



**Exponent**<sup>®</sup>  
Engineering & Scientific Consulting

## Jay R. Prigmore, II, Ph.D., P.E.

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### Professional Profile

Dr. Prigmore is a licensed Electrical Engineer with expertise in the fields of power systems, power electronics, power markets, arc flash and arc blast, short-circuits, power system protection, fuses, circuit breakers, relays, magnetics, electromagnetics, rotating electrical machinery (motors and generators), electrical current sensing technologies, semiconductor device applications, explosives, HAZMAT shipping regulations, microcontrollers, circuit board analysis, high power lab testing, standards testing, standards development and compliance. He has eight years' experience in developing and implementing short-circuit current limitation techniques and devices, which, includes novel concepts of, fault current limiters and solid-state circuit breakers in addition to traditional techniques. He has evaluated power systems and commissioned their components on six continents for a wide range of industries, including mining, petrochemical, pulp and paper mills, and renewable energy installations. Dr. Prigmore has the training necessary to climb wind turbines.

Dr. Prigmore's experience while at Exponent consists of performing arc flash hazard analysis, short-circuit studies, load flow studies, and protection coordination studies. He has performed thorough electrical analysis on wind turbines, which included a comparison of the wind turbine components and their installation to the National Electric Code, arc flash hazard analysis, protection coordination and has investigated wind turbine failures including fires. He has investigated electrical power generator failure modes, provided recommendations on maintenance procedures and has recommended protection devices for both large electrical power generators and smaller consumer electronic motors. In addition, he has investigated transformer failures.

Dr. Prigmore has advised utilities on interconnection plans and screening criteria of distributed energy resources for renewable energy installations such as solar farms and wind farms. He has also investigated failures of solar inverters. He has performed electromagnetic field measurements in underground transmission lines and he has performed power quality analysis for multiple industrial facilities. Dr. Prigmore has also evaluated compliance with applicable industry standards such as the National Electric Code (NEC) and the National Electric Safety Code (NESC).

Dr. Prigmore's Exponent experience further consists of evaluating, testing and performing root cause analysis of consumer and industrial electronics. He has designed tests to expedite failure modes and performed risk assessment to consumers. He has also investigated commercial fires. He has analyzed Programmable Logic Controllers (PLCs) for industrial facilities and has performed evaluations of SCADA systems in litigation matters. Dr. Prigmore has experience in applying, troubleshooting and performing failure analysis on power semiconductors such as IGBTs, IGCTs, ETOs, and MOSFETs. He has performed arc flash hazard studies and advised clients on recommended solutions to reduce the incident energy site wide. He has performed load flow studies and short-circuit studies for power systems and is experienced in system protection coordination. He has experience in designing high voltage power transmission lines and performed protection coordination studies low, medium and high voltage. He has

designed, analyzed and type tested current limiting fuses for both low and medium voltage systems.

He has designed wide-band, high accuracy current transformers and has developed Rogowski coils that can measure electrical currents over 100,000A with greater than 99 percent accuracy in industrial applications. Dr. Prigmore has performed numerous heat runs and dielectric tests on low and medium voltage equipment as well as numerous tests, analysis and improvements on analog control circuitry designs. He has experience performing and leading high power tests on industrial equipment in accordance with IEEE/ANSI, IEC and UL standards. In addition, Dr. Prigmore has experience in hardware design for integrating a small scale solar farm and battery storage into a microgrid. He has programmed novel control algorithms using microcontrollers and FPGAs. He has also designed a GUI for a controllable thermostat incorporating human factor principles.

Prior to joining Exponent, he was a member of the system protection division from G&W Electric, an electrical switchgear manufacturer. He was responsible for sales, marketing, application engineering, R&D, manufacturing improvements, field service and troubleshooting. Dr. Prigmore was instrumental in developing a product that was deemed a "Product of the Year" winner in the Electrical Safety Category from Plant Engineering Magazine for its significant improvement in the reduction of incident energy levels in arc flash and arc blast hazardous electrical systems vs. existing technologies.

Dr. Prigmore is the chair for the IEEE Industrial Application Society's Early Career Development Subcommittee and he is a voting member of the IEEE Region 4 Power and Energy Society's Scholarship Committee. He is a voting member for the standard committee of IEEE P1584 (Guide for Performing Arc Flash Hazard Calculations) and is a chapter chair to the CIGRE "Green Book" on Fault Current Limiters. He has also authored a chapter on High Voltage Direct Current (HVDC).

Dr. Prigmore is proficient in EasyPower, ETAP, SKM, MATLAB/Simulink, PLECS, LabVIEW, PSCAD, ARCAD, C, VBA and PowerWorld. He has experience with Code Composer Studio, Arduino, SABER, Pspice, and AMPL software.

## Academic Credentials & Professional Honors

Ph.D., Electrical Engineering, Arizona State University, 2013

M.S., Electrical Engineering, Arizona State University, 2012

B.S., Electrical Engineering, Lamar University, 2010

Plant Engineering Magazine "Product of the Year" Winner in Electrical Safety in 2016

NFPA Technical Committee on Electrical Inspection Practices - Founding Alternate Member

IEEE Senior Member

IEEE IAS Early Career Development Executive Sub-Committee, Chair

IEEE Region 4 PES Scholarship Committee, Member

CIGRE "Green Book," Chapter Author on Fault Current Limiters, Chair

IEEE 1584 WG - IEEE Guide for Performing Arc Flash Hazard Calculations - Voting Member

"The Power Grid" Book Chapter on High Voltage Direct Current (HVDC) - Author

Arizona State Graduate Fellowship

NSF FREEDM Graduate Fellowship

Houston Endowment Scholarship

## Licenses and Certifications

Licensed Professional Engineer, California, #E22128

Licensed Professional Engineer, Illinois, #062068074

Licensed Professional Engineer, Kansas, #PE26487

Licensed Professional Engineer, Kentucky, #032351

Licensed Professional Engineer, Maryland, #53335

Licensed Professional Engineer, Electrical, Massachusetts, #54678

Licensed Professional Engineer, Electrical, Nevada, #026230

Licensed Professional Engineer, New Mexico, #24357

Licensed Professional Electrical Engineer, Texas, #126419

Licensed Professional Engineer, Wisconsin, #45483-6

Explosives License, Illinois Department of Natural Resources, #0006577

PADI Open Water Diver License, #13100Z4100

OSHA 10-hour certification

First Aid and CPR Certification

MISTREAS Ropeworks PDQ Competent User Certified

## Publications

Prigmore J, Majd A. Educating students in electrical safety practices and the inclusion of electrical safety material in academic curriculum. 2017 IEEE IAS Electrical Safety Workshop (ESW) 2017; 1-4.

Prigmore J, Bishop J. Arc flash energy underestimated. Exponent EECS Newsletter 2016; 5:1-3.

Prigmore J. Protecting FPSO's from arc flash. Plant Engineering Magazine. Published on January 21st 2016. <http://www.plantengineering.com/single-article/protecting-fpsos-from-arc-flash/cf852241359b42cc93ff497b4d4ce765.html>

Prigmore JR, Mendoza JA, Karady GG. A neodymium hybrid fault current limiter. Int. Trans. Electr. Energy Syst. 2015; 25(7):1366-1380.

Prigmore JR. A neodymium hybrid fault current limiter. Ph.D. dissertation, Arizona State University, 2013.

Prigmore JR, Mendoza JA, Karady GG. Comparison of four different types of ferromagnetic materials for fault current limiter applications. Power Delivery, IEEE Transactions on 2013; 28(3):1491-1498.

## Conference Papers

Han J, Prigmore J, Wang Z, Khushalani-Solanki S. Modeling and coordinated controller design of a microgrid system in RTDS. Power and Energy Society General Meeting (PES), pp. 1-5, 2013.

Karady GG, Prigmore JR, Mendoza JA. A neodymium permanent magnet fault current limiter for use in the FREEDM project. In Innovative Smart Grid Technologies (ISGT Europe), 2012 3rd IEEE PES International Conference and Exhibition on, pp. 1-7, 2012.

Prigmore J, Karady G. A novel 7.2 kV fault current limiter for use in the FREEDM Project. In Transmission and Distribution Conference and Exposition (T&D), 2012 IEEE PES, pp. 1-7, 2012.

Prigmore J, Karady G. An ETO-based AC buck-type fault current limiter for use in the FREEDM project. In Applied Power Electronics Conference and Exposition (APEC), 2012 27th Annual IEEE, pp. 1042-1047, 2012.

Werho T, DeGuzman P, Singh A, Prigmore J, Karady G. Autonomous switch fault current limiter. In North American Power Symposium (NAPS), pp. 1-5, 2011.

Prigmore J, Tcheslavski G, Bahrim C. An IGCT-based electronic circuit breaker design for a 12.47kV distribution system. In Power and Energy Society General Meeting, 2010 IEEE, pp. 1-5, 2011.

## Invited Presentations

Prigmore J. Current limiting protector - A 30 year old technology that can provide improved arc flash mitigation, damage reduction and current limitation. IEEE PES Lehigh Valley Chapter, Mar. 29th, 2016.

Prigmore J. Arc flash mitigation techniques. MYPSCON, Nov. 5th 2015.

Prigmore J. Current limiting protector - A 30 year old technology that can provide improved arc flash and arc blast mitigation. IEEE Chicago Section, Oct. 26th, 2015.

Prigmore J. A neodymium hybrid fault current limiter. IEEE Phoenix Section, February 2013.

Prigmore J. An IGCT-based electronic circuit breaker design for a 12.47 kV distribution system. IEEE Region 5 Annual Meeting Student Competition, Dallas, TX, April 2010.