Andrew Spott

Physicist turned Machine Learning researcher

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With a doctorate in theoretical quantum physics, I bring extensive technical skill to bear on difficult problems both in business and in science.

Experience

2021-2023 **Head of Data Science**, *Submittable*

Submittable produces a software platform that helps thousands of organizations worldwide launch, manage, and measure social impact programs, including grant management and proposal reviews.

- I led the data science and auto-review efforts for several large government projects. Led team in development of custom data analytics for optimizing the distribution of funds and direct money based on specifications. Developed automatic review code which scored grant proposals according to rubrics. Used extracted external data to validate proposal claims.
- I worked with marketing and product development on constructing larger enterprise deals, some of which include data science and analytics services for our customers.
- I led machine learning team in developing data products within the Submittable platform. I served as engineering manager and product manager, creating cutting-edge machine learning and data-driven products. I led our customer data analytics initiative, providing custom reports that show value of platform and contribute to additional sales.
- I built and led the partnership that created an AI product to reduce grant proposal review workloads. Product takes a sample of manual reviews and builds models for autonomous review.

2017-2021 **Head of Data Science**, *TruU Inc.*

TruU is a leading provider of passwordless authentication at the enterprise level. In three years I built a data-science team and collected our initial behavioral biometrics. My team designed the data pipeline from the ground up: from the initial development of our iOS application for data collection, to the initial model development of our behavioral biometrics, to the inference engine in production.

- **Model Development**: I designed and developed our prototype gait biometric, including a novel Wavelet Spectrogram layer, the data collection spec, the "walk/not-walk" signal decision model, and the initial model using pytorch and deep learning.
- **Datascience Support Infrastructure**: I managed our data science compute cluster which was used for all research compute needs and production model batch training. I wrote a majority of the internal deep learning library which leveraged LMDB to ease use of out-of-memory data.
- **Leadership**: I led a team of 2-4 data scientists in the development of two other biometrics, along with the continued development of the gait biometric. This included technical advising, strategic planning and management.
- **Technical Skills**: I continually leverage my broad skillset to keep the data science team on track and progressing. My IT skills have been used in the management of our local compute cluster. I have used Python and Julia for general data analysis and model development, C++ for model deployment, and Swift for the initial data collection app development. I have managed postgresql databases and used kibana to develop visualizations and dashboards for data collection monitoring.

2015 **Data Science Intern**, *Cognilytics, Centurylink*, Denver

- **Data Science:** Preliminary analysis of anomalous network traffic for network security applications using raw packet captures with support vector machines, recurrent neural nets and random forests.

2011–2017 **Research Assistant**, *University of Colorado Boulder*

- Developed a complex mathematical model to solve the time dependent Schrödinger equation (TDSE) in a field-free energy basis. The code was developed using PETSc and Boost MPI in C++14, with an approximate size of 10kloc. During this time, I also worked on developing our groups FDTD Schrödinger equation solver.
- Created a data analysis package for the above TDSE solver output using pandas, numpy, scipy and matplotlib.

2010–2017 **Teaching Assistant**, *University of Colorado Boulder*

Taught a wide variety of introductory physics classes. Demonstrated a strong ability to take complex mathematical concepts and explain them intuitively.

Education

2010–2017 **University of Colorado Boulder**, *School of Arts and Sciences*

- ◇ **Ph.D.** Physics, *Perturbative and ab-initio calculations of the electrical susceptibilities of atoms*
- ◇ **Masters of Science** Physics, 2013

2004–2010 **University of Washington**, *School of Arts and Sciences*

- ◇ **Bachelor of Science** Physics.

Side Projects

A C++ wrapper around the C Library PETSc

petsc-cpp *https://github.com/spott/petsc-cpp*

- ◇ An object oriented wrapper around PETSc for faster and safer PETSc development. The wrapper includes RAII types, operator overloading where it makes sense, and simpler interfaces to common tasks.

Data Science: NumPy, SciPy, Pandas, Bokeh, Pytorch, Matplotlib

Languages: Python, C/C++/C++14, Swift, Julia, Bash/ZSH, SQL, Elasticsearch, LMDB

Selected Publications and Patents

US Patent 2022 #US20220382845A1 *Supervised and Unsupervised Techniques for Motion Classification*
L. Budman, A. Agrawal, A. Spott

US Patent 2021 #US20200302722A1 *Machine Learning-Based Platform For User Identification*
L. Budman, A. Agrawal, A. Spott, M. Graf

US Patent 2021 #US20210248219A1 *Integrated Quality Assessment for a Passive Authentication System*
L. Budman, A. Agrawal, A. Spott, J. Carli

US Patent 2021 #US20220182379A1 *Context-Based Risk Assessment for an Identity Verification System*
L. Budman, A. Agrawal, O. Rodak, A. Spott

US Patent 2021 #US20210256789A1 *Detecting Intent of a User Requesting Access to a Secured Asset*
D. Pasirstein, J. Welch, A. Spott, L. Budman, A. Agrawal, N. Hacking

Phys. Rev. A 2017 *Time-dependent susceptibility of helium atom in intense laser pulses*
A. Spott, A. Jaron-Becker, and A. Becker

Phys. Rev. A 2015 *Transition from perturbative to nonperturbative interaction in low-order-harmonic generation*
A. Spott, A. Becker, and A. Jaron-Becker

Phys. Rev. A 2014 *Ab initio and perturbative calculations of the electric susceptibility of atomic hydrogen*
A. Spott, A. Jaron-Becker, and A. Becker

Optics Express 2010 *Silicon-on-sapphire integrated waveguides for the mid-infrared* Optics Express
T. Baehr-Jones, A. Spott, R. Ilic, **A. Spott**, B. Penkov, W. Asher, and M. Hochberg