

Exponent®
Engineering & Scientific Consulting

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Professional Profile

Dr. Scott is a physicist with over 20 years of experience in scientific research on topics including complex electronic, magnetic, and optical interactions, control systems, and quantum mechanical phenomena. He applies his expertise to the investigation of a wide range of technologies including consumer electronics, software controls, computer hardware, and industrial power distribution.

At Exponent, Dr. Scott provides scientific consultation for clients on matters ranging from litigation support and failure analysis, to product development and technical analysis of designs or proposals in relation to suitable industry standards.

Dr. Scott provides scientific and technical support to litigation involving intellectual property disputes, international arbitration, class-action lawsuits, and trade secret disputes. He has supported these matters by performing analyses of computer hardware components including computer processors and memory, mobile devices, integrated circuits (ICs) and semiconductor components, light emitting diodes (LEDs), solar cells, smart home devices, industrial control systems, optical sensing components, network security systems, LiDAR, and medical devices. He has also supported these matters by performing source code analysis and reviewing control software embedded in hardware devices.

Dr. Scott also provides an array of professional technical services to aid in product development and engineering applications including advising clients on matters of product reliability and performing root-cause failure analysis of multi-component systems. For instance, he has conducted investigations relating to Bluetooth communication, infrared thermometry, semiconductor chip manufacturing facilities, industrial power generation facilities, and thermal management of lighting systems and hand held mobile devices (i.e., analysis of heat generation and dissipation). His services also include both quantitative modeling and onsite measurements of electromagnetic fields for power transmission and offshore wind farms, the results of which have been used for EMF exposure assessments.

Dr. Scott additionally has extensive experience performing cause-and-origin assessments of fires, including those that may be related to arc-flash hazards, electrical wiring, and lithium ion batteries. He is also experienced investigating the technical aspects of claims relating to floods, explosions, and natural disasters.

Prior to joining Exponent, Dr. Scott worked as a research scientist at Nokia Bell Laboratories where, as the principal investigator for a low temperature experimental research effort, he engineered a sophisticated control system incorporating an extensive array of instrumentation designed to probe highly correlated electron states leading to collective effects (e.g., phase transitions) in magnetic nanostructures. He additionally advised management on quantum computing methodologies and quantum information processing applications aligned with their business strategies.

Dr. Scott worked as a postdoctoral research scientist at Rice University after receiving his Ph.D. in

physics at UCLA where he studied charge transport in metallic nanogap devices, single molecule transistors, and electrostatically defined semiconductor quantum dots. He has broad practical experience with a large range of semiconductor and nanofabrication processing techniques including lithographic processes and thin film deposition/etching. Dr. Scott has considerable experience with cryogenic systems, and related vacuum equipment, in addition to a variety of material characterization techniques including SEM, AFM, and STM. He is also highly skilled with data acquisition via data flow programming (e.g., LabVIEW) and quantitative data analysis techniques, and he has worked extensively with finite-element based modeling for micromagnetic simulations.

Academic Credentials & Professional Honors

Ph.D., Physics, University of California, Los Angeles (UCLA), 2007

M.S., Physics, University of California, Los Angeles (UCLA), 2001

B.S., Physics, University of California, Santa Barbara, 2000

W. M. Keck Postdoctoral Fellowship, 2007, 2008, 2009

Licenses and Certifications

Certified Fire and Explosion Investigator (CFEI)

Prior Experience

Research Scientist/Member of Technical Staff, Bell Labs, 2010-2017

Postdoctoral Research Fellow, Rice University, 2007-2010

Professional Affiliations

American Physical Society (APS) – member

American Chemical Society (ACS) – member

Institute of Electrical and Electronics Engineers (IEEE) – Senior member

National Association of Fire Investigators (NAFI) – member

Patents

Unites States Patent 9852833: Magnetization alignment in a thin-film device, 2017.

Publications

D'Andrade B, Scott GD. (2025). Health and Safety Advances in Power Engineering. In: The Sustainable Power Grid: Challenges, Applications, and Case Studies, Elsevier Publishing; DOI: 10.1016/B978-0-443-13442-5

Scott GD, Pooley MA, Ocola PL. (2024). Quantum Computation: From Hardware Challenges to Software Engineering Tools and Technologies. In: Computer Engineering Applications in Electronic, Biomedical, and Automotive Systems, Nova Science Publishers; DOI: 10.52305/XATK7438

Scott GD, Pooley MA, Cotts BRT. Numerical and Analytical Modeling of Electromagnetic Fields From

Offshore Power Distribution Cables. IEEE Transactions on Magnetics 2023; 59:5900105.

Pooley M., Scott GD., Souri SJ., Practical Pitfalls of Regulating Technology, Exponent Thought Leadership. February 18, 2021.

Scott G., Sorini A., PyLocky Ransomware Source Code Analysis. IEEE Symposium on Product Compliance Engineering Proceedings. Portland, OR (Virtual). November, 2020.

Scott G., Pooley M., Murphy P., Infrared Thermometry Amid the COVID-19 Pandemic, Exponent Thought Leadership. July 30, 2020.

Scott GD, Hu T-C. Gate-controlled Kondo effect in a single-molecule transistor with elliptical ferromagnetic electrodes. Physical Review B 2017; 96:144416.

Scott GD, Hu T-C. Controlled Electrode Magnetization Alignment in Planar Elliptical Ferromagnetic Break Junction Devices. Journal of Applied Physics 2016; 120:164311.

Scott GD. Electrode Design for Antiparallel Magnetization Alignment in Nanogap Devices. IEEE Transactions on Magnetics 2016; 52:9600104.

Arvidson RS, Fischer C, Sawyer DS, Scott GD, Natelson D, Lüttge A. Lateral Resolution Enhancement of Vertical Scanning Interferometry by Sub-Pixel Sampling. Microscopy and Microanalysis, 2014; 20:90-98.

Scott GD, Natelson D, Kirchner S, Muñoz E. Transport Characterization of Kondo-Correlated Single Molecule Devices. Physical Review B 2013; 87:241104(R).

Scott GD, Natelson D. Kondo Resonances in Molecular Devices. ACS Nano 2010; 4:3560-3579.

Scott GD, Palacios JJ, Natelson D. Anomalous Transport and Possible Phase Transition Palladium Nanojunctions. ACS Nano 2010; 4:2831-2837.

Scott GD, Keane ZK, Ciszek JW, Tour JM, D. Natelson D. Universal Scaling of Nonequilibrium Transport in the Kondo Regime of Single Molecule Devices. Physical Review B, 2009; 79:165413.

Jiang HW. Yablonovitch E, Xiao M, Sakr MR, Scott GD, E. T. Croke ET. Single Electron Spin Measurements in Si-Based Semiconductor Nanostructures, chapter in book entitled Electron Spin Resonance and Related Phenomena in Low Dimensional Structures Fanciulli M, Editor, Springer-Verlag, TAP series 2009; 115.

Ward DR, Scott GD, Keane ZK, Halas NJ, Natelson D. Electronic and Optical properties of Electromigrated Molecular Junctions. Journal of Physics: Condensed Matter 2008; 20:374118.

Zhang XC, Scott GD, Jiang HW. NMR Probing Spin Excitations in the Ring Structure of a Two-Subband System. Physical Review Letters 2007; 98:246802.

Scott GD, Xiao M, Croke ET, Yablonovitch E, Jiang HW. Sputtered Gold as an Effective Schottky Gate for Strained Si/SiGe Nanostructures. Applied Physics Letters 2007; 90:032110.

Scott GD, Chichak K, Peters A, Cantrill SJ, Stoddart JF, Jiang HW. Mechanism of Enhanced Rectification in Unimolecular Borromean Ring Devices. Physical Review B 2006; 74:113404.

Selected Presentations

Scott G., Sorini A., "PyLocky Ransomware: Exploiting Implementation Errors." IEEE Symposium on Product Compliance Engineering Proceedings. Portland, OR (Virtual). November, 2020.

Scott G., Pooley M., Crump C., Lively E., McLean S. Critical Decision-Making and COVID-19: Contact Tracing, Temperature Checks, and Human Factors in the Workplace. Exponent Live Webinar. June 24, 2020.

Scott GD, Natelson D, Kirchner S, Muñoz E. Transport characterization of Kondo-correlated single molecule devices, Invited Presentation, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany, 2013.

Scott GD, Hu T-C. Kondo-correlated transport in single molecule ferromagnetic break junction devices with controllable electrode magnetization alignment, Contributed Presentation, March Meeting of the American Physical Society, Baltimore, MD, 2016.

Scott GD, Natelson, D. Conductance scaling and Kondo correlations in single molecule transistors, Contributed Presentation, March Meeting of the American Physical Society, Boston, MA, 2012.

Project Experience

Failure Analysis

- Root cause failure analysis of Bluetooth-enabled integrated circuits
- Root cause failure analysis of blood alcohol sensors
- Technical Analysis of thermal management capabilities and implementations in hand held portable electronic devices
- Root cause analysis of processing failures in a semiconductor device fabrication foundry

Consumer Electronics

- Engineering review and assessment of the design, development, and performance of technical home health products
- Implementation and oversight of user studies for electronic products
- Technical analysis of components and manufacturing processes for portable electronic devices such as smartphones

EMF Field Analysis

- Analytical model calculations of anticipated magnetic and electric field from planned power distribution equipment
- Calculation of radiation patterns for microwave tower links
- Onsite measurements of magnetic and electric fields

Fire and Explosion Investigation

- Root cause analysis of warehouse fire involving automated systems
- Root cause analysis of fire/explosion involving power transmission equipment
- Root cause analysis of fire/explosion involving consumer electronic products and associated batteries
- Flood damage assessment to electrical instrumentation, communication systems, and networking equipment

Legal Matters and Intellectual Property

- Patent Infringement analysis of LED lighting products
- Patent Infringement analysis of Smart Control System products
- Patent Infringement analysis of transportation safety systems
- Patent Infringement analysis of wireless telecommunication infrastructure and devices
- Patent validity investigations relating to LiDAR systems
- Technical investigation of product manufacturer's Reliability Engineering practices for a portable electronic device, as related to a class action lawsuit
- Patent analysis relating to semiconductor products with opto-electronic capabilities
- Patent analysis relating to medical devices
- Patent Infringement analysis of network security systems
- Patent Infringement analysis of malware protection systems
- Investigation and review of electrical engineering issues related to the design and installation of wireless network systems in a major transportation hub
- Technical analysis of design-related issues at nuclear power plants

Peer Reviews

Nature Nanotechnology

Nature Communications

Nano Letters

Journal of the American Chemical Society (JACS)