

# Nathan McCormick

*Biomedical Engineer*  
*CV/AI/DS Developer*  
*Scientific Programmer*

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## Python

TensorFlow-CPU/GPU,  
Scikit-Learn, Statsmodels,  
Numpy, SciPy, Pandas,  
SymPy, Numba, Cupy,  
OpenCV, Pillow,  
Matplotlib

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## Skills

Machine/Deep Learning  
CNN (Keras/TensorFlow),  
DNN, Random Forest,  
Hierarchical Clustering,  
k-NN, k Means, SVM, PCA  
Regression  
Multiple Linear, Logistic  
Lasso, Ridge, Elastic Net  
Machine/Computer Vision  
Image Analysis  
Robotics  
Process Automation  
Statistics and Probability  
Data Analysis/Visualization  
Numerical Methods  
Vectorized Computations  
GPU Acceleration (CUDA)  
Python, R, Minitab  
SAM (Meta) API, Keras API  
GPT-4 API  
Git, GitHub, Docker  
  
Cross-site Collaboration  
Rapid Prototyping  
R&D Innovation

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## Graduate Education

*University of Minnesota, 2020 - 2023*

### MS in Biomedical Engineering (GPA: 3.95)

Advanced Biomedical Imaging, Advanced Bioelectricity and Instrumentation, Statistics, Applied Regression Analysis (w/ Machine Learning), Quality Engineering, Physiology, Differential Equations, Linear Algebra, Functional Genomics, Systems Biology, and Bioinformatics

*Research Engineer - Translational NeuroEngineering Lab*

*May 2022 - Aug 2022*

Refactored existing data pipeline in R by converting nested loops to vectorized operations, reducing file processing time from 15 minutes to 12 seconds. Built pipeline to visualize lab rat location and correlate with behavior responses.

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## Work Experience

*Sherwin Williams, 2014 - Present*

### Automated Image Analysis of Corrosion

*2020 - Present*

Developed a robotic and machine vision system to automate measurement of corrosion panels, achieving 95% time savings and winning the 2022 Percy Neyman award for Science. Implemented image analysis, data processing, and statistical testing in Python. Trained a TensorFlow convolutional neural network to segment images. Used GPU acceleration, image augmentation, and weighted classes to achieve 99.9% accuracy. Programmed control of 108MP camera including autofocus algorithm to maximize the variance of the image Laplacian. Responsible for mechanical and electrical design, controls, and global rollout strategy.

### Automated EIS Data Processing

*2023 - Present*

Used Python, HTML, JavaScript, and Docker to build a fully functional and scalable web application that automates electrochemical impedance spectroscopy data processing for the Pittsburgh Packaging Group. Implemented Kramers - Kronig residuals analysis, log least squares curve fitting, circuit model selection, and automated statistical analysis. Collaborated with IT to deploy on Kubernetes.

### Surface Roughness Measurement

*2022 - Present*

Developed a method to quantify the surface roughness induced by the absorption of a liquid coating into a porous substrate. Used Python to process data from a 3D structured light scanner, algorithmically orient the surface using vector calculus, compensate for surface curvature, and coerce the data from an irregular point cloud into an image. Used imaged analysis to quantify surface roughness.

### Corrosion Rate Characterization Method

*2020 - Present*

Invented a novel, contactless method to measure the corrosion rate of steel substrates. Designed and built an instrument that generates a change in AC voltage magnitude as a function of corrosion. Screened for optimal settings using DOE methodology in Minitab. Used Python to fully automate sample placement, Keithley DMM6500 data collection, Fourier filtering, and baseline correction.

## Career Progression

Sr. Chemist

PCG Innovation

March 2022 - Present

Chemist II

PCG Innovation

May 2019 - March 2022

Chemist I

Advanced Liquid Platforms

Jan 2017 - May 2019

Associate Chemist

Commercial Vehicle Group

Sept 2014 - Jan 2017

Contractor

Truck/Trailer Group

March 2014 - Sept 2014

## Machine Vision Adhesion Measurement

2022

Supported General Industrial (GI) business unit response to customer adhesion failure complaint. Rapidly developed prototype system using Python OpenCV to quantify adhesion loss in real time, enabling the GI R&D team to rapidly measure samples, quantify adhesion improvement, and respond to the complaint.

## Simulation of Tumor Growth (MS Class Project)

2022

Modeled tumor response to a combination of chemotherapy, radiation, and immunotherapy. Numerically solved a system of six coupled differential equations using Python. Explored effect of initial conditions on tumor survival.

## Mathematical Model of Solar Heat Gain in Insulative Coatings

2022

Developed and programmed a heat transfer model of coating surface temperature that includes coating reflectance, emissivity, thickness, and thermal conductivity. Conducted a Monte Carlo simulation to determine which coating parameters offer the best opportunity for optimization. Project was presented at the 2023 Association for Materials Protection and Performance Annual Conference.

## Automated Statistical Inference

2022

Developed a tool to quantify correlations between formula contents and performance metrics that dynamically adjusts p-value thresholds for data set size and multiple testing. Deployed the tool with an intuitive user interface that visualizes significance thresholds and results, aiding interpretation by end users.

## Machine Vision for Air Inclusion Defect Analysis

2021 - 2022

Invented a microscopic image analysis method to quantify air release of curing coatings. Used Python and machine vision to provide a real time quantification of bubble rise and pop time constants, enabling a mechanistic understanding of air entrapment. Developed GUI for distribution to R&D lab groups.

## Latent Base Catalyst

2018 - 2020

Invented patent pending latent base crosslinking catalyst for a premium General Industrial product line, winning the 2019 Percy Neyman award for Innovation. Worked cross-functionally with Regulatory Group to define global regulatory strategy. Collaborated with Analytical Group in Cleveland, OH to generate C-NMR data and validate synthesis process.

## Manufacturing and Commercialization Support

2014 - 2018

Commercialized \$3M of new business in the light industrial market at various customers. Invented a method for improving wet film catalyst latency.

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## Undergraduate Education

University of Dallas, 2009 - 2013

### Bachelor's in Biology (Cum Laude)

Anatomy, Molecular Biology, Microbiology, Vector Calculus, General Physics, General Chemistry, Organic Chemistry, Analytical Chemistry

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Heat Buildup for Thermally Insulative Coatings due to Solar Exposure: Efforts in Modeling and Prediction - 2023 AMPP Annual Conference

[US20220332884A1](#) - Coating Compositions and Methods with Polyfunctional Carbamate Salt (2020)

[US20200079965A1](#) - Polyurethane Coating Composition (2019)

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2022 Sherwin Williams Percy Neyman Award - Science

2019 Sherwin Williams Percy Neyman Award - Innovation

2009 Vex Robotics World Championship Innovation Award

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## Patents and Publications

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## Awards