DAVE SPIEGEL, Ph.D.

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SUMMARY

As an R&D Data Scientist at Sum Labs, and previously as a computational and theoretical astrophysicist, I have extensive experience in numerical modeling, statistical analysis, and visualization of large data sets. I have worked effectively in diverse teams including non-technical people (designers, user-experience experts), technical people of different backgrounds (mechanical engineers, firmware engineers, back-end software engineers), and clinical advisors. I have taught, published broadly (over 40 papers with 1500 citations), and given nearly 100 lectures at universities, conferences, and fundraising events around the world.

SKILLS

software: Python, Matlab, C, scikit-learn, statsmodels, SQL, PySpark, familiarity with C++, Mathematica
mathematical: classification, regression, clustering, filtering, digital signal processing, numerical solutions of differential equations

EXPERIENCE

Stitch Fix   **San Francisco, CA**

Data Scientist   *August 2015 — Present*

I'm on the Algorithms team at Stitch Fix, working on helping the company better understand our inventory and our clients. We have a unique blend of human stylists and data-driven algorithmic processes, and my role is to help the company make optimal decisions and ultimately provide an excellent experience for our clients. I thrive working on cross-functional teams and bringing the tools of machine learning to bear on economic decisions and business strategy.

Sum Labs   **Manhattan, NY**

R&D Data Scientist   *September 2014 — May 2015*

I joined Sum Labs when there were 20 employees and had the opportunity to help the company nearly double in size in the last year. I work on problems from hardware to firmware to back-end data analytics, using skills from physics, engineering, and machine learning. I have also managed external contractors and relationships with medical and physiological experts. I enjoy working with excellent colleagues who share common values.

- Developed activity-recognition for wrist-based wearable by using machine learning techniques to classify accelerometer/gyro data.
- Led team that developed Gaussian Process Regression technique for improving the accuracy of heartrate determination (publication in prep).
- Developed and wrote the firmware for wrist-worn optical heartrate determination algorithm that outperforms industry-standard wrist heartrate monitor for heartrate variability at rest.
- Optimized the LED wavelength and positioning for wrist-worn photoplethysmography (PPG) when fingers are in motion.
- Provisional patent for low-energy method of determining respiration from PPG.
- Consulted with team working to explore the possibility of determining blood pressure from PPG.

Institute for Advanced Study   **Princeton, NJ**

Research Member, W.M. Keck Fellow   *September 2011 — July 2014*

As an astrophysicist at IAS, and at Princeton University and Columbia previously, I made fundamental contributions to exoplanetary science, and at the same time tried to give back to the community by volunteering to teach families about astronomy, by teaching in prisons, and by giving numerous public talks. A highlight of my time in astro was developing an essentially optimal solution to the oldest problem in computational astrophysics — the problem of numerically calculating trajectories of objects under the influence of a force.

- Co-developed a nearly-optimal algorithm for calculating trajectories of objects under the influence of forces (open source, with simple Python bindings).
- Developed the most widely-used set of ~40,000 atmosphere spectrum models for observations of young Jupiter-like planets.
- Led independent research in astrobiology, statistical astrophysics, and cosmology, with analytic and numerical approaches.
- Ran the Princeton Astrophysics Undergraduate Summer Research Program (USRP) for 3 years (summers of 2011-2013).
- Designed and taught a research course for Princeton astrophysics undergraduates in USRP.
- Designed and taught a course in Astrobiology at Quest University.
- Reviewed NASA grant applications and observing proposals for major telescopes.
- Peer reviewed ~12 papers per year for top journals in astrophysics and astrobiology.
- Taught algebra, precalculus, and astronomy in 3 New Jersey prisons.

Princeton University Department of Astrophysical Sciences   **Princeton, NJ**

Postdoctoral Research Fellow   *August 2008 — August 2011*

- Led independent research projects in atmospheric radiative transfer, stellar structure and evolution, and habitability.
- Developed visualization software for hydrodynamical models of atmospheres.
- Developed the first set of realistic atmosphere models of Neptune-class exoplanets and the first models of planets visible to *Kepler*.
- Guided undergraduate research projects that led to 4 coauthored papers.

Columbia University   **New York, NY**

Graduate Research Fellow   *2001-2008*

- Developed and ran thousands of climate models to redefine our concept of the habitable zone.
- Identified a major mystery: that the early universe appeared to be deficient in atoms.
- Won the "Outstanding Teaching Assistant Award".

Scripps Institution of Oceanography   **La Jolla, CA**

Predoctoral Researcher   (performed statistical analysis of climate models)   *2000 — 2001*

MIT, Center for Space Research and NASA Goddard   **Cambridge, MA; Greenbelt, MD**

Scientific Programmer   (used images from Mars Global Surveyor to build coordinate system database)   *1999 — 2000*

Harvard School of Public Health   **Boston, MA**

Summer Researcher   (measured cell stiffness with magnetometry)   *1996, 1997*

EDUCATION

Columbia University	**Ph.D., Astronomy, 2008**		**New York, NY**
Amherst College	**B.A., Mathematics, 1999**	(*summa cum laude*)	**Amherst, MA**