

**BIOGRAPHICAL SKETCH**

Provide the following information for the Senior/key personnel and other significant contributors

NAME Micah Altman	POSITION TITLE Director of Research, MIT Libraries Non-Resident Senior Fellow, Brookings Instiution		
Institutional affiliation Massachusetts Institute of Technology			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	MM/YY	FIELD OF STUDY
Harvard University; Cambridge, MA	Postdoc	1999-2001	Government
California Institute of Technology; Pasadena, CA	Ph.D.	1998	Social Sciences
Brown University; Providence, RI	B.A.	1989	Computer Science
Brown University; Providence, RI	B.A.	1989	Philosophy

**A. Personal Statement**

Dr. Altman conducts research in social science, information science and research methods. He is known for his work on computational models of electoral districting and for his contributions to the research methodology of social sciences, especially data curation and statistical computing. His current work focuses on the intersections of information, technology, privacy, and politics; and on the dissemination, preservation, reliability and governance of scientific knowledge.

In the area of data curation, his past work has included contributing to the development of a widely-used metadata standard; the creation of production award-winning open source digital library systems; the invention of data citation and fingerprinting methods; and the development of open source statistical software for scientific replication; and the creation and deployment of award-winning a crowd-sourced web GIS platform.

Dr. Altman has authored over sixty publications and seven open-source software packages that span information science, statistics, computer science, political science, law, and other social-science disciplines. His books correct common computational errors made across the range of social sciences, and articulate principles for data management and dissemination. Dr. Altman's work has been recognized with awards from professional organizations, citations by the U.S. Supreme Court, and coverage by numerous local and national media organizations.

**B. Positions and Honors**

2012-Present	Director of Research, MIT Libraries	MIT
2012-Present	Head/Scientist, Program on Information Science MIT Libraries	MIT
2010-Present	Non-Resident Senior Fellow	Brookings Institution
2011-2012	Director of Archives and Acquisitions, Institute for Quantitative Soc. Sci.	Harvard University
2006-2012	Senior Research Scientist, Institute for Quantitative Soc. Sci.	Harvard University
2006-2011	Archival Director, Henry A. Murray Research Archive	Harvard University
1998-2009	Associate Director, Harvard-MIT Data Center	Harvard University
2001-2004	Research Associate, Center for Basic Research in Soc. Sci.	Harvard University
1993-1996	High Performance Computing Consultant	A-Z Technology
1990-1992	Member of Technical Staff	Silicon Graphics, Inc.

*Selected Honors*

2012                      Data Innovation Award (for Social Impact), O'Reilly Strata

2012	Outstanding Software Development, American Political Science Association (ITP Section)
2011	Best Policy Innovations of 2011, Politico
2011	Senior Fellow, Information Technology & Politics, American Political Science Association
2009	Best Research Software, American Political Science Association (ITP Section)
2005	Best Research Software Award, American Political Science Association (ITP Section)
1999	Best Political Science Research Website, American Political Science Association (CMS Section)
1999	Outstanding Dissertation Award, Western Political Science Association
1998	Weaver Award, American Political Science Association (Representation Section)

### C. Selected Peer-reviewed Publications

1. Micah Altman, 2012. "Data Citation in the Dataverse Network", in *With Attribution, Developing Data Attribution and Citation Practices and Standards: Report from an International Workshop*, National Academies Press
2. Kevin Novak, Micah Altman, Elana Broch, John M. Carroll, Patrick J. Clemens, Diane Fournier, Christian Laavaert, Andrew Reamer; 2011. *Communicating Science and Engineering Information in the Digital Era* (National Academies Press).
3. Micah Altman, Jonathan Crabtree 2011. Using the SafeArchive System: TRAC-Based Auditing of LOCKSS", *Proceedings of Archiving 2011*, Society for Imaging Science and Technology.
4. Altman, M., & McDonald, M. P. 2011. BARD: Better Automated Redistricting. *Journal Of Statistical Software*, VV(ii), 1-28.
5. Altman, M., Adams, M., Crabtree, J., Donakowski, D., Maynard, M., Pienta, A., & Young, C. 2009. Digital Preservation through Archival Collaboration: The Data Preservation Alliance for the Social Sciences. *American Archivist*, 72(1), 170-184.
6. Altman, M., 2008. "A Fingerprint Method for Verification of Scientific Data" in, *Advances in Systems, Computing Information Sciences and Software Engineering*, (Proceedings of the International Conference on Systems, Computing Sciences and Software Engineering 2007), Springer Verlag.
7. Altman, M., Gill, J., & McDonald, M. P. 2007. accuracy: Tools for Accurate and Reliable Statistical Computing. *Journal Of Statistical Software*, 21(1), 1-30.
8. Micah Altman, Jeff Gill, Michael P. McDonald, 2004. *Numerical Issues in Statistical Computing for the Social Scientist*, John Wiley and Sons.
9. Altman, M., & McDonald, M. P. 2003. Replication with Attention to Numerical Accuracy. *Political Analysis*, 11(3), 302-307.
10. Altman, M., Krot, M., Andreev, L., Diggory, M., King, G., Sone, A., Verba, S., et al. 2001. A Digital Library for the Dissemination and Replication of Quantitative Social Science Research: The Virtual Data Center. *Social Science Computer Review*, 19(4), 458-470.

### D. Research Support

- 2012-1014 "Helping Journals to Upgrade Data Publication" (Co-PI). Project will develop workflows and OSS tools for joint data and article publication. Sloan Foundation.
- 2012-2016 "Privacy Tools for Sharing Research Data" (Collaborator). Project will develop method, tools and infrastructure for disseminating confidential data. NSF.
- 2009-2012 "A Policy Based Archival Replication System for Libraries, Archives, and Museums" (Project Founder and Director). Project developed tools and methods for policy-based auditing of distributed p2p replicated storage networks. IMLS.
- 2009-2012 "Public Mapping Project" (PI, with Michael McDonald). Project developed OSS tools and methods for crowdsourced election and community mapping.

**BIOGRAPHICAL SKETCH**

Provide the following information for the Senior/key personnel and other significant contributors

NAME Lalana Kagal	POSITION TITLE Research Scientist, Computer Science and Artificial Intelligence Lab, MIT Deputy Director, Decentralized Information Group		
Institutional affiliation MIT			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	MM/YY	FIELD OF STUDY
Fergusson College, University of Pune, India	BS	06/1994	Computer Science
University of Pune, India	MS	06/1996	Computer Science
University of Maryland, Baltimore County	PhD	12/2004	Computer Science
Massachusetts Institute of Technology	PostDoc	12/2006	Policy & the Web

**NOTE: The Biographical Sketch may not exceed two pages. Follow the formats and instructions below.****A. Personal Statement**

Research areas: Include semantic web technologies, privacy, cybersecurity, policy specification and reasoning, multi-agent systems, data usage management, and policy-compliant data analysis.

Key academic accomplishments and recognition: Authored over 60 peer reviewed publications; organized or on program committee of over 50 conferences such as International Semantic Web Conference (ISWC), World Wide Web Conference (WWW), International Joint Conference on Artificial Intelligence (IJCAI) and National Conference on Artificial Intelligence (AAAI); Guest Editor of the Journal of Web Semantics; Winner of Air Force Young Investigator Award.

International Collaborations:

Worked with the Deputy Inspector General of Central Bureau of Investigation (India) on a semantic framework for privacy

**B. Positions and Honors**

May 2002 – Aug 2002	Research Intern at HP Labs, Palo Alto
Dec 2004 – Dec 2006	Postdoctoral Associate (supervised by Tim Berners-Lee) at MIT
June 2009 – current	Deputy Director, Decentralized Information Group

**C. Selected Peer-reviewed Publications**

Complete list of 60 publications can be found at: <http://people.csail.mit.edu/lkagal/publications.html>

1. A. Khandelwal, I. Jacobi, and L. Kagal, "Linked Rules: Principles for Rule Reuse on the Web", Fifth International Conference on Web Reasoning and Rule Systems (RR), August 2011.
2. T. Kang and L. Kagal, "Enabling Privacy Awareness in Social Networks", AAAI Spring Symposium 2010.
3. O. Seneviratne, L. Kagal and T. Berners-Lee, "Policy-aware Content Reuse on the Web", International Semantic Web Conference 2009.
4. T. Berners-Lee, D. Connolly, L. Kagal, Y. Scharf, and J. Hendler, "N3Logic : A Logic For the Web", Journal of Theory and Practice of Logic Programming (TPLP), Special issue on Logic Programming and the Web, 2008.

5. L. Kagal, Tim Berners-Lee, Dan Connolly, and Daniel Weitzner, "Using Semantic Web Technologies for Open Policy Management on the Web", 21st National Conference on Artificial Intelligence (AAAI 2006), July 2006.
6. L. Kagal, C. Hanson, and D. Weitzner, "Explanation Generation via Dependency Tracking", 9<sup>th</sup> International IEEE Workshop on Policies for Distributed Systems and Networks (POLICY 2008), 4-6 June 2008.
7. L. Kagal, T. Berners-Lee, D. Connolly, and D. Weitzner, "Self-describing Delegation Networks for the Semantic Web", 7<sup>th</sup> International IEEE Workshop on Policies for Distributed Systems and Networks (POLICY 2006), June 2006.
8. L. Kagal and T. Finin, "Modeling Conversation Policies using Permissions and Obligations", Journal of Autonomous Agents and MultiAgent Systems (JAAMAS), December 2006.
9. L. Kagal, V. Korolev, S. Avancha, A. Joshi, T. Finin, and Y. Yesha, "Centaurus : An Infrastructure for Service Management in Ubiquitous Computing", ACM Wireless Networks Journal, November 2002.
10. L. Kagal, T. Finin, and A. Joshi, "A Policy Based Approach to Security to the Semantic Web", 2<sup>nd</sup> International Semantic Web Conference (ISWC), October 2003.

#### **D. Research Support**

2012 – 2013: [co Principal Investigator] Department of Homeland Security (DHS), **Accountable Information Usage in Distributed Information Sharing Environments Project**

2009 – 2012: [Technical Lead] National Science Foundation (NSF), **Theory and Practice of Accountable Systems**

2009 – 2011: [Principal Investigator] Air Force Office of Scientific Research (AFOSR), Young Investigator Research Program

2009 – 2010: [Technical Lead] Intelligence Advanced Research Projects Activity (IARPA), **Providing Policy Assurance over Private Information Retrieval Queries**

2009 – 2010: [Principal Investigator] Microsoft, **Identifying and Addressing Privacy Leakage from Query Logs**

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**BIOGRAPHICAL SKETCH**

Provide the following information for the Senior/key personnel and other significant contributors

NAME Allen MOULTON	POSITION TITLE: Research Scientist, MIT Information Quality Program (MITIQ), MIT Sociotechnical Systems Research Center (SSRC)		
Institutional affiliation MIT			
INSTITUTION AND LOCATION	DEGREE	MM/YY	FIELD OF STUDY
Massachusetts Institute of Technology	SB	6/1970	Political Science

**A. Personal Statement**

Research areas: Connectivity among disparate information systems, information integration, semantic interoperability, data quality, data standards, software project management, semantic data quality and information interchange in military command and control systems, business intelligence information integration, and financial services.

Key academic accomplishments and recognition: Research and development on the CASCON system for substantive foreign policy analysis of international conflict with an emphasis on the prevention of escalation to hostilities. Development of a book and teaching materials for an "international relations laboratory" using CASCON. Received EDUCOM / NCRIPTAL Award for Distinguished Software in Political Science. Book and software is supplemented by the <http://mit.edu/cascon> website.

Industry and Entrepreneurship experience: Development of a small business formed to assist in the application of context interchange mediation technology. Management for a government sub-contract applying the technology to problems of integrating information from diverse sources in counter-terrorism intelligence analysis. Development and execution of procedures for integrating and data cleaning of demographic data originating from multiple independent sources with source updates provided on an annual or more frequent periodic basis over a period of fourteen years. Product planning, design, architecture and development management of a unique extensible, object-oriented data and calculation services component for a Wall Street venture dealing with decision information for fixed income securities of all types, developed for a Sun Unix platform. Strategic review and planning of technical architecture for a large trust accounting, investment management, and employee benefit administration system product line running on IBM mainframes and mid-range computers, including analysis of migration to new application architecture technology.

**B. Positions and Honors**

1971-72 Instructor, MIT Sloan School of Management, Cambridge, MA.  
 1975 Visiting Instructor, University of Miami School of Business, Coral Gables, Florida.  
 1976-77 Lecturer, MIT Sloan School of Management, Cambridge, MA.  
 1977-79 Research Associate, MIT Center for Information Systems Research, Cambridge, MA.  
 1984-95 Founder and Director, Lotus User Group, Boston Computer Society, Boston, MA.  
 1981-2010 Visiting Scholar and Research Affiliate, MIT Sloan School of Management and Department of Political Science and Center for International Studies, Cambridge, MA.  
 2010-present Research Scientist, MIT Information Quality Program (MITIQ), Sociotechnical Systems Research Center (SSRC) (formerly Center for Technology, Policy and Industrial Development), Cambridge, MA.

### C. Selected Peer-reviewed Publications

- Gannon, Thomas, Stuart Madnick, Allen Moulton, Michael Siegel, Marwan Sabbouh, and Hongwei Zhu. **"Framework for the Analysis of the Adaptability, Extensibility, and Scalability of Semantic Information Integration and the Context Mediation Approach."** Proc. of HICSS 2009. 1-11.
- Choucri, Nazli., Stuart Madnick, Allen Moulton, Michael Siegel, and Hongwei Zhu. **"Information Integration for Counter Terrorism Activities: The Requirement for Context Mediation,"** Proc. of 2004 IEEE Aerospace Conference, Big Sky, Montana, March 6-13, 2004
- Moulton, Allen, Stuart Madnick, and Michael Siegel. **"Context Interchange Mediation for Semantic Interoperability and Dynamic Integration of Autonomous Information Sources in the Fixed Income Securities Industry"**, Proceedings of the Workshop on Information Technology and Systems (WITS), Barcelona, Spain, December 14-15, 2002, pp.61-66.
- Moulton, Allen, Stuart Madnick, and Michael Siegel. **"Semantic Interoperability in the Fixed Income Securities Industry: A Knowledge Representation Architecture for Dynamic Integration of Web-Based Information"**. Proc of HICSS 2003, p. 287 ff.
- Moulton, Allen, Stuart Madnick, and Michael Siegel. **"Semantic Interoperability in the Securities Industry: Context Interchange Mediation of Semantic Differences in Enumerated Data Types"**. DEXA Workshops WEBH 2002, Aix-en-Provence, pp. 883-888.
- Moulton, Allen, Stuart Madnick, and Michael Siegel. **"Knowledge Representation Architecture for Context Interchange Mediation: Fixed Income Securities Investment Examples"**, Proc. of the First International Workshop on Electronic Business Hubs: XML, Metadata, Ontologies, and Business Knowledge on the Web (WEBH; Munich, Germany), published by IEEE (ISBN 0-7695-1230-5, ISSN 1529-4188), September 2001, pp. 50-54.
- Moulton, Allen, Stephan Bressan, Stuart Madnick, and Michael Siegel. **"An Active Conceptual Model for Fixed Income Securities Analysis for Multiple Financial Institutions"**. Proc. 17th International Conference on Conceptual Modeling (ER'98), Singapore, 1998.
- Bloomfield, Lincoln, and Allen Moulton. ***Managing International Conflict: from Theory to Policy*** (with CASCON Software). New York: St. Martin's Press. 1997.
- Ness, David, Robert Green, William Martin, and Allen Moulton. **"Computer Education in a Graduate School of Management,"** *Communications of the ACM* 13,2 (February, 1970), pp. 110-114.

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5 Cambridge Center, Cambridge, MA 02142, USA.

**BIOGRAPHICAL SKETCH**

Provide the following information for the Senior/key personnel and other significant contributors

NAME Abel Sanchez	POSITION TITLE: Research Scientist, Engineering Systems Division		
Institutional affiliation MIT			
INSTITUTION AND LOCATION	DEGREE	MM/YY	FIELD OF STUDY
University of Arizona	BS	6/1996	Engineering Mechanics
MIT	MS	6/1999	Information Technology
MIT	PhD	6/2003	Information Technology

**A. Personal Statement**

Research areas: include Radio Frequency Identification (RFID), Information Engineering, Engineering Complex Systems, simulation of large systems to predict complex system behavior, cyber-physical security, product authentication, Medical Reminders, big data analytics, and geospatial data analysis for cyber security.

Key academic accomplishments and recognition: Executive Director of MIT Geospatial Data Center (GDC) <http://geospatial.mit.edu>, 2009-present, under his leadership, the center has already won a number of contracts from industry and government including Microsoft, KACST Saudi Arabia, MASDAR and the Intelligent Advance Research Project Agency and has set up collaborations with researchers in Harvard, Oxford, University of Central Florida, University of Memphis, and the Fed-Ex Institute at the University of Tennessee. GDC has formalized relationships with defense contractors, such as Raytheon, Northrop-Grumman, Sonalysts, and Centripetal Networks and was recently invited to submit proposals to the US Department of Homeland Security on 5 Broad Agency Announcements (BAAs) in the area of cyber security.

International Collaborations: Malaysia University of Science and Technology (MUST); Masdar Institute of Science and Technology (Abu Dhabi.), U. of Wales, UK, Hong Kong University of Science and Technology, Hong Kong. Organized first Cyber-Physical Security Conference, 2011 in UK.

Industry and Entrepreneurship experience: founder and Chief Software Architect of the Open Source RFID platform project. Software systems are used by Samsung, NEC, NTT, Hitachi, Motorola, SAP, IBM, and Microsoft. Other software initiatives are in use by Sandia National Laboratories, MIT, and by several organizations in East Asia and Europe. Consulted to SAP, Phillip Morris International, Schlumberger, Ford Motor Company, Dassault, Dell, and Microsoft. In computational health, in partnership with the Harvard Medical School, design and construction of a low cost, scalable, Medical Reminder System.

**B. Positions and Honors (non MIT)**

1997-98 Massachusetts Institute of Technology Fellowship  
 1998-99 System Design and Management (MIT) Research Fellowship  
 1999-00 Merit Scholarship  
 1999-00 Microsoft Corporation Research Fellowship  
 2000- National Science Foundation (NSF) Honors  
 2000 Sandia National Laboratories Research Fellowship  
 2000 IBM Cooperative Fellowship  
 2001 Microsoft-MIT iCampus Grant  
 2002 Ford Motor Company Research Fellowship  
 2002 Patrick J. McGovern Award for Entrepreneurship  
 2004 Ford Foundation, National Research Council Fellowship  
 2007 Auto-ID Laboratory, Massachusetts Institute of Technology, Research Scientist  
 2009 Engineering Systems Division, Research Scientist

2009 Executive Director of MIT Geospatial Data Center <http://geospatial.mit.edu>

### C. Selected Peer-reviewed Publications

*Complete list of 190 publications can be supplied if requested*

- Williams, J., S. Herrero-Lopez, C. Leonardi, S. Chan, A. Sanchez, and Z. Aung, **Large in-memory cyber-physical security-related analytics via scalable coherent shared memory architectures**, in Proceedings of the IEEE Symposium on Computational Intelligence in Cyber Security, pp. 1-9, 2011.
- Arenas-Martínez, M., S. Herrero-Lopez, A. Sanchez, J. Williams, P. Roth, P. Hofmann, and A. Zeier, **A comparative study of data storage and processing architectures for the smart grid**, in Proceedings of the First IEEE International Conference on Smart Grid Communications, pp. 285-290, 2010.
- Aung, Z., J. Williams, A. Sanchez, M. Toukhy, and S. Herrero-Lopez, **Towards accurate load forecasting in smart power grids**, submitted to The 16th Pacific-Asia Conference on Knowledge Discovery and Data Mining, Kuala Lumpur, Malaysia, May 2012.
- Faisal, M. A., Z. Aung, J. Williams, and A. Sanchez, **Securing advanced metering infrastructure using two-layered intrusion detection system**, to be submitted to The 11th International Conference on Developments in Power System Protection - Protecting the Smart Grid, Birmingham, UK, April 2012.
- Li, D., Z. Aung, J. Williams, and A. Sanchez, **Efficient authentication scheme for data aggregation in smart grid with fault tolerance and fault diagnosis**, accepted for publication at 2012 IEEE Power and Energy Society Conference on Innovative Smart Grid Technologies, Washington D.C., USA, January 2012.
- Li, D., Z. Aung, S. Sampalli, J. Williams, and A. Sanchez, **Privacy preservation for smart metering data via accountable group key scheme**, submitted to IEEE Transactions on Smart Grids, Special Issue on Computational Intelligence Applications in Smart Grids, 2011.
- Williams, J., S. Herrero-Lopez, C. Leonardi, S. Chan, A. Sanchez, and Z. Aung, **Large in-memory cyber-physical security-related analytics via scalable coherent shared memory architectures**, in Proceedings of the IEEE Symposium on Computational Intelligence in Cyber Security, pp. 1-9, 2011.

### D. Research Support: [CO-PI] means Principal Investigator (sample projects only)

2009-2011: [PI] **Data Mining for Smart Grids**, \$400K Sponsor: Masdar Institute This research develops a simulator for the electrical smart grid to investigate future billing systems and also cyber security systems.

2011-2012 **Center for Complex Engineering Systems - Integrated Energy Decision Support System**  
Role: Co-PI with Prof. Crawley (President SkTech) Sponsor: CCES/ KACST Saudi Arabia

2012-2013 **Modeling Cyber Range for Cyber Security**, Sponsor Lincoln Labs, Boston

2012-2013 **Design and Implementation of Negative Authentication System**, US Intelligence Advanced Research Project Agency.

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**BIOGRAPHICAL SKETCH**

Provide the following information for the Senior/key personnel and other significant contributors

NAME MICHAEL D SIEGEL	POSITION TITLE: Principal Research Scientist, MIT Sloan School of Management		
Institutional affiliation MIT			
INSTITUTION AND LOCATION	DEGREE	MM/YY	FIELD OF STUDY
Trinity College, Hartford CT	BS	6/1977	Engineering
University of Wisconsin, Madison	MS	6/1980	Engineering
Boston University	MS	6/1985	Computer Science
Boston University	PhD	6/1989	Computer Science

**A. Personal Statement**

Research areas: intelligent integration of information systems, data semantics, data standards, web-based information extraction and integration, cybersecurity and international relations, hospital process improvement, global risk management, information security, financial applications, pre-conflict analysis, managing data semantics, query optimization, learning in database systems, digital health, and modeling state stability.

Accomplishments

1. Developed technology and transferred for use by DOD and private companies.
2. Director of Digital Health Special Interest Group at the Digital Business Center, MIT. Research areas include data integration, real-time data collection systems, process improvement and data mining.
3. Served as Project Manager and Chief Research Scientist for various projects and programs, such as: Context Interchange (COIN), PROductivity From Information Technology (PROFIT), Pro-Active INTelligence (PAINT). Sponsors have included NSF, DARPA, iARPA, DOD, and industry companies.
4. Managed large private sector integration efforts for the financial services industry
5. Integration of System Dynamics modeling and analysis of large systems with new software applications and data collection efforts.
6. Co-founder, iAggregate (acquired by ArsDigita which was subsequently acquired by Red Hat),

**B. Positions and Honors**

- 2006-10 Director Special Interest Group on Digital Health. Center for Digital Business at MIT
- 2001-04 Director Global Financial Services Special Interest Group. Center for eBusiness at MIT
- 2000-01 Co-founder, iAggregate Corporation, Cambridge, MA
- 1996-99 Co-Director, Finance Research Center (FRC).
- 1998 Senior Lecturer, Sloan School of Management, Massachusetts Institute of Technology
- 1993- Principal Research Scientist, Massachusetts Institute of Technology.
- 1989-93 Research Scientist, Sloan School of Management, Cambridge, MA.
- 1987 Member Technical Staff, Knowledge-Based Systems Department, GTE Laboratories.

**C. Selected Peer-reviewed Publications**

2011 Goldsmith, D., and Siegel, M. "Improving Health Care Management Through the Use of Dynamic Simulation Modeling and Health Information Systems." Proceedings of the 29th International Conference of the System Dynamics Society. Washington, DC, July 24 – 28, 2011

2010 Goldsmith, D., and Siegel, M. "Improving Strategic Management of Hospitals: Addressing Functional Interdependencies within Medical Care." *International Journal of Information Technologies and Systems Approach*, October 2010.

- 2010 Siegel, M., and Goldsmith, D. "Simulation Modeling for Cyber Resilience." *Proceedings of the MIT-Harvard Conference on Cyber International Relations: Emergent Realities of Conflict and Cooperation*.
- 2008 Hongwei Zhu, Stuart E. Madnick, Michael D. Siegel, Enabling global price comparison through semantic integration of web data, *International Journal on Electronic Business*, IJEB 6(4), 319-353. 2008
- 2008 Gannon, T, Siegel, M., Madnick, S., Sabbouth, M., Moulton, A., Zhu, H. "Framework for the Analysis of the Adaptability, Extensibility, and Scalability of Semantic Information Integration and the Context Mediation Approach," *Hawaii International Conference on System Sciences - 42*, Hawaii, 2008
- 2008 Masanori, A., Goldsmith, D., Siegel, M. "Improving Strategic Management of Hospitals: Addressing Functional Interdependencies within Medical Care," *American Medical Informatics Association Conference*, Washington, D.C., 2008
- 2008 Morrison, B., Goldsmith, D., Siegel, M. "Grappling with Dynamic Complexity in Military Planning: The System Dynamics Approach," *International System Dynamics Conference*, Athens, Greece, 2008
- 2007 Choucri, N., Goldsmith, D., Madnick, S., Morrison B., Siegel, M. "Using System Dynamics to Model and Better Understand State Stability," *System Dynamics Conference*, Cambridge, MA, 2007
- 2007 Masanori, A., Goldsmith, D., Siegel, M. "Improving Hospital Operations Using Bar-Code Capture Data and System Dynamics Modeling Techniques," *System Dynamics Conference*, Cambridge, MA, January 2007

**D. Research Support:** [PI] means Principal Investigator

- 2010-12: [PI] SAP, "Using Systems Modeling to Simulate the Evolution of the Industry Specific Application Development Business at SAP
- 2010-11: State Farm Insurance Company, "Identifying a Winning Information Aggregation Strategy"
- 2010-12: Office of Naval Research, "Explorations in Cyber International Relations" (large-scale collaboration among MIT Sloan School of Management, MIT Political Science, MIT Electrical Engineering & Computer Science, Harvard Law School, and Harvard Kennedy School of Government)

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**BIOGRAPHICAL SKETCH**

Provide the following information for the Senior/key personnel and other significant contributors

NAME Richard Y. Wang	POSITION TITLE: Director of MIT Information Quality Program (MITIQ) at the Socio Technical Systems Research Center, and Co-Director for the Total Data Quality Management (TDQM) Program at MIT Sloan School of Management.		
Institutional affiliation MIT			
INSTITUTION AND LOCATION	DEGREE	MM/YY	FIELD OF STUDY
National Taiwan University	BS	2/1975	Electrical Engineering
University of Wisconsin, Madison	MBA	6/1979	Business Statistics
Massachusetts Institute of Technology	PhD	6/1985	Information Technology

**A. Personal Statement**Key academic accomplishments and recognition:

Richard Y. Wang is a Director of MIT Information Quality (MITIQ) Program at the Socio Technical Systems Research Center, and Co-Director for the Total Data Quality Management (TDQM) Program at Sloan School of Management, MIT. Dr. Wang has served as a professor at MIT for a decade. He is a University Professor at University of Arkansas, Little Rock. Previously he also served as a professor at the University of Arizona, Boston University, and a Visiting Professor at the University of California, Berkeley. He has also served as Chief Data Quality Officer and Acting Data Officer for the US Army.

Dr. Wang has put the term *Information Quality* on the intellectual map with myriad journal and conference publications. His books on information quality include, *Chief Data Officer: Enterprise Data Solution for Business Challenges* (MIT Press, forthcoming), *Journey to Data Quality* (MIT Press, 2006), *Data Quality* (Kluwer Academic, 2001), and *Quality Information and Knowledge* (Prentice Hall, 1999).

At MITIQ Program, Dr. Wang has developed a well-received information quality curriculum to educate practitioners. His outreach programs such as the MITIQ consortium extend Information quality principles and theories to intelligence quality in homeland security, information architecture in both public and private sectors, and intelligent commerce. At TDQM Program, Dr. Wang co-heads the innovative Corporate Household research that investigates relationships of business units within the firm and across organizational boundaries such as those in supply chains.

He received the International Data Administration Management Association's (DAMA-L) Academic Award in 2005 for his leadership and academic contribution to the data quality and management area. He also received the Certificate of Appreciation from the US government, Director of National Intelligence, for his work on enterprise architecture and data quality in 2005.

He is a founder and chair of many conferences and workshops: International Conference on Information Quality (ICIQ), Workshop on Information Technology (WITS), the CDO and Information Quality Symposium (CDOIQ-IQIS). He is also the chair of senior advisory board of the *ACM Journal of Data and Information Quality* (ACM JDIQ).

International Collaborations:

Dr Wang has collaborated with many international institutions and colleagues for collaborative research, program development, and executive training. They include Xi'an Jiaotong University in China, Database Association in Korea, and many international data quality associations and institutions around the world, including in Germany, France, Brazil, Australia, New Zealand, and Japan.

Industry and Entrepreneurship experience:

Co-inventor of *Integrity Analyzer* (software) and *Information Quality Assessment* software, Cambridge Research Group in 1997.

Principal designer and programmer, *ExecuVision*, Visual communications Network Inc. and Prentice hall, Inc., in 1984.

Dr. Wang has extensive industry practice over 25 years. His advisory and consulting work includes the service to the US government agencies and many Fortune 500 companies.

**B. Positions and Honors**

2000-present Director, MIT Information Quality Program, MIT

2010-present University Professor, University of Arkansas, Little Rock

1990-present Co-Director, total Data quality Program, MIT

2008-2010 Chief Data Quality Officer, US Army

2009-2010 Acting Chief Data Officer, US Army

2002-2003 Visiting Professor, Hass School of Business, University of California, Berkeley

2000-2002 Fellow, Center for Information Technology and Market Transformation, University of California, Berkeley

1994-1996 Associate Professor of Information Technologies, MIT

1989-1994 Assistant Professor of Information Technologies, MIT

1987-1989 Visiting Assistant Professor, MIT

1984-1986 Assistant Professor, University of Arizona

1984-present Co-founder and Chairman, Cambridge Research Group

Selected Honors and Awards:

University Professor: University of Arkansas, Little Rock

Academic Award recipient: DAMA-L

Certificate of Appreciation: The US Government, Director of National Intelligence,

**C. Selected Peer-reviewed Publications**

Madnick, S., Wang, R., Lee, Y., and Zhu, H., "**Overview and Framework for Data and Information Quality Research**," *ACM Journal of Data and Information Quality*, Vol. 1, No. 1, Article 2, June 2009, pp. 2-22.

Lee, Y., Pipino, L., Funk, J., and Wang, R., *Journey to Data Quality*, MIT Press, 2006, Cambridge, MA.

Ballou, D., and Chengalur-Smith, S., and Wang, R., "**Sample-based Quality Estimation of Query Results in Relational Database Environment**," *IEEE Transactions on Knowledge and Data Engineering*, May 2006, Vol. 18, No. 5, pp. 639-650.

Lee, Y., Wang, R., Pipino, L., and Strong, D., "**Process-Embedded Data Integrity**," *Journal of Database Management*, Jan-march 2004, vol. 15, Issue 1, pp. 87-103

Wang, R., Lee, Y., Pipino, L., and Strong, D., "**Manage Your Information as a Product**," *Sloan management Review*, 1998, vol. 39, No 4, pp. 95-105.

Wang, Y., and Wang, R., "**Anchoring Data Quality Dimensions in Ontological Foundations**," *Communications of the ACM*, 1996, pp. 86-95.

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**BIOGRAPHICAL SKETCH**

Provide the following information for the Senior/key personnel and other significant contributors

NAME  Pavel A KLEMENKOV	POSITION TITLE Software engineer, News projects development team		
Institutional affiliation Rambler & Afisha United Company			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	MM/YY	FIELD OF STUDY
Lomonosov Moscow State University	MS	07/09	Computer Science

**A. Personal Statement**

Key academic accomplishments and recognition: Graduate thesis contest, 2<sup>nd</sup> award. Author of several papers.

International Collaborations: Researcher at Parallels Joint Educational and Scientific Center, software performance estimation in a virtualized environment based on atomic tests.

Industry and Entrepreneurship experience: As a software engineer at Vimpelcom Ltd. used NoSQL datastores to optimize rate of WAN user authentication and accounting. At Rambler & Afisha United Company was engaged in research and development of algorithms for news recommendations. Now working on new clustering algorithm for Rambler news project. Experienced in high-scalability web, big data, data mining of semistructured data, NoSQL.

**B. Positions and Honors**

2007 – 2010, Software engineer, CMC Department of Lomonosov Moscow State University, Moscow.

2009 – *present* Postgraduate student, CMC Department of Lomonosov Moscow State University, Moscow.

2010 – 2011 Software engineer, Vimpelcom Ltd., Moscow.

Principal Investigator or collaborator (Klemenkov, Pavel, Andreevich):

2011 – *present* Software engineer, Rambler & Afisha United Company, Moscow.

## C. Selected Peer-reviewed Publications

Pavel Klemenkov. **Software performance estimation in a virtualized environment based on atomic tests**. Proceedings of the Institute for System Programming of RAS, volume 21, 2011, pp. 133-140.

Pavel Klemenkov. **Building Real-Time Recommender Services with NoSQL**. Proceedings of the 14th All-Russian Scientific Conference "Digital libraries: Advanced Methods and Technologies, Digital Collections", 2012, pp. 281-287.

Contact information: Email: p.klemenkov@rambler-co.ru; Phone: +7-926-327-1224; Address: Rambler & Afisha United Company, Varshavskoe shosse, 9, bldg. 1, Moscow, 117105, Russian Fed.

**BIOGRAPHICAL SKETCH**

Provide the following information for the Senior/key personnel and other significant contributors

NAME Alexander V KOSHKAREV	POSITION TITLE Senior researcher of Laboratory for Geomorphology at Institute of Geography, Russian Academy of Sciences		
Institutional affiliation IG RAS			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	MM/YY	FIELD OF STUDY
Moscow State University	MS	06/1972	Cartography
Moscow State University	PhD	07/1977	Cartography
Pacific Institute of Geography, Far Eastern Science Center of the USSR Academy of Sciences (Vladivostok)	Senior Researcher	10/1985	Cartography

**A. Personal Statement**Key academic accomplishments and recognition:

Author or co-author of over 350 books, journal articles, or conference papers including 10 books (in Russian); list of recent publications and activities can be found at: <http://www.geomor.igras.ru/index.php?r=56&id=162>.  
 editor-in-chief (2009) of Journal «Prostranstvennye dannye» (Geospatial data), Member, Russian (former USSR) Geographical Society; Member, Russian GIS-Association; Member, Technical Committee 394 «Geographic information/Geomatics», Russian Federal Agency on Technical Regulating and Metrology.  
International Collaborations: Correspondent member, Commission on Theoretical Cartography, International Cartographic Association.

Industry and Entrepreneurship experience: no acted.

**B. Positions and Honors**

1976 – 1979: Researcher, Laboratory of Cartography, Pacific Institute of Geography, Far East Science Center of the USSR Academy of Sciences, Vladivostok.

1979 – 1986: Head of Laboratory of Cartography, Pacific Institute of Geography, Far East Science Center of the USSR Academy of Sciences, Vladivostok.

1987 – RF Government prize laureate in science and technology

1986 – present: Senior Researcher, Institute of Geography, Russian (former USSR) Academy of Sciences, Moscow.

**C. Selected Peer-reviewed Publications**

Koshkariov A.V., Tikunov V.S., Trofimov A.M. **The current state and the main trends in the development of geographical information systems in the U.S.S.R.** – International Journal of Geographical Information Systems, 1989, Vol 3, № 3. – P. 257-272.

Koshkariov A.V. **Cartography, geographic information and they interact.** – Mapping Sciences and Remote Sensing, 1990, Vol. 27, № 2. – P. 185-198.

Borunov A.K., Koshkarev A.V., Kandelaki V.V. **Geocological consequences of the Spitak earthquake (Armenia).** – Mountain Research and Development, 1991, Vol. 11, № 1. – P. 19-35.

Koshkaryov A.V., Zinchuk L. **An analysis of computer map-making and graphic design.** – International Journal of Special Libraries, 1993, Vol. 27, № 2. P. 87-97.

- Koshkariov A., Krasovskaja T., Tikunov V. **Towards resolving the problems of regional development of the Commonwealth of Independent States using geographic information systems.** – Mountain environments and geographic information systems. – London: Taylor and Francis, 1994. – P. 77-97
- Koshkarev A.V., Antipov A.N., Batuyev A. R., Yermoshin V. V., Karakin V.P. **Geo-portals as part of spatial data infrastructures: Russian Academy-supported resources and geoservices.** – Geography and Natural Resources, № 29 (2008). – P. 18–27.
- Koshkarev A.V., Tikunov V.S., Timonin V.S. **Geo-portal «Demography»: an approach and technologies.** – Geodesia i Kartografia (Geodesy and Cartography), 2010, № 1. – P. 24-31. (in Russian)
- Kapralov E.G., Koshkarev A.V., Tikunov V.S. et al. **Geo-informatics.** Third ed., Moscow: 2010, Academia Publisher House, Vol. 1 – 400 p.; Vol. 2 – 432 p. (in Russian)
- Koshkarev A.V., Ryakhovsky V.M., Serebryakov V.A. . **Infrastructure of Distributed Environment of Spatial Data Storage, Search and Processing.** – Otkrytoe obrazovanie (Open Education), 2010, № 5. – P.61-73. (in Russian)

**D. Research Support [PI]** means Principal Investigator

- 2009-2010: [PI] Russian Foundation for Basic Research, «Creation of environmental-geomorphological digital map model of the Moscow city»
- 2010-2011: [Investigator] Russian Foundation for Basic Research, «Distributed system for remote sensing data integration in the interest of Earth sciences»
- 2011-2012 [PI] Presidium of RAS, «Implementing of the computer network node for spatial data integration as a component of Academic spatial data infrastructure»

Contact information: Email: akoshkarev@yandex.ru; Phone: +7-(499)-238-03-60; Address: Institute of Geography, Staromonetny per., 29, 119017 Russia, Moscow



**BIOGRAPHICAL SKETCH**

Provide the following information for the Senior/key personnel and other significant contributors

NAME Dmitry E Namiot	POSITION TITLE: Senior Scientist, Open Information Technologies Lab, faculty of Computational Mathematics and Cybernetics, Lomonosov Moscow State University		
Institutional affiliation Lomonosov Moscow State University			
INSTITUTION AND LOCATION	DEGREE	MM/YY	FIELD OF STUDY
Moscow Aviation Institute	MS	02/1986	Applied Mathematics
Lomonosov Moscow State University	PhD	04/1990	Computer Science

**A. Personal Statement**

Key academic accomplishments and recognition: Author or co-author of over 60 journal articles and 4 books. Innovation Award at World Wide Java Cards Development contest (3GSM World), Best on Technology Award at World Wide Java Cards Development contest (3GSM World), several readers Choice Awards from computer magazines, several Java Developers challenges awards.

International Collaborations: participated in European research projects (together with Rigas Technical University and Ventspils University College - Latvia), prepared and provided educational programs for European telecom firms (Iskratel, Slovenia), reviewer for several international conferences (ICST, IARIA), invited key speaker (ICUMT).

Industry and Entrepreneurship experience: founder and maintainer for the biggest Java web components collection (Coldbeans); won several awards for mobile development on 3GSM World contests, as well as several Java Developers challenges awards; key designer and developer of projects such as Parlay and Parlay X implementation, web telecom mashups, data mining in social networks, geo data processing for mobile subscribers; data gathering and analysis for M2M systems; a consultant to major corporations, such as Sun, Sprint, and Bell Canada; co-founder of several high-tech firms, including AbavaNet (Open APIs for telecom applications), FundTech (big data processing for finance systems).

**B. Positions and Honors**

1986-1989	software engineer and senior software engineer, Scientific Radio Institute (Moscow, Russia)
1989-1999	lead software engineer, Computer Center of Lomonosov Moscow State University (Moscow, Russia)
1992-1993	senior software engineer (consulting contract), Auriga, Inc (USA)
1994-1995	senior software engineer (consulting contract), ACE (Holland)
1995-1999	lead systems architect, ZQ (USA)
1999-2000	systems architect (consulting contract), Sun Microsystems (USA)
2000-present	founder, technical director, Coldbeans (Moscow, Russia)
2003-2010	co-founder, technical director, AbavaNet (Moscow, Russia)
2001-present	senior scientist, Faculty of Computational Mathematics and Cybernetics of Lomonosov Moscow State University (Moscow, Russia)

**C. Selected Peer-reviewed Publications**

Author of 60+ publications (Russian, English). CV with publications can be found at: <http://servletsuite.com/cv>  
 Dmitry Namiot and Manfred Sneys-Sneppe, **"Customized Check-in Procedures"**, Smart Spaces and Next Generation Wired/Wireless Networking Lecture Notes in Computer Science, 2011, Volume 6869/2011, pp. 160-164

Dmitry Namiot, **"Geo Messages,"** *Ultra Modern Telecommunications and Control Systems and Workshops (ICUMT), International Congress on*, Moscow, 2010, pp. 14-19

Principal Investigator or collaborator (**Namiot, Dmitry Evgenievitch**):

- Dmitry Namiot and Manfred Schneps-Schneppe, “**About Location-aware Mobile Messages: Expert System Based on WiFi Spots**”, *Next Generation Mobile Applications, Services and Technologies (NGMAST), 5th International Conference on*, Cardiff, 2011, pp. 48-53.
- Dmitry Namiot and Manfred Sneys-Snepe, “**Advertising in Social Networks: Business-oriented Check-ins**”, *AFIN 2011, The Third International Conference on Advances in Future Internet*, Nice, France, 2011, pp. 20-24.
- Dmitry Namiot and Manfred Sneys-Snepe, “**A new approach to advertising in social networks - business-centric check-ins**”, *Intelligence in Next Generation Networks (ICIN), 2011 15th International Conference on*, Berlin, 2011, pp. 92 – 96.
- Dmitry Namiot and Manfred Sneys-Snepe, “**About expert system for Wi-Fi access points**”, *Proceedings of the 8th International Symposium on Location-Based Services*, Vienna, November 2011, pp.126-136
- Yousef Daradkeh, Dmitry Namiot, and Manfred Sneys-Snepe, “**Telecom Mashups: a Practical Example**”, *International Journal of Engineering Research and Applications (IJERA)*, Vol 2, Issue 2, 2011.
- Manfred Schneps-Schneppe and Dmitry Namiot “**Telco enabled social networking exemplified by GEO tagging**”, *Proceedings of Applied Information And Communication Technology conference*, Jelgava, Latvia, 2008, pp. 50-55
- Manfred Schneps-Schneppe and Dmitry Namiot, “**Telco Enabled Social Networking: Russian Experience**”, *Proceedings of the Baltic Conference. Advanced Topics in Telecommunication*, Tartu, Rostok, 2008, pp. 33-40
- Dmitry Namiot, “**Open Source products in the telephony applications**”, *Basic Topics of NGN*. pp. 60-72  
Iskratel, Kranj, 2005

**D. Research Support:** [PI] means Principal Investigator

2004-2005: [PI] Ericsson, “Parlay implementations”

2005-2006: Senior researcher, RFFI “Monitoring for biological objects”

2006-2007: [PI] Iskratel, “Open APIs for telecom systems”

2008-2010: Senior researcher, Ventspils University College, “Data processing in M2M systems”

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**BIOGRAPHICAL SKETCH**

Provide the following information for the Senior/key personnel and other significant contributors

NAME Nikolay A SKVORTSOV	POSITION TITLE Researcher of the Laboratory for Compositional Information System Development at IPI RAN		
Institutional affiliation IPI RAN			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	MM/YY	FIELD OF STUDY
Moscow Power Engineering Institute	MS	2/1997	Computers, Systems and Networks

**A. Personal Statement**

Key academic accomplishments and recognition: Author or co-author of over 30 journal articles, or conference papers; list of publications can be found at: <http://synthesis.ipi.ac.ru/synthesis/staff/nskv>.

International Collaborations: Participated in INTAS international research project.

Industry and Entrepreneurship experience: Participated in projects for Siemens Corp. Consulting BroadVision Inc.

**B. Positions and Honors**

1997 – 2000 Junior Researcher, Institute of Informatics Problems of RAS, Moscow

2000 – *present* Researcher, Institute of Informatics Problems of RAS, Moscow

2001 – 2005 Consultant, Auriga Software Development Center

**C. Selected Peer-reviewed Publications**

- Kalinichenko L.A., Skvortsov N.A., Briukhov D.O., Kravchenko D.V., Chaban I.A. **Designing Personalized Digital Libraries over Web-sites with Semistructured Data.** Programming and Computer Software. -- Moscow: MAIK Nauka / Interperiodica, 2000. -- V. 26, N. 3. -- P. 123-133.
- Briukhov D.O., Kalinichenko L.A., Skvortsov N.A. **Personalization through Specification Refinement and Composition.** Personalisation and Recommender Systems in Digital Libraries: Proc. of the Second DELOS Network of Excellence Workshop. -- ERCIM Workshop Proceedings, 2001. -- No. 01/W03.
- Briukhov D.O., Kalinichenko L.A., Skvortsov N.A. **Information sources registration at a subject mediator as compositional development.** -- Advances in Databases and Information Systems: Proc. of the 5th East European Conference. LNCS 2151. -- Berlin-Heidelberg: Springer-Verlag, 2001. -- P. 70--83.
- Kalinichenko L.A., Briukhov D.O., Tyurin I.N., Skvortsov N.A. **Intermediator framework protocol for information sources registration at heterogeneous mediators.** Interoperability and Mediation in Heterogeneous Digital Libraries: Proc. of the Third DELOS Network of Excellence Workshop. -- Sophia-Antipolis Cedex: ERCIM EEIG, 2001. -- P. 61--68.
- Briukhov D.O., Kalinichenko L.A., Skvortsov N.A., Stupnikov S.A. **Value Reconciliation in Mediators of Heterogeneous Information Collections Applying Well-Structured Context Specifications.** Databases and Information Systems II: Proc. of the Fifth International Baltic Conference on Databases and Information Systems BalticDB&IS'2002. -- Dordrecht: Kluwer Academic Publishers, 2002. -- P. 15--28.
- Kalinichenko L.A., Briukhov D.O., Martynov D.O., Skvortsov N.A., Stupnikov S.A. **Mediation Framework for Enterprise Information System Infrastructures.** Proc. of the 9th International Conference on Enterprise Information Systems ICEIS 2007. -- Funchal, 2007. -- Volume Databases and Information Systems Integration. -- P. 246--251.

- Briukhov D.O., Vovchenko A. E., Zakharov V.N., Zhelenkova O. P., Kalinichenko L.A., Martynov D.O., Skvortsov N.A., Stupnikov S.A. The **Middleware Architecture of the Subject Mediators for Problem Solving over a Set of Integrated Heterogeneous Distributed Information Resources in the Hybrid Grid-Infrastructure of Virtual Observatories**. Informatics and Applications. -- 2008. -- V. 2, Issue 1. -- P. 2--34.
- Skvortsov N.A. **Specificity of Ontology Mapping Approaches**. Artificial Intelligence Issues. SCMAI Transactions, N. 2. -- Moscow, 2010, -- P. 183-195.
- Briukhov D., Kalinichenko L., Martynov D., Skvortsov N., Stupnikov S., Vovchenko A., Zakharov V., Zhelenkova O. **Application driven mediation middleware of the Russian virtual observatory for scientific problem solving over multiple heterogeneous distributed information resources**. Scientific Information for Society – from Today to the Future: Proc. of the 21st CODATA Conference. ISBN 966-8993-86-0. - 2009. - P. 80-85.
- N. A. Skvortsov, S. A. Stupnikov, L. A. Kalinichenko. **Usage of taxonomies of instantiation relations in subject domain specifications**. Proceedings of Voronezh State University. System Analysis and Information Technologies -- No. 1. – 2012.
- Vovchenko A. E., Zakharov V. N., Kalinichenko L. A., Kovalyov D. Yu., Ryabukhin O. V., Skvortsov N. A., Stupnikov S. A. **Multilayer Specifications in Conceptual and Ontological Modeling**. Proc. of the 13th Russian Conference on Digital Libraries RCDL'2011. -- CEUR Workshop Proceedings, 2011. – Vol. 803. – P. 17-25.

#### **D. Research Support [PI] means Principal Investigator**

2008-2010: [Investigator] Russian Foundation for Basic Research, “Methods and tools for semantic identification of specifications of heterogeneous information resources relevant to a scientific problem and their integration in the specifications of the problem at the scientific information systems”

2009-2012: [Investigator] Presidium of RAS, “Subject mediator middleware providing for problem solving over a set of heterogeneous distributed information resources”

2010-2012: [Investigator] Russian Foundation for Basic Research, “Definition of scientific subject domains conceptual models and problem solving support based on subject mediators in the hybrid grid-infrastructure”

2011-2013: [Investigator] Russian Foundation for Basic Research, “Integration of rule-based declarative programs and knowledge, databases and services for scientific problems solving over heterogeneous distributed information resources”

Contact information: Email: nskv@mail.ru; Phone: +7-499-129-1843; Address: IPI RAN, 44 bldg. 2 Vavilova st., Moscow, 119333, Russian Fed.

**BIOGRAPHICAL SKETCH**

Provide the following information for the Senior/key personnel and other significant contributors

NAME Sergey STUPNIKOV	POSITION TITLE Senior Scientist, Institute of Informatics Problems, Russian Academy of Sciences & Junior Scientist, Department of Computational Mathematics and Cybernetics, Moscow State University		
Institutional affiliation IPI RAN			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	MM/YY	FIELD OF STUDY
Moscow State University	MS	6/2000	Mathematics and Applied Mathematics
Institute of Informatics Problems, Russian Academy of Sciences	PhD	2/2006	Computer Science

**A. Personal Statement**

Research areas: Information models and specification languages: object, ontological, process and workflow models; integration and transformations of heterogeneous information models; formal semantics of object and process models; compositional development of information systems.

Author or co-author of 40 publications in international and national journals and conference proceedings. PC co-chair of RCDL 2011, PC member of I-ESA 2012, BCI 2012, RCDL 2012, RCDL 2010, RCDL 2009, SYRCoDIS 2009, ADBIS 2008.

**B. Positions and Honors**

2000-present Junior Scientist, Scientist (2003), Senior Scientist (2006), Institute of Informatics Problems, Russian Academy of Sciences

2009-present Lecturer (Object Databases) at the Department of Computational Mathematics and Cybernetics, Moscow State University

2010-present Junior Scientist at the Department of Computational Mathematics and Cybernetics, Moscow State University

**C. Selected Peer-reviewed Publications**

Complete list of 40 publications can be found at <http://synthesis.ipi.ac.ru/synthesis/staff/ssa>

Brukhov D.O., Kalinichenko L.A., Skvortsov N.A., Stupnikov S.A. **Value Reconciliation in Mediators of Heterogeneous Information Collections Applying Well-Structured Context Specifications.** Databases and Information Systems II: Proc. of the Fifth International Baltic Conference on Databases and Information Systems BalticDB&IS'2002. -- Dordrecht: Kluwer Academic Publishers, 2002. -- P. 15--28.

Stupnikov S.A., Kalinichenko L.A., Jin Song DONG **Applying CSP-like Workflow Process Specifications for their Refinement in AMN by Pre-existing Workflows.** Advances in Databases and Information Systems: Proc. of the Sixth East-European Conference. Vol. 2: Research Communications. -- Bratislava: Slovak University of Technology, 2002. -- P. 206-215.

Kalinichenko L.A., Martynov D.O., Stupnikov S.A. **Query rewriting using views in a typed mediator environment.** Advances in Databases and Information Systems: Proc. of the 8th East European Conference. LNCS 3255. -- Berlin-Heidelberg: Springer-Verlag, 2004. -- P. 37-53.

- Kalinichenko L.A., Stupnikov S.A., Zemtsov N.A. **Extensible Canonical Process Model Synthesis Applying Formal Interpretation**. Advances in Databases and Information Systems: Proc. of the 9th East European Conference. LNCS 3631. -- Berlin-Heidelberg: Springer-Verlag, 2005. -- P. 183--198.
- Stupnikov S.A., Kalinichenko L.A., Bressan S. **Interactive discovery and composition of complex Web services**. Advances in Databases and Information Systems: Proc. of the 10th East European Conference. LNCS 4152. -- Berlin-Heidelberg: Springer-Verlag, 2006. -- P. 216--231.
- Kalinichenko L.A., Briukhov D.O., Martynov D.O., Skvortsov N.A., Stupnikov S.A. **Mediation Framework for Enterprise Information System Infrastructures**. Proc. of the 9th International Conference on Enterprise Information Systems ICEIS 2007. -- Funchal, 2007. -- Volume Databases and Information Systems Integration. -- P. 246--251.
- Stupnikov S.A., Kalinichenko L.A., **Methods for Semi-automatic Construction of Information Models Transformations**. Proc. of the 13th East-European Conference Advances in Databases and Information Systems, workshop Model – Driven Architecture: Foundations, Practices and Implications (MDA). - Riga: Riga Technical University, 2009. – P. 432-440
- Kalinichenko L.A., Stupnikov S.A. **Heterogeneous information model unification as a pre-requisite to resource schema mapping**. A. D'Atri and D. Sacca (eds.), Information Systems: People, Organizations, Institutions, and Technologies (Proc. of the V Conference of the Italian Chapter of Association for Information Systems itAIS). -- Berlin-Heidelberg: Springer Physica Verlag, 2010. -- P. 373-380.
- Vovchenko A. E., Zakharov V. N., Kalinichenko L. A., Kovalyov D. Yu., Ryabukhin O. V., Skvortsov N. A., Stupnikov S. A. **Multilayer Specifications in Conceptual and Ontological Modeling**. Proc. of the 13th Russian Conference on Digital Libraries RCDL'2011. -- CEUR Workshop Proceedings, 2011. – Vol. 803. – P. 17-25
- Kalinichenko L. A., Stupnikov S. A. **OWL as Yet Another Data Model to be Integrated. Advances in Databases and Information Systems**. Proc. II of the 15th East-European Conference. - Vienna: Austrian Computer Society, 2011. - P. 178-189.

#### D. Research Support

2009-2012: [Senior Researcher] Presidium of RAS, “Methods and tools for a subject mediator middleware providing for problem solving over set of heterogeneous distributed information resources”

2011-2013: [Senior Researcher] Russian Foundation for Basic Research, “Integration of rule-based declarative programs and knowledge, databases and services for scientific problems solving over heterogeneous distributed information resources”

2010-2012: [Researcher] Russian Foundation for Basic Research, “Development of methods and tools for definition of scientific subject domains conceptual models and problems solving support based on subject mediators in the hybrid grid-infrastructure”

2010-2012: [Researcher] Russian Foundation for Basic Research, “Developing of Grid-Infrastructure and Programming Environments for Resource-intensive Computational and Data Processing Problem Solving”

2011-2013: [Senior Researcher] IPI RAN, “Development of methods and tools for specification, architecture and support of subject mediator environment”.

The projects are aimed at investigating methods, languages and architectures for heterogeneous information resources interoperability and integration through mediation, specific infrastructures based on the mediation concepts for virtual observatories supporting problem solving over a set of distributed information resources, integration of rule-based declarative programs and knowledge, databases and services.

Contact information: Email: ssa@ipi.ac.ru; Phone: +7-499-129-1843; Address: 44 bldg. 2 Vavilova st., Moscow, 119333, Russia

**BIOGRAPHICAL SKETCH**

Provide the following information for the Senior/key personnel and other significant contributors

NAME Pavel E VELIKHOV	POSITION TITLE Research Scientist, NIISI RAS		
Institutional affiliation NIISI RAS			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	MM/YY	FIELD OF STUDY
University of California at San Diego	B.Sc.	06/1998	Computer Science
University of California at San Diego	M.Sc.	03/2000	Computer Science

**NOTE: The Biographical Sketch may not exceed two pages for each investigator. The number of bios should be limited to five investigators. Follow the formats and instructions below.**

**A. Personal Statement**

Key academic accomplishments: Co-authored the first Russian VLDB paper since 1978. Has authored 15 papers in Russian and international conferences and journals and 1 Russian patent.

Research collaboration: Headed the collaboration between HP Labs and ISP RAS in 2007-2008.

Industry and Entrepreneurship experience: Started Enosys Software with my advisor, a company in San Diego founded on the basis of my master's research. Served as a Lead Software Engineer, managing a group of 4 software developers. Maintained architecture documents and participated in sales presentations and pilot projects with customers, including Cisco Systems. Advised W3C committee body on XQuery standard. The company was successfully sold to BEA Systems in 2003.

Worked on NLP and Text mining technology based on Semantic Relatedness metric over Wikipedia link graph. Instead of bags of keywords, that most text processing systems operate on, we have proposed a new document model, where the document consists of terms from Wikipedia in a semantic similarity space. Under my supervision we have conducted research on semantic similarity measures and developed algorithm for efficient ranking of terms with respect to a similarity measure. We have developed a word sense disambiguation algorithm that was based on similarity between the context of a term and different word senses, and has a rate of success of more than 80%. Under my supervision we have developed Texterra system, that disambiguated text documents and classified documents without machine learning techniques, that require training sets to operate. The technology we developed became the main component of TweetedTimes, a start-up company that was sold to Yandex in 2011.

Authored a patent "Accuracy estimate and optimization techniques for SimRank computation"

**B. Positions and Honors**

1998-99 Research Assistant, UCSD Database Laboratory, La Jolla, CA

1999-03 Lead Software Engineer, Enosys Software, San Diego, CA

2003-04 Software Architect, San Diego Supercomputer Center, La Jolla, CA

2004-06 Research Scientist, Program Systems Institute, Pereslavl, Russia

2006-08 Research Scientist, Institute of Systems Programming, Moscow, Russia

2008-present Research Scientist, Research Institute for Systems Studies (NIISI RAS), Moscow, Russia

2010-present, CEO, Scienfitic Database Management Company, Moscow, Russia

### C. Selected Peer-reviewed Publications

- Bertram Ludäscher, Yannis Papakonstantinou, Pavel Velikhov: **A Framework for Navigation-Driven Lazy Mediators**. *SIGMOD WebDB Workshop* 1999
- C. Baru, A. Gupta, B. Ludasher, M. Marciano, Y. Papakonstantinou, P. Velikhov, V. Chu, **XML-Based Information Mediation with MIX**, *SIGMOD* 1999
- Y. Papakonstantinou, P. Velikhov, Enchancing Semistructured **Data Mediators with Document Type Definitions**, *ICDE* 1999
- B. Ludasher, Y. Papakonstantinou, P. Velikhov, **Navigation-Driven Evaluation of Virtual Mediated Views**, *EDBT* 2000
- Y. Papakonstantinou, V. Borkar, M. Orgiyan, K. Stathatos, L. Suta, V. Vassalos, P. Velikhov, **Queries and Algebra in the Enosys Integration Platform**, *DKE* 2003
- D. Turakov, P. Velikhov, **Semantic Relatedness Metric for Wikipedia Concepts Based on Link Analysis and its Application to Word Sense Disambiguation**, *SYRCoDIS* 2008
- D. Lizorkin, P. Velikhov, M. Grinev, D. Turdakov, **Accuracy Estimate and Optimization Techniques for SimRank computation**, *VLDB* 2008
- Pavel Velikhov, **Similarity measures for Wikipedia articles and their application to text analysis systems**, *Information Technologies and Computer Systems*, 2009
- Philippe Cudré-Mauroux, Hideaki Kimura, Kian-Tat Lim, Jennie Rogers, Roman Simakov, Emad Soroush, Pavel Velikhov, Daniel Wang, Magdalena Balazinska, Jacek Becla, David J. DeWitt, Bobbi Heath, David Maier, Samuel Madden, Jignesh M. Patel, Michael Stonebraker, Stanley B. Zdonik: **A Demonstration of SciDB: A Science-Oriented DBMS**. *VLDB* 2009
- Ilya Taranov, Ivan Shcheklein, Alezander Kalinin, Leonid Novak, Sergei D. Kuznetsov, Roman Pastukhov, Alexander Boldakov, Denis Turdakov, Konstantin Antipin, Andrey Fomichev, Peter Pleshachkov, Pavel Velikhov, Nikolai Zavaritski, Maxim Griven, Maria P. Grineva, Dmitry Lizorkin: **Sedna: native XML database management system (internals overview)**. *SIGMOD* 2010 1037-1046

### D. Research Support

2012-2014: [co-PI] "Near Real-Time Big Data Platform for Financial Analytics", Sberbank

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**BIOGRAPHICAL SKETCH**

Provide the following information for the Senior/key personnel and other significant contributors

NAME Alexey E Vovchenko	POSITION TITLE Junior Scientist, Institute of Informatics Problems, Russian Academy of Sciences		
Institutional affiliation IPI RAN			
INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Moscow State University	MS	6/2007	Applied Mathematics and Computer Science
Institute of Informatics Problems	PhD	3/2012	Applied Mathematics and Computer Science

**A. Personal Statement**

Research areas: Databases, heterogeneous information resources integration, subject mediation languages and infrastructures, semantic information grids, problem solving in the mediation environment.

Developer of methods and tools for problem solving in Russian Virtual Observatory which is a part of International Virtual Observatory Alliance (IVOA).

Author or co-author of 19 publications in international and national journals and conference proceedings.

**B. Positions and Honors**

2006-present Institute of Informatics Problems (IPI RAN)

**C. Selected Peer-reviewed Publications**

- Vovchenko A. E., **"Binding of Programming Languages with Subject Mediators for Scientific Problems Solving"**, Advances in Databases and Information Systems: Proc. II of the 15th East-European Conference. - Vienna: Austrian Computer Society, 2011. - P. 272-279.
- Vovchenko A. E. **"Dispersed organization of problem solving algorithm over heterogeneous distributed resources"**, Proc. of Voronezh State University, Series: Systems Analysis and information Technologies. - № 2. - Voronezh: Voronezh State University, 2011, p.117-122 (In Russian)
- Vovchenko A. E., Zakharov V. N., Kalinichenko L. A., Kovalyov D. Yu., Ryabukhin O. V., Skvortsov N. A., Stupnikov S. A. **"Multilayer Specifications in Conceptual and Ontological Modeling"**, Proc. of the 13th Russian Conference on Digital Libraries RCDL'2011. -- CEUR Workshop Proceedings, 2011. -- Vol. 803. -- P. 17-25. (In Russian)
- Vovchenko A.E., Kalinichenko L.A., Kostukov M.U. **"Methods and tools for subject mediators access to the streaming data"**, Proc. of the 12th Russian Conference on Digital Libraries RCDL'2010. -- Kazan: Kazan Federal University, 2010. -- P. 273-278. (In Russian)
- Vovchenko A.E., Kalinichenko L.A., Stupnikov S.A. **"Mediation Based Semantic Grid"**, Distributed Computing and Grid-Technologies in Science and Education: Proceedings of the 4th International Conference. -- Dubna: JINR, 2010. -- P. 309-318. (In Russian)
- Vovchenko A. E., Zakharov V. N., Kalinichenko L. A., Kovalyov D. Yu., Ryabukhin O. V., Skvortsov N. A., Stupnikov S. A. **"From specifications of requirements to conceptual schema"**, Proc. of the 12th Russian Conference on Digital Libraries RCDL'2010. -- Kazan: Kazan Federal University, 2010. -- P. 375--381. (In Russian)
- Briukhov D., Kalinichenko L., Martynov D., Skvortsov N., Stupnikov S., Vovchenko A., Zakharov V., Zhelenkova O., **"Application driven mediation middleware of the Russian virtual observatory for scientific problem solving over multiple heterogeneous distributed information resources"**,

Scientific Information for Society – from Today to the Future: Proc. of the 21st CODATA Conference. -- 2009. -- P. 80-85.

Vovchenko A.E., Krupa A.V. **“Query planning over heterogeneous distributed information resources in the architecture of the subject mediators”**, Proc. of the 11th Russian Conference on Digital Libraries RCDL'2009. -- Petrozavodsk, 2009. -- P. 335-342. (In Russian)

Briukhov D.O., Vovchenko A. E., Zakharov V.N., Zhelenkova O. P., Kalinichenko L.A., Martynov D.O., Skvortsov N.A., Stupnikov S.A. **“The Middleware Architecture of the Subject Mediators for Problem Solving over a Set of Integrated Heterogeneous Distributed Information Resources in the Hybrid Grid-Infrastructure of Virtual Observatories”**, Informatics and Applications. -- 2008. -- V. 2, Issue 1. -- P. 2--34. (In Russian)

Kalinichenko L.A., Stupnikov S.A., Vovchenko A.E., Zakharov V.N., Zhelenkova O.P., **“Russian Virtual Observatory Community Centre for Scientific Problems Solving over Multiple Distributed Information Sources”**, Proc. of the Eighth Russian Conference on Digital Libraries RCDL'2006, Suzdal. -- Yaroslavl: P. G. Demidov Yaroslavl State University, 2006. -- P. 120—129.

#### D. Research Support

2009-2012: [Researcher] Presidium of RAS, “Methods and tools for a subject mediator middleware providing for problem solving over set of heterogeneous distributed information resources”

2011-2013: [Researcher] Russian Foundation for Basic Research, “Integration of rule-based declarative programs and knowledge, databases and services for scientific problems solving over heterogeneous distributed information resources”

2010-2012: [Researcher] Russian Foundation for Basic Research, “Development of methods and tools for definition of scientific subject domains conceptual models and problems solving support based on subject mediators in the hybrid grid-infrastructure”

2010-2012: [Researcher] Russian Foundation for Basic Research, “Developing of Grid-Infrastructure and Programming Environments for Resource-intensive Computational and Data Processing Problem Solving”

2011-2013: [Senior Researcher] IPI RAN, “Development of methods and tools for specification, architecture and support of subject mediator environment”.

The projects are aimed at investigating methods, languages and architectures for heterogeneous information resources interoperability and integration through mediation, specific infrastructures based on the mediation concepts for virtual observatories supporting problem solving over a set of distributed information resources, integration of rule-based declarative programs and knowledge, databases and services.

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**BIOGRAPHICAL SKETCH**

Provide the following information for the Senior/key personnel and other significant contributors

NAME Victor N Zakharov	POSITION TITLE: Scientific Secretary & Deputy Director		
Institutional affiliation Institute of Informatics Problems RAS (IPI RAN)			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	MM/YY	FIELD OF STUDY
Lomonosov Moscow State University, Faculty of Mechanics and Mathematics	MS	6/1971	Mathematics
Lomonosov Moscow State University (MSU), postgraduate	MS	10/1974	Cybernetics
Institute of Control Computers, Moscow	PhD	4/1979	Computer Science
Moscow Political University	MBA	5/1985	Philosophy
Institute of Control Computers, Moscow	Dr. Sci.	4/2011	Computer Science
Technical University MIREA, Moscow	Associate professor	10/1997	Computer Science

**A. Personal Statement**

Key academic accomplishments and recognition: Served as Scientific Secretary & Deputy Director of IPIRAN for more than twenty eight years, during which participated in great number of different type research programs both within Academy of Sciences and the State. Headed 5 scientific projects in Russian Foundation for Basic Research. Co-headed the IPIRAN research projects in the areas of Fault Tolerance of Application Servers, Concurrent Implementation of Applications in Distributed Environment and Concurrent design and verification of digital hardware; served as Principal Investigator of research projects in the area of Digital Libraries and Middleware architecture of Information Systems. Authored or co-authored of over 140 journal articles or reports. Member of Editorial Board of journals "Systems and Means of Informatics" and "Informatics and Applications". Member of the Steering committee of RCDL conference (Digital Libraries: Advanced Methods and Technologies, Digital Collections" – since 1999).

International Collaborations: Participated in the international collaborations between IPI RAN and foreign companies: USA – Market Metrics, DEC, Compaq, Hewlett Packard, Motorola, Microchip; Germany – Siemens, Israel – Ben-Gurion University.

Industry and Entrepreneurship experience: Co-inventor on 4 patents. Participated in implementation of system software for mainframes, teaching and support of systems in former COMECON countries. Participated in a number of Russian state-level projects related to development of wide-area information and control systems.

**B. Positions and Honors**

1972-74 Junior Scientist, MSU Chemical Faculty Laboratory

1974-83 Junior Scientist, Senior Scientist Institute of Control Computers, Moscow

1984-present Scientific Secretary & Deputy Director Institute of Informatics Problems of the Russian Academy of Sciences

1991-2000 Associate Professor, Moscow Institute of Radio Engineering, Electronics and Automation (Technical University MIREA)

1999 State award "Medal of the order "For the services before Fatherland of the 2-nd degree"" for the scientific activity

2011-present Member of Scientific Board at RAS Natural Sciences Library

### C. Selected Peer-reviewed Publications

- Zakharov V. N., Briukhov D. O., Kalinichenko L. A., Panchuk V. E., Vitkovsky V. V., Zhelenkova O. P., Dluzhnevskaya O. B., Malkov O. Yu., Kovaleva D. A. **Information Infrastructure of the Russian Virtual Observatory (RVO)**. First edition. Second edition. // M.: IPI RAN, 2005, 173 p.
- Zakharov V., Briukhov D., Kalinichenko L., Martynov D., Skvortsov N., Stupnikov S., Vovchenko A., Zhelenkova O. **Application driven mediation middleware of the Russian virtual observatory for scientific problem solving over multiple heterogeneous distributed information resources** // Scientific Information for Society – from Today to the Future: Proc. of the 21st CODATA Conference. ISBN 966-8993-86-0. - 2009. - p. 80-85.
- Kalinichenko L., Sokolov I., Stupnikov S., Zakharov V. **Development of Canonical Information Models for Integrated Information Systems** (in Russian) // Informatics and Applications, vol. 1, issue 2, p. 15-38.
- Zakharov V., Dyachkov V., Kozmidiadi V., Kuzmin A., Popov A., Shulyatnikov D. **Service applications for working with hierarchical data within distributed system** // The Systems and Means of Informatics. Issue 18, Moscow.: Science, 2008, p. 20-35.
- Zakharov V. **Applications Non-deterministic Behavior and Fault Tolerance** // The XXVI International Seminar on Stability Problems for Stochastic Models. Transactions. Nahariya, Israel, October 22-26, 2007. Ort Braude College, Karmiel, Israel, 2007, p. 197-200.
- Zakharov Victor. **A Model for Application Server Designed to Maintain its Fail Robustness** (in Russian) // OP&PM Surveys on Applied and Industrial Mathematics, vol. 15, issue. 6, 2008, p. 974-987.
- Zakharov Victor, Stepchenkov Yuri, Diachenko Yuri, Rogdestvenski Yuri, Morozov Nikolai and Stepchenkov Dmitri. **Quasi-Delay-Insensitive Computing Device: Methodological Aspects and Practical Implementation** // J. Monteiro and R. van Leuken (Eds.): PATMOS 2009, LNCS 5953, p. 276–285, 2010. Springer-Verlag Berlin Heidelberg 2010.
- Zakharov V., Levner E., Alcalde D., Vishnevsky V., Frenkel S. **Real-Time Scheduling Algorithms for Fault Diagnostics of Computer Communication networks** // Real-Time Middleware Seminar 2007, IBM Haifa Labs, April 15, 2007, Haifa, Israel, <http://www.haifa.ibm.com/Workshops/rt2007/agenda.html>
- Zakharov V., Alcaide D., Levner E., Levin I., Frenkel S. **On-line search algorithms for fault diagnostics in large-scale computer communication networks** // Actas del XXIX Congreso Nacional de Estadística e Investigación Operativa y de las III Jornadas de Estadística Pública, Tenerife, Spain, 15-19 May 2006, pp. 557-558.
- Zakharov V., Frenkel S., Levner E. **Characterization of Probabilistic Faults Diagnostic Models** // 4th IEEE International Conference on Information Technology: Research and Education (ITRE 2006), Tel-Aviv, Israel, October 17-18, 2006, p. 156-160.

### D. Research Support [PI] means Principal Investigator

- 2010-2012: [PI] Russian Foundation for Basic Research (RFBR) “Development of methods and tools for definition of scientific subject domains conceptual models and problems solving support based on subject mediators in the hybrid grid-infrastructure”
- 2010-2012: [PI] IPI RAN “Investigation and development of algorithmic models for integration of different verification approaches in computer systems design”
- 2011-2013: [PI] RFBR “Development of asymptotic methods of probability theory and mathematical statistics as a base for the construction of mixture probability models and methods of the analysis of large data sets with application to the problems of the determination of the stochastic structure of complex systems”
- 2011-2013: [PI] joint grant RFBR-Israel “Nanotechnology Based Optical Computing”

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