Armando Martins Leite da Silva

(*Curriculum Vitae – Short Version*)

1. *General Data*

- Address: Pontifical Catholic University of Rio de Janeiro – PUC-Rio
  Department of Electrical Engineering – DEE
  Power System Engineering Group
  Rua Marquês de São Vicente, 225 – Gávea
  22.451-900 – Rio de Janeiro, RJ
  Brazil
  Phone no.: +55 (21) 3527.1208 (room)
  Email: armando@dee.puc-rio.br or am.leitedasilva@gmail.com (preferable) or armando@unifei.edu.br

- Birth: February 4th, 1954, Rio de Janeiro, RJ, Brazil
- Citizenships: Brazilian and Portuguese
- Family: Married with Patrícia and two Daughters (Carolina and Paula)
- Leisure: Classical and Pop Guitar, Jogging, Football/Soccer, Swimming.

2. *Academic History*

- B.Sc. – Catholic University of Rio de Janeiro (PUC-Rio), Brazil, 1975;
- M.Sc. – Federal University of Rio de Janeiro (COPPE-UFRJ), Brazil, 1977;
- Ph.D. – University of Manchester Institute of Science and Technology (UMIST), UK, 1980.

(All in Electrical Engineering)

3. *Academic Experience*

- Assistant Professor – Electrical Eng. Department – Federal University, Rio de Janeiro, 1976-1977;
- Professor – Electrical Eng. Department – PUC-Rio, Rio de Janeiro, 1977-1994 and since 2014;
- Professor – Institute of Electrical Eng. – Federal University, Itajubá (UNIFEI), 1994-2014;
- Researcher 1A, CNPq – National Council for Scientific and Technological Development, at the highest level since 1994.

4. *Professional Experience*

- Researcher, *Reliability Unit*, Ontario Hydro Research Division, Toronto, Canada, 1990-1991;
- Researcher, Power System Unit, INESC Porto, Portugal, 2003-2004;
- Power System Consulting Research Works (1980-2014) – **Some of them** are listed as follows:
  - Stochastic Power Flow Analysis (General Electric Company, Schenectady, NY, USA, 1980);
  - Probabilistic Load Flow (Eletrobrás, Brazil, 1987–1988);
  - Power Systems Dynamic Equivalents (Eletrobrás, Brazil, 1988);
  - Global Reliability Assessment – Hierarchical Level II Project (CEPEL/Eletrobrás, Brazil, 1988–1989);
  - Adequacy and Security Reliability Assessment (Ontario Hydro Research Division – OHRD, Toronto, Canada, 1990);
  - Estimation of Generator and Motor Insulation Remaining Life (OHRD, Toronto, Canada, 1991–1992);
  - System Observability – LIGHT Network (LIGHT–Rio, Brazil, 1993);
  - Probabilistic Markov Model Used for Estimation of the Remaining Life of Equipment (Ontario Hydro Technologies – OHT, Toronto, Canada, 1994–1995);

- Network Reliability Study on a Defined DVG (Germany) Test System (OHT/DVG, Canada/Germany, 1996);
- Reliability Assessment of the Colombian System (Energy Planning Unit – UPME, Bogotá, Colombia, 1997);
- Modifications to the APM (Asset Management Planner) Model to Automate Calculation of Frequencies of Repair (OHT, Toronto, Canada, 1997);
- Determination of the Transmission Operating Limits to Maximize Reliability and Revenue (OHT, Toronto, Canada, 1998);
- Expansion and Operation Planning under Uncertainties: Probabilistic and Fuzzy Modeling (Brazilian Electric Power Research Center – CEPEL, Rio de Janeiro, Brazil, 1998);
- Maintenance Strategies to Maximize Reliability and Revenue (OHT, Toronto, Canada, 1999);
- DESPRO – Outage Scheduling for Power System Equipment (CEPEL, Brazil, 1999);
- Interruption Costs Evaluation (Brazilian Electricity Regulatory Agency, ANEEL, Brasília, Brazil, 1999);
- A Review of Major Optimal Power Flow Programs (Ontario Power Generation, Toronto, Canada, 1999);
- Interruption Costs Evaluation – Preliminary Survey (Brazilian Electricity Regulatory Agency, ANEEL, Brazil, 2000);
- Reliability Analysis and Maintenance for Large Power Systems – Network Equivalents (Kinectrics, Canada, 2000);
- State of the Art Review for Decision Support Tools: New Economic Environment of Transmission Systems (Kinectrics, Toronto, Canada, 2000);
- Evaluation of Transmission Loss Factors for the Brazilian Wholesale Market: Model and Tool Development (MAE – Brazilian Wholesale Market, São Paulo, Brazil, 2000–2003);
- OSCAR – Outage Scheduling and Reliability Program (Kinectrics/Hydro One, Toronto, Canada, 2001–2002);
- Reliability Assessment of CEMIG Distribution Systems (CEMIG – Energy Company of the State of Minas Gerais, Brazil, 2001–2002);
- Computational System to Evaluate the Reliability of Distribution Networks (EDP – Bandeirante Energy Company, São Paulo, Brazil, 2002–2003);
- The Influence of Penetration Levels of Special Production to the Definition of Secure Reserve Needs (DGGE – Directorate General for Geology and Energy, Ministry of Economy, Portugal, 2003–2004);
- Methodology for Sub-transmission Optimal Planning Considering Uncertainties (CEMIG – Energy Company of the State of Minas Gerais, Belo Horizonte, Brazil, 2004–2006);
- Methodology for Determining the Amount of Utilization of the Transmission Network through Connection Points (AMPLA – Electricity Company of Rio de Janeiro, Niterói, Brazil, 2004-2006);
- Computational System to Evaluate the Reliability of Distribution Networks: An Extension (EDP – Bandeirante Energy Company, São Paulo, Brazil, 2006–2007);
- Evaluation of Operating Reserve Levels for the REN and REE Systems (Portuguese REN – Rede Eléctrica Nacional, Porto, Portugal and Spanish REE – Red Eléctrica de España, Madrid, Spain, 2007);
- Transmission Contingency Ranking (TRANK) – Hydro One Transmission System (Kinectrics/Hydro One, Toronto, Canada, 2007);
- Development of a Computational Tool to Evaluate the Static and Operating Reserves for the REN and REE Systems (Portuguese REN – Rede Eléctrica Nacional, Porto, Portugal and Spanish REE – Red Eléctrica de España, Madrid, Spain, 2008–2009);
- Development of a Monte Carlo Chronological Based Tool to Assess Reliability Indices for the CEMIG Distribution Networks: Minimizing Penalties (CEMIG – Energy Company of the State of Minas Gerais, Belo Horizonte, Brazil, 2008–2010);
- Substation and Transmission Contingency Ranking (Kinectrics/CEATI International, Toronto/Montreal, Canada, 2009);
- Transmission Expansion Planning Optimization – TEPOP (Kinectrics/Hydro One, Toronto, Canada, 2009–2010);
- Flexible and Intelligent Optimal Power Flow – FINEOPF (Kinectrics/Hydro One, Toronto, Canada, 2009–2010);

- Study on the Impact of Large Renewable Deployment on European Electricity High Voltage Systems – Reliability Evaluation (INESC Porto, Portugal, and European Commission JRC, Joint Research Center, Brussels, Belgium, 2009–2010);
- Probabilistic Methodology and Computational Tool to Assess the Optimal Amount of Technical Reserve for the CEMIG Substation Equipment (CEMIG – Energy Company of the State of Minas Gerais, Belo Horizonte, Brazil, 2010–2012);
- A New Methodology for Transmission Costs Allocation for the Brazilian System (Brazilian Electricity Regulatory Agency, ANEEL, Brasília, and nineteen companies (CPFL, Cemig, Tractebel, Neoenergia, Coelba, Cesp, AES, etc.) coordinated by DUKE Energy Brazil, São Paulo, Brazil, 2010–2011);
- Transmission Planning in the Presence of Large Amounts of Renewable Generation (Kinectrics/Hydro One, Toronto, Canada, 2010–2011);
- A New Interface for the PLANNER Program – Hydro One Transmission Planning Environment (Kinectrics/ Hydro One, Toronto, Canada, 2009–2011);
- Ranking of Transmission Substations – SRANK (Kinectrics/Hydro One, Toronto, Canada, 2010–2011);
- Fast Transient Stability Analysis – FASTAB (Kinectrics/Hydro One, Toronto, Canada, 2010–2011);
- New Ranking of Transmission Substations: Static and Dynamic Analyses – New SRANK (Kinectrics/Hydro One, Toronto, Canada, 2011–2012);
- Computational Tool for the Transmission Planning in the Presence of Large Amounts of Renewable Generation – (Kinectrics/Hydro One, Toronto, Canada, 2011–2012);
- Sub-transmission Planning Computational Program (CEMIG – Energy Company of the State of Minas Gerais, Belo Horizonte, Brazil, 2011–2013);
- Methodology and Computer Program for Static and Dynamic Network Equivalent Reduction – NETEQ (Kinectrics-Hydro One, Toronto, Canada, 2012–2014);
- Probabilistic Criteria for Establishing Substation Configurations in the Brazilian Interconnected Network (Brazilian ISO, Rio d Janeiro, Brazil, 2014-2015);
- Remaining Life Assessment of the Stator Winding Insulation of Synchronous Generators (CEMIG – Energy Company of the State of Minas Gerais, Belo Horizonte, Brazil, 2015–2017);
- Methodology for Calculation of Transmission System Usage Tariffs - The Market View and Suggested Advances (Thymos Inc. and Abraget - Brazilian Association of Thermoelectric Generators, Brazil, 2016);
- MORA: Model for Operational Reserve Adequacy (INESC TEC & REN - TSO, Portugal, 2017-2018).

- Software Developing. **Some of them** are listed as follows:
  - FLUXP – Probabilistic Load Flow;
  - REAL – Reliability Analysis of Electric Power Systems (Generation & Transmission);
  - REAL_G – Reliability Analysis of Generating Systems;
  - REAL_D – Reliability Analysis of Distribution Systems (also named REDIS);
  - REAL_M – Reliability Analysis – Maintenance;
  - OSCAR – Optimal Split Capacity Assessment and Risk;
  - OPERA – Operating Probabilistic Reserve Assessment;
  - RESERVE – Static and Operating Reserve Assessment with High Penetration of Renewable Sources;
  - EMAS – Equipment Maintenance Scheduler;
  - TRANK – Transmission Contingency Ranking;
  - SRANK – Substation Ranking (Static and Dynamic Assessment);
  - TEPOP – Transmission Expansion Planning Optimization;
  - FINEOPF – Flexible and Intelligent Optimal Power Flow;
  - PLANNER – Hydro One Transmission Planning Environment;
  - FASTAB – Fast Transient Stability Analysis;
  - $NETEQ_{Static}$ – Network Equivalent (Static Analysis);
  - $NETEQ_{Dynamic}$ – Network Equivalent (Dynamic Analysis);
  - TUST – Transmission Usage Tariff Tool.

- Reviewer of IEEE Transactions, IEE/IET Proceedings, EPSR, IJEPES, Automatica, IEEE/PICA Meetings, PMAPS, PSCC, IEEE PowerTech, Several Brazilian Conferences, etc.

5. Scientific Production

- M.Sc. Dissertations: Supervised (33); Under supervision (9);
- Ph.D. Theses: Supervised (26) Under supervision (4);
- Publications in Scientific Journals: 101 papers (48 IEEE Trans., 15 IEE/IET Proc. C, 19 other Int. Journals like EPSR, etc., 15 papers in 3 Brazilian Journals, and 4 book Chapters). **Some of them** are listed as follows:

  - R.N. Allan, A.M. Leite da Silva, and R.C. Burchett, "Evaluation Methods and Accuracy in Probabilistic Load Flow Analysis", ***IEEE Trans. on Power Apparatus and Systems***, vol. PAS-100, pp.2531-2546, May 1981.
  - R.N. Allan and A.M. Leite da Silva, "Probabilistic Load Flow Using Multilinearisations", ***IEE Proceedings Part C***, vol. 128, no. 5, pp. 280-287, September 1981.
  - R.N. Allan, A.M. Leite da Silva, A.A. Abu-Nasser, and R.C. Burchett, "Discrete Convolution in Power System Reliability", ***IEEE Trans. on Reliability***, vol. R-30, no. 5, pp. 452-456, December 1981.
  - A.M. Leite da Silva, M.B. Do Coutto Filho and J.F. de Queiroz, "State Forecasting in Electric Power Systems", ***IEE Proceedings Part C***, vol. 130, no. 5, pp. 237-244, September 1983.
  - A.M. Leite da Silva, V.L. Arienti, and R.N. Allan, "Probabilistic Load Flow Considering Dependence Between Input Nodal Powers", ***IEEE Trans. on Power Apparatus and Systems***, vol. PAS-103, pp. 1524-1530, June 1984.
  - A.M. Leite da Silva, G. Perrotta, R.B. Prada, and D.M. Falcão, "State Estimation for Integrated Multi-Terminal DC/AC Systems", ***IEEE Trans. on Power Apparatus and Systems***, vol. PAS-104, pp. 2349-2355, Sept. 1985.
  - A.M. Leite da Silva, R.N. Allan, S.M. Soares, and V.L. Arienti, "Probabilistic Load Flow Considering Network Outages", ***IEE Proceedings Part C***, vol. 132, no. 3, pp. 139-145, May 1985.
  - A.M. Leite da Silva, M.B. Do Coutto Filho, and J.M.C. Cantera, "An Efficient Dynamic State Estimation Algorithm Including Bad Data Processing", ***IEEE Trans. on Power Systems***, vol. PWRS-2, no.4, pp. 1050-1058, Nov. 1987.
  - A.M. Leite da Silva, F.A.F. Plazo Blanco, and J. Coelho, "Discrete Convolution in Generating Capacity Reliability Evaluation - LOLE Calculations and Uncertainty Aspects", ***IEEE Trans. on Power Systems***, vol. PWRS-3, no.4, pp. 1616-1624, Nov. 1988.
  - M.B. Do Coutto Filho, A.M. Leite da Silva, J.M. Calvo Cantera, and R.A. da Silva, "Information Debugging for Real-Time Power System Monitoring", ***IEE Proceedings Part C***, vol. 136, no. 3, pp. 145-152, May 1989.
  - A.M. Leite da Silva and V.L. Arienti, "Probabilistic Load Flow by a Multilinear Simulation Algorithm", ***IEE Proceedings Part C***, vol. 137, no.4, pp. 276-282, July 1990.
  - A.M. Leite da Silva, S.M.P. Ribeiro, V.L. Arienti, R.N. Allan, and M.B. Do Coutto Filho, "Probabilistic Load Flow Techniques Applied to Power System Expansion Planning", ***IEEE Trans. on Power Systems***, vol. 5, no. 4, pp. 1047-1053, Nov. 1990.
  - A.M. Leite da Silva, A.C.G. Melo, and S.H.F. Cunha, "Frequency and Duration Method for Reliability Evaluation of Large Scale Hydrothermal Generating Systems", ***IEE Proceedings Part C***, vol. 138, no. 1, pp. 94-102, Jan. 1991.
  - A.C.G. Melo, M.V.F. Pereira, and A.M. Leite da Silva, "Frequency and Duration Calculations in Composite Generation and Transmission Reliability Evaluation", ***IEEE Trans. on Power Systems***, vol. 7, no. 2, pp. 469-476, May 1992.
  - A.M. Leite da Silva, J. Coelho, and A.C.G. Melo, "Uncertainty Considerations in Frequency and Duration Analysis for Large Hydrothermal Generating Systems", ***IEE Proceedings Part C***, vol. 138, no. 3, pp. 277-285, May 1992.
  - E.J.S. Pires de Souza and A.M. Leite da Silva, "An Efficient Methodology for Identifying Coherent Generators", ***IEE Proceedings Part C***, vol. 139, no. 5, pp. 371-382, Sept. 1992.
  - A.M. Leite da Silva, J. Endrenyi, and L. Wang, "Integrated Treatment of Adequacy and Security in Bulk Power System Reliability Evaluations", ***IEEE Trans. on Power Systems***, vol. 8, no. 1, pp. 275-285, Feb. 1993.
  - A.C.G. Melo, M.V.F. Pereira, and A.M. Leite da Silva, "A Conditional Probability Approach to the Calculation of Frequency and Duration Indices in Composite Reliability Evaluation", ***IEEE Trans. on Power Systems***, vol. 8, no. 3, pp. 1118-1125, Aug. 1993.

- J.C.O. Mello, M.V.F. Pereira, and A.M. Leite da Silva, "Evaluation of Reliability Worth in Composite Systems Based on Pseudo-Sequential Monte Carlo Simulation", ***IEEE Trans. on Power Systems***, vol. 9, no. 3, pp. 1318-1326, Aug. 1994.
- J.C.S. Souza, A.M. Leite da Silva, and A.P. Alves da Silva Data Debugging for Real-Time Power System Monitoring Based on Pattern Analysis", ***IEEE Trans. on Power Systems***, vol. 11, no. 3, pp. 1592-1599, Aug. 1996.
- J.C.O. Mello, A.M. Leite da Silva, and M.V.F. Pereira, "Efficient Loss of Load Cost Evaluation by Combined Pseudo-Sequential and State Transition Simulation", ***IEE Proceedings Part C***, vol. 144, no. 2, pp. 147-154, March 1997.
- J.C.S. Souza, A.M. Leite da Silva, and A.P. Alves da Silva, "Data Visualisation and Identification of Anomalies in Power System State Estimation Using Artificial Neural Networks", ***IEE Proceedings Part C***, vol. 144, no. 5, pp. 445-455, Sept. 1997.
- J. Endrenyi, G.J. Anders, and A.M. Leite da Silva, "Probabilistic Evaluation of the Effect of Maintenance on Reliability - An Application", ***IEEE Trans. on Power Systems***, vol. 13, no. 2, pp. 576-583, May 1998.
- J.C.S. Souza, A.M. Leite da Silva, and A.P. Alves da Silva, "Online Topology Determination and Bad Data Suppression in Power System Operation Using Artificial Neural Network", ***IEEE Trans. on Power Systems***, vol. 13, no. 3, pp. 796-803, Aug. 1998.
- A.M. Leite da Silva, J.W. Marangon Lima, and G.J. Anders, "Available Transmission Capability - Sell Firm or Interruptible?," ***IEEE Trans. on Power Systems***, vol. 14, no. 4, pp. 1299-1305, Nov. 1999.
- A.M. Leite da Silva, L.A.F. Manso, J.C.O. Mello, and R. Billinton, "Pseudo-Chronological Simulation for Composite Reliability Analysis with Time Varying Loads", ***IEEE Trans. on Power Systems***, vol.15, no.1, pp.73-80, Feb. 2000
- A.M. Rei, A.M. Leite da Silva, J.L. Jardim, and J.C.O. Mello, "Static and Dynamic Aspects in Bulk Power System Reliability Evaluations", ***IEEE Trans. on Power Systems***, vol. 15, no. 1, pp. 189-195, Feb. 2000.
- G.J. Anders and A.M. Leite da Silva, "Cost Related Reliability Measures for Power System Equipment", ***IEEE Trans. on Power Systems***, vol. 15, no. 2, pp. 654-660, May 2000.
- A.C. Zambroni de Souza, J.C.S. Souza, and A.M. Leite da Silva, "On-Line Voltage Stability Monitoring", ***IEEE Trans. on Power Systems***, vol. 15, no. 4, pp. 1300-1305, Nov. 2000.
- A.M. Leite da Silva, A.M. Cassula, R. Billinton, and L.A.F. Manso, "Integrated Reliability Evaluation of Generation, Transmission and Distribution Systems", ***IEE Proc.-Gener. Trans. Distrib.***, vol. 149, no.1, pp.1-6, Jan. 2002.
- A.M. Leite da Silva, J.G.C. Costa, L.A.F. Manso, and G.J. Anders, "Transmission Capacity: Availability, Maximum Transfer and Reliability", IEEE Trans. on Power Syst., vol. 17, no. 3, pp. 843-849, Aug. 2002.
- A.M. Leite da Silva and J.G.C. Costa, "Transmission Loss Allocation - Part I: Single Energy Market, ***IEEE Trans. on Power Systems***", vol. 18, no. 4, pp. 1389-1394, Nov. 2003.
- A.M. Leite da Silva and J.G.C. Costa, "Transmission Loss Allocation - Part II: Multiple Interconnect Energy Markets, ***IEEE Trans. on Power Systems*** vol. 18, no. 4, pp. 1395-1401, Nov. 2003.
- A.M. Leite da Silva, L.C. Resende, L.A.F. Manso, and R. Billinton, "Well-Being Analysis for Composite Generation and Transmission Systems", ***IEEE Trans. on Power Systems***, vol. 19, no. 4, pp. 1763-1770, November 2004.
- A.M. Leite da Silva, W.F. Schmitt, A.M. Cassula, C.E. Sacramento, "Analytical and Monte Carlo Approaches to Evaluate Probability Distributions of Interruption Duration", ***IEEE Trans. on Power Systems***, vol. 20, no. 3, pp. 1341-1348, Aug. 2005.
- A.M. Leite da Silva, J.G.C. Costa, and C.M. Mattar, "A Probabilistic Approach for Determining the Optimal Amount of Transmission System Usage", ***IEEE Trans. on Power Systems***, vol. 21, no. 4, pp. 1557-1564, Nov. 2006.
- A.M. Leite da Silva and G.P. Alvarez, "Operating Reserve Capacity Requirements and Pricing in Deregulating Market Using Probabilistic Techniques", ***IET Proc.-Gener. Trans. Distrib.***, vol. 1, no. 3, pp.439-446, May 2007.
- A.M. Leite da Silva, L.C. Resende, L.A.F. Manso, and V. Miranda, "Composite Reliability Assessment Based on Monte Carlo Simulation and Artificial Neural Networks", ***IEEE Trans. on Power Systems***, vol. 22, no. 3, pp. 1202-1209, Aug. 2007.
- A.M. Leite da Silva, L.C. de Resende, L.A.F. Manso, and V. Miranda, " Well-being Analysis for Composite Generation and Transmission Systems Based on Pattern Recognition Techniques", ***IET Proc.-Gener. Trans. Distrib.***, vol. 2, no. 2, pp. 202-208, March 2008.

- V. Miranda, L.M. Carvalho, A.M. Leite da Silva, and M.A. Rosa, "Improving Power System Reliability Calculation Efficiency with EPSO Variants", ***IEEE Trans. on Power Systems***, vol. 24, no. 4, pp. 1772-1779, Nov. 2009.
- A.M. Leite da Silva, J.G.C. Costa, and A.A. Chowdhury, "Probabilistic Methodologies for Determining the Optimal Number of Substation Spare Transformers", ***IEEE Trans. on Power Systems***, vol. 25, no. 1, pp. 68-77, Feb. 2010.
- A.M. Leite da Silva, W.S. Sales, L.A.F. Manso, and R. Billinton, "Long-Term Probabilistic Evaluation of Operating Reserve Requirements with Renewable Sources", ***IEEE Trans. on Power Systems***, vol. 25, no. 1, pp. 106-116, Feb. 2010.
- A.M. Leite da Silva, R.A.G. Fernández, and C. Singh, "Generating Capacity Reliability Evaluation Based on Monte Carlo Simulation and Cross-Entropy Methods", ***IEEE Trans. on Power Systems***, vol. 25, no. 1, pp. 129-137, Feb. 2010.
- L.M. Honório, A.M. Leite da Silva, D.A. Barbosa, and L.F.N. Delboni, "Solving Optimal Power Flow Problems Using a Probabilistic α-Constrained Evolutionary Approach", ***IET Proc.-Gener. Trans. Distrib.***, vol. 4, no. 6, pp. 674-682, June 2010.
- A.M. Leite da Silva, L.S. Rezende, L.M. Honório, and L.A.F. Manso, "Performance Comparison of Metaheuristics to Solve the Multi-Stage Transmission Expansion Planning Problem", ***IET Proc.-Gener. Trans. Distrib.***, vol. 5, no. 3, pp. 360-367, March 2011.
- R.A.G. Fernández and A.M. Leite da Silva, " Reliability Assessment of Time-Dependent Systems via Sequential Cross-Entropy Monte Carlo Simulation", ***IEEE Trans. on Power Systems***, vol. 26, no. 4, pp. 2381-2389, Nov. 2011.
- L.M. Honório, A.M. Leite da Silva, and D.A. Barbosa, "A Cluster and Gradient-Based Artificial Immune System Applied in Optimization Scenarios", ***IEEE Trans. on Evolutionary Computation***, vol. 16, no. 3, pp. 301-318, June 2012.
- A.M. Leite da Silva, L.A.F. Manso, W.S. Sales, S.A. Flávio, G.J. Anders, L.C. Resende, "Chronological Power Flow for Planning Transmission Systems Considering Intermittent Sources" ***IEEE Trans. on Power Systems***, vol. 27, no. 4, pp. 2314-2322, Nov. 2012.
- L.M. Carvalho, M.A. Rosa, A.M. Leite da Silva, V. Miranda, "Probabilistic Analysis for Maximizing the Grid Integration of Wind Power Generation", ***IEEE Trans. on Power Systems***, vol. 27, no. 4, pp. 2323-2331, Nov. 2012.
- A.M. Leite da Silva, L.C. Nascimento, M.A. da Rosa, D. Issicaba, J.A. Peças Lopes, "Distributed Energy Resources Impact on Distribution System Reliability under Load Transfer Restrictions", ***IEEE Trans. on Smart Grid,*** vol. 3, no. 4, pp. 2048-2055, Dec. 2012.
- A.M. Leite da Silva, J.G.C. Costa, L.H.L. Lima, "A New Methodology for Cost Allocation of Transmission Systems in Interconnected Energy Markets" ***IEEE Trans. on Power Systems***, vol. 28, no. 2, pp. 740-748, May 2013.
- L.M. Carvalho, R.A.G. Fernández, A.M. Leite da Silva, M.A. Rosa, V. Miranda, "Simplified Cross-Entropy Based Approach or Generating Capacity Reliability Assessment", ***IEEE Trans. on Power Systems,*** vol. 28, no. 2, pp. 1609-1616, May 2013.
- R.A.G. Fernández, A.M. Leite da Silva, L.C. Resende, M.T. Schilling, "Composite Systems Reliability Evaluation Based on Monte Carlo Simulation and Cross-Entropy Methods", ***IEEE Trans. on Power Systems***, vol. 28, no. 4, pp. 4598-4606, Nov. 2013.
- M.Th. Schilling, A.M. Leite da Silva, "Conceptual Investigation on Probabilistic Adequacy Protocols: Brazilian Experience", ***IEEE Trans. on Power Systems,*** vol. 29, no. 3, pp. 1270-1278, May 2014.
- A.M. Leite da Silva, A. Violin, C. Ferreira, Z.S. Machado Jr., "Probabilistic Evaluation of Substation Criticality Based on Static and Dynamic System Performances", ***IEEE Trans. on Power Systems,*** vol. 29, no. 3, pp. 1410-1418, May 2014.
- Z. Shu, P. Jirutitijaroen, A.M. Leite da Silva, C. Singh, "Accelerated State Evaluation and Latin Hypercube Sequential Sampling for Composite System Reliability Assessment", ***IEEE Trans. on Power Systems,*** accepted for publication, 2014.
- A.M. Leite da Silva, J.G. Carvalho Costa, K.G. Machado, L.L. Souza, R.A.G. Fernández, "Probabilistic Method for Optimizing the Number and Timing of Substation Spare Transformers", ***IEEE Trans. on Power Systems***, vol. 30, no. 4, pp. 2004-2012, July 2015.

- A.M. Leite da Silva, M.R. Freire, L.M. Honório, "Transmission Expansion Planning Optimization by Adaptive Multi-Operator Evolutionary Algorithms", ***Electric Power Syst. Research***, vol. 133, pp. 173-181, April 2016.
- A.M. Leite da Silva, J.F. Costa Castro, R.A. González-Fernández, "Spinning Reserve Assessment under Transmission Constraints Based on Cross-Entropy Method", ***IEEE Trans. on Power Systems***, vol. 31, no. 2, pp. 1341-1349, March 2016.
- A.M. Leite da Silva, J.L. Jardim, L.R. Lima, Z.S. Machado Jr., "A Method for Ranking Critical Nodes in Power Networks Including Load Uncertainties", ***IEEE Trans. on Power Systems***, vol. 31, no. 2, pp. 1624-1632, March 2016.
- J.L. Jardim, A.M. Leite da Silva, "Methodology for Computing Robust Dynamic Network Equivalents of Large Power Systems", ***Electric Power Systems Research***, Vol. 143, pp. 513-521, Feb. 2017.

- Publications in Book Chapters:

  - A.M. Leite da Silva, C.E. Sacramento, L.A.F. Manso, L.S. Rezende, L.C. Resende, and W.S. Sales, "Metaheuristics-Based Optimization Methods for Transmission Expansion Planning Considering Unreliability Costs", Chapter 4 – Book "Optimization Advances in Electric Power Systems", ***Nova Science Publishers***, Hardcover, ISBN: 978-1-60692-613-0, pp. 59-85, Dec. 2008.
  - A.M. Leite da Silva, L.S. Rezende, and L.A.F. Manso, "Transmission Expansion Planning: A Methodology to Include Security Criteria and Uncertainties Using Optimization Techniques", Chapter 6 – Book "Innovations in Power Systems Reliability", ***Springer Series in Reliability Engineering***, Eds. George Anders and Alfredo Vaccaro, Springer, Feb. 2011.
  - A.M. Leite da Silva, L.A.F. Manso, S.A. Flávio, M.A. Rosa, L.C. Resende, "Composite Reliability Assessment of Power Systems with Large Penetration of Renewable Sources", Chapter 8 – Book "Reliability and Risk Evaluation of Wind Integrated Power Systems", ***Springer Series in Reliable and Sustainable Electric Power and Energy Systems Management***, Eds. R. Billinton, R. Karki, and A.K. Verma, Springer, February 2013.
  - M.A. Rosa, M.A. Matos, R. Ferreira, A.M. Leite da Silva, and W.S. Sales, "Operational Reserve Assessment Considering Wind Power Fluctuations in Power Systems", Handbook of Wind Power Systems, Part II – Grid Integration of Wind Power Systems***, Springer Series in Energy Systems***, Series Editor, P.M. Pardalos, Springer, 2013.

- Publications in Proceedings of Conferences: 77 papers in International Conferences and 156 papers in Brazilian Conferences. **<u>Some conference participations</u>** (always presenting papers, etc.) are listed as follows:

  - IEEE PES Winter, Summer, and General Meetings: Atlanta (1981, 1990), New York (1985, 1988, 1989, 1992), San Diego (1991, presentation of paper and Session Chairman "Reliability Techniques Equipment and System Analysis"), Dallas (1984), New Orleans (1987), Baltimore (1996), Edmonton (1999, presentation of paper and Key Speaker of Panel "Risk-Based Dynamic Security Assessment"), Singapore (2000), Detroit (2011, Key Speaker of Panel "Power System Flexibility"); San Diego (2012); Denver (2015, Key Speaker of Panel "Probabilistic System Planning").
  - PMAPS - Probabilistic Methods Applied to Power Systems – Member of the International Technical Advisory Committee: Toronto, Canada (1986); Oakland, U.S. (1988, Session Chairman "Power Systems Operation"); London, UK (1991); Rio de Janeiro, Brazil (1994, Chairman of Sessions "Reliability Assessment" and "Planning and Operation of Power Systems"); Vancouver, Canada (1997, Key Speaker of Panel "Maintaining Reliability in a Competitive Environment" and Session Chairman "Developing and Modeling I"); Funchal, Portugal (2000, Session Chairman "Power System Planning"); Naples, Italy (2002, Session Chairman "Planning and Operation I"); Ames, Iowa, USA (2004, Session Chairman "Renewables"); Stockholm, Sweden (2006, Tutorial "Composite Generation and Transmission System Reliability Evaluation" and Session Chairman "Monte Carlo-Based Approaches to Assessing Power System Reliability"); Rincón, Puerto Rico (2008, Session Chairman "Transmission III"); Singapore (2010, Session Chairman "Reliability Prediction"); Istanbul, Turkey (2012, Session Chairman "Reliability Analysis V"); Durham, UK (2014, Session Chairman "Smart Grids and Microgrids"); Beijing, China (2016, Tutorial "Applications and Researches in Power System Reliability Assessment" and Session Chairman "Probabilistic Applications in Utilities".
  - Other International Conferences: 1996 PSCC – Power System Computation Conference, Dresden, Germany; 1991 CIGRE Symposium on Electric Power System Reliability, Montreal, Canada; 2001 IEEE Power Tech, Porto, Portugal (Chairman of Sessions "Power System Operation 4" and "Enhancing Quality in Technical Solutions"); 2011 CIGRÉ - International Symposium on Assessing and Improving Power System Security, Reliability and Performance in Light of Changing Energy Sources, Recife, Brazil (Tutorial "Integration of renewable and storage energy to deliver optimum system performance"; "International Power and Energy Reliability Forum 2014", Chongqing, China (Tutorial "Application of Monte Carlo Simulation in Power

System Reliability Assessment"); 18th ISAP – International Conference on Intelligent System Applications to Power Systems (2015, Session Chairman "System Planning").

- Several participations in Brazilian conferences: SEPOPE, SNPTEE, CBA, etc.;
- Total Conference Participations ⇒ 75.

- **Total of publications** (periodicals/journals, conferences, technical reports, etc.) ⇒ **401**;
- **Citation Hirsch's index *h=38***, using the following names: "AM Leite da Silva", "AML da Silva", "DAS Leite", "AM da Silva", etc. Approximate number of **citations ⇒ 5103** (Google Scholar).

6. Awards and Recognitions

- **The Sebastian Z. de Ferranti premium**, Power Division of the IET/IEE (Institution of Electrical Engineers), Outstanding Paper to "*Frequency and Duration Method for Reliability Evaluation of Large Scale Hydrothermal Generating Systems*", by A.M. Leite da Silva, A.C.G. Melo, and S.H.F. Cunha, London, UK, 1992.
- Indication (Nomination) to the IEEE Outstanding Paper by the "Application of Probability Methods Subcommittee (APM)" for the paper "*Integrated Treatment of Adequacy and Security in Bulk Power System Reliability Evaluations*", by A.M. Leite da Silva, J. Endrenyi, and L. Wang, USA, 1993.
- Honor Paper (2nd place), XIV SNPTEE, Brazilian Conference on Production and Transmission of Electric Energy, to "*Application of ANN to Data Debugging in Power System Monitoring" in Portuguese*, Belém, Brazil, 1997.
- Honor Paper (3rd place), XIV SNPTEE, to "*Spinning Reserve Requirements in Competitive Environments*", *in Portuguese*, Belém, Brazil, 1997.
- **IEEE Fellow** - Engineer/Scientist, with citation *"For contributions to the application of probabilistic models to electric power systems planning and operations and to power engineering education"*, IEEE, U.S., 2000.
- **Prize Paper PMAPS**, 10th Probabilistic Methods Applied to Power Systems - PMAPS'2008 International Conference, Rincón, Puerto Rico, 25-29 May, 2008, paper: "*Artificial Neural Networks Applied to Reliability and Well-Being Assessment of Composite Power Systems*", by A.M. Leite da Silva, L.C. Resende, L.A.F. Manso, V. Miranda.
- **INESC Porto Fellow** given by the "Board of Directors", September 2008, Porto, Portugal, with citation "*Outstanding professional record and proficuous cooperation with the institution*";
- Honor Paper, best paper in "System Development and Economics", at the XIII ERIAC – Encuentro Iberoamericano de Cigré, Puerto Iguazú, Argentina, 24-28 May, 2009, paper: "*Evaluation of Adequate Levels of Operating Reserve in the Electric Iberian Systems for the Medium- and Long-Terms*" (in Spanish).
- **PMAPS Merit Award,** 11th Probabilistic Methods Applied to Power Systems - PMAPS'2010 International Conference, Singapore, 14-17 June, 2010, "*In Recognition and Appreciation for Contributions to the Development and Application of Probability Methods Applied to Power Systems*".
- **PES Technical Committee Prize Paper Award**, for the paper "*Generating Capacity Reliability Evaluation Based on Monte Carlo Simulation and Cross-Entropy Methods*", by A.M. Leite da Silva, R.A.G. Fernández, and C. Singh, published at the IEEE Transactions on Power Systems, February 2010. The PSACE (Power Systems Analysis, Computing, and Economics Committee) was the technical Committee responsible for the award during the "2011 IEEE Power & Energy Society General Meeting (IEEE-PES-GM)", Detroit, Michigan USA, 24-28 July, 2011.
- Honor Paper (2nd place), XXI SNPTEE, Brazilian Conference on Production and Transmission of Electric Energy, to "*Allocation of Transmission Costs in Brazil: Analysis, Improvement, and Generalization of the Nodal Methodology*, Florianópolis, SC, Brazil, 2011.

- **IEEE PES Roy Billinton Power System Reliability Award**, received during the "Awards Ceremony and Banquet", 24 July, 2012 IEEE Power & Energy Society General Meeting (IEEE-PES-GM), San Diego, California, USA, with the following citation: "*For Contributions to Analytical and Monte Carlo Simulation Based Methods in Power System Reliability Assessment*".
- **Centennial Gold Medal,** Federal University of Itajubá – UNIFEI (1913-2013). The only professor to receive this honor, presented by the Rector of UNIFEI, Prof. Dagoberto A. Almeida and by the City Mayor of Itajubá, Mr. Rodrigo Riera, November 23, 2013.
- Honor title of **Advisory Professor of Chongqing University** and member of International Advisory Committee do Power and Energy Reliability Center, established by the Chinese Government at the Chongqing University, February 2014, China.

7. Additional Information

- Professional Affiliations:
  - Professional Engineer – CREA-RJ (since 1975) and CREA-MG (since 1994), where CREA means "Conselho Regional de Engenharia e Arquitetura" (Regional Council for Engineering and Architecture);
  - IEEE Fellow since 2000 – Started as Student Member (1977), Member (1978), and Senior Member (1991);
  - SBA – Brazilian Society of Automatic Control;
- CNPq/MCT – National Council for Scientific and Technological Development, Ministry of Science and Technology (MCT), Brazil: Associate researcher since 1985 (at the highest level "1A" since 1994). Member of the Electrical Engineering Advisory Committee, during the periods "1992-1994" and "1999-2001";
- CAPES/MEC – Coordination for the Brazilian Post-Graduation Courses, Ministry of Education (MEC), Brazil: Member of the Engineering IV Advisory Committee, during the period "2000-2001";
- IEEE PES Fellow Committee: Member during the period "2008-2010";
- Administrative Positions at the Universities (UFRJ, PUC-Rio and UNIFEI): Several positions have been occupied since 1975, besides teaching undergraduate and graduate disciplines (electric circuits, power system analysis, power system planning and operation, reliability analysis, stochastic processes);
- Power Systems Reliability Courses for the Industry (Brazil and abroad): About 32 "one-week" courses (40 hours), training about 950 engineers and professors;
- Areas of Research Interest: Power system analysis (static and dynamic); Probabilistic methods applied to power systems (monitoring, operation, planning, and maintenance); Stochastic processes; Monte Carlo simulation; Cross entropy methods; Rare event simulation; State estimation (static and dynamic); Power system optimization; Metaheuristics; Electricity markets (cost allocation, tariff structure, penalties, insurance, etc.), Renewable energy, Smart and micro grids;
- Reference Names (*in no preference order*):
  - Dr. George Anders – Principal Engineer/Scientist, Transmission and Distribution Technologies Department, Kinectrics (former Ontario Hydro RD), Toronto, Ontario, Canada (e-mail: george.anders@bell.net);
  - Prof. Roy Billinton – Emeritus Professor, Department of Electrical Engineering, University of Saskatchewan, Saskatoon, Canada (e-mail: roy250@mail.usask.ca);
  - Prof. Ron Allan – Former Professor, University of Manchester (UMIST), England, UK (e-mail: ronallan10@gmail.com);
  - Dr. John Endrenyi – Former Principal Scientist Emeritus, Transmission and Distribution Technologies Department, Kinectrics, Toronto, Ontario, Canada (e-mail: john.endrenyi@rogers.com);
  - Prof. Vladimiro Miranda – Director of INESC Porto and Professor at FEUP (Faculty of Engineering, University of Porto), Porto, Portugal (e-mail: vmiranda@inescporto.pt);

- Prof. Chanan Singh – Professor Electrical & Computer Engineering Department, Texas A&M University, College Station, TX, U.S. (e-mail: singh@ece.tamu.edu);
- Prof. Dr. Marcus Th. Schilling – Former Senior Engineer – Eletrobrás and Professor at the Fluminense Federal University (UFF), Brazil (e-mail: marcustheodors@gmail.com);
- Prof. Dr. Pedro Magalhães Guimarães Ferreira S.J. – Former Vice-Rector and Emeritus Professor at the Pontifical Catholic University of Rio de Janeiro, (PUC-Rio), Rio de Janeiro, RJ, Brazil, (e-mail: pedromgf@puc-rio.br);
- Dr. João Carlos de Oliveira Mello – President of Thymos Energy Consulting, São Paulo, SP, Brazil, (e-mail: jmello@thymosenergia.com.br);
- Dr. Albert C. Geber de Melo – General Director, Brazilian Electric Power Research Center (Centro de Pesquisas de Energia Elétrica), CEPEL, Eletrobrás, Rio de Janeiro, RJ, Brazil, (e-mail: albert@cepel.br);
- Dr. Wenyuan Li – Principal Engineer at BC Hydro, Vancouver, Canada, (e-mail: wenyuanli630@gmail.com).

Rio de Janeiro, May 21th, 2017

Rio de Janeiro, BRAZIL