

RICARDO A. CALIX, PH.D.

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EDUCATION:

- Ph.D. in Engineering Science** August, 2007 – August, 2011
Concentration: Information Technology and Engineering (IT&E)
Louisiana State University, College of Engineering Baton Rouge, LA
Dissertation: “*Automated Semantic Understanding of Human Emotions in Writing and Speech*”
Advisor: Gerald M. Knapp, Ph.D., P.E.
- M.S. in Engineering Science** August, 2007 – August, 2010
Concentration: Information Technology and Engineering (IT&E)
Louisiana State University, College of Engineering Baton Rouge, LA
- M.B.A.** August 2004 – May 2006
Louisiana State University Baton Rouge, LA
- Bachelor in Industrial & Systems Engineering** January 1997 – September 2001
Universidad Tecnologica Centroamericana Tegucigalpa, Honduras

EXPERIENCE:

- Assistant Professor** October, 2011 – Present
Computer Information Technology and Graphics College of Technology
Purdue University Calumet Hammond, IN
- Graduate Research and Teaching Assistant** August, 2007 – August, 2011
Engineering Science College of Engineering
Louisiana State University Baton Rouge, LA

RESEARCH INTERESTS

General Research Interests

- **Multimedia Semantic Analysis:** natural language processing, image analysis, inform. retrieval
- **Machine Learning:** supervised and unsupervised learning, HMMs, multimodal integration, SVM
- **Cyber Security:** biometrics, intrusion detection systems, behavior analysis, embedded systems

Specific Research Interests

- Emotion Detection from Text and Speech and applications to healthcare, business, and HCI
- Machine Learning for Intrusion Detection Systems
- Kernel Methods in Machine Learning
- Affective Computing and automatic understanding of human behavior
- Corpus development for natural language processing, biometrics, and semantic analysis
- Behavioral based biometrics analysis and development for healthcare and cyber security

January 26, 2015

FUNDED RESEARCH

1. **Funding Entity:** NIH (National Institutes of Health)
Role: Calix as Co-PI
Project title: Detection of Potential Drug Effect Signals from Twitter Data
PI: Keyuan Jiang
Co-PI's: Gordon Bernard
Award amount: \$ 359,922
Duration: 9/2014-9/2017
2. **Funding Entity:** Northrop Grumman Cyber Security Research Consortium
Project title: Northrop Grumman Funding for CERIAS year 6
Note: This funding is for a collection of several separate research grants under the year 6 funding agreement between Purdue and Northrop Grumman. The total amount for year 6 funding was \$771,916.28. The PI for the entire collection of grants is Dr. Eugene Spafford from Purdue.
The detail of my specific grant is as follows:
Role: Calix as PI
Project title: Developing a Smart and Fast Semantic Intrusion Detection System
Award amount: \$ 59,877.39 (Amount allocated to my project)
Duration: 9/2014-8/2015

REFEREED JOURNAL PUBLICATIONS:

1. Calix, R. A.; Knapp, G. M.; "Actor Level Emotion Magnitude Prediction in Text and Speech", *Springer Multimedia Tools and Applications*, Vol. 62, Issue 2, pp. 319-332, 2013, <http://dx.doi.org/10.1007/s11042-011-0909-8>
2. Calix, R. A.; Mallepudi, S. A.; Chen, B.; Knapp, G. M.; "Emotion Recognition in Text for 3-D Facial Expression Rendering", *IEEE Transactions on Multimedia*, Special Issue on Multimodal Affective Interaction, Vol. 12, Issue 6, October 2010, pp. 544-551, <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5571902&isnumber=5571813>
3. Calix, R. A.; Mallepudi, S. A.; Knapp, G. M.; Nahmens, I.; "Factors that Influence Usage of Knowledge Management by Information Technology Professionals at Institutions of Higher Education", *Journal of Management and Engineering Integration*, Vol. 3, No. 1, Summer 2010, pp. 73-80, <http://www.ricardocalix.com/jmeiKM2010.pdf>
4. Calix, R. A.; Javadpour, L.; Knapp, G. M.; "Detection of Affective States from Text and Speech for Real-time Human Computer Interaction", *Human Factors: The Journal of the Human Factors and Ergonomics Society*, doi: 10.1177/0018720811425922, 2012, Vol. 54, No. 4, 530-545, <http://hfs.sagepub.com/content/early/2011/11/29/0018720811425922.abstract>

REFEREED CONFERENCE PUBLICATIONS:

1. Moghaddam, M.; Calix, R.A. "Network Intrusion Detection using a Hardware-based Restricted Coulomb Energy Algorithm on a Cognitive Processor", Accepted for Publication In *Proceedings of the Twenty-Eight International Florida Artificial Intelligence Research Society Conference (FLAIRS-28)*, May 18-20, 2015, Hollywood, Florida, USA
2. Franz, D.R.; Calix, R.A.; "Semantic Content Enrichment of Sensor Network Data for Environmental Monitoring", In *Proceedings of the Twenty-Seventh International Florida Artificial Intelligence Research Society Conference (FLAIRS-27)*, May 21-23, 2014, Pensacola

Beach, Florida, USA,

<http://www.aaai.org/ocs/index.php/FLAIRS/FLAIRS14/paper/view/7785/7839>

3. O'Day, D.R.; Calix, R.A.; "Text Message Corpus: Applying Natural Language Processing to Mobile Device Forensics", In Proceedings of the 2013 IEEE International Conference on Multimedia and Expo, Special Workshop on Social Multimedia Research (SMMR), San Jose, California, July 15-19, 2013,
[http://ieeexplore.ieee.org/xpl/articleDetails.jsp?tp=&arnumber=6618380&queryText%3DText+Message+Corpus%3A+Applying+Natural+Language+Processing+to+Mobile+Dev
ice+Forensics](http://ieeexplore.ieee.org/xpl/articleDetails.jsp?tp=&arnumber=6618380&queryText%3DText+Message+Corpus%3A+Applying+Natural+Language+Processing+to+Mobile+Device+Forensics)
4. Calix, R. A.; "Emotion Expression 3-D Synthesis From Predicted Emotion Magnitudes", In *Proceedings of the Twenty-Fifth International Florida Artificial Intelligence Research Society Conference (FLAIRS-25)*, May 23-25, 2012, Marco Island, Florida,
<http://www.aaai.org/ocs/index.php/FLAIRS/FLAIRS12/paper/view/4424>
5. Calix, R. A.; Knapp, G. M.; "Affect Corpus 2.0: An Extension of a Corpus for Actor Level Emotion Magnitude Detection", In *Proceedings of the 2nd ACM Multimedia Systems (MMSys) Conference*, Feb. 2011 in San Jose, California, U.S.A.,
<http://portal.acm.org/citation.cfm?id=1943570>
6. Mallepudi, S. A.; Calix, R. A.; Knapp, G. M.; "Material Classification and Automatic Content Enrichment of Images Using Supervised Learning and Knowledge Bases", In *Proceedings of IS&T/SPIE International Conference on Multimedia Content Access: Algorithms and Systems V*, January 2011, San Francisco, California. Proc. SPIE 7881, 788113 (2011); doi:10.1117/12.876583, http://spie.org/x648.html?product_id=876583
7. Calix, R. A.; Khazaeli, M.; Javadpour, L.; Knapp, G.; "Dimensionality Reduction and Classification Analysis on the Audio Section of the SEMAINE Database", In *Proceedings of the Humaine Association Conference on Affective Computing and Intelligent Interaction (ACII 2011)*, Memphis, Tennessee, Oct. 9-12, 2011, (Lecture Notes in Computer Science, 2011, Volume 6975/2011, 323-331), <http://www.springerlink.com/content/6r53583164041q62/>
8. Calix, R. A.; Javadpour, L.; Khazaeli, M.; Knapp, G. M.; "Automatic Detection of Nominal Entities in Speech for Enriched Content Search", In *Proceedings of the Twenty-Sixth International Florida Artificial Intelligence Research Society Conference (FLAIRS-26)*, May 22-24, 2013, St. Pete Beach, Florida, USA,
<http://www.aaai.org/ocs/index.php/FLAIRS/FLAIRS13/paper/view/5862/6066>

OTHER REFEREED PUBLICATIONS:

1. Calix, R.A.; Sankaran, R.; "Feature Ranking and Support Vector Machines Classification Analysis of the NSL-KDD Intrusion Detection Corpus", poster presentation, short-paper (4 pages), in *Proceedings of the Twenty-Sixth International Florida Artificial Intelligence Research Society Conference (FLAIRS-26)*, May 22-24, 2013, St. Pete Beach, Florida,
<http://www.aaai.org/ocs/index.php/FLAIRS/FLAIRS13/paper/view/5842/6085>

CONFERENCE PRESENTATIONS:

1. AIEMS 16th International Conference on Industry, Engineering, & Management Systems, March 8-10, 2010, Cocoa Beach, Florida, "Management of Technology session"
2. IS&T/SPIE International Conference on Multimedia Content Access: Algorithms and Systems V, January 2011, San Francisco, California, "Session 5: Multimedia Tagging"

3. Second ACM Multimedia Systems (MMSys 2011) conference, Feb. 2011, San Jose, California, U.S.A., “Session: Data set track”
4. The Industrial and Systems Engineering Research Conference (ISERC) 2012, “An Affect Rating System for Medical Speech Segment Detection”, Computer and Information Systems Track, ISERC 2012, May 19-23, Orlando, Florida
5. The Twenty-Fifth International Florida Artificial Intelligence Research Society Conference (FLAIRS-25), May 23-25, 2012, Marco Island, Florida, “Affective Computing Track”
6. The Twenty-Sixth International Florida Artificial Intelligence Research Society Conference (FLAIRS-26), May 22-24, 2013, St. Pete Beach, Florida, “Applied Natural Language Processing”
7. IEEE International Conference on Multimedia and Expo (ICME 2013), San Jose, California, July 15-19, 2013, “Social Multimedia Research (SMMR)”
8. The Twenty-Seventh International Florida Artificial Intelligence Research Society Conference (FLAIRS-27), May 21-23, 2014, Pensacola Beach, Florida, “AI in Business”

WORKING PAPERS:

1. Calix, R.A.; Sankaran, R. “On the Feasibility of an Embedded Machine Learning Processor for Intrusion Detection”, submitted.

TECHNICAL SKILLS:

- Python, C\C++, VB.NET, C#, ASP.NET, SQL, Java, OpenGL, php , Hadoop, MySQL
- WEKA, MatLab, image processing toolbox, NLTK, Praat, Octave
- SAS, Metasploit, Visual Studio, Windows, Linux, Mac
- OpenWRT, Cisco IOS, Arduino, PIC and Basic Micro Programming

PROFESSIONAL AFFILIATIONS:

- IIE – Institute of Industrial Engineers
- ACM – Association for Computing Machinery, professional member
- IEEE – Institute of Electrical and Electronic Engineers, professional member

HONORS AND AWARDS:

- Placed 4th of 8 finalists in the audio sub-challenge out of 41 total entries at the Audiovisual Emotion Challenge (AVEC 2011) in Memphis Oct 9th, 2011 in conjunction with the Humaine Association sponsored Affective Computing and Intelligent Interaction (ACII) 2011 conference.
- LSU Graduate Student Travel Grant, 2011
- Outstanding Teaching Award, College of Technology, Purdue University Calumet, 2013-2014
- 2014 Purdue Research Foundation (PRF) Summer Faculty Research Grant

PROPOSALS IN DEVELOPMENT:

- PI, Submitted a NSF IUSE grant proposal titled: “An Embedded Systems and Cyber Security Laboratory for STEM students of Information Assurance and Security”. This proposal focuses on biometrics, semantic analysis, embedded systems, and machine learning, National Science Foundation (NSF), (Type I), Amount: \$200,000, submitted May 30, 2012. (Not Funded)

- PI, Submitted a NSF CAREER award grant proposal titled: “CAREER: A Multimodal Approach to Semantic Affect Detection and Analysis of Psychological Signals”. This proposal focuses on the understanding of how machine learning algorithms can be used to predict depression in users of computer systems, National Science Foundation (NSF), submitted July 23, 2012. (Not Funded)

PROFESSIONAL ACTIVITIES:

- Reviewer for Springer Multidimensional Systems and Signal Processing, FLAIRS-26, and FLAIRS-27, IEEE Transactions on Image Processing
- Co-Chair of Special Track on Artificial Intelligence and Cyber Security at the Twenty-sixth International Florida Artificial Intelligence Research Society Conference (FLAIRS-26), 2013

COURSES TAUGHT:

Graduate Level

Instructor – TECH 581, Web Applications, (Fall 2014), Purdue University Calumet, Computer Information Technology and Graphics. This course covers the theory and technologies used in developing web applications in the context of eCommerce, social media, big data, information retrieval and analytics, the Internet of things, web security, and other emerging web areas. Topics to be covered include: servers and networking infrastructure, web server architecture; web applications technologies such as HTML, Javascript, PHP or .NET web applications and services; web applications in the context of Big Data, the Internet of things, social media, information retrieval, e-commerce; web security; overview and web search basics; web crawling and indexing; vector space models and analysis; data mining of unstructured data in the web; eCommerce models & architectures, Page rank, and other special topics. Link: <http://www.ricardocalix.com/teaching/teaching.htm>

Instructor – ITS 55000, Biometrics, (Spring 2012), Purdue University Calumet, Computer Information Technology and Graphics. Topics covered: The basic biometric approach, features and feature extraction, supervised and unsupervised machine learning. Image based biometric techniques, Speech based biometric techniques, and behavioral based techniques. Link: <http://www.ricardocalix.com/teaching/teaching.htm>

Instructor – TECH 55400, Intrusion Detection and Prevention Systems, (Fall 2013), Purdue University Calumet, Computer Information Technology and Graphics. Topics: network traffic analysis and feature extraction algorithms, signature and anomaly based techniques, key heuristic based and machine learning based techniques and algorithms for intrusion detection, artificial neural networks (ANNs), and ANN-based embedded systems for intrusion detection. Link: <http://www.ricardocalix.com/teaching/teaching.htm>

Undergraduate Level:

Instructor - IE 2060, Introduction to Computers, (Spring 2008, Spring 2009, Spring 2010), Louisiana State University, Industrial Engineering. Topics covered: Computer components, programming fundamentals, date & string types, subroutines & functions, systems analysis, data structures, file systems, form controls, object oriented programming, and computer graphics. Link: <http://www.ricardocalix.com/teaching/IE2060Syllabus.pdf>

Instructor - ITS 37200, Systems Administration and Management, (Spring 2012, Spring 2013), Purdue University Calumet, Computer Information Technology and Graphics. Topics covered: Workstations, servers, services, data centers, helpdesks, upgrades, namespaces, system backup, IT support, scripting with Python for system management. Link: <http://www.ricardocalix.com/teaching/teaching.htm>

Instructor - IE 3201, Engineering Economics, (Summer 2008, Fall 2008, Summer 2009, Fall 2009, Summer 2010), Louisiana State University, Industrial Engineering. Topics covered: Economic decisions, time value of money, nominal and effective interest rates, inflation, present worth analysis, annual equivalence analysis, rate of return, depreciation and income taxes, project cash flow analysis, replacement decisions, and benefit-cost analysis.

Instructor - ITS 35000, Systems Assurance, (Fall 2012), Purdue University Calumet, Computer Information Technology and Graphics. Topics covered: confidentiality, integrity, authentication, non-repudiation, intrusion detection, physical security, and encryption. Link: <http://www.ricardocalix.com/teaching/teaching.htm>

Instructor - ITS 11000, Web Systems Technology, (Fall 2012, Spring 2013), Purdue University Calumet, Computer Information Technology and Graphics. Topics covered: web technologies, information architecture, digital media, web development, vulnerabilities, social software and other topics. Link: <http://www.ricardocalix.com/teaching/teaching.htm>

Instructor - ITS 45000, Software Assurance, (Fall 2012), Purdue University Calumet, Computer Information Technology and Graphics. Topics covered: defensive programming techniques, bounds analysis, error handling, advanced testing techniques, detailed code auditing, software specification in a trusted assured environment. Link: <http://www.ricardocalix.com/teaching/teaching.htm>

Instructor - ITS 45400, Assured Systems Design and Implementation, (Spring 2012, Spring 2013), Purdue University Calumet, Computer Information Technology and Graphics. Topics covered: system security axioms, security policy and operations life cycle, secure systems threats, system security technologies, sniffing and spoofing, encryption, general design considerations, firewalls, DMZs, VPN, biometrics, designing your security system, intrusion detection systems. Link: <http://www.ricardocalix.com/teaching/teaching.htm>

Teaching Assistant:

Teaching Assistant – IE 4485, Systems Integration in Manufacturing, (Fall 2007), Louisiana State University, Industrial Engineering. Topics covered: sensors, data acquisition, PLCs, RFID, motion control, vision systems, human machine interfaces, OSI model, sensor based data integration, manufacturing information systems. Prof: Dr. Gerald M. Knapp, Ph.D., P.E.

Teaching Assistant – IE 7428, Semantic Analysis, (Spring 2011), Louisiana State University, Industrial Engineering. Topics covered: human communication factors, speech and language processing, syntax, semantics, morphology, POS tagging, N-grams, HMMs, machine learning, dimensionality reduction, text mining, speech features and processing. Software: MatLab, python, NLTK, Praat, WEKA. Prof: Dr. Gerald M. Knapp, Ph.D., P.E.

INDUSTRY AND OTHER EXPERIENCE:

Associate - Advisory Services KPMG	June 2006 – June, 2007 Baltimore, Maryland
Internship – Advisory Services KPMG	Summer 2005 Baltimore, Maryland
Buyer Standard Fruit of Honduras (A Dole Foods Company)	April 2002 – June 2004 La Ceiba, Honduras
Student Worker LSU Cyber Security Laboratory Lab. Director: Dr. Peter Chen Louisiana State University	Summer 2008 and 2009 Baton Rouge, LA

REFERENCES:

Dr. Gerald M. Knapp, Ph.D., P.E., Fred B. & Ruth B. Zigler Associate Professor
Department of Mechanical and Industrial Engineering, College of Engineering
Engineering Science Information Technology and Engineering Graduate Coordinator
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Engineering Management
University of the Pacific
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