

CONTACT
INFORMATION

Iowa State University
Electrical and Computer Engineering
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RESEARCH
INTERESTS

Power System Operations, Power Markets, Computational Optimization, Mathematical Modeling and Power System Software Development.

EDUCATION

Iowa State University, USA

Ph.D. Student, Electrical Engineering (expected May 2015)

- Advisor: Dr. Leigh Tesfatsion (Professor of Economics, Math and Electrical and Computer Engineering)
- GPA: 3.7/4.0

Iowa State University, USA

M.S., Electrical Engineering, Dec 2012

- Advisor: Dr. Leigh Tesfatsion and Dr. Dionysios Aliprantis
- Thesis: Residential Air-Conditioning System with Smart-Grid Functionality

SSN College of Engineering, Anna University, Chennai, India

B.E. in Electrical and Electronics Engineering, May 2010

- Final year project: Modeling, Simulation and Implementation of Five Phase Induction Machines and Drives

NIIT, Chennai, India

2 yr. course (ANIIT) in Software Engineering, Jan 2010

- Courses taken in C++, Java, SQL, C#, ASP.Net and UML

WORK/RESEARCH
EXPERIENCE**Ph.D. Intern, Pacific Northwest National Lab, May 2014-Aug 2014**

1. Work in three projects with the Demand Response and Distribution Systems group:
2. Future Power Grid Initiative: Wholesale-Retail power market integration with focus on the software framework and LSE demand bid formulation
3. Transactive Market for Ancillary Services: Modify GridLAB-D to include transactive market capabilities for regulation services using residential customers
4. GAMS project: Use GAMS to analyse and extend an economic dispatch model to include special capabilities

Graduate Teaching Assistant, Iowa State University, Spring 2014 & Fall 2014

1. Physics 111 (Department of Physics and Astronomy)
2. EE 303 (Department of Electrical and Computer Engineering)

Graduate Research Assistant, Iowa State University, Aug 2010-Present

1. Integrated Retail/Wholesale Power System Operation with Smart-Grid functionality
 - Extended an agent based test bed in Java to simulate the power market structure.
 - Developed an air-conditioning system controller to provide optimal inter-temporal comfort/cost trade-offs for the resident, conditional on anticipated retail energy prices.
 - To analyze the feedback loop that is established wherein the wholesale market prices affect the retail load (through the retail price) that in turn affects the wholesale market price (through Load Serving Entity [LSE] demand bids)
 - <http://www2.econ.iastate.edu/tesfatsi/irwprojecthome.htm>

2. Improved Power System Operations Using Advanced Stochastic Optimization (ARPA-E) [Mar 2012-Feb 2013]

- Extended the agent based test bed to include a stochastic unit commitment python package developed by Sandia National Laboratories.
- <http://arpa-e.energy.gov/?q=arpa-e-projects/probability-based-software-grid-optimization>

HONORS AND AWARDS

2008-09 SSN Merit Scholarship for securing 1st rank in Department of Electrical and Electronics Engineering, SSN, Chennai, India
2013 **Session Chair:** Coordinated Operation of Retail and Wholesale Power Markets (Panel Session), IEEE Power Energy Soc. Gen. Meet., Vancouver, British Columbia, Jul. 2013.

EXTENDED PROFESSIONAL TRAVEL

Summer 2013 IEEE Power Energy Society Gen. Meet., Vancouver, BC, Canada
Summer 2012 IEEE Power Energy Society General Meeting, San Diego, CA, USA
Spring 2012 GridLAB-D Training, Pacific Northwest National Lab (PNNL), Richland, WA, USA
Summer 2011 IEEE Power Energy Society General Meeting, Detroit, MI, USA

MEMBERSHIP

- IEEE Student Member (2009-Present)
- IEEE Power and Energy Society Member (2010-Present)

RELEVANT SKILLS

Languages: C, C++, Python, Java and SQL
HPC: MPI and OpenMP
Others: Matlab, CPLEX and GAMS.
Operating Systems: Windows, Linux (Ubuntu, Fedora and Redhat) and MacOS.

GRADUATE COURSEWORK

- Electromechanical Wind Energy Conversion
- Power System Planning
- Power System Dynamics
- Steady State Analysis
- Statistical Theory for Research Workers
- Numerical Analysis of High Performance Computing
- Linear Systems
- Optimal Control
- Optimization in Complex Systems
- Linear Programming
- Continuous Optimization
- Stochastic Programming

REFERENCES

Leigh Tesfatsion

- Professor, Department of Economics
- Iowa State University
- tesfatsi@iastate.edu

Dionysios Aliprantis

- Associate Professor, Department of Electrical Engineering
- Purdue University
- dali@iastate.edu

PEER-REVIEWED JOURNAL PUBLICATIONS

A. G. Thomas, P. Jahangiri, D. Wu, C. Cai, H. Zhao, D. C. Aliprantis, and L. Tesfatsion, "Intelligent residential air-conditioning system with smart-grid functionality," *IEEE Trans. Smart Grid (Special Issue on Intelligent Buildings and Home Energy Management in a Smart Grid Environment)*, Vol. 3, No. 4, pp. 2240–2251, Dec. 2012

CONFERENCE
PUBLICATIONS

A. G. Thomas, C. Cai, D. C. Aliprantis, and L. Tesfatsion, “Effects of price-responsive residential demand on retail and wholesale power market operations,” in *Proc. IEEE Power Energy Soc. Gen. Meet.*, San Diego, CA, Jul. 2012.

H. Zhao, **A. G. Thomas**, P. Jahangiri, C. Cai, L. Tesfatsion, and D.C. Aliprantis, “Two-settlement electric power markets with dynamic-price customers,” in *Proc. IEEE Power Energy Soc. Gen. Meet.*, Detroit, MI, Jul. 2011.

C. Cai, P. Jahangiri, **A. G. Thomas**, H. Zhao, D. C. Aliprantis, and L. Tesfatsion, “Agent-based simulation of distribution systems with high penetration of photovoltaic generation,” in *Proc. IEEE Power Energy Soc. Gen. Meet.*, Detroit, MI, Jul. 2011.

A. G. Thomas, D. Krishnamurthy, R. Balaji, A. Balasubramanian “A Low Cost SVPWM Controller for Five-Phase VSI Using PIC18F4550,” in *Proc. Intl. Conf. on System Dynamics and Control (ICSDC 2010)*, Manipal, Karnataka, India, Aug. 2010.

POSTER
PRESENTATION

A. G. Thomas, P. Jahangiri, D. Wu, C. Cai, H. Zhao, D. C. Aliprantis, and L. Tesfatsion, “Effects of Price-Responsive Residential Demand on Retail and Wholesale Power Market Operations,” *Student Poster Session*, IEEE Power Energy Soc. Gen. Meet., San Diego, CA, Jul. 2012.

A. G. Thomas, P. Jahangiri, C. Cai, H. Zhao, L. Tesfatsion, and D.C. Aliprantis, “Integrated Retail and Wholesale Power System Operation with Smart Grid Functionality,” *Student Poster Session*, IEEE Power Energy Soc. Gen. Meet., Detroit, MI, Jul. 2011.

CONFERENCE
TALKS

A. G. Thomas, P. Jahangiri, D. Wu, C. Cai, H. Zhao, D. C. Aliprantis, and L. Tesfatsion, “Intelligent residential air-conditioning system with smart-grid functionality,” *IGCC Transaction Paper Session (Paper Session)*, IEEE Power Energy Soc. Gen. Meet., Vancouver, British Columbia, Jul. 2013. [Presenter]

A. G. Thomas, L. Tesfatsion, and D. C. Aliprantis, “Impacts of Residential A/C Demand Response on Wholesale Power Markets,” *Smart Dispatch with Demand Response and Distributed Energy Resources: Business Models, Methodology and Incentives (Panel Session)*, IEEE Power Energy Soc. Gen. Meet., Vancouver, British Columbia, Jul. 2013. [Presenter]

A. G. Thomas, L. Tesfatsion, and D. C. Aliprantis, “Integrated Retail and Wholesale (IRW) Power Market Operations,” *Coordinated Operation of Retail and Wholesale Power Markets (Panel Session)*, IEEE Power Energy Soc. Gen. Meet., Vancouver, British Columbia, Jul. 2013. [Session Chair and Presenter]

A. G. Thomas, D.Krishnamurthy, and L. Tesfatsion, “Multi-Agent System Capabilities of the AMES Wholesale Power Market Test Bed ,” *Multi-Agent Systems Test Beds and Applications (Panel Session)*, IEEE Power Energy Soc. Gen. Meet., Vancouver, British Columbia, Jul. 2013. [Co-presenter]

A. G. Thomas, C. Cai, D. C. Aliprantis, and L. Tesfatsion, “Effects of price-responsive residential demand on retail and wholesale power market operations,” in *Effects of Demand Response on Retail and Wholesale Power Markets (Panel Session)*, IEEE Power Energy Soc. Gen. Meet., San Diego, CA, Jul. 2012. [Presenter]

H. Zhao, **A. G. Thomas**, P. Jahangiri, C. Cai, L. Tesfatsion, and D.C. Aliprantis, “Two-settlement electric power markets with dynamic-price customers,” in *Smart-Grid Support for Dynamic Pricing (Panel Session)*, IEEE Power Energy Soc. Gen. Meet., Detroit, MI, Jul. 2011. [Co-presenter]

OTHER TALKS

A. G. Thomas and L. Tesfatsion, “Retail and Wholesale Power Market Operations under Increased Penetration of Price-Responsive Demand,” in *Power System Energy Research Center (PSERC) webinar*, Ames, IA, October 1, 2013. [Presenter]

A. G. Thomas, D. C. Aliprantis, and L. Tesfatsion, “Integrated Retail and Wholesale (IRW) Power System Operation with Smart Grid Functionality,” Final Project Report, *Electric Power Research Center (EPRC) Yearly Meeting*, Ames, IA, Jun. 2013. [Presenter]

A. G. Thomas, P. Jahangiri, C. Cai, D. C. Aliprantis, and L. Tesfatsion, “Integrated Retail and Wholesale (IRW) Power System Operation with Smart Grid Functionality,” Second Year Progress Report, *Electric Power Research Center (EPRC) Yearly Meeting*, Ames, IA, May 2012. [Co-presenter]

A. G. Thomas, P. Jahangiri, C. Cai, D. C. Aliprantis, and L. Tesfatsion, “Integrated Retail and Wholesale (IRW) Power System Operation with Smart Grid Functionality,” First Year Progress Report, *Electric Power Research Center (EPRC) Yearly Meeting*, Ames, IA, May 2011. [Co-presenter]