

# Matthew Wilchek

Federal Data Scientist (GS-14) | Active Top-Secret Clearance | Ph.D. Student in Computer Science

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Experienced Data Scientist in the federal law enforcement and intelligence industry with practical experience leading and deploying machine learning, data mining, and data visualization solutions; Interested in continued research for my Ph.D. program in Computer Science with focuses on **computer vision and shared perception systems**.

## Skills

**Notes:** Skills with **bold** mean expert (100+ hours 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, Unity, scikit-learn, PyTorch, Tensorflow, openCV**, Gym, MPI, Git, ArcMap, Scene-Builder

## Education

2022/01 - Present **Ph.D. Computer Science — Virginia Tech, DC**

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 Datawarehouse 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 November, 2020	<b>U.S. Army, DEVCOM, C5ISR Center, Data Scientist (GS-14), Fort Belvoir, VA</b> <ul style="list-style-type: none"><li>➤ Support the Countermine Division's Algorithms and Image Processing Branch in development of advance computer vision algorithms, such as target recognition and classification of threats using High Performance Computing (HPC) and Python programming</li><li>➤ Deploy and evaluate performance of algorithms on edge devices used in robotics and drones</li><li>➤ Lead new computer vision research and manage new projects with various academic partners</li><li>➤ Develop augmented reality (AR) experiences for the Integrated Visual Augmentation System (IVAS) (Microsoft HoloLens) for soldiers that control &amp; command various air systems using Unity</li></ul> <div>PythonNeural NetworkPyTorchopenCVComputer VisionAugmented Reality</div>
November, 2020 November, 2017	<b>DHS, Immigration Customs Enforcement (ICE), Data Scientist (GS-14), Washington, DC</b> <ul style="list-style-type: none"><li>➤ Develop deep-learning algorithms on AWS Cloud GPU infrastructure for time-series forecasting on detention populations using Python/PyTorch such as Long Short-Term Memory (LSTM) models and Dual-staged Attention-based Recurrent Neural Network (DA-RNN) models</li><li>➤ Support development of advance web-based business intelligence dashboards, mobile applications for officers, ETL processing scripts, and database management scripts using Python, R, Java, Swift, SQL, and Tableau</li><li>➤ Lead and drive a 11 contractor personnel team in complex data modeling, mining, visualization and other related data science initiatives around the immigration lifecycle</li><li>➤ Develop and evaluate various algorithms for automating criminal intelligence reports for investigative case support of federal officers/special agents</li></ul> <div>PythonRNeural NetworkShinyPyTorchTableauAWS</div>

November, 2017 November, 2016	<b>U.S. Census Bureau, Geographer (GS-11), Suitland, MD</b> <ul style="list-style-type: none"> <li>➤ Developed programs in Python to ingest and analyze large geo-spatial data sets</li> <li>➤ Performed exploratory data analysis (EDA) with R statistical computing and SQL</li> <li>➤ Assisted the Hidden Unit Task Force with the identification of hidden housing units for 2020 enumeration by utilizing near-infrared (NIR) imagery and Light Detection and Ranging (LiDAR) imagery, and ArcGIS Python Arcpy scripting</li> </ul> <div>Python R SQL ArcGIS NIR Imagery LiDAR Imagery</div>
November, 2016 October, 2015	<b>USDA – Foreign Agriculture Service (FAS), International Program Specialist (GS-7), Washington, DC</b> <ul style="list-style-type: none"> <li>➤ Acted as the primary technology liaison/business analyst for the Disaster Assistance division's Office of the Director</li> <li>➤ Designed and executed analytical reports from various databases of global agricultural data to be integrated to a Geographic Information System (GIS), including big data sets, using various programming languages such as Java, JavaScript, HTML, and QML</li> </ul> <div>Java ArcGIS HTML CSS foreign service</div>
October, 2015 May, 2012	<b>Northrop Grumman Corp., Competitive Intelligence Analyst, McLean, VA</b> <ul style="list-style-type: none"> <li>➤ Supported the international business development team in providing competitive and market intelligence that influenced strategies to support business winning goals of the Air and Missile Defense division</li> <li>➤ Design and implement content updates such as guidance and advisories to financial institutions on FinCEN.gov, 314a Financial Regulators web site, and the FinCEN Registered User Portal used by all domestic law enforcement agencies</li> <li>➤ Assisted Senior Solution Architects with the development of open-source intelligence (OSINT) analytical software by performing operational research, planning analysis, and financial intelligence (FININT) analysis such as predictive analytics</li> </ul> <div>National Security OSINT FININT Data Visualization HTML CSS</div>

## Research Projects

October, 2019 December, 2019	<b>Facial Expression Recognition using Convolutional Neural Network, Washington, DC</b> <ul style="list-style-type: none"> <li>➤ Implemented a Convolutional Neural Network (CNN) on augmented images to detect key features among facial expressions.</li> <li>➤ Improved the prediction accuracy by 20% using Multi-Task Cascaded Convolutional Neural Network (MTCNN) face detection with the identification of critical facial features towards each expression.</li> <li>➤ Experimented with over 1000 different configurations of the CNN model for optimization such as kernel sizes and activation functions using an advanced library called Talos.</li> </ul> <div>Python Neural Network Tensorflow Talos</div>
December 2017 October 2017	<b>Cellular Automata Model Simulation with Malware Propagation, Washington, DC</b> <ul style="list-style-type: none"> <li>➤ Developed a cellular automata model in python that simulated the propagation of infected Bluetooth mobile devices and then measured the spread and diagnostic speed of the devices</li> <li>➤ Structured the simulation algorithm to be executed on the Colonial One super computer (350k cores) from George Washington University using parallel programming techniques</li> <li>➤ Communicated results through executive briefings using interactive visualizations from R statistical programming libraries such as ggplot2 and plotly</li> </ul> <div>Python Data Mining Machine Learning High Performance Computing</div>

## “ Publications & other trainings

- Matthew Wilchek and Yingjie Wang. “Synthetic Differential Privacy Data Generation for Revealing Bias Modelling Risks” Accepted by *IEEE SpACCS 2021* [Sample]
- Tableau Desktop and Oracle OBIEE certification training (2018-2019)
- Geo-spatial Intelligence development and analysis training by the National Geo-Spatial Intelligence Agency (NGA) and Esri (2016-2017)
- Project Management Professional (PMP) Certification training (2015-2016)