

**The 3rd International Conference on
Behavioral, Economic and Socio
-Cultural Computing (BESC'2016)**

Nov 11-13, 2016
Duke University, Durham, USA

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Welcome from BESC 2016 Chairs

Behavioral, Economic and Socio-cultural Computing (BESC) series conference aims to become a premier forum in which academic researchers and industry practitioners from data mining, artificial intelligence, statistics and analytics, business and marketing, finance and politics, and behavioral, economic, social and psychological sciences could present updated research efforts and progresses on foundational and emerging interdisciplinary topics of BESC, exchange new ideas and identify future research directions.

The 3rd International Conference on Behavioral, Economic, and Socio-Cultural Computing (BESC2016) technically co-sponsored by IEEE Computational Intelligence Society, and takes place in Hilton Garden Inn, South Point, Durham, NC, USA, 11-13 November, 2016. BESC 2016 focuses on qualitative and explicit behavior, economic and social appearance and drivers, and intends to support explicit behavioral, economic and societal involvement through a conversion from transactional entity spaces to behavior/economic/socio-cultural feature spaces, through a better understanding of interactions between users and computing systems and better modeling of social concepts like trust, credibility, privacy, and, and influence, further genuine analysis of native behavior/economic/social patterns and impacts, and the facilitation of deployment of information technologies in various socially-centric application domains.

BESC 2016 received 70 submissions, and the selection process this year was competitive, each submitted paper was reviewed by three members of the Program Committee. Following this independent review, there were discussions among reviewers and chairs. A total of 24 papers were selected as full papers, and another 8 papers were selected as short papers.

We would like to thank everyone who participated in the development of the BESC 2016 program. In particular, we would give special thanks to the Program Committee, for their diligence and concern for the quality of the program, and also with their detailed feedback to the authors. The general organization of the conference also relied on the efforts of BESC 2016 Organizing Committee. We especially thank five Track Chairs, Jaroslaw Kozlak, Herbert Dawid, Wu He, JianBo Gao, Yidong Li, Industry track Chair Alvin Chin and Xin Li, Special Session Chair I-HSIEN TING, Publication Chair Guanfeng Liu, Publicity Chair Jie Kong

and Frank Jiang, and Dr Shaowu Liu for the general administrative issues, and the maintaining of the conference website. Our special gratitude also goes to Prof Shu-heng Chen and his team, especially Ms. Hou-ning Wang for conference organizing on registration and Visa letter matter. We appreciated the local support from Duke University and joint organizing effort with Duke Forest Conference (DFC 2016), which make the joint conference great successful.

Finally and most importantly, we thank all the authors, who are the primary reason why BESC 2016 is so exciting, and why it is the premier forum for presentation and discussion of innovative ideas, research results, applications, and experience from around the world as well as for highlight activities in the related areas.

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On behalf of BESC Steering Committee

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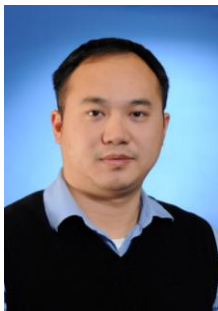
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Wu HE, Old Dominion University, USA

Digital Humanities:



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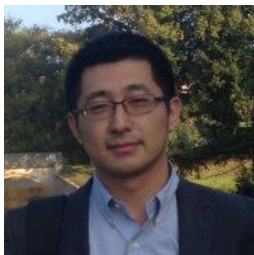


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- Lefeng Zhang, ZhongNan University of Economics and Law, China

Main Conference Program

Friday, November 11st

Main Conference

DAY 1, Friday, November 11, 2016 Venue: Old Chatham Ballroom III	
8:00-9:00	Registration
9:00-9:15	Opening Ceremony <i>Paul Wang, Guandong Xu, and Shu-Heng Chen</i>
9:15-9:50	Keynote 1: Economic Systems as Constructively Rational Games: Oh, the Places We Could Go! <i>Speaker: Prof. Leigh Tesfatsion, Iowa State University</i> Chair: William Lawless
9:50-10:25	Keynote 2: A von Neumann Operator for Exact Analytical Calculus of Hybrid Functions in Complex Systems <i>Speaker: Prof. Claudio Cioffi-Revilla, George Mason University</i> Chair: William Lawless
10:25-10:45	Break
Session: Social Computing and Applications (SCA-1) Session chair: Koraljka Golub	
10:45-12:15	- Mohd Anwar, Wu He and Xiaohong Yuan. Employment Status and Cybersecurity Behaviors - Jianbo Gao, Scaling Laws Governing the Complexity of Global Political Event Evolutions - Chris Kuhlman, Gizem Korkmaz and Fernando Vega-Redondo. Can Social Contagion Spread Without Key Players? - Somayyeh Aghababaei and Masoud Makrehchi. Interpolative Self-training Approach for Sentiment Analysis
12:15-13:30	Lunch
Session: Behavioral and Economic Computing (BEC) Session chair: Chris Kuhlman	
13:30-15:00	- Hongwei Yin, Research on Influence of Chinese Urbanization on Hotel Industry Development

	- Jie Zhang, Lin Li, Ge Zhu, Xiangfu Meng and Qing Xie. A Comparison Study of Semi-supervised SVM Algorithms for Small Business Credit Prediction - German Creamer. Trading Network and Systemic Risk in the Energy Market - Charles Chu, Guandong Xu, James Brownlow, Bin Fu. Churn Prediction Deployment in Financial Services Industry
Session: Industrial Applications (IA) and Digital Humanities (DH-1) Session chair: Jianbo Gao	
15:00-16:30	- Jianbo Gao. A multiscale theory for sentiment variation in novels - Yuan Sun, Shiwei Ye, Guiping Su, Yi Sun, Q-matrix Learning and DINA Model Parameter Estimation - Raul Manongdo and Guandong Xu. Applying client churn prediction modelling on home-based care services industry - Cheng Chen. Learning Text to Model: A Bayesian Network based L-system Modeling Strategy
16:30-16:50	Break
16:50-17:25	Keynote 3: "Too Big to Fail?" - Intellectual Property Protection of Big Data Speaker: Susan Freya Olive, Olive and Olive Chair: Paul Wang
19:10-21:00	Conference Banquet Speaker: Sam Wang, Synchrony Financial Chair: Shu-Heng Chen
DAY 2, Saturday, November 12, 2016 Venue: Old Chatham Ballroom III	
8:30-9:30	Registration
9:30-10:10	Keynote 4: Learning to Coordinate: Experiments with Artificial and Real Agent Speaker: Prof. John Duffy, University of California at Irvine Chair: William Rand
10:10-10:30	Break
Session: Social Computing and Applications (SCA-2) Session chair: German Creamer	
10:30-12:00	- Naiyue Chen, Yun Liu, Junjun Cheng and Qing Liu. Parallelizing Label Propagation for Overlapping Community Detection - Yu Liu, Bin Wu, Yunlei Zhang and Bai Wang. Overlapping Community Detection via Self-constrained Symmetric Non-negative Matrix Factorization - Min Gu and Yanhui Gu. Research on Interpretation of Norminal Compound

	- Hao Chen, Yinghong Dong and Kaisheng Lai. Revisit Hemline Index Theory: Forecasting Daily Trading of Short Skirts by Stock Market in China
12:00-13:30	Lunch
Session: Information Management and Systems (IMS-1) Session chair: Mohd Anwar	
13:30-15:00	- Lu Zhang, Zhan Bu, Zhiang Wu and Jie Cao. DGWC: Distributed and Generic Web Crawler for Online Information Extraction - Zhiyuan Zhang, Yun Liu, Haiqiang Chen and Qing Liu. POI Recommendation with Geographical and MultiTag Influences - Jiao Xue, Takao Terano, Hiroshi Deguchi and Manabu Ichikawa. Simulation Analysis of Immunization Policy Diffusion in Social Network with ABM Approach - Yaxin Hou, Cong Ma and Yidong Li. Research on Fire Risk Factors of Cotton in Railway Transportation
Session: Digital Humanities (DH-2) Session chair: Changxiu Cheng	
15:00-16:30	- Changxiu Cheng, Nikita Murzintcev Event-related information retrieval from social media - Aihua Jiang and Jianbo Gao. Fractal analysis of complex power load variations through adaptive multiscale filtering - Koraljka Golub and Marcelo Milrad. Digital Humanities as a Cross-Sector and Cross-Discipline Initiative: Prospects in the Linnaeus University Region - Shi Shen, Changxiu Cheng, Kai Su, Jing Yang and Shanli Yang. Quantitative Visualization about Differences between Scientists concerned Nature Disasters and Historic Events
16:30-16:50	Break
16:50-17:25	Keynote 6: Why Bother with the Brain? The Promise and Challenge of Neuroeconomics Speaker: Prof. Scott Huettel, Duke University Chair: Andreas Pape
17:25-18:00	Keynote 7: The Sea Battle Tomorrow: The Identity of Reflexive Economic Agents Prof. John Davis, Marquette University Chair: Andreas Pape
DAY 3, Sunday, November 13, 2016 Venue: Old Chatham Ballroom II	
9:00-9:35	Keynote 8: The Good, the Bad and the Ugly: Uncovering Novel Opportunities of Data Science Speaker: Prof. Huan Liu, Arizona State University Chair: Guandong Xu

9:35-10:10	Keynote 9: Is Agent Computing the New Calculus for Social Interactions? Speaker: Prof. Robert Axtell, George Mason University Chair: Guandong Xu
10:10-10:30	Break
Session: Social Computing and Applications (SCA-3) Session chair: Wu He	
10:30-12:00	- Sherif Abdelhamid, Chris Kuhlman, Madhav Marathe and S. S. Ravi. Interactive Exploration and Understanding of Contagion Dynamics in Networked Populations - Zhicheng Liu, Jinbin Yu, Weiting Xiong, Jian Lu, Junyan Yang and Qiao Wang. Using Mobile Phone Data to Explore Spatial-Temporal Evolution of Home-Based Daily Mobility Patterns in Shanghai - Frank Jiang, Jin Gan and Guandong Xu. Coupled Behavioral Analysis for User Preference-based Email Spamming - Yanhui Gu and Min Gu. Human motion retargeting with trajectory constraints
12:00-13:30	Lunch
Session: Information Management and Systems (IMS-2) Session chair: I-Hsien Ting	
13:30-15:00	- Jiancheng Shen, Feng Dong and Wu He. Using Media-Based Emotion to Predict Commodity Price - Qian Li, Wei Cao and Zhenglu Yang. An Effective System for Managing Tail-Anchored Protein Data - Min Gu and Yanhui Gu. Towards Effective Web Page Classification - Somayyeh Aghababaei, Eren Gultepe, Masoud Makrehchi and Iuliia Chepurna. Activity-Based Sampling of Twitter Users for Temporal Prediction Models
15:00-15:10	Break
Session: User Modeling, Privacy, and Ethics (UMPE) Session chair: Frank Jiang	
15:1-16:40	- Aastha Nigam, Salvador Aguinaga and Nitesh V. Chawla. Connecting the Dots to Infer Followers' Topical Interest on Twitter - Anand Chinchore, Guandong Xu and Frank Jiang. Classifying Sybil in MSNs using C4.5 - Yidong Li, Shugeng Ding, Jianhui Zhang, Liang Chen, Zhen Wang and Qunqun Xu. An Efficient and Privacy-Preserving Ranked Fuzzy Keywords Search over Encrypted Cloud Data - Peng Bian, Luyue Jiang, Yi Jin and Yidong Li. Coupled Feature Spaces Learning with Joint Graph Regularization for Person Re-identification

Keynote Speakers

[Robert Axtell, George Mason University](#)

Title: Is Agent Computing the New Calculus for Social Interactions? [Abstract](#)



Rob Axtell is Professor of Economics and of Computational Social Science at George Mason University, and a member of the Krasnow Institute for Advanced Study. He is Co-Director of the new Computational Public Policy Lab at Mason and External Faculty Member at both Northwestern University's Institute on Complex Systems and the University of Waterloo's Institute for Complexity and Innovation. Previously he was a Senior Fellow in the Economic Studies and Governance Studies programs at the Brookings Institution. He has been Visiting Professor in the Complexity Economics Programme at the University of Oxford, Mellon Visiting Distinguished Professor

at Middlebury College, and External Professor at the Santa Fe Institute. He holds a Ph.D. in Engineering and Public Policy from Carnegie Mellon University. His research involves agent-based computational models of social phenomena. His book *Growing Artificial Societies: Social Science from the Bottom Up*, (MIT Press, 1996), co-authored with J.M. Epstein, is widely cited as an early statement of the potential of multi-agent systems to represent social processes. His research has appeared in leading general interest scientific journals (e.g., *Science*, *Proceedings of the National Academy of Sciences USA*, *PLOS One*), disciplinary journals (e.g., *American Economic Review*, *Economic Journal*, *Computational and Mathematical Organization Theory*, *Journal of Regulatory Economics*), and has been reprised in the popular science press (e.g., *Nature*, *Scientific American*, *Science News*, *New Scientist*, *Discover*, *Technology Review*), in newspapers and magazines (e.g., *Wall Street Journal*, *Los Angeles Times*, *Washington Post*, *Atlantic Monthly*, *the New Yorker*) and in a museum installation. His current research involves the creation of entire artificial economies consisting of 100s of millions of agents.

[Claudio Cioffi-Revilla, George Mason University](#)

Title: A von Neumann operator for exact analytical calculus of hybrid functions in complex systems [Abstract](#)



Cioffi-Revilla is University Professor of Computational Social Science, founding and former Chair of the Department of Computational Social Science, and founding and current Director of the Mason Center for Social Complexity at George Mason University. He holds two doctoral degrees in Political Science and International Relations and has conducted extensive scientific research on conflict and disasters, international relations, computational social science modeling, and social complexity with funding from DARPA, NSF, ONR, NATO, and European research agencies. He has authored six books, the most recent being *Introduction to Computational Social Science*

(Springer 2014), the first comprehensive textbook in CSS, and over 90 papers in peer-reviewed journals and publications. He has served in various senior science advisory capacities in the US and other NATO governments, including as Jefferson Science Fellow of the National Academy of Sciences, and is an Associate Research Scientist at the Smithsonian National Museum of Natural History in Washington DC.

[John Davis, Marquette University](#)

Title: The Sea Battle Tomorrow: The Identity of Reflexive Economic Agents [Abstract](#)

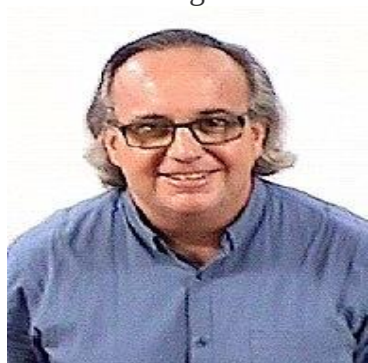


John B. Davis, Professor of Economics, Marquette University, Professor of Economics, University of Amsterdam, and Fellow of the Tinbergen Institute, is author of *Keynes's Philosophical Development* (Cambridge, 1994), *The Theory of the Individual in Economics* (Routledge, 2003), *Individuals and Identity in Economics* (Cambridge, 2011), and co-author with Marcel Boumans of *Economic Methodology: Understanding Economics as a Science* (2nd ed., Palgrave, 2016). He has been a visiting professor at the University of Paris Sorbonne, Cambridge University,

Erasmus University, Duke University, and University of Reims. He is co-editor with Wade Hands of the *Journal of Economic Methodology*. His current research addresses the principle of reflexivity in complex evolutionary systems with particular attention to the nature of reflexive economic agents. His personal website is [here](#).

[John Duffy, University of California at Irvine](#)

Title: Learning to Coordinate: Experiments with Artificial and Real Agents [Abstract](#)



John Duffy is Professor of Economics at the University of California, Irvine. His research concerns the micro-foundations of aggregate phenomena such as monetary exchange, voting and information aggregation and social norms of behavior. Duffy addresses these topics using models, laboratory experiments and agent-based simulations. His research has appeared in the leading economics journals and has been funded by the U.S. National Science Foundation.

Norman Greenburg, West Michigan University

[Scott Huettel, Duke University](#)

Title: Why bother with the brain? The promise and challenge of neuroeconomics [Abstract](#)



Scott Huettel is the Jerry G. and Patricia Crawford Hubbard Professor and Chair of the Department of Psychology and Neuroscience, with secondary appointments in the Departments of Psychiatry and Neurobiology. His research uses a combination of behavioral, genetic, physiological, and neuroscience techniques to discover the neural mechanisms that underlie higher cognition, with a focus on economic and social decision making. Much of his research - which includes collaborations with neuroscientists, psychologists, behavioral economists, and business and medical faculty - falls within the emerging interdiscipline of neuroeconomics, where he is a

Past-President of the Society for Neuroeconomics. He is an author of more than 120 scientific publications, including articles in *Science*, *Nature Neuroscience*, *Nature Reviews Neuroscience*, *Neuron*, *Psychological Science*, and other top journals in several fields. His research has been featured in *CNN*, *Newsweek*, *Money Magazine*, *NPR Science Friday*, and many other media outlets. He is lead author on a primary textbook in neuroscience, *Functional Magnetic Resonance Imaging*, and is a co-editor of the textbook *Principles of Cognitive Neuroscience*.

Dr. Huettel has won the Dean's Award for Excellence in Mentoring from the Duke University Graduate School, and has been recognized as one of the top 5% of undergraduate instructors at Duke.

Huan Liu, Arizona State University

Title: The Good, the Bad and the Ugly: Uncovering Novel Opportunities of Data Science [Abstract](#)



Huan Liu is a professor of Computer Science and Engineering at Arizona State University. He obtained his Ph.D. in Computer Science at University of Southern California and B.Eng. in Computer Science and Electrical Engineering at Shanghai JiaoTong University. Before he joined ASU, he worked at Telecom Australia Research Labs and was on the faculty at National University of Singapore. At Arizona State University, he was recognized for excellence in teaching and research in Computer Science and Engineering and received the 2014 President's Award for Innovation. His research interests are in data mining, machine learning, social computing, and artificial intelligence, investigating interdisciplinary problems that arise in many real-world, data-intensive applications with high-dimensional data of disparate forms such as social media. His well-cited publications include books, book chapters, encyclopedia entries as well as conference and journal papers. He is a co-author of Social Media Mining: An Introduction by Cambridge University Press. He serves on journal editorial boards and numerous conference program committees, and is a founding organizer of the International Conference Series on Social Computing, Behavioral-Cultural Modeling, and Prediction. He is an IEEE Fellow. More information can be found [here](#).

Barkley Rosser, James Madison University

Title: Complexity and Institutional Evolution [Abstract](#)



John Barkley Rosser, Jr. is the Professor of Economics and Kirby L. Cramer, Jr. Professor of Business Administration at James Madison University in Harrisonburg, Virginia. He is known for work in nonlinear economic dynamics, including applications in economics of catastrophe theory, chaos theory, and complexity theory (complex dynamics, complexity economics). With Marina V. Rosser he invented the concept of the "new traditional economy". He introduced into economic discourse the concepts of chaotic bubbles, chaotic hysteresis, and econochemistry. He has published several books and about 150 journal articles, book chapters, and book reviews in a wide variety of sub-fields of economics. He served as Editor of the Journal of Economic Behavior and Organization from 2001-2010. He is also the Founding Editor-in-Chief of the Review of Behavioral Economics.

Leigh Tesfatsion, Iowa State University

Title: Economic Systems as Constructively Rational Games: Oh, the Places We Could Go! [Abstract](#)

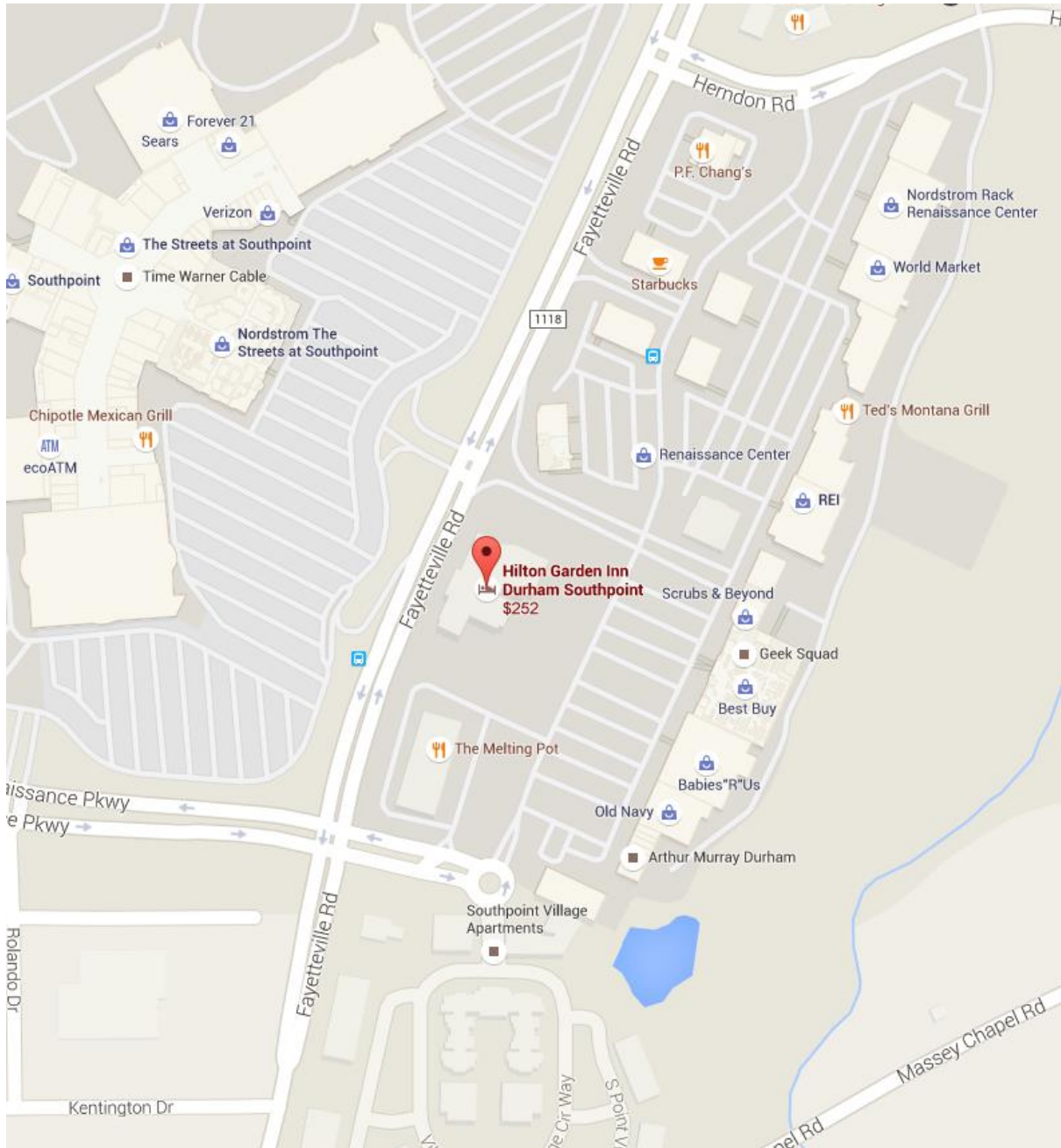


Leigh Tesfatsion is a Professor of Economics with courtesy appointments as Professor of Mathematics and Professor of Electrical and Computer Engineering at Iowa State University. She is an interdisciplinary researcher whose primary specialty is the study of economic processes as critical components of coupled natural and human systems. In support of this study, she has pursued the development of [Agent-based Computational Economics](#) (ACE), the computational modeling of economic processes (including whole economies) as open-ended dynamic systems of

interacting agents. Her current work focuses on three research topics: (1) the study of macroeconomies as open-ended dynamic games with constructively rational participants to facilitate the understanding of macroeconomies as historical processes; (2) the study of water and climate change issues with the ultimate goal of facilitating watershed sustainability through community engagement; and (3) the study of new contract designs for electric power markets to facilitate the increased penetration of renewable energy resources. She has published 128 research articles on these and related topics in a variety of journals, edited books, and conference proceedings. For further information about her research and professional service activities, please refer to her [full CV](#).

Conference Venue

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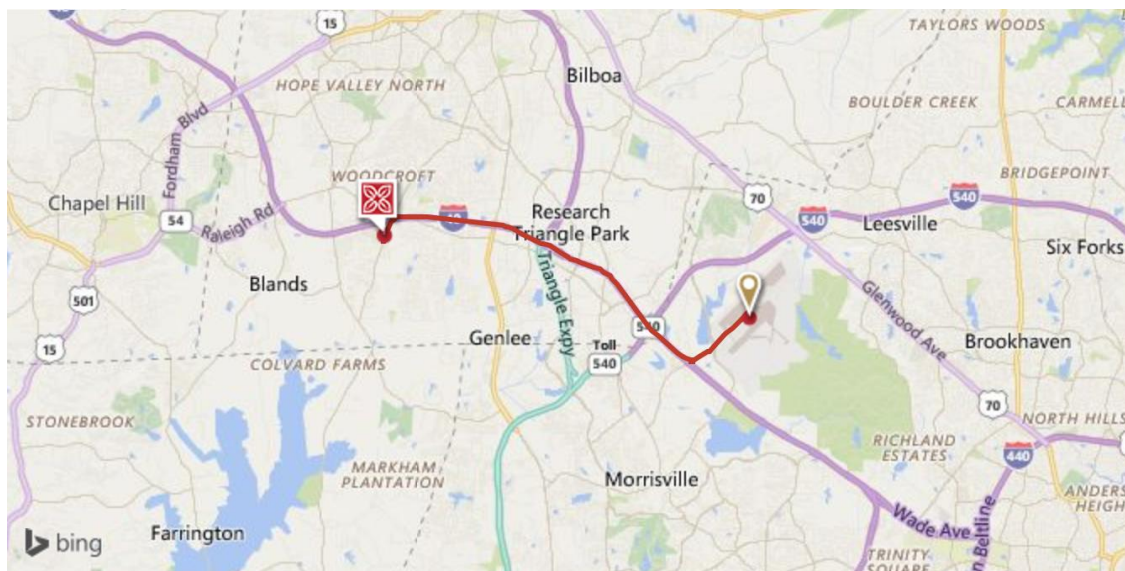
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Distance from Hotel: 10.5 mi.

Drive Time: 16 min.

Map for Raleigh-Durham International Airport:



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