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Major, Armor Branch  
Senior Instructor, Geospatial Information Science Program  
Department of Geography and Environmental Engineering  
United States Military Academy  
West Point, NY 10996

## EDUCATION

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### Academic Education

M.S., 2022      Geomatics, University of Florida – The College of Agricultural and Life Sciences, Gainesville, FL  
Thesis: *Accuracy Assessment of Low-Cost Airborne Lidar Scanners: An Analysis of the Velodyne HDL 32E and Livox Mid 40's Temporal Stability*  
Graduate Certificate, 2021. Mapping with Unmanned Aerial Systems, University of Florida – The College of Agricultural and Life Sciences, Gainesville, FL  
Graduate Certificate, 2020. Geospatial Analysis, University of Florida – The College of Agricultural and Life Sciences, Gainesville, FL

B.S., 2013      Geospatial Information Science, United States Military Academy, West Point, NY

### Military Education

Cavalry Leader's Course, 2019  
Maneuver Captain's Career Course, 2017  
Army Reconnaissance Course, 2014  
Armor Basic Officer Leader's Course, 2013

### Special Qualifications

Security Clearance: Top Secret/SCI  
Additional Skill Identifiers: Army Space Cadre (3Y), Cavalry Leader (C6), Scout Leader (R7), Bradley Leader (3X)

## PROFESSIONAL EXPERIENCE

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### Teaching Experience

United States Military Academy, Department of Geography and Environmental Engineering  
Instructor, 2022 – Present

#### Courses:

Course Director: EV482 – Military Geospatial Operations (2024-Present)  
EV377 – Remote Sensing (2023-Present)  
EV379 – Photogrammetry (2024)  
EV398 – Geographic Information Systems (2022-2023)

Instructor:            EV380 – Surveying (2023)  
(in addition to        EV489A/B – Advanced Independent Study I/II (2022-Present)  
courses listed        EV389A – Intermediate Independent Study and Research (2024)  
above)                EV289A – Introduction to Independent Study and Research (2022-2023)

University of Florida, The College of Agricultural and Life Sciences, School of Forest, Fisheries, and Geomatics Sciences  
Graduate Student and M.S. Candidate, 2020 – 2022

#### Courses:

Teaching Assistant (TA): SUR3331C – Photogrammetry (2022)

### Military Experience

Observer Coach Trainer (OCT), Task Force 4, Operations Group, Joint Readiness Training Center, Fort Polk, LA, 2019-2020.  
Commander, C Troop, 2-15 CAV, 194<sup>th</sup> Armored Brigade, Fort Benning, GA, 2017-2019.  
Executive Officer, C Troop, 4-10 CAV, 3<sup>rd</sup> Brigade, 4<sup>th</sup> Infantry Division, Fort Carson, CO, 2016.  
Unit Movement Officer, 4-10 CAV, 3<sup>rd</sup> Brigade, 4<sup>th</sup> Infantry Division, Fort Carson, CO, 2015.  
Platoon Leader, B Troop, 4-10 CAV, 3<sup>rd</sup> Brigade, 4<sup>th</sup> Infantry Division, Fort Carson, CO, 2014-2015.

## AWARDS

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Peter L. Zhu Scholastic Achievement Award, 2024 – Recognized by the United States Military Academy for scholarly impact within classroom environments, curriculum, and publications within academic discipline.  
United States Military Academy Superintendent Recognition for Excellence, 2023 – Support of Sandhurst and Cadet Summer Training Gray Force Tracker.  
Geomatics Outstanding Master of Science Student, 2022 – Recognized by the University of Florida’s School of Forest, Fisheries, and Geomatics Sciences for academic achievement and service to the school.  
Mark Eckl Memorial Scholarship, 2022 – Awarded for outstanding service to the University of Florida Geomatics Program.

## MEMBERSHIP AND ACTIVITIES IN PROFESSIONAL AND HONOR SOCIETIES

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American Society of Photogrammetry and Remote Sensing  
Esri's Young Professionals Network  
Society of American Military Engineers  
The US Army Cavalry and Armor Association  
United States Geospatial Intelligence Foundation

## INSTITUTIONAL SERVICE, UNITED STATES MILITARY ACADEMY

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Executive Officer, Department of Geography and Environmental Engineering New Instructor Training (2023)  
Advisor, Cadet Independent Studies (2023-present)  
Coordinator, GIS AIADs (2022-present)  
Assistant Officer Representative, Swimming and Diving, (2022-present)  
Cadet Summer Training Gray Force Tracker Development and Implementation (2022-Present)  
Cadet Sandhurst Tracker Development and Implementation (2022-Present)  
Strategic Communications Officer, GIS Program (2022-present)  
Company Academic Counselor, Company G2 (2022-present)  
Mentor, PL300 - Military Leadership (2022-present)

### Academic Individual Advanced Development (AIAD) Support

National Geospatial Intelligence Agency (NGA) Helicopter Landing Zone Sensitivity Analysis. Pohakuloa Training Area, HI, Fort Greely, AK, San Diego, CA.  
2023 (Three Cadets)  
2024 (TBD)  
National Geospatial Intelligence Agency (NGA) InnoVision Directorate. Fort Belvoir, VA.  
2023 (Eight Cadets)  
2024 (TBD)  
US Army Engineer Research and Development Center (ERDC) Intelligent Environmental Battlespace Awareness (IEBA). Vicksburg, MS.  
2023 (One Cadet)  
2024 (TBD)

## PUBLICATIONS, PRESENTATIONS, AND RESEARCH

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### Peer-Reviewed Journal Articles

Albeaino, G., **Kelly, C.**, Lassiter, H.A., Wilkinson, B., Gheisari, M., Issa, R.R.A. Quantitative and Qualitative Assessments of Geometric Feature Accuracy Using a UAS-Lidar System for Building Surveying Applications. Journal of Architectural Engineering 2023, 29. <https://doi.org/10.1061/jaeied.aeeng-1493>  
**Kelly, C.**; Wilkinson, B.; Abd-Elrahman, A.; Cordero, O.; Lassiter, H.A. Accuracy Assessment of Low-Cost Lidar Scanners: An Analysis of the Velodyne HDL-32E and Livox Mid-40’s Temporal Stability. Remote Sens. 2022, 14, 4220. <https://doi.org/10.3390/rs14174220>

### Peer-Reviewed Conference Proceedings

**Kelly, C.**, Mao, O., Gramlich, V., Kirkpatrick, R. Assessment of SLAM Lidar – An Accuracy Assessment and Drift Analysis of the Leica BLK2GO. IEEE International Geoscience and Remote Sensing Symposium. Athens, Greece. July 2024.

- Wright, W., **Kelly, C.**, O'Banion, M., Kirkpatrick, R. Detection of Vegetation Height using a Small Unmanned Aircraft System (sUAS) on Hawai'i. IEEE International Geoscience and Remote Sensing Symposium. California. July 19, 2023.
- Kirkpatrick, R., and **Kelly, C.** Evaluating the Spatial Resolution of sUAS Sensors in Two and Three Dimensions. IEEE International Geoscience and Remote Sensing Symposium. California. July 19, 2023.
- Lassiter, H. A.; Wilkinson, B.; Gonzalez Perez, A.; **Kelly, C.** Absolute 3D Accuracy Assessment of UAS Lidar Surveying, International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, 2021, XLIV-M-3-2021, 105–111, <https://doi.org/10.5194/isprs-archives-XLIV-M-3-2021-105-2021>

#### Conference Presentations

- Kelly, C.** West Point Flood Damage: Disaster Response and Management for a 1,000-Year Storm. Esri User Conference, Education Summit. San Diego, California. July 2024.
- Gramlich, V., **Kelly, C.** Modernizing GIS Education: Integrating ArcGIS Experience Builder at West Point. Live Session. Education Summit; Stay Innovative: Approaches to a Modernized GIS Curriculum. Esri User Conference, San Diego, CA. 17 July 2024.
- Kelly, C., W. Wright.** Teaching Spatial Thinking: Area Analysis with StoryMaps in Geography Classrooms. Esri User Conference, Education Summit. San Diego, California. July 9, 2023.
- Kelly, C., B. Wilkinson, O. Cordero, and H.A. Lassiter.** Accuracy Assessment of Low-Cost Lidar Scanners: An Analysis of the Temporal Stability of the Velodyne® HDL-32E and Livox® Mid-40. ASPRS Virtual Conference. March 25, 2022.
- Kelly, C.** Temporal Instability and Bias in UAS-Mounted Lidar Systems. National Geospatial Agency and University of Florida's Geospatial Mapping and Applications Laboratory Research Symposium. June 15, 2021.

#### Conference Poster Sessions

- Wright, W., **Kelly, C.**, O'Banion, M., Kirkpatrick, R. Detection of Vegetation Height using a Small Unmanned Aircraft System (sUAS) on Hawai'i. IEEE International Geoscience and Remote Sensing Symposium, Session WEP.P18: Retrieval of Vegetation Parameters III. Pasadena, California. July 19, 2023.
- Kirkpatrick, R., and **Kelly, C.** Evaluating the Spatial Resolution of sUAS Sensors in Two and Three Dimensions. IEEE International Geoscience and Remote Sensing Symposium, Session WEP.P6: 3D Data Construction, Processing and Evaluation, Pasadena, California. July 19, 2023.
- Kelly, C.** Accuracy Assessment of Low-Cost Lidar Scanners: Velodyne® HDL-32E and Livox® Mid-40. ASPRS Geo Week. Denver, Colorado. February 7, 2022.

#### Advised Cadet Research

- EV489B: Mobile Mapping in Subterranean Infrastructure: Analysis of Leica BLK2GO, Apple iPhone 15 Pro, and Apple iPhone 13 in Two- and Three-Dimensional Model Generation. Cadet Katherine Cornett (2024). AY24-2.
- EV489B: Analysis of Severe Weather on Great Salt Lake Area and Volume through LANDSAT-8 and -9 Imagery. Cadet Samuel Weisenburger (2024). AY24-2.
- EV489A: Identification of Potential West Point Parking Lot Areas. Cadet Tate Jolly (2025). AY24-2.
- EV389A: Qualitative Optimization of sUAS Data Collections to Support Maneuver. Cadet Taylor Krakar (2024). AY24-2.
- EV489A: Review of Simultaneous Localization and Mapping (SLAM) Technologies and Subterranean Mapping Methodologies. Cadets Katherine Cornett (2024) and Zachary Schnieder (2023). AY24-1.
- Tucker, J., Predicting Tree Diameter Near the Suwalki Gap, a Framework for the Future. Faculty Advisors: MAJ Jordan Laughlin, CPT Carter Kelly. S&T Advisors: Dr. Nathan Beane, Mr. Gabe Powell. Presented at USGIF GEOINT Symposium 2023. St. Louis, MO. May 21 2023. USMA Projects Day Research Symposium, West Point, NY. 04 May 2023.
- EV289A: Background of National Geospatial-Intelligence Agency (NGA) and Geospatial Intelligence (GEOINT) Introduction, InnoVision Directorate Support. Cadets Nicholas Hughes (2024), Spencer Roy (2024), Dakota Overland (2025), Cayden Landrum (2025), and Jennifer Taylor (2024). AY23-2.

## **GRANTS AND MANAGED FUNDS**

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1-Year \$75,000 grant awarded from the National Geospatial Intelligence Agency, Foundation GEOINT Office, 2024

1-Year \$22,000 grant awarded from the US Army Engineer Research and Development Center, IEBA, 2024

1-Year \$50,000 grant awarded from the National Geospatial Intelligence Agency, Annual Sponsorship, 2023

1-Year \$90,000 grant awarded from the National Geospatial Intelligence Agency, Foundation GEOINT Office, 2023

1-Year \$20,000 grant awarded from the National Geospatial Intelligence Agency, InnoVision Directorate, 2023