**2017 PROGRAM COMMITTEE**

**Kenneth R. Brand,**

Manager

Distribution Operations Services

Public Service Company of Oklahoma

Tulsa, Oklahoma

**Stephen Condren**

Manager, Protection Coordination Engineering

OG&E Electric Services

Oklahoma City, Oklahoma

**David Osburn**

General Manager

Oklahoma Municipal Power Authority

Edmond, Oklahoma

**2017 EXECUTIVE COMMITTEE**

**Kenneth R. Brand,**

Manager

Distribution Operations Services

Public Service Company of Oklahoma

Tulsa, Oklahoma

**Peter Day**

Director, Technical Services

OGE Energy Corporation

Oklahoma City, Oklahoma

**David Osburn**

**G**eneral Manager

Oklahoma Municipal Power Authority

Edmond, Oklahoma

**Rama Ramakumar**

Director

Engineering Energy Laboratory

Regents and PSO/Naeter Professor of Electrical & Computer Engineering

Oklahoma State University

Stillwater, Oklahoma

**2017 SPONSORS**

**Grand River Dam Authority, Luncheon**

**Siemens Energy, Banquet**

**50th Annual**

**Frontiers of Power Conference**

 October 30-31, 2017

Conoco/Phillips OSU Alumni Center

 *50 Years of Serving the*

*Oklahoma and Regional Power Industry*

 Co-Sponsored by

 The Engineering Energy Laboratory and

 The School of Electrical and Computer Engineering

 Oklahoma State University

 

 Conference Arrangements by

 The Engineering Energy Laboratory

 216 Engineering South

 Oklahoma State University

 Stillwater, Oklahoma 74078-5034

 An Oklahoma State University Outreach Program

**2017**

**50th Annual**

**Frontiers of Power Conference**

ABOUT THE CONFERENCE

The frontiers of power technologies have been expanding dramatically in recent years. This is due to concerns over environmental impacts, entry of renewable energy technologies, security issues, power quality needs to satisfy the evolving digital society and the opportunities that have opened up to embed sensors, computers and two-way communications that utilize the internet to evolve a smart grid. The variety of papers and the Keynote Speakers scheduled in this 50th annual conference reflect these changing times and provide an opportunity for free and open discussion of important issues with serious economic implications.

KEYNOTE SPEAKERS

**Thomas Reddoch**

Senior Technical Executive

Power Delivery and Utilization

Electric Power Research Institute

Knoxville, Tennessee

**S. S. (Mani) Venkata**

Principal Enterprise Architect

GE Grid Solutions/Alstom Grid Inc. (recently retired)

Phoenix, Arizona

Affiliate Professor of Electrical Engineering

University of Washington

Seattle, Washington

**Chanan Singh**

Regents Professor and Irma Runyon Chair Professor

Electrical and Computer Engineering

Texas A&M University

College Station, Texas

**Harold Kirkham**

Staff Scientist

Pacific Northwest National Laboratory

Richland, Washington

**Phil Crissup**

Vice President, Utility Technical Support

OG&E

Oklahoma City, Oklahoma

2

The Frontiers of Power Conference seeks to provide for the frank and open discussion of current problems facing the electric utility industry. Over the years, the scope of this conference has expanded to include several critical problem areas of energy and power technologies. These problems are not only technical but political and economic as well.

Engineers, engineering managers, and supervisors associated with planning, designing, or operating power generating stations, transmission and distribution systems and renewable energy projects will find this program of special relevance to their work.

Participation is invited from all those associated with electric utilities, electric power production facilities, power equipment manufacturers, consultants for municipal and rural electric utilities, universities, and government agencies.

This Fiftieth Annual Conference is a continuation of a program first started in the early 1960’s at Oklahoma State University, Stillwater.

Frontiers of Power Conference Proceedings may be accessed at

<https://stw.sp.okstate.edu/ceat/eel-proceedings/Documents>

username: ceatg1@okstate.edu

Password (case sensitive)

11

*Impacts of Time Delay and False Data Injection Attacks on*

*Power System Control Loops*

 Dattatreya Poosarla

 Master of Science Graduate 2017

 Yuanxiong Guo

 Assistant Professor

 Electrical and Computer Engineering

 Oklahoma State University

 Stillwater, Oklahoma

*Transient Stability Analysis of Two Machine Power System*

 Abdulhamid Zaidi

 Ph.D. Candidate

 Qi Cheng

 Associate Professor

 Electrical and Computer Engineering

 Oklahoma State University

 Stillwater, Oklahoma

PRESENTED BY TITLE ONLY

*Design and Development of Solar PV Based DC Nano Grid for*

*Residential Applications*

 E. Chandira Sekaran

Professor

 S. Vasantharahna

 Professor and Head

 R. Vaishnavi

 PG Student

 Electrical and Electronics Engineering

 Coimbatore Institute of Technology

 Coimbatore, Tamil Nadu, India

*A Novel Single Phase AC-AC Converter Using Four Controlled Switches*

 R. L. Josephine

Associate Professor

 S. Vimal Raj

 Assistant Professor

 G. Sivagnanam

 Assistant Professor

 Chandragupta Mauryan

 Professor and Head

 Divya Priyadarshini

 Assistant Professor

 Sri Krishna College of Technology

 Coimbatore, India

4:15 p.m. ADJOURN

10

**Monday, October 30, 2017**

 8:00 Registration & Continental Breakfast

Conoco/Phillips OSU Alumni Center

Jones Conference Room

9:00 Conference Opening—Jones Conference Room

Introductions and Welcome

 **Rama Ramakumar**

Conference Director

 Regents Professor and

PSO/Albrecht Naeter Professor

 Director, Engineering Energy Laboratory

 **Jeffrey L. Young**

Professor and Head

 School of Electrical and Computer Engineering

 **Paul Tikalsky**

 Dean

 College of Engineering, Architecture and Technology

 **Burns Hargis**

 President

 Oklahoma State University

 Stillwater, Oklahoma

9:30 KEYNOTE PRESENTATION

***Characterizing New Frontiers Facing the Electric Power Industry***

 **Thomas Reddoch**

 Senior Technical Executive

 Power Delivery and Utilization

 Electric Power Research Institute

 Knoxville, Tennessee

10:30 Break

10:45 KEYNOTE PRESENTATION

***The Vision for Electric Power and Energy Education and***

***Research for the Next 50 years***

 **S. S. (Mani) Venkata**

 Principal Enterprise Architect

 GE Grid Solutions/Alstom Grid Inc.. (recently retired)

 Affiliate Professor of Electrical Engineering

 University of Washington

 Seattle, Washington

11:45 GRDA Luncheon

 Click Alumni Hall East

3

1:00 KEYNOTE PRESENTATION

***Resources and Geographic Diversification to Improve***

***Reliability of Renewable Generation***

 **Chanan Singh**

 Regents Professor and Irma Runyon Chair Professor

 Electrical and Computer Engineering

 Texas A&M University

 College Station, Texas

2:00 Technical Paper Session

Moderator Peter Day

 Director, Technical Services

 OG&E

 Oklahoma City, Oklahoma

*Planning for the Future: The Nation’s First Cyber-Secure Utility*

*Microgrid at Ameren*

 Chris Evanich

 Manager of Microgrids

 Don Dumich

 Application Director-Microgrids

 S&C Electric

 Chicago, Illinois

*Microgrid Experiences in Marine Power and Energy Systems:*

*Stability Issues in Power Electronic Interfaces*

 Paul S. Moses

 Assistant Professor

 John N. Jiang

 OG&E Associate Professor

 Electrical and Computer Engineering

 University of Oklahoma

 Norman, Oklahoma

 Marounfa Djibo

 Ph.D. Candidate

 Old Dominion University

 Norfolk, Virginia

 Huntington Ingalls Industries

 Newport News Shipbuilding

4

*Droop Based DC Microgrid Control by State Feedback Linearization*

Anushka M. Dissanayake

 Ph.D. Candidate

 Nishantha C. Ekneligoda

 Assistant Professor

 Electrical and Computer Engineering

 Oklahoma State University

 Stillwater, Oklahoma

*Shunt Active Power Filter for Improved Power Quality and Enhanced Dynamic Performance*

 Amali Dehigolle Gedara

 Graduate Student

 Nishantha C. Ekneligoda

 Assistant Professor

 Electrical and Computer Engineering

 Oklahoma State University

 Stillwater, Oklahoma

2:45 BREAK

3:00 Technical Paper Session

Moderator Jeff Beasley

 Protection Engineering Group Leader

 Relay Engineer

 Grand River Dam Authority

 Tulsa, Oklahoma

*Impact of PV Integration on the Libyan Power System*

 Abdulmunim Guwaeder

 Ph.D. Candidate

 R. Ramakumar

 Regents Professor and PSO/Albrecht Naeter Professor

 Electrical and Computer Engineering

 Director, Engineering Energy Laboratory

 Oklahoma State University

 Stillwater, Oklahoma

9

*Bumps on the Grid: The Status of Oklahoma Wind*

 Steve Stadler

 Professor

 Geography

 Oklahoma State University

 Stillwater, Oklahoma

 Scott Greene

 Professor and Associate Chair

 Geography and Environmental Sustainability

 University of Oklahoma

 Norman, Oklahoma

12:00 Lunch On Your Own

 Hideaway Pizza Buffet Option $10.50 for FOPC Participants

 230 S. Knoblock (short walking distance)

**Tuesday afternoon sessions are in Click Alumni Hall West**

1:15 Technical Paper Session

Moderator Stephen Condren

 Manager

 Protection Coordination Engineering

 OG&E Electric Services

 Oklahoma City, Oklahoma

*Energy Production in Lean Times*

 Marcus O. Durham

 Principal

 Jason A. Coffin

 Senior Analyst

 Robert A. Durham

 Principal

 THEWAY Labs

 Tulsa, Oklahoma

*SIRES: Promises and Challenges*

 Zeel Maheshwari

 Ph.D. Graduate 2017

 R. Ramakumar

 Regents Professor and PSO/Albrecht Naeter Professor

 Electrical and Computer Engineering

 Director, Engineering Energy Laboratory

 Oklahoma State University

 Stillwater, Oklahoma

8

*Decentralized Control of a Hybrid AC and DC Ring Bus Microgrid System*

 Majid Alhomim

 Ph.D. Candidate

 Badur Alharbi

 Ph.D. Candidate

 Roy A. McCann

 Professor

 Electrical Engineering

 University of Arkansas

 Fayetteville, Arkansas

*Microgrid Master Controls-Distributed and Cybersecure*

 Don Dumich

 Application Director-Microgrids

 S&C Electric

 Chicago, Illinois

3:30 Break

3:40 Technical Paper Session

Moderator: Dan Johnson

 Account Manager-Oklahoma and Texas

 Power System Sales, Siemens Energy

 Dallas, Texas

*Transmission Access and Pricing*

 Bernard A. Cevera

 Managing Consultant

 Guernsey

 Oklahoma City, Oklahoma

*Weakness Analysis for Renewable Energy Integration Based on*

*Electrical Distances*

 Di Wu

 Assistant Professor

 Electrical and Computer Engineering

 North Dakota State University

 Fargo, North Dakota

 Dhruv Sharma

 Ph.D. Candidate

 John N. Jiang

 OG&E Associate Professor

 Electrical and Computer Engineering

 University of Oklahoma

 Norman, Oklahoma

5

*Medium Voltage Solar PV Transient Analysis Using*

*Krylov Subspace Techniques*

Sebastian Garrido

 Graduate Student

 Roy McCann

 Professor

 Electrical Engineering

 University of Arkansas

 Fayetteville, Arkansas

4:50 ADJOURN

7:00 Siemens Energy Banquet

Freddie Paul’s Steakhouse

1707 E. 6th Avenue (Highway 51)

Map online at: [www.freddiepauls.com](http://www.freddiepauls.com)

**Tuesday, October 31, 2017**

**Morning Sessions are in Jones Conference Room**

8:00 Continental Breakfast

8:15 KEYNOTE PRESENTATION

***Measurements and the Smart Grid***

 **Harold Kirkham**

 Staff Scientist

 Pacific Northwest National Laboratory

 Richland, Washington

9:15 KEYNOTE PRESENTATION

***Data Analytics: The Next Utility Frontier***

 **Phil Crissup**

 Vice President, Utility Technical Support

 OG&E

 Oklahoma City, Oklahoma

10:15 Break

10:30 Technical Paper Session

Moderator Ken Brand

 Manager

 Distribution Operations

 Public Service Company of Oklahoma

 Tulsa, Oklahoma

6

*Understanding the Impact of Measurement Errors on Grid Structure*

*Monitoring and Intrusion Detection*

 Wanghao Fei

 Ph.D. Candidate

 Evan Browning

 Ph.D. Candidate

 Paul S. Moses

 Assistant Professor

 John N. Jiang

 OG&E Associate Professor

 Electrical and Computer Engineering

 University of Oklahoma

 Norman, Oklahoma

*Demand Response and House Design to Mitigate Photovoltaic Ramping*

 Milan Dahal

 Graduate Student

 Kesh Pun

 Graduate Student

 Ward Jewell

 Professor

 Electrical Engineering

 Wichita Site Director

 Power System Engineering Research Center

 Wichita State University

 Wichita, Kansas

*A Holistic Assessment of Harmonics Induced Technical Losses in*

*Power Distribution Networks*

 Onyema S. Nduka

 Ph.D. Candidate

 Control and Power Research Group

 Bikash Pal

 Professor

 Electrical and Electronic Engineering

 Imperial College

 London, United Kingdom

7