

# CHARLES DAVID WILLIAMS

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Seattle, WA

## SUMMARY

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Data scientist and software developer with 15 years of experience across data science, with research featured in high-impact journals such as *Science* and *PNAS*. Expertise in applying NLP and computer vision models using cloud computing, identifying and adopting innovative techniques from other domains to solve open problems, and framing results to identify meaning for stakeholders. Seasoned speaker and presenter, with experience encompassing more than 20 national presentations and seminars.

## SKILLS PROFILE

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### Technical Tools

- Scientific Python Stack
  - NumPy, SciPy
  - Pandas
  - Matplotlib
- AI/ML Python Stack
  - Scikit-learn
  - Keras, PyTorch
- Mathematica & MATLAB

### Development & Data Analysis

- Agent & Individual Modeling
- Stochastic Simulation
- Dimensionality Reduction
- Data Visualization
- OOP, CI, CD, & TDD
- AI & Neural Network Approaches

### Systems & Platforms

- Distributed Computing
- Containerized Applications
- Python Packaging
- AWS
- GitHub

## EXPERIENCE

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11/2020 – Present

Microsoft

Redmond, WA

*Senior Data and Applied Scientist, Data Intelligence & Design*

- Develop and deploy solutions using predictive modeling and deep learning in Azure.
- Research and introduce new techniques, like distillation to reduce model deployment costs 10x or application of GPT3 to synthetic dataset creation from tiny starting sets. Research and introduce new techniques, like distillation to reduce model deployment costs 10x or application of GPT3 to synthetic dataset creation from tiny starting sets.
- Execute end-to-end data science processes: understanding requirements, exploring large datasets, developing and evaluating models, and delivering a production pipeline implementation.

04/2017 – 10/2020

Allen Institute for Cell Science

Seattle, WA

*Scientist, Modeling & ML Group*

- Managed the full life cycle of novel scientific and engineering projects, defined areas of study addressing the physics of stem cells via multi-scale agent-based and AI/ML models
- Established and led the biophysical modeling team, generating project ideas, planning milestones, and managing staffing requirements, in addition to creating a 5-year plan to support strategic growth
- Designed and implemented 3 [novel scientific libraries](#) to explain observed biological variation and behavior in spreading stem cell colonies and early cardiac muscle cells
- Led the creation of a [versioned data-access API](#) for image data by establishing a partnership with an [open source startup](#) and collaborating with developers to architect integration, enabling reproducible machine learning workflows and increasing external data usage by more than 10 times

- Presented research at national meetings, highlighting the application of biophysical and machine learning principles to microscopy data, reaching audiences of up to 300 attendees
- Employed modern learning principles to develop presentations explaining latent space embeddings of biological shape data, clarifying the inner workings and applications of AI/ML models to a general audience

**09/2014 – 04/2017**

**eScience Institute, University of Washington**

**Seattle, WA**

*Moore-Sloan Data Science Postdoctoral Fellow*

- Designed computational algorithms and built robotic systems to collect and process high-speed X-ray images of muscles in a synchrotron particle accelerator
- Created a machine vision [package](#) to automatically extract information from X-ray diffraction images, reducing analysis and processing times from weeks to minutes, and built a robotic apparatus for remote manipulation of tissues to enable image collection
- Taught biophysics and computer science classes, introducing more than 300 graduate students to the basics of data science and modern software development methodologies
- Offered guidance on student projects with techniques including agent models, model reduction, and evolutionary programming, helping students go on to achieve admission to desired doctoral programs or postdoctoral positions

**06/2012 – 09/2014**

**Harvard University**

**Cambridge, MA**

*NSF Mathematical Biology Postdoctoral Fellow*

- Investigated the interaction between visual perception and navigation during animal flight by creating custom electronic tracking sensors and analyzing the resulting data in order to enable bio-inspired algorithm design for low-power drone navigation systems
- Assessed path planning in pigeons by developing new rigid-body characterizations of spatial networks and evaluating inertial and aerodynamic reaction forces
- Tested obstacle avoidance in hummingbirds, developing a VR flight chamber and the accompanying graphics to simulate visual responses
- Received recognition by NPR, BBC News, National Geographic, and other publications for the clear narratives of these projects and the broad appeal of the accompanying images

**08/2006 – 06/2012**

**University of Washington**

**Seattle, WA**

*Graduate Research Assistant*

- Created and published some of the first [spatial graph models](#) of muscle protein interactions
- Invented apparatuses to investigate muscle properties, utilizing microcontroller automation and 3D rapid prototyping
- Built one of the university's first AWS clusters, and became a subject matter expert on the application of AWS to scientific research, offering training and guidance throughout the scientific community
- Developed expertise in Python and taught seminars on how to use Python for scientific software development and automating data collection

## EDUCATION

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**PhD, Biophysics**

**University of Washington**

**Seattle, WA**

**BA, Physics**

**Reed College**

**Portland, OR**