ARIZONA STATE UNIVERSITY
Ira. A. Fulton Schools of Engineering
School of Electrical, Computer and Energy Engineering
Tempe, AZ 85287-5706

Vita

Revised November 2016

I. PERSONAL DATA

Name:	Vijay Vittal
Address:	PO Box 875706, Department of Electrical Engineering Arizona State University, Tempe, AZ 85287-5706
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Email:	vijay.vittal@asu.edu
Home:	5418 E. Hartford Ave. Scottsdale, AZ 85254
Birthdate/Place:	December 25, 1955, India
Orig. Date of Employment:	January 1, 2005
Prof. Reg.:	
Citizenship:	U.S. Naturalized Citizen
Grad. Faculty Status:	Full Member

II. EDUCATION

Ph.D.	EE	Iowa State University	1982
M.T.	EE	Indian Institute of Technology Kanpur, India	1979
B.E.	EE	B.M.S. College of Engineering Bangalore, India	1977

III. ACADEMIC EXPERIENCE

2013 – Preset	ASU Foundation Professor in Power Systems Engineering
2005 – Present	Ira. A. Fulton Chair Professor School of Electrical, Computer and Energy Engineering Ira. A. Fulton Schools of Engineering Arizona State University
2005 – Present	Director, National Science Foundation IUCRC Power System Engineering Research Center
2004-2005	Anson Marston Distinguished Professor Electrical and Computer Engineering Department Iowa State University, Ames, IA
2001-2003	Associate Chair of Department and Director of Graduate Education
2000-2004	Murray and Ruth Harpole Professor

	Electrical and Computer Engineering Department Iowa State University, Ames, IA
1999-2004	Director, Electric Power Research Center
1998-2004	Site Director, National Science Foundation IUCRC Power System Engineering Research Center
1990 - 2004	Professor Electrical and Computer Engineering Department Iowa State University, Ames, IA
1986 - 1990	Associate Professor Electrical and Computer Engineering Department Iowa State University, Ames, IA
1982 - 1986	Assistant Professor Electrical and Computer Engineering Department Iowa State University, Ames, IA
1979 - 1982	Research Assistant Electrical and Computer Engineering Department Iowa State University, Ames, IA
1977 - 1979	Teaching Assistant Electrical Engineering Department Indian Institute of Technology, Kanpur, India

IV. INDUSTRIAL AND OTHER NON-ACADEMIC EXPERIENCE

2005 -	Director, Power Systems Engineering Research Center (PSERC – A NSF Supported IUCRC) – Arizona State University
1999-2004	Site Director, Power Systems Engineering Research Center (PSERC – A NSF Supported IUCRC) – Iowa State University
1993-1994	Program Director for Power Systems, National Science Foundation Division of Electrical & Communication Systems, Washington, DC

V. HONORS AND AWARDS

2013 IEEE Herman Halperin Electric Transmission and Distribution Award – IEEE Technical Field Award – "For development of power system stability assessment methods leading to the maximum utilization and increased reliability of transmission facilities."

2009 IEEE Power and Energy Society, Working Group Recognition Award, Outstanding Technical Report – "Blackout Experience and Lessons, Best Practices for System Dynamic Performance, and the Role of New Technologies.

2007 Outstanding Alumnus Award, B.M. Sreenivasaiah College of Engineering Bangalore, India.

2007 IEEE Power Engineering Society, Power System Dynamic Performance Committee, Technical Committee Prize Paper Award – "Small-Disturbance angle Stability Enhancement Through Direct Load Control Part I and II, IEEE Transaction on Power Systems, Vol. 21, No. 2, May 2006, pp. 773-781 and pp. 782-790.

2007 Named among the 150 "Visionaries" -- individuals who built Iowa State University, from its earliest beginnings as an agricultural college, to today's university of science and technology on the occasion of ISU's sesquicentennial.

2006 IEEE Power Engineering Society, Power System Dynamic Performance Committee, Technical Committee Working Group Recognition Award – "Task Force on Assessing the Need to Include Higher-Order Terms for Small-Signal (Modal) Analysis."

2005 IEEE Power Engineering Society, Power System Dynamic Performance Committee, Distinguished service award for distinguished and meritorious service to the Power System Dynamic Performance Committee.

2004 Elected to the U.S. National Academy of Engineering. Citation: "For improvements in real-time control and dynamic security assessment for electric power systems." Election to the National Academy of Engineering is among the highest professional distinctions accorded to an engineer. Academy membership honors those who have made "important contributions to engineering theory and practice, including significant contributions to the literature of engineering theory and practice," and those who have demonstrated accomplishment in "the pioneering of new fields of engineering, making major advancements in traditional fields of engineering, or developing/implementing innovative approaches to engineering education."

2003 Iowa State University Foundation Award for Outstanding Achievement in Research. This award recognizes faculty members for outstanding achievement in research, scholarship, or creative activity.

2001 Institute of Electrical and Electronics Engineers, Power Engineering Society Technical Council Committee of the Year Award 2000-2001 – Power System Dynamic Performance Committee – Chair Vijay Vittal.

2000 Outstanding Power Engineering Educator Award, Power Engineering Society, Institute of Electrical and Electronics Engineers. Awarded for excellence in teaching and ability to inspire students, and leadership in electric power engineering education through publication of textbooks and writings on engineering education. Citation: "For Inspirational Leadership and Innovative Contributions to Electric Power Engineering Education, Research and Program Development."

2000 Warren B. Boast Undergraduate Teaching Award. Departmental Award for Student Recognition of Outstanding Classroom Performance.

1997 Elected Fellow of the Institute of Electrical and Electronics Engineers. Citation:

"For contributions to the development of the transient energy function method and its application to power system dynamic security assessment, and for leadership in power engineering educations and research."

1989 Young Engineering Faculty Research Award, presented by the College of Engineering, Iowa State University. The award recognizes superior, early achievements in research as evidenced by the ability to conduct original research by scholarly contributions to the literature, and by the introduction of new and improved laboratory techniques and instrumentation.

1988 Faculty Award of Excellence, presented annually by the NCR Corporation to recognize outstanding contributions to the Academic Education of Electrical Engineering Students.

1985 Presidential Young Investigator Award, received from the President of the United States in recognition of research and teaching abilities. Presidential Young Investigator (PYI) awards are among the highest honors given by the U.S. government to outstanding young scientists and engineers. Presidential Young Investigators are selected on the basis of demonstrated ability and potential for contributing to the future vitality of the Nation's scientific and engineering effort. Nominations are evaluated in a multi-level process including external peer review.

VI. ACADEMIC AREAS OF SPECIALIZATION

Teaching

At Arizona State University

1. EEE360 Energy Conversion and Transport (2006F, 2012F)
2. EEE470 Electric Power Devices (2007F, 2012F, 2014F, 2016SB)
3. EEE471 Power System Analysis (2015S, 2016S(Online))
4. EEE480 Feedback Systems (2009S, 2010F, 2011S)
5. EEE573 Electric Power Quality (2005S, 2006S)
6. EEE575 Power System Stability (2005F, 2008S,2009F, 2011F, 2013F, 2015F)
7. EEE576 Power System Dynamics (2007S, 2008F, 2010S, 2012S, 2014S, 2016S)
8. EEE691 Electric Power Seminar (2005F, 2006S, 2006F, 2007S, 2007F, 2008S, 2008F, 2009S, 2009F, 2010S, 2010F, 2011S, 2011F, 2012S, 2012F, 2013 S, 2014F, 2014S)

At Iowa State University

1. ENGR 161 Engineering Problems with Computational Laboratory in C (1996F)
2. EE 205 Electric Circuits I (1990F)
3. EE 206 Electric Circuits II (1991S, 1995S, 1995F)
4. EE 251 Introduction to Modern Power Systems (1995F, 1996S, 1996F, 1997F)
5. EE303 Energy Systems and Power Electronics (2004F
6. EE 456 Pow Sys Anal I (1989F, 1992F, 1994F, 1994S, 1998F, 1999F, 2000F,2002F)
7. EE 457 Pow Sys Anal II (1990S, 1993S, 1995F, 1999S, 2000S, 2001S, 2002S, 2003S, 2004S)

8. EE 475 Design of Linear Control Systems (1993S)
9. EE 476 Cont Sys Simul (1988S, 1988F, 1989S, 1989F, 1991S, 1992F)
10. EE 553 Steady State Analysis (2001F)
11. EE 554 Power System Dynamics (1996S, 1997S, 1998S, 1999S, 2000S)
12. EE 578 Mod Cont Sys II (1989S, 1990F)
13. EE 578XR Mod Cont Sys I (1989S, 1991S)
14. EE 577 Mod Cont Sys I (1988F, 1990F)
15. EE 577XR Mod Cont Sys I (1988F)
16. EE 556 Com Tech Pow Sy An (1988S)
17. EE 594 Seminar In Electric Power (1995F, 1996S, 1996F, 1997S, 1997F, 1998S, 1998S, 1998F, 1999S, 1999F, 2000S, 2000F, 2001S, 2001F, 2002S,2002F, 2003S, 2003F, 2004S, 2004F)
18. EE 552 Sym Co Anal Pow Sy (1987F)
19. EE 653 Special Topics in Power (2000F, 2003F)
20. EE 699 Research (1987F, 1988S, 1988F, 1989S, 1989F, 1990S, 1990F, 1991S, 1991F, 1992S, 1992F, 1993S, 1994F, 1995S, 1995F, 1996S, 1996F, 1997S, 1998F, 1999S, 1999F, 2000S, 2000F, 2001S, 2001F, 2002S,2002F, 2003S, 2003F, 2004S, 2004F)

Research

1. Electric Power
2. Power System Dynamics and Controls
3. Nonlinear Systems
4. Computer Applications in Power
5. Integration of renewable energy resources

VII. GRANTS AND CONTRACTS

1. **Vittal, V**., G.T. Heydt, R. Ayyanar, DOE, $250,000, "Leveraging Industry Research to Educate a Future Electric Grid Workforce in the Westerns U.S." February 2016 – February 2019.
2. J. Zhang, K. Hedman, **Vittal, V.** (Co-PI), and A. Scaglione, ARPA-E, $3,000,000, "Stochastic Optimal Power Flow for Real-Time Management of Distributed Renewable Generation and Demand Response." July 2016-June 2018.
3. **Vittal, V.** (Co-P.I.), National Science Foundation, $1,478,907, "Resilient Cyber-Enable Electric Energy and Water Infrastructures: Modeling and Control under Extreme Mega Drought Scenarios." July 2015 – June 2018.
4. **Vittal,V.** (Co-P.I.), Department of Energy, $5,512,900, "The Future Grid to Enable Sustainable Energy Systems: An Initiative of the Power Systems Engineering Research Center," March 30, 2011 – December 31, 2013.
5. Junshan Zhang and **Vittal,V.** (Co-P.I.), National Science Foundation, $500,000, "Architecture and Distributed Management for Reliable Mega-scale Smart Grids," September 7, 2010 – August 31, 2013.

6. G.T. Heydt, **Vittal, V.** (Co-P.I.), and R. Gorur, Department of Energy, $2,315,000, "WECC - Resource Assessment and Interconnection-Level Transmission Analysis and Planning – FOA68," Jan 1, 2010 – Dec 31, 2012.
7. **Vittal, V.** (Co-P.I.), G.T. Heydt, and R. Ayyanar, Department of Energy, $400,000, "Power System Operation and Planning for Enhanced Wind Penetration," 12/01/2009 – 11/30/2011.
8. **Vittal, V.** (Co-P.I.), R. Ayyanar, and G.T. Heydt, Department of Energy, $965,000, "High Penetration of Photovoltaic Generation Study –Flagstaff Community Power," 12/01/2009 – 11/30/2011.
9. **Vittal, V.** (Co-P.I.) Science Foundation of Arizona, $54,063, "Solar market and analysis tool," June 30, 2009-June 29, 2010.
10. **Vittal, V.** (Co-P.I.) Battle Labs, $70,000, "Integration of renewable resources," April 20, 2009 – December 31, 2009.
11. **Vittal, V.** (Co-P.I.) DOE – NETL, $61,519, "Adaptive Islanding," January 1, 2009 – December 31, 2010.
12. **Vittal, V.** (Co-P.I.), PSERC, $150,000, "Next generation on-line dynamic security assessment," July 1, 2009 – June 30, 2011.
13. **Vittal**, **V**. and Ayyanar, R., NSF, $ 239,999, "Control strategies to mitigate the impact of reduced inertia of variable frequency wind generators on the transient stability of power systems," July 1, 2007 - June 30, 2010.
14. **Vittal**, **V**. (Co-P.I.), PSERC, $95,000, "Development and Evaluation of System Restoration Strategies from a Blackout," June 1, 2007 – May 31, 2009.
15. **Vittal**, **V**. (Co-P.I.), PSERC, $95,000, "Impact of Increased DFIG Wind Penetration on Power System Reliability and Consequent Market Adjustments," June 1, 2007 – May 31, 2009.
16. **Vittal, V.** (Co-P.I.), PSERC, $85,000, "Optimal allocation of Static and Dynamic VAR Reserves," June 1, 2005 – May 31, 2007.
17. **Vittal, V.** (Co-P.I.), PSERC, $80,000, "A Tool for On Line Stability Determination and Control for Coordinated Operation between Regional Entities using PMUs," June 1, 2005 – May 31, 2007.
18. **Vittal, V.** (P.I.), NSF, $20,000, "Workshop on Understanding and Preventing Cascading Failures in Power Systems," September 15, 2005 – August 31, 2006.
19. **Vittal, V.** (P.I.), NSF, $48,000, "Research Experience with Alternate Energy with Special Attention to Native American Communities," Sep 1, 2005 – August 31-2007.
20. **Vittal, V.** (P.I.), A. K. Somani, M. Govindarasu, M. Salapaka, and Z. Wang, National Science Foundation, $400,000, "SST-Sensor Network Design for a Secure National Electric Energy Infrastructure," September 1, 2004 – August 31, 2007
21. **Vittal**, **V.** (P.I.), CERTS, $100,000, "An Agent Based Self Healing Scheme for Large Power Systems Using Adaptive Islanding," Jan 1, 2003 – December 31, 2005.
22. **Vittal**, **V.** (P.I.), National Science Foundation, $78,270, "SGER: Robust Gain Scheduled Control Design in Power Systems," August 15, 2003 – July 15, 2004.
23. **Vittal**, **V.** (P.I.), PSERC, $90,000, "Enhanced Reliability of Interconnected Power Systems and Prevention of Cascading Outage," June 1, 2002 – May 30, 2005.
24. **Vittal**, **V.** (P.I.), PSERC, $90,000, "Security Enhancement through Direct Non-disruptive Load Control," June 1, 2002 – May 30, 2005.
25. Khammash, M. H. (P.I.), **V. Vittal** (Co-PI), National Science Foundation, $49,000, "International Workshop on Control and Power Systems," September 1, 2000 - February 28, 2001.

26. **Vittal, V.** (P.I.), M. Govindarasu (Co-PI), National Science Foundation $80,000, "Collaborative Research: Damage Assessment, Control, and Restoration of the Electric Power Grid Following Catastrophic Disturbances," October 1, 2000 - September 30, 2001.
27. Khammash, M. H. (P.I.), **V. Vittal** (Co-PI)**,** PSERC, $60,000, "Robust Control of Large Scale Power Systems," May 1, 2000 - April 30, 2001.
28. **Vittal, V.** (P.I.). National Science Foundation, $237,500, "Industry /University Cooperative Research Center for Power System," September 1, 1999 - August 30, 2004.
29. **Vittal, V.** (P.I.), V. Ajjarapu, M.H. Khammash, W. Kliemann, J. D. McCalley, G. B. Sheblé, L. Tesfatsian, S. S. Venkata (Co-PIs) Electric Power Research Institute and Department of Defense, $1,481234, "Innovative Technologies for Defense Against Catastrophic Failures of Complex, Interactive Power Networks," November 1, 1999,- October 31, 2004.
30. McCalley, J. (PI), **V. Vittal**, Electric Power Research Institute (EPRI), $790,000 "Security Mapping and Reliability Index Evaluation," April, 1999 - March 31, 2001. ISU is the main contractor, and Dr. McCalley is the project manager. Subcontractors are the Laurits R. Christian Associates Company ($400,000) and Virginia Tech ($80,000).
31. Khammash, M. H. (P.I.), **V. Vittal** (Co-PI), National Science Foundation, $237,681, "Robust Control of Large Scale Power Systems," September 1, 1998 -August 30, 2001.
32. **Vittal, V.** (P.I.), M. H. Khammash (Co-PI), Electric Power Research Institute/MidAmerican Energy, $100,000, "Robust Analysis and Design of Controls in Power Systems," August 1, 1998-July 31, 2000.
33. McCalley, J. D. (PI), **V. Vittal (Co-PI)**, G. B. Sheblé (Co-PI), V. Ajjarapu (Co-PI), S. S. Venkata (Co-PI), National Science Foundation, and Electric Power Research Institute, $162,248, "Module Based Multimedia Courseware Development for Power System Education," June 1, 1997 - May 31, 2000.
34. **Vittal, V.** (PI) and M. H. Khammash (Co-PI), Electric Power Research Institute, $182,881, "Robust Analysis and Design of Controls in Power Systems," March 1, 1996 - December 31, 1997.
35. McCalley, J. D. (PI) and **V. Vittal** (Co-PI), Electric Power Research Institute, $140,313, "Development of a Risk-Based Security Assessment Framework," September 1, 1995 - September 1, 1997.
36. Fouad, A. A. (PI), **V. Vittal** (Co-PI), and W. Kliemann (Co-PI), National Science Foundation/Electric Power Research Institute, $199,998 "Nonlinear Power System Behavior Using Normal Forms," Extension of Linear System Analysis Via Higher Order Correction, December 1, 1993 - November 30, 1995.
37. **Vittal, V.**, National Science Foundation, $107,613 IPA Assignment, August 1993 - July 1994.
38. **Vittal, V.** (PI) and M. H. Khammash (Co-PI), National Science Foundation, $136,848, **"**A Novel Approach to Robust Control Design and Analysis of Power Systems," September 1992 - December 1994.
39. **Vittal, V.** (PI) and M. H. Khammash (Co-PI), EPRC, $23,400, "Robust Design of Controls," January 1992 - December 1992.
40. **Vittal, V.**, EMPROS/Electric Power Research Institute, $233,840 "Analytical Methods for Contingency Selection and Ranking for Dynamic, Security Analysis," October 1991 - June 1993.
41. Fouad, A. A. (PI), **V. Vittal** (Co-PI), and W. Kliemann (Co-PI), National Science Foundation/Electric Power Research Institute, $176,085, "Analysis of Stressed Interconnected Power Networks," October 1991 - June 1993.

42. **Vittal, V.**, EPRC Research Grant, $16,200, "Robust Design and Performance of Controls in Power Systems," January 91 - December 91.
43. **Vittal, V.**, National Science Foundation SGER Research Grant, $40,000, "A Framework to Enhance Power System Operation Closer to Security Limits," March 90 - November 91.
44. **Vittal, V.**, National Science Foundation Expedited Award for Novel Research, $30,000, August 1988 - December 1990.
45. **Vittal, V.**, National Science Foundation Presidential Young Investigator Award, $500,000, June 1985 - June 1990.
46. Fouad, A. A. (PI) and **V. Vittal** (Co-PI), Electric Power Research Institute, $284,000, "Extending the Application of Direct Transient Stability Analysis," March 1985 - March 31, 1989.
47. Fouad, A. A. (PI) and **V. Vittal** (Co-PI), Electric Power Research Institute, $82,000, "Output Analysis," December 1982 - December 1985.
48. Fouad, A. A. (PI) and **V. Vittal** (Co-PI), Florida Power & Light Co., $23,800, "Direct Stability Analysis in Loss of Generation Disturbance," September 1983 - December 1984.
49. Fouad, A. A. (PI) and **V. Vittal** (Co-PI), Ontario Hydro/Electric Power Research Institute, $435,000, "Demonstration of Large Scale Direct Analysis of Power System," March 1983 - December 1985.

VIII. TECHNICAL PUBLICATIONS

Refereed Journals

SCI - Science Citation Index Citations - Total Citations 5052
Ph.D. Dissertation - 6 Citations

1. Werho, T., **V. Vittal**, S. Kolluri, and S.M. Wong, "Power System Connectivity Monitoring Using a Graph Theory Network Flow Algorithm," *IEEE Transactions on Power Systems*, Vol. 31, No. 6, pp. 4945-4952, November 2016.
2. Li, Q., R. Ayyanar, **V. Vittal**, "Convex Optimization for DES Planning and Operation Radial Distribution Systems with High Penetration of Photovoltaic Resources," *IEEE Transactions on Sustainable Energy*, Vol. 7, No. 3, pp. 985-995, July 2016.
3. Huang, Q., and **V. Vittal**, "Application of Electromagnetic Transient-Transient Stability Hybrid Simulation to FIDVR Study," *IEEE Transactions on Power Systems*, Vol. 31, No. 4, pp. 2634-22646, July 2016.
4. Al-Abdullah, Y., A. Salloum, K.W. Hedman, **V. Vittal**, "Analyzing the Impacts of Constraint Relaxation Practices in Electric Energy Markets," *IEEE Transactions on Power Systems*, Vol. 31, No. 4, pp. 2566-2577, July 2016.
5. Mitra, P., and **V. Vittal**, "A Systematic Approach to *n*-1 -1 Analysis for Power System Security Assessment," *IEEE Power and Energy Technology Systems Journal*, Vol. 3, No. 2, pp. 71-80, June 2016.
6. Yang, L., M. He, **V. Vittal**, and J. Zhang, "Stochastic Optimization based Economic Dispatch and Interruptible Load Management with Increased Wind Penetration," *IEEE Transactions on Smart Grid*, Vol. 7, No.2, pp. 730–739, March 2016.

7. Werho, T., **V. Vittal**, S. Kolluri, and S.M. Wong, "A Potential Island Formation Identification Scheme Supported by PMU Measurements," *IEEE Transactions on Power Systems*, Vol. 31, No. 1, pp. 423-431, January 2016.
8. Rahmann, C., **V. Vittal**, J. Ascui, and J. Hass, "Mitigation Control against Partial Shading Effects in Large-scale PV Power Plant," *IEEE Transactions on Sustainable Energy*, Vol. 7, No. 1, pp. 173-180, January 2016.
9. Nguyen, H., **V. Vittal**, "Impact of high WPPs penetration on Vietnam Power System," To appear in the *ECTI Transactions on Computer Engineering, Computer and Information Technology*, Vol. 9, No. 2, pp. 101-108, November 2015.
10. Murugesan, V., Y. Chakhchoukh, V. Vittal, G.T. Heydt, N. Logic, and S. Sturgill, "Error Detection and Error Correction for PMU Data as Applied to State Estimators," *IEEE Power and Energy Technology Systems Journal*, Vol. 2, pp. 1-9, 2015.
11. Eftekharnejad, S., G.T. Heydt, and **V. Vittal**, "Optimal Generation Dispatch with High Penetration of Photovoltaic Generation," *IEEE Transactions on Sustainable Energy*, Vol. 6, No. 3, pp. 1013-1020, July 2015.
12. Yang, L., M. He, J. Zhang, and **V. Vittal**, "Support Vector Machine Enhanced Markov Model for Short-term Wind Power Forecast," *IEEE Transactions on Sustainable Energy*, Vol. 6, No.3, pp. 791-799, July 2015. (SCI 2)
13. Ganger, D., J. Zhang, **V**. **Vittal**, "Statistical Characterization of Wind Power Ramps Via Extreme Value Analysis, "*IEEE Transactions on Power Systems*, Vol. 29, No. 6, pp. 3118-3119, November, 2014.
14. Quintero, J., **V. Vittal**, G.T. Heydt, H. Zhang, "The Impact of Increased Penetration of Converter Control Based Generators on Power System Modes of Oscillation," *IEEE Transactions on Power Systems*, Vol. 29, No. 5, pp.2248-2256, September, 2014. (SCI 4)
15. Zhang, S., **V. Vittal**, "Wide-Area Control Resiliency Using Redundant Communication Paths," *IEEE Trans. on Power Systems*, Vol. 29, No. 5, pp.2189-2199, September, 2014. (SCI 5)
16. Quintero, J., H. Zhang, Y. Chakhchoukh, **V. Vittal**, G.T. Heydt, "Next Generation Transmission Planning Framework: Model, Tools, and Educational Opportunities," *IEEE Trans. on Power Systems*, Vol. 29, No. 4, pp.1911-1918, July, 2014. (SCI 2)
17. He, M., L. Yang, J. Zhang, and **V. Vittal**, "A Spatio-temporal Analysis Approach for Short-term Forecast of Wind Generation," *IEEE Trans. on Power Systems*, Vol. 29, No. 4, pp.1611-1622, July, 2014. (SCI 10)
18. Vittal, V., "Foreword: Special Section on Stability and Control of Electric Energy Systems with an Increasing Level of Non-Dispatchable Generating Sources," *IEEE Trans. on Power Systems*, Vol. 29, No. 3, pp.1445, May, 2014.
19. Chakhchoukh, Y., **V. Vittal**, G.T. Heydt, "PMU Based State Estimation by Integrating Correlation," *IEEE Transactions on Power Systems*, Vol. 29, No.2, pp. 617-626, March 2014. (SCI 7)
20. Fan, M., **V. Vittal**, G.T. Heydt, R. Ayyanar, "Preprocessing Uncertain Photovoltaic Data," *IEEE Transactions on Sustainable Energy*, Vol. 5, No. 1, pp. 351-352, January 2014. (SCI 1)
21. Liu, Y., **V. Vittal**, J. Undrill, J. H. Eto, "Transient Model of Air-Conditioner Compressor Single Phase Induction Motor," *IEEE Transactions on Power Systems*, Vol. 28, No.4, pp. 4528-4536, November, 2013. (SCI 4)

22. Zhang, S., **V. Vittal**, "Design of Wide-Area Power System Damping Controllers Resilient to Communication Failures," *IEEE Transactions on Power Systems*, Vol. 28, No.4, pp. 4292-4300, November, 2013. (SCI 15)
23. He, M., J. Zhang, **V. Vittal**, "Robust Online Dynamic Security Assessment Using Adaptive Ensemble Decision-Tree Learning," *IEEE Transactions on Power Systems*, Vol. 28, No.4, pp. 4089-4098, November, 2013. (SCI 8)
24. Paramasivam, M., A. Salloum, V. Ajjarapu, **V. Vittal**, N. Bhatt, S. Liu, "Dynamic Optimization based Reactive Power Planning to Mitigate Slow Voltage Recovery and Short Term Voltage Instability," *IEEE Transactions on Power Systems*, Vol. 28, No. 4., pp. 3865-3873, November 2013. (SCI 12)
25. Eftekharnejad, S., **V. Vittal**, G.T. Heydt, B. Keel, J. Loehr, "Small Signal Stability Assessment of Power Systems with Increased Penetration of Photovoltaic Generation: A Case Study," *IEEE Transactions on Sustainable Energy*, Vol. 4, No. 4, pp. 960-967, October 2013. (SCI 15)
26. Zhang, H., G.T. Heydt, **V. Vittal**, J. Quintero, "An Improved Network Model for Transmission Expansion Planning Considering Reactive Power and Network Losses," *IEEE Transactions on Power Systems*. Vol. 28, No. 3, pp. 3471-3479, August 2013. (SCI 14)
27. Hou, G., **V. Vittal**, "Determination of Transient Stability Constrained Interface Real Power Flow Limit Using Trajectory Sensitivity Approach," *IEEE Transactions on Power Systems*, Vol. 28, No.3, pp.2156-2163, August 2013. (SCI 2)
28. Eftekharnejad, S., **V. Vittal**, G.T. Heydt, B. Keel, J. Loehr, "Impact of Increased Penetration of Photovoltaic Generation on Power Systems," *IEEE Transactions on Power Systems*, Vol. 28, No. 2, pp. 893-901, May 2013. (SCI 52)
29. Zhang, Q., Y. Chakhchoukh, **V. Vittal**, G.T. Heydt, N. Logic, S. Sturgill, "Buffer Length Optimization for PMU Measurements Integrated into State Estimation," *IEEE Transactions on Power Systems*, Vol. 28, No. 2, pp. 1657-1665, May 2013. (SCI 7)
30. Fan, M., **V. Vittal**, G.T. Heydt, R. Ayyanar, "Probabilistic Power Flow Analysis with Generation Dispatch Including Photovoltaic Resources," *IEEE Transactions on Power Systems*, Vol. 28, No. 2, pp. 1797-1805, May 2013. (SCI 13)
31. He, M., **V. Vittal**, J. Zhang, "On-line Dynamic Security Assessment with Missing PMU Measurements: A Data Mining Approach," *IEEE Transactions on Power Systems*, Vol. 28, No. 2, pp. 1969-1977, May 2013. (SCI 10)
32. Fan, M., **V. Vittal**, G.T. Heydt, R. Ayyanar, "Probabilistic Power Flow Studies for Transmission Systems with Photovoltaic Generation Using Cumulants," *IEEE Transactions on Power Systems*, Vol. 27, No. 4, pp. 2251-2261, November 2012. (SCI 30)
33. Hou, G., **V. Vittal**, "Trajectory Sensitivity Based Preventive Control of Voltage Instability Considering Load Uncertainties," *IEEE Transactions on Power Systems*, Vol. 27, No.4, pp. 2280-2288, November 2012. (SCI 3)
34. Ma, F., **V. Vittal**, "A Hybrid Dynamic Equivalent Using ANN-based Boundary Matching Technique," *IEEE Transactions on Power Systems*, Vol. 27, No. 3, pp. 1494-1502, August 2012. (SCI 2)
35. Kezunovic, M., **V. Vittal**, S. Meliopoulos and T. Mount, "The Big Picture," *IEEE Power and Energy Magazine*, Vol. 10, No.4, pp. 22-34, July/August 2012. (SCI 13)
36. Heydt, G.T., R. Ayyanar, K.W. Hedman and **V. Vittal**, "Electric Power and Energy Engineering: The First Century, *Proceedings of the IEEE*, 100th Anniversary Issue, pp. 1315-1328, May 13th, 2012. (SCI 7)

37. Zhang, H., **V. Vittal**, G.T. Heydt, J. Quintero, "A Mixed-Integer Linear Programming Approach for Multi-Stage Security-Constrained Transmission Expansion Planning," *IEEE Transactions on Power Systems*, Vol. 27, No. 2, pp. 1125-1133, May 2012. (SCI 38)
38. Hou, G., **V. Vittal**, "Cluster Computing Based Trajectory Sensitivity Analysis Application to the WECC System," *IEEE Transactions on Power Systems*, Vol. 27, No.1, pp. 502-509, February 2012. (SCI 8)
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93. Ni, Y., **V. Vittal**, W. Kliemann, and A. A. Fouad, "Application of the Normal Form of Vector Fields to AC/DC Power Systems," *Proceedings* of the 27th North American Power Symposium, pp. 6-12, Bozeman, MT, October 2-3, 1995.
94. Saha, S., W. Kliemann, **V. Vittal**, and A. A. Fouad, "Effect of Stress on Boundary of Stability of a Power System," *Proceedings* of the 27th North American Power Symposium, pp. 257-262, Bozeman, MT, October 2-3, 1995.
95. Pawloski, C. D., M. H. Khammash, and **V. Vittal**, "Analysis of Stability Robustness of a Power System With Loads Represented by Induction Motors," *Proceedings* of the 4th IEEE Conference on Control Applications, pp. 818-824, Albany, NY, September 28-29, 1995.
96. Saha, S., **V. Vittal**, W. Kliemann, and A. A. Fouad, "Local Approximation of Stability Boundary of a Power System Using the Real Normal Forms of Vector Fields," *Proceedings* of the 1995 ISCAS, Vol. 3, pp. 2330-2333, Seattle, WA, April 30 - May 3, 1995. (SCI 3)
97. **Vittal, V.**, V. Chadalavada, G. C. Ejebe, and G. D. Irisarri, "Contingency Filters for Dynamic Security Assessment Using the Transient Energy Function Method," *Proceeding* of the Eighth National Power Systems Conference, Vol. 1, pp. 239-244, New Delhi, India, December 14-17, 1994.
98. McCalley, J., A. Fouad, **V. Vittal**, A. Irizarry-Rivera, R. Farmer, and B. Agrawal, "A Probabilistic Problem in Electric Power System Operation: The Economy-Security Tradeoff for Stability-Limited Systems," *Proceedings of the Third International Workshop on Rough Sets and Soft Computing*, San Jose, CA, November 10-12, 1994.
99. Ejebe, G. C., G. D. Irisarri, W. F. Tinney, **V. Vittal**, and A. A. Fouad, "A Sparse Formulation and Implementation of the Transient Energy Function Method for Dynamic Stability Analysis," *Proceedings* of the International Conference on Power System Technology, pp. 599-605, October 18-21, 1994, Beijing, China.
100. Starrett, S. K., W. Kliemann, **V. Vittal**, and A. A. Fouad, "Excitation of Second-Order Normal Forms and First-Order Jordan Form Modes of Oscillation," *Proceedings* of the 26th, North American Power Symposium, pp. 27-36, Manhattan, KS, September 1994.

101. Jing, C., **V. Vittal**, and G. C. Ejebe, "The Simplification of HVDC and SVC Models in the Mid-Continent Area Power Pool (MAPP) for First Swing Stability Analysis," *Proceedings* of the 26th, North American Power Symposium, pp. 491-497, Manhattan, KS, September 1994.
102. Lin, C. M., W. Kliemann, **V. Vittal**, and A. A. Fouad, "Interaction Between Excitation Control Modes and Inertial Modes in Stressed Power Systems," *Proceedings* of the 26th, North American Power Symposium, pp. 669-678, Manhattan, KS, September 1994.
103. Venkataraman, S., **V. Vittal**, and M. H. Khammash, "Enhancement of Power System Transmission Using Robust Control Design," *Proceedings* of the IEEE T & D Conference, pp. 215-220, Chicago, IL, 1994. (SCI 1)
104. **Vittal, V.,** "The Power Systems Program Area at NSF (1993-1994)," *Proceedings* of the 56th American Power Conference, pp. 846-851, Chicago, IL, 1994.
105. **Vittal, V.,** M. Khammash, and C. Pawloski, "Analysis of Control Performance for Stability Robustness of Power Systems," *Proceedings* of IEEE Conference on Decision and Control, pp. 2341-2346, San Antonio, Texas, 1993. (SCI 1)
106. Starrett, S. K., **V. Vittal**, A. A. Fouad, and W. Kliemann, "A Methodology for the Analysis of Nonlinear, Interarea Interactions Between Power System Natural Modes of Oscillation Utilizing Normal Forms," *Proceedings* of the 1993 International Symposium on Nonlinear Theory and Its Application, Vol. 2, pp. 523-538, Sheraton Waikiki Hotel, Hawaii, December 5-10, 1993.
107. Lin, C., **V. Vittal**, and A. A. Fouad, "Dynamic Modal Interaction In A Stressed Power System," *Proceedings* of the 1993 North American Power Symposium, pp. 38-43, Howard University, Washington, D.C., October 11-12, 1993.
108. Starrett, S. K., W. Kliemann, **V. Vittal**, and A. A. Fouad, "Power System Modal Behavior: Significance of Second and Third Order Nonlinear Terms," *Proceedings* of the 1993 North American Power Symposium, pp. 246-255, Howard University, Washington, D.C., October 11-12, 1993.
109. Venkataraman, S., **V. Vittal**, and M. H. Khammash, "Analysis of Stability Robustness of HVDC Controls Using L Robustness Approach," *Proceedings* of the 1993 North American Power Symposium, pp. 256-265, Howard University, Washington, D.C., October 11-12, 1993.
110. **Vittal, V.,** W. Kliemann, S. Starrett, and A. A. Fouad, "Analysis of Stressed Power Systems Using Normal Forms," *Proceedings* of the 1992 ISCAS, Vol. V., pp. 2553-2556. (SCI 1)
111. **Vittal, V.,** "Extending Applications of the Transient Energy Function," *Proceedings* of the 35th Midwest Symposium on Circuits and Systems, August 9-12, 1992.
112. **Vittal, V.,** and V. Chadalavada, "Analytical Sensitivity of the Transient Energy Margin With Exciter Effects," *Proceedings* of the 23rd North American Power Symposium, pp. 24-33, Carbondale, IL, October 7-8, 1991. (SCI 2)
113. **Vittal, V.,** B. Ray, R. Treinen, and A. A. Fouad, "A Modal-Based Transient Energy Function for Analysis of the Inter-Area Mode," *Proceedings* of the 23rd North American Power Symposium, pp. 11-16, Carbondale, IL, October 7-8, 1991.
114. **Vittal, V.,** N. Bhatia, and A. A. Fouad, "Analysis of the Inter-Area Mode Phenomenon in Power Systems Following Large Disturbances," *Proceedings* of the 1991 IEEE International Symposium on Circuits and Systems, pp. 982-985, Singapore, June 11-19, 1991.
115. **Vittal, V.**, R. D'souza, and A. A. Fouad, "Analytical Sensitivity of Transient Energy Margin Including Second Order Series Expansion," *Proceedings* of the Tenth Power Systems Computation Conference, pp. 481-486, Graz, Austria, August 1990. (SCI 3)

116. **Vittal, V.,** and Jolene Gleason, "Determination of Transient Stability Constrained Line Flow Limits: An Application of Linearized Techniques for the Transient Energy Function Method," *Proceedings* of the 21st North American Power Symposium, pp. 142-150, October 9-10, 1989.
117. Hwang, C., **V. Vittal**, and A. A. Fouad, "Determination of Interface Flow Stability Limits by Sensitivity Analysis of Transient Energy Margin," *Proceedings* of the IFAC International Symposium on Power Systems and Power Plant Control, pp. 189-194, August 22-25, 1989, Seoul, Korea.
118. **Vittal, V.,** "A Generalized Procedure to Obtain First Integrals for Non-Conservative Dynamical Systems: Application to Power Systems," *Proceedings* of the International Symposium on Circuits and Systems, Vol. 3, pp. 1984-1987, May 1989.
119. Shi, H., and **V. Vittal**, "Approximation of Dissipation Terms in the Transient Energy Function," *Proceedings* of the 20th North American Power Symposium, pp. 355-364, Purdue University, West Lafayette, IN, September 1988.
120. Fouad, A. A., Y-X. Ni, **V. Vittal**, "Incorporating Excitation Control in the Transient Energy Function Method: Selection of Generators with Exciters," *Proceedings* of the 12th IMACS World Congress, Vol. 3, pp. 114-116, Paris, France, July 1988.
121. **Vittal, V.,** Discussion on "Security: Its Meaning and Objective," *Proceedings* of the Workshop on Power System Security Assessment, pp. 42-48, April 1988.
122. **Vittal, V.,** N. Bhatia, A. A. Fouad, "Investigation of Sparse Network Formulation of the Transient Energy Function (TEF) Method," *Proceedings* of the IASTED International Symposium on High Technology in the Power Industry, pp. 169-173, Scottsdale, Arizona, March, 1988.
123. **Vittal, V.,** S. Rajagopal, A. A. Fouad, M. A. El-Kady, E. Vaahedi, and V. F. Carvalho, "Transient Stability Analysis of Stressed Power Systems Using the Energy Function Method," *Proceedings* of the 1987 Power Industry Computer Applications Conference, pp. 253-258, May 1987. (SCI 1)
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125. **Vittal, V.**, A. A. Fouad, and P. Kundur, "Determination of Transient Stability-Constrained Plant Generation Limits," *Proceedings* of the IFAC Symposium on Automation and Instrumentation for Power Plants, Bangalore, India, pp. A-8-1 through A-8-5, December 15-17, 1986. (SCI 2)
126. Fouad, A. A., and **V. Vittal**, "Direct Method of Power System Transient Stability: Perspectives of the Analyst and the Practitioner," *Proceedings* of The Eighteenth Southeastern Symposium on System Theory, pp. 355-358, April 1986.
127. Michel, A. N., and **V. Vittal**, "Stability and Security Assessment of a Class of Systems Governed by Lagrange's Equation with Application to Multi-Machine Power Systems," *Proceedings* of the 24th IEEE Conference on Decision and Control, Ft. Lauderdale, Florida, pp. 43-48, December 1985.
128. **Vittal, V.,** T. Oh, and A. A. Fouad, "Correlation of the Transient Energy Margin to the Out-of-Step Relay Operation," *Proceedings* of the 1985 Midwest Power Symposium, pp. II-B-1 through II-B-8. (SCI 1)
129. Michel, A. N., and **V. Vittal**, "On The Mechanism Of Transient Instability Of Power Systems: Improved Results," *Proceedings* of the 1985 American Control Conference, pp. 245-250, June 1985.

130. El-Kady, M. A., C. K. Tang, V. F. Carvalho, A. A. Fouad, and **V. Vittal**, "Dynamic Security Assessment Utilizing The Transient Energy Function Method," *Proceedings* of the 1985 Power Industry Computer Applications Conference, pp. 132-139, 1985. (SCI 5)
131. Michel, A. N., and **V. Vittal**, "Power System Transient Stability Analysis: Lagrangian Formulation," *Proceedings* of the 23rd IEEE Conference on Decision and Control, Las Vegas, Nevada, pp. 167-172, December 1984.
132. Fouad, A. A., and **V. Vittal**, "Power System Response to a Large Disturbance: Energy Associated with System Separation," *Proceedings* of the 1983 Power Industry Computer Applications Conference, pp. 116-122, 1983.
133. Michel, A. N., B. H. Nam, and **V. Vittal**, "Computer Generated Lyapunov Functions for Interconnected Systems: Improved Results with Applications to Power Systems," *Proceedings* of the 1983 IEEE Control and Decision Conference, pp. 509-514, December 1983.
134. **Vittal, V.,** A. N. Michel, and A. A. Fouad, "Power System Transient Stability Analysis: Formulation as Nearly Hamiltonian System," *Proceedings* of the 1983 American Control Conference, San Francisco, CA, pp. 668-673. June 1983. (SCI 1)
135. Michel, A. N., A. A. Fouad, and **V. Vittal**, "Power System Transient Stability Using Individual Machine Energy Functions," *Proceedings* of the 1982 IEEE Large Scale Systems Symposium, October 1982.
136. Pai, M. A., and **V. Vittal**, "Multi-Machine Stability Analysis of Power Systems Using Vector Lyapunov Function with Inertial Center Decomposition," *Proceedings* of the Midwest Power Symposium, October 1981.

Books or Chapters of Books

1. Kezunovic, M., S. Meliopoulos, V. Venkatasubramanian, **V. Vittal**, *Application of Time-Synchronized Measurements in Power System Transmission Networks*, Springer, 2014.
2. **Vittal, V.**, F. Ma, *A Hybrid Dynamic Equivalent Using ANN-Based Boundary Matching Technique*, "Power System Coherency and Model Reduction," pp.91-118, Springer, 2013.
3. **Vittal V.**, R. Ayyanar, *Grid Integration and Dynamic Impact of Wind Energy*, Springer, New York, 2013.
4. T.J. Browne, **V. Vittal**, G.T. Heydt, and A.R. Messina, *Inter-area Oscillations in Power Systems – A Nonlinear and Nonstationary Perspective*, "Practical Application of Hilbert Transform Techniques in Identifying Inter-area Oscillations," pp. 101-126, Springer, 2009. (SCI 3)
5. **Vittal, V.**, *The Electric Power Engineering Handbook*, Second Edition, Power System Stability and Control, L.L. Grigsby, Editor, "Direct Stability Methods," pp. 11-1 – 11-13, CRC Press, Taylor and Francis Group, Boca Raton Florida, 2007.
6. Sauer, P.W., K. L. Tomsovic, **V. Vittal**, *The Electric Power Engineering Handbook*, Second Edition, Power System Stability and Control, L.L. Grigsby, Editor, "Dynamic Security Assessment," pp. 15-1 – 15-10, CRC Press, Taylor and Francis Group, Boca Raton Florida, 2007.
7. **Vittal, V.**, "Emergency Control and Special Protections Systems in Large Electric Power Systems," *Stability and Control of Dynamical Systems with Applications*, pp. 293-313, Birkhäuser, Boston, 2003.
8. **Vittal, V.**, *The Electric Power Engineering Handbook*, L. L. Grigsby, Editor and Chief, "Direct Stability Methods," pp. 11-42 – 11-54, CRC Press, Boca Raton, Florida, 2001.
9. Bergen, A. R., and **V. Vittal**, *Power System Analysis*, Prentice Hall, New Jersey, 2000. (SCI 261)

10. **Vittal**, **V.**, M. H. Khammash, and C. D. Pawloski, "Robust Stabilization of Controls in Power Systems," *Systems and Control Theory for Power Systems*, The IMA Volumes In Mathematics And Its Application, Vol. 64, pp. 399-413, Springer Verlag, 1995.
11. Fouad, A. A., and **V. Vittal**, *Power System Transient Stability Analysis Using the Transient Energy Function Method*, Prentice Hall, New Jersey, 1992. (SCI 231)
12. Fouad, A. A., and **V. Vittal**, *Control & Dynamic Systems, Advances in Theory and Applications*, C. T. Leondes, Editor, Vol. 43: Analysis and Control System Techniques for Electrical Power Systems, Part 3 of 4. "Power System Transient Stability Assessment Using The Transient Energy Function Method," pp. 115-184, Academic Press, Boston, 1991. (SCI 2)

Research and Technical Reports

1. V. Vittal, M. Khammash, X. Yu, "Robust Analysis and Design of Controls in Power Systems," EPRI Final Report 1001307, January 2001.
2. McCalley, J. D., V. Vittal, M. Ni, S. Greene, A. Phadke, "On-Line Risk-Based Security Assessment," EPRI Final Report 1000411, November 2000.
3. McCalley, J. D., **V. Vittal**, Y. Dai, W. Fu, A. Irizarry-Rivera, V. Van Acker, H. Wan, S. Zhao, "Risk Based Security Assessment," EPRI Final Report TR-113276, July 1999. (SCI 1)
4. **Vittal, V.**, M. H. Khammash, M. Djukanovic, "Robust Analysis and Design of Controls in Power Systems," EPRI Final Report TR-111922, December 1998. (SCI 3)
5. **Vittal, V.**, W. Kliemann, and Y-X. Ni, "Testing Methods for Prediction of Onset of Interarea Split on a Full-Scale Real World Context," Electric Power Research Institute Report TR-108533, September 1997.
6. Fouad, A. A., **V. Vittal**, W. Kliemann, et al., "Nonlinear Power System Behavior Using Normal Forms: Extension of Linear System Analysis via Higher Order Correction," Electric Power Research Institute Report TR-107798, February 1997. (SCI 1)
7. Ejebe, G. C., G. D. Irisarri, **V. Vittal**, A. A. Fouad, et al., "Analytical Methods for Contingency Selection and Ranking for Dynamic Security Analysis," Electric Power Research Institute Report TR-104352, 1994. (SCI 5)
8. Fouad, A. A., **V. Vittal**, W. Kliemann, S. K. Starrett, and C. K. Lin, "Analysis of Stressed Interconnected Power Networks," Electric Power Research Institute Report TR-103704, 1994. (SCI 3)
9. Carvalho, V. F., M. A. El-Kady, E. Vaahedi, P. Kundur, C. K. Tang, G. Rogers, J. Libaque, D. Wong, A. A. Fouad, **V. Vittal**, S. Rajagopal, "Demonstration of Large Scale Direct Analysis of Power System Transient Stability," Electric Power Research Institute Report RP-2206-1, 1986. (SCI 10)
10. Fouad, A. A., **V. Vittal**, Y. X. Ni, H. R. Pota, K. Nodehi, and T. K. Oh, "Extending Applications of the Transient Energy Function Method," Electric Power Research Institute Report RP-2206-5, 1986. (SCI 2)
11. Fouad, A. A., K. C. Kruempel, **V. Vittal**, A. Ghafurian, and K. Nodehi, "Transient Stability Program Output Analysis," Electric Power Research Institute Report EL-4192, August 1985. (SCI 4)
12. Fouad, A. A., **V. Vittal**, K. C. Kruempel, and T. Oh, "Analysis of Loss of Generation Disturbance Using the Transient Energy Function Method," Final Report submitted to Florida Power & Light Co., ISU-ERI-AMES-85217, April 1985.

13. A. A. Fouad, A. A., K. C. Kruempel, K. R. C. Mamandur, M. A. Pai, S. E. Stanton, and **V. Vittal**, "Transient Stability Margin as a Tool for Dynamic Security Assessment," Electric Power Research Institute Report EL-1755, March 1981. (SCI 52)

IX. EXTENSION/OUTREACH ACTIVITIES

1. EE653 Engineering Distance Education Course 2003F.
2. EE553 Engineering Distance Education Course 2001F.
3. "Operation of AC-DC-AC Ties," Lecture at Power System Operator Short Course, Iowa State University, April 2000.
4. Taught a four-hour Professional Engineering refresher course for engineers at IES utilities, 1997 F.
5. EE 577 Video Course, 1990F.
6. EE 578 Video Course, 1990S, 1991S.

X. PATENTS

XI. GRADUATE STUDENTS

Masters Degree Thesis

1. *Evaluation and Mitigation of Power System Oscillations Arising from High Solar Penetration* — Anushree Pethe (Co-major)

2. *Error Detection and Error Correction for PMU Data as Applied to Power System State Estimators* — Veerakumar Murugesan (Co-major)

3. *Mitigating the Detrimental Impacts of Solar PV Penetration On Electric Power Transmission Systems* — Nitin Prakash (Co-Major)

4. *Distributed Photovoltaic Generation in Residential Distribution Systems: Impacts on Power Quality and Anti-islanding* — Parag Mitra (Co-Major)

5. *Effect of Reduced System Inertia Due to Increased Renewable Resource Penetration on Power System Stability* — Iknoor Singh

6. *Modeling of Air-Conditioner Compressor Single Phase Induction Motor for Transient Analysis* — Yuan Liu

7. *Transmission Expansion Planning with Large Scale Renewable Resource Integration* — Sruthi Hariharan

8. *Optimal Location and Sizing of Dynamic VArs for Fast Voltage Collapse* — Ahmed Salloum

9. *Reliability Evaluation of Demand Response Actions for Electricity Market Operations* — Bharathram Rajaraman

10. *Special Protection Schemes Modeling: Dynamic Braking and Generation Rejection Schemes* — Inna Kim

11. *Evaluation of Surge Arrester Location Strategies for Transmission Line Lightning Protection* — Karthik V N S D Munukutla (Co-Major)

12. *Dynamic Modeling of Fixed Speed Wind Generator with Blade Pitch Control* — Sang Su Noh

13. *Voltage Stability Assessment of the Entergy Energy System* — Muhammad Randhawa

14. *Online Prediction of Transient Stability Using Decision Trees and Phasor Measurements* — Siddharth Likhate

15. *On-Line Monitoring of Sag in Overhead Transmission Lines with Leveled Spans* — Poorani Ramachandran

16. *Sensor Network Design for a Secure Electric Energy Infrastructure* — Ramon Alberto Leon Candela

17. *Proposing an Innovative Information Architecture for Power Systems with its Modeling and Reliability Analysis* — Zhaoxia Xie (Co-Major)

18. *A New Automatic Under-Frequency Load Shedding Scheme* — Zhong Yang

19. *Robustness Analysis for Thyristor Controlled Series Compensators In Power Systems and Its Performance Comparison Against Static VAR Compensators* — Dede Oke Subakti (Co-Major)

20. *Application of the Normal Form of Vector Fields to Predict Interarea Split Following Large Disturbances in Power Systems* — Jyotika Thapar

21. *A Modified Approach to Determine the Controlling*

UEP in the TEF Method Jan Heiberg-Anderson

22. *Robust Stabilization of High Voltage Direct Current Controls In a Power System* Sundar Rajan Venkataraman (Co-Major)

23. *Robust Design and Performance of Controls in Power System* Charles Pawloski (Co-Major)

24. *Application of the Transient Energy Function Method to the Northern States Power System* Roger T. Treinen

25. *Sensitivity Analysis of the Transient Energy Function Method with Excitation Control* Vamsi Krishna Chadalavada

26. *Incorporation of the Modal Interactions in Stressed Power Systems Using the Transient Energy Function Method* Bhaskar Ray

27. *A Parallel Computer Implementation of Power System Transient Stability Assessment Using the Transient Energy Function Method* Swee Lian Lim

28. *Sensitivity Analysis of the Transient Energy Function Method: Using A Second Order Analytic Technique* Romeo D'souza

29. *Approximation of Dissipation Terms in the Transient Energy Function* Hwang-Chi Shih

30. *Determination of Transient Stability-Constrained Line Flow Limits: An Application of Linearized Techniques to the Transient Energy Function Method* Jolene L.Gleason, (Moore)

31. *Sparse Network Formulation of the TEF Method* Neelu Gopal Bhatia

Ph.D. Degree Dissertations

1. *Load Sensitivity Studies and Contingency Analysis in Power Systems* Parag Mitra

2. *Representation of Vector-Controlled Induction Motor Drive Load in Electro-Magnetic Transient and Positive Sequence Transient Stability Simulations* Yuan Liu

3. *Enhanced Power System Operational Performance with Anticipatory Control Under Increased Penetration of Wind Energy* David Ganger (Co-Major)

4. *Improved Optimal Decision-Making Process in Distribution Systems: Enable Grid Integration of Photovoltaic Resources and Distributed Energy Storage* Qifeng Li

5. *Electromagnetic Transient and Electromechanical Transient Stability Hybrid Simulation: Design, Development and its Applications* Qiuhua Huang

6. *Impacts of Base-Case and Post –Contingency Constraint Relaxations on Static and Dynamic Operational Security* Ahmed Salloum (Co-Major)

7. *Real-Time Power System Topology Monitoring Supported by Synchrophasor Measurements* Trevor Nelson Werho

8. *Improved Power Grid Resiliency Through Interactive System Control* Song Zhang

9. *Transmission Expansion Planning for Large Power Systems* Hui Zhang (Co-Major)

10. *A Data Analytics Framework for Smart Grids: Spatio-temporal Wind Power Analysis and Synchrophasor Data Mining* Miao He (Co-Major)

11. *The Impact of Increased Penetration of Photovoltaic Generation On Smart Grids* Sara Eftekharnejad (Co-Major)

12. *Probabilistic Power Flow Studies to Examine the Influence of Photovoltaic Generation on Transmission System Reliability* Miao Fan

13. *Analysis of Synchronization and Accuracy of Synchrophasor Measurement* Qing Zhang (Co-Major)

14. *Trajectory Sensitivity Based Power System Dynamic Security Assessment* Guanji Hou

15. *Improved Coherency-Based Dynamic Equivalents* Feng Ma

16. *Transmission System Restoration Strategies in Real Time* Chong Wang

17. *Impact of Increased Penetration of DFIG Based Wind Turbine Generators on Rotor Angle Stability of Power Systems* Durga Gautam

18. *Controlled Islanding Algorithms and Demonstration on the WECC System* Guangyue Xu

19. *Voltage Stability Assessment and Enhancement of a Large*

Power System Using Static and Dynamic Approaches Bishnu Prasad Sapkota

20. *Power System Online Stability Assessment Using Synchronized Phasor Measurements and Decision Trees* Ruisheng Diao

21. *Mechanical State Estimation of Transmission Line Sag Using Tilt Sensors* Sunita Vikas Malhara

22. *Slow Coherency Based Graph Theoretic Islanding Strategy* Bo Yang

23. *Distributed State Estimation* Weiqing Jiang

24. *Damping controller design for FACTS Devices in Power Systems using novel control techniques* Qian Liu (Co-Major)

25. *Assessing Placement of Controllers and Nonlinear Behavior of Electrical Power System using Normal Form Information* Shu Liu

26. *Transmission System Reconfiguration for Corrective Control* Wei Shao

27. *Slow Coherency Grouping Based Islanding Using Minimal Cutsets and Generator Coherency Index Tracing Using Continuation Method* Xiaoming Wang

28. *Power System Security Enhancement through Direct Non-disruptive Load Control* Badri Ramanathan

29. *Application of Linear Parameter Varying Control Synthesis in Power Systems* Wenzheng Qiu (Co-Major)

30. *Self-healing in Power Systems: An Approach Using Islanding and Rate of Frequency Based Load Shedding* Haibo You

31. *Robustness Analysis for Power Systems Based on the Structured Singular Value Tools and the ν Gap Metric* Chuanjiang Zhu (Co-Major)

32. *Analyzing Dynamic Performance of Power Systems over Parameter Space Using the Method of Normal Forms of Vector Fields* Songzhe Zhu

33. *Robustness Analysis and Controller Design for Static VAR Compensators in Power Systems* Xuechun Yu (Co-Major)

34. *Risk-based Security Assessment for Operating Electric Power Systems* Hua Wan (Co-major)

35. *Investigation and Visualization of the Stability Boundary for Stressed Power Systems* Rong Qi

36. *Nonlinear Control Design for Stressed Power Systems Using Normal Forms of Vector Fields* Gilsoo Jang

37. *Analysis and Synthesis of Nonlinear Control Systems* Shan Lin (Co-Major)

38. *Contingency Filters for Dynamic Security Assessment Using the Transient Energy Function* Vamsi K. Chadalavada

39. *An Improved Technique to Determine the Controlling Unstable Equilibrium Point in a Power System* Roger Treinen

40. *Sensitivity Analysis of the Transient Energy Function Method* Chiu Hwang

41. *Incorporation of Nonlinear Load Models and Identification of the Inter-Area Mode Phenomenon in the Transient Energy Function Method* Neelu Gopal Bhatia

42. *Application of the Transient Energy Function Method to Stressed Large-Scale Power Systems* Sankaran Rajagopal (Co-Major)

43. *Correlation of the Transient Energy Margin to Out-of-Step Impedance Relay Operation* Tae-Kyoo Oh (Co-Major)

XII. PROFESSIONAL SOCIETIES AND COMMITTEES

2015-	Secretary	IEEE Power and Energy Society Technical Council
2006-08	Chair	IEEE Power Engineering Education Committee
2005-11	Editor in Chief	IEEE Transactions on Power Systems
2004-06	Vice President for Education and Industry Relations	IEEE Power Engineering Society
2004-06	Vice Chair	IEEE Power Engineering Education Committee
2002-04	Secretary	IEEE Power Engineering Education Committee
2001-05	Editor	IEEE Transactions on Power Systems
2000	Tech. Program Chair	IEEE PES 2001 Summer Power Meeting
2000-02	Chair	IEEE System Dynamic Performance Committee
	Chair	IEEE Power Engineering Education Research Subcommittee
1998	Secretary	IEEE System Dynamic Performance Committee
	Vice Chair	IEEE Power Engineering Education Research Subcommittee
1997-	Fellow	Institute of Electrical and Electronics Engineers (IEEE)
	Chair	IEEE Technical Working Group on Stability Test System

	Member	IEEE Technical Task Force on System Oscillations
1996	Secretary	IEEE System Dynamic Performance Committee
	Secretary	IEEE Power Engineering Education Research Subcommittee
1992-	Member	IEEE System Dynamic Performance Subcommittee
1992-	Member	IEEE Computer and Analytical Methods Subcommittee
1992-	Member	Eta Kappa Nu
1982-	Member	Sigma Xi

XIII. UNIVERSITY ACTIVITIES

University Committees

1. 2003-2004 College of Engineering Dean Search Committee – Iowa State University

College Committees

Arizona State University

1. 2014 - ECEE Personnel Committee
2. 2005-2011 Dean's Personnel Advisory Committee

Iowa State University

1. 2001 –2003 College of Engineering Promotion & Tenure Committee, Chair in 2003
2. 1997-2000 College of Engineering Promotion & Tenure Committee
3. 1995 DEO Search Committee
4. 1990-1993 College Research Grants Committee
5. 1989 DEO Search Committee
6. 1988 Dean's Review Committee/EECpE

Departmental Committees

Arizona State University

1. 2005 - 2007 Graduate Committee
2. 2014 - Personnel Committee

Iowa State University

1. 2003 Chair, Departmental Strategic Planning Committee
2. 2003 Chair, Faculty Search Committee
3. 2001-2003 Director of Graduate Education, Associate Chair
4. 2001 Chair, Faculty Search Committee
5. 2000-2003 Promotion and Tenure Committee
6. 1997-1999 Chair, Faculty Search Committee

7. 1995-1996 Promotion and Tenure Committee
8. 1995 Workload Committee
9. 1992, 1994-96 Organized Distinguished Lecture Series
10. 1991-1993 Promotion and Tenure Committee
11. 1991-1992 Organized Midwest Electro Technology Conference
12. 1989 Power Area Subcommittee
13. 1989-present Circuits & Systems Area Subcommittee
14. 1989-present Graduate Committee
15. 1989 Graduate Application Review
16. 1989 Endowment Advisory Board

XIV. OTHER INFORMATION

NSF Coalition Activities: Have actively participated in the NSF Synthesis Coalition in two projects:

1. Development of three videotapes on the generation subsystem, transmission subsystem, and distribution subsystem. These videotapes are now being used at a number of schools: Arizona State University, Cornell University, Memorial University of Newfoundland, Canada, Drexel, and Montana State University.
2. Development of a visualization program for the power flow.
   The videotapes have been shown at various coalition schools.

National and International Level Activities:

1. Invited Speaker at Tsinghua University, China EPRI, North China Electric Power University, Xian Jiao Tong Univeristy, Zhejiang University, Hong Kong University, Korea University, Korea Power Exchange, and Korea Electric Power Company, June 2007.
2. Department Colloquium, "Slow Coherency Based Islanding," Department of Electrical Engineering, University of Washington, March 2007.
3. Invited Seminar "Structured Singular Value Based Analysis and Synthesis of PSS," Department of Electrical Engineering, Arizona State University, February 2003.
4. Invited Speaker at Tsinghua University, Shangai Jia Tong University, and Hong Kong University, May 2002.
5. Co-organized a national workshop sponsored by NSF workshop on "Future Directions for Complex Interactive Electric Networks," November 2000.
6. Panel Session speaker on "New Methods of Linear Analysis," at the 1998 IEEE PES Summer Power Meeting, San Diego, CA, July 1998.
7. Panel Session speaker on "Risk Based Security Assessment," at 1999 IEEE PES Summer Power Meeting, Edmonton, Canada, July 1999.
8. Panel Session speaker on "Fast Dynamic Security Assessment," at the 1997 IEEE PES Summer Power Meeting, Berlin, Germany, July 1997.
9. Presentation on Calculation of Available Transmission Capability, at the NSF Workshop, University of Illinois, Urbana-Champaign, June 1997.
10. Plenary Session speaker on Infrastructure Issues in Power Systems, at the NSF Workshop, Washington State University, Pullman, WA, October 1994.

11. Panel presentation, "Multi-Media and its Use in Power Engineering Education," 1993 IEEE, PES Winter Power Meeting, Columbus, OH, January 31 - February 5, 1993.
12. Chaired and organized a panel session on the Potential Impact of Supercomputers on Power System Analysis at the 1992 IEEE PES Winter Power Meeting, New York, NY, 1992.