

Tobias Brown-Heft, Ph.D.

Metrology Software & Algorithm Engineering

Los Angeles, CA · Consulting & full-time roles · Remote or Los Angeles-based

tobiasbrownheft.xyz/contact/ · github.com/tbrownhe · linkedin.com/in/tobias-brown-heft

Experimental physicist and software engineer with responsibility for optical experiments, magnetic thin-film epitaxy, industrial CVD/ALD tools, novel BEOL films, and automated inspection. Builds metrology algorithms and applications grounded in the demands of delivering experimental and manufacturing results.

EXPERIENCE

HRL Laboratories

2022–present

Metrology Group Lead / Senior Optical Metrology Engineer

- Developed defect-to-design analysis using inspection coordinates and layout geometry. Reproduced a senior engineer's manual Excel conclusion while reducing analysis from hours to seconds.
- Built image-registration tools, reusable SQLAlchemy inspection-data libraries, and PyQt applications; packaged software for other engineers. Automation reduced manual analysis effort by more than 80%.
- Developed optical models, calibration methods, and qualified metrology recipes; connected statistical monitoring and Python/SQL analysis to manufacturing feedback.

Transphorm

2021–2022

Senior Product Engineer

- Automated optical-inspection defect classification and wafer grading, validated against engineer-reviewed populations and known wafer dispositions.
- Achieved greater than 95% wafer-grading accuracy and saved over 1,000 labor hours annually by shifting review toward exceptions.

Intel · Components Research

2018–2021

Research Engineer

- Developed spectroscopic ellipsometry models for novel semiconductor materials on 300 mm wafers, including film thickness, optical constants, and optical band gap; transferred models into inline metrology.
- Owned industrial CVD/ALD tools through bring-up, qualification, and process stabilization; developed novel BEOL films and contributed to four U.S. patents.

UC Santa Barbara

2013–2018

Graduate Researcher, Materials — Grew and characterized epitaxial magnetic thin films. Built a vacuum-compatible MOKE magnetometer with LabVIEW acquisition and MATLAB analysis.

University of Oregon

2010–2013

Undergraduate Researcher, Atom Optics — Laser systems, interferometric wavemeter calibration, electronics, and instrument-control software.

SELECTED PUBLIC SOFTWARE

AGNN defect detection: attention-guided autoencoder workflow with simulated inspection examples.

ParseTrail: open-source desktop finance application with statement parsers, local analysis, and supporting web services.

EDUCATION & METHODS

Ph.D., Materials · UC Santa Barbara, 2018

B.S., Physics, summa cum laude · University of Oregon, 2013

Python · NumPy/SciPy · OpenCV · SQL/SQLAlchemy · PyQt · MATLAB · LabVIEW · JMP/JSL · Git · Docker
Optical modeling · Computational geometry · Image registration · Measurement validation · Statistical process control

Eight peer-reviewed publications and four U.S. patents. Project details and full background:
tobiasbrownheft.xyz/background/