

# J. Caleb Goodwin

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## RESEARCH INTERESTS

Cognitive information retrieval, Complexity Science, Artificial Intelligence, Biomedical Informatics, Semantic Web, and Cognitive Science

## EDUCATION

### University of Texas Health Science Center:

#### School of Health Informatics                      Houston, Texas

Philosophy of Science in Health Information Science                      August 2008 - Present

Keck Fellow

Advisor: Dr. Todd R. Johnson

Current GPA 4.0

#### The University of Memphis                      Memphis, Tennessee

Masters of Science in Electrical Engineering                      August 2007

Focus in computer science and intelligent systems

Advisor: David J. Russomanno

GPA: 3.81

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

#### The University of Memphis                      Memphis, Tennessee

Bachelor of Science in Computer Engineering                      December 2005

GPA: 3.68

Graduated Magna Cum Laude

## OTHER EDUCATION

- 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

## PROFESSIONAL WORK EXPERIENCE

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

Houston, Texas

*Keck Fellow, Graduate Research Assistant: Cognitive Information Retrieval*

June 2009-Present

- The goal of the research is to develop a human-centered framework for information retrieval based on human long-term declarative memory retrieval. The research is being conducted under the supervision of Dr. Todd R. Johnson.
- A prototype is under development that utilizes the ACT-R cognitive architecture. The prototype includes several domain specific ontologies as well as the ICD-9 taxonomy. The current goal is to experiment with clinical information retrieval using spreading activation for contextual search based on meaning.

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

Houston, Texas

*Keck Fellow, Graduate Research Assistant: Cognitive Informatics Laboratory*

August 2008-Present

- The goal of the research is to understand how the systemic behavior of emergency care gives rise to the emergent property medical error. The research is conducted under the supervision of Dr. Todd R. Johnson and Dr. Jiajie Zhang.
- Developing test bed multi-agent simulation in Repast Symphony IDE to allow for investigation of systemic effect of resource allocation and triage strategies.

**United Space Alliance****Houston, Texas**Engineering Staff: Primary Avionics System Software Development

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: Center for Advanced Sensors

August 2005-August 2007

- Research funded by the Army Research Labs, Office of Naval Research, and Army Night Vision Labs for 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.
- Published one book chapter, one journal paper, one conference paper, and one poster paper in the domain of the Semantic Web.

**The University of Memphis****Memphis, Tennessee**Graduate Research Assistant: Data Visualization in High School Pedagogy

May 2005-August 2007

- National Science Foundation funded interdisciplinary workshop 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 White Station High School physics teachers in the classroom using TCL/TK and the Visualization Toolkit (VTK).
- Published one journal paper and one conference paper in the domain of incorporating scientific visualization in science focused high-school outreach programs.

**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.
- Published one journal paper and one conference paper in the domain of defibrillator visualization and simulation.

**The University of Memphis****Memphis, Tennessee**Graduate Research Assistant: Anti Rocket Propelled Grenade System for HUMV

May 2005-August 2005

- Developed TCP-IP system component communication software using socket programming for a HUMV Anti-RPG system for the Army Night Vision Lab. Research conducted under the supervision of Dr. Aaron Robinson.

## PROFESSIONAL ACTIVITIES

- Reviewer for International Journal of Computer Science Issues 2009 – Present
- Teaching assistant for Foundations of Health Information Sciences I Summer 09 – Present
- Member of American Medical Informatics Association
- Member of Houston Human Factors Society
- 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

- Awarded Keck Fellowship from Gulf Coast Consortia August 2008 – Present
- 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: Semantic web, artificial intelligence, data visualization, human-centered design, software engineering, object-oriented design

Languages: C++, C, TCL/TK, Prolog, JAVA, XML, RDF, OWL, UML 2.0, xUML (Executable UML)

Database: MySQL, PostgreSQL, Oracle

Software: ACT-R, Repast Symphony, WEKA, SWI Prolog, Protégé, Matlab, Simulink, Telelogic Rhapsody, Rational Rose, Visual Studio 6.0, Kennedy Carter iUML, Eclipse IDE

Technologies: Web Services, Service-Oriented Architectures

Toolkits: Visualization Toolkit (VTK), ACE TCP/UDP socket toolkit

## SAMPLE COURSEWORK

Topics in Data Mining (Graduate)

Artificial Intelligence (Graduate)

Computational Modeling of Cognitive Processes (Graduate)

Foundations of Biomedical Informatics II (Graduate, Artificial Intelligence and modeling)

Computational Intelligence EE (Graduate, Machine Learning)

Biostatistics I (Graduate)

Social Dynamics (Graduate)

Knowledge and Information Representation in Health Informatics (Graduate)

Expert Systems (Graduate)

Introduction to Artificial Intelligence (Undergraduate)

Human Computer Interaction (Graduate)

Human Factors in Health Care (Graduate)

Probability I (Undergraduate)

Computational Intelligence CS (Graduate, Neural Networks and Fuzzy Logic)

Linear Systems Analysis (Graduate)

Data Visualization (Undergraduate)

## 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*.

### 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*.

### PEER REVIEWED 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.
- **Goodwin, J.C.**, Johnson, T.R., Zhang, J., Li, Z., & Okafor, N. Development of a multi-agent simulation of a level-one trauma center. 2009 Annual AMIA Symposium. San Francisco, California, November, 2009.
- Li, Z., **Goodwin, J.C.**, Liu, Y., & Zhang, J. Towards a Ontological Model of the Emergency Department Work Domain. 2009 Annual AMIA Symposium. San Francisco, California, November, 2009.

### STUDENT CONFERENCE AND PRESENTATIONS

- **J.C. Goodwin**, Jiajie Zhang, and Todd R. Johnson. (2008, Poster Abstract) "Modeling Emergency Care as a Complex Adaptive System: Implications for Quality Improvement," *Keck Annual Research Conference 2008*, Houston, TX.
- **J.C. Goodwin**, Jiajie Zhang, and Todd R. Johnson. (2008, Poster Abstract) "Modeling Emergency Care as a Complex Adaptive System," *University of Texas Health Science Center Annual Research Day 2008*, Houston, TX.
- **Goodwin, J.C.**, Johnson, T.R., Zhang, J., & Okafor, N. Emergency care as a complex adaptive system: Implications for quality improvement. 2009 15<sup>th</sup> Annual NRSA Trainees Conference. Chicago, Illinois, June, 2009.

## REFERENCES AVAILABLE UPON REQUEST