THOMAS L. SAATY

EDUCATION

Ph.D., Mathematics, Yale University, 1953
Post-graduate study, The Sorbonne, University of Paris, 1952-53
M.A., Mathematics, Yale University, 1951
M.S., Physics, Catholic University of America, 1949
B.A., Columbia Union College, 1948

POSITIONS

1979 -present, University of Pittsburgh, Distinguished University Professor Chair,

with appointments to the Philosophy of Science; Operations, Decision Sciences and Artificial Intelligence at the Joseph M. Katz Graduate School of Business; School of Engineering; Mathematics and Sociology.

In the early to mid 1970's he was invited by the American Association for the Advancement of Science to give the National Science Foundation Chautauqua type short courses, two-day lectures on the mathematics of operations research, at four university centers from North to South in the East, Central, and Western divisions (gave about ten 2-day workshops over a period of three years).

1969-1979, University of Pennsylvania, Professor

with appointments in the Wharton School to the Graduate Groups of Operations Research (Chairman, 1969-71), and Social Systems Sciences, and appointments in the University to the Graduate Groups of Applied Mathematics, Energy Management and Power, Peace Science, Civil Engineering, and Decision Sciences.

From 1963 to 1967 he regularly presented 2-week short courses at the University of California Life Long Learning Extension Program on the UCLA campus on graphs and networks (Aug. 1965 and August 1967), nonlinear analysis with applications (June-July 1964 and June 1965), operations research (Sept. 1966), queueing theory (June-July 1963), and optimization and stochastic models with applications (August 1966).

1963-1969, Arms Control and Disarmament Agency, Washington, D.C. Scientific Analyst

1965-1967, Conference Board of the Mathematical Sciences, Washington, D.C. Executive Director

1961-1963, Office of Naval Research, Head: Mathematics Branch.

1959-1961, Office of Naval Research, Director of Advanced Planning (Completed a report on the feasibility - infeasibility of the hydrofoil for the U.S. Navy and supervised the production and synthesis of a completed report on chemical and biological warfare.)

1958-1959, U.S. Embassy, London, Scientific Liaison Officer.

1957-1958, Navy Management Office, Scientific Analyst

1954-1957, Operations Evaluation Group (MIT), Scientific Analyst

1953-1954, Melpar, Inc. Scientific Analyst, submarine defense

AWARDS AND HONORS

2012 Awarded the Herbert Simon Award for Outstanding Contribution in Information Technology and Decision Making for the paper "The Possibility Of Group Welfare Functions" coauthored with Professor Luis G. Vargas, published in the International Journal of Information Technology & Decision Making (IJITDM)

2011 Awarded Doktor Honoris Causa degree by Jagiellonian University (Poland's oldest) in Krakow

2010 Award for Excellence in Teaching

2009 The University of Pittsburgh Chancellor's Distinguished Research Award

2008 Awarded the INFORMS Impact Prize

2007 Awarded the International Quality Function Deployment Akao Prize from Japan
http://www.qfdi.org/who_is_qfdi/akao_prize.htm

Who's Who in America and in American Men of Science

International Society of the Analytic Hierarchy Process (ISAHP) established in honor of Saaty's Analytic Hierarchy Process. International Meetings have been held in Tianjin 1988, Pittsburgh 1991, Washington, DC 1994, Vancouver 1996, Kobe 1999, Bern 2001, Bali 2003, Hawaii 2005, Chile 2007 and Pittsburgh 2009.

2005, Member, National Academy of Engineering: "For the development and generalization of the analytic hierarchy process and the analytic network process in multicriteria decision-making."

2004, Honored with a gathering of scholars and friends to talks and dinner, Oct. 25

2000, Gold Medal: The International Society of Multicriteria Decision Making

1998, Elected member of the International Academy of Management

1984, Beta Gamma Sigma Honor Society

1982, Alumnus of the Year Honor, Columbia Union College

1982, Notified that the Thomas L. Saaty Prize awarded to best research papers in Mathematics and Management has been established.

1977, Won the Franz Edelman Award for Achievement in Operations Research and the Management Sciences, College on the Practice of Management Science for his contributions and leadership in one of the best applied studies of the year: The Sudan Transport Plan, work in which 40 scientists, engineers and world renowned Wharton colleague economist (Lawrence Klein, Nobel Laureate) were involved over a period of two years to develop a comprehensive transport plan for the Sudan in Africa, a million dollar study sponsored by the Kuwait fund for Arab Economic Development

1973, Awarded the Lester R. Ford prize by the Mathematical Association of America for a major work on the four-color problem.
1972-1976, Invited by the Association for the Advancement of Science (AAAS) in collaboration with the National Science Foundation to give Chautauqua type two day lectures eight times a year around the US to professors of mathematics and science, on the latest ideas in modeling, problem-solving and decision-making, planning and resource allocation.
1970, Elected to the National Academy of Sciences, Spain
1959, Elected Fellow of the American Association for the Advancement of Science.

Best lifetime accomplishments- Brief Account

1. Being his class's curve-breaker in Organic Chemistry, at the age of 20, corrected the Encyclopedia Britannica about what ketones consisted of.
2. Received scholarship for PhD study of mathematics at Yale University.
3. Contributed to the development of the new and widely known and applied field of Linear Programming : Parametric programming with S.I. Gass (3 papers); initiated research by others by publishing an article on the number of vertices of a polyhedron, important for estimating the number of steps needed to solve a linear programming problem.
4. While still in his twenties, wrote the first book in the field: Mathematical Methods of Operations Research published by McGraw Hill and translated to Russian and Japanese. The famous Russian mathematician B.V. Gnedenko said that it is the best book on the subject among the many books written in the United States.
5. Queuing theory – was first to solve for the average waiting time for the well known time-dependent waiting line problem with a single line having multiple servers; published a large paper called "Resume of Queuing Theory" followed by a book on the subject, reviewed by D.G. Kendall of Oxford as "a substantial encyclopedia of queuing theory… an extremely useful work of reference which will be valuable in many ways."
6. Solved a version of the Chapman-Kolmogorov equations with absorbing barriers, used later to develop a model for the growth of bacteria (tularemia) , implemented by the Army Chemical Corp. Later supervised work at the Arms Control and Disarmament Agency done by the Midwest Research Institute in Kansas City to test the extreme fragility of such bacteria under different temperatures thus giving up on the use of such bacteria in war.

7. As director of advanced planning at the Office of Naval Research supervised a study on chemical warfare for the US Pacific Fleet and another on the infeasibility of using hydrofoils in a substantive way for the US Navy.
8. As director of the mathematics Branch at the Office of Naval Research invited 18 leading mathematicians in the world to give a lecture at the George Washington University each contributing a chapter in the three volume series that he edited: Lectures on Modern Mathematics, published by John Wiley.
9. Wrote two volumes on non-linear mathematics covering 13 types of equations published by McGraw-Hill. The first volume was co-authored with J. Bram.
10. At the Arms Control and Disarmament Agency Co-authored a report on trading off the Soviet Badger and the US B-52 bombers.
11. In 1968 wrote the book Mathematical Models of Arms Control and Disarmament published by John Wiley and reviewed in Management Science in 1969: "This fascinating book is an important contribution to the pressing task of discovering some valid underlying mathematical structures in politics" later translated to Russian: also supervised a group of economists and game theory consultants on disarmament negotiations four of whom later won the Nobel Prize (Robert Aumann, Gerard Debreu, John Harsanyi, Reinhard Selten).
12. Director of the Conference Board of the Mathematical Sciences, 1964-1966.
13. President of a corporation, that cooperated with the World Bank and the supporting Kuwait Fund to develop a comprehensive transport system of 103 air, land, rail, road and water projects in the Sudan in Africa that is one of the most fertile countries in the world and seventh largest in area through which the White and Blue Niles flow. Won a prize for that work from the Institute of Management Science in 1977.
14. In 1972 won the Lester R. Ford prize from the Mathematical Association of America for a comprehensive article on the very long-standing mathematical Four-Color Problem, solved on the computer with more than 1000 cases, soon after, exhaustively, by three mathematicians.
15. Until the present serves on the Scientific Committee of the Royal Academy of Sciences, Spain.
16. Assisted the government of Tanzania to choose the best of a dozen worldwide contractors to build the new capital in the central city Dodoma instead of the ocean city Dar es Salaam.
17. Developed the Analytic Hierarchy Process for the measurement of intangibles, providing foundations for the mathematics of the social sciences, particularly in decision making. This work incorporated the mathematical concept of inconsistency and its measurement, a concept that is prohibited through an axiom in economics and game theory. He also applied the concept of consistency to limiting jury size. In 2000 he won the International Decision Making Society's Gold Medal; in 2005 the Japanese Akao Prize and elected to the National Academy of Engineering and in 2008 the INFORMS impact award for this work.
18. Developed the Analytic Network Process for the measurement of intangibles with dependence and feedback. This process contributed to the invention of the much needed concept of a supermatrix whose entries are matrices of column Perron vectors.

19. Discovered the fundamental functional equation for neural activity to establish the proportionality between brain information from stimuli and the original source of the stimuli, solved by the world-renowned functional equation specialists, Janos Aczel, and later for operators by Nicole Brillouet-Belluot; this several years work culminated in a book on the brain in 2000..
20. Applied the AHP/ANP to conflict resolution by developing equations for making fair tradeoffs applied to conflicts in South Africa, Northern Ireland and, more recently, the Israeli-Palestinian conflict.
21. Wrote a book, Compact City, an imaginative and practical work about future 3-dimensional cities whose first version he co-authored with G.B. Dantzig, inventor of the simplex process in linear programming.
22. In 2012 won the Herbert Simon Award along with student, colleague and friend Luis Vargas for proving that it is *possible* to derive a representative group judgment from individual judgments if one were to use paired comparisons with numerically represented cardinal judgments. Kenneth Arrow had proved that if the individuals use ordinal judgment (either A is preferred to B or B is preferred to A) then it is *impossible* to derive from them a representative group judgment. In 1972, Arrow won the Nobel Prize for his proof.

MEMBERSHIPS

National Academy of Engineering
Fellow, American Association for the Advancement of Science
American Mathematical Society
Mathematical Association of America
Operations Research Society of America
International Institute for Strategic Studies
World Future Society
International Peace Science Society
International Academy of Management
Beta Gamma Sigma

EDITORIAL POSITIONS

Present

Member of the board of Review of Economics & Finance
The International Journal of Systems, Measurement and Decisions, Associate Editor
Information Technology and Decision Making, Associate Editor
Journal of Multi-Criteria Decision Analysis, Associate Editor
Journal of Systems Science and Systems Engineering (**JSSSE**), Associate Editor
International Journal of Organizational Analysis, Associate Editor
International Journal of Commerce and Management, Associated Editor

Real Academia de Ciencias; Revista de la Real Academia de Ciencias Exactas, Fisicas y Naturales, Series A Matematicas, Scientific Committee member

Past

Journal of Operations Research, Associate Editor, 1958-63
Mathematical Reviews, Reviewer, 1954-75
Newsletter for the Mathematical Sciences, Editor (and originator), 1965-67
Naval Research Logistics Quarterly, Associate Editor
Applied Mathematical Letters, Associate Editor
The Journal of Mathematical and Computer Modeling, Associate Editor

CONSULTING

Governments of US, France, Egypt, Sudan, Kuwait (Council of Ministers), Tanzania, and the United Nations. Westinghouse; U.S. Steel; RCA; Woods Gordon of Canada; R.J. Reynolds; The Ford Foundation; American Cyanimid; Colonial Penn Insurance; Pan American Airlines; Monsanto; Xerox; Kodak; North American Rockwell; Westinghouse; Booz Allen Applied Research; Logistics Management Institute; The Urban Institute; Electric Power Research Institute; NASA; AID; LEAA; Department of State, Department of Defense; Department of the Air Force; National Institute of Health; National Bureau of Standards; Bureau of the Census.

RECENT RESEARCH INTEREST

Decision Making: Developing the mathematical theory of the Analytic Network Process (ANP) for decisions with dependence and feedback to decisions with benefits opportunities, costs and risks. The ANP is a generalization of the Analytic Hierarchy Process (AHP), which I created, by assisting governments and corporations in making decisions such as: trading off weapon systems in arms control negotiations, defending against attacks by terrorists and the feasibility of acquiring manufacturing plants in overseas countries in the face of strong competition.

Conflict Resolution: Applying the Analytic Network Process to propose solutions to a variety of international conflicts discussed in my book Conflict Resolution and several works after including the 2003 war in Iraq and the Isreali-Palestinian conflict. Proposed and widely circulated the creation of an International Center for Conflict Resolution (ICCR). Corresponded and visited with interested world leaders. I am concerned about the spread of nuclear weapons around the world and the increasing threat of a world war.

Process thinking as an advance in systems thinking suggests that systems are always subject to change and improvement, and this applies to our world in general and its integration through the spread of ideas and through trade and interdependence. There is no holding back of the progressive forces shaping the future of mankind. I am writing a book to show that the AHP/ANP is a natural way for people to work together by laying out their goals and purposes to plan and design systems that allow for change and for improvement. I have developed and extensively applied a practical method for projecting the likely future

based on the use of both tangible and intangible factors and for working backwards to identify strategies to better attain desired futures.

Research on neural networks: how the synthesis of firing of neurons is intimately related to decision making using ratio and proportion.

Research about more accurately predicting sports outcomes more accurate by including intangibles along with data; data-based prediction is what most others use in predicting sports outcomes

OTHER INTERESTS

Collector, editor and publisher of twenty-two books on "The Thinking Man's Humor" (an international collection), under various humorous pseudonyms

Owner of a very comprehensive collection of books on Beethoven and of all his recorded works

Builder of furniture

Long time carer and waterer and sometimes planter as needed with wonderful and multi-talented wife Rozann of a large and beautiful garden (1000 tulips, 100's of impatience etc. etc.) in the spring and summer.I gave the Katz school a large beautiful split-leaf philodendron that sits on the third floor and I look after it, trimming it and watering it with rainwater specially collected for it.

BOOKS

1. Applications and Theory of the Analytic Hierarchy Process (editor with Fabio De Felice and Antonella Petrillo), Intech, 2016.

2. The Neural Network Process (NNP), RWS Publications, 4922 Ellsworth Avenue, Pittsburgh, PA 15213, 2014.

3. Compact City: The Next Urban Evolution in Response to Climate Change, RWS Publications, 4922 Ellsworth Avenue, Pittsburgh, PA 15213, 2013.

4. Models, Methods, Concepts and Applications of the Analytic Hierarchy Process (with L.G. Vargas), Kluwer Academic Publishers, Boston, Much Revised, 2013.

5. The Encyclicon Volume 3 (with L. G. Vargas), RWS Publications, 4922 Ellsworth Avenue, Pittsburgh, PA 15213, 2011.

6. Principia Mathematica Decernendi: Mathematical Principles of Decision Making, RWS Publications, 4922 Ellsworth Avenue, Pittsburgh, PA 15213, 2010.

7. Il decision making e i decisionali Multicriterio: Le metodologie AHP e ANP, (with Domenico Falcone and Fabio De Felice) HOPELI, Milano, Italy, 2009.

8. The Encyclicon Volume 2 (with Brady Cillo), RWS Publications, 4922 Ellsworth Avenue, Pittsburgh, PA 15213, 2008.

9. Group Decision Making: Drawing our and Reconciling Differences (with Kirti Peniwati), RWS Publications, 4922 Ellsworth Avenue, Pittsburgh, PA 15213, 2008.

10. Decision Making with the Analytic Network Process: Economic, Political, Social and Technological Applications with benefits, Opportunities, Costs and Risks, (with L.G. Vargas), 2006, Springer's International Series.

11. Theory and Applications of the Analytic Network Process, RWS Publications, 4922 Ellsworth Avenue, Pittsburgh, PA 15213, 2005.

12. The Encyclicon, (with M. Ozdemir), RWS Publications, 4922 Ellsworth Avenue, Pittsburgh, PA 15213, 2005.

13. Creative Thinking, Problem Solving & Decision Making, RWS Publications, 4922 Ellsworth Avenue, Pittsburgh, PA 15213, 2001, Revised 2006.

14. Models, Methods, Concepts and Applications of the Analytic Hierarchy Process (with L.G. Vargas), Kluwer Academic Publishers, Boston, 2000.

15. The Brain, Unraveling the Mystery of How it Works: The Neural Network Process, RWS Publications, 4922 Ellsworth Avenue, Pittsburgh, PA 15213, 2000

16. The Analytic Network Process: Decision Making with Dependence and Feedback, RWS Publications, 4922 Ellsworth Ave., Pittsburgh, PA 15213, 1996, completely revised and published 2001.

17. Decision Making with Dependence and Feedback: The Analytic Network Process (ANP) and SuperDecisions Software, Guide, Manual and Examples, RWS Publications, 4922 Ellsworth Avenue, Pittsburgh, PA 15213, Pittsburgh, 1997.

18. Decision Making in Economic, Political, Social and Technological Environments: The Analytic Hierarchy Process, (with L.G. Vargas), paperback, RWS Publications, 4922 Ellsworth Ave., Pittsburgh, PA 15213, 1994.

19. Fundamentals of Decision Making with the Analytic Hierarchy Process, paperback, RWS Publications, 4922 Ellsworth Avenue, Pittsburgh, PA 15213-2807, original edition 1994, revised 2000.

20. The Hierarchon - A Dictionary of Hierarchies, (with Ernest H. Forman), RWS Publications, 4922 Ellsworth Avenue, Pittsburgh, PA 15213-2807, 1993.

21. Prediction, Projection and Forecasting, (with Luis G. Vargas), Kluwer Academic, Boston, 1991.

22. Embracing the Future, (with Larry W. Boone), Praeger, New York, 1990.

23. Conflict Resolution: The Analytic Hierarchy Process, (with Joyce Alexander), Praeger, New York, 1989.

24. Analytical Planning; The Organization of Systems, (with Keven P. Kearns), Pergamon Press, Oxford, 1985. Translated to Russian. Paperback edition, RWS Publications, Pittsburgh, 1991.

25. The Logic of Priorities; Applications in Business, Energy, Health, and Transportation, (with Luis G. Vargas), Kluwer-Nijhoff, Boston, 1982. Paperback edition, RWS Publications, Pittsburgh, 1991.

26. Decision Making for Leaders; The Analytical Hierarchy Process for Decisions in a Complex World, Wadsworth, Belmont, CA, 1982. Translated to French, Indonesian, Spanish, Korean, Arabic, Persian, Thai. Latest revised version, RWS Publications, Pittsburgh, 2000.

27. The Analytic Hierarchy Process, McGraw Hill International, New York, 1980. Translated to Russian, Portuguese, and Chinese. Revised edition, paperback, RWS Publications, Pittsburgh, 1990,1996.

28. Thinking with Models, (with Joyce Alexander), Pergamon Press, Oxford, 1981.

29. The Four-Color Problem; Assaults and Conquest, (with Paul C. Kainen), McGraw-Hill International, 1977, Dover, 1986.

30. Topics in Behavioral Mathematics, Mathematical Association of America, Washington, D.C., 1973.

31. Compact City, (with George B. Dantzig), (translated to Japanese and Russian), W.H. Freeman and Company, 1973.

32. Optimization in Integers and Related Extremal Problems, (translated to Russian), McGraw-Hill, 1970.

33. The Spirit and Uses of the Mathematical Sciences, (Editor, with F.J. Weyl), McGraw-Hill, 1969.

34. Mathematical Models of Arms Control and Disarmament,(translated to Russian), John Wiley and Sons, 1968.

35. Modern Nonlinear Equations, McGraw-Hill, 1967, reprinted by Dover, 1982.

36. Finite Graphs and Networks, (with R. Busacker), (translated to Japanese, Russian, German and Hungarian), McGraw-Hill, 1965.

37. Lectures on Modern Mathematics, Volumes I, II, III (Editor), Translated to Japanese), John Wiley and Sons, Inc., 1964-65.

38. Nonlinear Mathematics, (with J. Bram), McGraw-Hill, 1964; reprinted by Dover, 1981.

39. Elements of Queueing Theory with Applications, (translated to Russian, Spanish and German), McGraw-Hill, 1961.

40. Mathematical Methods of Operations Research, (translated to Japanese and Russian), McGraw-Hill, 1959.

The Unthinkable and the Possible in the Middle East with the economist Lawrence Klein Completed but unpublished (1977).

Another book on the Middle East that is relevant to our times, completed but also unpublished (1989). Decision Technology and Problem Solving (300 pages), completed text book but not published.

Complexity and Choice, another completed but unpublished book (more than 300 pages).

CHAPTERS IN BOOKS

The Analytic Hierarchy and Analytic Network Processes for the Measurement of Intangible Criteria and for Decision-Making Multiple Criteria Decision Analysis: State of the Art Surveys 2nd Edition to be edited by Matthias Ehrgott, José Rui Figueira, and Salvatore Greco, pp. 1-60. Springer 2015

The Analytic Hierarchy and Analytic Network Measurement Processes: The Measurement of Intangibles, (with M. Sodenkamp) in: C. Zopounidis, P.M. Pardalos, Handbook of Multicriteria Analysis, Springer, New York, pages 91-166, 2010.

How to Obtain Representative Group Judgments from Individual Judgments, in Technologies for Supporting Reasoning Communities and Collaborative Decision Making, John Yearwod and Andrew Stranieri, Editors, IGI Global, Hershey, PA (2010).

The Analytic Network Process- Dependence and Feedback in Decision-Making: Theory and Validation Examples, Chapter 18 in Business Applications and Computational Intelligence, edited by Kevin E. Voges and Nigel K. LI. Pope, Idea Group Publishing, London, 2006.

Dispersion of Group Judgments (with Luis Vargas), pp. 385-396, in "The Next Wave in Computing, Optimization and Decision Technologies" Edited by B. Golden, S. Raghvan and E. Wasil, Springer 2005.

The Analytic Hierarchy and Analytic Network Processes for the Measurement of Intangible Criteria and for Decision-Making, Chapter 9, pp.345-407 in Multiple Criteria Decision Analysis: State of the Art Surveys, edited by J. Figueira, S. Greco, and M Ehrgott, Springer (2005).

The first six chapters in the book Toma de Decisiones En Escenarios Complejos, by Claudio Garuti and Mauricio Escudey (Eds), Editorial Universidad de Santiago, Santiago, Chile, 2005.

“Fundamentals of the Analytic Hierarchy Process, “Chapter 2 in *The Analytic Hierarchy Process in Natural Resource and Environmental Decision Making*, edited by Daniel L. Schmoldt, Jyrki Kangas, Guillermo A. Mendoza and Mauno Pesonen, Kluwer Academic Publishers, 2001.

“The Seven Pillars of the Analytic Hierarchy Process,” Chapter 2 in *Multiple Criteria Decision Making in the New Millennium*, edited by Murat Köksalan and Stanley Zionts, Springer, 2001.

"Decision Making in Complex Situations - The Analytic Hierarchy Process as a Multivalued Logic", Chapter 4 - Logic, p.95 in Causality & Non-Causality, edited by Toshiko Sawaguchi, Forensic Press, 1992.

"Partial Differential Equations," Computers and Mathematics with Applications, Matthew Witten, Editor,

Pergamon Press, 1985.

"The Sudan Transport Study", Chapter 6 in Selected Readings in Operational Research for Developing Countries, 1982.

Theory of Measurement of Impacts and Interactions in Systems,. in Systems Methodology in Social Science Research, Kluwer-Nijhoff Publishing, 1982.

Systemic Ordering of Complexity, in McGraw-Hill Yearbook of Science and Technology, McGraw-Hill editors, McGraw-Hill, 1982.

Graph Theory: the Four Color Problem, in McGraw-Hill Year-book of Science and Technology, McGraw-Hill editors, McGraw-Hill, 1981.

Terrorism: Patterns for Negotiation; A Case Study Using Hierarchies and Holarchies, (with J.P. Bennett), in Terrorism: Threat, Reality, Response, Robert Kupperman and Darrell Trent, Hoover Institution Press, 1979.

Habitat, in Social Consequences of Engineering, edited by Hayrettin Kardestuncer, Boyd and Fraser, 1979.

Interaction and Impacts in Hierarchical Systems, in Decision Information, edited by R. Thrall and C. Tsokos, The Academic Press, 1979.

Mathematische Konflikt-Analyse, in Handworterbuch der Mathematischen Wirtschaftswissenschaften, edited by Martin Beckman, Gabler, Germany, 1978.

Methods of Conflict Analysis in Urban and International Conflicts, in Selected Readings in Quantitative Urban Analysis, edited by J. Bernstein, 1977.

Graph Theory: Some Methods and Applications, in Handbook of Operations Research, edited by S. Elmaghraby and J. Moder, D. Van Nostrand, 1978.

Variations on a Four Color Theme, in Unsolved Problems in Mathematics, in Russian, Mathematical Cybernetics Series, Moscow, 1975.

Mathematical Foundation of the Stability of Deterrence, (with Paul J. Long), in Topics in Behavioral Mathematics, Mathematical Association of America, 1973.

An Application of Decision Theory - The Development of New Tools, in Symposium on Decision Theory, Dunod, Paris, 1969.

Stochastic Network Flows, in Congestion Theory, Smith and Wilkinson, Chapel Hill, 1965

Ordering Disorderly Queues, in Queueing Theory, Recent Developments and Applications, edited by R.

Cruon, The English Universities Press, Ltd., 1967.

Operational Analysis, in Mathematics for Physicists and Chemists, Vol. II, Margenau and Murphy, D. Van Nostrand, 1964.

PAPERS and ARTICLES

Papers published in 2016-2017

1. How to Prioritize Inventions, (with Elena Rokou), World Patent Information 48 (2017) 78e95

2. An Indicator of One's Life Satisfaction, (with Lirong Wei and J.H. Zoffer), In publication

3. Should the UK have Brexited the European Union? (with Lirong Wei), International Journal of the Analytic Hierarchy Process Vol. 8 Issue 2 2016 ISSN 1936-6744, http://dx.doi.org/10.13033/ijahp.v8i2.415 **.**

4. Five Ways to Combine Tangibles with Intangibles, International Journal of the Analytic Hierarchy Process Vol. 8 Issue 2 2016 ISSN 1936-6744 http://dx.doi.org/10.13033/ijahp.v8i2.395.

5. The Need for Adding Judgment in Baysian Prediction, (with L.Zhang), International Journal of Information Technology & Decision Making, Vol. 15, No. 4 (2016) 733-761.

6. Expert System for Ice Hockey Game Prediction: Data Mining with Human Judgment, (with Wei Gu and Rozann Whitaker) International Journal of Information Technology & Decision Making, Vol. 15, No. 4 (2016) 763–789.

7. Axioms of the Analytic Hierarchy Process (AHP) and its Generalization to Dependence and Feedback: The Analytic Network Process (ANP), (with Konrad Kułakowski) Fundamenta Informaticae.arXiv:1605.05777,2016.

8. Continuous Pairwise Comparisons, Fundamenta Informaticae 144 (3-4), 213-221, 2016.

9. Seven is the Magic Number in Nature, Proceedings of the American Philosophical Society, Vol. 160, No. 4, December 2016.

10. Neurons the decision makers, Part I: The firing function of a single neuron, Neural Networks Volume 86, February 2017, Pages 102–114.

11. Part 2—The firings of many neurons and their density; the neural network its connections and field of firings, Neural Networks, Volume 86, February 2017, Pages 115–122.

Papers published prior to 2016

RANKING COUNTRIES MORE RELIABLY IN THE SUMMER OLYMPICS, (with Mujgan Ozdemir), International Journal of the Analytic Hierarchy Process, Dec. 2015

A Marijuana Legalization Model Using Benefits, Opportunities, Costs and Risks (BOCR) Analysis, Strategic Decision Sciences, Vol. 6, No.2 April-June, 2015.

A structured scientific solution to the Israeli–Palestinian conflict: the analytic hierarchy process approach, (with Luis Vargas and H.J. Zoffer)Decision Analytics, **2**:7 Sept. 2015

Choosing the best city of the future,(with Mujgan Ozdemir), Journal of Urban Management, August 2015

How Many Judges Should There Be in a Group? (with Mujgan Ozdemir) Ann. Data. Sci. 2014-0026-4 January 2015.

Questions and Answers: Valentina Ferretti Interviews Tom Saaty, IJAHP Vol. 6 #2, 2014

About a Hundred Years of Creativity in Decision Making IJAHP Vol. 7 #1, 2015

AN ANALYTIC HIERARCHY PROCESS MODEL OF GROUP CONSENSUS, (With Qingxing Dong), Journal of Systems Science and Systems Engineering September 2014, Volume 23, Issue 3, pp 362-374

When is a Decision-Making Method Trustworthy? Criteria for Evaluating Multi-Criteria Decision-Making Methods (with Daji Ergu) Int. J. Info. Tech. Dec. Mak. 2015

Ranking Countries by Medal Priorities Won in the 2014 Sochi Winter Olympics (with Xiaoyue Liu and Michael Sanserino), Ann. Data. Sci. (2014) 1(2):151–172

THE RATIONALITY OF PUNISHMENT – MEASURING THE SEVERITY OF CRIMES: AN AHP BASED ORDERS-OF-MAGNITUDE APPROACH, (with Mujgan Ozdemir and Jennifer Shang), International Journal of Information Technology and Decision Making, Vol. 14, Issue 1, October, 2014.

The Three Laws of Thought, Plus One: The Law of Comparisons. Journal: Axioms, Volume 3, Page(s):46-49, 2014.

Ranking Countries More Reliably in the Summer Olympics (with Mujgan Ozdemir) submitted 2015

The Need for Adding Judgment in Bayesian Prediction (with Lei Zhang) to appear in International Journal of Forecasting, to appear 2015

The Intrinsic Mathematics of Neural Firing

The Firings of many Neurons and their Density: Outward Manifestations of the Nervous Systems

Questioning the Validity of all Methods of Decision-Making that do not compare the Alternatives but Simply Rate them one at a time Submitted Interfaces (INFORMS Journal)

Proof that there is a Bound on the Number of Interdependent Interacting Elements Components and subcomponents in a Working System: A Law of Nature , being revised 2015

Forecasting the Resurgence of the U.S. Economy in 2010:An Expert Judgment Approach, Review of Economics and Finance, May 2015(with Andrew R. Blair, Gershon Mandelker and Rozann Whitaker

A New Revolution in Conflict Resolution (with Luis Vargas and H.J. Zoffer)

Structured Scientific Solution to the Israeli Palestinian Conflict (with Luis Vargas and H.J. Zoffer)

Об измерении неосязаемого. Подход к относительным измерениям на основе главного собственного вектора матрицы парных сравнений1 Cloud of Science, Moscow, Russia, April, 2015. Т. 2.

Axioms of the Analytic Hierarchy Process (AHP) and its Generalization to Dependence and Feedback: The Analytic Network Process (ANP), Fundamenta Informaticae, Poland

Continuous Pairwise Comparisons, Fundamenta Informaticae, Poland

Book: Compact Society, in progress How Many Judges Should There Be in a Group ? (with Mujgan Ozdemir) Ann. Data. Sci. DOI 10.1007/s40745-014-0026-4

Questions and Answers: Valentina Ferretti Interviews Thomas Saaty, International Journal of the Analytic Hierarchy Process, Vol. 6 #2, 2014

A Better World Through Better Decision Making, Malaysian Management Review; Jul-Dec 2013.

Criteria for Evaluating Multi-criteria Decision Making Methods (with Daji Ergu and Gang Kou) International Journal of Information Technology and Decision Making, 2016.

THE RATIONALITY OF PUNISHMENT – MEASURING THE SEVERITY OF CRIMES: AN AHP

BASED ORDERS-OF-MAGNITUDE APPROACH, (with Mujgan Ozdemir and Jennifer Shang), International Journal of Information Technology and Decision Making, Vol. 14, Issue 1, October, 2015.

The Three Laws of Thought, Plus One: The Law of Comparisons. Journal: Axioms, Volume 3, Page(s):46-49, 2014.

The Analytic Hierarchy Process without the Theory of Oskar Perron, International Journal of the Analytic Hierarchy Process, Vol.5, Issue 2, 2013, ISSN 1936-6744.

Principles for Implementing a Potential Solution to the Middle East Conflict, (with H.J. Zoffer) Notices of the **American Mathematical Society**, Volume 60, Number 10, 1300-1322, 2013.

The Modern Science of Multicriteria Decision Making and Its Practical Applications: The AHP/ANP Approach. Operations Research 61(5):1101-1118, 2013.

On the Measurement of Intangibles. A Principal Eigenvector Approach to Relative Measurement Derived from Paired Comparisons, Notices of the American Mathematical Society, Vol 60, No. 2pp. 192-208, February 2013.

Neural synthesis of firing decisions in the brain**,** Istanbul University Journal of the School of Business Administration Cilt/Vol:41, Sayı/No:2, 2012, 162-171 ISSN: 1303-1732 – www.ifdergisi.org © 2012.

A New Approach to The Middle East Conflict: The Analytic Hierarchy Process. (with H.J. Zoffer), J. Multi-Crit. Decis. Anal. vol. 19 pp 201-225,2012.

THE SERIOUS OMISSION OF COMPARISONS IN ARISTOTLE'S LAWS OF THOUGHT, International Journal of the Analytic Hierarchy Process, Vol. 3 Issue 2, 2011, ISSN 1936-6744.

The analytic hierarchy process applied to complexity (with Nina Begicevic) Int. J. Economics and Business Research, Vol. 4, No. 3, 2012.

The Possibility of Group Choice: Pairwise Comparisons and Merging Functions, (with L.G. Vargas), Social Choice and Welfare, Volume 38, Issue 3, Page 481-496, 2012.

Nina's Decision, How to Make Better Decisions and Resolve Conflicts: An Essay for the Layman, (with H.J. Zoffer), International Journal of the Analytic Hierarchy Process, (IJAHP) Vol 4, No 1 (2012): Special Issue on "AHP/ANP Multicriteria Decision Making on Sustainable Development"

An Innovative Orders-of-Magnitude Approach to Multi-criteria Decision Making: Prioritizing Divergent Intangible Humane Acts (with Jen Shang), European Journal of Operational Research, 214 (2011) 703–715.

Negotiating the Israeli Palestinian Controversy from a New Perspective, (with H.J. Zoffer), International Journal of Information Technology and Decision Making, Vol.10, Issue 1, pp. 5-64, January 2011.

Analytic Hierarchy Process, Encyclopedia of Operations Research and Management Science, 3rd edition, Gass/ Harris editors, Kluwer Academic Publishers, 2011.

The Eigenvector in Lay Language, International Journal of the Analytic Hierarchy Process, Vol. 2, No. 2, 2010.

The scope of human values and human activities in decision making, Applied soft computing (with Nina Begicevic) Volume 10, Issue 4, pp. 963 -974, doi:10.1016/j.asoc.2010.04.002, September, 2010.

Who Won the Winter Olympics? A Quest into Priorities and Ranking, Journal of Multicriteria Decision Analysis, Vol. 17, Issues 1-2, January 2010-April 2010.

Fuzzy Judgments and Fuzzy Sets,(with Liem Tran), International Journal of Strategic Decision Sciences, Vol. 1, No.1, January-March 2010.

Economic Forecasting with Tangible and Intangible Criteria: The Analytic Hierarchy Process of Measurement and its Validation, Journal of Economic Horizons, Serbia, 2010.

Forecasting the Resurgence of the U.S. Economy in 2010: An Expert Judgment Approach, (with A. Blair, G. Mandelker and R. Whitaker), Socio-economic Planning Sciences, September 2010.

The Analytic Hierarchy in the Transportation Sector, (with Rafikul Islam), in book Multiple Criteria Decision Making for Sustainable Energy and Transportation Systems, M. Ehrgott, B. Naujoks,T.J. Stewart, J. Wallenius Editors, Springer-Verlag Berlin Heidelberg 2010.

Addressing with Brevity Criticisms of the Analytic Hierarchy Process, (with L.G. Vargas amd R. Whitaker), Journal of the Analytic Hierarchy Process, Vol. 1, No. 2, 2009.

An Essay on Rank Preservation and Reversal, (with Mujgan Sagir), Mathematical and Computer Modelling 49 (2009) 1230_1243

Decisions, Structure, and Natural Law, International Journal of the Analytic Hierarchy Process, Vol. 1, No. 1, 2009.

An Essay on How Judgment and Measurement are Different in Science and in Decision Making, International Journal of the Analytic Hierarchy Process, Vol. 1, No. 1, 2009.

Words from the AHP Creator, International Journal of the Analytic Hierarchy Process, Vol. 1, No. 1, 2009.

Extending the Measurement of Tangibles to Intangibles, (with Mujgan Sagir), Int. J. of Informations Technology and Decision Making, Vol. 8, No. 1, pp. 7-27, 2009.

Relative Measurement and Its Generalization in Decision Making; Why Pairwise Comparisons are Central in Mathematics for the Measurement of Intangible Factors The Analytic Hierarchy/Network Process, Royal Academy of Sciences, Spain, Series A. Mathematics, November, pp. 251-318, 2008

Making decisions in hierarchic and network systems, (with Mariya Sodenkamp), Int. J. Applied Decision Sciences, Vol.1, No. 1, pp. 24-79, 2008.

Who Won the 2008 Olympics? Journal of Systems Science and Systems Engineering, Vol. 17, No, 4,pp.473-486, Dec. 2008.

Synthesis of Complex Criteria Decision Making: A Case Towards a Consensus Agreement for a Middle East Conflict Resolution, (with J. Zoffer et al.) Group Decision and Negotiation, 17: 363-385, 2008.

The Analytic Network Process, Iranian Journal of Operations Research, Vol.1 No.1 pp.1-27, 2008.

The analytic hierarchy and analytic network measurement processes: Applications to decisions under Risk, *European Journal of Pure and Applied Mathematics*, Vol.1, No.1, pp. 122-196, 2008.

Decision Making with the Analytic Hierarchy Process, Int.J. Services Sciences, Vol. 1, No. 1, 2008.

Time Dependent Decision making; Dynamic Priorities In the AHP/ANP: Generalizing from Points to Functions and from Real to Complex Variables, Mathematical and computer Modelling, Vol. 46, No. 7-8, pp. 860-889, October 2007.

Dispersion of Group Judgments, (with Luis Vargas), Mathematical and computer Modelling, Vol. 46, No. 7-8, pp. 918-925, October 2007.

On the Invalidity of Fuzzifying Numerical Judgments in the Analytic Hierarchy Process, (with Liem T. Tran), Mathematical and computer Modelling, Vol. 46, No. 7-8, pp. 962-975, October 2007.

Multi-decisions Decision-Making: In Addition to Wheeling and Dealing, our national Political Bodies Need a Formal Approach for Prioritization, Mathematical and computer Modelling, Vol. 46, No. 7-8, pp. 1001-1016, October 2007.

The Analytic Hierarchy Process and Human Resource Allocation: Half the Story (with Kirti Peniwati and Jennifer Shang), Mathematical and computer Modelling, Vol. 46, No. 7-8, pp. 1041-1053, October 2007.

The Analytic Hierarchy Process: How to Measure Intangibles in a Meaningful Way Side by Side with tangibles, Transactions from International Symposium on Quality Function Deployment, 19th Symposium, pp. 113-135, 2007.

Group decision-making: Head-count versus intensity of preference，（with Jennifer Shang) Socio-Economic Planning Sciences 41, pp. 22–37, 2007.

There is no Mathematical Validity for Using Fuzzy Number Crunching in the Analytic Hierarchy Process, Journal of Systems Science and Systems Engineering, V0l. 15, No. 4, December 2006.

What is AHP/ANP, Proceedings of the First Japanese Symposium on the Analytic Hierarchy Process, Meijo University, Nagoya, Japan, December, 2006, pp.3-50.

The Unknown in Decision Making: What to do about it, European Journal of Operational Research, 174, 2006, 349-359, with M. Ozdemir.

The Analytic Hierarchy Process: Wash Criteria Should not be Ignored, International Journal of Management and Decision Making, Vol. 7, Nos.2/3, 2006 with L. Vargas

Rank from comparisons and from ratings in the analytic hierarchy/network processes， European Journal of Operational Research 168 (2006) 557–570．

A framework for making a better decision (with Michael Niemira), Research Review, Vol. 13, No. 1, 2006.

Making and Validating Complex Decisions with the AHP/ANP, Journal of Systems Science and Systems Engineering, published at Tsinghua University, Beijing Vol. 14, No. 1, March, 2005, pages 1-36.

The Possibility of Group Welfare Functions, Information Technology and Decision Making, Vol.4, No.2, 2005, pages 167-176, with L. Vargas.

Los conflictos y la resolución de conflictos, Poliantea, Politécnico Grancolombiano, Bogotá, Colombia, No.2 July-December 2004.

An Analytic Network Process model for financial-crisis forecasting, International Journal of Forecasting, Volume 20, Issue 4, October-December 2004, Pages 573-587 with Michael P. Niemira.

The Analytic Hierarchy Process in Medical Diagnosis, the Encyclopedia of Biostatistics, John Wiley and Sons, 2004.

Automatic Decision-Making: Neural Firing and Response, Journal of Systems Science and Systems Engineering, published at Tsinghua University, Beijing Vol. 13, No. 4, December, 2004, pages 385-404.

Fundamentals of the Analytic Network Process: Multiple Networks with Benefits, Costs, Opportunities and Risks, Journal of Systems Science and Systems Engineering, published at Tsinghua University, Beijing**,** Vol. 13, No. 3, September, 2004, pages 348-379.

Fundamentals of the Analytic Network Process: Dependence and Feedback in Decision-Making with a Single Network, Journal of Systems Science and Systems Engineering, published at Tsinghua University, Beijing, Vol. 13, No. 2, June, 2004, pages 129-157.

Decision Making- The Analytic Hierarchy and Network Processes (AHP/ANP), Journal of Systems Science and Systems Engineering, published at Tsinghua University, Beijing, Vol. 13, No. 1, March 2004, pages 1-35.

Rank from Comparisons and from Ratings in the Analytic Hierarchy/ Network Processes, European Journal of Operational Research, 168, 2006, pages 557-570.

Why the Magic Number Seven Plus or Minus Two, Mathematical and Computer Modelling, 38, 2003 pages 233-244 (With M. Ozdemir)

Theory of the Analytic Hierarchy and Analytic network process- Examples Part 2.2, The International Journal of Systems Research and Information Technologies, 2,2003.

Time Dependent Decision-Making; Dynamic Priorities in the AHP/ANP, Generalizing from Points to Functions and From Real to Complex Variables, Proceedings of the 7th ISAHP Symposium on the AHP, Bali, Indonesia, August, 2003

Theory of the Analytic hierarchy Process, Part 2.1, The International Journal of Systems Research and Information Technologies, 1,2003.

Decision-making with the AHP: Why is the principal eigenvector necessary, European Journal of Operational Research 145 (2003) 85-9.

Priorities as Dominance in Derived measurement: Invariance of the Principal Eigenvector, International Journal of Information Technology and Decision Making, Vol. 2, No. 2 (2003) 185-195 (With M. Ozdemir).

Negative Priorities in the Analytic Hierarchy Process, Mathematical and Computer Modelling 37 (2003) 1063-1075 (With M. Ozdemir).

The Allocation of Intangible Resources: The Analytic Hierarchy Process and Linear programming," Socio-Economic Planning Sciences 37 (2003) 169-184. (With L. Vargas and K. Dellmann).

How to Make and Justify a Decision: The Analytic Hierarchy Process (AHP); Part 1. Examples and Applications, *The Journal of the Ukrainian Academy of Sciences*, 2002, 1.

Decision Making with the Analytic Hierarchy Process, *The Iranian Academy of Sciences in their Journal, Scientia Iranica*, Vol. 9, No. 3, July 2002.

Forecasting the Resurgence of the US Economy in 2001: An Expert Judgment Approach, *Socio-Economic Planning Sciences*, 36(2002) 77-91, (with Andrew R.Blair, Robert Nachtmann, and Rozann Whitaker)

Wrote preface for the book, *Modernes Entscheiden mit AHP und Expert Choice*, by Oliver Meixner and Rainer Haas of Vienna, Austria, published in German in 2001

"In the Brain Ratio Scales Are Critical for Modeling Neural Synthesis," *Proceedings of the 5th International Conference on Artificial Neural Networks and Genetic Algorithms (ICANNGA),* Academy of Sciences, The Czech Republic, Prague, April 22-25, 2001

"Hypermatrix of the Brain*," Proceedings of the 5th International Conference on Artificial Neural Networks and Genetic Algorithms (ICANNGA),* Academy of Sciences, The Czech Republic, Prague, April 22-25, 2001

"Deriving the AHP 1-9 Scale from First Principles," *ISAHP 2001 Proceedings*, Bern, Switzerland, August, 2-4, 2001

"Decision Making with the AHP: Why is the Principal Eigenvector Necessary?," *ISAHP 2001 Proceedings*, Bern, Switzerland, August, 2-4, 2001

"Decision Making with the Analytic Network Process (ANP) and Its "Super Decisions" Software: The National Missile Defense (NMD) Example," *ISAHP 2001 Proceedings*, Bern, Switzerland, August, 2-4, 2001

"The Decision by the US Congress on China's Trade Status: A Multicriteria Analysis," Socio-Economic Planning Sciences, 35(2001) 243-252, (with Yeonmin Cho).

"Ratio Scales are Essential in Neural Synthesis," *Invited Lecture, Academy of Sciences,* Prague, The Czech Republic, Springer Verlag, to appear April 2001.

"Hypermatrix of the Brain," *Invited Lecture, Academy of Sciences*, Prague, The Czech Republic, Springer Verlag, to appear April 2001.

"Como Tomar Una Decisions y," published in a new magazine on decision making in Argentina: *Decisiones: Toma de Decisiones*, January 2000, Vol. I, No.1, Buenos Aires, Argentina.

"Basic Theory of the Analytic Hierarchy Process: How to Make a Decision," *Rev .R. Acad. Cienc. Exact. Fis. Nat. (Spanish),* Vol. 93, No. 4, pp. 395-423, 1999.

"On the relativity of relative measures – accommodating both rank preservation and rank reversals in the AHP," (with Ido Millet), *European Journal of Operational Research*, 121 (2000), pp. 205-212.

"The AHP, the ANP and the NNP for understanding Complexity with Derived Relative Ratio Scales," Communications of the Operations Research Society of Japan, Special Issue on AHP, Vol. 44 (1999), pp. 6-7.

"Principles of the Analytic Network Process," Proceedings of the International Symposium on the Analytic

Hierarchy Process, Kobe, Japan, July, 1999.

"Seven Pillars of the Analytic Hierarchy Process," Proceedings of the International Symposium on the Analytic Hierarchy Process, Kobe, Japan, July 1999.

"Review and Comments on the Research Report: 'Decision Making Related to the U.S. Department of Energy's Environmental Management Office of Science and Technology'." An in-depth report for the National Research Council, 15 pp., January, 1999.

Comment and critique of the paper by Wright and Goodwin, published in *The International J. Multi-criteria Decision Analysis*, Vol. 8, pp. 11-27, Jan. 1999.

"Basic Theory of the Analytic Hierarchy Process: How to Make a Decision," *Rev.R.Acad. Cienc.Exact.Fis.Nat. (J. of the Spanish Academy of Science)*, Vol. 93, No. 4, pp. 395-423, 1999.

"Diagnosis with Dependent Symptoms: Bayes Theorem and the Analytic Hierarchy Process," co-authored with Luis Vargas, *Operations Research*, Vol. 46, No. 4, July-August, 1998.

"Ranking by Eigenvector versus other Methods in the Analytic Hierarchy Process," co-authored with Gang Hu, *Applied Math. Letters.* Vol. 11, No. 4, pp. 121-125, 1998.

"Reflections and Projections on Creativity in Operations Research and Management Science: A Pressing Need for a Shift in Paradigm," *Operations Research*, Vol. 46, No. 1, January-February 1998.

"The Peruvian hostage crisis of 1996-1997: what should the government do? " (with Enrique Mu), Socio-Economic Planning Sciences, Vol. 31, Number 3, 1997.

"Implementing Neural Firing: Towards a New Technology, " (with L.G. Vargas), Mathl. Comput. Modelling Vol. 26, No. 4, pp. 113-124, 1997.

"Analytic Hierarchy Process," Encyclopedia of Biostatistics, John Wiley, Chichester, pp. 165-171, February, 1998.

"That is Not the Analytic Hierarchy Process: What the AHP is and What It Is Not. " J. Multi-Crit. Decis. Anal. 6: 320-339, 1997.

"Reflections and Projections on Creativity in Operations Research and Management Science: A Pressing Need for a Shift in Paradigm, " Operations Research, Vol. 46, No. 1, January-February, 1998.

"The Analytic Hierarchy Process and the Voting System" (with J Shang), Fourth International Symposium on The Analytic Hierarchy Process, Simon Fraser University, Burnaby, B.C., Canada, July 12-15, 1996.

"The Analytic Hierarchy Process and Linear Programming in Human Resource Allocation" (with K. Peniwati), Fourth International Symposium on The Analytic Hierarchy Process, Simon Fraser University, Burnaby, B.C., Canada, July 12-15, 1996.

"Prediction of the 1996 Super Bowl An Application of the AHP with Feedback (the Supermatrix Approach" (with D. S. Turner), Fourth International Symposium on The Analytic Hierarchy Process, Simon Fraser University, Burnaby, B.C., Canada, July 12-15, 1996.

"Examples of Difficulties with Ordinal Preference That Disappear with Cardinal Preference" (with L. G. Vargas), Fourth International Symposium on The Analytic Hierarchy Process, Simon Fraser University, Burnaby, B.C., Canada, July 12-15, 1996.

"Ratio Scales are Fundamental in Decision Making ", Fourth International Symposium on The Analytic Hierarchy Process, Simon Fraser University, Burnaby, B.C., Canada, July 12-15, 1996.

"The Analytic Hierarchy Process and Utility Theory: Ratio Scales and Interval Scales", Fourth International Symposium on The Analytic Hierarchy Process, Simon Fraser University, Burnaby, B.C., Canada, July 12-15, 1996.

"Decisions with the Analytic Network Process (ANP)", Fourth International Symposium on The Analytic Hierarchy Process, Simon Fraser University, Burnaby, B.C., Canada, July 12-15, 1996.

"The Analytic Hierarchy Process ", Encyclopedia Of Operations Research And Management Science, Edited by Saul I. Gass and Carl M. Harris, Kluwer Academic Publishers, 1996.

"Thoughts On Decision Making", OR/MS Today , April 1996.

"Decision Making with the Analytic Hierarchy Process", International Journal of Information Technology, Vol. 1, No. 1, pp. 33-52, 1995.

"Decision Making in the Health Care System - Seven Cases", International Journal of Management and Systems, Vol. 10, Nos. 1-3, pp. 219-258, 1995.

"The Analytic Hierarchy Process: Some Observations on the Paper by Apostolou & Hassell", Journal of Accounting Literature, Vol. 13, pp. 212-219, 1994.

"Transport Planning with Multiple Criteria: The Analytic Hierarchy Process Applications and Progress Review", Journal of Advanced Transportation, Vol. 29, No. 1, pp. 81-126, 1995.

"A Ratio Scale Metric and the Compatibility of Ratio Scales: The Possibility of Arrow's Impossibility Theorem", Applied Mathematical Letters, Vol. 7, No. 6, pp. 51-57, 1994.

"How to Make a Decision: The Analytic Hierarchy Process", Interfaces, Vol. 24, No. 6, p. 19-43, 1994.

"Nonnegative Solutions of Linear Algebraic Systems with Ratio Scale Coefficients" (with L.G. Vargas), Proceedings of the 3rd International Symposium on The Analytic Hierarchy Process, Washington, DC, 61-66, 1994.

"Observations on Multiplicative Composition in the Analytic Hierarchy Process" Proceedings of the 3rd International Symposium on The Analytic Hierarchy Process, Washington, DC, 169-178, 1994.

"Reciprocal Comparisons, Inversion, and Hyperbolic Geometry (From Psychology to Geometry)", Proceedings of the 3rd International Symposium on The Analytic Hierarchy Process, Washington, DC, 41-60, 1994.

"A Ratio Scale Metric and the Compatibility of Ratio Scales: On the Possibility of Arrow's Impossibility Theorem", Proceedings of the 3rd International Symposium on The Analytic Hierarchy Process, Washington, DC, 33-40, 1994.

"Perspectives on the Theory and Practice of Decision Making with the Analytic Hierarchy Process", Proceedings of the 3rd International Symposium on The Analytic Hierarchy Process, Washington, DC, 5-18, 1994.
"Highlights and Critical Points in the Theory and Application of the Analytic Hierarchy Process", European Journal of Operational Research, Vol. 74, 426-447, 1994.

"Homogeneity and Clustering in AHP Ensure the Validity of the Scale", European Journal of Operational Research, Vol. 72, p. 598-601, 1994.

"The Analytic Hierarchy Process: A 1993 Overview", Central European Journal for Operations Research and Economics, Vol. 2, No. 2, p. 119-137, 1993.

"Incorporating Expert Judgment in Economic Forecasts: The Case the the U.S. Economy in 1992", (with A. Blair and R. Nachtmann), in: Fundamentals of the Analytic Hierarchy Process, p. 175-192, 1993.

"Representation of Visual Response to Neural Firing", with L.G. Vargas, Mathematical and Computer Modelling, Vol. 18, No. 7, p. 17-24, 1993.

"A Model of Neural Impulse Firing and Synthesis", with L.G. Vargas, Journal of Mathematical Psychology, Vol. 37, p. 200-219, 1993.

"Knapsack Allocation of Multiple Resources in Benefit-Cost Analysis by Way of the Analytic Hierarchy Process" with J.P. Bennett, Mathl. Comput. Modelling, Vol. 17, No. 4/5, p. 55-72, 1993.

"Experiments on Rank Preservation and Reversal in Relative Measurement" with L. G. Vargas. Mathl. Comput. Modelling, Vol 17, No. 4/5, p. 13-18, 1993.

"What is Relative Measurement? The Ratio Scale Phantom" Mathl. Comput. Modelling, Vol. 17, No. 4/5, p. 1-12, 1993

"Group Decision Making Using the Analytic Hierarchy Process" with I. Basak. Mathl. Comput. Modelling, Vol. 17, No. 4/5, p. 101-109, 1993.

"The Analytic Hierarchy Process" section 6.3.2 in: A Conceptual Framework for Life Cycle: Impact

Assessment by Society of Environmental Toxicology and Chemistry, Pensacola, FL, pp. 92-96, 149-156, 1993.

"A Model of Neural Impulse Firing and Synthsis" with L. Vargas. Journal of Mathematical Psychology, 37, 1993.

"Presidential Elections, the Superconducting Supercollider, and Organ Transplant Decisions", p. 345 in Multiple Criteria Decision Making, edited by A. Goicoechea, L. Duckstein, and S. Zionts, Springer-Verlag, 1992.

"A Natural Way to Make Momentous Decisions", in Journal of Scientific & Industrial Research, Volume 51, No 8 & 9, August-September, 1992.

"How to Make Environmental Decisions. How to Perform a Life Cycle Analysis": A Conference and Workshop organized and conducted by the Institute of Packaging Professionals and Franklin Associates Ltd, Alexandria, Virginia, Sept.30 - Oct.2, 1992.

"Best Decision Strategy for Nuclear Waste Disposal", in Health & Environment Digest, Volume 6, No. 6, October 1992.

"Priorities and Decisions in Hierarchic and Feedback Systems", in Planning for Human Systems ─ Essays in Honor of Russell L. Ackoff, edited by Jean-Marc Choukroun and Roberta M. Snow, Busch Center, Wharton School of the University of Pennsylvania, 1992.

"Decision Making in Complex Situations ─ The Analytic Hierarchy Process as a Multivalued Logic" Product Life-Cycle Assessment ─ Impact Analysis Workshop, SETAC Foundation for Environmental Education, Inc., Feb. 1992

"Bagaimana Membuat Suatu Keputusan", Manajamen, Number 77, pp. 56-58, 1991.

"Viewpoints : Response to Holder's Comments on the Analytic Hierarchy Process / Response to the Response to the Response" Journal Operational Research Society, Vol. 42, No. 10, pp. 909-929, 1991.

"Rank and the Controversy About the Axioms of Utility Theory ─ A Comparison of AHP and MAUT" Proceedings of The 2nd International Symposium on The Analytic Hierarchy Process, Pittsburgh, Pennsylvania, 1991

"Inner and Outer Dependence in the Analytic Hierarchy Process : The Supermatrix and the Superhierarchy", Proceedings of The 2nd International Symposium on The Analytic Hierarchy Process, Pittsburgh, Pennsylvania, 1991

"The AHP Captures Order So Essential in Making Decisions", Proceedings of The 2nd International Symposium on The Analytic Hierarchy Process, Pittsburgh, Pennsylvania, 1991

"Modeling the Graduate Business School Admissions Process," with James W. France and Kathleen

Riehle Valentine, Socio-Economic Planning Sciences, Vol. 25, No. 2, pp. 155- 162, 1991.

"Some Mathematical Concepts of the Analytic Hierarchy Process", Behaviormetrika, No. 29, pp. 1-9 , 1991.

"Ratio Scales Derived From Perturbations of Consistent Judgments", Behaviormetrika, No. 28, pp. 1-21, 1990.

"Eigenvector and logarithmic least squares", European Journal of Operations Research, Vol. 48, No.1, pp. 156-160, 1990.

"Physics as a decision theory", European Journal of Operations Research, Vol. 48, No.1, pp. 98-104, 1990.

"How to make a decision : The Analytic Hierarchy Process", European Journal of Operations Research, Vol. 48, No.1, pp. 9-26, 1990.

"An Exposition of the AHP in reply to the Paper "Remarks on the Analytic Hierarchy Process"," Management Science, Vol. 36, No. 3, pp. 259-268, 1990.

"Hierarchical-Multiobjective Systems," Control-Theory and Advance Technology, Vol. 5, No. 4, pp. 485-498, December, 1989.

"Not So Fast Mr. Lootsma, Not So Fast," Orion, Vol. 5, No. 1, pp. 55-57, 1990.

"The Analytical Hierarchy Process in Conflict Management," The International Journal of Conflict Management, Vol. 1, No. 1, pp. 47-68, 1990.

"Group Decision Making and the AHP", in The Analytic Hierarchy Process, edited by Bruce L. Golden, Edward A. Wasil and Patrick T. Harker, Springer-Verlag, London, 1989.

"A New Precious Resource for the Developing World," OR/MS Today, Vol. 16, No. 3, June 1989.

"International Center for Conflict Resolution," Defense Analysis, Vol. 5, No. 1, pp. 80-82, Brassey's Defense Publishers Ltd., Great Britain, 1989.

"Decision Making, Scaling, and Number Crunching," Decision Sciences, Vol. 20, No. 2, pp. 404-409, Spring 1989.

"Dirac Distributions and Threshold Firing in Neural Networks," Applied Mathematical Letters, Vol. 2, No. 1, pp. 1-6, 1989, Pergamon Press.

"A Note on Multiplicative Operations In the Analytic Hierarchy Process", Preprints of International Symposium on the Analytic Hierarchy Process, Tianjin University, Tianjin, China, pp. 82-86, September 1988.

"How to Make a Decision : The Analytic Hierarchy Process", Preprints of International Symposium on the Analytic Hierarchy Process, Tianjin University, Tianjin, China, pp. 1-17, September 1988.

"Some Mathematical Topics in the Analytic Hierarchy Process," Mathematical Models for Decision Support, Edited by Gautam Mitra, NATO ASI Series, Springer Verlag, Vol. 48, pp. 89-107, 1988.

"Some Mathematical Concepts of the Analytic Hierarchy Process," Investigacion Operativa, Edited by Jose Perez Vilaplana, Universidad Del Pais, Vasco, Spain, pp. 223-234, 1988.

"Making Decisions by Measuring Intangibles," Investigacion Operativa, Edited by Jose Perez Vilaplana, Universidad Del Pais, Vasco, Spain, pp. 191-222, 1988.

"Free Trade Discussions Between Canada and the United States," with W.C. Wedley, Canadian Journal of Administrative Sciences, Vol. 5, No. 2, pp. 67-76, June, 1988.

"The Conflict in South Africa," Orion, Vol. 4, No. 1, pp. 3-25, 1988.

"What is the Analytic Hierarchy Process?" Mathematical Models for Decision Support, NATO ASI Series, Vol F48, pp. 109-133, Springer, 1988.

"Resolution of Retributive Conflicts," Edited by G.K. Rand, Operational Research, pp. 549-565, Elsevier Science Publishers B.V., IFORS, 1988.

"Speculating on the Future of Mathematics," Applied Mathematics Letters, Vol. 1, No. 1, pp. 79-82, 1988.

"Fuzzy Sets, Analytic Hierarchies and Decisions," in Encyclopedia of Building Technology, (edited by H. Cowen, Sydney: Prentice Hall, 1988.

"Resolution of Retributive Conflicts", in Contributions of Technology to International Conflict Resolution , Pergamon Press, 1987.

"Principles of the Analytic Hierarchy Process", Expert Judgement and Expert Systems, NATO ASI Series, Vol. F35, Edited by J. Mumpower et al., Springer-Verlag, Berlin Heidelberg, 1987.

"Uncertainty and rank order in the analytic hierarchy process", (with Luis G. Vargas) European Journal of Operational Research, 32, pp. 107-117, 1987.

"Forecasting Foreign Exchange Rates: An Expert Judgement Approach," with A. Blair, R. Nachtmann, J. Olson, Socio- Economic Planning Sciences, Vol. 21, No. 6, pp. 363-369, 1987.

"Nuclear Balance and the Parity Index: The Role of Intangibles in Decisions," with A. Arbel and L.G. Vargas, IEE Transactions on Systems, Man and Cybernetics, Vol. CMC-17, No. 5, Sept.-Oct. 1987.

"Rank According to Perron: A New Insight," Mathematics Magazine, Vol. 60, No. 4, pp. 211- 213, October 1987.

"Rank Generation, Preservation, and Reversal in the Analytic Hierarchy Decision Process," Journal of the Decision Sciences Institute, Vol. 18, No. 2, Spring, 1987.

"Risk: Its Priority and Probability, The Analytic Hierarchy Process," Risk Analysis, Vol. 7, No. 2, 1987.

"How to Handle Dependence with the Analytic Hierarchy Process," International Journal of Mathematical Modelling, Vol. 9, No. 3-5, pp. 369-376, 1987.

"A New Macroeconomic Forecasting and Policy Evaluation Method Using the Analytic Hierarchy Process," Journal of Mathematical Modelling, Vol. 9, No. 3-5, pp. 219-231, 1987.

"Stimulus-Response with Reciprocal Kernels: The Rise and Fall of Sensation," (with L.G. Vargas), J. Math. Psych., Vol. 31, No. 1, pp. 83-92, March 1987.

"The General Case of Dependence in Hierarchic Decision Theory," Toward Interactive and Intelligent Support Systems," Edited by Y. Sawaragi, K. Inoue and H. Nakayama, Vol. 2, pp. 239-248, Proceedings, Kyoto, Japan, 1986.

"A Note on the AHP and Expected Value Theory," Socio-Economic Planning Sciences, Vol. 20, No. 6, pp. 397-398, 1986.

"Exploring Optimization Through Hierarchies and Ratio Scales," Socio-Economic Planning Sciences, Vol. 20, No. 6, pp. 335- 360, 1986.

"Absolute and Relative Measurement with the AHP. The Most Livable Cities in the United States," Socio-EconomicPlanning Sciences, Vol. 20, No. 6, pp. 327-331, 1986.

"Structure and Judgement in Decision Making Using the Analytic Hierarchy Process," Communications of the Operations Research Society of Japan, Vol. 31, No. 8, pp. 479- 481, 1986.

"Dependence and Independence: From Linear Hierarchies to Nonlinear Networks," (with M. Takizawa), European Journal of Operational Research, Vol. 26, No. 2, August, 1986, pp. 229-237.

"Axiomatic Foundation of the Analytic Hierarchy Process," Management Science, D.G. Morrison Ed., Vol. 32, No. 7, July 1986.

"Decision Making, New Information, Ranking and Structure," Proceedings of the Fifth International Conference on Mathematical Modelling (held in Berkeley) June, 1986.

"The Role of Microcomputers in Analysis and Creativity," Impacts of Microcomputers on Operations Research, Gass, Greenberg, Hoffman, and Langley Eds., Elsevier Science Publishing Co., June, 1986.

"The Conflict in South Africa," Proceedings of the IFAC Working Group (SWIIS), H. Chestnut & Y. Haimes Eds., Case Western Reserve University, June 3-5, 1986.

"Resolution of Retributive Conflicts," Proceedings of the IFAC Working Group (SWIIS), H. Chestnut & Y. Haimes Eds., Case Western Reserve University, June 3-5, 1986.

"International Center for Conflict Resolution," Proceedings of the IFAC Working Group (SWIIS), H. Chestnut & Y. Haimes Eds., Case Western Reserve University, June 3-5, 1986.

"Scaling the Membership Function," European Journal of Operational Research, Vol. 25, No. 3, June, 1986, pp. 320-329.

"New Light on the Theorem of Perron," Homenaje Al Professor Sixto Rios, Trabajos De Estadistica Y De Investigacion Operativa, Vol. 36, No. 3, 1985, pp. 253-257.

"Modelling Behavior in Competition: The Analytical Hierarchy Process," (with Luis Vargas), Applied Mathematics and Computation, 16:49, 1985.

"Impacts of Disarmament Nuclear Package Reduction," in Quantitative Assessments in Arms Control, (ed. R. Avenhaus), Plenum Press, 1984.

"Inconsistency and Rank Preservation," (with Luis Vargas), Journal of Mathematical Psychology, Vol. 28, No. 2, June 1984.

"The Analytic Hierarchy Process: Decision Making in Complex Environments," in Quantitative Assessments in Arms Control, Plenum Press, 1984.

"The Legitimacy of Rank Reversal," OMEGA International Journal of Management Science, Vol. 12, No. 5, pp. 513-516, 1984.

"Comparison of Eigenvalue, Logarithmic Least Squares and Least Squares Methods in Estimating Ratios," (with Luis Vargas), Mathematical Modelling, Vol. 5, No. 5, 1984, pp. 309-324.

"Inconsistency and Rank Preservation," (with Luis Vargas), Journal of Mathematical Psychology, Vol. 28, No. 2, June 1984.

"The Analytic Hierarchy Process: Decision Making in Complex Environments," in Quantitative Assessments in Arms Control, (ed. R. Avenhaus), Plenum Press, 1984.

"Center for Conflict Resolution," Bulletin of the Atomic Scientists, Vol. 40, No. 3, March 1984, p. 52.

"Impacts of Disarmament Nuclear Package Reduction," in Quantitative Assessments in Arms Control, (ed. R. Avenhaus), Plenum Press, 1984.

"Hierarchies, Reciprocal Matrices, and Ratio Scales", in Modules in Applied Mathematics, Vol. 3: Discrete and System Models, edited by W.F. Lucas, F.S. Roberts and R.M. Thrall, Springer-Verlag, 1983.

"Knowledge Utilization: Estimating Gaps by the Analytic Hierarchy Process", in Producing Useful Knowledge for Organizations, edited by R. Kilmann, K. Thomas, D. Slevin, R. Nath and S.L. Jerrell, Praeger, 1983.

"International Center for Conflict Resolution: A Proposal, "Man, Environment, Space and Time, Vol. 3, No. 2, Fall, 1983.

"Multicriterion Decisions in Systems with Feedback," Mathematical Modelling in Science and Technology Proceedings of the Fourth ICMM, August 15-17, 1983, Zurich, Switzerland.

"Conflict Resolution and the Falkland Islands Invasion," Interfaces: Special Issue: CPMS/TIMS Prize Papers, Vol. 13, No. 6, December, 1983, pp. 68-83.

"Projecting Average Family Size in Rural India by the Analytic Hierarchy Process," (with Molly Wong), Journal of Mathematical Sociology, Vol. 9, 1983, pp. 181-209.

"Procedures for Synthesizing Ratio Judgements," (with Janos Aczel), Journal of Mathematical Psychology, Vol. 27, No. 1, March 1983, pp. 93-102.

"Priority Setting in Complex Problems," IEEE Transactions on Engineering Management, Vol. EM-30, No. 3, August 1983, pp. 140-155.

"Continuous, Recursive and Feedback Hierarchic Systems", Working Paper, University of Pittsburgh, Pittsburgh, PA.

"An Objective Approach to Faculty Promotion and Tenure by the Analytic Hierarchy Process," (with Vasudevan Ramanujam), Research in Higher Education, Vol. 18, No. 3, 1983, pp. 311-331.

"Assessing Attribute Weights by Ratios," (with Luis Vargas and Richard Wendell), OMEGA: The International Journal of Management Science, Vol. 11, No. 1, 1983, pp. 9-13.

"Priority Setting in Complex Problems," Proceedings, Mons, 1982, (edited by Pierre Hansen), in Surveys on Multiple Criteria Decision Making, Springer-Verlag, 1983.

"The Analytic Hierarchy Process: A New Approach to Deal with Fuzziness in Architecture," Architectural Science Review, Vol. 25, No. 3, September 1982, pp. 64-69.

"High-level Nuclear Waste Management: Analysis of Options," (with H. Gholamnezhad) Environment and Planning B, Vol. 9, 1982, pp. 181-196.

"Proposal for a Center to Resolve International Conflicts," Managing, No. 3, 1982, pp. 33-34; OR/MS Today, Vol. 9, No. 5, September/October, 1982; Humans Systems Management, 1982.

"Waiting for the Doctor," letter to the editor, Private Practice, September, 1982; Self, November, 1982; US, December 7, 1982.

"Modeling of Decision Processes," Proceedings of the 10th IMACS World Congress on System Simulation and Scientific Computation, University of Montreal, Vol. 3, August 8-13, 1982, pp. 306-307.

"Priority Setting in Complex Problems," Proceedings of the Second World Conference on Mathematics at the Service of Man, Las Palmas, Spain, June, 1982.

"Applications of the Analytic Hierarchy Process to Long Range Planning Processes," (with James R. Emshoff), European Journal of Operational Research, Vol. 10, 1982, pp. 131- 143.

"What an Intelligence Test Should Measure," Mensa Bulletin, May, 1982.

"A Desired Energy Mix for the United States in the Year 2000: An Analytic Hierarchy Approach," (with Hamid Gholamnezhad), International Journal of Policy Analysis and Information Systems, Vol. 6, No. 1, 1982.

"High Level Decisions: A Lesson from the Iran Hostage Rescue Operation,"(with Amos Barzilay and Luis Vargas), Decision Sciences, Vol. 13, No. 2, April, 1982, pp. 185-206.

"Oil Prices: 1985 and 1990," Energy Systems and Policy, Vol. 5, No. 4, 1981, pp. 303-318.

"Priorities in Systems with Feedback," International Journal of Systems, Measurement and Decisions, Vol. 1, No.1, 1981

"The Analytic Hierarchy Process: Scenarios, priorities and cost/benefits for the Sudan transport plan". *Operational Research '81. Proceedings of the Ninth IFORS International Conference* (North-Holland Publishing Company, Amsterdam), 161-175.

"Technological Choice in the Less Developed Countries: An Analytic Hierarchy Approach," Technological Forecasting and Social Change, Vol. 19, 1981, pp. 81-98.

"Financial and Intangible Factors in Fleet Lease or Buy Decision," (with Luis G. Vargas), Industrial Marketing Management, Vol. 10, 1981, pp. 1-10.

"The Analytic Hierarchy Process and Health Care Problems," Proceedings of the International Conference on Systems Science in Health Care, Montreal, 1981.

"The Conflict in South Africa," (with David Tarbell), Conflict Management and Peace Science, Vol. 4, No. 2, 1980, pp. 151-168.

"Marketing Applications of the Analytic Hierarchy Process," (with Y. Wind), Management Science, Vol. 26, No. 7, 1980, pp. 641-658.

"A Computational Tool for Decision Analytic Hierarchies", (with J. Smith and R. Kalaba), Working Paper, University of Pittsburgh, Pittsburgh, PA.

"Portfolio Selection Through Hierarchies," (with P. Rogers and R. Pell), The Journal of Portfolio Management, No. 3, Spring, 1980.

"Hierarchical Analysis of Behavior in Competition: Prediction in Chess," (with Luis G Vargas), Behavioral Sciences, May, 1980.

"Architectural Design by the Analytic Hierarchy Process," (with Miguel Beltran), Design Methods and Theories Journal of DMG, Vol. 14, Nos. 3/4, 1980, pp. 124-134.

"The U.S.- OPEC Energy Conflict; The Payoff Matrix by the Analytic Hierarchy Process," International Journal of Game Theory, 1979.

"Rationing Energy to Industries: Priorities and Input- Output Dependence," (with Reynaldo S. Mariano), Energy Systems and Policy, Vol. 8, 1979, pp. 85-111.

"Mathematical Modeling of Dynamic Decisions; Priorities and Hierarchies with Time Dependence," Mathematics and Computers in Simulation, Vol. 21, 1979, pp. 352-358.

"Applications of Analytical Hierarchies," Mathematics and Computers in Simulation, Vol. 21, 1979, pp. 1-20.

"Estimating Technological Coefficients by the Analytic Hierarchy Process," (with Luis G. Vargas), Socio-Econ. Planning Sciences, Vol. 13, 1979, pp. 333-336.

"A New Approach to Performance Measurement, The Analytic Hierarchy Process," (with Eren Erdener), Design Methods and Theories, Vol. 13, No. 2, 1979, pp. 64-72.

"Decision Making in Fleet Management," (with Anand Desai), NAFA Bulletin, April, 1979.

"Foresight--Insight--Hindsight," (with James C. Frauenthal), Modules in Applied Mathematics, Cornell University, The Mathematical Association of America, 1976, and the TCMJ Journal, Vol. 10, No. 4, 1979.

"An Adaptive Approach to Energy Resources and Their Impacts: Analytical Hierarchies and Priorities" (with David R. Chalson), June 1978.

"Modeling Unstructured Decision Problems: Theory of Analytical Hierarchies," Mathematics and Computers in Simulation, Vol. 20, No. 3, 1978, pp. 147-157.

"Exploring the Interface Between Hierarchies, Multiple Objectives and Fuzzy Sets", Fuzzy Sets and Systems, Vol. 1, January, 1978, pp. 57-68.

Notes on "A Scaling Method for Priorities in Hierarchical Structures," Journal of Math. Psychology, Vol. 15, No. 3, 1977, reprinted in Research Opportunities in Command and Control, Naval Postgraduate School, Monterey, CA, Proceedings of Conference, August 23-25, 1978.

"Theory of Measurement of Impacts and Interactions in Systems," Proceedings of the International Conference on Applied General Systems Research: Recent Developments and Trends, Binghamton, New York, 1977.

"The Sudan Transport Study," Interfaces, Vol. 8, No. 1, 1977, pp. 37-57.

"The Forward and Backward Processes of Conflict Analysis," (with Joyce Alexander) Behavioral Science, Vol. 22, 1977, pp. 87-98.

"The Faculty Tenure Problem -- Determination of Requirements," (with Anand Desai), in publication, 1977.

"Terrorism: Patterns for Negotiations: Three Case Studies Through Hierarchies and Holarchies," Study for the Arms Control and Disarmament Agency, 1977. See also Facing Tomorrow's Terrorist Incident Today, U.S. Department of Justice, LEAA, Washington, D.C., 20531, pp. 28-31.

"Stability Analysis of the Forward-Backward Process," (with Joyce Alexander), Behavioral Science, Vol. 22, 1977, pp. 375-382.

"Scenarios and Priorities in Transport Planning: Application to the Sudan," Transportation Research, Vol. 11, No. 5, 1977.

"A Scaling Method for Priorities in Hierarchical Structures," Journal of Mathematical Psychology, Vol. 15, No. 3, 1977, pp. 234-281.
"Operational Gaming for Energy Policy Analysis," (with Fred Ma and Peter Blair), Energy Policy, March, 1977, pp. 63-75.

"Modeling Unstructured Decision Problems: A Theory of Analytical Hierarchies," Proceedings of the First International Conference on Mathematical Modeling, University of Missouri- Rolla, Vol. 1, 1977, pp. 59-77.

"A Theory of Analytical Hierarchies Applied to Political Candidacy," (with J.P. Bennett), Behavioral Science, Vol. 22, 1977, pp. 237-245.

"Hoover's Problem; When is a Graph Hooverian?," (with Kun-Yuan Chen), Mathematics Magazine, 1977.

"A Guided Tour Through Graph Theory Algorithms," (with Ruben Diaz-Mora), Modules in Applied Mathematics, Cornell University, The Mathematical Association of America, 1976.

"Higher Education in the United States (1985-2000): Scenario Construction Using a Hierarchical Framework with Eigenvector Weighting," (with Paul C. Rogers), Socio-Econ. Planning Sciences, Vol. 10, 1976, pp. 251-264.

"Hierarchies, Reciprocal Matrices, and Ratio Scales," Modules in Applied Mathematics, Cornell

University, The Mathematical Association of America, 1976.

"A Measure of World Influence," (with M.W. Khouja), Journal of Peace Science, Spring, 1976.

"Optimization and the Geometry of Numbers: Packing and Covering," (with Joyce Alexander), SIAM Review, Vol. 17, No. 3, pp. 475-519, 1975.

"Hierarchies and Priorities--Eigenvalue Analysis," University of Pennsylvania, 1975.

"Measuring the Fuzziness of Sets," Journal of Cybernetics, Vol. 4, No. 4, 1974, pp. 53-61.

"The Sudan Transport Study," presented to the Democratic Republic of the Sudan, THE ADAR Corporation, 1974.

"Thoughts on Mathematics and the Behavioral Sciences," Chapter 1 of Topics in Behavioral Mathematics, Lectures given at the 1973 MAA Summer Seminar, Williams College, Williamstown, MA, 1973.

"Impact of Thermal Energy Storage on Power System Planning and Operation," (with Michael Tinkleman and Lawrence Lapide), IEE Power Engineering Society Summer Meeting and EHV/UHV Conference, Vancouver, Canada, July 15-20, 1973.

"An Eigenvalue Allocation Model for Prioritization and Planning," Energy Management and Policy Center, University of Pennsylvania, 1972.

"Operations Research in International Conflict,"Peace Research, 1972.

"Planning: A Triangle of Imagination, Politics and Applied Science," Proceedings, Institute of Management Sciences, Cairo, 1972, pp. 24-26.

"Operations Research: Some Contributions to Mathematics," Science, Vol. 178, 1972, pp. 1061- 1070.

"Mathematical Structures Applicable to Multi-Party Conflicts," Peace Research, Vol. 17, 1972, pp. 7-30.

"Optimum Position for m Airports," Naval Research Logistics Quarterly, Vol. 19, No. 1, 1972, pp. 101-109.

"Thirteen Colorful Variations on Guthrie's Four Color Conjecture," American Math. Monthly, Vol. 79, No. 1, pp. 2-43, 1972.

"The Future of Operations Research in the Government," Interfaces, Vol. 2, No. 2, 1972, pp. 1-19.

"Personal Values in Operations Research: A Gloomy View -- A Challenge," Summation, Vol. 17, No. 4, 1972, pp. 6-12; also a talk before the American Mathematical Society, Atlantic City, 1971.

"Using the Analysis of Options Technique to Analyze a Community Conflict," Journal of Conflict

Resolution, Vol. 15, No. 2, 1971, pp. 133-144.

"On Polynomials and Crossing Numbers of Complete Graphs," Journal of Combinatorial Theory, Vol. 10, No. 2, 1971, pp. 183-184.

"The Number of Intersections in Complete Graphs," Tekhnicheskaya Kibernetika, No. 6, 1971, pp. 151-154.

"Symmetry and the Crossing Number for Complete Graphs," Journal of Research of the National Bureau of Standards, Vol. 73B, No. 2, 1969, pp. 177-186.

"On Mathematical Structures in Some Problems of Politics," The Mathematics Teacher, Vol. 61, No. 7, 1968, pp. 677-682.

"On Nonlinear Optimization in Integers," Naval Research Logistics Quarterly," Vol. 15, No. 1, 1968, pp. 1-22.

"La Decision, Agregation et dynamique des ordres de preference," Proceedings of Colloques Internationaux du Centre National de la Recherche Scientifique, Aix-en-Provence, No. 171, July, 1967, pp. 241-250.

"Two Theorems on the Minimum Number of Intersections for Complete Graphs," Journal of Combinatorial Theory, Vol. 2, No. 4, 1967, pp. 571-584.

"Remarks on the Four Color Problem: The Kempe Catastrophe," Math. Magazine, Vol. 40, No. 1, 1967, pp. 31-36.

"A Discrete Search Problem in Pattern Recognition," Proceedings of IRE, 1967.

"A Dilemma in Mathematical Education," American Math. Monthly, Vol. 73, No. 4, Part I, 1966, pp. 398-400.

"Seven More Years of Queues," Naval Research Logistics Quarterly, Vol. 13, No. 4, 1966, pp. 447-476.

"A Nonlinear Programming Model in Optimum Communication Satellite Use," (with G. Suzuki). SIAM Review, Vol.7, No. 3, 1965, pp. 403-408.

"The Marvelous Mosaic of Mathematics, Part II," IEEE Student Journal, Vol. 3, No. 4, 1965, pp. 11-17.

"The Marvelous Mosaic of Mathematics, Part I," IEEE Student Journal, Vol. 3, No. 3, 1965, pp. 2-12.

"The Minimum Number of Intersections in Complete Graphs," Proceedings National Academy of Sciences, Vol. 52, No. 3, 1964, pp. 688-690.

"Mathematical Tools," International Science and Technology, August, 1964, pp. 18-28.

"A Model for the Control of Arms," Operations Research, Vol. 12, No. 4, 1964, pp. 586-609.

"A Conjecture Concerning the Smallest Bound on the Iterations of Linear Programming," Operations Research, Vol. 11, No. 1, 1963, pp. 151-153.

"Discipline and Practice of Operations Research," Naval Research Logistics Quarterly, 1962, pp. 8-13.

"Approximate Solution to Semi-Conductor Noise as a Queuing Problem," Proceedings of the IRE, Vol. 49, No. 6, June, 1961.

"Some Stochastic Processes with Absorbing Barriers," Journal of the Royal Statistical Society, Vol. 23, No. 2, pp. 319-334, 1961.

"Stochastic Processes with Small Barriers," Chapter 5 in Elements of Queueing Theory," T.L. Saaty, McGraw-Hill, 1961.

"Education in Operations Research," Pi Mu Epsilon, 1961.

"Time-Dependent Solution of the Many-Server Poisson Queue," Operations Research, Vol. 8, No. 6, pp. 755-772, 1960.

Discussion of "The Nature of Mathematical Thinking," April, 1959, in Mathematics, Education and Industry Technology, London, 1960.

"Aircraft Overhaul in the U.S. Navy," (with K. Webb), Proc. International Conference on Operations Research, 1960.

"Coefficient Perturbation of a Constrained Extremum," Operations Research, Vol. 7, No. 3, pp. 294-302, 1959.

"An Application of Semi Groups Theory to the Solution of a Mixed Type Partial Differential Equation," Rend Math. di Torino, Vol. 18, 1959, pp. 53-76.

"A Note on the Fourier Transform of Bessel Functions," Rend Math di Torino, Vol. 93, 1958- 59, pp. 1-4.

"Five Papers by Conny Palm," (detailed analysis), Operations Research, 1958.

"Résumé of Useful Formulas in Queuing Theory," Operations Research, Vol. 5, No. 2, 1957, pp. 162-200.

"Approximation to the Value of the Objective Function in Linear Programming by the Method of Partitions," Operations Research, 1956.

"The Computational Algorithm for the Parametric Objective Function," (with Saul Gass), Naval Research

Logistics Quarterly, Vol. 2, pp. 39-45, 1955.

"The Number of Vertices of a Polyhedron," American Math. Monthly, Vol. 62, No. 5, pp. 326-331, 1955.

"Parametric Objective Function, Part II, Generalization," (with Saul Gass), Operations Research, pp. 395-401, 1955.

"Parametric Objective Function, Part I," (with Saul Gass), Operations Research, Vol. 2, No. 3, pp.316-319, 1954.

OTHER REPORTS AND STUDIES

Mathematics in: Ireland, February, 1959; Cambridge University, February, 1959; Greece and Turkey, April, 1959; Israel, May, 1959; London University, June, 1959.

Pure Mathematics, Statistics and Operations Research in Madrid and Barcelona, June, 1959.

Operations Research in: France, December, 1958; Holland and Scandinavia, December, 1958; Italy, April, 1959; the U.A.R.--Egyptian Region; Turkey (with an Illustration of the multiplex method), May, 1959; United Kingdom, June, 1959; Switzerland, Austria and West Germany, August, 1959.

SCIENTIFIC NOTES, 1958-1959

Mathematical Education at Oxford, November, 1958; Operations Research at BEA and BOAC: Mathematics activity at the University of Oslo, January, 1959; Recent research in probability at Stockholm and Helsinki, June, 1959; Department of Pure Mathematics at the University of Birmingham; Mathematics teaching in the U.S.S.R.

OPERATIONS STUDIES FOR THE U.S. NAVY

Research in prediction theory on Submarine and Aircraft Detection, 1953-1954; Several mathematical studies of Operations Research problems arising in the U.S. Navy, 1954-1957, unpublished; Chemical and biological warfare, 1960.

Reviews of a large number of books for many technical journals.

Member of editorial boards of several mathematics and social science journals.

SIGNIFICANT PRESENTATIONS GIVEN

3 hour presentation to the Senate in Argentina on AHP 1997
Presentation to the president of Sudan at Jaffar Nimeiry in Khartoum
Have given over the years 3 day workshops on AHP and ANP around the world (US, UK, Austria, Norway, Italy, Spain, China, Japan, Indonesia, Singapore, South Africa, Colombia, Brazil, Peru, Ecuador, Chile, Turkey, Iran)
Presented longer 1 week to 2 week workshops (Chile, Italy)
Presentation to the National Defense University in Washington, February 2001
Presentation at the Pentagon to Navy Admirals Buss and Brown in 2007 (on ANP analysis of what to do about Iran – bombing Iran was a much-discussed option at the time and the analysis revealed that was the almost the worst option)
Presentation to the Navy Department on Chemical/Biological warfare as the leader of the team on a project about it
1960's conducted short courses lasting 2 weeks on nonlinear mathematics and operations research at UCLA
1970s gave 2 day Chautauqua seminars organized by the National Science Foundation and the Association for the Advancement of Science at 12 centers around the US
1972 Several week high level government seminars about no peace no war in Cairo, Egypt in which officials communicated to President Sadat the findings having used very early forms of the AHP with group participation
1972 Prioritization in Dar es Salam of the contending international designers to plan the new capital city of Dodoma for Tanzania
2007 Invited to give 3 hour class on Creative Thinking at Harvard University

PH.D. DISSERTATIONS SUPERVISED

1972

David Michael Berman: The Number of 5-cycles in a Tournament
(Now at University of New Orleans)

1973

Michael Tinkleman: Power Systems Capacity Expansion
(Now at Electric Power Institute)

1975

Reynaldo Mariano: Allocation Models for Energy Planning
(Now with Canadian Bell Telephone)

1976

Fred Ma: Planning Models for the Assessment of Advanced Energy Storage Systems;
(Advanced mathematics and energy)
(Now with Systems Research Corporation)

Joyce Alexander: An Analysis of Conflict in Northern Ireland
(Now with Immaculata College, PA)

Nagy Hanna: Towards a Methodology for Planning Models; Case Study: Transportation Planning

in the Sudan (Now with the International Bank for Reconstruction and Development-World Bank)

1977

Peter Blair: Hierarchical Systems and Multiobjective Planning: Applications to the Energy Park Concept
(Now at University of Pennsylvania)

1979

Eren Erdnener: A New Approach to Performance Measurement in Architecture

Abdolhamid Gholamnezhad: Critical Choices for OPEC Members and the United States: A Hierarchical Search for Their Desired Future
(Now with Eastern Illinois University)

Boris Odynoki: Planning the National Health Insurance Policy: An application of the Analytic Hierarchy Process in Health Policy Evaluation and Planning
(Now at Northern Illinois University)

Luis G. Vargas: Measurement and Optimal Resource Allocation in Social Systems
(Now at the University of Pittsburgh)

1994

David Hauser: Structures for Best Decisions: The Analytic Hierarchy Process

1995

Munleong Chan: A Decision Support System for Complex Marketing Problems

1996

Kirti Peniwati Srisoepardani: The Possibility Theorem for Group Decision Making: The Analytic Hierarchy Process

2012

Orrin Cooper: The Analytic Network Process Applied in Supply Chain Decisions, in Ethics, and in World Peace

Provided major thesis ideas and help in the following cases:

1971

Howard Simkowitz: Common Carrier Vehicle Scheduling over Multi-Link Networks Using Optimal Trip Path Estimation
(Now with Commonwealth of Massachusetts energy program)

1974

Lawrence Bein: Airport Terminal Frontage Parking (Sequential Search Under Completion)
(Now with Arthur D. Little, Boston)

1977

Kun Y. Chen: On a Class of Stochastic Programming Problems -- A Network Approach
(Now with Upjohn Pharmaceutical Company)

1979

Glen Shimamoto: Reza Banai Committee

Supervised several Master's theses in the 1950's and 1960's at the George Washington University and Catholic University of America. Assisted extensively on a Ph.D. dissertation that generalized one of my papers at the American University in Washington, D.C. by Alexander Craw.

A PLACE TO PRESERVE A TESTIMONIAL

"It has been a privilege and a pleasure to share my life with Tom Saaty. It has been an intellectual journey every day to see his fascinating mind work and it has been an earthly journey as well as his ideas have taken us to so many places as he shared them with others in the world. He is a tremendously creative man with an inquiring mind. He constantly turns things over, looking at them from fresh perspectives and asking questions no one ever thought to ask before. What someone once said about the Greeks, "They were born to take no rest themselves, nor to give one to others," is certainly true of him, and I would not have missed a minute of it. He is a great and original thinker, of a kind that comes along once in a great while. I am so glad I am on this earth at the same time he is."

-Rozann