

Exponent®
Engineering & Scientific Consulting

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Professional Profile

Shaun Cruz, Ph.D., P.E., PMP, is an electrical engineering and technology consulting expert at Exponent with over a decade of experience in power and energy systems, defense technology, control systems, software products and platforms, and engineering management. He serves as a consulting expert for law firms, investors, defense agencies, and technology companies on technical due diligence, intellectual property disputes, project management standard of care, product liability disputes, military and commercial product development, and power and energy system assessments.

Dr. Cruz is a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE) and the IEEE Power and Energy Society, reflecting peer-recognized expertise in electrical engineering and power systems. He has authored and co-authored peer-reviewed publications on shipboard power systems, MVDC stability analysis, power converter modeling, and AC/DC state estimation, and he is a licensed professional engineer (P.E.) in New York, New Jersey, and California.

As a certified Project Management Professional (PMP) and Certified Electrical Safety Technician (CEST), Dr. Cruz brings a combination of technical depth, regulatory fluency, and professional credentialing that positions him as a consulting expert across his five core practice areas.

Technical Due Diligence

Dr. Cruz supports private equity firms, corporate acquirers, and strategic investors conducting technical due diligence for mergers and acquisitions, pre-close technology assessments, joint ventures, and licensing negotiations involving electrical, software, and technology-intensive assets. His assessments include intellectual property landscape reviews, software architecture audits, technology risk assessments, and pre-acquisition product maturity evaluations. This involves evaluation of product maturity, technology readiness levels (TRLs), minimum viable product (MVP) viability, software architecture soundness, and development roadmap credibility. He identifies technical gaps, integration risks, and hidden liabilities that directly inform deal valuation and risk allocation, and post-close remediation planning. For startups and emerging technology companies, Dr. Cruz evaluates the uniqueness and novelty of core technologies, assesses the defensibility of IP positions, and identifies development risks that may affect long-term value.

Intellectual Property Consulting

Dr. Cruz advises legal teams on intellectual property disputes involving electrical systems, software platforms, and communications technologies. His work spans patent infringement analysis, patent validity and invalidity assessments, copyright disputes, trade secret matters, and ITC Section 337 investigations. He has analyzed IP issues across a wide range of technologies, including power conversion technology, wireless communications (VoIP, radio frequency), mobile applications, LiDAR-based systems, capacitive

touch sensors, battery systems, enterprise software, 3D visualization and rendering software, medical devices, and blockchain-based networks. Dr. Cruz translates complex technical subject matter into clear, defensible analyses that support counsel in litigation, arbitration, and inter partes review (IPR) proceedings.

Defense Technology Consulting

Dr. Cruz brings direct experience from his tenure as a research and development engineer at the Naval Surface Warfare Center Philadelphia Division, where he led prototype development of autonomous and robust power and energy systems for unmanned Navy platforms. He additionally supported various research endeavors in advanced power system stability and control, modeling and simulation of novel shipboard power systems/components, and test and evaluation of Navy systems.

At Exponent, he advises defense contractors, government agencies, and technology developers on military R&D programs, systems engineering, and government contract technical requirements. His expertise spans unmanned systems (UUVs, USVs, UAVs), hybrid and all-electric military vehicle feasibility, Hull, Mechanical, and Electrical (HM&E) machinery control systems (MCS), cybersecurity considerations for military networks, and model-based systems engineering (MBSE) using tools such as CAMEO MagicDraw.

Project Management Standard of Care

Dr. Cruz serves as a consulting expert on project management standard-of-care disputes involving technology development, software delivery, and AI system implementation. He is a certified Project Management Professional (PMP) with hands-on experience managing complex engineering programs using Agile, Waterfall, and hybrid methodologies, including work breakdown structure (WBS) development, schedule management, risk analysis, and requirements traceability. His assessments apply recognized industry frameworks such as the PMI PMBOK Guide and IEEE engineering standards (e.g., IEEE 12207) to evaluate whether development teams, contractors, or vendors met applicable professional and contractual standards of care.

Dr. Cruz also leverages his engineering expertise to review technical documents (e.g., drawings, flow diagrams, models, test procedures, and reports) as well as software documents and code — e.g., Unified Modeling Language (UML), Systems Modeling Language (SysML), C++, Java, Python, Matlab, etc. — to provide a deeper technical understanding of the relationship between engineering developments and project management developments. He has supported disputes involving delayed product delivery, scope creep, requirements management breakdowns, deliverable adequacy, validity of estimation approaches, and system defects and deficiencies, and he has served as a testifying expert witness in technology and engineering program disputes.

Power and Energy Systems Assessment

Dr. Cruz provides technical consulting on power system design, analysis, and failure investigation for utilities, energy developers, and industrial operators. His capabilities include power flow analysis, AC/DC power system modeling and simulation, microgrid development and validation, energy storage system sizing, and electromagnetic field (EMF) modeling. He is experienced with MATLAB, Simulink, and real-time hardware-in-the-loop (HIL) testing environments, as well as analysis tools such as PSSE, PowerWorld, and TARA. He applies these tools to assess various aspects of power systems, including steady-state and dynamic stability, fault tolerance, and system reliability.

Dr. Cruz is also a Certified Electrical Safety Technician (CEST) and leverages his knowledge of electrical safety standards (e.g., NFPA 70E) and his expertise in electrical systems to conduct root-cause analysis of electrical failures and assessment of proper implementation of electrical safety practices.

Educational Background

Dr. Cruz received his B.S., M.S., and Ph.D. in Electrical Engineering from Drexel University. His research focused on the increased integration of DC power systems into AC power grids due to installations of modern technologies (e.g., renewables, energy storage, etc.), and the impact into existing power system analysis and operation tools. Specifically, he identified the convergence shortcomings of state estimators that use iterative numerical solvers and sequential approaches when applied to AC/DC power systems. To overcome these issues, Dr. Cruz developed a new approach to non-linear regression using holomorphic embedding for state estimation of AC-DC power systems.

Academic Credentials & Professional Honors

Ph.D., Electrical Engineering, Drexel University, 2022

M.S., Electrical Engineering, Drexel University, 2014

B.S., Electrical Engineering, Drexel University, 2014

Science, Mathematics, and Research for Transformation Scholarship Recipient

Licenses and Certifications

Professional Engineer, California, #E 26124

Professional Engineer, New Jersey, #24GE06033400

Professional Engineer, New York, #109329

Certified Electrical Safety Technician (CEST)

Google Data Analytics Professional Certificate

IBM - Introduction to Data Science

IBM Data Science Professional Certificate

Project Management Professional (PMP)

Prior Experience

Research and Development Engineer, Naval Surface Warfare Center Philadelphia Division, 2014-2022

Computer Science Teaching Assistant, Drexel University, 2011

Electrical Engineering Co-op, Ametek Aerospace and Defense, 2010-2011

Professional Affiliations

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

IEEE Power and Energy Society – Senior Member

IEEE Technology and Engineering Management Society, Senior Member

Project Management Institute, Member

Publications

S. Cruz, "State Estimation of AC/DC Power Systems," in The Sustainable Power Grid: Challenges, Applications, and Case Studies, B. D'Andrade, Ed. Elsevier, 2024, pp. 85–102.

R. Cuzner, S. Cruz, F. Ferrese and R. Hosseini, "Power converter metamodeling approach for the smart ship design environment," 2017 IEEE Electric Ship Technologies Symposium (ESTS), 2017, pp. 118-125

Q. Dong, S. Biswas, S. Cruz, A. Curlett, and T. Hannon, "Modeling and Stability Analysis of a MVDC System in the dq-Reference Frame," Intelligent Ships Symposium (ISS) X, 2015, pp. 57

Presentations

“Dispute mitigation strategies on mega design-build programs,” DBIA Liberty Region Conference, September 15-16, 2026

“Modeling and Stability Analysis of a MVDC System in the dq-Reference Frame,” Intelligent Ships Symposium (ISS) X, May 20-21, 2015

Project Experience

Technical Due Diligence

Dr. Cruz has supported technical due diligence engagements across semiconductor, power electronics, oil and gas, software, and defense technology sectors, evaluating technology portfolios, IP assets, development roadmaps, product architectures, development maturity, competitive positioning, and integration risk for investors, acquirers, and corporate development teams.

- Conducted comprehensive technical due diligence of a semiconductor manufacturer developing custom computation chips for high-performance computing (HPC) and AI data center applications, assessing the full technology portfolio (including chip hardware architecture, firmware, embedded software, and AI software stacks), evaluating development schedule risks and recovery credibility, and benchmarking against competing platforms to inform an acquisition decision for a corporate client.
- Conducted technical due diligence of a company developing integrated inline and downhole inspection systems for the oil and gas industry; evaluated novel ultrasonic sensor hardware, AI-driven defect detection algorithms, and 3D pipe modeling software; performed a patent portfolio and trade secret analysis in support of a freedom-to-operate assessment to inform a strategic investment decision.
- Conducted technical due diligence of a power electronics company developing grid-forming converters and solid-state transformers (SSTs) targeting data center and grid interconnection markets, evaluating proprietary system topologies, control algorithms, development schedule credibility, intellectual property portfolio, and competitive positioning to support transaction structuring and investment planning.
- Performed a comparative analysis of industry-standard power flow analysis and interconnection study software platforms against a proprietary program developed by an acquisition target; conducted stress testing and evaluated hardware requirements and performance metrics across platforms to assess whether the target company's software represented a viable alternative to

established tools, offered novel features or analytical capabilities, and provided measurable value in expediting interconnection approval processes; findings informed the client's acquisition decision and assessment of the software's commercial differentiation and market viability.

Intellectual Property Consulting

Dr. Cruz has conducted IP analyses across a broad range of electrical and software technologies, supporting law firms and corporate clients in patent litigation, copyright and trade secret disputes, and ITC proceedings.

- Evaluated the technical architecture of a decentralized wireless cloud services network and blockchain-based system and identified aspects similar to another party’s system in the context of a trade secrets and contract dispute.
- Conducted patent infringement analysis of VoIP and radio communications systems, evaluating claim mapping against accused product architectures and identifying technical distinctions relevant to infringement and validity positions.
- Conducted patent infringement analysis of a mobile application platform involving push-notification technology, assessing the technical implementation of the accused system against asserted patent claims.
- Conducted patent infringement analysis of a LiDAR-based facial measurement system, evaluating sensor architecture, data processing algorithms, and claim scope in the context of a product liability and IP dispute.
- Conducted ITC Section 337 patent non-infringement analysis of a radio frequency (RF) microneedling device, providing technical analysis of the accused product's electrical and RF system design relative to asserted claims.
- Conducted patent validity investigation of tire pressure monitoring sensor systems, analyzing prior art and claim construction to assess the patentability of the asserted claims.
- Analyzed copyright issues involving an enterprise software suite used for mainframe interoperability, reverse engineering both the original and allegedly copied software to assess copying through an abstraction-filtration-comparison (AFC) analysis — systematically abstracting the software's structural elements, filtering out unprotectable components (including ideas, elements dictated by efficiency, and elements in the public domain), and comparing the remaining protectable expression against the accused software to evaluate the scope and substance of alleged copying; additionally performed a fair use analysis, evaluating the four statutory factors to assess whether the accused use of the copyrighted software qualified as a permissible fair use under applicable copyright law.
- Conducted technical analysis of capacitive touch sensor technology for a patent dispute, evaluating sensor design, signal processing methods, and claim mapping.
- Conducted technical analysis of a GPS sensor system in the context of a false claims dispute, assessing system design, data accuracy representations, and technical performance claims.
- Conducted claim construction analysis for a patent invalidity matter involving software that generated photorealistic 3D renderings of furniture within virtual environments, performing intrinsic evidence analysis of the patent specification and prosecution history from the perspective of a “person of ordinary skill in the art” (POSITA) to identify potentially indefinite claim terms, conducting extrinsic evidence analysis to establish relevant terms of art and common knowledge at the priority date, and performing a means-plus-function analysis under 35 U.S.C. § 112(f) to identify nonce terms and the absence of disclosed structure and algorithms, including a

comparative analysis of alternative rendering algorithms and their computational implications demonstrating how each could render the claimed invention inoperable; prepared an expert declaration in support of Markman hearing proceedings.

- Performed patent claim construction analysis in support of a Markman hearing proceedings for an invalidity matter involving a medical aesthetics device that used electromagnetic stimulation to improve the appearance of muscle tone, reviewing the patent specification and prosecution history through the lens of a POSITA to identify indefinite claim terms, conducting extrinsic evidence research to establish terms commonly understood at the patent's priority date, and performing a means-plus-function analysis under 35 U.S.C. § 112(f) identifying nonce terms and insufficient disclosure of supporting structure and algorithms; findings formed the basis of an expert declaration submitted in connection with Markman hearing proceedings.

Defense Technology Consulting

Dr. Cruz has supported military and defense technology programs spanning unmanned systems, vehicle electrification, and cybersecurity, drawing on his background as an R&D engineer at the Naval Surface Warfare Center Philadelphia Division.

- Developed system requirements for a conceptual military platform enabling deployment of wearable devices and algorithms across connected, cloud, and edge environments (encompassing cybersecurity, data storage and handling, communications, and deployment considerations) and evaluated multiple contractor-proposed solutions for requirements alignment, performing a comparative cost-benefit and technical risk assessment across vendors to support the client's down-select decision and development path forward.
- Performed a trade study analysis of state-of-the-art carbon capture system technologies to assess applicability for submarine use; extracted relevant requirements and performance metrics from existing submarine carbon capture systems as a baseline for comparison; evaluated candidate technologies against those requirements to identify the most viable solution; conducted preliminary testing and evaluation of the selected system; delivering findings and a recommended development path forward.
- Assessed the technical feasibility and development maturity of a hybrid and all-electric military vehicle program, evaluating system architecture, power train integration, and technology readiness; findings identified key development gaps and integration risks that informed program planning and investment decisions.
- Verified and validated models and analytical tools developed for optimal microgrid design and deployment, assessing the soundness of underlying assumptions, computational methods, and performance projections; findings confirmed the reliability of the platform and identified modeling deficiencies that required remediation for client consideration.
- Reviewed and developed MBSE models in CAMEO MagicDraw for data architecture and system integration planning in support of a military vehicle development program, producing a structured systems architecture baseline that supported requirements traceability and standards alignment.
- Generated a Plan of Action and Milestones (POAM) for the development of a high-power hardware-in-the-loop (HIL) testing program, establishing a structured development roadmap with defined milestones, risk mitigation steps, and resource requirements, providing the program team with a credible execution framework for advancing development.

Project Management Standard of Care

Dr. Cruz has provided technical analysis in disputes involving software development, technology delivery, and engineering program management, applying his PMP credentials and direct program management experience to assess whether applicable standards were met.

- Conducted schedule and requirements analysis for a subcontractor involved in a mission-critical military satellite development program in the context of a prime-subcontractor dispute, tracing requirements derivation and lifecycle changes, analyzing how dynamically evolving schedules and requirements contributed to alleged technical defects and deficiencies, and evaluating whether the subcontractor's development practices (including change management processes) reflected the prioritization of schedule over procedure; findings supported the assessment of whether applicable standards of care were met under the constraints of an R&D development environment.
- Analyzed the derivation and development of a bill of quantities for a power plant construction and commissioning program in the context of a standard-of-care dispute; reviewed technical specifications, design documents, and final construction and commissioning records to evaluate whether the bill of quantities was generated in accordance with applicable estimating standards (e.g., AACE 18R-97, 17R-97, 56R-08, etc.) and whether the resulting estimates met the technical and contractual requirements of the project.
- Evaluated the standard of care applied in the development of design documents for an Intelligent Transportation System (ITS) as part of a highway development program, reviewing drawings and design documentation to assess whether the deliverables were sufficiently complete and technically adequate to support viable cost estimation and whether they fully addressed applicable contractual requirements and technical specifications.
- Investigated a software development dispute involving a custom home renovation design application, reconstructing undocumented development requirements from client calls, meeting notes, and correspondence to establish a baseline scope of work; evaluated the software deliverables to assess development progression toward a viable product; demonstrated that the developer followed applicable standards of care for software development and project management while accommodating scope creep introduced by the client under a time-and-material contract structure.
- Conducted technical analysis of a software development engagement for a CAD product developed in UNITY in the context of a contract dispute, evaluating project management practices, requirements traceability, software development, and delivery against contractual milestones to assess whether the development team met applicable professional and contractual standards of care.
- Conducted technical analysis of a fall-detection sensor algorithm in the context of an accident dispute, assessing the design, testing, and validation processes applied during development relative to applicable engineering and software standards to evaluate causation and liability.

Power and Energy Systems Assessment

Dr. Cruz has performed power system modeling, simulation, and failure analysis for energy developers, utilities, and industrial clients, with particular depth in AC/DC hybrid systems, microgrids, and renewable energy integration.

- Performed electric and magnetic field (EMF) modeling for multiple wind farm development projects to support environmental permitting, assessing field strength distributions relative to applicable regulatory thresholds.
- Performed power flow analysis to evaluate the operational impact of proposed transformer tap and bus voltage modifications at a generating plant, identifying potential stability and reliability concerns.
- Developed a concept model of an AC/DC power converter to identify system integration issues, including steady-state and dynamic stability considerations relevant to the client's power architecture decisions.
- Developed a communication network model to assess signal latency effects on power system stability, identifying potential control loop vulnerabilities in a distributed energy system.
- Performed analysis of variation in energy storage system sizing parameters (e.g., recharge rate, capacity, output power, and run time) based on architectural decisions and load profiles, supporting system design optimization.
- Conducted root-cause analysis of an electrical fault involving undersea cabling, applying diagnostic methods to identify the failure mechanism and contributing factors.
- Conducted root-cause analysis of a system failure involving wireless energy transfer technology, evaluating the electrical and systems engineering factors that contributed to the malfunction.
- Performed analysis of diesel engine control software to identify gaps in auxiliary emissions strategy reporting, supporting regulatory compliance assessment.
- Conducted technical analysis of safety precautions and engineering controls in the context of an electrocution dispute, evaluating whether applicable electrical safety standards were followed.
- Conducted technical analysis of the control system of a hydraulic truck tipper deployed in a biomass fuel plant in the context of a personal injury matter, evaluating the adequacy of the system's design, development, and maintenance practices against applicable industry standards and best practices to assess causation and liability.

Deposition & Trial Testimony

Declaration

False claims dispute involving accuracy and performance of GPS sensor systems, U.S. District Court, Eastern District of Tennessee, 2024

Report and Deposition

Personal injury matter involving control system of hydraulic truck tipper, Superior Court for the State of California, County of Shasta, 2026