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Engineering & Scientific Consulting

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Professional Profile

Dr. Sinenian has expertise in the fields of applied physics, electrical engineering & computer science and nuclear engineering. He has advised corporate leadership and management on business and technical matters in the automotive, consumer electronics, defense, and medical device industries in the United States, Asia and Australia. Dr. Sinenian has also served as an advisory technical expert to assist clients engaged in disputes in the United States and around the world. He has experience advising clients in matters pertaining to intellectual property, trade secrets, product liability, US ITC investigations, and global disputes (international arbitration), including certain technical aspects of large capital projects involving energy, mining, and transportation.

Dr. Sinenian has experience in the analysis and design of circuits and systems for a wide range of applications, including control systems and instrumentation, power converters, and radio-frequency systems. He has conducted investigations and design reviews of electronic systems to assist clients during product development, to conduct failure analysis, and in various litigation contexts.

Dr. Sinenian also has extensive experience in machine learning, data analytics and algorithm development and analysis. He has experience applying clustering, regression and deep-learning techniques to large datasets to draw actionable insights and for predictive modeling applications. He has analyzed dynamic control algorithms in embedded systems and products in the context of failure analysis and assisted clients with software and signal processing related matters in trade secret and intellectual property litigation. He is proficient in numerous languages, including C, C++, Java and Python. Dr. Sinenian is actively involved open-source software development and is the co-author of a book on data structures and algorithms.

Dr. Sinenian has research experience in the area of plasma physics and its applications in propulsion and fusion. In his earlier studies, he designed and built a novel compact radio-frequency driven plasma thruster for small satellite applications. As part of this work, he built plasma diagnostics and used them to characterize the performance of the thruster with argon and nitrogen propellants. In his doctoral research, Dr. Sinenian built nuclear instrumentation and used it to study aspects of laser inertial fusion in support of the national laser fusion program. As part of this work, he led a team that built an ion accelerator laboratory and used it to develop and calibrate nuclear instruments for use on the OMEGA and the National Ignition Facility laser systems. Dr. Sinenian's dissertation focused on using measurements of fast ions produced in inertial fusion experiments to diagnose the performance of fusion implosions.

Academic Credentials & Professional Honors

Ph.D., Massachusetts Institute of Technology (MIT), 2013

M.S., Electrical Engineering and Computer Science, Massachusetts Institute of Technology (MIT), 2008

M.S., Nuclear Science and Engineering, Massachusetts Institute of Technology (MIT), 2008

B.S., Physics, University of California, San Diego, 2005

UCSD Physics Best Project (Winter 2005): GPS-navigated Autonomous Rover

UCSD Marshall College Provost's Honors

Licenses and Certifications

Machine Learning Engineer (Udacity #3GS5TRNQ)PADI Advanced Open Water Diver

PADI Enriched Air Diver

Languages

Armenian

Publications

Sinenian, N. and Shai, D., Chapter 3: Advances in Power Converters. D'Andrade Brian W. (Editor), The Power Grid: Smart, Secure, Green and Reliable. Book, ISBN 978-0-12-805321-8, 2017.

Jagannathan S, Sinenian N. Algorithms and data structures in Python. ISBN: 9781502378712. 2014.

Sinenian N, Manuel M J-E, Frenje, JA, et al. An empirical target discharging model relevant to hot-electron preheat in direct-drive implosions on OMEGA. Plasma Physics and Controlled Fusion 2013; 55(4).

Sinenian N, Zylstra AB, Manuel M, et al. A multithreaded modular software toolkit for control of complex experiments. Computing in Science and Engineering 2013; 15(1):65.

Sinenian N, Theobald W, Frenje JA, et al. Proton emission from cone-in-shell fast-ignition experiments at Omega. Physics of Plasmas 2012; 19(11):112,708.

Sinenian N, Fiksel G, Frenje JA, et al. Heavy-ion emission from short-pulse laser-plasma interactions with thin foils. Physics of Plasmas 2012; 19(9):093,118.

Sinenian N, Zylstra AB, Manuel MJ-E, et al. Total energy loss to fast ablator-ions and target capacitance of direct-drive implosions on OMEGA. Applied Physics Letters 2012; 101(11):114,102.

Sinenian N, Manuel MJ-E, Zylstra AB, et al. Upgrade of the MIT Linear Electrostatic Ion Accelerator (LEIA) for nuclear diagnostics development for Omega, Z, and the NIF. Review of Scientific Instruments 2012; 83(4):043502.

Sinenian N, Rosenberg MJ, Manuel M, et al. The response of CR-39 nuclear track detector to 1-9 MeV protons. Review of Scientific Instruments 2011; 82(10).

Presentations

Sinenian N. An empirical target discharging model for direct-drive implosions on OMEGA. 54th Annual Meeting of the APS Division of Plasma Physics, Providence, RI, November 2, 2012.

Sinenian N. Measurements of deuteron ablator-ion energy spectra for studies of energy-loss and preheat in direct-drive implosions on OMEGA. Doctoral Seminar at the Plasma Science & Fusion Center, MIT, Cambridge, MA, December 13, 2011.

Sinenian N. Measurements of the ablator-ion energy-loss channel in direct-drive implosions on OMEGA. 53rd Annual Meeting of the APS Division of Plasma Physics, Salt Lake City, UT, November 14, 2011.

Sinenian N. Implementation of a Thomson Parabola for improved fast-ion measurements and nuclear physics studies. Laboratory for Laser Energetics Theory Group Meeting, Rochester, NY, September 27, 2011.

Sinenian N. Observations of energetic protons in recent integrated fast-ignition experiments at the OMEGA Laser Facility. Doctoral Seminar at the Plasma Science & Fusion Center, MIT, Cambridge, MA, November 11, 2010.

Sinenian N. The role of nuclear particles at OMEGA, OMEGA EP, and the NIF. Doctoral Seminar at the Plasma Science & Fusion Center, MIT, Cambridge, MA, October 28, 2009.

Project Experience

Dr. Sinenian has over 7 years of project experience in various litigation and arbitration contexts as well as product development and failure analysis. Selected projects are summarized below.

Global Disputes

Advised counsel and major US-based contractor on information technology (IT) and other electrical issues arising from the development of a major international airport in the Middle East.

Performed analytics on freight logistics data for a multi-billion dollar dispute involving an LNG facility in Australia to draw insights and to help formulate strategy for a major arbitration.

Advised barrister and solicitor teams on technical issues and assisted with case strategy for a USD 1B dispute involving a range of technical disciplines pertaining to a mining facility.

Advised a solicitor on electrical defects pertaining to a gas pipeline control system as part of an international dispute.

Intellectual Property Investigations

Provided testimony on key differences between the implementation of radio-frequency systems (including radio architecture and signal processing techniques) employed in two defense products as part of a trade-secret litigation case.

Investigated the design of mass-market flash memory chips for infringement of certain patents as part of an ITC Section 337 investigation and assisted legal team with fact-finding abroad.

Conducted review of the implementation of certain audio functionality of a mobile device, including hardware implementation and kernel drivers as part of an ITC Section 337 investigation.

Product Development and Failure Analysis

Investigated, identified and addressed field failures associated with e-scooter embedded systems, including motor control and system control algorithms.

Applied machine learning and analytical techniques to large-scale manufacturing data for lithium-ion

batteries to draw actionable insights for a US-based Fortune 100 consumer electronics company.

Investigated and advised senior engineering management on likely root cause of field failures of a battery management circuitry for a portable medical device.

Investigated field failures of an FDA-approved miniature power conversion system and associated control software for a wearable drug-delivery device. Recommended design changes and enhancements for a future revision.

Conducted engineering analysis to determine the root cause of various primary logic board failures of prototype mobile devices, recommended actions for increasing yield during production ramp up.