BIOGRAPHICAL SKETCH

NAME	POSITION TITLE
Mark Alan Musen	Professor of Medicine
eRA COMMONS USER NAME	
MUSEN.MARK	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Brown University, Providence, Rhode Island	Sc.B.	1977	Biology
Brown University, Providence, Rhode Island	M.D.	1980	Medicine
Stanford University, Stanford, California	Ph.D.	1988	Medical Information Sciences

A. Positions and Honors.

Positions and Employment

1983-1987 Henry J. Kaiser Family Foundation Fellow in General Internal Medicine, Stanford University School of Medicine, Stanford CA
1987-1988 Visiting Scientist, Department of Medical Informatics, Erasmus University, Rotterdam, The Netherlands
1988-1995 Assistant Professor of Medicine (General Internal Medicine), Stanford University School of Medicine
1989-1995 Assistant Professor of Computer Science (by courtesy), Stanford University
1993- Chief, Stanford Medical Informatics, Stanford University School of Medicine
1995-2002 Associate Professor of Medicine (Medical Informatics), Stanford University School of Medicine
1995-2002 Associate Professor of Computer Science (by courtesy), Stanford University
2002- Professor of Medicine (Medical Informatics), Stanford University School of Medicine
2002- Professor of Computer Science (by courtesy), Stanford University

Honors:

Co-editor in Chief: Applied Ontology; Associate Editor: Artificial Intelligence in Medicine, International Journal of Human-Computer Studies; Editorial Board: Web Semantics
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
1992 National Science Foundation Young Investigator Award
1992-1996 Member, Biomedical Library Review Committee
1997 Elected Member, American Society for Clinical Investigation
2006 Donald A.B. Lindberg Award for Innovation in Informatics, given by the American Medical Informatics Association (AMIA)

B. Selected peer-reviewed publications or manuscripts in press (in chronological order).

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(6): 367-388, 1996.

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

van Bemmel, J.H. and Musen, M.A. (eds.) Handbook of Medical Informatics. Berlin: Springer-Verlag, 1997.

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

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

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(4):523-546, 1998.

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(1/2):121-145, 1999.

Shahar, Y., Chen, H., Stites, D.P., Basso, L., Kaizer, H., Wilson, D.M., and Musen, M.A. Semi-automated entry of clinical temporal-abstraction knowledge*. Journal of the American Medical Informatics Association* 6(6):494-511, 1999.

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

Musen, M.A., Fergerson, R.W., Grosso, W.E., Noy, N.F., Crubezy, M., and Gennari, J.H. Component-based support for building knowledge-acquisition systems. Conference on Intelligent Information Processing (IIP 2000) of the International Federation for Information Processing World Computer Congress (WCC 2000), Beijing, August 2000.

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.

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.

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

Musen, M.A. Medical informatics: Searching for underlying components. *Methods of Information in Medicine,* 41(1):12–19, 2002.

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.

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.

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.

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

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) pp. 335-359, 2004.

Goldstein MK, Coleman RW, Tu SW, Shankar RD, O'Connor MJ, Musen MA, Martins SB, Lavori PW, Shlipak MG, Oddone E, Advani AA, Gholami P, Hoffman BB "Translating research into practice: organizational issues in implementing automated decision support for hypertension in three medical centers." *Journal of the American Medical Informatics Association* 2004 Sep-Oct; 11: 5: 368-76:

Musen, M.A. Ontology-oriented design and programming. In: Cuena, J., Demazeau, Y., Garcia, A., and Treur, J. (Eds). *Knowledge Engineering and Agent Technology*, London: IOS Press, 2004.

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.

Crubezy, M., O'Connor, M., Buckeridge, D., Pincus, Z., Musen, M. (2005) Knowledge-Based Syndromic Surveillance for Bioterrorism. *IEEE Intelligent Systems, Special Issue on Artificial Intelligence for National and Homeland Security*, 20(5); 26-35.

Rubin, D.L., O. Dameron, Y. Bashir, D. Grossman, P. Dev, Musen, M.A.. Using an ontology of human anatomy to inform reasoning with geometric models. *Studies in health technology and informatics*,111:429-35. 2005

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 15th International World Wide Web Conference* (WWW 2006), Edinburgh, UK, 2006.

Rubin, D.L., O. Dameron, Y. Bashir, D. Grossman, P. Dev, Musen, M.A.. Using ontologies linked with geometric models to reason about penetrating injuries. *Artificial Intelligence in Medicine*.(in press).

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. and Musen, M.A. The National Center for Biomedical Ontology: Advancing Biomedicine through Structured Organization of Scientific Knowledge. OMICS, 2006

C. Research Support.

Ongoing Research Support

U54 HG004028 Musen(PI) 10/01/05 – 09/30/10
NIH
National Center for Biomedical Ontology
The goal of the National Center for Biomedical Ontology (NCBO) is to develop methods and tools for structuring and accessing biomedical knowledge to assist in the management, integration, visualization, analysis, and interpretation of large distributed data sets that are currently the hallmark of biomedical research.

F015215 Musen (PI) 10/01/05-09/30/10
NIH
Subcontract: University of Michigan
National Center for Biomedical Knowledge Access
The major goal of this project is to provide interfaces to Protégé and Prompt to enable their wrapping as part of a problem-posing architecture.

21XS067 Musen (PI) 10/18/01-01/31/07
National Cancer Institute/SAIC
"Support for Development of a Clinical Trials Enterprise Model"
This contract concerns development of an ontology of clinical trials in oncology and software to aid computer support for clinical research. Protégé is the modeling tool used in this work.

1P41 LM007885 Musen (PI) 06/01/03 – 05/31/07
NIH/ NLM
"A Resource for Biomedical Ontologies and Knowledge Bases"
The major goal of this project is to establish a biotechnology resource for the general support of Protégé 2000 in a manner that will benefit the system's entire user community.

ITN10107-00SC Das (PI) 05/01/05 - 09/30/07
Subcontract – University of California, San Francisco
"Immune Tolerance Network Informatics Core"
Design and development of an informatics core to support the current and emerging computational needs of the Immune Tolerance Network in advancing knowledge on immune tolerance mechanisms through integration and analysis of clinical and immunoassay study results.
Role: Co-PI

85983CBS43 Musen (PI) 10/01/05 - 09/29/07
Subcontract - Booz-Allen & Hamilton, Inc.
caBIG Imaging Workspace Participant
The goal of the caBIG Imaging Workspace Participant is to develop imaging informatics infrastructure for clinical trial research.

1 P20 CA112973 Plevritis(PI) 09/30/04-08/31/07
NIH/NCI
Computational Modeling of Cancer Biology
The major goal of this project is develop a multi-disciplinary research program in systems biology of cancer. Initial pilot projects will focus on computational models of the genetic regulatory networks and signaling pathways that identify the molecular mechanisms underlying the transformation from low grade to high grade lymphoma.

1 R01 PH000027 (Musen) 09/30/06 – 09/29/08
Centers for Disease Control
A Computational Testbed for Biosurveillance Methods
The major goal of this project is to develop an ontology-driven computational test bed that will enable the critical and easy evaluation of surveillance data sources and analytic methods.

Completed Research Support

00-00-4606B Musen (PI) 10/30/01-11/30/06
National Institute of Standards and Technology (NIST)
Subcontract to IDX
"Computable, Interoperable, Clinical Guidelines: A Proposal to the NIST Advanced Technology Program."
This project, in cooperation with IDX, Apelon, Mayo Clinic, the University of Nebraska Medical Center, and Intermountain Health Care involves development of a shared ontology of clinical practice guidelines and dissemination of guideline knowledge bases to three clinical sites. Stanford is building an environment for guideline authoring based on Protégé.

W81XWH-04-2-0012 Musen (PI) 12/01/03 – 08/31/05
Defense Advanced Research Projects Agency (DARPA)
Subcontract to University of Michigan
"An Ontology Architecture to Support the Virtual Soldier"
This project will create (1) a generalizable and scalable global architecture of the *Virtual Soldier*, a computational model of human anatomy and physiology to guide medical care of injured war fighters, (2) a properties-level model of the heart and associated structures in the context of quantitative modeling of heart function, and (3) a geometric properties model of the chest with emphasis on the heart and associated structures.

Musen (PI) 11/01/03 – 07/31/05
Subcontract to University of Manchester (UK)
"Collaborative Open Ontology Development Environment – CO-ODE"
This project aims to integrate the most widely used tools for developing ontologies worldwide—OilEd from the University of Manchester in the UK and Protégé from Stanford University in the US. The integrated open-source toolset will be a user-oriented package designed to satisfy the needs of four cases: (1) developing and maintaining large ontologies, (2) creating small local ontologies, (3) extending existing ontologies for specific uses, and (4) using ontologies to develop applications.

VSD-01-0138-00-SC-01 Musen (PI) 09/12/01 - 05/14/04
Defense Advanced Research Projects Agency (DARPA)
Subcontract to General Dynamics
"A Bio-Surveillance System for Advanced Medical Readiness"
This subcontract from Veridian Systems, Inc. concerns development of knowledge-based techniques to evaluate routinely collected clinical data as well as non-clinical data identify patterns that could suggest incipient epidemics that might be the result of bioterrorism. Protégé-2000 is used to build all the knowledge bases required for this work.

Musen (PI) 12/01/04 – 11/15/05
Perot Systems
Visualization of Protégé Knowledge
The major goal of this project will be to create open-source extensions to the Protégé software system.