# Jean Ruggiero


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## Education

**Northeastern University**, Boston, MA — August 2021
Master of Science in Computer Science — GPA: 4.00/4.00

- Coursework: Scalable Distributed Systems, Cybersecurity, Operating Systems, Machine Learning, Algorithms, Computer Systems, Object-Oriented Design, Discrete Math
- Thesis: Evaluation of Synthetic Training Data and Training-Data-Augmentation Techniques for Object Detection in Ground-Penetrating Radar Data Using Deep-Learning Models

  Advisor: Dr. Craig Martell

**University of Washington**, Seattle, WA — June 2019
Certificate in Python Programming

**Purdue University**, West Lafayette, IN — May 2014
Bachelor of Science in Aeronautical and Astronautical Engineering — GPA: 3.76/4.00

- Selected coursework: Computational Fluid Dynamics, Signal Analysis, Control System Analysis, Thermodynamics, Heat and Mass Transfer, Jet Propulsion.
- Senior Design Project: 3D printed unmanned aircraft for agricultural imaging

  Leader of a team that designed, fabricated, and tested the world's largest 3D printed aircraft. Pioneered the use of surface modeling and fused deposition modeling to 3D print aircraft skin, ribs, and spars as a single piece without the need for support material.

  Awarded Best Overall in 2014 ASME Innovative Additive Manufacturing 3D Challenge.

  Advisor: Professor John Sullivan

## Professional Experience

Fortive, Pittsburgh, PA

**Data Scientist** — September 2020 – Present

- Contributed bug fixes, feature requests, and infrastructure updates to several production machine learning applications.
- Led the deployment of a customer churn model, including instantiation of a CI/CD pipeline.
- Developed internal code packages and applications for use in CI/CD and product management.
- Designing and implementing a deep learning demand forecasting model.

**Data Science Intern** — June 2020 – September 2020

- Explored machine learning approaches to time series revenue forecasting and compared them to traditional methods such as ARIMA.
- Developed a model using gradient boosted regression trees that reduced prediction error by 40% when compared with the incumbent model.
- Built an application based on the forecasting model, constructed a fully automated CI/CD pipeline including unit tests, wrote thorough documentation, and deployed the application into production.
- Organized and led a workshop on user experience design, lean prototyping, and usability testing of data visualizations.

Boeing, Seattle, WA
**Product Manager** October 2018 – August 2019

- Paired with developers to implement flight test computations in Python and develop a framework that allows engineers to configure and run computations on large datasets in real time.
- Performed user research to identify and prioritize web application usability issues and generated new features to alleviate user pain points.

**Flight Test Engineer** June 2014 – October 2018

- Analyzed flight test data to inform root cause analysis of airplane system anomalies.
- Developed an application using MATLAB for real-time analysis and visualization of aircraft fuel system data during flight tests.
- Authored and submitted certification reports to the FAA detailing flight test methods and results.
- Mentored team members, developed training courses on technical topics for flight test pilots and engineers, and regularly contributed to internal technical publications.

Rolls-Royce, Indianapolis, IN
**Engineering Co-Op** January 2012 – August 2013

- Developed thermodynamic models of new and novel gas turbine engine cycles using C++ and performed a design of experiments to determine optimal cycle parameters.
- Performed a Monte Carlo analysis to determine optimal sizing of secondary flow cooling pathways in a gas turbine engine.
- Performed statistical analysis of torque tool data to measure manufacturing defect rates.

## Teaching Experience

Northeastern University, Boston, MA
**Teaching Assistant - CS5002 Discrete Math** January 2020 – May 2020

- Coached students during office hours and provided feedback on assignments and exams.
- Led online review sessions to help students transition to virtual classes during the COVID-19 pandemic. Topics included recursive algorithms, recurrences, and mathematical induction.
- Generated and reviewed practice problem sets and assignment solutions.

Boeing Employees Alpine Society, Seattle, WA
**Head Instructor, Basic Rock Climbing Course** September 2017 – August 2019

- Organized content, logistics, and communications for a course of 15 students and 30 instructors.
- Taught rock climbing fundamentals and safety skills to students and instructors through lectures and hands-on experience by understanding and accommodating individual learning styles.

## Awards & Honors

**John Cashman Flight Test Safety Award** (2015). Awarded to the KC-46 fuels test team for safely troubleshooting anomalies during testing. The Cashman Award recognizes one individual or group at Boeing per year that has made an enduring contribution to the advancement of flight test safety.

**ASME IAM3D Challenge Best Overall** (2014). The ASME Innovative Additive Manufacturing 3D Challenge recognizes undergraduate students from around the world who re-engineer existing products or create new designs that minimize energy consumption or improve energy efficiency.

**Purdue University Trustees Scholarship** (2010 – 2014). The Trustees Scholarship is awarded to individuals who demonstrate exceptional academic achievement, leadership, and service in their school and community.

## Projects

**MS Computer Science Thesis** January 2021 – August 2021

Evaluation of Synthetic Training Data and Training-Data-Augmentation Techniques for Object Detection in Ground-Penetrating Radar Data Using Deep-Learning Models

- Examined the current state of deep learning in the subsurface imaging field and expanded upon it by evaluating the real-world performance of a synthetically-trained neural network model for object detection in GPR images.
- Proposed and evaluated three data augmentation techniques for GPR data: (1) random cropping, (2) negative augmentation, and (3) real noise application.

**WiFi Smart Switch Security Assessment & Penetration Test** February 2021 – May 2021

Cybersecurity class project that applied penetration testing practices to an IoT device

- Performed security assessment detailing potential attackers and their incentives as well as types of attacks and associated risks
- Conducted four types of attack: supply chain attack, direct memory access, DoS, and replay attack

**Ocularize** May 2020 – September 2020

A low-cost online patient intake application for a family-owned medical practice

- Developed an application to help a small, family-owned optometry practice re-open safely during the COVID-19 pandemic, allowing the business to provide essential care to patients and recover from the financial stresses of the shutdown.
- Developed an application using Python/Django, React, and AWS services which has successfully processed over 2,000 intake forms and appointment requests at a cost of less than $3 per month.

**Lighthouse** January 2020 – April 2020

An open source C unit testing framework

- Built a lightweight and easy-to-use unit testing framework for testing C code from the command line.
- Released project as open source under the MIT License with an accompanying API reference.

**Rock Climbing Course Website** May 2019 – September 2019

A course web application to foster learning and build community

- Built a course website allowing students to create profiles, access course materials, and receive course updates.
- Redesigned the website based on feedback from course participants, including a front end React application (in the prototyping stage) and backend Django server with a fully-documented REST API conforming to the OpenAPI specification.

## Skills

**Programming Languages & Frameworks**

Python, Django, C, C++, Java, JavaScript, React, HTML, CSS, MATLAB, shell scripting, assembly

**Software & Web Development**

Git, CI/CD pipelines, API development, SQL & NoSQL databases, AWS, Heroku

**Data Science**

pandas, scikit-learn, tensorflow, keras, deep learning, time series forecasting, data visualization

**Engineering**

Flight test, jet propulsion, fuels systems, computational fluid dynamics, technical writing, LaTeX

**Product/Design**

Jira, Sketch, InVision, lean product development, user research, usability testing