Kyle Landolt

Profile

Technically proficient geographer who generates insights into geospatial data using a variety of computational skill sets. Persistent and adaptable in working with team members and subject matter experts (SMEs). Uses machine learning, geographic information systems (GIS), and Python programming to create solutions for desired objectives by constructing effective and operational workflows for processing geospatial data.

- Five years of experience leading geospatial technical applications of machine learning, data pipelines, and annotation tool development to meet project objectives with a federal research agency.
- Proficient in drafting robust documentation on projects to allow external users to replicate methodologies.
- Accomplished communicator, adept in presenting objectives, analyses, and key research findings.
- Efficient and established excellence in working remotely or in-house, alone or as part of a team.

Work Experience

Geographer, United States Geological Survey (USGS)
Upper Midwest Environmental Sciences Center 2019–Present

Leads development and deployment of artificial intelligence (AI)-based object detection models for detecting and classifying wildlife in aerial imagery. Collaborates with teams from the USGS, Bureau of Ocean Energy Management (BOEM), and United States Fish and Wildlife Service (FWS) to develop the cohesive technical strategy critical to collecting huge volumes of imagery, creating manual annotations for model training, conducting model training, and deploying models for large-scale inference. These models rapidly increase the understanding of wildlife in areas of offshore energy production to support efficient energy infrastructure development.

Duties and accomplishments:

- Lead design, development, and deployment of machine learning methods for geospatial applications
- Adopt the leading edge of software and technology to meet project requirements
- Develop custom object detection models to automate wildlife detection in aerial imagery
- Train, tune, and deploy models in Amazon® SageMaker®
- Deploy models on-premises high-performance computing resources using Python and Ultralytics® YOLOv8® object detection models
- Coordinate with project partners to integrate efforts for automating wildlife classification from aerial imagery
- Archive big (300+ TB) image datasets from multiple organizations in multiple locations including on-premises tape storage and Amazon S3 buckets with intelligent-tiering
- Process digital aerial imagery from remote sensing surveys for more efficient GeoTIFF and compression storage
- Host an annotation tool to distribute imagery to annotators, collecting >120,000 unique annotations to support machine learning model development

- Return predictions of detection models to annotators for review, saving time and project expenses while maintaining high-quality data standards
- Provide guidance and expertise for machine learning and remote sensing applications, ranging from unmanned aircraft systems (UAS) to crewed aircraft for optical and thermal imagery
- Prepare reports, papers, and presentations detailing analyses and results to both technical and non-technical audiences
- Read and review the latest research developments in AI and machine learning to advance knowledge of the state-of-the-art science and methods
- Attend conferences and workshops focusing on geographic and remote sensing applications

Post-Master's Research Associate, Oak Ridge National Lab 2017–2019

Duties:

- Wrote Python scripts to manipulate spatial data to support LandScan dataset development
- Automated GIS tasks with Python and R
- Managed and compiled numerous types of spatial data for cartographic display
- Created training data for developing machine learning models

Environmental Sciences Division (ESD) Intern, Oak Ridge National Lab 2016

Duties:

- Developed maps of specific datasets using R and QGIS
- Used Google Earth™ to make video displaying Carbon in Arctic Reservoirs Vulnerability Experiment (CARVE) datasets for public outreach
- Evaluated Distributed Active Archive Center (DAAC) website to improve and debug user interface

Geographic Information Science and Technology (GIST) Intern, Oak Ridge National Lab 2015

Duties:

- Stored, managed, and manipulated spatial data for the LandScan dataset using Esri® ArcGIS® and Microsoft® Excel®
- Used ArcMap to edit polygons representing human population areas in rural Africa to develop a framework for polio vaccination distribution
- Delineated residential and non-residential areas to determine spatial fluxes of daily population in urban areas using ArcMap

Education

Ph.D. Coursework in Geography, The University of Tennessee, Knoxville 2016–2017
Major: Geography

M.S. in Geography, The University of Tennessee, Knoxville 2014–2016
Thesis: "Developing Historical Productivity Maps for the Blue Oak Woodlands in California using Remote Sensing and Dendrochronology"
Advisor: Robert A. Washington-Allen

B.S. in Ecological Restoration, Texas A&M University 2010–2014
GPA: 3.903; Department of Ecosystem Science and Management

Job-Related Training

- Amazon Web Services (AWS) SysOps Associate 2022: AWS Backup (2025)

- AWS Developer Associate: Storage Services (2025)
- AWS Developer Associate: AWS Database Services (2025)
- Information Management and Technology (IMT) Awareness (2024)
- Docker Skills: Advanced Docker Security (2024)
- AWS Solutions Architect Associate 2022: Managing S3 Buckets (2024)
- Introducing Application Programming Interface (API) Fundamentals & Testing: Understanding APIs (2024)
- Hypertext Markup Language 5 (HTML5) with JavaScript & Cascading Style Sheets Level 3 (CSS3): Data Flow, Consuming, & Transmitting Data (2024)
- Department of the Interior (DOI) Certified Defensive Driving Course (2024)
- Safe Vehicle Backing (2024)
- Distracted Driving 2.0 (2024)
- Urban Driving (2024)
- Emergency Situations While Driving (2024)
- Driving Safely; Driving Smarter (2024)
- Collision Avoidance (2024)
- Defensive Driving 2.0 (2024)
- Freedom of Information Act (FOIA) Training for All Federal Employees (2024)
- Stanford University Institute for Human-Centered AI (HAI) + AI Community of Practice (CoP) Artificial Intelligence Training Series for Federal Employees (2023)
- Data Access & Governance Policies: Data Classification, Encryption, and Monitoring (2023)
- Developing an AI/Machine Learning (ML) Data Strategy: Data Analytics (2023)
- ARC Intro to Deep Learning Workshop (2023–2024)
- United States Forest Service (USFS)- National Aeronautics and Space Administration (NASA) Applied Earth Observations Innovation Partnership (AEOIP) Workshop (2023)
- AWS Cloud Practitioner 2020: Core Services (2022)
- AWS Cloud Practitioner 2019: Cloud Security & Compliance (2022)
- USGS Mentoring Program—National Rollout Partner Training (2021)
- Creating a Safe and Healthy Work Environment: Ergonomics While Teleworking (2020)
- USGS High-Performance Computing in R and Python (2020)

Professional Publications

Manuscripts

Ke, Tsung-Wei, Stella X. Yu, Mark D. Koneff, David L. Fronczak, Luke J. Fara, Travis J. Harrison, Kyle L. Landolt, Enrika J. Hlavacek, Brian R. Lubinski, and Timothy P. White. “Deep learning workflow to support in-flight processing of digital aerial imagery for wildlife population surveys.” Plos one 19, no. 4 (2024): e0288121.

Miao, Zhongqi, Stella X. Yu, Kyle L. Landolt, Mark D. Koneff, Timothy P. White, Luke J. Fara, Enrika J. Hlavacek, Bradley A. Pickens, Travis J. Harrison, and Wayne M. Getz. “Challenges and solutions for automated avian recognition in aerial imagery.” Remote Sensing in Ecology and Conservation 9, no. 4 (2023): 439–453.

Luz-Ricca, Emilio, Kyle Landolt, Bradley A. Pickens, and Mark Koneff. “Automating sandhill crane counts from nocturnal thermal aerial imagery using deep learning.” Remote Sensing in Ecology and Conservation 9, no. 2 (2023): 182–194.

Datasets

Koneff, M.D., Pickens, B.A., Dotson, R., White, T., Landolt, K.L., Schuster, S., Murphy, A., and Dieck, J., 2025, Imagery and metadata from the Safe, Efficient Aerial Bird Detection (SEABirD) Platform over the Outer Continental Shelf of the Atlantic Ocean: U.S. Geological Survey data release, In Review.

Ke, T., Koneff, M.D., Lubinski, B.R., Robinson, L., Fronczak, D.L., Fara L.J., Landolt, K.L., and White, T.P., 2024, Code, imagery, and annotations for training a deep learning model to detect wildlife in aerial imagery: U.S. Geological Survey data release, https://doi.org/10.5066/P9CBZQV1.

Miao, Z., Fara, L.J., Fronczak, D., Landolt, K.L., Bragger, A., Koneff, M.D., Lubinski, B., Robinson, L.R., and Yates, S. 2023, Images and annotations to automate the classification of avian species: U.S. Geological Survey data release, https://doi.org/10.5066/P9YL80R6.

Lubinski, B., Robinson, L.R., Finley, B.C., Wilkerson, G., Strassman, A.C., Baker, A., Luz-Ricca, E., Bragger, A., and Landolt, K.L., 2022, Aerial thermal imagery of the Central Platte River Valley and bounding box annotations of sandhill cranes: U.S. Geological Survey data release, https://doi.org/10.5066/P9DZKFQ3.

Master’s Thesis

Landolt, Kyle Lawrence. “Developing Historical Productivity Maps for the Blue Oak Woodlands in California using Remote Sensing and Dendrochronology.” (2016).

Software

Landolt, K.L. and Schuster, S., 2025, YOLO for Wildlife: U.S. Geological Survey software release, In Review.

Grants and Funding

- AI/ML Subsidy, FY24–FY25, USGS Cloud Hosting Solutions. For the development of projects in AWS related to AI/ML, $25,000.
- Travel Award, Spring 2017: From the Graduate Student Senate, University of Tennessee, Knoxville. For the participation in the Annual Meeting of the Association of American Geographers; Boston, Massachusetts, $200.
- Travel Award, Fall 2015: From the Graduate Student Senate, University of Tennessee, Knoxville. For participation in the Annual Meeting of the Association of American Geographers; Chicago, Illinois, $390.
- Applied Biodiversity Science (ABS) United States National Science Foundation (NSF)-Integrative Graduate Education and Research Traineeship (IGERT) Program at Texas A&M University. Summer 2013. “The spatial and temporal variability of *Triadica sebifera* germination.” Principal Undergraduate Investigator (with mentor Dr. Rogers), $800.

Technical Skills

- Python—Advanced
- Python Packages: Geospatial Data Abstraction Library (GDAL), Rasterio, OGR, Pandas, & YOLOv8
- R—Intermediate

- Ubuntu/Linux/bash
- Miniforge
- SLURM
- Git
- QGIS
- PostgreSQL
- Docker
- Django
- WSL
- Parallel computing
- Machine learning
- Big data analyses
- Data and statistical visualization
- Geospatial data and spatial statistics
- Data science and analytics

Public Outreach

- Annual University of Wisconsin, La Crosse Geography Poster Judging (2021–2024)
- Annual University of Tennessee, Knoxville Geography Career Mingle (2021–2024)

Honors and Awards

- STAR (Special Thanks for Achieving Results) Award (2023)
- Bruce Ralston Geospatial Achievement Award (2016)
- College of Agriculture and Life Sciences Dean's Outstanding Achievement Award for Undergraduate Research (2013)
- Garlyn O. Hoffman Memorial Scholarship (2013)
- Joseph L. Schuster Leadership in Range Management Scholarship (2012)
- Top 10% State Scholarship (2010)

Conferences Attended

Landolt, K.L., White, T., Murphy, A., Schuster, S., Walker, M., Fara, L., Koneff, M., Pickens, B., Dieck, J., Fronczak, D., & Yu, S., 2024: Machine learning and high-performance computing for the detection and classification of marine wildlife in digital aerial imagery. New York State Environmental Technical Working Group, State of the Science Workshop, Stony Brook, New York.

Landolt, K.L., White, T., Koneff, M., Pickens, B., Murphy, A., Schuster, S., Walker, M., Dieck, J., Fara, L., Fronczak, D., & Yu, S, 2024: Automating the detection and classification of marine wildlife in aerial imagery with machine learning methods. AGU Ocean Sciences Meeting, New Orleans, Louisiana.

Landolt, K.L., White, T., Koneff, M., Pickens, B., Murphy, A., Walker, M., Dieck, J., Fara, L., Fronczak, D., & Yu, S., 2024: Automating the detection and classification of sea ducks and other wildlife in aerial imagery with machine learning methods. 7th International Sea Duck Conference, Hosted Virtually.

Landolt, K.L., White, T., Koneff, M., Pickens, B., Murphy, A., Walker, M., Dieck, J., Fara, L., Fronczak, D., Miao, Z., Ke, T., & Yu, S., 2023: Automating the detection and classification of marine wildlife in digital aerial imagery. Michigan AI Symposium: Responsible AI, Ann Arbor, Michigan.

Landolt, K.L., 2022: Machine learning for automated detection and classification of seabirds, waterfowl, and other marine wildlife from digital aerial imagery. State of the Science Workshop on Wildlife and Offshore Wind Energy, Tarrytown, New York.

Landolt, K.L., White, T., Koneff, M., Dieck, J., Harrison, T., Fara, L., Fronczak, D., Hlavacek, E., Lubinski, B., Robinson, L., Spellman, L., Wagner, S., Yu, S., & Ke, T., 2020: Machine learning for the automated detection and classification of seabirds, waterfowl, and other marine wildlife from digital aerial imagery. Annual Meeting, Ecological Society of America 2020. Hosted Virtually.

Landolt, K.L., White, T., Koneff, M., Dieck, J., Harrison, T., Fara, L., Fronczak, D., Hlavacek, E., Lubinski, B., Robinson, L., Spellman, L., Wagner, S., Yu, S., & Ke, T., 2020: Machine learning for the automated detection and classification of seabirds, waterfowl, and other marine wildlife from digital aerial imagery. Artificial Intelligence for Data Discovery and Reuse (AIDR) Symposium, Hosted Virtually.

Tennille, S., LeDoux, St. T., Weaver, J., & **Landolt, K.L.,** 2018: What we see versus what we know: detecting slum location through satellite imagery analysis and primary source research in the city of Johannesburg. Annual Meeting, American Geophysical Union, Washington, D.C.

Wakefield, K., Bailey, G., **Landolt, K.L.**, Laverdiere, M., Moehl, J., McKee, J., & Weber, E., 2018: Inclusion of Ancillary Data for Systematic Selection of Training Data for Convolutional Neural Networks. Annual Meeting, American Geophysical Union, Washington, D.C.

Landolt, K.L., Washington-Allen, R.A., Nagle, N.N., & Grissino-Mayer, H.D., 2017: Developing historical productivity maps for the blue oak woodlands in California using remote sensing and dendrochronology. Annual Meeting, Association of American Geographers, Boston, Massachusetts.

Washington-Allen, R.A., **Landolt, K.L.**, Emanuel, R.E., Therrell, M.D., Nagle, N.N., Grissino-Mayer, H.D., & Poulter, B., 2016: Progress Towards the Use of Publicly Available Data Networks to Conduct Cross-Scale Historical Reconstructions of Carbon Dynamics in U.S. Drylands. Annual Meeting, American Geophysical Union, San Francisco, California.

Landolt, K.L., Vannan, Suresh K.S., Boyer, A.G., McNelis, J., Wright, D., & McMurry, B., 2016: Text mining trends in published research that use data from the ORNL DAAC. Internship at Environmental Sciences Division: Distributed Active Archive Center. Summer 2016.

Landolt, K.L., Washington-Allen, R.A., Nagle, N.N., & Grissino-Mayer, H.D., 2015: Towards the Development of Historical Indicators of Spatial Carbon Dynamics in Drylands: A Blue Oak Woodlands of California Case Study. Annual Meeting, American Geophysical Union, San Francisco, California.

Landolt, K.L., Washington-Allen, R.A., Delgado, A., Brademan, C., Wann, M., Nally, D.D., Bruton, R., & Rogers, W., 2015: Can Chinese tallow distribution be reduced to certification levels within Greens Bayou Wetlands Mitigation Bank? Annual Meeting, Association of American Geographers, Chicago, Illinois.