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CONTACT INFORMATION	<i>Mailing Address:</i> 1495 S. Steele St. Denver, CO 80210	<i>Webpage:</i> www.brianjohnsonresearch.com <i>Mobile:</i> (217) 778-3667 <i>E-mail:</i> johnson.brianb@gmail.com
AREAS OF EXPERTISE	Power Systems, Power Electronics, Control Systems, Distributed Generation, Photovoltaics, Energy Conversion Systems	
AFFILIATION	<b>National Renewable Energy Laboratory</b> , Golden, Colorado Electrical Engineer, March 2013 – Present	
EDUCATION	<b>University of Illinois at Urbana-Champaign</b> , Urbana, Illinois Ph.D., Electrical and Computer Engineering, May 2013 <ul style="list-style-type: none"> <li>• Thesis: <i>Control, Analysis, and Design of Distributed Inverter Systems</i></li> <li>• Adviser: Professor Philip T. Krein</li> </ul> M.S., Electrical and Computer Engineering, December 2009 <ul style="list-style-type: none"> <li>• Thesis: <i>A Unified Technique for Dynamic Modeling and Stability Analysis of Microgrid Systems</i></li> <li>• Adviser: Associate Professor Patrick L. Chapman</li> </ul> <b>Texas State University</b> , San Marcos, Texas B.S., Physics, and B.M., Music, May 2008	
JOURNAL PUBLICATIONS	J.12) <b>B. Johnson</b> , P. Krein, “An Analytical Time-Domain Expression for the Net Ripple Produced by Parallel Interleaved Converters,” <i>IEEE Transactions on Circuits and Systems II: Express Briefs</i> , 2016, (Accepted). J.11) J. Cale, E. Dall’Anese, <b>B. Johnson</b> , and P. Young, L. Holton, D. Zimmerle, “A Method for Mitigating Communication Latency Errors in Remote Hardware-in-the-loop Experiments,” <i>IEEE Transactions on Industrial Electronics</i> , 2016, (Submitted). J.10) <b>B. Johnson</b> , M. Sinha, N. Ainsworth, F. Dörfler, and S. Dhople, “Synthesizing virtual oscillators to control islanded inverters,” <i>IEEE Transactions on Power Electronics</i> , vol. 31, no. 8, pp. 6002–6015, Nov. 2015. J.9) M. Sinha, F. Dörfler, <b>B. Johnson</b> , S. Dhople, “Uncovering droop control laws embedded within the nonlinear dynamics of Van der Pol oscillators,” <i>IEEE Transactions on Control of Network Systems</i> , 2015, (Accepted). J.8) E. Dall’Anese, S. Dhople, <b>B. Johnson</b> , G. Giannakis, “Optimal dispatch of residential photovoltaic inverters under forecasting uncertainties,” <i>IEEE Journal of Photovoltaics</i> , vol. 5, no. 1, pp. 350–359, Jan. 2015. J.7) E. Dall’Anese, S. Dhople, <b>B. Johnson</b> , G. Giannakis, “Decentralized optimal dispatch of photovoltaic inverters in residential distribution systems,” <i>IEEE Transactions on Energy Conversion</i> , vol. 29, no. 4, pp. 957–967, Dec. 2014. J.6) <b>B. Johnson</b> , S. Dhople, A. Hamadeh, and P. Krein, “Synchronization of parallel single-phase inverters using virtual oscillator control,” <i>IEEE Transactions on Power Electronics</i> , vol. 29, no. 11, pp. 6124–6138, Nov. 2014. J.5) S. Dhople, <b>B. Johnson</b> , F. Dörfler, and A. Hamadeh, “Synchronization of nonlinear circuits in generalized dynamic electrical networks,” <i>IEEE Transactions on Circuits and Systems I: Fundamental Theory and Applications</i> , vol. 61, no. 9, pp. 2677–2690, Sept. 2014.	

- J.4) **B. Johnson**, S. Dhople, A. Hamadeh, and P. Krein, “Synchronization of nonlinear oscillators in an LTI electrical power network,” *IEEE Transactions on Circuits and Systems I: Fundamental Theory and Applications*, vol. 61, no. 3, pp. 834-844, Mar. 2014.
- J.3) **B. Johnson**, S. Dhople, J. Cale, A. Hamadeh, and P. Krein, “Oscillator-based inverter control for islanded three-phase microgrids,” *IEEE Journal of Photovoltaics*, vol. 4, no. 1, pp. 387–395, Jan. 2014.
- J.2) P. Shenoy, K. Kim, **B. Johnson**, and P. Krein, “Differential power processing for increased energy production and reliability of photovoltaic systems,” *IEEE Transactions on Power Electronics*, vol. 28, no. 6, pp. 2968–2979, June 2013.
- J.1) **B. Johnson**, A. Davoudi, P. Chapman, and P. Sauer, “A unified dynamic characterization framework for microgrid systems,” *Electric Power Components and Systems*, vol. 40, no. 1, pp. 93–111, Nov. 2011.
- CONFERENCE PUBLICATIONS C.13) **B. Johnson**, S. Salapaka, B. Lundstrom, M. Salapaka, “Optimal Structures for Voltage Controllers in Inverters,” in *Proc. 2016 International Symposium on Mathematical Theory of Networks and Systems*, 2016, (Accepted).
- C.12) M. Sinha, F. Dörfler, **B. Johnson**, and S. Dhople, “Synchronization of Lienard-type oscillators in Uniform Electrical Networks,” in *Proc. 2016 American Control Conference*.
- C.11) M. Sinha, **B. Johnson**, N. Ainsworth, F. Dörfler, and S. Dhople, “Nonlinear Supersets to Droop Control,” in *Proc. 2015 Workshop on Control and Modeling for Power Electronics*, 2015, pp. 1–6.
- C.10) M. Sinha, F. Dörfler, **B. Johnson**, and S. Dhople, “Virtual oscillator control subsumes droop control,” in *Proc. 2015 American Control Conference*, 2015, pp. 2353–2358.
- C.9) S. Salapaka, **B. Johnson**, B. Lundstrom, S. Kim, S. Collyer, and M. Salapaka, “Viability and analysis of implementing only voltage-power droop for parallel inverter systems,” in *Proc. Control and Decision Conference*, 2014, pp. 3246–3251.
- C.8) F. Dörfler, S. Dhople, **B. Johnson**, and A. Hamadeh, “Synchronization of nonlinear circuits in dynamic electrical networks,” in *Proc. IEEE European Control Conference*, 2014, pp. 552–557.
- C.7) S. Dhople, **B. Johnson**, F. Dörfler, and A. Hamadeh, “Virtual oscillator control for voltage source inverters,” in *Proc. Allerton Conference on Communication, Control, and Computing*, 2013, pp. 1359–1363.
- C.6) **B. Johnson**, A. Lentine, P. Krein, and Z. Zheng, “A single-stage three-phase ac module for high-voltage photovoltaics” in *Proc. IEEE Applied Power Electronics Conference*, 2012, pp. 885–891.
- C.5) P. Shenoy, **B. Johnson**, and P. Krein, “Differential power processing architecture for increased energy production and reliability of photovoltaic systems,” in *Proc. IEEE Applied Power Electronics Conference*, 2012, pp. 1987–1994.
- C.4) A. Bazzi, K. Kim, **B. Johnson**, P. Krein, and A. Dominguez-Garcia, “Fault impacts on solar power unit reliability,” in *Proc. IEEE Applied Power Electronics Convention*, 2011, pp. 1223–1231.
- C.3) **B. Johnson**, P. Krein, and P. Chapman, “Photovoltaic ac module composed of a very large number of interleaved inverters,” in *Proc. IEEE Applied Power Electronics Convention*, 2011, pp. 976–981.

- C.2) K. Kroeger, S. Choi, A. Bazzi, **B. Johnson**, and P. Krein, “A digital implementation of continuous-time ripple correlation control for photovoltaic applications,” in *Proc. IEEE Power and Energy Conference at Illinois*, 2010, pp. 7–11.
- C.1) **B. Johnson**, A. Davoudi, P. Chapman, and P. Sauer, “Microgrid dynamics characterization using the automated state model generation algorithm,” in *Proc. IEEE International Symposium on Circuits and Systems*, 2010, pp. 2758–2761.

## GRANTS

- [PI], “Stabilizing the Power System in 2035 and Beyond: Evolving from Grid-Following to Grid-Forming Distributed Inverter Controllers,” Department of Energy –Solar Energy Technologies Office, Oct. 2015–Sept. 2018, Agreement # 30364, Amount: \$3,849,999.
- [PI], “Optimal Inverter Dispatch: Facilitating High PV Penetration with Optimization and Grid Informatics,” National Renewable Energy Laboratory–Internal R&D Program, Oct. 2014–Sept. 2016, Amount: \$385,774.

## PATENTS

- B. Johnson**, P. Krein, and P. Chapman, “Inverter array with localized inverter control,” SolarBridge Technologies, Application # (13/030,118), U.S.
- B. Johnson**, P. Krein, A. Lentine, “Micro-inverters for employment in connection with photovoltaic modules,” Sandia National Laboratories, Application # (13/741,546), U.S.
- P. Krein, **B. Johnson**, S. Dhople, and A. Hamadeh, “Virtual oscillator control of power electronic inverters,” U. S. Patent # (61/875,518), U.S.

## HONORS AND AWARDS

- NREL Outstanding Mentor Award (2015)
- NREL Chairman’s Award for Exceptional Performance (2013)
- National Science Foundation Graduate Research Fellowship (2010-2013)
- University of Illinois Graduate College Fellowship (2008-2010)
- Support for Under-Represented Groups in Engineering Fellowship (2008-2010)
- Outstanding Presentation Award – Applied Power Electronics Conference (2011)
- Outstanding Graduating Physics Major (2008)
- Houston Louis Stokes Alliance for Minority Participation Scholarship (2006-2008)

## SERVICE

## Editorial Experience:

- Associate Editor for *IEEE Transactions on Energy Conversion* (2016–present)
- Guest Editor for *IEEE Transactions on Energy Conversion* Special Issue: Advanced Distributed Control of Energy Conversion Devices and Systems (2015)

## Reviewer for:

- *IEEE Transactions on Energy Conversion*
- *IEEE Transactions on Power Electronics*
- *IEEE Transactions on Circuits and Systems*
- *IEEE Transactions on Power Systems*
- *IEEE Transactions on Automatic Control*
- *IEEE Transactions on Industrial Electronics*
- *IEEE Journal of Emerging and Selected Topics in Power Electronics*
- *IEEE Journal of Photovoltaics*
- *Electric Power Components and Systems*
- *IET Power Electronics*
- *International Journal of Electrical Power and Energy Systems*
- *IEEE Control and Decision Conference* (2015)
- *IEEE Indian Control Conference* (2014)
- *IEEE Energy Conversion Conference and Exposition* (2013)

- *IEEE Photovoltaic Specialists Conference* (2013, 2014)
- *IEEE Applied Power Electronics Conference* (2011, 2012)
- *IEEE International Symposium on Circuits and Systems* (2010, 2011)
- *IEEE North American Power Symposium* (2012)
- *IEEE Power and Energy Conference at Illinois* (2011, 2012)

Conference Service:

- Technical Program Committee: *IEEE Workshop on Control and Modeling for Power Electronics (COMPEL)* (2015)
- Session Chair: *IEEE Power and Energy Conference at Illinois* (2011, 2012)
- Volunteer Coordinator: *IEEE Energy Conversion Conference and Exposition* (2013)

PROFESSIONAL  
EXPERIENCE

**National Renewable Energy Laboratory** – Distributed Energy Systems Integration,  
Golden, CO

*Electrical Engineer*

**March 2013 – Present**

- Wrote proposals and secured research funding from various funding agencies.
- Acted as Principal Investigator on multiple projects where responsibilities included acting as technical lead, coordinating activities of staff, reporting to funding agencies, and ensuring that project deliverables were completed on schedule.
- Developed techniques for modeling, control, and analysis of distributed power systems, microgrids, and power electronics.

**Sandia National Laboratories** – Distributed Energy Technologies Laboratory,  
Albuquerque, NM

*Electrical Engineer – Intern*

**Summer 2011**

**SolarBridge Technologies**, Champaign, IL

*Electrical Engineer – Intern*

**Summer 2010**

**Avenson Audio**, Austin, TX

*Electrical Engineer – Intern*

**2006 – 2008**

INVITED TALKS

*Nonlinear Oscillators and Self-Organizing Power Electronics Systems*, NREL Workshop: Frontiers on Distributed Optimization and Control of Sustainable Power Systems, January 2016.

*The Grid of the Future*, Half-day workshop, American Control Conference, Presenters: {**B. Johnson** (organizer), B. Lundstrom, M. Salapaka, S. Salapaka, M. Wytock, Z. Kolter}, Chicago, Illinois, July 2015.

*Optimal Operation of Distribution Networks with Increased Photovoltaic Penetration*, Photovoltaic Specialists Conference, Denver, Colorado, June 2014.

*Control and Validation of Distributed Inverter-Based Microgrids*, Google Sponsored Power Systems Research Workshop, Mountain View, California, June 2014. Presented jointly with B. Lundstrom.

*Inverter-Based Microgrids and the Role of Power Electronics*, Power Systems Engineering Research Center – Industry Advisory Board Meeting, Urbana, Illinois, May. 2014.

*An Integrated Approach to Design and Analysis of Future Energy Systems*, NSF Young Professional Workshop on Exploring New Frontiers in Cyber-Physical Systems, D.C., Washington, Mar. 2014.

*Virtual Oscillator Control for Voltage Source Inverters*, University of Colorado, Boulder, Colorado, Nov. 2013.

*Oscillator-Based Inverter Control for Islanded Three-Phase Microgrids*, Photovoltaics Specialists Conference, Tampa, Florida, June 2013.

*Synchronization of Distributed Inverters in a Microgrid*, National Renewable Energy Laboratory, Golden, Colorado, May 2012.

*A Single-Stage Three-Phase AC Module for High-Voltage Photovoltaics*, Applied Power Electronics Conference, Orlando, Florida, Feb. 2012.

*Interleaving of Parallel Connected Inverters and Low-Cost Circuit Design*, University of Illinois at Urbana-Champaign, Urbana, Illinois, Sept. 2011.

*Interleaving of Parallel Connected Inverters: A System-Level Approach to DC-AC Conversion for Photovoltaics*, Sandia National Laboratories, Albuquerque, New Mexico, Aug. 2011.

*Photovoltaic AC Module Composed of a Very Large Number of Interleaved Inverters*, Sandia National Laboratories, Albuquerque, New Mexico, July 2011.

*Photovoltaic AC Module Composed of a Very Large Number of Interleaved Inverters*, Applied Power Electronics Conference, Dallas, Texas, Mar. 2011. (\*Outstanding Presentation Award)

*Distributed Photovoltaic AC Module*, University of Illinois at Urbana-Champaign, Urbana, Illinois, Nov. 2010.

*Dynamic Modeling and Stability Analysis of Microgrids*, University of Illinois at Urbana-Champaign, Urbana, Illinois, Feb. 2010.