**Lior Rokach** June 2016

CURRICULUM VITAE

**• Personal Details**

Name: **Lior Rokach**

Address and telephone number at work:

Department of Information Systems Engineering

Faculty of Engineering Sciences, Ben-Gurion University of the Negev

P.O.B. 653, Beer-Sheva, Israel 84105.

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Email: [liorrk@bgu.ac.il](mailto:liorrk@bgu.ac.il)

**• Education**

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| **B.Sc.** | 1994 to 1998 | **Tel-Aviv University, Israel**  **Department of Industrial Engineering** |
| Summa Cum Laude |  | Under the special program for outstanding students.  (התוכנית החד-תחומית לתלמידים מצטיינים)  Graduated 1st in class with 97.7 points average (out of 100) |
| **M.Sc.** | 1997 to 1999 | **Tel-Aviv University, Israel**  **Department of Industrial Engineering** |
| Magna Cum Laude |  | Direct M.Sc. Track  Dissertation Title: “Attribute Decomposition for Classification Tasks”. Advisor: Prof. Oded Maimon |
| **Ph.D.** | 2000 to 2004 | **Tel-Aviv University, Israel**  **Department of Industrial Engineering** |
|  |  | Dissertation Title: “Decomposition Methodology in Data Mining”. Advisor: Prof. Oded Maimon |

**• Employment History**

**In Academic Institutes:**

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| July.2014- | **Ben-Gurion University of the Negev,**  Dep. of Information Systems Eng. |
| Dec. 2011-June 2014 | Position: Full Professor (Tenured)  Position: Associate Professor (Tenured) |
| Apr.2009-Nov.2011 | Position: Senior Lecturer (Tenured since June 2010) |
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| Oct.2005-Mar.2009 | Position: Lecturer |
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| Mar. 2012-Oct.2012 | **Penn State University,** |
|  | College of Information Sciences and Technology  Position: Visiting Scholar |
| Oct. 1998-Sep. 2003 | **Tel-Aviv University,**  **Dep. of Industrial Eng.** |
|  | Position: Teaching Assistant (Part-Time) |

**In The Industry:**

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| 2009–2012 | **YooChoose GmbH (Acquired by eZ Systems)**  **Cologne Germany and Omer Israel** |
|  | **Position: Co-Founder and Chief Scientist (Part Time)**  This spinoff was established as a result of an applied research  performed in Ben-Gurion University and sponsored by Deutsche  Telekom Co. The company develops and delivers recommender  systems as-a-service to the media market and to the retailer market. In  this position I voluntarily helped the company in developing the algorithmic framework for recommender systems |

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| 2004–2005 | **Ness, Insurance Division, Tel-Aviv**  **Position: Chief Architect** |
|  | This position includes the following responsibilities: Leading the design of large-scale IT project (70 Engineers) for the insurance division; |
| 2002-2003 | **MedDak Ltd. Netanya, Israel**  **Position: VP R&D** |
|  | MedDak was a startup that developed information retrieval and business intelligence systems for the Healthcare and the Insurance industry. Held full responsibility for leading a small R&D Team, designing the product architecture, developing the main algorithms. Meddak was part of the Target Innovation Center, a high technology incubator funded by the Chief Scientist and a group of well known, prominent investors from Israel and overseas |
| 1999-2001 | **Kamoon. Inc.** |
|  | **Position: Founder & Chief Technology Officer, Member of the Board of Directors** |
|  | Kamoon developed Tacit Knowledge Management (TKM) software enabling organizations to maximize employees' know-how and expertise by matching requestors to the right expert, facilitating and capturing the interaction process, and measuring the process for continuous improvement. Kamoon has received funding of totally $25 million from Patricof & Co. Ventures and its global network Apax Partners, XDL Intervest Capital, and BRM Group. |
| 1997-1999 | **Demantra (Acquired by Oracle)** |
|  | **Position: Software Engineer and then Algorithms Team Leader** |
|  | Leading research and development of advanced quantitative time-series algorithms in Matlab. Demantra is a software development company specializing in solutions in the Supply Chain Planning market. The Company develops and delivers decision support and planning systems to the industrial and commercial markets. |
| 1994-1997 | **Radlinx Ltd (Rad Group, Acquired by VocalTech)** |
|  | **Position: Software Engineer in Part Time Job.** |
|  | Developed networking components. The main programming language used was C and C++ on Unix platform. |
| 1991-1994 | **Army Service, Israel Defense Force**  **Intelligence Corps (Unit 8200)** |

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**• Professional Activities**

**Positions in academic administration**

2014- Chairman of the Faculty’s Teaching Committee, Faculty of Engineering,

Ben-Gurion University

2012-2014 Member of the Faculty’s Teaching Committee, Faculty of Engineering,

Ben-Gurion University

2012-2014 Chairman of the Department's Committee for Graduate Studies, Department of ISE, Ben-Gurion University

2012- Member of the Department's appointments and promotions committee, Department of ISE, Ben-Gurion University

2013- Member of the Department’s Curriculum committee

2011-2012 Chairman of the Department's Teaching Committee of the

Undergraduate Program, Department of ISE, Ben-Gurion University

2008-2011 Coordinator of research seminar, Department of ISE,

Ben-Gurion University

2009-2010 Responsible for the department web-site, Department of ISE,

Ben-Gurion University

**Significant professional consulting**

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| **Year** | **Company** | **Subject** |
| 2014 | Perion Networks | Machine Learning |
| 2014 | Celtick | Recommender Systems |
| 2013 | MyThings | Data Mining and Recommender Systems |
| 2012-2013 | Fortscale | Cyber Security |
| 2012-2013 | Engageya | Recommender Systems |
| 2001,2002,  2011, 2013 | Intel | Data Mining |
| 2012 | Rafael | Machine Learning |
| 2006-2007 | Actimize | Data Mining |
| 2005-2006 | Panorma | Data Mining |
| 2005 | eBay | Data Mining |
| 2005-2006 | Migdal (Generali) | System Architecture and Web Services |
| 2004-2005, 2013, 2015 | Strauss-Elit | Demand Forecasting |

**Editor or member of editorial board of scientific or professional journal**

1. Information Fusion (published by Elsevier). Role: Area Editor - "Machine Learning and Pattern Recognition", From: 2014.
2. Pervasive and Mobile Computing, Role: Guest Editor, Special issue on Mobile Security and Forensics (with Kim-Kwang Raymond Choo and Claudio Bettini)
3. Information Sciences (published by Elsevier). Role: Guest Editor, Special Issue: Data Mining for Information Security (with Prof. Yuval Elovici, BGU and Prof. Sahin Albayrak, TU Berlin). 2012-2013.
4. Progress in Artificial Intelligence (published by Springer). Role: Associate Editor. From: January 2011 to December 2013.
5. The Scientific World Journal. Role: Associate Editor, From October 2013.
6. International Journal of Data Analysis Techniques and Strategies, From: October, 2007 to October, 2008.
7. International Journal of Data Mining, Modeling and Management, From: October, 2008 to October, 2009.
8. Journal of Advanced Research in Statistics and Probability, From: February 2009 to January 2011.

**Ad-hoc reviewer for journals (Sorted Alphabetically)**

• ACM Computing Surveys

• ACM Transactions on Intelligent Systems and Technology

• ACM Transactions on Interactive Intelligent Systems

• AI Communication

• Annals of Information Systems

• Artificial Intelligence in Medicine

• Computational Intelligence

• Computational Statistics & Data Analysis

• Computers and Mathematics with Applications

• Computers in Biology and Medicine

• DSS

• Data Mining and Knowledge Discovery

• Data and Knowledge Engineering

• Digital Signal Processing

• Entropy

• ETRI Journal

• Expert Systems with Applications

• IEEE Intelligent Systems

• IEEE Transactions on Cybernetics

• IEEE Transactions on Dependable and Secure Computing.

• IEEE Transactions on Industrial Informatics

• IEEE Transactions on Knowledge and Data Engineering

• IEEE Transactions on Neural Networks and Learning Systems

• IEEE Transactions on SMC-Part A

• IEEE Transactions on SMC-Part C

• Information Sciences

• Intelligent and Fuzzy Systems

• International Journal of Pattern Recognition and Artificial Intelligence

• International Journal of Production Economics

• International Journal of Production Research

• Integrated Computer-Aided Engineering

• Journal of Artificial Intelligence Research

• Journal of Autonomous Agents and Multi-Agent Systems

• Journal of Intelligent Manufacturing

• Journal of Machine Learning Research

• Journal of Systems and Software

• Journal of Zhejiang University-SCIENCE A

• Journal of the American Society for Information Science and Technology (JASIST)

• Knowledge and Information Systems

• Machine Learning

• NeuroComputing

• Optimization and Engineering

• Pattern Analysis and Applications

• Pattern Recognition

• PLOS One

• Scientometrics

• Soft Computing

• WIREs Data Mining and Knowledge Discovery

**Chairing and organizing**

1. Co-organizer of ACM RecSys 2016 Workshop: Deep Learning for Recommender Systems (DeepRec), Haggai Roitman, Oren Sar-Shalom, Bracha Shapira, Alexandros Karatzoglou, Domonkos Tikk, Balazs Hidasi
2. Co-chair of "Data Mining for Business Intelligence" (with M. Last and B. Shapira), April, 2016 at Ben-Gurion University of the Negev.
3. Co-organizer of ACM RecSys Challenge 2015, (With David Ben-Shimon, Michael Friedmann, Alexander Tsikinovsky, Johannes Hörle and Bracha Shapira)
4. Co-chair of "Data Mining for Business Intelligence" (with M. Last and B. Shapira), April, 2015 at Ben-Gurion University of the Negev.
5. Co-chair of the workshop "Advances in recommender systems – social media and semantics in recommender systems”, (with B. Shapira and Z. Kuflik), Hiafa, June 16-17 2015.
6. Workshops Co-Chair of ACM Recommender Systems 2014 (with Badrul Sarwar)
7. Co-chair of "Data Mining for Business Intelligence" (with M. Last and B. Shapira), April 24, 2014 at Ben-Gurion University of the Negev.
8. Co-chair of Workshop on Computational Scientometrics in ACM CIKM 2013 (with Cornelia Caragea, C. Lee Giles and  Xiaozhong Liu), October 27 to November 1, 2013 at San Francisco, CA, USA.
9. Co-chair of Special Track in 29th ACM Symposium on Applied Computing on Recommender Systems (with Bracha Shapira and Francesco Ricci), March 24 - 28, 2014, Gyeongju, Korea.
10. Co-chair of Special Track in 28th ACM Symposium on Applied Computing on Recommender Systems (with Prasenjit Mitra, and Yehuda Koren), Coimbra, Portugal March 18 - 22, 2013.
11. Co-chair of Workshop on Computational Scientometrics: Theory and Applications (with Cornelia Caragea, C. Lee Giles and Vetle I. Torvik) as part of iConference 2013, February 12, 2013, Dallas Fort Worth, TX.
12. Co-chair of "Ubiquitous User Modeling Workshop" (with B. Shapira and Z. Kuflik), April 10 –11, 2013, University of Haifa and Ben Gurion University of the Negev.
13. Co-chair of "Data Mining for Business Intelligence - Bridging the gap" (with M. Last and B. Shapira), March 7, 2013 at Ben-Gurion University of the Negev.
14. Co-chair of the machine ensembles session in ESANN'2012 (with Aníbal R. Figueiras-Vidal), Bruges (Belgium), 25 - 27 April 2012
15. ICML MLD'10 panelist, Haifa, Israel.
16. Session Chair: ATDM 2006 workshop, 4th Atlantic Web Intelligence Conference.

**Program Committee Member:**

1. Senior Program Committee Member: ACM Recommender Systems – 2016
2. Program Committee Member: ACM KDD – 2016
3. Program Committee Member: WWW 2016
4. Program Committee Member: 11th International Conference on Availability, Reliability and Security (ARES and CD-ARES), Salzburg, Austria, August 29 – September, 2, 2016
5. Program Committee Member: Data Mining for Cyber Security - A workshop organized in association with ICDM’2016
6. Senior Program Committee Member: ACM Recommender Systems – 2015
7. Program Committee Member: ACM KDD – 2015
8. Program Committee Member: 3rd Workshop on Large-Scale Recommender Systems 2015
9. Program Committee Member: UMAP – 2015
10. Senior Program Committee Member: ACM Recommender Systems – 2014
11. Program Committee Member: ACM KDD – 2014
12. Program Committee Member: UMAP – 2014
13. Program Committee Member: IEEE SocialInformatics 2014
14. Program Committee Member: ACM KDD 2013
15. Program Committee Member: IJCAI 2013
16. Program Committee Member: ACM Recommender Systems – 2013
17. Program Committee Member: ESANN 2013
18. Program Committee Member: MCS 2013
19. Program Committee Member: 4th International Workshop on Social Recommender Systems, in conjunction with WWW 2013
20. Program Committee Member: ECML 2013 workshop on "Solving Complex Machine Learning problems with Ensemble Methods"
21. Program Committee Member: Human-Computer Interaction & Knowledge Discovery (HCI-KDD) @ CD-ARES’13
22. Program Committee Member: SouthCHI 2013 - International Conference on Human Factors in Computing & Informatics
23. Program Committee Member: Principles of Diagnosis (DX-2013)
24. Program Committee Member: CIKM 2012
25. Program Committee Member: ICPRAM 2013
26. Program Committee Member: ACM Recommender Systems – 2012
27. Scientific Board Member: HCI & Knowledge Discovery at AMT 2012
28. Program Committee Member: ACM RecSys Doctoral Symposium program – 2012
29. Program Committee Member: IEEE Intern. Conference on Social Informatics 2012
30. Senior Program Committee Member: IEEE SocialCom 2012
31. Advisory Board Member of IEEE GrC2012
32. Program Committee Member: CIP 2012
33. Program Committee Member: ICPRAM 2012
34. Program Committee Member: 12th I2CS 2012
35. Program Committee Member: ACM KDD 2011
36. Program Committee Member: ACM Recommender Systems – 2011
37. Program Committee Member: 11th I2CS 2011
38. Program Committee Member: CYBERLAWS 2011
39. Machine Intelligence Research Labs - a global non-profit academic consortium
40. Program Committee Member: ACM Recommender Systems - 2010
41. Program Committee Member: 12th ER 2010
42. Program Committee Member: 10th I2CS 2010
43. Program Committee Member: CYBERLAWS 2010
44. Program Committee Member: 9th I2CS 2009
45. Program Committee Member: Foundation of Data Mining Workshop (ICDM 2008)
46. Program Committee Member: IRMA, Vancouver, 2007.

**Technical Reviewer for Book Publishers:**

* McGraw-Hill
* Springer
* World Scientific Publishing
* IDEA group publishing
* Open University Press (Israel)

**Funding agencies reviewing**

1. Israel Science Foundation (ISF)
2. United States-Israel Binational Science Foundation (BSF)
3. The German Israeli Foundation (GIF)
4. Israeli Ministry Science and Technology (MOST)
5. Pazi Foundation (a joint foundation of UPBC and IAEC).
6. The Netherlands Organization for Scientific Research (NWO)
7. National Research Fund (FNR) of Luxembourg
8. The Portuguese Foundation for Science and Technology (FCT)
9. Romanian National Council for Innovation and Development

**• Educational activities**

**Courses taught**

* Databases Systems – Undergraduate – Ben-Gurion Univ. and Tel-Aviv Univ
* Advanced Databases – Undergraduate – Ben-Gurion Univ.
* Massive Data Mining – Graduate – Ben-Gurion Univ.
* Distributed Databases – Undergraduate - Ben-Gurion Univ.
* Simulation – Undergraduate - Ben-Gurion Univ. and Bar-Ilan Univ.
* Machine Learning - Graduate – Ben-Gurion Univ.
* Pattern Recognition - Undergraduate – Ben-Gurion Univ.
* Knowledge Acquisition- Graduate – Ben-Gurion Univ.
* Expert Systems and Knowledge Based Systems - Graduate – Ben-Gurion Univ.
* Data Warehousing – Undergraduate - Ben-Gurion Univ. and Tel-Aviv Univ.
* Advanced Systems Analysis and Design – Graduate – Tel-Aviv Univ.
* Operating Systems – Undergraduate - Tel-Aviv Univ.
* Data Structures– Undergraduate - Tel-Aviv Univ.
* E-Commerce - Undergraduate – Ben-Gurion Univ and Bar-Ilan Univ.
* Operation Research – Undergraduate - Tel-Aviv Univ.
* Data Analysis – Undergraduate - Tel-Aviv Univ.
* Operation Management – Graduate – Open University
* Introduction to Information Systems – Executive MBA - Hebrew Univ.

**Research students**

**Ph.D. Students**

* Lena Tenenboim, Multiple Label Classification, Graduated 2012, (with B. Shapira)
* Eitan Menachem, Active Security of Distributed Systems, Graduated 2013, (with Y. Elovici)
* Lihi Namani, Multi-Agent Voting, Graduated (with B. Shapira and M. Kalech)
* Daniel Gordon, Anomaly detection in time series, Graduated (With D. Handler)
* Nir Ofek, Sentiment Analysis, Dissertation Submitted
* David Ben-Shimon, Anytime algorithms for recommender systems, Dissertation Submitted (with B. Shapira)
* Eli Khalastchi, Anomaly detection, Proposal approved (with Meir Kalech), awardee of IBM Ph.D. Fellowship
* Sigal Elnekave, Geospatial Data Mining
* Victor Makarenkov, Automatic Proofreading (with B. Shapira)
* Edita Grolman, Scalable Transfer Learning Cross-Domain Recommendation Systems (with B. Shapira)
* Adam Kubany,
* Asi Messica Greenstein
* Ariel Bar –
* Maya Malamud –
* Hagit Grushka

**M.Sc. Students (with Thesis)**

* Dimitry Getsels , M.Sc., Preferences Elicitation for Stereotype-Based Recommender Systems Using Analytical Hierarchal Procedure, Graduated 2007.
* Eitan Menachem , M.Sc., Troika – New Classifiers Ensemble Scheme for Risk Weighting, Graduated 2008 (with Y. Elovici)
* Lihi Namani, M.Sc., Cost Sensitive Active Learning of Decision Trees, Graduated 2008 (with A. Shmilovici)
* Lior Sapir , M.Sc., A Methodology for Fuzzy Data Warehousing, Graduated 2008 (with A. Shmilovici)
* Slava Kisilevich , M.Sc., New approach for achieving k-anonymity in privacy preserving data mining, Graduated 2009 (with B. Shapira, Y. Elovici)
* Nissim Matatov , M.Sc. (Tel-Aviv University), Feature Set Decomposition for Privacy Preserving Data Mining, Graduated 2009 (With Oded Maimon)
* Dan Hutter , M.Sc., Automatic discovery of the root causes for quality drift in high dimensionality manufacturing processes, Graduated 2009
* Liat Antwarg , M.Sc., Hierarchical HMM, Graduated 2010 (with B. Shapira)
* Adi Abramson , M.Sc., Authentication approaches based on Applications order and keystrokes, Graduated 2010 (with Y. Elovici)
* Ehud Itach, M.Sc., Ensemble Method for Multi-Label Classification, Graduated 2010
* Nadav Marom , M.Sc., Ensemble Methods, Graduated 2011 (with A.Shmilovici)
* Tomer Shimshon , M.Sc., Activity Based Verifications, Graduated 2011 (with Y. Elovici)
* Ariel Bar , M.Sc., Ensemble Methods for Collaborative Filtering, Graduated 2011 (with B. Shapira)
* Yael Weizz , M.Sc., Cost-Sensitive Feature Selection, Graduated 2011(with Y. Elovici)
* Raz Wasserstein , M.Sc., Limiting disclosure of sensitive data in sequential releases of databases, Graduated 2012 (with B. Shapira)
* Shirly -Elena Freilikhman , M.Sc., Exploring Cross domain recommendation accuracy, Graduated 2012 (with B. Shapira)
* Robert Pinchevsky , M.Sc., Anomaly detection in Time Series, Graduated 2012
* Doron Oded , M.Sc., Cognitive load awareness method for continues verification of users based on their keystroke dynamics Graduated 2012 (with N. Tractinsky)
* Ma'ayan Gafny , M.Sc., Supervised Many-to-Many Record Linkage, Graduated 2012 (with Y. Elovici)
* Nassem Biadsy , M.Sc., Transfer Learning for Content-Based Recommender Systems using Tree Matching, Graduated 2012 (with A. Shmilovici)
* Maya Ilani , M.Sc., Data Honey Pot for Leakage Detection, Graduated 2012 (with Y. Elovici)
* Amir Harel , M.Sc., Misusability for Preventing Data Leakage, Graduated 2012 (with Y. Elovici)
* Olga Peled , M.Sc., Privacy Preserving in Social Networks, Graduate 2013 (with Y. Elovici)
* Orly Moreno , M.Sc., Transfer Learning for Recommender Systems, Graduated 2013 (with B. Shapira)
* Ayelet Urieli , M.Sc., Survival Decision Trees, Graduated 2013 (with M. Kalech)
* Alexander Ostrikov , M.Sc., Using geospatial metadata to boost collaborative filtering, Graduated 2013 (with B. Shapira)
* Adi Ben-David , M.Sc., Anomaly detection, Graduated 2014 (with D. Handler)
* Ortal Tovim, M.Sc., Feature Selection for Anomaly Detection, Graduated 2014.
* Rada Fishel, M.Sc., Meta-Recommender, Graduated 2015 (with B. Shapira)
* Ido Blank , M.Sc., Keywords Extraction from Papers, Graduated 2015 (with G. Shani)
* Adi Polak, M.Sc., Anomaly Detection in Bipartite Graph with Complex Nodes, Graduated 2015.
* Eyal Machluf. M.Sc., Transfer Learning For Intrusion Detection, Graduated 2015
* Moran Beladev, M.Sc., Recommender Systems for Product Bundling, Graduated 2015 (with B. Shapira)
* Dimitri Bekerman, M.Sc., Cross-Malware detection, Graduated 2015 (with B. Shapira)
* Nofar Dali, Finding the Right Timing for Proactive Recommendations by Adopting Behavioral Patterns Using Smartphone-Sensed Context, Graduated 2015 (with B. Shapira)
* Guy Shtar , Clustering Wi-Fi Fingerprints for Indoor-Outdoor Detection, Graduated 2015, (with B. Shapira)
* Yasmin Bokobza, Harvest Leaked Information and Leakers Detection In Online Social Networks, Graduated 2015 (with B. Shapira and R. Puzis)
* Moran Hacham, M.Sc., Global Utility for CF Recommender Systems (with B. Shapira)
* Eran Feinman (with B. Shapira), Intelligent Smartphone Sensing

**Postdoctoral Fellows**

* Alon Schclar, Ph.D., Tel-Aviv Univ., Computer Science
* Moti Zwilling, Ph.D., Hebrew Univ., Bio-Informatics

**• Awards, Citations, Honors, Fellowships**

**Honors, Citation Awards**

1. 1995 - Tel-Aviv University, Rector's award for outstanding academic record during the 1st year of B.Sc. studies.
2. 1995 Tel-Aviv University, Faculty of Engineering Dean's award for outstanding academic record during the 1st year of B.Sc. studies.
3. 1995 –Holon Mayor Award for Undergraduate Students in Science.
4. 1996 - Tel-Aviv University, Faculty of Technology Dean's award for outstanding academic record during the 2nd year of B.Sc. studies.
5. 1997 - Tel-Aviv University, Faculty of Technology Dean's award for outstanding academic record during the 3rd year of B.Sc. studies.
6. 1998 - Tel-Aviv University, Faculty of Technology Dean's award for outstanding academic record during the 4th year of B.Sc. studies.
7. 1999 - Tel-Aviv University, Faculty of Engineering. Assistant Teacher of the year Award.
8. 2000 - Tel-Aviv University, Faculty of Engineering. Assistant Teacher of the year Award.
9. 2002 - Holon Academic Institute of Technology, Lecturer of the year Award.
10. 2003 - Tel-Aviv University, Faculty of Engineering. Lecturer of the year Award.
11. 2006 – Ben-Gurion University, Faculty of Engineering. Lecturer of the year Award.
12. 2007 – Ben-Gurion University, Faculty of Engineering. Lecturer of the year Award.
13. 2012 – Thomson Reuters Essential Science Indicators for a Highly Cited Article: *ENSEMBLE-BASED CLASSIFIERS*
14. 2012 – BGU Toronto Prize for Academic Excellence in Research: “*For significant contributions to the field of machine learning and in particular for the development of efficient ensemble learning algorithms.*”
15. 2014 - Advisor and co-author of a paper, The 11th ESWC 2014, Best Performance Award in the Sentiment Analysis Challenge

**Fellowships and Scholarships**

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| **Year** | **Granting institution** | **Amount ($)** | **Purpose of Scholarships** |
| 1995–1998 | Tel-Aviv Univ. | Tuition fees for BSc. degree | Special program for Outstanding Students. |
| 1997 | Municipality of Holon City | $5,000 | Student Award in Science |
| 1998 | Baan Institute | $20, 000 | Research grant for MSc. Research |
| 2003 | Bialik Institute Fund | $5,000 |  |
| 2000-2003 | Israeli Higher Education Planning and Budgeting Committee (VATAT) | $40, 000 | Research grant for outstanding high-tech Ph.D. students |
| 2006 | Ben-Gurion Univ. | $3,720 | Startup Grant |
| 2010 | Ben-Gurion Univ. | $2,010 | Encouragement Grant based on performance |
| 2012 | Ben-Gurion Univ. | $1,500 | Toronto Prize |
| 2012 | Penn State University | $42,000 | Visiting Scholar |

**• Scientific Publications**

Google Scholar Number of Citations: **7,253**

Google Scholar H-Index (including conferences papers and books): **38**

ISI Number of Citations (mainly journal papers): **893** (not including self-citations)

ISI H-Index (mainly journal papers): **17**

**(a) Authored books**

1. **Lior Rokach**, Study Guide in Data Processing (a book written in Hebrew), Hod-Ami Press, ISBN 965-361-009-0, 1991, 243 pages
2. Oded Maimon and **Lior Rokach**, “Decomposition Methodology for Knowledge Discovery and Data Mining: Theory and Applications”, Series in Machine Perception and Artificial Intelligence - Vol. 61, World Scientific Publishing, 2005, 323 pages, Hardcover, ISBN:981-256-079-3 (Indicated by World Scientific as Best-Seller in CS, for three months in 2007)

Published Reviews:

* *“The book presents an interesting and pleasant introduction to the topic, which can guide the reader to the knowledge of the existing decomposition methods, and to the choice of those most promising for the problems he has to face." Zentralblatt MATH, 2007*
* *“An excellent book on ensemble methodology” Okun, Oleg and Valentini, Giorgio, in Supervised and Unsupervised Ensemble Methods Springer 2008.*

1. **Lior Rokach**, "Operation Management for MBA - Study Guide", Open University Press, 2005. (In Hebrew).
2. **Lior Rokach**, Oded Maimon, "Data Mining with Decision Trees: Theory & Applications", Series in Machine Perception and Artificial Intelligence, Hardcover, 300 pages, World Scientific Publishing Company, 2008, ISBN: 9812771719 (Indicated by World Scientific as Best-Seller in CS for year 2008-2011)

Published Reviews:

* + *“It is a timely publication, since, although decision trees are one of the oldest and most competitive computational intelligence methods, there are less dedicated books on decision trees than on other methods such as neural networks, support vector machines or Bayesian classification … The book is a comprehensive and detailed reference book rather than a text book and contains an extensive bibliography of the field. As such it could be very useful to graduate students who wish to broaden their knowledge in the area or are doing a project in this or a related area. It could also be useful to practitioners who wish to use decision trees in their day-to-day data mining work”* Mark Levene, The Computer Journal, Oxford University Press, 2008
  + *“… the book is a very useful and nice coverage of the field … It is highly recommendable for people who want to begin working in this field and need guidance to start into the large area of applying these methods.”* Zentralblatt MATH, 2008.
  + *“Here they give students and professionals what they need to grow decision trees, evaluate classification trees, split criteria, "prune" trees, create advanced decision trees and forests, manage incremental learning of decisions trees, select features, make fuzzy trees, combine decision trees with other techniques and classify sequences. Their text is accessible and loaded with examples, and their bibliography is especially comprehensive.” SciTech Book News, 2008*

1. **Lior Rokach**, "Pattern Classification Using Ensemble Methods”, Series in Machine Perception and Artificial Intelligence, Hardcover, 250 pages, World Scientific Publishing Company, June 2010. ISBN: 978-9814271066, (Indicated by World Scientific as Best-Seller in CS for 2010), (Translated to Chinese, 模式分类的集成方法 精装), National Defense Industry Press, 2015, ISBN: 9787118103977)
2. Asaf Shabtai, Yuval Elovici**, Lior Rokach**, Data Leakage Detection and Prevention, Springer 2012, Softcover, 92 pages, ISBN 978-1-4614-2052-1.
3. Haim Dahan, Shahar Cohen, **Lior Rokach** and Oded Maimon, Proactive Data Mining with Decision Trees, Springer, 2014, ISBN: 978-1-4939-0538-6 (Print) 978-1-4939-0539-3 (Online).

Published Review:

* + *“The authors propose using a decision tree model to proactively classify datasets while mining through existing ones. The model is not only able to predict and explain a phenomenon in the datasets; it also utilizes a problem's domain knowledge to suggest specific actions for achieving optimal changes in the values of the target attributes ... The book is very well written, easy to understand, and easy to follow. Each chapter is well organized.*

*(Xiannong Meng, ACM Computing Reviews, October, 2014)*

1. **Lior Rokach**, Oded Maimon, "Data Mining with Decision Trees: Theory and Applications", **Second Edition**, Series in Machine Perception and Artificial Intelligence, 350 pages, World Scientific Publishing, 2014, ISBN: 978-9814590075
2. **Lior Rokach,** Cluster Analysis: Data Clustering Algorithms and Evaluation Techniques, Series in Machine Perception and Artificial Intelligence, 242 pages, World Scientific Publishing, 2016 (in preparation).
3. Bracha Shapira, Victor Makarenkov, Nir Ofek, Gilad Katz and **Lior Rokach**, Exploiting Wikipedia for Information Retrieval Tasks, Morgan & Claypool Publishers, 2016 (in preparation)
4. **Lior Rokach**, "Ensemble Learning: Pattern Classification Using Ensemble Methods, 2nd Edition”, Series in Machine Perception and Artificial Intelligence, 2016 (in preparation)

**(b) Editorship of collective volumes**

1. Oded Maimon and **Lior Rokach**, “The Data Mining and Knowledge Discovery Handbook: A Complete Guide for Practitioners and Researchers”, Springer, 2005, 1383 pages, Hardcover, ISBN: 0-387-24435-2.

Published Reviews:

* + *“The editors have succeeded in giving us a snapshot of the current state of the art… So, having enjoyed the ebb and flow of this first edition, I patiently await the over-the-horizon arrival of the second edition."* (C. Scheff, ACM Computing Reviews, 2006)

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56. Ayelet Eyal, **Lior Rokach**, Meir Kalech, Ofra Amir, Rahul Chougule, Rajkumar Vaidyanathan, and Kallappa Pattada, Survival Analysis of Automobile Components using Mutually Exclusive Forests, IEEE Transactions on Systems Man and Cybernetics: Systems, 44(2):246-253, 2014. (2012 IF = 2.123, JR = 2/20 Q1 in Computer Science, Cybernetics)
57. Ma'ayan Dror, Asaf Shabtai, **Lior Rokach**, Yuval Elovici, OCCT: A One-Class Clustering Tree for Implementing One-to-Many Data Linkage, IEEE Transactions on Knowledge and Data Engineering, 26(3): 682-697 (2014) (2011 IF = 1.657, JR = 29/133 Q1 in Computer Science, Information Systems).
58. Lihi Naamani-Dery, Meir Kalech, **Lior Rokach**, Bracha Shapira, Reaching a Joint Decision with Minimal Elicitation of Voter Preferences, Information Sciences, Volume 278, 10 September 2014, Pages 466–487 (2012 IF = 3.643, JR = 6/132, Q1 in Computer Science, Information Systems).
59. Daniel Gordon, Danny Hendler, **Lior Rokach**, Fast and scalable shapelets-based time-series classification, Intelligent Data Analysis, Volume 19, Issue 5, 2015. (2012 IF = 0.472, JR = 98/114, Q4 in Computer Science, Artificial Intelligence).
60. Nir Ofek, **Lior Rokach**, A Classifier to Determine which Wikipedia Biographies will be Accepted, Journal of the American Society for Information Science and Technology, 66(1): 213-218 (2015), DOI: 10.1002/asi.23199 (IF = 2.081, JR = 21/133 Q1 in Computer Science, Information Systems).
61. Daniel Gordon, Danny Hendler, Aryeh Kontorovich, **Lior Rokach**, Local-Shapelets for Fast Classification of Spectrographic Measurements, Expert Systems With Applications, 42(6):3150-3158 (2015) (2012 IF = 1.854, JR = 56/243, Q1 in Engineering, Electrical & Electorinic).
62. Lihi Naamani-Dery, Inon Golan, Meir Kalech, **Lior Rokach**, Preference Elicitation for Group Decisions Using the Borda Voting Rule, Group Decision and Negotiation, January 2015, pp. 1-19 (2013 IF = 1.253, JR = 17/92, Q1 in Social Sciences).
63. Nir Ofek, Soujanya Poria, **Lior Rokach**; Erik Cambria; Amir Hussain; Asaf Shabtai, Unsupervised Common-Sense Knowledge Enrichment for Domain-Specific Sentiment Analysis, Cognitive Computation, 2016, 8(3):467-477, DOI 10.1007/s12559-015-9375-3 (2014 IF = 1.1, JR = 68/121, Q3 in Computer Science, Artificial Intelligence).
64. Ido Blank, Guy Shani, **Lior Rokach**, Leveraging Metadata to Recommend Keywords for Academic Papers, Journal of the American Society for Information Science and Technology, JASIST (accepted) (IF= 2.081, JR = 21/133 Q1 in Computer Science, Information System).
65. Eitan Menachem, Alon Schclar, **Lior Rokach**, Yuval Elovici, XML-AD: Detecting Anomalous Patterns In XML Documents, Information Sciences, 2016, 326:71-88 (In Press) (2012 IF = 3.643, JR = 6/132, Q1 in Computer Science, Information Systems).
66. **Lior Rokach**, Decision Forest: Twenty Years of Research, Information Fusion, Volume 27, January 2016, Pages 111–125 (2013 IF = 3.472, JR = 12/121, Q1 in Computer Science, Artificial Intelligence).
67. Nir Nissim, Robert Moskovitch, Oren BarAd, **Lior Rokach**, Yuval Elovici, ALDROID: Efficient Update of Android Anti-Virus Software Using Designated Active Learning Methods, Knowledge and Information Systems (In Press) (2013 IF = 2.639, JR = 15/135, Q1 in Computer Science, Information Systems).
68. Dudi Ben-Shimon, **Lior Rokach**, Bracha Shapira, Guy Shani, Anytime Algorithms for Recommendation Service Providers, ACM Transactions on Intelligent Systems and Technology, 2016, 7 (3): 43-26
69. Asaf Shabtai, Maya Bercovitch, **Lior Rokach**, Ya’akov (Kobi) Gal, Yuval Elovici, Erez Shmueli, Behavioral study of users when interacting with active honeytokens, ACM Transactions on Information and System Security (TISSEC) 18 (3): 9-21.
70. Moshe Unger, Ariel Bar, Bracha Shapira, **Lior Rokach**, Towards Latent Context-Aware Recommendation Systems, Knowledge-Based Systems (In Press).
71. Olga Peled, Michael Fire, **Lior Rokach** and Yuval Elovici, Matching Entities Across Online Social Networks, Neurocomputing (In Press)
72. Lihi Naamani-Dery, Meir Kalach, **Lior Rokach**, Bracha Shapira, Reducing Preference Elicitation in Group Decision Making, Expert Systems With Applications (In Press)
73. Edita Grolman, Arial Bar, Brahca Shapira, **Lior Rokach**, Aviram Dayan, Utilizing Transfer Learning for In-Domain Collaborative Filtering, Knowledge-Based Systems (In Press)
74. Aviad Cohen, Nir Nissim, **Lior Rokach**, Yuval Elovici,SFEM: Structural Feature Extraction Methodology for the Detection of Malicious Office Documents Using Machine Learning Methods, Expert Systems With Applications
75. Alon Schclar, **Lior Rokach**, Amir Amit, Ensembles of Classifiers based on Dimensionality Reduction, Intelligent Data Analysis, Volume 21(3), 2017.
76. Dudi Ben-Shimon, **Lior Rokach**, Bracha Shapira, An Ensemble Method for Top-N Recommendations from the SVD, Expert Systems With Applications (In Press)
77. Yisroel Mirsky, Yuval Elovici, Asaf Shabtai, Bracha Shapira, **Lior Rokach**, Anomaly Detection for Smartphone Data Streams, Pervasive and Mobile Computing (In Press)

**(e) Unrefereed professional articles and publications**

1. **Lior Rokach**, Knowledge Commerce, Oracle Magazine, November, 2000, pp 41-41.
2. **Lior Rokach**, Decomposition Methodology in Data Mining, IEEE SMC Society eNewsletter, December 2005 Issue 13 (Invited paper).
3. **Lior Rokach**, Data Mining and Knowledge Discovery, A Feature Paper - Technology Radar, Technology Radar, 2011.

**• Lectures and Presentations at Meetings and Invited Seminars**

**(a) Invited Talks and Tutorials at Conferences**

1. k-Anonymized Reducts, IEEE International Conference on Granular Computing, Silicon Valley, CA, USA, August 14-16, 2010, Invited Speaker.
2. Recommender Systems, “What is Watson?” IBM Event, Tel-Aviv, Israel, February 2012, Invited Speaker.
3. Ensemble Learning, Cognitive Information Processing, Baiona, Spain, May, 2012 (Sponsored by the International Association for Pattern Recognition, IAPR), Keynote Addresses.
4. When Cyber Security Meets Machine Learning, Israeli Academic Cyber Conference Day, Beer-Sheva, Israel, June 2012, Invited Speaker.
5. Cross Domain User Modeling, Ubiquitous User Modeling (U2M'2012), Haifa, Israel, June 2012, Invited Speaker.
6. Cyber Security – A Bibliometric Study, Cybernight 325 Body of Knowledge, Beer Sheva, May 2014, Israel.
7. Machine Learning and Cyber Security, CyberTech 2015, Tel-Aviv, Israel March 2015, Israel.
8. Context Aware Recommender Systems, the Second Annual Microsoft ReCon Conference, Hertzeliya, Israel June 22 2015.
9. When Cyber Security Meets Machine Learning, Jornadas Nacionales de Investigación en Ciberseguridad, Beer-Sheva, Israel, June 2016, Invited Speaker.

**(b) Presentation of papers at conferences/meetings (oral or poster)**

1. Eliahu Khalastchi, Meir Kalech and **Lior Rokach**, From Unsupervised to Supervised Fault Detection in Autonomous Systems, BISFAI 2013, Wednesday-Friday, June 19-21, 2013.
2. Lena Tenenboim, Dan Gutfreund, Aryeh Kontorovich, **Lior Rokach**, Bracha Shapira, Label Dependencies for Multi-label classification, Machine Learning Seminar, October 14, 2012, IBM Research - Haifa, Israel
3. Lihi Dery, Meir Kalech, **Lior Rokach** and Bracha Shapira, Iterative Voting under Uncertainty for Group Recommender Systems, BISFAI-2011.
4. Bracha Shapira, **Lior Rokach**, Recommender Systems and Search engines – two sides of the same coin!?, INFO-2010, Tel-Aviv Israel, 3-5 May, 2010.
5. Lihi Dery (Naamani), Meir Kalech, Lior Rokach, Bracha Shapira, A Probabilistic Approach for Communication Reduction in Range Voting, The Israeli Association for Artificial Intelligence (IAAI), February 2010, at Ashkelon.
6. Amir Gershman, Alon Grubshtein, Amnon Meisels, Lior Rokach, Roee Zivan, Scheduling Meeting by Agents, The Israeli Association for Artificial Intelligence (IAAI), November 2008, at Ashkelon.
7. Slava Kisilevich, Yuval Elovici, Bracha Shapira, Lior Rokach, Supervised Rule-Based k-Anonymity, Ministry of Science & Technology Infrastructure Conference, 27 December, 2007, Beer-Shave, Israel.
8. Lior Rokach, Roni Romano, Oded Maimon, "Mining Manufacturing Databases for Revealing the Effect of Operations Sequence on the Quality", 21st European Conference on Operational Research (EURO XXI), Iceland, 2006.
9. Roni Romano, Lior Rokach, and Oded Maimon, M. Averbuch, "Improving Information Retrieval of Patient Records Using Learning Methods", The Annual Conference of the Israel Association of Medical Information, 2006.
10. Lior Rokach and Yuval Cohen, “Daily Newspaper Demand Planning from Unobserved Lost Sales“, The Annual ORSIS (Operation Research Society of Israel) Conference, Caesarea, Israel, May 2005.
11. Yuval Cohen, Arik Sadeh, Lior Rokach , A New Technique for a Two-Phase Truck Fleet Routing, The Annual ORSIS (Operation Research Society of Israel) Conference, Caesarea, Israel, May 2005
12. Yuval Cohen, Bam Bidanda, Lior Rokach, A new technique for modeling and implementation of agent-based discrete industrial automation, The 15th International conference on flexible automation and manufacturing, Bilbao, Spain, July 2005.
13. Oded Maimon, Lior Rokach, Mickey Averbuch, Eli Ezer, John Kannry, "Information Extraction System for Medical Narrative Reports", Workshop on Intelligent Data Analysis in Medicine and Pharmacology, Stanford University, Palo Alto, CA, USA, September 6, 2004.
14. Oded Maimon, Lior Rokach, Yaron Naveh and Mickey Averbuch, “Clinical Datamart”, The Annual Conference of the Israel Association of Medical Information, 2003.
15. Oded Maimon, Lior Rokach, "Data Mining for Improving Manufacturing's Quality: A feature set decomposition approach", Proceedings of the 9th International Conference on Manufacturing Excellence, Melbourne, October 2003.
16. Lior Rokach and Oded Maimon, “Decomposition Methods in Data Mining”, The Annual ORSIS (Operation Research Society of Israel) Conference, Shfeim, Israel, May 2002.
17. Lior Rokach and Oded Maimon, “Introduction to Decomposition Methodology in Classification Models”, Haifa Winter Workshop on Computer Science and Statistics, CsStat 2001.

**(c) Seminar presentations at universities and institutions**

|  |  |  |
| --- | --- | --- |
| **Year** | **Title** | **Institute** |
| 2014 | Utilizing Transfer Learning for Recommender Systems | IBM Research - Haifa |
| 2012 | Alleviating the Sparsity Problem of Collaborative Recommender Systems using Transfer Learning | Tel-Aviv University |
| 2012 | Data Mining and Information Security | Signal Th. & Comms Dept., Universidad Carlos III de Madrid |
| 2011 | Introduction to Machine Learning | Deutche Telekom Laboratories, Berlin, Germany |
| 2009 | Active Learning for Preferences Elicitation in Recommender Systems | Free University of Bozen-Bolzano, Italy |
| 2005 | Data Mining and Knowledge Discovery | Open University, Israel |
| 2004 | Feature Set Partitioning | ISE, Ben-Gurion University, |
| 2003 | Decomposition methodology in DM | IE, Tel-Aviv University |
| 1999 | Development of efficient BOM | Baan Research |
| 1999 | Attribute Decomposition in DM | IE, Tel-Aviv University |

**• Patents**

**Granted Patents**

1. Shani, G., **Rokach, L.**, Meisels, A., Piratla, N. (2011), Interactive hybrid recommender system, US Patent 8,019,707.
2. Menahem, E., **Rokach, L.**, Elovici, Y. (2012), An improved stacking schema for classification tasks, US Patent 8,244,652
3. Friedmann M., Ben-shimon D., **Rokach L.** (2014), Method and system for recommending geo-tagged items, US Patent 8,793,248.
4. Barak Chizi, Yuval Elovici, David Mimran, **Lior Rokach** (2016), An accurate mechanism for estimating a mobile communication service provider's market share, European Patent 2,871,869 B1

**Patent Applications**

1. Harari, Y. and Rokach, L. and Klevansky, Y.E. and Galili, B.Z. and Tsenter, I. (2001), Method and system for enabling the exchange, management and supervision of leads and requests in a network, US Patent App. 09/801,560, WO/2001/067359
2. Maimon, O., Ezer, E., **Rokach, L**., Averbuch, M. (2003), Medical data storage system and method, Patent Application 2003.
3. Shapira, B., Mimran, D., Meyer, J., **Rokach, L.**, Peretz, S., Glass, G., Henke, K., Schneider, L. (2010), A system for detecting usability problems of users while using their mobile devices, EP Patent 2,369,481
4. **Rokach, L.**, Antwarg, L., Shapira, B. (2010), Next-step prediction system and method, EP Patent 2,221,719
5. Kisilevich, S., **Rokach, L.,** Elovici, Y., Shapira, B. (2010), Efficient multi-dimensional suppression for k-anonymity, EP Patent 2,228,735
6. Schclar, A., **Rokach, L.**, Shapira, B., Glass, G., Jepsen, K., Henke, K. (2011), System and method for the detection of usability problems in an interactive application, EP Patent 2,367,113

**• Research Grants**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Title of Research** | **Source** | **Role** | **Total grant** | **Period** |
|  |  |  |  |  |
| Automatic Question Generation from Watson | IBM | Principal Investigator (with M. Last) | $60,417 | 11.15-10.16 |
| Robust Identity Analytics | IBM | Principal Investigator (with M. Kalech) | $92,555 | 11.15-10.16 |
| Deep learning for deep understanding of videos and images | Israeli Ministry of Defense | Principal Investigator (with A. Shmilovici) | $51,419 | 11.15-10.16 |
| Beehive | Deutsche Telekom Co. | Principal Investigator (with B. Shapira) | $391,150 | 11.15-10.16 |
| Advanced forensic Analysis of VM snapshots | Israeli Ministry of Trade and Commerce | Principal Investigator (with Y. Elovici) | $124,000 | 11.15-10.16 |
| Risk Factoring | IBM | Principal Investigator (with B. Shapira) | $61,000 | 11.15-10.16 |
| Infomedia consortium | Israeli Ministry of Trade and Commerce | Principal Investigator (with A. Shmilovici) | $65,104 | 6.15-5.16 |
| Cyber Watson | IBM | Coordinator and PI (with R Puzis, A. Sturm, M. Elhadad) | $217,000 | 3.15-3.16 |
| Anomaly Detection using Co-Clustering | IBM | Principal Investigator (with M. Kalech and A. Shabtai) | $72,534 | 1.15-12.15 |
| Context-Aware Sentiment Analysis for Application Security Grading | National Cyber Bureau | Principal Investigator | $109,714 | 2.15-1.17 |
| Joint Cyber Security Research | Lockheed Martin + EMC | Principal Investigator (with R. Puzis, Y. Elovici, B. Shapira) | $500,000 | 6.14-6.17 |
| XDR | Deutsche Telekom Co. | Coordinator and PI (with B. Shapira) | $196,937 | 6.14-6.15 |
| Context Aware Data Leakage Prevention for Mobile Devices | Israeli Ministry of Science | Coordinator and PI (with B. Shapira, A. Shabtai and A. Schuster, Y. Elovici) | $522,000 | 12.13-12.16 |
| Machine learning based algorithms for detecting QR malicious code | Israeli Ministry of Science | Principal Investigator | $20,000 | 12.13-12.15 |
| Information security awareness | Israeli Ministry of Trade and Commerce | Principal Investigator (with A. Shabtai and R. Puzis) | $174,709 | 1.14-12.14 |
| Cyber C&C | Israeli Ministry of Defense | Principal Investigator (with Y Elovici, B. Shapira and R. Puzis) | $55,227 | 11.13-11.14 |
| Soundtrax - Contextual Audio Intervention | Deutsche Telekom Co. | Principal Investigator (with Y B. Shapira and E. Gudes) | $681,386 | 8.13-9.14 |
| Advanced Persistent Threats | Israeli Ministry of Science | Principal Investigator | $13,150 | 1.13-12.13 |
| Monetizing Generated Data | Deutsche Telekom Co. | Coordinator and Principal Investigator (with B. Shapira) | $67,441 | 10.13-4.14 |
| Data Leakage in Social Networks: Detection and Prevention | Israeli Ministry of Science | Principal Investigator (with B. Shapira, David Schwartz, Michael Birnhack, Y. Elovici) | $265,183 | 1.13-12.15 |
| Data Leakage Prevention from Textual Documents | Israeli Ministry of Science | Principal Investigator (with B. Shapira and Y. Elovici) | $50,526 | 1.13-12.14 |
| Motion Logic (Trajectory Analysis) | Deutsche Telekom Co. | Coordinator and PI (with Y. Elovici, B. Shapira) | $790,000 | 8.13-4.14 |
| Equipment Grant for Big Data Lab | Intel | Coordinator and PI (with B. Shapira) | $20,000 | 6.13 |
| Information Protection | Israeli Ministry of Defense | Principal Investigator (with Y Elovici, B. Shapira) | $66,000 | 11. 12-10. 13 |
| Low amplitude anomaly detection | RSA (The Security Division of EMC) | Coordinator and PI (with Y. Elovici, A. Shabtai) | $104,000 | 11. 12-10. 13 |
| Location Movement Analysis | Deutsche Telekom Co. | Coordinator and PI (with Y. Elovici, B. Shapira) | $1,026,122 | 8.12-3.13 |
| RiMaDePa Productization | Deutsche Telekom Co. | Principal Investigator (with Y Elovici) | $473,000 | 4.12-3.13 |
| Anomaly Detection Laboratory | Israeli Ministry of Defense | Principal Investigator (with Y Elovici, B. Shapira and R. Puzis) | $203,000 | 5.12-4. 13 |
| Acceleration of cyber-attacks over time | Elbit Systems | Principal Investigator (with Y Elovici, B. Shapira and R. Puzis) | $556,000 | 3.12-9.13 |
| Reconstruction of Hidden or non-existent Identities Through Automatic Social Network Crawling | Ministry of Trade and Commerce | Principal Investigator (with Y Elovici and A. Felner and R. Puzis). | $288,000 | 1.12-12.13 |
| Cost efficient network monitoring and filtering | Ministry of Trade and Commerce | Principal Investigator (with Y Elovici and R. Puzis) | $86,500 | 1.12-12.12 |
| Advanced persistent threat | Ministry of Trade and Commerce | Coordinator and Principal Investigator (with Y Elovici, B. Shapira) | $292,000 | 1.12-12.14 |
| Global Attacks by Local Intruder-2 | Israeli Ministry of Defense | Principal Investigator (with Y Elovici, B. Shapira) | $108,000 | 10.11-10.12 |
| Evaluation Environment for Simulating Cyber Attacks | Israeli Ministry of Defense | Principal Investigator (with Y Elovici, B. Shapira, R. Puzis) | $95,000 | 10.11-4.13 |
| Information Leakage Detection | Israeli Ministry of Defense | Principal Investigator (with Y Elovici and B. Shapira) | $27,000 | 10.11-10.12 |
| Deferred Payment | Deutsche Telekom Co. | Coordinator and PI (with Y. Elovici) | $400,000 | 7.11-4.12 |
| Customer Analytics | Deutsche Telekom Co. | Coordinator and PI (with Y. Elovici, B. Shapira and Guy Shani) | $405,235 | 11.11-6.12 |
| Customer Analytics Pre-Study | Deutsche Telekom Co. | Coordinator and PI (with B. Shapira and Guy Shani) | $40,000 | 7.11-10.11 |
| Data Leakage Prevention | Israeli Ministry of Defense | Principal Investigator (with Y Elovici and B. Shapira) | $54,000 | 12.10-12.11 |
| Command and Control for Security | Israeli Ministry of Defense | Principal Investigator (with Y Elovici and B. Shapira) | $55,000 | 12.10-12.11 |
| Anomaly Detection | Deutsche Telekom Co. | PI (with Y Elovici and Shlomi Dolev) | $1,180,000 | 1.10-1.12 |
| Using Anomaly Detection Techniques to Diagnose and Prognosticate Faults in Vehicles | General Motors | Coordinator and Principal Investigator (with Y. Elovici and M Kalech) | $75,000 | 11.10-10.12 |
| Providence | Israeli Ministry of Defense | Principal Investigator (with Y Elovici and B. Shapira) | $77,000 | 9.10-9.11 |
| Recommendation Next Steps | Deutsche Telekom Co. | Principal Investigator (with B. Shapira) | $615,967 | 12.09-6.11 |
| Activity Based Verifications | Deutsche Telekom Co. | Principal Investigator (with Prof. Y. Elovici) | $1,381,539 | 7.08-9.10 |
| Context Aware Services Offering and Usage | Deutsche Telekom Co. | Coordinator and Principal Investigator (with Prof. A. Meisels) | $733,354 | 7.07-2.09 |
| Customer Data Leakage Prevention | Deutsche Telekom Co. | Coordinator and Principal Investigator (with Y. Elovici, Prof. S. Dolev) | $2,684,000 | 8.09-7.11 |
| Smart Mobile | Deutsche Telekom Co. | Principal Investigator (with Dr. B. Shapira, Prof. P. Shoval, Prof. J. Meyer) | $2,495,124 | 4.08-8.10 |
| Code Obfuscation | Israeli Ministry of Defense | Principal Investigator (with Dr. Y. Elovici and Dr. B. Shapira) | $50,000 | 12.08-12.09 |
| Computer and Network Security | Israeli Ministry of Defense | PI (with Y Elovici and B. Shapira) | $55,000 | 8. 07-1.08 |
| Belt Contraction Phase 2 | Israeli Ministry of Defense | PI (with Y Elovici and B. Shapira) | $25,000 | 9.09-9.10 |
| Belt Contraction | Israeli Ministry of Defense | PI (with Y Elovici and B. Shapira) | $50,000 | 9.08-9.09 |
| Contigo: Recommendation Systems | Deutsche Telekom Co. | Coordinator and PI (with Prof. A. Meisels) | $1,181,329 | 4.06-6.08 |
|  |  | **Total:** | **$19,308,804** | **My Share:**  **$7,891,442** |

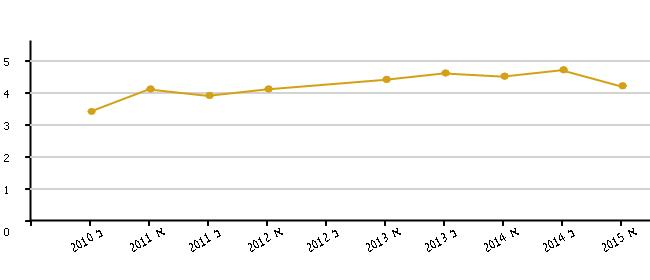
**• Additional Information**

**Average teaching evaluations – student surveys (last two years)**

|  |  |  |
| --- | --- | --- |
| **Course Name** | **Semester** | **Score (out of 5)** |
| Massive Data Mining | 2015 B | 4.8 |
| Databases | 2015 A | 4.3 |
| Machine Learning | 2014 B | 4.7 |
| Advanced Database Systems | 2014A | 4.8 |
| Databases | 2014 A | 4.3 |
| Advanced Databases | 2014A | 4.3 |
| Massive Data Mining | 2013 B | 4.6 |
| Advanced Databases | 2013 A | 4.5 |
| Databases | 2013 A | 4.3 |
| Distributed Databases | 2012 A | 4.0 |
| Databases | 2012 A | 4.2 |
| Databases | 2012 A | 4.0 |
| Machine Learning | 2011 B | 3.9 |
| Databases | 2011 A | 4.2 |
| Distributed Databases | 2011 A | 4.0 |
| E-Commerce | 2010 B | 3.4 |
| Simulation | 2010 A | 3.8 |
| Databases | 2010 A | 4.0 |
| Distributed Databases | 2010 A | 3.7 |
| E-Commerce | 2009 B | 4.3 |
| Machine Learning | 2009 B | 4.8 |
| Simulation | 2009 A | 4.0 |
| Databases | 2009 A | 4.1 |
| Distributed Databases | 2009 A | 4.1 |
| Expert Systems | 2008 B | 3.6 |
| E-Commerce | 2008 B | 4.2 |
| Machine Learning | 2008 B | 4.4 |

Overall Average for Mandatory Courses: 4.0 (out of 5) in 15 instances (last 5 years).

Overall Average for Elective Courses: 4.5 (out of 5) in 5 instances (last 5 years).

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**Average Teaching Evaluation Scores in the Last Five Years.**

**Developing and starting new laboratories**

1. Laboratory of Machine Learning Systems, Ben-Gurion University

The lab hosts graduate and undergraduate students working in the lab during the academic year. The lab carries out research and projects in the broad area of machine learning and its applications, and specifically, the lab promotes innovative adaptations of machine learning methods to create the next generation of Intelligent Systems. Since its establishment in March 2006, the machine learning lab has been involved in more than two dozen research projects. Among the institutions that have funded Prof. Rokach’s research are: Deutche Telekom Co., General Motors, the Israeli Ministry of Defense (Center for Development of Means and Infrastructure), and the Israeli Ministry of Trade and Commerce.

1. Big Data Lab

The Big Data lab at Ben-Gurion University of the Negev conducts research in the area of data science. The lab is also devoted to fostering knowledge for both graduate and undergraduate students. The lab is closely affiliated with the Machine Learning Lab and the Cyber Security Lab. The Big Data Lab at BGU was established in 2013 with the generous support of Intel. It is focused on the analysis of very large datasets, especially those that arise in the application areas of web mining and cyber security. The emphasis is on developing novel, sound and theoretically-motivated algorithms for accomplishing large-scale tasks in data mining, such as high-dimensional clustering, classification algorithms and anomaly detection.

**Developing new graduate programs**

Co-defining (with B. Shapira and M. Last) a new MSc program in Data Mining and Business Intelligence. Graduates of this program acquire a variety of skills required for integrating cutting edge information technologies with data analytics methods. The program offers a unique mix of courses in IT, in statistics and in machine learning. With these courses the students are able to analyze large datasets and to develop modeling solutions to support decision making. This graduate program is specifically designed to meet the abovementioned need in the Israeli industry.

* **Synopsis of research**

My main research interests are in the fields of Machine Learning and Data Mining and their applications in Information Security, Recommender Systems, Information Retrieval, Intelligent Manufacturing and Medical Informatics.

**Pattern Classification Using Ensemble Methods**

Ensemble methodology imitates our second nature to seek several opinions before making a crucial decision. The core principle is to weigh several individual pattern classifiers, and combine them in order to reach a classification that is better than the one obtained by each of them separately. Since 1997, I have been working on the field of data mining. More specifically, I developed a decomposition methodology for large scale data mining tasks. We presented a complete methodology for decomposing classification problems into smaller and more manageable sub-problems that are solvable by using existing tools. The various elements are then joined together to solve the initial problem. The benefits of decomposition methodology in data mining include: increased performance (classification accuracy); conceptual simplification of the problem; enhanced feasibility for huge databases; clearer and more comprehensible results; reduced runtime by solving smaller problems and by using parallel/distributed computation; and the opportunity of using different solution techniques for individual sub-problems. Obviously the most essential question that decomposition methodology should be able to answer is whether a given classification problem should be decomposed and in what manner. The main theory developed in our research is that the decomposition can be achieved by recursively performing a sequence of single, elementary decompositions. We introduced several fundamental and elementary decomposition methods, namely: Attribute Decomposition, Space Decomposition, Sample Decomposition, Function Decomposition, and Concept Decomposition. We propose a unifying framework for using these methods in real applications. Finally we show that the decomposition methods developed by us extend the envelope of problems that data mining can efficiently solve. These methods also enhance the comprehensibility of the results that emerge and suggest more efficient implementation of knowledge discovery conclusions. A detailed description of our methodology is presented in our joint book with O. Maimon (World Scientific Publishing, 2005). In addition to the general framework, I also proposed specific contributions. For example, in the paper “Genetic algorithm-based feature set partitioning for classification problems, *Pattern Recognition* 41, 1676–1700, 2008” a new Vapnik–Chervonenkis dimension bound for mutually exclusive oblivious tree classifiers is developed. The new bound is used to create a small ensemble of simple classifiers which obtains a predictive performance that is comparable to that of much more complicated ensembles.

In addition to decomposition methodology, I am working to improve existing ensemble methods by developing new ensemble scheme or by pruning of induced ensembles. For example in the paper “Collective-agreement-based pruning of ensembles, *Computational Statistics and Data Analysis* 53, 1015-1026, 2009” a new ensemble pruning method is presented. This method considers the individual predictive ability of each classifier along with the degree of redundancy among them. The new measure is mathematically derived from the Spearman formula that was originally developed for measuring the augmented validity coefficient of a psychological test. Finally in my current research, I am using data mining techniques and in particular ensemble methods to improve machine learning applications in various domains.

**Recommender Systems and Personalization**

Recommender Systems are software tools and techniques providing suggestions for items to be of use to a user. The suggestions provided are aimed at supporting their users in various decision-making processes, such as what items to buy, what music to listen, or what news to read. In the last five years I am interested in developing recommender systems. I am using data mining methods to improve the accuracy of recommendation in case of imperfect data. These algorithms are developed as part of three recent research projects (Contigo, CASOU, Recom) that I manage at the Deutsche-Telekom Laboratories at BGU. Additionally, I am interesting in improving the process of preferences elicitation for recommender systems. Specifically I develop new methods for learning user profiles for individual or group of users with minimum intrusiveness.

In another research we develop a novel HMM for Intention prediction using. This research is related to the SmartMobile project at the Deutsche-Telekom Laboratories that I manage, in which we need to predict the intention of the user (her next step) from a sequence of her session data. For this we try to use Hidden Markov Model and learn the probabilities of different types of users to perform different sequences of operations, in order to be able to track the user current sessions and predict her next step. This research is performed with Prof. Bracha Shapira and Liat Antwarg (M.Sc. student).

Finally together with Prof. Francesco Ricci, Dr. Bracha Shapira and Prof. Paul Kantor, we have edited an extensive handbook on Recommender Systems that was recently published by Springer.

**Information Security**

Data mining techniques have displayed a considerable degree of effectiveness in dealing with the new challenges to information security. In my research I am focusing on theoretical and practical issues about data mining for information security.

In my current research, I am using machine learning techniques to detect computers infected by Malware, such as computer viruses, Trojan horses and Worms. In a recent paper (Mal-ID: Automatic Malware Detection Using Common Segment Analysis and Meta-Features, *Journal of Machine Learning Research* 13, 905-935, 2012), we introduce a method for common segment analysis, which is able to discard malware parts that originate from benign code. The findings indicate that most of the malwares are not developed from scratch but rather they are developed in an incremental manner, such that some code segments are migrated from one malware to another. Moreover, certain malwares can be identified by their anti-forensic mechanism which is used to make their identification by anti-virus software much more difficult. In another paper (Detection of unknown computer worms based on behavioral classification of the host, *Computational Statistics and Data Analysis* 52, 4544–4566, 2008), we show that many malwares have noticeable behavioral patterns that can be easily identified using existing machine learning methods.

Privacy preserving data mining (PPDM) – Many applications that employ data mining techniques involve mining data that include private and sensitive information about the subjects. In this field I am developing algorithms for anonymizing the dataset that include private information about subjects before being released for data mining. In a recent research we propose a new method for achieving k-anonymity named K-anonymity of Classification Trees Using Suppression (kACTUS). In kACTUS efficient multi-dimensional suppression is performed, i.e., values are suppressed only on certain records depending on other attribute values, without the need for manually-produced domain hierarchy trees. Thus, in kACTUS we identify attributes that have less influence on the classification of the data records and we suppress them if needed in order to comply with k-anonymity. In a recent research we propose a different approach for achieving k-anonymity by partitioning the original dataset into several projections such that each one of them adheres to k-anonymity. Moreover any attempt to rejoin the projections, results in a table that still complies with k-anonymity. A classifier is trained on each projection and subsequently, an unlabelled instance is classified by combining the classifications of all classifiers. Guided by classification accuracy and k-anonymity constraints, the proposed data mining privacy by decomposition (DMPD) algorithm uses a genetic algorithm to search for optimal feature set partitioning.

In another research funded by the ministry of defense, we aim at blocking messages in a network by learning and building models for "good" and "bad" messages only from positive examples (as only positive examples for "good" messages exist). We develop a new method that uses clustering for positive learning. Also, the research deals with defining a firewall for XML-based content considering the special features of XML content (i.e., the structure). We implement the method and run simulation to test and calibrate the algorithm.

Finally, together with Prof. Yuval Elovici and Prof. Sahin Albayrak, I am participating as a guest editor to a special issue titled "Data Mining for Information Security" to be published in Information Sciences.

**Cost-Sensitive Learning**

Cost sensitive learning methods take into account the complex economic environments in which data mining occurs. Specifically, the economic factors relevant for maximizing the utility of a data mining process include (1) the costs and benefits associated with obtaining data, (2) the costs associated with building the predictive model or extracting descriptive patterns using a data mining algorithm, and (3) the costs and benefits derived from utilizing the acquired knowledge.

I examined a particular form of information acquisition, namely active learning in an online environment. The setting we explore is common in practice and offers many intriguing challenges. Specifically, we consider a direct marketing campaign in which information about consumers is available (independent variables) but consumer responses to the offer being solicited are not known and must be acquired. In this setting, it is necessary to solicit offers before a satisfactory model to estimate the utility from each prospective solicitation is available. Thus there are opportunities to develop policies to suggest what solicitations can improve the desired objective the most. The challenge is primarily due to the tension between the costs of acquiring information and the uncertainty, at the time an acquisition decision is made, regarding the utilities that will result from different prospective acquisitions. In an online setting, there is also an interesting tension between the potential to inform future decisions via information acquisition and the desire to maximize the overall campaign profitability. This online learning scenario is common and presents a richer domain than is addressed by traditional active learning.

In many applications, the cost of collecting the features must be taken into account. In particular, we developed a new cost-sensitive feature selection method based on histogram comparison. This function is integrated with a genetic search method to form a new feature selection algorithm termed CASH (cost- sensitive attribute selection algorithm using histograms). The CASH algorithm takes into account feature collection costs as well as feature grouping and misclassification costs.

**Multi-label classification**

Traditional single-label classification is concerned with learning from a set of examples that are associated with a single label from a set of disjoint labels. In multi-label classification, the examples are associated with a set of labels. In this research domain we develop new methods for multi-label classification. The new methods learn latent relations between the single labels and induce classifiers only for combined labels with significant relations. This research is conducted with Prof. Bracha Shapira and our Ph.D student Yelena Tenenbaum. The results of this research were published in the Machine Learning Journal and other various conferences. We also employed ensemble methods for solving multi-label classification tasks. Specifically, we select the minimum required subsets of k labels that cover all labels and meet additional constraints such as coverage of inter-label correlations. Construction of the cover is achieved by formulating the subset selection as a minimum set covering problem (SCP) and solving it by using approximation algorithms. Every cover needs only to be prepared once by offline algorithms. Once prepared, a cover may be applied to the classification of any given multi-label dataset whose properties conform with those of the cover. We provide theoretical bounds that quantify the probabilities of random selection to produce covers that meet the proposed construction criteria.

**Biosketch**

Lior Rokach is a data scientist and a Full Professor of Information Systems and Software Engineering at Ben-Gurion University of the Negev (BGU). BGU is ranked 30th worldwide among universities that are less than 50 years old, on the QS World University Rankings 2014/2015 report. His research interests lie in the design and analysis of Machine Learning and Data Mining algorithms and their applications in Cyber Security, Recommender Systems and Information Retrieval.

Prof. Rokach received a B.Sc. (summa cum laude, 1998), M.Sc. (cum laude, 1999) and PhD (2004) from Tel Aviv University. Since 2005 he has been a faculty member at Ben-Gurion University. In addition, he has had several visiting positions - the most recent at the College of Information Sciences and Technology at the Pennsylvania State University, University Park, PA.

Prof. Rokach is the author of over 200 peer reviewed papers in leading journals (e.g., Machine Learning, Machine Learning Research, Data Mining and Knowledge Discovery, IEEE Transactions on Knowledge, and Data Engineering and Pattern Recognition), conference proceedings, patents, and book chapters. In addition, he has also authored six books including Data Leakage Detection and Prevention (Springer, 2012), Pattern Classification Using Ensemble Methods (World Scientific Publishing, 2009), Data Mining with Decision Trees (World Scientific Publishing, 2007) and Decomposition Methodology for Knowledge Discovery and Data Mining (World Scientific Publishing, 2005). Prof. Rokach is also the co-editor of The Data Mining and Knowledge Discovery Handbook (1st edition, Springer, 2005; 2nd edition, 2010), Soft Computing for Knowledge Discovery and Data Mining (Springer, 2007), and Recommender Systems Handbook (1st edition, Springer, 2011; 2nd edition, 2015). His works are highly cited and his books are standard classroom reading on the topic for graduate courses. Several excellent scholarly book reviews regarding Prof. Rokach’s monographs have been published, to name a few:

* *“It is a timely publication, … The book is a comprehensive and detailed reference book … It could be very useful to graduate students who wish to broaden their knowledge in the area or are doing a project in this or a related area. It could also be useful to practitioners who wish to use decision trees in their day-to-day data mining work”* Mark Levene, The Computer Journal, Oxford University Press, 2008
* *“The book presents an interesting and pleasant introduction to the topic, which can guide the reader to the knowledge of the existing decomposition methods, and to the choice of those most promising for the problems he has to face."* Zentralblatt MATH, 2007
* *“Here they give students and professionals what they need to grow decision trees, evaluate classification trees, split criteria, "prune" trees, create advanced decision trees and forests, manage incremental learning of decisions trees, select features, make fuzzy trees, combine decision trees with other techniques and classify sequences. Their text is accessible and loaded with examples, and their bibliography is especially comprehensive.”* SciTech Book News, 2008
* *“… the book is a very useful and nice coverage of the field … It is highly recommendable for people who want to begin working in this field and need guidance to start into the large area of applying these methods.”* Zentralblatt MATH, 2008.
* *“… This handbook provides an excellent guide in every aspect of the discovery process… This new edition again serves to define the current state of the art in knowledge discovery ... It is an indispensable reference for researchers and an excellent starting point for advanced students taking graduate courses in this area. Summing Up: Highly recommended (Cheung, J Y, Data mining and knowledge discovery handbook. Choice, 48(10), 1953-1953, June, 2011)*
* *“I recommend this comprehensive book to advanced readers--including designers and architects at software companies--interested in the R&D of data mining.” (K. Balogh, ACM Computing Reviews, November, 2011)*
* *“…. The model is not only able to predict and explain a phenomenon in the datasets; it also utilizes a problem's domain knowledge to suggest specific actions for achieving optimal changes in the values of the target attributes ... The book is very well written, easy to understand, and easy to follow. Each chapter is well organized.” (Xiannong Meng, ACM Computing Reviews, October, 2014)*

Prof. Rokach established the Machine Learning Research Laboratory in BGU which hosts graduate students working in a lab during the academic year. The lab carries out research and projects in the broad area of machine learning and its applications, and specifically, the lab promotes innovative adaptations of machine learning methods to create the next generation of Intelligent Systems. Since its establishment in March 2006, the machine learning lab has been involved in more than two dozen research projects that attracted a significant amount of funding. Among the institutions that have funded Prof. Rokach’s research are: Deutche Telekom Co., Intel, IBM, EMC, Lockheed Martin, General Motors, the Israeli Ministry of Defense (Center for Development of Means and Infrastructure), and the Israeli Ministry of Trade and Commerce. His current research and research group interests are in intelligent information processing systems, such as:

* Ensemble Learning
* Decision Trees
* Cyber Security, Malware Detection and User Authentication and Verification
* Privacy Preserving Data Mining
* Recommender Systems
* Anomaly Detection
* Text Mining and Information Extraction from Text
* Scientific Digital Libraries and Scientometrics
* Social Networks Analysis
* Data Mining for Science
* Novel applications and architectures of intelligent information systems for big data.
* Survival Analysis

Prof. Rokach has made core contributions to the field of machine learning by developing novel ensemble learning algorithms. He has been involved in the creation and development of various novel recommender systems which are deployed in real large scale e-commerce web-sites serving millions of users. Prof. Rokach has highly contributed to the field of Information Security by developing machine learning algorithms that are capable of identifying malwares and protecting user data and privacy. He is the awardee of the 2012 BGU Toronto Prize for young researchers. His research has been highlighted in many places including the BBC Radio, CBS News, The Telegraph, Internet World, Israel Channel 2, Reshet Bet (Israel Leading National News Radio Station), and Galei Tzahal (the official Israel Defense Forces Radio), Yedioth Ahronoth (Israel’s largest daily newspaper), Haaretz (Israel's oldest daily newspaper), The Jerusalem Post, Calcalist, Globes and The Marker (daily financial newspapers).

Prof. Rokach is currently serving as an area editor for Information Fusion (published by Elsevier). He has recently served as a Guest-Editor in Information Sciences (published by Elsevier) for a Special Issue titled “Data Mining for Information Security”. He regularly serves on related conference program committees (such as ACM RecSys, ACM KDD, and ACM CIKM) and has helped organize several sessions. He has given several invited and keynote talks. He regularly serves as a referee for many international journals, research proposals, books proposals, and PhD committees.

Prof. Rokach is an excellent educator who takes special interest in inspiring students. He has supervised more than 50 graduate students at all levels, from master degrees to post-docs. The majority of his students received honorable recognition through their research presentation from universities all over the globe. Prof. Rokach co-established the MSc program in Data Mining and Business Intelligence. Graduates of this program acquire a variety of skills required for integrating cutting edge information technologies with data analytics methods. The program offers a unique mix of courses in IT, in statistics and in machine learning. He was involved in the development of two courses for the Israeli Open University and has won six awards for excellence in teaching from three different institutes.

Lior is an active entrepreneur with several patents and technology licenses. Prior to Ben-Gurion University, Prof. Rokach was involved for more than 15 years in information technology development and design. He was co-founder, CTO, VP R&D, and Chief Architect of several technology startups and mature public companies. In 2000, Lior co-founded Kamoon that developed Tacit Knowledge Management (TKM) software enabling organizations to maximize employees' know-how and expertise by matching requestors to the right expert, facilitating and capturing the interaction process, and measuring the process for continuous improvement. Kamoon Inc. has attracted a total funding of 25 million USD from various ventures capitals. In March of 2003, Kamoon acquired Actionbase, a provider of collaborative execution management solutions. Among Kamoon’s clients were FedEx, Sony, AT&T, Unisys, SAP, and others. Dr. Lior Rokach served in the Israeli Defense Force's prestigious central intelligence unit (8200). He is married to Ronit Flint. They live in Omer with their four boys.