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Education

Carnegie Mellon University, Pittsburgh, PA, 1984-1991
Ph.D., Computer Science, May 1991

Carnegie Mellon University, Pittsburgh, PA, 1984-1988
M.S., Computer Science, May 1988

Syracuse University, Syracuse, NY, 1980-1984
B.S., Computer Science with Honors, May 1984

Research & Administrative Positions

Keston Executive Director, Information Sciences Institute, April 2020 – present
Interim Keston Executive Director, Information Sciences Institute, June 2018 – April 2020
Division Director, Intelligent Systems Division, October 2017 – June 2018
Research Director, Center on Knowledge Graphs, June 2010 – June 2018
Senior Project Leader, May 2001 – June 2010
Project Leader, May 1997 – May 2001
Senior Research Scientist, August 1991 – May 1997
Information Sciences Institute
University of Southern California

Research Professor, April 2006 – present
Research Associate Professor, November 1998 – March 2006
Research Assistant Professor, September 1991 – November 1998
Computer Science Department
University of Southern California

Research Professor, January 2014 – present
Affiliated Faculty Member, 2010 – January 2014
Spatial Sciences Institute
University of Southern California

Vice Dean of Engineering, April 2020 – present
Viterbi School of Engineering
University of Southern California

Director of Data Science Program, November 2018 – April 2020
Associate Director of Data Informatics, October 2014 – November 2018
University of Southern California

Key Investigator, September 1996 – September 2007

Integrated Media Systems Center
University of Southern California

Cofounder & Chief Scientist, November 1999 – December 2010

Fetch Technologies, Inc.

Acquired by Connotate, Inc. in December, 2011

Strategic Advisor, June 2012 – July 2014

Cofounder & Chief Scientist, November 2004 – June 2012

Geosemble Technologies, Inc.

Acquired by TerraGo Technologies in June 2012

Research Interests

Research focus: Techniques for describing, acquiring, and exploiting the semantics of data: source modeling, schema alignment, ontology alignment, entity linking, data cleaning, information extraction, web data extraction, and combining all of these techniques to create linked data and build knowledge graphs.

Teaching Experience

- **DSCI 558: Building Knowledge Graphs**
Taught jointly with Professor Jay Pujara, University of Southern California, Spring 2021
- **Short course on Building Knowledge Graphs**
BigDat 2020: 6th International Winter School on Big Data, Ancona, Italy, Jan 2020
- **Short course on Building Knowledge Graphs**
BigDat 2019: 5th International Winter School on Big Data, Cambridge, United Kingdom, Jan 2019
- **INF 558: Building Knowledge Graphs**
Taught jointly with Professor Pedro Szekely, University of Southern California, Fall 2017
- **CSCI 548: Information Integration on the Web**
Two sections taught jointly with Professor Pedro Szekely, University of Southern California, Fall 2015
- **CSCI 648: Advanced Information Integration**
Taught jointly with Professor Jose Luis Ambite, University of Southern California, Spring 2015
- **CSCI 548: Information Integration on the Web**
Taught jointly with Professor Jose Luis Ambite, University of Southern California, Spring 2015
- **CSCI 548: Information Integration on the Web**
Two sections taught jointly with Professor Pedro Szekely, University of Southern California, Fall 2014
- **CSCI 599: Geospatial Data Integration**
Taught jointly with Professor Yao-Yi Chiang, University of Southern California, Spring 2014.
- **CSCI 548: Information Integration on the Web**
Taught jointly with Professor Pedro Szekely, University of Southern California, Fall 2013.
- **CSCI 548: Information Integration on the Web**
Taught jointly with Professors Pedro Szekely and Jose Luis Ambite, University of Southern California, Spring 2012.
- **CSCI 599: Geospatial Data Integration**
University of Southern California, Spring 2011.
- **Geospatial Data Integration**
University of Trento, Italy, July 2010.
- **CSCI 548: Information Integration on the Web**
Taught jointly with Professor Kristina Lerman, University of Southern California, Spring 2010.

- **CSCI 548: Information Integration on the Web**
Taught jointly with Professor Kristina Lerman, University of Southern California, Spring 2009.
- **CSCI 548: Information Integration on the Web**
University of Southern California, Spring 2008.
- **CSCI 548: Information Integration on the Web**
University of Southern California, Fall 2006.
- **CSCI 548: Information Integration on the Web**
University of Southern California, Spring 2005.
- **CSCI 548: Information Integration on the Web**
University of Southern California, Spring 2004.
- **CSCI 599: Information Integration on the Web**
University of Southern California, Spring 2003.
- **CSCI 599: Information Integration on the Web**
University of Southern California, Spring 2002.
- **CSCI 541: Artificial Intelligence Planning**
Taught jointly with Dr. James Blythe, University of Southern California, Fall 1998.
- **CSCI 541: Artificial Intelligence Planning**
Taught jointly with Dr. Yolanda Gil, University of Southern California, Fall 1996.
- **CSCI 599: AI Planning Systems**
Taught jointly with Dr. Steve Chien, University of Southern California, Fall 1992.

Honors and Awards

- **AAIA Fellow**, Asia-Pacific Artificial Intelligence Association (AAIA), 2021.
- **IEEE Fellow**, Institute of Electrical and Electronics Engineers (IEEE), 2020.
- **Outstanding Engineering Merit Award**, Orange County Engineering Council, 2020
- **Use-Inspired Research Award**, USC Viterbi School of Engineering, 2018.
- **Donald E. Walker Distinguished Service Award**, IJCAI, 2018.
- **ACM Fellow**, Association of Computing Machinery (ACM), 2017.
- **IAPR Best Paper Prize**, 2017.
Extracting Human Settlement Footprint from Historical Topographic Map Series Using Context-Based Machine Learning
Johannes H. Uhl, Stefan Leyk, Yao-Yi Chiang, Weiwei Duan, and Craig A. Knoblock
8th International Conference on Pattern Recognition Systems (ICPRS-17).
- **Best Research Paper Award**, 2016.
Unsupervised entity resolution on multi-type graphs. Linhong Zhu, Majid Ghasemi-Gol, Pedro Szekely, Aram Galstyan, and Craig A. Knoblock. International Semantic Web Conference (ISWC).
- **Best In-Use Paper Award**, 2015.
Building and using a knowledge graph to combat human trafficking
Pedro Szekely, Craig A. Knoblock, et al.
14th International Semantic Web Conference (ISWC 2015).
- **Robert S. Engelmore Memorial Lecture Award**, 2014.
- **Finalist, 2nd LinkedUp Competition**, 2014
LODStories: Learning About Art by Building Multimedia Stories
Jianliang Chen, Yuting Liu, Dipanwita Maulik, Linda Xu, Hao Zhang, Craig A. Knoblock, Pedro Szekely and Miel Vander Sande.

- **Best In-Use Paper Award**, 2013.
Connecting the Smithsonian American Art Museum to the linked data cloud
Pedro Szekely, Craig A. Knoblock, Fengyu Yang, Xuming Zhu, Eleanor Fink, Rachel Allen, and Georgina Goodlander
Extended Semantic Web Conference (ESWC).
- **Best Research Paper Award**, 2012.
Discovering concept coverings in ontologies of linked data sources
Rahul Parundekar, Craig A. Knoblock, and Jose Luis Ambite
International Semantic Web Conference (ISWC).
- **Distinguished Scientist**, Association of Computing Machinery (ACM), 2008.
- **Fellow**, Association for the Advancement of Artificial Intelligence (AAAI), 2004.
- **Best Paper Award**, IEEE/WIC International Conference on Web Intelligence (WI 2003).
- **Meritorious Service Award**, Information Sciences Institute, 1999.
- **Teaching Fellowship**, Information Sciences Institute, Fall, 1996.
- **Best Paper Award**, Canadian Artificial Intelligence Conference, 1994.
- **Graduate Fellowship**, Air Force Laboratory, 1987-1991.
- **Class Scholar**, Syracuse University, 1984.
- **Upper Division Honors**, Syracuse University, 1984.
- **Lower Division Honors**, Syracuse University, 1982.
- **Regents Scholarship**, New York State, 1980-1984.

Invited Talks

- **Acquiring and Exploiting the Semantics of Data**
Invited talk at the Open Data Science Conference (ODSC) West, Online & San Francisco, CA, Nov 18, 2021.
- **Building Knowledge Graphs to Solve Societal Problems: Applications, Challenges, and Solutions**
Keynote talk at the International Conference on Computing and Data Science, Online, August 2, 2020
- **Building Knowledge Graphs from Online Sources to Solve Societal Problems**
Keynote talk at The Web Conference Workshop on Linked Data on the Web and its Relationship with Distributed Ledgers (LDOW/LDDL), San Francisco, CA, May 13, 2019
- **Building Knowledge Graphs for Cyber Security**
Plenary talk at the AAAI Workshop on Artificial Intelligence for Cyber Security, Honolulu, Hawaii, Jan 27, 2019
- **Mining Data from the Deep and Dark Web to Combat the Illicit Art Trade**
Plenary talk at EuroMed 2018: International Conference on Digital Heritage, Nicosia, Cyprus, October 29, 2018
- **From Artwork to Cyber Attacks: Lessons Learned in Building Knowledge Graphs using Semantic Web Technologies**
Plenary talk at the U.S. Semantic Technologies Symposium, March 1, 2018
Invited talk at the University of Trento, Trento, Italy, April 18, 2018
- **Learning to Adapt to Sensor Changes and Failures**
Plenary talk at the IJCAI Workshop on AI for Internet of Things, August 19, 2017
- **Extracting, Aligning, and Linking Data to Build Knowledge Graphs**
Plenary talk at the 1st International Workshop on Industrial Knowledge Graphs, June 25, 2017

- **Lessons Learned in Building Human-Aware Systems for Data Science**
Invited talk at the AAAI Workshop on Human-Aware AI, February 4, 2017
- **Aligning and Integrating Data for Building Knowledge Graphs**
IC Academic Research Symposium, September 22, 2016
- **Creating Linked Knowledge for Cities**
AAAI Workshop on AI for Cities, January 25, 2015
- **Creating and Using Linked Knowledge**
Robert S. Englemore Memorial Lecture Award, IAAI, July 29, 2014
AI2, Seattle, Wa, July 2, 2014
University of Texas at Austin, June 10, 2014
- **Data Integration for Big Data**
Huawei Strategy and Technology Workshop, May 13, 2013
- **The Role of Semantics in Big Data Integration**
2013 Semantic Technology & Business Conference, June 4, 2013
- **Learning Semantics of Sources for Big Data Integration**
Invited talk at the University of Nebraska at Lincoln, March 27, 2013
Invited talk at the University of Nebraska at Omaha, March 28, 2013
- **Challenges to the Success of Linked Open Data** Invited talk at the Planet Data Roadmapping Workshop at the 2012 Extended Semantic Web Conference, May 30, 2012.
- **Harvesting Named Geographic Features from Raster Maps**
Invited talk at GeoINT 2011 Symposium Interoperability Tech Talks, San Antonio, TX, Oct 18, 2011.
- **Interactive Information Integration for Network Extraction, Discovery, and Analysis**
Invited talk at the Technology Visions for Network Extraction, Discovery, and Analysis Workshop, Vernon, NY, Sept 21, 2011.
- **A General Approach to Discovering, Registering, and Extracting Features from Raster Maps**
Invited talk at the University of California, Santa Barbara, CA, February 3, 2011
Invited talk at Syracuse University, Syracuse, NY, October 6, 2010
Invited talk at Google, Inc., Mountain View, CA, August 25, 2010
- **A Reference-Set Approach to Information Extraction from Unstructured, Ungrammatical Data Sources**
Invited talk at the University of Washington, Seattle, WA, January 21, 2011
Invited talk at the University of Lugano, Lugano, Switzerland, July 12, 2010
- **Building Semantic Descriptions of Linked Data**
Invited talk at the 1st International Workshop on Consuming Linked Data (COLD 2010) at the International Semantic Web Conference, 2010.
Shanghai, China, November 8, 2010
- **Interactively Building Geospatial Mashups**
Keynote talk at the 2nd International Workshop on New Trends in Information Integration
Long Beach, CA, March 5, 2010
- **A General Approach to Discovering, Registering, and Extracting Features from Raster Maps**
Invited talk at the Conference on Document Recognition and Retrieval of the IS&T/SPIE 19th Annual Symposium International Symposium on Electronic Imaging
San Jose, CA, January 20, 2010
- **Geospatial Data Integration for High-level Fusion**
Invited talk at the ONR Workshop Panel on Directions for Higher-Level Fusion Research: Needs and Capabilities
Seattle, WA, July 6, 2009

- **Discovering and Building Semantic Models of Web Sources**
Keynote address at 6th Annual European Semantic Web Conference (ESWC2009)
Heraklion, Greece, June 3, 2009
- **Web-based Learning**
Invited talk at the AFRL Next Generation Reasoning and Learning: Theory and Applications Workshop
Vernon, NY, May 27, 2009
- **Exploiting Open Source Data for Imagery Understanding**
Invited talk at NRO Tech Seminar
Chantilly, VA, February 20, 2009
- **Automatically Discovering, Extracting and Modeling Web Sources for Information Integration**
Invited talk at Universita degli Studi di Genova
Genoa, Italy, December 15, 2008
- **Building Mashups by Example**
Invited talk at Microsoft Research
Bellevue, WA, August 1, 2008
- **Finding, Extracting, and Integrating Data from Maps**
Invited talk at University of Nebraska
Lincoln CSE Colloquium Series, November 29, 2007.
- **Beyond the Elves: Making Intelligent Agents Intelligent**
Invited talk at AAAI Spring Symposium on What Went Wrong and Why
Palo Alto, CA, March 28, 2006
- **Learning to Optimize Plan Execution in Information Agents**
Plenary talk at the 6th International Conference on Case-Based Reasoning (ICCBR 2005)
Chicago, IL, USA, August 25, 2005
- **Mining Data from Online and Geospatial Information Sources**
Invited talk at National Geospatial Intelligence Agency (Oct 19, 2004), Central Intelligence Agency (Oct 19, 2004), National Security Agency (Oct 20, 2004)
- **Building Software Agents for Planning, Monitoring, and Optimizing Travel**
Plenary talk at the Eleventh International Conference On Information Technology and Travel & Tourism
Cairo, Egypt, January, 26, 2004
- **Deploying Information Agents on the Web**
Plenary talk at the International Joint Conference on Artificial Intelligence (IJCAI-03)
Acapulco, Mexico, August 15, 2003
- **Integrating Online and Geospatial Information Sources**
Plenary talk at the Summer Assembly of the University Consortium for Geographic Information Science
Monterey, CA, June 17, 2003
- **Information Integration on the Web**
Invited talk at the Planet 2002 Summer School on Planning on the Web, September 2002
- **Exploring Real World Planning**
Invited talk at the AIPS 2002 Workshop, April, 2002
- **Electronic Commerce in the Information Industries**
Invited talk at The 36th Annual Graduate School of Library and Information Science Clinic, April 2-4, 2000
- **Abstraction and Hierarchy in Reinforcement Learning**
Invited talk at NIPS-98 workshop, 1998

Professional Activities

Elected Positions

- **Past President**, International Joint Conferences on Artificial Intelligence, 2013-2015.
- **President**, International Joint Conferences on Artificial Intelligence, 2011-2013.
- **Trustee**, International Joint Conference on Artificial Intelligence, 2007-2015.
- **President**, International Conference on Automated Planning and Scheduling, 2006-2008.
- **President-Elect**, International Conference on Automated Planning and Scheduling, 2004-2006.
- **Treasurer**, Executive Council of the International Conference on Automated Planning and Scheduling, 2002-2004.
- **Executive Council Member**, AAAI, 2001-2004.

2021

- **Co-Organizer**, IJCAI Workshop on Applied Semantic Extraction and Analytics (ASEA 2021), 2021
- **Program Committee**, IJCKG, 2021
- **Program Committee, In-Use Track**, International Semantic Web Conference, 2021
- **Steering Committee**, IEEE Transactions on Artificial Intelligence, 2021
- **Associate Editor**, Spatial Algorithms and Systems, 2021
- **Editorial Board**, Data Journal, 2021
- **Advisory Board Member**, ACM Transactions on Intelligent Systems and Technology, 2021
- **Publication Committee**, AAAI Press, 2021
- **Finance Committee**, IJCAI Inc., 2021

2020

- **Area Chair**, AAAI 2021
- **Program Committee**, 24th European Conference on Artificial Intelligence (ECAI 2020), 2020
- **Steering Committee**, IEEE Transactions on Artificial Intelligence, 2020
- **Associate Editor**, Spatial Algorithms and Systems, 2020
- **Editorial Board**, Data Journal, 2020
- **Advisory Board Member**, ACM Transactions on Intelligent Systems and Technology, 2020
- **Publication Committee**, AAAI Press, 2020
- **Finance Committee**, IJCAI Inc., 2020

2019

- **Program Committee, Journal Track**, International Semantic Web Conference, 2019
- **Program Committee, In-Use Track**, International Semantic Web Conference, 2019
- **Program Committee**, WWW 2019 Workshop on Knowledge Graph Technology and Applications
- **Associate Editor**, Spatial Algorithms and Systems, 2019
- **Editorial Board**, Data Journal, 2019
- **Advisory Board Member**, ACM Transactions on Intelligent Systems and Technology, 2019
- **Publication Committee**, AAAI Press, 2019
- **Finance Committee**, IJCAI Inc., 2019

2018

- **Organizer**, Workshop on Knowledge Base Construction, Reasoning and Mining, 2018
- **Program Committee, In-Use Track**, International Semantic Web Conference, 2018
- **Program Committee**, 2nd Workshop on Enabling Open Semantic Science, 2018
- **Associate Editor**, Spatial Algorithms and Systems, 2018
- **Advisory Board Member**, ACM Transactions on Intelligent Systems and Technology, 2018
- **Publication Committee**, AAAI Press, 2018
- **Finance Committee**, IJCAI Inc., 2018

2017

- **Senior Program Committee**, AAAI 2017.
- **Senior Program Committee, Research Track**, International Semantic Web Conference, 2017
- **Program Committee, In-Use Track**, International Semantic Web Conference, 2017
- **Program Committee**, Extended Semantic Web Conference, 2017
- **Program Committee**, WWW 2017 Special Track on Semantics and Knowledge, 2017
- **Program Committee**, 1st International Workshop on Industrial Knowledge Graphs, 2017
- **Program Committee**, 1st Workshop on Enabling Open Semantic Science, 2017
- **Associate Editor**, Spatial Algorithms and Systems, 2017
- **Advisory Board Member**, ACM Transactions on Intelligent Systems and Technology, 2017
- **Publication Committee**, AAAI Press, 2017
- **Finance Committee**, IJCAI Inc., 2017

2016

- **Senior Program Committee**, IJCAI 2016
- **Senior Program Committee**, AAAI 2016
- **Program Committee**, Extended Semantic Web Conference, 2016
- **Program Committee**, International Semantic Web Conference, 2016
- **Program Committee**, 15th International Semantic Web Conference Applications Track

- **Program Co-Chair**, 5th Workshop on Knowledge Discovery and Data Mining meets Linked Open Data, 2016
- **Program Committee**, Workshop on Linked Data for Information Extraction, 2016.
- **Associate Editor**, Artificial Intelligence, 2009-2016
- **Associate Editor**, Spatial Algorithms and Systems, 2015-2016
- **Advisory Board Member**, ACM Transactions on Intelligent Systems and Technology, 2016
- **Publication Committee**, AAAI Press, 2016.
- **Finance Committee**, IJCAI Inc., 2016

2015

- **Senior Program Committee**, Conference on Artificial Intelligence, AI & the Web Track, 2015
- **Program Committee**, Workshop on Linked Data for Information Extraction, 2015.
- **Program Committee**, 11th International Conference on Data Integration in the Life Sciences, 2015.
- **Program Committee**, ISWC 5th International Workshop on Linked Science 2015.
- **Associate Editor**, *Artificial Intelligence*, 2009-2016
- **Associate Editor**, *Spatial Algorithms and Systems*, 2015-2016
- **Editorial Board Member**, *Journal of Web Semantics*, 2010-2015.
- **Advisory Board Member**, *ACM Transactions on Intelligent Systems and Technology*, 2015.
- **Editorial Board Member**, *AAAI Press*, 2015.

2014

- **Program Chair**, International Semantic Web Conference, In-Use Track, 2014
- **Program Committee**, Conference on Artificial Intelligence (AAAI), 2014
- **Program Committee**, AAI Workshop on Discovery Informatics: Scientific Discoveries Enabled by AI, 2014.
- **Program Committee**, Workshop on Linked Data for Information Extraction, 2014. .
- **Student Travel Award Committee**, ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems, 2014.
- **Associate Editor**, *Artificial Intelligence*, 2009-2015
- **Editorial Board Member**, *Journal of Web Semantics*, 2010-2015.
- **Advisory Board Member**, *ACM Transactions on Intelligent Systems and Technology*, 2014.
- **Editorial Board Member**, *Journal on Foundations and Trends in Web Science*, 2014.
- **Editorial Board Member**, *AAAI Press*, 2014.

2013

- **Conference Co-Chair**, ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems, 2013.
- **Senior Program Committee Member**, Conference on Artificial Intelligence, AI & the Web Track, 2013
- **Program Committee**, AAI 2013 Workshop on Semantic Cities.
- **Organizing Committee**, Tenth International Workshop on Information Integration on the Web (IIWeb 2013).
- **Program Committee**, 4th International Workshop on Consuming Linked Data, 2013.
- **Program Committee**, Extended Semantic Web Conference, Tutorials, 2013.
- **Program Committee**, Workshop on Linked Data for Information Extraction, 2013.
- **Program Committee**, ISWC 3rd Workshop on Linked Science 2013
- **Program Committee**, Semantics For Big Data, AAI Fall Symposium 2013
- **Associate Editor**, *Artificial Intelligence*, 2009-2015
- **Editorial Board Member**, *Journal of Web Semantics*, 2010-2013.
- **Advisory Board Member**, *ACM Transactions on Intelligent Systems and Technology*, 2013.

- **Editorial Board Member**, *Journal on Foundations and Trends in Web Science*, 2013.
- **Editorial Board Member**, *AAAI Press*, 2013.

2012

- **Conference Co-Chair**, ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems, 2012.
- **Workshop Chair**, Workshop at the Extended Semantic Web Conference on Linked APIs, 2012.
- **Area Chair**, Twenty-Sixth Conference on Artificial Intelligence, 2012.
- **Organizing Committee**, Computing Community Consortium Workshop on Spatial Computing, 2012
- **Steering Committee**, AAAI 2012 Workshop on Semantic Cities.
- **Organizing Committee**, Ninth International Workshop on Information Integration on the Web (IIWeb 2012).
- **Program Committee**, Extended Semantic Web Conference, 2012.
- **Program Committee**, International Semantic Web Conference, 2012.
- **Program Committee**, Workshop on Knowledge Discovery and Data Mining Meets Linked Open Data, 2012.
- **Associate Editor**, *Artificial Intelligence*, 2009-2012
- **Editorial Board Member**, *Journal of Web Semantics*, 2010-2013.
- **Advisory Board Member**, *ACM Transactions on Intelligent Systems and Technology*, 2012.
- **Editorial Board Member**, *Journal on Foundations and Trends in Web Science*, 2012.
- **Editorial Board Member**, *AAAI Press*, 2012.

2011

- **Conference Chair**, International Joint Conference on Artificial Intelligence, 2011
- **Associate Editor**, *Artificial Intelligence*, 2009-2012
- **Editorial Board Member**, *Journal of Web Semantics*, 2010-2013.
- **Advisory Board Member**, *ACM Transactions on Intelligent Systems and Technology*, 2011.
- **Editorial Board Member**, *Journal on Foundations and Trends in Web Science*, 2011.
- **Editorial Board Member**, *AAAI Press*, 2011.
- **Special Issue Editor**, *Journal of Web Semantics* on Dealing with the Messiness of the Web of Data, 2011.
- **Program Committee Member**, ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems, 2011.
- **Steering Committee**, IIWeb 2011 : Eighth International Workshop on Information Integration on the Web, 2011.

2010

- **Conference Chair**, International Joint Conference on Artificial Intelligence, 2011
- **Associate Editor**, *Artificial Intelligence*, 2009-2012
- **Advisory Board Member**, *ACM Transactions on Intelligent Systems and Technology*, 2010.
- **Editorial Board Member**, *Journal of Web Semantics*, 2010-2013.

- **Editorial Board Member**, *Journal on Foundations and Trends in Web Science*, 2010.
- **Editorial Board Member**, *AAAI Press*, 2010.
- **Senior Program Committee Member**, Twenty-Fourth Conference on Artificial Intelligence, AI & the Web Special Track, 2010.
- **Program Committee Member**, ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems, 2010.

2009

- **Conference Chair**, International Joint Conference on Artificial Intelligence, 2011
- **Co-organizer**, Workshop on Information Integration on the Web, 2009.
- **Associate Editor**, *Artificial Intelligence*, 2009-2012
- **Editorial Board Member**, *Journal on Foundations and Trends in Web Science*, 2009.
- **Editorial Board Member**, *AAAI Press*, 2009.
- **Senior Program Committee Member**, Conference on Intelligent User Interfaces, 2009.
- **Program Committee Member**, Twenty-Third Conference on Artificial Intelligence, AI & the Web Special Track, 2009.
- **Program Committee Member**, International Conference on GeoSpatial Semantics, 2009.
- **Program Committee Member**, ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems, 2009.

2008

- **Conference Chair**, International Joint Conference on Artificial Intelligence, 2011
- **Conference Co-Chair**, Twenty-Second Conference on Artificial Intelligence, AI & the Web Special Track, 2008.
- **Vice Chair**, International Semantic Web Conference, 2008.
- **Editorial Board Member**, *Journal on Foundations and Trends in Web Science*, 2008.
- **Editorial Board Member**, *AAAI Press*, 2008.
- **Senior Program Committee**, Conference on Intelligent User Interfaces, 2008.
- **Program Committee Member**, International Conference on Advances in Geographic Information Systems, 2008.
- **Program Committee Member**, Second Workshop on Analytics for Noisy Unstructured Text Data, 2008
- **Panel Member**, National Geospatial-Intelligence Agency Multi-Source, Multi-INT Fusion Panel, State College, PA, December 2-3, 2008.

2007

- **Conference Chair**, International Joint Conference on Artificial Intelligence, 2011
- **Senior Program Committee Member**, National Conference on Artificial Intelligence, 2007.
- **Editorial Board Member**, *Computational Intelligence*, 2005-2007.
- **Editorial Board Member**, *Journal on Foundations and Trends in Web Science*, 2007.
- **Editorial Board Member**, *AAAI Press*, 2005-2007.
- **Program Committee Member**, Workshop on Information Integration on the Web, 2007.

2006

- **Senior Program Committee Member**, International Joint Conference on Artificial Intelligence, 2007.
- **Senior Program Committee Member**, National Conference on Artificial Intelligence, 2006.
- **Co-organizer**, IJCAI 2007 Workshop on Analytics for Noisy Unstructured Text Data
- **Review Panel Member**, Marine Geosciences External Review of NRL's Battlespace Environments Technology S&T Program, Stennis, September 19-20, 2006.
- **Editorial Board Member**, *Computational Intelligence*, 2005-2007.
- **Editorial Board Member**, *Journal on Foundations and Trends in Web Science*, 2006.
- **Editorial Board Member**, *AAAI Press*, 2005-2007.
- **Program Committee Member**, Workshop on Information Integration on the Web, 2006.

2005

- **Participant**. National Academy of Sciences Workshop on Using Information Technology to Enhance Disaster Management, Washington, D.C., June 22-23, 2005.
- **Editorial Board Member**, *Computational Intelligence*, 2005-2007.
- **Founding Member**, Editorial Board for the *Journal on Foundations and Trends in Web Science*, 2005.
- **Editorial Board Member**, *AAAI Press*, 2005-2007.
- **Program Committee Member**, ACM Conference on Geospatial Information Science (ACM GIS), 2005.
- **Program Committee Member**, International Conference on Geospatial Semantics (GeoS), 2005.
- **Program Committee Member**, Workshop on Representation and Analysis of Web Space (RAWS-05), 2005.
- **Program Committee Member**, International Joint Conference on Artificial Intelligence, 2005.
- **Program Committee Member**, National Conference on Artificial Intelligence, 2005.
- **Program Committee Member**, International Conference on Automated Planning and Scheduling, 2005.
- **Editorial Board Member**, *IEEE Intelligent Systems*, 2005.

2004

- **Guest Editor**, Special issue of *IEEE Intelligent Systems* on Mining the Web, 19((6), November/December, 2004.
- **Senior Program Committee Member**, Semantic Web Conference, 2004
- **Senior Program Committee Member**, National Conference on Artificial Intelligence, 2004.
- **Program Committee Member**, International Conference on Automated Planning and Scheduling, 2004.
- **Program Committee Member**, 17th International FLAIRS Conference Special Track on AI and the Web, 2004.
- **Editorial Board Member**, *IEEE Intelligent Systems*, 2004.

2003

- **Guest Editor**, Special issue of *IEEE Intelligent Systems* on Information Integration on the Web, September, 2003.
- **Co-Chair**, IJCAI'03 Workshop on Information Integration on the Web, 2003.
- **Program Committee Member**, International Conference on Service Oriented Computing, 2003.
- **Program Committee Member**, KDD'03 Workshop on Data Cleaning, Record Linkage and Object Consolidation, 2003.
- **Program Committee Member**, ISWC'03 Semantic Integration Workshop.
- **Program Committee Member**, Conference on AI Planning and Scheduling, 2003.
- **Program Committee Member**, Conference on Innovative Applications of Artificial Intelligence, 2003
- **Editorial Board Member**, *IEEE Intelligent Systems*, 2003.

2002

- **Member**, Joint European-US Working Group on Information Extraction from Digital Libraries, 2002.
- **Member**, DARPA IXO panel study on Information Integration, 2002.
- **Panel Member**, Robotic, Intelligent and Information Systems Evaluation, Science and Technology Foundation, Ministry of Science and Technology, Portugal, February, 2002.
- **Program Committee Member**, Conference on Innovative Applications of Artificial Intelligence, 2002.
- **Program Committee Member**, Conference on AI Planning and Scheduling, 2002.
- **Program Committee Member**, National Conference on Artificial Intelligence, 2002.
- **Program Committee Member**, AIPS 2002 Workshop on Exploring Real-World Planning, 2002.
- **Editorial Board Member**, *IEEE Intelligent Systems*, 2002.

2001

- **Co-Chair**, NASA RIACS Panel on Information Management Requirements, 2001-2002.
- **Program Committee Member**, Conference on Innovation Applications of Artificial Intelligence, 2001.
- **Editorial Board Member**, *IEEE Intelligent Systems*, 2001.

2000

- **Program Co-Chair**, International Conference on AI Planning and Scheduling, 2000.
- **Senior Program Committee Member**, National Conference on Artificial Intelligence, 2000.
- **Editorial Board Member**, *IEEE Intelligent Systems*, 2000.

1999

- **Review Board Member**, Jet Propulsion Laboratory Annual Technology Program Review of the Telecommunications and Mission Operations Directorate (TMOD), 1999.
- **Reviewer**, International Joint Conference on Artificial Intelligence, 1999.
- **Publicity Chair**, Autonomous Agents, 1999.
- **Editorial Board Member**, *IEEE Intelligent Systems*, 1999.

1998

- **Senior Program Committee Member**, National Conference on Artificial Intelligence, 1998.
- **Co-organizer**, AAAI Workshop on AI and Information Integration at the Fourteenth National Conference on Artificial Intelligence, 1998.
- **Program Committee Member**, International Conference on Artificial Intelligence Planning Systems, 1998.
- **Program Committee Member**, International Conference on Autonomous Agents, 1998.
- **Editorial Board Member**, *IEEE Intelligent Systems*, 1998.

1997

- **Senior Program Committee Member**, National Conference on Artificial Intelligence, 1997.
- **Editor**, Department on Trends and Controversies for *IEEE Expert*, 1997.
- **Program Committee Member**, International Conference on Autonomous Agents, 1997.
- **Reviewer**, European Conference on Planning, 1997.
- **Editorial Board Member**, *IEEE Intelligent Systems*, 1997.
- **Editorial Board Member**, *Journal of Artificial Intelligence Research*, 1997.

1996

- **Editorial Board Member**, *Journal of Artificial Intelligence Research*, 1996.
- **Editor**, Department on Trends and Controversies for *IEEE Expert*, 1996.
- **Program Committee Member**, National Conference on Artificial Intelligence, 1996.
- **Reviewer**, International Conference on Artificial Intelligence Planning Systems, 1996.

1995

- **Editorial Board Member**, *Journal of Artificial Intelligence Research*, 1995.
- **Program Committee Member**, Conference on Artificial Intelligence Applications, 1995.
- **Program Committee Member**, Conference on Cooperative Information Systems, 1995.
- **Reviewer**, International Joint Conference on Artificial Intelligence, 1995.
- **Co-organizer**, AAAI Spring Symposium on Information Gathering from Distributed, Heterogeneous Environments, 1995.
- **Panel Member**, National Science Foundation proposal review panel, 1995.

1993

- **Reviewer**, International Joint Conference on Artificial Intelligence, 1993.

1992

- **Associate Chair**, Tenth National Conference on Artificial Intelligence, 1992.
- **Program Committee Member**, Conference on Principles of Knowledge Representation and Reasoning, 1992.

Journal Reviewer

- *Artificial Intelligence*
- *Constraints, An International Journal*
- *Machine Learning*
- *Journal of Artificial Intelligence Research*
- *Journal of the ACM*
- *Journal of Experimental and Theoretical Artificial Intelligence*
- *Journal of Web Semantics*
- *IEEE Transactions on Knowledge and Data Engineering*
- *IEEE Transactions on Pattern Analysis and Machine Intelligence*
- *IEEE Intelligent Systems*
- *International Journal of Cooperative Information Systems*
- *Theory and Practice of Object Systems*
- *World Wide Web Journal*

Graduated Students

- **Yuan Shi, 2019**
Learning to Adapt to Sensor Changes and Failures
Ph.d., Department of Computer Science, University of Southern California, 2019
- **Mohsen Taheriyan, 2015**
Learning the Semantics of Structured Data Sources
Ph.d., Department of Computer Science, University of Southern California, 2015
Current position: Research Scientist, Google
- **Bo Wu, 2015**
Iteratively Learning Data Transformation Programs from Examples
Ph.d., Department of Computer Science, University of Southern California, 2015
Current position: Yelp.com
- **Daniel W. Goldberg, 2010**
Spatial Approaches to Reducing Error in Geocoded Data
Ph.D., Department of Computer Science, University of Southern California, 2010
Jointly advised with Professor John Wilson
Current position: Assistant Professor, Texas A&M University, College Station
- **Yao-Yi Chiang, 2010**
Harvesting Geographic Features from Heterogeneous Raster Maps
Ph.D., Department of Computer Science, University of Southern California, 2010
Current position: Assistant Professor, Research, Spatial Sciences, University of Southern California
- **Matthew Michelson, 2009**
A Reference-set Approach to Information Extraction from Unstructured, Ungrammatical Data Sources
Ph.D., Department of Computer Science, University of Southern California, 2009
Current position: Researcher, Inferlink, Inc.
- **Martin Michalowski, 2008**
A General Approach to Using Problem Instance Data for Model Refinement in Constraint Satisfaction Problems
Ph.D., Department of Computer Science, University of Southern California, 2008
Current position: Assistant Professor, University of Minnesota

- **Rattapoom Tuchinda, 2008**
 Building Mashups by Example
 Ph.D., Department of Computer Science, University of Southern California, 2008
 Current position: National Electronics and Computer Technology Center, Thailand
- **Snehal Thakkar, 2007**
 A Data Integration Approach to Dynamically Fusing Geospatial Sources
 Ph.D., Department of Computer Science, University of Southern California, 2005
 Current position: Google, Inc.
- **Mark James Carman, 2006**
 Learning Semantic Definitions of Information Sources on the Internet
 Ph.D. Thesis, Department of Information and Communication Technology, University of Trento, 2006
 Current position: Associate Professor at Politecnico di Milano
- **Ching-Chien Chen, 2005**
 Automatically and Accurately Conflating Road Vector Data, Street Maps and Orthoimagery
 Ph.D., Department of Computer Science, University of Southern California, 2005
 Jointly advised with Professor Cyrus Shahabi
 Current position: Director of Research and Development, TerraGo Technologies
- **Matthew Michelson, 2005**
 Building Queryable Datasets from Ungrammatical and Unstructured Sources
 M.S., Department of Computer Science, University of Southern California, 2005
 Current position: Researcher, InferLink
- **Rahul Bakshi, 2004**
 Integrating and reasoning about online sources to accurately geocode addresses
 M.S., Department of Computer Science, University of Southern California, 2004
 Current position: Software Engineer, SiRF Technology
- **Greg Barish, 2003**
 Speculative Plan execution for information agents
 Ph.D., Department of Computer Science, University of Southern California, 2003
 Current position: Chief Technology Officer, InferLink
- **Sheila Tejada, 2002**
 Learning object identification rules for information integration
 Ph.D., Department of Computer Science, University of Southern California, 2002
 Current position: Lecturer, University of Southern California
- **Ion Alexandru Muslea, 2002**
 Active Learning with Multiple Views
 Ph.D., Department of Computer Science, University of Southern California, 2002
 Current position: Research Scientist, Amazon
- **Naveen Ashish, 2000**
 Optimizing information mediators by selectively materializing data
 Ph.D., Department of Computer Science, University of Southern California, 2000
 Current Position: Research Scientist, InferLink
- **Jose Luis Ambite, 1998**
 Planning by rewriting
 Ph.D., Department of Computer Science, University of Southern California, 1998
 Current Position: Research Lead and Research Associate Professor, Information Sciences Institute, University of Southern California
- **Chun-Nan Hsu, 1996**
 Learning effective and robust semantic knowledge for database query optimization
 Ph.D., Department of Computer Science, University of Southern California, 1996
 Current Position: Research Scientist, University of California at San Diego

Publications

Journal Articles

1. Yolanda Gil, Daniel Garijo, Deborah Khider, Craig A. Knoblock, Varun Ratnakar, Maximiliano Osorio, Hernan Vargas, Minh Pham, Jay Pujara, Basel Shbita, Binh Vu, Yao-Yi Chiang, Dan Feldman, Yijun Lin, Hayley Song, Vipin Kumar, Ankush Khandelwal, Michael Steinbach, Kshitij Tayal, Shaoming Xu, Suzanne A. Pierce, Lissa Pearson, Daniel Hardesty-Lewis, Ewa Deelman, Rafael Ferreira Da Silva, Rajiv Mayani, Armen R. Kemanian, Yuning Shi, Lorne Leonard, Scott Peckham, Maria Stoica, Kelly Cobourn, Zeya Zhang, Christopher Duffy, and Lele Shu. Artificial intelligence for modeling complex systems: Taming the complexity of expert models to improve decision making. *ACM Transactions on Interactive Intelligent Systems*, 11(2), July 2021.
2. Johannes H. Uhl, Stefan Leyk, Zekun Li, Weiwei Duan, Basel Shbita, Yao-Yi Chiang, and Craig A. Knoblock. Combining remote-sensing-derived data and historical maps for long-term back-casting of urban extents. *Remote Sensing*, 13(18), 2021.
3. Yuan Shi, Ang Li, T. K. Satish Kumar, and Craig A. Knoblock. Building survivable software systems by automatically adapting to sensor changes. *Applied Sciences*, 11(11), 2021.
4. Weiwei Duan, Yao-Yi Chiang, Stefan Leyk, Johannes H. Uhl, and Craig A. Knoblock. Automatic alignment of contemporary vector data and georeferenced historical maps using reinforcement learning. *International Journal of Geographical Information Science*, 34(4):824–849, 2020.
5. Avi Pfeffer, Curt Wu, Gerald Fry, Kenny Lu, Steve Marotta, Mike Reposo, Yuan Shi, TK Satish Kumar, Craig A Knoblock, David Parker, Irfan Muhammad, and Chris Novakovic. Software adaptation for an unmanned undersea vehicle. *IEEE Software*, 36(2):91–96, 2019.
6. Ying Zhang, Qunfei Ma, Yao-Yi Chiang, Craig Knoblock, Xin Zhang, Puhai Yang, Minghe Gao, and Xiang Hu. Extracting geographic features from the internet: A geographic information mining framework. *Knowledge-Based Systems*, 174:57–72, 2019.
7. Johannes H Uhl, Stefan Leyk, Yao-Yi Chiang, Weiwei Duan, and Craig A Knoblock. Automated extraction of human settlement patterns from historical topographic map series using weakly supervised convolutional neural networks. *IEEE Access*, 2019.
8. Weiwei Duan, Yao-Yi Chiang, Stefan Leyk, Johannes H Uhl, and Craig A Knoblock. Automatic alignment of contemporary vector data and georeferenced historical maps using reinforcement learning. *International Journal of Geographical Information Science*, pages 1–26, 2019.
9. Johannes H Uhl, Stefan Leyk, Yao-Yi Chiang, Weiwei Duan, and Craig A. Knoblock. Spatialising uncertainty in image segmentation using weakly supervised convolutional neural networks: a case study from historical map processing. *IET Image Processing*, 12(11):2084–2091, 2018.
10. Johannes H Uhl, Stefan Leyk, Yao-Yi Chiang, Weiwei Duan, and Craig A. Knoblock. Map archive mining: Visual-analytical approaches to explore large historical map collections. *ISPRS International Journal of Geo-Information*, 7(4):148, 2018.
11. Mohsen Taheriyani, Craig A. Knoblock, Pedro Szekely, and Jose Luis Ambite. Learning the semantics of structured data sources. *Journal of Web Semantics*, 37, 2016.
12. Pedro Szekely, Craig A. Knoblock, Fengyu Yang, Xuming Zhu, Eleanor Fink, Rachel Allen, and Georgina Goodlander. Publishing the data of the smithsonian american art museum to the linked data cloud. *International Journal of Humanities and Art Computing (IJHAC)*, 8:152–166, 2014.
13. Yao-Yi Chiang, Stefan Leyk, and Craig A. Knoblock. A survey of digital map processing techniques. *ACM Computing Surveys*, 47(1):1–44, 2014.
14. Yao-Yi Chiang and Craig A. Knoblock. Recognizing text in raster maps. *Geoinformatica*, pages 1–27, 2014. Published Online.
15. Yao-Yi Chiang and Craig A. Knoblock. A general approach for extracting road vector data from raster maps. *International Journal on Document Analysis and Recognition*, 16(1):55–81, 2013.

16. Yao-Yi Chiang and Craig A. Knoblock. A general approach for extracting road vector data from raster maps. *International Journal on Document Analysis and Recognition*, 2011.
17. Rattapoom Tuchinda, Craig A. Knoblock, and Pedro Szekely. Building mashups by demonstration. *ACM Transactions on the Web (TWEB)*, 5(3), July 2011. <http://dx.doi.org/10.1145/1993053.1993058>.
18. Aman Goel, Matthew Michelson, and Craig A. Knoblock. Harvesting maps on the web. *International Journal on Document Analysis and Recognition*, 2010. <http://dx.doi.org/10.1007/s10032-010-0136-2>.
19. Matthew Michelson and Craig A. Knoblock. Constructing reference sets from unstructured, ungrammatical text. *Journal of Artificial Intelligence Research*, 38:189–221, 2010.
20. Daniel W. Goldberg, John P. Wilson, and Craig A. Knoblock. Extracting geographic features from the internet to automatically build detailed regional gazetteers. *International Journal of Geographic Information Science*, 2009.
21. Yao-Yi Chiang, Craig A. Knoblock, Cyrus Shahabi, and Ching-Chien Chen. Automatic and accurate extraction of road intersections from raster maps. *Geoinformatica*, 2008. <http://dx.doi.org/10.1007/s10707-008-0046-3>.
22. Ching-Chien Chen, Craig A. Knoblock, and Cyrus Shahabi. Automatically and accurately conflating raster maps with orthoimagery. *Geoinformatica*, 12(3):377–410, 2008. <http://dx.doi.org/10.1007/s10707-007-0033-0>.
23. Jim Blythe, Dipsy Kapoor, Craig A. Knoblock, Kristina Lerman, and Steven Minton. Information integration for the masses. *Journal of Universal Computer Science*, 14(11):1811–1837, 2008.
24. Daniel W. Goldberg, John P. Wilson, Craig A. Knoblock, Beate Ritz, and Myles G Cockburn. An effective and efficient approach for manually improving geocoded data. *International Journal of Health Geographics*, 7(60), 2008. doi:10.1186/1476-072X-7-60.
25. Matthew Michelson and Craig A. Knoblock. Creating relational data from unstructured and ungrammatical data sources. *Journal of Artificial Intelligence Research (JAIR)*, 31:543–590, 2008.
26. Greg Barish and Craig A. Knoblock. Speculative plan execution for information gathering. *Artificial Intelligence*, 172(4-5):413–453, 2008. <http://dx.doi.org/10.1016/j.artint.2007.08.002>.
27. Craig A. Knoblock, Jose Luis Ambite, Kavita Ganesan, Maria Muslea, Steven Minton, Greg Barish, Evan Gamble, Claude Nanjo, Kane See, Cyrus Shahabi, , and Ching-Chien Chen. Entitybases: Compiling, organizing and querying massive entity repositories. In *International Conference on Artificial Intelligence (ICAI'07)*, Las Vegas, Nevada, USA, June 2007.
28. Matthew Michelson and Craig A. Knoblock. Unsupervised information extraction from unstructured, ungrammatical data sources on the world wide web. *International Journal of Document Analysis and Recognition (IJ DAR), Special Issue on Noisy Text Analytics*, 10(3-4):211–226, 2007.
29. Mark Carman and Craig A. Knoblock. Learning semantic definitions of online information sources. *Journal of Artificial Intelligence Research (JAIR)*, 30:1–50, 2007.
30. Kristina Lerman, Anon Plangprasopchok, and Craig A. Knoblock. Semantic labeling of online information sources. *International Journal on Semantic Web and Information Systems*, 3(3):36–56, 2007.
31. Daniel W. Goldberg, John P. Wilson, and Craig A. Knoblock. From text to geographic coordinates: The current state of geocoding. *Journal of the Urban and Regional Information Systems Association*, 19(1):33–46, 2007. <http://urisa.org/goldberg>.
32. Ching-Chien Chen, Craig A. Knoblock, and Cyrus Shahabi. Automatically conflating road vector data with orthoimagery. *Geoinformatica*, 10(4):495–530, December 2006.
33. Ion Muslea, Steve Minton, and Craig A. Knoblock. Active learning with multiple views. *Journal of Artificial Intelligence Research*, 27:203–233, 2006.
34. Shou de Lin and Craig A. Knoblock. Sergeant: A framework for building more flexible web agents by exploiting a search engine. *Web Intelligence and Agent Systems*, 3(1):1–15, 2005.
35. Greg Barish and Craig A. Knoblock. An expressive language and efficient execution system for software agents. *Journal of Artificial Intelligence Research*, 23:625–666, 2005.

36. Snehal Thakkar, Jose Luis Ambite, and Craig A. Knoblock. Composing, optimizing, and executing plans for bioinformatics web services. *VLDB Journal, Special Issue on Data Management, Analysis and Mining for Life Sciences*, 14(3):330–353, Sep 2005.
37. Kristina Lerman, Steven N. Minton, and Craig A. Knoblock. Wrapper maintenance: A machine learning approach. *Journal of Artificial Intelligence Research*, 18:149–181, 2003.
38. Naveen Ashish, Craig A. Knoblock, and Cyrus Shahabi. Selectively materializing data in mediators by analyzing user queries. *International Journal of Cooperative Information Systems*, 11(1), March, 2002.
39. Jose Luis Ambite and Craig A. Knoblock. Planning by rewriting. *Journal of Artificial Intelligence Research*, 15:207–261, 2001.
40. Sheila Tejada, Craig A. Knoblock, and Steven Minton. Learning object identification rules for information integration. *Information Systems*, 26(8), 2001.
41. Jose Luis Ambite, Craig A. Knoblock, Ion Muslea, and Andrew Philpot. Compiling source descriptions for efficient and flexible information integration. *Journal of Intelligent Information Systems*, 16(2):149–187, March 2001.
42. Craig A. Knoblock, Steven Minton, Jose Luis Ambite, Naveen Ashish, Ion Muslea, Andrew G. Philpot, and Sheila Tejada. The ariadne approach to web-based information integration. *International Journal of Cooperative Information Systems (IJCIS), Special Issue on Intelligent Information Agents: Theory and Applications*, 10(1/2):145–169, 2001.
43. Ion Muslea, Steven Minton, and Craig A. Knoblock. Hierarchical wrapper induction for semistructured information sources. *Autonomous Agents and Multi-Agent Systems*, 4(1/2), March 2001.
44. José Luis Ambite and Craig A. Knoblock. Flexible and scalable cost-based query planning in mediators: A transformational approach. *Artificial Intelligence Journal*, 118(1-2):115–161, April 2000.
45. Chun-Nan Hsu and Craig A. Knoblock. Semantic query optimization for query plans of heterogeneous multi-database systems. *IEEE Transactions on Knowledge and Data Engineering*, 12(6):959–978, November/December 2000.
46. Chun-Nan Hsu and Craig A. Knoblock. Discovering robust knowledge from databases that change. *Data Mining and Knowledge Discovery*, 2(1), 1997.
47. Yigal Arens, Craig A. Knoblock, and Wei-Min Shen. Query reformulation for dynamic information integration. *Journal of Intelligent Information Systems, Special Issue on Intelligent Information Integration*, 6(2/3):99-130, 1996.
48. Subbarao Kambhampati, Craig Knoblock, and Qiang Yang. Planning as refinement search: A unified framework for evaluating the design tradeoffs in partial order planning. *Artificial Intelligence*, 76(1-2), 1995.
49. Craig A. Knoblock. Automatically Generating Abstractions for Planning. *Artificial Intelligence*, 68(2), 1994.
50. Yigal Arens, Chin Y. Chee, Chun-Nan Hsu, and Craig A. Knoblock. Retrieving and integrating data from multiple information sources. *International Journal on Intelligent and Cooperative Information Systems*, 2(2):127-158, 1993.
51. Steven Minton, Jaime G. Carbonell, Craig A. Knoblock, Daniel R. Kuokka, Oren Etzioni, and Yolanda Gil. Explanation-based learning: A problem solving perspective. *Artificial Intelligence*, 40(1-3):63–118, 1989.

Books

1. Mayank Kejriwal, Craig A. Knoblock, and Pedro Szekely. Knowledge Graphs: Fundamentals, Techniques, and Applications. The MIT Press, Cambridge, MA, 2021.

2. Yao-Yi Chiang, Weiwei Duan, Stefan Leyk, Johannes Uhl, and Craig A. Knoblock. Using Historical Maps in Scientific Studies: Challenges and Best Practices. Springer International Publishing, 2020.
3. Craig A. Knoblock. Generating Abstraction Hierarchies. Kluwer Academic Publishers, Norwell, MA, 1993.

Book Chapters

1. Rahul Parundekar, Craig A. Knoblock, and Jose Luis Ambite. Aligning ontologies of linked data. In *Linked Data Management: Principles and Techniques*. CRC Press, 2014.
2. Yao-Yi Chiang, Stefan Leyk, and Craig A. Knoblock. Efficient and robust graphics recognition from historical maps. In *Graphics Recognition: Achievements, Challenges, and Evolution, Selected Papers of the 8th International Workshop on Graphics Recognition (GREC), Lecture Notes in Computer Science*. Springer, 2012.
3. Kristina Lerman and Craig A. Knoblock. Wrapper maintenance. In Ling Liu and M. Tamer Ozsü, editors, *Encyclopedia of Database Systems*. Springer, Leipzig, Germany, 2009.
4. Yao-Yi Chiang and Craig A. Knoblock. Extracting road vector data from raster maps. In *Graphics Recognition: Achievements, Challenges, and Evolution, Selected Papers of the 8th International Workshop on Graphics Recognition (GREC), Lecture Notes in Computer Science, 6020*, pages 93–105. Springer, New York, 2009.
5. Daniel W. Goldberg, John P. Wilson, and Craig A. Knoblock. Extracting geographic features from the internet to automatically build detailed regional gazetteers. *International Journal of Geographic Information Science*, 23(1):92–128, 2009.
6. Ching-Chien Chen and Craig A. Knoblock. Conflation of geospatial data. In Shashi Shekhar and Hui Xiong, editors, *Encyclopedia of Geospatial Information Science*, pages 133–140. Springer, Leipzig, Germany, 2008. http://dx.doi.org/10.1007/978-0-387-35973-1_182.
7. Kristina Lerman and Craig A. Knoblock. Wrapper maintenance. In Ling Liu and M. Tamer Ozsü, editors, *Encyclopedia of Database Systems*. Springer, Leipzig, Germany, 2008.
8. Craig A. Knoblock and Cyrus Shahabi. Geospatial data integration. In John Wilson and A. Stewart Fotheringham, editors, *The Handbook of Geographic Information Science*. Wiley-Blackwell, 2007. ISBN: 978-1-4051-0796-9.
9. Mehdi Sharifzadeh, Cyrus Shahabi, and Craig A. Knoblock. Learning approximate thematic maps from labeled geospatial data. In Peggy Agouris and Arie Croitoru, editors, *Next Generation Geospatial Information: From Digital Image Analysis to SpatioTemporal Databases*, pages 129–141. A.A. Balkema Publishers, New York, 2005.
10. José Luis Ambite, Craig A. Knoblock, and Steve Minton. Plan optimization by plan rewriting. In Ioannis Vlahavas and Dimitris Vrakas, editors, *Intelligent Techniques for Planning*, pages 121–161. Idea Group Publishing, Hershey, PA, 2005.
11. Kristina Lerman, Steven N. Minton, and Craig A. Knoblock. Machine learning techniques for web wrapper maintenance. In Goran D. Putnik and Maria Manuela Cunha, editors, *Virtual Enterprise Integration: Technological and Organizational Perspectives*, pages 334–350. Idea Group Publishing, Hershey, PA, 2005.
12. Craig A. Knoblock, Kristina Lerman, Steven Minton, and Ion Muslea. Accurately and reliably extracting data from the web: A machine learning approach. In Piotr S. Szczepaniak, Javier Segovia, Janusz Kacprzyk, and Lotfi A. Zadeh, editors, *Intelligent Exploration of the Web*, pages 275–287. Springer-Verlag, Berkeley, CA, 2003.
13. Yigal Arens, Craig A. Knoblock, and Chun-Nan Hsu. Query processing in the sims information mediator. In Michael N. Huns and Munindar P. Singh, editors, *Readings in Agents*. Morgan Kaufmann, San Francisco, CA, 1998.

14. Craig A. Knoblock and Jose-Luis Ambite. Agents for information gathering. In J. Bradshaw, editor, *Software Agents*. AAAI/MIT Press, Menlo Park, CA, 1997.
15. Yigal Arens, Craig A. Knoblock, and Wei-Min Shen. Query reformulation for dynamic information integration. In Gio Wiederhold, editor, *Intelligent Integration of Information*. Kluwer Academic Publishers, Boston, MA, 1996.
16. Yigal Arens, Craig A. Knoblock, and Chun-Nan Hsu. Query processing in the SIMS information mediator. In Austin Tate, editor, *Advanced Planning Technology*. The AAAI Press, Menlo Park, CA, 1996.
17. Chun-Nan Hsu and Craig A. Knoblock. Using inductive learning to generate rules for semantic query optimization. In Gregory Piatetsky-Shapiro and Usama Fayyad, editors, *Advances in Knowledge Discovery and Data Mining*, chapter 17. MIT Press, Boston, MA, 1996.
18. Jaime Carbonell, Oren Etzioni, Yolanda Gil, Robert Joseph, Craig Knoblock, Steven Minton, and Manuela Veloso. Planning and learning in PRODIGY: Overview of an integrated architecture. In Ashwin Ram and David B. Leake, editors, *Goal-Driven Learning*, chapter 11, pages 297–306. MIT Press, Cambridge, MA, 1995.
19. Jaime G. Carbonell, Craig A. Knoblock, and Steven Minton. PRODIGY: An integrated architecture for planning and learning. In Kurt VanLehn, editor, *Architectures for Intelligence*. Erlbaum, Hillsdale, NJ, 1990.
20. Craig A. Knoblock. A theory of abstraction for hierarchical planning. In D. Paul Benjamin, editor, *Change of Representation and Inductive Bias*. Kluwer, Boston, MA, 1990.
21. Steven Minton, Jaime G. Carbonell, Craig A. Knoblock, Daniel R. Kuokka, Oren Etzioni, and Yolanda Gil. Explanation-based learning: A problem solving perspective. In Jaime G. Carbonell, editor, *Machine Learning: Paradigms and Methods*. MIT Press, Boston, MA, 1990.

Magazine Articles

1. Yolanda Gil, Suzanne A. Pierce, Hassan Babaie, Arindam Banerjee, Kirk Borne, Gary Bust, Michelle Cheatham, Imme Ebert-Uphoff, Carla Gomes, Mary Hill, John Horel, Leslie Hsu, Jim Kinter, Craig Knoblock, David Krum, Vipin Kumar, Pierre Lermusiaux, Yan Liu, Chris North, Victor Pankratius, Shanan Peters, Beth Plale, Allen Pope, Sai Ravela, Juan Restrepo, Aaron Ridley, Hanan Samet, and Shashi Shekhar. Intelligent systems for geosciences: An essential research agenda. *Communications of the ACM*, 62(1):76–84, 2018.
2. Mayank Kejriwal, Pedro Szekely, and Craig A. Knoblock. Investigative knowledge discovery for combating illicit activities. *IEEE Intelligent Systems*, 33(1):53–63, 2018.
3. Craig A. Knoblock and Pedro Szekely. Exploiting semantics for big data integration. *AI Magazine*, 2015.
4. Craig A. Knoblock. Reduce data overload. *Earth Imaging Journal*, pages 28–30, March/April 2012.
5. Craig A. Knoblock, Jose Luis Ambite, Mark Carman, Matthew Michelson, Pedro Szekely, and Rattapoom Tuchinda. Beyond the elves: Making intelligent agents intelligent. *AI Magazine*, 29(2):33–42, 2008.
6. Martin Michalowski, Snehal Thakkar, and Craig A. Knoblock. Automatically utilizing secondary sources to align information across data sources. *AI Magazine, Special Issue on Semantic Integration*, 26(1), 2005.
7. Jose Luis Ambite, Craig A. Knoblock, Maria Muslea, and Steven Minton. Heracles ii: Conditional constraint networks for interleaved planning and information gathering. *IEEE Intelligent Systems*, 20(2):25–33, March/April 2005.
8. Martin Michalowski, Jose-Luis Ambite, Snehal Thakkar, Rattapoom Tuchinda, Craig A. Knoblock, and Steve Minton. Retrieving and semantically integrating heterogeneous data from the web. *IEEE Intelligent Systems*, 19(3), 2004.

9. Craig A. Knoblock. Agents for gathering, integrating, and monitoring information for travel planning. *IEEE Intelligent Systems*, 17(6), November/December 2002.
10. Hans Chalupsky, Yolanda Gil, Craig A. Knoblock, Kristina Lerman, Jean Oh, David V. Pynadath, Thomas A. Russ, and Milind Tambe. Electric elves: Agent technology for supporting human organizations. *AI Magazine*, 23(2):11–24, Summer 2002.
11. David N. Allsopp, Patrick Beautement, Michael Kirton, Jeffrey M. Bradshaw, Niranjani Suri, Edmund H. Durfee, Craig A. Knoblock, Austin Tate, and Craig W. Thompson. Coalition agents experiment: Multiagent cooperation in international coalitions. *IEEE Intelligent Systems*, 17(3):26–35, May/June 2002.
12. Craig A. Knoblock, Kristina Lerman, Steven Minton, and Ion Muslea. Accurately and reliably extracting data from the web: A machine learning approach. *IEEE Data Engineering Bulletin*, 23(4), December 2000.
13. Craig A. Knoblock and Steven Minton. The ariadne approach to web-based information integration. *IEEE Intelligent Systems*, 13(5), September/October 1998.
14. Jose Luis Ambite and Craig A. Knoblock. Agents for information gathering. *IEEE Expert: Intelligent Systems and their Applications*, September/October 1997.
15. Craig A. Knoblock and Qiang Yang. Relating the performance of partial-order planning algorithms to domain features. *SIGART Bulletin, Special Issue on Evaluating Plans, Planners and Planning Agents*, 6(1), 1995.

Conference Papers

1. Minh Pham, Craig A. Knoblock, Muhao Chen, Binh Vu, and Jay Pujara. Spade: A semi-supervised probabilistic approach for detecting errors in tables. In Zhi-Hua Zhou, editor, Proceedings of the Thirtieth International Joint Conference on Artificial Intelligence, IJCAI-21, pages 3543–3551, August 2021.
2. Binh Vu, Craig A. Knoblock, Pedro Szekely, Minh Pham, and Jay Pujara. A graph-based approach for inferring semantic descriptions of Wikipedia tables. In Andreas Hotho, Eva Blomqvist, Stefan Dietze, Achille Fokoue, Ying Ding, Payam Barnaghi, Armin Haller, Mauro Dragoni, and Harith Alani, editors, The Semantic Web – ISWC 2021, pages 304–320. Springer International Publishing, 2021.
3. Basel Shbita, Craig A. Knoblock, Weiwei Duan, Yao-Yi Chiang, Johannes H. Uhl, and Stefan Leyk. Building linked spatio-temporal data from vectorized historical maps. In European Semantic Web Conference, pages 409–426. Springer, 2020.
4. Zekun Li, Yao-Yi Chiang, Sasan Tavakkol, Basel Shbita, Johannes H. Uhl, Stefan Leyk, and Craig A. Knoblock. An automatic approach for generating rich, linked geo-metadata from historical map images. In Proceedings of the 26th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining, pages 3290–3298, 2020.
5. Daniel Garijo, Deborah Khider, Varun Ratnakar, Yolanda Gil, Ewa Deelman, Rafael Ferreira da Silva, Craig Knoblock, Yao-Yi Chiang, Minh Pham, Jay Pujara, Binh Vu, Dan Feldman, Rajiv Mayani, Kelly Cobourn, Chris Duffy, Armen Kemanian, Lele Shu, Vipin Kumar, Ankush Khandelwal, Kshitij Tayal, Scott Peckham, Maria Stoica, Anna Dabrowski, Daniel Hardesty-Lewis, and Suzanne Pierce. An intelligent interface for integrating climate, hydrology, agriculture, and socioeconomic models. In *Proceedings of the 24th International Conference on Intelligent User Interfaces: Companion*, IUI '19, pages 111–112, New York, NY, USA, 2019. ACM.
6. Minh Pham, Craig A. Knoblock, and Jay Pujara. Learning data transformations with minimal user effort. In *2019 IEEE International Conference on Big Data (Big Data)*, pages 657–664. IEEE, 2019.
7. Binh Vu, Craig Knoblock, and Jay Pujara. Learning semantic models of data sources using probabilistic graphical models. In *The World Wide Web Conference, WWW '19*, pages 1944–1953, New York, NY, USA, 2019. ACM.

8. Yuan Shi, TK Satish Kumar, and Craig A Knoblock. Automatic adaptation to sensor replacements. In *The Thirty-Second International Flairs Conference*, 2019.
9. Binh Vu, Jay Pujara, and Craig A Knoblock. D-repr: A language for describing and mapping diversely-structured data sources to rdf. In *Proceedings of the 10th International Conference on Knowledge Capture*, pages 189–196, 2019.
10. Basel Shbita, Arun Rajendran, Jay Pujara, and Craig A. Knoblock. Parsing, representing and transforming units of measure. In *Proceedings of the Conference on Modeling the World's Systems*, 2019.
11. Yuan Shi, TK Satish Kumar, and Craig A Knoblock. Constraint-based learning for sensor failure detection and adaptation. In *2018 IEEE 30th International Conference on Tools with Artificial Intelligence (ICTAI)*, pages 328–335. IEEE, 2018.
12. Yolanda Gil, Kelly Cobourn, Ewa Deelman, Chris Duffy, Rafael Ferreira da Silva, Armen Kemanian, Craig Knoblock, Vipin Kumar, Scott Peckham, Lucas Carvalho, Yao-Yi Chiang, Daniel Garijo, Deborah Khider, Ankush Khandelwal, Minh Pahm, Jay Pujara, Varun Ratnakar, Maria Stoica, and Binh Vu. Mint: Model integration through knowledge-powered data and process composition. In *Proceedings of the 9th International Congress on Environmental Modelling and Software*, 2018.
13. T. K. Satish Kumar, Hong Xu, Zheng Tang, Anoop Kumar, Craig Milo Rogers, and Craig A. Knoblock. Alert generation in execution monitoring using resource envelopes. In *Proceedings of the 31st International Florida Artificial Intelligence Research Society Conference (FLAIRS)*, pages 38–43, 2018.
14. T. K. Satish Kumar, Zhi Wang, Anoop Kumar, Craig Rogers, and Craig A. Knoblock. Load scheduling of simple temporal networks under dynamic resource pricing. In *Proceedings of the Thirty-Second AAAI Conference on Artificial Intelligence (AAAI-2018)*, 2018.
15. T. K. Satish Kumar, Hong Xu, Zheng Tang, Anoop Kumar, Craig Milo Rogers, and Craig A. Knoblock. A distributed logical filter for connected row convex constraints. In *Proceedings of the 29th IEEE International Conference on Tools with Artificial Intelligence (ICTAI)*, 2017.
16. Johannes Uhl, Stefan Leyk, Yao-Yi Chiang, Weiwei Duan, and Craig A. Knoblock. Extracting human settlement footprint from historical topographic map series using context-based machine learning. In *8th International Conference on Pattern Recognition Systems, At Madrid, Spain, Volume: 8*, 2017.
17. Craig A. Knoblock, Pedro Szekely, Eleanor Fink, David Newbury Duane Degler, Robert Sanderson, Kate Blanch, Sara Snyder, Nilay Chheda, Nimesh Jain, Ravi Raju Krishna, Nikhila Begur Sreekanth, and Yixiang Yao. Lessons learned in building linked data for the american art collaborative. In *ISWC 2017 - 16th International Semantic Web Conference*, 2017.
18. Yuan Shi and Craig A. Knoblock. Learning with previously unseen features. In *Proceedings of the 26th International Joint Conference on Artificial Intelligence (IJCAI)*, 2017.
19. Linhong Zhu, Majid Ghasemi-Gol, Pedro Szekely, Aram Galstyan, and Craig A. Knoblock. Unsupervised entity resolution on multi-type graphs. In *ISWC 2016 - 15th International Semantic Web Conference*, 2016. Best Research Paper.
20. Ying Zhang, Yao-Yi Chiang, Craig A. Knoblock, Chaopeng Li, Liming Du, Shaowen Liu, and Sanjay Singh. An automatic approach for building place-name datasets from the web. In *Proceedings of the 19th AGILE International Conference on Geographic Information Science*, 2016.
21. Minh Pham, Suresh Alse, Craig Knoblock, and Pedro Szekely. Semantic labeling: A domain-independent approach. In *ISWC 2016 - 15th International Semantic Web Conference*, 2016.
22. Mohsen Taherian, Craig Knoblock, Pedro Szekely, and JosÈ Luis Ambite. Leveraging linked data to discover semantic relations within data sources. In *ISWC 2016 - 15th International Semantic Web Conference*, 2016.
23. Gleb Gawriljuk, Andreas Harth, Craig A. Knoblock, and Pedro Szekely. A scalable approach to incrementally building knowledge graphs. In *TPDL 2016 - 20th International Conference on Theory and Practice of Digital Libraries*, 2016.

24. Christian Paul, Achim Rettinger, Aditya Mogadala, Craig A. Knoblock, and Pedro Szekely. Efficient graph-based document similarity. In *The Semantic Web. Latest Advances and New Domains. 13th Extended Semantic Web Conference (ESWC), Crete, Greece.*, 2016.
25. Bo Wu and Craig A. Knoblock. Maximizing correctness with minimal user effort to learn data transformations. In *Proceedings of the 21st International Conference on Intelligent User Interfaces*, 2016.
26. Pedro Szekely, Craig A. Knoblock, Jason Slepicka, Andrew Philpot, Amandeep Singh, Chengye Yin, Dipsy Kapoor, Prem Natarajan, Daniel Marcu, Kevin Knight, David Stallard, Subessware S. Karunamoorthy, Rajagopal Bojanapalli, Steven Minton, Brian Amanatullah, Todd Hughes, Mike Tamayo, David Flynt, Rachel Artiss, Shih-Fu Chang, Tao Chen, Gerald Hiebel, and Lidia Ferreira. Building and using a knowledge graph to combat human trafficking. In *Proceedings of the 14th International Semantic Web Conference (ISWC 2015)*, 2015.
27. Bo Wu and Craig A. Knoblock. An iterative approach to synthesize data transformation programs. In *Proceedings of the 24th International Joint Conference on Artificial Intelligence (IJCAI)*, 2015.
28. Craig A. Knoblock and Pedro Szekely. A scalable architecture for extracting, aligning, linking, and visualizing multi-int data. In *Proceedings of the Conference on the Next Generation Analyst III*. SPIE, 9499, 2015.
29. S.K. Ramnandan, Amol Mittal, Craig A. Knoblock, and Pedro Szekely. Assigning semantic labels to data sources. In *Proceedings of the 12th ESWC*, 2015.
30. Anastasia Dimou, Miel Vander Sande, Jason Slepicka, Pedro Szekely, Erik Mannens, Craig A. Knoblock, and Rik Van de Walle. Mapping hierarchical sources into RDF using the RML mapping language. In *IEEE International Conference on Semantic Computing (ICSC)*, pages 151–158. IEEE, 2014.
31. Eleanor E. Fink, Pedro Szekely, and Craig A. Knoblock. How linked open data can help in locating stolen or looted cultural property. In Marinos Ioannides, Nadia Magnenat-Thalmann, Eleanor Fink, Roko Zarnic, Alex-Yianing Yen, and Ewald Quak, editors, *Digital Heritage: Progress in Cultural Heritage: Documentation, Preservation, and Protection, LNCS 8740*, pages 228–237. Springer International Publishing, 2014.
32. Ayush Jaiswal, Yao-Yi Chiang, Craig A. Knoblock, and Liang Lan. Location prediction with sparse GPS data. In *Proceedings of the 8th Geographic Information Science*, 2014.
33. Mihir Sathe, Craig A. Knoblock, Yao-Yi Chiang, and Aaron Harris. A parallel query engine for interactive spatiotemporal analysis. In *Proceedings of the 22nd ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*, 2014.
34. Mohsen Taheriyani, Craig A. Knoblock, Pedro Szekely, and Jose Luis Ambite. A Scalable Approach to Learn Semantic Models of Structured Sources. In *Proceedings of the 8th IEEE International Conference on Semantic Computing (ICSC 2014)*, 2014.
35. Bo Wu, Pedro Szekely, and Craig A. Knoblock. Minimizing user effort in transforming data by example. In *Proceedings of the International Conference on Intelligent User Interface*, 2014.
36. Rahul Parundekar, Craig A. Knoblock, and Jose Luis Ambite. Discovering alignments in ontologies of linked data. In *Proceedings of the 23rd International Joint Conference on Artificial Intelligence (IJCAI)*, 2013.
37. Mohsen Taheriyani, Craig A. Knoblock, Pedro Szekely, and Jose Luis Ambite. A graph-based approach to learn semantic descriptions of data sources. In *Proceedings of the 12th International Semantic Web Conference (ISWC 2013)*, 2013.
38. Pedro Szekely, Craig A. Knoblock, Fengyu Yang, Xuming Zhu, Eleanor Fink, Rachel Allen, and Georgina Goodlander. Connecting the smithsonian american art museum to the linked data cloud. In *Proceedings of the 10th Extended Semantic Web Conference*, Montpellier, May 2013. Awarded Best In-Use Paper at ESWC 2013.
39. Aman Goel, Craig A. Knoblock, and Kristina Lerman. Exploiting Structure within Data for Accurate Labeling Using Conditional Random Fields. In *Proceedings of the 14th International Conference on Artificial Intelligence (ICAI)*, 2012.

40. Mohsen Taheriyan, Craig A. Knoblock, Pedro Szekely, and Jose Luis Ambite. Rapidly integrating services into the linked data cloud. In *Proceedings of the 11th International Semantic Web Conference (ISWC 2012)*, 2012.
41. Rahul Parundekar, Craig A. Knoblock, and Jose Luis Ambite. Discovering concept coverings in ontologies of linked data sources. In *Proceedings of the 11th International Semantic Web Conference (ISWC 2012)*, 2012. Awarded Best Research Paper at ISWC 2012.
42. Yao-Yi Chiang and Craig A. Knoblock. Generating named road vector data from raster maps. In *Proceedings of the Seventh International Conference on Geographic Information Science*, 2012.
43. Craig A. Knoblock, Pedro Szekely, Jose Luis Ambite, Shubham Gupta, Aman Goel, Maria Muslea, Kristina Lerman, and Parag Mallick. Semi-automatically mapping structured sources into the semantic web. In *Proceedings of the Extended Semantic Web Conference*, Crete, Greece, 2012.
44. Steven N. Minton, Sofus A. Macskassy, Peter LaMonica, KaneSee, Craig A. Knoblock, Greg Barish, Matthew Michelson, and Raymond Liuzzi. Monitoring entities in an uncertain world: Entity resolution and referential integrity. In *Proceedings of the 25th National Conference on Artificial Intelligence (AAAI-11)*, San Francisco, CA, 2011.
45. Yolanda Gil, Pedro Szekely, Sandra Villamizar, Thomas C. Harmon, Varun Ratnakar, Shubham Gupta, Maria Muslea, Fabio Silva, and Craig A. Knoblock. Mind your metadata: Exploiting semantics for configuration, adaptation, and provenance in scientific workflows. In *Proceedings of the 10th International Semantic Web Conference (ISWC 2011)*, 2011.
46. Yao-Yi Chiang and Craig A. Knoblock. Recognition of multi-oriented, multi-sized, and curved text. In *Proceedings of the Tenth International Conference on Document Analysis and Recognition*, 2011.
47. Yao-Yi Chiang and Craig A. Knoblock. A general approach for extracting road vector data from raster maps. *International Journal on Document Analysis and Recognition*, 2011.
48. Aman Goel, Craig A. Knoblock, and Kristina Lerman. Using conditional random fields to exploit token structure and labels for accurate semantic annotation. In *Proceedings of the 25th National Conference on Artificial Intelligence (AAAI-11)*, San Francisco, CA, 2011.
49. Shubham Gupta and Craig A. Knoblock. A framework for integrating and reasoning about geospatial data. In *Extended Abstracts of the Sixth International Conference on Geographic Information Science (GIScience)*, 2010.
50. Rahul Parundekar, Craig A. Knoblock, and José Luis Ambite. Linking and building ontologies of linked data. In *Proceedings of the 9th International Semantic Web Conference (ISWC 2010)*, 2010.
51. Yao-Yi Chiang and Craig A. Knoblock. An approach for recognizing text labels in raster maps. In *Proceedings of the 20th International Conference on Pattern Recognition*, 2010.
52. Shubham Gupta and Craig A. Knoblock. Building geospatial mashups to visualize information for crisis management. In *Proceedings of the 7th International Conference on Information Systems for Crisis Response and Management*, 2010.
53. Craig A. Knoblock, Ching-Chien Chen, Yao-Yi Chiang, Aman Goel, Matthew Michelson, and Cyrus Shahabi. A general approach to discovering, registering, and extracting features from raster maps. In *Proceedings of the Conference on Document Recognition and Retrieval XVII of SPIE-IS&T Electronic Imaging*, volume 7534, 2010.
54. Yao-Yi Chiang and Craig A. Knoblock. Classification of raster maps for automatic feature extraction. In *GIS '09: Proceedings of the 17th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*, pages 138–147, New York, NY, USA, 2009. ACM.
55. Matthew Michelson and Craig A. Knoblock. Exploiting background knowledge to build reference sets for information extraction. In *Proceedings of the 21st International Joint Conference on Artificial Intelligence (IJCAI-2009)*, Pasadena, CA, 2009.
56. José Luis Ambite, Sirish Darbha, Aman Goel, Craig A. Knoblock, Kristina Lerman, Rahul Parundekar, and Thomas Russ. Automatically constructing semantic web services from online sources. In *Proceedings of the 8th International Semantic Web Conference (ISWC 2009)*, 2009.

57. Yao-Yi Chiang and Craig A. Knoblock. A method for automatically extracting road layers from raster maps. In *Proceedings of the Tenth International Conference on Document Analysis and Recognition*, 2009.
58. Matthew Michelson and Craig A. Knoblock. Mining the heterogeneous transformations between data sources to aid record linkage. In *Proceedings of the International Conference on Artificial Intelligence (ICAI)*, 2009.
59. Zachary G. Ives, Craig A. Knoblock, Steven Minton, Marie Jacob, Partha Pratim Talukdar, Rattapoom Tuchinda, José Luis Ambite, Maria Muslea, and B. Cenk Gazen. Interactive data integration through smart copy & paste. In *Fourth Biennial Conference on Innovative Data Systems Research (CIDR)*, Pacific Grove, CA, January 2009.
60. Matthew Michelson, Aman Goel, and Craig A. Knoblock. Identifying maps on the World Wide Web. In *Proceedings of the 5th International Conference on GIScience, LNCS 5266*, pages 249–260, New York, 2008. Springer. DOI=10.1007/978-3-540-87473-7_16.
61. Yao-Yi Chiang and Craig A. Knoblock. Automatic extraction of road intersection position, connectivity, and orientation from raster maps. In *16th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM GIS 2008)*, 2008.
62. Rattapoom Tuchinda, Pedro Szekely, and Craig A. Knoblock. Building mashups by example. In *Proceedings of the 2008 International Conference on Intelligent User Interface*, January 2008.
63. Martin Michalowski, Craig A. Knoblock, Kenneth M. Bayer, and Berthe Y. Choueiry. Exploiting Automatically Inferred Constraint Models for Building Identification in Satellite Imagery. In *Proceedings of the 15th ACM International Symposium on Advances in Geographic Information Systems (ACM GIS 07)*, pages 35–42, 2007.
64. Snehal Thakkar, Craig A. Knoblock, and Jose Luis Ambite. Quality-driven geospatial data integration. In *Proceedings of the 15th ACM International Symposium on Advances in Geographic Information Systems (ACM GIS 07)*, 2007.
65. Kenneth M. Bayer, Martin Michalowski, Berthe Y. Choueiry, and Craig A. Knoblock. Reformulating CSPs for Scalability with Application to Geospatial Reasoning. In *International Conference on Principles and Practice of Constraint Programming (CP 07)*, pages 164–179. LNCS 4741, Springer, 2007.
66. Rattapoom Tuchinda, Pedro Szekely, and Craig A. Knoblock. Building data integration queries by demonstration. In *Proceedings of the International Conference on Intelligent User Interface*, January 2007.
67. Mark James Carman and Craig A. Knoblock. Learning semantic descriptions of web information sources. In *Proceedings of the Twentieth International Joint Conference on Artificial Intelligence (IJCAI)*, January 2007.
68. Matthew Michelson and Craig A. Knoblock. Learning blocking schemes for record linkage. In *Proceedings of the 21st National Conference on Artificial Intelligence (AAAI-06)*, Boston, MA, 2006.
69. Kristina Lerman, Anon Plangrasopchok, and Craig A. Knoblock. Automatically labeling the inputs and outputs of web services. In *Proceedings of the 21st National Conference on Artificial Intelligence (AAAI-06)*, Boston, MA, 2006.
70. Yao-Yi Chiang and Craig A. Knoblock. Classification of line and character pixels on raster maps using discrete cosine transformation coefficients and support vector machines. In *Proceedings of the International Conference on Pattern Recognition (ICPR 2006)*, 2006.
71. Cyrus Shahabi, Yao-Yi Chiang, Kelvin Chung, Kai-Chen Huang, Jeff Khoshgozaran-Haghighi, Craig Knoblock, Sung Chun Lee, Ulrich Neumann, Ram Nevatia, Arjun Rihan, Snehal Thakkar, and Suya You. Geodec: Enabling geospatial decision making. In *Proceedings of the IEEE International Conference on Multimedia & Expo (ICME)*, Toronto, Canada, July 2006.

72. Craig A. Knoblock, Cyrus Shahabi, Ching-Chien Chen, and E. Lynn Usery. Automatic alignment of vector data and orthoimagery for the national map. In *Proceedings of the 7th Annual Conference on Digital Government Research*, San Diego, CA, 2006.
73. Craig A. Knoblock. Learning to optimize plan execution in information agents. In Hector Munoz-Avila and Francesco Ricci, editors, *Proceedings of the 6th International Conference on Case-Based Reasoning (ICCBR 2005)*, LNAI 3620, pages 2–3. Springer-Verlag, New York, 2005.
74. Yao-Yi Chiang, Craig A. Knoblock, and Ching-Chien Chen. Automatic extraction of road intersections from raster maps. In *The 13th ACM International Symposium on Advances in Geographic Information Systems (ACM-GIS'05)*, Bremen, Germany, November, 2005.
75. Martin Michalowski and Craig A. Knoblock. A constraint satisfaction approach to geospatial reasoning. In *Proceedings of the Twentieth National Conference on Artificial Intelligence (AAAI-05)*, 2005.
76. Steven N. Minton, Claude Nanjo, Craig A. Knoblock, Martin Michalowski, and Matthew Michelson. Heterogeneous field matching method for record linkage. In *Proceedings of the Fifth IEEE International Conference on Data Mining (ICDM '05)*, 2005.
77. Matthew Michelson and Craig A. Knoblock. Semantic annotation of unstructured and ungrammatical text. In *Proceedings of the 19th International Joint Conference on Artificial Intelligence (IJCAI-2005)*, Edinburgh, Scotland, 2005.
78. Rattapoom Tuchinda and Craig A. Knoblock. Interactively building agents for consumer-side data mining. In *Proceedings of Intelligent User Interfaces*, San Diego, CA, 2005.
79. Ching-Chien Chen, Craig A. Knoblock, Cyrus Shahabi, Snehal Thakkar, and Yao-Yi Chiang. Automatically and accurately conflating orthoimagery and street maps. In *Proceedings of the 12th ACM International Symposium on Advances in Geographic Information Systems (ACM-GIS'04)*, 2004.
80. Rahul Bakshi, Craig A. Knoblock, and Snehal Thakkar. Exploiting online sources to accurately geocode addresses. In *Proceedings of the 12th ACM International Symposium on Advances in Geographic Information Systems (ACM-GIS'04)*, 2004.
81. Kristina Lerman, Lise Getoor, Steven Minton, and Craig A. Knoblock. Using the Structure of Web Sites for Automatic Segmentation of Tables. In *Proceedings of ACM SIG on Management of Data (SIGMOD-2004)*, 2004.
82. Craig A. Knoblock. Building software agents for planning, monitoring, and optimizing travel. In Andrew J. Frew, editor, *Proceedings of the Eleventh International Conference on Information Technology and Travel & Tourism*. Springer-Verlag, New York, 2004.
83. Rattapoom Tuchinda and Craig A. Knoblock. Agent wizard: Building information agents by answering questions. In *Proceedings of Intelligent User Interfaces*, Island of Madeira, Portugal, 2004.
84. Shou de Lin and Craig A. Knoblock. Exploiting a search engine to develop more flexible web agents. In *Proceedings of the 2003 IEEE/WIC International Conference on Web Intelligence (WI2003)*, pages 54–60, Halifax, Canada, 2003. IEEE Computer Society.
85. Shahram Ghandeharizadeh, Craig A. Knoblock, Christos Papadopoulos, Cyrus Shahabi, Esam Alwagait, Jose Luis Ambite, Min Cai, Ching-Chien Chen, Parikshit Pol, Rolfe Schmidt, Saihong Song, Snehal Thakkar, and Runfang Zhou. Proteus: A system for dynamically composing and intelligently executing web services. In *Proceedings of the First International Conference on Web Services (ICWS)*, Las Vegas, NV, June 2003.
86. Ching-Chien Chen, Snehal Thakkar, Craig A. Knoblock, and Cyrus Shahabi. Automatically annotating and integrating spatial datasets. In *Proceedings of the Eighth International Symposium on Spatial and Temporal Databases (SSTD 2003)*, volume 2750 of *Lecture Notes in Computer Science*, Springer, Berlin, 2003.
87. Craig A. Knoblock. Deploying information agents on the web. In *Proceedings of the 18th International Joint Conference on Artificial Intelligence (IJCAI-2003)*, Acapulco, Mexico, 2003.

88. Oren Etzioni, Craig A. Knoblock, Rattapoom Tuchinda, and Alexander Yates. To buy or not to buy: Mining airline fare data to minimize ticket purchase price. In *Proceedings of the Ninth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, 2003.
89. Ion Muslea, Steven Minton, and Craig A. Knoblock. Active learning with strong and weak views: A case study on wrapper induction. In *Proceedings of the 18th International Joint Conference on Artificial Intelligence (IJCAI-2003)*, Acapulco, Mexico, 2003.
90. Greg Barish and Craig A. Knoblock. Learning value predictors for the speculative execution of information gathering plans. In *Proceedings of the 18th International Joint Conference on Artificial Intelligence (IJCAI-2003)*, Acapulco, Mexico, 2003.
91. Jose Luis Ambite, Greg Barish, Craig A. Knoblock, Maria Muslea, Jean Oh, and Steven Minton. Getting from here to there: Interactive planning and agent execution for optimizing travel. In *Proceedings of the Fourteenth Conference on Innovative Applications of Artificial Intelligence (IAAI-2002)*, pages 862–869, Edmonton, Alberta, Canada, 2002.
92. Sheila Tejada, Craig A. Knoblock, and Steven Minton. Learning domain-independent string transformation weights for high accuracy object identification. In *Proceedings of the Eighth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD-2002)*, Edmonton, Alberta, Canada, 2002.
93. D.N. Allsopp, P. Beautement, J.M. Bradshaw, E.H. Durfee, M. Kirton, C.A. Knoblock, N. Suri, A. Tate, and C.W. Thompson. Coalition agents experiment: Multi-agent co-operation in an international coalition setting. In *Proceedings of the Second International Conference on Knowledge Systems for Coalition Operations (KSCO-2002)*, Toulouse, France, April 2002.
94. Ion Muslea, Steven Minton, and Craig A. Knoblock. Active + semi-supervised learning = robust multi-view learning. In *Proceedings of the 19th International Conference on Machine Learning (ICML-2002)*, pages 435–442, Sydney, Australia, 2002.
95. Ion Muslea, Steven Minton, and Craig A. Knoblock. Adaptive view validation: A first step towards automatic view detection. In *Proceedings of the 19th International Conference on Machine Learning (ICML-2002)*, pages 443–450, Sydney, Australia, 2002.
96. Greg Barish and Craig A. Knoblock. Speculative execution for information gathering plans. In *Proceedings of the Sixth International Conference on Artificial Intelligence Planning and Scheduling*, Toulouse, France, 2002.
97. Cyrus Shahabi, Mohammada R. Kolahdouzan, Snehal Thakkar, Jose Luis Ambite, and Craig A. Knoblock. Efficiently querying moving objects with pre-defined paths in a distributed environment. In *Proceedings of the Ninth ACM International Symposium on Advances in Geographic Information Systems (ACM-GIS)*, Atlanta, GA, November 2001.
98. Hans Chalupsky, Yolanda Gil, Craig A. Knoblock, Kristina Lerman, Jean Oh, David V. Pynadath, Thomas A. Russ, and Milind Tambe. Electric elves: Applying agent technology to support human organizations. In *Proceedings of the Conference on Innovative Applications of Artificial Intelligence*, 2001.
99. Craig A. Knoblock, Jose Luis Ambite, Steven Minton, Cyrus Shahabi, Mohammad Kolahdouzan, Maria Muslea, Jean Oh, and Snehal Thakkar. Integrating the world: The worldinfo assistant. In *Proceedings of the 2001 International Conference on Artificial Intelligence (IC-AI 2001)*, Las Vegas, NV, 2001.
100. Craig A. Knoblock, Steven Minton, Jose Luis Ambite, Maria Muslea, Jean Oh, and Martin Frank. Mixed-initiative, multi-source information assistants. In *Proceedings of the World Wide Web Conference*, Hong Kong, May 2001.
101. Martin Frank, Maria Muslea, Jean Oh, Steve Minton, and Craig Knoblock. An intelligent user interface for mixed-initiative multi-source travel. In *Proceedings of the ACM International Conference on Intelligent User Interfaces*, Santa Fe, New Mexico, January 2001.
102. Greg Barish, Daniel DiPasquo, Craig A. Knoblock, and Steven Minton. Dataflow plan execution for software agents. In *Proceedings of the Fourth International Conference on Autonomous Agents (Agents-2000)*, Barcelona, Spain, 2000.

103. Greg Barish, Daniel DiPasquo, Craig A. Knoblock, and Steven Minton. A dataflow approach to agent-based information management. In *Proceedings of the 2000 International Conference on Artificial Intelligence (IC-AI 2000)*, Las Vegas, NV, 2000.
104. José Luis Ambite, Craig A. Knoblock, and Steven Minton. Learning plan rewriting rules. In *Proceedings of the Fifth International Conference on Artificial Intelligence Planning and Scheduling Systems*, Breckenridge, CO, 2000.
105. Greg Barish, Craig A. Knoblock, Yi-Shin Chen, Steven Minton, Andrew Philpot, and Cyrus Shahabi. The theaterloc virtual application. In *Proceedings of Twelfth Annual Conference on Innovative Applications of Artificial Intelligence (IAAI-2000)*, Austin, Texas, 2000.
106. Ion Muslea, Steven Minton, and Craig A. Knoblock. Selective sampling with redundant views. In *Proceedings of the 17th National Conference on Artificial Intelligence (AAAI-2000)*, 2000.
107. Naveen Ashish, Craig A. Knoblock, and Cyrus Shahabi. Selectively materializing data in mediators by analyzing user queries. In *Fourth International Conference on Cooperative Information Systems (CoopIS)*, Edinburgh, Scotland, September 1999.
108. Ion Muslea, Steve Minton, and Craig A. Knoblock. A hierarchical approach to wrapper induction. In *Proceedings of the 3rd International Conference on Autonomous Agents 1999*, Seattle, WA, 1999.
109. Craig A. Knoblock, Steven Minton, Jose Luis Ambite, Naveen Ashish, Pragnesh Jay Modi, Ion Muslea, Andrew G. Philpot, and Sheila Tejada. Modeling web sources for information integration. In *Proceedings of the Fifteenth National Conference on Artificial Intelligence*, Madison, WI, 1998.
110. José Luis Ambite and Craig A. Knoblock. Flexible and Scalable Query Planning in Distributed and Heterogeneous Environments. In *Proceedings of the Fourth International Conference on Artificial Intelligence Planning Systems*, Pittsburgh, PA, 1998.
111. José Luis Ambite and Craig A. Knoblock. Planning by rewriting: Efficiently generating high-quality plans. In *Proceedings of the Fourteenth National Conference on Artificial Intelligence*, Providence, RI, 1997.
112. Naveen Ashish and Craig A. Knoblock. Semi-automatic wrapper generation for Internet information sources. In *Proceedings of the Second IFCIS International Conference on Cooperative Information Systems*, Kiawah Island, SC, 1997.
113. Naveen Ashish, Craig A. Knoblock, and Alon Levy. Information gathering plans with sensing actions. In Sam Steel and Rachid Alami, editors, *Recent Advances in AI Planning: 4th European Conference on Planning, ECP'97*. Springer-Verlag, New York, 1997.
114. B. Cenk Gazen and Craig A. Knoblock. Combining the expressiveness of UCPOP with the efficiency of Graphplan. In Sam Steel and Rachid Alami, editors, *Recent Advances in AI Planning: 4th European Conference on Planning, ECP'97*. Springer-Verlag, New York, 1997.
115. Chun-Nan Hsu and Craig A. Knoblock. Discovering robust knowledge from dynamic closed-world data. In *Proceedings of the Thirteenth National Conference on Artificial Intelligence*, Portland, OR, 1996.
116. Craig A. Knoblock. Building a planner for information gathering: A report from the trenches. In *Proceedings of the Third International Conference on Artificial Intelligence Planning Systems*, Edinburgh, Scotland, 1996.
117. Craig A. Knoblock. Planning, executing, sensing, and replanning for information gathering. In *Proceedings of the Fourteenth International Joint Conference on Artificial Intelligence*, Montreal, Canada, 1995.
118. Chun-Nan Hsu and Craig A. Knoblock. Estimating the robustness of discovered knowledge. In *Proceedings of the First International Conference on Knowledge Discovery and Data Mining*, Montreal, Canada, 1995.
119. Yigal Arens and Craig A. Knoblock. Intelligent caching: Selecting, representing, and reusing data in an information server. In *Proceedings of the Third International Conference on Cooperative Information Systems*, Gaithersburg, MD, 1994.

120. Craig A. Knoblock. Generating parallel execution plans with a partial-order planner. In *Proceedings of the Second International Conference on Artificial Intelligence Planning Systems*, Chicago, IL, 1994.
121. Craig A. Knoblock and Qiang Yang. Evaluating the tradeoffs in partial-order planning algorithms. In *Proceedings of the Canadian Artificial Intelligence Conference*, 1994.
122. Chun-Nan Hsu and Craig A. Knoblock. Rule induction for semantic query optimization. In *Proceedings of the Eleventh International Conference on Machine Learning*, New Brunswick, NJ, 1994.
123. Craig Knoblock, Yigal Arens, and Chun-Nan Hsu. Cooperating agents for information retrieval. In *Proceedings of the Second International Conference on Cooperative Information Systems*, Toronto, Canada, 1994.
124. Chun-Nan Hsu and Craig A. Knoblock. Reformulating Query Plans For Multidatabase Systems. In *Proceedings of the Second International Conference on Information and Knowledge Management*, Washington, D.C., 1993.
125. Yigal Arens and Craig A. Knoblock. Planning and reformulating queries for semantically-modeled multidatabase systems. In *Proceedings of the First International Conference on Information and Knowledge Management*, Baltimore, MD, 1992.
126. Craig A. Knoblock. An Analysis of ABSTRIPS. In *Proceedings of the First International Conference on Artificial Intelligence Planning Systems*, College Park, MD, 1992.
127. Craig A. Knoblock. Search reduction in hierarchical problem solving. In *Proceedings of the Ninth National Conference on Artificial Intelligence*, Anaheim, CA, 1991.
128. Craig A. Knoblock, Steven Minton, and Oren Etzioni. Integrating abstraction and explanation-based learning in PRODIGY. In *Proceedings of the Ninth National Conference on Artificial Intelligence*, Anaheim, CA, 1991.
129. Craig A. Knoblock, Josh D. Tenenber, and Qiang Yang. Characterizing abstraction hierarchies for planning. In *Proceedings of the Ninth National Conference on Artificial Intelligence*, Anaheim, CA, 1991.
130. Craig A. Knoblock. Learning abstraction hierarchies for problem solving. In *Proceedings of the Eighth National Conference on Artificial Intelligence*, Boston, MA, 1990.

Workshop and Symposium Papers

1. Zekun Li, Runyu Guan, Qianmu Yu, Yao-Yi Chiang, and Craig A. Knoblock. Synthetic map generation to provide unlimited training data for historical map text detection. In *Proceedings of the 4th ACM SIGSPATIAL International Workshop on AI for Geographic Knowledge Discovery, GEOAI '21*, page 17–26, New York, NY, USA, 2021. Association for Computing Machinery.
2. Deborah Khider, Yolanda Gil, Kelly M Cobourn, Ewa Deelman, Christopher Duffy, Rafael Ferreira da Silva, Armen Kemanian, Craig Knoblock, Vipin Kumar, Scott Dale Peckham, et al. Mint: An intelligent interface for understanding the impacts of climate change on hydrological, agricultural and economic systems. In *AGU Fall Meeting 2019*. AGU, 2019.
3. Rahul Gupta, Jay Pujara, Craig A Knoblock, Shushyam M Sharanappa, Bharat Pulavarti, Gerard Hoberg, and Gordon Phillips. Feature selection methods for understanding business competitor relationships. In *Proceedings of the Fourth International Workshop on Data Science for Macro-Modeling with Financial and Economic Datasets*, ACM, 2018.
4. Weiwei Duan, Yao-Yi Chiang, Craig A. Knoblock, Stefan Leyk, and Johannes H. Uhl. Automatic generation of precisely delineated geographic features from georeferenced historical maps using deep learning. In *The 22nd International Research Symposium on Computer-based Cartography and GI-Science (Autocarto/UCGIS)*, 2018.
5. T. K. Satish Kumar, Zhi Wang, Anoop Kumar, Craig Rogers, and Craig Knoblock. On the linear programming duals of temporal reasoning problems. In *Proceedings of the Fifteenth International Symposium on Artificial Intelligence and Mathematics (ISAIM-2018)*, 2018.

6. Chun Lin, Hang Su, Craig A. Knoblock, Yao-Yi Chiang, Weiwei Duan, Stefan Leyk, and Johannes H. Uhl. Building linked data from historical maps. In *Proceedings of the ISWC 2018 Workshop on Enabling Open Semantic Science (SemSci 2018)*, 2018.
7. Craig A. Knoblock, Aparna R. Joshi, Abhishek Megotia, Minh Pham, and Chelsea Ursaner. Automatic spatio-temporal indexing to integrate and analyze the data of an organization. In *UrbanGIS 2017: International Workshop on Smart Cities and Urban Analytics*, 2017.
8. Weiwei Duan, Yao-Yi Chiang, Craig A. Knoblock, Vinil Jain, Dan Feldman, Johannes H. Uhl, and Stefan Leyk. Automatic alignment of geographic features in contemporary vector data and historical maps. In *1st ACM SIGSPATIAL Workshop on Artificial Intelligence and Deep Learning for Geographic Knowledge Discovery (GeoAI 2017)*, 2017.
9. Eric Heiden, Gerard Hoberg, Craig A. Knoblock, Palak Modi, Gordon Phillips, Gaurangi Raul, and Pedro Szekely. Web text-based network industry classifications: Preliminary results. In *Proceedings of DSMM: Data Science for Macro-Modeling with Financial and Economic Datasets*, 2017.
10. Mohsen Taheriyani, Craig Knoblock, Pedro Szekely, José Luis Ambite, and Yinyi Chen. Leveraging Linked Data to Infer Semantic Relations within Structured Sources. In *Proceedings of the 6th International Workshop on Consuming Linked Data (COLD 2015)*, 2015.
11. Jason Slepicka, Chengye Yin, Pedro Szekely, and Craig Knoblock. KR2RML: An Alternative Interpretation of R2RML for Heterogenous Sources. In *Proceedings of the 6th International Workshop on Consuming Linked Data (COLD 2015)*, 2015.
12. Bo Wu and Craig A. Knoblock. Iteratively learning conditional statements in transforming data by example. In *Proceedings of the First Workshop on Data Integration and Application at the 2014 IEEE International Conference on Data Mining*, pages 1105–1112. IEEE, 2014.
13. Shrikanth Narayanan, Ayush Jaiswal, Yao-Yi Chiang, Yanhui Geng, Craig A. Knoblock, and Pedro Szekely. Integration and automation of data preparation and data mining. In *Proceedings of the First Workshop on Data Integration and Application at the 2014 IEEE International Conference on Data Mining*, 2014.
14. Andreas Harth, Craig Knoblock, Steffen Stadtmuller, Rudi Studer, and Pedro Szekely. On-the-fly integration of static and dynamic sources. In *Proceedings of the Fourth International Workshop on Consuming Linked Data (COLD2013)*, 2013.
15. Ying Zhang, Yao-Yi Chang, Pedro Szekely, and Craig A. Knoblock. A semantic approach to retrieving, linking, and integrating heterogeneous geospatial data. In *Proceedings of the 2013 IJCAI Workshop on Semantic Cities*, 2013.
16. Craig A. Knoblock and Pedro Szekely. Semantics for big data integration and analysis. In *Proceedings of the AAAI Fall Symposium on Semantics for Big Data*, 2013.
17. Rahul Parundekar, Craig A. Knoblock, and Jose Luis Ambite. Finding concept coverings in aligning ontologies of linked data. In *Proceedings of the ESWC 2012 Workshop on Knowledge Discovery and Data Mining Meets Linked Open Data*, 2012.
18. Bo Wu, Pedro Szekely, and Craig A. Knoblock. Learning data transformation rules through examples: Preliminary results. In *Ninth International Workshop on Information Integration on the Web (IIWeb 2012)*, 2012.
19. Mohsen Taheriyani, Craig A. Knoblock, Pedro Szekely, and Jose Luis Ambite. Semi-automatically modeling web apis to create linked apis. In *Proceedings of the ESWC 2012 Workshop on Linked APIs*, 2012.
20. Pedro Szekely, Craig A. Knoblock, Shubham Gupta, Mohsen Taheriyani, and Bo Wu. Exploiting semantics of web services for geospatial data fusion. In *Proceedings of the SIGSPATIAL International Workshop on Spatial Semantics and Ontologies (SSO 2011)*, Chicago, IL, 2011.
21. Rahul Parundekar, Jose Luis Ambite, and Craig A. Knoblock. Aligning unions of concepts in ontologies of geospatial linked data. In *Proceedings of the Terra Cognita 2011 Workshop in Conjunction with the 10th International Semantic Web Conference*, Bonn, Germany, 2011.

22. Craig A. Knoblock, Pedro Szekely, Jose Luis Ambite, Shubham Gupta, Aman Goel, Maria Muslea, Kristina Lerman, and Parag Mallick. Interactively mapping data sources into the semantic web. In *Proceedings of the First International Workshop on Linked Science 2011 in Conjunction with the 10th International Semantic Web Conference*, Bonn, Germany, 2011.
23. Yao-Yi Chiang, Stefan Leyk, and Craig A. Knoblock. Harvesting cartographic information from historical maps: Efficient user intervention strategy for robust graphics recognition. In *In Proceedings of the Ninth IAPR International Workshop on Graphics RECOgnition (GREC'11)*, 2011.
24. Rahul Parundekar, Craig A. Knoblock, and José Luis Ambite. Aligning geospatial ontologies on the linked data web. In *Proceedings of the Workshop on Linked Spatiotemporal Data*, 2010.
25. Rahul Parundekar, Craig A. Knoblock, and José Luis Ambite. Linking the deep web to the linked data web. In *Proceedings of the AAAI Spring Symposium on Linked Data Meets Artificial Intelligence*, Stanford, CA, 2010.
26. Yao-Yi Chiang and Craig A. Knoblock. An approach to automatic road vectorization of raster maps. In *Proceedings of the 8th IAPR International Workshop on Graphics RECOgnition (GREC'09)*, 2009.
27. José Luis Ambite, Bora Cenk Gazen, Craig A. Knoblock, Kristina Lerman, and Thomas Russ. Discovering and learning semantic models of online sources for information integration. In *Proceedings of the IJCAI Workshop on Information Integration on the Web*, Pasadena, CA, 2009.
28. Jose Luis Ambite, Craig A. Knoblock, Kristina Lerman, Anon Plangprasopchok, Thomas Russ, Cenk Gazen, Steven Minton, and Mark Carman. Exploiting data semantics to discover, extract, and model web sources. In *Proceedings of the First International Workshop on Semantic Aspects in Data Mining (SADM'08)*, 2008.
29. Martin Michalowski, Craig A. Knoblock, and Berthe Y. Choueiry. Exploiting problem data to enrich models of constraint problems. In *Proceedings of the 6th International Workshop On Constraint Modelling and Reformulation (ModRef07)*, pages 1–15, 2007.
30. James Blythe, Dipsy Kapoor, Craig A. Knoblock, Kristina Lerman, and Steven Minton. Information integration for the masses. In *Proceedings of the 6th International Workshop on Information Integration on the Web (IIWeb)*, 2007.
31. Matthew Michelson and Craig A. Knoblock. Mining heterogeneous transformations for record linkage. In *Proceedings of the 6th International Workshop on Information Integration on the Web (IIWeb)*, pages 68–73, 2007.
32. Martin Michalowski, Craig A. Knoblock, and Berthe Y. Choueiry. Reformulating Constraint Models Using Input Data. In *Symposium on Abstraction, Reformulation and Approximation (SARA 07)*, pages 402–403, Whistler, Canada, 2007. LNAI 4612, Springer.
33. Kenneth M. Bayer, Martin Michalowski, Berthe Y. Choueiry, and Craig A. Knoblock. Reformulating Constraint Satisfaction Problems to Improve Scalability. In *Symposium on Abstraction, Reformulation and Approximation (SARA 07)*, pages 64–79, Whistler, Canada, 2007. LNAI 4612, Springer.
34. Matthew Michelson and Craig A. Knoblock. Beginning to understand unstructured, ungrammatical text: An information integration approach. In *Proceedings of the AAAI Spring Symposium on Machine Reading*, 2007.
35. Matthew Michelson and Craig A. Knoblock. An automatic approach to semantic annotation of unstructured, ungrammatical sources: A first look. In *Proceedings of the 1st IJCAI Workshop on Analytics for Noisy Unstructured Text Data*, 2007.
36. Ching-Chien Chen, Cyrus Shahabi, Craig A. Knoblock, and Mohammad R. Kolahdouzan. Automatically and efficiently matching road networks with spatial attributes in unknown geometry systems. In *The VLDB 2006 Workshop on Spatio-Temporal Database Management (STDBM)*, Seoul, Korea, September 2006.
37. Mohammad R. Kolahdouzan, Ching-Chien Chen, Cyrus Shahabi, and Craig A. Knoblock. Geomatchmaker: Automatic and efficient matching of vector data with spatial attributes in unknown geometry systems. In *Proceedings of the UCGIS 2005 Summer Assembly*, Jackson Hole, Wyoming, June 2005.

38. Mark James Carman and Craig A. Knoblock. Inducing source descriptions for automated web service composition. In *Proceedings of the AAAI 2005 Workshop on Exploring Planning and Scheduling for Web Services, Grid, and Autonomic Computing, Technical Report WS-05-03*. AAAI Press, 2005.
39. Craig A. Knoblock, Pedro Szekely, and Rattapoom Tuchinda. A mixed-initiative system for building mixed-initiative systems. In *Proceedings of the AAAI Fall Symposium on Mixed-Initiative Problem-Solving Assistants*, 2005.
40. Sneha Desai, Craig A. Knoblock, Yao-Yi Chiang, Kandarp Desai, and Ching-Chien Chen. Automatically identifying and georeferencing street maps on the web. In *Proceedings of the 2nd International Workshop on Geographic Information Retrieval (GIR'05)*, 2005.
41. Ching-Chien Chen, Cyrus Shahabi, and Craig A. Knoblock. Utilizing road network data for automatic identification of road intersections from high resolution color orthoimagery. In *Proceedings of the 2nd Workshop on Spatio-Temporal Database Management - STDBM'04*, 2004.
42. Kristina Lerman, Cenk Gizen, Steven Minton, and Craig A. Knoblock. Populating the semantic web. In *Proceedings of the AAAI 2004 Workshop on Advances in Text Extraction and Mining*, 2004.
43. Martin Michalowski, Snehal Thakkar, and Craig A. Knoblock. Exploiting secondary sources for unsupervised record linkage. In *Proceedings of the 2004 VLDB Workshop on Information Integration on the Web*, 2004.
44. Snehal Thakkar, Jose Luis Ambite, and Craig A. Knoblock. A data integration approach to automatically composing and optimizing web services. In *Proceedings of 2004 ICAPS Workshop on Planning and Scheduling for Web and Grid Services*, Whistler, BC, Canada, 2004.
45. Ching-Chien Chen, Craig A. Knoblock, Cyrus Shahabi, and Snehal Thakkar. Automatically and accurately conflating satellite imagery and maps. In *Proceedings of the International Workshop on Next Generation Geospatial Information*, Cambridge, MA, 2003.
46. Mehdi Sharifzadeh, Cyrus Shahabi, and Craig A. Knoblock. Learning approximate thematic maps from labeled geospatial data. In *Proceedings of the International Workshop on Next Generation Geospatial Information*, Cambridge, MA, 2003.
47. Martin Michalowski, Snehal Thakkar, and Craig A. Knoblock. Exploiting secondary sources for automatic object consolidation. In *Proceedings of the KDD'03 Workshop on Data Cleaning, Record Linkage and Object Consolidation*, 2003.
48. Greg Barish and Craig A. Knoblock. Combining classification and transduction for value prediction in speculative plan execution. In *Proceedings of 2003 IJCAI Workshop on Information Integration on the Web*, Acapulco, Mexico, 2003.
49. Snehal Thakkar and Craig A. Knoblock. Efficient execution of recursive integration plans. In *Proceedings of 2003 IJCAI Workshop on Information Integration on the Web*, Acapulco, Mexico, 2003.
50. Snehal Thakkar, Jose-Luis Ambite, and Craig A. Knoblock. A view integration approach to dynamic composition of web services. In *Proceedings of 2003 ICAPS Workshop on Planning for Web Services*, Trento, Italy, 2003.
51. Greg Barish and Craig A. Knoblock. An efficient and expressive language for information gathering on the web. In *Proceedings of the AIPS-2002 Workshop on Is there life after operator sequencing? – Exploring real world planning*, pages 5–12, Toulouse, France, 2002.
52. Greg Barish and Craig A. Knoblock. Learning efficient value predictors for speculative plan execution. In *Proceedings of the Fifth International Workshop on the World Wide Web and Databases (WebDB 2002)*, pages 77–82, Madison, WI, 2002.
53. Ion Muslea, Steven Minton, and Craig A. Knoblock. Adaptive view validation: A case study on wrapper induction and text classification. In *Proceedings of the AAAI-2002 Workshop on Intelligent Services Integration*, Edmonton, Alberta, Canada, 2002.
54. Snehal Thakkar, Craig A. Knoblock, Jose Luis Ambite, and Cyrus Shahabi. Dynamically composing web services from on-line sources. In *Proceeding of AAAI-2002 Workshop on Intelligent Service Integration*, pages 1–7, Edmonton, Alberta, Canada, July 2002.

55. Kristina Lerman, Craig A. Knoblock, and Steven Minton. Automatic data extraction from lists and tables in web sources. In *Proceedings of the IJCAI 2001 Workshop on Adaptive Text Extraction and Mining*, Seattle, WA, 2001.
56. Greg Barish, Craig A. Knoblock, Yi-Shin Chen, Steven Minton, Andrew Philpot, and Cyrus Shahabi. Theaterloc: A case study in building an information integration application. In *Proceedings of the IJCAI-99 Workshop on Intelligent Information Integration*, Stockholm, Sweden, 1999.
57. Greg Barish, Craig A. Knoblock, Daniel DiPasquo, and Steven Minton. An efficient plan execution system for information management agents. In *Proceedings of the ACM CIKM'99 Workshop on Web Information and Data Management (WIDM)*, Kansas City, MO, 1999.
58. Craig A. Knoblock and Steven Minton. Building agents for internet-base supply chain integration. In *Proceedings of the Workshop on Agents for Electronic Commerce and Managing the Internet-Enabled Supply Chain*, Seattle, WA, 1999.
59. Ion Muslea, Steven Minton, and Craig A. Knoblock. Selective sampling with co-testing. In *Proceedings of the CRM Workshop on Selecting and Combining Models with Machine Learning Algorithms*, Montreal, Canada, April 2000.
60. Ion Muslea, Steven Minton, and Craig A. Knoblock. Selective sampling with naive co-testing: Preliminary results. In *Proceedings of the ECAI-2000 Workshop On Machine Learning for Information Extraction*, Berlin, Germany, 2000.
61. Craig A. Knoblock Naveen Ashish and Cyrus Shahabi. Selectively materializing data in mediators by analyzing query distribution, source structure and maintenance cost. In *Proceedings of the ACM CIKM'99 Workshop on Web Information and Data Management (WIDM)*, Kansas City, MO, 1999.
62. Naveen Ashish and Craig A. Knoblock. Wrapper generation for semi-structured Internet sources. In *Proceedings of the Workshop on Management of Semistructured Data*, Tucson, AZ, 1997.
63. Craig A. Knoblock. Why plan generation and plan execution are inseparable. In *Proceedings of the AAAI Fall Symposium on Plan Execution*, Cambridge, MA, 1996.
64. Sheila Tejada, Craig A. Knoblock, and Steven Minton. Learning models for multi-source integration. In *Proceedings of the AAAI Spring Symposium on Machine Learning in Information Access*, Stanford, CA, 1996.
65. Craig A. Knoblock. Integrating planning and execution for information gathering. In *Working Notes of the AAAI Spring Symposium on Information Gathering in Distributed Heterogeneous Environments*, Palo Alto, CA, 1995.
66. Craig A. Knoblock and Alon Levy. Exploiting run-time information for efficient processing of queries. In *Working Notes of the AAAI Spring Symposium on Information Gathering in Distributed Heterogeneous Environments*, Palo Alto, CA, 1995.
67. Jose-Luis Ambite and Craig A. Knoblock. Reconciling distributed information sources. In *Working Notes of the AAAI Spring Symposium on Information Gathering in Distributed Heterogeneous Environments*, Palo Alto, CA, 1995.
68. Craig A. Knoblock and Alon Levy. Efficient query processing for information gathering agents. In *Proceedings of the Workshop on Intelligent Information Agents*, Gaithersburg, MD, 1994.
69. Jose Luis Ambite and Craig A. Knoblock. Reconciling agent models. In *Proceedings of the Workshop on Intelligent Information Agents*, Gaithersburg, MD, 1994.
70. Craig A. Knoblock. Applying a general-purpose planner to the problem of query access planning. In *Proceedings of the AAAI Fall Symposium on Planning and Learning: On to Real Applications*, New Orleans, La, 1994.
71. Craig A. Knoblock and Qiang Yang. Evaluating the tradeoffs in partial-order planning algorithms. In *Proceedings of the Workshop on Comparative Analysis of AI Planning Systems*, pages 42–58, 1994.
72. Craig A. Knoblock and Qiang Yang. A Comparison of the SNLP and TWEAK Planning Algorithms. In *Proceedings of the AAAI Spring Symposium on Classical Planning Systems*, Palo Alto, CA, 1993.

73. Chun-Nan Hsu and Craig A. Knoblock. Learning Database Abstractions for Query Reformulation. In *Proceedings of the AAAI Workshop on Knowledge Discovery in Databases*, Washington, DC, 1993.
74. Craig A. Knoblock, Josh D. Tenenber, and Qiang Yang. A spectrum of abstraction hierarchies for planning. In *Proceedings of the Workshop on Automatic Generation of Approximations and Abstractions*, Boston, MA, 1990.
75. Craig A. Knoblock. Abstracting the Tower of Hanoi. In *Proceedings of the Workshop on Automatic Generation of Approximations and Abstractions*, Boston, MA, 1990.
76. Craig A. Knoblock. Learning problem-specific abstraction hierarchies. In *Proceedings of the Workshop on Change of Representation and Problem Reformulation*, Palo Alto, CA, 1990.
77. Jaime G. Carbonell, Yolanda Gil, Robert Joseph, Craig A. Knoblock, Steve Minton, and Manuela M. Veloso. Designing an integrated architecture: The PRODIGY view. In *Proceedings of The Twelfth Annual Conference of the Cognitive Science Society*, Boston, MA, 1990.
78. Craig A. Knoblock. Learning hierarchies of abstraction spaces. In *Proceedings of the Sixth International Workshop on Machine Learning*, Ithaca, NY, 1989.
79. Craig A. Knoblock. Automatically generating abstractions for planning. In *Proceedings of the First International Workshop on Change of Representation and Inductive Bias*, Briarcliff, NY, 1988.
80. Steven Minton, Jaime G. Carbonell, Oren Etzioni, Craig A. Knoblock, and Daniel R. Kuokka. Acquiring effective search control rules: Explanation-based learning in the PRODIGY system. In *Proceedings of the Fourth International Workshop on Machine Learning*, Irvine, CA, 1987.
81. Steven Minton, Jaime G. Carbonell, Craig A. Knoblock, Dan Kuokka, and Henrik Nordin. Improving the effectiveness of explanation-based learning in the PRODIGY system. In *Proceedings of the Workshop on Knowledge Compilation*, Inn at Otter Crest, OR, 1986.

Demonstration Papers

1. Jason Slepicka, Chengye Yin, Pedro Szekely, and Craig A. Knoblock. A demonstration of linked data source discovery and integration. In *Proceedings of the ISWC 2014 Posters & Demonstrations Track*, volume 1272. CEUR, 2014.
2. Yao-Yi Chiang, Sima Moghaddam, Sanjauli Gupta, Renuka Fernandes, and Craig A. Knoblock. From map images to geographic names. In *Proceedings of the 22nd ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*, 2014.
3. Yao-Yi Chiang, Bo Wu, Akshay Anand, Ketan Akade, and Craig A. Knoblock. A system for efficient cleaning and transformation of geospatial data attributes. In *Proceedings of the 22nd ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*, 2014.
4. Craig A. Knoblock, Pedro Szekely, Shubham Gupta, Animesh Manglik, Ruben Verborgh, Fengyu Yang, and Rik Van de Walle. Publishing data from the Smithsonian American Art Museum as linked open data. In *Proceedings of the ISWC 2013 Posters & Demonstrations Track*, pages 129–132, 2013.

Selected Technical Reports

1. Jose-Luis Ambite, Yigal Arens, Naveen Ashish, Chin Y. Chee, Chun-Nan Hsu, Craig A. Knoblock, Wei-Min Shen, and Sheila Tejada. The SIMS manual: Version 1.0. Technical Report ISI/TM-95-428, University of Southern California, Information Sciences Institute, 1995.
2. Craig A. Knoblock. *Automatically Generating Abstractions for Problem Solving*. Ph.D. Thesis, School of Computer Science, Carnegie Mellon University, Pittsburgh, PA, 1991.
3. Steven Minton, Craig A. Knoblock, Daniel R. Kuokka, Yolanda Gil, Robert L. Joseph, and Jaime G. Carbonell. PRODIGY 2.0: The manual and tutorial. Technical Report CMU-CS-89-146, School of Computer Science, Carnegie Mellon University, Pittsburgh, PA, 1989.

Tutorials

1. ***Knowledge Graph Construction from Web Corpora***
Mayank Kejriwal, Craig Knoblock, and Pedro Szekely
Tutorial Program, 32nd AAAI Conference on Artificial Intelligence
February 3, 2018
2. ***Constructing Domain-specific Knowledge Graphs***
Mayank Kejriwal, Pedro Szekely and Craig Knoblock
Tutorial Program, 16th International Semantic Web Conference
October 21, 2017
3. ***Information Integration on the Web***
Craig Knoblock and Subbarao Kambhampati
Tutorial Program, Twenty-Second National Conference on Artificial Intelligence
July 22, 2007
4. ***Planning on the Web***
Craig Knoblock and Jose Luis Ambite
Tutorial Program, Fourteenth International Conference on Automated Planning and Scheduling
June 3, 2004
5. ***Information Integration on the Web***
Craig Knoblock and Subbarao Kambhampati
Tutorial Program, Eighteenth National Conference on Artificial Intelligence
July 29, 2002
6. ***Planning and Plan Execution for Information Gathering***
Tutorial Program, PLANET International Summer School on AI Planning
September 16-22, 2002 Halkidiki, Greece
7. ***Recent Advances in AI Planning***
Co-taught with Subbarao Kambhampati
Tutorial Program, Fifteenth National Conference on Artificial Intelligence, 1998.
8. ***Information Gathering and Integration***
Co-taught with Alon Halevy
Tutorial Program, Thirteenth National Conference on Artificial Intelligence, 1996.

Grants, Contracts, & Gifts

1. **Principal Investigator**, Food Agricultural Assurance Supply Chains Testbed (FAAST), DARPA (subcontract via UMD ARLIS), \$400,000, April 2021.
2. **Co-Principal Investigator**, FAIR Data Platform for Scaling up Data For FAIR-ification, Novartis, \$613,208, August 2020.
3. **Co-Principal Investigator**, *Exploiting Financial and Economic Data: Business OKN*, National Science Foundation, \$1,000,000, September 2019.
4. **Principal Investigator**, *Computer Vision Artificial Intelligence Search Tool (CFAST)*, Combating Terrorism Technical Support Office (CTTSO) (subcontract via SRI), \$320,000, July 2019.
5. **Principal Investigator**, *Multi-Source Data Fusion for Space Situational Awareness (SpaceAware)*, Air Force, \$929,441, April 2018.
6. **Co-Principal Investigator**, *MINT: Model INTeGration through Knowledge-Rich Data and Process Composition*, DARPA, \$12,979,881, December 2017.
7. **Principal Investigator**, *Exploiting Context in Cartographic Evolutionary Documents to Extract and Build Linked Spatial-Temporal Datasets*, National Science Foundation, \$642,959, August 2016.

8. **Principal Investigator**, *Automatic Alignment of Design Semantics to Enable Mapping Between CAD Systems*, DARPA, \$120,000, September 2016.
9. **Co-Principal Investigator**, *Effectively Forecasting Evolving Cyber Threats*, IARPA, \$6,476,872, July 2016.
10. **Principal Investigator**, *American Art Collaborative's (AAC) Linked Open Data (LOD) Initiative*, Mellon Foundation (subcontract via Smithsonian American Art Museum), \$100,000, July 2016.
11. **Principal Investigator**, *Large-scale Database Construction of Firms, Organizational Form, Competition, and Industry Change*, National Science Foundation, \$250,000, March 2016.
12. **Principal Investigator**, *Phase 1 of the American Art Collaborative Linked Open Data Initiative*, Institute of Museum and Library Services (subcontract via Crystal Bridges Museum of American Art), \$50,000, January 2016.
13. **Principal Investigator**, *Probabilistic Representation of Intent Commitments to Ensure Software Survival*, DARPA (subcontract via Charles River Associates), \$1,294,800, November 2015.
14. **Principal Investigator**, *Organizing Data for Effective End-User Management*, U.S. Government, \$225,000, August 2015.
15. **Principal Investigator**, *Scalable Coordinated Human-centered Automated Resilient Planning*, DARPA (subcontract via Next Century), \$3,425,000, August 2015.
16. **Co-Principal Investigator**, *Domain-Specific Insight Graphs*, DARPA, \$8,400,000, September 2014.
17. **Co-Principal Investigator**, *Text and Symbol Recognition from Historical Maps, Conveyancing Liability Solutions*, \$120,000, September 2014.
18. **Principal Investigator**, *Creating Linked Open Data About Conflict Indicators for Peacebuilding*, Center for Global Health and Peacebuilding, \$100,000, July 2014.
19. **Principal Investigator**, *Extracting and Integrating User Generated Content*, National Geospatial-Intelligence Agency (subcontract via SRI), \$100,000, October 2014.
20. **Principal Investigator**, *Integrating and Visualizing Diverse Sources of Network Data, Phase II*, Air Force Research Lab (via Northrup Grumman), \$35,000, April 2014.
21. **Principal Investigator**, *Building Integration Tools for Complex Domains*, IARPA (via CUBRC), \$75,000, January 2014.
22. **Principal Investigator**, *Integrating Heterogeneous Sources in a Geospatial Framework to Support Oil Field Operations*, Chevron, \$116,000, January 2014.
23. **Principal Investigator**, *Semantic Alignment to Integration Data*, US Government, \$340,000, November 2013.
24. **Principal Investigator**, *Integrating and Visualizing Diverse Sources of Network Data*, Air Force Research Lab (via Northrup Grumman), \$125,000, October 2013.
25. **Principal Investigator**, *A Unified Approach to Information Integration and Data Mining on Large, Heterogeneous Data Sources*, Huawei Technologies, \$130,000, September 2013.
26. **Principal Investigator**, *Harvesting Geographic Information from Heterogeneous Raster Maps*, TerraGo Technologies, \$75,000, August 2013.
27. **Principal Investigator**, *Integrating Heterogeneous Sources in a Geospatial Framework to Support Oil Field Operations*, Chevron, \$110,000, January 2013.
28. **Principal Investigator**, *U.S. Based Students Travel Support for the ACM SIGSPATIAL 2013*, NSF, \$30,000, August 2013.
29. **Principal Investigator**, *Organizing and Linking Art Museum Information*, Smithsonian American Art Museum, \$200,000, April 2012.
30. **Principal Investigator**, *Integrating Heterogeneous Sources in a Geospatial Framework to Support Oil Field Operations*, Chevron, \$145,000, January 2012.

31. **Co-Principal Investigator**, *Geospatial Analysis of Motion-Based Intelligence Tracking*, Office of Naval Research, \$2,520,000, December 2011.
32. **Principal Investigator**, *Building Linked Open Services from Online Sources*, NSF, \$516,000, October 2011.
33. **Principal Investigator**, *Integrating Heterogeneous Sources in a Geospatial Framework to Support Oil Field Operations*, Chevron, \$96,000, January 2011.
34. **Principal Investigator**, *Domain Vocabulary from Extraction, Transduction, and Auto Induction of Layout (DOVETAIL)*, IARPA, (subcontract from SRI), \$2,307,822, October 2010.
35. **Principal Investigator**, *An Integrated Framework for Geospatial Data Fusion*, DOD, \$300K, August 2010.
36. **Principal Investigator**, **Building Mashups for Decision Making**, DARPA, \$150,000, April 2010.
37. **Principal Investigator**, *Integrating Heterogeneous Sources in a Geospatial Framework to Support Oil Field Operations*, Chevron, \$150,000, January 2010.
38. **Principal Investigator**, *Harvesting Named Geographic Features from Raster Maps*, DOD, \$300,000, October 2009.
39. **Co-Principal Investigator**, *Automation of Technical Reachback for PMESII Best Practices*, OSD STTR Phase I Project (subcontract from Securboratorion), \$100,000, February 2009.
40. **Co-Principal Investigator**, *Trend Analysis and Data Mining for Finding Suspicious Entities*, AFRL STTR Phase II Project (subcontract from Fetch Technologies), \$750,000, November 2008.
41. **Co-Principal Investigator**, *Rapid engagement of humanitarian assistance social networks for ad hoc geospatial data sharing*, National Science Foundation, \$450,000, September 2008.
42. **Principal Investigator**, *Sapling Effort on Information Integration*, DARPA, \$500,000, November 2007.
43. **Co-Principal Investigator** *Exploiting Raster Maps for Imagery Analysis*, AFOSR STTR Phase II Project (subcontract from Geosemble Technologies), \$742,000, October 2007.
44. **Co-Principal Investigator** *Trend Analysis and Data Mining for Finding Suspicious Entities*, AFRL STTR Phase I Project (subcontract from Fetch Technologies), \$100,000, October 2007.
45. **Principal Investigator**, *Geospatial Information Integration and Visualization for Oil Field Operation and Exploration*, Chevron, \$275,000, September 2007.
46. **Principal Investigator**, *Interleaved Information Gathering and Reasoning for Information Fusion*, AFOSR, \$740,000, April 2007.
47. **Principal Investigator**, *Integrating Online Maps with Aerial Imagery*, Microsoft Research, \$40,000, March 2007.
48. **Co-Principal Investigator**, *Exploiting Raster Maps for Imagery Analysis*, AFOSR STTR Phase I Project (subcontract from Geosemble Technologies), \$100,000, September 2006.
49. **Co-Principal Investigator**, *GeoDec: Geospatial Decision Making*, Microsoft Research, \$40,000, January 2006.
50. **Co-Principal Investigator**, *Accurate and Rapid Construction of Information-Rich 3-D City Models*, Microsoft Research, \$100,000, October 2005.
51. **Principal Investigator**, *PSYOP Global Reach*, Institute for Creative Technologies \$200,000, October 2005.
52. **Principal Investigator**, *EntityBases: Large-scale Knowledge Bases for Intelligence Data*, AFRL, \$3,450,000, April 2005.
53. **Principal Investigator**, *Constraint-based Integration of Geospatial and Online Sources*, Institute for Creative Technologies, \$501,000, March 2004.

54. **Principal Investigator**, *A Framework for Integrating Geospatial and Online Data to Respond to Unexpected Events*, NSF ITR Grant, \$1,180,000, October 2003.
55. **Principal Investigator**, *Enduring Personal Cognitive Assistant*, DARPA PAL Program (subcontract from SRI), \$3,125,000, May 2003.
56. **Co-Principal Investigator**, *Proteus: A System for Execution of Dynamically Composed Web Services Using GXA*, Microsoft, \$350,000, January 2003.
57. **Co-Principal Investigator**, *Machine Learning for Record Linkage II*, AFOSR STTR Phase II (subcontract from Fetch Technologies), \$173,000, September 2002.
58. **Principal Investigator**, *Efficiently Accessing and Integrating Worldwide Geographic Data (Tera-World)*, AFOSR DURIP equipment grant, \$208,000, April 2002.
59. **Co-Principal Investigator**, *Composing Web Sources Using a Scalable .Net Middleware*, Microsoft, \$200,000, January 2002.
60. **Co-Principal Investigator**, *Machine Learning for Record Linkage (ML-Link)*, AFOSR STTR Phase I project (subcontract from Fetch Technologies), \$36,000, October 2001.
61. **Principal Investigator**, *WIDELink: A Bootstrapping Approach to Identifying, Modeling, and Linking On-Line Data Sources*, DARPA Evidence Extraction and Link Discovery Program, \$1,485,000, September 2001.
62. **Principal Investigator**, *Rapidly Building High-Performance Information Agents*, AFOSR, \$780,000, December 2000.
63. **Principal Investigator**, *Active Template Reasoning and Optimization*, DARPA Active Templates Program, \$3,911,500, April 2000.
64. **Co-Principal Investigator**, *Agents for Plan Management*, DARPA Cooperative Agent-Based Systems Program, \$2,102,000, July 1998.
65. **Principal Investigator**, *Intelligent Agents for Retrieving, Filtering, and Managing Information*, AFOSR, \$985,000, October 1997.
66. **Co-Principal Investigator**, *A Portable SIMS System for Integrating Inconsistent and Partial Information Sources*, DARPA Intelligent Information Integration Program, \$1,867,000, October 1997.
67. **Co-Principal Investigator**, *Information Integration for Battlefield Awareness*, DARPA Battlefield Awareness and Data Dissemination Program, 750,000, June 1997.
68. **Co-Principal Investigator**, *SIMS for Dealmaker*, DARPA Advanced Logistics Program, \$544,000, August 1996.
69. **Co-Principal Investigator**, *SIMS II: Single Interface to Multiple Sources of Incomplete Information*, ARPA Intelligent Integration of Information Program, \$1,200,000, March 1994.
70. **Principal Investigator**, *Learning and Reformulation for Efficient Multidatabase Retrieval*, National Science Foundation Database and Expert Systems Program, \$259,000, September 1993.
71. **Principal Investigator**, *Building Information Servers*, DARPA Augmentation Award for Science and Engineering Research Training, \$139,000, March 1993.

Patents

- **Processing Time-based Geospatial Data**
Ching-Chien Chen, Craig A. Knoblock, Cyrus Shahabi
US Patent No. 8,953,887, 2015
- **Systems and methods for linking content to individual image features**
Craig A. Knoblock, Cyrus Shahabi, Ching-Chien Chen, Dipsy Kapoor
US Patent No. 8,670,617

- **Precisely Locating Features on Geospatial Imagery**
Ching-Chien Chen, Dipsy Kapoor, Craig A. Knoblock, Cyrus Shahabi
US Patent No. 8,675,995, 2014
- **Dynamically linking relevant documents to regions of interest**
Cyrus Shahabi, Craig A. Knoblock, Dipsy Kapoor, Ching-Chien Chen
US Patent No. 8,340,360, 2013
- **Performing Predictive Pricing Based on Historical Data**
Oren Etzioni, Alexander Yates, Craig A. Knoblock, and Rattapoom Tuchinda
US Patent No. 8,566,143, 2013
US Patent No. 7,974,863, 2011
US Patent No. 7,346,520, 2008
US Patent No. 7,010,494, 2006
- **System and method for fusing vector data with imagery**
Ching-Chien Chen, Dipsy Kapoor, Craig A. Knoblock, Cyrus Shahabi
US Patent No. 8,340,360, 2012
- **System and Method for Fusing Geospatial Data**
Ching-Chien Chen, Craig A. Knoblock, Cyrus Shahabi, and Yao-Yi Chiang
US Patent No. 7,660,441, 2010
- **Wrapper Induction by Hierarchical Data Analysis**
Ion Muslea, Steven Minton, and Craig A. Knoblock
US Patent No. 6,606,625, 2003