

Exponent®
Engineering & Scientific Consulting

Therice Morris, Ph.D.

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Professional Profile

Dr. Morris' background is in electrical and optical engineering. She has extensive experience in computer and data sciences including complex data management, analytics, and visualization for many industries such as for utilities asset evaluation and management, user experience studies, health sciences, and consumer software/electronics.

Dr. Morris applies her expertise in engineering and risk management to build robust custom software solutions that integrate into customer databases and data pipelines. From data collection and ETL operations to visualization and documentation, she ensures data and software quality and ease-of-use are central in her design process in order to provide clear, actionable insights to clients. Her programming language experience includes Python, R, SQL, MATLAB, and DAX, and she has built dashboards in Tableau and Power BI.

Dr. Morris also brings considerable experience to projects requiring optical and electrical engineering expertise. She has performed numerous DFMEAs and optical hazard evaluations of consumer electronic devices with optical emitters. In addition, she has developed and carried out testing plans for DFMEA validation and de-risking.

Before joining Exponent, Dr. Morris developed and tested the first polarization-maintaining hollow-core fiber-optic gyroscope as a graduate student at Stanford University. During this work, she also developed new computational models in MATLAB and Python to understand and optimize this complex opto-electrical system. Her research experience spans the areas of lasers, fiber optics, optical sensing, and electrical and optical instrumentation. She has designed and built fiber optic and electro-optical systems for navigational sensing, performed optical validation and design for telecommunications applications, and has extensive experience with laser and broadband illumination systems.

Dr. Morris' areas of expertise include:

- Software development and quality
- Data analytics and validation
- Data storytelling, visualizations, and dashboards
- Data pipelines (ETL)
- Design reviews and DFMEAs of optical devices
- Optical hazard and failure mode testing
- Fiber optics

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Academic Credentials & Professional Honors

Ph.D., Electrical Engineering, Stanford University, 2020

M.S., Electrical Engineering, Stanford University, 2016

Sc.B., Electrical Engineering, Brown University, 2013

Tau Beta Pi, 2013

Licenses and Certifications

Certified Software Quality Engineer (CSQE)

Prior Experience

Engineering Intern, Finisar, 2018

Technical IP Clerk, Jenkins, Wilson, Taylor, & Hunt, 2013

Professional Affiliations

Optical Society of America (OSA), Member

SPIE, Member

Publications

Morris TA, Digonnet MJF. Discrete model of backscattering drift in fiber optic gyroscopes. Journal of Lightwave Technology 2020; 2969177.

Morris TA, Digonnet MJF. Broadened-laser-driven polarization-maintaining hollow-core fiber optic gyroscope. Journal of Lightwave Technology 2019; 294923.

Morris TA, Wheeler JM, Grant MJ, Digonnet MJF. Advances in optical gyroscopes. SPIE EWOFS 2019; 111990T.

Morris TA, Zawada AN, Garcia D, Wheeler JM, Digonnet MJF. Optimization of the Angular Random Walk in Laser-Driven Fiber-Optic Gyroscopes. IEEE Sensors Journal 2022; 3136087.

Project Experience

Data and Computer Science

- Built custom software packages in R and Python for client data pipelines
- Performed rigorous software and data testing and validation for public power utilities
- Wrote software specifications and quality documentation for regulatory bodies, including the FDA
- Constructed a data pipeline from collection through reporting for user interaction studies
- Reviewed software patents and source code for patent, copywrite, and/or trade secret infringement

Electrical and Optical Engineering

- Assessed optical hazard of consumer electronic devices through both Zemax modeling and testing
- Evaluated the risk of single-point failures in a DFMEA framework for consumer electronic devices with optical emitters, including evaluating custom ASIC design

Peer Reviews

Journal of Lightwave Technology