# James Mullen

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| **Research Interests** | Computer Vision, Artificial Intelligence, and Human-Robot Interaction, with applications in autonomy. |

**Education**

**VIRGINIA TECH**                                                             2017-2021

B.S in Mechanical Engineering, Computer Science Minor
3.94 GPA

**Experience**

**RAYTHEON**                                                             2018-Present
**AI Research Intern & Principal Investigator**
Advisor: Dr. Philip Sallee
Computer Vision Research Projects

· Initiated a research proposal, then ran and completed a research project exploring connections between imagery annotation types and neural network performance

· Research resulted in **Patent Application #16/413730[5]**, and a **publication at the IEEE Conference on Computer Vision and Pattern Recognition [1]**

· Pitched and secured funding as Principal Investigator to develop novel probabilistic pseudo-annotations for achieving state-of-the-art detection results on cheaply annotated data, **Patent Application #16/586480 [4]** filed

· Designed and implemented a new, clustering-based method of hardening neural networks against out of distribution data, data drift, and adversarial attacks in a focus to operationalize AI, **Patent Application #17/081612 [2]** filed

Innovation Center Research Project

· Developed a grant proposal and pitched to a panel of 7 research and business executives, selected for funding from over 100 applicants

· Directed execution including tracking funds, managing the team, developing business interest, and filing **Patent Application #16/745885 [3]**

· Postulated a unique approach to course of action planning using 'costmaps' and AI

**VIRGINIA TECH**
**Undergraduate Research**
Advisor: Dr. Brain Lattimer, Dr. Dylan Losey
Communicating Robot Learning (Dr. Losey)                    2020-Present

· Designing methods to gather information from a robot as it learns, and present said information to a human intuitively through haptic and AR feedback devices

· Wrote VT ME Grant application and was awarded funding for the project

**Satellite Imagery Super-Resolution (Dr. Lattimer)**                2019-Present
· Explored a super-resolution of GOES Imagery to VIIRS-I Imagery to produce high resolution, frequent imagery for use in wildland fire burn map creation
· Wrote VSGC Fellowship application and was awarded funding for the project

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| **Refereed Conference Proceedings** | 1. **James F. Mullen Jr.,** Franklin R. Tanner, and Philip A. Sallee, "Comparing the Effects of Annotation Type on Machine Learning Detection Performance," *IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPR)*, 2019. |
| **Patents** | 2. Philip A. Sallee, **James F. Mullen Jr., "**Hardening Deep Neural Networks," *US Patent Application 17/081612*, 2020. |
| | 3. **James F. Mullen Jr.** and Rupal Nigam, "Systems and Methods for Multi-Factor Pathfinding," *US Patent Application 16/745885,* 2020. |
| | 4. **James F. Mullen Jr.**, Jon Goldstein, Philip A. Sallee, and Franklin R. Tanner, "A Training Schema for Extended Object Detection with Point-Wise Labels," *US Patent Application 16/586480*, 2019. |
| | 5. Philip A. Sallee, **James F. Mullen Jr.**, and Franklin R. Tanner, "Machine Learning Using Informed Pseudolabels," *US Patent Application 16/413730,* 2019. |

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| **Honors & Awards** | Raytheon AI/ML Scholars Fellowship | 2020 |
| | Virginia Tech Mechanical Engineering Grant | 2020 |
| | Virginia Space Grant Consortium (VSGC) Fellowship | 2020 |
| | Raytheon Innovation Grant (x2) | 2018 & 2019 |
| | Raytheon Achievement Award (x2) | 2018 & 2019 |
| | Edward H. Cahill Memorial Scholarship | 2019 |
| | Pratt Engineering Scholarship | 2018 |
| **Outreach** | **Montgomery County Animal Shelter Volunteer** | 2019 to Present |
| | **Eagle Scout** | 2015 |