

# NICHOLAS PAYNE

## Data Engineering/Science Software Engineering

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## CATERPILLAR, INC.

### Software Engineer

#### Group: Remanufacturing

📅 February 2021-Present

📍 Remote

- Build ETL pipeline solutions with Python and Kedro targeting Docker deployment on AWS Batch with Snowflake and S3 data stores
- Manage AWS infrastructure including S3, Batch, ECS, Sagemaker, CloudWatch, and EventBridge
- Coach data scientists on my team in clean coding, best practices such as git, advanced python coding for data engineering, and Kedro pipeline deployment
- Manage Azure Build Pipelines and help enable/mature our CI/CD strategy
- Build Streamlit apps for visualizing and exploring data with customers to guide our Kedro pipeline development

### Data Engineer/Data Scientist

#### Groups: Excavation Division & Integrated Components and Solutions

📅 January 2019-February 2021

📍 Mossville, IL

- Co-authored Python library for interfacing with controls software of Caterpillar Excavators for automated data gathering and ML activities
- Designed an automated data ingestion and grooming pipeline managed by docker-compose to index and organize data which included deep learning object detection modeling for tagging datasets with desired information
- Designed an Exploratory Data Analysis (EDA) web application with streamlit to explore the data ingested with above-mentioned data pipeline
- Designed database schema and data hierarchy/storage standards for commonizing on data-related practices in the perception space at Caterpillar
- Built a data storage prototype utilizing MySQL and Flask to centralize telematics and kinematics data storage and data access across many projects
- Utilized Docker for portability of machine learning pipelines as well as data preprocessing pipelines

### Data Scientist 2

#### Group: Information Analytics

📅 July 2017-January 2019

📍 Peoria, IL

- Graduated from the Analytics Professional Development Program (2019)
- Worked on Scrum team following Agile development

## LOOKING FOR

*A team of other disciplined students and tenacious learners who continuously look for ways to improve their lives by striving for excellence in their respective passions.*

## TECHNICAL SKILLS

### 🐍 Python

- 📁 Pipeline | Kedro
- ⚙️ Data Science/Engineering | Pandas, Numpy, Scipy, SQLAlchemy
- 🧠 Machine Learning / Deep Learning Frameworks | Keras / Tensorflow, PyTorch with APex and AMP, SciKit-Learn
- 🧠 Machine Learning / Deep Learning Algorithms | Standard sk-learn techniques, object detection + classification
- 👁️ Exploration | Streamlit, Jupyter Notebooks
- 📊 Viz | Plotly, Matplotlib, Seaborn, Hvplot
- 🔗 Versioning | MLflow, git

### 🗄️ SQL

- Schema design and data modeling
- Databases | MySQL, Oracle, MS SQL Server, Snowflake

### 🐳 Containerization

- Docker(-Compose)

### 📊 Visualization

- Some experience with dashboard frameworks in Python such as Dash or Visdom
- Basic Tableau experience
- Experience building EDA tools with streamlit

### 📁 Miscellaneous

- 🐧 Linux
- Remote deployment/development
- Vim is the superior editor
- L<sup>A</sup>T<sub>E</sub>X
- git

q: Which came first, the phoenix or the egg?

- Gained experience in building machine learning models using various frameworks in Python for random forest regressions models, reinforcement learning models, and various deep learning models for computer vision applications
- Became certified on the C3.IoT (now: C3.ai) platform for a data platform initiative at Cat




## CERTIFICATES

- Fundamentals of Deep Learning for Computer Vision | *Nvidia*
- Convolutional Neural Networks | *Coursera*
- Structuring Machine Learning Projects | *Coursera*
- Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization | *Coursera*
- Neural Networks and Deep Learning | *Coursera*
- Python Programmer | *Data Camp*
- Data Scientist with Python | *Data Camp*

## CONFERENCES

- vim.conf 2021
- Nvidia GPU Technology Conference 2019 & 2020
- Hackillinois 2018

## PUBLICATIONS

-  Properties Preserving Schemes for a Kinetic Eikonal Equation | *J. Comput. Phys.* 331(2016)
-  An asymptotic method based on a Hopf-Cole transformation for a kinetic BGK equation in the hyperbolic limit | *J. Comput. Phys.* 341: 295-312 (2017)
-  A Hopf-Cole transformation based asymptotic method for kinetic equations with a BGK collision operator in the large scale hyperbolic limit | *Iowa State University Graduate Theses and Dissertations.* 15788.

## PATENTS

- **filed** | Excavator Control Mapping System
- **filed** | Vision Based Object Detection Alarm Snooze Strategy for Rotating Machines

## HOBBIES



### Whisky tasting and cigar pairing

Enjoying a nice dram



### Home-labbing

Self host all the things!



### Theology

Ancient Near Eastern Cosmology as the roots for Biblical exegesis



### Volleyball

Because ball is life



### Disc Golf

Olympics 2024. You heard it here first

## STRENGTHS

Active Learning

Leadership

Coaching

Flexibility and Adaptability

Conflict Resolution

Analytical Thinking

## EDUCATION

### MS Applied Mathematics

#### Iowa State University



2014 - 2016



Ames, IA

CGPA: 3.84/4.0

### BS Mathematics

#### Iowa State University



2011-2014



Ames, IA

CGPA: 3.64/4.0

## REFERENCES

Available on request