

# J. Caleb Goodwin

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## RESEARCH INTERESTS

Information retrieval (query log mining, cognitively inspired algorithms, and Bayesian models), artificial intelligence, computational cognitive architectures, and text mining (distributional semantics)

## EDUCATION

### University of Texas Health Science Center: School of Biomedical Informatics

Philosophy of Science in Biomedical Informatics  
Keck (NLM & AHRQ) Fellow

Advisor: Elmer Bernstam

Dissertation project: Constrained Spreading Activation - Rational: Cognitively inspired framework for multi-modal biomedical document retrieval and ranking

**Houston, Texas**  
August 2008 - Present

### The University of Memphis

Masters of Science in Electrical Engineering  
Focus in computer science and intelligent systems

Advisor: David J. Russomanno

Thesis: Ontology Integration within a Service-Oriented Architecture for Sensor Networks

**Memphis, Tennessee**  
August 2007

### The University of Memphis

Bachelor of Science in Computer Engineering  
Graduated Magna Cum Laude

**Memphis, Tennessee**  
December 2005

## WORK EXPERIENCE

### University of Texas Health Science Center: School of Health Informatics

*AHRQ Fellow, NLM Fellow, Graduate Research Assistant*

**Houston, Texas**  
June 2008-Present

- The goal of the research is to investigate the application of human associative memory theory to information retrieval.

### The National Library of Medicine Lister Hill National Center for Biomedical Communications

Training for Graduate and Medical students program

June 2011-August 2011

- Research conducted under Tom Rindflesch.
- Developing SemBot, a personalized search engine leveraging predications extracted from MEDLINE abstracts using SemRep and constrained cognitively inspired spreading activation (CSA) search.

### United Space Alliance

*Engineer I: Primary Avionics System Software Development*

**Houston, Texas**  
August 2007-September 2008

- Member of software development team responsible for the development, inspection, testing, and maintenance of the primary avionics flight computer operating system for the space shuttle.
- Supported numerous shuttle missions in the Mission Evaluation Room as part of flight support.
- Prepared employee training courses on executable UML (xUML), UML modeling, object-oriented programming and design, and Kennedy Carter iUML.
- Received Employee Performance Award in May 2008 for development of employee training courses.

**The University of Memphis**

**Memphis, Tennessee**

Graduate Research Assistant: Knowledge Engineering Lab

August 2005-August 2007

- Conducted Semantic Web research in the domain of wired and wireless sensors to support high-level user queries for increased situational awareness. Research conducted under the supervision of Dr. David J. Russomanno.
- Contributed to the development of Web Ontology Language (OWL) sensor ontology OntoSensor.
- Developed ontology-based architecture for wireless sensor Web service dynamic allocation and discovery using Service-Oriented Architectures, knowledge base systems, and Semantic Web technologies using OWL/RDF, C#, Web services, and Prolog.

**The University of Memphis**

**Memphis, Tennessee**

Graduate Research Assistant: Data Visualization in High School Pedagogy

May 2005-August 2007

- Interdisciplinary project for requirements elicitation, design, and development of multidimensional visualization tools for recruitment of high school students in the fields of engineering, physics, math, and computer science. Research conducted under the supervision of Dr. David J. Russomanno.
- Developed physics simulation software used by high-school physics teachers in the classroom using TCL/TK and the Visualization Toolkit (VTK).

**The University of Memphis**

**Memphis, Tennessee**

Graduate Research Assistant: Biomedical Data Visualization

August 2006-August 2007

- Contributed in development of C++ finite element analysis defibrillator simulation for visualization of custom electrode placements using TCL/TK and Visualization Toolkit (VTK). The software is used for research and development at a leading biotechnology corporation. Research conducted under the supervision of Dr. David J. Russomanno.

**PROFESSIONAL ACTIVITIES**

- Reviewer on Journal of American Medical Informatics (JAMIA) student editorial board 2009-Present
- Teaching assistant for Foundations of Health Information Sciences I Summer 09 – Fall 2010
  - Guest lecturer on Turing, Nyquist frequency, and information theory
- Teaching assistant for Foundations of Health Information Sciences II Spring 2011
  - Gave lecturer on data analysis
- Member of American Medical Informatics Association 2009 – Present
- Keck Center for Computational Biology speaker committee 2011 -- Present
- Member of Association for the Advancement of Artificial Intelligence 2010-Present
- Writer for Humanity Plus magazine – 2011 - Present
- Ad-hoc editor for Singularity Institute of Artificial Intelligence 2010 - Present
- Conference reviewer for the IEEE Southeast Conference 2006
- Teaching assistant for Data Visualization course Fall 2006 at The University of Memphis
- Computer committee advisor for Electrical and Computer Engineering Fall 2005

**ACADEMIC HONORS**

- Accepted into NLM training program for graduate students June 2011-August 2011
- Awarded AHRQ Fellowship from the Keck Gulf Coast Consortia August 2008 – June 2011
- Awarded NLM Fellowship from the Keck Gulf Coast Consortia June 2011- June 2013
- Research assistanceship under grants from Center for Advanced Sensors and National Science Foundation (NSF) Data Visualization outreach at The University of Memphis August 2005– August 2007
- The University of Memphis Herff College of Engineering scholarship August 2004– December 2005
- Member of Tau Beta Pi Honor Society 2005-Present
- Two year transfer scholarship from The University of Memphis August 2002-May 2004

## **SKILLS SUMMARY**

General: Information retrieval, Semantic Web, artificial intelligence, data visualization, software engineering  
Languages: C++, C, TCL/TK, Prolog, JAVA, XML, RDF, OWL, UML 2.0, xUML (Executable UML)  
Software: ACT-R, Repast Symphony, WEKA, Protégé, Topbraid Composer, Lucene  
Technologies: Web Services, Service-Oriented Architectures, Semantic Web  
Data visualization: Visualization Toolkit (VTK), Processing  
Math and data analysis software: R, STATA, Matlab

## **OTHER SKILLS**

- Oracle University – August 2008, OracleAS 10g R3: Build Java EE Applications with EJB 3.0 and JPA Ed 2
- Oracle University – July 2008, Oracle Service-Oriented Architecture Suite 10g: Service Orchestration

## **SAMPLE COURSEWORK**

Topics in Data Mining	Expert Systems
Artificial Intelligence	Introduction to Artificial Intelligence
Computational Modeling of Cognitive Processes	Machine learning in Biomedical Informatics
Computational Intelligence EE (Graduate,	Distributional Semantics
Machine Learning)	Computational Intelligence CS (Graduate, Neural
Biostatistics I	Networks and Fuzzy Logic)
Knowledge and Information Representation in	Data Visualization
Health Informatics	Language, Thought, and Mind

## **PUBLICATIONS**

### **JOURNAL**

- **J.C. Goodwin** and D.J. Russomanno. (2009) “Ontology Integration within a Service-Oriented Architecture for Expert System Applications using Sensor Networks,” *Journal of Expert Systems*.
- D.J. Russomanno, A.L. Curry, G.S. Atanasova, L.C. Hunt, and **J.C. Goodwin**. (2008) “DefibViz: A Visualization Tool for the Assessment of Electrode Parameters on Transthoracic Defibrillation Thresholds,” *IEEE Transactions on Information Technology in Biomedicine*.
- D.J. Russomanno and **J.C. Goodwin**. (2006) “Animation and Visualization Tools: From Undergraduate Projects to Pedagogical Aids,” *Journal of STEM Education*.
- **J.C. Goodwin**, T. Cohen, J.R. Herskovic, T.R. Johnson, and E.V. Bernstam. (In Peer Review, Submitted JAMIA), “Predicting Biomedical Document Access”.

### **BOOK CHAPTER**

- D.J. Russomanno and **J.C. Goodwin**. (2008) “OntoSensor: An Ontology for Sensor Network Application Development, Deployment, and Management,” *Handbook of Wireless Mesh and Sensor Networking*, McGraw Hill.

### **CONFERENCE**

- **J.C. Goodwin** and D.J. Russomanno. (2007) “Survey of Semantic Extensions to UDDI: Implications for Sensor Services,” *The 2007 International Conference on Semantic Web and Web Services*.
- D.J. Russomanno, A. Lambert, and **J.C. Goodwin**. (2007) “Data Visualization in the High-School Physics Classroom: Pathway to Engineering and Computer Science Careers?,” *The 2007 International Conference on Frontiers in Education: Computer Science and Computer Engineering*.
- J. Qualls, D.J. Russomanno, and **J.C. Goodwin**. (2007) “Hinged-Sliced Visualization of Defibrillation Induced Voltage Gradients,” *The 2007 International Conference on Modeling, Simulation and Visualization Methods*.

- J.R. Herskovic, **J.C. Goodwin**, P.A. Bozzo Silva, I. Willcockson, and A. Franklin. (2010) “Sequential incoherence in a multi-party synchronous computer mediated communication for an introductory Health Informatics course”, *2010 AMIA Annual Symposium*.

## POSTER ABSTRACTS

- **J.C. Goodwin** and D.J. Russomanno. (2006, Poster) “An Ontology-Based Sensor Network Prototype Environment,” *Fifth International Conference on Information Processing in Sensor Networks*, Nashville, TN. **(Cited > 20 times)**
- **Goodwin, J.C.**, Johnson, T.R., Zhang, J., Li, Z., & Okafor, N. (2009). Development of a multi-agent simulation of a level-one trauma center. *2009 Annual AMIA Symposium*. San Francisco, California, November.
- Li, Z., **Goodwin, J.C.**, Liu, Y., & Zhang, J. (2009). Towards a Ontological Model of the Emergency Department Work Domain. *2009 Annual AMIA Symposium*. San Francisco, California, November.
- **J.C. Goodwin**, J. Herskovic, and T.R. Johnson. (2010). Application of Associative Memory Theory to Biomedical Document Retrieval. *AMIA 2010 Annual Symposium*.
- Kookal, K., **Goodwin, J.C.**, Saitwal, H., Johnson, T.R., Walji, M., and Mirhaji, P. (2010). Enabling Semantic Query of Medication Data within the i2b2 Framework. *2010 Annual AMIA Symposium*.