# Biographical Sketch

## Personal

- Born in Cluj, Romania; U.S. citizen (immigrated in 1967)
- Married to Edith Balas; daughters Anna and Vera

## Education

- Diploma Licentiae (D.L.) in Economics, Bolyai University, Cluj (Romania)
- Doctoral degree in Economics (D.Sc.Ec.), *summa cum laude*, University of Brussels
- Doctoral degree in Science (Mathematics), Docteur de l'Université, University of Paris

## Employment

- Thomas Lord Professor of Operations Research (1996-)
- University Professor, Carnegie Mellon University (1990-)
- Professor, The GSIA Alumni Chair, Carnegie Mellon University (1980-1996)
- Professor of Industrial Administration and Applied Mathematics, Carnegie Mellon University (1968-)
- Visiting Humboldt Research Scientist, University of Cologne, West Germany, (1980-1981)
- Visiting Operations Research Analyst, Federal Energy Administration (September-December 1976)
- Visiting Professor of Systems Engineering, Federal University of Rio de Janeiro (May-July 1976)
- Ford Distinguished Research Professor, Carnegie Mellon University (1967-1968)
- Visiting Professor of Operations Research, Stanford University (May-September 1967)
- Visiting Professor of Operations Research, University of Toronto (January-April 1967)
- Research Fellow, International Computation Centre, Rome, Italy (August-December 1966)
- Head of the Mathematical Programming Sector, Centre of Mathematical Statistics of the Romanian Academy, Bucharest (1964-1965)
- Project Engineer (1959-1961) and Head of the Mathematical Programming Group (1962-1964), Designing Institute for Forestry and the Timber Industry (ISPF), Bucharest
- Research Associate, Institute for Economic Research of the Romanian Academy, Bucharest (1956-1958)
- Lecturer, Institute of Economic Science and Planning, Bucharest (1949-1958)

## Research

- Author or coauthor of over 220 publications, with results on various aspects of integer programming, combinatorial optimization, network models, polyhedral theory, disjunctive programming, projection methods, scheduling and sequencing, distribution and location theory, etc.
- Author or coauthor of algorithms and computer codes for mixed 0-1 programming, the knapsack problem, the set covering problem, the asymmetric traveling salesman problem, job shop scheduling, traffic assignment in communication satellites, rolling mill scheduling, etc.

## Teaching

- Courses taught: Linear Programming, Integer Programming, Convex Polyhedra, Graphs and Network Flows, Location and Distribution Theory, Combinatorial Optimization, Energy Modeling, Large Scale Systems, Scheduling and Sequencing.
- Chairman of the Ph.D. Committees for: Manfred W. Padberg (1971), Haakon Samuelsson (1974), Andris A. Zoltners (1975), Christopher J. Piper (1975), Eiten Zemel (1976), Clarence H. Martin (1978), Andrew Ho (1980), Joseph B. Mazzola (1981), Chang-Sung Yu (1984), Daniel Zawack (1985, co-chair), Matthew Saltzman (1986), Shu Ming Ng (1987, co-chair), Joseph Adams (1988), Joseph Tama (1990), Jue Xue (1991), Maria C. Carrera (1991), Sebastian Ceria (1993, co-chair), Bruno Repetto (1994), Alkis Vazacopoulos (1994), Robert Carr (1995, co-chair), William Niehaus (1996), Gabor Pataki (1996), Giuseppe Lancia (1997), Neil Simonetti (1997), Milind Dawande (1998, co-chair), Michael Perregaard (2002), Anureet Saxena (2009), Christopher Wallace (2010).
- GSIA Doctoral Committee (1973-1987, 1995-1996)

## Other Professional Activities

### Editorial

- Member of the Editorial Board, *Discrete Optimization* (2003-)
- Member of the Editorial Board, *Naval Research Logistics* (2003-)
- Advisory Editor, *Journal of Combinatorial Optimization* (1996-)
- Member of the Editorial Board, *Computational Optimization and Applications* (1991-)
- Associate Editor, *Annals of Operations Research* (1983-)
- Member of the Editorial Board, *Zeitschrift für Operations Research* (1980-)
- Advisory Editor, *Discrete Applied Mathematics* (1976-)
- Editorial Associate, *European Journal of Operational Research* (1976-)
- Member of the Editorial Board, *Revue d'Automatique, Informatique et Recherche Opérationnelle* (R.A.I.R.O.) (1976-2004)
- Associate Editor, *Operations Research* (1967-1996)
- Member of the Editorial Board, *Ricerca Operativa* (1981-1995)
- Member of the Editorial Board, *Cahiers du Centre d'Etudes de Recherche Opérationnelle* (1986-1995)
- Associate Editor, *Naval Research Logistics Quarterly* (1979-1989)

### CMU Committees

- Chairman, Review Committee of Tepper School's Dean (2006-2007)
- Member, GSIA Dean's Advisory Council (1990-2000)
- Member, GSIA Dean Search Committee (1990-1991, 1995-1996)
- Member, CMU Provost Search Committee (1990-1991)
- Member, Carnegie Mellon University Research Council (1986-1991)
- Member, GSIA Doctoral Committee (1972-1987, 1995-1996)

### Outside Expert Committees

- Member of NSF panels, 2008, 2005, 2003, 2001, 1998, 1997, 1994.

- Member of the Selection Committee for the John von Neumann Theory Prize, 1998-2001.
- Member of the Visiting Committee to the School of Management, University of Texas at Dallas, April 1993.
- Member of the Advisory Panel, University Research Initiative on Computational Combinatorics, Purdue University, 1987-1991
- Consultant to Rutgers University on proposed Doctoral Program in OR, May 1987
- Member of the National Research Council's Committee on Recommendations for U.S. Army Basic Research (1977-1980)
- Scientific Advisor, Summer School on Combinatorial Optimization, Urbino, Italy, June 1977
- Member of the Visiting Operations Research Committee to the University of Tel-Aviv, December, 1975
- Scientific Advisor, NATO Advanced Study Institute on Combinatorial Programming, Versailles, September 1974

**Professional Organizations**

- Member of Program Committee, Tenth Conference on Integer Programming and Combinatorial Optimization (IPCO 10), 2004.
- Chairman of the Program Committee, Fourth Conference on Integer Programming and Combinatorial Optimization, (IPCO 4) 1995.
- Member of the Program Committee, Second Conference on Integer Programming and Combinatorial Optimization, (IPCO 2) 1992.
- Member of the Program Committee for the 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th and 16th International Symposium on Mathematical Programming
- Council Member, Mathematical Programming Society (1988-1991)
- Council Member, TIMS (1972-1975)
- Chairman, TIMS Publications Committee (1974-1975)
- Member of the U.S. team, Brazilian-German-U.S. Workshop on Mathematical Programming, Rio de Janeiro, April 1981
- Member of the U.S. team, China-U.S. Symposium on Systems Analysis and Engineering, Xian, April 1981
- Member of: ORSA, TIMS, MPS, AMS, SIAM, SIGMAP
- Session chairman at numerous ORSA and TIMS meetings
- Plenary speaker at annual or biannual meetings of the American, Belgian, German and Italian Operations Research Societies

**Invited papers and lectures (past 5 years)**

- INFORMS meeting in Charlotte, NC, November 13-16, 2011 (invited paper).
- Workshop on Combinatorial Optimization, Aussois (France), January 10-25, 2011 (invited talk).
- Annual INFORMS Meeting in Austin, TX, November 7-10, 2010 (2 joint papers).
- The University of Tel-Aviv, October 27, 2010, invited talk.
- The Technion, Haifa (Israel), October 25, 2010, invited talk.

- INFORMS Optimization Society Meeting, Atlanta, GA, October 12, 2010 (keynote speaker).
- MOPTA (Modeling, Optimization and Algorithms) Meeting, Lehigh University, August 17-20, 2010 (keynote speaker).
- MIP2010 (Mixed Integer Programming) Workshop, Atlanta, GA, July 25-29, 2010 (invited talk).
- EURO2010 Meeting, Lisbon (Portugal), July 10-15, 2010 (3 papers, 2 with coauthors).
- ALIO/INFORMS Meeting, Buenos Aires (Argentina), June 5-9, 2010 (keynote speaker).
- Workshop on Combinatorial Optimization, Aussois, France, January 3-10, 2010.
- International Symposium on Mathematical Programming, Chicago, August 23-26, 2009.
- EURO 2009 Meeting in Bonn, Germany, July 5-8, 2009.
- Invited speaker, American Mathematical Society, Regional Meeting held at San Francisco State University, April 2009.
- INFORMS Meeting in Washington, DC, October 2008, invited speaker.
- Four lectures on Advanced Integer Programming, University of Siena, Italy, June 3-7, 2008.
- Invited lecture, University of Padova, Italy, May 29, 2008.
- IPCO (Integer Programming and Combinatorial Optimization) Conference, Bertinoro, Italy, May 26-28, 2008.
- Invited lecture Belgium Operations Research Students Meeting, Liege, Belgium, March 2008.
- INFORMS Optimization Society Conference, Atlanta, March 14-16, 2008.
- Workshop on Combinatorial Optimization (50th anniversary of Integer Programming), Aussois, France, January 7-13, 2008.
- Mixed Integer Programming Workshop, Montreal, Canada, July 29-August 3, 2007.
- Optimization 2007, Porto, Portugal, July 24-26, 2007.
- EURO 2007 Meeting, Prague, the Czech Republic, July 7-12, 2007.
- IPCO (Integer Programming and Combinatorial Optimization) Conference, Cornell University, June 2007.
- Workshop on Combinatorial Optimization, Aussois France, June 2007.
- INFORMS annual meeting, Pittsburgh, PA, November 2006.
- AIRO (Italian OR Society) annual meeting, Cesena, Italy, September 2006.
- CORS (Canadian OR Society) annual meeting. (IFORS distinguished lecturer), Montreal, Quebec, Canada, May 2006.
- Workshop on Combinatorial Optimization, Aussois, France, January 2006.

## Honors, Grants, Listings

- Appointed to 3-member committee for selecting the winner of the Khachiyan Prize for lifetime accomplishment of the Mathematical Optimization Society, 2012.
- Honored by the essay by Graham Rand from Lancaster University, "Egon Balas," in A. Assad and S. Gass (editors), Profiles in Operations Research: Pioneers and Innovators, Springer, 2011, 447-462.
- Academy of Sciences of Bologna, Italy, corresponding member, 2011-
- Honorary doctorate, University of Liege, Belgium, March 2008
- National Academy of Engineering, 2006-
- IFORS Hall of Fame (International Federation of Operational Research Society), 2006-
- Honorary doctorate in Mathematics, University of Waterloo, June 2005.
- Hungarian Academy of Sciences, external member, 2004-
- Fellow of INFORMS, 2002.
- Honorary doctorate, Miguel Hernandez University, Spain, 2002.
- Special issue, *Mathematical Programming, 98,* 2002, for $80^{\text{th}}$ birthday.
- EURO Gold Medal, July 2001.
- John von Neumann Theory Prize, April 1995.
- University Professorship, Carnegie Mellon University (1990-)
- The Thomas Lord Professorship in Operations Research, a chair endowed by the Thomas Lord Foundation (1996-)
- The GSIA Alumni Chair, a professorship endowed by the alumni of GSIA (1980-1996)
- Senior American Scientist Award of the Alexander von Humboldt Foundation, 1980-1981
- National Science Foundation continuing grant CMMI-1024554, 2010-2013, with Gérard Cornuéjols (2010-2013).
- National Science Foundation continuing grant CMMI-0653419 (with G. Cornuéjols), 2007-2010.
- National Science Foundation continuing grant DMI-0352885, (with G. Cornuéjols), 2004-2007.
- National Science Foundation continuing grant DMI-0098427, (with G. Cornuéjols), 2001-2004.
- National Science Foundation continuing grant DMI-9802773, (with G. Cornuéjols), 1998-2001.
- National Science Foundation GIG grant DMS-9509581 (with G. Cornuéjols, A. Frieze and R. Kannan) for the ACO Doctoral Program, 1995-1999.
- National Science Foundation continuing grant DMI-9424348 (with G. Cornuéjols), 1995-1998.
- National Science Foundation continuing grant DDM-9201340, (with G. Cornuéjols), 1992-1995.
- Office of Naval Research Contract No. N00014-12-1-0032 (with G. Cornuéjols and F. Margot, 2011-2014.

- Office of Naval Research Contract No. N00014-09-1-0133 (with G. Cornuéjols and F. Margot), 2008-2011.
- Office of Naval Research Contract No. N00014-03-1-0133 (with G. Cornuéjols and F. Margot), 2006-2008.
- Office of Naval Research Contract No. N00014-03-1-0133 (with G. Cornuéjols and G.L. Thompson), 2003-2005.
- Office of Naval Research contract No. N00014-97-1-0196 (with G. Cornuéjols and G. Thompson), 1997-2002.
- Office of Naval Research Contract No. N00014-89-J-1063 (with G. Cornuéjols and G.L. Thompson), 1995-1996.
- Office of Naval Research contract N00014-89-J-1063 (with G. Cornuéjols and G.L. Thompson), 1992-1994
- Air Force Office of Scientific Research grant AFOSR-91-0287 (with G. Cornuéjols and J. Hooker), 1990-1993
- National Science Foundation continuing grant DDM-8901495 (with G. Cornuéjols), 1989-1992
- Air Force Office of Scientific Research grant AFOSR-87-0292 (with G. Cornuéjols and J. Hooker), 1987-1990
- NATO International Research Grant 228/88 (with P. Toth), 1988-1990
- National Science Foundation continuing grant ECS-8601660 (with G. Cornuéjols), 1986-1989
- National Science Foundation grant ECS-8503192 (with G. Cornuéjols), 1985-1986
- National Science Foundation continuing grant ECS-8218181 (with N. Megiddo), 1983-1985
- National Science Foundation continuing grant ECS-8205425 (with G. Cornuéjols), 1982-1985
- National Science Foundation continuing grant ECS-7902506 (with G. Cornuéjols), 1979-1982
- National Science Foundation continuing grant MPS73-08534-A02, 1976-1979
- National Science Foundation continuing grant GP-37510X, 1973-1976
- National Science Foundation grant CP-31699, 1972
- Office of Naval Research annual contracts (with G.L. Thompson), 1968-1991
- Ford Distinguished Research Professor, Carnegie Mellon University, Pittsburgh, Pennsylvania, 1967-1968
- Research Fellow, International Computation Centre, Rome (Italy), 1966
- Listed in:
  - *Who's Who in the World*
  - *Who's Who in America*
  - *American Men and Women of Science*
  - *Current Contents, 30*, July 26, 1982, as a Citation Classic
  - *Contemporary Classics in Engineering and Applied Science*, 1986

## Consulting Activities

- CombineNet, Inc. (2003-2010)

- United States Steel (1992-1995), rolling mill scheduling.
- Sumitomo Metal Industries (1988-1991), rolling mill scheduling
- LTV Steel, (1985-1988), rolling mill scheduling
- Paine Webber (1986-1987), portfolio optimization
- American Airlines (1984-1986), crew scheduling
- Swiss National Railways, Zurich (1983), locomotive engineer scheduling
- N.S. Nederlandse Spoorwegen (The Dutch Railway Co.), Utrecht (1980-1981), modeling crew scheduling and related problems
- SOGESTA, Urbino (1977-1978), development of educational programs for systems analysts.
- Federal Energy Administration, Washington, D.C., full-time assignment as Visiting Operations Research Analyst, September 1-December 31, 1976. Developed a game-theoretic model for selecting the optimum overall size of the Strategic Petroleum Reserve. Activity renewed in 1978 as part-time consultant.
- International Institute of Technology, Tokyo (1975), educational programs for systems analysts
- Haverly Systems, New York (1972-1973), consultant for software development in the area of facility location, scheduling and other integer programming models
- Volvo A.G. (1971-1972), modeling the decision problems of a 10-year development plan for the Truck Manufacturing Division
- Belgian Productivity Center, Gent (1970-1971), visiting consultant on behalf of the Ford Foundation on projects concerning stock cutting, iron ore mining and other productivity-related problems
- Synergistic Systems, New York (1970-1971), consultant for developing a computer-based scheduling methodology for printing and binding operations.
- Control Data Corporation (1969-1970), consultant on software development in the area of 0-1 programming
- Weyerhaeuser (1970), Esso Mathematics and Systems (1969), IBM New York Scientific Center (1968), consultant on modeling and implementation problems
- The Institute of Energy Research, Bucharest, Romania (1963-1965), technical consultant for a development study of the Romanian Electric Power Industry.

## Area of Specialization and Current Interests

- On the theoretical/research side: mathematical programming, especially integer and nonconvex programming, disjunctive programming, combinatorial optimization, polyhedral theory, lift-and-project methods, algorithmic graph theory, network flows, large scale systems, location theory, scheduling, heuristic methods.
- On the modeling/applications side: the scheduling of industrial processes, crew scheduling, machine sequencing, manufacturing efficiency, location and distribution problems, communication satellites, robotics, portfolio optimization, energy studies.

**APPENDIX:** List of Publications

*Last updated: December 9, 2011*