Lionel R. Orama-Exclusa

Department of General Engineering
University of Puerto Rico, Mayagüez
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EDUCATION

D.Eng. Electric Power Engineering, Rensselaer Polytechnic Institute, October 1997.
Dissertation: *Numerical Modeling of Circuit Breaker Arcs And Their Interaction With The Power System*
Doctoral Committee: Sheppard J. Salon (Chair), Allan Greenwood, Mietek T. Glinkowski, Robert C. Degeneff, and Kenneth A. Connor.

M.E. Electric Power Engineering, Rensselaer Polytechnic Institute, May 1994.
Master's Project: *Extraction of Model Parameters from Vacuum and SF6 Arcs' Oscillograms*

B.S. Electrical Engineering, Polytechnic University of Puerto Rico, *magna cum laude*, November 1992.
Senior Project: *Circuit Breaker Duty Calculation*

LICENSE

Licensed Professional Engineer (P.E.) in the Commonwealth of Puerto Rico. License number 13841, expiration date June 2008.

RESEARCH INTERESTS

Electrical discharges in vacuum and gases, vacuum switching technology, fields stress analysis in electric power devices, power systems transients, alternative energy sources, distributed generation, power systems protection.

RESEARCH EXPERIENCE

- *Sudent Developed DCAS Radar Network for NASA Satellites Validation.* Supported by a $90,000 grant from the National Aeronautics and Space Administration (NASA)-IDEAS-ER Program, May 2005-April 2006.
- *Strengthening Diversity Collaboration Trough a Student Led System Test Bed on the Island of Puerto Rico ERC for (CASA.* With Dr. Sandra Cruz Pol, Dr. Jose Colóm, Dr. Rafael Rodriguez Solís and Dr. Walter Diaz, supported by a $100,000 grant from the National Science Foundation (NSF)-Supplement 2005.
- *Collaborative Adaptive Sensing of the Athmosphere (CASA).* With Dr. Sandra Cruz Pol, Dr. Jose Colóm, Dr. Rafael Rodriguez Solís and Dr. Walter Diaz, supported by a $4M grant from the National Science Foundation (NSF)-Enegineering Research Centers (ERC) Program, Fall 2003-Spring 2008.
- *Acquisition of Instrumentation for the Electric Energy Processing Systems Laboratory at UPRM.* With Dr. Efraín O'neill and Dr. Miguel Vélez, supported by a $150,000.00 grant from the National Science Foundation (NSF)-Major Research Instrumentation (MRI) Program, Spring 2002-Fall 2004.
- *Grease Bio-diesel: Clean Energy for Puerto Rico. S*upported by a $28,856 grant from the Department of Energy (DOE) through the Southern States Energy Board (SSEB), Fall 2001-Summer 2002.
- *Integrating Laboratory Practices and Undergraduate Research to the Power Engineering Curriculum at UPRM.* With Dr. Efraín O'neill and Dr. Miguel Vélez, supported by a $160,000.00 grant from the National Science Foundation (NSF)-Course Curriculum Laboratory Improvement (CCLI) Program, Fall 2001-Spring 2003.
- *Grease Bio-diesel for Puerto Rico.* With Dr. José Colucci and Dr. Arturo Portnoy, supported by a $224,000.00 grant from the Department of Energy (DOE), Fall 2000-Spring 2002.
- *Used Cooking Oil.* With Dr. José Colucci and Dr. Arturo Portnoy, supported by Panzardi-ERM, Inc. with a $190,000.00 grant from the Puerto Rico Industrial Development Company (PRIDCO), Fall 2000-Spring 2002.
- *Breakdown Phenomena of Vacuum Interrupters After Current Zero. Doctoral research, 1994-1997.*
- *Series Vacuum Interrupters for High Voltage Applications. Doctoral research, 1994-1997.*
- *High Voltage Hybrid Circuit Breaker. Doctoral research, 1994-1997.*

RESEARCH MENTORING

- *Testing and Output Optimization of PV Modules to Power an Off-the-Grid Radar Node.* Master Thesis by Carlos A. Giraldo, Spring 2006-present.
- *Voltage Grading of Suspension Insulators Using Finite Element Analysis.* Master Thesis by Jesus Bedoya-Arango, Spring 2002-Summer 2004.
- *Parameter Extraction Tool for High Pressure Gas Arc Models in High Voltage Circuit Breakers Simulations.* Master Thesis by Bienvenido Rodriguez-Medina, Fall 2001-Summer 2003.
- *Antenna Redesign and Re-localization for the Lightning Network Detection.* Undergraduate research project, Fall 2003-Spring 2004.
- *Probabilities of Lightning Strikes as a Function of Structure Elevation.* Undergraduate research project, Fall 2002-Spring 2003.

- *Efficiency of a Solar Hydrogen Scaled System.* Undergraduate research project, Fall 2002-Spring 2003.
- *Self supported motor/generator.* Undergraduate research project, Fall 2000.
- *Medium voltage transmission line modeling for short line fault analysis.* Undergraduate research project, Fall 1999.
- *Protective system failure of residential circuits.* Undergraduate research project, Spring 1999.

PUBLICATIONS

- Teaching Arc Dynamics During Current Interruption Of Vacuum Interrupters And SF6 Circuit Breakers Using TACS Routines Within ATP, submitted to the ASEE 2007 Annual Conference, Honolulu.
- Student Developed Meteorological Radar Network for Western Puerto Rico, IEEE International Midwest Symposium on Circuits and Systems MWSCAS 2006, San Juan, August 2006.
- Numerical Modeling of Vacuum Arc Dynamics at Current Zero Using ATP, International Conference on Power System Transients IPST 05, Montreal, June 2005.
- El Método de Elemento Finito Aplicado a Aisladores de Suspensión, Technomundo, a publication of the CIAPR, Vol. 3, Num. 31, 2005 (in Spanish).
- A DCAS Network for QPE on the Island of Puerto Rico, American Institute of Aeronautics and Astronautics, March 2004.
- Arc Model Parameter Extraction Techniques using Nonlinear Least Squares, North American Power Symposium NAPS 2003, November 2003.
- Numerical Arc Model Parameter Extraction for SF6 Circuit Breakers Simulation, International Conference on Power System Transients IPST 03, New Orleans, September 2003.
- SF6 Arc Model: Nonlinear Equations and Parameter Fitting, Electrotechnology International Symposium 2002, San Juan, November 2002.
- Increasing Retention Rates in Computer Science and Engineering with a Wireless Classroom at UPRM, International Conference on Engineering Education ICEE 02, Manchester, UK, August 18-21, 2002.
- Breakdown Phenomena of a Vacuum Interrupter after Current Zero, International Conference on Power System Transients IPST 01, Brazil, July 2001.
- Numerical Modeling of Circuit Breaker Arcs and Their Interaction with the Power System, Doctoral Thesis, Rensselaer Polytechnic Institute, Troy, NY, October 1997.
- Circuit Breaker Duty Calculation, Revista de la Universidad Politécnica de Puerto Rico, Vol.3, Num.1, June 1993, L.M. Tórres co-author (in Spanish).

PRESENTATIONS

- "High Efficiency Motors for Energy Conservation", Energy Systems Seminar Series (ES^3), University of Puerto Rico, Mayagüez, November 2006.

- "Are You Grounded?", SIEPR Student Chapter, November 2006.
- "Searching for a Research Topic", IEEE Student Chapter, Computer Chapter and Communications Chapter, March 2006.
- "Student Developed Radar Network for NASA Satellites Validation", Puerto Rico Space Grant Consortium, External Advisory Board Site Visit, February 2006.
- "Are You Grounded?", SIEPR Student Chapter, September 2005.
- "What is Engineering? Teachers and Students lecture, María D. Faria Middle School in Mayagüez, April 2005.
- "You Are GROUNDED, Are You?", SIEPR Student Chapter, February 2005.
- "Student Led Test Bed (S8)", CASA-ERC Executive Committee Meeting, February 2005.
- "Hola Soy un Eticajólico", Ethics Across the Currículo Workshop, SEED, Oficina del Decano de Ingeniería, diciembre de 2003.
- "Numerical Arc Model Parameter Extraction for SF6 Circuit Breakers Simulation", International Conference on Power System Transients IPST 03, New Orleans, September 2003.
- "Atmospheric Electrical Discharges", *Residencia Universitaria Almenares*, Mayagüez, November 2002.
- "Increasing Retention Rates in Computer Science and Engineering with a Wireless Classroom", International Conference on Engineering Education ICEE 02, Manchester, UK, August 2002.
- "How to Cope with the University Life, A Professor's look at What Freshmen Must Do", *Residencia Universitaria Almenares*, Mayagüez, August 2002.
- "Energy Conservation Using High Efficiency Motors", University of Puerto Rico Mayagüez, May 2002.
- "Introduction to Efficient Lighting for State Energy Managers", Energy Affairs Administration, Department of Natural Resources, San Juan, February 2002.
- "Introduction to Energy Management for Energy Inspectors", Energy Affairs Administration, Department of Natural Resources, San Juan, September 2001.
- "Energy Conservation Using High Efficiency Motors", *Asociación de Industriales de Puerto Rico*, Carolina, September 2001.
- "Introduction to Energy Management for Municipal Energy Managers", Energy Affairs Administration, Department of Natural Resources, San Juan, September 2001.
- "Introduction to Energy Management for State Energy Managers", Energy Affairs Administration, Department of Natural Resources, San Juan, September 2001.
- "Breakdown Phenomena of a Vacuum Interrupter after Current Zero", International Conference on Power System Transients, Brazil, July 2001.
- "Protective System Failure of Residential Circuits", Poster session, April 1999.
- "Vacuum Interrupters in Series", Poster session, FoPER '98, University of Puerto Rico at Mayagüez, Mayagüez, Puerto Rico, February 1998.
- "Model for the Interruption Process in Vacuum Switches", Faculty Seminar, Department of General Engineering, University of Puerto Rico at Mayagüez, Mayagüez, Puerto Rico, October 1997.

- "Numerical Modeling of Vacuum Arcs Using EMTP", Poster session, Third of 28 participants, Summer Meeting of the Power Engineering Society, Institute of Electrical and Electronic Engineers, Denver, CO, August 1996.
- "Numerical Modeling of Circuit Breaker Arcs", Graduate Seminar, Department of Electric Power Engineering, Rensselaer Polytechnic Institute, Troy, NY, March 1996.

TEACHING EXPERIENCE

Professor, University of Puerto Rico, Mayagüez, January 1998 to present. Courses: Electrical Transients in Power Systems (graduate), Power Systems Protection (Protective Relaying), Power Systems Engineering Fundamentals, Fundamentals of Transformers and Electric Machinery, Electrical Distribution Systems Design, Numerical Methods for Engineers, Electrical Circuit Analysis, Engineering Mechanics; Statics & Dynamics, Algorithms and Computer Programming. Classes taught in traditional and multimedia classrooms, and networked computer environment. Research is conducted in the areas electrical transients, atmospheric electricity, alternative energy sources and gaseous conductors.

Part-time Professor, Polytechnic University of Puerto Rico, Hato Rey, December 1997 to May 1998. Courses: Power System Analysis II, class in traditional classroom. Electro-mechanical Energy Conversion Laboratory, empirical laboratory work.

Teaching Assistant, Rensselaer Polytechnic Institute, August 1993 to May 1994. Courses taught: Dynamic Systems, Power Generation Operation and Control, and Industrial Power Systems Design. Taught classes in problems sessions, and networked computer environment.

Instructor, Polytechnic University of Puerto Rico, Summer 1993. Course taught: Economic Load Dispatch. Taught class in traditional classroom.

ACADEMIC ADMINISTRATION EXPERIENCE

Special Assistant to the Chancellor for Research Affairs, University of Puerto Rico, Mayagüez, October 2001 to October 2003.

Director, Title V Proyect, $2,118,696 Grant from the U.S. Department of Education, University of Puerto Rico, Mayagüez, October 2001 to October 2003.

OTHER ACADEMIC EXPERIENCE

Consulting Board Member for Licensing of the Electrical Engineering Program at the Interamerican University of Puerto Rico, February 2004 to present.

Proposal Evaluator for the Puerto Rico Research and Commercialization Alliance, Communication and Information Technology Initiatives Program, October 2003 to October 2004.

INDUSTRY EXPERIENCE

Inspector of Electrical Distribution Systems, Puerto Rico Electric Power Authority, December 1991- December 1992. Inspection of electrical distribution systems of up to 38kV to comply with the NEC and PREPA's regulations.

Professional in Training, Puerto Rico Electric Power Authority, Summer 1990. Dispatch of hydroelectric units for emergency use, peak load analysis, transmission lines faults investigation. Training on the SCADA system. Assisting load shearing emergencies.

DESIGN EXPERIENCE

- *Méndez & Co. Facilities*, Ponce, Puerto Rico. Under Development. Design includes all interior and exterior distribution system with 300KVA substation with Back-up power generation. Lighting desing was also developed.
- *Medical Offices*, San German, Puerto Rico. Design includes all interior and exterior distribution system with 150KVA substation. Lighting desing was also developed.
- *Plaza Celebración de Eugenio Maria de Hostos*, Mayagüez, Puerto Rico. Design includes all interior and exterior distribution system with 75KVA substation. Lighting desing was also developed.
- *Plaza de Joyuda*, Cabo Rojo, Puerto Rico. Design includes exterior distribution system with primary distribution line relocation. Lighting desing was also developed.
- *Mayaguez Home for the Elderly*, Mayagüez, Puerto Rico. Under development. Design includes design of a parallel 300KVA substation, for building expension.
- *Ponce de León 245*, San Juan, Puerto Rico. Design includes all interior and exterior distribution system with 150KVA substation, for new structure. Lighting design is also under development.
- *Boquerón Townhouses*, Cabo Rojo, Puerto Rico. Under development. Design includes all aerial and underground primary distribution system, for new housing complex.
- *Buffalo's Café*, Caguas, Puerto Rico. January 2001. Design includes all interior distribution system with restaurant grade kitchen. The distribution consists of a 480v, 200A supply, a main distribution for HVAC system and a step-down Dry Type Transformer for lighting and kitchen load.
- *Winnie's Active Learning Kids School (WALKS)* Mayagüez, Puerto Rico, March 2000. Design includes all exterior and interior distribution system.. Lighting design was also developed.
- *Picó Building*, Mayagüez, Puerto Rico. March 2000. Design includes all exterior and interior distribution system. Lighting design was also developed.
- *Castillo Building*, Añasco. Puerto Rico. February 2000. Design includes all exterior and interior distribution system. Lighting design was also developed.
- *Babilonia Building*, Rio Piedras. Puerto Rico. October 1999. Design includes all exterior and interior distribution system for reconstruction of an existing structure. The exterior design includes a 20kW back-up generator. Lighting design was also developed.
- *Iglesia de la Santa Cruz*, Bayamón. Puerto Rico. July 1999. Design includes all exterior and interior distribution system with 225KVA substation, for restoration of the existing structure. Lighting design was also performed. The Church is a historic monument protected by the Conservation Bureau.

CONSULTING EXPERIENCE

- *Consultant, expert witness*, Mayagüez, Puerto Rico. March 2005 to present. Work with Enrique Alcaraz Michelli Law Offices, on a lawsuit regarding telephone line electrocution during lightning storms.

- *Consultant, expert witness*, Mayagüez, Puerto Rico. January 2005 to present. Work with Surrillo Pumarada Law Offices, on a lawsuit regarding electrocution a teenager in contact with aerial distribution lines.
- *Consultant*, San José, California, March 2004 to July 2004, on Vacuum Interrupters technology, application and research, Jennings Technology Co.
- *Consultant, expert witness*, Hato Rey, Puerto Rico. January 2003 to present. Work with Mario Pabón & Associates, attorneys at law, on a lawsuit regarding electrocution of two children in contact with an electrified gate.
- *Consultant, expert witness*, Hato Rey, Puerto Rico. December 2001 to present. Work with Moreda, Moreda & Associates, Law Offices, on a lawsuit regarding electrocution of a worker with aerial primary distribution lines.
- Consultant, expert witness, Aguadilla, Puerto Rico. May 2000 to February 2001. Work with Nicolás Rivera & Associates, attorneys at law, on a lawsuit regarding electrocution of a child with aerial primary distribution lines.
- *Consultant, expert witness*, Rio Piedras, Puerto Rico. December 1999 to December 2000. Work with Mr. Charles Hey Maestre and Mr. José J. Nazario de la Cruz, attorneys at law, on a lawsuit regarding electrocution of a worker with a distribution transformer.
- *Consultant*, Mayagüez, Puerto Rico. October 2000. Design evaluation for Boquerón Bay Villas housing project.
- *Consultant, expert witness*, Rio Piedras, Puerto Rico. January 1998 to February 2000. Work with Mr. Ignacio Fernández, attorney at law, on a lawsuit regarding a house on fire due to electrical system failure.
- *Special Commissioner*, Bayamón. Puerto Rico. Work for Judge Ollivette Sagebién Raffo on a lawsuit regarding electrocution of a worker with a distribution transformer. Report submitted on November 1999.
- *Special Commissioner*, Bayamón. Puerto Rico. Work for Judge Ollivette Sagebién Raffo on a lawsuit regarding a house on fire due to electrical system failure. Report submitted on November 1998.

OTHER PROFESSIONAL EXPERIENCE

Member of the Governors' Energy Advising Committee, Commonwealth of Puerto Rico, July 2002 to 2004.

PROFESSIONAL DEVELOPMENT

- *Generación Eólica*, Electro-viernes, Colegio de Ingenieros y Agrimensores de Puerto Rico, mayo de 2006.
- *Energía Eléctrica: Perspectivas Alternas*, Comité de Energía, Cámara de Comercio de Puerto Rico, febrero de 2006.
- *Primera Cumbre de Expertos en Energía Eléctrica*, Colegio de Ingenieros y Agrimensores de Puerto Rico, noviembre de 2005.
- *Sobrevoltajes y Caidas de Voltajes*, IEEE Distinguish Lecturer Series & Colegio de Ingenieros y Agrimensores de Puerto Rico, October 2005.
- *Financiamiento de Proyectos de Eficiencia Energética*, Oficina de Asuntos de Energía, marzo de 2004.
- *Ethics Across the Currículo Workshop*, SEED, Oficina del Decano de Ingeniería, diciembre de 2003.
- *Diseño de Sistemas de Puesta a Tierra*, Colegio de Ingenieros y Agrimensores de Puerto Rico, mayo de 2003.
- *Building Energy Management*, On-Line Course, Asociation of Energy Engineers, August 2002.

HONORS

- *Golden Key National Honor Society*, Honorary Member, 2006.
- *Who's Who Among America's Teachers*, 2005 & 2006.
- *Sigma Xi, The Scientific Research Society*, University of Puerto Rico, Mayagüez Campus, Mayagüez, PR, April 2002.
- *Who's Who, Historical Society*, 2001-2002.
- *GEM Fellowship Programs, Doctoral Fellow in Engineering, August 1994- December 1997.*
- *Rensselaer Honors Convocation, Rensselaer Polytechnic Institute, Troy, NY, November 1994.*
- *National Deans' List, Polytechnic University of Puerto Rico, 1991- 1993.*
- *Reserve Officers Association Award, AFROTC national decoration, May 1987.*

PROFESSIONAL ORGANIZATIONS

- Institute of Electrical and Electronic Engineers (IEEE)
    - Power Engineering Society (IEEE-PES)
- Colegio de Ingenieros y Agrimensores de Puerto Rico (CIAPR)
    - Instituto de Ingenieros Electricistas (IIE)

REFERENCES

Jorge I. Vélez, Chancellor
University of Puerto Rico, Mayagüez, PR 00680-9000

Pablo Rodríguez, Chancellor
University of Puerto Rico, Aguadilla, PR

Ramón E. Vázquez, Dean of Engineering
University of Puerto Rico, Mayagüez, PR 00680-9000

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Department of General Engineering
University of Puerto Rico, Mayagüez, PR 00681-9044

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Department of Electric Power Engineering
Rensselaer Polytechnic Institute, Troy, NY 12180-3590

Sheppard J. Salon, Professor
Department of Electrical Engineering
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J. Keith Nelson, Philip Sporn Professor of Engineering
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