

Senior AI Research Manager and Ph.D. Candidate in Computer Science with a proven track record leading the design, development, and field testing of advanced AI systems for national defense. Experienced in shaping technical vision, managing multi-institutional teams and contractors, and driving program success across the R&D lifecycle—from concept to operational testing.

Skills

Notes:	Skills with bold mean expert (8+ years experience) & ranked with familiarity
Computer Languages:	Python, R , SQL, Java, C, HTML/CSS, Terraform
Data Visualization:	Rshiny, ArcGIS, Tableau, Plotly , leaflet, Matplotlib, Seaborn, Bokeh
Cloud Management:	AWS, EC2, Azure, Slurm , EMR, Spark SQL, Hadoop, MapReduce, Docker, GCP
Software:	MS Office, scikit-learn, PyTorch, Tensorflow, openCV , Unity, Gym, MPI, Git, ArcMap

Education

2022/01-	Ph.D. Computer Science — Virginia Tech, DC
2025/12	Research Focus : How to improve shared perception systems through assured AI-driven object detection. While leveraging Humans-in-the-loop (HITL), I focus on creating new AI assurance methodologies that can be integrated with object detection capabilities on Augmented Reality (AR) headsets and other mobile distributed platforms such as robots or CCTV networks.
2021/01	M.S. Data Science — George Washington University, DC Core Courses : Deep Learning with Neural Networks, Data Visualization, Advanced Natural Language Processing (NLP), Parallel Programming, Big Data, High-Performance Computing (HPC), Probabilistic Modeling and Statistical Computing, and Data warehouse Systems.
2017/08	A.S. Computer Science — Northern Virginia Community College, VA Core Courses : Linear Algebra, Discrete Mathematics, Calculus/Vector Analysis, Computer Organization, Object Oriented Programming, Data Structures & Analyzing Algorithms.
2012/05	B.A. International Affairs — George Mason University, VA

Work Experience

Present	U.S. Army, DEVCOM, C5ISR Center, Data Scientist (GS-14), Fort Belvoir, VA
November, 2020	<div><div>> Serve as the Principal Investigator for the Dismounted AiTR Innovation Project, a three-year effort to develop AI-enabled threat recognition for dismounted soldiers.</div><div>> Led a cross-functional team of federal employees and three contracting companies, ensuring alignment across technical, operational, and programmatic objectives.</div><div>> Managed all aspects of program execution, including budgeting, burn rate analysis, development timelines, and risk mitigation strategies.</div><div>> Conducted weekly status briefings and delivered high-stakes technical demonstrations to senior Army leadership, including general officers; ensured program visibility and alignment with strategic priorities.</div><div>> Lead R&D of advanced computer vision algorithms for target detection and threat classification using Python and high-performance computing (HPC) infrastructure.</div><div>> Design, deploy and optimize deep learning models for edge computing platforms integrated with autonomous ground systems.</div><div>> Architect and prototype augmented reality (AR) applications for IVAS using Unity and Microsoft HoloLens, enabling real-time soldier interaction with firearm optics.</div><div>> Coordinate and manage collaborative AI research initiatives with academic partners, providing technical direction and oversight on deliverables.</div></div> <div><div>Project Leadership</div><div>Program Management</div><div>AI/ML</div><div>Computer Vision</div><div>Edge Computing</div><div>PyTorch</div><div>HPC</div><div>Unity</div><div>AR</div><div>openCV</div><div>Human-in-the-Loop Testing</div></div>

November, 2020	DHS, Immigration and Customs Enforcement (ICE-ERO/HSI), Senior Operations Research Analyst (GS-14), Washington, DC
November, 2017	<ul style="list-style-type: none"> ➤ Led and managed a team of 11 contractors within ERO delivering advanced data science and analytics solutions across the immigration enforcement lifecycle; oversaw tasking, technical direction, and performance quality. ➤ Developed deep learning models for time-series forecasting detention populations using AWS-based GPU infrastructure; implemented Long Short-Term Memory (LSTM) and Dual-Stage Attention-Based Recurrent Neural Networks (DA-RNN) in Python/PyTorch. ➤ Built and maintained web-based dashboards, mobile apps for field officers, and automated ETL pipelines using Python, R, SQL, Tableau, and Java/Swift. ➤ Designed and evaluated algorithms for automating the generation of criminal intelligence reports for HSI supporting federal investigations and case management. <div> Team Leadership Python R PyTorch AWS Neural Networks Tableau Shiny SQL ETL Mobile App Development </div>
November, 2017	U.S. Census Bureau, Geographer (GS-11), Suitland, MD
November, 2016	<ul style="list-style-type: none"> ➤ Developed Python programs to ingest, process, and analyze large geospatial datasets supporting national mapping and enumeration efforts. ➤ Conducted exploratory data analysis (EDA) using R and SQL to extract spatial and demographic data insights. ➤ Supported the Hidden Unit Task Force in identifying concealed housing units for the 2020 Census using near-infrared (NIR) and LiDAR imagery, employing ArcGIS and Arcpy for spatial analysis and scripting automation. <div> Geospatial Analysis Python R SQL ArcGIS Arcpy NIR Imagery LiDAR </div>
November, 2016	U.S. Department of Agriculture – Foreign Agricultural Service (FAS), International Program Specialist (GS-7), Washington, DC
October, 2015	<ul style="list-style-type: none"> ➤ Served as the primary technology liaison and business analyst for the Disaster Assistance Division within the Office of the Director, supporting cross-functional coordination and technical integration. ➤ Developed and executed analytical reports using large global agricultural datasets; integrated findings into Geographic Information Systems (GIS) using Java, JavaScript, HTML, and QML. <div> GIS Java JavaScript ArcGIS HTML CSS International Programs </div>
October, 2015	Northrop Grumman Corporation, Competitive Intelligence Analyst, McLean, VA
May, 2012	<ul style="list-style-type: none"> ➤ Provided market and competitive intelligence supporting international business development efforts within the Air and Missile Defense division; directly contributed to opportunity assessments and capture strategies. ➤ Developed and maintained critical content for federal advisory platforms, including FinCEN.gov, the 314a Financial Regulators site, and the FinCEN Registered User Portal, used by law enforcement and financial institutions nationwide. ➤ Supported Senior Solution Architects in designing OSINT-enabled analytical tools; performed operational research, planning analysis, and financial intelligence (FININT) assessments to guide software development. <div> Defense Contracting Competitive Intelligence OSINT FININT Data Visualization HTML CSS </div>

“ Publications

- **M. Wilchek**, M. Nguyen, Y. Wang, K. Luther, and F. A. Batarseh, “PerceptiSync : Trustworthy Object Detection using Crowds-in-the-Loop for Cyber-Physical Systems,” *ACM Transactions on Cyber-Physical Systems*, Just Accepted, Jul. 2025. doi : 10.1145/3746644
- **M. Wilchek**, L. Wang, S. Dickinson, E. Feuerbacher, K. Luther, and F. A. Batarseh, “KHAIT : K-9 Handler Artificial Intelligence Teaming for Collaborative Sensemaking,” in *Proceedings of the 30th International Conference on Intelligent User Interfaces (IUI '25)*, Association for Computing Machinery, New York, NY, USA, 2025, pp. 925–937. doi : 10.1145/3708359.3712107
- **M. Wilchek**, K. Luther, and F. A. Batarseh, “Ajna : A Wearable Shared Perception System for Extreme Sensemaking,” *ACM Transactions on Interactive Intelligent Systems*, vol. 15, no. 1, Art. no. 1, Mar. 2025, 29 pages. doi : 10.1145/3690829
- **M. Wilchek**, W. Hanley, J. Lim, K. Luther, and F. A. Batarseh, “Human-in-the-loop for computer vision assurance : A survey,” *Engineering Applications of Artificial Intelligence*, vol. 123, part B, 2023, Art. no. 106376. doi : 10.1016/j.engappai.2023.106376 [Publisher Link]
- **M. Wilchek** and Y. Wang, “Synthetic Differential Privacy Data Generation for Revealing Bias Modelling Risks,” in *Proceedings of the 2021 IEEE International Conference on Parallel & Distributed Processing with Applications, Big Data & Cloud Computing, Sustainable Computing & Communications, Social Computing & Networking (ISPA/BDCloud/SocialCom/SustainCom)*, New York City, NY, USA, 2021, pp. 1574–1580. doi : 10.1109/ISPA-BDCloud-SocialCom-SustainCom52081.2021.00211