

BIOGRAPHICAL SKETCH

NAME	POSITION TITLE
Mor Peleg	Assoc. Prof., University of Haifa

EDUCATION

INSTITUTION AND LOCATION	DEGREE	YEARS	FIELD OF STUDY
Technion - Israel Institute of Technology	B.Sc.	1988-1991	Biology
Technion - Israel Institute of Technology	M.Sc.	1991-1994	Molecular Biology
Technion - Israel Institute of Technology	Ph.D.	1994-1999	Information Systems Eng.
Stanford Medical Informatics, Stanford Uni.	Post-doc	1999-2003	Biomedical Informatics

A. PERSONAL STATEMENT

The goal of our proposed research is develop, assimilate, and evaluate an IT-based mobile decision-support system (DSS) that uses behavioral economics principles for improving compliance to healthy lifestyle principals and obesity prevention clinical guidelines in pre-teens. I have the motivation, experience and management skills in order to successfully carry out the research. After completing a BSc and MSc in (molecular) biology, and a PhD in information systems engineering, all at the Technion, I completed a 4-year post doc in biomedical informatics at Stanford University, specializing in clinical-guideline based decision-support systems (DSS). I received the New Investigator Award from the American Medical Informatics Association in 2005 for my contribution to the development of the GLIF3 clinical guideline modeling language. In 2013 I was elected International Fellow of the American College of Medical Informatics in recognition of my development of novel methods as well as implementation in clinical settings of guideline-based DSSs, including the domains of diabetes and thyroid disease. In 2011-15 I have led the MobiGuide European project (www.mobiguide-project.eu) in which over 60 researchers, clinicians and information systems engineers from 13 partner organizations of 5 countries created a patient-centric DSS, distributed between web-based and mobile system that includes wearable sensors and a Smartphone to monitor and communicate with patients and care providers. We have evaluated the MobiGuide system with patients and care providers in the domain of gestational diabetes in a hospital in Spain and in the domain of atrial fibrillation in a hospital in Italy. I also participated in the NIH-funded Conte Center for Computational Neuropsychiatric Genomics, developing an ontology for inferring DSM-related autism phenotypes. Each of my research projects have led to publications, with recent papers about MobiGuide submitted during the past month. I have a total of 149 publications with 3777 citations and an H-index of 31. I am an Assoc. Prof. of Information Systems at the University of Haifa, Israel and was Dept. head during 2009-12. I am Associate Editor of Journal of Biomedical Informatics and am on the editorial board of Methods of Information in Medicine. I'm currently on Sabbatical at Stanford University BioMedical Informatics Research (BMIR) till July 2017.

B. POSITIONS AND HONORS:

Positions and Employment

9/86–9/88	Courseware developer and programmer in the Intelligence Force, Israel Defense Force
10/92–2/94	Teaching Assistant, Faculty of Biology, Technion - Israel Institute of Technology
3/95–2/99	Teaching Assistant, Faculty of Industrial Engineering and Management, Technion, Israel
3/98–6/99	Course Lecturer, Faculty of Industrial Engineering and Management, Technion, Israel
9/99–8/03	Post-doctoral student, Stanford Medical Informatics, Stanford University
10/03 –4/11	Senior Lecturer at the department of Information Systems, University of Haifa, Israel.
7/04-8/04	Visiting Assistant Professor, Columbia University, NY
8/07-8/09	Visiting Assistant Professor, Biomedical Informatics Research (BMIR), Stanford Uni.
5/11-ongoing	Assoc. Prof. at the department of Information Systems, University of Haifa, Israel.
10/10-9/12	Head, Dept. Information systems

Honors

2014-16	Appeared on "Meet the Expert" series of the American Medical Informatics Association
2013	Elected International Fellow of the American College of Medical Informatics.
2007	Excellent Research Award from the Israeli Association for Medical Informatics

- 2005 Awarded the New Investigator Award by the American Medical Informatics Association.
- 1999 Received a post-doctoral Fellowship from the Pearl Found, Israel's Ministry of Justice.
- 1998 Received a prize for excellent doctoral students from the Wolf Foundation.
- 1996 Awarded excellent persistent teacher assistant, Technion-Israel Institute of Technology.
- 1995 Awarded excellent persistent teacher assistant, Technion-Israel Institute of Technology.
- 1995 First place in the Dashed Line Detection Contest, sponsored by the International Association for Pattern Recognition. Obtained 100% recognition rate.
- 1990-1 Outstanding Honors, Department of Biology, Technion-Israel Institute of echnology.
- 1990 Excellent Student Award, awarded by the Knesset - Israeli Parliament.

C. SELECTED PEER-REVIEWED PUBLICATIONS (IN CHRONOLOGICAL ORDER).

1. **Peleg, M**, Kopel, V, Borowiec, JA and Manor, H. Formation of DNA Triple Helices Inhibits DNA Unwinding by the SV40 Large T-Antigen Helicase. Nucleic Acids Research, 1995; 23(8):1292-9.
2. **Peleg, M** and Dori, D. The Model Multiplicity Problem: Experimenting with Real-Time Specification Methods”, IEEE T Soft Eng, 2000; 26(8): 742-59.
3. **Peleg, M.**, Boxwala, A., Ogunyemi, O., Zeng, Q., Tu, S., Lacson, R., Bernstam, E., Ash, N., Mork, P., Ohno-Machado, L., Shortliffe, E.H., and Greenes. R.A. GLIF3: The Evolution of a Guideline Representation Format. Proc AMIA 2000(20 Suppl):645-649.
4. **Peleg, M**, Boxwala, AA, Bernstam, E, Tu, SW, Greenes, RA, and Shortliffe, EH. Sharable Representation of Clinical Guidelines in GLIF: Relationship to the Arden Syntax. J Biomed Inform 2001; 34(3):170-181.
5. Boxwala, AA, Tu, SW, **Peleg, M**, Zang, Q, Ogunyemi, O. et al. Towards a representation format for sharable clinical guidelines. J Biomed Inform 2001; 34(3): 157-169. I.F.(ISI 2013): 2.482, R (ISI 2013): 6/24, Cited: 63
6. Patel, VK, Branch, T, Wang, D, **Peleg, M**, and Boxwala, AA. Analysis of the Process of Encoding Guidelines: An Evaluation of GLIF3. Methods of Inform in Med 2002;44(2):105-113..
7. **Peleg, M**, Yeh, I, and Altman, R. Modeling biological processes using Workflow and Petri Nets models. Bioinformatics, 2002;18(6):825-837.
8. Wang, D, **Peleg, M**, Tu, SW, Boxwala, AA, Greenes, RA, Patel, VL, and Shortliffe, EH. Representation primitives, process models and patient data in computer-interpretable clinical practice guidelines: A literature review of guideline representation models. Intl J Med Inform 2002;68(1-3): 59-70.
9. **Peleg, M**, Gabashvili, IS, and Altman, RB. Qualitative models of molecular function: linking genetic polymorphisms of tRNA to their functional sequelae. Proc IEEE. 2002;90(12):1875-1886.
10. **Peleg, M** and Tu SW. Comparing Computer-interpretable Guideline Models: A Case-study Approach. JAMIA 2003;10(1):52-68.
11. **Peleg, M**, Boxwala, AA, Tu, SW, Zeng, Q, Ogunyemi, O, et al. The InterMed Approach to Sharable Computer-interpretable Guidelines: A Review. JAMIA 2004;11(1):1-10.
12. Boxwala, AA, **Peleg, M**, Tu, SW, Ogunyemi, O, Zeng, QT et al. GLIF3: A Representation Format for Sharable Computer-Interpretable Clinical Practice Guidelines. J Biomed Inform 2004;37(3):147-161.
13. Wang, D, **Peleg, M**, Tu, SW, Boxwala, AA, Ogunyemi, O. et al. Design and Implementation of the GLIF3 Guideline Execution Engine. J Biomed Inform 2004;37(5):305-318.
14. **Peleg, M**, Rubin, D, and Altman, RB. Using Petri Net Tools to Study Properties and Dynamics of Biological Systems. JAMIA 2005;12(2):181-199
15. **Peleg, M**, Gutnik, L, Snow, V, and Patel, VL. Interpreting procedures from descriptive guidelines, J Biomed Inform 2006;39(2):184-195.
16. **Peleg, M** and Tu, SW. Decision Support, Knowledge Representation and Management in Medicine. Meth Inform Med 2006;45 Suppl 1:72-80.
17. Mulyar, N, van der Aalst, WMP, **Peleg, M**. A Pattern-based Analysis of Clinical Computer-Interpretable Guideline Modeling Languages. JAMIA 2007;14(6): 781-787.
18. **Peleg, M**, Keren, S, and Denekamp, Y. Mapping Computerized Clinical Guidelines to Electronic Medical Records: Knowledge-Data Ontological Mapper (KDOM), J Biomed Inform 2008 41(1):180-201
19. **Peleg, M**, Beimel, D, Dori, D, Denekamp, Y. Situation-based Access Control: privacy management via modeling of patient data access scenarios. J Biomed Inform 2008;41(6):1028–1040.

20. **Peleg, M**, Asbeh, N, Kuflik, T, and Schertz, M. Onto-clust - A methodology for combining clustering analysis and ontological methods for identifying groups of comorbidities for developmental disorders, J Biomed Inform 2009 42(1):165-75
21. **Peleg, M**, Shachak, A, Wang, D, and Karnieli, E. Using multi-perspective methodologies to study user interactions with the front-end of a guideline-based decision-support system for diabetic-foot care, Intl J Med Inform, 2009;78(7): 482-493.
22. **Peleg, M** and Tu, SW. Design Patterns for Clinical Guidelines. Artif Intel Med 2009;47(91):1-24.
23. **Peleg, M**, Somekh, J, and Dori, D. A Methodology for Eliciting and Modeling Exceptions. J Biomed Inform 2009; 42(4):736-747.
24. Denekamp, Y and **Peleg, M**. TiMeDDx – A Multi Phase Anchor-based Diagnostic Decision-support Model. J Biomed Inform 2010;43:111-124.
25. Grando, AM, **Peleg, M**, and Glasspool, D. A goal-oriented framework for specifying clinical guidelines and handling medical errors, J Biomed Inform 2010;1(2): 287-299.
26. Beimel, D, and **Peleg, M**. The Context and the SitBAC models for Privacy Preservation – An experimental comparison of model understanding and synthesis. IEEE TKDE 2010;22(10): 1475-1488.
27. Tu, SW, **Peleg, M**, Carini, S, Bobak, M, Ross, J, Rubin, D, and Sim, I. A Practical Method for Transforming Free-Text Eligibility Criteria into Computable Criteria. J Biomed Inform 2011; 44(2):239-50.
28. Beimel, D, and **Peleg, M**. Using OWL and SWRL to Represent and Reason with Situation-based Access Control Policies. Data and Knowledge Engineering Journal 2011;70(6):596-615.
29. Grando, A, **Peleg, M**, Cuggia, M, and Glasspool, D. Patterns for collaborative work in health care teams. Artif Intell Med 2011;53(3):139-60.
30. **Peleg, M**. Computer-interpretable Clinical Guidelines: a Methodological Review. J Biomed Inform 2013;46(4):744–763.
31. Ghattas, J, Soffer, P, **Peleg, M**, Denekamp, Y. Data Requirements for Process Learning. Intl J Knowledge-Based Organizations, 2013;3(1):1-18.
32. García-Sáez, G, Rigla, M, Martínez-Sarriegui, I, Shalom, E, **Peleg, M**, et al. Patient-oriented Computerized Clinical Guidelines for Mobile Decision Support in Gestational Diabetes. J Diabetes Sci Technol 2014;8(2):238-246.
33. **Peleg, M**, Nassar, S, Fox, J, Patkar, V, Glasspool, et al. A computer-interpretable clinical guideline for the diagnosis and management of thyroid nodules. Endocr Pract 2014;20(4):352-9.
34. Ghattas, J, Soffer, P, **Peleg, M**. Improving Business Process Decision Making Based on Past Experience. Decision Support Systems, 2014 (5):93-107.
35. Sim, S, Tu, SW, Carini, S, Lehmann, HP, Pollock, BH, **Peleg, M**, Wittkowski, KM. The Ontology of Clinical Research (OCRe): An Informatics Foundation for the Science of Clinical Research. Journal of Biomedical Informatics 2014; 52:78-91.
36. Marcos, C, González-Ferrer, A, **Peleg, M**, and Cavero, C. Solving the interoperability challenge of a distributed complex patient guidance system: A data integrator based on HL7's Virtual Medical Record standard. JAMIA 2015; 22(3):587-99.
37. Gonzalez-Ferrer, A and **Peleg, M**. Understanding requirements of clinical data standards for developing interoperable knowledge-based DSS: a case study. Computer Standards & Interfaces 2015;(42):125-36.
38. Mugzach, O, **Peleg, M**, Bagley, SC, Guter, SJ, Cook, EH, Altman, RB. An ontology for Autism Spectrum Disorder (ASD) to infer ASD phenotypes from Autism Diagnostic Interview–Revised data. J Biomed Inform 2015;56:333-47.
39. Pimus, I, **Peleg, M** and Schertz, M. Sequence Mining of Comorbid Neurodevelopmental Disorders using the SPADE Algorithm. Methods of Information in Medicine 2016;55(3):223-33.
40. González-Ferrer, A, **Peleg, M**, Marcos, M, Maldonado, JA. Analysis of the process of representing clinical statements for decision-support applications: a comparison of openEHR archetypes and HL7 virtual medical record. Journal of Medical Systems, 2016; 40(7):163-174.
41. Shabo A, **Peleg, M**, Parimbelli, E, Quaglini, S, Napolitano, C. Interplay between Clinical Guidelines and Organizational Workflow Systems: Experience from the MobiGuide project. Meth Inform Med 2016;55(4).

42. Somekh, J, **Peleg, M**, Eran, A, Koren, I, Demishtein, A. et al. A Model-driven methodology for exploring complex disease comorbidities applied to Autism Spectrum Disorder and Inflammatory Bowel Disease. J Biomed Inform, accepted August 5, 2016.

D. Research Support

Israel Ministry of Science 906/16 (Peleg and Hochberg) 1/10/2016– 31/9/2019
Goal-oriented ontology-supported methodology for integrating computer-interpretable clinical guidelines and medical knowledge to support comorbidity management Total grant: 600,000 NIS

This research aims to detect and solve interactions between recommendations originating from different clinical guidelines that are applicable to patients with multi morbidities. The novel focus of the proposed approach is the combination of a flexible CIG language with an ontology of general medical knowledge. The CIG language that we will use is PROforma, which links medical goals to decision arguments regarding action selection. We will develop an ontology of general medical knowledge in the Web Ontology Language (OWL) and its rule-based language (SWRL) that could supplement PROforma's argumentation-based decision-making with additional knowledge regarding action hierarchies, goal/state hierarchies, and action interactions (e.g., drug-drug, contra-indications, etc.). By relying on OWL reasoners, the ontology's knowledge could be combined with the CIG even when it is provided at different level of hierarchy (e.g., antiplatelet in general vs. aspirin in particular). We will implement and evaluate the proposed framework using a clinical case study and two experiments with users.

FP7- ICT 287811 (Coordinator: Peleg) 1/11/2011- 30/10/2015
MobiGuide: Guiding Patients Anytime Everywhere Total grant: 7 Million Euros; My part:752,684 Euros
MobiGuide (MG) developed a patient guidance system that integrates hospital and monitoring data into a Personal Health Record (PHR) accessible by patients and care providers and provide personalized secure clinical-guideline-based guidance also outside clinical environments. MG's ubiquity was achieved by having a Decision Support System (DSS) at the back end, and on the front end by utilizing Body Area Network technology and developing a coordinated light-weight DSS that can operate independently. Personalization was achieved by considering patient preferences and context. Retrospective data analysis was used to assess compliance. MG was validated on atrial fibrillation and gestational diabetes to demonstrate the generality of the design and assess functionality, feasibility, and impact.

NIH P50 PAR-08-194 (Coordinator: Rzhetsky; PI: Peleg)
1/08/11-30/7/14
Conte Center for Computational Systems Genomics of Neuropsychiatric Phenotypes. My part: \$ 137,230
The Conte Center aims to develop, test, and apply a new computational methodology for the analysis of more than one complex phenotype at a time, with the goal of generating novel biological results. We designed and validated novel analytical tools for the inference of causal relationships among human genomic variations, environmental factors, and more than one neurodevelopmental phenotype, explicitly exploiting the genetic and environmental non-independence of complex (multigenic) disorders. My team developed an ontology of autism phenotypes and a Petri Net model for studying the common molecular mechanisms of ASD and its common IBD comorbidity.