrove, W. W., Hoffman, F. M., Ganguly, A. (2019). Using the Concept of Ecoregions for Large Area Crop Mapping. Oral presentation delivered at the International Association for Landscape Ecology (IALE), Annual Meeting, Fort Collins, CO, April 2019. URL: [https://www.climatemodeling.org/~forrest/presentations/Konduri\\_US-IALE\\_20190408.pdf](https://www.climatemodeling.org/~forrest/presentations/Konduri_US-IALE_20190408.pdf)

**Konduri, V. S.**, Kumar, J., Hoffman, F. M., Hargrove, W. W. and Ganguly, A. R. (2018), Estimating Crop Acreage over Regional Scale using Remote Sensing and Climate Data. Poster presentation delivered at the American

Geophysical Union (AGU), Annual Fall Meeting, Washington D.C., December 2018. URL: [https://www.geobabble.org/~hnw/Shashank\\_AGU\\_poster\\_2018.pdf](https://www.geobabble.org/~hnw/Shashank_AGU_poster_2018.pdf)

**Konduri, V. S.**, Kumar, J., Hoffman, F. M., Ganguly, A. R., Hargrove, W. W. (2017). Spatiotemporal Analysis of Corn Phenoregions in the Continental United States. Oral presentation delivered at the American Geophysical Union (AGU), Annual Fall Meeting, New Orleans, LA, December 2017.

## CERTIFICATIONS

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- **Neural Networks and Deep Learning**, Coursera Aug 2018
- **Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization**, Coursera Aug 2018
- **Introduction to TensorFlow**, Coursera Oct 2018
- **Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning**, Coursera May 2019

## FIELD WORK EXPERIENCE

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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.

## POSITIONS OF RESPONSIBILITY

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**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

## HOBBIES/INTERESTS

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