

# Christopher H. Greer, Ph.D

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## Basic Information

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## Professional Experience

### Children's Hospital Colorado

Aurora, Colorado

#### *Data Scientist Advanced*

**November, 2019 – Present**

As the senior data scientist in the Analytics Resource Center, I lead implementation of real-time machine-learning models into the electronic health record (EHR) providing clinical decision support. I provide expertise around software engineering and devops best practices, and leverage new technologies for clinical applications (e.g. LLMs).

- Designed and built a pipeline for custom model implementation into the production EHR to predict: risk of complications from influenza, risk of septic shock, and risk of serious bacterial infection, (Epic, Python, Docker, Azure)
- Replaced existing NLP process to analyze employee survey comments using ChatGPT (Azure OpenAI Service) in a Retrieval Augmented Generation (RAG) pattern (Azure AI Search), saving of 400 developer hours per year. (Python, Azure OpenAI Service, AI Search)
- Designed and built a process using a RAG pattern for ChatGPT to build patient cohorts using information contained in clinical notes, doubling the precision of existing NLP techniques. Eliminated 16 hours of manual chart-review time per 1000 patients. (Python, Azure OpenAI Service, AI Search)
- Leveraged discrete event simulation with a hospital digital twin to build census projections used during the COVID-19 response and ongoing strategic planning. (Python, FutureFlow RX)
- Developed a risk stratification model for a serious hospital acquired injury attaining 80% recall with 75% precision; results to be used for allocating scarce nursing resources. (Python, R)
- Supervised junior team members to design and develop models predicting the risk of central-line associated bloodstream infections, likelihood of employee turnover, and a time series model of respiratory-season hospital volumes using epidemiology data. (Data Robot)
- Co-author on clinical trial results for the sepsis models. Spoke nationally to audiences on real-time implementation and MLOps pipelines for custom models in Epic.

### Oracle

Broomfield, Colorado

#### *Principle Data Scientist*

**February, 2017 – November, 2019**

- Incorporated geolocation data into the Oracle Data Cloud Identity Graph (using Apache Spark on AWS EMR).
- Rebuilt a privacy-preserving record linkage algorithm between incoming and fulfilled datasets, improving the quality of the match by 45%, scale by 30%, and standardizing the approach across 1000s of datasets.
- Designed and built a graph-quality measurement algorithm using a Monte-Carlo approach, demonstrating a factor of  $\sim 6$  improvement over deterministic graph approaches.

### KPMG

Denver, Colorado

#### *Sr. Associate Data Scientist*

**October, 2015 – February, 2017**

- Architected a document classification tool for end-users. Wrote a domain-specific language for ease-of-use. Used Apache OpenNLP, Spark, Python, and Elasticsearch.
- Built of suite of distributed tools to augment publicly available NLP packages.
- Used these tools for information security and control for KPMG as well as data separation for large, multinational clients across millions of documents hundreds of TB in size.

### Steward Observatory, The University of Arizona

Tucson, Arizona

#### *Postdoctoral Research Associate*

**July, 2012 – September, 2015**

- 2020 Breakthrough Prize in Fundamental Physics Laureate for contributions to the Event Horizon Telescope project on the South Pole Telescope.

## Skills

**Data:** Bayesian statistics, machine learning, natural language processing, Fourier signal analysis, MCMC, record linkage, visualization, large-language model prompt engineering, retrieval augmented generation (RAG)

**Technology:** Docker, Luigi, Azure DevOps Pipelines, Apache Spark, Python, MATLAB, C, SQL, git, BASH, Epic

electronic health record, Microsoft Azure, AWS, Data Robot, Elasticsearch, R, Scala

**Leadership:** Experience organizing and leading workshops and collaboration meetings, Teaching and mentoring junior team members, Public speaking, Agile development, writing/publishing.

## Education

**University of Chicago**, Chicago, IL

- Ph.D., Astronomy and Astrophysics, 2012
- M.S., Astronomy and Astrophysics, 2004

**Northwestern University**, Evanston, IL

- B.A., Physics and Mathematics, 2002