CURRICULUM VITAE

Mark Alan Musen

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Major Projects

1984–	The Protégé Project: Computer support for the construction of electronic knowledge bases and ontologies. http://protege.stanford.edu
1988–2006	EON: Computer-based decision support for clinical protocols and guidelines.
2005–2014	The National Center for Biomedical Ontology (NCBO). An NIH-supported National Center for Biomedical Computing. http://bioontology.org
2014–	The Center for Extended Data Annotation and Retrieval (CEDAR). An NIH Big-Data-to-Knowledge Initiative Center of Excellence. http://metadatacenter.org
2014–	The World Health Organization Stanford University Collaborating Centre for Classification, Terminology, and Standards.
2022–2026	Rapid Acceleration of Diagnostics (RADx) Data Hub. A national data repository to harmonize and integrate the results from COVID-related studies supported by the NIH. https://radx-hub.nih.gov

Employment, Research, and Academic Positions

2019–	Professor of Biomedical Data Science, Stanford University, Stanford, California
2002–	Professor of Medicine (Computational Medicine), Stanford University, Stanford, California
1995–2002	Associate Professor of Medicine (General Internal Medicine, Medical Informatics), Stanford University, Stanford, California
1993–	Chief, Division of Computational Medicine (formerly Stanford Medical Informatics), Stanford University School of Medicine
1989–2011	Assistant Professor; Associate Professor; Professor of Computer Science (by courtesy), Stanford University, Stanford, California
1988–1995	Assistant Professor of Medicine (General Internal Medicine), Stanford University, Stanford, California

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1987–1988	Visiting Scientist, Department of Medical Informatics, Erasmus University, Rotterdam, the Netherlands (December through August)
1984–1987	Clinical Instructor, Department of Medicine, Stanford University School of Medicine, Stanford, California
1983–1987	Ph.D. Candidate, Medical Information Sciences Program, Stanford University, Stanford, California
1983–1987	Henry J. Kaiser Family Foundation Fellow in General Internal Medicine, Stanford University School of Medicine, Stanford, California
1981–1983	Resident in Internal Medicine, Stanford University Hospital, Stanford, California
1980–1981	Intern in Internal Medicine, Stanford University Hospital, Stanford, California

Honors and Awards

1973	National Science Award, Westinghouse Science Talent Search
1977	Graduation Magna Cum Laude, Brown University
1977	Honors in Biology, Brown University, Providence, Rhode Island
1977	*Sigma Xi,* Brown University, Providence, Rhode Island
1980	Upjohn Achievement Award, Brown University Program in Medicine, Providence, Rhode Island
1989	Young Investigator Award for Research in Medical Knowledge Systems, American Association for Medical Systems and Informatics
1989	Elected Fellow, American College of Medical Informatics
1990	Fellow, American College of Physicians
1992	National Science Foundation Young Investigator Award
1997	Elected Member, American Society for Clinical Investigation
2003	Program Chair, American Medical Informatics Association Annual Symposium
2005	General Chair, International Semantic Web Conference
2006	Donald A.B. Lindberg Award for Innovation in Informatics, American Medical Informatics Association

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2007	Leadership Award, American Medical Informatics Association
2010	Elected Member, Association of American Physicians
2011	General Chair, International Conference on Knowledge Capture (K-Cap)
2014	"Ten Year" Award, Semantic Web Science Association, for the most influential paper from the *Proceedings of the International Semantic Web Conference* ten years earlier (with Holger Knubauch, Ray W. Fergerson, and Natalya F. Noy)
2016	Elected Member, National Academy of Medicine
2017	Elected Founding Fellow, International Academy of Health Sciences Informatics
2018	Classic Paper Award, Association for the Advancement of Artificial Intelligence, for the most influential paper from the AAAI conference 18 years earlier (with Natalya F. Noy)
2021	*Doctor honoris causa*, University of A Coruña, Spain
2022	Stanford Medicine Professor of Biomedical Informatics Research (endowed chair)
2023	*Doctor honoris causa*, University of Fribourg, Switzerland
2025	Lifetime achievement award, Knowledge Graph Conference
2025	Distinguished Fellow, American College of Medical Informatics

Education

School	**Major Subject, Degree, and Date**
Brown University, Providence, RI	Biology, Sc.B., 1977
Brown University, Providence, RI	Medicine, M.D., 1980
Stanford University, Stanford, CA	Medical Information Sciences, Ph.D., 1988

Licensure and Certification

1981	Diplomate, National Board of Medical Examiners, Certificate No. 227602
1981	California Medical License, No. G044898 (inactive)
1983	Diplomate, American Board of Internal Medicine, Certificate No. 091133 (retired)

Editorial Activities (Selected)

Applied Ontology
Founding Co-editor-in-chief, 2005–2016
Associate editor, 2017–

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Artificial Intelligence in Medicine
Associate Editor, 1989–1992
Member, Editorial Board, 1993–2017
Guest Editor, 1995, Special issue on component-based architectures (with A.T. Schreiber)

Biomedical Computation Review
Editorial Advisory Board, 2005–2017

Data Intelligence
Member, Editorial Board, 2017–

Faculty of 1000
Member of the Faculty, 2017–2020

IEEE Expert
Associate Editor, 1990–1994

IEEE Intelligent Systems
Guest Editor, 2001, Special issue on the Semantic Web (with Dieter Fensel)
Guest Editor, 2002, Special issue on Intelligent Information Processing (with Bernd Neumann and Rudi Studer)

International Journal of Expert Systems
Member, Editorial Board, 1990–1996

International Journal of Human–Computer Studies
Associate Editor, 1995–2009
Advisory Board, 2010–2023
Guest Editor, 2005, Special issue on the Protégé system

International Journal on Semantic Web and Information Systems
Member, Editorial Board, 2008–2024

Journal of Biomedical Semantics
Member, Editorial Board, 2010–2022

Journal of the American Medical Informatics Association
Member, Editorial Board, 1996–2006

Journal of Web Semantics
Member, Editorial Board, 2003–2011

Knowledge Acquisition
Member, Editorial Board 1989–1994
Guest Editor, 1992, Special issue on Knowledge Acquisition for Therapy-Planning Systems

Knowledge Engineering Review
Guest Editor, 1993, Special issue on Automated Tools for Knowledge Acquisition

Learning Health Systems
Founding Member, Editorial Board, 2015–

MD Computing
Advisory Board, 1998–2001

Medical Decision Making
Member, Editorial Board, 1992–1994

Methods of Information in Medicine
Member, Editorial Board, 1991–2005
Guest Editor, 2002, Special issue on Challenges for Medical Informatics as an Academic Discipline (with Jan van Bemmel)

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National Service and Consultantships (Selected)

Agency for Health Care Policy and Research
Field Reviewer, 1992–1993

American Board of Family Practice
Consultant, Computer-Based Assessment Project, 1993–1997

American College of Medical Informatics
Awards Committee, member, 2015–2016; chair, 2017–2018

American Medical Association
Consultant, CPT Revision Project, 2012–2016

American Medical Informatics Association
Member, Meetings Committee, 1992–1993; 2002–2003
Member, Nominating Committee, 1993–1996, 2014–2015
Member, Board of Directors, 1996–2002
Member, Awards Committee, 1996–2005; Chair, 2002–2005
Member, Ethics Committee, 1998–1999
Member, Task Force on Open Source Software, 2002–2003
Founding Chair, Academic Forum, 2006–2011
Past Chair, Academic Forum, 2011–2013
Member, Task Force on Certification in Medical Informatics, 2012

Apixio, Inc. (San Mateo, CA)
Member, Scientific Advisory Board, 2010–2020

Association for Computing Machinery
Member, Council, Special Interest Group in Biomedical Computing (SIGBIO), 1987–1991

Cardiovascular Research Grid
Member, Scientific Advisory Board, 2008–2011

Cerebra, Inc.
Member, Scientific Advisory Board, 2002–2006

Center for Expanded Data Annotation and Retrieval (NIH BD2K Center of Excellence)
Principal Investigator, 2014–2018

Chiron Corporation (Alameda, CA)
Consultant, Informatics Unit, 1997–1999

CODATA (Committee on Data of the International Science Council)
Member, United States National Committee for CODATA, 2021–
Member, Executive Committee, 2025–

dkNET
Member, Scientific Advisory Board, 2019–2023

Einstein–Montefiore Institute for Clinical and Translational Research
Member, External Advisory Committee, 2014–2023

ELIXIR Project, UK Node, Scientific Advisory Board, 2016–2017

Elsevier SciVerse Advisory Board, 2010–2013

European Translational Information and Knowledge Management Services (eTRIKS)
Member, Standards Advisory Panel, 2013–2017

Fast Track Systems, Inc. (San Mateo, CA)
Member, Scientific Advisory Board, 1999–2004

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Fred Hutchinson Cancer Research Center (Seattle, WA)
Consultant, Knowledge-Based Systems Project, 1994

Kyron, Inc. (Palo Alto, CA)
Member, Scientific Advisory Board, 2013–2015

Health Fidelity, Inc. (Palo Alto, CA)
Member, Scientific Advisory Board, 2012–2020

IO Informatics, Inc. (Berkeley, CA)
Member, Scientific Advisory Board, 2013–2020

KnowMED, Inc. (Houston, TX)
Chair, Scientific Advisory Board, 2012–2014

The Immune Tolerance Network
Deputy Director for Bioinformatics, 2005–2007

Institute for Medical Knowledge Implementation
Member, Board of Directors, 2001–2002

International Federation for Information Processing
Working Group 12.5: Knowledge-Oriented Development of Applications
Vice Chair, 1995–1999
Chair, 2000–2002

International Federation of Associations of Anatomists
Federative International Programme for Anatomical Terminology
Consultant, Informatics subcommittee, 2017–2024

International Medical Informatics Association (IMIA)
Steering Committee, Working Group 6: Coding and Classification of Health Data, 1993–1994

National Board of Medical Examiners
Member, Computer-Based Testing Technical Design Advisory Committee, 1990–1994

The National Center for Biomedical Ontology (NIH National Center for Biomedical Computing)
Principal Investigator, 2005–2017

National Center for Genome Resources (Santa Fe, NM)
Scientific Advisory Board, Virtual Plant Information Network, 2006–2008

National Institutes of Health
Member, Special Study Section 9 (Computer applications in biomedicine), 1990–1991
Member, Biomedical Library Review Committee, National Library of Medicine, 1992–1996
Member, Integrated Advanced Information Management Systems (IAIMS) review group, National Library of Medicine, 1993
Co-Chair, National Heart, Lung, and Blood Institute Ontology Workshop, Bethesda, MD, 2006
Member, National Advisory Council on Biomedical Imaging and Bioengineering, 2012–2016
Member, Inter-Council Working Group on Biomedical Data Science, 2014–2015
Founding Co-Chair, Big Data to Knowledge Metadata Working Group, 2015–2017
Founding Chair, Big Data to Knowledge Centers Steering Committee, 2015–2018

Pharmacogenomics Knowledge Base Project (Stanford University)
Member, Scientific Advisory Board, 2006–2007

Project NeOn: Lifecycle Support for Networked Ontologies
Scientific Advisory Board, 2006–2009

Rockefeller University Center for Clinical and Translational Science
Member, External Advisory Board, 2017–

Semantic Web Authority Tool Project (University of Manchester)
Member, Scientific Advisory Board, 2010–2012

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SmithKline Beecham Pharmaceuticals Research and Development (King of Prussia, PA)
Member, Advanced Information Technology Advisory Board, 1999–2001

University Health Network (Toronto, Canada)
International Research Advisory Board, 2002–2005

University of Leipzig (Germany)
Visiting Professor, Institute for Medical Informatics, Statistics, and Epidemiology, November 13–17, 1999

University of Washington
External Advisory Committee, Ph.D. Program, Biomedical and Health Informatics, 2002–2003

University of Wisconsin–Madison
Visiting Professor, Department of Industrial and Systems Engineering, 2006–2008

Vulcan, Inc. (Seattle, WA)
Member, Scientific Advisory Board, 2012–2013

World Health Organization
Member, International Classification of Diseases (ICD-11) Revision Steering Committee, 2008–2016
Chair, ICD-11 Health Informatics and Modeling Topic Advisory Group, 2008–2016
Member, International Classification of Traditional Medicine, Program Advisory Group, 2010–2013
Co-Chair, International Classification of Traditional Medicine, Informatics Working Group, 2010–2013
Director, Stanford University Collaborating Center for Classification, Terminology, and Standards, 2014–
Member, ICD-11 Medical and Scientific Advisory Committee, 2017–

National Scientific Program Committees (Selected)

AAAI National Conference on Artificial Intelligence
Program Committee, 1994; 1997; 2005

AAAI Spring Symposia (Stanford, CA)
Program Co-Chair, 1990, Artificial Intelligence in Medicine
Program Committee, 1992, Artificial Intelligence in Medicine
Program Co-Chair, 1997, Artificial Intelligence and Knowledge Management
Program Committee, 2000, Bringing Knowledge to Business Processes
Program Co-Chair, 2008, Symbiotic Relationships Between Semantic Web and Knowledge Engineering

AIME Artificial Intelligence in Medicine Europe
Program Committee, 2005; 2007; 2009; 2011

AMIA Annual Symposium
Program Committee, 1996
Program Chair, 2003

AMIA Spring Congress
Program Chair, 1992

Annual Banff Workshop on Knowledge Acquisition for Knowledge-Based Systems
Program Committee, 1989–1999
Program Co-Chair, 1992–1999

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Conference on Sharable and Reusable Problem-Solving Methods, Schloss Dagstuhl, Germany, 1995
Program Co-chair

DARPA Workshop on Reusable Problem-Solving Methods, Stanford, California, 1992
Organizer and Chair

European Knowledge-Acquisition Workshop (EKAW)
Program Committee, 1990–2012
Steering Committee, 2000–

Florida Artificial Intelligence Research Symposium
Program Committee, 1992

Intelligent Systems for Molecular Biology (ISMB)
Program Committee, 2005; 2006

International Conference on Biomedical Ontology
Program Committee, 2009–2015

International Federation for Information Processing, World Computer Congress
Program Co-Chair, Information Technology and Knowledge Processing 1998 (Budapest, Hungary)
Program Co-Chair, Intelligent Information Processing 2000 (Beijing, China)
Program Co-Chair, Intelligent Information Processing 2002 (Montreal, Quebec, Canada)
General Chair, Intelligent Information Processing 2010 (Manchester, UK)

International Medical Informatics Association Satellite Conference, Workshop on Challenges for Medical Informatics as an Academic Discipline, Madrid, Spain, 2001
Co-organizer and Program Co-Chair

International Working Conference on Natural Language and Medical Concept Representation, International Medical Informatics Association Working Group 6, Mont Pelerin, Switzerland, 1994
Program Committee

International Working Conference on Electronic Patient Records in Medical Practice (EPRIMP), Rotterdam, the Netherlands, 1998
Program Co-Chair

International Semantic Web Conference (ISWC)
Program Committee, 2004–2019
General Chair, 2005 (Galway, Ireland)

Japanese Knowledge Acquisition Workshop
Program Committee, 1989–1994

K-Cap: Conference on Knowledge Capture
Program co-chair, 2001
Steering Committee, 2001–2015
General Chair, 2011

MEDINFO: The World Congress on Medical Informatics
Program Committee, 2001

National Institute for Standards and Technology Workshop on Ontology Evaluation, 2007
Program co-chair

Symposium on Computer Applications in Medical Care
Program Committee, 1991–1993, 1996

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Stanford University Activities (Selected)

1988–2026	Executive Committee, Biomedical Informatics Graduate Program
1988–1994	Combined Admissions Mode (CAM) Committee, School of Medicine
1989–1992	Coordinator, Lectures on Clinical Reasoning, Preparation for Clinical Medicine Course
1989–1997	Director of Admissions, Medical Information Sciences Program
1990–1995	Medical Service Quality of Care Committee, Stanford University Hospital
1992–1995	Committee on Academic Computing and Information Systems (C-ACIS)
1992–1996	Executive Committee, Center for Advanced Medical Informatics at Stanford
1994–1995	Presidential Commission on Technology in Teaching and Learning
1995–2020	Advisory Committee, Center for Health Care Evaluation, Veterans Affairs Palo Alto Health Care System
1997	Chair, Department of Medicine Committee on Primary-Care Faculty Development
1998–2001	Academic Council Committee on Libraries (C-Lib)
2000	Information Technology Visioning Committee, Stanford University Medical Center
2000	School of Medicine Internet Strategy Steering Committee
1999	Co-chair, Provost's Committee on Academic Computing and Information Resources
2001–2011	Resident Fellow, Soto House, Wilbur Hall
2003–2007	Advisory Group on the Freshman Experience at Stanford, Dean of Freshmen and Transfer Students
2003–2011	Department of Medicine Appointments and Promotions Committee
2006–2009	Committee on Academic Computing and Information Systems (C-ACIS)
2009–2012	Member, Academic Council Committee on Libraries (C-Lib)
2012	Chair, Faculty Search Committee, Chief, Division of Gastroenterology and Hepatology, Department of Medicine
2012–2013	Member, Faculty Search Committee, Institute for Immunity, Transplantation, and Infection
2012–2013	Member, Faculty Search Committee, Institute for Stem Cell Biology and Regenerative Medicine
2012–2014	Chair, Academic Council Committee on Libraries (C-Lib)
2012–2014	Member, Academic Council Committee on Academic Computing and Information Systems (C-ACIS)
2013–2015	Chair, Faculty Search Committee, Division of Rheumatology and Immunology
2013–2015	Planning Committee, Department of Biomedical Data Sciences
2014–2015	Member, School of Medicine Clinical Informatics Task Force
2014–2017	Member, Steering Committee, Stanford Center for Clinical Informatics
2015–2016	Member, Faculty Search Committee, Division of Infectious Diseases

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2015–2017	Member, Faculty Search Committee, Integrative Biomedical Imaging Informatics at Stanford, Department of Radiology
2017–2020	Member, Academic Council Committee on Libraries (C-Lib)
2017–2019	Chair, Faculty Search Committee for Chief, Stanford Prevention Research Center, Department of Medicine
2019–	Member, Department of Biomedical Data Science, Appointments and Promotions Committee
2020–	Member, Executive committee, Center for Open and Reproducible Science (CORES)
2021–	Member, Steering Committee, Stanford Program on Research Rigor and Reproducibility

Graduate Student Supervision

Bennett, Andrew. FORMIKA: A form-based user interface management system for knowledge acquisition. (M.S., Stanford University, Department of Computer Science, June 1990; principal advisor)

Schoen, Eric J. Intelligent assistance for the design of knowledge-based systems. (Ph.D., Stanford University, Department of Computer Science, September 1990; dissertation committee)

Garcia, Ana Christina Bichara. Active Design Documents: A new approach for supporting documentation in preliminary routine design. (Ph.D., Stanford University, Department of Civil Engineering, August, 1992; dissertation committee)

Gilbertson, David G. Representation of the QMR knowledge base using SNOMED III and conceptual graphs. (M.S., Stanford University, Medical Information Sciences Program, June, 1993; principal advisor)

Kuilboer, Manon. CALIPER: Temporal reasoning for the monitoring of children's growth. (M.S., Stanford University, Medical Information Sciences Program, October, 1993; principal advisor)

Egar, John W. Construction of normative decision models using abstract graph grammars. (Ph.D., Stanford University, Medical Information Sciences Program, March, 1994; principal advisor)

Shahar, Yuval. A knowledge-based method for temporal abstraction of clinical data. (Ph.D., Stanford University, Medical Information Sciences Program, October, 1994; principal advisor)

Winkles, James. Modeling the induction of cognitive skills with classifier systems. (Ph.D., Stanford University, School of Education, December, 1994; dissertation committee)

Jain, Nilesh L. Preference acquisition through reconciliation of inconsistencies. (D.Sc., Washington University, Department of Computer Science, May, 1995; dissertation committee)

Sujansky, Walter V. An extended relational algebra for bridging representational heterogeneity among relational databases. (Ph.D., Stanford University, Medical Information Sciences Program, March, 1996; dissertation committee)

Ohno-Machado, Lucila. Medical applications of artificial neural networks: Connectionist models of survival. (Ph.D., Stanford University, Medical Information Sciences Program, March, 1996; principal advisor)

Katzenberg, B. Designing care: Evolving communities, working rules, and practice representations. (Ph.D., Stanford University, School of Education, August, 1997; dissertation committee)

Nguyen, John. Integration of temporal reasoning and temporal-data maintenance into a reusable database mediator to answer abstract, time-oriented queries: The Tzolkin system. (M.S., Stanford University, Medical Information Sciences Program, January, 2000; principal advisor)

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Oliver, Diane E. Managing local divergence of a shared clinical vocabulary. (Ph.D., Stanford University, Medical Information Sciences Program, August, 2000; principal advisor)

Jannink, Jan F. A word nexus for systematic interoperation of semantically heterogeneous data sources. (Ph.D., Stanford University, Department of Computer Science, March 2001; dissertation committee)

Felciano, Ramon. Graphical style sheets: Reusable representations of biomedical graphics. (Ph.D., Stanford University, Medical Information Sciences Program, June, 2001; dissertation committee)

Lee, Burton H. Failure modes and effects analysis with Bayesian belief networks. (Ph.D., Stanford University, Department of Mechanical Engineering, June 2001; dissertation committee)

Das, Amar K. A temporal data model for the integration of heterogeneous databases. (Ph.D., Stanford University, Biomedical Informatics Program, March 2002; principal advisor)

Bada, Michael R. A computational model of structural-biological experimental data and its applications. (Ph.D., Stanford University, Department of Chemistry, February 2003; dissertation committee)

Fridsma, Douglas B. Organizational simulation of medical work: An information-processing approach (Ph.D., Stanford University, Biomedical Informatics Program, August 2003; dissertation committee)

Mitra, Prasenjit An algebraic framework for the interoperation of ontologies. (Ph.D., Stanford University, Department of Computer Science, August 2004; dissertation committee)

Buckeridge, David L. A method for the evaluation of outbreak detection in surveillance systems that use administrative data. (Ph.D., Stanford University, Biomedical Informatics Program, September 2004; principal advisor)

Advani, Aneel. MedCritic: Quality assessment for guideline-based medical care using multi-agent abductive plan recognition. (M.S., Stanford University, Biomedical Informatics Program, April 2007; principal advisor)

Chen, Richard O. Automated diagnosis of data–model conflicts in biocomputational processes. (M.S., Stanford University, Biomedical Informatics Program, June 2007; co-advisor)

Park, John Y. A schema for mapping across ontologies in knowledge-based systems: The virtual knowledge base constructor. (M.S., Stanford University, Biomedical Informatics Program, June 2007; principal advisor)

Supekar, Kaustubh S. Methods for detecting and characterizing brain networks using multimodal neuroimaging data. (Ph.D., Stanford University, Biomedical Informatics Program, August 2010; principal advisor)

Murray, Katherine J. You use more than you see interfaces. (Ph.D., Stanford University, Department of Communication, June 2011; dissertation committee)

Hassanpour, Saeed. Semantic-based information extraction of biomedical definitions. (Ph.D., Stanford University, Department of Electrical Engineering, June 2012 dissertation committee, Ph.D. Minor Stanford University Biomedical Informatics, 2012)

Lee, Wei-Nchih. Evaluating clinical practice variation using a knowledge-based temporal sequence alignment framework (Ph.D., Stanford University, Biomedical Informatics Program, 2012; co-advisor)

Mortensen, Jonathan. Crowdsourcing ontology verification (Ph.D., Stanford University, Biomedical Informatics Program, December 2015, principal advisor)

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Gimenez, Francisco J. Fast adaptive structured reporting for decision support in radiology. (Ph.D., Stanford University, Biomedical Informatics Program, December 2015, dissertation committee)

Planey, Katey. Clustering within and across multiple datasets to discover repeatable subtypes. (Ph.D., Stanford University, Biomedical Informatics Program, December 2015, dissertation committee)

Lee, Rebecca S. Effects of surrounding tissue radiographic features in diagnosis of breast cancer. (Ph.D., Stanford University, Biomedical Informatics Program, June 2017, dissertation committee)

Kamdar, Maulik R. A Web-based integration framework over heterogeneous biomedical data and knowledge structures. (Ph.D., Stanford University, Biomedical Informatics Program, March 2019, principal advisor)

Patterson, Evan. The algebra and machine representation of statistical models. (Ph.D., Stanford University, Department of Statistics, June 2020, dissertation committee)

Sosa, Daniel N. Contexts and contradictions: Reasoning with science for literature-based drug repurposing. (Ph.D., Stanford University, Department of Biomedical Data Science, May 2023, dissertation committee)

Foreign Graduate Examinations

Eriksson, Henrik. Meta-tool support for knowledge acquisition. (Ph.D., Linköping University, Department of Computer and Information Science, April 1991; "opponent")

Pierret-Golbreich, Christine. TASK, an environment for the development of flexible knowledge-based systems. (Habilitation to direct research, Université Paris-Sud, Laboratory for Research in Informatics, April, 1996; external examiner)

Miksch, Silvia. Task-specific problem-solving methods for plan management in the medical domain. (Habilitation to direct research, Technical University of Vienna, September, 1999; external examiner)

de Clercq, Paul A. Guideline-based decision support in medicine. (Ph.D., Technical University Eindhoven, June, 2003; external examiner)

Heller, Barbara. Knowledge-based systems and ontologies in medicine. (Habilitation to direct research, University of Leipzig, June, 2004; external examiner)

Tudorache, Tania. Employing ontologies for an improved process in collaborative engineering. (Ph.D., Technical University of Berlin, November, 2006; external examiner)

Scharffe, François. Correspondence patterns representation. (Ph.D., University of Innsbruck, Austria, February, 2009; external reader)

López-García, Pablo. Ontology customization for biomedical informatics. (Ph.D., University of the Basque Country, Spain, 2013; external reader)

Walk, Simon. Edit patterns in collaborative ontology-engineering projects. (Ph.D., Graz University of Technology, Austria, 2016; external reader)

Lozano, Raimundo. A metamodel for clinical data integration: basis for a new model of electronic health record driven by ontologies. (Ph.D., Autonomous University of Barcelona, Spain, 2016; co-advisor)

Plug, Ruduan B.F. Methods for federated data analysis. (M.S., University of Leiden, the Netherlands, 2022; co-advisor); Secure distributed machine learning in healthcare. (Ph.D., University of Leiden, the Netherlands, 2025; external examiner)

Kersloot, Martijn G. FAIR data in medical research: Incorporating the FAIR principles in the research data life cycle. (Ph.D., Amsterdam University Medical Center, the Netherlands, 2022; external examin

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Publications

***h* Index = 107 (Google Scholar)**

Erdös number = 3

Refereed Journal Articles

1. Musen, M.A., Fagan, L.M., Combs, D.M., and Shortliffe, E.H. Use of a domain model to drive an interactive knowledge-editing tool. *International Journal of Man–Machine Studies* 26:105–121, 1987. Reprinted in Boose, J.H. and Gaines, B.R. (eds.) *Knowledge Acquisition Tools for Expert Systems.* London: Academic Press, 1988, pp. 257–273. Also reprinted in Gaines, B.R. (ed.) The 30th Anniversary Special Issue 1969–1999. *International Journal of Human–Computer Studies* 51:479–495, 1999.

2. Walton, J.D., Musen, M.A., Combs, D., Lane, C.D., Shortliffe, E.H., and Fagan, L.M. Graphical access to medical expert systems: III. Design of a knowledge-acquisition environment. *Methods of Information in Medicine*, 26:78–88, 1987. PMID: 3670103

3. Musen, M.A. and van der Lei, J. Knowledge engineering for clinical consultation programs: Modeling the application area. *Methods of Information in Medicine,* 28:28–35, 1989. PMID: 2649771

4. Musen, M.A. Conceptual models of interactive knowledge-acquisition tools. *Knowledge Acquisition*, 1:73–88, 1989.

5. Tu, S.W., Kahn, M.G., Musen, M.A., Ferguson, J.C., Shortliffe, E.H., and Fagan, L.M. Episodic skeletal-plan refinement based on temporal data. *Communications of the Association for Computing Machinery*, 32:1439–1455, 1989.

6. Musen, M.A. Knowledge acquisition at the metalevel: Creation of custom-tailored knowledge-acquisition tools. *SIGART Newsletter,* Special issue on knowledge acquisition, Number 108, pp. 45–55, April, 1989. Reprinted in Westphal, C.R. and McGraw, K. (eds.) *Readings in Knowledge Acquisition: Current Practices and Trends*. New York: Ellis Horwood, 1990, pp. 150–163.

7. Musen, M.A. An editor for the conceptual models of interactive knowledge-acquisition tools. *International Journal of Man–Machine Studies,* **31**:673–698, 1989. Reprinted in Boose, J.H. and Gaines, B.R. (eds.) The *Foundations of Knowledge Acquisition*. London: Academic Press, 1990, pp. 135–160.

8. Van der Lei, J. and Musen, M.A. A model for critiquing based on automated medical records. *Computers and Biomedical Research*, **24**:344–378, 1991. PMID: 1889202

9. Van der Lei, J., Musen, M.A., van der Does, E., Man in 't Veld, A. J., and van Bemmel, J.H. Comparison of computer-aided and human review of general practitioners' management of hypertension. *The Lancet, 338:1504*–1508, 1991. Reprinted in van Bemmel, J.H. and McCray, A.T. (eds.) Yearbook *of Medical Informatics 1992* Stuttgart: F.K. Schattauer and The International Medical Informatics Association, 1992, pp. 351–355. PMID: 1683929

10. Linster, M. and Musen, M.A. Use of KADS to create a conceptual model of the ONCOCIN task. *Knowledge Acquisition,* **4:55**–87, 1992. Reprinted in Schreiber, G., Wielinga, B., and Breuker, J. (eds.) *KADS: A Principled Approach to Knowledge-Based System Development,* London: Academic Press, 1993, pp. 359–384.

11. Puerta, A.R., Egar, J.W., Tu, S.W., and Musen, M.A. A multiple-method knowledge-acquisition shell for the automatic generation of knowledge-acquisition tools. *Knowledge Acquisition,* **4:**171–196, 1992.

12. Tu, S.W., Shahar, Y., Dawes, J., Winkles, J., Puerta, A.R., and Musen, M.A. A problem-solving model for episodic skeletal-plan refinement. *Knowledge Acquisition,* **4:**197–216, 1992.

13. Shahar, Y., Tu, S.W., and Musen, M.A. Knowledge acquisition for temporal-abstraction

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mechanisms. *Knowledge Acquisition,* **4**:217–236, 1992.

14. Musen, M.A. Automated support for building and extending expert models, *Machine Learning,* **4**:349–377, 1989. Reprinted in Marcus, S. (ed.) *Knowledge Acquisition: Selected Research and Commentary*. Boston: Kluwer, 1990, pp. 101–129; also reprinted in Buchanan, B.G. and Wilkins, D.C. (eds.) *Readings in Knowledge Acquisition and Machine Learning: Automating the Construction and Improvement of Expert Systems.* San Mateo, CA: Morgan Kaufmann, 1993, pp. 283–296.

15. Musen, M.A. Dimensions of knowledge sharing and reuse. *Computers and Biomedical Research*. **25**:435–467, 1992. Reprinted in van Bemmel, J.H. and McCray, A.T. (eds.) *Yearbook of Medical Informatics 1993*, Stuttgart: F.K. Schattauer and The International Medical Informatics Association, 1993, pp. 402–421. PMID: 1395522

16. Puerta, A.R., Tu, S.W., and Musen, M.A. Modeling tasks with mechanisms. *International Journal of Intelligent Systems,* **8**:129–152, 1993. Reprinted in Ford, K.M. and Bradshaw, J.M. (eds.) *Knowledge Acquisition as Modeling*, New York: John Wiley, 1993, pp. 129–152.

17. Eriksson, H, and Musen, M.A. Conceptual models for automatic generation of knowledge-acquisition tools. *Knowledge Engineering Review,* **8**:27–47, 1993.

18. Van der Lei, J., van der Does, E., Man in 't Veld, A., Musen, M.A., and van Bemmel, J.H. Response of general practitioners to computer-generated critiques of hypertension therapy. *Methods of Information in Medicine,* **32**:146–153, 1993. PMID: 8321133

19. Erikssson, H. and Musen, M.A. Metatools for knowledge acquisition. *IEEE Software*, **10**(3):23–29, 1993.

20. Shahar, Y. and Musen, M.A. RÉSUMÉ: A temporal-abstraction system for patient monitoring. *Computers and Biomedical Research*, **26**:255–273, 1993. Reprinted in van Bemmel, J.H. and McCray, A.T. (eds.) Yearbook *of Medical Informatics 1994* Stuttgart: F.K. Schattauer and The International Medical Informatics Association, 1994, pp. 443–461. PMID: 8325005

21. Tu, S.W., Kemper, C.A., Lane, N.M., Carlson, R.W., and Musen, M.A. A methodology for determining patients' eligibility for clinical trials. *Methods of Information in Medicine,* 32:317–325, 1993. Reprinted in van Bemmel, J.H. and McCray, A.T. (eds.) Yearbook *of Medical Informatics 1994* Stuttgart: F.K. Schattauer and The International Medical Informatics Association, 1994, pp. 162–170. PMID: 8412828

22. Henry, S.B., Borchelt, D., Schreiner, J.G., and Musen, M.A. A computer-based approach to quality improvement for telephone triage in a community AIDS clinic. *Nursing Administration Quarterly*, **18**(2):65–73, 1994. PMID: 8159333

23. Campbell, K.E., Das, A.K., and Musen, M.A. A logical foundation for representation of clinical data. *Journal of the American Medical Informatics Association*, **1**(3):218–232, 1994. Reprinted in van Bemmel, J.H. and McCray, A.T. (eds.) Yearbook *of Medical Informatics 1995* Stuttgart: F.K. Schattauer and The International Medical Informatics Association, 1995, pp. 205–219. PMID: 7719805, PMCID: PMC116201

24. Das, A.K. and Musen, M.A. A temporal query system for protocol-directed decision support. *Methods of Information in Medicine*, **33**:358–370, 1994. Reprinted in van Bemmel, J.H. and McCray, A.T. (eds.) Yearbook *of Medical Informatics 1995* Stuttgart: F.K. Schattauer and The International Medical Informatics Association, 1995, pp. 494–506. PMID: 7799812

25. Egar, J.W. and Musen, M.A. Graph-grammar assistance for automated construction of influence diagrams. *IEEE Transactions on Systems, Man, and Cybernetics*, **24**:1625–1642, 1994.

26. Gennari, J.H., Tu, S.W., Rothenfluh, T.E., and Musen, M.A. Mapping domains to methods in support of reuse. *International Journal of Human–Computer Studies*, **41**:399–424, 1994.

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

27. Eriksson, H., Puerta, A.R., and Musen, M.A. Generation of knowledge-acquisition tools from domain ontologies. *International Journal of Human–Computer Studies*, **41**:425–453, 1994.

28. Musen, M.A., Wieckert, K.E., Miller, E.T., Campbell, K.E., and Fagan, L.M. Development of a controlled medical terminology: Knowledge acquisition and knowledge representation. *Methods of Information in Medicine*, **34**:85–95, 1995. PMID: 9082143

29. Van der Lei, J. and Musen, M.A. The separation of reviewing knowledge from medical knowledge. *Methods of Information in Medicine*, **34**:131–139, 1995. PMID: 9082122

30. Carlson, R.W., Tu, S.W., Lane, N.M, Lai, T.L., Kemper, C.A., Musen, M.A., Shortliffe, E.H. Computer-based screening of patients with HIV/AIDS for clinical-trial eligibility. *Online Journal of Current Clinical Trials*, Document 179, March 28, 1995. PMID: 7719564

31. Tu, S.W., Eriksson, H., Gennari, J.H., Shahar, Y., and Musen, M.A. Ontology-based configuration of problem-solving methods and generation of knowledge-acquisition tools: Application of PROTÉGÉ-II to protocol-based decision support. *Artificial Intelligence in Medicine,* **7**:257–289, 1995. PMID: 7581625

32. Eriksson, H., Shahar, Y., Tu, S.W., Puerta, A.R., and Musen, M.A. Task modeling with reusable problem-solving methods. *Artificial Intelligence,* **79**:293–326, 1995.

33. Rothenfluh, T.E., Gennari, J.H., Eriksson, H., Puerta, A.R., Tu, S.W., and Musen, M.A. Reusable ontologies, knowledge-acquisition tools, and performance systems: PROTÉGÉ-II solutions to Sisyphus-2. *International Journal of Human–Computer Studies*, **44**:303–332, 1996.

34. Shahar, Y. and Musen, M.A. Knowledge-based temporal abstraction in clinical domains. *Artificial Intelligence in Medicine*, **8**:267–298, 1996. PMID: 8830925

35. Musen, M.A., Tu, S.W., Das, A.K., and Shahar, Y. EON: A component -based approach to automation of protocol-directed therapy. *Journal of the American Medical Informatics Association*, **3**:367–388, 1996. PMID: 8930854, PMCID: PMC116322

36. Fensel, D., Eriksson, H., Musen, M.A., and Studer, R. Conceptual and formal specifications of problem-solving methods. *International Journal of Expert Systems*, **9**:507–532, 1996.

37. Ohno-Machado, L. and Musen, M.A. Modular neural networks for medical prognosis: Quantifying the benefits of combining neural networks for survival prediction. *Connection Science* **9**:71–86, 1997

38. Ohno-Machado, L. and Musen, M.A. Sequential versus standard neural networks for pattern recognition: An example using the domain of coronary heart disease. *Computers in Biology and Medicine*, **27**:267–281, 1997. PMID: 9303265

39. Tu, S.W. and Musen, M.A. Episodic refinement of episodic skeletal-plan refinement. *International Journal of Human–Computer Studies*, **48**:475–497, 1998.

40. Gennari, J.H., Cheng, H., Altman, R.B., and Musen, M.A. Reuse, CORBA, and knowledge-based systems. *International Journal of Human–Computer Studies*, **49**:523–546, 1998.

41. Musen, M.A. Domain ontologies in software engineering: Use of Protégé with the EON architecture. *Methods of Information in Medicine*, **37**:540–550, 1998. PMID: 9865052

42. Oliver, D.E., Shahar, Y., Shortliffe, E.H., and Musen, M.A. Representation of change in controlled medical terminologies. *Artificial Intelligence in Medicine*, **15**:53–76, 1999. PMID: 9930616

43. Nguyen, J.H., Shahar, Y., Tu, S.W., Das, A.K., and Musen, M.A. Integration of temporal reasoning and temporal-data maintenance into a reusable database mediator to answer abstract, time-oriented queries: The Tzolkin system. *Journal of Intelligent Information Systems*, **13**:121–145. 1999.

44. Shahar, Y., Chen, H., Stites, D.P., Basso, L., Kaizer, H., Wilson, D.M., and Musen, M.A. Semiautomated entry of clinical temporal-abstraction knowledge. *Journal of the*

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

American Medical Informatics Association, **6**:494–511, 1999. PMID: 10579607, PMCID: PMC61392.

45. Musen, M.A. Scalable software architectures for decision support. *Methods of Information in Medicine*, **38**:229–238, 1999. PMID: 10805007

46. Stead, W.W., Miller, R.A., Musen, M.A., and Hersh, W.R. Integration and beyond: Linking information from disparate sources and into workflow. *Journal of the American Medical Informatics Association*, **7**:135–145, 2000. PMID: 10730596, PMCID:PMC61466

47. Noy, F.N., Sintek, M., Decker, S., Crubézy, M., Fergerson, R.W., and Musen, M.A. Creating Semantic Web contents with Protégé-2000. *IEEE Intelligent Systems,* **16**(2):60–71, 2001.

48. Musen, M.A. Medical informatics: Searching for underlying components. *Methods of Information in Medicine,* **41**(1):12–19, 2002. Reprinted in: Haux, R. and Kulikowski, C.A. (eds.) Yearbook *of Medical Informatics 2003*, Stuttgart: F.K. Schattauer and The International Medical Informatics Association, 2003, pp. 215–222. PMID:11933757

49. Meric, F., Bernstam, E.V., Mirza, N.Q., Hunt, K.K., Ames, F.C., Ross, M.I., Kuerer, H.M., Pollock, R.E., Musen, M.A., and Singletary, S.E. Breast cancer on the world wide web: Cross sectional survey of quality of information and popularity of websites. *British Medical Journal*, **324**:577–581, 2002. PMID: 11884322, PMCID:PMC78995.

50. Gennari, J.H., Musen, M.A., Fergerson, R.W., Grosso, W.E., Crubézy, M., Eriksson, H., Noy, N.F., and Tu, S.W. The evolution of Protégé: An environment for knowledge-based systems development. *International Journal of Human-Computer Studies*, **58**(1):89–123, 2003.

51. Crubézy, M., Musen, M.A., Lu, W., Motta, E. Configuring online problem-solving resources with the Internet Reasoning Service. *IEEE Intelligent Systems,* **18**(2):34–42, 2003.

52. Noy, N.F. and Musen, M.A. The PROMPT suite: Interactive tools for ontology merging and mapping. *International Journal of Human–Computer Studies*, **59**(6):983–1024, 2003.

53. Noy, N.F., Musen, M.A., Mejino, J.L.V., and Rosse, C. Pushing the envelope: challenges in a frame-based representation of human anatomy. *Data and Knowledge Engineering*, **48**(3):335–359, 2004.

54. Noy, N.F. and Musen, M.A. Ontology versioning as an element of an ontology-management framework. *IEEE Intelligent Systems*, **19**(4):6–13, 2004.

55. Noy, N. F., Rubin, D.L., Musen, M.A. Making Biomedical Ontologies and Ontology Repositories Work. *IEEE Intelligent Systems,* **19**(6):78–81, 2004.

56. Goldstein, M.K., Coleman, R.W., Tu, S.W., Shankar, R.D., O'Connor, M.J., Musen, M.A., Martins, S.B., Lavori, P.W., Shilpak, M., Oddone, E.Z., Advani, A., Gholami, P., Hoffman, B.B. Translating research into practice: organizational issues in implementing automated decision support for hypertension in three medical centers. *Journal of the American Medical Informatics Association,* **11**(5):368–376, 2004. PMID: 15187064, PMCID: PMC516243

57. Crubézy, M., O'Connor, M.J., Buckeridge, D.L., Pincus, Z. S., Musen, M.A. Ontology-Centered Syndromic Surveillance for Bioterrorism. *IEEE Intelligent Systems,* **20**(5):26–35, 2005.

58. Rubin, D.L., Dameron, O., Bashir, Y., Grossman, D., Dev, P., Musen, M.A. Using ontology of human anatomy to inform reasoning with geometric models. *Studies in Health Technology and Informatics,* 111:429–35, 2005. PMID:15718773

59. Hou, C.J., Noy, N.F., and Musen, M.A. EZPAL: Environment for creating constraint axioms by instantiating templates. *International Journal of Human–Computer Studies*, **62**(5) 578–596, 2005.

60. Buckeridge, D.L., Switzer, P., Owens, D., Siegrist, D., Pavlin, J., Musen, M.A. An evaluation model for syndromic surveillance: assessing the performance of a temporal algorithm.

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

Morbidity and Mortality Weekly Report, 54 Suppl: pp 109–115, 2005. PMID: 16177701

61. Rubin, D.L., Dameron, O., Bashir, Y., Grossman, D., Dev, P., Musen, M.A. Using ontologies linked with geometric models to reason about penetrating injuries. *Artificial Intelligence in Medicine,* **37**:167–176, 2006. PMID: 16730959

62. Rubin, D.L., Lewis, S. E., Mungall, C. J., Misra, S., Westerfield, M., Ashburner, M., Sim, I., Chute, C. G., Solbrig, H., Storey, M. A., Smith, B., Richter, J.D., Noy, N.F., Musen, M.A. The National Center for Biomedical Ontology: Advancing Biomedicine through Structured Organization of Scientific Knowledge. *OMICS: A Journal of Integrative Biology,* **10**(2):185–98, 2006. PMID:16901225

63. Buckeridge, D.L., Owens, D.K., Switzer, P., Frank, J., Musen, M.A. Evaluating detection of an inhalational anthrax outbreak. *Emerging Infectious Diseases*, **12**(12):1942–9, 2006. PMID: 17326949, PMCID: PMC3291344

64. Dameron, O., Musen, M.A., Gibaud, B. Using semantic dependencies for consistency management of an ontology of brain-cortex anatomy. *Artificial Intelligence in Medicine,* **39**(3):217–25, 2007. PMID: 17254759

65. Shah, N.H., Rubin, D.L., Espinosa, I., Montgomery, K., Musen, M.A. Annotation and query of tissue microarray data using the NCI Thesaurus. *BMC Bioinformatics.* 8:296, 2007. PMID: 17686183, PMCID: PMC1988837

66. Rubin, D.L., Noy, N.F., Musen, M.A. Protégé: A tool for managing and using terminology in radiology applications. *Journal of Digital Imaging*. **20**, Suppl 1:34–46, 2007. PMID: 17687607, PMCID: PMC2039856

67. Shah, N.H., Rubin, D.L., Espinosa, I., Montgomery, K., Musen, M.A. Ontology-based annotation and query of tissue microarray data. *BMC Bioinformatics*. **8**:296, 2007. PMID: 17238433, PMCID: PMC1839511

68. Tu, S.W., Campbell, J.R., Glasgow, J., Nyman, M.A., McClure, R., McClay, J., Parker, C. Hrabak, M., Berg, D., Weida, T., Mansfield, J.G., Musen, M.A., Abarbanel, R.M. The SAGE guideline model: achievements and overview. *Journal of the American Medical Informatics Association*. **14**(5):589–98, 2007. PMID:17600098, PMCID: PMC1975799

69. Moreira, D.A., Musen, M.A. OBO to OWL: A Protégé OWL Tab to Read/Save OBO Ontologies. *Bioinformatics*. **23**(14):1868–70, 2007. PMID: 17496317

70. Buckeridge, D., Okhmatovskaia O., Tu, S.W., O'Connor, M.J., Nyulas, C.I., Musen, M.A. Understanding detection performance in public health surveillance: modeling aberrancy-detection algorithms. *Journal of the American Medical Informatics Association*, **15**(6):760-769, 2008. PMID: 18755992, PMCID: PMC2585528

71. Supekar, K., Menon, V., Rubin, D.L, Musen, M.A. and Greicius, M. Network analysis of intrinsic functional brain connectivity in Alzheimer's Disease. *PLoS Computational Biology*, **4**(6), e1000100, 2008. PMID: 18584043, PMCID: PMC2435273

72. Dinov, I.D., Rubin, D.L., Lorensen, W., Dugan, J., Ma, J., Murphy, S., Kirschner, B., Bug, W., Sherman, M., Floratos, A., Kennedy, D., Jagadish, H.V., Schmidt, J., Athey, B., Califano, A., Musen, M.A., Altman, R., Kikinis, R., Kohane, I., Delp, S., Parker, D.S. and Toga, A.W. iTools: A framework for classification, categorization and integration of computational biology resources. *PLoS ONE*, **3**(5): e2265, 2008. PMID: 18509477, PMCID: PMC2386255

73. Noy, N.F., de Coronado, S., Solbrig, H., Fragoso, G., Hartel, F.W. and Musen, M.A. Representing the NCI Thesaurus in OWL DL: Modeling tools help modeling languages. *Applied Ontology*, **3**(3):173–190, 2008. PMID:19789731, PMCID: PMC2753293

74. Talos, I.F., Rubin, D.L., Halle, M., Musen, M.A., Kikinis, R. Prototype symbolic model of canonical functional neuroana**to**my of the motor system. *Journal of Biomedical Informatics,* **41**(2):251–63, 2008. PMID:18164666, PMCID: PMC2376098

75. Mons, B., Ashburner, M., Chichester, C., van Mulligen, E., Weeber, M., den Dunnen, J., van Ommen, G.J., Musen, M.A., Cockerill, M., Hermjakob, H., Mons, A., Packer, A.,

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

Pacheco, R., Lewis, S., Berkeley, A., Melton, W., Barris, N., Wales, J., Meijssen, G., Moeller, E., Roes, P.J., Borner, K., Bairoch, A. Calling on a million minds for community annotation in WikiProteins. *Genome Biology,* **9**(5): R89, May 2008. PMID:18507872, PMCID: PMC2441475

76. Shah, N.H., Jonquet, C., Chiang, A.P., Butte, A.J., Chen, R., Musen, M.A. Ontology-driven indexing of public datasets for translational bioinformatics, *BMC Bioinformatics*, **10**(Suppl 2): S1. February 2009. PMID: 19208184, PMCID: PMC2646250

77. Rubin, D.L., Talos, I.F., Halle, M., Musen, M.A., Kikinis, R. Computational neuroanatomy: ontology-based representation of neural components and connectivity. *BMC Bioinformatics*, 10 (Suppl2): S3. February 2009. PMID:19208191, PMCID: PMC2646240

78. O'Connor, M.J., Nyulas, C.I., Tu, S.W., Buckeridge, D., Okhmatovskaia, A., Musen, M.A. Software-engineering challenges of building and deploying reusable problem solvers. *Artificial Intelligence for Engineering Design, Analysis and Manufacturing*. 23:339–356, 2009. PMID: 23565031, PMCID: PMC3615443

79. Noy, N.F., Shah, N.H., Whetzel, P.L., Dai, B., Dorf, M.V., Jonquet, C., Rubin, D.L., Storey, M.A., Chute, C.G., Musen, M.A. Bio-Portal: ontologies and data resources with the click of a mouse. *Nucleic Acids Research*, **37**, (Web Server Issue): W170–3, 2009. PMID:18999306

80. Supekar, K.S., Musen, M.A., Menon, V. Development of large-scale functional brain networks in children. *PLoS Biology*, **7**(7): e100157, 2009. PMID: 19621066, PMCID: PMC2705656

81. Shah, N.H., Bhatia, N., Jonquet, C., Rubin, D.L., Chiang, A.P., and Musen, M.A. Comparison of concept recognizers for building the Open Biomedical Annotator. *BMC Bioinformatics*, **10** (Suppl 9): S14. Published online 2009 September 17. Doi 10.1186/147-2105-10-S9-S14. 2009. PMID: 19761568, PMCID: PMC2745685

82. Jonquet, C., Musen, M.A., Shah, N.H. Building a biomedical ontology recommender web service. *Journal of Biomedical Semantics*, **1** (Suppl 1):S1. Published online 2010 June 22. Doi 10.1186/2041-1480-1-S1-S1. 2010. PMID: 20626921, PMCID: PMC2903720

83. Coulet, A., Shah, N.H., Garten, Y., Musen, M., Altman, R.B. Using text to build semantic networks for pharmacogenomics. *Journal of Biomedical Informatics*, **43** (6): 1009-19, 2010. PMID: 20723615, PMCID: PMC2991587

84. Tenenbaum, J.D., Whetzel, P.L., Anderson, K., Borromeo, C.D., Gabriel, D., Kirschner, B., Mirel, B., Morris, T., Noy, N., Nyulas, C., Rubenson, D., Saxman, P.R., Singh, H., Whelan, N., Wright, Z., Athey, B.D., Becich, M.J., Ginsburg, G.S., Musen, M.A., Smith, K.A., Tarantal, A.F., Rubin, D.L., Lyster, P. The Biomedical Resource Ontology (BRO) to enable resources discovery in clinical and translational research. *Journal of Biomedical Informatics,* **44** (1): 137–45, 2011. PMID: 20955817, PMCID: PMC3050430

85. Coulet, A., Garten, Y., Dumontier, M., Altman, R.B., Musen, M.A., Shah, N.H. Integration and publication of heterogeneous text-mined relationships on the semantic web. *Journal of Biomedical Semantics,* **2** (Suppl 2):S10, 2011. PMID: 21624156, PMCID: PMC3102890

86. Ghazvinian, A., Noy, N.F., Musen, M.A. How orthogonal are the OBO Foundry ontologies? *Journal of Biomedical Semantics*, **2** (Suppl 2):S2, 2011. Published online: http://www.jbiomedsem.com/content/2/S2/S2. PMID: 21624157, PMCID: PMC3102891

87. Harland, L., Larminie, C., Sansone, S.A., Popa, S., Marshall, M.S., Braxenthaler, M., Cantor, M., Filsell, W., Forster, M.J., Huang, E., Matern, A. Musen, M., Saric, J., Slater, T., Wilson, J., Lynch, N., Wise, J., Dix, I. Empowering industrial research with shared biomedical vocabularies. *Drug Discovery Today.* Published online 2011 September 23. Doi: 10.1016/j.drudis.2011.09.013. PMID: 21963522

88. Jonquet, C., LePendu, P., Falconer, S.M., Coulet, A., Noy, N.F., Musen, M.A., Shah, N.H. NCBO Resource Index: Ontology-based search and mining of biomedical resources, information retrieval, biomedical data and ontologies. *Journal of Web Semantics:*

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

Science Services and Agents on the World Wide Web, **9** (3), 2011. PMID: 21918645, PMCID: PMC3170774

89. LePendu, P., Musen, M.A., Shah, N.H. Enabling enrichment analysis with the Human Disease Ontology. *Journal of Biomedical Informatics*, **44** (Suppl 1): S31–8, 2011. PMID: 21550421, PMCID: PMC3392036

90. Whetzel, T., Noy, N.F., Shah, N.H., Alexander, P.R., Nyulas, C.I., Tudorache, T., Musen, M.A. BioPortal: Enhanced functionality via new Web services from the National Center for Biomedical Ontology to access and use ontologies in software applications. *Nucleic Acids Research,* **39** (Web server issue): W541–5, 2011. PMID: 21672956, PMCID: PMC3125807

91. Musen, M.A., Noy, N.F., Chute, C.G., Storey, M.A., Smith, B., Shah, N.H. The National Center for Biomedical Ontology. *Journal of the American Medical Informatics Association*, **19** (2): 190–5, 2012. PMID: 22081220, PMCID: PMC3277625

92. Wu, S., Liu, H., Li, D., Tao, C., Musen, M.A., Chute, C., and Shah, N.H. UMLS term occurrences in clinical notes: A large-scale corpus analysis. *Journal of the American Medical Informatics Association,* **19**:149–56, 2012. PMID: 22493050, PMCID: PMC339286

93. Tudorache, T., Nyulas, C., Noy, N.F., Musen, M.A. WebProtégé: A collaborative ontology editor and knowledge-acquisition tool for the Web. *Semantic Web*, **4**(1):89–99, 2013. PMID: 23807872, PMCID: PMC3691821

94. Strohmaier, M., Walk, S., Pöschko, J., Lamprecht, D., Tudorache, T., Nyulas, C., Musen, M.A., Noy, N.F. How ontologies are made: Studying the hidden social dynamics behind collaborative ontology-engineering projects. *Journal of Web Semantics*, **20**:18–34, 2013. PMID: 24311994, PMCID: PMC3845806

95. Walk, S., Pöschko, J., Strohmaier, M., Andrews, K., Tudorache, T., Noy, N. F., Musen, M. A. PragmatiX: An interactive tool for visualizing the creation process behind collaboratively engineered ontologies. *International Journal on Semantic Web and Information Systems (IJSWIS)*, ***9***(1): 45–78, 2013. NIHMSID: 47217. PMC3901413.

96. Cases, M., Furlong, L. I., Albanell, J., Altman, R. B., Bellazzi, R., Boyer, S., Brand, A., Brookes, A.J., Brunak, S., Clark, T.W., Gea, J., Ghazal, P., Graf, N., Guigo, R., Klein, T.E., Lopez-Bigas, N., Maojo, V., Mons, B., Musen, M.A., *et al*. Improving data and knowledge management to better integrate health care and research. *Journal of Internal Medicine*, **274**(4): 321–328, 2013. PMID: 23808970, PMC4110348.

97. Salvadores, M., Alexander, P.R., Musen, M.A., and Noy, N.F. BioPortal as a dataset of linked biomedical ontologies and terminologies in RDF. *Semantic Web* **4**:277–284, 2013. PMID: 25214827, PMCID: PMC4159173

98. López-García P., Lependu P., Musen M.A., and Illarramendi A. Cross-domain targeted ontology subsets for annotation: The case of SNOMED CORE and RxNorm. *Journal of Biomedical Informatics*, **47**:105–111, 2014. PMID: 24095962, PMCID: PMC3951555.

99. Walk, S., Singer, P., Strohmaier, M., Helic, D., Noy, N.F., and Musen, M.A. Sequential usage patterns in collaborative ontology-engineering projects. arXiv preprint arXiv:1403.1070, 2014. PMID: 24953242, PMCID: PMC4194274.

100. Shluzas, L.M., Cronkite, R.C., Chambers, D., Hoffman, B.B., Breeling, J., Musen, M.A., Owens, D.K., and Goldstein, M.K. Organizational factors affecting implementation of the ATHENA-Hypertension clinical decision support system during the VA's nation-wide information technology restructuring: a case study. *Health Systems*, **3**(3):214–234, 2014. PMID: 24772411, PMCID: PMC3989772

101. Horridge, M., Tudorache, T., Nyulas, C., Vendetti, J., Noy, N.F., and Musen, M.A. WebProtégé: A collaborative web-based development environment for OWL 2 ontologies. *Bioinformatics* **30**(16):2384–2385, 2014. PMID: 24771560, PMCID: PMC4176057.

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

102. Walk, S., Singer, P., Strohmaier, M., Tudorache T., Musen M.A., Noy, N.F. Discovering beaten paths in collaborative ontology-engineering projects using Markov chains. *Journal of Biomedical Informatics*, **51**:254–271, 2014. PMID: 24953242; PMCID: PMC4194274.

103. Wang, H., Dou, D., Tudorache, T., Noy, N.F., and Musen, M.A. Analysis and prediction of user editing patterns in ontology development projects. *Journal on Data Semantics*, 2014. DO1 10.1007/s1370-014-0047-3. PMID: 26052350, PMCID: PMC4454427

104. Mortensen, J.M., Minty, E.P., Januszyk, M., Sweeney, T.E., Rector, A.L., Noy, N.F., and Musen, M.A. Using the wisdom of the crowds to find critical errors in biomedical ontologies: A study of SNOMED CT. *Journal of the American Medical Informatics Association*, **2015**(22):640–648. PMID: 25342179; PMCID PMC5566196

105. Friedman, C., Rubin, J., Brown, J., Buntin, M., Corn, M., Etheridge, L., Gunter, C., Musen, M., Platt, R., Stead, W., Sullivan, K., and Van Heuweling, D. Toward a science of learning systems: a research agenda for the high-functioning learning health system. *Journal of the American Medical Informatics Association*, **22**(1):43–50, 2015. PMID: 25342177, PMCID: PMC4433378

106. Liu, V., Musen, M.A., Chou, T. Data breaches of protected health information in the United States. *Journal of the American Medical Association*, **313**(14), April 14, 2015 (research letter). PMID: 25871675, PMCID: PMC4479128

107. Lamprecht, D., Strohmaier, M., Helic, D., Nyulas, C., Tudorache, T., Noy, N.F., and Musen, M.A. Using ontologies to model human navigation behavior in information networks: a study based on Wikipedia. *Semantic Web*, **6**(4):403–422, 2015. PMID: 26568745, PMCID: PMC4643321

108. Musen, M.A., Bean, C.A., Cheung, K.-H., Dumontier, M., Durante, K.A., Gevaert, O., Gonzalez-Beltran, A., Khatri, P., Kleinstein, S.H., O'Connor, M.J., Pouliot, Y., Rocca-Serra, P., Sansone, S.-A., Wiser, J.A., and the CEDAR team. The Center for Expanded Data Annotation and Retrieval. *Journal of the American Medical Informatics Association*, **22**(6):1148–52, 2015. doi:10.1093/jamia/ocv048. PMID: 26112029, PMCID: PMC5009916

109. Musen, M.A. The Protégé project: A look back and a look forward. *AI Matters*. Association of Computing Machinery Special Interest Group in Artificial Intelligence, **1**(4), June 2015. DOI: 10.1145/2557001.25757003. PMID: 27239556, PMCID: PMC4883684

110. Walk, S., Singer, P., Strohmaier, M., Helic, D., Noy, N.F., Musen, M.A. How to apply Markov chains for modeling sequential edit patterns in collaborative ontology-engineering projects. *International Journal of Human–Computer Studies*, **84**:51–66, 2015.

111. Mortensen, J.M., Tellis, N., Hughey, J.J., Fan-Minogue, H., Van Auken, K., Dumontier, M., Musen, M.A. Is the crowd better as an assistant or a replacement in ontology engineering: an exploration through the lens of the Gene Ontology. *Journal of Biomedical Informatics,* **60**:199–209, 2016. PMID: 26873781, PMCID: PMC4836980

112. Buckeridge, D., Lavigne, M., Zinszer, K., Okhmatovskaia, A., Tu. S., Nyulus, C., Musen, M.A., Lau, W., Carroll, L., and Abernethy, N. Developing the scalable data integration for disease surveillance (SDIDS) platform. Online Journal of Public Health Informatics, **8**(1), 2016.

113. Buckeridge, D., Lavigne, M., Zinser, K., Okhmatovskaia, A., Tu, S., Nyulas, C., Musen, M., Lau, W., Carroll, L., and Abernethy, N. Developing the scalable data integration for disease surveillance (SDIDS) platform. *Online Journal of Public Health Informatics*, **8**(1), 2016.

114. Ochs, C., He, Z., Zheng, L., Geller, J., Perl, Y., Hripcsak, G., and Musen, M.A. Utilizing a structural meta-ontology for family-based quality assurance of BioPortal ontologies. *Journal of Biomedical Informatics,* **61**:63–76, 2016. PMID: 26988001, PMCID: PMC4893909

115. Ochs, C., Geller, J., Perl, Y., and Musen, M.A. A unified software framework for deriving, visualizing, and exploring abstraction networks for ontologies. *Journal of Biomedical*

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

Informatics, **62**:90–105, 2016. PMID: 27345947, PMCID: PMC4987206

116. Kamdar, M., Tudorache, T., Musen, M.A. A systematic analysis of term reuse and term overlap across biomedical ontologies. *Semantic Web*, 2017. DOI: 10.3233/SW-160238

117. Lou, Y., Tu, S.W., Nyulas, C., Tudorache, T., Chalmers, R.J.G., and Musen, M.A. Use of ontology structure and Bayesian models to aid the crowdsourcing of ICD-11 sanctioning rules. *Journal of Biomedical Informatics*, **68**:20–34, 2017. PMID: 28192233

118. Martínez-Romero, M., Jonquet, C., O'Connor, M.J., Graybeal, J., Pazos, A., and A Musen, M.A. NCBO Ontology Recommender 2.0: an enhanced approach for biomedical ontology recommendation. *Journal of Biomedical Semantics*, **8**:21, 2017. https://doi.org/10.1186/s13326-017-0128-y

119. Gonçalves, R.S., Tu, S.W., Nyulas, C.I., Tierney, M.J., Musen, M.A. An ontology-based tool for structured data acquisition using Web forms. *Journal of Biomedical Semantics*, **8**:26, 2017. https://doi.org/10.1186/s13326-017-0133-1

120. Ochs, C., Perl, Y., Geller, J., Arabandi, S., Tudorache, T., and Musen, M.A. An empirical analysis of ontology reuse in BioPortal. *Journal of Biomedical Informatics*, **71**:165–177, 2017.

121. Hadley, D., Pan, J., El-Sayed, O., Al-Jannan, J., Al-Jabban, I., Azad, T., Hadied, M., Raza, S., Rayikanti, B., Chen, B., Paik, H., Aran, D., Spatz, J., Himmelstein, D., Panahiazar, M., Bhattacharya, S., Sirota, M., Musen, M., Butte, A. Precision annotation of digital samples in NCBI's Gene Expression Omnibus. *Scientific Data*, **4**:170125, 2017. https://doi.org/10.1038/sdata.2017.125

122. Kamdar, M., Walk, S., Tudorache, T., Musen, M.A. Analyzing user interactions with biomedical ontologies: A visual perspective. *Journal of Web Semantics*, 2017. https://doi.org/10.1016/j.websem.2017.12.002

123. Jonquet, C., Toulet, A., Arnaud, E., Aubin, S., Yeumo, E.D., Emonet, V., Graybeal, J., Laporte, M.-A., Musen, M.A., Pesce, V. AgroPortal: a vocabulary and ontology repository for agronomy. *Computers and Electronics in Argriculture*, **144**:126–143, 2018.

124. Tomczak, A., Mortensen, J., Winnenburg, R., Liu, C., Alessi, D., Swamy, V., Vallania, F., Lofgren, S., Haynes, W., Shah, N., Musen, M.A., Khatri, P. Interpretation of biological experiments changes with evolution of Gene Ontology and its annotations. *Nature Scientific Reports,* 8:Article Number 5115. https://doi.org/10.1038/s41598-018-23395-2

125. Bukhari, S.A.C., Martínez-Romero, M., O'Connor, M.J., Egyedi, A.L., Willrett, D., Graybeal, J., Musen, M.A., Cheung, K.-H., and Kleinstein, S.H. CEDAR OnDemand: a browser extension to generate ontology-based scientific metadata. *BMC Bioinformatics* **19**:268, 2018. https://doi.org/10.1186/s12859-018-2247-6

126. Bukhari, S.A.C.,O'Connor, M.J., Martínez-Romero, M., Egyedi, A.L., Willrett, D., Grayeal, J., Musen, M.A., Rubelt, F., Cheung, K.-H., and Kleinstein, S.H. The CAIRR pipeline for submitting standards-compliant B and T cell receptor repertoire sequencing studies to the National Center for Biotechnology Information. *Frontiers in Immunology*, August 16, 2018. https://doi.org/10.3389/fimmu.2018.01877

127. Gonçalves, R.S. and Musen, M.A. The variable quality of metadata about biological samples used in biomedical experiments. *Scientific Data*, **6**:190021, 2019. https://doi.org/10.1038/sdata.2019.21

128. Martínez-Romero, M., O'Connor, M. J., Egyedi, A. L., Willrett, D., Hardi, J., Graybeal, J., and Musen, M.A. Using association rule mining and ontologies to generate metadata recommendations from multiple biomedical databases. *Database*, Jan 1;2019. pii: baz059. https://doi.org/10.1093/database/baz059

129. Kamdar, M.R., Fernández, J.D., Polleres, A., Tudorache, T., and Musen, M.A. Enabling Web-scale data integration in biomedicine through Linked Open Data. *npj Digital Medicine*, **2**:90, 2019; https://doi.org/10.1038/s41746-019-0162-5

130. Polleres, A., Kamdar, M.R., Fernández, J.D., Tudorache, T., Musen, M.A. A more decentralized

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

vision for linked data. *Semantic Web* **11**(1):101–113, 2020.

131. Sustkova, H.P., Hettne, K.M., Wittenburg, P., Kuhn, T., Pergl, R., Slifka, J., McQuilton. P., Magagna, B., Sansone, S.-A., Stocker, M., Imming, M., Lannom, L., Musen, M., and Schultes, E. FAIR convergence matrix: optimizing the reuse of existing FAIR-related reources. *Data Intelligence* **2**(1–2):158–170, 2020.

132. Tu SW, Nyulas CI, Tudorache T, Musen M.A. et al. Toward a Harmonized WHO Family of International Classifications Content Model. *Stud Health Technol Inform*. **270**:1409–1410, 2020. doi:10.3233/SHTI200466

133. Miron, L., Gonçalves, R.S., Musen, M.A. Obstancles to the reuse of study metadata in ClinicalTrials.gov. *Scientific Data* **7**(1):1–14, 2020.

134. Kumar, A., Aikens, R.C., Hom. J., … Musen, M.A., … Chen, J.H. OrderRex clinical user testing: a randomized trial of recommender system decision support on simulated cases. *J. Am. Med. Inform. Assoc.* **27**(2):1850–1859, 2020.

135. Gruendner, J., Gulden, C., Prokosh, H.-U., … Musen, M., Boxwala, A., Tu, S., and Peleg, M. Data model requirements for a digital cognitive aid for anesthesia to support intraoperative crisis management. *Applied Clinical Informatics* **11**(1):190–199, 2020.

136. Maitra, A., Kamdar, M.R., Zulman, D.A., Haverfield, M.C., Brown-Johnson, C., Schwartz, R., Israni, S.T., Verghese, A., Musen, M.A. Using ethnographic methods to classify the human experience in medicine: A case study of the Presence ontology. *J. Am. Med. Inform. Assoc.* **28**(9):1900-1909, 2021.

137. Van Reisen, M., Oladipo, F., Stockmans, M., … Musen, M.A. Design of a FAIR digital health infrastructure in Africa for COVID-19 reporting and research. *Advanced Genetics* **2**(2):e10050, 2021.

138. Kamdar, M.R., Musen, M.A. An empirical meta-analysis of the life sciences linked open data on the web. *Scientific Data* **8**(1):1–21, 2021.

139. Baranzini, S., Börner, K., Morris, J., Nelson, C.A., Soman, K., Schleimer, E., Keiser, M., Musen, M., et al. A biomedical open knowledge network harnesses the power of AI to understand deep human biology. *AI Magazine* 43(1), 46–58, 2022.

140. Musen, M.A., O'Connor, M.J., Schultes, E., Martínez-Romero, M., Hardi, J., Graybeal, J. Modeling community standards for metadata as templates makes data FAIR. *Scientific Data* **9**(1), 2022, Article Number 696.

141. Morris, J.H., Soman, K., Akbas, R.E., … Baranzini, S.E. The scalable precision medicine open knowledge engine (SPOKE): a massive knowledge graph of biomedical information. *Bioinformatics* **39**(2), 2023. Article btad080.

142. Herr, B.W., Hardi, J., Quardokus, E.M., … Musen, M.A., Börner, K. Specimen, biological structure, and spatial ontologies in support of a Human Reference Atlas. *Scientific Data* **10**(1), 2023, Article Number 171.

143. Jain, S., Pei, L., Spraggins, J.M., … HuBMAP Consortium, Börner, K., and Snyder, M.P. Advances and prospects for the Human BioMolecular Atlas Program (HuBMAP). *Nature Cell Biology* **25**(8):1089–1100, 2023.

144. O'Connor, M.J., Hardi, J., Martínez-Romero, M., Somasundaram, S., Honick, B., Fisher, S.A., Pillai, A., Musen, M.A. Ensuring adherence to standards in experiment-related metadata entered via spreadsheets. *Scientific Data* **12**(1): 2025/2/14, 2025.

145. Hegde, H., Vendetti, J., Goutte-Gattat, D., Caufield, J.H., Graybeal, J.B., Harris, N.L., Karam, N., Kindermann, C., Matentzoglu, N., Overton, J.A., Musen, M.A., Mungall, C.J. A change language for ontologies and knowledge graphs. *Database* **2025**:baae133, 2025.

146. Vendetti, J., Harris, N.L., Dorf, M.V., Skrenchuk, A., Caufield, J.H., Gonçakves, R.S., Graybeal, J.B., Hegde, H., Redmond, T., Mungall, C.J., Musen, M.A. BioPortal: an open community resource for sharing, searching, and utilizing biomedical ontologies. *Nucleic Acids Review*, gkaf402, https://doi.org/10.1093/nar/gkaf402, 2025.

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

147. Bueckle, A., Herr, B.W. II, Hardi, J., Quardokus, E.M., Musen, M.A., Börner, K. Construction, deployment, and usage of the Human Reference Atlas knowledge graph. *Scientific Data*, **12**:Article 1100, 2025.

148. Martínez-Romero, M., Horridge, M., Mistry, N., Weyhmiller, A., Yu, J.K., Fujimoto, A., Henry, A., O'Connor, M.J., Sier, S., Suber, S., Akdogan, M.U., Cao, Y., Valliappan, S., Mieczkowska, J.O., Krishnamurthy, A., Keller, M.A., Musen, M.A. RADx Data Hub: a cloud repository for FAIR, harmonized COVID-19 data. *JMIR Public Health and Surveillance,* **11**:e72677, 2025.

149. Caron, A.R., Puig-Barbe, A., Quardokos, E., Balhoff, J.P., Belfiore, J., et al. A general strategy for generating expert-guided, simplified views of ontologies. *Scientific Data* **13**:Article 75, 2026.

150. Wu, C., Liu, H., Flannick, J., Musen, M.A., Su, A.I., Hunter, L.E., Powers, T.M., Wu, C.H. Desiderata for a biomedical knowledge network: opportunities, challenges, and future directions. *Bioinformatics Advances* **6**(1), 2026, vbag036.

151. Musen, M.A., O'Connor, M.J., Hardi, J., Martínez-Romero, M. Knowledge engineering for open science: building and deploying knowledge bases for metadata standards. *AI Magazine* **47**(1): e70048, 2026.

152. Sundaram, S.S., Gonçalves, R.S., Musen, M.A. Toward total recall: enhancing data FAIRness through AI-driven metadata standardization. *GigaScience*, giag019, 2026.

153. O'Connor, M.J., Martínez-Romero, M., Egyedi, A., Akdogan, M., Dorf. M., Musen, M.A. Author once, publish everywhere: Portable metadata authoring with the CEDAR Embeddable Editor. *Data Science Journal* **25**, 2026.

154. Zheng, J., Lin, A.Y., Huffman, A., et al. VO: The vaccine ontology. *Scientific Data*, 2026. https://doi.org/10.1038/s41597-026-07298-w

155. Farlow, B.L., Smith, K.L., Weyhmiller, A., Hubal, R., RADx Data Hub Partners, Keller, M.A., Musen, M.A., Suber, S., Krishnamurthy, A. Harnessing multiteam systems in the development of a multifaceted data repository for emergency public health response. *Journal of Public Health Management and Practice*, in press.

Editorials

1. Musen, M.A. The strained quality of medical data. *Methods of Information in Medicine*, **28**:123–125, 1989. PMID: 2796752

2. Musen, M.A. The search for the knowledge level. *Künstliche Intelligenz – KI*, **2**:25–26, June, 1990.

3. Cooper, G.F. and Musen, M.A. The 1990 AAAI Spring Symposium on Artificial Intelligence in Medicine. *Artificial Intelligence in Medicine*, **2**:293–298, 1990.

4. Musen, M.A. Overcoming the limitations of role-limiting methods. *Knowledge Acquisition*, **4**:165–170, 1992.

5. Musen, M.A. There's no better theory than that of a practical tool. *Knowledge Engineering Review*, **8**:1–4, 1993.

6. Musen, M.A. Architectures for architects: A response to Heathfield and Wyatt. Methods of Information in Medicine, 32:12–13, 1993. Reprinted in van Bemmel, J.H. and McCray, A.T. (eds.) *Yearbook of Medical Informatics 1994*, Stuttgart: F.K. Schattauer and The International Medical Informatics Association, 1994, pp. 343–344.

7. Musen, M.A. and Schreiber, A.T. Architectures for intelligent systems based on reusable

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

components. *Artificial Intelligence in Medicine*, **7**:189–199, 1995. PMID: 7581622

8. Musen, M.A. and Barnett, E.A. The road to professionalism in medical informatics: The need for training. *Methods of Information in Medicine*, **35**:148–151, 1996.

9. Van der Lei, J., Moorman, P.W., and Musen, M.A. Electronic patient records in medical practice: A multidisciplinary endeavor. *Methods of Information in Medicine*, **38**:287–288, 1999. PMID: 10805014

10. Fensel, D., and Musen, M.A. The Semantic Web: A brain for humankind. *IEEE Intelligent Systems*, **16**(2):24–25, 2001.

11. Musen, M.A. and van Bemmel, J.H. Challenges for medical informatics as an academic discipline. *Methods of Information in Medicine*, **41**(1):1–3, 2002.

12. Musen, M.A. and van Bemmel, J.H. Challenges in medical informatics: A discipline coming of age. In: Haux, R. and Kulikowski, C.A. (eds.) *Yearbook of Medical Informatics 2003*, Stuttgart: F.K. Schattauer and The International Medical Informatics Association, 2003, pp. 209–210. PMID: 27706339

13. Musen, M.A. Ontologies: necessary—indeed essential—but not sufficient. *IEEE Intelligent systems*, **19**(1):77–79, 2004.

14. Musen, M.A., Lewis, S. and Smith, B. Wrestling with SUMO and bio-ontologies. *Nature Biotechnology* **24**(21): 2006. PMID: 16404381, PMCID: PMC2768033

15. Musen, M.A. It takes a village: Building the next generation of biomedical ontologies. *Biomedical Computation Review*, **5**(1): 1–2, 2009.

16. Musen, M.A. Biomedical ontologies: Dogmatism considered harmful. In: Brochhausen, M., Burgun, A., Ceusters, W., Hasman, A., Leong, T.Y., Musen, M.A., Olivera, J.L., Peleg, M., Rector, A., Schulz, S. Discussion of "Biomedical ontologies: toward scientific debate." *Methods of Information in Medicine*, 50(3):217–236, 2011.

17. Musen, M.A. Informatics: The discipline that cares about the content. In: Hasman, A., Ammenwerth, E., Dickhaus, H., Knaup, P., Lovis, C., Mantas, J., Maojo, V., Martin-Sanchez, F.J., Musen, M.A., Patel, V.L., Surjan, G., Talmon, J.L., Sarkar, I.N. Biomedical informatics – a confluence of disciplines? *Methods of Information in Medicine,* **50**(6): 508–524, 2011.

18. Musen, M.A. The knowledge acquisition workshops: A remarkable convergence of ideas. *International Journal of Human–Computer Studies*, **71**:195–199, 2013.

19. Guarino, N., and Musen, M.A. Applied Ontology: the next decade begins. *Applied Ontology*, **10**(1):1–4, 2015.

20. Guarino, N., and Musen, M.A. Ten years of Applied Ontology. *Applied Ontology*, **10**(3, 4):169–170, 2015

21. Musen, M.A. Without appropriate metadata, data-sharing mandates are pointless. *Nature*, **609**:222, 2022.

Refereed Conference Articles

1. Musen, M.A., Langlotz, C.P., Fagan, L.M., and Shortliffe, E.H. Rationale for knowledge **b**ase redesign in a medical advice system. *Proceedings of AAMSI Congress 85*, American Association for Medical Systems and Informatics, San Francisco, CA, May 1985, pp. 197–201.

2. Musen, M.A., Rohn, J.A., Fagan, L.M., and Shortliffe, E.H. Knowledge engineering for a clinical trial advice system: Uncovering errors in protocol specification. *Proceedings of*

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

AAMSI Congress 86, American Association for Medical Systems and Informatics, Anaheim, CA, May 1986, pp. 24–27. Reprinted in *Bulletin du Cancer* (Paris), **74**:291–296 (1987). PMID: 3620734

3. Combs, D.M., Musen, M.A., Fagan, L.M., and Shortliffe, E.H. Graphical entry of procedural and inferential knowledge. *Proceedings of AAMSI Congress 86,* American Association for Medical Systems and Informatics, Anaheim, CA, May 1986, pp. 298–302.

4. Musen, M.A., Fagan, L.M., Combs, D.M., and Shortliffe, E.H. Facilitating knowledge entry for an oncology therapy advisor using a model of the application area. *Proceedings of MEDINFO '86*, Fifth World Congress on Medical Informatics, Washington, DC, October 1986, pp. 46–50.

5. Musen, M.A. Generation of knowledge-acquisition tools from clinical-trial models. *Proceedings of Medical Informatics Europe '88,* European Federation for Medical Informatics, Oslo, Norway, August 1988, pp. 630–635.

6. Combs, D.M., Tu, S.W., Musen, M.A., and Fagan, L.M. From expert models to expert systems: Translation of an intermediate knowledge representation. *Proceedings of the Integration of Knowledge Acquisition and Performance Systems Workshop,* American Association for Artificial Intelligence, St. Paul, MN, August 1988.

7. Musen, M.A. Languages for knowledge acquisition: Building and extending models. *Proceedings of the AAAI Spring Symposium on Knowledge System Tools and Languages,* American Association for Artificial Intelligence, Stanford, CA, March 1989.

8. Van der Lei, J. and Musen, M.A. Critiquing physician decision making using data from automated medical records: An evaluation of HYPERCRITIC, *Proceedings of the AAAI Spring Symposium on Artificial Intelligence in Medicine,* American Association for Artificial Intelligence, Stanford, CA, March 1990, pp. 186–190.

9. Van der Lei, J., Musen, M.A., van der Does, E., and Man in 't veld, A.J. Critiquing physician decision making using data from automated medical records: Assessing the limitations. *Proceedings of the Fourteenth Annual Symposium on Computer Applications in Medical Care,* Washington, DC, November 1990, pp. 559–563.

10. Shahar, Y., Tu, S.W., and Musen, M.A. Temporal abstraction mechanisms in management of clinical protocols. *Proceedings of the Fifteenth Annual Symposium on Computer Applications in Medical Care,* Washington, DC, November 1991, pp. 629–633. PMID: 1807678, PMCID: PMC2247607

11. Van der Lei, J. and Musen, M.A. Separation of critiquing knowledge from medical knowledge: Implications for the Arden syntax, in: Timmers, T., and Blum, B.I. (eds.) *Proceedings of the IMIA Working Conference on Software Engineering in Medical Informatics,* Amsterdam: North-Holland, 1991, pp. 499–510.

12. Linster, M. and Musen, M.A. Using KADS to build K-ONCOCIN: A conceptual model of ONCOCIN. *Proceedings of the Sixth Knowledge Acquisition for Knowledge-Based Systems Workshop,* Banff, Alberta, Canada, October, 1991.

13. Linster, M. and Musen, M.A. The inference structure of K-ONCOCIN: Skeletal-plan refinement. *Proceedings of the Second KADS User Meeting,* Munich, Germany, February, 1992.

14. Tu, S.W., Shahar, Y., and Musen, M.A. Protocol-based therapy management in graft-versus-host disease. *Proceedings of the AAAI Spring Symposium on Artificial Intelligence in Medicine,* American Association for Artificial Intelligence, Stanford, CA, March, 1992.

15. Shahar, Y., Tu, S.W., and Musen, M.A. Using temporal-abstraction mechanisms for patient monitoring. *Proceedings of the AAAI Spring Symposium on Artificial Intelligence in Medicine,* American Association for Artificial Intelligence, Stanford, CA, March, 1992. PMID: 1482852, PMCID: PMC2248062

16. Walther, E., Eriksson, H., and Musen, M.A. Plug and Play: Construction of task-specific expert-system shells using sharable context ontologies. *Proceedings of the AAAI'92 Workshop*

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

on Knowledge Representation Aspects of Knowledge Acquisition. American Association for Artificial Intelligence, San Jose, CA, July, 1992, pp. 191–198.

17. Shahar, Y., Tu, S.W., Das, A.K., and Musen, M.A. A problem-solving architecture for managing temporal data and their abstractions. *Proceedings of the AAAI'92 Workshop on Implementing Temporal Reasoning*. American Association for Artificial Intelligence, San Jose, CA, July, 1992, pp. 141–152.

18. Musen, M.A., Tu, S.W., and Shahar, Y. A problem-solving model for protocol-based care: From e-ONCOCIN to EON. *Proceedings of MEDINFO'92.* Seventh World Congress on Medical Informatics, Geneva, Switzerland, September, 1992, pp. 519–525.

19. Egar, J.W., Puerta, A.R., and Musen, M.A. Diagrammatic acquisition of medical information for clinical trials. *Proceedings of MEDINFO'92.* Seventh World Congress on Medical Informatics, Geneva, Switzerland, September, 1992, pp. 1330–1336.

20. Campbell, K.E. and Musen, M.A. Creation of a systematic domain for medical care: The need for a comprehensive patient-description vocabulary. *Proceedings of MEDINFO'92.* Seventh World Congress on Medical Informatics, Geneva, Switzerland, September, 1992, pp. 1437–1442.

21. Egar, J.W., Puerta, A.R., and Musen, M.A. Graph-grammar assistance for modeling of decisions. *Proceedings of the Seventh Banff Knowledge Acquisition for Knowledge-Based Systems Workshop,* Banff, Alberta, Canada, October, 1992.

22. Eriksson, H., Shahar, Y., Tu, S.W., Puerta, A.R., and Musen, M.A. Task modeling with reusable problem-solving methods. *Proceedings of the Seventh Banff Knowledge Acquisition for Knowledge-Based Systems Workshop,* Banff, Alberta, Canada, October, 1992.

23. Musen, M.A., Carlson, R.A., Fagan, L.M., Deresinski, S.C., and Shortliffe, E.H. T-HELPER: Automated support for community-based clinical research. *Proceedings of the Sixteenth Annual Symposium on Computer Applications in Medical Care,* Baltimore, MD, November, 1992, pp. 719–723. PMID: 1482965, PMCID: PMC2247986

24. Campbell, K.E. and Musen, M.A. Representation of clinical data using SNOMED III and conceptual graphs. *Proceedings of the Sixteenth Annual Symposium on Computer Applications in Medical Care,* Baltimore, MD, November, 1992, pp. 354–358. PMID: 1482897, PMCID: PMC2248067

25. Shahar, Y. and Musen, M.A. A temporal-abstraction system for patient monitoring. *Proceedings of the Sixteenth Annual Symposium on Computer Applications in Medical Care,* Baltimore, MD, November, 1992, pp. 121–127. PMID: 1482852, PMCID: PMC2248062

26. Egar, J. and Musen, M.A. Graph-grammar productions for the modeling of medical dilemmas. *Proceedings of the Sixteenth Annual Symposium on Computer Applications in Medical Care,* Baltimore, MD, November, 1992, pp. 349–353. PMID: 1482895, PMCID: PMC2248114

27. Das, A.K., Tu, S.W., Purcell, G., and Musen, M.A. An extended SQL for temporal data management in clinical decision-support systems. *Proceedings of the Sixteenth Annual Symposium on Computer Applications in Medical Care,* Baltimore, MD, November, 1992, pp. 128–132. PMID: 1482853, PMCID: PMC2248091

28. Henry, S.B., Schreiner, J.G., Borchelt, D., and Musen, M.A. A needs analysis for computer-based telephone triage in a community AIDS clinic. *Proceedings of the Sixteenth Annual Symposium on Computer Applications in Medical Care,* Baltimore, MD, November, 1992, pp. 59–63. PMID: 1482941, PMCID: PMC2248033

29. Egar, J.W. and Musen, M.A. Graph-grammar assistance for automated generation of influence diagrams. *Uncertainty in Artificial Intelligence: Proceedings of the Ninth Conference.* San Mateo: Morgan Kaufman, July, 1993, pp. 235–242.

30. Campbell, K.E., Wieckert, K., Fagan, L.M., Musen, M.A. A computer-based tool for generation of progress notes. *Proceedings of the Sixteenth Annual Symposium on Computer*

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

Applications in Medical Care, Washington, DC, November, 1993, pp. 284–288. PMID: 8130479, PMCID: PMC2248519

31. Ohno-Machado, L., Parra, E., Henry, S.B., Tu, S.W., and Musen, M.A. AIDS2: A decision-support tool for decreasing physicians' uncertainty regarding patient eligibility for HIV treatment protocols. *Proceedings of the Sixteenth Annual Symposium on Computer Applications in Medical Care,* Washington, DC, November, 1993, pp. 429–433. PMID: 8130510, PMCID: PMC2248545

32. Egar, J.W. and Musen, M.A. Automated modeling of medical decisions. *Proceedings of the Sixteenth Annual Symposium on Computer Applications in Medical Care,* Washington, DC, November, 1993, pp. 424–428. PMID: 8130509, PMCID: PMC2248544

33. Kuilboer, M.M., Shahar, Y., Wilson, D.M., and Musen, M.A. Knowledge reuse: Temporal-abstraction mechanisms for the assessment of children's growth. *Proceedings of the Sixteenth Annual Symposium on Computer Applications in Medical Care,* Washington, DC, November, 1993, pp. 449–453. PMID: 8130514, PMCID: PMC2248549

34. Puerta, A.R., Neches, R., Eriksson, H., Szekely, P., Luo, P., and Musen, M.A. Toward ontology-based frameworks for knowledge-acquisition tools. *Proceedings of the Eighth Banff Knowledge Acquisition for Knowledge-Based Systems Workshop,* Banff, Alberta, Canada, January, 1994.

35. Rothenfluh, T.E., Gennari, J.H., Eriksson, H., Puerta, A.R., Tu, S.W., and Musen, M.A. Reusable ontologies, knowledge-acquisition tools, and performance systems: PROTÉGÉ-II solutions to Sisyphus-2. *Proceedings of the Eighth Banff Knowledge Acquisition for Knowledge-Based Systems Workshop,* Banff, Alberta, Canada, January, 1994.

36. Gennari, J.H., Tu, S.W., Rothenfluh, T.E., and Musen, M.A. Mapping domains to methods in support of reuse. *Proceedings of the Eighth Banff Knowledge Acquisition for Knowledge-Based Systems Workshop,* Banff, Alberta, Canada, January, 1994.

37. Eriksson, H., Puerta, A.R., and Musen, M.A. Generation of knowledge-acquisition tools from domain ontologies. *Proceedings of the Eighth Banff Knowledge Acquisition for Knowledge-Based Systems Workshop,* Banff, Alberta, Canada, January, 1994.

38. Aben, M., Shahar, Y., and Musen, M.A. Temporal abstraction mechanisms as KADS inferences. *Proceedings of the Eighth Banff Knowledge Acquisition for Knowledge-Based Systems Workshop,* Banff, Alberta, Canada, January, 1994.

39. Das, A.K., Shahar, Y., Tu, S.W., and Musen, M.A. A temporal-abstraction mediator for protocol-based decision support. *Working Notes of the AAAI Spring Symposium on AI in Medicine: Interpreting Clinical Data.* Stanford, CA, March, 1994, pp. 24–27. PMID: 7949943, PMCID: PMC2247875

40. Shahar, Y., Das, A.K., Tu, S.W., and Musen, M.A. Knowledge-based temporal abstraction in clinical-management tasks. *Working Notes of the AAAI Spring Symposium on AI in Medicine: Interpreting Clinical Data.* Stanford, CA, March, 1994, pp. 143–147.

41. Puerta, A.R., Eriksson, H., Gennari, J.H., and Musen, M.A. Model-based generation of user-interfaces. *Proceedings of the National Conference on Artificial Intelligence* (AAAI '94), Seattle, Washington, August, 1994, pp. 471–477.

42. Shahar, Y., Das, A.K., Tu, S.W., Kraemer, F.B., and Musen, M.A. Knowledge-based temporal abstraction for diabetic monitoring. *Proceedings of the Eighteenth Annual Symposium on Computer Applications in Medical Care,* Washington, DC, November, 1994, pp. 697–701. PMID: 7950015, PMCID: PMC2247929

43. Das, A.K., Shahar, Y., Tu, S.W., and Musen, M.A. A temporal-abstraction mediator for protocol-based decision-support systems. *Proceedings of the Eighteenth Annual Symposium on Computer Applications in Medical Care,* Washington, DC, November, 1994, pp. 320–324. PMID: 7949943, PMCID: PMC2247875

44. Musen, M.A., Eriksson, H., Gennari, J.H., Tu, S.W., Puerta, A.R., PROTEGE-II: a suite of tools

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

for development of intelligent systems from reusable components. *Proceedings Annual Symposium Computer Applied Medical Care*.1065, 1994 PMID: 7949900, PMCID: PMC2247842

45. Musen, M.A., Gennari, J.H., Eriksson, H., Tu, S.W., and Puerta, A.R. PROTÉGÉ-II: Computer support for development of intelligent systems from libraries of components. *MEDINFO'95: Proceedings of the Eighth World Congress on Medical Informatics*, Vancouver, British Columbia, July, 1995, pp. 766–770. PMID: 7949900, PMCID: PMC2247842

46. Shahar, Y., Das, A.K., Tu, S.W., Kraemer, F.B., Basso, L.V., and Musen, M.A. Knowledge-based temporal abstraction in diabetes therapy. *MEDINFO'95: Proceedings of the Eighth World Congress on Medical Informatics*, Vancouver, British Columbia, July, 1995, pp. 852–856. PMID: 8591345

47. Ohno-Machado, L., Walker, M.G., and Musen, M.A. Hierarchical neural networks for survival analysis. *MEDINFO'95: Proceedings of the Eighth World Congress on Medical Informatics*, Vancouver, British Columbia, July, 1995, pp. 828–832. PMID: 8591339

48. Miller, E.T., Wieckert, K.E., Fagan, L.M., and Musen, M.A. Development of a controlled medical terminology: Identification, collaboration, and customization. *MEDINFO'95: Proceedings of the Eighth World Congress on Medical Informatics*, Vancouver, British Columbia, July, 1995, pp. 148–152. PMID: 8591141

49. Shahar, Y. and Musen, M.A. Plan recognition and revision in support of guideline-based care. *Working notes of the AAAI Spring Symposium on Representing Mental States and Mechanisms,* Stanford, CA, March, 1995, pp. 118–126.

50. Gennari, J.H., Altman, R.B., and Musen, M.A. Reuse with PROTÉGÉ-II: From elevators to ribosomes. *Proceedings of SSR'95: ACM-SIGSOFT Symposium on Software Reusability.* Seattle, WA, April, 1995, pp. 72–80.

51. Rosenal, T.W., Musen, M.A., and Seiver, A. Support for information management in critical care: A new approach to identifying needs. *Proceedings of the Nineteenth Annual Symposium on Computer Applications in Medical Care,* New Orleans, LA, October, 1995, pp. 2–6.

52. Gennari, J.H., Oliver, D.E., Pratt, W., Rice, J., and Musen, M.A. A web-based architecture for a medical vocabulary server. *Proceedings of the Nineteenth Annual Symposium on Computer Applications in Medical Care,* New Orleans, LA, October, 1995, pp. 275–279. PMID: 8563284, PMCID: PMC2579098

53. Musen, M.A., Gennari, J.H., and Wong, W.W. A rational reconstruction of INTERNIST-I using PROTÉGÉ-II. *Proceedings of the Nineteenth Annual Symposium on Computer Applications in Medical Care,* New Orleans, LA, October, 1995, pp. 289–293. PMID: 8563287, PMCID: PMC2579101

54. Das, A.K. and Musen, M.A. A comparison of the temporal expressiveness of three database query methods. *Proceedings of the Nineteenth Annual Symposium on Computer Applications in Medical Care,* New Orleans, LA, October, 1995, pp. 331–337. PMID: 8563296, PMCID: PMC2579109

55. Ohno-Machado, L. and Musen, M.A. A comparison of two computer-based prognostic systems for AIDS. *Proceedings of the Nineteenth Annual Symposium on Computer Applications in Medical Care,* New Orleans, LA, October, 1995, pp. 737–741. PMID: 8563387, PMCID: PMC2579191

56. Tuttle, M.S., Sherertz, D.D., Olson, N.E., Nelson, S.J., Erlbaum, M.S., Keck, K.D., Davis, A.N., Suarez-Munist, O.N., Lipow, S.S., Cole, W.G., Fagan, L.M., Acuff, R.D., Crangle, C.E., Musen, M.A., Tu, S.W., Wiederhold, G.C., Carlson, R.W. Toward reusable software components at the point of care. *Proceedings AMIA Annual Fall Symposium*. 150-4, 1996 PMID: 8947646, PMCID: PMC2233053

57. Stein, A., Musen, M.A., and Shahar, Y. Knowledge acquisition for temporal abstraction. *Proceedings of the AMIA Fall Symposium*. Washington, DC, October, 1996, pp. 204–

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

208. PMID: 8947657, PMCID: PMC2233051

58. Tu, S.W. and Musen, M.A. The EON model of intervention protocols and guidelines. *Proceedings of the AMIA Fall Symposium*. Washington, DC, October, 1996, pp. 587–591. PMID: 8947734, PMCID: PMC2233213

59. Fridsma, D.B., Gennari, J.H., and Musen, M.A. Making generic guidelines site specific. *Proceedings of the AMIA Fall Symposium*. Washington, DC, October, 1996, pp. 597–601. PMID: 8947736, PMCID: PMC2232947

60. Gennari, J.H. and Musen, M.A. Reuse for knowledge-based systems and CORBA components. *Proceedings of the Tenth Knowledge Acquisition for Knowledge-Based Systems Workshop.* Banff, Alberta, Canada, November, 1996.

61. Tu, S.W. and Musen, M.A. Episodic refinement of ESPR. *Proceedings of the Tenth Knowledge Acquisition for Knowledge-Based Systems Workshop.* Banff, Alberta, Canada, November, 1996.

62. Molina, M., Shahar, Y., Cuena, J., and Musen, M.A. A structure of problem-solving methods for real-time decision support: Modeling approaches using PROTÉGÉ-II and KSM. *Proceedings of the Tenth Knowledge Acquisition for Knowledge-Based Systems Workshop.* Banff, Alberta, Canada, November, 1996.

63. Das, A.K., and Musen, M.A. A foundational model of time for heterogeneous clinical databases. *Proceedings of the AMIA Fall Symposium*. Nashville, TN, October, 1997, pp. 106–110. PMID: 9357598, PMCID: PMC2233542

64. Nguyen, J.H., Shahar, Y., Tu, S.W., Das, A.K., and Musen, M.A. A temporal database mediator for protocol-based decision-support. *Proceedings of the AMIA Fall Symposium*. Nashville, TN, October, 1997, pp. 298–302. PMID: 9357636, PMCID: PMC2233432

65. Grosso, W.E., Gennari, J.H., Fergerson, R.W., and Musen, M.A. When knowledge models collide: How it happens and what to do. *Proceedings of the Eleventh Knowledge Acquisition for Knowledge-Based Systems Workshop.* Banff, Alberta, Canada, April, 1998.

66. Gennari, J.H., Grosso, W.E., and Musen, M.A. A method-description language: An initial ontology with examples. *Proceedings of the Eleventh Knowledge Acquisition for Knowledge-Based Systems Workshop.* Banff, Alberta, Canada, April, 1998.

67. Park, J.Y., Gennari, J.H., and Musen, M.A. Mappings for reuse in knowledge-based systems. *Proceedings of the Eleventh Knowledge Acquisition for Knowledge-Based Systems Workshop.* Banff, Alberta, Canada, April, 1998.

68. Park, J.Y. and Musen, M.A. VM-in-Protégé: A study of software reuse. *MEDINFO'98: Proceedings of the Ninth World Congress on Medical Informatics*, Seoul, Korea, August, 1998, 644–648. PMID: 10384534

69. Shankar, R.D., Tu, S. W., and Musen, M.A. A declarative explanation framework that uses a collection of visualization agents. *Proceedings of the AMIA Fall Symposium*, American Medical Informatics Association, Orlando, FL, November, 1998, pp. 602–606. PMID: 9929290, PMCID: PMC2232258

70. Smith, D.S., Park, J.Y., and Musen, M.A. Therapy planning as constraint satisfaction: A computer-based antiretroviral therapy advisor for the management of HIV. *Proceedings of the AMIA Fall Symposium*, American Medical Informatics Association, Orlando, FL, November, 1998, pp. 627–631. PMID: 9929295, PMCID: PMC2232332

71. Noy, N.F. and Musen, M.A. An algorithm for merging and aligning ontologies: Automation and tool support. *Proceedings of the Workshop on Ontology Management.* Sixteenth National Conference on Artificial Intelligence (AAAI-99), Orlando, FL, July 1999, pp. 17–27.

72. Eriksson, H., Fergerson, R., Shahar, Y., and Musen, M.A. Automatic generation of ontology editors. *Proceedings of the Twelfth Knowledge Acquisition for Knowledge-Based Systems Workshop.* Banff, Alberta, Canada, October, 1999.

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

73. Noy, N.F. and Musen, M.A. SMART: Automated support for ontology merging and alignment. *Proceedings of the Twelfth Knowledge Acquisition for Knowledge-Based Systems Workshop.* Banff, Alberta, Canada, October, 1999.

74. Shahar, Y. and Musen, M.A. Evaluation of a temporal-abstraction knowledge-acquisition tool. *Proceedings of the Twelfth Knowledge Acquisition for Knowledge-Based Systems Workshop.* Banff, Alberta, Canada, October, 1999.

75. Grosso, W.E., Eriksson, H., Fergerson, R.W., Gennari, J.H., Tu, S.W., and Musen, M.A. Knowledge modeling at the millennium: The design and evolution of Protégé-2000. *Proceedings of the Twelfth Knowledge Acquisition for Knowledge-Based Systems Workshop.* Banff, Alberta, Canada, October, 1999.

76. Advani, A., Tu, S.W., O'Connor, M.J., Coleman, R., Goldstein, M.K., and Musen, M.A., Integrating a modern knowledge-based system architecture with a legacy VA database: The ATHENA and EON projects at Stanford. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 1999, pp. 653–657. PMID: 10566440, PMCID: PMC2232584

77. Shankar, R.D., and Musen, M.A. Justification of automated decision making: Medical explanation or medical argument? *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 1999, pp. 395–399. PMID: 10566388, PMCID: PMC2232527

78. O'Connor, M.J., Tu, S.W., and Musen, M.A. Applying temporal joins to clinical databases. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 1999, pp. 335–339. PMID: 10566376, PMCID: PMC2232759

79. Tu, S.W., and Musen, M.A. A flexible approach to guideline modeling. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 1999, pp. 420–424. PMID: 10566393, PMCID: PMC2232509

80. Rubin, D.L., Gennari, J.H., Srinivas, S., Yuen, A., Kaizer, H., Musen, M.A., and Silva, J.S. Tool support for authoring eligibility criteria for cancer trials. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 1999, pp. 369–373. PMID: 10566383, PMCID: PMC2232521

81. Shon, J., and Musen, M.A. The low availability of metadata elements for evaluating the quality of medical information on the World Wide Web. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 1999, pp. 945–949. PMID: 10566500, PMCID: PMC2232512

82. Noy, N.F., Grosso, W.E., and Musen, M.A. Knowledge-acquisition interfaces for domain experts: An empirical evaluation of Protege-2000. *Proceeding of the Twelfth International Conference on Software Engineering and Knowledge Engineering* (SEKE 2000), Chicago, IL, July, 2000, pp. 177–184.

83. Noy, N.F. and Musen, M.A. PROMPT: Algorithm and tool for automated ontology merging and alignment. *Proceedings of the Seventeenth National Conference on Artificial Intelligence*, Austin, TX, July, 2000, pp. 450–455.

84. Noy, N.F., Fergerson, R.W., and Musen, M.A. The knowledge model of Protege-2000: Combining interoperability and flexibility. *Proceedings of the 12th International Conference on Knowledge Engineering and Knowledge Management* (EKAW 2000), Juan-les-Pins, France, October 2000, pp. 17–32.

85. Schreiber, G., Crubézy, M., and Musen, M.A. A case study in using Protege-2000 as a tool for CommonKADS. *Proceedings of the 12th International Conference on Knowledge Engineering and Knowledge Management* (EKAW 2000), Juan-les-Pins, France, October 2000, pp. 33–48.

86. Goldstein, M.K., Hoffman, B.B., Coleman, R.W., Musen, M.A., Tu, S.W., Advani, A., Shankar, R., and O'Connor, M. Implementing clinical practice guidelines while taking account of changing evidence: ATHENA DSS, an easily modifiable decision-support system for

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

managing hypertension in primary care. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Los Angeles, CA, November, 2000, pp. 300–304. PMID: 11079893, PMCID: PMC2243943

87. Li, Q., Shilane, P., Noy, N.F., and Musen, M.A. Ontology acquisition from online knowledge sources. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Los Angeles, CA, November, 2000, pp. 497–501. PMID: 11079933, PMCID: PMC2244130

88. O'Connor, M.J., Tu, S.W., and Musen, M.A. Representation of temporal indeterminacy in clinical databases. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Los Angeles, CA, November, 2000, pp. 615–619. PMID: 11079957, PMCID: PMC2243750

89. Rubin, D.L., Gennari, J., and Musen, M.A. Knowledge representation and tool support for critiquing clinical trial protocols. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Los Angeles, CA, November, 2000, pp. 724–728. PMID: 11079979, PMCID: PMC2243914

90. Shon, J., Marshall, J., and Musen, M.A. The impact of displayed awards on the credibility and retention of Web site information. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Los Angeles, CA, November, 2000, pp. 794–798. PMID: 11079993, PMCID: PMC2243820

91. Tu, S.W., and Musen, M.A. From guideline modeling to guideline execution: Defining guideline-based decision-support services. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Los Angeles, CA, November, 2000, pp. 863–867. PMID: 11080007, PMCID: PMC2243940

92. Tu, S.W., and Musen, M.A. Representation formalisms and computational methods for modeling guideline-based care. *Proceedings of the First European Workshop on Computer-based Support for Clinical Guidelines and Protocols.* Leipzig, Germany, November, 2000, pp. 125–141. Reprinted in: Heller, B., Löffler, M., Musen, M., and Stefanelli, M. (eds.), *Computer-Based Support for Clinical Guidelines and Protocols*, Amsterdam: IOS Press, 2001.

93. Noy, N.F. and Musen, M.A. Anchor-PROMPT: Using non-local context for semantic matching. Workshop on Ontologies and Information Sharing at the Seventeenth International Joint Conference on Artificial Intelligence (IJCAI-2001), Seattle, WA. 2001.

94. Musen, M.A., O'Connor, M.J., Buckeridge, D.L., Graham, J., Noy, N.F,, Shahar, Y., Henry, K.A. A knowledge-based approach to temporal abstraction of clinical data for disease surveillance. NATO Human Factors in Medicine *Symposium on Operational Issues in Chemical and Biological Defense*, Estoril, Portugal, May 14–17, 2001.

95. O'Connor, M.J., Grosso, W.E., Tu, S.W., and Musen, M.A. RASTA: A distributed temporal abstraction system to facilitate knowledge-driven monitoring of clinical databases. *MEDINFO'01: Proceedings of the Tenth World Congress on Medical Informatics*, London, England, September, 2001, pp. 508–512. PMID: 11604792

96. Shankar, R.D., Martins, S.B., Tu, S.W., Goldstein, M.K., and Musen, M.A. Building an explanation function for a hypertension decision-support system. *MEDINFO'01: Proceedings of the Tenth World Congress on Medical Informatics*, London, England, September, 2001, pp. 538–542. PMID: 11604798

97. Tu, S.W., and Musen, M.A. Modeling data and knowledge in the EON guideline architecture. *MEDINFO'01: Proceedings of the Tenth World Congress on Medical Informatics*, London, England, September, 2001, pp. 280–284. PMID: 11604749

98. Crubézy, M., Lu, W., Motta, E., and Musen, M.A. The Internet reasoning service: delivering configurable problem-solving components to Web users. Workshop on Interactive Tools for Knowledge Capture, *First International Conference on Knowledge Capture* (K-CAP 2001), Victoria, British Columbia, Canada, October, 2001, pp. 15–22.

99. Storey, M.-A., Musen, M.A., Silva, J., Best, C., Ernst, N., Fergerson, R., Noy, N. Jambalaya:

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

Interactive visualization to enhance ontology authoring and knowledge acquisition in Protégé. Workshop on Interactive Tools for Knowledge Capture, *First International Conference on Knowledge Capture* (K-CAP 2001), Victoria, British Columbia, Canada, October, 2001, pp. 35–43.

100. Advani, A., Musen, M.A., and Shahar, Y. Medical quality assurance by scoring adherence to guideline intentions. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 2001, pp. 2–6. PMID: 11825146, PMCID: PMC2243332

101. Das, A.K., and Musen, M.A. A formal method to resolve temporal mismatches in clinical databases. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 2001, pp. 130–134. PMID: 11825168, PMCID: PMC2243601

102. Johnson, P.D., Tu, S.W., Musen, M.A., and Purves, I. A virtual medical record for guideline-based decision support. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 2001, pp. 294–298. PMID: 11825198, PMCID: PMC2243604

103. Goldstein, M.K., Hoffman, B.B., Coleman, R.W., Tu, S.W., Shankar, R.D., O'Connor, M.J., Martins, S.B., Advani, A., Musen, M.A. Patient safety in guideline-based decision support for hypertension management: ATHENA DSS. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 2001, pp. 214–218. PMID: 11825183, PMCID: PMC2243380

104. Shankar, R.D., Tu, S.W., Martins, S.B., Fagan, L.M., Goldstein, M.K., and Musen, M.A. Integration of textual guideline documents with formal guideline knowledge bases. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November 2001, pp. 617–621. PMID: 11825260, PMCID: PMC2243392

105. Noy, N.F., and Musen, M.A. PromptDiff: A fixed-point algorithm for comparing ontology versions. *Proceedings of the Eighteenth National Conference on Artificial Intelligence.* American Association for Artificial Intelligence, Edmonton, Alberta, August 2002, pp. 744-750.

106. Hou, C.J., Noy, N.F., and Musen, M.A. A template-based approach toward acquisition of logical sentences. In: Musen, M.A., Neumann, B., and Studer, R. (eds.), *Intelligent Information Processing*. IFIP 17th World Computer Congress — TC 12 Stream on Intelligent Information Processing, August 25–30, 2002, Montreal, Quebec, Canada. Dordrecht: Kluwer, 2002, pp. 77–89.

107. Crubézy, M., Lu, W., Motta, E., Musen, M.A. Configuring online problem-solving resources with the Internet Reasoning Service. In: Musen, M.A., Neumann, B., and Studer, R. (eds.), *Intelligent Information Processing*. IFIP 17th World Computer Congress — TC 12 Stream on Intelligent Information Processing, August 25–30, 2002, Montreal, Quebec, Canada. Dordrecht: Kluwer, 2002, pp. 91–102.

108. Noy, N.F. and Musen, M.A. Evaluation of ontology-mapping tools: Requirements and experience. *Proceedings of EON2002: EKAW 02 Workshop on Evaluation of Ontology-Based Tools.* Sigüenza, Spain, September 30, 2002, pp. 1–14.

109. Advani, A., Goldstein, M.K., and Musen, M.A. A framework for evidence-adaptive quality assessment that unifies guideline-based and performance-indicator approaches. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, San Antonio, TX, November 2002, pp. 1–6. PMID: 12463775, PMCID: PMC2244239

110. Buckeridge, D.L., Graham, J., O'Connor, M.J., Choy, M.K., Tu, S.W., and Musen, M.A. Knowledge-based bioterrorism surveillance. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, San Antonio, TX, November 2002, pp. 76–80. PMID: 12463790, PMCID: PMC2244298

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

111. Das, A.K. and Musen, M.A. SYNCHRONUS: A reusable software module for temporal integration. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, San Antonio, TX, November 2002, pp. 195–199. PMID: 12463814, PMCID: PMC2244421

112. O'Connor, M.J., Tu, S.W., and Musen, M.A. The Chronus II temporal database mediator. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, San Antonio, TX, November 2002, pp. 567–571. PMID: 12474882, PMCID: PMC2244583

113. Crubézy, M., Pincus, Z.S., and Musen, M.A. Mediating knowledge between application components. Semantic Integration Workshop. Second International Semantic Web Conference (ISWC-03). Sanibel Island, FL, October 2003.

114. Advani, A, Goldstein, M.K., Shahar, Y., and Musen, M.A. Developing quality indicators and auditing protocols from formal guideline models: Knowledge representation and transformations. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November 2003, pp. 11–15. PMID: 14728124, PMCID: PMC1480136

115. Buckeridge, D.L., Musen, M.A., Switzer, P, Crubézy, M. An analytic framework for space–time aberrancy detection in public health surveillance data. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November 2003, pp. 120–124. PMID: 14728146, PMCID: PMC1479968

116. Pincus, Z. and Musen, M.A. Contextualizing heterogeneous data for integration and inference. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November 2003, pp. 514–519. PMID: 14728226, PMCID: PMC1479915

117. Tu, S.W., Campbell, J., and Musen, M.A. The structure of guideline recommendations: A synthesis. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November 2003, pp. 679–683. PMID: 14728259, PMCID: PMC1480008

118. O'Connor, M.J., Buckeridge, D.L., Choy, M., Crubezy, M., Pincus, Z., Musen, M.A. BioSTORM: a system for automated surveillance of diverse data sources. *AMIA Annual Symposium Proceedings*. 1071, 2003. PMID: 14728574, PMCID: PMC1480334

119. Shankar, R.D., Tu, S.W., Musen, M.A. A knowledge-acquisition wizard to encode guidelines. *AMIA Annual Symposium Proceedings*. 1007, 2003. PMID: 14728510, PMCID: PMC1479958

120. Noy, N.F., Crubezy, M., Fergerson, R.W., Knublauch, H., Tu, S.W., Vendetti, J., Musen, M.A. Protégé-2000: An open-source ontology-development and knowledge-acquisition environment. *AMIA Annual Symposium Proceedings*. 953, 2003. PMID: 14728458, PMCID: PMC1480139

121. Buckeridge, D.L., O'Connor, M.J., Xu, H., Musen, M.A. A knowledge-based framework for deploying surveillance problem solvers. *Proceedings of the 2004 International Conference on Information and Knowledge Engineering (IKE'04)*. Las Vegas, NV, June, 2004.

122. Tu, S.W., Musen, M.A., Shankar, R., Campbell, J., Hrabak, K., McClay , J., Huff, S.M., McClure, R., Parker, C., Rocha, R., Abarbanel, R., Beard, N., Glasgow, J., Mansfield, G., Ram, P., Ye, Q., Mays, E., Weida, T., Chute, C.G., McDonald, K., Molu, D., Nyman, M.A., Scheitel, S., Solbrig, H., Zill, D.A., Goldstein, M.K. Modeling guidelines for integration into clinical workflow. *Medinfo 2004*;11(Pt 1):174–178. PMID: 15360798

123. Advani, A., Jones, N., Shahar, Y., Goldstein, M.K., Musen, M.A. An intelligent case-adjustment algorithm for the automated design of population-based quality auditing protocols. *Medinfo* 2004;11(Pt 2):1003–1007. PMID: 15360963

124. Chan, A.S., Coleman, R.W., Martins, S.B., A. Advani, Musen, M.A., Bosworth, H. B., Oddone, E. Z., Shlipak, M. G. Evaluating provider adherence in a trial of a guideline-based

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

decision support system for hypertension. *Medinfo 2004*, San Francisco, California, September, 2004. PMID: 15360788

125. Rubin, D.L., Bashir, Y., Grossman, D., Dev, P., Musen, M.A. Linking ontologies with three-dimensional models of anatomy to predict the effects of penetrating injuries. The 26th Annual International Conference of the IEEE EMBS San Francisco, CA, September, 2004, pp. 3128 –3131. PMID: 17270942

126. Knublauch, H., R. W. Fergerson, Noy, N.F., Musen, M.A. The Protégé OWL Plugin: An open development environment for semantic web applications. *Third International Conference on the Semantic Web*, Hiroshima, Japan, 2004, pp. 229–243.

127. Noy, N. F., Musen, M.A. Specifying ontology views by Traversal. *Third International Conference on the Semantic Web*, Hiroshima, Japan, 2004, pp. 713–725.

128. Noy, N. F., Kunnatur, S., Klein, M., Musen, M.A. Tracking changes during ontology evolution. *Third International Conference on the Semantic Web*, Hiroshima, Japan, 2004; pp. 259–273.

129. Noy, N.F., Musen, M.A. Using PROMPT ontology-comparison tools in the EON ontology alignment contest. Workshop on Evaluation of Ontology-Based Tools (EON2004). *Third International Conference on the Semantic Web,* Hiroshima, Japan, 2004.

130. Dameron, O., Noy, N.F., Knublauch, H., Musen, M.A. Accessing and manipulating ontologies using web services. Workshop on Semantic Web Services: Preparing to Meet the World of Business Applications. *Third International Conference on the Semantic Web*, Hiroshima, Japan, 2004.

131. Dameron, O., Gibaud, B., Musen, M.A. Using semantic dependencies for consistency management of an ontology of brain-cortex anatomy. *First International Workshop on Formal Biomedical Knowledge Representation KRMED04*, Whistler, Canada, 2004. PMID: 17254759

132. Knublauch, H., Rector, A.L., Musen, M.A., Editing description logic ontologies with the Protégé OWL plugin. *International Workshop on Description Logics,* Whistler, Canada, 2004.

133. Knublauch, H., Dameron, O., Musen, M.A., Weaving the Biomedical Semantic Web with the Protégé OWL Plugin, *International Workshop on Description Logics*, Whistler, Canada, 2004.

134. Tu, S. W., Campbell, J. R., Musen, M.A. SAGE guideline modeling: motivations and methodology. In: Kaiser, K., Miksch, S. and Tu, S.W. *Computer-Based Support for Clinical Guidelines and Protocols: Proceedings of the Symposium on Computerized Guidelines and Protocols (CGP-2004),* Amsterdam, 2004, pp. 167–171. PMID:15537222

135. O'Connor, M.J., Knublauch, H., Tu, S.W., B. Grossof, M. Dean, W. E. Grosso, Musen, M.A. Supporting rule system interoperability on the semantic web with SWRL. *Fourth International Semantic Web Conference*, Galway, Ireland, 2005, pp. 974–986.

136. Knublauch, H., Horridge, M., Musen, M.A., A. L. Rector, R. Stevens, N. Drummond, P. Lord, Noy, N.F., J. Seidenberg, H. Wang. The Protégé OWL Experience: workshop on OWL: experiences and directions. *Fourth International Semantic Web Conference*, Galway, Ireland, 2005.

137. Rubin, D.L., Dameron, O., Musen, M.A. Using OWL and description logics-based classification for reasoning in biomedical applications. *Eighth International Protégé Conference*, Madrid, Spain, July 18n21, 2005.

138. Dameron, O., Rubin, D.L., Musen, M.A. Challenges in converting frame-based ontology into OWL: the Foundational Model of Anatomy case-study. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 2005, pp. 181-5. PMID: 16779026, PMCID: PMC1560487

139. Noy, N.F., Guha, RV, Musen, M.A. User ratings of ontologies: Who will rate the raters? *Proceedings of the AAAI Spring Symposium on Knowledge Collection from Volunteer Contributors*, Stanford, CA, 2005.

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

140. Musen, M.A., Crubézy, M., O'Connor, M.J., Buckeridge, D.L.. Knowledge-based syndromic surveillance for bioterrorism. *2005 AAAI Spring Symposium on AI Technologies for Homeland Security*, Stanford, CA, 2005.

141. Rubin, D.L., Dameron, O., Musen, M.A. Use of description logic classification to reason about consequences of penetrating injuries. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 2005, pp. 649–653. PMID: 16779120, PMCID: PMC1560440

142. Eriksson, H., Tu, S.W., Musen, M.A. Semantic clinical guideline documents. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November*,* 2005, pp. 236–240. PMID: 16779037, PMCID: PMC1560832

143. Supekar, K. and Musen, M.A., Ontology metadata to support the building of a library of biomedical ontologies. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 2005, pp. 1126. PMID:16779413, PMCID: PMC1560607

144. Shankar, R. D., Tu, S. W. and Musen, M.A. Medical arguments in an automated health care system. *AAAI 2006 Spring Symposia*, Stanford University, 2006.

145. Lewen, H., Supekar, K., Noy, N.F., Musen, M.A. Topic-specific trust and open rating systems: an approach for ontology evaluation. Workshop on Evaluation of Ontologies for the Web (EON2006) at the *Fifteenth International World Wide Web Conference*, Edinburgh, UK, 2006.

146. Tu, S.W., Hrabak, K.M., Campbell, J.R., Glasgow, J., Nyman, M.A., McClure, R., McClay, J., Abarbanel, R., Mansfield, J.G., Martins, S.M., Goldstein, M.K., Musen, M.A. Use of declarative statements in creating and maintaining computer-interpretable knowledge bases for guideline-based care, *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 2006, pp.784–788. PMID: 17238448, PMCID: PMC1839725

147. Lin, N.D., Martins, S.B., Chan, A.S., Coleman, R.W., Bosworth, H.B., Oddone, E.Z., Shankar, R.D., Musen, M.A., Hoffman, B.B., Goldstein, M.K. Identifying barriers to hypertension guideline adherence using clinician feedback at the point of care, *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 2006, pp. 494–498. PMID: 17238390, PMCID: PMC1839712

148. Noy, N. F., Chugh, A., Liu, W., Musen, M. A. A framework for ontology evolution in collaborative environments. Fifth International Semantic Web Conference, Athens, GA, 2006, pp. 544–558.

149. Shah, N.H., Rubin, D.L., Supekar, K.S., Musen, M.A. Ontology-based annotation and query of tissue microarray data. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 2006; pp. 709–713. PMID: 17238433, PMCID: PMC1839511

150. Rubin, D.L., Grossman, D., Neal, M., Cook, D.L., Bassingthwaighte, J.B., Musen, M.A. Ontology-based representation of simulation models of physiology. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 2006, pp. 664–668. PMID: 17238424, PMCID: PMC1839612

151. Supekar, K., Rubin, D., Noy, N., Musen, M.A. Knowledge Zone: a public repository of peer-reviewed biomedical ontologies. *Medinfo,* 2007, 12(Pt 1), pp. 812–816. PMID: 17911829

152. Moreira, D., Shah, N. H., Musen, M.A. Interpretation errors related to the GO annotation file format. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Chicago, IL, November, 2007, pp. 759–764. PMID: 18693894, PMCID: PMC2655813

153. Alani, H., Noy, N.F., Shah, N.H., Musen, M.A. Searching ontologies based on content: experiments in the biomedical domain. *The Fourth International Conference on Knowledge Capture (K-CAP 2007)*, Whistler, BC, Canada, 2007, pp. 55–62.

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

154. O' Connor, M.J., Tu, S.W., Das, A.K., Musen, M.A. Querying the semantic web with SWRL. *The International RuleML Symposium on Rule Interchange and Applications (RuleML2007)*, Orlando, FL, 2007.

155. O' Connor, M.J., Shankar, R.D., Tu, S. W., Parrish, D. B., Das, A. K., Musen, M.A. Using semantic web technologies for knowledge-driven querying of biomedical data. *Eleventh Conference on Artificial Intelligence in Medicine (AIME2007)*, Amsterdam, Netherlands, 2007, pp. 267–276.

156. O' Connor, M.J., Shankar, R. D., Tu, S.W., Das, A.K., Nyulas, C. I., Musen, M.A. Efficiently querying relational databases using OWL and SWRL. *The First International Conference on Web Reasoning and Rule Systems*, Innsbruck, Austria, 2007, pp. 361–363.

157. Jonquet, C., Musen, M.A., Shah, N.H. A system for ontology-based annotation of biomedical data. *International Workshop on Data Integration in The Life Sciences*, Evry, France, 2008, pp. 144–152.

158. Rubin, D.L., Moreira, D.A., Kanjamala, P.P. and Musen, M.A. BioPortal: a web portal to biomedical ontologies. In: *AAAI Spring Symposium Series, Symbiotic Relationships between Semantic Web and Knowledge Engineering*, Stanford University, 2008.

159. Shah, N.H., Chiang, A.P., Butte, A.J., Chen, R., Musen, M.A. Ontology-driven indexing of public datasets for translational bioinformatics. *AMIA Summit on Translational Bioinformatics*, San Francisco, CA, 2008, pp. 100–104.

160. Noy, N.F., Tudorache, T., de Coronado, S. and Musen, M.A. Developing biomedical ontologies collaboratively. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 2008, pp. 520–524. PMID: 18998901, PMCID: PMC2656043

161. Shah, N.H. and Musen, M.A. UMLS-Query: a Perl module for querying the UMLS. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 2008, pp 652–656. PMID: 18998805, PMCID: PMC2656020

162. Lee, W.N., Shah, N., Sundlass, K., and Musen, M.A. Comparison of ontology-based semantic-similarity measures. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 2008, pp. 384–388. PMID: 18999312, PMCID: PMC2655943

163. Tudorache, T., Noy, N.F., Tu, S.W., Musen, M.A. Supporting collaborative ontology development in Protégé. *Seventh International Semantic Web Conference (ISWC2008)*, Karlsruhe, Germany, 2008, pp. 17–32.

164. Noy, N.F., Griffith, N.B., Musen, M.A. Collecting community-based mappings in an ontology repository. *Seventh International Semantic Web Conference Proceedings (ISWC2008),* Karlsruhe, Germany, 2008, pp. 371–386.

165. Sebastian, A., Tudorache, T., Noy, N.F., Musen, M.A. Customizable workflow support for collaborative ontology development. *Fourth International Workshop on Semantic Web Enabled Software Engineering (SWESE)*, Karlsruhe, Germany, 2008.

166. Jonquet, C., Shah, N., Musen, M.A. Un service Web pour l'annotation sémantique de données biomédicales avec des ontologies. *13èmes Journées Francophones d'Informatique Médicale*, JFIM'09, Nice, France, 2009.

167. Nyulas, C.I., O'Connor, M.J., Tu, S.W., Okhmatovskaia, A., Buckeridge, D., Musen, M.A. An ontology-driven framework for deploying JADE agent systems. *IEEE/WIC/ACM International Conference on Intelligent Agent Technology*, Sydney, Australia, 2009, pp. 573–577.

168. Buckeridge, D., Okhmatovskaia, A., Tu, S.W., O'Connor, M.J., Nyulas, C.I., Musen, M.A. Predicting outbreak detection in public health surveillance: quantitative analysis to enable evidence-based method selection. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November, 2008, pp. 76–

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

80. PMID: 18999264, PMCID: PMC2656053

169. Sebastian, A., Noy, N.F., Tudorache, T. and Musen, M.A. A generic ontology for collaborative ontology-development workflows. *Sixteenth European Knowledge Acquisition Workshop* (EKAW 2008), Catania, Italy, 2008, pp. 318–328.

170. Rubin, D., Talos, I., Halle, M., Musen, M.A. and Kikinis, R. Toward computational neuroanatomy: a functional representation of neural components and connectivity. In: *AMIA Summit on Translational Bioinformatics*, San Francisco, CA, 2009. PMID: 19208191, PMCID: PMC2646240

171. Jonquet, C., Shah, N.H., and Musen, M.A. The open biomedical annotator. In: *AMIA Summit on Translational Bioinformatics,* pp. 56–60, San Francisco, CA, 2009. PMID: 21347171, PMCID: PMC3041576

172. Ghazvinian, A., Noy, N.F., Jonquet, C., Shah, N.H., Musen, M.A. What four million mappings can tell you about two hundred ontologies. *The Eighth International Semantic Web Conference (ISWC 2009),* Washington, DC, Springer 2009, pp. 229–242.

173. Izadi, M., Buckeridge, D., Okhmatovskaia, A., Tu, S.W., O'Connor, M.J., Nyulas, C.I., Musen, M.A. A Bayesian network model for analysis of detection performance in surveillance systems. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, San Francisco, CA, November, 2009, pp. 276–280. PMID: 20351864, PMCID: PMC2815401

174. Nyulas, C.I., Noy, N.F., Dorf, M.V., Musen, M.A. Ontology-driven software: what we learned from using ontologies as infrastructure for software. *Fifth International Workshop on Semantic Web-Enabled Software Engineering (SWESE)*. International Semantic Web Conference (ISWC 2009), Chantilly, VA, 2009.

175. Jonquet, C., Shah, N.H., Musen, M.A. Prototyping a biomedical ontology recommender service. *Bio-Ontologies: Knowledge in Biology*, SIG, ISMB ECCB 2009, Stockholm, Sweden, 2009.

176. Ghazvinian, A., Noy, N.F., Musen, M.A. Creating mappings for ontologies in biomedicine: simple methods work. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, San Francisco, CA, November, 2009, pp. 198–202. PMID: 20351849, PMCID: PMC2815474

177. Noy, N.F., Dorf, M.V., Griffith, N., Nyulas, C.I., Musen, M.A. Harnessing the power of the community in a library of biomedical ontologies. Workshop on Semantic Web Applications in Scientific Discourse*, The Eighth International Semantic Web Conference (ISWC 2009),* Washington, DC, 2009.

178. Tu, S.W., Bodenreider, O., Celik, C., Chute, C.G., Heard, S., Jakob, R., Jiang, G., Kim, S., Miller, E., Musen, M.A., Nakaya, J., Patrick, J., Rector, A.L., Reynoso, G., Rodrigues, J., Solbrig, H., Spackman, K.A., Tudorache, T., Weber, S., Üstün, T.B. A content model for the ICD-11 revision. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association*,* Washington, DC, November, 2010.

179. Ghazvinian, A., Noy, N. F., Musen, M. A. How orthogonal are the OBO Foundry ontologies? *Bio-Ontologies 2010: Semantic Applications in Life Sciences.* Conference on Intelligent Systems in Molecular Biosystems (ISMB). Boston, MA, USA, 2010. PMID: 21624157, PMCID: PMC3102891

180. O' Connor, M.J., Halaschek-Wiener, C., Musen, M.A. M2: A language for mapping spreadsheets to OWL. *OWL: Experiences and Directions (OWLED), Sixth International Workshop*, San Francisco, CA, 2010.

181. Tudorache, T., Falconer, S.M., Noy, N.F., Nyulas, C.I., Üstün, T.B., Storey, M.-A., Musen, M.A. Ontology development for the masses: Creating ICD-11 in WebProtégé. *European Knowledge Acquisition Workshop (EKAW 2010)*, Lisbon, Portugal, 2010, pp. 74–89.

182. Tudorache, T., Falconer, S.M., Nyulas, C.I., Storey, M.-A., Üstün, T.B., Musen, M.A. Supporting the collaborative authoring of ICD-11 with WebProtégé. *Proceedings of the*

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

AMIA Annual Symposium. American Medical Informatics Association*,* Washington, DC, November, 2010. PMID: 21347089, PMCID: PMC3041458

183. Noy, N.F., Tudorache, T., Nyulas, C.I., Musen, M.A. The ontology life cycle: Integrated tools for editing, publishing, peer review, and evolution of ontologies. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association*,* Washington, DC, 2010. PMID: 21347039, PMCID: PMC3041389

184. Tudorache, T., Falconer, S.M., Nyulas, C.I., Noy, N.F., Musen, M.A. Will Semantic Web technologies work for the development of ICD-11? *Ninth International Semantic Web Conference*, Shanghai, China, 2010.

185. M. J. O' Connor, M.J., C. Halaschek-Wiener, C., Musen, M.A. Mapping Master a flexible approach for mapping spreadsheets to OWL**.** *Ninth International Semantic Web Conference,* Shanghai, China, 2010, pp.194–208.

186. Tordai, A., Ghazvinian, A., van Ossenbruggen, J., Musen, M.A., Noy, N.F. Lost in Translation? Empirical analysis of mapping compositions for large ontologies. *The Fifth International Workshop on Ontology Matching (OM 2010)*, *Ninth International Semantic Web Conference,* Shanghai, China, 2010.

187. LePendu, P., Noy, N.F., Jonquet, C., Alexander, P., Shah, N.H., Musen, M.A. Optimize first, buy later: Analyzing metrics to ramp-up very large knowledge bases. *Ninth International Semantic Web Conference,* Shanghai, China, 2010, pp. 486–501.

188. Wlodarczyk, T.W., O' Connor, M., Rong, C., Musen, M.A. SWRL-F- A fuzzy logic extension of the semantic web rule language. *The Sixth International Workshop on Uncertainty Reasoning for the Semantic Web*, *Ninth International Web Conference*, Shanghai, China, 2010.

189. Tudorache, T., Noy, N.F., Musen, M.A., Nyulas, C.I. Two use cases for the interoperation between an ontology repository and an ontology editor. *ISWC Workshop on Ontology Repositories for the Web (SERES 2010), Ninth International Semantic Web Conference,* Shanghai, China, 2010.

190. Xu, R., Musen, M.A., Shah, N.H. A comprehensive analysis of five million UMLS metathesaurus terms using eighteen million MEDLINE citations. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association*,* Washington, DC, November, 2010*.* PMID: 21347110, PMCID: PMC3041393

191. Tudorache, T., Falconer, S., Nyulas, C., Storey, M.A., Ustün, T.B., Musen, M.A. Supporting the collaborative authoring of ICD-11 with WebProtégé. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association*,* Washington, DC, November, 2010*.* PMID: 21347089, PMCID: PMC3041458

192. Tirrell, R., Evani, U., Berman, A.E., Mooney, S.D., Musen, M.A., Shah, N.H. An ontology-neutral framework for enrichment analysis. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association*,* Washington, DC, November, 2010*.* PMID: 21347088, PMCID: PMC3041299

193. Parai, G.K., Jonquet, C., Xu, R., Musen, M.A., Shah, N.H. The lexicon builder web service: building custom lexicons from two hundred biomedical ontologies. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association*,* Washington, DC, November, 2010*. PMID: 21347046, PMCID: PMC3041331*

194. Le Pendu, P., Musen, M., Shah, N. Enabling enrichment analysis with the Human Disease Ontology. *Proceedings of the AMIA Summit on Translational Bioinformatics.* San Francisco, CA, March 2011. PMID: 21550421, PMCID: PMC3392036

195. Garton, Y., Coulet, A., Shah, N., Musen, M., Altman, R. Mining the scientific literature to build a rich semantic network for pharmacogenomics knowledge aggregation and discovery using natural language processing and ontology-based techniques. *Proceedings of the AMIA Summit on Translational Bioinformatics.* San Francisco, CA, March 2011.

196. Alexander, P.R., Nyulas, C.I., Tudorache, T., Whetzel, T., Noy, N.F., Musen, M.A. Semantic

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

infrastructure to enable collaboration in ontology development. *International Workshop on Semantic Technologies for Information-Integrated Collaboration (STIIC 2011)*, Philadelphia, PA, 2011.

197. Ghazvinian, A., Noy, N.F., Musen, M.A. From mappings to modules: Using mappings to identify domain-specific modules in large ontologies. *The Sixth International Conference on Knowledge Capture*. Association for Computing Machinery, Banff, Canada, 2011.

198. Salvadores, M., Alexander, P.R., Musen, M.A., Noy, N.F. The quad economy of a Semantic Web ontology repository. *Workshop on Scalable Semantic Web Knowledge Base Systems at International Semantic Web Conference 2011*, Bonn, Germany, 2011.

199. Tao, C., Noy, N.F., Solbrig, H., Shah, N.H., Musen, M.A., Chute, C.G. Proposed SKOS extensions for BioPortal terminology services. *Joint International Semantic Technology Conference (JIST 2011)*, Hangzhou, China, 2011.

200. Tudorache, T., Noy, N.F., Musen, M.A., Falconer, S.M. A knowledge base driven user interface for collaborative ontology development. *2011 International Conference on Intelligent User Interfaces (IUI 2011)*, Palo Alto, CA, 2011.

201. Tudorache, T., Nyulas, C.I., Noy, N.F., Redmond, T., Musen, M.A. iCAT: A collaborative authoring tool for ICD-11. *Workshop on Ontologies Come of Age in the Semantic Web at International Semantic Web Conference 2011,* Bonn, Germany, 2011.

202. Whetzel, P.L., Jonquet, C., Youn, C., Dorf, M., Fergerson, R., Musen, M., Shah, N. The NCBO Annotator: Ontology-based annotation as a Web service. *International Conference on Biomedical Ontology (ICBO 2011)*, Buffalo, NY, July 2011.

203. Pöschko, J., Strohmaier, M., Tudorache, T., Musen, M.A. Pragmatic analysis of crowd-based knowledge production systems with iCAT Analytics: Visualizing changes to the ICD-11 ontology. *Wisdom of the Crowd: AAAI Spring Symposium*, Stanford, CA, March 2012.

204. Walk, S., Strohmaier, M., Tudorache, T., Noy, N.F., Nyulas, C., Musen, M.A. Recommending concepts to experts: An exploration of recommender techniques for collaborative ontology engineering platforms in the biomedical domain. *International Conference on Biomedical Ontology (ICBO 2012)*, Graz, Austria, July 2012.

205. Mortensen, J.M., Horridge, M., Musen, M.A., Noy, N.F. Applications of ontology design patterns in biomedical ontologies. *AMIA Annual Symposium*, 643–652, November 2012. PMID: 23304337, PMCID: PMC3540458

206. Ochs, C., Agrawal, A., Perl, Y., Halper, M., Tu, S.W., Carini, S., Sim, I., Noy, N., Musen, M., Geller, J. Deriving an abstraction network to support quality assurance in OCRe. *AMIA Annual Symposium*, 681-619, November 2012. PMID: 23304341, PMCID: PMC3540580

207. Mortensen, J.M., Horridge, M., Musen, M.A., Noy, N.F. Modest use of ontology design patterns in biomedical ontologies. Workshop on Ontology Patterns. International Semantic Web Workshop (ISWC 2012), Boston, MA, November 2012.

208. Salvadores, M., Horridge, M., Alexander, P.R., Fergerson, R.W., Musen, N.F., Noy, N.F. Using SPARQL to query BioPortal ontologies and metadata. International Semantic Web Workshop (ISWC 2012), Springer–Verlag:Boston, MA, November 2012, pp. 180–195.

209. Noy, N. F., Alexander, P. R., Harpaz, R., Whetzel, P. L., Fergerson, R. W., Musen, M. A. Getting lucky in ontology search: A data-driven evaluation framework for ontology ranking. *International Semantic Web Conference (ISWC 2013)*. 12th International Semantic Web Conference, Sydney, Australia, Oct 2013, Proceedings, Part I, pp. 444–459.

210. Tudorache, T., Nyulas, C. I., Noy, N. F., Musen, M. A. Using Semantic Web in ICD-11: Three years down the road. *International Semantic Web Conference (ISWC 2013)*. 12th International Semantic Web Conference, Sydney, Australia, Oct 2013, Proceedings, Part II, pp. 195–211.

211. Horridge, M., Tudorache, T., Vendetti, J., Nyulas, C. I., Musen, M. A., Noy, N. F. Simplified OWL ontology editing for the Web: Is WebProtégé enough? *International Semantic Web*

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

Conference (ISWC 2013). 12th International Semantic Web Conference, Sydney, Australia, Oct 2013, Proceedings, Part I, pp. 200–215.

212. Wang, H., Tudorache, T., Dou, D., Noy, N. F., Musen, M. A. Analysis of user editing patterns in ontology development projects. *On the Move to Meaningful Internet Systems: OTM 2013 Conferences.* Confederated International Conferences, Graz, Austria, Jan 2013, pp. 470–487.

213. Noy, N. F., Mortensen, J., Musen, M. A., Alexander, P. R. Mechanical turk as an ontology engineer: using microtasks as a component of an ontology-engineering workflow. *Proceedings of the 5th Annual ACM Web Science Conference*, May 2013, pp. 262–271.

214. Salvadores, M., Alexander, P.R., Fergerson, R.W., Noy, N.F., Musen, M.A. Boosting RDF adaption in Ruby with GOO. *Proceedings of the 2013th International Conference on Semantic Web Enterprise Adoption and Best Practice*. Volume 1106, pp. 4–11, 2013.

215. Mortensen, J., Musen, M.A., Noy, N.F. Ontology quality assurance with the crowd. *First AAAI Conference on Human Computation and Crowdsourcing*. Palm Springs, CA, 2013.

216. Mortensen, J. M., Musen, M. A., Noy, N. F. Crowdsourcing the verification of relationships in biomedical ontologies. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, D.C., Nov 2013. PMID: 24551391, PMCID: PMC3900126

217. Horridge, M., Nyulas, C.I., Tudorache, T., Musen, M.A. WebProtégé: a Web-based development environment for OWL ontologies. *Proceedings of the Eleventh OWL Experiences and Directions Workshop* (OWLED 2014), Riva del Garda, Italy, Oct 2014.

218. Horridge, M., Mortensen, J.M., Parsia, B., Sattler, U., Musen, M.A. A study on the atomic decomposition of ontologies. *Proceedings of the 13th International Semantic Web Conference*, Riva del Garda, Italy, Oct 2014.

219. Lou, V., Tu, S.W., Nyulas, C., Tudorache, T., Chalmers, R., Musen, M.A. Crowdsourcing ICD-11 sanctioning rules. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, D.C., Nov 2014.

220. Horridge, M., Parsia, B., Noy, N.F., Musen, M.A. Reasoning based quality assurance of medical ontologies: a case study. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, D.C., Nov 2014. PMID: 25954373, PMCID: PMC4420015

221. Mortensen, J.M., Musen, M.A., Noy, N.F. An empirically derived taxonomy of errors in SNOMED CT. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, D.C., Nov 2014. PMID: 25954397, PMCID: PMC4419962

222. Jonquet, C., Musen, M.A., Roche, C., Costa, C., Costa, R., Coudyzer, E. Gestion du multilinguisme dans un portail d'ontologies: étude de cas pour le NCBO BioPortal. *TOTh'14: Terminology and Ontology: Theories and Applications Workshop*, Brussels, Belgium, Dec 2014.

223. Rospocher, M., Tudorache T., and Musen. M.A. Investigating collaboration dynamics in different ontology development environments. *Knowledge Science, Engineering, and Management 2014*. Springer International Publishing, Lecture Notes in Computer Science, **8793**:302–313, 2014.

224. Leung, T.I., Jalal, H., Zuman, D.M., Dumontier, M., Owens, D.K., Musen, M.A., Goldstein, M.K. Automating identification of multiple chronic conditions in clinical practice guidelines. *AMIA Summits on Translational Science Proceedings*, p. 456, 2015. PMID: 26306285, PMCID: PMC4525235

225. Zhang, Y., Tudorache, T., Horridge, M., and Musen, M.A. Helping users bootstrap ontologies: an empirical investigation. *Computer–Human Interaction* (CHI 2015), Seoul, Korea, April 2015.

226. Jonquet, C., Emonet, V., and Musen, M.A. Roadmap for a multilingual BioPortal. In

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

Fourth Workshop on the Multilingual Semantic Web, MSW4'15. Portoroz, Slovenia, June 2015.

227. Kamdar, M.R., Tudorache, T., and Musen, M.A. Investigating term reuse in biomedical ontologies. *International Conference on Biomedical Ontology*, Lisbon, Portugal, July 2015.

228. Gonçalves, R.S., Tu, S.W., Nyulas, C.I., Tierney, M.J., and Musen, M.A. Structured data acquisition with ontology-based forms. *International Conference on Biomedical Ontology*, Lisbon, Portugal, July 2015.

229. Orlando, J.P., Musen, M.A., and Moreira, D.A. User extensible system to identify problems in OWL ontologies and SWRL rules. *International Symposium on Rules and Rule Markup Languages for the Semantic Web* (RuleML 2015), Berlin, Germany, Aug 2015.

230. Walk, S., Singer, P., Noboa, L.E., Tudorache, T., Musen, M.A., and Strrohmaier. Understanding how users edit ontologies: Comparing hypotheses from four real-world projects. *Proceedings of the 14th International Semantic Web Conference*, Bethlehem, PA, Oct 2015.

231. Horridge, M. and Musen, M.A. Snap-SPARQL: A Java Framework for working with SPARQL and OWL. *Proceedings of the Twelfth OWL Experiences and Directions Workshop* (OWLED 2015), Bethlehem, PA, Oct 2015.

232. Ochs, C., Perl, Y., Geller, J., and Musen, M.A. Using aggregate taxonomies to summarize SNOMED CT evolution. *IEEE International Conference on Bioinformatics and Biomedicine* (BIBM 2015), Washingtin DC, Nov 2015, pp. 1008–1015.

233. Tu, S.W., Nyulas, C.I., Tudorache, T., and Musen, M.A. A method to compare ICF and SNOMED CT for coverage of U.S. Social Security Administration's disability listing criteria. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, San Francisco, CA, Nov 2015. PMID: 26958262, PMCID: PMC4765666

234. Jonquet, C., Toulet, A., Aubin, S., Dzalé-Yeumo, E., Emonet, V., Graybeal, J., Musen, M.A., Pommier, C., and Larmande, P. Reusing the NCBO BioPortal technology for agronomy to build AgroPortal. International Conference on Biomedical Ontology (ICBO 2015), Corvallis. OR, Aug 2016.

235. Walk, S., Tudorache, T., and Musen, M.A. Visualizing user editing behavior in collaborative ontology-engineering projects. VOILA Workshop, *International Semantic Web Conference*, Kobe, Japan, Oct 2016.

236. O'Connor, M.J., Martínez-Romero, M., Egyedi, A., Willrett. D., Graybeal, J., and Musen, M.A. An open repository model for acquiring knowledge about scientific experiments. In: *Proceedings of the 20th International Conference on Knowledge Engineering and Knowledge Management* (EKAW'16), Bologna, Italy, November, 2016.

237. Walk, S., Espin-Noboa, L., Helic, D., Strohmaier, M., and Musen, M. How users explore ontologies on the Web: a study of NCBO's BioPortal user logs. *26th International World Wide Web Conference*, Perth, Australia, April 2017.

238. Kamdar, M.R. and Musen, M.A. PHLeGrA: Jumping across the web of linked open data for discovering associations. *26th International World Wide Web Conference*, Perth, Australia, April 2017.

239. Leung, T.I., Goldstein, M.K., Musen, M.A., Cronkite, R., Chen, J.H., Gottleib, A., Leitersdorf, E. The New HIT: Human Health Information Technology. *Proceedings of MEDINFO 2017, The 16th World Congress on Medical and Health Informatics*, Hangzhou, China, August, 2017.

240. Martínez-Romero, M., O'Connor, M.J., Dorf, M., Vendetti, J., Willrett, D., Egyedi, A., Graybeal, J., and Musen, M.A. Supporting ontology-based standardization of metadata in the CEDAR workbench. Procedings of the International Conference on Biomedical Ontology (ICBO 2017), Newcastle, U.K., September 2017.

241. Ochs, C., Geller, J., Perl, Y., and Musen, M.A. Real time summarization and visualization of

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

ontology change in Protégé. VOILA Workshop*, International Semantic Web Conference*, Viennna, Austria, October 2017.

242. Gonçalves, R.S., O'Connor, M.J., Martínez-Romero, M., Graybeal, J., and Musen, M.A. Metadata in the BioSample online repository are impaired by numerous anomalies. SemSci Workshop: Enabling Open Semantic Science*, International Semantic Web Conference*, Viennna, Austria, October 2017.

243. Gonçalves, R.S., O'Connor, M.J., Martínez-Romero, M., Egyedi, A.L., Willrett, D., Graybeal, J., Musen, M.A. The CEDAR workbench: an ontology-assisted environment for authoring metadata that describe scientific experiments. *Proceedings of the International Semantic Web Conference*, Viennna, Austria, October 2017.

244. Kamdar, M., Walk, S., Tudorache, T, and Musen, M.A. The BiOnIC: A catalog of user interactions with biomedical ontologies. *Proceedings of the International Semantic Web Conference*, Viennna, Austria, October 2017.

245. Kamdar, M.R. and Musen, M.A. Mechanism-based pharmacovigilance over the life sciences linked open data cloud. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November 2017.

246. Martínez-Romero, M., Shankar, R., Panahiazar, M., Willret, D., Egyedi, A., Gevaert, O., Graybeal, J., Musen, M.A. Fast and accurate metadata authoring using context-sensitive and ontology-based recommendations. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November 2017.

247. Egyedi, A.L., O'Connor, M.J., Martínez-Romero, M., Willrett, D., Hardi, J., Graybeal, J., and Musen, M.A. Embracing semantic technology for better metadata authoring in biomedicine. *Proceedings of Semantic Technology for Health Care and the Life Sciences* (SWAT4LS), Rome, Italy, November, 2017.

248. Musen, M.A., Sansone, S.-A., Cheung, K.-H., Kleinstein, S.H., Crafts, M., Schürer, S.C., and Graybeal, J. CEDAR: Semantic Web technology to support open science. *The Web Conference* (WWW2018), Lyon, France, April, 2018.

249. Kody, M., Hardi, J., Graybeal, J., Musen, M., and Dumontier, M. Assessing Schema.org's coverage of terms from key biomedical datasets. *Intelligent Systems for Molecular Biology* (ISMB 2018), Chicago, IL, July, 2018.

250. Horridge, M., Gonçalves, R.S., Nyulas, C.I., Tudorache, T., and Musen, M. Protégé 5.5 – Improvements for editing ontologies. *International Conference on Biomedical Ontology*, Corvalis, OR, August, 2018.

251. Dinakarpandian, D., Dinakar, B., Liedtke, M., and Musen, M. TOCSOC: A temporal ontology for comparing survival outcomes of clinical trials in oncology. *International Conference on Biomedical Ontology*, Corvalis, OR, August, 2018.

252. Küçük-Mcginty, H., Clark, A., Graybeal, J., Cooper, D., Turner, J., Dorf, M., Musen, M., Bunin, B., and Schürer, S. Ontolobridge – A semi-automated ontology update request system for better FAIR-ifying BioAssay Ontology, Drug Target Ontology, and LINCS Ontology. *International Conference on Biomedical Ontology*, Corvalis, OR, August, 2018.

253. Polleres, A., Kamdar, M.R., Fernandez, J.D., Tudorache, T., and Musen, M.A. A more decentralized vision for linked data. *Workshop on Decentralizing the Semantic Web* (DeSemWeb2018), *International Semantic Web Conference*, Pacific Grove, CA, October, 2018.

254. Geller, J., Keloth, V.K., and Musen, M.A. How sustainable are biomedical ontologies? *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, San Francisco, CA, November 2018.

255. Espin-Noboa, L., Lemmerich, F., Strohmaier, M., Musen, M., and Walk, S. HopRank: how semantic structure influences teleportation in PageRank (a case study on BioPortal). *The Web Conference* (WWW2019), San Francisco, CA, pp. 2708–2714, May, 2019.

256. Horridge, M, Gonçalves, R.S., Nyulas, C., Tudorache, T., Musen, M.A. WebProtégé: A cloud-

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

based ontology editior. *The Web Conference* (WWW2019), San Francisco, CA, pp. 686–689, May, 2019.

257. Gonçalves, R.S., Kamdar, M.R., and Musen, M.A. Aligning biomedical metadata with ontologies using clustering and embeddings. *European Semantic Web Confernce*, pp. 146–161, June 2019.

258. Musen, M.A. and the CEDAR team. Making data FAIR requires more than just principles: we need knowledge technologies. *Workshop on Advanced Knowledge Technologies for Science in a FAIR World.* IEEE eScience Conference. San Diego, CA, Sept 24, 2019.

259. Gonçalves, R.S., Horridge, M., Li, R., Liu, Y., Musen, M.A., Nyulus, C., Obamos, E., Shrouty, D., and Temple, D. Use of OWL and Semantic Web technologies at Pinterest. *International Semantic Web Conference*, Aukland, NZ, October 2019. pp. 418–435, 2019.

260. O'Connor, M.J., Warzel, D.B., Martínez-Romero, M., Hardi, J., Willrett, D., Egyedi, A.L., Eftekhari, A., Graybeal, J., and Musen, M.A. Unleashing the value of Common Data Elements through the CEDAR Workbench. *Proceedings of the AMIA Annual Symposium.* American Medical Informatics Association, Washington, DC, November 2019.

261. Chiang J, Kumar A, Morales D, Saini D, Hom J, Shieh L, Musen M, Goldstein MK, Chen JH. Physician Usage and Acceptance of a Machine Learning Recommender System for Simulated Clinical Order Entry. *AMIA Joint Summits on Translational Science Proceedings*. Houston, TX, May 2020.

262. Curty, S., Fill, H.-G., Gonçalves, R.S., and Musen, M.A. An architecture for attesting to the provenance of ontologies using Blockchain technologies. *Business Modeling and Software Design: 12th International Symposium*, BMSD 2022, Fribourg, CH, June 2022.

263. Sundaram, S., and Musen, M.A. Making metadata more FAIR using large language models. *Workshop on Data and Research Objects Management for Linked Open Science*. Extended Semantic Web Conference, Hersonissos, Crete, Greece, 2023. https://arxiv.org/abs/2307.13085

264. Jonquet, C., Graybeal, J., Bouazzouni, S., … Musen, M. Ontology repositories and semantic artefact catalogues with the OntoPortal technology. In: *Proceedings of the International Semantic Web Conference*. Athens, Greece. Springer, 2023, pp. 38–58.

265. Sundaram, S.S., Solomon, B., Khatri, A., Laumas, A., Khatri, P., Musen, M.A. Structural knowledge base enhances effective use of large language models for metadata curation. Proceedings of the AMIA Annual Symposium, 2024, p. 1050.

266. Yu, J.K., Martínez-Romero, M., Horridge, M., Akdogan, M.U., Musen, M.A. A general-purpose data harmonization framework: Supporting reproducible and scalable data integration in the RADx Data Hub. Proceedings of the AMIA Annual Symposium, 2025, p. 1482.

Books (Excluding Edited Conference Proceedings)

1. Musen, M.A. *Automated Generation of Model-Based Knowledge-Acquisition Tools*. London: Pitman, Artificial Intelligence Research Notes Series, 1989.

2. Studer, R., and Musen, M.A. (eds.) *Shareable and Reusable Problem Solving Methods*. Dagstuhl-Seminar-Report 113 08.05.-12.05.95 (9519), 1995.

3. Heller, B., Löffler, M., Musen, M., and Stefanelli, M. (eds.) *Computer-Based Support for Clinical Guidelines and Protocols*. Amsterdam: IOS Press, 2001.

4. van Bemmel, J.H. and Musen, M.A. (eds.), *Handbook of Medical Informatics*, Heidelberg:

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

Springer–Verlag, 1997. (Chinese edition 2002.)

5. Musen, M.A., Neumann, B., and Studer, R. (eds.), *Intelligent Information Processing*. IFIP 17th World Computer Congress — TC 12 Stream on Intelligent Information Processing, August 25–30, 2002, Montreal, Quebec, Canada. Dordrecht: Kluwer, 2002

Book Chapters

1. Musen, M.A., Fagan, L.M., and Shortliffe, E.H. Graphical specification of procedural knowledge for an expert system. In: Hendler, J., ed., *Expert Systems: The User Interface*. Norwood, NJ: Ablex Publishing Company, 1988, pp. 15–35. Also appears in Proceedings of the 1986 IEEE Computer Society Workshop on Visual Languages, Dallas TX, June 1986, pp. 167–178.

2. Musen, M.A. and van der Lei, J. Of brittleness and bottlenecks: Challenges in the construction of expert-system and pattern-recognition models. In: Gelsema, E.S. and Kanal, L., eds., *Pattern Recognition and Artificial Intelligence: Towards an Integration*, New York: Elsevier, 1988, pp. 335–352.

3. Musen, M.A. Generation of visual languages for development of knowledge-based systems. In: Ichikawa, T., Jungert, E., and Korfhage, R.R., eds., *Visual Languages and Applications*, New York: Plenum, 1990, pp. 69–95.

4. Musen, M.A. An overview of knowledge acquisition. In: David, J.-M., Krivine, J.-P., and Simmons, R., eds., *Second Generation Expert Systems*, Berlin: Springer–Verlag, 1993, pp. 415–438.

5. Musen, M.A. and Tu, S.W. *Problem-solving models for generation of task-specific knowledge-acquisition tools*. In: Cuena, J., ed., Knowledge-Oriented Software Design, Amsterdam: Elsevier, 1993, pp. 23–50.

6. Middleton, B., Detmer, W.M., Musen, M.A. Diagnostic decision support. In: Osheroff, J.E., ed., *Computers in Clinical Practice: Managing Patients, Information, and Communication*. Philadelphia: American College of Physicians, 1995, pp. 59–75.

7. Chan, A.S., Martins, S.B., Coleman, R.W., Bosworth, H.B., Oddone, E.Z., Shlipak, M.G., Tu, S.W., Musen, M.A., Hoffman, B.B., Goldstein, M.K. Post-fielding surveillance of a guidline-based decision support system. In: Henrikesen, K., Battles, J.B., Marks, E.S., Lewin, D.I., editors. *Advances in patient safety: from research to implementation* (Volume 1: Research findings). Rockville, MD: Agency for healthcare research and quality (US); 2005 Feb. PMID: 21249810.

8. Van Bemmel, J.H., Musen, M.A., and Miller, R.A. Methods for decision support. In: van Bemmel, J.H. and Musen, M.A., eds., *Handbook of Medical Informatics*, Heidelberg: Springer–Verlag, 1997, pp. 233–260.

9. Musen, M.A. Modeling for decision support. In: van Bemmel, J.H. and Musen, M.A., eds., *Handbook of Medical Informatics*, Heidelberg: Springer–Verlag, 1997, pp. 431–448.

10. Haux, R., Leven, F.J., Protti, D.J., and Musen, M.A. Education and training in medical informatics. In: van Bemmel, J.H. and Musen, M.A., eds., *Handbook of Medical Informatics*, Heidelberg: Springer–Verlag, 1997, pp. 537–547.

11. Musen, M.A. Design and use of clinical ontologies: Curricular goals for the education of health-telematics professionals. In: Iakovidis, I, Maglavera, S., and Trakatellis, A., eds. *User Acceptance of Health Telematics Applications: Education and Training in Health Telematics*, IOS Press, Amsterdam, 2000, pp. 40–47. PMID: 11010333

12. Musen, M.A., Shahar, Y., and Shortliffe, E.H. Clinical decision-support systems. In: Shortliffe, E.H., Perreault, L.E., Wiederhold, G., and Fagan, L.M., eds. *Medical Informatics:*

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

Computer Applications in Health Care and Biomedicine, 2nd Edition. New York: Springer-Verlag, pp. 573–609, 2000.

13. Park, J.Y. and Musen, M.A. Mappings for reuse in knowledge-based systems. In: Roy, R. ed. *Industrial Knowledge Management. A Micro Level Approach*, London: Springer-Verlag, pp. 349–363, 2001.

14. Omelayenko, B., Crubézy, M., Fensel, D., Benjamins, R., Wielinga, B., Motta, E., Musen, M.A., and Ding, Y. UPML: The language and tool support for making the Semantic Web alive. In: Fensel, D., Hendler, J., Lieberman, H., and Wahlster, W., eds. *Spinning the Semantic Web*, Cambridge, MA: MIT Press, pp. 141–170, 2003.

15. Crubézy, M. and Musen, M.A. Ontologies in support of problem solving. In: Staab, S. and Studer, R. eds. *Handbook on Ontologies*, Berlin: Springer-Verlag, pp. 321–341, 2004.

16. Musen, M.A. Ontology-oriented design and programming. In: Cuena, J., Demazeau, Y., Garcia, A., and Treur, J., eds. *Knowledge Engineering and Agent Technology*. Amsterdam: IOS Press, 2004.

17. Chan A.S., Martins, S.B., Coleman, R.W., Bosworth, H.B., Oddone, E.Z., Shlipak, M.G., Tu S.W., Musen, M.A., Hoffman, B.B., and Goldstein, M.K. Post fielding surveillance of a guideline-based decision support system: A method for maintaining quality assurance and patient safety during deployment of a new technology, In: Henriksen, K., Battles, J.B., Lewin, D.I., Marks, E., eds. *Advances in Patient Safety: From Research to Implementation*. Vol. 2, Concepts and Methodology. Rockville, MD: Agency for Healthcare Research and Quality, 2005.

18. Musen, M.A., Shahar, Y., and Shortliffe, E.H. Clinical decision-support systems. In: Shortliffe, E.H., Cimino, J.J. eds. *Biomedical Informatics: Computer Applications in Health Care and Biomedicine*, 3rd Edition. New York: Springer-Verlag, 2006.

19. Shah, N.H. and Musen, M.A. Ontologies for formal representation of biological systems. In: Studer, R. and Staab, S., eds. *Handbook on Ontologies*. New York: Springer, 2009.

20. O' Connor, M.J., Das. A., Musen, M.A. Using the semantic web rule language in the development of ontology-driven applications. In: *Handbook of Research on Emerging Rule-Based Languages and Technologies: Open Solutions and Approaches*. IGI Global, Hershey, PA, pp. 525–539, 2009.

21. Haase, P., Herzig D., Musen, M.A. and Tran T. Semantic Wiki Search. In: Paolo, L.A. et al., eds. *The Semantic Web: Research and Applications.* Springer Berlin/Heidelberg, pp. 445–460, 2009.

22. Noy, N.F. and Musen, M.A. Traversing Ontologies to Extract Views. In: Stuckenschmidt, H., Parent, C., Spaccapietra, S., eds. *Modular Ontologies*. Springer Berlin/Heidelberg, pp. 245–260, 2009.

23. Kalra, D., Musen, M.A., Smith, B., Ceusters, W., and De Moor, G. ARGOS policy brief on semantic interoperability. In: De Moor, G.J.E., ed. *Transatlantic Cooperation Surrounding Health Related Information and Communication Technology*. IOS Press, pp. 1–16, 2011. PMID: 21893897, PMCID: PMC4896070

24. Tudorache, T. and Musen, M.A. Collaborative development of large-scale biomedical ontologies. In: Ekins, S., Hupcey, M.A.Z., and Williams, A.J., eds. *Collaborative Computational Technologies for Biomedical Research*. John Wiley & Sons, 2011.

25. Shah, N.H., Cole, T., Musen, M.A. Analyses using disease ontologies. In: Chen, J.Y., and Kann, M.G., eds. *Translational Bioinformatics.* Chapter 9. *PLoS Computational Biology* 8(12), Dec 2012. PMID: 23300417, PMCID: PMC3531278

26. Musen, M.A., Middleton, B., and Greenes, R.A. Clinical decision-support systems. In: Shortliffe, E.H., Cimino, J.J. eds. *Biomedical Informatics: Computer Applications in Health Care and Biomedicine*, 4nd Edition. New York: Springer-Verlag, pp 643–674, 2014.

27. Musen, M.A. Knowledge representation. In: Sarkar, I.N., ed. *Methods in Biomedical Informatics:*

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

A Pragmatic Approach. Waltham, MA: Academic Press, Elsevier, 2014.

28. Musen, M.A., Middleton, B., and Greenes, R.A. Clinical decision-support systems. In: Shortliffe, E.H., Cimino, J.J. eds. *Biomedical Informatics: Computer Applications in Health Care and Biomedicine*, 5th Edition. New York: Springer-Verlag, pp 795–840, 2021.

Other Publications

1. Studer R., and Musen, M.A. (eds.) Shareable and reusable problem solving methods. *Dagstuhl Seminar Report 113*. May 5–May 12, 1995. Schloss Dagstuhl, University of Saarland, Saarbrücken, Germany.

2. Friedman, C.P. (organizer and moderator), Frisse, M.E., Musen, M.A., Slack, W.V., and Stead, W.W. (participants). How should we organize to do informatics? Report of the ACMI debate at the 1997 AMIA Fall Symposium. *Journal of the American Medical Informatics Association* **5**:293–304, 1998. PMID: 9609499, PMCID: PMC61303

3. Musen, M.A. Stanford Medical Informatics: Uncommon research, common goals. *MD Computing* **16**(1):47–50, January/February 1999. PMID: 10202424

4. Stead, W.W., Miller, R.A., Musen, M.A., and Hersh, W.R. (panel members). Integration and beyond: panel discussion. *Journal of the American Medical Informatics Association,* **7**:146–148, 2000. PMID: 10730597, PMCID: PMC61467

5. Bravata, D.M., Owens, D.K., Buckeridge, D.L., Haberland, C., Rydzak, C., Schleinitz, M., Smith, W.M., Szeto, H., and Musen, M.A. Bioterrorism preparedness and response: use of information technologies and decision support systems. Evidence Report/Technology Assessment No. 59 (Prepared by University of California San Francisco–Stanford Evidence-Based Practice Center under Contract No. 290-97-0013). AHRQ Publication No. 02-E028. Rockville, MD: Agency for Healthcare Research and Quality. June 2002. PMID: 12154489, PMCID: 4781373

6. Moreira, D.A., Mungall, C.J., Shah, N., Aitken, S., Richter, J.-D., Redmond, T. and Musen, M.A. The NCBO OBOF to OWL Mapping. *Nature Proceedings* 2009. <http://hdl.handle.net/10101/npre.2009.3938.1>

7. Denney, C. Batchelor, C., Bodenreider, O., Cheng, S. Hart, J., Hill, J., Madden, J., Musen, M.A., Pichler, E., Samwald, M., Szalma, S., Schriml, L., Sedlock, D., Soldatova, L., Sonoda, K., Statham, D., Stenzhorn, H., Whetzel, P., Wu, E. and Stephens, S. Creating a Translational Medicine Ontology. *Nature Proceedings* 2009. <http://dx.doi.org/10.1038/npre.2009.3686.1>

8. Musen, M.A. BioPortal: Bringing semantic technology to biomedicine. Nodalities. Issue 11, September 2010, pp. 1–5.

9. Kulikowski, C.A., Shortliffe, E.H., Currie, L.M., Elkin, P.L., Hunter, L.E., Johnson, T.R., Kalet, I.J., Lenert, L.A., Musen, M.A., Ozbolt, J.G., Smith, J.W., Tarczy-Hornoch, P.Z., Williamson, J.J. AMIA Board white paper: definition of biomedical informatics and specification of core competencies for graduate education in the discipline. *Journal of the American Medical Informatics Asso*ciation, 19(6):931–938, Nov-Dec 2012. PMID: 22683918, PMCID: PMC3534470

10. Chang, A.P., Musen, M.A. Artificial intelligence in pediatric cardiology: An innovative transformation in patient care, clinical research, and medical education. *Congenital Cardiology Today*, **10**(11):1–3, Nov 2012.

11. Musen, M. A. Upper level ontology. *Encyclopedia of Systems Biology*, 2013, pp. 2328-2328.

12. Musen, M. A. National Center for Biomedical Ontology. *Encyclopedia of Systems Biology*, 2013, pp. 1492-1492.

BMJ Publishing Group Ex. 1004
BMJ Publishing Group v. Evidium

13. Musen, M. A. BioPortal. *Encyclopedia of Systems Biology*, 2013, pp. 146-147, 2013.

14. Musen, M. A. International classification of diseases. *Encyclopedia of Systems Biology*, 2013, pp. 1052-1052.

15. Musen, M.A. We face a new "tragedy of the commons." The remedy is better metadata. National Cancer Informatics Program Blog, November 6, 2017. https://datascience.cancer.gov/news-events/blog/we-face-new-tragedy-commons-remedy-better-metadata

16. Kaplan, R,M, and Beatty, A. (eds.) *Accelerating Behavioral Science Through Ontology Development and Use.* Consensus Study. Division of Behavioral and Social Sciences and Education, the National Academies of Sciences, Engineering, and Medicine. Washington: The National Academies Press, June, 2022. (Contributions to all chapters)

Selected Invited Presentations

November 2025 Keynote, International Conference on Biological and Biomedical Ontology (ICBO), "Conspiracy Theories: Are Ontologies Really Under Attack?"

May 2025 Keynote, Healthcare and Life Sciences Track, The Knowledge Graph Conference, New York, NY. "Reports of the Death of Knowledge Engineering Are Greatly Exaggerated"

April 2025 SOLID Conference, Leiden, the Netherlands. "Inception, development, and ambitions of the CEDAR Platform"

February 2025 Biomedical Informatics and Data Science Seminar Series, Yale University, "Enhancing Open Science by Cleaning Up Our Metadata Mess"

January 2025 Environmental Health Language Collaborative webinar. "CEDAR: Enhancing Open Science through Standard Metadata"

January 2025 Ed Hammond 90th Celebratory Scientific Symposium: From Foundations to Future of Informatics in Health. Duke University, Raleigh, NC. "Dumbing Down or Getting Real? The Changing Agenda for Research in Clinical Decision-Support Systems"

October 2024 FAIR in ML, AI Readiness, and Reproducibility (FARR) Workshop, AGU Conference Center, Washington, DC. "Representing Standards for FAIR Data in a Machine-Actionable Way"

March 2024 European Union COST Action on Distributed Knowledge Graphs webinar. "Semantic technology in science: Enhancing data stewardship in support of new discovery"

January 2024 Lorentz Center workshop: The Road to FAIR and Equitable Science, Leiden, NL. "Represent Community Standards for Metadata as Templates to Make Data FAIR"

February 2024 NIH Data Repository and Knoweledge Base Workshop, Rockville, MD. "Enhanced Data Curation with Large Language Models through Use of a Structured Knowledge Base."

November 2023 University of Fribourg, Switzerland, Faculty of Management, Economics, and Social Science. "Knowledge Engineering and Cultural Change to Advance the Way We Do Science"

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October 2023	FASEB DataWorks! Salon (webinar), Federation of American Societies for Experimental Biology. "Making Biomedical Data FAIR at the Source"
May 2023	Medical Informatics Europe, Gothenburg, Sweden. "Computable Knowledge in Healthcare"
May 2022	Keynote Address, Florida AI Research Symposium (FLAIRS 2019), Jensen Beach, FL. "AI for AI-readiness: Facilitating Scientific Discovery by Cleaning Up Our Metadata Mess"
April 2022	FAIR Data Symposium, Bio-IT World, Boston, MA. "FAIR Means Metadata: How Technology for Better Metadata Can Make Data FAIR"
March 2022	National Library of Medicine Curation at Scale Workshop. "Technology is not enough. Curation at scale will require mobilizing scientific communities—at scale"
October 2021	Stanford Media-X Symposium on Ontology. "Ontologies to Support Human Communication: From the Mundane to the Abstruse"
September 2021	Templeton World Charitable Floundation Open Science Webinar. "Making Data FAIR Requires Better Metadata. Information Technology Can Help
July 2021	Mobile Computable Biomedical Knowledge Conference. "Metadata and the CBK Lifecycle"
July 2021	NIH Office of Data Science Strategy Data Sharing and Reuse Seminar Series. "There's No Easy Way Out. Making Data FAIR Requires Better Metadata. Information Technology Can Help."
May 2021	Meta Research Innovation Center at Stanford (METRICS) International Seminar. "When FAIR is Foul and Foul is FAIR, What Do We Do about Data FAIRness?"
March 2021	Department of Biomedical Informatics, University of Pittsburgh, Resesarch Colloquium. "CEDAR: Promoting FAIRness at the Source"
March 2021	FAIR4Health Consortium. "Let's stop trying to measure FAIRness! We Are Better Off Making Data FAIR in the First Place"
February 2021	Data-Centric Architecture Forum. Semantic Arts, Inc., Fort Collins, CO. "A Data-Centric Architecture for Ensuring the Quality of Scientific Data"
November 2019	Keynote Address, Biomedical Engineering 2019, Jinan, China. "Biomedical Engineering and Open Science: Creating an Ecosystem for FAIR Data"
December 2020	Office of Data and Informatics Seminar Series, National Institute of Standards and Technology. "FAIR Data Require Better Metadata: The Case for CEDAR"
December 2020	International FAIR Convergence Symposium, convened by CODATA and GO FAIR. "FAIR Data Stewards Don't Need Training in the FAIR Principles!"
October 2019	Stanford University Media-X Symposium on Algorithms and Analytics: Connecting the Learner with the Learning, Stanford University. "Intelligent Agents, Knowledge Graphs, and Open Data for Learning"
October, 2019	Elsevier Digital Conference 2019, San Diego, CA. "AI in Healthcare: What Really Matters."

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August 2019	Medinfo 2020. The World Congress on Medical Informatics, Lyon, France. "Struck by OWL: The Adoption of Semantic Web Standards for ICD-11"
August 2019	American Society of Clinical Oncology Data Sharing Summit, Alexandria, VA. "Enhancing Data Production Through Metadata Standards"
July 2019	Genentech, Inc., South San Francisco, CA. "Technology for Open Science and Data Sharing: Creating an Ecosystem for FAIR Data"
May 2019	University of Toulouse, Toulose, France. "Semantic Technology for Open Science: Creating an Ecosystem for FAIR Data"
April 2019	Semantics @ Roche, Basel, Switzerland. "Data will never be FAIR without semantic technology: The case for CEDAR"
March 2019	Towards Artificial Intelligence for Collaborative Open Science. AAAI Spring Symposium Series, Stanford CA. "Making scientific data findable, accessible, interoperable, and reusable: How semantic technology can help"
Dec 2018	Semantic Web Applications and Tools for Healthcare and the Life Sciences (SWAT4HCLS), Antwerp, Belgiun. "The CEDAR Workbench: Enhanced Authoring of Standards-Based Metadata for use on the Semantic Web"
Oct 2018	PRISME Forum, Deerfield, IL. "CEDAR: Semantic Technology in Support of Open Science and Improved Knowledge Management"
Sept 2018	Special Speaker Seminar Series, Institute for Informatics, Washington University, St. Louis, MO. "The Rush to Make Scientific Data FAIR: The Need for Semantic Technology"
July 2018	Midwest Big Data Hub Data Science Tools and Methods Workshop. Rosemont, IL. "Of Course Data Stewards Benefit from Training. But What They Really Need is Better *Technology*"
July 2018	Mobilizing Computable Biomedical Knowledge Conference. National Library of Medicine, Bethesda, MD. "The State of Computable Biomedical Knowledge"
July 2018	Intelligent Systems for Molecular Biology (ISMB 2018), BD2K Special Track, Chicago, IL. "Cloud Computing Alone Will Not Make Experimental Data FAIR. We Need Better Metadata First"
July 2018	Annual Conference on Data, Information, and Society, Nanjing, China. "CEDAR: Sematic Web Technology to Support Open Science"
April 2018	Accelerated Discovery Laboratory, Distinguished Speaker Series, IBM Research Almaden, San Jose CA. "The Rush to Make Scientific Data Findable, Accessible, Interoperable, and Reusable: How Semantic Technology Can Help"
March 2018	BioDataWorld West 2018, American Heart Association Precision Medicine Platform Hands-On Workshop, Mountain View, CA. "Learning From Other People's Data: Challenges in Developing a Data Commons for Precision Medicine"
March 2018	European Bioinformatics Institute, Hixton, UK. Workshop on AI-Assisted Data and Knowledge Acquisition for Biomedical Researchers. "Services from CEDAR: Center for Expanded Data Acquisition and Retrieval"

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Sept 2017	Center for Biomedical Informatics and Information Technology, National Cancer Institute, Rockville, MD. "Making Online Data Searchable, Accessible, and Reusable"
Sept 2017	Fourth Annual International Symposium on Information Management and Big Data, Lima, Peru. "Making Online Datasets More Searchable and Accessible: The CEDAR project"
July 2017	Intelligent Systems for Molecular Biology (ISMB 2017), BD2K Special Track, Prague, Czech Republic. "CEDAR: Technology for Using Metadata Standards to Ease Sharing, Integration, and Reuse of Biomedical Data"
July 2017	The International Symposium on Open Data and Innovation: Vision and Practice, Beijing, China. "The CEDAR Workbench: Sharing, Integrating, and Analyzing Open Data"
April 2017	Research Data Alliance Ninth Plenary Session, Barcelona, Spain. "Metadata evolution: CEDAR as an enabling platform"
Feb 2017	Molecular Medicine Tri-Conference, San Francisco, CA. "Making Experimental Results Findable, Accessible, Interoperable and Reusable: The CEDAR Technology for Managing Online Biomedical Metadata"
Dec 2016	AI Med: Artificial Intelligence in Medicine, Dana Point, CA. "The history of AI in Medicine"
Sept 2016	NIH Big Data to Knowledge Guide to the Fundamentals of Data Science Webinar Series, inaugural lecture. "Introduction to Big Data and the Data Lifecycle"
July 2016	Gordon Research Conference on Advanced Health Informatics, Hong Kong. "Big Data to Knowledge: Biomedical Data Annotation and Retrieval"
July 2016	Stanford University Medical Grand Rounds, Stanford, CA. "From ICD-11 to Robot Scientists: How the Use of Ontology in Informatics is Advancing Biomedicine"
May 2016	Bringing Research and Information to Decision-making and Governance through Evidence (BRIDGE) Webinar. McGill University, Johns Hopkins University, University of Pittsburgh Supercomputer Center. "Describing Scientific Results for Both People and Computers: The Dissemination of Science in a Connected World"
May 2016	Ontolog Community Ontology Summit, Arlington, VA. "A Semantic Ecosystem for Enhancing E-Science: The Center for Expanded Data Annotation and Retrieval"
March 2016	AMIA Summit on Translational Bioinformatics, Panel on Big Data to Knowledge, San Francisco, CA. "The Center for Expanded Data Annotation and Retrieval"
March 2016	Molecular Medicine Tri-Conference, San Francisco, CA. "The Center for Expanded Data Annotation and Retrieval: New Technology for Data Discovery and Integration"
Feb 2016	Association of Professors of Medicine, Charleston, SC. "The Era of Bioinformatics in Medicine: It's not just analytics; it's also ontology!"
Nov 2015	National Institutes of Health Big Data to Knowledge Program All Hands Meeting, Bethesda, MD. "Making Data FAIR Through Better Metadata"
Oct 2015	International Methodology Consortium for Coded Health Information (IMECCHI 2015),

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	Manchester, UK. "Using Ontologies and Unstructured Data for Better Health Care"
Oct 2015	First International Workshop on Capturing Scientific Knowledge. Conference on Knowledge Capture (K-Cap 2015), Palisades, NY. Keynote talk: "Ontologies for Capturing Biomedical Knowledge"
Sept 2015	The Learning Health System in Europe, Brussels, Belgium. "Decision Support for the Learning Health System: Shoring up the "Effector Arm"
Sept 2015	Stanford University Department of Radiology Research Retreat, Santa Cruz, CA. "Adventures in Biomedical Ontology: Driving Biomedical Research Using Words Alone"
July 2015	Special Interest Group on Biomedical Ontology, ISMB Conference, Dublin, Ireland. "The State of Biomedical Ontology: 'Wherefore art thou Romeo?' and Other Ontological Questions"
June 2015	Stanford Big Data in Biomedicine Conference. "CEDAR: Creating the Metadata to Make Big Data Findable, Interpretable, and Reusable"
May 2015	National Cancer Institute, Bethesda, MD. "Better Metadata for Better Data Sharing in Biomedicine: The CEDAR Project"
Mar 2015	AMIA Summit on Translational Bioinformatics, San Francisco, CA. "The Center for Expanded Data Annotation and Retrieval"
Mar 2015	University of Toronto. Department of Mechanical and Industrial Engineering Distinguished Speaker Series. "The Upsurge of Ontology in Biomedical Computation: Just Because You Have a Ph.D., It Doesn't Mean You're a Philosopher"
Feb 2015	Brown University Day of Biology. Panel on Big Data in Biomedicine.
Nov 2014	HL7 Implementable Technology Specifications RDF Webinar. "Support for Building WHO Terminologies"
Oct 2014	International Semantic Web Conference, Riva del Garda, Italy. "Protégé-OWL: Has it Really Been Ten Years?"
Sep 2014	China Academy for Chinese Medical Sciences. "Ontology and the Future of Health Care"
Jul 2014	Yale University Center for Medical Informatics. "The National Center for Biomedical Ontology: Technology for Making Knowledge Computable"
Jul 2014	Keynote Address: Inconsistency Robustness (IR 2014), Stanford, California. "Automation of Clinical Guidelines: Seeking Robustness in Inherently Inconsistent Situations"
Feb 2014	University of Michigan Workshop on the Learning Health System. "Ontological Foundations for Computer-Based Decision Support"
Nov 2013	AMIA Annual Symposium, Washington DC: Tutorial on "Ontologies in Biomedicine"
Oct 2013	Workshop on Big Data in Bioinformatics and Health Informatics, IEEE Big Data 2013, Santa Clara, CA: "Big Data for Big Data: Metadata to Manage Access and Analysis of Large Biomedical Datasets"

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Sept 2013	Third Annual Stanford Conference on Computational Social Science, Institute for Research in the Social Sciences, Stanford University: "Now Everyone's a Philosopher: The Social Construction of Ontologies for e-Science"
Aug 2013	Seminars on Computational Health, Johns Hopkins University: "Philosophy and Reason as elements of computer-based decision support: A plea to stop searching where the light is"
Jul 2013	Workshop on Enhancing Training for Biomedical Big Data, the National Institutes of Health: "Data Integration"
Jul 2013	Workshop on Health Informatics and Artificial Intelligence, Association for the Advancement of Artificial Intelligence, Bellevue, WA, Keynote: "Artificial Intelligence in Medicine: Back to the Future"
Jun 2013	Information Technology in Academic Medicine Conference, American Association of Medical Colleges Group on Information Resources, Vancouver, BC: "The Semantic Web and the Future of Medicine"
Jun 2013	Health Datapalooza IV, Washington, DC: "Healthdata.gov Metadata: Lifting Schemes and Controlled Vocabularies"
May 2013	Networking and Information Technology Research and Development (NITRD) Program Workshop on Data Sharing and Metadata Curation: "Obstacles and Strategies: Biomedical Metamodels"
May 2013	Big Data in Biomedicine Conference, Stanford University School of Medicine: "Big Data for Big Data"
Feb 2013	Molecular Medicine Tri-Conference 2013, San Francisco, CA: "Technology for Collaborative Development of Ontologies for Data Analysis and Integration"
Nov 2012	Semantic Web Applications and Tools for Life Sciences (SWAT4LS), Paris France, Keynote: "Semantic Technology Goes Mainstream: The NCBO Experience"
Nov 2012	International Semantic Web Conference, Boston MA, Keynote: "Tackling Climate Change: Unfinished Business from the Last 'Winter'"
Nov 2012	AMIA Annual Symposium, Washington DC: Tutorial on "Ontologies in Biomedicine"
Oct 2012	American Medical Association Current Procedural Terminology Advisors Annual Meeting, Memphis TN: "Positioning CPT for the Future"
Jul 2012	International Conference on Biomedical Ontology, Graz AT: "Biomedical Ontologies: Where is the use? Where is the user?"
Jul 2012	Intelligent Systems for Molecular Biology (ISMB), Long Beach CA: "Biomedical Informatics Under the NCBC Program"
Jul 2012	INBIOMED Vision Conference, Beyond OMICS Revolutions: Integrative Knowledge Management for Empowered Healthcare and Research: "Big Data needs Big Ontology: The Omics Revolutions and the Formalization of Scientific Knowledge"
May 2012	Rensselaer Polytechnic Institute Visiting Professor Lecture: "When Professionals Codify Their Knowledge: Making Biology and Medicine 'Computable'"
Feb 2012	Kings College International Lecture Series, London UK: "Becoming a Meta-Physician: Better Clinical Information in the Future of Health Care"

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Dec 2011	Indo-U.S. Workshop on Large Scale Data Analytics and Intelligent Services, Indian Institute of Science, Bangalore India: Clinical Informatics and Decision Making: "Challenges for Large-Scale Analytics and Intelligent Services"
Oct 2011	AMIA Annual Symposium, Washington DC: Tutorial on "Ontologies in Biomedicine"
Sep 2011	The Fifth IEEE International Conference on Semantic Computing, Stanford CA: "Semantic Computing in Biomedicine"
Jul 2011	Festkolloquium for Prof. Dr. Rudi Studer, Karlsruhe Institute of Technology, Karlsruhe Germany: "Modeling Procedural Aspects of Tasks: Beyond Ontologies"
Jun 2011	*Methods of Information in Medicine* 50-Year Celebration, Heidelberg Germany: "Biomedical Informatics: Confluence of Multiple Disciplines—NOT!"
Feb 2011	Molecular Medicine Tri-Conference 2011, San Francisco, CA: "Ontologies for the Masses"

Sponsored Research Support

Indiana University/ National Institutes of Health Co-Investigator
Multiple Principal Investigator
SUB00004665 / 10666 / U24 AG088019
09/20/2024–05/31/2026 $611,130.91
Accelerating Behavioral and Social Science through Ontology Development and Use

Yale University/ National Institutes of Health
Co-Investigator
AWD0011915 / 23-005714 / R24 ES036135
05/15/2024–02/28/2027 $302,331
Accelerating Data and Metadata Standards in the Environmental Health Sciences Study of Emerging Water Contaminants

World Health Organization
Principal Investigator
203352082
01/04/2024–10/30/2025 $326,694
Online Authoring Platform for WHO-FIC

National Institutes of Health
Co-Investigator
R24 MH117179
07/15/2023–05/31/2027 $598,260.20
OpenNeuro: An open archive for analysis and sharing of BRAIN Initiative data

Chan Zuckerberg Initiative / Silicon Valley Community Foundation Principal
Principal Investigator
252576
11/01/2022–10/31/2025 $350,000
Integration of Protege with other open tools for ontology engineering

Carnegie Mellon University/ National Institutes of Health

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Co-Investigator
1090719-462287 // OT2OD033759
08/01/2022–07/31/2026 $2,100,000
Flexible Hybrid Cloud Infrastructure for Seamless Integration and Use of Human Biomolecular Data and Reference Maps

Indiana University / National Institutes of Health
Co-Investigator
9422 // PO0745942 // OT2OD033756
08/01/2022–07/31/2025 $271,750
3D Multiscale Biomolecular Human Reference Atlas Construction, Visualization and Usage

DataCite/Templeton World Charity Foundation Principal Investigator
Co-Investigator
SPO #269617
06/01/2022–01/31/2024 $52,585
Implementing FAIR Workflows: A proof of concept study in the field of consciousness

National Institutes of Health Principal Investigator
Principal Investigator
OT2 DB000009
12/10/2021–07/31/2026 $44,331,574
Enhancing the RADx Data Hub for Data FAIRness

National Institutes of Health
Principal Investigator
U24GM143402 / R24GM143402
09/27/2021–08/31/2026 $5,590,118
BioPortal: An Expansive Knowledgebase of Biomedical Entities and Relations

National Alliance Against Disparities in Patient Health / National Institutes of Health
Co-Investigator
2021-AA-004 // OT2OD032581
09/17/2021–09/16/2022 $560,000
The Artificial Intelligence/Machine Learning Consortium to Advance Health Equity and Researcher Diversity (AIM-AHEAD)

Metadata Game Changers / National Science Foundation
Co-Investigator
2134956
08/15/2021–07/31/2023 $99,978
EAGER: Dryad BRIDGE: Building Repository Interconnections with Dryad Guidance and Extensions

Indiana University / National Institutes of Health
Co-Investigator
9006 / OT2 OD026671
06/21/2021-06/20/2022 $100,000
Semantic Technology for HuBMAP

Wellcome Trust
Principal Investigator
213170- 2
05/01/2021-08/01/2022 $289,472
FAIRware – Designing and embedding open-source software to support researchers and funders in implementing the FAIR principles

National Institutes of Health

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Principal Investigator
R01LM013498
05/01/2021–01/31/2025 $1,848,879
The Metadata Powerwash - Integrated tools to make biomedical data FAIR

University of California, San Francisco / National Science Foundation
Co-Investigator
12431sc
09/01/2020–08/31/2022 $120,000
A multi-scale open knowledge network for precision medicine

BASF Corporation
Principal Investigator
20131459
12/01/2019–11/30/2020 $127,235
How to use Knowledge GraphDBs in Web Protégé

Elsevier
Principal Investigator
166204
11/11/2019–11/10/2020 $190,235
Provision of Health Knowledge Graph (H-Graph) core data

Chan Zuckerberg Initiative
Principal Investigator
2019-207355
11/11/2019–11/10/2020 $130,435
Migrating Protege to a Modern Web Stack

National Institutes of Health
Co-Investigator
1U24HG01073301
08/13/2019–05/31/2024 $947,439
ELSI.hub: National Center for ELSI Resources and Analysis

American Heart Association
Principal Investigator
18IDHP34660267
10/05/2018–10/04/2020 $136,364
Clinical Trials Data to Drive Precision Management of Cardiovascular Disease

Leidos Biomedical Research Inc (NCI Prime Sponsor)
Principal Investigator
17X074
03/14/2018–08/30/2020 $1,035,026
CEDAR Template Testing

National Institutes of Health
Principal Investigator
5R01GM12444303
02/01/2018–01/31/2022 $312,050
SimTK: An Ecosystem for Data and Model Sharing in the Biomechanics Community

University of Miami (NIH Prime Sponsor)
Site Principal Investigator
5U01 LM012630-02
08/01/2017–07/31/2021 $72,800
Unifying Templates, Ontologies and Tools to Achieve Effective Annotation of Bioassay Protocols

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National Institutes of Health
Principal Investigator
R01 GM121724
01/01/2017–12/31/2020 $2,261,324
Protégé: A Knowledge-Engineering Environment for Advancing Biomedical Sciences

World Health Organization (WHO)
Principal Investigator
201508960
06/01/2016–09/30/2016 $24,250
Extensions to iCAT for Post-Coordination and Linearization

Harvard University (NIH Prime Sponsor)
Site Principal Investigator
U54HG007963 (PI: Kohane)
05/01/2015–04/30/2016 $91,048
Patient-Centered Information Commons

Dionne Associates, LLC
Site Principal Investigator
HHSN261200800001E (Awarded Vendor: Leidos Biomedical Research, Inc.)
04/01/2015–09/30/2016 $662,538
Protégé Extensions to Support the NCI Thesaurus Development

National Institutes of Health
Principal Investigator
U54AI117925
09/29/2014–08/31/2018 $12,462,934
Center for Expanded Data Annotation and Retrieval

American Medical Association
Principal Investigator
AMA 22722
08/01/2014–12/31/2014 $404,522
Web-Based Methods for Developing the International Classification of Health Interventions

Georgia State University (NIH Prime Sponsor)
Site Principal Investigator
R56 MH097870 (PI: Turner)
03/01/2014–12/31/2016 $145,216
BrainMap Tracker: Automated Annotation of Brain Mapping Experiments

McGill University (Bill and Melinda Gates Foundation Prime Sponsor)
Site Principal Investigator
OPP1093164 (PI: Buckeridge)
10/08/2013–09/30/2017 $332,107
Scalable Data Integration for Disease Surveillance (SDIDS)

Department of the Army
Principal Investigator
W81XWH-13-2-0010
02/15/2013–02/14/2015 $920,092
Semantic Web Technology for Mapping and Applying Clinical Functional Assessment Information

National Institutes of Health
Principal Investigator
R01 GM103316

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01/01/2013–12/31/2017 $2,120,188
Protégé: An Ontology-Development Platform for Biomedical Scientists

University of New Mexico (NIH Prime Sponsor)
Site Principal Investigator
R56MH097870 (PI: Turner)
08/07/2012–05/31/2014 $118,241/annual direct costs
BrainMap Tracker: Automated Annotation of Brain Mapping Experiments

National Institutes of Health
Principal Investigator
HHSN276201000027C
09/27/2010–12/31/2011 $378,000
Automated Reasoning about Application of Clinical Guidelines for Computational Thinking

World Health Organization (WHO)
APW200218093
06/14/2010–09/30/2011 $100,000
Development of iCAT-PS Tool for WHO ICPS

University of Pennsylvania (NIH Prime Sponsor)
Site Principal Investigator
R01 GM093132 (PI: Stoeckert)
04/01/2010–03/31/2014 $354,322
Integrative Tools for Protozoan Parasite Research

Science Applications International Corporation (NIH Prime Sponsor)
Site Principal Investigator
S10-082
12/01/2009–05/31/2011 $195,669
Protégé 1.4 Deployment and O&M Support

Brigham and Women's Hospital (NIH Prime Sponsor)
Site Principal Investigator
R01HG004836 (PI: Alterovitz)
09/30/2009–07/31/2011 $37,983
Automated Integration of Biomedical Knowledge

National Institutes of Health
Site Principal Investigator
R01 LM009607 (PI: Das)
07/01/2009–06/31/2011 $504,564
Open-Source Toolkit for Knowledge-Based Querying of Time-Oriented Data

National Institutes of Health
Principal Investigator
R01 GM086587
03/01/2009–01/31/2018 $4,062,493
Collaborative Development of Biomedical Ontologies and Terminologies

National Science Foundation
Principal Investigator
0849207
09/01/2008–08/31/2010 $200,000
III/SGER: Hypothesis based query and verification of pathway models

Wright State University (NIH Prime Sponsor)
Site Principal Investigator

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R01 HL087795 (PI: Sheth)
04/01/2008–3/31/2012 $338,239
Semantics and Services-enabled Problem Solving Environment for Trypanosoma cruzi

Clados Management, LLC (NSF Prime Sponsor)
Co-Principal Investigator
0750543 (PI: Moore)
1/1/2008–12/31/2011 $260,202
STTR Phase II: Integrating Online Analytical Processing (OLAP) and Ontologies to Discover Inconsistencies in Expectations for Supply and Demand

University of Colorado (NIH Prime Sponsor)
Site Principal Investigator
R01GM083649 (PI: Hunter)
9/30/2007–8/31/2011 $300,858
Ontologies and Biomedical Language Processing

University of California, San Diego (NIH Prime Sponsor)
Site Principal Investigator
R01 NS058296 (PI: Martone)
4/1/2007–3/31/2011 $249,031
Ontology-based multiscale investigation of human neurological disease models

University of Washington (NIH Prime Sponsor)
Site Principal Investigator
R01 HL087706 (PI: Brinkley)
2/1/2007–12/31/2010 $384,932
Realizing the Potential of Reference Ontologies for the Semantic Web

Northwestern University (NIH Prime Sponsor)
Site Principal Investigator
79596CBS10 PI: (Channin)
1/3/2007–9/30/2008 $215,482
caBIG In Vivo Imaging Workspace: Annotations and Imaging Markup Development Project

Centers for Disease Control
Principal Investigator
R01 PH000027-02
9/30/2006–12/29/2008 $1,350,038
A Computational Testbed for Biosurveillance Methods

University of Michigan (NIH Prime Sponsor)
Site Principal Investigator
U54 DA021519 (PI: Athey)
9/25/2005–7/31/2010 $199,080
National Center for Biomedical Knowledge Access

National Institutes of Health
Principal Investigator
U54 HG004028
09/23/2005–07/31/2017 $36,109,079
National Center for Biomedical Ontology

University of California, San Francisco (NIH Prime Sponsor)
Site Principal Investigator
N01AI15416 (PI: Das)
5/1/2005–9/30/2008 $1,521,977
Immune Tolerance Network Informatics Core

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Perot Systems
Principal Investigator
03/01/2005–11/15/2005 $66,666
Visualization of Protege Knowledge Bases

National Cancer Institute
Investigator
U56CA112973 (PI: Plevritis)
09/30/2004–08/31/2008 $286,619
Computational Modeling of Cancer Biology

University of Michigan (DARPA Prime Sponsor)
Site Principal Investigator
W81XWH-0420012 (PI: Athey)
12/01/2003–09/21/2006 $1,411,704
An Ontology Architecture to Support the Virtual Soldier

Elsevier
Principal Investigator
11/01/2003–06/30/2004 $69,280
Applying Methods for Semantic Information Retrieval

National Institutes of Health
Principal Investigator
P41 LM007885
6/1/2003–12/30/2011 $6,371,879
A Resource for Biomedical Ontologies and Knowledge Bases

University of Manchester
Site Principal Investigator
04/01/2003–09/30/2006 $50,000
Collaborative Open Ontology Development Environment CO-ODE

Clinician Support Technology (Department of the Army Prime Sponsor)
Site Principal Investigator
2000-106-CSTI
2/1/2002–1/31/2003 $78,320
A Semantic Information Retrieval Infrastructure for the CST Clinical Digital Library

IDX Systems Corporation (NIST Prime Sponsor)
Site Principal Investigator
00-00-4606B
12/01/2001–11/30/2006 $1,772,497
Computable, Interoperable, Clinical Guidelines: A Proposal to the NIST Advanced Technology Program

Scientific Applications International Corporation (NCI Prime Sponsor)
Site Principal Investigator
21XS067A
10/18/2001–11/30/2009 $4,326,029
Support for Development of a Clinical Trials Enterprise Model

Center for Total Access
Principal Investigator
DADA08-01-P-1154
9/30/2001–9/29/2002 $60,000
Support Services for Special Forces Hand Book Project

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Veridian Systems Division (DARPA Prime Sponsor)
Site Principal Investigator
VSD-01-0138-00-SC-01
9/12/2001–3/31/2004 $1,300,737
A Bio-Surveillance System for Advanced Medical Readiness

National Medical Technology TestBed (Department of the Army Prime Sponsor)
Site Principal Investigator
182N004
5/1/2001–6/30/2002 $354,512
Concept-based Search and Retrieval of Knowledge from Army Medical Manual

Center for Total Access
Site Principal Investigator
DADA08 00 P 1735
9/30/2000–9/29/2001 $51,086
Technical, Engineering and ADP Information Technology Services

Fasttrack System, Inc.
Principal Investigator
6/15/1999–6/13/2002 $861,000
Distributed Components for Clinical Decision Support

University Of Washington (NIH Prime Sponsor)
Site Principal Investigator
5 R01 LM006822
6/1/1999–2/28/2003 $541,542
Foundational Model of Anatomy

Space and Naval Warfare Systems Center (Department of the Navy Prime Sponsor)
Site Principal Investigator
N66001-99-1-8910-P00006
4/1/1999–3/31/2002 $1,349,994
Communication Between Humans and Information Systems to Build Large, Electronic Knowledge Bases

Du Pen, Inc. (NIH Prime Sponsor)
Site Principal Investigator
R44 CA78101-02 (PI: Du Pen)
3/15/1998–9/14/2000 $67,774
An Intelligent Knowledgebase Assistant for Cancer Pain Treatment

Chiron Corporation
Principal Investigator
1/21/1998–1/20/2000 $400,000
Distributed Components for Clinical Decision Support

Department of the Navy (DARPA Prime Sponsor)
Site Principal Investigator
N66001-97-C-8549
4/30/1997–10/31/2000 $769,838
High-Performance Knowledge Editing and Problem Solving over the Internet

Science Applications International Corporation (Department of the Navy Prime Sponsor)
Site Principal Investigator
N66001-97-C-8549
4/30/1997-12/31/1999 $181,415
Integrated Knowledge Base Development Environment

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Ellora Software, Inc. (Department of the Navy Prime Sponsor)
Site Principal Investigator
97-8503-02
01/10/1997–12/19/1997 $111,600
Support for the Rapid Evolution and Development of Effective Pathogen Countermeasures

DARPA - Defense Advanced Research Projects Agency
Principal Investigator
N66001-96-C-8525-P00003
07/30/1996–09/30/1999 $694,288
User-Centered Model-Based Interface Design for Distributed Information Spaces

Department of the Army
Principal Investigator
DAAH04-96-1-024
06/15/1996–06/14/1999 $187,617
Enhanced Models for Complex Software Systems

National Institutes of Health
Investigator
R29 LM06245-05 (PI: Shahar)
5/1/1996–4/30/2001 $559,626
Knowledge-Based Temporal Abstraction of Clinical Data

Science Applications International Corporation (DARPA Prime Sponsor)
Site Principal Investigator
4500049039-2
12/01/1995–09/30/1997 $167,115
RAPIT and PEN-IVORY

National Institutes of Health
Principal Investigator
5 R01 LM005708
4/1/1995–3/31/2003 $3,857,783
A Software Architecture for Guideline Directed Therapy

University of Texas at Arlington (DARPA Prime Sponsor)
Site Principal Investigator
N66001-94-D-6055
01/15/1995–12/31/1996 $100,000
Clinical Associate Consortium

Lexical Technology, Inc.
CR Contract
09/15/1994–09/14/1995 $55,283
A Domain Model and Reference Architecture for Oncology

Department of the Navy (DARPA Prime Sponsor)
Principal Investigator
N66001-94-D-6052-0014
8/4/1994–12/3/1999 $3,477,693
Model-Based Development Environments for User Interfaces

National Science Foundation
Principal Investigator
9257578
10/01/1992–02/28/1999 $312,500
NYI: Design of Knowledge-Based Systems from Reusable Components

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National Institutes of Health
Principal Investigator
5 R29 LM05157
04/01/1990–03/31/1996 $550,256
Custom-Tailored Tools for Protocol-Knowledge Management

National Institutes of Health
Principal Investigator
5 R18 HS06330
03/01/1990–08/31/1995 $317,806
Computer Support for Protocol-Directed Therapy

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