

ABBREVIATED CV

DONALD G. SAARI

PROFESSIONAL ADDRESS:

Institute for Mathematical Behavioral Sciences (<http://www.imbs.uci.edu>)
SSPA 2119
University of California, Irvine
Irvine, CA 92697-5100
dsaari@uci.edu, <http://www.math.uci.edu/~dsaari>

POSITIONS:

Yale University

1967 – 68 Post-Doc, “Research Staff Astronomer,” Dept. of Astronomy

Northwestern University

1968 – 70 Assistant Professor, Mathematics
1970 – 74 Associate Professor, Mathematics
1974 – 2000 Professor, Mathematics
1974 – 2000 Member, Center for Mathematical Studies in Economics,
1976– 2000 Professor, Applied Mathematics & Engineering Science
1981 – 84 Chair, Department of Mathematics
1988 – 2000 Professor, Department of Economics
1995 – 2000 Arthur and Gladys Pancoe Professor of Mathematics,
Currently: Arthur and Gladys Pancoe Professor Emeritus of Mathematics

University of California, Irvine

2000 – Distinguished Professor

- Department of Economics
- Department of Mathematics
- Professor (Courtesy Appt.) Dept. of Logic and Philosophy of Science
- Member, Institute for Mathematical Behavioral Sciences

2004– Member, Center for Democratic Studies
2002- 2005 Director, UCI Center for Decision Analysis
2003 - Director, Institute for Mathematical Behavioral Sciences

Selective List of Honors

- **Honorary Societies and Fellows**

- United States**

- 2001, US National Academy of Sciences
 - 2004, Fellow, American Academy of Arts and Sciences
 - 2001, Fellow, American Association for the Advancement of Science
 - 1988–89, Guggenheim Fellow

- Foreign Member**

- 2009, Finnish Academy of Science and Letters (Suomalainen Tiedeakatemia)

- Society Fellow**

- 2009, Fellow, Society of Industrial and Applied Mathematics (SIAM's inaugural class of fellows)
 - 2011, Fellow, Society for Advancement of Economic Theory (SAET's inaugural class of fellows)

- **Honorary Doctorates**

- 1989, Doctorat Honoris Causa, Purdue University (Applied Mathematics and Economics)
 - 1998, Doctorat Honoris Causa, (Economics) Université de Caen, Caen, France
 - 1999, Doctorat Honoris Causa, (Mathematics) Michigan Technological University
 - 2009, Doctorat Honoris Causa, University of Turku, Turku, Finland

- **Honorary Professorships, etc**

- 1995, Concurrent Professorship; Nanjing University, Nanjing, China.
 - 1994, Honorary Prof., Mathematics, MTU
 - 1995, Member, Academy of Arts and Sciences; Michigan Technological University
 - 1995, Charles Taft Lecturer. University of Cincinnati,
 - 1997, Lansdowne Chair: University of Victoria, Canada
 - 2002, Purdue University, “Outstanding Alumnus” award
 - 2002, Pacific Institute of Mathematical Sciences Distinguished Chair

- **Selective Professional Recognition**

- University of California, Irvine**

- 2005, UCI Distinguished Faculty Award for Research
 - 2011, Daniel G. Aldrich, Jr. Distinguished University Service Award

- Societies**

- 1985, Lester R. Ford Award; Math. Assoc. of Amer.
 - 1991, Duncan Black Research Award; Public Choice Society
 - 1995, Chauvenet Prize; Math. Assoc. of Amer.
 - 1999, Allendoerfer Award; Math. Assoc. of Amer.

Others

- 1999, Week long International conference on Dynamical Systems held at Northwestern University in my honor / December
- 2002, Nanjing University, China, “Garden of Scientists” Tree planted in honor of my research contributions
- 2002, *Celestial Mechanics: Dedicated to Donald Saari* Book published in Contemporary Mathematics (292) series by AMS
- 2005, “Saarifest,” a week long International conference on Economics and Celestial Mechanics held in my honor at CIMAT, Guanajuato, Mexico / April 2005
- 2006, Laureate, *Theta Tau* (Professional Engineering Fraternity) National Hall of Fame
- 2008, December issue of “*Discrete and Continuous Dynamical Systems*” dedicated to me in honor of my contributions to dynamics and celestial mechanics over 40 yrs

- **Teaching, students**

Northwestern University

- 1978, College of Arts and Sciences Outstanding Teaching Award
- 1989, Alpha Lamda Delta Honor Society Outstanding Teacher Award
- 1990, Sigma Phi Epsilon, Outstanding NU Professor Award
- 1990, College of Arts and Sciences Outstanding Teaching Award
- 1993, Mortar Board, Faculty Honor Roll, Outstanding Recognition
- 1998 and 1999, “Most Influential Professor” award

University of California, Irvine

- 2011, “Outstanding Contributions to Undergraduate Education” award; School of Physical Sciences

Science Boards (Since 2000)

- 2003 - 07, NSF Mathematical Sciences Research Institute (MSRI), Berkeley, Board of Trustees
 - 2004 - 07, Chair
- 2005 - 09, Pacific Institute for Mathematical Sciences (Vancouver, BC), Scientific Review Panel
- 2007 - 12, Scientific Advisory Board, Academy of Finland, Public Choice Research Centre
- 2008 - 14, Scientific Board, Santa Fe Institute
- 2010 - 13, Scientific Board, ICERM, NSF Math Research Institute, Brown University
- 2011 - 13, Scientific Advisory Board, CREATE, USC

Selective NRC Committees

- 2007 - 15, Board on Mathematical Sciences and their Applications,
– Chair, 2012 – 15
- 2011-12, Committee for the Assessment of the U.S. Air Force's Astrodynamical Standards (Emphasis on tracking space debris)
- 2003 - 13, US National Committee for Inter. Instit. for Appl. Systems Analysis,
– Vice Chair 20010-13
- 2001 - 07, Mathematical Sciences Education Board
- 1997 - 2002, US National Committee for Mathematics,
– Vice-Chair, 1999-2000,
– Chair, 2000 - 02
- 2001 - 03, Board on International Scientific Organizations
- 2001 - 04, Committee evaluating US K-12 Math Education

Selective Editorial Positions

Chief Editor

- 1999 - 2005, Chief Editor, *Bulletin of American Math Society*
- 1981 - 86, Chief Editor, *SIAM Journal on Mathematical Analysis*

Assoc., Advisory Ed

- 1973 - 78, 86-88, Associate Editor, *SIAM Journal on Mathematical Analysis*
- 1972 - 85, 89-97, Associate Editor, *Celestial Mechanics & Dynamical Astronomy*
- 1997 - 2007, Assoc. Ed., *Social Choice & Welfare*
– 2008 – Advisory Editor
- 1999 - 2010, Assoc. Ed., *Qualitative Theory of Dynamical Systems*
- 1987 - 93, Ed. Board, *Journ Econ. Behav. & Organ.*
- 1990 - 2007, Assoc. Editor, *Economic Theory*
– 2007 –, Advisory Board
- 2000 - 08, Assoc. Ed., *Positivity*

Publications

• Books

- (1) *Dynamics of Macrosystems* (edited with J.P. Aubin and K. Sigmund), Lecture Series in Economics and Math, 257, Springer Verlag, 1985.
- (2) *Hamiltonian Dynamical Systems*, (ed. with K. Meyer), Vol. 81, Contemporary Mathematics, AMS, Providence, 1988.
- (3) *Geometry of Voting*, Springer-Verlag, 1994.
- (4) *Basic Geometry of Voting*, Springer-Verlag, 1995.
- (5) *Hamiltonian Dynamics and Celestial Mechanics*, (with Z. Xia), Contemporary Mathematics, vol 198, AMS, Providence, 1996.
- (6) *Decisions and Elections; Explaining the Unexpected*; Cambridge University Press, 2001.

- (7) *Chaotic Elections! A Mathematician Looks at Voting*, American Math Society, 2001.
- (8) *The Way it Was: Mathematics From the Early Years of the Bulletin*, American Math Society, 2003.
- (9) *Collisions, Rings, and Other Newtonian N-Body Problems*, American Math Society, Providence RI, 2005. (The Russian translation of this book, by the Russian Scientific Publishing Center, R&C Dynamics, appeared in 2009.)
- (10) *Disposing Dictators; Demystifying Voting Paradoxes*, Cambridge University Press, 2008.

- **NRC Reports**

- (1) *On Evaluating Curricular Effectiveness: Judging the Quality of K-12 Mathematics Evaluations*, (Jointly authored), NRC report, National Academy Press, Oct. 2004.
- (2) *Continuing Kepler's Quest – Assessing Air Force Space Command's Astrodynamics Standards*, (Jointly authored), NRC report, National Academy Press, 2012.

- **Papers**, I have published approximately 190 papers on topics ranging from dynamical systems, celestial mechanics, mathematical economics, decision analysis (in engineering and elsewhere) and voting theory. A selection of recent papers follows:
 - ‘Ranking wheels’ and decision cycles, *Homo Oeconomicus*, **28** 2011, 233-263.
 - Source of complexity in the social and managerial sciences: An extended Sen’s Theorem. *Social Choice & Welfare*, **37** 2011, 609-620.
 - (With A. Bargagliotti) Explaining Paradoxes in Nonparametric Statistics, *International Encyclopedia of Statistical Sciences*, ed. M. Lovric, Springer, New York., 2011, Part 5, 482-486.
 - (With A. Bargagliotti) Symmetry of Nonparametric Statistical Tests on Three Samples, *Journal of Mathematics and Statistics* **6** (4) 2010, pp 395-408.
 - Aggregation and multilevel design for systems: Finding guidelines, *Journal of Mechanical Design*, **132**, 081006-1 to 081006-9, (August) 2010.
 - (With H. Nurmi) Connections and Implications of the Ostrogorski Paradox for Spatial Voting Models, pp 31-56 in *Collective Decision Making: Views from Social Choice and Game Theory*, ed. A. Van Deemen and A. Rusinowska, Springer, 2010.
 - (With M. Merrifield) Telescope time without tears – A distributed approach to peer review. *Astronomy & Geophysics*, August, 2009.
 - Virial Theorem, Dark Matter, and N-Body Problems, *Exploring the Solar System and the Universe*, ed. V. Mioc, C. Dumitrache, N. Popescu, American Institute of Physics, 2008
 - Complexity and the Geometry of Voting, *Mathematical and Computer Modeling* **48** (2008), 1335-1356.
 - Mathematics and Voting, *Notices of the AMS*, **55** (April 2008), 448-455.

- (With G. Asay) Finessing a point; augmenting the core; *Social Choice & Welfare*, 2009.
 - Condorcet domains; A geometric perspective; IMBS Discussion papers, 2007, in *The Mathematics of Preference, Choice, and Order*: ed. W. Gehrlein, S. Brams, and R. Roberts, Springer.
 - (With J. Kronewetter) From Decision Problems to Dethroned Dictators, *Journal of Mathematical Economics* (Online 1/2007), **44** (2008), 745-761.
 - (With L. Li) Sen’s Theorem: Geometric Proof and New Interpretations, *Social Choice & Welfare*, 2008.
 - Which is better: the Condorcet or Borda winner?, *Social Choice & Welfare*, **26** (1) (2006), 107-130.
 - The Profile Structure for Luce’s Choice Axiom, *Journal Mathematical Psychology* **49** (2005), 226-253.
 - (With A. Petron) Negative Externalities and Sen’s Liberalism Theorem, *Economic Theory* **28** (June, 2006), 265-281.
 - A toolkit for voting theory, in *Handbook of Political Economy*, pp. 318-342, D. Wittman and B. Weingast, Oxford University Press, 2006.
 - (with K. Sieberg), Are part wise comparisons reliable? *Research in Engineering Design* **15** (2004), 62-71.
- **Invited Talks:** Since 1980, I have given over 800 invited talks. A selective list of recent ones (since Jan. 2008) follow:
- Physical Sciences, Breakfast Lecture Series (public lecture), UCI / May 2012, “From Dark Matter to the Evolution of the Universe”
 - Math Across Campus (university public lecture), University of Washington, Seattle / May 2012, “We vote, but do we elect whom we really want?”
 - Inaugural “Koh Lecture” (university public lecture) North Carolina State University / April 2012, “Mathematics and the mystery of dark matter”
 - PACM colloquium, Princeton University / October 2011, “Complexity theory applied to voting theory”
 - Math Assoc. of America, Fall Meeting, So Cal - Nevada Sect. CSU LA Oct. 2011, Plenary talk, “Mathematics and the mystery of “dark matter.”
 - Conference: “Security in the Age of Systemic Risk,” IIASA, Vienna / June 2011, “Mechanism design and international relations”
 - Colloquium, Physics, University of Vienna / June 2011, “Dark matter; is it really a problem?”
 - RAMiCA (Relational Algebraic Methods in Computer Applications), Rotterdam / May 2011
 - (1) “Mysteries involving paired comparisons,” Invited lecture
 - (2) “Explaining Voting Paradoxes; including Arrow’s and Sen’s Theorems”
Invited Tutorial
 - Conference: “Hamiltonian Systems 2010,” Mexico City, Mexico / December 2010, “Dark matter and the Newtonian N-body problem”

- “Dr. Karen Ames Memorial Lecture Series on Applied Mathematics,” University of Alabama, Huntsville, / Oct. 2010, “Voting; that is *real* chaos.”
- Colloquium, Economics, Zhejiang University, Hangzhou, China / Sept. 2010, “Complexity in Economics and the Social Sciences is related to complexity in engineering”
- Colloquium, Economics, Shanghai University of Finance and Economics, China / Sept. 2010, “The inherent complexity of economics and the social sciences”
- American Institute of Mathematics, Palo Alto, CA, / August 2010, “Mathematical structure of group decision rules.”
- Conference: “Public Choice” University of Turku, Turku, Finland / June 2010, “The source of problems in spatial voting”
- Conference: “Institutions in Context”, University of Tampere, Tampere, Finland / May 2010, “Understanding institutions via voting theory”
- Karl Menger Distinguished Lecturer (Fourth Annual), IIT, Chicago, / April 2010, “Arrow’s Theorem: What does it really mean and how does it affect *all* academic disciplines?”
- Colloquium, Economics, Shanghai University of Finance and Economics, China / July 2009; “The challenge of finding appropriate dynamics for the social sciences”
- Colloquium, Mathematics, Peking University, Beijing, China / July 2009, “Searching for appropriate dynamics for the social sciences”
- International Workshop, “New approaches to voting and social choice” Tilberg University, Holland / May, 2009:
 - (1) “Explaining all possible positional and pair wise voting inconsistencies and paradoxes ”
 - (2) “Extending Arrow’s Theorem to — just about everything!”
- New Developments in Social Choice and Welfare Theories, Caen, France June 2009; “New ways to examine voting in spatial settings.”
- International Year of Astronomy IYA 2009 90th anniversary of IAU) event, (IAU, IMU), Madrid, Spain, Nov. 2009, Conference “Mathematics and Astronomy: A Joint Long Journey,” “Mathematics and new insights into dark matter.”
- Colloquium, Political Science, University of Turku, Finland / May 2009: Two talks;
 - (1) “Finesse point as a solution concept in spatial voting”,
 - (2) “A qualitative approach toward evolutionary game theory”
- Five lectures, Central University of Finance and Economics, Beijing, China / July 2009;
 - (1) “Reinterpreting Arrow’s Theorem with extensions to almost everything”,
 - (2) “From Sen’s Theorem to game theory and voting paradoxes”,
 - (3) “Voting theory via symmetry constructions”,
 - (4) “Understanding psychological behavior via mathematics”,
 - (5) “Price dynamics and price mechanisms”.

- Annual Conference, California Mathematics Council Community Colleges / March 2009, Keynote Presentation “We vote, we make decisions; so why can the outcomes be so bad?”
- Arnold Family Lecture Series (public lecture), NSF Institute for Mathematics and its Applications, U. of Minnesota / Sept. 2009, “Chaotic elections! Why do we not elect whom we really want?”
- Colloquium, New Mexico State University, Math / April 2009 “Mathematics of Dark Matter”
- Iowa State University, Feb. 2009
 - (1) Miller Distinguished Lecture (university lecture), “We vote, we decide; but why can we get bad outcomes?”
 - (2) Colloquium, Mathematics, “The evolution of the universe”
- Invited lecture for conference on “Exploring the Solar System and the Universe,” Centennial celebration of Bucharest Observatory, Romania / April 2008, “Reflections on my conjecture and several new ones”
- Conference on “Games and Social Choice” GATE, Lyon France / September 2008; “Social choice, and its connection to alcoholism, engineering and nanotechnology.”
- *Graz Schumpeter Lectures 2008*, Schumpeter Society, Graz, Austria / May, June 2008. Four lectures under the title “The incredible complexity of the social sciences”;
 - (1) “We vote, but do we elect whom we really want?”,
 - (2) “Why is it that no matter how hard we try, somebody can propose an “improvement”?”,
 - (3) . “The surprising complexity of economics”,
 - (4) “The responsibility of the social sciences to assist the engineering and physical sciences”.
- Colloquium, Economics, University of Graz, Austria / May 2008, “Qualitative dynamics in economics and the social sciences.”
- Joint Mathematics Meetings, San Diego / Jan. 08,
 - (1) AMS plenary talk “A new mathematical frontier: The social and behavioral sciences”
 - (2) Invited MAA minicourse “Mathematics of Voting” 4 hrs.
- SUMS, Brown University / March 2008, Plenary talk “Mathematics of Voting”
- Workshop on microeconomics dynamics, Cal Tech / May 2008, “A qualitative approach toward the dynamics of the social and behavioral sciences”
- NIAAA conference, “Mechanisms of Behavior Change in Behavioral Treatment: Today and Tomorrow,” Washington, DC, / June 2008; “Relaxing barriers for understanding behavioral change”
- Mathfest (Math Assoc of Amer. National meeting) Madison, WI / July 2008,
 - (1) Plenary talk “The Chaotic Evolution of Newton’s Universe”
 - (2) Invited hour talk, Short Course “A qualitative approach to evolutionary game theory”

- (3) Mathfest, Madison, WI, Invited MAA Minicourse (4 hours) “Mathematics and the Geometry of Voting”
- Joint Colloquium Stanford, Dec. 2008 “Mathematics of voting and social choice; along with implications”
- Santa Fe Institute’s Business Network and Board of Trustees’ Symposium, Nov. 2008, Invited talk. “The challenge of complexity – from the perspective of a mathematician”
- “Scope Academy Distinguished Lecture” (Public lecture), Raleigh, NC / Oct. 2008, “Chaotic Elections! A Mathematician Looks at Voting”
- Distinctive Voices, NAS lecture series; Woods Hole, Mass, / October 2008. “Chaotic Elections! A Mathematician Looks at Voting”