

## 1. PERSONAL INFORMATION:

Name: Barry Gordon Rawn  
Address: 10 Wooburn Close, Uxbridge, United Kingdom, UB83UB  
Telephone: +44 74 21 76 52 74  
e-mail: barry.rawn@gmail.com  
Date of Birth: July 9<sup>th</sup>, 1978  
Nationality: Canadian

## 2. WORK EXPERIENCE:

2015 - present

**Lecturer in Power Systems at Brunel University London, United Kingdom**  
Member of Smart Power Networks Research Theme of Institute of Energy Futures

Advise graduate students:

PhD candidate Mohamed Osman: *“Controlled Islanding Procedures for Nigeria”*

Master’s student Mackdivings Longwe: *“Grid Integration Study of Photovoltaic Power in Malawi”*

Master’s student Shuai Chen: *“Interaction Between Electric Arc Furnaces and Utility-Scale Photovoltaic Plants”*

Master’s student Alexander Kpadeh: *“Liberia Electricity System Expansion via Micro Hydro Power”*

Advise undergraduate students on final year projects, on topics including:

Renewable resource analysis and forecasting, power system measurement, electric vehicle and battery storage, energy harvesting, and wearable electronics.

2015 - 2016

**Systems Analyst at Nigeria Infrastructure Advisory Facility, Nigeria**

Provided technical assistance and training to the Transmission Company of Nigeria, as part of 5-year program funded by UK Department of International Development. Generated notes, reports, and trainings on remedial action schemes, voltage regulation, transmission investment, and potential grid integration issues arising from utility-scale solar.

2012 - 2015

**Postdoctoral researcher at Katholieke Universiteit (KU) Leuven, Belgium**

Managed projects and contribute research in transmission planning and investment (European project eHighway 2050, industrial project TRIP), and contributed to projects on power system security and reliability (GARPUR). Lead and contributed to European and national funding proposals. Contributed to course delivery, delivering lectures on power system stability and modeling of renewable energy conversion devices. Managed industrial project on switched capacitor and offshore ac transmission technology. Proposed and advised summer student and master’s thesis projects.

Co-advised with Prof. Dirk Van Hertem and Prof. Ronnie Belmans;

-Ph. D candidate Hakan Ergun, thesis topic: *“Grid Planning for the Future Grid Optimizing Topology and Technology Considering Spatial and Temporal Effects”*

-Ph. D candidate Muhajir Mekonnen, transmission cost remuneration.

Co-advised with Prof. M. Gibescu and Prof. Wil Kling

-Ph. D Candidate Jens Bömer, thesis topic *“Effect of large scale distributed renewables on the transient stability of transmission networks.”* (TU Delft)

Co-advised with Prof. M. Gibescu and Prof. Mart van der Meijden  
-Ph. D Candidate Shahab Shariat Torbaghan, "*Optimization of transmission capacity for investment recovery in offshore grids with large amounts of wind power*". (TU Delft)

2009 - 2012

**Postdoctoral researcher at Technical University of Delft, the Netherlands.**

Conducted research on effects of wind and solar power on power system reserves and ancillary service markets. Co-wrote national funding proposals on offshore grid code definition project, led TU Delft contributions to FP7 consortium funding proposal. Designed and delivered guest lecture, participated in expert panel, and set examination questions for the course "Impact of the Integration of Wind and Solar Energy on the Operation of Power Systems: Reliability and Market Prices", EES-UETP, Nov 10-12, 2010, Universidad Pontificia Comillas, Madrid, Spain. Proposed and advised master's thesis topics.

Co-supervised with Assistant Prof. M. Gibescu and Prof Mart van der Meijden:

- Ph. D candidate Mario Ndreko, offshore grid code for wind farms.
- Master's candidate Sergio Torres Romo, "*Photovoltaic installation disconnections during faults in a large distribution network*"
- Master's candidate Trent Ratzlaff, "*Time series of synchronous inertia and of potential synthetic inertia in power systems with large amounts of renewables*"
- Master's candidate Aymeric Buatois, "*Extreme ramping events and power flow scenarios from North Sea offshore wind farm clusters*"
- Master's candidate Simone Pagliuca, "*Potential active power ancillary services from controlled consumer load*"
- Master's candidate Michiel Nijhuis "*Classification and forecasting of power fluctuations from photovoltaic plants*"

2004 - 2009

**Research Assistant at University of Toronto, Canada.**

Ph.D. Thesis, supervised by Prof Peter Lehn and Prof Manfredi Maggiore: "*Ensuring Safe Exploitation of Wind Turbine Kinetic Energy: An Invariance Kernel Formulation*". Defined an analytical stability margin for wind turbines that exploit their kinetic energy to support power system frequency.

2006 - 2007

**Engineering Consultant** (*concurrent with University of Toronto position*)

Consultancy in wind turbine technology and pre-feasibility studies for power generation projects.

Client inMotive, Toronto, Canada: Estimation of cost of delivered energy and business strategy advice for wind turbine technology based on novel mechanical variable speed transmission.

Client Hydratek and Associates, Woodbridge, Canada. Information-gathering and consultancy services regarding pumped-hydro storage pre-feasibility assessment.

Client DTD Consulting, Mississauga, Canada: Site assessment for wind energy development pre-feasibility site assessment.

- 2002 - 2004      **Research Assistant at University of Toronto, Canada.**
- M.A.Sc. Thesis, supervised by Prof Peter Lehn and Prof Manfredi Maggiore  
*"Wind turbines as power filters: a control methodology"*  
 Introduction of a control structure to completely decouple wind turbine dynamics from the grid and obtain adjustable power filtering.
- 2001- 2002      **Embedded Electrical Systems Engineer, Hydrogenics, Mississauga, Canada**
- Designed hydrogen fuel cell monitoring and control algorithms, control system hardware, and circuit boards. Performed system integration, troubleshooting, and client-side support of hydrogen fuel-cell test stations.

### 3. EDUCATION:

- 2004 - 2009      **Ph. D, Energy Systems Group, University of Toronto**  
 Edward S. Rogers Sr. Department of Electrical and Computer Engineering  
 Toronto, Ontario, Canada
- 2006 - 2007      **Potential Professors in Training Pilot Program:**  
 Training in advising, course design, and other aspects of pedagogy,  
 Faculty of Applied Science  
 Toronto, Ontario, Canada
- 2002 - 2004      **M.A.Sc., Energy Systems Group, University of Toronto**  
 Edward S. Rogers Sr. Department of Electrical and Computer Engineering  
 Toronto, Ontario, Canada
- 1997 - 2002      **B.A.Sc. and Professional Experience Year, University of Toronto**  
 Division of Engineering Science, Faculty of Applied Science  
 Toronto, Ontario, Canada

### 4. TEACHING

- 2015 – present      **Brunel University London, London, UK**  
 Graduate Teaching:  
     EE5617-Applied Sensors, Instrumentation and Control (lead)  
     EE5520-Power System Analysis and Security  
     EE5519-Power Electronics and FACTS  
     EE5521-Power System Stability and Control  
     EE5518-Power Markets
- Undergraduate Teaching (half courses)  
     EE2604-Electronics  
     EE1085-Computer Systems Workshop  
     EE3900-Dissertation (advise 6-12 students per year)
- 2013      **Katholieke Universiteit Leuven, Belgium**  
 Delivered lectures on power system stability and renewable energy modeling for the courses “Power System Calculations” and “Design and Management of Electrical Networks”.

- 2010 **EES-UETP, Universidad Pontificia Comillas, Madrid, Spain**  
Designed and delivered lecture, participated in expert panel, set examination questions for the course “Impact of the Integration of Wind and Solar Energy on the Operation of Power Systems: Reliability and Market Prices”, Nov 10-12, 2010.
- 2002 - 2008 **University of Toronto, Canada**  
Conducted tutorials and laboratories for courses in electromechanical energy conversion and power electronics, control systems, and circuit theory.
- Laboratory demonstrations:  
ECE315- Electromechanical Energy Conversion  
ECE359- Industrial Electronics  
MIE342- Circuits with App. to Mech. Eng. Sys.  
MIE347- Electromechanical Energy Conversion
- Tutorial sessions:  
ECE212- Circuit Theory  
ECE410- Control Systems  
MIE347- Electromechanical Energy Conversion
- Lectures:  
ECE315- Electromechanical Energy Conversion
- 1999 – 1999 **Kenora-Patricia District School Board, Canada:**  
Managed and delivered special classes, summer computer camp for grades K-9. Developed activities and lesson plans for K-8 computer curriculum.

## 5. ACADEMIC AND PROFESSIONAL SERVICE

- 2016 - present Technical Program Committee, IEEE PES&IAS Power Africa Conference  
2014 - present Comm. Officer, IEEE WG on Sustainable Energy Systems for Developing Communities  
2017 - present Comm. Officer, IEEE TF on Task Force on Future TSO-DSO Interaction (PSOPE)  
2015 - 2015 Conference Reviewer, IEEE 2015 Electrical Power and Energy Conference  
2014 - 2014 Research Project Reviewer, L’Agence Nationale de la Recherche, France  
2013 - 2014 Secretary, IEEE Joint IAS/PELS/PES Benelux Chapter  
2012 - 2013 Contributor to CIGRÉ Working Group B4-54, Guidelines for the Preparation of “Connection Agreements” or “Grid Codes” for HV-dc Grids  
2013 - 2013 Topic Co-Chair, IEEE Energy Conversion Congress and Expo 2013  
2012 - 2013 Technical Program Committee Member, IEEE EUROCON 2013  
2010 - 2012 Member of IEA Task 25, Design and Operation of Power Systems with Large Amounts of Wind Power.  
2003 - 2008 Graduate Student Representative, Energy Systems Group, University of Toronto.  
2007 - 2011 Advisory Board Member, Vicicog.  
2007 - 2008 Member, Energy and Environment Advisory Group, Upper Canada College.  
2004 - 2005 Curriculum Committee, Faculty of Applied Science, University of Toronto.
- Reviewer: IEEE Transactions on: Power Systems Letters, Energy Conversion, Power Delivery Sustainable Energy, Smart Grids. Journals of: Wind Energy, Renewable Energy

External Examiner: External examiner, PhD candidate Maria Del Mar Martinez, thesis title “Stand-alone hybrid renewable energy systems”, Universitat Politecnica De Catalunya, July 14<sup>th</sup>, 2017

Committee member, PhD Candidate Jens Boemer, thesis title “On Stability of Sustainable Power Systems”, Delft University of Technology, June 16<sup>th</sup>, 2016.

External assessor, PhD candidate Johanette de Merwe, thesis title “Determining preferred substation configurations based on reliability and cost”, University of Cape Town, 30th November, 2015

Committee member, PhD candidate Simon De Rijcke, thesis title “Control of the Kinetic Energy Reserves in a Wind Farm”, Katholieke Universiteit Leuven, March 18<sup>th</sup> 2014

External assessor, Master candidate Johanette de Merwe, thesis title “Simplified Approach for the Reliability Estimation of Large Transmission and Sub- Transmission Systems”, University of Cape Town, March 17<sup>th</sup> 2014

External assessor, PhD Candidate Rajesh Kuman Thakur, “Dynamic Modeling and Control of Wind Turbine Fed Wind Energy Systems”  
Indian Institute of Technology Bombay, 2013

## 6. VOLUNTEER INITIATIVES:

2009 Fall                    **Local Training, Mfaminyen Conservation Society, Cross River State, Nigeria**  
Designed and graded written candidate selection exam for training in off-grid photovoltaic and storage systems.

2007 - 2009                **Team Advisor, Bluesky Solar Racing, University of Toronto**  
Mentored team management and leaders on technical and personnel issues. Acted as liason between team and faculty in Energy Systems Group.

2003 - 2008                **Campus Wind Resource Assessment, University of Toronto**  
Directed student-initiated exploration of urban wind energy. Selected and managed equipment, analyzed and evaluated data. In partnership with University of Toronto Sustainability Office and University of Toronto Environmental Resource Network.

2004 - 2006                **Sustainable Energy Fair Organizing Committee, University of Toronto**  
Co-founded annual public event combining research, industry and Community initiatives. Served as operations chair, committee coordinator, and mentor for subsequent leadership. Funded by University of Toronto Environmental Resource Network, Faculty of Arts and Science, Faculty of Applied Science, Student's Administrative Council, Engineering Society, engineering departments.

2005 - 2009                **Groundskeeping Fleet Biodiesel Conversion Project, University of Toronto**  
Initiated impact and feasibility in consultation with groundskeeping staff and fleet manager. Helped define formal feasibility study carried out by work-study student. Fleet adopted two-percent biodiesel blend. In partnership with University of Toronto Sustainability Office and Facilities and Services.

2001- 2002

**Blue Sky Solar Racing, University of Toronto**

Served as solar array team leader. Specified power electronics, designed photovoltaic array prototypes, planned array assembly process, managed construction and integration team, lead array group during American Solar Challenge 2001.

**7. LANGUAGES AND SKILLS:**

***Languages:***

English: Native proficiency  
French: Intermediate  
Dutch: Intermediate

***Engineering Software and Programming:***

MATLAB: advanced  
PSCAD, PSS-E, DigSilent: intermediate  
C/C++, UNIX scripting: intermediate  
MS Office Suite: advanced  
Python, VBA: basic

**8. HOBBIES:**

Hiking, picking up trash, playing the guitar, observing animals.

**9. FUNDING**

2017	Co-investigator on TDX-ASSIST, Project 774500 in Horizon 2020 Research and Innovation Action, LCE05; lead institution of £1.2M workplan	£682k	Government Grant
2016	BRIEF Research Award	£14k	Institutional Award
2015	Newton Research Collaboration Programme	£12k	Government Grant
2008	National Science and Engineering Research Council	\$40k/year	Government Grant
2008	V.L. Henderson and M. Bassett Research Fellowship	\$3.3k	Institutional Award
2004-2008	University of Toronto Open Fellowship:	\$12k/year	Institutional Award
2005	Edward S. Rogers Sr. Graduate Scholarship:	\$5k	Institutional Award
2003	Edward S. Rogers Sr. Graduate Scholarship:	\$5k	Institutional Award
2002-2004	University of Toronto Open Fellowship:	\$10k/year	Institutional Award

**10. PUBLICATIONS**

**Journal Publications**

[16] **B. G. Rawn** and H. Louie, “Planning for Electrification: On- and Off-Grid Considerations in Sub-Saharan Africa”, International of Development Studies Bulletin, Vol. 48, Issue 5, October 2017

[15] S. S. Torbaghan, H Müller, M. Gibescu, **B.G. Rawn**, M. Roggenkamp, M. van der Meijden, “Investigating the Impact of Construction Delays on the Development of a Meshed HVDC Grid for Offshore Wind Energy Integration”. IET Generation, Transmission & Distribution Vol. 9, Issue: 15, 11-19-2015 pp 2224 – 2233

[14] H. Ergun, **B. G. Rawn** , R. Belmans, D. Van Hertem, “Stepwise Investment Plan Optimization for Large Scale and Multi-Zonal Transmission System Expansion”, IEEE Transactions on Power Systems, Vol. 31, Issue 4, October 2015

- [13] J. C. Boemer, **B. G. Rawn**, M. Gibescu, M. van der Meijden, W. L. Kling, “*Response of Wind Power Park Modules in Distribution Systems to Transmission Network Faults During Reverse Power Flows*”, IET Renewable Power Generation, Vol. 9, Issue 8-11-2015.
- [12] S. S. Torbaghan, M. Gibescu, **B. G. Rawn**, M. van der Meijden, “*A Market Based Transmission Planning for VSC HVDC Grids: Case Study of the North Sea*”. IEEE Transactions on Power Systems Vol.: 30, Issue: 2, March 2015, pp 784-794
- [11] S. De Rijcke, P. Tielens, **B. G. Rawn**, D. Van Hertem, J. Driesen, “*Trading Energy Yield for Frequency Regulation: Optimal Control of Kinetic Energy in Wind Farms*”. IEEE Transactions on Power Systems Vol. 30, Issue: 5, Sept. 2015, pp 2469 - 2478
- [10] A. Buatois, M. Gibescu, **B. G. Rawn**, M. A.M.M. van der Meijden, “*Analysis of North Sea Offshore Wind Power Variability*”. Resources Special Issue, Spatial and Temporal Variation of the Wind Resource, Vol. 3, Issue 2, p.454-470.
- [9] A. Samadi, A. Shayesteh, R. Eriksson, **B. G. Rawn**, L. Söder, “*Multi-Objective Coordinated Droop-Based Voltage Regulation in Distribution Grids with PV Systems*”. Solar Energy, Vol. 71, November 2014, p 315–323
- [8] H. Ergun, **B. G. Rawn**, R. Belmans, D. Van Hertem, “*Technology and Topology Optimization for Multizonal Transmission Systems*”. IEEE Transactions on Power Systems, Vol. 29, Issue 5, September 2014, p. 2469 - 2477
- [7] A. Samadi, R. Eriksson, L. Söder, **B. G. Rawn**, J.C Boemer, “*Coordinated Active Power Dependent Voltage Regulation in Distribution Grids with PV Systems*”. IEEE Transactions on Power Delivery, Vol. 29, Issue 3, June 2014 p. 1454 – 1464.
- [6] M. Nijhuis, **B. G. Rawn**, M. Gibescu, “*Prediction of Power Fluctuation Classes for Photovoltaic Installations and Potential Benefits of Dynamic Reserve Allocation*”. IET Renewable Power Generation, 2013, Volume 8, Issue 3, April 2014, p. 314 – 323
- [5] **B. G. Rawn**, P. Lehn, M. Maggiore, “*A Disturbance Margin For Quantifying Limits on Power Smoothing by Wind Turbines*”, IEEE Transactions on Control System Technology, Vol. 21, Issue 5, 2012.
- [4] J. Smith, D. Osborn, R. Zavadil; W. Lasher, E. Lázaro, T Trötscher, J. Tande, M. Korpås, F. van Hulle, A. Estantequeiro, L. Dale, **B. Rawn**, M. Gibescu, J. Dobschinski, H. Holttinen, “*Transmission Planning for Wind Energy: Status and Prospects*”, Wiley Disciplinary Reviews, Energy and Environment, Vol. 2, Issue 1, Dec 2012.
- [3] H. Holttinen, M. Milligan, E. Ela, N. Menemenlis, J. Dobschinski, **B. Rawn**, R. J. Bessa, D. Flynn, E. Lazaro, N. Detlefsen, “*Methodologies to Determine Operating Reserves due to Increased Wind Power*”, IEEE Transactions on Sustainable Energy, Vol 3. Issue 4, pp 713-723, Oct. 2012.
- [2] M. Maggiore, **B. G. Rawn**, P. Lehn, “*Invariance Kernels of Single-Input Planar Nonlinear Systems*”, SIAM Journal of Control and Optimization. Vol. 50, Issue 2, pp. 1012-1037, April 2012.
- [1] **B. G. Rawn**, P. Lehn, M. Maggiore, “*A Control Methodology to Mitigate the Grid Impact of Wind Turbines*”, IEEE Transactions on Energy Conversion, Vol. 22, Issue 2, pg 431-438, 8 pages, June 2007.

*In preparation:*

JOURNAL: “*Power Smoothing by a Line of Wind Turbines: Experimental Comparison with Theoretical Predictions*”. Wind Energy, B.G. Rawn, M. Gibescu, A. Brand, P. Eecen.

JOURNAL: “*Dependence of Wind Farm Output Variability on Atmospheric Stability: Experimental Study*”. Wind Energy, B.G. Rawn, M. Gibescu, A. Brand, P. Eecen.

## Conference Publications

- [25] **B. G. Rawn** and T. Nwachukwu, “Voltage Control Grid Connection Requirements For Renewable Power Plants Connected To The Electricity Transmission System In Nigeria”. IEEE PES Power Africa 2017, 26th -28th June 2017, Accra.
- [24] V. Vajnar, Z. Vostracky and **B. G. Rawn**, “Assessment of the delayed current zeros occurrence using the evaluation of the Z-bus matrix in Matpower toolkit”, 2017 18th International Scientific Conference on Electric Power Engineering (EPE), May 2017, Ostrava
- [23] A. Knevic, D. Oyedokun, **B. G. Rawn**, “Discussion of methods and past results of grid Thévenin equivalent impedance (TEI) estimation in the context of distributed generation (DG)”, Volume: 25, 25th Southern African University’s Power Engineering Conference (SAUPEC), January 2017, Stellenbosch.
- [22] **B. G. Rawn**, T. Nwachukwu, and E. Cebeci, “Factors and Options for Improved Frequency Regulation: Case Study of Utility Scale Solar in Nigeria”. IEEE PES Power Africa 2016, 28<sup>th</sup> June- 2<sup>nd</sup> July 2016, Livingston.
- [21] T. Nazarčík, **B. G. Rawn**, “Phase current asymmetry on the double-circuit very high voltage overhead transmission line”, 2016 17th International Scientific Conference on Electric Power Engineering (EPE), 16-18 May 2016, Prague
- [20] V. Muzik, Z. Vostracky, M. Strelec, **B. G. Rawn**, “Control possibilities for Island Operation in City of Pilsen”, 2016 17th International Scientific Conference on Electric Power Engineering (EPE), 16-18 May 2016, Prague
- [19] H. Ergun, R. Belmans, D. Van Hertem, **B. G. Rawn**, “Long Term Investment Optimization Methodology for Multi-Zonal Transmission Expansion”, IEEE International Energy Conference ENERGYCON 2016, 4-8 April 2016, Leuven.
- [18] J. C. Boemer, M. Gibescu, M. van der Meijden, **B. G. Rawn**, W. L. Kling , “Network Fault Response of Wind Power Plants in Distribution Systems during Reverse Power Flows (Part II)”, 12th International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Wind Power Plants, 22-24 October 2013, London.
- [17] **B. G. Rawn**, S. Torres Romo, M. Gibescu, M. van der Meijden, “*Quasi-steady State Modelling of Low-voltage Connected Photovoltaic Systems for Analysing Distribution Feeder Behaviour During Faults*”, 3rd International Workshop on Integration of Solar Power into Power Systems, 21-22 October 2013, London.
- [16] M. Ndreko, A. van der Meer, M. Gibescu, M. van der Meijden, **B. G. Rawn**, “*Damping Power System Oscillations by VSC-Based HVDC Networks: A North Sea Grid Case Study*”, 12th International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Wind Power Plants, 22-24 October 2013, London.
- [15] M.T. Mekonnen, C. De Jonghe, **B. G. Rawn**, D. Van Hertem, R. Belmans, “*Power Flow Control and its Effect on Flow-Based Transmission Cost Allocation*”, 10th International Conference on the European Energy Market EEM13, 28-30 May 2013, Stockholm.
- [14] J. C. Boemer, **B. G. Rawn**, M. Gibescu, E. Coster, M. van der Meijden, and W. L. Kling, “*Contribution of Negative-Sequence Controlled Distributed Generation to Power System Stability under Unbalanced Faults: A Discussion Paper*”, IEEE PES Innovative Smart Grid Technologies (ISGT) Europe Conference, 14-17 October 2012, Berlin, Germany



- [13] J. C. Bömer, A. A. van der Meer, **B. G. Rawn**, R. L. Hendriks, M. Gibescu, M. van der Meijden, W. L. Kling, and J. A. Ferreira, “*Network Fault Response of Wind Power Plants in Distribution Systems during Reverse Power Flows*”, 10th International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Wind Power Farms, 25-26 October 2011, Aarhus, Denmark
- [12] H. Holttinen, J. Kiviluoma, A. Estanqueiro, E. Lázaro, **B. G. Rawn**, J. Dobschinski, P. Meibom, E. Lannoye, T. Aigner, Y. Wan and M. Milligan, “*Variability of load and net load in case of large scale distributed wind power*”, 10th International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Wind Power Farms, 25-26 October 2011, Aarhus.
- [11] S. Pagliuca, I. Lampropoulos, M. Bonicolini, **B. G. Rawn**, M. Gibescu, W. L. Kling, “*Capacity assessment of residential demand response mechanisms*”, 46th International Universities’ Power Engineering Conference, Sept 5-8 2011, Soest.
- [10] W.L. Kling, **B. G. Rawn**, I. Erlich, P. Sørensen, M.J. O’Malley, H. Holttinen, J.H. López, L. Söder, “*Wind Power Integration: The European Experience*”, 17<sup>th</sup> Power Sys. Comp. Conf., Aug 22-26<sup>th</sup> 2011 Stockholm.
- [9] J. C. Bömer, A. A. van der Meer, **B. G. Rawn**, R.L. Hendriks, A. R. Ciupuliga, M. Gibescu, W. L. Kling, J.A. Ferreira, “*Fault Ride-through Requirements for Onshore Wind Power Plants in Europe: the Needs of the Power System*”. IEEE Power Engineering Society General Meeting, July 2011, Detroit.
- [8] M. Maggiore, **B. G. Rawn**, P. Lehn, “*Invariance Kernels of Single-Input Nonlinear Planar Systems*”, American Control Conference, July 2011, San Francisco.
- [7] M. Nijhuis, **B. G. Rawn**, M. Gibescu, “*Classification technique to quantify the significance of partially cloudy conditions for reserve requirements due to PV plants*”. IEEE PowerTech 2011, June 19-23, Trondheim.
- [6] **B. G. Rawn**, M. Gibescu, W. Kling, “*Kinetic Energy from Distributed Wind Farms: Technical Potential and Implications*”, Innovative Smart Grid Technologies Europe, October 2010, Gothenburg.
- [5] M. Milligan, P. Donohoo, D.Lew, E. Ela, B. Kirby, H. Holttinen, E. Lannoye, D. Flynn, M. O’Malley, N. Miller, P. Eriksen, A. Gøttig, **B. G. Rawn**, J. Frunt, W.L. Kling, M. Gibescu, E. Lázaro, A. Robitaille, I. Kamwa, “*Operating Reserves and Wind Power Integration: An International Comparison*”, 9th International Workshop on Large Scale Integration of Wind Power into Power Systems, October 2010, Quebec City.
- [4] **B. G. Rawn**, M. Gibescu, W. Kling, “*Availability of Kinetic Energy from Wind Turbines: A Static Analysis Method*”, IEEE Power Engineering Society General Meeting, July 2010, Minneapolis.
- [3] **B. G. Rawn**, P. Lehn, “*A Method for Assessing Stability of Wind Turbines Providing Frequency Stabilization*”, Nordic Wind Power Conference, September 2009, Bornholm.
- [2] **B. G. Rawn**, P. Lehn, “*Wind rotor inertia and variable efficiency: fundamental limits on their exploitation for inertial response and power systems damping*”, European Wind Energy Conference, April 2008, Brussels.
- [1] **B. G. Rawn**, P. Lehn, M. Maggiore, “*Toward Wind Farm Output Control: Adjustable Power Filtering*”, IEEE Power Engineering Society General Meeting, June 2006, Montreal.

### **Book Chapters**

**B.G. Rawn**, M. Gibescu, B.C. Ummels, E. Pelgrum, W.L. Kling, “*Unit Commitment and Economic Dispatch for Operations Planning of Power Systems with Significant Installed Wind Power Capacity*”, Chapter 9 in Electric Power Systems: Advanced Forecasting Techniques and Optimal Generation Scheduling, edited by João S. Catalão, published by CRC Press, Taylor and Francis Group, 2011.

## Selected Technical Reports

**B. G Rawn** and T. Nwachukwu, “*Note on Grid Code Compliance Costs for Generation Players: Case of Renewable Generation*”, NIAF Report Project no ER0045-D2, July 2016.

**B. G Rawn** and T. Nwachukwu, “*Note on Dynamic Models of Utility-Scale Photovoltaic Power Plants: Purpose and Usage*”, NIAF Report Project no ER0055-D2, November 2015.

**B. G Rawn** and T. Nwachukwu, “*Note on Reactive Power, Voltage Control, and Harmonics Issues*”, NIAF Report Project no ER0055-D2, April 2015.

**B. G. Rawn**, “*Power System Security and Ancillary Service Markets: Focus on Response Risk*”, work package technical report for Senternovem as part of the EOS-project Regelduurzaam, April 2012.

**B. G. Rawn**, “*Future Demands on Energy: Players and Policies*”, work package technical report for Senternovem as part of the EOS-project Regelduurzaam, June 2010.

**B. G. Rawn**, “*An Engineering Minor in Energy*”, Submitted analysis of engineering curriculum integration to Faculty committee exploring new curriculum in energy, 2006.

**B. G. Rawn**, “*Greenhouse Gas Reduction Through Biodiesel Use: A Lifecycle Assessment of a Small Utility Vehicle*”, Submitted to University of Toronto Sustainability Office in support of biodiesel initiative, 2005.

## 11. SELECTED PRESENTATIONS

**Keynote Address:** B. G. Rawn, “*Applications of Big Data Analytics to Enable Smart Grids*”, SMARTGIFT 2017, March 27-28 2017, London UK

**Keynote Address:** B. G. Rawn and M.D Samec, “*Factors of Success in Off-Grid Solar Power Projects*”, UK – Egypt Enhanced Research Network in Solar Energy Systems Workshop, Helwan University, Feb 5<sup>th</sup> 2017, Cairo.

**Panel Presentation:** B. G Rawn “*Challenges and Opportunities for Utility Scale Solar PV in Nigeria*”, Energy Development in Africa, IEEE Power Engineering Society General Meeting 2017, July 16<sup>th</sup> -21<sup>st</sup> 2017, Chicago

**Panel Presentation:** B. G Rawn “*On-Grid Planning Perspective: Observations from Nigeria*”, Unlocking Investment in Africa’s renewables: What are the Binding Constraints? Green Growth Final Dissemination Event, Jan 19<sup>th</sup> 2017, London

**Invited Talk:** B. G. Rawn, “*How Computing Exact Planar Invariance Kernels Could Help Wind Turbines Calm the Grid*”, System and Modeling Group Seminar, Montefiore Institute, University of Liege, Feb 22<sup>nd</sup> 2013, Liege.

**Invited Talk:** B. G. Rawn, “*Rotational Kinetic Energy as Power System Service: Assessing The Role of Wind Farms*”, RASEI/ECEE Seminar, University of Colorado at Boulder, Oct 22<sup>nd</sup> 2012, Boulder.

**Invited Talk:** B.G. Rawn, “*Changing Power System Characteristics: When to Control Renewables and When to Adapt to Them?*”, University of Ontario Institute of Technology, July 30<sup>st</sup> 2012, Oshawa

**Public Lecture:** B. G. Rawn “*The Coming Power of Wind: Perspectives and Prospects*”, Soirée Technique: European Electrical Energy Session 4, IEEE Student Branch Leuven, December 8<sup>th</sup> 2011, Leuven.

**Public Lecture:** B. G. Rawn, “*Renewable Energy Sources*”, presented at Council for Renewable Energy in Nigeria, Cross River State chapter annual general meeting, Dec 14th, 2005, Calabar.