Paul Vaughan Manley, II

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Personal Profile

My work in remote sensing of vegetation for landmine detection is what drives me every day. As a remote sensing ecologist, I have the opportunity to apply science to military and humanitarian needs. Integrating multiple sensors onto a single platform has been an exciting and challenging task. It has allowed me to work on a diverse set of projects from explosives detection to leaking landfills to sturgeon tracking. Working with drones for my degree has also inspired me to purchase my own for side work where I have provided imagery and video to help real estate agents sell homes, conducted property inspections, and was contracted to film part of a Busch Beer commercial.

Education

1. **Doctor of Philosophy in Civil Engineering**
   Missouri University of Science and Technology (Missouri S&T)
   (August 2015-Expected graduation Fall 2020)
   My research continues to focus on using vegetation to remotely detect explosive compounds to locate buried ordnance. I will be relating anthropogenic chemical stress to natural causes such as water and nutrient stress in both greenhouse and field settings.
2. **Master of Science in Biology**
   Virginia Commonwealth University (VCU)
   (January 2012-December 2015)
   My research focused on using vegetation to remotely detect explosive compounds (Composition B) in order to locate buried ordnance. Thesis title: “Plants as bio-indicators for remote detection of landmines”.
3. **International Summer School – Biodiversity and Conservation**
   VCU in conjunction with University of Messina, Sicily
   (June 2011-July 2011)
   This course provided information on how to assess water quality via testing and macroinvertebrate sampling.
4. **Bachelor of Science in Environmental Studies**
   Virginia Commonwealth University
   (August 2005-December 2010)
   This program provided a foundation for graduate work in biology, and prepared me for a career in an environmental related field.

Employment

09/2020 – now	**Surdex Corporation** LiDAR Technology Engineer II Research and develop new methods for the acquisition and processing of both Light Detection And Ranging (LiDAR) and orthophotography captured from manned aircraft.
08/2015 – 09/2020	**Missouri University of Science and Technology, Rolla, MO** Graduate Research Assistant Currently conducting research on remote sensing of vegetation. I use multiple

remote sensing platforms to image plants explosives and drought conditions, mainly focusing on hyperspectral imaging. This includes both greenhouse studies and the use of UAVs in a field setting.

05/2018 – now **Mosaic Aerial Productions, LLC**
Owner/Operator
www.mosaicaerials.com
UAV-based imagery/video for various types of projects including photogrammetry, building inspections, surveying, and videography

01/2012 – 08/2015 **Virginia Commonwealth University, Richmond, VA**
Department of Biology Webmaster
Built and maintained VCU's Department of Biology website

01/2014 – 12/2014 **Virginia Commonwealth University, Richmond, VA**
Graduate Research/Teaching Assistant
Taught two sections of Introduction to Biological Sciences Laboratory I & II. During my master's work I used LiDAR, ArcGIS, and hyperspectral remote sensing tools for various purposes. The LiDAR data was used to assess shrub canopy architecture and related to field measurements. I used ArcGIS to classify multiple components of a barrier island, the publication for which is listed below. Hyperspectral imagery and spectroradiometers were the focal point of my research on the effects of explosives on vegetation for landmine detection.

01/2011 – 05/2013 **MANYHANDS Collective, LLC**
Co-owner/Web Designer/Audio Engineer
Founded and co-owned a locally operated multimedia design company

Papers, Presentations, Awards, and Press

1. **Paper in MDPI** *(December 2019)*
   Legleiter, CJ, PV Manley, SO Erwin, and EA Bulliner. "An Experimental Evaluation of the Feasibility of Inferring Concentrations of a Visible Tracer Dye from Remotely Sensed Data in Turbid Rivers".
2. **Paper in MDPI** *(August 2019)*
   Manley, PV, V Sagan, FB Fritschi, and JG Burken. "Remote sensing of explosives-induced stress in plants: Hyperspectral imaging analysis for remote detection of unexploded threats".
3. **Full presentation at ASPRS/ILMF Conference, Denver, Colorado** *(February 2018)*
   Manley, PV and JG Burken. "Remote detection of forgotten explosives: An imaging approach".
4. **Full presentation at ASPRS/ILMF Conference, Denver Colorado** *(February 2018)*
   Manley, PV and JG Burken. "UAV-based image assessment of crop species to drought conditions".
5. **Article on news.mst.edu** *(24 January 2018)*
   "How Plant Health Can Be Used to Detect Land Mines"
   URL: https://www.engineering.com/Education/EducationArticles/ArticleID/16366/How-Plant-Health-Can-Be-Used-to-Detect-Land-Mines.aspx#
6. **Article on news.mst.edu** *(9 January 2018)*
   "Missouri S&T doctoral student enlists drones to detect unexploded landmines through changes in plant health"
   URL: https://news.mst.edu/2018/01/missouri-st-doctoral-student-enlists-drones-to-detect-unexploded-landmines-through-changes-in-plant-health/
7. **Student representative for National NSF EPSCoR meeting, Missoula, Montana** *(November 2017)*

After designing and helping to develop a website to make project data accessible to the public, I was chosen to represent the Missouri EPSCoR project at the National NSF EPSCoR meeting.

8. **Departmental seminar speaker at Missouri University of Science and Technology** *(October 2017)*
   Conducted an interactive seminar for the Civil, Architectural and Environmental Engineering Department at Missouri S&T. After speaking about the various aspects of my research, attendees were given a UAV demonstration.
9. **Student representative for NSF Site Visit** *(September 2017)*
   After being judged at a closed poster session, I was chosen to represent the Missouri EPSCoR project at an NSF site visit September 2017.
10. **1st Place for best presentation at 14th International Phytotechnologies Conference, Montreal, Canada** *(September 2017)*
    Best student talk at IPC 2017, the annual conference for the International Phytotechnologies Society.
11. **Full presentation at 14th International Phytotechnologies Conference, Montreal, Canada** *(September 2017)*
    Manley, PV, Z Yin, A Ghulam, M Berezin, and JG Burken. "Phytosensing of landmines: Agricultural plants as life-saving mine detectors".
12. **Financial award from NIEHS**
    The National Institution of Environmental Health Sciences (NIEHS) will fund my attendance to the 14th International Phytotechnologies Conference as a "PhytoScholar".
13. **Full presentation at Imaging and Geospatial Technical Forum** *(March 2017)*
    Manley, PV and JG Burken. "Hyperspectral image comparison of monocots and dicots to exposure of varying RDX, HMX, and TNT concentrations".
14. **Poster at 13th International Phytotechnologies Conference, Hangzhou, China** *(September 2016)*
    Manley, PV, Z Yin, A Ghulam, M Berezin, and JG Burken. "Explosive Hide and Seek – Hyperspectral Assessment of Plant Stress for Detecting Environmental Pollutants".
15. **Financial award from NIEHS**
    The National Institution of Environmental Health Sciences (NIEHS) funded me to attend the 13th International Phytotechnologies Conference as a "PhytoScholar".
16. **Poster at Imaging and Geospatial Technology Forum 2016, Fort Worth, TX** *(April 2016)*
    Manley, PV, Burken JG. "Phytoforensics of Explosives: Using Plants to Locate Forgotten Landmines".
17. **3-Minute Thesis Competition – 3rd Place winner** *(December 2015)*
    I won 3rd place in the 3-Minute Thesis competition at Missouri S&T for my research on remote detection of landmines.
18. **Paper in Frontiers in Ecology and the Environment** *(June 2016)*
    Zinnert, JC, SA Shiflett, SN Bissett, BL Dows, PV Manley, and SM Via. "Spatial-temporal dynamics in barrier island upland vegetation: the forgotten coastal landscape".
19. **Co-author on presentation at American Geophysical Union, San Francisco, CA** *(December 2014)*
    Zinnert JC, SA Shiflett, SN Bissett, BL Dows, PV Manley, SM Via, and DR Young. "Cross-scale interactions in barrier island land cover change".
20. **Full presentation at 11th International Phytotechnologies Conference, Heraklion, Crete** *(October 2014)*
    Manley PV, JC Zinnert, and DR Young. "Before the blast: the interaction between plants and explosives".
21. **Financial award from NIEHS**
    The National Institution of Environmental Health Sciences (NIEHS) funded me to attend the 11th International Phytotechnologies Conference as a "PhytoScholar".

22. **Full presentation at 99th Ecological Society of America (ESA) Conference, Sacramento, CA** (*August 2014)*
    Manley PV, SM Via, JC Zinnert, and DR Young. "Landmines: Using plants as bio-indicators to what may lie beneath".
23. **Co-author on presentation at 99th ESA Conference, Sacramento, CA** *(August 2014)*
    Zinnert JC, SA Shifflett, SN Bissett, BL Dows, PV Manley, SM Via. "Cross-island comparison of temporal variations in shrub-grassland bistability at the Virginia Coast Reserve".
24. **Article on LiveScience.com** *(14 August 2014)*
    "Leafy Bloodhounds: Plants Might Find Land Mines"
25. **VCU Next Big Idea Competition – 2nd Place winner** *(April 2014)*
    2nd place in this Next Big Idea competition for my thesis work involving remote detection of landmines using plants.
26. **Article on news.vcu.edu** *(26 March 2013)*
    "Using Plants to Detect Buried Explosives"
27. **Article in Style Weekly** *(12 February 2013)*
    "Want to Navigate a Mine Field With Your Phone?"
28. **Poster at 97th ESA Conference, Portland, OR** *(August 2012)*
    Manley PV, JC Zinnert, RD Massaro, ER Crawford, SN Bissett, and DR Young. "LASERS ON A PLANE! LiDAR analysis of spatial variations in shrub thicket canopies and light attenuation in coastal environments".

Memberships

2016 – Current	Association of Environmental Engineering & Science Professors
2013 – Current	American Society for Photogrammetry and Remote Sensing (Current Immediate PastPresident of Heartland Region)
2013 – Current	International Phytotechnology Society
2012 – 2014	Ecological Society of America
2007 – 2010	Phi Kappa Sigma – Founding father of VCU chapter

Skills and Competencies

- FAA Part 107 Certified – Small Unmanned Aerial Systems
- Great experience with lab and field equipment such as Headwall Nano-Hyperspec, Velodyne LiDAR, FLIR Thermal, ASD FieldSpec Pro, FluorPen, METER Group porometer, LAI-2000, LI-1400, MINI-PAM, spectrophotometers, LI-3100C, Trimble, Emlid
- Proficient with a computer and ENVI analytical software, R, machine learning, LP360, ArcGIS, Python, IDL, Headwall software, ASD software, JMP Pro 11, SigmaPlot, JMP, Quick Terrain Modeler, Microsoft Office, Adobe Photoshop, DaVinci Resolve 15 video editing software
- Experienced in web design, development, and maintenance
- Strong presentation skills both nationally and internationally
- Excellent interpersonal skills and adaptability within a team

Interests

Outside of the world of science, music has always been a major part of my life. I have played some sort of percussion since I joined drumline when I was 12 years old. I have been very lucky to play with some talented musicians since moving to Richmond in 2005. Another central facet of my life is travel; I love experiencing other cultures be it here or abroad. I

even hope to get my pilot's license one day. I'm a very hands-on, "build your own" individual. I didn't like what the current Greek life had to offer as an undergraduate, so I expanded a chapter of a fraternity more in line with my values. I wanted to be my own boss and record musicians, so opened a multimedia design company with a friend. These, and other, achievements speak to my personality.

References available upon request