

# Jeffrey K. Gillan, Ph.D.

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[gillanscience.com](http://gillanscience.com)

I am an imagery and data scientist looking to join a mission driven organization and contribute to an advanced geospatial team

- 17 years of geospatial experience in applied research, government, and contracting
- Core expertise is executing multi-scale (drone, airplane, satellite) imagery projects for ecosystem monitoring and civil infrastructure
- Extensive experience collecting and analyzing LiDAR, photogrammetry, multispectral and hyperspectral data to provide meaningful management insights across rangelands, forests, and riparian areas.
- Specifically focused on *GeoAI* imagery analysis and *Cloud-Native* geospatial to scale reproducible machine learning workflows and share results with clients and colleagues

## *Technical Skills*

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### **Uncrewed Aerial Systems (UAS)**

*Planning, piloting, imagery processing & analysis:* 2011 to present

*Remote Pilot sUAS Rating:* 2017 to present #3969325

*Platforms:* Mavic 3 Enterprise RTK; Phantom 4 RTK; M600; Phantom 3 Pro; 3DR Solo; 3DR X8;  
Phantom 2 Vision+; MLB Bat3 fixed-wing; MLB Bat4 fixed-wing

*Sensors:* Headwall hyperspec nano; Velodyne lidar puck; Micasense multispectral; Parrot Sequoia  
multispectral; many flavors of RGB CMOS

*Drone Imagery Archive:* <https://data.geonadir.com/social-profile/55>

### **Software Stack**

Agisoft Metashape | OpenDroneMap | Pix4D | QGIS | ArcGIS Pro & Online | ENVI | Conda  
Geospatial Python | Geospatial R | Docker | Pytorch | git & github | Earth Engine | PostgreSQL  
Linux Command line | JupyterLab | GDAL | PDAL | Lastools | CloudCompare | Exiftools

### **Cyberinfrastructure**

AWS & OpenStack Cloud Computing | Nvidia GPUs & CUDA | Multi-node network processing  
Terraform & Ansible infrastructure-as-code | REST API deployment | SpatioTemporal Asset Catalogs  
Irods | Kubernetes | Argo Workflows

### **In the Field**

Close-range photogrammetry; Terrestrial laser scanning (Faro, Reigl); Handheld RTK GNSS (Trimble,  
Emlid); Rangeland vegetation & soil field methods (BLM AIM, NRCS NRI, Interpreting Indicators of  
Rangeland Health)

## *Professional Roles*

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### **Principal - Gillan Geospatial LLC | Tucson, AZ**

2024-Present

- Provide drone mapping services specializing in machine learning feature detection and precise topographic survey
- Design cyberinfrastructure solutions and data processing pipelines on cloud platforms

### **Drone Data Engineer - University of California, Davis**

June 2025-Present

- Developed aerial imagery processing and analysis pipelines scaled across cloud computing using Argo workflows and kubernetes

### **Data Scientist & Educator- Cyverse & Data Science Institute | University of Arizona**

Sept. 2022-Present

- Evangelist for drone imagery web platform [Data-to-Science](#) and developer for [Open Forest Observatory](#)
- Develop automated machine learning workflows for classification of drone & satellite imagery
- Advise research groups (e.g., US Forest Service) on best practices for geospatial data collection, analysis, & sharing
- Instruct technical workshops on [Cloud Native Geospatial](#) | [DeepLearning](#) | Data Management | [Processing Pipelines](#) | [Reproducible Scientific Computing](#)
- Mentor PhD fellowship students (n=26) in cloud and high performance computing

### **Remote Sensing Scientist – School of Natural Resources & Environment | University of Arizona**

Feb. 2019 - Aug. 2022

#### *Research*

- Developed high-throughput workflow to scale collection, processing, analysis, and sharing of drone imagery for ecosystem monitoring, resulting in 4.5x faster than conventional methods
- Developed novel drone hyperspectral index for cacti detection
- Mapped dryland vegetation to 94% accuracy using NAIP aerial imagery, aerial LiDAR, and object-based machine learning

#### *Contracting*

- Led multi-scale imagery contract (drone, aerial LiDAR, satellite) to map time-series of wildfire-driven forest change across 126,000 acres for client Pima County
- Led multi-scale imagery contract (drone, aerial LiDAR) to map time-series vegetation change along 15 miles stretch of Santa Cruz River for the client Pima County
- Led multi-scale (aerial LiDAR, drone photogrammetry) forest fuel mapping project for homeowner association client in New Mexico
- Led drone topographic mapping for clients US Golf Association & Paradise Valley Country Club

#### *Teaching and Mentoring*

- Designed and taught university course on UAS mapping of land & natural resources
- Supervised and mentored 1 student employee

**Drone Survey Contractor** - Jeffrey Gillan

2021

- Executed drone mapping project (photogrammetry) for time series analysis of tree health along the lower Colorado River.
- Clients were US Bureau of Reclamation and The Nature Conservancy

**Graduate Research Asst.** - Arizona Remote Sensing Center | University of Arizona

Sept. 2017-May 2018

- Executed drone data collection and analysis projects related to pecan orchard disease, wetland restoration, dryland geomorphology, watershed management, and invasive vegetation
- Clients included FICO Pecan Growers, BLM, USGS, USDA

**Remote Sensing Researcher** - USDA-Agricultural Research Service | New Mexico State University

March 2011-Sept. 2017

- Led applied research in the use of high-resolution aerial photography from manned and unmanned platforms to map and monitor vegetation, soil erosion, and surface hydrology in dryland ecosystems
- Developed remote sensing monitoring methods for Bureau of Land Management's Assessment, Inventory and Monitoring (AIM) national program
- Supervised 3 student employees

**GIS Technician** – Yellowstone National Park, National Park Service

June 2010-Sept. 2010

- Developed bison pasture monitoring program using satellite imagery (MODIS)
- Managed databases and created a variety of maps for various park projects including comprehensive planning and biological inventories

*Select Publications & Reports*

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Villarreal, M.L., Bishop, T.B.B., **Gillan, J.K.**, et al. 2025. Applications of unoccupied aerial systems (UAS) in landscape ecology: a review of recent research, challenges and emerging opportunities. *Landscape Ecology* 40, 43 (2025). <https://doi.org/10.1007/s10980-024-02040-6>

Swetnam, T.L., **Gillan, J.K.**, et al. 2024. Cyverse: Cyberinfrastructure for Open Science. *PLoS Computational Biology* 20(2): e1011270. <https://doi.org/10.1371/journal.pcbi.1011270>

Lee, K., W.J.D. van Leeuwen, **J.K. Gillan**, D.A. Falk. 2024. Examining the impacts of pre-fire forest conditions on burn severity using multiple remote sensing platforms. *Remote Sensing* 16(10). DOI: 10.3390/rs16101803

Ponce-Campos, G.E., M. McClaran, P. Heilman, & **J.K. Gillan**. 2023. UAV and satellite-based sensing to map ecological states at the landscape scale. *Open Journal of Ecology*, 13(8). DOI: 10.4236/oje.2023.138035.

**Gillan, J.K.** 2022. Supporting restoration of the Santa Cruz River in Tucson, AZ, with remotely sensed mapping

and monitoring of vegetation. [Final Report](#) for Pima County Regional Flood Control District.

**Gillan, J.K.** 2022. Assessing watershed impact of the Bighorn Fire. [Final Report](#) for Pima County Regional Flood Control District.

Hartfield, K., **J.K. Gillan**, C.L. Norton, C. Conley, & W.J.D. van Leeuwen. 2022. A novel spectral index to identify cacti in the Sonoran desert at multiple scales using multi-sensor hyperspectral data acquisitions. *Land* 11, 786. DOI: 10.3390/land11060786

**Gillan, J.K.**, G. Ponce-Campos, T.L. Swetnam, A. Gorlier, M.P. McClaran, & P. Heilman. 2021. Innovations to expand drone data collection and analysis for rangeland monitoring. *Ecosphere*, 12(7). DOI: 10.1002/ecs2.3649

**Gillan, J.K.**, M.P. McClaran, T.L. Swetnam, & P. Heilman. 2019. Estimating forage utilization with drone-based photogrammetric point clouds. *Rangeland Ecology and Management*. DOI: 10.1016/j.rama.2019.02.009.

Swetnam, T.L., **J.K. Gillan**, T.T. Sankey, M. McClaran, M. Nichols, P. Heilman, and J. Mcvay. 2017. Considerations for achieving cross-platform point cloud data fusion across different dryland ecosystem structural states. *Frontiers in Plant Science*. doi: 10.3389/fpls.2017.02144

**Gillan, J.K.**, J.W. Karl. And M.C. Duniway. 2017. High-resolution repeat topographic surveying of dryland landscapes using UAS-based structure-from-motion photogrammetry: assessing accuracy and precision against traditional ground-based erosion measurement. *Remote Sensing* 9(5), 437. DOI:10.3390/rs9050437

## Recent Grants & Contracts

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Year	Granting Agency	Type	Name	Role	Amount \$
2023	University of Arizona	Research Grant	Aeolus - Airborne Environmental Observatory & Laboratory for Uncrewed Systems	Co-Principal Investigator	\$141,215
2023	Agricultural Genome to Phenome Initiative	Seed Grant	Open-source online platform for UAS high throughput phenotyping data management	Co-Principal Investigator	\$178,684
2021-2022	Pima County Regional Flood Control District	Service Contract	Supporting restoration of the Santa Cruz River in Tucson, AZ, with remotely sensed mapping and monitoring of vegetation	Principal Investigator	\$46,599
2020-2021	Pima County Regional Flood Control District	Service Contract	Assessing watershed impacts of Bighorn Fire	Co-Principal Investigator	\$77,762

## *Education*

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Ph.D. in Natural Resources/Remote Sensing | University of Arizona

Dissertation: *Rangeland Monitoring with unmanned aerial system imagery*

M.S. in Environmental Science & GIS Certificate | University of Idaho

Thesis: *Spatial statistics and point pattern simulations to assess the spatial dependency between greater sage-grouse and anthropogenic features*

Honors B.S. in Park Management and Conservation | Kansas State University

Secondary Major in Natural Resources of Environmental Science