

David B. Ruffner

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Summary

Physics PhD and Vice-President of R&D with 11+ years experience in a scientific instrument startup. Successfully commercialized technology with sales to major pharma and semiconductor companies. Used curiosity and empathy to cultivate effective, continually learning teams and worked with them to iteratively improve our devices. Intent on using technical and organizational skills to solve environmental sustainability problems.

Experience

2017- present **Spheryx, Inc.** *Vice President of Research and Development*

- Lead R&D efforts across the company. Iteratively improved Spheryx particle characterization instruments leading to sales at top pharmaceutical and semiconductor companies.
- Supervise and mentor direct reports. My mentees have excelled including one who went from intern to Director of Scientific Software and four who went on to graduate school.
- Initiated and led transition to agile processes: Kanban to track progress on long running research projects, and a Scrum style process to limit work-in-progress for software team.
- Encourage an atmosphere of learning through documenting, asking questions, training others and encouraging the team to teach others.
- Use optics expertise to identify and resolves sources of aberration and noise in our optical system.
- Develop our software application: created wizard for training our sample loading robot, built visualization tools for internal and customer use, contributed to a compliant version of our software satisfying 21 CFR p11 requirements.
- Improve speed and robustness of our data analysis. Trained a machine learning object detection model to increase recall from 72% to 92% on challenging test data.

2015-2017 **Spheryx, Inc.** *Director of Analytical Services*

- Played key role in start-up company as first employee. Designed and setup lab for particle characterization. Trained new employees and interns.
- Developed commercial holographic particle characterization instrument from academic prototype.
- Measured customer samples using our new technology and created reports detailing our results.
- Sped up academic data analysis code by 180x and built user-friendly interface for controlling our device.

- Contributed to successful SBIR grant applications to NSF and NIH

Education

- 2015** **PhD physics, New York University**, New York, NY, USA
Dissertation: *Optical Forces in Complex Beams of Light*
Advisor: Prof. David G. Grier
- 2009** **BA physics, Rutgers University**, New Brunswick, NJ, USA

Selected Publications

- T. Marcus, J. Lumer, R. Stasavage, D. B. Ruffner, L. A. Philips, F. C. Cheong, "Monitoring polysorbate 80 degradation in protein solutions using Total Holographic Characterization", *International Journal of Pharmaceutics* **652**, 123843 (2024).
- R. E. Cavicchi, L. A. Philips, F. C. Cheong, D. B. Ruffner, P. Kasimbeg, W. Vreeland, "Distribution of average aggregate density from stir-stressed NIST mAb protein", *Journal of Pharmaceutical Sciences* **111**, 1614 (2022).
- D. B. Ruffner, F. C. Cheong, J. M. Blusewicz, L. A. Philips, "Lifting degeneracy in holographic characterization of colloidal particles using multi-color imaging", *Optics Express* **26**, 13239 (2018).
- D. B. Ruffner and D. G. Grier, "Optical conveyors: A class of active tractor beams", *Phys. Rev. Lett.* **109**, 163903 (2012)

Honors and Recognition

- 2014** The NYU Graduate School of Arts and Science Dean's dissertation fellowship
- 2012** Article on NewScientist.com: "Tractor beam built from rings of laser light"

Professional Affiliations

- 2009 - present** Member: American Physical Society
- 2011-2012** Organizer: New York Academy of Science's Gotham-Metro Condensed Matter Conference

Skills

- **Programming:** Python, git/jj, SQL, scheme, HTML/CSS/JS, CUDA, C/C++
- **IT:** bash, PowerShell, Ansible, Google Workspace admin, Linux
- **Machine learning:** Pandas, PyTorch, Tensorflow, OpenCV, Scipy, DVC, scikit-learn
- **Agentic AI:** OpenCode, Ollama, OpenRouter
- **Data visualization:** matplotlib, Dash, Plotly
- **Social/organizational:** Scrum/Kanban, Non-Violent Communication, sociocracy

Other Activities

- 2025 – present** Member of Peer Support across Practices sociocracy community
- 2025 - present** Coach for Rutherford recreational soccer