Xiaoyu (Shawn) Wang

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PROFESSIONAL PROFILE

Dr. Xiaoyu Wang joined Brookhaven National Laboratory in 2010. Dr. Wang's expertise includes power systems modeling, controller design for power electronic devices especially for renewable energy integration incorporated with energy storage systems (ESS). He has extensive experiences on dynamic modeling the wind and solar energy resources and how to solve the operational challenges faced by the grid operators when a large scale of intermittent renewable energy resources penetrates to the existing power systems. Dr. Wang is familiar with the analytical tools and simulation software used for power system analysis, among others including PSCAD, PSS/E, Matlab/SimPower and DEW. He also has hand-on experiences of relay protection programming and testing.

In 2012, Dr. Wang worked with a utility modeling its smarter grid with an integrated system model and applying algorithms for analyzing and evaluating cost benefits analysis of phase balancing, and capacitor placement, etc. in the utility system.

Currently Dr. Wang is working on a project to investigate the degradation of inertial response with high penetration levels of solar energy integrated with grid and how to use ESS for addressing this technical issue, herein to increase the penetration levels of solar energy in the grid. This method can be adopted in deployment of other type renewable energy generations with stochastic characteristics.

EDUCATION

Ph. D in Power Engr.	Nanyang Technological University, Singapore	2008
MSc in Power Engr.	North China Electric Power University, China	2004
BSc in Power Engr.	North China Electric Power University, China	1999

PROFESSIONAL MEMBERSHIP AND SERVICES

- Member, IEEE
- Reviewer for
  - IEEE Transactions on Smart Grid
  - IEEE Transactions on Sustainable Energy
  - IEEE Transactions on Power Delivery
  - IEEE Transactions on Energy Conversion
  - IEEE Transactions on Industrial Electronics
  - Electric Power System Research
  - European Transactions on Electrical Power

PUBLICATIONS:

- **X. Y. Wang**, D. M. Vilathgamuwa and S. S. Choi, "Determinant of battery energy storage capacity required in a buffer as applied to wind energy," *IEEE Trans. on Energy Conversion*, vol. 23, no. 3, pp. 868 - 878, Sept. 2008.
- S. Zhang, K. J. Tseng, T. D. Nguyen, **X. Y. Wang** and D. M. Vilathgamuwa, "Design of a Robust Grid Interface System for PMSG-based Wind Turbine Generators," *IEEE Transactions on Industrial Electronics*, vol. 58, no. 1, pp. 316-328, Jan. 2011.

- **X. Y. Wang**, D. M. Vilathgamuwa and S. S. Choi, "Design of energy storage system for a buffer scheme to enhance network transient stability and load ride-through," *International Journal of Power Sources*, vol. 179, no. 2, pp. 819-829, May 2008.
- **X. Y. Wang**, M. Yue, and E. Muljadi, "System Design for an Integrated Solar Generation and Energy Storage System with a Ride-through Capability," submitted to *IEEE Trans. on Industrial Application*.
- **X. Y. Wang**, M. Yue, R. Lofaro and E. Muljadi, "Probability-based method for capacity specifications of storage systems in wind farms," submitted to *IEEE Trans. on Industrial Application*.
- M. Yue, **X. Y. Wang**, and M. Villaran, **"**Dynamic modeling of a hybrid solar/battery storage energy system and grid integration study," submitted to *IEEE Trans. on Sustainable Energy*.
- **X. Y. Wang**, M. Yue, R. Lofaro and E. Muljadi, "Impact of large scale integration of wind power on transient stability," in preparation.
- **X. Y. Wang**, Y. K. Wu and S. F. Huang, "Optical pilot differential current protection based on fault component," *Electric Power Automation Equipment*, vol. 24, no. 2, pp. 60-63, Feb. 2004.
- **X. Y. Wang**, M. Yue, and E. Muljadi, "Innovative Control System Design for an Integrated Solar Generation and Energy Storage System with Ride-through Capability," in *Proc. of ECCE 2012*, Raleigh, NC, USA.
- W. Z. Gao, **X. Y. Wang**, and E. Muljadi, "A new probability-based method for power capacity specification of energy storage systems for wind power plant," in *Proc. of ECCE 2011*, Phoenix, AZ, USA.
- W. Z. Gao, **X. Y. Wang** and E. Muljadi, "Probability-based method for power capacity specification of wind energy storage systems," in *Proc. of ICIEA 2011*, Beijing, China.
- H. Babazadeh, W. Z. Gao, **X. Y. Wang**, "Controller design for a Hybrid Energy Storage System enabling longer battery life in wind turbine generators," in *Proc. of NAPS 2011*, Boston, MA, USA.
- M. Yue, M. Villaran, R. Lofaro, and **X. Y. Wang**, "Detailed Modeling and Integration Study of Grid-Connected Solar PV Generation with Energy Storage and Power-Factor Control Capability," in *Proc. of SPI 2011*, Dallas, TX, USA.
- **X. Y. Wang**, D. M. Vilathgamuwa, K. J. Tseng et al.**,** "Controller design for variable-speed permanent magnet wind turbine generators interfaced with Z-source inverter," in *Porc. of PEDS 2009*, Taiwan.
- S. S. Choi, D. L. Yao, **X. Y. Wang**, et al., "Design of Power Buffers and their applications in wind farms," in *Proc. of IEJ 2009*, Japan.
- **X. Y. Wang**, D. M. Vilathgamuwa and S. S. Choi, "Design of a power buffer system to enhance voltage stability," in *Proc. ICHQP 2008*, Wollongong, NSW, Australia.
- D. M. Vilathgamuwa, **X. Y. Wang** and C. Gajanayake, "Z-source converter based grid-interface for variable-speed permanent magnet wind turbine generators," in *Proc. of IEEE PESC 2008*, Rhodes, Greece.
- S. S. Choi, **X. Y. Wang**, and D. M. Vilathgamuwa, "On the design of power buffer and its applications," in *Proc. of IEEE DRTP 2008*, Nanjing, China.
- **X. Y. Wang**, D. M. Vilathgamuwa and S. S. Choi, "Decoupling load dynamics to prevent power system collapse," in *Proc. of IEEE PES 2006*, Montreal, Canada.
- **X. Y. Wang**, D. M. Vilathgamuwa and S. S. Choi, "Decoupling load and power system dynamics to improve system stability," in *Proc. of IEEE PEDS 2005*, Kuala Lumpur, Malaysia.