CURRICULUM VITAE
NIGAM H. SHAH, MBBS, PhD

OFFICE ADDRESS: Stanford Center for Biomedical Informatics Research
Medical School Office Building X229
1265 Welch Road
Stanford, CA 94305-5479

EMAIL: nigam@stanford.edu

TELEPHONE: (650) 725-6236

FAX: (650) 725-7944

EDUCATION:

2007 Postdoctoral training, Medical Informatics
Stanford University, Stanford CA

2005 Ph.D. Integrative Biosciences (Molecular Medicine)
The Pennsylvania State University, University Park, PA

1999 M.B.B.S. (Bachelor of Medicine and Bachelor of Surgery)
Baroda Medical College, M.S. University Baroda, India

MEDICAL REGISTRATION:

G-28864, Issued 31st May 2000 by Gujarat Medical Council, India

ACADEMIC APPOINTMENTS:

09/10 – Assistant Professor of Medicine, Biomedical Informatics Research
Stanford University School of Medicine

03/07 - 08/10 Research Scientist, Biomedical Informatics Research
Stanford University School of Medicine

10/05 - 3/07 Postdoctoral Fellow, Stanford Medical Informatics & the National Center for Biomedical Ontology

Summer 2003 Research Intern, Functional Genomics and Systems Biology Group, IBM T. J. Watson research center.

Summer 2002 Research Intern, Functional Genomics and Systems Biology Group, IBM T. J. Watson research center.

1999 - 2000 Medical Internship, three months each in the Departments of Internal Medicine, Surgery, Obstetrics and Gynecology, and Public Health

TEACHING EXPERIENCE:

Mar- 2013	Tutorial on “How can bio-ontologies support clinical and translational science ?” at the AMIA Summit on Translational Bioinformatics , March 18-20 , San Francisco , CA
Aug- 2011	Instructor for “Data driven medicine” http://bmi215.stanford.edu (Biomedin 215)
Aug – 2010	Instructor for “Asking translational research questions using ontology enrichment analysis” at the Computational Systems Bioinformatics conference, Aug 16 – 18, Stanford CA
Spring – 2009, 2010 2011, 2012	Instructor for "Informatics in Industry" http://bmi206.stanford.edu/ (Biomedin 206)
Dec - 2008	Instructor for "Developing biomedical ontologies using protege" at the WHO-ICF development workshop, Nottwil, Switzerland.
Jul - 2008	Instructor for "How to Make Useful Ontologies for Biomedicine" at the Intelligent Systems in Molecular Biology conference 2008, Toronto, Canada.
Jul - 2007	Instructor for "Ontologies for Biomedicine - How to make and use them" at the Intelligent Systems in Molecular Biology conference 2007, Vienna, Austria.
Jun - 2007	Instructor for "Reasoning with Biomedical Information – Training course in Logic for Biomedical Research" at Schloss Dagstuhl, Germany
May - 2007	Instructor for “Use of OWL Ontologies for Biological Pathways" in the Semantic Technology Conference, 2007, San Jose.
Jan - 2007	Instructor for "Preparation for Expression Analysis" and "Beyond Single Gene Analysis" at the International Microarray Workshop 2007, at the University of Arizona, Tucson, AZ.
Aug - 2006	Instructor for "Ontologies for Biomedicine" tutorial at Computational Systems Bioinformatics Conference 2006.
Summer – 2003, 2004, 2005	Instructor for Microarray Data Analysis methods in the Penn State Bioinformatics workshop
Fall 2001	Physiology Laboratory (Biology 142); Taught vertebrate physiology to 34 undergraduate nursing and nutrition students.

AWARDS & HONORS:

2012	Faculty award for Outstanding Teaching in the Stanford School of Medicine
2009	Selected among outstanding papers at the AMIA Summit on Translational Bioinformatics
2008	Selected among outstanding papers at the AMIA Summit on Translational Bioinformatics
2003	Travel fellowships from ISCB to attend the Intelligent Systems in Molecular Biology conference
2000- 2002	Life Sciences Consortium Graduate Fellowship from Penn State University

EDITORIAL ACTIVITIES:

Journals: Nature, Scientific Data, Editorial Board member (2013)
Journal of Biomedical informatics, Editorial Board member (2012)
BMC Bioinformatics, Editorial Board member (2012)
CSI Transactions on ICT, Editorial Board member (2012)
Bioinformatics (reviewer since 2004)
Journal of Biomedical Informatics (reviewer since 2008)
BMC Bioinformatics (reviewer since 2007)
PLoS Computational Biology (reviewer since 2009)
Applied Ontology (reviewer since 2008)
Journal of American Medical Informatics Association (reviewer since 2011)

Conferences: AMIA Annual Symposium (reviewer since 2005)
AMIA Summit on Translational Bioinformatics (reviewer since 2008)
Pacific Symposium on Biocomputing (reviewer since 2008)
Intelligent Systems in Molecular Biology (2004 – 2008)
International Conference on Biomedical Ontology (reviewer since 2009)

PROFESSIONAL MEMBERSHIPS:

International Society for Computational Biology (ISCB)
American Medical Informatics Association (AMIA)

PROGRAM COMMITTEES:

- 2013, AMIA Annual Symposium
- 2013, Text and Data Mining for Biomedical Discovery, Big Island, Hawaii
- 2013, IEEE International Conference on Healthcare Informatics , Philadelphia, Pa
- 2013, Computational Semantics in Clinical Text Workshop, Potsdam, Germany
- 2012, Joint Workshop on Semantic Technologies Applied to Biomedical Informatics and Individualized Medicine, Boston Massachusetts
- 2012, Discovery Informatics Symposium: The Role of AI Research in Innovating Scientific Processes, Arlington , Virgina
- 2012,Methods for Adverse Events Representation Ontology and Information Model
- 2011, AMIA Summit on Translational Bioinformatics, San Francisco, CA
- 2011, Extended Semantic Web Conference, Heraklion, Greece
- 2010, Workshop on Web Science & Information Exchange in the Medical Domain, Raleigh, NC
- 2010, Workshop on The Future of the Web for Collaborative Science, Raleigh NC
- 2010, Workshop on the Semantics of Visual Objects, Raleigh NC

- 2008, Semantic Web Applications and Tools for Life Sciences meeting, Edinburgh, UK
- 2009, Semantic Web Applications and Tools for Life Sciences meeting, Amsterdam, Netherlands
- 2009, Workshop on Semantic Web Applications in Scientific Discourse, Washington DC
- 2008, Databases and Ontologies track at Intelligent Systems in Molecular Biology, Toronto, Canada
- 2008, Semantic Web for Health Care and Life Sciences Workshop, Beijing, China
- 2007, Workshop on Service Oriented Technologies for Biological Databases & Tools, Salt Lake City
- 2007, Workshop on Semantic E-Science, Menlo Park, CA
- 2006, Computational Systems Bioinformatics conference, Stanford, CA

COMMITTEE DUTY:

- 2013 Committee member, IOM/PCORI workshop on Data Harmonization for Patient-Centered Clinical Research
- 2011 Faculty search committee member, Stanford Center for Biomedical Informatics
- 2011 Advisory Committee Member, Stanford Center for Clinical Informatics
- 2005 Search committee member for Director of The Huck Institutes of the Life Sciences

STUDY SECTION DUTIES:

- NIH ZRG1 BST-G (50), Special Emphasis Review Panel (2008)
- NSF Semantic Web panel (2010)
- NSF Big Data panel (2012)
- NIH ZRG1 IMST-N (11), Small Business Biological Chemistry, Biophysics and Drug Discovery review panel (2012)
- NIH ZRG1 HDM-T (90), Multidisciplinary Healthcare Delivery Research AREA Grant Applications review panel (2012)
- NIH ZHL1 CSR-K (M1), Research Dissemination and Implementation Review (2013)
- NSF Smart and Connected Health (2013)

CONFERENCE ORGANIZATION:

- Scientific Program Chair, 16th Annual Bio-Ontologies Meeting, co-located with ISMB/ECCB, 2013
- Co-chair, Text and Data Mining for Biomedical Discovery, 2013
- Co-chair, Bio-Ontologies SIG meeting at the Intelligent Systems in Molecular Biology conference, 2012
- **Scientific Program Chair**, AMIA Summit on Translational Bioinformatics, 2012
- Track chair, AMIA Summit on Translational Bioinformatics, 2011
- Co-chair, Bio-Ontologies meeting at the Intelligent Systems in Molecular Biology conference, 2011
- Co-chair, Bio-Ontologies meeting at the Intelligent Systems in Molecular Biology conference, 2010
- Co-chair, Bio-Ontologies meeting at the Intelligent Systems in Molecular Biology conference, 2009
- Co-chair, Bio-Ontologies meeting at the Intelligent Systems in Molecular Biology conference, 2008

ADVISORY BOARDS:

- Kyron Inc, 2013
- Apixio Inc, 2012
- Socrates MD, 2012
- Advisory Board Member, Medicine X, 2011
- IO-Informatics Inc, 2010

INVITED PRESENTATIONS

2013 Mining of Clinical Notes to Aid in Drug Surveillance at HIMSS 2013 CME session, March 5, 2013, New Orleans, LA

2012 Using Ontologies for Reasoning in a Virtual Cell at Toward the 3D Virtual Cell Conference, December 13-14, UCSD, San Diego, CA

2012 Leveraging NCBC Infrastructure for Making Sense of Unstructured Data at The National Centers for Biomedical Computing (NCBC) Showcase meeting, Nov 8-9, 2012 at the Natcher Conference Center, NIH, Bethesda, Maryland

2012 Data Driven Medicine in the age of Electronic Health Records at the Department of Biomedical Informatics at the Cincinnati Children's Hospital, November 9, 2012, Cincinnati , Ohio

2012 Overview of the Uses of NCBO Technology, , Software and Systems Division, Information Technology Laboratory at the National Institute of Standards and Technology, April 26, 2012, Gaithersburg, MD

2012 Making Sense of Unstructured Data in Medicine using Ontologies, Software and Systems Division, Information Technology Laboratory at the National Institute of Standards and Technology, March 26, 2012, Gaithersburg, MD

2011 NCBO Resource Index: Ontology-Based Search and Mining of Biomedical Resources at the Conference on Semantics in Healthcare and Life Sciences, Feb. 23-25, 2011, Boston, MA,

2011 Opportunities for applying semantic technologies to health care data, at the Open day on Linked Data and Health, Aug 19th 2011, London, UK

2011 The Age of Data-Driven Medicine, at Ohio State University, Dept. of Biomedical Informatics, July 25-26 2011, Columbus, Ohio

2010 BioPortal – A scalable, open source ontology repository, at the Workshop on Ontology Repositories and Editors for the Semantic Web, May 30th, Heraklion, Greece

2009 BioPortal - Ontologies and Data Resources with the Click of a Mouse, at the Asia-Pacific Congress on Electron Tomography, Jan 31 - Feb 4, Brisbane, Australia

2009 Ontology services for semantic application in health and life sciences at the Conference on Semantics in Health and Life Sciences (C-SHALS), Feb 25 - 27, 2009, Boston, MA

2009 Ontology services for emerging publishing paradigms, Panel on Advanced Web Technologies for Translational Informatics across Different Biomedical Domains at the Summit on Translational Bioinformatics, March 2009, San Francisco, CA

2007 Bio-Ontologies: current status and emerging trends at the Bridging Ontologies and Text Mining workshop at the European Bioinformatics Institute, Hinxton, UK, Sep 12-14th 2007

2006 Formal Structuring of Genomic Knowledge at Toward genomics knowledge representation for clinical trials Workshop, AMIA Annual Symposium, 2006, Washington DC

2004 "HyBrow: A System for computer aided hypothesis testing" at Rocky 2004, Aspen, CO

WORKSHOP AND PANEL PRESENTATIONS

2013 “Speeding up Translational Research using Ontologies” at the Neurotrauma 2013 meeting, August 4-7, 2013 Nashville, TN

2013 “Drug Safety surveillance using ontologies and free-text clinical notes in a Panel session on How can bio-ontologies support clinical and translational science?” at AMIA Summit on Translational Bioinformatics, March 18-20, San Francisco, CA

2012 “The Meaningful Use of Natural Language Processing in Healthcare” at Strata Rx Conference, October 17, 2012, San Francisco, CA

2012 “Power of Big Data to Solve Real-World Health Care Challenges, at Health 2.0 Conference ,October 7, 2012, San Francisco, CA

2012 “Examples of Research Done with NCBO Technology” at the Clinical and Translational Science Ontology Workshop, April 25, 2012, Linthicum, MD

2012 “Overview of Uses of NCBO Technology for Building Ontology Communities” at the Clinical and Translational Science Ontology Workshop, April 25, 2012, Linthicum, MD

2012 “Making Sense of Unstructured Data in Medicine using Ontologies” at the Clinical and Translational Science Ontology Workshop, April 25, 2012, Linthicum, MD

2012 “Ontologies to Drive Clinical Research: Time to Get Real” at the AMIA Joint Summits on Translational Science, March 19-23, 2012 San Francisco, CA

2012 “Making Sense of Unstructured Data in Medicine using NLP and Ontologies” at the AMIA Joint Summits on Translational Science, March 19-23, 2012 San Francisco, CA

2012 “Detection of Adverse Events using Unstructured Clinical notes” at the AMIA Joint Summits on Translational Science, March 19-23, 2012 San Francisco, CA

2009 "Ontology Services for Semantic Applications in Healthcare and Life Sciences" at the AMIA Annual Symposium, Nov 15-18, 2009, San Francisco, CA

2009 "How bio-ontologies enable open science" at the Open Science workshop at the Pacific Symposium on Biocomputing Jan 5-9, 2009, Kohala Coast, Big Island, HI

2008 "Computations using pathways and networks" at the Workshop on Ontologies of Cellular Networks, March 27-28, 2008, Newark, NJ

2007 "Relationship b/w pathways and models of biological processes" BioPAX Workshop, October 15-16, 2007, Menlo Park, CA

2007 "Operations on pathways from different resources"BioPAX Workshop, October 15-16, 2007, Menlo Park, CA

2007 "Aligning and Combining Ontologies" at the workshop on Interoperability of Biomedical Ontologies March 27-30 2007, Schloss Dagstuhl, Germany

RESEARCH FUNDING:

Present/Pending

2012- 2013 Funder: Profectus Health Research, L.L.C. (Sponsored Research)
Title: Data-mining to identify and profile safety of off-label drug usage
Role: Principal Investigator

2012-2016 Funder: NIH 1RO1NS080145/Subcontract: University of Miami School of Medicine(
Title: Regenbase: A Searchable Database to Organize Regeneration of knowledge via Ontologies
Role: Key Personnel

2005-2015 Funder: NIH, U54 HG004028
Title: National Center for Biomedical Ontology
Role: Co-Investigator (PI Mark A. Musen)

2010-2013 Funder: NIH Prime U54LM008748/Subcontract: Brigham & Women's Hospital (Isaac Kohane)
Title: Informatics for Integrating Biology and the Bedside (i2b2)
Role: Co-Investigator (PI Mark A. Musen)

2013-2017 Funder: NLM
Title: Methods for Generalized Ontology Terms Enrichment Analysis
Role: Principal Investigator

2013-2018 Funder: NIGMS
Title: Mining Health Data to Discover Drug Safety Profiles
Role: Principal Investigator

Past/Completed:

2010-2011 Funder: NIH/NLM, HHSN276201000025C
Title: Computational Thinking for Pharmacogenomics Curation and Discovery
Role: Co-Investigator (PI Russ Altman)

2007-2011 Funder: NIH Prime 5R01GM083649/Subcontract: University of Colorado (Lawrence Hunter)
Title: Ontologies and Biomedical Language processing

Role: Sole investigator on the sub award. (PI Mark A. Musen)

2008-2010 Funder: NSF, award # 0849207
Title: Hypothesis Based Query and Verification of Pathway Models
Role: Co-Investigator. (PI Mark A. Musen)

2008-2009 Funder: Commerce Net Inc. (Research Gift)
Title: Mining dependencies between drugs, genes and disease phenotypes
Role: Co-Investigator. (PI Mark A. Musen)

2007-2008 Funder: NextBio Inc. (Sponsored Research)
Title: Using Ontologies for Improving the Search of Biomedical Datasets
Role: Co- Investigator. (PI Mark A. Musen)

2003-2004 Funder: Penn State University, Life Sciences Consortium Fund.
Title: Developing a new bioinformatics tool for biological hypothesis testing
Role: Key personnel (PI Nina V. Fedoroff)

INVENTION DISCLOSURES:

1. 2004-S098, on *HyBrow - A prototype system for computer aided hypothesis evaluation*; with Penn State University, February 2005

2. S10-328, on *Methods for ontology based analytics*; with Stanford University, October 2010

3. S10-461, on *A method and system for extraction and normalization of relationships via ontology induction;* with Stanford University, December 2010

4. S11-483, on *Patient de-identification for data-mining*; with Stanford University, December 2011

5. S12-019, on *Testing for significance of drug-adverse event associations*, February 2012

6. S12-020, on *Discerning indications from adverse events in drug-disease pairs*; with Stanford University, February 2012

PUBLICATIONS

PEER-REVIEWED JOURNAL PAPERS:

1. Mitra M, **Shah NH**, Mueller L, Pin S and Fedoroff NV, *StressDB: A locally installable web-based relational microarray database designed for small user communities.* Comparative and Functional Genomics, 2002, 3(2): 91-96. PubMed PMID: 18628845; PubMed Central PMCID: PMC2447266.

2. Jelinek DF, Tschumper RC, Stolovitzky GA, Iturria SJ, Tu Y, Lepre J, **Shah N** and Kay NE, *Identification of a global gene expression signature of B-chronic lymphocytic leukemia*. Mol Cancer Res. 2003 Mar;1(5):346-61. PubMed PMID: 12651908.

3. Mahalingam R, Gomez-Buitrago A, Eckardt N, **Shah N**, Guevara-Garcia A, Day P, Raina R, Fedoroff NV, *Characterizing the stress/defense transcriptome of Arabidopsis.* Genome Biology 2003, 4:R20. PubMed PMID: 12620105 ; PubMed Central PMCID: PMC153460.

4. **Shah NH**, King DC, Shah PN and Fedoroff NV, *A Tool-kit for cDNA microarray and promoter analysis.* Bioinformatics 2003 Sep 22; 19(14):1846-8. PubMed PMID: 14512358.

5. **Shah NH** and Fedoroff NV, *CLENCH: A Program for Calculating Cluster Enrichment using the Gene Ontology*. Bioinformatics 2004 May 1; 20(7):1196-7. PubMed PMID: 14764555.

6. Racunas SA*, **Shah NH***, Albert I and Fedoroff NV, *HyBrow: A prototype system for computer aided hypothesis evaluation.* Bioinformatics 2004 Supplement; 20: i257-i264 (*= equal authors).

7. Mahalingam R, **Shah NH**, Scrymgeour A and Fedoroff NV, *Temporal evolution of the Arabidopsis oxidative stress response.* Plant Molecular Biology, March 2005;57(5):709-730. PubMed PMID: 15988565.

8. Racunas SA*, **Shah NH*** and Fedoroff NV, *A case study in pathway knowledgebase verification.* BMC Bioinformatics 2006, 7:196 (*= equal authors). PubMed PMID: 16603083; PubMed Central PMCID: PMC1522024.

9. **Shah NH**, Rubin DL, Espinosa I, Montgomery K, and Musen MA, *Annotation and Query of Tissue Microarray Data Using NCI-T.* BMC Bioinformatics 2007, 8:296. PubMed PMID: 17686183; PubMed Central PMCID: PMC1988837.

10. Srinivasan BS, **Shah NH**, Flannick JA, Abeliuk E., Novak AF and Batzoglou S, *Current progress in network research: toward reference networks for key model organisms.* Briefings in Bioinformatics 2007 Sep;8(5):318-32. PubMed PMID: 17728341.

11. Smith B, Ashburner M, Rosse C, Bard J, Bug W, Ceusters W, Goldberg LJ, Eilbeck K, Ireland A, Mungall CJ; OBI Consortium, Leontis N, Rocca-Serra P, Ruttenberg A, Sansone SA, Scheuermann RH, **Shah N**, Whetzel PL, Lewis S, *The OBO Foundry: coordinated evolution of ontologies to support biomedical data integration* Nat Biotechnol. 2007 Nov; 25(11):1251-5. PubMed PMID: 17989687; PubMed Central PMCID: PMC2814061.

12. Rubin DL, **Shah NH** and Noy NF, *Biomedical Ontologies: A Functional Perspective.* Briefings in Bioinformatics, 2008 Jan; 9(1):75-90. PubMed PMID: 18077472.

13. Marinelli RJ, Montgomery K, Liu CL, **Shah NH**, Nitzberg M, Zachariah ZK, Sherlock G, Natkunam Y, West RB, Van de Rijn M, Brown PO, and Ball CA, *The Stanford Tissue Microarray Database.* Nucleic Acid Research, 2008 Jan 1; 36(Database issue):D871-7. PubMed PMID: 17989087; PubMed Central PMCID: PMC2238948.

14. Kotecha N, Bruck K, Lu W and **Shah NH,** *Pathway Knowledge Base: An Integrated pathway resource using BioPAX* Applied Ontology, Vol 3:4, pg 235-245, December 2008

15. Noy NF, **Shah NH**, Whetzel PL, Dai B, Dorf M, Griffith N, Jonquet CM, Rubin DL, Storey MA, Chute CG, Musen MA, *BioPortal: ontologies and integrated data resources at the click of a mouse.* Nucleic Acids Res. 2009 Jul 1; 37(Web Server issue):W170-3. PubMed PMID: 18999306.

16. **Shah NH**, Jonquet CM, Chiang AP, Butte AJ, Chen R and Musen MA, *Ontology-driven Indexing of Public Datasets for Translational Bioinformatics.* BMC Bioinformatics 2009, 10(Suppl 2):S1. PubMed PMID: 19208184; PubMed Central PMCID: PMC2646250.

17. **Shah NH**, Bhatia N, Jonquet CM, Rubin DL, Chiang AP and Musen MA, *Comparison of Concept Recognizers for building the Open Biomedical Annotator* BMC Bioinformatics 2009, 10(Suppl 9):S14. PubMed PMID: 19761568; PubMed Central PMCID: PMC2745685.

18. Evani US, Krishnan VG, Kamati KK, Baenziger PH, Bagchi A, Peters BJ, Sathyesh R, Li B, Sun Y, Xue B, **Shah NH**, Kann MG, Cooper DN, Radivojac P and Mooney SD, *In Silico Functional Profiling of Human Disease-Associated and Polymorphic Amino Acid Substitutions.* Hum Mutat. 2010 Jan 5; 31(3):335-346. PubMed PMID: 20052762; PubMed Central PMCID: PMC3098813.

19. Jonquet CM, Musen MA and **Shah NH,** *Building a Biomedical Ontology Recommender Web Service.* Journal of Biomedical Semantics, 2010 Jun 22;1 Suppl 1:S1. PubMed PMID: 20626921; PubMed Central PMCID: PMC2903720.

20. Roeder C, Jonquet CM, **Shah NH**, Baumgartner WA Jr and Hunter L, *A UIMA Wrapper for the NCBO Annotator*. Bioinformatics. 2010 July 15; 26(14): 1800–1801. PubMed PMID: 20505005; PubMed Central PMCID: PMC2894505.

21. Demir E, Cary MP … Shah NH … Sander C, Bader GD. [90 authors]. *BioPAX – A Community Standard for Pathway Data Sharing*. Nature Biotechnology, 2010 Sep;28(9):935-42. PubMed PMID: 20829833; PubMed Central PMCID: PMC3001121.

22. Adrien Coulet, **Nigam Shah**, Yael Garten, Mark Musen and Russ B. Altman, *Using text to build semantic networks for pharmacogenomics.* Journal of Biomedical Informatics, 2010 Dec;43(6):1009-19. PubMed PMID:20723615; PubMed PMCID: PMC2991587.

23. Tirmizi SH, Aitken S, Moreira DA, Mungall CJ, Sequeda J, **Shah NH**, Miranker DP. *Mapping between the OBO and OWL ontology languages.* J Biomed Semantics. 2011 Mar 7; 2 Suppl 1:S3. PubMed PMID: 21388572: PubMed Central PMCID: PMC3105495.

24. Paea LePendu, Mark A. Musen, and **Nigam H. Shah.** *Enabling enrichment analysis with the Human Disease Ontology.* J Biomed Inform. 2011 Apr 29. PubMed PMID: 21550421.

25. Adrien Coulet, Yael Garten, Michel Dumontier, Russ B. Altman, Mark A. Musen and **Nigam H. Shah** *Integration and publication of heterogeneous text-mined relationships on the Semantic Web*. Journal of Biomedical Semantics, 2011 May 17;2 Suppl 2:S10. PubMed PMID: 21624156; PubMed Central PMCID: PMC3102890.

26. Callahan A, Dumontier M and **Shah NH**, *HyQue: Evaluating hypotheses using Semantic Web technologies.* Journal of Biomedical Semantics, 2011 May 17;2 Suppl 2:S3. PubMed PMID: 21624158; PubMed Central PMCID: PMC3102892.

27. Patricia L. Whetzel, Natalya F. Noy, **Nigam H. Shah**, Paul R. Alexander, Csongor Nyulas, Tania Tudorache, and Mark A. Musen. *BioPortal: enhanced functionality via new Web services from the National Center for Biomedical Ontology to access and use ontologies in software applications.* Nucleic Acids Res. 2011 Jul; 39(Web Server issue):W541-5. Epub 2011 Jun 14. PubMed PMID: 21672956; PubMed Central PMCID: PMC3125807.

28. Wu ST, Liu H, Tao C, Musen MA, Chute GG, and **Shah NH,** *Unified Medical Language System term occurrences in clinical notes: a large-scale corpus analysis.* Journal of the American Medical Informatics Association, 2012 April 4. PubMed PMID:22493050

29. Yi Liu, Adrien Coulet, Paea LePendu and **Nigam Shah**, *Using ontology-based annotation to profile disease research.* Journal of the American Medical Informatics, 2012 April 11. PubMed PMID:22494789

30. Paea LePendu, Srinvasan V I yer, Cèdrick Fairon, **Nigam H Shah,** *Annotation analysis for testing drug safety signals using unstructured clinical notes.* Journal of Biomedical Semantics, 2012 April 24. Pub Med PMID:22541596

31. Harpaz R, Dumouchel W, **Shah NH,** Madigan D, Ryan P, Friedman C., *Novel Data-Mining Methodologies for Adverse Drug Event Discovery and Analysis.* Nature Clinical Pharmacology & Therapeutics Journal, 2012 May12, PMID: 22549283

32. **Nigam Shah,** *Translational Bioinformatics Embraces Big Data,* IMIA, Year book of Med Inform. 2012;7(1):130-4. PMID: 22890354

33. Hahn U, Cohen KB, Garten Y, **Shah NH**. *Mining the pharmacogenomics literature--a survey of the state of the art*. Brief Bioinform. 2012 Jul;13(4):460-94. PMID: 22833496 PMCID: PMC3404399

34. Rave Harpaz, Santiago Vilar, William DuMouchel , Hojjat Salmasian, Krystl Haerian, **Nigam H Shah**, Herbert S Chase, and Carol Friedman. *Combing signals from spontaneous reports and electronic health records for detection of adverse drug reactions,* Journal of American Medical Informatics, 2012 October 31. PMID: 23118093

35. **Nigam H Shah,** Tyler Cole, Mark A. Musen, *Analysis Using Disease Ontologies,* PLoS Comput Biol. 2012 Dec;8(12). PMID: 23300417

36. Wittkop T, Teravest E, Evani US, Fleisch KM, Berman AE, Powell C, **Shah NH**, Mooney SD. *STOP using just GO: a multi-ontology hypothesis generation tool for high throughput experimentation.* BMC Bioinformatics. 2013 Feb 14;14(1):53.

37. White RW, Tatonetti NP, **Shah NH**, Altman RB, Horvitz E. *Web-scale pharmacovigilance: listening to signals from the crowd*. J Am Med Inform Assoc. 2013 Mar 6

38. Rave Harpaz, William DuMouchel, Paea LePendu, Anna Bauer-Mehren, Patrick Ryan and **Nigam H. Shah** *Performance of Pharmacovigilance Signal Detection Algorithms for the FDA Adverse Event Reporting System.* Clin Pharmacol Ther. 2013 Feb 11. doi: 10.1038/clpt.2013.24. PMID: 23571771

39. Paea LePendu, Srinivasan V. Iyer, Anna Bauer-Mehren, Rave Harpaz, Jonathan M. Mortensen, Tanya Podchiyska, Todd A. Ferris and **Nigam H. Shah**. *Pharmacovigilance Using Clinical Notes.* Clin Pharmacol Ther. 2013 Mar 4. doi: 10.1038/clpt.2013.47. PMID: 23571773

40. Ghebremariam, T Yohannes , Paea LePendu; Jerry C.Lee, Daniel A. Erlanson, Anna Slaviero, **Nigam H. Shah,** James Leiper, and John P. Cooke. *An Unexpected Effect of Proton Inhibitors: Elevation of the Cardiovascular Risk Factor ADMA,* Circulation. 2013 Aug 20;128(8):845-53. 2013 Jul 3. PMID: 23825361

41. Lyalina S, Percha B, Lependu P, Iyer SV, Altman RB, **Shah NH**. *Identifying phenotypic signatures of neuropsychiatric disorders from electronic medical records.* J Am Med Inform Assoc. 2013 Aug 16. doi: 10.1136/amiajnl-2013-001933. [Epub ahead of print]. PMID: 23956017

42. Leeper NJ, Bauer-Mehren A, Iyer SV, Lependu P, Olson C, **Shah NH**. *Practice-based evidence: profiling the safety of cilostazol by text-mining of clinical notes.* PLoS One. 2013 May 23;8(5):e63499. doi: 10.1371/journal.pone.0063499. PMID: 23717437

43. Iyer SV, Harpaz R, Lependu P, Bauer-Mehren A, **Shah NH**. *Mining clinical text for signals of adverse drug-drug interactions.* J Am Med Inform Assoc. 2013 Oct 24. doi: 10.1136/amiajnl-2013-001612. PMID: 24158091

44. Blair DR, Lyttle CS, Mortensen JM, Bearden CF, Jensen AB, Khiabanian H, Melamed R, Rabadan R, Bernstam EV, Brunak S, Jensen LJ, Nicolae D, **Shah NH**, Grossman RL, Cox NJ, White KP, Rzhetsky A. *A nondegenerate code of deleterious variants in Mendelian loci contributes to complex disease risk.* Cell. 2013 Sep 26;155(1):70-80. doi: 10.1016/j.cell.2013.08.030. PMID: 24074861

PEER-REVIEWED CONFERENCE PAPERS:

1. **Shah NH**, Lepre J, Tu Y and Stolovitzky G, *Can We Identify Cellular Pathways Implicated in Cancer Using Gene Expression Data?* IEEE Computer Society CSB Conference, Aug 2003, Proc pg 94 - 103

2. Racunas SA, **Shah NH** and Fedoroff NV, *A Contradiction-Based Framework for Testing Gene Regulation Hypotheses* IEEE Computer Society CSB Conference, Aug 2003, Proc pg 634 - 638

3. Racunas SA, Griffin C and **Shah NH,** *A Finite Model Theory for Biological Hypotheses* IEEE Computer Society CSB Conference, Aug 2004, Proc pg 585-589

4. **Shah NH**, Rubin DL, Supekar KS and Musen MA, *Ontology-based Annotation and Query of Tissue Microarray Data* AMIA Annu Symp Proc. 2006:709-13

5. Kotecha N, Bruck K, Lu W and **Shah NH,** *Pathway Knowledge Base: Integrating BioPAX compliant pathways using Oracle RDF Store* Health Care and Life Sciences interest group Workshop at the International Semantic Web Conference, Athens, GA 2006 (Available at http://esw.w3.org/HCLS/ISWC/Workshop/Abstracts)

6. W.-J. Lee, L. Raschid, P. Srinivasan, **N. Shah**, D. Rubin, N. Noy, *Using annotations from controlled vocabularies to find meaning associations* Lecture Notes in Bioinformatics, Vol.4544, pp.247-263, June 2007

7. Alani H, Noy NF, **Shah NH**, Shadbolt N and Musen, MA, *Searching Ontologies Based on Content: Experiments in the Biomedical Domain* 4th International Conference on Knowledge Capture (K-Cap), 28-31 October 2007 Whistler, Canada; *proceedings* pg 55-62 (ISBN: 978-1-59593-643-1)

8. Moreira D, **Shah NH** and Musen MA, *Interpretation Errors related to the GO Annotation File Format* AMIA Annu Symp Proc. 2007 Oct 11:538-42. PMID: 18693894,PMCID: 2655813

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