

## VALENTINA CECCHI, Ph.D.

University of North Carolina at Charlotte • Department of Electrical and Computer Engineering  
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### EDUCATION

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#### Drexel University / Philadelphia, PA, USA

- Ph.D. Electrical Engineering, Dissertation: *Temperature-Dependent Transmission Line Models for Electric Power Systems and Their Impacts on System Studies*, Aug 2010
- Master of Science in Electrical Engineering, Thesis: *A Modeling Approach for Electric Power Transmission Lines in the Presence of Non-Fundamental Frequencies*, Dec 2007
- Bachelor of Science in Electrical Engineering, *magna cum laude*, June 2005

### PROFESSIONAL APPOINTMENTS

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#### Associate Professor / University of North Carolina at Charlotte / July 2017 – Present

#### Assistant Professor / University of North Carolina at Charlotte / August 2010 – June 2017

- *Research*: Published 56 peer reviewed articles, procured over \$2.3M (of which \$722,173 as sole or lead PI) in research and educational grant funding through federal agencies and industry, including NSF, U.S. DOE, EPRI and Duke Energy. Supervised/supervising 10 Ph.D. students (5 completed), 5 M.S. students (4 completed), and 16 undergraduate RAs. Mentored 10 Senior Design teams (34 students).
- *Teaching*: Developed two new graduate level courses: Electric Power Distribution Systems I and II and one undergraduate/graduate special topic course cross-listed among all engineering disciplines. Taught 16 semester-long courses covering 8 different topics, including: Network Theory I, Linear Systems Theory, Electric Power Distribution Systems I and II, Senior Design.
- *Service*: Served various roles in departmental, college and university committees, including chair of the Power Systems Focus Area Improvement Team and member of the ECE Department Chair Search Committee. Served on professional committees, including as the 2015 North American Power Symposium (NAPS) general co-chair, as IEEE NC Council secretary, and in IEEE PES PEEC.

#### Graduate Research Assistant / Center for Electric Power Engineering, Drexel University/ Aug 2005 – Aug 2010

- Novel transmission line mathematical modeling and simulation
- Non-destructive testing and measurement of power systems
- Development of power system experiments for outreach education
- Fault detection studies using wavelet transforms

#### Teaching Assistant / Electrical and Computer Engineering Dept., Drexel University / Aug 2005 – Aug 2010

- Power Systems courses
- Advanced Electronics courses

#### Design Engineer / Technology Department, Italferr – Ferrovie dello Stato, Rome, Italy / Mar 2008 – Oct 2008

- Design and supervision of new and existing substations for high-speed railway networks

#### Undergraduate Research Assistant / Center for Electric Power Engineering, Drexel U. / Mar 2004 – Sep 2005

- Assisted in the design, implementation, and testing of the RDAC: Reconfigurable Distribution Automation and Control Laboratory
- Developed a network reconfiguration experiment for a power distribution class

## PUBLICATIONS AND RESEARCH

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### Synopsis:

*Publications:* 56 peer-reviewed journal & conference articles and 2 book chapters.

*Funding:* \$2,338,770 (16 funded grants and contracts, sole or lead PI for 9). Funding by source: NSF (NSF - \$730,606), U.S. DOE (DOE - \$968,180), Utilities/Industry (Duke Energy, Southern California Edison, Quanta - \$623,484), Institutional Grants (UNC Charlotte - \$16,500). Additional Funding in terms of Equipment and Software Donations: \$277,418.

## PUBLICATIONS

### Journal and Magazine Articles

- [J1] B. Poudel, V. Cecchi, “Frequency-Dependent Models of Electric Power Lines for Steady-State Harmonic Analysis: Model Derivation, Evaluation, and Practical Applications”, *Elsevier Journal of Electric Power Systems Research*, Vol. 151, 2017, pp. 266-272.
- [J2] A. St. Leger, V. Cecchi, K. Miu, and C. Nwankpa, “Automated Test Measurement System for Determining Frequency Dependent Parameter Model of Transmission Lines in a Laboratory Environment”, *Measurement, Elsevier Journal of the International Measurement Confederation*, Vol. 92, 2016, pp. 1-10.
- [J3] M. Azarbayjani, B. Futrell, V. Cecchi, T. Gentry, A. Ebong, “The Road Map to the Integrated Design Process of a Net-Zero Energy Solar House: A Case Study of a Solar Decathlon Competition Entry”, *Journal of Green Building*, Vol. 9, Issue 2, 2014, pp. 20-37.
- [J4] V. Cecchi, M. Knudson, and K. Miu, “System Impacts of Temperature-Dependent Transmission Line Models”, *IEEE Transactions on Power Delivery*, Vol. 28, Issue 4, October 2013, pp. 2300-2308.
- [J5] A. Kailas, V. Cecchi, and A. Mukherjee, “A Survey of Communications and Networking Technologies for Energy Management in Buildings and Home Automation”, *Journal of Computer Networks and Communications*, Vol. 2012, 2012.
- [J6] V. Cecchi, A. St. Leger, K. Miu, and C. Nwankpa, “Incorporating Temperature Variations into Transmission Line Models”, *IEEE Transactions on Power Delivery*, Volume 26, Issue 4, October 2011, pp. 2189-2196.
- [J7] K. Miu, V. Cecchi, M. Kleinberg, A. Deese, M. Tong, and B. Kleinberg, “A Distribution Power Flow Experiment for Outreach Education,” *IEEE Transactions on Power Systems*, Volume 25, Issue 1, February 2010, pp. 3-9.
- [J8] V. Cecchi, A. St. Leger, K. Miu, and C. Nwankpa, “Modeling Approach for Transmission Lines in the Presence of Non-Fundamental Frequencies”, *IEEE Transactions on Power Delivery*, Volume 24, Issue 4, October 2009, pp. 2328-2335.
- [J9] V. Cecchi, X. Yang, K. Miu, and C. Nwankpa, “Instrumentation and Measurement of a Power Distribution System Laboratory for Meter Placement and Network Reconfiguration Studies”, *IEEE Transactions on Instrumentation and Measurement*, Volume 56, Issue 4, Aug. 2007, pp. 1224-1230.
- [J10] V. Cecchi, X. Yang, K. Miu, and C. Nwankpa, “Instrumentation and Measurement of a Power Distribution System Laboratory for Meter Placement and Network Reconfiguration Studies”, *IEEE Instrumentation and Measurement Magazine*, Volume 10, Issue 5, October 2007, pp. 10-19.

### Manuscripts Under Review or in Preparation

- [IP1] A. Shrestha, V. Cecchi, R. Cox, “Transient Stability Preventive Control using Quasi-Linear Behavior of Critical Machines”, submitted for publication in the *IEEE Transactions on Power Systems*.
- [IP2] M. Davoudi, V. Cecchi, J. Romero-Agüero, “Increasing Hosting Capacity of Distribution Feeders via Reconfiguration and Modern Operation Practices”, submitted for publication in the *IEEE Trans. on Smart Grid*.
- [IP3] C. Liu, V. Cecchi, S. Kamel, “Solution and Optimization of AC Resistance in Large Mixed Medium Power Conductors”, in preparation for submission to the *IEEE Transactions on Power Delivery*.

**Book Chapters**

- [B1] A. Kailas, V. Cecchi, A. Mukherjee, *A Survey of Contemporary Technologies for Smart Home Energy Management*, in Handbook of Green Information and Communication Systems, Elsevier, 2012.
- [B2] A. Mukherjee, V. Cecchi, R. Tenneti, A. Kailas, *Embedded Computing in the Emerging Smart Grid*, in Handbook of Green Information and Communication Systems, Elsevier, 2012.

**Refereed Conference Articles**

- [C1] M. Rahman, C. Braun and V. Cecchi, “Determination of Transmission Line Power Transfer Capabilities Using Temperature Dependent Continuation Power Flow”, to appear in the *Proceedings of the 2018 IEEE Power and Energy Society (PES) General Meeting*, Pub. Year: 2018.
- [C2] C. Braun, M. Rahman and V. Cecchi, “An Evaluation of Transmission Line Models Incorporating Longitudinal Temperature Variations”, to appear in the *Proceedings of the 2018 IEEE International Symposium on Circuits & Systems (ISCAS)*, Pub. Year: 2018.
- [C3] T. Lawanson, R. Karandeh, V. Cecchi, Z. Wartell and I. Cho, “Improving power distribution system situational awareness using visual analytics,” to appear in the *Proceedings of the IEEE SoutheastCon 2018*, Pub. Year: 2018.
- [C4] M. Rahman, C. Braun and V. Cecchi, “Study of the Impact of Load Step Changes on Thermal and Voltage Stability Limits of Overhead Transmission Lines”, to appear in the *Proceedings of the IEEE SoutheastCon 2018*, Pub. Year: 2018.
- [C5] C. Braun, M. Rahman and V. Cecchi, “A transmission line model with non-uniformly distributed line impedance,” *Proc. of the 2017 North American Power Symposium (NAPS)*, Pub. Year: 2017.
- [C6] M. Rahman, C. Braun and V. Cecchi, “Study of the impact of longitudinal variations in ambient conditions on transmission line voltage stability margin,” *Proc. of the 2017 North American Power Symposium (NAPS)*, Pub. Year: 2017.
- [C7] R. Karandeh, S. Mohajeryami, V. Cecchi and M. H. Javidi, “Evaluation of investments made by GENCOs in transmission network development,” *Proc. of the 2017 North American Power Symposium (NAPS)*, Pub. Year: 2017.
- [C8] S. Mohajeryami, R. Karandeh and V. Cecchi, “Correlation between predictability index and error performance in Customer Baseline Load (CBL) calculation,” *Proc. of the 2017 North American Power Symposium (NAPS)*, Pub. Year: 2017.
- [C9] M. Rahman, M. Kiesau, V. Cecchi and B. Watkins, “Investigating Effects of Weather Parameter Uncertainty on Transmission Line Power Handling Capabilities using Affine Arithmetic,” *Proceedings of the 2017 IEEE Power and Energy Society (PES) General Meeting*, Pub. Year: 2017.
- [C10] M. Rahman, M. Kiesau, V. Cecchi and B. Watkins, “Investigating the impacts of conductor temperature on power handling capabilities of transmission lines using a multi-segment line model,” *Proceedings of the IEEE SoutheastCon 2017*, Pub. Year: 2017.
- [C11] M. Davoudi, V. Cecchi, J. Romero-Agüero, “Network Reconfiguration with Relaxed Radiality Constraint for Increased Hosting Capacity of Distribution Systems”, *Proceedings of the 2016 IEEE Power & Energy Society (PES) General Meeting*, Pub. Year: 2016.
- [C12] A. Shrestha, V. Cecchi, R.W. Cox, “Optimal Power Flow-based Generation Shedding for Dynamic Remedial Action Scheme”, *Proceedings of the 2016 IEEE PES T & D Conference and Exposition*, Pub. Year: 2016.
- [C13] S. N. K. Jagarlapudi, V. Cecchi, “Investigating Wind Speed-Dependent Models for Electric Power Transmission Lines”, *Proceedings of the 2016 IEEE International Symposium on Circuits & Systems (ISCAS)*, Pub. Year: 2016.
- [C14] A. Shrestha, V. Cecchi, R.W. Cox, “Minimum-Cost Generation-Shedding for Dynamic Remedial Action Scheme”, *Proc. of the 2015 IEEE PES General Meeting*. Pub. Year: 2015.
- [C15] B. Poudel, V. Cecchi, “Frequency-Dependent Transmission Line Modeling for Steady State Power System

- Harmonic Analysis”, *Proc. of the 2015 North American Power Symposium (NAPS)*. Pub. Year: 2015.
- [C16] S. Zilberdrut, V. Cecchi, “Investigating the Effects of Grid Equivalent Circuit at a Point of Common Coupling on Bus Voltage Variations Due to Variable Distributed Generation”, *Proceedings of the 2015 North American Power Symposium (NAPS)*. Pub. Year: 2015.
- [C17] C. Liu, V. Cecchi, S. Kamel, “Analysis of AC Resistance in Non-Ferrous Bimetallic Solid Conductors”, *Proceedings of the 2015 North American Power Symposium (NAPS)*. Pub. Year: 2015.
- [C18] M. Davoudi, V. Cecchi, J. Romero-Agüero, “Effects of Stiffness Factor on Bus Voltage Variations in the Presence of Intermittent Distributed Generation”, *Proceedings of the IEEE 2015 NAPS*. Pub. Year: 2015.
- [C19] A.S. Deese, V. Cecchi, B. Poudel, “Introduction of Emerging Technologies to Distribution System Laboratory Modules via Simulation”, *Proc. of the 2015 IEEE PES General Meeting*. Pub. Year: 2015.
- [C20] M. Davoudi, V. Cecchi, J. Romero-Agüero, “Increasing Penetration of Distributed Generation with Meshed Operation of Distribution Systems”, *Proc. of the 2014 North American Power Symposium (NAPS)*. Pub. Year: 2014.
- [C21] A. Shrestha, V. Cecchi, R.W. Cox, “Dynamic Remedial Action Scheme using online transient stability analysis,” *Proc. of the 2014 North American Power Symposium (NAPS)*. Pub. Year: 2014.
- [C22] B. Poudel, V. Cecchi, “An Approach for Modeling Frequency-Dependent Apparent Resistance of Power Transmission Lines”, *Proceedings of the 2014 North American Power Symposium (NAPS)*. Pub. Year: 2014.
- [C23] V. Cecchi, M. Azarbayjani, B. Tempest, “Collaborative Research and Education in the Design and Building of a Net-Zero Energy Solar Powered House – Testimony of a Solar Decathlon 2013 Entry”, *2014 American Society for Engineering Education (ASEE)*, International Forum. Publication Year: 2014.
- [C24] M. Davoudi, V. Cecchi, and J. Romero-Agüero, “Evaluation of Meshed Distribution Systems for Increased Penetration of Distributed Generation,” *CIGRE US National Committee, 2014 Grid of the Future Symposium*, Oct. 2014.
- [C25] M. Azarbayjani, V. Cecchi, B. Tempest, “Lessons Learned from an Interdisciplinary Collaboration in Design and Construction of a Net-Zero Energy Solar House”, *ASME 2014 8th International Conference on Energy Sustainability*. Publication Year: 2014.
- [C26] M. Azarbayjani, B. Futrell, V. Cecchi, “Integrative Photovoltaic Shadings in a Net-Zero-Energy Solar House”, *American Solar Energy Society, SOLAR 2014*. Publication Year: 2014.
- [C27] M. Davoudi, V. Cecchi, J. Romero-Agüero, “Investigating the Ability of Meshed Distribution Systems to Increase Penetration Levels of Distributed Generation”, *Proceedings of the IEEE SoutheastCon 2014*. Publication Year: 2014.
- [C28] B. Poudel, V. Cecchi, “Harmonic Power Flow using Multi-Segment Frequency-Dependent Transmission Line Models”, *Proceedings of the 2013 North American Power Symposium (NAPS)*. Publication Year: 2013.
- [C29] V. Cecchi, S. Kamalasadani, J. Enslin, M. Miller, “Grid Impacts and Mitigation Measures for Increased PV Penetration Levels using Advanced PV Inverter Regulation”, *Proceedings of the 2013 IEEE Energy Conversion Congress and Exposition (ECCE)*. Pub. Year: 2013.
- [C30] A.S. Deese, V. Cecchi, K. Miu, “Capacitor Placement and Control Experiment for Reconfigurable Distribution Automation and Control Laboratory”, *Proceedings of the 2013 IEEE PES General Meeting*. Publication Year: 2013.
- [C31] B. Chowdhury, B. Parkhideh, A. Martin, Z. Salami, J. Enslin, V. Cecchi, S. Kamalasadani, M. Noras, “Enhancing Power and Energy Systems Concepts with Laboratory Experience”, *Proceedings of the 2013 IEEE PES General Meeting*. Publication Year: 2013.
- [C32] A. Shrestha, V. Cecchi, R. Cox, “A Real-Time Platform for Validating Continuous Wide-Area Control Systems”, *Proceedings of the 2013 IEEE PES Innovative Smart Grid Technologies (ISGT)*. Publication Year: 2013.
- [C33] V. Cecchi, M. Knudson, K. Miu, and C. Nwankpa, “A Non-Uniformly Distributed Parameter

- Transmission Line Model”, *Proceedings of the 2012 North American Power Symposium (NAPS)*. Publication Year: 2012.
- [C34] R.T.S. Sai, A. Mukherjee, V. Cecchi, and A. Kailas, “Architecture Exploration of a Heterogeneous Embedded Processor for the Smart Grid”, *Proceedings of the IEEE SoutheastCon 2012*. Pub. Year: 2012.
- [C35] V. Cecchi and M. Knudson, “Study of the Effects of Temperature-Dependent Electric Power Transmission Line Models on Estimation of Transfer Capabilities”, *Proceedings of the 2012 NAUN WSEAS/NAUN International Conferences (NAUN 2012), Circuits, Systems and Signals*. Pub. Year: 2012.
- [C36] V. Cecchi, K. Miu, A. St. Leger, and C. Nwankpa, “Study of the Impacts of Ambient Temperature Variations along a Transmission Line Using Temperature-Dependent Line Models”, *Proceedings of the 2011 IEEE PES General Meeting*. Publication Year: 2011.
- [C37] N. BouSaba, J. Conrad, C. Hargrove, V. Cecchi, “Keys to Success in the IEEE Hardware Competition”, *Proceedings of the 2011 American Society for Engineering Education Annual Conference and Exposition (ASEE)*. Publication Year: 2011.
- [C38] P. Schmidt, V. Cecchi, N. BouSaba, S. G. Teng, D. Hoch, S. Patterson, D. Sharer, “An Optimization Routine for Assigning Students to Capstone Project Groups”, *Proc. of the 2011 American Society for Engineering Education Annual Conference and Exposition (ASEE)*. Publication Year: 2011.
- [C39] C. Schegan, V. Cecchi, X. Yang, K. Miu, “A Model Specific Simulation of Power Distribution Grids for Non-Destructive Testing of Network Reconfiguration Schemes”, *Proceedings of the 2010 Conference on Grand Challenges in Modeling & Simulation (SummerSim)*. Publication Year: 2010.
- [C40] K. Miu, A. Deese, X. Yang, V. Cecchi, M. Kleinberg, C. Schegan, “Integrating Distribution Automation and Control Techniques into Power System Curriculum”, *Proceedings of the 2009 IEEE PES General Meeting*. Publication Year: 2009.
- [C41] V. Cecchi, A. St. Leger, K. Miu, and C. Nwankpa, “Loading Studies for Power Transmission Line Models in the Presence of Non-Fundamental Frequencies”, *Proceedings of the 2007 Summer Computer Simulation Conference (SCSC)*. Publication Year: 2007.
- [C42] V. Cecchi, A. St. Leger, K. Miu, and C. Nwankpa, “Experimental Setup for Investigating Gamma Transmission Line Models in the Presence of Non-Fundamental Frequencies”, *Proceedings of the 2007 IEEE Power Engineering Society General Meeting*. Pub. Year: 2007.
- [C43] K. Miu, V. Cecchi, M. Tong, B. Kleinberg, and M. Kleinberg, “Adapting Existing Distribution Power Flow Experiments for Outreach Education”, *Proceedings of the 2007 IEEE Power Engineering Society General Meeting*. Pub. Year: 2007.
- [C44] V. Cecchi, M. Kleinberg, M. Tong, B. Kleinberg, and K. Miu, “Design of Power Engineering Outreach Experiments using Feedback from Non-Engineers and Grade 9-12 Students”, *Proceeding of the 2007 American Society for Engineering Education Annual Conference and Exposition (ASEE)*. Pub. Year: 2007.
- [C45] V. Cecchi, X. Yang, K. Miu, and C. Nwankpa, “Instrumentation and Measurement of a Power Distribution System Laboratory for Network Reconfiguration Studies”, *Proceedings of the 2006 IEEE Instrumentation and Measurement Technology Conference (IMTC)*. Pub. Year: 2006. **1<sup>st</sup> Place: Student Paper Competition**
- [C46] X. Yang, V. Cecchi, K. Miu, and C. Nwankpa, “Reconfigurable Distribution Automation and Control Laboratory: A Network Reconfiguration Experiment for Load Balancing and Loss Reduction in Power Distribution Systems”, *Proceeding of the 2005 American Society for Engineering Education Annual Conference and Exposition (ASEE)*. Pub. Year: 2005.

### Patents and Intellectual Property

- Provisional Patent: Bikash Poudel and Valentina Cecchi, “Frequency-Dependent Electric Power Line Modeling Approach”, Report Date: March 23, 2016.

## INVITED TALKS AND PRESENTATIONS

- Invited Panelist: “Introduction of Emerging Technologies to Distribution Systems via Simulation”, at *IEEE PES General Meeting*, Boston, MA, 2016.
- Invited Panelist: “Multi-Institutional Power System Education Collaboration, GEARED University Curricula”, at *IEEE PES General Meeting*, Boston, MA, 2016.
- Moderator, *First Roundtable on Italian Technology & Italian FDI*, Charlotte, NC, 2016.
- J.H.R. Enslin, V. Cecchi, J. Romero-Agüero, “Advanced Real-Time Control and Alternative Closed-Loop Operation of Power Distribution Systems for High Penetration of Distributed Energy Resources”, *DistribUTECH – Africa 2014*, Cape Town, 17-19 March 2014.
- “Research in Power Delivery Systems”, *E4 Carolinas Emerging Leaders Program*, Charlotte, NC, 2013.
- J. Romero-Agüero, J.H.R. Enslin, J. Spare, L. Willis, F. Katiraei, V. Cecchi, “Closed-loop Operation of Power Distribution Systems for Integration of High Penetration Levels of Distributed Energy Resources”, *DistribUTECH 2013*, January 2013.
- *Smart or “Smarter” Grid... Moving Towards the Modern Power System*, North American Young Generation in Nuclear (NAYGN) Meeting, Shaw Group, Charlotte, NC, 2012.
- *Electric Power Lines: Investigating the Backbone in Power System Modeling and Analysis*, Georgia Institute of Technology, Power System Technical Interest Group, Atlanta, GA, 2012.
- *Towards the Modern Power System*, *IEEE Charlotte Section*, Charlotte, NC, 2011.
- Invited Panelist: “A Distribution Power Flow Experiment for Outreach Education”, at *IEEE PES General Meeting*, Calgary, CA, 2011.

## RESEARCH GRANTS

### Grants and Contracts Awarded (Total: \$2,338,770)

#### Sole or Lead Principal Investigator (\$722,173)

1. **Typhoon Modeling and Analysis of the Rankin Feeder and Associated Resources**  
Principal Investigator: V. Cecchi  
Co-PI: M. Manjrekar  
Source of Support: Duke Energy  
Award Period: 1/1/2018 – 12/31/2018  
Award Amount: \$99,868
2. **Integrated Rankin Feeder Real-Time Modeling and Use-Case/Asset Coordination Analysis**  
Principal Investigator: V. Cecchi  
Co-PI: M. Manjrekar  
Source of Support: Duke Energy  
Award Period: 1/1/2017 – 12/31/2017  
Award Amount: \$99,764
3. **Duke Energy Microgrid at Mt. Holly and Distribution Circuit Modeling and Analysis**  
Principal Investigator: V. Cecchi  
Co-PI: M. Manjrekar  
Source of Support: Duke Energy  
Award Period: 7/1/2016 – 12/31/2016  
Award Amount: \$68,054
4. **A Novel Electric Power Line Modeling Approach: Coupling of Dynamic Line Ratings with Temperature-Dependent Line Model Structures**  
Principal Investigator: V. Cecchi  
Co-PI: None  
Source of Support: National Science Foundation

Award Period: 9/1/2015 – 8/31/2018

Award Amount: \$257,232

5. **Conference Support for 2015 North American Power Symposium**

Principal Investigator: V. Cecchi

Co-PI: S. Kamalasan

Source of Support: National Science Foundation

Award Period: 9/1/2015 – 8/31/2016

Award Amount: \$15,000

6. **Quanta Technology Graduate Research Assistantship** (research fellowship)

Principal Investigator: V. Cecchi

Co-PI: None

Source of Support: Quanta Technology

Award Period: 8/1/2015 – 5/1/2016

Award Amount: \$25,137

7. **Collaborative Research: Smart Power Distribution System Curriculum - Multi-Institution Demonstration and Deployment**

Principal Investigator: V. Cecchi

Co-PI: None

Source of Support: National Science Foundation

Award Period: 9/1/2012 – 9/1/2015

Award Amount: \$89,487

8. **Photo Voltaic Generation Integration Study**

Principal Investigator: V. Cecchi

Co-PI: J. Enslin, S. Kamalasan

Source of Support: Duke Energy Corporation

Award Period: 5/30/2012 – 12/30/2012

Award Amount: \$55,631

9. **Towards a Future Microgrid: Renewable, Sustainable, and Transportable Energy Source** (institutional grant)

Principal Investigator: V. Cecchi

Co-PI: S. Kamalasan

Source of Support: UNC Charlotte Faculty Research Grant

Award Period: 1/15/2011 – 5/30/2012

Award Amount: \$12,000

**Co-Principal Investigator (\$1,616,597)**

1. **A Visual Analytics Approach for the Situationally Aware Distribution System**

Principal Investigator: I. Cho

Co-PI: V. Cecchi, Z. Wartell, W. Dou

Source of Support: Electric Power Research Institute (EPRI)

Award Period: 9/1/2017 – 8/31/2018

Award Amount: \$44,000

2. **Interconnection between EPIC Laboratories and Duke Energy Mount Holly Facilities**

Principal Investigator: M. Manjrekar

Co-PIs: B. Chowdhury, J. Enslin, S. Kamalasan, V. Cecchi

Source of Support: Duke Energy

Award Period: 8/1/2015 – 5/31/2016

Award Amount: \$21,801

3. **Hybrid Real-Time Simulator (OPAL-RT with RTDS) based Advanced Modeling and Analytical System Solutions of SCE Grid with Renewable Energy Resource and Storage**

Principal Investigator: S. Kamalasan  
 Co-PIs: B. Chowdhury, J. Enslin, M. Manjrekar, V. Cecchi, R. Shankar  
 Source of Support: Southern California Edison  
 Award Period: 1/1/2015 – 8/31/2015  
 Award Amount: \$150,000

1. **Towards a STEM Diversity Center at UNC Charlotte** (institutional grant)  
 Principal Investigator: M. Walter  
 Co-PI: V. Cecchi, M. Azarbayjani  
 Source of Support: UNC Charlotte Chancellor's Diversity Challenge Fund  
 Award Period: 8/2014 – 6/2015  
 Award Amount: \$4,500
4. **Leveraging Industry Research to Educate a Future Electric Grid Workforce (GEARED)**  
 Principal Investigator: B. Chowdhury  
 Co-PIs: J. Enslin, B. Parkhideh, V. Cecchi, M. Manjrekar, R. Cox, Z. Salami  
 Source of Support: Electric Power Research Institute and U.S. DOE  
 Award Period: 1/1/2014 – 12/31/2018  
 Award Amount: \$868,180
5. **Energy Storage Integration Study**  
 Principal Investigator: S. Kamalasan  
 Co-PI: J. Enslin, V. Cecchi  
 Source of Support: Duke Energy Corporation  
 Award Period: 2/1/2013 – 9/30/2013  
 Award Amount: \$59,229
6. **MRI: Acquisition of Real-Time Digital Simulator for Real-Time Studies in Next Generation Power Grid Infrastructure**  
 Principal Investigator: J. Enslin  
 Co-PI: V. Cecchi, S. Kamalasan  
 Source of Support: National Science Foundation  
 Award Period: 8/15/2012 – 12/31/2015  
 Award Amount: \$368,887 (Individual Share: 33%)
7. **Department of Energy – 2013 Solar Decathlon Competition**  
 Principal Investigator: M. Azarbayjani  
 Co-PI: V. Cecchi, B. Futrell, A. Ebong, L. Swayne  
 Source of Support: Department of Energy (DOE)  
 Award Period: 10/01/2011 – 9/30/2012  
 Award Amount: \$100,000  
 Total Amount Raised: \$1.2M

#### **Equipment and Software Donations (Total: \$277,418)**

1. **SEL Relay Testbed** (equipment donation)  
 Source of Support: Schweitzer Engineering Laboratories, Inc.  
 In-Kind Donation Amount: \$177,418
2. **RTDS Software Platform** (software donation)  
 Source of Support: RTDS, Inc.  
 In-Kind Donation Amount: \$100,000
3. **GE/Alstom e-terradistribution and e-terracontrol** (software donation)  
 Source of Support: GE/Alstom  
 In-Kind Donation Amount: unknown



## RECENT RESEARCH COLLABORATIONS

**University of North Carolina at Charlotte** • *Department of Electrical and Computer Engineering*: Sukumar Kamalasan, Robert Cox, Badrul Chowdhury, Madhav Manjrekar, Arindam Mukherjee, *College of Computing and Informatics - Department of Computer Science*: Bill Ribarsky, Isaac Cho, Zachary Wartell, Wenwen Dou, *Engineering Technology*: Maciej Noras, *Department of Architecture*: Mona Azarbayjani, Benjamin Futrell, *School of Business*: Linda Swayne. **Drexel University** • *Electrical and Computer Engineering Department, Center for Electric Power Engineering*: Karen Miu, Chika Nwankpa. **United States Military Academy** • *Department of Electrical Engineering and Computer Science*: Aaron St. Leger. **The College of New Jersey** • *Department of Electrical and Computer Engineering*: Anthony Deese. **University of Texas at El Paso** • *Department of Electrical and Computer Engineering*: Paras Mandal. **Cornell University** • *Department of Electrical and Computer Engineering*: Hsiao-Dong Chiang. **Appalachian State University** • *Department of Sustainable Technology and the Built Environment*: Brian Raichle, Jeff Ramsdell. **Washington State University** • *School of Electrical Engineering and Computer Science*: Anurag Srivastava.

## PROFESSIONAL AFFILIATIONS

### Professional Societies

- Institute of Electrical and Electronics Engineers (IEEE), Member (2005 – present)
  - Power and Energy Society
  - Circuits and Systems Society
  - Power Electronics Society
  - Instrumentation and Measurement Society
  - Education Society
  - Women in Engineering (WIE)
- American Society for Engineering Education (ASEE), Member (2005 – present)
- The Society of Women Engineers (SWE), Member

### Honor Societies

- Eta Kappa Nu, An Electrical and Computer Engineering Honor Society (2004 - present)
- The National Society of Collegiate Scholars (2001 - present)

### Honors

- **1<sup>st</sup> Place**: Student Poster Competition, 2016 IEEE Power and Energy Society, Transmission and Distribution Conference, Dallas, TX, May 2-5, 2016. (*Student's Award*)
- **3<sup>rd</sup> Place**: Student Poster Competition, 2016 IEEE Power and Energy Society, Transmission and Distribution Conference, Dallas, TX, May 2-5, 2016. (*Student's Award*)
- Charlotte Business Journal 2013 Young Leader in Energy Award, 2013.
- E4 Carolinas Emerging Leaders Program, 2013.
- **3<sup>rd</sup> Place**: Engineering, U.S. DOE Solar Decathlon Competition, 2013.
- **1<sup>st</sup> Place**: People's Choice Award, U.S. DOE Solar Decathlon Competition, 2013.
- Stellar Student Speaker, Honorable Mention, 2015 Appalachian Energy Summit, Boone, NC, July 13-15, 2015. (*Student's Award*)
- **3<sup>rd</sup> Place**: Student Poster Competition, 2012 IEEE Power and Energy Society, Transmission & Distribution Conference, Orlando, FL, May 7-10, 2012. (*Student's Award*)
- **1<sup>st</sup> Place**: Student Poster Competition, 2011 IEEE Power and Energy Society, General Meeting, Detroit, MI, July 24-28, 2011. (*Student's Award*)
- **2<sup>nd</sup> Place**: Student Poster Competition, 2008 IEEE Power and Energy Society, Transmission and Distribution Conference, Chicago, IL, April 21-24, 2008.
- **1<sup>st</sup> Place**: Student Paper Competition, 2006 IEEE Instrumentation and Measurement Technology Conference, Sorrento, Italy, April 24-27, 2006.
- Dean's Fellowship, A.J. Drexel Scholarship, and Drexel University Dean's List.
- Esther K. Swerdlow Scholarship, Drexel University, for high proficiency in the study of mathematics.

## TEACHING

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### Synopsis:

- Teaching:* 23 semester-long courses covering 10 different topics.
- Curriculum:* Developed 2 new graduate courses and 1 undergraduate/graduate special topic course crossed-listed among all engineering disciplines.
- Advising:* 10 Ph.D. students (5 graduated, 5 current), 5 M.S. students (4 graduated, 1 current), 8 undergraduate RAs and 8 undergraduate RAs for the Solar Decathlon Project.
- Mentored:* 10 undergraduate senior design projects (5 award-winning teams) and 14 independent study projects.

## COURSES TAUGHT

### Undergraduate Courses

- ECGR 2111: Network Theory I *(core curriculum course)*
  - Fall 2012, Spring 2014, Spring 2015, Spring 2016, Spring 2017
- ECGR 4141: Power System Analysis I
  - Fall 2016
- ECGR 4142: Power System Analysis II
  - Spring 2017, Spring 2018
- ECGR 3156: Electromagnetic & Electronic Devices Laboratory *(core curriculum course)*
  - Spring 2013
- ECGR 3253-E01/C01: Senior Design I – EE and CpE *(core curriculum course)*
  - Fall 2010
- ECGR 3253-E01/C01: Senior Design II – EE and CpE *(core curriculum course)*
  - Fall 2010
- ECGR 4090/CEGR 4090/MEGR 3090: *(course co-developed with Dr. Ebong)*  
 Special Topic: Solar Decathlon Construction Phase
  - Spring 2013
- ECGR 4892-003: Individual Study: Modeling of Electric Power Distribution Systems
  - Spring 2014
- ECGR 3890: Individual Study
  - Spring 2011
- ECGR 4892-C01: Individual Study
  - Fall 2011
- ECGR 4892: Independent Study: Solar Decathlon
  - Summer 2012

### Graduate Courses

- ECGR 6111/8111: Linear Systems
  - Spring 2011
- ECGR 5194: Power Systems Analysis II
  - Spring 2018
- ECGR 6144/8144: Electric Power Distribution Systems I *(developed course)*
  - Fall 2011, Spring 2014, Spring 2015, Spring 2017, Spring 2018
- ECGR 6145/8145: Electric Power Distribution Systems II *(developed course)*
  - Spring 2012, Fall 2014, Spring 2016
- ECGR 5090/CEGR 5090: *(course co-developed with Dr. Ebong)*

## Special Topic: Solar Decathlon Construction Phase

- Spring 2013
- ECGR 6890: Individual Study and Projects
  - Fall 2011, Spring 2012, Fall 2012, Spring 2013, Spring 2016
- ECGR 8890: Individual Study and Projects: Harmonics in Power Systems
  - Spring 2013, Spring 2014
- ECGR 8890: Individual Study and Projects: Electric Power Substation Engineering
  - Fall 2014
- ECGR 8890: Individual Study and Projects
  - Spring 2015, Spring 2016

**STUDENT ADVISING****Advised Ph.D. Students (5 graduated, 5 current)**

- B. Poudel, *Frequency-Dependent Electric Power Line Modeling for Steady-State Harmonic Analysis*, May 2016. (now at EnerNex)
- A. Shrestha, *Dynamic Remedial Action Scheme using Online Transient Stability Analysis*, May 2016. (now at Schweitzer Engineering Laboratories, Inc.- SEL)
- C. Liu, *Skin Effect in Large Bi-Media Power Conductors*, May 2016. (now at Southwire Company, LLC)
- S. Mohajeryami, *An Improvement of the Load Reduction Evaluation Methodologies Employed in Demand Response (DR) Programs Offered to Residential Customers*, May 2017. (now at UC San Diego)
- M. Davoudi, tentative title: *Increasing Hosting Capacity of Distribution Systems by Means of Network Reconfiguration with Relaxed Radiality Constraints*, May 2017. (now at Quanta Technologies)
- M. M. Rahman, tentative title: *Coupling of Dynamic Line Ratings Systems and Temperature Dependent Transmission Line Models*, expected completion: December 2018.
- T. Lawanson, expected completion: May 2019.
- R. Karandeh, expected completion: May 2020.
- B. Banu, expected completion: May 2021.
- R. Mbake, expected completion: May 2022.

**Advised M.S. Students (4 graduated, 1 current)**

- S. N. K. Mohan Jagarlapudi, *Investigation of Wind Speed Dependent Electric Power Transmission Line Models*, December 2015.
- M. Davoudi, *Investigation of Distribution System Meshed Configuration to Increase Maximum Allowable Penetration of Renewable and Distributed Generation*, December 2014.
- D. Sheth, *An Approach to Power System Protection that Adapts to Changes in System Topology*, August 2013.
- E. Mora, *Investigation of Distribution System Protection Methodologies in the Presence of Distributed Generation*, May 2017.
- P. Morgansgate, expected completion: May 2019.

**Advised Undergraduate Research Assistants (8 funded undergrad RAs and 8 funded from the U.S. DOE Solar Decathlon Project)**

- L. Hall and H. Damewood, *funded by EPIC Associate research award: Establish hardware/software platform to evaluate and validate novel electric power line models.* (Aug 2015 – May 2016)
- L. Tucker, L. Cole (BSME), J. Barney (BSME), *funded by UNC Charlotte Chancellor's Diversity Challenge Fund: Towards a STEM Diversity Center at UNC Charlotte.* (January 2015 – June 2015)

- S. Zilbedrut, *funded by EPIC Associate research award: Investigating applicability and explore system-level applications of point-of-load distribution feeder impedance. Stellar Student Speaker, Honorable Mention, 2015 Appalachian Energy Summit.* (Aug 2014 – May 2015)
- J. Cappelletti (BSME), *funded by EPIC Associate research award: Investigating applicability and explore system-level applications of point-of-load distribution feeder impedance.* (Aug 2014 – Dec 2014)
- P. O'Connor, *funded by Duke Energy Photo Voltaic Generation Integration Study.* (June – Dec 2012)
- C. Truong, J. Polk (BSME), J. Wittmer, S. Lanier (BSME), B. Ouimette (BSME), J. Cappelletti (BSME), M. Koenig, M. Trejo (BSCE), *funded by the US DOE Solar Decathlon project.* (Jan – May 2013)

#### Advised Undergraduate Senior Design Projects (10 projects, 34 students)

- P. Rankin, E. Joniaux, J. Tribble, *Integrated Distribution Energy Management System* (sponsored by Duke Energy), **IEEE PES T&D 2016 Student Poster Competition 1<sup>st</sup> place winner**, Fall 2015 – Spring 2016.
- C. DeCoste, B. Madden, J. McCall, A. Scaria, *Distribution Management System for CRI Campus* (sponsored by Duke Energy), **COE Senior Design Program 2<sup>nd</sup> place winner**, Fall 2014 – Spring 2015.
- S. Zilberdrut, D. McKenzie, R. Sherretts, *Automatic Reconfiguration Scheme and Load Management for UNC Charlotte Campus* (sponsored by SEL), **COE Senior Design Program 2<sup>nd</sup> place winner**, Fall 2014 – Spring 2015.
- R.M. Al Onazy, D. Wilson, A. Al Matar, *Modeling, Analysis and Management Strategies for Large-Scale Renewables* (sponsored by Duke Energy), Spring 2014 – Fall 2014.
- D. Martin, M. Hamed Al Malki, A. Ksionsk, S. Belle Isle, *Integrated PV and Natural Gas Microgrid*, Fall 2013 – Spring 2014.
- J. Hart, D. Barton, P. Hight, *Solar Decathlon Home Control System*, Fall 2012 – Spring 2013.
- P. O'Connor, W. Bomela, M. Knudson, *Study of Grid-Connected Renewable Sources for Smart Grid Applications* (sponsored by Duke Energy), **IEEE PES T&D 2012 Student Poster Competition 3<sup>rd</sup> place winner**, Fall 2011 – Spring 2012.
- P. Finnie, R. Ricono, S. Hoyos, J. Shipley, M. Bixler, *Renewable and Modular Micro-Source for Smart Grid Applications*, **COE Senior Design Program 1<sup>st</sup> place winner** and **IEEE PES GM 2011 Student Poster Competition 1<sup>st</sup> place winner**, Spring 2011 – Fall 2011.
- A. Suleiman, Y. Siddiqui, B. Fitzgerald, *UNC Charlotte Parking*, Fall 2010 – Spring 2011.
- J. Welch, C. Yang, A. Jackson, *Smart Home Energy Management System* (sponsored by Duke Energy), Fall 2010 – Spring 2011.

## UNIVERSITY AND PROFESSIONAL SERVICE

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#### Synopsis:

*University Service:* Served roles on 20 committees/responsibilities (11 departmental, 6 college, and 3 university-level), including chair of the Power Systems Focus Area Improvement Team (FAIT) and member of the ECE Chair Search Committee.

*Scholarly Service:* Served roles on 13 committees/responsibilities, including NAPS 2015 conference general chair, conference organizing and steering committee, conference session chair, reviewer for 9 journals and 5 conference proceedings, and NSF panel reviewer.

## UNIVERSITY SERVICE

### The Electrical and Computer Engineering Department (11 committees/responsibilities)

- Department Review Committee, Non-voting member (May 2015 – May 2016)

- Power Engineering Technical Thrust (TT) Group, Member (Aug 2010 – Present) and Chair (Aug 2014 – Present)
- Power Systems Focus Area Improvement Team (FAIT), Member (Aug 2010 – Present) and Chair (Aug 2014 – Present)
- Outreach Committee, Member (Aug 2014 – Present)
- ECE Department Chair Search Committee, Member (Aug 2014 – May 2015)
- Core Courses and Laboratory Focus Area Improvement Team (FAIT) (Aug 2011 – May 2014)
- Undergraduate Student Academic Advisor, with 41 undergraduate advisees in 2015-2016 (Aug 2010 – Present)
- Graduate Student Academic Advisor, with 23 graduate advisees in 2015-2016 (Aug 2010 – Present)
- Member of Multiple Ph.D. and M.S. Committees (Aug 2010 – Present)
- ECE Power & Energy Concentration, Proposal Development Member
- IEEE Women In Engineering (WIE), Active participant in the founding of the chapter

#### **The William States Lee College of Engineering (6 committees/responsibilities)**

- College of Engineering Faculty Organization Executive Committee, President-Elect (Aug 2017 – Present)
- College of Engineering Faculty Organization Executive Committee, Secretary (Aug 2016 – July 2017)
- ECE Chair Search Committee, Member (Aug 2014 – April 2015)
- EPIC Hiring Committee, Member (Aug 2011 – April 2012)
- College of Engineering Alumni Affairs Staff Hiring Committee, Member (June – Dec 2012)
- College of Engineering Freshman Learning Community Annual Women's Lunch, Participant (2012 – Present)
- EPIC Associate and Member of the Power System Research Cluster (Aug 2010 – Present)

#### **The University of North Carolina at Charlotte (3 committee/responsibilities)**

- Alpha Omega Epsilon sorority for women in engineering and applied sciences, Faculty Advisor (Jan 2011 – Present)
- EPIC Power and Energy Society Student Chapter, Faculty Advisor (2011 – 2014)
- Judge for the Sustainability Awards in the UNC Charlotte Undergraduate Research Conference (2014)

### **PROFESSIONAL SERVICE**

#### **Committees (13 committees/responsibilities)**

- North American Power Symposium 2015, General Chair – Co-chair with Dr. Kamalasan (2014 – 2015)
- IEEE PES, PEEC Student Activities Subcommittee, Secretary (2014 – Present)
- IEEE PES, PEEC Lifelong Learning Subcommittee, Secretary-Elect (2014 – Present)
- IEEE Line Rating Prediction Task Force (2015 – Present)
- EPRI Integrated Grid Collaboration Site, Contributor (2014 – Present)
- IEEE PES, Career Promotion and Workforce Development, Secretary, Vice-Chair (2013 – Present)
- IEEE North Carolina Council, Secretary (2012 – 2014)
- IEEE Charlotte Section, Power and Energy Society (PES), Treasurer (2013)
- IEEE Charlotte Section, Education Society, Treasurer (2013)
- North America Power Symposium (NAPS) Steering Committee (2012 – Present)
- 2012 NC Smart Grid Forum Local Organizing Committee, Vice-Chair (2011 – 2012)
- 2012 NC Smart Grid Forum Steering Committee (2011 – 2012)
- IEEE PES Young Professionals (formerly GOLD) Committee (2010 – Present)

### Scholarly Service

- NSF Panel Reviewer, 2013 – present
- Session Chair at NAPS 2014, Washington State University, WA, Fall 2014
- Session Chair at NAPS 2013, Kansas State University, KS, Fall 2013
- Session Chair at NAPS 2012, University of Illinois Urbana-Champaign, IL, Summer 2012
- Session Chair at NAUN 2012, Vouliagmeni Beach, Athens, Greece, Spring 2012
- Journal and Conference Article Reviewer for:
  - IEEE Transactions on Power Systems
  - IEEE Transactions on Power Delivery
  - IEEE Transactions on Smart Grid
  - IEEE Transactions on Power Electronics
  - IEEE Transactions on Industry Applications
  - IEEE Transactions on Sustainable Energy
  - Elsevier Journal of Electrical Power Systems Research
  - Elsevier International Journal of Electrical Power & Energy Systems
  - IEEE Intelligent Systems Magazine
  - IEEE ISGT (2014 – Present)
  - IEEE PES GM (2013 – Present)
  - NAPS (2012 – Present)
  - IEEE SmartGridComm Symposium 2012
  - IEEE IAS Conference, 2012