# Daniel Kolosa

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## Education

**PhD Mechanical Engineering** Western Michigan University 09/2015 – 12/2019
**Relevant Coursework:** Machine Learning, Advanced Parallel Computations, Intractability and Approximation Algorithms, Continuous Systems Modeling and Simulation

**MS Mechanical Engineering** Western Michigan University 09/2013 – 12/2015
**Relevant Coursework:** Design Optimization, Engineering Analysis, Mechatronics

## Relevant Skills

Python, Numpy, Scikit-learn, Pandas, Tensorflow, Pytorch, Reinforcement Learning, Machine Learning, Computer Vision C#, C/C++, SQL, GIT, Linux/Unix**,** Java, HTML, CSS, Javascript, Bash, Windows, macos

## Work History

**Software Developer** Icon - Zoetis 03/2020 - Present

- Developed a pipeline to process large datasets using python, and integrating C++ reducing processing time from 7 to 3 hours..
- Using C# and SQL, developed and maintained a web application with an emphasis on usability allowing customer service to manage an animal database more efficiently.
- Wrote python scripts using Pandas to parse genetic data and convert to a JSON configuration format with an emphasis on performance.
- Using C#, .Net core, and SQL, created an application with a development team to process genetic data from laboratory results to integrate into existing software subsystems, improving the performance and processing time of data.

**Part-Time Lecturer** Western Michigan University 09/2019 – 12/2019

- Presented lectures and instructed students from various academic backgrounds on fundamental engineering concepts.
- Assisted students in understanding material covered in lecture and providing copious feedback to students through examinations and weekly assignments.

**Graduate Research Assistant** Western Michigan University 09/2014 - 08/2019

- Developed a DARPA funded research project resulting in a well received conference presentation at AIAA SciTech 2018 and delivered production-level software according to customer specifications.
- Implemented a genetic algorithm to determine the optimal trajectory that maximizes profit for a robot servicer satellite mission in Geosynchronous orbit.
- Reduced fuel usage by 25% by creating a custom plugin to model an electric propulsion system using C# and Javascript.

**Software Developer, Intern** Jet Propulsion Laboratory 06/2014 - 08/2014

- Developed satellite trajectory simulation software resulting in a well received journal publication by conducting trade studies of various combinations of micro propulsion systems for satellites.
- Designed novel satellite systems using off-the-shelf parts resulting in a total cost of $80,000 per satellite.

## Projects

**Carla Pilot - Implementing an autonomous vehicle system in a simulated environment** 02/2021 - Present

- Building a reinforcement learning algorithm using PyTorch based on the Twin-Delayed Deterministic Policy Gradient algorithm to train a car to navigate to a specified destination from a random location in a simulated environment.
- Integrating pre-trained neural networks using transfer learning to decrease training time of the autonomous vehicle.
- Developing an object detection model using YOLOv5 to detect pedestrians, vehicles, and road signs.
- Utilized: Python, PyTorch, Numpy, Neural Networks, Carla, Transfer learning, Computer Vision

**Satmind - Design of an autonomous spacecraft using reinforcement learning** 09/2015 - 12/2019

- Utilized project management skills, market/industry knowledge, and machine learning expertise, to develop a generalized machine learning algorithm for solving low-thrust spacecraft trajectory optimization problems.
- Implemented methodologies demonstrated in machine learning research papers to improve algorithm performance.
- Integrated the Java library Orekit, to create a simulated space environment.
- Utilized: Python, TensorFlow, Keras, Java, Matplotlib, Numpy, Neural Networks

**Space Debris Classifier and Decay Prediction** 02/2017 - 04/2017

- Performed exploratory analysis using pandas and matplotlib on a dataset containing debris in Earth's orbit to determine useful features and transformations.
- Developed a machine learning model using random forests, and cross-validation to predict the orbit decay of objects resulting in a training and test accuracy of 98% and 68%, respectively.
- Developed a machine learning model using nearest neighbors, and cross validation to classify an object's radar cross-section resulting in a training and test accuracy of 70% and 68%, respectively.
- Utilized: Python, Scikit-learn, Machine Learning, Matplotlib, Pandas

**Applying neural networks to model orbit rendezvous** 02/2017 - 12/2017

- Created a fully-connected neural network using Python and Numpy to model the dynamics of a spacecraft
- Using established analytical models, created a dataset of time-series trajectories to use for training and testing
- Implemented a recurrent neural network in TensorFlow to model time-series vibration data of turbine blades reducing the cost of experimentation.
- Utilized: Python, Numpy, Tensorflow, Matplotlib