

CURRICULUM VITAE

Boris Mirkin

Tenured Professor

Department of Data Analysis and Machine Intelligence
National Research University “Higher School of Economics”

Moscow, 3 Kochnovski Proezd, Russia

Phone: +7-495-316-4641

E-mail: bmirkin@hse.ru, Web-page: <https://www.hse.ru/en/staff/bmirkin>



Professor Emeritus

Department of Computer Science and Information Systems

Birkbeck University of London, Malet Street, WCE1 7X, London, UK

e-mail: mirkin@dcs.bbk.ac.uk, Web-page: www.dcs.bbk.ac.uk/~mirkin

Research Interests

Mathematical models and algorithms for visualization, clustering and interpretation of data in molecular biology, genomics, sociology, ecology, and other applications; related issues in data mining, knowledge discovery, and in text and mixed scale data analysis.

Qualifications

- MSc, Computer Science (Hon), Saratov State University, Russia, 1964
- PhD, Computer Science, Saratov State University, Russia, 1966
- DSc, Systems Engineering and Statistics, Russian Academy of Sciences, Moscow, Russia, 1990

Positions

- Research/Senior Research Associate, Head of Division, Institute of Economics, Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia USSR (1967-1982)
- Associate Professor part-time, Department of Mathematics and Economics, Novosibirsk University, Russia USSR (1970-1982)
- Senior Research Associate, Leading Research Fellow, Central Economics and Mathematics Institute of the Russian Academy of Sciences, Moscow, Russia (1982-2000, on leave from 1991-2000)
- Associate/Full Professor part-time, Department of Mathematics, Higher School of the Trade Unions, Moscow, Russia (1985-1991)
- Consultant, International Energy Agency, OECD, Paris, France (1992-1993)
- Research Associate, DIMACS Rutgers University of NJ, USA (1993-1998, supported by ONR USA grants)
- Visiting Research Professor, Division of Bioinformatics, German National Cancer Centre, Heidelberg, Germany (1996-1999)
- Professor of Computer Science (Professor Emeritus from 2010), Department of Computer Science Birkbeck University of London UK (2000-2010)
- Professor (Tenured Professor from 2010), Department of Data Analysis and Machine Intelligence, National Research University Higher School of Economics, Moscow RF (2008-present)

Selected Professional Activities

- Member of the UK EPSRC Computing Peer Review College (2003– present)
- Member of the British Classification Society (BCS) (2001 – present), member of the Council of the BCS (2003-2010), member of the Council of the International Federation of Classification Societies (2003-2010), member of the Editorial Board of the Journal of Classification (2009-present)
- Organised a number of conferences and workshops including the All-Union Conference on Theory and Practice of Classifications (Pushchino, Russia, 1990), International Symposium “Hierarchies in Biology” (Rutgers University USA, 1996), United Kingdom Workshop on

- Computational Intelligence UKCI (London, 2005) and 13th International Conference on Rough and Fuzzy sets (Moscow 2011)
- Reviewing for funding agencies, conferences and a dozen of professional journals (about 25-30 items a year)
 - Joint projects supported by invited visits with groups in:
 - National Center for Biotechnology Information NIH, Bethesda USA (2001- 2005)
 - University of Reunion, Island of Reunion, France (2003 –2006)
 - Rutgers University NJ USA (1992 –2008, supported by two grants from ONR)
 - Katholieke Universiteit Leuven Belgium (2004 - 2007)
 - New University of Lisbon (2007 – 2011, supported by two funded projects)
 - Univercite du Quebec Canada (2015 -2016)
 - Invited speaker at International meetings including Conference of North-American Classification Society (2001), German Classification Society (2002, 2006, 2008), International Federation of Classification Societies (2001, 2006, 2010), International Conference on Pattern Recognition and Machine Intelligence (2011), Inaugural Conference on Systems Analysis (2015), etc.
 - Supervised and co-supervised 18 successful PhD theses; 10 of them in Russia, 8 in the UK and other European countries. Participated in 9 PhD exams as Examiner in the UK (2003-2012).

Selected refereed research publications since 2012

- Amorim R., Mirkin B. (2012) Minkowski metric, feature weighting and anomalous cluster initializing in K-Means clustering, *Pattern Recognition*, 45, 1061-1075.
- Mirkin B., Nascimento S. (2012) Additive spectral method for fuzzy cluster analysis of similarity data including community structure and affinity matrices, *Information Sciences*, 183, 16-34.
- Nascimento S., Mirkin B. G., Felizardo R. (2013) Laplacian normalization for deriving thematic fuzzy clusters with an additive spectral approach, *Expert Systems: The Journal of Knowledge Engineering*, 30(4), 294-305.
- Nascimento S., Casca S., Mirkin B. G. (2015) A seed expanding cluster algorithm for deriving upwelling areas on sea surface temperature images, *Computers & Geosciences*, 85(B), 74-85.
- Ignatov D. I., Gnatyshak D. V., S. O. Kuznetsov, B. G. Mirkin (2015) Triadic formal concept analysis and triclustering: searching for optimal patterns, *Machine Learning*, 101(1), 271-302.
- de Amorim, R. C., Makarenkov, V., & Mirkin, B. (2016). A-Ward p β : Effective hierarchical clustering using the Minkowski metric and a fast k-means initialisation. *Information Sciences*, 370, 343-354.
- Nascimento, S., & Mirkin, B. (2017). Applying Anomalous Cluster Approach to Spatial Clustering. In *Uncertainty Modeling* (pp. 147-157). Springer International Publishing.
- de Amorim, R. C., Shestakov, A., Mirkin, B., & Makarenkov, V. (2017). The Minkowski central partition as a pointer to a suitable distance exponent and consensus partitioning. *Pattern Recognition*, 67, 62-72.

Main research results (principal ones in bold)

1966 – pre-base equations in the algebra of events for abstract automata design (supervised by M. Spivak)

1970 – distance between partitions with axioms (jointly with L. Cherny)

1974 – method for structural partitioning and application to industrial organization design (jointly with V. Kupershtoch and V. Trofimov)

1974 – method for linear maps of gene structures (jointly with S. Rodin)

1975 – method for uniform clustering with subtracted threshold (jointly with V. Kupershtoch and V. Trofimov)

1976 – method for qualitative hidden factor analysis of similarity matrices via sequential extraction of additive clusters (1987, jointly with V. Kupershtoch and V. Trofimov),

biclusters (1995, jointly with P. Arabie and L. Hubert), fuzzy spectral clustering (2009, jointly with S. Nascimento), anomalous clusters (2005), and the like

1977 – method for finding chain structures in similarity matrices (jointly with N. Vyssotskaya, V. Kupershtoch and V. Trofimov)

1979 – federation group choice functions and characterization

1980 – symmetric criteria for consensus clustering (jointly with I. Muchnik)

1983 – method for scoring association between features measured in different scale types

1990 – method for principal cluster analysis with mixed scale data

1990 – relation between feature normalization, their contribution to the data scatter, and association indexes for categorical features

1994 – method for interpretation of gene trees over a species phylogenetic tree via gene duplications (jointly with I. Muchnik and T. Smith)

1999 – method for conjunctive description of groups of objects

2003 – method for reconstruction of scenarios of individual gene evolution over a phylogenetic tree with loss/gain events (jointly with T. Fenner)

2003 – method of proportional membership for fuzzy clustering (jointly with S. Nascimento)

2005 – intelligent version of k-means clustering

2006 – classifier based on annotated suffix tree (jointly with M. Levene and R. Pampapathi)

2009 – method PAR for automated interpretation of activities by lifting query sets in a hierarchical ontology of a domain (jointly with T. Fenner and S. Nascimento)

2011 – method of triclusters (jointly with A. Kramarenko)

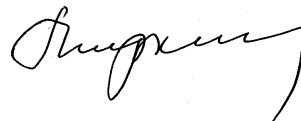
2012 – method FADDIS (spectral-additive) for finding fuzzy clusters over similarity matrices (jointly with S. Nascimento)

2012 – intelligent version of k-means with automated feature weighting (jointly with R. de Amorim)

2013 – method for approximate linear stratification over multiple criteria (jointly with M. Orlov)

2014 – method for building reference graphs between selected phrases over a text collection with annotated suffix trees (jointly with E. Chernyak and M. Dubov)

2015 – method for scoring the level of research results over a taxonomy of the domain (jointly with M. Orlov)



October 30, 2017