



TAIWAN-ISRAEL

"ARTIFICIAL INTELLIGENCE AND LEARNING ALGORITHMS" &
"EFFECT OF HUMAN ACTIVITIES ON MARINE ENVIRONMENT"
WORKSHOP

Organizers

National Science Council, Republic of China
Ministry of Science and Technology, State of Israel
National Cheng Kung University, Taiwan
National Taiwan Ocean University, Taiwan



Program Chair Message

We are happy to welcome you to the 2012 Taiwan-Israel "Artificial intelligence and learning algorithms" & "Effect of human activities on marine environment" Workshop, held in National Cheng Kung University, Tainan, Taiwan, November 06 – 07, 2012. This workshop provides a forum for researchers, scientists, and faculties to discuss on Artificial Intelligence and Marine Science and to exchange ideas, opinions, and the latest results in these important fields.

Following the success of the 2011 workshop held in the University of Haifa, Israel, this Taiwan-Israel workshop is dedicated to the promotion and advancement of all aspects of Artificial Intelligence and Marine Science in both countries. In this workshop, the latest findings in the effects of global warming, ocean acidification and human activities on marine environment and ecosystem will be reported and discussed in the workshop. The machine learning techniques and intelligence algorithms will be investigated and explored as well.

This year, we are putting together a rich program by 10 delegations from Israel and 20 delegations from Taiwan. Invited talks are arranged and research results are to be presented. Collaboration between two sides is one of the key goals that we wish to achieve in this workshop.

We are extremely grateful to the sponsors, National Science Council, Republic of China, and Ministry of Science and Technology, State of Israel. We wish to express our appreciation to the supporters, including National Cheng Kung University and National Taiwan Ocean University.



Gwo-Ching Gong
National Taiwan Ocean University



Sheng-Tzong Cheng
National Cheng Kung University

Taiwan-Israel "Artificial intelligence and learning algorithms" & "Effect of human activities on marine environment" Workshop

November 06 (Tuesday)		
09:30-10:00	Registration	
10:00-10:30	Openning Ceremony	
10:30-11:00	Coffee Break	
11:00-11:30	Larry Manevitz (Brain Pattern Recognition and Mapping via Machine Learning Tools:Cases of One-Class Pattern Recognition and Identifying Relevant Voxels using Stable Liquid State Machines)	Aldo Shemesh (Anthropogenic changes as detected by siliceous and carbonate paleoceanography)
11:30-11:50	Von-Wun Soo (Agent-based automated negotiation for power restoration in a smart grid)	Hui-Ling Lin (The Succession of Modern Foraminifera: Observations from Sediment Traps off Southwest Taiwan Waters)
11:50-12:10	Chia-Mei Chen (Attack Sequence Detection Using Hidden Markov Model)	Yuan-Pin Chang (Long-term Variations of Intermediate Water in the Okinawa Trough and the Implications on Paleoclimate)
12:10-14:00	Lunch @ 雨荷舞水	
14:00-14:30	Nachum Dershowitz (Using Semantics)	Ariel Kushmaro (Coral nutrition, defense and adaptation to changing environment: the role of it' s associated microbial community)
14:30-14:50	Wen-Yang Lin (Resource-Aware Frequent Pattern Mining over Data Streams: A Generic Approach)	Chau-Ron Wu (The forcing mechanism leading to the Kuroshio intrusion into the South China Sea)
14:50-15:10	Hsing-Kuo Pao (Malicious URL Detection Based on Kolmogorov Complexity Estimation)	Chih-Ching Chung (Phylogenetic distribution of Synechococcus in the surface East China Sea, inferring from their phycocyanin operon)
15:10-16:10	NCKU Museum Visit	
16:10-16:40	Shaul Markovith (Anytime Learning of Anycost Classifiers)	Rosenfeld Hanna (Reproductive activity of Bluefin Tuna (Thunnus thynnus) in the Mediterranean Sea)
16:40-17:00	Husan-Tien Lin (Feature-aware Label Space Dimension Reduction for Multi-label Classification)	I-Shiung Chen (Seasonal fluctuation of larval fish community of the Dongshar Island, South China Sea by Fish light traps)
17:00-17:20	Yuh-Jye Lee(Anomaly Detection via Online Over-Sampling Principal Component Analysis)	Shinya Shikina (Germ cell development in the scleractinian coral Euphyllia ancora (Cnidaria, Anthozoa)
18:00-20:00	Banquet @ Shangri-La (B1 Chi-Kan Hall)	

November 07 (Wednesday)		
09:30-10:00	Moshe Koppel (Authorship Attribution: What's Easy and What's Hard?)	Yehuda Benayhu (Octocorals: Challenges in research)
10:00-10:20	Fang-Jing Wu (Transportation Activity Analysis Using Smartphones)	Chang-Feng Dai (Dynamics of marginal coral communities in northeastern Taiwan)
10:20-10:40	Wen-Yu Su (Analysis of Musical Recordings and Expressive Sound Synthesis)	Ker-Yea Soong (Why and How Does the Sponge Terpios hoshinota)
10:40-11:00	Coffee Break	
11:00-11:30	Tei-Wei Kuo (Opportunities and Positioning of Storage-Class Memory)	Maoz Fine (Corals and Coral reefs under ocean acidification and climate change)
11:30-11:50	Chang-Shing Lee (Applications of Type-2 Fuzzy Sets to Game of Go and Adaptive Assessment)	Wen-Chen Chou (Coastal CO2 distribution patterns altered by increasing eutrophication from large rivers: a case studyin the Changjiang-East China Sea system)
11:50-12:10		Fuh-Kwo Shiah (Distinct Bacterial production-DOC-Primary production relationships in the South China Sea shelf)
12:10-14:00	Lunch @ Chi-Mei Café	
14:00-17:00	Touch Center Visit	
14:00-17:00	Closing and Coffee Break	

Israel Delegations

Larry M. Manevitz

Prof. Larry M. Manevitz is on the faculty of the Computer Science Department, University of Haifa. He is the current head of the Neurocomputation Laboratory, located at the Caesarea Rothschild Institute located there. He is a co-founder of the Rothschild Institute and has served as its director. He was also the founding director of the HIACS Research Center (Haifa research center for Advanced Computer Science). (These research centers have about 12% of all the external grants of the University of Haifa.)



His Ph.D. is in Mathematics from Yale University with a specialty in applied mathematical logic (model theory); his B.Sc. is from Brooklyn College, CUNY. He has held many visiting positions in both mathematics and computer science including Stanford University, U. Texas (Austin), NASA Ames Research Center, U. Maryland, U. Wisconsin., Oxford University (Experimental Psychology), Royal Holloway (U. London), Baruch College, CUNY, Courant Institute (NYU), Hebrew University, and most recently at the Rotman Brain Research Center (U. Toronto).

Currently, his laboratory (the Neurocomputation Laboratory) has been focusing on pattern recognition, both temporal and static, including the use of machine learning techniques for fMRI classification and brain modeling. His laboratory also computationally models various psychological theories. Previous research includes applied model theory (especially non-standard analysis) to other areas of mathematics (stochastic processes, number theory, foundations, algebra), methods of combining uncertain information, and various techniques of artificial intelligence and soft computing to the finite element method. The laboratory web site is <http://neurocomputation.wordpress.com> which also has a full downloadable list of his (around 100) scientific publications.

Title:

Brain Pattern Recognition and Mapping via Machine Learning Tools: Cases of One-Class Pattern Recognition and Identifying Relevant Voxels using Stable Liquid State Machines

Abstract:

In the last ten years or so, the use of Machine Learning Tools for Human Brain Scan data has established itself both for cognitive brain pattern recognition and for aiding the development of human brain maps. Most pattern recognition is accomplished with two-class methodology as it is generally thought that one-class techniques can not reach appropriate levels of accuracy.

In this talk we will show how a synergy of a one-class pattern recognition technique based on neural networks together with aggressive feature selection based on genetic algorithms can result in one-class results at about the level of two-class. As time allows, we will also sketch how the use of a temporal pattern classifier based on a stabilized version of the Liquid State Machine can be used to successfully pick out relevant voxels and to produce a model of such voxels that are totally data driven and do not depend on BOLD assumptions.

Nachum Dershowitz

Curriculum Vitae
Spring 2010

Personal Data

- School of Computer Science
Tel Aviv University
Ramat-Aviv 69978
Israel
- Home phone: +972-77-493-6250
- Email: nachumd@tau.ac.il
- Website: <http://www.cs.tau.ac.il/~nachum>
- Born: December 30, 1951 (Malden, Massachusetts, USA)
- Married: Schulamith C. Halevy, May 27, 1975
- Children: Erga, November 12, 1976; Idan, June 15, 1982



Main Research Interests

- *Automated deduction*: Rewrite systems; Satisfiability; Equational reasoning; Verification
- *Artificial intelligence*: Machine translation; Natural language processing; Machine learning; Automated reasoning
- *Programming language semantics*: Rewrite systems; Termination
- *Software*: Calendrical algorithms; Analysis of historical manuscripts

Education

- Weizmann Institute of Science, Rehovot, Israel (1973-1978): Ph.D. in Applied Mathematics, 1979 (advisor: Zohar Manna); M.Sc. in Applied Mathematics, 1975
- Stanford University, Stanford, California (1975-1978): Research Assistant
- Bar-Ilan University, Ramat-Gan, Israel (1972-1973): B.Sc. (*summa cum laude*) in Computer Science-Applied Mathematics, 1974
- Jerusalem College of Technology, Jerusalem, Israel (1969-1972): Practical Engineer in Computer Science, 1973
- Brooklyn College, Brooklyn, New York (1968-1969): Mathematics Major

Academic Appointments

- Full Professor (1998-present), School of Computer Science, Tel Aviv University, Israel
- Visiting Researcher (Spring 2007, Spring 2008), Microsoft Research, Redmond, WA
- Full Professor (1990-1998), Department of Computer Science, University of Illinois at Urbana-Champaign, USA
- Professor Invité (Spring 1997), Laboratoire de Recherche en Informatique, Université Paris-Sud, France
- Professor Associé (Spring 1997), Laboratoire de Spécification et Vérification, Ecole Normale Supérieure de Cachan, France
- Visiting Research Professor (1996-1997), Department of Computer Science, Hebrew University, Jerusalem, Israel
- Visiting Professor (1994-1999), Department of Computer Science, University of Chicago,

- Chicago, IL
- Meyerhoff Visiting Fellow (Spring 1993), Department of Applied Mathematics, Weizmann Institute, Rehovot, Israel
- Lady Davis Visiting Professor (Fall 1992), Department of Computer Science, Hebrew University, Jerusalem, Israel
- Visiting Professor (Fall 1992), Department of Computer Science, Tel Aviv University, Tel Aviv, Israel
- Visitor (Summer 1991), Department of Computer Science, Hebrew University, Jerusalem, Israel
- Associate Professor (1984-1990), Department of Computer Science, University of Illinois at Urbana-Champaign, USA
- Visiting Professor (Summer 1989), Institut National de Recherche en Informatique et en Automatique
- Visiting Research Associate Professor (1986-1988), Department of Computer Science, Hebrew University, Israel
- Associate Professor (Spring 1984), Department of Mathematics and Computer Science, Bar-Ilan University, Israel
- Assistant Professor (1979-1984), Department of Computer Science, University of Illinois at Urbana-Champaign, USA
- Professor Associé (Fall 1983), Laboratoire de Recherche en Informatique, Université Paris-Sud, France
- Visiting Research Assistant Professor (1981-1982), Department of Mathematics and Computer Science, Bar-Ilan University, Israel
- Visiting Researcher (July 1980), Institut National de Recherche en Informatique et en Automatique, France
- Visiting Researcher (July 1979), Department of Applied Mathematics, Weizmann Institute of Science, Israel
- Visiting Research Assistant Professor (1978-1979), Department of Computer Science, University of Illinois at Urbana-Champaign, USA
- Research Assistant (1977-1978), Department of Computer Science, Stanford University, Stanford, CA, USA
- Visiting Scholar (1975-1977), Department of Computer Science, Stanford University, USA
- Research Assistant (1973-1974), Department of Applied Mathematics, Weizmann Institute of Science, Rehovot, Israel

Consulting Activities

- Genazim (Friedberg Genizah Project), Israel, 2008-2010
- Transformer Ltd., Israel, 2006-2007
- Celebros Ltd., Israel, 2000-2006
- Intel Corporation, Israel, 1999
- GTE Labs, Waltham, MA, USA, 1988
- Kestrel Institute, Palo Alto, CA, USA, 1986
- Computer Science Laboratory, The Aerospace Corporation, El Segundo, CA, USA, 1981-1986
- Institute for Information Retrieval and Computational Linguistics, Bar-Ilan University, Ramat-Gan, Israel, 1982
- Department of Religious Studies, Stanford University, Stanford, CA, USA, 1977
- KEDMA--Project in computational linguistics, Bar-Ilan University, Ramat-Gan, Israel, 1972-1974

Professional Activities

- Editor, *Ganita Bharati: Bulletin of the Indian Society for History of Mathematics*
- Founding Member (1998-present), *IFIP WG1.6 on Term Rewriting*
- Organizer (2010), YuriFest -- Symposium on Logic in Computer Science Celebrating Yuri

- Gurevich's Seventieth Birthday, Brno
- Programme Committee (2010), *Intl. Conf. on Logic for Programming, Artificial Intelligence and Reasoning*
- Programme Committee (2010), *Intl. Conf. on Unconventional Computation*
- Organizer (2009), CRI Symposium on Computational Semantics -- in Honor of Jeffrey Zucker
- Programme Co-Chair (2009), *Intl. Conf. on Unconventional Computation*
- Organizing Committee (2009), *Workshop on Verification of Infinite-State Systems*
- Programme Chair (2007), *Intl. Conf. on Logic for Programming, Artificial Intelligence and Reasoning*
- Program Committee (2007), *Intl. Symp. on Logic in Computer Science*
- Program Committee (2007), *Intl. Conf. on Language and Automata Theory and Applications*
- Faculty (2007), *International PhD School in Formal Languages and Applications*, Tarragona, Spain
- Program Committee (2007), *Intl. Workshop on Termination*
- Organizer (2006), *Computation Day at Tel Aviv -- in Honor of Boaz (Boris) Trakhtenbrot's Eighty-Fifth Birthday*
- Organizing Committee Chair (2004), *Logic and Computer Science Semester at Tel Aviv*
- Organizer (2003), *Theoretical Computer Science Day at Tel Aviv -- in Honor of Zohar Manna's Sixty-Fourth Birthday*
- Program Chair and Organizer (2003), *Intl. Symposium on Verification in Honor of Zohar Manna*, Taormina, Italy
- Organizing Committee Chair (2003), *Intl. Logic and Computer Science Semester at Tel-Aviv*
- Member (1999-2003), Construction of Computational Logics Working Group
- Program Committee (2002), *Symposium in Honor of Bruno Buchberger's 60th Birthday*, Castle of Hagenberg, Austria
- Program Chair (2001), *Bar-Ilan International Symposium on the Foundations of Artificial Intelligence*
- Program Committee and Conference Chair (2001), *Intl. Workshop on Termination*
- Conference Chair (2001), *Intl. Conf. on Rewriting Techniques and Applications*
- Organizer (2001), *Logic Day at Tel Aviv -- in Honor of Yoram Hirshfeld's Sixtieth Birthday*
- Organizing Committee (1999-2001), *Federated Logic Conference*
- Organizing Committee Chair (1998-2001), *Intl. Conf. on Rewriting Techniques and Applications*
- Organizing Committee (1998-2000), *Intl. Symp. on Logic in Computer Science*
- Co-Chair (2000), *Intl. Workshop on Rule-Based Programming*
- Co-Director (1985-1998), Automated Deduction and Programming Laboratory, Department of Computer Science, University of Illinois
- Organizing Committee (1990-1996), *Intl. Conf. on Rewriting Techniques and Applications*
- Member Directorship (1983-1996), International School for the Synthesis of Expert Knowledge, Udine, Italy
- Program Chair (1989), *Intl. Conf. on Rewriting Techniques and Applications*
- Acting Director (1974-1975), KEDMA--Project in computational linguistics, Bar-Ilan University, Ramat-Gan, Israel
- Referee for over 70 journals, conferences, and granting organizations
- Presented over 200 talks at conferences, symposia, and universities

Selected Honors

- Best Paper Award, *IEEE Workshop on eHeritage and Digital Art Preservation* (Kyoto, Japan, 2009)
- Invited Lecture, HyperNet09: *The UC2009 Hypercomputation Workshop* (Ponta Delgada, Azores, 2009)
- Invited Lecture, *Intl. Joint Conference on Automated Reasoning* (Sydney, Australia, 2008)
- Test-of-Time Award, *IEEE Intl. Symp. on Logic in Computer Science* (2006)
- Invited Lecture, *International Conference on Rewriting Techniques and Applications* (Nara, Japan,

2005)

- Invited Lecture, *International Conference on Logic Programming* (St. Malo, France, 2004)
- Choice's Outstanding Academic Title Award for *Calendrical Calculations* (2002)
- Invited Lecture, Clifford Lectures in Mathematical Logic for Computer Science, Tulane University (New Orleans, LA, 2001)
- Guastalla Fellowship, Tel Aviv University (Ramat-Aviv, Israel, 1998-2000)
- Invited Lecture, *Intl. Workshop on Frontiers of Combining Systems* (Nancy, France, 2000)
- Invited Lecture, *International Symposium on Mathematical Foundations of Computer Science* (Bratislava, Slovakia, 1997)
- Invited Lecture, *Workshop on Logic, Language, Information and Computation* (Salvador, Brazil, 1996)
- Keynote Address, *International Logic Programming Symposium* (Portland, Oregon, 1995)
- Meyerhoff Visiting Fellowship, Weizmann Institute (Rehovot, Israel, 1993)
- Lady Davis Fellowship, Hebrew University (Jerusalem, Israel, 1992)
- Invited Lecture, *Theory and Practice of Software Development* (Orsay, France, 1993)
- Incomplete List of Instructors Ranked Excellent by their Students, University of Illinois (Urbana, IL, Spring 1992; Spring 1991)
- Invited Lecture, *IEEE Symposium on Logic in Computer Science* (Philadelphia, PA, 1990)
- Beckman Associate Fellowship, Center for Advanced Study, University of Illinois (Urbana, IL, 1986-1987)
- Xerox Faculty Award for Excellence in Engineering Research, Engineering College, University of Illinois (Urbana, IL, 1986)
- Invited Lecture, *Intl. Conf. on Rewriting Techniques and Applications* (Dijon, France, 1985)
- Computer Science Award Feinberg Graduate School, Weizmann Institute of Science (Rehovot, Israel, 1975)

Grants

- Israel Science Foundation Grants (2001-2004; 2005-2009), \$240,000
- Intel Corporation Equipment Grants (2001-2009), \$163,000
- Intel Corporation (2000-2001)
- Illinois-Taiwan Universities Consortium (1998)
- National Science Foundation Grants (1997-1999), \$150,000
- National Science Foundation International Program Grants (1991-1999), co-PI, co-operation with France
- National Science Foundation Grants (1985-1994), \$412,000
- NSF/DARPA Joint Initiative Grant (1990-1994), co-PI, \$667,000
- National Science Foundation Grants (1981-1985), co-PI, \$380,000
- National Science Foundation Travel Awards (1975-1985)
- IBM Scientific Center Grant (1981-1982), Associate, \$676,000

Nachum Dershowitz

PUBLICATIONS

Books

1. Nachum Dershowitz, 1983, *The Evolution of Programs*, Birkhauser, Boston, MA (358 pages).
2. Edward M. Reingold and Nachum Dershowitz, 2002, *Calendrical Tabulations*, Cambridge University Press (606+xxx pages).
3. Edward M. Reingold and Nachum Dershowitz, 2008, *Calendrical Calculations (3rd ed.)*, Cambridge University Press.

Edited Works

4. Nachum Dershowitz, editor, Apr. 1989, *Third International Conference on Rewriting Techniques and Applications* (Chapel Hill, NC), Lecture Notes in Computer Science, vol. 355, Springer-Verlag, Berlin (579+vii pages).
5. Alan Bundy, Nachum Dershowitz, Martin Golumbic, and Hélène Kirchner, editors, Aug. 1993, *Proceedings of the Workshop on Heuristics and Search Guiding in Automated Theorem Proving*, 13th International Conference on Artificial Intelligence, Chambéry, France.
6. Nachum Dershowitz and Naomi Lindenstrauss, editors, 1995, *Proceedings of the International Workshop on Conditional and Typed Rewriting Systems (Jerusalem, Israel, July 1994)*, Lecture Notes in Computer Science, vol. 968, Springer-Verlag, Berlin, Germany (375+viii pages).
7. Nachum Dershowitz and Claude Kirchner, editors, Sept. 2000, *RULE 2000: Proceedings of the First International Workshop on Rule-Based Programming*, Montreal, Canada.
8. Nachum Dershowitz, editor, June 2001, *Abstracts of the Bar-Ilan International Symposium on Artificial Intelligence (BISFAI '01)*, Ramat-Gan, Israel.
9. Nachum Dershowitz, editor, May 2001, *Extended Abstracts of the Fifth International Workshop on Termination (WST '01)*, Utrecht, Logic Group Preprint Series No. 209, Institute of Philosophy, Utrecht University, Utrecht, The Netherlands.
10. Nachum Dershowitz, editor, 2003, *Verification — Theory and Practice, Essays Dedicated to Zohar Manna on the Occasion of His 64th Birthday*, Lecture Notes in Computer Science, vol. 2772, Springer-Verlag, Berlin, Germany (783+xv pages).
11. Arnon Avron, Nachum Dershowitz, and Alexander Rabinovich, editors, Oct. 2006, Special issue on “Logic and Computation: Symposia at Tel Aviv”, *Logic Journal of the IGPL*, vol. 14, no. 5, Oxford University Press.
12. Nachum Dershowitz and Andrei Voronkov, editors, Oct. 2007, *Proceedings of the 14th International Conference on Logic for Programming, Artificial Intelligence, and Reasoning (LPAR-07; Yerevan, Armenia; October 15-19, 2007)*, Lecture Notes in Computer Science, vol. 4790, Springer-Verlag, Berlin (562+xiii pages).
13. Arnon Avron, Nachum Dershowitz, and Alexander Rabinovich, editors, 2008, *Pillars of Computer Science: Essays Dedicated to Boris (Boaz) Trakhtenbrot on the Occasion of His 85th Birthday*, Lecture Notes in Computer Science, vol. 4800, Springer-Verlag, Berlin.
14. Christian S. Calude, José Félix Costa, Nachum Dershowitz, Elisabete Freire, and Grzegorz Rozenberg, editors, September 2009, *Proceedings of the Eighth International Conference on Unconventional Computation (UC 2009; Ponta Delgada, Portugal; Sept. 2009)*, Lecture Notes in Computer Science, vol. 5715, Springer-Verlag, Berlin.
15. Nachum Dershowitz and Ephraim Nissan, editors, *Language, Culture, Computation: Studies in*

- Honour of Yaacov Choueka* (2 volumes), Lecture Notes in Computer Science, Springer-Verlag, Berlin, to appear.
16. Andreas Blass, Nachum Dershowitz, and Wolfgang Reisig, *Studies in Honor of Yuri Gurevich*, Lecture Notes in Computer Science, Springer-Verlag, Berlin, to appear.
 17. José Félix Costa and Nachum Dershowitz, eds., Special issue of *Natural Computing on Unconventional Computation*.

Chapters in Books

18. Nachum Dershowitz, 1986, "Programming by Analogy", in: *Machine Learning II: An Artificial Intelligence Approach*, R. S. Michalski, J. G. Carbonell and T. M. Mitchell, eds., chap. 15, Morgan Kaufmann, Los Altos, CA, pp. 395-423.
19. Nachum Dershowitz, 1986, "Program Abstraction and Instantiation", in: *Readings in Artificial Intelligence and Software Engineering*, C. Rich and R. Waters, ed., chap. IX, Morgan Kaufmann, Los Altos, CA, pp. 475-490. Reprinted from *ACM Transactions on Programming Languages and Systems*.
20. Nachum Dershowitz and David A. Plaisted, 1988, "Equational Programming", in: *Machine Intelligence 11: The logic and acquisition of knowledge*, J. E. Hayes, D. Michie and J. Richards, eds., chap. 2, Oxford Press, Oxford, pp. 21-56.
21. Nachum Dershowitz, 1989, "Completion and Its Applications", in: *Resolution of Equations in Algebraic Structures, vol. 2: Rewriting Techniques*, H. Ait-Kaci and M. Nivat, eds., chap. 2, Academic Press, New York, pp. 31-86.
22. Leo Bachmair, Nachum Dershowitz and David A. Plaisted, 1989, "Completion Without Failure", in: *Resolution of Equations in Algebraic Structures, vol. 2: Rewriting Techniques*, H. Ait-Kaci and M. Nivat, eds., chap. 1, Academic Press, New York, pp. 1-30.
23. Nachum Dershowitz and Jean-Pierre Jouannaud, 1990, "Rewrite Systems", in: *Handbook of Theoretical Computer Science, vol. B: Formal Methods and Semantics*, chap. 6, pp. 243-320, J. van Leeuwen, ed., North-Holland, Amsterdam.
24. Nachum Dershowitz, 1993, "A Taste of Rewriting", in: *Functional Programming, Concurrency, Simulation and Automated Reasoning*, P. Lauer and J. Zucker, eds., Springer-Verlag, Berlin, Lecture Notes in Computer Science, vol. 693, pp. 199-228.
25. Nachum Dershowitz, 1995, "33 Examples of Termination", in: *French Spring School of Theoretical Computer Science Advanced Course on Term Rewriting (Font Romeaux, France, May 1993)*, H. Comon and J.-P. Jouannaud, eds., Lecture Notes in Computer Science, vol. 909, Springer-Verlag, Berlin, Germany, pp. 16-26.
26. Nachum Dershowitz and Edward M. Reingold, 1998, "Implementing Solar Astronomical Calendars", in: *Birashkname*, M. Akrami, ed., Shahid Beheshti University, Tehran, Iran, pp. 477-487.
27. Nachum Dershowitz and Edward M. Reingold, "Calendars", *McGraw-Hill Encyclopedia of Science & Technology*, 8th ed., 2000. Also available on CD-ROM: *McGraw-Hill Multimedia Encyclopedia of Science & Technology*, Release 2.0, 2000.
28. Nachum Dershowitz, 2000, "[Hebrew] Calendar", in: *Reader's Guide to Judaism*, M. Terry, ed., Fitzroy Dearborn, Chicago, IL, pp. 97-98.
29. Nachum Dershowitz and David A. Plaisted, 2001, "Rewriting", chap. 9 in: *Handbook of Automated Reasoning*, vol. 1, A. Robinson and A. Voronkov, eds., Elsevier, pp. 535-610.
30. Nachum Dershowitz, 2003, "Pæan to Zohar Manna", in: *Verification — Theory and Practice, Essays Dedicated to Zohar Manna on the Occasion of His 64th Birthday*, N. Dershowitz, ed., Lecture Notes in Computer Science, vol. 2772, Springer-Verlag, Berlin, Germany, pp. 1-10.
31. Nachum Dershowitz, D. N. Jayasimha, and Seungjoon Park, 2003, "Bounded Fairness", in: *Verification — Theory and Practice, Essays Dedicated to Zohar Manna on the Occasion of His 64th Birthday*, N. Dershowitz, ed., Lecture Notes in Computer Science, vol. 2772, Springer-

- Verlag, Berlin, Germany, pp. 304-317.
32. Nachum Dershowitz, Dec. 2005, "Primitive Rewriting", in: *Processes, Terms and Cycles: Steps on the Road to Infinity. Essays Dedicated to Jan Willem Klop on the Occasion of his 60th Birthday*, A. Middeldorp, V. van Oostrom, F. van Raamsdonk, and R. de Vrijer, eds., Lecture Notes in Computer Science, vol. 3838, Springer-Verlag, Berlin, pp. 127-147.
 33. Arnon Avron, Nachum Dershowitz, and Alexander Rabinovich, 2008, "Boris A. Trakhtenbrot: Genealogy and Publications", in: *Pillars of Computer Science: Essays Dedicated to Boris (Boaz) Trakhtenbrot on the Occasion of His 85th Birthday*, Arnon Avron, Nachum Dershowitz, and Alexander Rabinovich, eds., Lecture Notes in Computer Science, vol. 4800, Springer-Verlag, Berlin, pp. 46-57.
 34. Udi Boker and Nachum Dershowitz, 2008, "The Church-Turing Thesis over Arbitrary Domains", in: *Pillars of Computer Science: Essays Dedicated to Boris (Boaz) Trakhtenbrot on the Occasion of His 85th Birthday*, Arnon Avron, Nachum Dershowitz, and Alexander Rabinovich, eds., Lecture Notes in Computer Science, vol. 4800, Springer-Verlag, Berlin, pp. 199-229.
 35. Nachum Dershowitz and Claude Kirchner, July 2008, "Spreadspaces: Mathematically-Intelligent Graphical Spreadsheets", in: *Concurrency, Graphs and Models: Essays Dedicated to Ugo Montanari on the Occasion of His 65th Birthday*, Pierpaolo Degano, Rocco De Nicola, and José Meseguer, eds., Lecture Notes in Computer Science, vol. 5065, Springer-Verlag, Berlin, pp. 194-208.
 36. Nachum Dershowitz, May 2009, "On Lazy Commutation", in: *Languages: From Formal to Natural: Essays Dedicated to Nissim Francez on the Occasion of His 65th Birthday*, Orna Grumberg, Michael Kaminski, Shmuel Katz, and Shuly Wintner, eds., Lecture Notes in Computer Science, vol. 5533, Springer-Verlag, Berlin, pp. 59-82.
 37. Nachum Dershowitz and Edward M. Reingold, "Indian Calendrical Calculations", in: *Ancient Indian Leaps in the Advent of Mathematics*, B. S. Yadav, ed., Birkhauser, in press.
 38. Kfir Bar, Yaacov Choueka, and Nachum Dershowitz, "Matching Phrases for Arabic-to-English Example-Based Translation System", in: *Language, Culture, Computation: Studies in Honor of Yaacov Choueka*, Lecture Notes in Computer Science, Nachum Dershowitz and Ephraim Nissan, eds., Springer-Verlag, Berlin, to appear.
 39. Yaacov Choueka, Nachum Dershowitz, and Liad Tal, "Matching with a Hierarchical Ontology", *Language, Culture, Computation: Studies in Honor of Yaacov Choueka*, Lecture Notes in Computer Science, Nachum Dershowitz and Ephraim Nissan, eds., Springer-Verlag, Berlin, to appear.
 40. Udi Boker and Nachum Dershowitz, "Three Paths to Effectiveness are One", in: *Studies in Honor of Yuri Gurevich*, Andreas Blass, Nachum Dershowitz, and Wolfgang Reisig, eds., Lecture Notes in Computer Science, Springer-Verlag, Berlin, to appear.
 41. Yaacov Choueka, Roni Shweka, Lior Wolf, Rotem Littman, and Nachum Dershowitz, "Software Tools for Genizah Manuscript Research", *Codicology and Palaeography in the Digital Age II*, to appear.

Journal Articles

42. Nachum Dershowitz, 1975, "A Simplified Loop-Free Algorithm for Generating Permutations", *BIT*, vol. 15, no. 2, pp. 158-164.
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Title:

Using Semantics

Abstract:

Morphologically-rich languages pose difficulties for corpus-based methods of machine translation, because of the large number of word forms that are likely to occur rarely or be entirely absent from available corpora. Using semantic equivalents is one way of helping deal with that problem.

Curriculum Vitae

Shaul Markovitch

October 30, 2012

Personal Data

Identity No.: 53252565

Date and place of birth: 26/5/55, Israel.

Web site: <http://www.cs.technion.ac.il/~shaulm>



Academic Degrees

1989	Ph.D.	Electrical Engineering and Computer Science	University of Michigan
1985	M.Sc.	Electrical Engineering and Computer Science	University of Michigan
1982	B.Sc.	Computer Science and Mathematics	Hebrew University, Jerusalem

Academic Appointments

2007 –	Associate professor	Department of Computer Science	Technion
1995 – 2007	Senior Lecturer	Department of Computer Science	Technion
1990 – 1995	Lecturer	Department of Computer Science	Technion

Professional Experience

2009 – 2012	Visiting Scientist	Google
2002 – 2003	Consultant	Exceedo
2000 – 2001	Consultant	Zapper
1989 – 1990	Senior Research Engineer	Center for Machine Intelligence, General Motors
1987 – 1989	Research Engineer	Center for Machine Intelligence, General Motors
1986	Research Engineer	General Motors Research Laboratories
1985	Research Engineer	Artificial Intelligence Systems, Xerox

Research Interests

Artificial Intelligence, Machine Learning, Speedup Learning, Anytime Learning, Active Learning, Selective Learning, Semantics, Information retrieval, Multi-agent Systems, Adversary search, Opponent Modeling, Search, Resource-bounded reasoning, Anytime Learning, Cost-sensitive Learning

Teaching Experience

Introduction to Artificial Intelligence	undergraduate and graduate
Machine Learning	undergraduate and graduate
Operating systems	undergraduate
Laboratory in artificial intelligence	undergraduate and graduate
Laboratory in machine learning	undergraduate and graduate
Laboratory in intelligent systems	undergraduate and graduate

Technion Activities

2003 – 2004 : Technion Web Committee

Public Professional Activities

- Associate Editor, The Journal of Artificial Intelligence Research (JAIR), 2009–2015.
- Area Chair, The Twenty-Sixth Conference on Artificial Intelligence (AAAI 2012).
- Area Chair, The Twenty-Fifth Conference on Artificial Intelligence (AAAI 2011).
- Senior Program committee, The Twenty-Second International Conference on Artificial Intelligence (IJCAI 2011).
- Program committee, ICAPS 2011.
- Program committee, The Twenty-Seventh International Conference on Machine Learning (ICML 2010)
- Program Committee, The Twenty-first International Joint Conference on Artificial Intelligence (IJCAI-09).
- Program committee, The Twenty-Sixth International Conference on Machine Learning (ICML 2009)
- Program committee, The 8th International Joint Conference on Autonomous Agents and Multi Agents Systems (AAMAS 2009).

- Program committee, AAAI 2008 Workshop on Wikipedia And Artificial Intelligence: An Evolving Synergy.
- Program committee, The Twenty First Second National Conference on Artificial Intelligence (AAAI 2008).
- Program committee, The Seventh International Joint Conference on Autonomous Agents and Multi Agents Systems (AAMAS 2008).
- Editorial Board, Journal of Artificial Intelligence Research.
- Senior Program committee, The Sixth International Joint Conference on Autonomous Agents and Multi Agents Systems (AAMAS 2007).
- Senior Program committee, The Twenty Second National Conference on Artificial Intelligence (AAAI 2007).
- Program committee, The Twenty-First National Conference on Artificial Intelligence (AAAI 2006).
- Program committee, The Fifth International Joint Conference on Autonomous Agents and Multi Agents Systems (AAMAS 2006).
- Program committee, The 17th European Conference on Artificial Intelligence (ECAI 2006).
- Program committee, The Fifth International Conference on Computers and Games (CG 2006).
- Program committee, ICML 2005 Workshop on Machine Learning Techniques for Processing Multimedia Content.
- Program committee, The AAAI 2005 Workshop on Multiagent Learning.
- Program co-chair, Advances in Recommender Systems Workshop, 2005.
- Program committee, The twentieth National Conference on Artificial Intelligence (AAAI 2005).
- Program committee, The Fourth International Joint Conference on Autonomous Agents and Multi Agents Systems (AAMAS05).
- Program committee, The Twenty-First International Conference on Machine Learning (ICML 2004).
- Program committee, The Third International Joint Conference on Autonomous Agents and Multi Agents Systems (AAMAS04).
- Program committee, The Fourth International Conference on Computers and Games (CG 2004).

- Program committee, The Fourteenth International Conference on Automated Planning and Scheduling (ICAPS-2004).
- Program committee, The nineteenth National Conference on Artificial Intelligence (AAAI 2004).
- Program Committee, The symposium on *Man versus Machine: the Experiment*, Caesarea Rothschild Institute, University of Haifa, October 15-16, 2002.
- Program committee, The Eighteenth National Conference on Artificial Intelligence (AAAI 2002).
- Program committee, The Second International Conference on Computers and Games (CG 2000).
- Chair of the Israeli Association for Artificial Intelligence (starting November, 1998).
- Program chair, the 11th Israeli Symposium on Artificial Intelligence.
- Program committee The Fifteenth National Conference on Artificial Intelligence (AAAI 98). Madison, Wisconsin, 1998.
- Program committee, The First International Conference on Computers and Games (CG 98). Tsukuba Japan, 1998.
- Program committee, The 6th Bar-Ilan Symposium on Artificial Intelligence (BIFSAI 1999).
- Program committee, the 13th Israeli Symposium on Artificial Intelligence.
- Organizing chair, The first and the second Seminar Artzi on Artificial Intelligence, 1998.
- Reviewer for: IJCAI 97, AAAI 98, IJCAI 99, IJCAI 2003, Journal for Artificial Intelligence Research, ICCA Journal, Journal for Games and Economic Behavior, Computational Intelligence journal, Autonomous Agents and Multiagent Systems.
- Popular lectures in various occasions (the open day of the Technion, new students welcome, "Mahar 98" project, high school science days, television shows etc.)

Membership in Professional Societies

American Association for Artificial Intelligence

Honors

- 1995 – Muriel and David Jacknow Award for Excellence in Teaching.
- 2006 – Best PC member nomination, Fifth International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS 2006)
- 2009 – Ray and Miriam Klein Research Prize.

Graduate Students

Completed Thesis

1993	Lev Finkelstein	M. Sc.
1993	Shaul Marcus	M. Sc.
1993	Yaron Sella	M. Sc.
1993	David Carmel	M. Sc.
1994	David Lorenz	M. Sc.
1994	Irit Rosdeutscher	M. Sc.
1998	Oleg Ledeniov	M. Sc.
1998	Rivka Matosevich	M. Sc.
1998	David Carmel	Ph. D. [Main advisor. Additional supervisor: Jeff Rosenschain]
1998	Dan Rosenstein	M. Sc.
1999	Dmitry Rusakov	M. Sc. [Main advisor. Additional supervisor: Micha Lindenbaum]
2001	Tzach Livyatan	M. Sc.
2001	Shlomi Livne	M. Sc. [Main advisor. Additional supervisor: Orna Grumberg]
2002	Ronit Reger	M. Sc.
2002	Assaf Shatil	M. Sc.
2003	Dmitry Davidov	M. Sc.
2004	Asaf Amit	M. Sc.
2005	Oren Shnitzer	M. Sc.
2005	Lev Finkelstein	Ph. D. [Main advisor. Additional supervisor: Ehud Rivlin]
2006	Nela Gurevich	M. Sc. [Main advisor. Additional supervisor: Ehud Rivlin]
2006	Evgeniy Gabrilovich	Ph. D.
2008	Saher Esmeir	Ph. D.
2010	Ofer Egozi	M. Sc.
2010	Sonya Liberman	M. Sc.
2011	Anat Hashavit	M. Sc.
2012	Ariel Raviv	M. Sc.
2012	Erez Karpas	Ph. D.
2012	Omer Levy	M. Sc.

Thesis in Progress

Haggai Toledano	M. Sc.
Gal Naymark	M. Sc.
Kira Radinsky	Ph. D.
Assaf Glazer	Ph. D.

Research Grants

- 1997-1999, *Using Learning Techniques for Automated Test Generation*, Intel, \$40,000.
- 1999, *Infrastructure for Intelligent Internet Applications*, STL, \$20,000.
- 1998-2001, *Interactive Multimedia over Broad-Band Communication Channels*, Ministry of Science, \$ 1,050,000 (Consortium of three Universities).
- 1999-2001, *Integerated System for Discovery of Knowledge in Digital Libraries*, Ministry of Science, 430,000 I.S. for the first year. 250,000 I.S. for the second year.
- 2000, *Machine Learning for BDD ordering*, with Prof. Orna Grumberg, Intel, \$15,000.
- 2002-2003, *Feature Generation for Document Classification*, STL, \$40,000.
- 2003, *Feature Generation for Information Filtering*, Anti Terror Grant, \$10,000.
- 2004, *Multimedia Understanding through Semantics, Computation and Learning*, Network of Excellence of the European Community, with Michael Lindenbaum, about 112,000 Euro for 4 years.
- 2005, *Exploring Novel Decision Tree Induction Algorithms for Developing a Decision Support Tool to Treat Septic Febrile Neutropenic Patients*, with Haim Bitterman, M. D., and Yaron Denekamp, M. D., \$12,000
- 2005-2010, *MAGNET: IMG4 - Fourth generation of imaging machines*, with Michael Lindenbaum, 355,000 I.S. for first year, 453,000 I.S. for the second year.
- 2008-2011, *The knowledgeable computer: Using web-based knowledge repositories for semantic text analysis.*, The Israeli Internet Association. \$65,000 for 3 years.
- 2008-2010, *MAGNET: VOLCAN - Computerized Analysis of Video Content*, with Michael Lindenbaum, 320,000 I.S. for first year.
- 2012-2015, *Open SOurce Indicators*, IARPA as a subcontractor of Rytheon BBN, \$445,000

Publications

Theses

Shaul Markovitch. *Information Filtering: Selection Mechanisms in Learning Systems*. PhD thesis, EECS Department, University of Michigan, 1989

Refereed papers in professional journals

Published papers

1. Shaul Markovitch and Paul D. Scott. Information filtering: Selection mechanisms in learning systems. *Machine Learning*, 10(2):113–151, 1993.
2. Paul D. Scott and Shaul Markovitch. Experience selection and problem choice in an exploratory learning system. *Machine Learning*, 12:49–67, 1993.
3. Ido Dagan, Shaul Marcus, and Shaul Markovitch. Contextual word similarity and estimation from sparse data. *Computer Speech and Language*, 9:123–152, 1995.
4. Shaul Markovitch and Yaron Sella. Learning of resource allocation strategies for game playing. *Computational Intelligence*, 12(1):88–105, 1996.
5. David Carmel and Shaul Markovitch. Pruning algorithms for multi-model adversary search. *Artificial Intelligence*, 99(2):325–355, 1998.
6. David Carmel and Shaul Markovitch. Model-based learning of interaction strategies in multi-agent systems. *Journal of Experimental and Theoretical Artificial Intelligence*, 10(3):309–332, 1998.
7. Lev Finkelstein and Shaul Markovitch. A selective macro-learning algorithm and its application to the nxn sliding-tile puzzle. *Journal of Artificial Intelligence Research*, 8:223–263, 1998.
8. Lev Finkelstein and Shaul Markovitch. Learning to play chess selectively by acquiring move patterns. *ICCA Journal*, 21(2):100–119, 1998.
9. Oleg Ledeniov and Shaul Markovitch. The divide-and-conquer subgoal-ordering algorithm for speeding up logic inference. *Journal of Artificial Intelligence Research*, 9:37–97, 1998.
10. David Carmel and Shaul Markovitch. Exploration strategies for model-based learning in multiagent systems. *Autonomous Agents and Multi-agent Systems*, 2(2):141–172, 1999
11. Lev Finkelstein and Shaul Markovitch. Optimal schedules for monitoring anytime algorithms. *Artificial Intelligence*, 126:63–108, 2001.
12. Shaul Markovitch and Danny Rosenstein. Feature generation using general constructor functions. *Machine Learning*, 49:59–98, 2002.

13. Orna Grumberg, Shlomi Livne, and Shaul Markovitch. Learning to order BDD variables in verification. *Journal of Artificial Intelligence Research*, 18:83–116, 2003.
14. Shaul Markovitch and Asaf Shatil. Speedup learning for repair-based search by identifying redundant steps. *Journal of Machine Learning Research*, 4:649–682, 2003.
15. Lev Finkelstein, Shaul Markovitch, and Ehud Rivlin. Optimal schedules for parallelizing anytime algorithms: The case of shared resources. *Journal of Artificial Intelligence Research*, 19:73–138, 2003.
16. Michael Lindenbaum, Shaul Markovitch, and Dmitry Rusakov. Selective sampling for nearest neighbor classifiers. *Machine Learning*, 54(2):125–152, 2004.
17. Shaul Markovitch and Ronit Reger. Learning and exploiting relative weaknesses of opponent agents. *Autonomous Agents and Multi-agent Systems*, 10(2):103–130, March 2005.
18. Asaf Amit and Shaul Markovitch. Learning to bid in bridge. *Machine Learning*, 63(3):287–327, 2006.
19. Dmitry Davidov and Shaul Markovitch. Multiple-goal heuristic search. *Journal of Artificial Intelligence Research*, 26:417–451, 2006.
20. Saher Esmeir and Shaul Markovitch. Anytime learning of decision trees. *Journal of Machine Learning Research*, 8:891–933, May 2007.
21. Evgeniy Gabrilovich and Shaul Markovitch. Harnessing the expertise of 70,000 human editors: Knowledge-based feature generation for text categorization. *Journal of Machine Learning Research*, 8:2297–2345, Oct 2007.
22. Saher Esmeir and Shaul Markovitch. Anytime induction of low-cost, low-error classifiers: a sampling-based approach. *Journal of Artificial Intelligence Research*, 33:1–31, 2008.
23. Evgeniy Gabrilovich and Shaul Markovitch. Wikipedia-based semantic interpretation for natural language processing. *Journal of Artificial Intelligence Research*, 34:443–498, 2009.
24. Ofer Egozi, Shaul Markovitch, and Evgeniy Gabrilovich. Concept-based information retrieval using explicit semantic analysis. *ACM Transactions on Information Systems*, 29(2):8:1–8:34, 2011.
25. Saher Esmeir and Shaul Markovitch. Anytime learning of anycost classifiers. *Machine Learning*, 82(3):445–473, 2011.
26. Carmel Domshlak, Erez Karpas, and Shaul Markovitch. Online speedup learning for optimal planning. *Journal of Artificial Intelligence Research*, 44:709–755, 2012.

Research Reports (not published elsewhere)

1. Uri Keidar, Shaul Markovitch, and Erez Webman. Utilization filtering of macros based on goal similarity. Technical Report CIS9608, Technion, 1996.
2. David Carmel and Shaul Markovitch. Learning and using opponent models in adversary search. Technical Report CIS9609, Technion, 1996.
3. Shaul Markovitch and Oren Shnitzer. Self-consistent batch-classification. Technical report CIS-2005-04, Technion, 2005.

Patents

1. European Patent No. 2041669, *Text Categorization Using External Knowledge*, issued on 11/08/2011, co-authored with Evgeniy Gabrilovich.
2. US Patent No. 8108204, *Text categorization Using External Knowledge*, issued on 31/01/2012, co-authored with Evgeniy Gabrilovich)

Book Chapters

1. Paul D. Scott and Shaul Markovitch. Representation generation in an exploratory learning system. In D. Fisher and M. Pazzani, editors, *Concept Formation: Knowledge and Experience in Unsupervised Learning*. Morgan Kaufmann, 1991.
2. David Carmel and Shaul Markovitch. Opponent modeling in multi-agent systems. In Gerhard Weiss and Sandip Sen, editors, *Adaption And Learning In Multi-Agent Systems*, volume 1042 of *Lecture Notes in Artificial Intelligence*. Springer-Verlag, 1996.

Conferences

Plenary or Invited Talks

1. Invited Lecture – The Dual Taiwan-Israel Research Symposium on Artificial Intelligence and Learning Algorithms, 2011.
2. Invited Lecture – University of New South Wealth, Australia, 2011.
3. Invited Lecture – Monash University, Australia, 2011.
4. Invited Lecture – Computer Science Colloquium, Hebrew University, 2011.
5. Invited Lecture – Annual Database Summit, Haifa, 2010.
6. Invited Lecture – IBM Leadership Seminar on Information Retrieval, 2010.
7. Invited Lecture – Machine learning Workshop at Technion EE, Haifa, 2010.

8. Invited Lecture – Google Research Lab, Tel Aviv, 2009.
9. Invited Lecture – University of Haifa Workshop on Machine learning, 2009.
10. Invited Lecture – University of New South Wealth, Australia, 2008.
11. Invited Lecture – University of Melbourne, Australia, 2008.
12. Invited Lecture – Monash University, Australia, 2008.
13. Invited Lecture – Summer School at University of Illinois at Urbana-Champaign, 2008.
14. Invited Lecture – IBM Leadership Seminar on Machine Learning, Haifa, 2007.
15. Invited Lecture – Computer Science Colloquium, Hebrew University, 2007.
16. Keynote Lecture – ICML 2005 workshop on Machine Learning Techniques for Processing Multimedia Content, Bonn, 2005.
17. The Integrated Systems for Homeland Security Workshop, University of Massachusetts, Amherst, 2004.
18. Keynote speaker at the workshop on *Opponent Models in Games*, University of Maastricht, December 4, 2003.
19. Keynote speaker at The Italian-Israeli Forum on Computer Science: research and Applications of Artificial Intelligence, University of haifa, June 18, 2003.
20. The symposium on *Man versus Machine: the Experiment*, Caesarea Rothschild Institute, University of Haifa, October 15-16, 2002.
21. ICML-2000 Workshop on Multi-Agent Learning: Theory and Practice. Palo Alto, 2000.
22. The Israeli-Italian Symposium on Artificial Intelligence. Venice, Italy, 1996.
23. The 9th Israeli Symposium on Artificial Intelligence. Ramat-Gan, Israel, 1992.
24. The Symposium for Concept Formation. Palo Alto, 1990.

Refereed Papers in Conference Proceedings

1. Shaul Markovitch and Paul D. Scott. The role of forgetting in learning. In *Proceedings of The Fifth International Conference on Machine Learning*, pages 459–465, Ann Arbor, MI, 1988. Morgan Kaufmann.
2. Paul D. Scott and Shaul Markovitch. Learning novel domains through curiosity and conjecture. In *Proceedings of International Joint Conference for Artificial Intelligence*, pages 669–674, Detroit, Michigan, 1989.

3. Paul D. Scott and Shaul Markovitch. Uncertainty based selection of learning experiences. In *Proceedings of The Sixth International Workshop on Machine Learning*, pages 358–361, Ithaca, New York, 1989. Morgan Kaufmann.
4. Shaul Markovitch and Paul D. Scott. Automatic ordering of subgoals — a machine learning approach. In Ewing L. Lusk and Ross A. Overbeek, editors, *Proceedings of the North American Conference on Logic Programming*, pages 224–242, Cleveland, Ohio, USA, 1989.
5. Shaul Markovitch and Paul D. Scott. Information filters and their implementation in the SYLLOG system. In *Proceedings of The Sixth International Workshop on Machine Learning*, pages 404–407, Ithaca, New York, 1989. Morgan Kaufmann.
6. Shaul Markovitch and Paul D. Scott. Utilization filtering: a method for reducing the inherent harmfulness of deductively learned knowledge. In *Proceedings of The Eleventh International Joint Conference for Artificial Intelligence*, pages 738–743, Detroit, Michigan, 1989.
7. Marcial Losada and Shaul Markovitch. Group analyzer: A system for dynamic analysis of group interaction. In *Proceedings of 23rd Hawaii International Conference for System Sciences*, pages 101–110, Kailua-Kona, Hawaii, 1990.
8. Paul D. Scott and Shaul Markovitch. Knowledge considered harmful. In *Proceedings of IEEE Colloquium on Knowledge Engineering*, London, 1990.
9. Reuven A. Hasson, Shaul Markovitch, and Yaron Sella. Using filters to improve efficiency of game-playing learning procedures. In *Proceedings of Eleventh International Conference of the Chilean Computer Science Society*, pages 125–137, Santiago, Chile, 1991.
10. Shaul Markovitch and Irit Rosdeutscher. Systematic experimentation with deductive learning: Satisficing vs. optimizing search. In *Proceedings of the Knowledge Compilation and Speedup Learning Workshop*, Aberdeen, Scotland, 1992.
11. David Lorenz and Shaul Markovitch. Derivative evaluation function learning using genetic operators. In *Proceedings of The AAAI Fall Symposium on Games: Planning and Learning*, pages 106–114, New Carolina, 1993.
12. David Carmel and Shaul Markovitch. Learning models of the opponent’s strategy in game playing. In *Proceedings of The AAAI Fall Symposium on Games: Planning and Learning*, pages 140–147, North Carolina, 1993.
13. Shaul Markovitch and Yaron Sella. Learning of resource allocation strategies for game playing. In *Proceedings of The Thirteenth International Joint Conference for Artificial Intelligence*, pages 974–979, Chambéry, France, 1993.
14. Ido Dagan, Shaul Marcus, and Shaul Markovitch. Contextual word similarity and estimation from sparse data. In *Proceedings of the 31st Annual Meeting of the Association for Computational Linguistics*, pages 164–171, Ohio State University, 1993.

15. David Carmel and Shaul Markovitch. Learning models of intelligent agents. In *Proceedings of the Thirteenth National Conference on Artificial Intelligence*, pages 62–67, Portland, Oregon, 1996.
16. David Carmel and Shaul Markovitch. Incorporating opponent models into adversary search. In *Proceedings of the Thirteenth National Conference on Artificial Intelligence*, pages 120–125, Portland, Oregon, 1996.
17. David Carmel and Shaul Markovitch. Exploration and adaptation in multiagent systems: A model-based approach. In *Proceedings of The Fifteenth International Joint Conference for Artificial Intelligence*, pages 606–611, Nagoya, Japan, 1997.
18. David Carmel and Shaul Markovitch. How to explore your opponent’s strategy (almost) optimally. In *Proceedings of the Third International Conference on Multi-Agent Systems*, pages 64–71, Paris, France, 1998.
19. Oleg Ledeniov and Shaul Markovitch. Learning investment functions for controlling the utility of control knowledge. In *Proceedings of the Fifteenth National Conference on Artificial Intelligence*, pages 463–468, Madison, Wisconsin, 1998.
20. Michael Lindenbaum, Shaul Markovitch, and Dmitry Rusakov. Selective sampling for nearest neighbor classifiers. In *The Proceedings of the Sixteenth National Conference on Artificial Intelligence*, pages 366–371, Orlando, Florida, 1999.
21. Lev Finkelstein, Shaul Markovitch, and Ehud Rivlin. Optimal schedules for parallelizing anytime algorithms: The case of independent processes. In *Proceedings of the Eighteenth National Conference on Artificial Intelligence*, pages 719–724, Edmonton, Alberta, Canada, 2002.
22. Dmitry Davidov and Shaul Markovitch. Multiple-goal search algorithms and their application to web crawling. In *Proceedings of the Eighteenth National Conference on Artificial Intelligence*, pages 713–718, Edmonton, Alberta, Canada, 2002.
23. Evgeniy Gabrilovich and Shaul Markovitch. Text categorization with many redundant features: Using aggressive feature selection to make svms competitive with c4.5. In *Proceedings of The Twenty-First International Conference on Machine Learning*, pages 321–328, Banff, Alberta, Canada, 2004. Morgan Kaufmann.
24. Dmitry Davidov, Evgeniy Gabrilovich, and Shaul Markovitch. Parameterized generation of labeled datasets for text categorization based on a hierarchical directory. In *Proceedings of The 27th Annual International ACM SIGIR Conference*, pages 250–257, Sheffield, UK, 2004. ACM Press.
25. Saher Esmeir and Shaul Markovitch. Lookahead-based algorithms for anytime induction of decision trees. In *Proceedings of The Twenty-First International Conference on Machine Learning*, pages 257–264, Banff, Alberta, Canada, 2004. Morgan Kaufmann.

26. Evgeniy Gabrilovich and Shaul Markovitch. Feature generation for text categorization using world knowledge. In *Proceedings of The Nineteenth International Joint Conference for Artificial Intelligence*, pages 1048–1053, Edinburgh, Scotland, 2005.
27. Yaniv Hamo and Shaul Markovitch. The compset algorithm for subset selection. In *Proceedings of The Nineteenth International Joint Conference for Artificial Intelligence*, pages 728–733, Edinburgh, Scotland, 2005.
28. Saher Esmeir and Shaul Markovitch. Interruptible anytime algorithms for iterative improvement of decision trees. In *Proceedings of the 1st international workshop on Utility-based data mining*, pages 78–85, Chicago, Illinois, 2005.
29. Evgeniy Gabrilovich and Shaul Markovitch. Overcoming the brittleness bottleneck using wikipedia: Enhancing text categorization with encyclopedic knowledge. In *Proceedings of the Twenty-First National Conference on Artificial Intelligence*, pages 1301–1306, Boston, MA, 2006.
30. Nela Gurevich, Shaul Markovitch, and Ehud Rivlin. Active learning with near misses. In *Proceedings of the Twenty-First National Conference on Artificial Intelligence*, pages 362–367, Boston, MA, 2006.
31. Saher Esmeir and Shaul Markovitch. Anytime induction of decision trees: an iterative improvement approach. In *Proceedings of the Twenty-First National Conference on Artificial Intelligence*, pages 348–355, Boston, MA, 2006.
32. Saher Esmeir and Shaul Markovitch. When a decision tree learner has plenty of time. In *Proceedings of the Twenty-First National Conference on Artificial Intelligence*, pages 1597–1600, Boston, MA, 2006.
33. Evgeniy Gabrilovich and Shaul Markovitch. Computing semantic relatedness using wikipedia-based explicit semantic analysis. In *Proceedings of The Twentieth International Joint Conference for Artificial Intelligence*, pages 1606–1611, Hyderabad, India, 2007.
34. Saher Esmeir and Shaul Markovitch. Occam’s razor just got sharper. In *Proceedings of The Twentieth International Joint Conference for Artificial Intelligence*, pages 768–773, Hyderabad, India, 2007.
35. Saher Esmeir and Shaul Markovitch. Anytime induction of cost-sensitive trees. In *Proceedings of The 21st Conference on Neural Information Processing Systems (NIPS-2007)*, Vancouver, Canada, 2007.
36. Ofer Egozi, Evgeniy Gabrilovich, and Shaul Markovitch. Concept-based feature generation and selection for information retrieval. In *Proceedings of the Twenty-Third AAAI Conference on Artificial Intelligence*, pages 1132–1137, Chicago, IL, 2008.

37. Kira Radinsky, Sagie Davidovich, and Shaul Markovitch. Predicting the news of tomorrow using patterns in web search queries. In *Proceedings of the 2008 IEEE/WIC/ACM International Conference on Web Intelligence (WI'08)*, pages 363–367, Sydney, Australia, 2008.
38. Sonya Liberman and Shaul Markovitch. Compact hierarchical explicit semantic representation. In *Proceedings of the IJCAI 2009 Workshop on User-Contributed Knowledge and Artificial Intelligence: An Evolving Synergy (WikiAI09)*, Pasadena, CA, 2009.
39. Carmel Domshlak, Erez Karpas, and Shaul Markovitch. To max or not to max: Online learning for speeding up optimal planning. In *Proceedings of the Twenty-Fourth AAAI Conference on Artificial Intelligence*, pages 1071–1076, Atlanta, Georgia, 2010.
40. Kira Radinsky, Eugene Agichtein, Evgeniy Gabrilovich, and Shaul Markovitch. A word at a time: Computing word relatedness using temporal semantic analysis. In *Proceedings of the 20th International World Wide Web Conference*, pages 337–346, Hyderabad, India, March 2011.
41. Erez Karpas, Michael Katz, and Shaul Markovitch. When optimal is just not good enough: Fast near-optimal action cost-partitioning. In *Proceedings of the 21st International Conference on Automated Planning and Scheduling*, pages 122–129, Freiburg, Germany, 2011.
42. Anat Hashavit and Shaul Markovitch. Max-prob: An unbiased rational decision making procedure for multiple-adversary environments. In *Proceedings of the 22nd International Joint Conference on Artificial Intelligence*, pages 222–227, Barcelona, Spain, 2011.
43. Kira Radinsky, Sagie Davidovich, and Shaul Markovitch. Learning causality from textual data. In *Proceedings of the IJCAI Workshop on Learning by Reading and its Applications in Intelligent Question-Answering*, pages 363–367, Barcelona, Spain, 2011.
44. Ariel Raviv and Shaul Markovitch. Concept-based approach to word-sense disambiguation. In *Proceedings of the Twenty-Sixth AAAI Conference on Artificial Intelligence*, pages 807–813, Toronto, Canada, 2012.
45. Omer Levy and Shaul Markovitch. Teaching machines to learn by metaphors. In *Proceedings of the Twenty-Sixth AAAI Conference on Artificial Intelligence*, pages 991–997, Toronto, Canada, 2012.
46. Kira Radinsky, Sagie Davidovich, and Shaul Markovitch. Learning causality for news events prediction. In *Proceedings of WWW 2012*, pages 909–918, Lyon, France, 2011.
47. Assaf Glazer, Michael Lindenbaum, and Shaul Markovitch. Feature shift detection. In *21st International Conference on Pattern Recognition (ICPR-2012)*, Tsukuba, Japan, 2012.
48. Assaf Glazer, Michael Lindenbaum, and Shaul Markovitch. One-class background model. In *The 11th Asian Conference on Computer Vision (ACCV-2012)*, Daejeon, Korea, 2012.

49. Assaf Glazer, Michael Lindenbaum, and Shaul Markovitch. Learning high-density regions for a generalized kolmogorov-smirnov test in high-dimensional data. In *Proceedings of The 26th Conference on Neural Information Processing Systems (NIPS-2012)*, Lake Tahoe, Nevada, 2012.
50. Tamar Avraham, Ilya Gurvich, Michael Lindenbaum, and Shaul Markovitch. Learning implicit transfer for person re-identification. In *Proceedings of 1st International Workshop on Re-Identification, ECCV 2012*, pages 381–390, 2012.

Title:

Anytime Learning of Anycost Classifiers

Abstract:

The classification of new cases using a predictive model incurs two types of costs - testing costs and misclassification costs. Recent research efforts have resulted in several novel algorithms that attempt to produce learners that minimize both types of costs simultaneously. In many real life scenarios, however, we cannot afford to conduct all the tests required by the predictive model. For example, a medical center might have a fixed predetermined budget for diagnosing each patient. Due to their structure, decision trees are considered attractive for cost-bounded classification as they measure only the tests along a single path. In this work we present an anytime framework for producing decision-tree based classifiers that can make accurate decisions within a strict bound on testing costs. These bounds can be known to the learner, known to the classifier but not to the learner, or not predetermined. Extensive experiments with a variety of datasets show that our proposed framework produces trees of lower misclassification costs along a wide range of testing cost bounds. This work is done in collaboration with Saher Esmeir.

MOSHE KOPPEL

Associate Professor of Mathematics and Computer Science
Bar-Ilan University

Shivat Zion 29
Efrat, ISRAEL
Tel.: 972 2 993 3154
email: moishk@gmail.com

Born: 26/2/56, New York City
Married + 4 children



Degrees:

B.A. / M.A. (Mathematics), Yeshiva University, Sept. 1977
Ph.D. (Mathematics), New York University, Feb. 1980

Fellowships:

Institute for Advanced Study Fellowship, 1979-80
Yigal Allon Fellowship, 1981-84

Employment:

Member, Institute for Advanced Study in Princeton, 1979-80
Bar-Ilan University, 1980-present

Main Research Areas:

Computational Linguistics, Authorship Attribution, Social Choice Theory

Other Activities:

Consultant to various high-tech companies
Co-author (with Minister Michael Eitan) of proposed Constitution for Israel
Author and editor of books and articles on Jewish law and philosophy

Publications (since 2003):

1. M. Koppel, S. Argamon and A. Shimoni (2003), Automatically categorizing written texts by author gender, *Literary and Linguistic Computing* 17(4), November 2002, pp. 401-412.

2. S. Argamon, M. Koppel, J. Fine and A. Shimoni (2003), Gender, Genre, and Writing Style in Formal Written Texts, *Text*, 23(3), August 2003.
3. M. Koppel and J. Schler (2003), Exploiting Stylistic Idiosyncrasies for Authorship Attribution, in *Proceedings of IJCAI'03 Workshop on Computational Approaches to Style Analysis and Synthesis*, Acapulco, Mexico.
4. M. Koppel, N. Akiva and I. Dagan (2003), A Corpus-Independent Feature Set for Style Based Text Categorization, in *Proceedings of IJCAI'03 Workshop on Computational Approaches to Style Analysis and Synthesis*, Acapulco, Mexico.
5. M. Koppel and I. Shtrimerberg (2004), Good News or Bad News? Let the Market Decide, in *AAAI Spring Symposium on Exploring Attitude and Affect in Text*, Palo Alto CA, pp. 86-88.
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9. S. Argamon, S. Dawhle, M. Koppel and J. Pennebaker (2005), [Lexical Predictors of Personality Type](#), *Proceedings of Classification Society of North America*, St. Louis MI, June 2005.
10. M. Koppel and J. Schler (2005), [Using Neutral Examples for Learning Polarity](#) (poster), *Proceedings of IJCAI*, Edinburgh, Scotland, July 2005.
11. O. Glickman, I. Dagan and M. Koppel (2005), [A Probabilistic Classification Approach for Lexical Textual Entailment](#), *Proceedings of AAAI*, Pittsburgh PA, July 2005.
12. M. Koppel, J. Schler and K. Zigdon (2005), [Determining an Author's Native Language by Mining a Text for Errors \(short paper\)](#), *Proceedings of KDD*, Chicago IL, August 2005.
13. M. Koppel, D. Mughaz and N. Akiva (2006), [New Methods for Attribution of Rabbinic Literature](#), *Hebrew Linguistics: A Journal for Hebrew Descriptive, Computational and Applied Linguistics*, to appear.
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15. M. Koppel and J. Schler (2006), [The Importance of Neutral Examples in Learning Sentiment](#), in *Computational Intelligence* 22(2), May 2006, pp. 100-109. [PDF](#)
16. S. Hota, S. Argamon, M. Koppel, I. Zigdon (2006). [Performing Gender: Automatic Stylistic Analysis of Shakespeare's Characters](#), in *Proc. Digital Humanities*, July 2006.
17. M. Koppel, J. Schler, S. Argamon and E. Messeri (2006). [Authorship Attribution with Thousands of Candidate Authors](#), (poster). in *Proc. Of 29th Annual International ACM SIGIR Conference on Research & Development on Information Retrieval*, August 2006.

18. Y. Solewicz and M. Koppel (2006), [Automatically Correcting Bias in Speaker Recognition Systems](#), *Proc. IEEE Machine Learning for Signal Processing Workshop*, Sept. 2006.
19. M. Koppel, N. Akiva and I. Dagan (2006), [Feature Instability as a Criterion for Selecting Potential Style Markers](#), *JASIST: Journal of the American Society for Information Science and Technology*, Volume 57, Issue 11, Pages:1519-1525. July 2007.
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22. Y. Solewicz and M. Koppel (2007), [Using Post-Classifiers to Enhance Fusion of Low and High-Level Speaker Recognition](#), *IEEE Transactions on Audio, Speech, and Language Processing*, Vol. 15(7), September 2007, pp. 2063-2071.
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31. David-Tabibi, O., H.J. van den Herik, M. Koppel, and N.S. Netanyahu (2009), [Simulating human grandmasters: Evolution and coevolution of evaluation functions](#), in *Proceedings of the ACM Genetic and Evolutionary Computation Conference*, Montreal, Canada, July 2009, pp. 1483--1489.

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34. David, O., M. Koppel, N. Netanyahu (2010). [Optimizing Selective Search in Chess](#), *ICML Workshop on Machine Learning and Games*, Haifa, Israel
35. David, O., M. Koppel, N. Netanyahu (2010). [Genetic Algorithms for Automatic Search Tuning](#), *ICGA Journal*, Vol. 33, No. 2, pp. 67--79.
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40. Gabbay, D. and M. Koppel (2011). [Uncertainty Rules in Talmudic Reasoning](#), *History and Philosophy of Logic* 32 (1), pp. 63-69.
41. Diskin, A., M. Koppel and D. Samet, (2011). [Generalized Raiffa Solutions](#), *Games and Economic Behavior*, Vol. 73 (2), pp. 452-458.
42. M. Koppel, N. Akiva, I. Dershowitz and N. Dershowitz, (2011). [Unsupervised Decomposition of a Document Into Authorial Components](#), *Proceedings of ACL*, Portland OR, June 2011, pp. 1356-1364.
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45. Baharad, E., Goldberger, J., Koppel, M. and Nitzan, S. (2012), [Beyond Condorcet: Optimal Aggregation Rules Using Voting Records](#), *Theory and Decision*, Vol. 72 (1), pp. 113-130.
46. M. Koppel, J. Schler and S. Argamon (2012), The Fundamental Problem of Authorship Attribution, *English Studies* (Special issue on stylometry and authorship attribution), 93(3), pp. 284-291.

47. A. Diskin and M. Koppel (2012), The Measurement of Voting Power as a Special Case of the Measurement of Political Power. In *Voting Power and Procedures: Essays in Honor of Dan Felsenthal and Moshe Machover* (M. Salles, ed.), Springer
48. M. Koppel (2012), [The Responsa Project: Some Promising Future Directions](#) in N. Dershowitz and E. Nissan (eds.), *Language, Culture, Computation: Essays Dedicated to Yaacov Choueka*, Lecture Notes in Computer Science, Springer-Verlag, Berlin.
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Title:

Authorship Attribution: What's Easy and What's Hard?

Abstract:

We apply supervised and unsupervised machine-learning techniques to variants of authorship attribution problems, ranging from the reasonably easy to the unreasonably difficult, pointing out the conditions under which each is solvable. We begin with vanilla attribution problems in which an anonymous document needs to be attributed to one of a small closed set of candidate authors for each of whom we have copious training data. More difficult cases include ones in which the candidate set might be extremely large (possibly in the tens of thousands) or in which the true author might not be in the candidate set at all or for which we have very little training data.

Aldo Shemesh

Address:

Department of Environmental Sciences
The Weizmann Institute of Science
Rehovot 76100 Israel.
Aldo.Shemesh@weizmann.ac.il



Scientific Expertise and Current Research Activities:

- Global climate change as revealed from stable isotopes records of marine and continental siliceous sediments.
- Southern Ocean paleoceanography Oxygen isotopes in biogenic silica.
- Carbon and Nitrogen isotopes in diatom-opal as recorders of past oceanic productivity.
- Isotopic composition of siliceous microfossils: diatoms, radiolarian, sponge-spicules, phytoliths.
- Regional climate change inferred from high altitude, high latitude diatom 18O records.
- Carbon and Oxygen isotopes in corals: present and past manifestation of coral bleaching.

Title:

Anthropogenic changes as detected by siliceous and carbonate paleoceanography

Abstract:

Siliceous paleoceanography is based on marine and lake sediments serve as one of the best natural archives of past climatic variability on the continents. Their datable sediments typically have accumulated continuously over thousands of years, and a variety of physical, chemical, and biological indicators preserved in sediments can be used to reconstruct past climatic change and landscape response. The studies of oxygen isotopes in sediments were restricted to the carbonate phase, analyzing authigenic carbonates and calcareous bottom dwellers. However, carbonate material is not available in all lakes or marine regions. Focusing on lakes, carbonates are absent especially in high altitude and high latitude lakes, in which the geological setting and the precipitation/evaporation ratio do not allow the chemical precipitation of authigenic carbonate. In contrast, lake sediments in these regions often contain biogenic silica. It is composed primarily of diatoms (photosynthetic algae) that deposit internal opal ($\text{SiO}_2 \cdot n\text{H}_2\text{O}$) frustules. Because of light requirements for photosynthesis, silicification occurs only in the uppermost layer of the lake. Thus, diatoms are an ideal recorder of surface temperature and isotopic composition of the surface water. Recent studies demonstrate the potential of measuring the isotopic composition of oxygen in diatom frustules in order to reconstruct past climate changes, both quantitatively and qualitatively.

We developed and calibrated the use of vermetid skeletal material as paleo-indicators of past SST and carbon isotopes of dissolved inorganic carbon in the Eastern Mediterranean. These can be expanded to all vermetid reefs around the world. We think that this powerful tool faithfully record climate change of the last millennia and the anthropocene age.

Ariel Kushmaro

Address:

The Department of Biotechnology Engineering
Ben-Gurion University of the Negev
P.O. Box 653, 84105 Be'Er Sheva`, Hadarom, Israel
Email: arielkus@bgumail.bgu.ac.il
Webpages: <http://profiler.bgu.ac.il/frontoffice/ShowUser.aspx?id=2533>
<http://www.bgu.ac.il/BioTech/People/kushmaro.html>

Professional Position:

B.Sc. Biology, Tel Aviv University, Israel, 1990.
M.Sc. (Cum Laude), Microbiology and Biotechnology, Tel Aviv University, Israel, 1992.
Ph.D. (Cum Laude), Zoology and Microbiology, Tel Aviv University, Israel, 1999.

Scientific Expertise and Current Research Activities:

- Biological treatment of industrial wastewater.
- Microbial degradation of haloorganic compounds.
- Biology of wastewater reservoirs.
- Molecular microbial ecology.
- Symbiosis.

Publications:

Eugene Rosenberg, Rachel Legmann, Ariel Kushmaro, Ellick Adler, Haim Abir & Eliora Z. Ron. 1996. Oil bioremediation using insoluble nitrogen source. Journal of Biotechnology, Vol. 51, pp.273-278.
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A. Kushmaro, E. Rosenberg, M. Fine and Y. Loya.1997. Bleaching of the coral *Oculina patagonica* by *Vibrio* AK-1. Marine Ecology Progress Series, Vol. 147, pp. 159-165.
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A. Kushmaro, E. Rosenberg, M. Fine, Y. Ben Haim and Y. Loya .1998. Effect of temperature on bleaching of the coral *Oculina patagonica* by *Vibrio* AK-1. Marine Ecology Progress Series, Vol. 171, pp. 131-137.
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E. Rosenberg, A. Kushmaro, Y. Ben-Haim, A. Toren, E. Banin , M. Fine and Y. Loya. 1999. The effect of temperature on bacterial bleaching of corals. Microbiology and Infectious Disease, ASM pp. 242-254.

Yael Ben-Haim, Ehud Banim, Ariel Kushmaro, Yossi Loya and Eugene Rosenberg. 1999. Inhibition of photosynthesis and bleaching of zooxanthellae by the coral pathogen *Vibrio shiloi*. . Environmental Microbiology Vol. 1 (3): 223-230.
http://www.ncbi.nlm.nih.gov:80/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11207741&dopt=Abstract

E. Banin, T. Israely, A. Kushmaro, Y. Loya, E. Orr and E. Rosenberg. 2000. Penetration of coral-bleaching bacterium *Vibrio shiloi* into *Oculina patagonica*. Applied and Environmental Microbiology. 66(7): 3031-3036.
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A Kushmaro, E Banin, Y Loya, E Stackebrandt, and E Rosenberg .2001. *Vibrio shiloi* sp. nov., the causative agent of bleaching of the coral *Oculina patagonica*. Int J Syst Evol Microbiol 2001 51: 1383-1388.
http://ijs.sgmjournals.org/cgi/content/abstract/51/4/1383?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&author1=kushmaro&searchid=1005207411771_272&stored_search=&FIRSTINDEX=0&journalcode

A. Kushmaro, L. Lerner, V. Agmon, C. L. Greenblatt and J. Kopelowitz , 2001. *Vibrio cholerae* in Israel: Distribution and characterization of O1 and non-O1 strains from human and environmental sources. Epidemiology and Infection (submitted).

Title:

Coral nutrition, defense and adaptation to changing environment: the role of it's associated microbial community

Abstract:

A number of studies have shown that there is a dynamic microbial biota living on the surface and in the tissue of many coral species, but as of yet the exact functions of such populations and their contributions to corals have not been elucidated. Environmental stress such as eutrophication, acidification, dissolved organic carbon loads and other anthropogenic pollution sources can cause a change in coral physiology as well as an accompanying shift in coral surface microbial communities that in turn may affect coral health. Coral diseases are one of the most recent in a series of threats that is challenging the resilience of coral reef communities, leading to coral reef deterioration in many reefs around the world. Coral diseases can be caused as a result of pathogenic microorganisms, as well as environmental stress and weakening of the host's innate immune system for most of the coral diseases are, as of yet, unknown.

Coral-associated bacteria have been recently found to be active against coral pathogens. According to the Coral Probiotic Hypothesis, since the coral lives in a symbiotic relationship with a diverse metabolically active microbial population, when environmental conditions changes, the microbial biota changes as well. This shift may aid the coral holobiont in adapting to the new conditions. The fact that corals harbor a wide and diverse bacterial population associated with the mucus layer and the coral tissue, and that coral-associated bacteria can undergo a rapid change in population in response to alteration of environmental conditions support this hypothesis. It is therefore possible that in some cases corals can fend off diseases or develop resistance to certain microbial-driven diseases by "active" or passive shifting of their associated microbial communities. In light of recent studies, we suggest that coral-associated bacteria may play a beneficial role in protecting the coral against pathogens, and should be considered as symbionts, required for maintaining coral health. Corals may very well encourage certain bacteria to accommodate their surface, selecting towards beneficial, antibiotic-producing bacteria.

Hanna Rosenfeld

Address:

Israel Oceanographic and Limnological Research

National Center for Mariculture

P.O.B. 1212, Eilat 88112

Email: hanna@ocean.org.il



Scientific Expertise and Current Research Activities:

Fish and marine invertebrate reproductive physiology, including mechanisms that control sex differentiation, environmental and hormonal cues that initiate and regulate sexual maturity and in vivo/ in vitro procedures that promote gamete maturation and fertilization; focusing on development of methodologies and technologies for efficient broodstock management of various invertebrates (e.g. sea urchins and sea anemones), and finfish (e.g. seabream, sea bass, grey mullet, grouper and bluefin tuna).

Title:

Reproductive activity of Bluefin Tuna (*Thunnus thynnus*) in the Mediterranean Sea

Abstract:

The Atlantic bluefin tuna (BFT, *Thunnus thynnus*) is distinguished among fish for its pseudo-endothermic metabolism and its capacity for rapid lipid mobilization. In order to understand the endocrine mechanisms regulating reproduction in this species, the current study focused on assessment of pituitary gonadotropins (FSH and LH) and metabolic hormone (leptin) interplay in captive BFT during their natural reproductive season in the Mediterranean Sea. Mature fish, held in floating cages on the coast of Murcia (Spain), were sampled at three characteristic stages of the reproductive season: April, May, and July (2008). Morphometric parameters were recorded and gonad, liver, and fat indices (GSI, HIS, FSI, respectively), were calculated. Blood and various tissues were collected for hormone and gene expression analyses. Our results indicate that the pituitary FSH content reaches maximal levels at the early stages of gametogenesis (April), in both sexes. Yet, in females these levels gradually decline towards the end of the reproductive cycle (July), while in males they do not vary significantly ($P > 0.05$). Conversely, the pituitary LH levels gradually increase throughout gametogenesis. The negative correlation between the pituitary FSH and LH profiles in BFT females, further stresses that both gonadotropins preserve their “classic roles”; with FSH maintaining oogenesis in the asynchronous ovary, and LH triggering final gamete maturation. The combination of high pituitary LH content, low plasma LH levels, and low GSI values, suggests that, as was found in many other marine fish, the failure of captive BFT to normally undergo final oocyte maturation and ovulation is due to the absence of LH release during the spawning season, even though the hormone accumulates in the pituitary during oogenesis. These findings further strengthen the GnRH-based therapeutic approach for inducing breeding among captive BFT.

Expression of the BFT leptin gene (*bftLep*) was detectable in the liver and to a lesser extent in the hypothalamic, pituitary, and fat tissues. Similar temporal *bftLep* mRNA patterns were observed in both liver and hypothalamus, with relatively low levels in fully mature fish (May; $GSI = 1.85 \pm 0.2 \%$), and elevated levels in fish with regressed gonads (July; $GSI = 0.62 \pm 0.1 \%$). Interestingly, the hypothalamic *bftLep* mRNA levels were positively correlated with pituitary FSH β and to a lesser extent LH β mRNA levels. The organ indices HSI and FSI, declined as the reproductive season progressed reaching minimal values during July, the end of the spawning season. Further regression analysis revealed a significant negative correlation between the HSI values and the hypothalamic *bftLep* mRNA levels. Taken together our results demonstrating (i) an effect of leptin on pituitary gonadotrophs, and (ii) an association between regressed gonads, depleted energy resources (as indicated by the low HSI and FSI values) and increased transcription of the *bftLep* gene in the hypothalamus, suggesting that comparable to mammals, leptin is an important regulator of the gonadotropic axis in BFT.

Yehuda Benayahu

Address:

The Department of Zoology
Tel Aviv University
P.O. Box 39040, Tel Aviv 69978, Israel
Email: yehudab@tauex.tau.ac.il



Scientific Expertise and Current Research Activities:

Octocorallia, Marine Biology and Ecology, Invertebrate Biology, Biofouling and antifouling paints, Invasive species, Artificial Reefs, Conservation Biology, Marine Natural Products.

Education Background:

From-To	Institution	Area of specialization	Degree
1969-1972	Tel Aviv University	Biology	B.Sc.
1973-1976	Tel Aviv University	Zoology	M.Sc.
1977-1982	Tel Aviv University	Zoology & Ecology	Ph.D.

Employment and appointments:

From-To	Institution	Research area	Title
2010-present	Tel Aviv University	Environmental Zoology	Incumbent- The I. Cohen Chair in Environmental Zoology
2006-2008	Tel Aviv University, Porter School of Environmental Studies	Environmental studies	Head of School
2003-	Tel Aviv University	Marine Biology	Full Professor
2003-2006	Tel Aviv University, Dept. of Zoology	Zoology	Head of Dept.
1997- 2003	Tel Aviv University	Marine Biology	Assoc. Professor
1995-1996	U. of Maryland, College Park, MD	Octocoral Biology	Visiting Prof.
1990-1996	Tel Aviv University	Marine Biology	Senior Lecture
1987-1990	Tel Aviv University	Marine Biology	Lecturer
1983-1987	Tel Aviv University	Octocoral Taxonomy & Biology	Curator
1982-1983	Florida Inter. U., Miami,	Ultrastructure,	Post. doc

	Florida	Microscopy	
1973-1981	Tel Aviv University	Invertebrate Zoology	Teach. Assistant

Detailed interests and academic expertise:

Leader and member of scientific expeditions to the reefs of the Red Sea, South Africa, Kenya, Tanzania, Guam, Ryukyu Archipelago (Japan), Taiwan, Fiji, Palau, Singapore, Thailand, Hong Kong, Korea etc.

Octocorallia:

Taxonomy, biodiversity, zoogeography, life history, sexual versus clonal propagation, natural products, embryogenesis, onset of symbiosis with zooxanthellae, cytology and ultrastructure, gene expression during onset of symbiosis, resistance to UV radiation.

Artificial reefs:

recruitment of invertebrates and fish, interactions with natural reefs, invasive species and artificial marine structure, rehabilitation perspectives, ecosystem-restoration.

Scuba diving:

since 1972 in Indo-Pacific reefs and the Mediterranean Sea.

M.Sc. students supervised: 40 students

Ph.D. students supervised: 12 students

List of publications in peer reviewed journals: 165

Title:

Octocorals: Challenges in research

Abstract:

As an outcome of several octocoral surveys conducted on the reefs of southern Taiwan, Green Is., Penghu Archipelago, and Dongsha Atoll, several new species as well as a new genus were found. The geographic setting of these reefs, between the West Pacific Ocean and East China Sea and at the crossroads of the Philippine-Japan Is. arch, has produced reefs featuring a remarkably high octocoral biodiversity and live coverage, sometimes exceeding 80% of the reef surface. The genus *Sinularia* is the most diverse there, accounting for more than half of the species inventory. Although in tropical reefs octocorals are usually not considered as reef-builders, certain *Sinularia* species, however, are capable of consolidating sclerites at the colony base to form spiculite. Cores taken from living *Sinularia* revealed a distinct transition from discrete sclerites to compact spiculite and to amorphous calcium carbonate cementing the sclerites. Octocorals of the family Xenidae are highly abundant on the Green Is. reefs and at some sites they monopolize the substrate. An ongoing study of their taxonomy applies high-power scanning-electron microscopy, aimed at resolving their diagnostic features. Due to the ecological importance of octocorals throughout the entire Indo-Pacific region, their diversity, along with their possible response to global changes, should be carefully examined.

MAOZ FINE

Address:

The Mina & Everard Goodman Faculty of Life Sciences
Bar-Ilan University, Ramat-Gan 52900, Israel
Phone: 972-8-636-0123 Fax: 972-8-6374329
Email: finema@mail.biu.ac.il



Place of Birth: Israel
Family Status: Married + 2 children
Permanent Address: The Interuniversity Institute for Marine Science at Eilat, P.O.B 469
Eilat 88103, Israel
Home ☎: 972-077-333-0319
Army Service, Years: Israeli Navy, 1987-1990

Education, Certificates and Degrees:

From-To	Institute	Area of Specialty	Degree
1993-1996	Faculty of Life Sciences Tel Aviv University	Biology	B.Sc.
1997-1998	Department of Zoology Tel Aviv University	Marine Biology	M.Sc.
1998-2003	Department of Zoology Tel Aviv University	Marine Biology	Ph.D. (<i>Summa cum laude</i>)
2003-2005	Center for Marine Studies University of Queensland, Australia	Coral Reef Ecology	Postdoctoral Research Fellow

Master's Thesis: The scleractinian coral *Oculina patagonica*: A new invader to the Mediterranean Sea

Supervisor: Prof. Yossi Loya

Doctoral Thesis: Bleaching of the Mediterranean coral *Oculina patagonica*: colony physiology to population ecology

Supervisor: Prof. Yossi Loya

Positions Held:

From-To	Institute	Research Area	Title
2006-present	The Mina & Everard Goodman Faculty of Life Sciences Bar-Ilan University Ramat-Gan, Israel	Marine Biology	Senior Lecturer (tenure track)
2005-2006	Department of Maritime Civilizations, University of Haifa Haifa, Israel	Marine Biology	Senior lecturer (tenure track)
2004-2005	International Studies Stanford University, USA	Marine Biology	Lecturer (temporary nomination)
2001-2003	Maritime College of Israel, Michmoret, Israel	Marine Biology	Lecture (no tenure)
1997-2002	Department of Zoology Tel Aviv University Tel Aviv, Israel	Marine Biology	Senior teaching assistant (no tenure)

Academic Administrative Positions Held

From-To	Institute	Position
2004-2005	Centre for Marine Studies UQ	Member, teaching and research committee
2006-	Interuniversity Institute for Marine Science in Eilat	Chair, diving Committee
2010-	Interuniversity Institute for Marine Science in Eilat	Member, teaching committee

Public Scientific Activities Outside the University:

From-To	Type of Activity
2012-	Chief Editor of the journal "Ocean Acidification" (Versita)

	Member of the advisory editorial board of <i>Global Change Biology</i> , Reviewer for leading professional journals such as, <i>Limnology and Oceanography</i> , <i>Marine Ecology Progress Series</i> , <i>Experimental Biology</i> , <i>Marine Biology</i> , <i>ISME</i> and <i>Coral Reefs</i>
2003-2005	Member, Research Committee and Postgraduate Studies Committee Center for Marine Studies, University of Queensland, Australia
Nov. 2001	Israel's delegate to meeting of experts on coastal habitat types in the Mediterranean Sea. Organized by the UNEP. Montpellier, France
1998-1999	Consultant to the Israeli Ministry of Interior project: Management policy for the coastal waters of Israel
2008-	Examiner of PhD thesis and exams in the Scientific Centre of Monaco

Title:

Corals and Coral reefs under ocean acidification and climate change

Abstract:

Ongoing ocean acidification (OA) and global warming are rapidly altering the environment in which coral reefs developed for millions of years. Changes in the carbonate chemistry, photosynthesis and microbial community associate with corals may impact the health of corals and their ability to participate in reef building. Furthermore, this influences the ecological performance of corals (such as competition) and their resistance to potential pathogens. Nonetheless, diverse responses of reef-building corals calcification and photosynthesis to OA and climate change hinder our ability to decipher reef susceptibility to elevated pCO₂.

While some of the inconsistencies between studies originate in methodological approaches, others are genuine differences originating in the life strategy or physiology of corals.

In the present study, over 15 species of reef building corals were inspected for their overall performance under OA and climate change conditions. Calcification and growth, photosynthesis and carbon translocation were measured and the energetic state was estimated through rates of growth, regeneration and competition.

This large array of examined species facilitates predictions of the “Winners and Losers” in coral reefs under the projected environmental change.

Taiwan Delegations

Von-Wun Soo

Address:

Institute of Information Systems and Applications
101 section Kaung Fu Road Hinchu Taiwan
National Tsing Hua University
Phone: 886-3-5731068 Fax: 886-3-5731068
Email: soo@cs.nthu.edu.tw



Professional Position:

2010.8- now Director, Institute of Information Systems and Applications, National Tsing Hua University
2008.9-2010.2: Vice President, National University of Kaohsiung
2004.10-2008.8: Dean of R&A, National University of Kaohsiung
1997.1-1998.12: President of Taiwanese Association of Artificial Intelligence
1988-now Professor, Department of Computer Science, National Tsing Hua University

Education:

1987: Ph.D., Department of Computer Science, Rutgers University, USA
1980: MS., Department of Electrical Engineering, Rutgers University, USA
1976: BS., Department of Electrical Engineering, National Taiwan University, TAIWAN

Scientific Expertise and Current Research Activities:

I am a computer scientist and have been studying artificial intelligence since my graduate year at Rutgers University in 1987. Currently I am leading projects on 1) Interactive drama based on virtual agents with social awareness dialogues 2) Coordination of agents in power restoration and power markets in the smart power grid 3) Systems biology and genomic analysis for understanding disease mechanisms and drug effects based on protein networks and microarray data.

Publications:

1. Shih-Fang Lin, Ke-Ting Xiao, Yu-Ting Huang, Von-Wun Soo, A Tool for Finding Possible Explanations for Adverse Drug Reactions through Drug and Drug Target Interactions, Artificial Intelligence in Medicine. 2009.
2. Paul Chang and Von-Wun Soo, Planning-Based Narrative Generation in Simulated Game Universes , IEEE Transactions on Computational Intelligence and AI in Games, Vol.1, Issue 3, 2009.
3. Hsiang-Yuan Yeh, Shih-Wu Cheng, Yu-Chun Lin, Shih-Fang Lin and Von-Wun Soo, Identifying Significant Genetic Regulatory Networks in the Prostate Cancer from Microarray Data Based on Transcription Factor Analysis and Conditional Independency, BMC Medical Genomics

2009, 2:70.

4. Chung-Cheng Chiu, Von-Wun Soo, Automatic complexity reduction in reinforcement learning, Computational Intelligence- An International Journal, Wiley Blackwell, Vol. 26. No. 1, 2010.
5. Liang-Chun Chen, Hsiang-Yuan Yeh, Cheng-Yu Yeh, Carlos Roberto Arias and Von-Wun Soo, Identifying co-targets to fight drug resistance based on a random walk model, BMC Systems Biology, 2012.

Title:

Agent-based automated negotiation for power restoration in a smart grid

Abstract:

In a smart grid, we could treat power components switches, loads, power generators, as agents who can automatically make decision and communicate each other. When a fault occurs in a smart grid that causes blackout zones, it is the responsibility for the power system to make minimal cost of change to restore the power of those blackout zones as much as possible. The decision can become computationally expensive to find a optimal solution in a scale-up power grid. We develop agent negotiation protocols for the smart grid so that the agents can coordinate efficiently and distributed to find an optimal solution to restore the power.

Chia-Mei Chen

Address:

Dept. of Information Management
National Sun Yat-Sen University
Kaohsiung 804
TAIWAN
Phone: 07-5252000 ext:4726
Email: cchen@mail.nsysu.edu.tw



Professional Position:

1996-2004: Associate Professor, Dept. of Information Management
2004-present: Professor, Dept. of Information Management

Honors and Awards:

2011: Best paper award from JWIS (Joint Workshop on Information Security).
2011: Excellent Teaching award of Operating System Course in 2011 Fall.
2011: Excellent Lecture Note award from Ministry of Education.
2009: Best paper award from JWIS.
2008: Excellent Teaching award of Operating System Course in 2011 Fall
2005: Fullbright Scholarship award from U.S. Department of State.

Scientific Expertise and Current Research Activities:

My main research interests: network security, mobile networks, intrusion detection.

Publications:

1. Chia-Mei Chen, S.-T. Cheng, and R.-Y. Zeng, "A Proactive Approach to Intrusion Detection and Malware Collection," accepted by *Security and Communication Networks* (SCI), 2012.
2. Chia-Mei Chen, D. J. Guan, and Y.-L. Chen, "Behavior-based Detection of Abnormal IRC Traffic," *Communications of the CCISA*, Vol. 18, No. 3, July 2012.
3. G. H. Lai, C. S. Ouyang, Chia-Mei Chen, "A Group-based Deployment for Wormhole Prevention in Sensor Networks," *Journal of Information Science and Engineering*, Vol. 27, pp. 79-93, 2011 (SCI).
4. B. C. Jeng, D. M. Yeh, D. R. Wang, S-L Chu, and Chia-Mei Chen, "A Specific Effort Estimation Method Using Function Point," *Journal of Information Science and Engineering*, Vol. 27, No. 4, pp. 1363-1376 (July 2011) (SCI).
5. Y.-T. Hou and Chia-Mei Chen, "Malicious Web Page Detection Based on Anomaly Behavior," *Journal of e-Business*, Vol. 13, No. 1, pp. 117-134, March 2011 (TSSCI).
6. Y. T. Hou, Chia-Mei Chen, and B. C. Jeng, "An Optimal New-Node Placement to Enhance the Coverage of Wireless Sensor Networks," *Wireless Networks*, Vol. 14, No. 4, pp.

1033-1043, 2010 (SCI).

7. Chia-Mei Chen, Y. L. Chen, H. C. Lin, "An efficient network intrusion detection," *Computer Communications*, Vol. 33, No.4, pp. 477-484, 2010 (SCIE).
8. Y. Hou, Y. Chang, T. Chen, C. Lai, and Chia-Mei Chen, "Malicious Web Content Detection by Machine Learning," *Expert Systems with Applications*, Vol. 37, Issue 1, pp. 55-60, January 2010 (SCI).
9. J. L. Liu, C. W. Chou, and Chia-Mei Chen, "Optimising mobile base station placement using an enhanced Multi-Objective Genetic Algorithm," *International Journal Business Intelligence and Data Mining*, Vol. 5, No. 1, 2010.
10. J. L. Liu and Chia-Mei Chen, "Improved Intelligent Genetic Algorithm Applied to Long-endurance Airfoil Optimization Design," *Engineering Optimization*, Vol. 42, No. 2, 2009 (SCI).
11. G. H. Lai, C. W. Chou, Chia-Mei Chen, and Ya-Hua Ou, "Anti-Spam Filter Based on Data Mining and Statistical Test", *Studies in Computational Intelligence*, Vol. 208, 2009.
12. G.-H. Lai, C. W. Chou, and Chia-Mei Chen, "Anti-Spam Filter Based on Data Mining and Statistical Test," *Journal of e-Business*, Vol. 11, No. 4, December 2009 (TSSCI).
13. G. H. Lai, Chia-Mei Chen, C. S. Lai, and T. Chen, "A Collaborative Anti-Spam System," *Expert Systems with Applications*, Vol. 44, No. 1, 2008, (SCI).
14. Chia-Mei Chen, B. C. Jeng, G. H. Lai, W Chao, "Ant-Based IP Traceback," *Expert Systems with Applications*, Vol. 36, No. 3, 2008 (SCI).
15. G. H. Lai and Chia-Mei Chen, "Detecting Denial of Service Attacks in Sensor Networks," *Journal of Computers*, Vol. 18, No. 4, 2008.
16. Chia-Mei Chen and C. P. Wei, "Efficient Network Monitoring for Large Networks," *Journal of Computers*, Vol. 18, No. 4, 2008.
17. H. C. Wang, B. C. Jeng, and Chia-Mei Chen, "Structural Testing Using a Memetic Algorithm," *Journal of Software Engineering Studies*, 2007.
18. H. M. Sun, Chia-Mei Chen, and L. C. Shu, "Object-based Multimedia Scheduling Based on Bipartite Graphs," *IEICE Transaction on Communication*, Vol. E88-B, No. 1, January 2005 (SCI).
19. Chia-Mei Chen, H. M. Sun, L. C. Shu, "Optimizing Object-based Multimedia Delivery Across Bandwidth Constrained Networks," *Computer Journal*, Vol. 47, No. 5, September, 2004 (SCI).
20. S-T Cheng, C. Chen, C. Li, and Chia-Mei Chen, "Network topology management in a mobile-switch ATM network: dynamic partition algorithms," *International Journal of Network Management*, Vol. 12, No. 2, pp. 99-115, 2002 (EI).
21. S-T Cheng, Chia-Mei Chen, and H. T. Liu, "Dynamic Round-based Resource Management for On-Demand Multimedia Servers," *Computer Journal*, Vol. 43, No.5, pp. 386-395, 2000 (SCI).
22. S-T Cheng, Chia-Mei Chen, and S. K. Tripathi, "A Fault-Tolerant Model for Multiprocessor Real-Time Systems," *Journal of Computer and Systems Sciences*, Vol. 61, No. 3, pp. 457-477, December 2000 (SCI).
23. S-T Cheng and Chia-Mei Chen, "Temporal Analysis and Algorithms for Real-Time Scheduling and Allocation," *IJCA International Journal of Computers and Their*

Applications, March 1998.

24. S-T Cheng, Chia-Mei Chen, and Jing-Wen Hwang, "Low Power Design for Real-Time Systems," *Real-Time Systems*, September 1998 (SCI).
25. Chia-Mei Chen, Shyh-In Hwang, and Satish K. Tripathi, "A Performance Study of Real-Time Optimistic Concurrency Control with the Knowledge of Execution Time," *ISCA International Journal of Computers and Their Applications*, December, 1995.
26. Chia-Mei Chen and W. H. Tsai, "Automatic Identification of Chinese Seal Imprints with Arbitrary or Partial Shapes," *Computer Processing of Chinese and Oriental Languages*, October, 1986.

Conference

1. Chia-Mei Chen, D. J. Guan, Y.-Z. Huang, and Y.-H. Ou, "Attack Sequence Detection in Cloud Using Hidden Markov Model," The Asia Joint Conference on Information Security (AsiaJCIS 2012), IEEE Computer Society press, August 2012.
2. Chia-Mei Chen, D. J. Guan, Q.-K. Su, and S.-T. Cheng, "Detecting Suspicious URLs in Social Network Service," The 2012 IEEE International Conference on Computing and Security (ICCS), July 2012.
3. Chia-Mei Chen, Y.-H. Ou, J.-J. Huang, "Detecting Web Attacks Based on Domain Reputation," The 2012 IEEE International Conference on Computing and Security (ICCS), July 2012.
4. Chia-Mei Chen, T. Y. Wang, H. S. Tsai, "Concise Malware Behavior Analysis," ICIM 2012 (International Conference on Information Management).
5. Chia-Mei Chen, H.-W. Hsiao, C.-N. Lee, C.-H. Yang, P.-Y. Yang, "Study of Collaborative Attack Detection," ICIM 2012.
6. Chia-Mei Chen and Y.-H. Ou, "Secure Mechanism for Mobile Web Browsing," IEEE ICPADS 2011 Joint Workshop on Network and System Security, Dec. 2011.
7. Chia-Mei Chen, D. J. Guan, Q-K Su, and T-Y Wang, "Malicious URL Detection on Facebook," The Sixth Joint Workshop on Information Security (JWIS 2011), Oct. 2011.
8. Chia-Mei Chen, "Detecting Anomaly Mobile Web Page through Template Classification," The 11th Emerging Information and Technology Conference (EITC 2011), July 28-29, 2011.
9. Chia-Mei Chen, Y.-H. Ou, and M.-C. Hwang, "Detecting Botnets with Fast Flux Domain," CISC (Cryptology and Information Security Conference) 2011.
10. Chia-Mei Chen, Y-H Ou, and Y-C Tsai, "Web Botnet Detection Based on Flow Information," ICS 2010 International Computer Symposium, December 16-18, 2010.
11. Chia-Mei Chen, H.-L. Wu, and T. Y. Wang, "Honeypot for Malicious Websites," CIAIST 2010.
12. Chia-Mei Chen, Y.-H. Ou, and S.-F. Lin, "Secure Web Browsing Mechanism for Mobile Devices," IMP 2010.
13. Chia-Mei Chen, R.-L. Hong, S.-C. Lin, and H.-L. Wu, "Study of Linux System Log Patternization," TANET 2010.
14. Chia-Mei Chen, W. Y. Tsai., H. C. Lin, "Anomaly Behavior Analysis for Web Page Inspection," The First International Conference on Networks & Communications

(NetCoM-2009), December 27-29, 2009.

15. H.C. Lin, Chia-Mei Chen, J. Y. Tzeng, "Flow Based Botnet Detection," Fourth International Conference on Innovative Computing, Information and Control (ICICIC 2009), December 7 - 9, 2009.
16. M. Wu, Chia-Mei Chen, and C. H. Wang, "CPDCF for IEEE 802.11 WLANs," The Fourth International Conference on Communications and Networking in China (CHINACOM 2009), August 2009.
17. D. J. Guan, Chia-Mei Chen, J. S. Luo, and Y. T. Hou, "Malicious Web Page Detection based on Anomaly Semantics," The fourth Joint Workshop on Information Security (JWIS 2009), August 2009.
18. D. J. Guan, Chia-Mei Chen, and J. B. Lin, "Anomaly Based Malicious URL Detection in Instant Messaging," The fourth Joint Workshop on Information Security (JWIS 2009), August 2009.
19. G. H. Lai, Chia-Mei Chen, R. Y. Tzeng, C. S. Lai, and C. Faloutsos, "Botnet Detection by Abnormal IRC Traffic Analysis," The fourth Joint Workshop on Information Security (JWIS 2009), August 2009.
20. Gu-Hsin Lai, Chao-Wei Chou, Chia-Mei Chen, Ya-Hua Ou "Anti-Spam Filter Based on Data Mining and Statistical Test", 8th IEEE/ACIS International Conference on Computer and Information Science (ICIS 2009), June 1-3, 2009, Shanghai, China.
21. Chia-Mei Chen, Wan-Yi Tsai, Yung-Tsung Hou, "Malicious Webpage Detection", FIRST 2009, June 26-July 3, 2009, Kyoto, Japan.
22. Y.-C. Tsai, H.-C. Lin, and Chia-Mei Chen, "Web Botnet Detection Based on Flow Information," NCS 2009.
23. S.-C. Lin, Chia-Mei Chen, and Y.-C. Lin, "Study of Group Purchase Broadcast Rate in Mobile P2P Networks," ICIM 2009.

Title:

Attack Sequence Detection Using Hidden Markov Model

Abstract:

Advance persistent threat (APT) has become a primary security concern in many organizations for its low frequency, stealthy, and planned attack. The reports verify that some have been breached and lost confidential information. Attacker may combine multiple security vulnerabilities into an intelligent attack. For such a target attack, he often adopts persistent attack approach consisting of a sequence of attacks continuously until the target is compromised.

The proposed detection system analyzes multiple logs from the network to extract the intentions of the actions recorded in logs. Stealthy reconnaissance actions often neglected by administrator for the insignificant number of violations would be identified for further event correlation for subsequent attacks. Hidden Markov model is adopted to model the sequence of attack performed by hacker and attack events in a long time frame will become significant in the state-aware model. The results demonstrate that the proposed system can identify such attack plans in a real network.

Keyword: intrusion detection, Hidden Markov Model, attack plan

Wen-Yang Lin

Address:

Dept. of Computer Science and Information Engineering
National University of Kaohsiung (NUK)
700 Kaohsiung Univ. Rd., Nanzih District, Kaohsiung, TAIWAN
Phone: 886-7-5919517 Fax: 886-7-5919514
Email: wylin@nuk.edu.tw



Professional Position:

2004.8-present: Professor, Dept. of Computer Science and Information Engineering, NUK
2008.8-2010.7: Director, Library and Information Center, NUK
2004.8-2007.1: Chair, Dept. of Computer Science and Information Engineering, NUK
2003.8-2004.7: Chair, Dept. of Information Management, I-Shou University

Honors and Awards:

2006: Excellent Paper Award, 11th Conference on Artificial Intelligence and Applications
2002: Best Thesis Advisory Award, National Science Council, TAIWAN
2000: Research Award, National Science Council, TAIWAN

Scientific Expertise and Current Research Activities:

My main research interests are knowledge discovery and data mining, and evolutionary computation. Currently I am focusing on the development of streaming data mining techniques and its applications to real world problems. I also lead a NSC reach project “Applying Uncertain Data Preprocessing and Mining Techniques to Adverse Drug Reaction Detection”.

Publications:

Over 140 papers in refereed journals and conferences. Below is a selection of recent publications.

W.Y. Lin, H.Y. Li, J.W. Du, W.Y. Feng, and C.F. Lo, “iADR: Towards a web-based interactive adverse drug reaction analyzing system,” *ACM SIGHIT Record* 2(1), 2012.

W.Y. Lin, J.H. Su, and M.C. Tseng, “Updating generalized association rules with evolving fuzzy taxonomies,” *Soft Computing* 16:1109-1118, 2012

W.Y. Lin, Y.E. Wei, and C.H. Chen, “A generic approach for mining indirect association rules in data streams,” *Proc. IEA/AIE’11*, Syracuse, USA, June 28-July 1, pp. 95-104, 2011.

C.A. Wu, W.Y. Lin, C.L. Jiang, and C.C. Wu, “Toward intelligent data warehouse mining: An ontology-integrated approach for multi-dimensional association mining,” *Expert Systems With Applications* 38(9):11011-11023, 2011.

M.C. Tseng, W.Y. Lin, and R. Jeng, “Incremental maintenance of generalized association rules under taxonomy evolution,” *Journal of Information Science* 34(2):174-195, 2008.

M.C. Tseng and W.Y. Lin, “Efficient mining of generalized association rules with non-uniform minimum support,” *Data and Knowledge Engineering* 62(1):41-64, 2007.

Title:

Resource-Aware Frequent Pattern Mining over Data Streams: A Generic Approach

Abstract:

Recent studies on stream data mining have achieved some general requirements for effective mining algorithms, including single-pass of scanning over data set, real-time execution, and low memory consumption. Not until recently, however, researchers have begun to pay attention to another critical and more challenging issue, adaptive mining of streaming data with respect to variations in available resources, e.g., CPU power and memory space. Any mining algorithm running on these resources constrained devices has to be able to adjust and adapt its execution to utilize the very limited, changing in availability resources. Contemporary research works on this problem were conducted with respect to some specific stream window model, e.g., landmark, time-fading, or sliding window. Algorithms tailored for some particular window model usually are not applicable to and so need redesigning to fit to other models. In this talk, I will introduce our recent work on devising a generic framework with resource-awareness capability to adaptively adjust the CPU as well as memory consumption with respect to the available resources for mining frequent patterns over data streams.

Hsing-Kuo Pao

Address:

Dept. of Computer Science and Information Engineering
National Taiwan University of Science and Technology
No. 43, Sec. 4, Keelung Rd., Taipei, TAIWAN
Phone: +886-2-27301065 Fax: +886-2-27301081
Email: pao@mail.ntust.edu.tw



Professional Position:

2011.11-present: Associate Professor, National Taiwan University of Science and Technology
2003.8-2011.10: Assistant Professor, National Taiwan University of Science and Technology
2003.1-2003.7: Researcher, Vita Genomics
2001.9-2003.1: Post Doctorate Research Fellow, University of Delaware

Honors and Awards:

2009: The best project of dept. of computer science and information engineering, National Taiwan University of Science and Technology
2008: The excellent guidance teachers award, National Taiwan University of Science and Technology
2006: The final list of Ta-You Wu Memorial Award

Scientific Expertise and Current Research Activities:

My main research interests are machine learning, information security and computer vision. Some current research topics include large-scale learning, anomaly detection, graph mining, malware detection, user behavior analysis, social networks, object tracking, etc.

Selected Recent Publications:

Journals

1. Hsing-Kuo Pao, Junaidillah Fadlil, Hong-Yi Lin, and Kuan-Ta Chen. "Trajectory Analysis for User Verification and Recognition", Knowledge-Based Systems, Vol. 34: pp. 81-90, 2012.
2. Hsing-Kuo Pao, Ching-Hao Mao, Hahn-Ming Lee, Chi-Dong Chen, and Christos Faloutsos. "An Intrinsic Graphical Signature Based on Alert Correlation Analysis for Intrusion Detection", Journal of Information Science and Engineering, Vol. 28, no. 2: pp. 243-262, 2012.
3. Chien-Chung Chang, Hsing-Kuo Pao, and Yuh-Jye Lee. "An RSVM Based Two-teachers-one-student Semi-supervised Learning Algorithm", Neural Networks, Vol. 25, pp. 57-69, 2012.
4. H.-K. Pao, K.-T. Chen and H.-C. Chang. "Game Bot Detection via Behavior Analysis on Avatar Trajectories", IEEE Transactions on Computational Intelligence and AI in Games, Vol. 2, no. 3, Sep. 2010.

Conference Papers

5. Kai-Lung Hua, Ge-Ming Chiu, Tai-Ling Chin, Hsing-Kuo Pao, Yi-Chi Cheng, and Guan-Ming Su. "A Novel Scalable Video Streaming Systems on P2P Networks", International Conference on Computing, Networking and Communications, Multimedia Computing and Communications Symposium, San Diego, USA, Jan. 2013.
6. Chih-Hung Lin, Chin-Wei Tien, Hsing-Kuo Pao. "Efficient and Effective NIDS for Cloud Virtualization Environment", The 4th IEEE International Conference on Cloud Computing Technology and Science (CloudCom 2012), Taipei, Taiwan, Dec. 2012.
7. Hsing-Kuo Pao, Yan-Lin Chou, and Yuh-Jye Lee. "Malicious URL Detection Based on Kolmogorov Complexity Estimation", The 2012 IEEE/WIC/ACM International Conference on Web Intelligence, Macau, Dec. 2012.
8. Danai Koutra, Tai-You Ke, U Kang, Duen Horng Polo Chau, Hsing-Kuo Pao, and Christos Faloutsos. "Unifying Guilt-by-Association Approaches: Theorems and Fast Algorithms", European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML/PKDD), Athens, Greece, Sep. 2011.
9. J. C.-H. Tseng, H.-K. Pao, and C. Faloutsos. "The Typhoon Track Classification Using Tri-plots and Markov Chain", 2nd International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management, Valencia, Spain, Oct. 2010.
10. C.-H. Mao, H.-K. Pao, C. Faloutsos, and H.-M. Lee. "SBAD: Sequence Based Attack Detection via Sequence Comparison", ECML/PKDD Workshop on Privacy and Security issues in Data Mining and Machine Learning, Barcelona, Spain, Sep. 2010.
11. H.-K. Pao, H.-Y. Lin, K.-T. Chen, and J. Fadlil. "Trajectory Based Behavior Analysis for User Verification", 11th International Conference on Intelligent Data Engineering and Automated Learning, Paisley, Scotland, UK, Sep. 2010.
12. H.-S. Lin, H.-K. Pao, C.-H. Mao, H.-M. Lee, T. Chen and Y.-J. Lee "Adaptive Alarm Filtering by Causal Correlation Consideration in Intrusion Detection", First KES International Symposium on Intelligent Decision Technologies, IDT 2009.
13. K.-T. Chen, H.-K. Pao and H.-C. Chang. "Game Bot Identification Based on Manifold Learning", 7th Workshop on Network and Systems Support for Games (NetGames), Worcester, Massachusetts, USA, Oct. 21 - 22, 2008.
14. K.-T. Chen, A. Liao, H.-K. Pao and H.-H. Chu. "Game Bot Detection Based on Avatar Trajectory", 7th International Conference on Entertainment Computing, Pittsburgh, USA, Sep. 25 - 27, 2008.

Book Chapter

15. Y.-J. Lee, Y.-R. Yeh and H.-K. Pao. "Introduction to Support Vector Machines and their Applications in Bankruptcy Prognosis" in J.-C. Duan, J. E. Gentle, and W. Hardle (editors), Handbook of Computational Finance, Springer-Verlag, 2010.

Title:

Malicious URL Detection Based on Kolmogorov Complexity Estimation

Abstract:

Malicious URL detection has drawn a significant research attention in recent years. It is helpful if we can simply use the URL string to make precursory judgment about how dangerous a website is. By doing that, we can save efforts on the website content analysis and bandwidth for content retrieval. We propose a detection method that is based on an estimation of the conditional Kolmogorov complexity of URL strings. To overcome the incomputability of Kolmogorov complexity, we adopt a compression method for its approximation, called conditional Kolmogorov measure. As a single significant feature for detection, we can achieve a decent performance that can not be achieved by any other single feature that we know. Moreover, the proposed Kolmogorov measure can work together with other features for a successful detection. The experiment has been conducted using a private dataset from a commercial company which can collect more than one million unclassified URLs in a typical hour. On average, the proposed measure can process such hourly data in less than a few minutes.

Index Terms—blacklist, compression, entropy, Kolmogorov complexity, malicious URL.

Hsuan-Tien Lin, Ph.D. (Caltech '08)

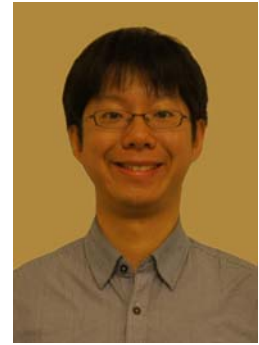
Address:

Dept. of Computer Science and Information Engineering

National Taiwan University, TAIWAN

Phone: +886-2-33664888x314 Fax: +886-2-33665898 (cover needed)

Email: htlin@csie.ntu.edu.tw



Professional Position:

Associate Professor, 2012.8-present (Assistant Professor, 2008.8-2012.7)

Honors and Awards:

- First Prize of Track 2 (Co-leader of the NTU Team), KDD Cup 2012.
- K.-T. Li Young Researcher Award, ACM Taipei Chapter and IICM, 2012.
- National Taiwan University Outstanding Teaching Award, 2011.
- First Prize of Track 1 and First Prize of Track 2 (Co-leader of the NTU Team), KDD Cup 2011.
- First Prize of All Teams and First Prize of All Student Teams (Co-leader of the NTU Team), KDD Cup 2010.
- Third Place of Slow Track (Co-leader of the NTU Team), KDD Cup 2009.

Scientific Expertise and Current Research Activities:

My research surrounds fundamental machine learning. I enjoy directing my research with a strong commitment to research topics that can be used a wide range of applications. Two of those topics continue to be my main focus:

1. enhancing the generalization ability of the machines, i.e., decreasing the error rate on the new examples that the machine has not seen before;
2. expanding the horizon of machine learning applications through the methodology of reducing new tasks to existing ones that are readily solvable.

In the past few years, I have worked on ordinal ranking, cost-sensitive classification, multi-label classification, online learning and active learning algorithms.

Selected Publications:

Yaser S. Abu-Mostafa, Malik Magdon-Ismael and Hsuan-Tien Lin. Learning from Data: A Short Course, AMLBook, ISBN-13: 978-1600490064, March 2012.

Yao-Nan Chen and Hsuan-Tien Lin. Feature-aware Label Space Dimension Reduction for Multi-label Classification. To appear in NIPS 2012.

Te-Kang Jan, Da-Wei Wang, Chi-Hung Lin and Hsuan-Tien Lin, A Simple Methodology of Soft Cost-sensitive Classification. In Proceedings of KDD '12, 2012.

Shang-Tse Chen, Hsuan-Tien Lin and Chi-Jen Lu. An Online Boosting Algorithm with Theoretical Justifications. In Proceedings of ICML '12, 2012.

Farbound Tai and Hsuan-Tien Lin. Multi-label Classification with Principal Label Space Transformation. Neural Computation, 2012.

Hsuan-Tien Lin and Ling Li. Reduction from Cost-sensitive Ordinal Ranking to Weighted Binary Classification. Neural Computation, 2012.

Han-Hsing Tu and Hsuan-Tien Lin. One-sided Support Vector Regression for Multiclass Cost-sensitive Classification. In Proceedings of ICML '10, 2010.

Title:

Feature-aware Label Space Dimension Reduction for Multi-label Classification

Abstract:

Multiclass classification is an important problem in machine learning. It can be used in a variety of applications, such as organizing documents to different categories automatically. Multi-label classification is an extension of multi-class classification --- the former allows a set of labels to be associated with an instance while the latter allows only one. For instance, a document may belong to both the "politics" and "health" class if it is about the National Health Insurance. Many other similar applications arise in domains like text mining, vision, or bio-informatics.

Label space dimension reduction (LSDR) is an efficient and effective paradigm for multi-label classification with many classes. Existing approaches to LSDR, such as compressive sensing and principal label space transformation, exploit only the label part of the dataset, but not the feature part. In this work, we propose a novel approach to LSDR that considers both the label and the feature parts. The approach, called conditional principal label space transformation, is based on minimizing an upper bound of the popular Hamming loss. The minimization step of the approach can be carried out efficiently by a simple use of singular value decomposition. In addition, the approach can be extended to a kernelized version that allows the use of sophisticated feature combinations to assist LSDR. The experimental results verify that the proposed approach is more effective than existing ones to LSDR across many real-world datasets.

Yuh-Jye Lee

Address:

Dept. of Computer Science and Information Engineering
National Taiwan University of Science and Technology
43 Keelung Rd, Section 4, Taipei 106, Taiwan
Phone: 886-2-27301066 Fax: 886-2-27301081
Email: yuh-jye@mail.ntust.edu.tw



Professional Position:

2007.8 ~ : Associate Prof., Dept. of Computer Science and Information Engineering, NTUST
2002.8-2007.7: Assistant Prof., Dept. of Computer Science and Information Engineering, NTUST
2001.8-2002.7: Assistant Prof., Dept. of Computer Science and Information Engineering, NCCU

Honors and Awards:

2010: 2005-2010 Top Cited Paper Award from ELSEVIER
2009, 2010: Excellent Research Award, NTUST
2008: Outstanding Teaching Award, NTUST
2006, 2007: Excellent Teaching Award, NTUST

Scientific Expertise and Current Research Activities:

My research interests are machine learning, data mining, and optimization. Recently, I apply machine learning algorithms to networks intrusion detection and anomaly detection. We also develop online learning algorithms for dealing with large-scale datasets as well as dimension reduction problems. Utilizing all the tools we developed in the past years and cloud computing technology, we are constructing a data analysis center that will provide an automatic data analysis service. Currently, I lead the “Cloud Service Defense-in-depth Security Technology Research and Development” an integrated 3 years project granted by National Science Council.

Publications:

Journal Papers:

1. **Yuh-Jye Lee**, Yi-Ren Yeh, and Yu-Chiang Frank Wang. "Anomaly Detection via Online Over-Sampling Principal Component Analysis", *IEEE Transactions on Knowledge and Data Engineering (TKDE)*, (To appear).
2. Chih-Cheng Chang, Li-Jen Chien and **Yuh-Jye Lee**. “A Novel Framework for Multi-class Classification via Ternary Smooth Support Vector Machine”, *Pattern Recognition*, Vol. 44, Issue 6, Pages 1235-1244, (June 2011).

3. Chun-Nan Hsu, Han-Shen Huang, Yu-Ming Chang and **Yuh-Jye Lee**. "Periodic Step-size Adaptation in Second-order Gradient Descent for Single-pass On-line Structured Learning", *Machine Learning*, Vol. 77, Issue 2-3, Special Issue for Structured Prediction, Pages 195-224, (December 2009).
4. Wolfgang Härdle, **Yuh-Jye Lee**, Dorothea Schäfer and Yi-Ren Yeh. "Variable Selection and Over-sampling in the use of Smooth Support Vector Machines for Predicting the Default Risk of Companies", *Journal of Forecasting*, Vol. 28 Issue 6, Pages 512-534, (September 2009). 《SSCI》
5. Yi-Ren Yeh, Su-Yun Huang, **Yuh-Jye Lee**. "Nonlinear Dimension Reduction with Kernel Sliced Inverse Regression", *IEEE Transactions on Knowledge and Data Engineering*, Vol. 21, No. 11, Pages 1590-1603, (November 2009). 《SCI》
6. **Yuh-Jye Lee**, Chien-Chung Chang and Chia-Huang Chao. "Incremental Forward Feature Selection with Application to Microarray Gene Expression Data", *Journal of Biopharmaceutical Statistics*, Vol. 18, Issue 5, Pages 827-840, (September 2008). 《SCI》
7. Chien-Ming Huang, **Yuh-Jye Lee**, Dennis K. J. Lin and Su-Yun Huang. "Model Selection for Support Vector Machines via Uniform Design", *Computational Statistics & Data Analysis*, Vol. 52, Issue 1, Pages 335-346, (September 2007). 《SCI》
8. **Yuh-Jye Lee** and Su-Yun Huang. "Reduced Support Vector Machines: A Statistical Theory", *IEEE Transactions on Neural Networks*, Vol. 18, No. 1, 1-13, (2007). 《SCI》
9. **Yuh-Jye Lee**, Wen-Feng Hsieh and Chien-Ming Huang. "ε-SSVR: A smooth support vector machine for ε-insensitive regression", *IEEE Transactions on Knowledge and Data Engineering*, Vol. 17, No. 5, Pages 678-685, (2005). 《SCI》

Conference Papers:

1. Yi-Cheng Tseng, **Yuh-Jye Lee**. "Rank-r Updating Techniques for Fast Exact Cross-Validation", *Industrial Conference on Data Mining (ICDM 2011)*, New York, USA, (August 30 - September 3, 2011).
2. Yu-Wei Chao, Yi-Ren Yeh, Yu-Wen Chen, **Yuh-Jye Lee**, and Yu-Chiang Frank Wang, "Locality-constrained Group Sparse Representation for Robust Face Recognition," *IEEE International Conference on Image Processing (ICIP)*, Brussels, Belgium, (September 11-14, 2011).
3. Li-Jen Chien, Zhi-Peng Kao, **Yuh-Jye Lee**. "Smooth LASSO for Classification", *The 2010 Conference on Technologies and Applications of Artificial Intelligence (TAAI 2010)*, Hsinchu, Taiwan, Pages 241-246, (November 18-20, 2010).

4. Chien-Chung Chang, **Yuh-Jye Lee**, Hsing-Kuo Pao. "A Passive-Aggressive Algorithm for Semi-supervised Learning", *The 2010 Conference on Technologies and Applications of Artificial Intelligence (TAAI 2010)*, Hsinchu, Taiwan, Pages 335-341, (November 18-20, 2010).
5. Chien-Yi Chiu, **Yuh-Jye Lee**, Chien-Chung Chang, Wen-Yang Luo and Hsiu-Chuan Huang. "Semi-supervised Learning for False Alarm Reduction", *Industrial Conference on Data Mining (ICDM)*, LNAI6171, Berlin, Germany, Pages 595–605, (July 12-14, 2010).
6. Li-Jen Chien, **Yuh-Jye Lee**, Zhi-Peng Kao, and Chih-Cheng Chang. "Robust 1-Norm Soft Margin Smooth Support Vector Machine", *Proc. of 11th Intelligent Data Engineering and Automated Learning*, Paisley, UK, (September 2010).
7. Chun-Nan Hsu, Yu-Ming Chang, Han-Shen Huang and **Yuh-Jye Lee**. "Periodic Step-Size Adaptation for Single-Pass On-line Learning", *The Neural Information Processing Systems (NIPS)*, Vancouver, B.C., Canada, (December 7-12, 2009).

Book Chapters:

1. **Yuh-Jye Lee**, Yi-Ren Yeh and Hsing-Kuo Pao. "Introduction to Support Vector Machines and Their Applications in Bankruptcy Prognosis", *Handbook of Computational Finance*, 1st Edition. Edition (invited book chapter), (2011).
2. Yuan-chin Ivan Chang, **Yuh-Jye Lee**, Hsing-Kuo Pao, Mei-Hsien Lee and Su-Yun Huang in Chun-houh Chen, Wolfgang Härdle and Antony Unwin (editors). "Data Visualization via Kernel Machines", *Handbook of Computational Statistics (Volume III)*, Data Visualization, (2006).

Title:

Anomaly Detection via Online Over-Sampling Principal Component Analysis

Abstract:

Anomaly detection has been an important research topic in data mining and machine learning. Many real-world applications such as intrusion or credit card fraud detection require an effective and efficient framework to identify deviated data instances. However, most anomaly detection methods are typically implemented in batch mode, and thus cannot be easily extended to large-scale problems without sacrificing computation and memory requirements. We introduce an online over-sampling principal component analysis (osPCA) algorithm for detecting the presence of outliers from a large amount of data via an online updating technique. Unlike prior PCA based approaches, we do not store the entire data matrix or covariance matrix, and thus our approach is especially of interest in online or large-scale problems. Since our osPCA needs not performing eigen analysis explicitly, the proposed framework is favored for online applications which have computation or memory limitations. This advantage will allow applying our method to distributed anomaly detection systems such as M2M communication systems and the Internet of Things (IoT). We believe that it will be an important technique for the Big Data era.

Fang-Jing Wu (巫芳璟)

Address:

Intelligent Systems Centre
Nanyang Technological University
Research Techno Plaza, BorderX Block, 7th Storey
50 Nanyang Drive, Singapore 637553
Republic of Singapore
Phone: +65-8416-4996 Fax:
Email: f.wu@ntu.edu.sg



Professional Position:

- 2012.1-present: Research Fellow, Intelligent Systems Centre, Nanyang Technological University
- 2010.10-2011.9: Visiting Researcher, Department of Electrical and Electronic Engineering, Imperial College London, UK
- 2005.09-2011-06: Ph.D. Department of Computer Science, National Chiao Tung University, Taiwan

Honors and Awards:

- 2011: The Google Anita Borg Memorial Scholarship
- 2010-2011: Graduate Students Study Abroad Program sponsored by National Science Council, visit Imperial College London
- 2010: National Communication Software and Innovative Applications Contest, 2nd place, Taiwan, “Cyber-physical handshake”, awarded by Ministry of Education, with Fang-Jing Wu, and Fong-Yi Chu.
- 2009: Excellent research fellowship, awarded by Department of Computer Science, National Chiao Tung University, Taiwan
- 2009: Best Demo Award, “A Wireless Human Motion Capturing System for Home Rehabilitation”, International Conference on Mobile Data Management (by Yu-Chee Tseng, Chin-Hao Wu, Fang-Jing Wu, Chi-Fu Huang, Chung-Ta King, Chun-Yu Lin, Jang-Ping Sheu, Chun-Yu Chen, Chi-Yuan Lo, Chien-Wen Yang, and Chi-Wen Deng)

Scientific Expertise and Current Research Activities:

- Mobile Ad Hoc Networks
- Wireless Sensor Networks/Body Sensor Networks
- Wireless Communications and Networks
- Cyber-Physical Systems
- Mobile Computing

Publications:

Journal Papers

1. Erol Gelenbe and **Fang-Jing Wu**, “Large Scale Simulation for Human Evacuation and Rescue”, Computers and Mathematics with Applications, 2012. (Published online: 24 April 2012, DOI:10.1016/j.camwa.2012.03.056)
2. You-Chiun Wang, **Fang-Jing Wu**, and Yu-Chee Tseng, “Mobility Management Algorithms and Applications for Mobile Sensor Networks”, Wireless Communications and Mobile Computing, Vol. 12, No. 1, 2012.
3. **Fang-Jing Wu** and Yu-Chee Tseng, “Energy-Conserving Data Gathering by Mobile Mules in a Spatially Separated Wireless Sensor Network”, Wireless Communications and Mobile Computing, 2011. (Published online: 15 AUG 2011, DOI: 10.1002/wcm.1184)
4. **Fang-Jing Wu**, Yu-Fen Kao, and Yu-Chee Tseng, “From Wireless Sensor Networks toward Cyber Physical Systems”, Pervasive and Mobile Computing, Vol. 7, No. 4, 2011. (Most Downloaded -counted by article downloads in the period April to June 2011)
5. **Fang-Jing Wu** and Yu-Chee Tseng, “Distributed Wake-up Scheduling for Data Collection in Tree-Based Wireless Sensor Networks”, IEEE Communications Letters, Vol. 13, No. 11, 2009
6. Jenn-Hwan Tarng, Bing-Wen Chuang, and **Fang-Jing Wu**, “A Novel Stability-based Routing Protocol for Mobile Ad-Hoc Networks”, IEICE Transactions on Communications, Vol.E90-B, No.4, April, 2007
7. Sheng-Po Kuo, Yu-Chee Tseng, **Fang-Jing Wu**, and Chun-Yu Lin, “A Probabilistic Signal-Strength-Based Evaluation Methodology for Sensor Network Deployment”, International Journal of Ad Hoc and Ubiquitous Computing, 2005.

Conference Papers

1. **Fang-Jing Wu**, Hsiu-Chi Hsu, and Yu-Chee Tseng, “Traffic-Attracted Mobile Relay Deployment in a Wireless Ad Hoc Network”, IEEE GLOBECOM, 2012.
2. Erol Gelenbe and **Fang-Jing Wu**, “Emergency Cyber-Physical-Human Systems”, International Conference on Computer Communication Networks (ICCCN), 2012.
3. Erol Gelenbe and **Fang-Jing Wu**, “Distributed Networked Emergency Evacuation and Rescue”, IEEE ICC Workshop on Re-think ICT infrastructure designs and operations (RIDO), 2012.
4. **Fang-Jing Wu**, Feng-I Chu, and Yu-Chee Tseng, “Cyber-Physical Handshake”, ACM SIGCOMM (Demo paper), 2011.
5. Erol Gelenbe and **Fang-Jing Wu**, “Cyber-Physical Evacuation and Rescue”, International Conference on Wireless Technologies for Humanitarian Relief, 2011

6. Yu-Chee Tseng, Wan-Ting Lai, Chi-Fu Huang, and **Fang-Jing Wu**, “Using Mobile Mules for Collecting Data from an Isolated Wireless Sensor Network”, International Conference on Parallel Processing (ICPP), San Diego, CA, 2010
7. **Fang-Jing Wu**, Chen-Shao Huang, and Yu-Chee Tseng, “My Tai-Chi Book: A Virtual-Physical Social Network Platform”, Information Processing in Sensor Networks (IPSN) (Demo paper), 2010, Stockholm, Sweden.
8. **Fang-Jing Wu**, Hsiu-Chi Hsu, Yu-Chee Tseng, and Chi-Fu Huang, “Non-Location-Based Mobile Sensor Relocation in a Hybrid Static-Mobile Wireless Sensor Network”, International Conference on Sensor Technologies and Applications (SENSORCOMM), 2009. (Greece)
9. **Fang-Jing Wu**, Chi-Fu Huang, and Yu-Chee Tseng, “Data Gathering by Mobile Mules in a Spatially Separated Wireless Sensor Network”, International Conference on Mobile Data Management (MDM), 2009, Taipei.
10. Yu-Chee Tseng, Chin-Hao Wu, **Fang-Jing Wu**, Chi-Fu Huang, Chung-Ta King, Chun-Yu Lin, Jang-Ping Sheu, Chun-Yu Chen, Chi-Yuan Lo, Chien-Wen Yang, and Chi-Wen Deng, “A Wireless Human Motion Capturing System for Home Rehabilitation”, International Conference on Mobile Data Management (MDM), 2009, Taipei. (Recipient of Best Demo Award)
11. Jenn-Hwan Tarng, Bing-Wen Chuang, and **Fang-Jing Wu**, “A Radio-Link Stability-based Routing Protocol for Mobile Ad Hoc Networks”, IEEE International Conference on Systems, Man, and Cybernetics (SMC), 2006
12. Sheng-Po Kuo, Yu-Chee Tseng, **Fang-Jing Wu**, and Chun-Yu Lin, “A Probabilistic Signal-Strength-Based Evaluation Methodology for Sensor Network Deployment”, International Conference on Advanced Information Networking and Applications (AINA), 2005.

Title:

Transportation Activity Analysis Using Smartphones

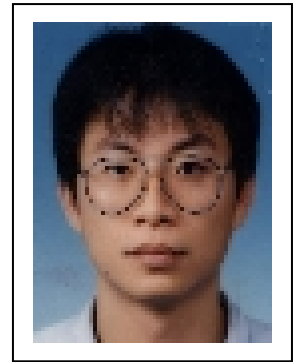
Abstract:

Transportation activity surveys investigate when, where and how people travel in urban areas to provide information necessary for urban transportation planning. Such surveys are conducted through conventional questionnaires and travel diaries. However, the conventional surveys are problematic and error-prone. We are developing a smartphone-based transportation activity survey system to replace the traditional surveys. The smartphones are used to collect GPS, GSM, accelerometer and other contextual information for place detection, trajectory tracking and transportation mode detection. Our smartphone based survey system is designed to seamlessly capture the daily transportation activity profiles of users, including their modes of transportation and places they visit. In this talk, we will discuss the design and implementation of the transportation activity survey system. We present the design of the mobile applications, based on the Android and iOS platforms, to improve the quality of the sensing data and reduce the energy required for data collection. We give an overview of the survey web application to enable users to validate their activities and trips. We highlight the design of the high-performance backend system for managing and processing the huge volume of sensor data, and its preliminary performance and scalability analysis. We also present the data analysis techniques for stop detection and transportation mode detection. A full prototype of the system has been developed and is being used to support the Singapore Land Transport Authority's (LTA) Travel Survey 2012, involving at least 1000 volunteer smartphone users.

Alvin W.Y. Su

Address:

SCREAM Lab. Dept. of Computer Science and Information Engineering
Tainan, National Cheng-Kung University, TAIWAN
Phone: 06-2757575-62537 Fax: 06-2747076
Email: alvinsu@mail.ncku.edu.tw



Professional Position:

2002.6-present: Professor, CSIE, National Cheng-Kung University

Honors and Awards:

2002:

Scientific Expertise and Current Research Activities:

Musical Signal analysis, Music Synthesis, EEG signal Analysis, Multi-core Platform Technology, Multi-core On-chip memory Architecture and Management.

Publications:

1. Jing-Xin Wang, Alvin W. Y. Su, "Adaptive Zero-Coefficient Distribution Scan for Inter Block Mode Coding of H.264/AVC ", IEICE TRANSACTIONS on Information and Systems Vol.E93-D No.8 pp.2273-2280, August 2010.
2. Jing-Xin Wang, Yung-Chang Chiu, Alvin W. Y. Su, **Ce-Kuen Shieh**, "PARALLEL H.264/AVC RATE-DISTORTION OPTIMIZATION BASELINE PROFILE ENCODER ON DISTRIBUTED SHARE MEMORY SYSTEM", International Journal of Innovative Computing, Information and Control Volume 6, Number 9, September 2010.
3. Y. L. Wang, J.X. Wang, and A.W.Y. Su, "Combined significance map coding for still image compression", *IET image processing*, vol. 5, pp.55-62, July, 2011.
4. Zhongho Chen, Alvin W.Y. Su, Ming-Ting Sun, and Scott Hauck, "Medical imaging process accelerated in FPGA 82X faster than software", EE Times, 21, June, 2011
5. Zhong-Ho Chen, Alvin W.Y. Su and Ming-Ting Sun, "Resource Efficient FPGA Architecture and Implementation of Hough Transform for Video Processing", IEEE Transactions on Very Large Scale Integration (VLSI) Systems, 25, July, 2011
6. D. W. Chang, S. F. Liang, C. P. Young, F. Z. Shaw, W. Y. Su, Y. D. Liu, Y. L. Wang, Y. C. Liu, J. J. Chen and C. Y. Chen, " A Versatile Wireless Portable Monitoring System for Brain-Behavior Approaches", IEEE Journal on Emerging and Selected Topics in Circuits and Systems, 2011.
7. Yu-Lin Wang; Wei-Hsiang Liao; Su, A.W.-Y.; "A SOT based digital audio coder using reference

frame ordering method”, *IEEE International Symposium on Circuits and Systems*, pp.1141, 2010.

8. Wang, Yu-Lin; Liao, Chia-Te; Su, Alvin W.Y.; Lai, Shang-Hong;, "Fingerprint compression: An adaptive and fast DCT-based approach," 17th IEEE International Conference on Image Processing (ICIP), pp. 3109-3112, 2010.
9. Tsung-Yin Shih, Yu-Lin Wang, Jhe-Rong Liou, Alvin W.Y. Su, Chung-Ho Chen, Kuen-Jong Lee, " OpenESL and Its Co-simulation Framework for Heterogeneous Tools", The 21-th 2010 VLSI Design/CAD Symposium, P1-13, August, 2010.
10. Pin-Hao Fang, Yu-Lin Wang, Zhong-Ho Chen, Alvin Su and Ce-Kuen Shieh, "An open electronic system level multi-SPARC virtual platform and its toolchain", International Symposium on Computer, 2010.
11. Zhong-Ho Chen, Ta-Chun Chen, Jung-Yin Chien, Alvin Su and Ce-Kuen Shieh, " Exploiting Parallelism of MPEG-4 Decoder with Dataflow Programming on Multicore Processor", International Symposium on Parallel and Distributed Processing with Applications, 2010.
12. P.-Y. Tsai, T.-M. Wang, and Alvin Su, "**GPU-Based Spectral Model Synthesis for Real-time Sound Rendering**," *Proc. of the 13th Int. Conf. on Digital Audio Effects (DAFx-10)*, Graz, Austria, September 6-10, 2010.
13. Zhong-Ho Chen, Alvin W.Y. Su, Scott Hauck and Ming-Ting Sun, "FPGA acceleration for statistical LOR estimation of a high-resolution PET scanner", The 19th Annual International IEEE Symposium on Field-Programmable Custom Computing Machines (FCCM), 2011.
14. Yi-Li Lin, Wei-Tso Chen, Alvin W.Y. Su, Da-Wei Chang and Chung-Ho Chen, "A Low Cost, Low Power, High Scalability and Dependability Processor-Cluster Platform," IEEE Symp. on Industrial Embedded Systems, 15-17 June 2011.
15. P.-Y. Tsai, T.-M. Wang, and Alvin Su, "ANALYSIS AND TRANS-SYNTHESIS OF ACOUSTIC BOWED-STRING INSTRUMENT RECORDINGS – A CASE STUDY USING BACH CELLO SUITES," *Proc. of the 14th Int. Conf. on Digital Audio Effects (DAFx-11)*, Paris, France, September 19-23, 2011.
16. Wei-Hsiang Liao, Alvin. Wen-Yu Su, Chunghsin Yeh, Axel Roebel, "On the Use of Perceptual Properties for Melody Estimation," *Proc. of the 14th Int. Conf. on Digital Audio Effects (DAFx-11)*, Paris, France, September 19-23, 2011.
17. Tien-Ming Wang, Shih-Wei Huang, and Alvin W.Y. Su, "A NEW STATE CLUSTERING METHOD FOR EXPRESSIVE VIOLIN SYNTHESIS", *2011 International Workshop on Computer Music and Audio Technology (WOCMAT 2011)*, Taipei, Taiwan, December 2-4, 2011.
18. Ta-Chun Chen, Pei-Yin Tsai, Hao-Jyun Liang and Alvin Su, "QUANTITATIVE ANALYSIS OF POLYPHONIC MUSICAL RECORDINGS USING NONNEGATIVE MATRIX FACTORIZATION", *2011 International Workshop on Computer Music and Audio Technology (WOCMAT 2011)*, Taipei, Taiwan, December 2-4, 2011.

Title:

Analysis of Musical Recordings and Expressive Sound Synthesis

Abstract:**Analysis of Musical Recordings**

It would be wonderful if one could learn how master musicians execute their performances from the recordings. It is also helpful if a student can learn her/his problems by recording her/his own playing. In the past, such analysis is more subjectively than objectively. Recently, source separation technologies are applied to audio signals. However, for detail analysis of musical performance, it is usually necessary to study every note in a recording. Therefore, we would like to present the extension from source separation to note separation/tracking. In this talk, acoustic recordings of violin solo, violin sonata and violin concerto are used to demonstrate our currently far from perfect results, especially when a recording contains too many instruments. It is expected that objective analysis and evaluation of musical performing can become popular with the advance of technologies.

Expressive Sound Synthesis

Sound/Music synthesis has been widely used. Methods such as wavetable, FM, spectral modeling, waveguide/physical modeling were proposed in the past few decades. Synthesized music is now everywhere, but it is seldom used in solo. Expression is the most important part in playing musical instrument. Musicians can change their way of playing a note using techniques such as vibrato. This is very common for bowed-string instruments and plucked-string instruments. Unfortunately, it is difficult to simultaneously control both temporal and spectral characteristics of a synthesized note to achieved the desired expression for most synthesis methods. In this talk, we would like to demonstrate a LPC-based synthesis method focusing on producing desired expressions. Guqin music will be played in the talk to show why expression is so important to the playing of instruments. Violin and guqin sounds are used as examples to show the flexibility of our method in controlling characteristics such as pitch, volume, timbre, duration and so on.

Tei-Wei Kuo

Address:

Dept. of Computer Science and Information Engineering

National Taiwan University, 10617 Taiwan.

Phone: 02- 33664888*315 Fax: 02-33663778

Email: ktw@csie.ntu.edu.tw



Professional Position:

- ♦ 2009.08 – now: Distinguished Professor, Department of Computer Science and Information Engineering, National Taiwan University, Taipei, Taiwan.
- ♦ 2012.02 - now: Executive Director, the Intelligent and Ubiquitous Computing Thematic Center of the Research Center of the IT Innovation, Academia Sinica, Taiwan.

Honors and Awards:

- ♦ IEEE Fellow, 2011.
- ♦ Distinguished Research Award, National Science Council, Taiwan, 2011-2013 and 2003-2005.
- ♦ Ten Outstanding Young Persons Award, Taiwan, 2004.
- ♦ Young Scholar Research Award, Academia Sinica, 2001.

Scientific Expertise and Current Research Activities:

My main research interests: Real-Time Systems, Embedded Systems, Flash-Memory Storage Systems, Real-Time Database Systems.

Publications:

- ♦ Ming-Chang Yang, Yuan-Hao Chang, Po-Chun Huang and Tei-Wei Kuo, 2012, “Working-Set-Based Address Mapping for Ultra-Large-Scaled Flash Devices,” IEEE/ACM/IFIP International Conference on Hardware/Software Codesign and System Synthesis (CODES+ISSS), Tampere, Finland, Oct 7-12, 2012.
- ♦ Che-Wei Chang, Jian-Jia Chen, Waqaas Munawar, Tei-Wei Kuo and Heiko Falk, 2012, “Partitioned Scheduling for Real-Time Tasks on Multiprocessor Embedded Systems with Programmable Shared SRAMS,” ACM EMSOFT, Tampere, Finland, Oct 7-12, 2012.
- ♦ Po-Chun Huang, Yuan-Hao Chang, and Tei-Wei Kuo, 2012, “Joint Management of RAM and Flash Memory with Access Pattern Considerations,” ACM/IEEE 49-th Design Automation Conference (DAC), San Francisco, USA, June 3-7, 2012.
- ♦ Chi-Hao Chen, Pi-Cheng Hsiu, Tei-Wei Kuo, Chia-Lin Yang, C.Y. Michael Wang, 2012, “Age-Based PCM Wear Leveling with Nearly Zero Search Cost,” ACM/IEEE 49-th Design Automation Conference (DAC), San Francisco, USA, June 3-7, 2012.
- ♦ Tei-Wei Kuo, Li-Pin Chang, Yu-Hua Liu, and Kwei-Jay Lin, "Efficient Online Schedulability

Tests for Real-Time Systems," IEEE Transactions on Software Engineering (SCI), Vol. 29, No. 8, August 2003, pp. 734-751.

Title:

Opportunities and Positioning of Storage-Class Memory

Abstract:

As flash memory gains its huge momentum in the storage market, people have high expectation on other potential roles that could be played by non-volatile memory. It has been a grand challenge to position selected non-volatile memory technologies in the memory hierarchy. In this talk, I will take flash memory and phased change memory (PCM) as examples to address the challenges and design methodologies for non-volatile memory as a storage medium or to serve as the role of DRAM. The talk will be concluded by moving the discussion forward to the opportunities of non-volatile memory in system designs, such as server cache and data storage in data manipulation.

Chang-Shing Lee

Address:

Dept. of Computer Science and Information Engineering
National University of Tainan (NUTN), Taiwan
70005, No. 33, Sec. 2, Shu-Lin St., Tainan, TAIWAN
Phone: 886-6-2602573 Fax: 886-6-2606125 Email: leecs@mail.nutn.edu.tw



Professional Position:

2011.1-present: Dean, Development and Research Office, NUTN, TAIWAN
2006.2-2011.7: Director, Computer Center, NUTN, TAIWAN

Honors and Awards:

- 2009-2010: Chair, IEEE CIS EETC
- 2008: Vice Chair, IEEE CIS EETC
- 2009-present: Associate editor of IEEE Transactions on Computational Intelligence and AI in Games
- 2011-present: Associate editor of Soft Computing-A Fusion of Foundations, Methodologies and Applications
- 2009: Prize for Outstanding Achievement in Information and Computer Education & Taiwan Academic Network (TANet), Ministry of Education, TAIWAN
- 2010-2011: Prize for Excellent Researcher, National University of Tainan, TAIWAN

Scientific Expertise and Current Research Activities:

My major research interests are in Ontology Applications, Knowledge Management, Capability Maturity Model Integration (CMMI), Semantic Web, and Artificial Intelligence. I am also interested in Intelligent Agent, Web Services, Fuzzy Theory & Application, Genetic Algorithm, and Image Processing. He also holds several patents on Ontology Engineering, Document Classification, Image Filtering, and Healthcare.

Publications:

- **C. S. Lee**, M. H. Wang, and H. Hagaras, "A type-2 fuzzy ontology and its application to personal diabetic diet recommendation," *IEEE Transactions on Fuzzy Systems*, vol. 18, no. 2, pp. 374-395, vol. 18, no. 2, pp. 374-395, Apr. 2010.
- **C. S. Lee** and M. H. Wang, "A Fuzzy Expert System for Diabetes Decision Support Application," *IEEE Transactions on Systems, Man, and Cybernetics Part B*, vol. 41, no. 1, pp. 139-153, Feb. 2011.
- J. B. Hoock, **C. S. Lee**, A. Rimmel, F. Teytaud, M. H. Wang, and O. Teytaud, "Intelligent Agents for the Game of Go," *IEEE Computational Intelligence Magazine*, vol. 5, no. 4, pp. 28-42, Nov. 2010.
- A. Rimmel, O. Teytaud, **C. S. Lee**, S. J. Yen, M. H. Wang, and S. R. Tsai, "Current frontiers in computer Go," *IEEE Transactions on Computational Intelligence and AI in Games*, vol. 2, no. 4, pp. 229-238, Dec. 2010.
- **C. S. Lee**, M. H. Wang, C. Chaslot, J. B. Hoock, A. Rimmel, O. Teytaud, S. R. Tsai, S. C. Hsu, and T. P. Hong, "The computational intelligence of MoGo revealed in Taiwan's computer Go tournaments," *IEEE Transactions on Computational Intelligence and AI in Games*, vol. 1, no. 1, pp. 73-89, 2009.
- **C. S. Lee**, Z. W. Jian, and L. K. Huang, "A fuzzy ontology and its application to news summarization," *IEEE Transactions on Systems, Man and Cybernetics Part B*, vol. 35, no. 5, pp. 859-880, 2005.
- **C. S. Lee**, S. M. Guo, and C. Y. Hsu, "Genetic-based fuzzy image filter and its application to image processing," *IEEE Transactions on Systems, Man and Cybernetics Part B: Cybernetics*, vol. 35, no. 4, pp. 694-711, 2005.

- C. S. Lee, M. H. Wang, Y. J. Chen, H. Hagsas, M. J. Wu, and O. Teytaud, "Genetic fuzzy markup language for game of NoGo," *Knowledge-Based Systems*, vol. 34, pp. 64-80, Oct. 2012.
- C. S. Lee, M. H. Wang, H. Hagsas, Z. W. Chen, S. T. Lan, S. E. Kuo, H. C. Kuo, and H. H. Cheng, "A novel genetic fuzzy markup language and its application to healthy diet assessment," *International Journal of Uncertainty, Fuzziness, and Knowledge-Based Systems*, vol. 20, no. 2, pp. 247-278, Oct. 2012.

Title:

Applications of Type-2 Fuzzy Sets to Game of Go and Adaptive Assessment

Abstract:

Go has developed for thousands of years so that the knowledge of Go players has been accumulated a lot for a long time. The layout of the Go game is a key factor to affect the game development and result. However, different Go players have different strategies and thinking models to layout the opening of the Go game. In this talk, we apply the type-2 fuzzy sets (T2FS) to the adaptive assessment. There are two applications in this talk. One is the construction of knowledge ontology about Go players with various levels. Generated by past Human vs. Computer Go Competitions, the simulation number of Monte Carlo Tree Search (MCTS) is first collected and organized according to different levels of Go players. Then, based on the simulation number and fuzzy theory, this talk actually constructs the T2FS to conceptualize the knowledge of the various Go players. Another is the construction of assessment ontology about students' learning performance. Ministry of Education started After School Alternative Program (ASAP) in 2006. The objective of this program is to promote the disadvantaged students' basic learning ability to achieve the compulsory education's goal cultivating students to be with lifelong learning ability. In 2008, Ministry of Education then commissioned National University of Tainan (NUTN) to set up the ASAP Technology-based Testing (ASP-tbt) System. On one hand, this established system supports the assessment of the learning-behind students from elementary schools and junior high schools in Taiwan. On the other hand, this system also analyzes, tracks, and accumulates the learning progress of involved students from various schools to be a referred direction of remedial instruction. As a result, this talk combines the technologies of ontology, fuzzy theory, with T2FS to apply them to the ASAP-tbt to actually construct the T2FS of the students involved the ASAP adaptive assessment. In the future, the experimental results of this talk could provide a reference to construct the type-2 fuzzy ontology.

HUI-LING LIN

Place of Birth : Tainan, Taiwan

Citizenship : Republic of China

Address : Institute of Marine Geology and Chemistry

National Sun Yat-Sen University

Kaohsiung, Taiwan 804, R.O.C.

Telephone : 886-7-525-2000 ext. 5139

FAX : 886-7-525-5149

E-mail : hllin@mail.nsysu.edu.tw



EDUCATION

1983 B.S. in Geology, National Taiwan University, Taipei, Taiwan.

1985 M.S. in Geology, National Taiwan University, Taipei, Taiwan.

1992 Ph.D. in Marine Geology and Geophysics, University of Miami, Miami, Florida.

PROFESSIONAL EXPERIENCES

1985-1993 Instructor, National Sun Yat-Sen University.

1988-1990 Teaching Assistant, University of Miami.

1991-1992 Research Assistant, University of Miami.

1993-2004 Associate Professor, National Sun Yat-Sen University.

2004-present Professor, National Sun Yat-Sen University.

2007-present Director, Institute of Marine Geology and Chemistry, NSYSU.

SELECTED PUBLICATIONS

Lin, H.-L., Wang, W.-C., and G.-W. Hung (2004) Seasonal Variation of Planktonic Foraminiferal Isotopic Composition from the Sediment Traps in the South China Sea: *Marine Micropaleontology*, v. 53, p. 447-460.

Lin, H.-L., Liu, J.T., and G.-W. Hung (2005) Foraminiferal shells in sediment traps: Implications of biogenic particle transport in the Kao-ping Submarine Canyon, Taiwan, *Continental Shelf Research*, v. 25, p. 2261-2272.

Lin, H.-L. and H.-Y. Hsieh (2007) Seasonal variations of modern planktonic foraminifera in the South China Sea, *Deep Sea Research II*, v. 54, p. 1634-1644.

Lin, H.-L., D.-D. Sheu, Y. Yang, W.-C. Chou, and G. -W. Hung (2011) Stable isotopes in modern planktonic foraminifera: Sediment trap and plankton tow results from the South China Sea, *Marine Micropaleontology*, v. 79, P. 15-33.

Title:

The Succession of Modern Foraminifera: Observations from Sediment Traps off Southwest Taiwan Waters

Abstract:

The succession of living planktonic foraminifera was observed based on the sediment trap collected off the Southwest Taiwan. Sediment traps were deployed at water depths of ~816 m and ~233/250 m for three mooring intervals: October-November 2009, March-April 2010 and July-August 2010. Sampling duration was 3 days per collecting cup for 36 days/12 cups for each mooring. In general, variation of shell abundance (#/g; number of specimens per gram of original bulk sample) shows a pattern that seems to be related to the lunar cycle: shell abundance increases from low values at new moon and reaches its maximum before full moon. The faunal assemblages were dominated by *Globigerinella aequilateralis*, *Globigerinoides sacculifer*, *Globorotalia menardii*, *Globigerinoides ruber*, *Neogloboquadrina dutertrei*, and *Pulleniatina obliquiloculata*; these six species constituting 30–80% of all foraminiferal shells found in sediment trap. The seasonal contrast for faunal assemblage among these three deployment periods, however, is not very evident except for the relative abundance of *G. sacculifer* and *G. ruber*.

Yuan-Pin Chang

Address:

Inst. of Marine Geology and Chemistry
804 No.70 Lein-hai Rd., National Sun Yat-sen University (NSYSU),
Kaohsiung, TAIWAN
Phone:+886-7-5252000 #5161 Fax:+886-7-5255130
Email: yuanpin.chang@mail.nsysu.edu.tw



Professional Position:

2009.2-present: Assistant Professor, Institute of Marine Geology and Chemistry, NSYSU
2008.8-2009.1: Postdoctoral Fellow, Institute of Applied Geosciences, NTOU

Education:

2008: Ph.D., Institute of Applied Geosciences, National Taiwan Ocean University, TAIWAN
1998: MAS., Institute of Applied Geophysics, National Taiwan Ocean University, TAIWAN
1996: BS., Department of Oceanography, National Taiwan Ocean University, TAIWAN

Scientific Expertise and Current Research Activities:

I am a paleoceanographer with expertise on fossil foraminifera identity, stable isotope measurement, organic biomarkers and major/trace elements analysis on fossil shells. At present, I am focus on reconstructing paleoceanographic and paleoclimatic records of the East China Sea, especially the long-term variation of paleo-Kuroshio and monsoon over the past glacial-interglacial cycle. Otherwise, I also focus on using organic biomarkers to monitor centennial and millennial climate changes of the Taiwan region by extracting coastal and lacustrine sediments.

Publications:

- Chen, H.-F., **Y.-P. Chang**, S.-J. Kao, M.-T. Chen, S.-R. Song, L.-W. Kuo, S.-Y. Wen, T.-N. Yang and T.-Q. Lee, 2011. Mineralogical and geochemical investigations of sediment-source region changes in the Okinawa Trough during the past 100 ka (MD012404). *Journal of Asian Earth Sciences*, 40(6): 1238-1249 doi:10.1016/j.jseaes.2010.09.015.
- Chen, M.-T., X.P. Lin, **Y.-P. Chang**, Y.-C. Chen, L. Lo, C.-C. Shen, Y. Yokoyama, D.W. Oppo, W.G. Thompson, and R. Zhang, 2010. Dynamic millennial-scale climate changes in the Northwestern Pacific over the past 40,000 years. *Geophysical Research Letters*, 37, L23603, doi:10.1029/2010GL045202.
- Chen, M.-T., **Y.-P. Chang**, P.-S. Yu, and L.-J. Shiau, 2010. Marine records of East Asian monsoon variability over the past 5 Myr. *Journal of the Geological Society (London)*, 342: 5-15, doi:10.1144/SP342.2.
- Chang, Y.-P.**, W.-L. Wang, M.-T. Chen, 2009. Last Interglacial–Glacial Paleoenvironmental Changes Inferred from the Diatom Assemblages of Core MD012404 from the Okinawa Trough. *Journal of Quaternary Science*, 24(8): 890-901.
- Chang, Y.-P.**, M.-T. Chen, Y. Yokoyama, H. Matsuzaki, W. G. Thompson, S.-J. Kao, and H. Kawahata, 2009. Monsoon precipitation and productivity changes in the tropical western Pacific during the past 100,000 years: Okinawa Trough evidence (MD012404). *Paleoceanography*, 24: PA3028, doi:10.1029/2007PA001577.

Title:

Long-term Variations of Intermediate Water in the Okinawa Trough and the Implications on Paleoclimate

Abstract:

Western boundary current transports lots of heat to high latitude area, however heat lots in high latitudes via cooling by lower air temperature therefore enhances the boundary currents. Cooling surface water sinks in the Sea of Okhotsk and Gulf of Alaska forming North Pacific Intermediate Water (NPIW) and flowing clockwise basinwidely toward low latitudes. Ultimately, the NPIW mixes into the Kuroshio then flows back to high latitudes forming a gyre. Thus, sinking rate of the NPIW plays a role to encourage the meridional heat and moisture transporting. Traditionally, reconstructions of intermediate water circulation are based on the carbon isotope compositions and radiocarbon datings of benthic foraminifera. These methods can be complicated by the fact of deep water nutrient inventory and reservoir effect. In this study, Mg/Ca based paleothermometry and stable isotopes via benthic foraminifera are used for reconstructing paleo-hydrographical conditions, include of temperature and salinity, of intermediate water in the Okinawa Trough (OT). According to modern observations, the NPIW can penetrate into the OT via the Kerama Gap. Thus the benthic records derived from the OT may represent to the NPIW variations for discussing paleoceanographic changes during glacial-interglacial cycles.

Keywords: NPIW, Okinawa Trough, benthic foraminifera, Mg/Ca, paleothermometry

Chau-Ron Wu

Address:

Department of Earth Sciences

11677 No. 88, Sec. 4 Ting-Chou Rd., National Taiwan Normal University (NTNU), Taipei, TAIWAN

Tel.: 886-2-2932-9042 Fax: 886-2-29333315

Email: cwu@ntnu.edu.tw



Professional Position:

2011.8: Director, Institute of Marine Environmental Science and Technology, NTNU

2009.8: Professor, Department of Earth Sciences, NTNU

Education:

1998: Ph. D. in Physical Oceanography, North Carolina State University

1990: M.S. in Chemical Oceanography, National Sun Yat-Sen University

1988: B.S. in Oceanography, National Taiwan Ocean University

Honors and Awards:

2007: Terrestrial, Atmospheric and Oceanic Sciences 2005-2006 Best Article Award

2009: Research Excellence Award, College of Science, NTNU

2010: Terrestrial, Atmospheric and Oceanic Sciences, Most Cited Article Award (2005-2009)

Scientific Expertise and Current Research Activities:

My research interest and expertise fall in the area of numerical modeling and data assimilation. I have developed several models with different integration domains and resolutions to study seas around Taiwan. My research is broad, varying from small-scale coastal and regional modeling to basin-scale marine climate processes.

Publications:

Chiang, T.-L., C.-R. Wu, and L.-Y. Oey (2011): Typhoon Kai-Tak: An ocean's perfect storm. *Journal of Physical Oceanography*, 41, 221-233, doi: 10.1175/2010JPO4518.1.

Sheu, W.-J., C.-R. Wu, and L.-Y. Oey (2010): Blocking and westward passage of eddies in the Luzon Strait. *Deep Sea Research II*, 57, 1783-1791, doi:10.1016/j.dsr2.2010.04.004.

Chang, Y.-L., C.-R. Wu, and L.-Y. Oey (2009): Bimodal Behavior of the Seasonal Upwelling off the northeastern coast of Taiwan. *Journal of Geophysical Research*, 114, C03027, doi:10.1029/2008JC005131.

Wu, C.-R., H.-F. Lu, and S.-Y. Chao (2008a): A numerical study on the formation of upwelling off northeast Taiwan. *Journal of Geophysical Research*, 113, C08025, doi:10.1029/2007JC004697.

Wu, C.-R. et al. (2008b): Air-sea interaction between Tropical Cyclone Nari and Kuroshio. *Geophysical Research Letters*, 35, L12605, doi:10.1029/2008GL033942.

Title:

The forcing mechanism leading to the Kuroshio intrusion into the South China Sea

Abstract:

We use a high-resolution numerical model to examine the forcing mechanism responsible for the Kuroshio intrusion into the South China Sea (SCS). The collective wisdom is that variations in the Kuroshio intrusion are closely related to the wind, inside or outside the SCS. A series of experiments was performed to identify the wind-related forcing regulating the intrusion. The experiments demonstrated that the importance of wind inside the SCS is greater than that outside the SCS. Furthermore, the northwestward Ekman drift due to northeasterly wind in winter intensifies the upstream Kuroshio in the Luzon Strait, enhancing the Kuroshio intrusion into the SCS. In particular, the wind-stress curl (WSC) off southwest Taiwan is chiefly responsible for the Kuroshio intrusion. Both the WSC and intrusion show both seasonal and intra-seasonal variation. As the negative WSC off southwest Taiwan becomes stronger, it contributes to anticyclonic circulation. The enhanced anticyclonic circulation helps the development of the Kuroshio intrusion. The consistency between WSC variability and the intrusion suggests that the WSC off southwest Taiwan is essential to the Kuroshio intrusion variability.

Chih-Ching Chung

Address:

Inst. of Marine Environmental Chemistry and Ecology
202 Keelung, National Taiwan Ocean University (NTOU), TAIWAN
Phone: +886-2-24622192 ext.5704 Fax: +886-2-24620892
Email: chungcc@mail.ntou.edu.tw



Professional Position:

2011-present Assistant Professor, Inst. of Marine Environmental Chemistry and Ecology, NTOU
2010 Guest Investigator, Woods Hole Oceanographic Institution, MA, USA
2008-2011 Assistant Researcher, Center for Marine Bioenvironment and Biotechnology, NTOU
2004-2008 Postdoctoral Scholar, Inst. of Marine Biology, NTOU

Education:

2004 Ph.D., Institute of Marine Biology, NTOU, TAIWAN

Scientific Expertise and Current Research Activities:

My main research interests are to apply novel molecular biology tools (e.g. high-throughput sequencing) to study effects of environmental changes on phytoplankton ecology. My current works are investigating the population composition and dynamics of picophytoplankton in the seas surrounding Taiwan.

Selected Publications:

Chung, C.-C., G.-C. Gong, and C.-C. Hung. 2012. Effect of Typhoon Morakot on microphytoplankton population dynamics in the subtropical Northwest Pacific. *Mar. Ecol. Prog. Ser.* **448**:39-49.

Chung, C.-C., J. Chang, G.-C. Gong, S.-C. Hsu, K.-P. Chiang, and C.-W. Liao. 2011. Effects of Asian dust storms on *Synechococcus* populations in the subtropical Kuroshio Current. *Mar. Biotechnol.* **13**:751-763.

Chung, C.-C., S.-P. L. Hwang, and J. Chang. 2009. The identification of three novel genes involved in the rapid-growth regulation in a marine diatom, *Skeletonema costatum*. *Mar. Biotechnol.* **11**:356-367.

Chung, C.-C., S.-P. L. Hwang, and J. Chang*. 2008. Nitric oxide as a signaling factor to upregulate the Death-Specific Protein in a marine diatom, *Skeletonema costatum*, during blockage of electron flow in photosynthesis. *Appl. Environ. Microbiol.* **74**:6521-6527.

Chung, C.-C., S.-P. L. Hwang, and J. Chang*. 2005. Cooccurrence of *ScDSP* gene expression, cell death, and DNA fragmentation in a marine diatom, *Skeletonema costatum*. *Appl. Environ. Microbiol.* **71**:8744-8751.

Chung, C.-C., S.-P. L. Hwang, and J. Chang*. 2003. Identification of a high-affinity phosphate transporter gene in a Prasinophyte alga, *Tetraselmis chui*, and its expression under nutrient limitation. *Appl. Environ. Microbiol.* **69**:754-759.

Title:

Phylogenetic distribution of *Synechococcus* in the surface East China Sea, inferring from their phycocyanin operon

Abstract:

Previous studies have indicated *Synechococcus* spp. are the major picophytoplankton in the East China Sea (ECS). Their population composition and phylogenetic distribution, however, are not investigated so far. The lack of this information will make it difficult to infer the relationship between *Synechococcus* ecology and global environmental changes. In this study, assemblages of *Synechococcus* spp. over the ECS in the summers 2009 and 2010 were revealed by a two-lasers flowcytometry, as well as by the phylogenetic analysis of phycocyanin operon, *cpcBA*-ITS. In the summer 2009, the phycoerytherin-rich (PE-rich) *Synechococcus* dominated in the water with a salinity of 31. In contract to the PE-rich *Synechococcus*, the phycocyanin-rich (PC-rich) *Synechococcus* preferred to grow in the low-saline coastal waters (salinity<31) near the mouth of the Chiangjian River. In addition, according to the result of *cpcBA*-ITS phylogenetic analysis, *Synechococcus* populations in the ECS were further categorized into at least 4 groups which contained a total of 14 operational taxonomic units. Among these, 3 groups, named ECS-1 to 3, belonged to PC-rich *Syenchococcus*: ECS-1 should be the species adapted in freshwater environment; ECS-2 and ECS-3 were characterized as novel marine PC-rich *Syenchococcus*. In the summer 2010, huge low-saline discharge occupied over half of the ECS due to the flooding arose in the Changjiang River. Except the decline of cell abundances, the distribution patterns of PE- and PC-rich *Synechococcus* were similar as that occurred in 2009. Plentiful terrestrial materials brought with the input of the Changjing River should be a critical factor to inhibit *Synehcococcus* growth in the summer 2010.

I-Shiung Chen

Address:

Institute of Marine Biology

20224 No. 2 Bei-Ning Rd., National Taiwan Ocean University (NTOU), Keelung, TAIWAN

Phone: 886-2-24622192 ext. 5305

Fax: 886-2-24634152

Email: isc@ntou.edu.tw



Professional Position:

Professor, 2008.08 till present, Institute of Marine Biology, National Taiwan Ocean University (NTOU), Keelung, TAIWAN

Associate Professor, 2005.02 ~ 2008.07, Institute of Marine Biology, National Taiwan Ocean University (NTOU), Keelung, TAIWAN

Associate Professor, 2004.08 ~ 2005.01, Institute of Wildlife, National Pingtung University of Science and Technology, Pingtung.

Education:

1996-1999 Ph.D. School of Biological Science, University of Bristol, UK

Honors and Awards:

2002 Ten Outstanding young person Award.

2003 Outstanding alumni of National Sun Yat-Sen University.

Scientific Expertise and Current Research Activities:

Systematics of fishes, Ecology of freshwater & marine fishes, Molecular evolution, Molecular phylogeography.

Publications:

Over 85 science papers in refereed journals. The following are a selection of recent publications.

Suzuki, T., **I-S. Chen*** and H. Senou (2011) A new species of *Rhinogobius* Gill, 1859 (Teleostei: Gobiidae) from the Bonin islands, Japan. **J. Mar. Sci. Tech.** 19(6): 693-701. **(SCI)** (Taiwan)

Chen, I-S., Z. Jaafar and K.T. Shao (2012) A new *Obliquogobius* Koumans, 1941 (Teleostei: Gobiidae) from Kumejima, Ryukyu Islands, Japan. **Zootaxa** 3367: 269-273. **(SCI)** (New Zealand)

Chen, I-S., T. Suzuki and K.T. Shao (2012) A new deepwater goby of the genus *Discordipinna* Hoese and Fourmanoir, 1978 (Teleostei: Gobiidae) from Kumejima of the Ryukyu, Japan. **Zootaxa** 3367: 274-280. **(SCI)** (New Zealand)

Jang-Liaw, N.-H., Y.-H. Gong and **I-S. Chen** (2012) A new marine gobiid species of the genus *Clariger* Jordan and Snyder (Gobiidae, Teleostei) from Taiwan. **Zookeys** 198: 69-77. **(SCI)** (Bulgaria)

Chiang, M.-C. and **I-S. Chen** (2012) A new species of the genus *Helcogramma* (Blenniiformes: Tripterygiidae) from Taiwan. **Zookeys** 216: 57-72. **(SCI)** (Bulgaria)

Title:

Seasonal fluctuation of larval fish community of the Dongshar Island, South China Sea by Fish light traps

Abstract:

The Dongshar island is the very important coral-reef associated habitats in northern region of South China Sea. Our ichthyological research carried out for realizing the community of larval fishes around the island since 2010. The fish samples were collected by fish light traps monthly along the southern coast of the island. There are totally about 18 families and 28 species from the whole year catch. The highest catch is around June to July up to totally 117 individuals (57%), the lowest catch is around Nov. to Jan. down to totally 1 individual. Among them, the largest group: the fishes of Apogonidae comprise 58.9% of total individuals; then the second group: fishes of Gobiidae comprise 18.3%. the further research work would be concentrated on more precise species identification via mtDNA bar-coding (partial COI sequence) with comparable adult fish reference genetic data to document real community structure and reproduction pattern for coastal larval fishes. The further open ocean survey of larval fish fauna around the island may provide more comprehensive data for complicate reproduction history of the coral-reef fishes.

Shinya Shikina

Place of birth: Okinawa, JAPAN

Address:

Department of Aquaculture, Ching-Fong Chang laboratory,
20224 No. 2 Bei-Ning Rd., National Taiwan Ocean University (NTOU),
Keelung, TAIWAN

Phone: 886-2-2462-2192 (#5209)

Fax: 886-2-24621579

Email: shikinash@gmail.com



Professional Position:

2010.5-: Postdoctoral fellow, Department of Aquaculture, NTOU

Education:

2009: Ph.D., Department of Aquaculture, Tokyo University of Marine Science and Technology (TUMST), JAPAN

2006: MAS., Department of Aquaculture, TUMST, JAPAN

2004: BS., Department of Aquaculture, TUMST, JAPAN

Scientific Expertise and Current Research Activities:

I had been working on germ cell transplantation and spermatogonial culture *in vitro* to establish surrogate broodstock technologies in fish during 2004-2009. Since 2010, I changed the research field to coral reproduction, and has been studying germ cell development in scleractinian corals.

Publications:

Shikina, S. et al. (2012) Germ cell development in the scleractinian coral *Euphyllia ancora* (Cnidaria, Anthozoa) ***PLoS ONE*** Vol.7: e41569.

Shikina, S and Yoshizaki G. (2010) Improvement in vitro culture conditions to enhance the survival, mitotic activity, and transplantability of rainbow trout type A spermatogonia. ***Biology of Reproduction***. Vol.83: 268-276.

Shikina, S. et al. (2008) Culture conditions for maintaining the survival and mitotic activity of rainbow trout transplantable type A spermatogonia. ***Molecular Reproduction and Development***. Vol. 75: 529-537.

Title:

Germ cell development in the scleractinian coral *Euphyllia ancora* (Cnidaria, Anthozoa).

Abstract:

Sexual reproduction of scleractinian coral is among the most important means of establishing coral populations. However, thus far, little is known about the mechanisms underlying coral gametogenesis. To better understand coral germ cell development, we performed a histological analysis of gametogenesis in *Euphyllia ancora* and characterized the coral homolog of the *Drosophila* germline marker gene *vasa*. The histological analysis revealed that *E. ancora* gametogenesis occurs in the mesenterial mesoglea between the mesenterial filaments and the retractor muscle bands. The development of germ cells takes approximately one year in females and half a year in males. Staining of tissue sections with an antibody against *E. ancora* Vasa (Eavas) revealed anti-Eavas immunoreactivity in the oogonia, early oocyte, and developing oocyte, but only faint or undetectable reactivity in developing oocytes that were >150 µm in diameters. In males, Eavas could be detected in the spermatogonia and primary spermatocytes but was only faintly detectable in the secondary spermatocytes, spermatids, and sperms. Furthermore, a reverse transcription-polymerase chain reaction analysis and Western blotting analysis of unfertilized mature eggs proved the presence of Eavas transcripts and proteins, suggesting that Eavas may be a maternal factor. Vasa may represent a germ cell marker for corals, and would allow us to distinguish germ cells from somatic cells in coral bodies that have no distinct organs.

Chang-Feng Dai

Address:

Institute of Oceanography, National Taiwan University (NTU)

1 Sec. 4, Roosevelt Rd., Taipei, TAIWAN, R.O.C.

Phone: +886-2-23916693 Fax: +886-2-23916693

Email: corallab@ntu.edu.tw



Professional Position:

2011.8-present: Director, Institute of Oceanography, NTU

1992-present: Professor, Institute of Oceanography, NTU

Education:

1988: Ph.D., Department of Biology, Yale University, New Haven, Conn., USA

1981: M.S., Institute of Oceanography, NTU

1979: B.S., Department of Biology, National Taiwan Normal University, Taipei, Taiwan

Scientific Expertise and Current Research Activities:

I am a marine biologist and have been studying the reproductive ecology, population biology, community ecology and conservation biology of coral reef organisms from the waters of Taiwan since 1988. Currently I am studying the impacts of global warming and ocean acidification on coral reefs in the South China Sea and East China Sea. I also work on the monitoring and conservation of coral reefs and act as the coordinator of Global Coral Reef Monitoring Network in Taiwan.

Publications:

Over 150 science papers in refereed journals. The following are a selection of recent publications.

Cheng YR, **Dai CF** (2010) Endosymbiotic copepods may feed on zooxanthellae from their coral host, *Pocillopora damicornis*. *Coral Reefs* 29:13-18.

Yeoh SR, **Dai CF** (2010) The production of sexual and asexual larvae within single broods of the scleractinian coral, *Pocillopora damicornis*. *Marine Biology* 157:351-359

Jeng MS, Huang HD, **Dai CF**, Hsiao YC, Benayahu Y (2011) Sclerite calcification and reef-building in the fleshy octocoral genus *Sinularia* (Octocorallia: Alcyonacea). *Coral Reefs* 30: 925-933.

Tu ZH, **Dai CF**, Jeng MS (2012) Precious corals (Octocorallia: Coralliidae) from the northern West Pacific region with descriptions of two new species. *Zootaxa* 3395:1-17.

Liu SYV, **Dai CF**, Allen GR, Erdmann MV (2012) Phylogeography of the neon damselfish, *Pomacentrus coelestis*, reveals species origin and a cryptic species in the West Pacific. *Marine Ecology Progress Series* 458:155-167.

Title:

Dynamics of marginal coral communities in northeastern Taiwan

Abstract:

Coral communities in Yenliao Bay (25° 2' N, 121° 56' E) are typical marginal coral communities characterized by low coral coverage and very limited reef-building activity. The dynamics of these communities are mostly due to the frequent typhoon disturbances. In order to assess the resilience of coral communities in this marginal environment, coral communities at three sites (A, B, C) were monitored by quadrat photography from 2003 to 2009. In 2003, most of the common species were encrusting species of *Montipora*, massive faviid species, foliaceous *Pachyseris*, and branching *Stylophora*. During the major typhoon disturbances in 2005, different coral species varied greatly in partial and whole colony mortality. Branching, foliaceous and encrusting species (*Stylophora*, *Pachyseris*, *Montipora*, and *Hydnopora*) suffered higher mortality under the critical impacts of typhoon disturbances. In contrast, massive faviids (*Favia*, *Favites*, *Cyphastrea*, *Montastrea* and *Platygyra*) suffered much lower mortalities and showed stable trajectories following typhoon disturbances. After the typhoon disturbances, the recovery of coral cover at Sites A and B was significant, while that at Site C was not evident. This delayed recovery might be due to the differences of community structures or localized stress.

Keryea Soong 宋克義

Gender: Male

Nationality: Taiwan, Republic of China

Telephone:

886-7-5255109 (office)

886-7-5252000, x.5109 (office)

886-7-5255100 (fax)

keryea@mail.nsysu.edu.tw



Degrees:

Bachelor of Science, 1977, Zoology, National Taiwan University

Master of Science, 1979, Marine Biology, National Taiwan University

Ph D., 1990, Biology, University of Texas at Austin (USA)

Position: Professor, Director, Institute of Marine Biology, National Sun Yat-sen University (Address: 70 Lienhai Road, Kaohsiung 804, Taiwan)

**Aug 2010-present, Director, Institute of Marine Biology, National Sun Yat-sen University
(Kaohsiung, Taiwan)**

Courses taught:

Evolution, Marine Ecology, Coral Reefs, Quantitative Genetics, Evolutionary Ecology, Coastal ecology, Marine Biodiversity,

Journal peer review referee:

Zoological Studies, Coral Reefs, Marine Ecology Progress Series, Deep-Sea Research, Marine Biology, Aquaculture, Bulletin of Marine Science, Estuarine Coastal and Shelf Science, The Open Ecology, AMBI, Journal of Experimental Marine Biology and Ecology, Journal of Marine Biology (Israel), Ambio,

Representative Publications:

Kao C-C, Chen J, Chen G-F Soong K* (2010) Variable swarming time of an intertidal midge is controlled by a circadian clock and temperature. **Marine and Freshwater Behaviour and Physiology** 43(1):1-9. (JR: 70/88, IF: 0.688)

Kuo KM, Soong K* (2010) Post-Settlement Survival of Reef Coral Juveniles in Southern Taiwan. **Zoological Studies** 49(6):724-734. (JR: 82/129, IF: 0.86)

Soong, K.*, Lee Yi-Jen, Chang In-How (2011) Short-Lived Intertidal Midge *Pontomyia oceana* Have Semilunar Eclosion Rhythm Entrained by Night-light. **Marine Ecology Progress Series** 433:121-130 (JR: 11/88, IF: 2.519)

Soong, K.*, Chang In-How (2012) Period of Semilunar rhythm is based on counting 15 endogenous circadian cycles. **Chronobiology International** (in press, JR: 13/84, IF:4.0)

Title:

Why and How Does the Sponge *Terpios hoshinota* Kill Stony Corals?

Abstract:

The black sponge *Terpios hoshinota* decimated reef corals in many western Pacific islands. It infects all stony corals and soon covers and kills the whole colonies. Unlike other coral diseases that are limited to the infected colony, *T. hoshinota* could cross to neighboring corals and expands at a rate of ~1.8 mm/d. A simulation in 2008 based on sponge densities and expansion rates suggested that the *T. hoshinota* had the potential to cover the shallow reefs of Green Island and Orchid Island in a matter of years. A follow-up survey in 2009 and 2010 did not substantiate the above claim. Sponge densities, sizes and coverage did not increase as expected, or not at all, although coral coverage did decline in this period in these two islands. In this investigation, we try to answer two questions. First, how does *T. hoshinota* kill the corals. There are two hypotheses, i.e., darkness vs toxin. We used transparent and dark caps to test the responses of corals. We also used gel containing sponge suspension or controls to test the toxicity of sponge to corals. We also used dark cloths, white cloths and *Terpios* tissues to contact corals. All experiments were done in the field. The results suggest that both darkness and toxin of the sponge contribute to the demise of stony corals. The second question is why does *T. hoshinota* kill the stony corals. The two hypotheses are nutrient source vs substrate. We investigated this by using stable isotopes as labels to see how much of the new sponge growth overlying stony corals were contributed by materials from corals. The results from N and C stable isotopes suggested that about 10% of the new growth was contributed by the underlying corals. Thus, material gain does not seem important, relatively. On the other hand, virtually all *T. hoshinota* was observed on coral substrate. We suggest that the substrate provided by the stony corals is the critical resource in a reef environment. The sponge kills the stony coral for their substrate.

Wen-Chen Chou

Address:

Institute of Marine Environmental Chemistry and Ecology (IMECE)
20224 No. 2 Bei-Ning Rd., National Taiwan Ocean University (NTOU),
Keelung, TAIWAN
Phone: 886-2-2463-4517 Fax: 886-2-2462-0892
Email: wcchou@mail.ntou.edu.tw



Professional Position:

2012.8- present: Associate professor, IMECE, National Taiwan Ocean University
2010.7-2011.7: Visiting scholar, Department of Marine Sciences, University of Georgia, U.S.A.
2007.8- 2012.7: Assistant professor, IMECE, National Taiwan Ocean University
2004.8-2007.7: Post-doctorate research fellow, National Center for Ocean Research, Taiwan

Education:

2004: Ph.D., Institute of Marine Geology and Chemistry, National Sun Yat-Sen University, Taiwan
1994: M.S., Institute of Marine Geology, National Sun Yat-Sen University, Taiwan
1992: B.S., Department of Marine Resources, National Sun Yat-Sen University, Taiwan

Honors and Awards:

2011 National Taiwan Ocean University Distinguished Research Teacher Award

Scientific Expertise and Current Research Activities:

My main research interest is on carbonate chemistry of seawater. Currently, I'm working on how anthropogenic perturbations would impact the biogeochemical cycles of CO₂ and ocean acidification in the East China Sea.

Publications:

Selected recent publications

1. **Chou, W.-C.***, Gong, G.C., Cai, W.J., Sheu, D.D., Hung, C.C., Chen, H.Y., Chung, C.C., 2011. CO₂ system in the oligotrophic northwest Pacific Ocean during the Asian dust storm season. *Marine Chemistry*, 127, 210-222.
2. **Chou, W.-C.***, Gong, G.C., Tseng, C.M., Sheu, D.D., Hung, C.C., Chang, L.P., Wang, L.W., 2011. The carbonate system in the East China Sea in winter. *Marine Chemistry* 123, 44-55.
3. Cai, W.J.* , Hu, X., Huang, W.J., Murrell, M.C., Lehrter, J.C., Lohrenz, S.E., **Chou, W.-C.**, Zhai, W., Hollibaugh, J.T., Wang, Y., Zhao, P., Guo, X., Gundersen, K., Dai, M., Gong, G.C., 2011. Acidification of subsurface coastal waters enhanced by eutrophication. *Nature Geoscience*, 4, 766-770, doi:10.1038/NGEO1297.
4. **Chou, W.-C.***, Gong, G.C., Sheu, D.D., Hung, C.C., Tseng, T.F., 2009. The surface distributions of carbon chemistry parameters in the East China Sea in summer 2007, *Journal of Geophysical Research*, 114, C07026, doi:10.1029/2008JC005128.
5. **Chou, W.-C.***, Gong, G.C., Sheu, D.D., Jen, S., Hung, C.C., Chen, C.C., 2009. Reconciling the paradox that the heterotrophic waters of the East China Sea shelf act as a significant CO₂ sink during the summertime: Evidence and implications, *Geophysical Research Letters*, 36, L15607, doi:10.1029/2009GL038475.

Title:

Coastal CO₂ distribution patterns altered by increasing eutrophication from large rivers: a case study in the Changjiang-East China Sea system

Abstract:

To explore the potential impact of river-induced eutrophication on oceanic carbon dioxide (CO₂) sequestration capacity, seasonal variations of the surface water's partial pressure of CO₂ (pCO_{2sw}) were investigated on the river-impacted East China Sea (ECS) shelf between 2008 and 2011. The seasonality of pCO_{2sw} has large spatial variations, with the strongest seasonality on the inner shelf near the Changjiang Estuary and the weakest seasonality on the outer shelf. This discrepancy is attributed to the differences in stratification and biological production between the inner and outer shelf regions in summer, which may control the steepness of the vertical gradient of CO₂ during the stratification period and further determines the magnitude of pCO_{2sw} fluctuation in the subsequent well-mixed period. Moreover, a comparison between present and historical data shows that pCO_{2sw} on the inner shelf near the Changjiang Estuary is notably lower during summer, but higher during autumn and winter in the 2000s compared with the 1990s. We suggest that this decadal change is associated with recently increased eutrophication, which would increase both the photosynthetic removal of CO₂ in surface waters and the respiratory release of CO₂ in bottom waters during summertime, and thereby it would return more CO₂ to the surface during the subsequent mixing seasons. Our finding suggests that the increasing anthropogenic nutrient delivery from a large river may alter seasonal CO₂ dynamics in coastal area, and the case we studied may not be unique to the Changjiang/ECS system but could also be found in other eutrophic coastal oceans.

Fuh-Kwo Shiah

Address:

Research Center for Environmental Changes, Academia Sinica
128 Sec. 2, Academia Rd., Taipei, 115 Taiwan
Phone: 886-2-27839910 ext 271 Fax: 886-2-27893234
Email: fkshiah@rcec.sinica.edu.tw



Professional Position:

2004.8: Research Fellow, Research Center for Environmental Changes, Academia Sinica
2004.8-2005.7: Director, Institute of Marine Environmental Chemistry and Ecology, NTOU

Education:

1993: Ph.D., Marine, Estuary and Environ. Science Program, University of Maryland, USA
1986: MAS., Institute of Marine Biology, Natl Sun-Yat-Sen University, TAIWAN
1981: BS., Department of Biology, Natl Taiwan Normal University, TAIWAN

Honors and Awards:

2001-2002. NSC the distinguish research award; 2001. National Taiwan Univ. Young scholar award
1999-2000. NSC research award and candidate of the distinguish research award; 1992. Univ. Maryland HPL MEERC research scholarship. 1992.09-1993.08.; 1987. Ministry of Education-ROC government scholarship. 1988.09 - 1991.08.

Scientific Expertise and Current Research Activities:

I am a biological limnologist and oceanographer and have been studying the microbial ecology since 1993. Currently I lead the “[Taiwan Watershed Ecology and Biogeochemistry Study \(T-WEBS\)](#)” integrated research project, where we are investigating the responses of the biogeochemical cycling and ecosystem to the environmental forcing and rapid climate change.

Publications:

The following are a selection of publications for the aquatic ecosystems that I have been working on. They are the Chesapeake Bay, East China Sea, north Taiwan coast and reservoir.

Shiah FK and HW Ducklow. 1995. Multi-scale variability of bacterioplankton abundance, production and specific growth rate in a temperate salt marsh tidal creek. *Limnol. Oceanogr.* **40(1)**: 55-66.

Shiah FK, GC Gong and T Xiao. 2006. Effects of ChangJiang River summer discharge on the bottom-up control processes of shelf bacterial growth. *Aquat. Microb. Ecol.* 44:105-113.

Shiah FK, TH Wu, KY Li, SJ Kao, YF Tseng, JL Chung and S. Jan. 2006. Thermal effects on heterotrophic processes in a coastal ecosystem adjacent to nuclear power plant. *Mar. Ecol. Prog. Ser.* 39: 55-65. (SCI).

Tseng YF, TC Hsu, YL Chen, SJ Kao, JT Wu, JC Lu, JC Lai, HY Kuo, CH Lin, Y. Yamamoto, T. Xiao and **FK Shiah**. 2010. Typhoon effects on DOC dynamics in a phosphate-limited reservoir. *Aquat. Microb. Ecol.* 60:247-260. doi: 10.3354. **corresponding author.**

Title:

Distinct Bacterial production-DOC-Primary production relationships in the South China Sea shelf

Abstract:

Dissolved organic carbon (DOC) constitutes >90% of total organic carbon in many aquatic ecosystems. Thus, to understand the processes regulating DOC dynamics (accumulation and depletion) is very important in assessing biological pump and global carbon cycling. In term of source, DOC may come from external inputs, such as tributary discharge. Internally, DOC can be generated from biogenic (i.e. food-web) processes (i.e. phytoplankton exudation, zooplankton grazing, viral lysis and excretion). Heterotrophic bacterioplankton (bacteria) are the major organisms responsible for DOC consumption. The “microbial-loop malfunctioning” theory derived from model and meso-cosm studies (Thingstad et al. 1997) suggested that DOC accumulation could be achieved by the de-coupling of primary production (PP; DOC source) and bacteria production (BP; DOC sink). However, the applicability of this theory has not been examined with field data from marine systems.

Continental shelves are ecosystems connecting lands and oceans. As affected by import of terrestrial materials through river discharge, the shelves usually exhibit strong gradients of inorganic nutrients and thus biological activities. The eu- to meso- and the oligo-trophy conditions in the near-shore and off-shore areas may serve as an ideal experimental ground to examine effects of inorganic nutrient supply on the coupling/decoupling of BP with PP, and thus DOC dynamics.

Based on the microbial-loop malfunctioning theory, one might expect to see strong couplings of BP vs. PP and BP vs. DOC in near-shore areas where mineral supply is not limiting. Under mineral-limited condition, BP, PP and DOC will be uncoupled with no correlation among each other. With several data sets collected during the summers of 2009 and 2010 from the shelf of the South China Sea, this study for the first time provided evidence indicating that the availability of limiting mineral could affect the relationships among BP, PP and ambient DOC concentrations in marine system.

Keywords : South China Sea, Shelf, Biogeochemistry, Nutrient limitation, Microbial-loop.