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Curriculum Vitae

Peter J. Olver
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Summary:

Peter J. Olver received his Ph.D. from Harvard University in 1976 under the guidance of Prof. Garrett Birkhoff. After being a Dickson Instructor at the University of Chicago and a postdoc at the University of Oxford, he has been on the faculty of the School of Mathematics at the University of Minnesota since 1980, and a full professor since 1985. He served as the Head of the Department from 2008 to 2020. He has supervised 23 Ph.D. students to date, as well as mentoring 30 postdocs and visiting students and scholars from around the world. He has also supervised over 25 undergraduate and high school research projects, many of which have led to publications. He is a Fellow of the American Mathematical Society, the Society for Industrial and Applied Mathematics (SIAM), the Institute of Physics, UK, and the Asia-Pacific Artificial Intelligence Association (AAIA).

His research interests revolve around the applications of symmetry and Lie groups to differential equations. Over the years, he has contributed to a wide range of fields, including partial differential equations, the calculus of variations, mathematical physics, fluid mechanics, elasticity, quantum mechanics, Hamiltonian mechanics, geometric numerical methods, differential geometry, classical invariant theory, algebra, computer vision and image processing, anthropology, and beyond.

Since 1976, he has given more than 500 invited lectures on his research at conferences, universities, colleges, and institutes throughout the world. He is the author of over 160 papers in refereed journals, and over 50 in conference proceedings. He was named a "Highly Cited Researcher" by Thomson-ISI in 2003. To date, he has written 5 books, including the definitive text on Applications of Lie Groups to Differential Equations, which was published in 1986, translated into Russian, and also republished in China. His most recent books are two undergraduate texts: Partial Differential Equations and the second edition of Applied Linear Algebra, the latter coauthored with his wife, Chehrzad Shakiban. He is currently finishing another undergraduate text, coauthored with Jeff Calder, entitled Linear Algebra, Data Science, and Machine Learning.

Personal Data:

Born: January 11, 1952 Twickenham, Middlesex, England

Emigrated to U.S.A.: June, 1961

Became Naturalized U.S. Citizen: 1967

Married: Chehrzad Shakiban, June, 1976

Children: Parizad, 1979, Sheehan, 1983, Noreen, 1989

Grandchildren: Tolemei, 2013, Avianna, 2015, Colette, 2016, Fabian, 2018, Elodie, 2020

Educational Data:

Sc.B. 1973 Brown University
Applied Mathematics
Magna Cum Laude With Honors

Ph.D. 1976 Harvard University
Mathematics
Thesis Advisor: Garrett Birkhoff

Professional Experience:

L.E. Dickson Instructor in Mathematics, University of Chicago, 1976–78

British Science Research Council Grant, University of Oxford, England, 1978–80

Assistant Professor, School of Mathematics, University of Minnesota, 1980–82

Associate Professor, School of Mathematics, University of Minnesota, 1983–84

Professor, School of Mathematics, University of Minnesota, 1985–

Professor, Department of Mathematics, University of Maryland, 1992–93

Member of Graduate Faculty, Control Science & Dynamical Systems, University of
Minnesota, 2001–2015

Head of Department, School of Mathematics, University of Minnesota, 2008–2020

Ph.D. Students:

1989 Petri Juha Pohjanpelto, “Symmetries of Maxwell’s Equations”

1989 David Barton Cooke, “Hamiltonian Systems of Evolution Equations”

1989 Jeffrey Robert Ondich, “Partially Invariant Solutions of Differential Equations”

1992 Philip Wendell Doyle, “Hydrodynamic Poisson Bivectors and Quasilinear Systems in
One Space Variable”

1993 Ayse Humeyra Bilge, “Construction of Recursion Operators for Scalar Evolution
Equations”

- 1993 Rui António Loja Fernandes, “Completely Integrable Bi–Hamiltonian Systems”
- 1994 Gary Alan Hatfield, “Conservation Laws in Anisotropic Elasticity”
- 1994 Roberto Murillo, “Cartan’s Equivalence Method and an Application to Second Order Evolution Equations”
- 1998 David Andrew Richter, “Semisimple Lie algebras of Differential Operators”
- 1999 Steven Haker, “Geometric PDE’s in Computer Vision”
- 1999 Mikhail Vassilievich Foursov, “On Integrable Evolution Equations in Commutative And Noncommutative Variables”
- 2000 Irina A. Kogan, “Inductive Approach to Cartan’s Moving Frame Method with Applications to Classical Invariant Theory”
- 2001 Mireille Boutin, “On Invariants of Lie Group Actions and their Application to Some Equivalence Problems”
- 2002 Vladimir Itskov, “Orbit Reduction of Exterior Differential Systems”
- 2005 Jeongoo Cheh, “Symmetry Pseudogroups of Differential Equations”
- 2006 Pilwon Kim, “Invariantization of Numerical Schemes for Differential Equations Using Moving Frames”
- 2009 Francis Valiquette, “Applications of Moving Frames to Lie Pseudo-Groups”
- 2009 Joseph Patrick Kenney, “Evolution of Differential Invariant Signatures and Applications to Shape Recognition”
- 2013 Robert Thompson, “Applications of Moving Frames to Group Foliation of Differential Equations”
- 2014 Joseph Jonathan Benson, “Integrable Planar Curve Flows and the Vortex Membrane Flow in Euclidean 4-Space Using Moving Frames and the Variational Bicomplex”
- 2016 Jessica Louise Senou, “Weighted Differential Invariant Signatures and Applications to Shape Recognition”
- 2017 Örn Arnaldsson, “Involutive Moving Frames”
- 2019 James Robert Patrick Broomfield, “Invariant Euler-Lagrange Equations for Variational Problems Defined over Framed Curves in Two and Three Dimensions”

Masters' Students:

- 1986 Mehrdad Rafiei
- 2022 Ted Paul Loch-Temzelides, “On Fixed Points of Locally and Pointwise Contractive Set-Valued Maps”

Visiting Graduate Student Advisor:

2009 – 10 Li Wei Dalian University of Technology, China

2011	Alberto Cogliati	Università degli Studi di Milano, Italy
2012	Reza Aghayan	Kingston University, London, UK
2014 – 15	Gülden Gün Polat	Istanbul Technical University, Turkey
2016, 17	Adrian Ruiz Servan	Universidad de Cádiz, Spain
2016	Markus Dafinger	University of Oldenburg, Germany
2017	Cláudio Basquerotto	Universidade Estadual Paulista, Brazil

Postdoctoral and Visiting Scholar Mentor:

1984 – 86	John Verosky	Visiting Assistant Professor, Tulane University
1985 – 88	Artemio González-López	Fulbright Postdoctoral Fellowship
1989	Peter J. Vassiliou	Postdoctoral Fellowship, Canberra College of Education, Australia
1994 – 95	Rafael H. Heredero	Ayuda Posdoctoral Fellowship, Spain
1995 – 97	Mark Fels	NSERC Postdoctoral Fellowship, Canada
1995 – 98	Yi A. Li	Dunham Jackson Assistant Professor
1996 – 97	Robert Milson	NSERC Postdoctoral Fellowship, Canada
1998 – 99	Jing Ping Wang	NWO Postdoctoral Fellowship, Holland
1999	Enrique Reyes	NSERC Postdoctoral Fellowship, Canada
2000 – 04	Jamylle Carter	IMA Postdoc
2001	Concepción Muriel Patino	Postdoctoral Fellowship, Spain
2003	Saadet Ozer	Postdoctoral Fellowship, Turkey
2004	Teoman Ozer	Postdoctoral Fellowship, Turkey
2006 – 07	José Martins	Postdoctoral Fellowship, Brazil
2010 – 11	Ruoxia Yao	Visiting Scholar, China
2010 – 11	Oscar Fernandez	IMA Postdoc
2014 – 15	Jing Kang	Visiting Scholar, China
2015 – 17	Rohit Gupta	IMA Postdoc
2015 – 19	Natalie Sheils	Department and IMA Postdoc
2017	Ibrar Hussain	Visiting Scholar, National University of Sciences and Technology, Islamabad, Pakistan
2017 – 19	Stuart Rogers	IMA Industrial Postdoc
2018 – 19	Yun Yang	Visiting Professor, Northeastern University, Shenyang, China

2019 Jiang Liu Visiting Professor, University of Shanghai for
Science and Technology, China

Undergraduate Student Research Projects: * means publication(s), ** is coauthored

2005 – 08	Derek Dalle *	Invariant numerical approximations
2007 – 08	Daniel Ojalvo	Object recognition in digital images
2007 – 09	Daniel Brinkman **	Invariant histograms and object recognition
2008 – 11	Daniel Hoff **	Signatures and jigsaw puzzle assembly
2010	Ellen Rice (Harvard), Laura Maki (Winona State University)	Invariant histograms
2010 – 11	Cody Youmans	Pixel-based object recognition
2010 – 12	Madeleine Kotzagiannidis *	Invariant histograms
2011 – 13	Gong Chen **	Dispersive quantization of linear and nonlinear waves
2012	Finsen Hadiwikarsa	Spline interpolation
2012 – 13	Jeremiah Peterson, Jeremy Anthony	Signature flows
2013 – 14	Roland Welter *	Dispersive quantization and numerics
2014 – 15	Yuxuan Chen *	Dispersive quantization
2014 – 15	Anna Grim (St. Thomas)**, Ryan Slechta (St. Thomas)**	3D jigsaw puzzle assembly
2016	Rajendra Beekie	Dispersive quantization in Fermi-Pasta-Ulam chains
2016 – 22	Pedro Angulo-Umana **, Jacob Elafandi, Bo Hessburg **, Riley O'Neill (St. Thomas)**, Jacob Theis (St. Thomas), Alexander Terwilliger **, David Floeder, Thomas Huffstutler **, Meredith Shipp, Jiafeng Li, Paige Cody **	Geometric analysis and reassembly of bone fragments in anthropology
2022	Grace Bergeron (Wayzata High School)	Refitting surfaces using gradient descent
2022	Carolyne Foster	Refitting surfaces using gradient descent
2024	Max Meyer	Models for erosion of broken bone fragments
2024 – 25	Dinh-Quan Tran	Dispersive quantization of Schrödinger equation with piecewise continuous potential
2024 – 25	Angad Handa (PSEO; Lakeville North High School)	Erosion of anthropological and archaeological objects using the spherical volume invariant

Publications:

244 papers written to date

167 have appeared or will appear in major refereed journals

51 have appeared in conference proceedings

7 have appeared as appendices and chapters in books

Books:

Olver, P.J., *Applications of Lie Groups to Differential Equations*, Graduate Texts in Mathematics, vol. 107, Springer-Verlag, New York, 1986.

Olver, P., *Prilozheniya grupp Lie k differentsial'nim upavneniyam*, Mir publishers, Moscow, 1989. (Russian language translation of [1], I.G. Shcherbak and A.B. Shabat, translators.)

Olver, P.J., *Applications of Lie Groups to Differential Equations*, Second Edition, Graduate Texts in Mathematics, vol. 107, Springer-Verlag, New York, 1993.

Olver, P.J., *Equivalence, Invariants, and Symmetry*, Cambridge University Press, Cambridge, 1995.

Olver, P.J., *Classical Invariant Theory*, London Math. Soc. Student Texts, vol. 44, Cambridge University Press, Cambridge, 1999.

Olver, P.J., and Shakiban, C., *Applied Linear Algebra*, Prentice-Hall, Inc., Upper Saddle River, N.J., 2006.

Olver, P.J., and Shakiban, C., *Student's Solutions Manual for Applied Linear Algebra*, Prentice-Hall, Inc., Upper Saddle River, N.J., 2006.

Olver, P.J., and Shakiban, C., *Instructor's Solutions Manual for Applied Linear Algebra*, Prentice-Hall, Inc., Upper Saddle River, N.J., 2006.

Olver, P.J., *Introduction to Partial Differential Equations*, Undergraduate Texts in Mathematics, Springer-Verlag, New York, 2014.

Olver, P.J., *Selected Solutions Manual for Introduction to Partial Differential Equations*, Springer, New York, 2014.

Olver, P.J., and Shakiban, C., *Applied Linear Algebra*, Second edition, Springer, New York, 2018.

Olver, P.J., and Shakiban, C., *Selected Solutions Manual for Applied Linear Algebra*, Springer, New York, 2018.

Calder, J., and Olver, P.J., *Linear Algebra, Data Science, and Machine Learning*, Springer, New York, to appear.

Edited Proceedings:

Olver, P.J., and Sattinger, D., eds., *Solitons in Physics, Mathematics, and Nonlinear Optics*, IMA Volumes in Mathematics and its Applications, vol. 25, Springer-Verlag, New York, 1990.

- Kamran, N., and Olver, P.J., eds., *Lie Algebras, Cohomology, and New Applications to Quantum Mechanics*, Contemporary Mathematics, vol. 160, American Mathematical Society, Providence, R.I., 1994.
- Ma, W.-X., Olver, P.J., Yan, M., Hu, J., eds., *Recent Advances in Integrable Systems*, Journal of Nonlinear Mathematical Physics, vol. 9 Supplement, Lulea University of Technology, Sweden, 2002.
- Olver, P.J., and Tannenbaum, A., eds., *Mathematical Methods in Computer Vision*, IMA Volumes in Mathematics and its Applications, Springer-Verlag, New York, 2003.
- Cucker, F., DeVore, R., Olver, P.J., Süli, E., eds., *Foundations of Computational Mathematics, Minneapolis 2002*, London Math. Soc. Lecture Note Series, vol. 312, Cambridge University Press, Cambridge, 2004
- Li, H., Olver, P.J., and Sommer, G., eds., *Computer Algebra and Geometric Algebra with Applications*, Lecture Notes in Computer Science, Springer-Verlag, vol. 3519, Springer-Verlag, New York, 2005.
- Winternitz, P., Gomez-Ullate, D., Iserles, A., Levi, D., Olver, P.J., Quispel, R., and Tempesta, P., eds., *Group Theory and Numerical Analysis*, CRM Proceedings & Lecture Notes, vol. 39, American Mathematical Society, Providence, R.I., 2005.
- Levi, D., Olver, P., Thomova, Z., and Winternitz, P., eds., *Symmetries and Integrability of Difference Equations*, Journal of Physics A, vol. 42, no. 45, IOP Publishing, Bristol, UK, 2009.
- Levi, D., Olver, P., Thomova, Z., and Winternitz, P., eds., *Symmetries and Integrability of Difference Equations*, London Math. Soc. Lecture Note Series, vol. 381, Cambridge University Press, Cambridge, 2011.
- Kalnins, E., Kamran, N., Olver, P., and Winternitz, P., eds., *Symmetry, Separation, Superintegrability and Special Functions (S^4)*, Special Issue, Symmetry, Integrability and Geometry: Methods and Applications (SIGMA), 2011.
- Acosta-Humánez, P.B., Finkel, F., Kamran, N., and Olver, P.J., eds., *Lie Algebraic Aspects of Darboux Transformations, Quantum Integrable Systems and Supersymmetric Quantum Mechanics*, Contemporary Mathematics, vol. 563, American Mathematical Society, Providence, R.I., 2012.
- Kac, V., Olver, P.J., Winternitz, P., Özer, T., eds., *Symmetries, Differential Equations and Applications*, Springer Proceedings in Mathematics & Statistics, Springer-Verlag, New York, 2018.

Honors:

Distinguished Lecturer, Los Alamos National Laboratory and University of New Mexico, April, 1991.

Invited Hour Speaker, Meeting of the American Mathematical Society, Springfield, MO, March, 1992.

London Mathematical Society Invited Lecturer, University of Bath, United Kingdom, April, 1992.

Australian Research Council Visiting Researcher, University of Sydney, Australia, October, 1992.

Plenary Speaker, Summer Meeting of the Canadian Mathematical Society, University of Alberta, Edmonton, Canada, June, 1994.

Course Lecturer, European School of Group Theory, Valladolid, Spain, July 17–29, 1995.

Plenary Speaker, XXI International Colloquium on Group Theoretical Methods in Physics, Goslar, Germany, July, 1996.

Erskine Fellow, University of Canterbury, Christchurch, New Zealand, 1997.

Invited Long Term Visitor, Program on Symbolic Computation in Geometry and Analysis, Mathematical Sciences Research Institute, Berkeley, August & September, 1998.

Plenary Speaker, Third Conference on Foundations of Computational Mathematics, Oxford, England, July, 1999.

Visiting Professor, EPFL (Swiss Federal Institute of Technology), Lausanne, Switzerland, January – June, 2002.

Plenary Speaker, International Symposium on Symbolic and Algebraic Computation (ISSAC), Lille, France, July, 2002

Course Lecturer, Fields Institute Special Meeting on Symbolic and Numeric Computation in Geometry, Algebra and Analysis, University of Western Ontario, London, Ontario, Canada, July, 2002.

Course Lecturer, Summer School in Geometric Integration, Fevik, Norway, August, 2002.

Named “Highly Cited Researcher” by Thomson – ISI, 2003.

Plenary Lecturer, Fifth International Conference on Geometry, Integrability and Quantization, Varna, Bulgaria, June, 2003.

Plenary Speaker, 6th International Workshop on Mathematics Mechanization, Shanghai, and Mathematics Mechanization Key Laboratory, Beijing, China, May, 2004.

Plenary Speaker, Joint Canadian Math Society and Canadian Applied and Industrial Mathematics Society, Halifax, Canada, June, 2004.

Plenary Speaker, Ninth Meeting on Computer Algebra and Applications, Santander, Spain, July, 2004.

Elected Fellow of the Institute of Physics, UK, 2004.

Plenary Speaker, Red Raider Symposium, Texas Tech University, Lubbock, TX, November, 2004.

Member of EPSRC Review College, UK, 2006–09.

Course Lecturer, 12th International Summer School in Global Analysis and Applications, Comenius University, Bratislava, Slovakia, August, 2007.

Plenary Speaker, 10th International Conference on Differential Geometry and Its Applications, Olomouc, Czech Republic, August, 2007.

Course Lecturer, Summer School in Mathematical Physics, Ravello, Italy, September, 2007.

Course Lecturer, Séminaire de Mathématiques Supérieures, Université de Montréal, Canada, June, 2008.

Course Lecturer, XVIII International Fall Workshop on Geometry and Physics, Benasque Center for Physics, Spain, September, 2009.

A conference in honor of my 60th birthday, "Symmetries of Differential Equations: Frames, Invariants and Applications", was held at the University of Minnesota, May, 2012. A special issue of the online journal *Symmetry, Integrability and Geometry: Methods and Applications* (SIGMA) in my honor, entitled "Symmetries of Differential Equations: Frames, Invariants and Applications", has been published.

Plenary Speaker, XIV International Conference on Geometry, Integrability and Quantization, Varna, Bulgaria, June, 2012.

Fellow of the American Mathematical Society, September, 2012.

Course Lecturer, African Mathematical School, University of Abomey–Calavi, Cotonou, Benin, October–November, 2012.

A special issue of the Springer journal *Foundations of Computational Mathematics*, vol. 13, issue 4, was published in my honor.

Keynote Speaker, 5th International Conference on Nonlinear Mathematical Physics and 12th National Conference on Integrable Systems, Hangzhou, China, August, 2013.

Public Lecture, Texas Tech University, January, 2014

Fellow of the Society for Industrial and Applied Mathematics (SIAM) "for developing new geometric methods for differential equations leading to applications in fluid mechanics, elasticity, quantum mechanics, and image processing", April, 2014.

Tenth Distinguished Lecture Series in Mathematics, Georgia Southern University, April, 2014.

Boeing Distinguished Colloquium Speaker, University of Washington, May, 2014.

Course Lecturer, Nordfjordeid Summer School, Lie Groups and Pseudogroups Actions: from Classical to Differential Invariants, Sophus Lie Conference Center, Nordfjordeid, Norway, June, 2015.

Public Lecture on the Centenary of Noether's Theorem, Perimeter Institute for Theoretical Physics, Waterloo, Canada, June, 2015.

Course Lecturer, MOGRAN 18, Lie groups and Computation Method in Nonlinear Problems of Mathematical Modeling, Shenyang Aerospace University, China, August, 2015.

Plenary Speaker, Conference on Differential Equations and Applications, Lahore University of Management Sciences, Pakistan, May, 2016.

Plenary Speaker, 22nd International Symposium on Mathematical Theory of Networks and Systems, University of Minnesota, July 2016.

Plenary Speaker, WAVES 2017, The 13th International Conference on Mathematical and Numerical Aspects of Wave Propagation, University of Minnesota, May, 2017

Course Lecturer, International Summer School on Geometry, Mechanics and Control, Instituto de Ciencias Matemáticas, Madrid, Spain, July, 2017.

Plenary Speaker, 3rd International Conference on Symmetries, Differential Equations and Applications, Istanbul, Turkey, August, 2017.

Public lecture at the Royal Academy of Sciences, Madrid, Spain, September, 2017, accompanied by article in *La Razon*.

Outstanding Reviewer Award, *Journal of Physics A: Mathematical and Theoretical*, 2017.

Founding member, AMAAZE (Anthropological and Mathematical Analysis of Archaeological and Zooarchaeological Evidence) <https://amaaze.umn.edu>, 2019–

Plenary Speaker, International Workshop on Applications of Moving Frames to Equations and Geometry, organized in recognition of the 20th anniversary of the new equivariant moving frame formulation introduced in my 1999 paper with M. Fels, Northeastern University, Shenyang, China, May, 2019.

Distinguished Atiyah Lecture, CAMS@20, Centre for Advanced Mathematical Sciences, American University of Beirut, Lebanon, November, 2019.

Distinguished Speaker Series, University of Alabama in Huntsville, February, 2020.

The books *Introduction to Partial Differential Equations* and *Applied Linear Algebra* (the latter coauthored with Chehrzad Shakiban) were selected as among the “500 essential textbooks” for Springer's COVID-19 textbook access initiative in Spring, 2020.

Plenary Speaker, Conference on Geometry of Curves in Time Series and Shape Analysis, Max Planck Institute for Mathematics in the Sciences, Leipzig, Germany (online), August 11-14, 2020.

Course Lecturer, Groups, invariants, and moving frames, Winter School & Workshop, Wisla, Poland (online), “The theory and applications of moving frames”, February, 2021.

Course Lecturer, Differential Geometry and its Applications: Fluid Dynamics, Dispersive Systems, Image Processing, and Beyond, Winter School & Workshop, Wisla, Poland (online), “Fractalization and quantization in dispersive systems” (2 lectures), “Symmetry, invariance, and equivalence in image processing” (2 lectures), January, 2022.

A conference in celebration of my 70th birthday, "Symmetries, Invariants and their Applications", will held at Dalhousie University, Halifax, Canada, August 3–5, 2022.

Series of invited lectures in the UK funded by a London Mathematical Society Scheme 2 grant, April, 2023

The Alfred T. Brauer Lecturer at the University of North Carolina, February 27–29, 2024.

Named an inaugural "Highly Ranked Scholar" by ScholarGPS, 2024.

Fellow of Asia-Pacific Artificial Intelligence Association (AAIA), 2024.

Research Grants:

- 1976–78 National Science Foundation (with J. Douglas)
- 1978–80 British Science Research Council (with T.B. Benjamin)
- 1981–82 National Science Foundation MCS 81–00786
- 1983–85 National Science Foundation MCS 81–00786 (Renewal)
- 1986–88 National Science Foundation (with J. Verosky) DMS 86–02004
- 1986–88 NATO Collaborative Research Grant (with Y. Nutku, F. Neyzi and J. Verosky)
RG.86/0055
- 1988–90 NATO Collaborative Research Grant (with Y. Nutku) RG.86/0055 (Renewal)
- 1989–92 National Science Foundation DMS 89–01600
- 1992–94 National Science Foundation
(US–USSR Cooperative Research Program) DMS 91–16672
- 1992–95 National Science Foundation DMS 92–04192
- 1995–98 National Science Foundation DMS 95–00931.
- 1995–98 United States–Israel Binational Science Foundation (with P. Rosenau)
94–00283.
- 1998–2001 National Science Foundation DMS 98–03154.
- 2001–05 National Science Foundation DMS 01–03944.
- 2005–08 National Science Foundation DMS 05-05293.
- 2008–11 National Science Foundation DMS 08-07317.
- 2011–16 National Science Foundation DMS 11-08894.
- 2018–21 National Science Foundation DMS-1816917 (with Jeff Calder).
- 2023 London Mathematical Society Scheme 2: Visiting Speakers to the UK

Professional Service:

Member of Organizing Committee for XV International Colloquium on Group Theoretic Methods in Physics, Drexel University, Philadelphia, PA, October 20–24, 1986.

Organizer (with I. Anderson) N.S.F. Conference on Symmetry Methods in Differential Equations, Utah State University, Logan, Utah, June 18–23, 1987.

Member of Organizing Committee for SIAM 35th Anniversary Meeting, October 12–15, 1987, Denver, Colorado.

Member of Organizing Committee for Year on Nonlinear Waves, 1988–89, Institute for Mathematics and its Applications (IMA), University of Minnesota, MN.

Member of Editorial Board, *Journal of Mathematical Physics*, 1988–91.

Member of Editorial Board, *Journal of Physics A*, 1990–93.

Organizer (with K. Meyer), Workshop on Using Algebraic Processors in Dynamical Systems, Institute for Mathematics and its Applications (IMA), University of Minnesota, MN, April 16–20, 1990.

Member of Organizing Committee, Gregynog Differential Equations Conference, Gregynog, University of Wales, UK, July, 1991.

Member of International Advisory Committee, Workshop on Modern Group Analysis, Ufa, Bashkiria, USSR, June 17–22, 1991.

Organizer (with N. Kamran) Special Session on Lie Algebras, Cohomology and New Applications to Quantum Mechanics, Meeting of the American Mathematical Society, Springfield, MO, March 20–21, 1992.

Member of Organizing Committee, AMS–SIAM Summer Seminar in Applied Mathematics, Exploiting Symmetry in Applied and Numerical Analysis, Colorado State University, Fort Collins, Colorado, July 26 – August 1, 1992.

Member of Organizing Committee, International Workshop on Modern Group Analysis, Catania, Sicily, Italy, October 27–31, 1992.

Member of Committee on Group Theory, National Academy of Sciences, 1993–94.

Member of Editorial Board, *Journal of Nonlinear Mathematical Physics*, 1993–98.

Organizer (with M.J. Gotay), Minisymposium on Symplectic Methods in Physics, Cornelius Lanczos Centenary Memorial Conference, University of North Carolina, December, 1993.

Member of Editorial Board, *Lie Groups and their Applications*, 1994–95.

Member of Scientific Committee, International Conference on Modern Group Analysis, Witwatersrand University, Johannesburg, South Africa, January 18–22, 1994.

Member of Advisory Panel for Statements for National Mathematical Awareness Week, April 23–29, 1995.

Member of Advisory Committee, International Conference on Symmetry in Nonlinear Mathematical Physics, Kiev, Ukraine, July 3–8, 1995.

Member of Organizing Committee, Workshop on Mathematical Methods in Computer Vision, Geometry Center, University of Minnesota, September 11–15, 1995.

Member of Scientific Committee, International Conference on Modern Group Analysis, Johannesburg, South Africa, January 15–20, 1996.

Member of Organizing Committee, Workshop on Algebraic Approaches to Quantum Dynamics, Fields Institute, Canada, May 7–12, 1996.

Member of Editorial Board, *Journal of Lie Theory*, 1995– .

Member of Advisory Committee, International Conference on Symmetry in Nonlinear Mathematical Physics, Kiev, Ukraine, July 7–13, 1997.

Member of Organizing Committee, CRM-AARMS Workshop on Bäcklund and Darboux Transformations, Halifax, Nova Scotia, June 4–8, 1999.

Member of Advisory Committee, International Conference on Symmetry in Nonlinear Mathematical Physics, Kiev, Ukraine, July 12–18, 1999.

Member of Editorial Board, *Foundations of Computational Mathematics*, 1999–2015.

Member of Editorial Board, *Mathematical Sciences Research Hot-Line*, 1999–2000.

Member of Focused Research Group Evaluation Panel, National Science Foundation, February, 2000.

Member of International Advisory Committee, Conference on Symmetry and Differential Equations, Krasnoyarsk, Russia, August 21 - 25, 2000.

Member of Editorial Advisory Board, *London Mathematical Society Student Texts*, Cambridge University Press, 2000–07.

Member of Organizing Committee for Year on the Mathematics of Multimedia, Institute for Mathematics and its Applications (IMA), University of Minnesota, MN, 2000–01.

Member of Organizing Committee for Special Session on Integrable Systems, First Joint International Meeting of the AMS and the Hong Kong Mathematical Society, Hong Kong, December 13 - 17, 2000.

Member of Editorial Board, *Advances in Applied Mathematics*, 2000–2012

Member of International Advisory Board, Proposed NSF Mathematics Institute, University of Hawaii, 2000–01.

Member of Editorial Board, *SIAM Journal of Mathematical Analysis*, 2001–03.

Member of International Advisory Committee, International Workshop on Structure Preserving Algorithms, Beijing, China, March 25-31, 2001.

Member of Organizing Committee, European Summer School, What is Integrability?, Newton Institute, Cambridge, England, August 13 - 24, 2001.

Member of CARGO Evaluation Panel, National Science Foundation, December, 2001.

Member of Advisory Panel, *Journal of Physics A*, 2001– .

Member of Organizing Committee, Workshop on Under- and Overdetermined Systems of Algebraic or Differential Equations, Karlsruhe, Germany, March 18–19, 2002.

Member of Organizing Committee for Summer Program on Special Functions in the Digital Age, Institute for Mathematics and its Applications (IMA), University of Minnesota, MN, 2002.

Member of Organizing Committee for Foundations of Computational Mathematics Conference, Institute for Mathematics and its Applications (IMA), University of Minnesota, MN, Summer, 2002.

Co-managing Editor, *Foundations of Computational Mathematics*, 2002–08.

Member of Board of Directors, Foundations of Computational Mathematics, 2002–14.

Organizer (with G. Marî–Beffa), Special Session on Geometric Methods in Differential Equations, Meeting of the American Mathematical Society, Madison, WI, October 12–13, 2002.

Member of Organizing Committee, Workshop on Group Theory and Numerical Analysis, Université de Montréal, Canada, May 26–31, 2003.

Member of Organizing Committee, International Conference on Symmetry in Nonlinear Mathematical Physics, Kiev, Ukraine, June 23–29, 2003.

Member of Organizing Committee, Workshop on Differential Invariants and Invariant Differential Equations, Banff International Research Station, Canada, July 19–24, 2003.

Member of Organizing Committee, IEEE Workshop on Variational, Geometric and Level Set Methods in Computer Vision, Nice, France, October 14–17, 2003.

Member of Organizing Committee, Workshop on Integrable and Near-integrable Hamiltonian PDE, Fields Institute, Canada, May 17-21, 2004.

Member of Organizing Committee, Symmetry and Perturbation Theory, Cala Gonone, Sardinia, May 30 - June 6, 2004.

Member of Organizing Committee, Geometry, Integrable Systems and Quantization, Varna, Bulgaria, June 3-10, 2004.

Member of Editorial Board, Proceedings Series of the International Conference on Geometry, Integrability and Quantization, 2004–

Member of Applied Mathematics Editorial Board, Cambridge University Press, 2004– .

Member of Organizing Committee, International Conference on Symmetry in Nonlinear Mathematical Physics, Kiev, Ukraine, June 20-26, 2005.

Member of Organizing Committee, Foundations of Computational Mathematics, Santander, Spain, June 30 - July 9, 2005.

Member of Editorial Board, *Symmetry, Integrability and Geometry: Methods and Applications (SIGMA)*, 2005– .

Member of Editorial Board, SIAM Classics Book Series, 2005– .

Member of EPSRC Peer Review College, UK, 2006–09.

Member of Organizing Committee, Abel Symposium, Alesund, Norway, May 25-27, 2006.

Member of Scientific Committee, International Conference on Symmetry in Nonlinear Mathematical Physics, Kiev, Ukraine, June 24-30, 2007.

Member of Organizing Committee, Symmetry and Perturbation Theory, Otranto, Italy, June 2-9, 2007.

Member of Organizing Committee, ISSAC 2007, International Symposium in Symbolic and Algebraic Computation, University of Waterloo, Canada, July 28 - August 1, 2007.

Member of Organizing Committee, Séminaire de Mathématiques Supérieures, "Symmetries and Integrability of Difference Equations", Montréal, Canada, June 9-21, 2008.

Member of Organizing Committee, Foundations of Computational Mathematics, Hong Kong, June 16-26, 2008.

Member of Organizing Committee, Symmetries and Integrability of Difference Equations (SIDE8), Saint Adèle, Canada, June 22-28, 2008.

Member of Editorial Board, *Scholarly Research Exchange*, 2008–10.

Member of Committee on Electronic Information and Communication, International Mathematical Union, 2008–14.

Member of Editorial Board, *Portugaliae Mathematica*, 2008– .

Member of Organizing Committee, International Conference on Differential Geometry and Dynamical Systems (DGDS-2009), Bucharest, Romania, October 8-11, 2009.

Member of Organizing Committee, S^4 Conference: Symmetry, Separation, Super-integrability and Special Functions, University of Minnesota, September 17-19, 2010.

Organizer (with G. Marí Beffa) Special Session on Geometric Flows, Moving Frames and Integrable Systems, Meeting of the American Mathematical Society, St. Paul, MN, April 10-11, 2010.

Member of Organizing Committee, Foundations of Computational Mathematics, Budapest, Hungary, July 4-14, 2011.

Member of First Smale Prize Committee, Foundations of Computational Mathematics, 2011.

Chair of Committee on Electronic Information and Communication, International Mathematical Union, 2011–14.

Chair of Moderating Group, Blog on Mathematical Journals, International Mathematical Union, 2011–12.

Chair of Organizing Committee, Symposium on The Future World Heritage Digital Mathematics Library: Plans and Prospects, June 1-3, 2012, National Academy of Sciences, Washington, D.C.

Member of Editorial Board, *Forum of Mathematics, Pi and Sigma*, 2012–21.

Member of Program Committee, Modern Group Analysis, MOGRAN 15, Kemer, Turkey, October 1–6, 2012.

Member of National Academy of Sciences' Committee on The Future World Digital Mathematics Library, 2012–13.

Member of Scientific Committee, Conference on Nonlinear Systems CNLS-2013, Kathmandu, Nepal, June 18-22, 2013.

Member of Epi-Math Publishing Committee, 2013–2019.

Member of Program Committee, SIAM Conference on Applied Algebraic Geometry, Colorado State University, August 1-4, 2013.

Member of Scientific Committee, 8th International Conference of Differential Geometry and Dynamical Systems, University of Bucharest, Romania, October 10-13, 2013.

Member of Organizing Committee, Society for Natural Philosophy Conference: on Mathematics and Mechanics in the Physical Sciences, A Tribute to James Serrin, University of Minnesota, November 9-13, 2013.

Member of Organizing Committee, Focused Research Workshop on Exterior Differential Systems and Lie Theory, The Fields Institute, Canada, December 9-13, 2013.

Member of Advisory Committee, 30th International Colloquium on Group Theoretical Methods in Physics, Ghent University, Ghent, Belgium, July 14-18, 2014.

Member of Second Smale Prize Committee, Foundations of Computational Mathematics, 2014.

Chair of American Mathematical Society Whiteman Memorial Prize Committee, 2014–15.

Member of Editorial Board, *Minnesota Journal of Undergraduate Mathematics*, 2015– .

Member of Editorial Board, *European Journal of Applied Mathematics*, 2015– .

Member of Editorial Board, *Journal of Mathematical Imaging and Vision*, 2016– .

Associate Editor, *SIAM Journal on Applied Algebra and Geometry* (SIAGA), 2016–21.

Member of the SIAM T. Brooke Benjamin Prize in Nonlinear Waves Funding Advisory Board, 2016.

Member of Organizing Committee, Special Session on Geometric Flows, Integrable Systems and Moving Frames, AMS Fall Central Sectional Meeting, University of St. Thomas, Minneapolis Campus, October 28-30, 2016.

Member of the SIAM Selection Committee for the Polya Prize in Math Exposition, 2016.

Member of Editorial Board, *Advances in Mechanics and Mathematics Book Series*, Springer, 2016–18, then Birkhäuser, 2019– .

Member of Scientific Committee, 3rd International Conference On Symmetries, Differential Equations and Applications, Istanbul Technical University, Turkey, August 14-17, 2017.

Member of Organizing Committee, Conference on Multiscale Modeling, Theory, and Computation, University of Minnesota, September 23–25, 2017.

Member of Editorial Board, *Studies in Applied Mathematics*, 2018 –

Member of Programme Committee, Conference on Differential Algebra and Related Topics (DART IX), University of Leeds, UK, August 3-5, 2018.

Member of American Mathematical Society Chevalley Prize Selection Committee, 2019–23.
Chair: 2021-23.

Member of the SIAM Selection Committee, SIAG/Algebraic Geometry Early Career Prize, 2018.

Member of Scientific Committee, Symmetry 2019: Modern Treatment of Symmetries, Differential Equations and Applications, Suranaree University of Technology, Nakhon Ratchasima, Thailand, January 14-18, 2019.

Member of Program Committee, ISSAC 2020, International Symposium in Symbolic and Algebraic Computation, Kalamata, Greece, (online) July 20–23, 2020.

Chair of Organizing Committee, Meeting on Water Waves and Bores, Ningbo University, China, September 2–6, 2020. (postponed)

Member of Organizing Committee, Workshop on Moving Frames and their Modern Applications, Banff International Research Station, Canada, November 22–26, 2021.

Member of Advisory Board, *Graduate Texts in Mathematics*, Springer, 2022–

Member of Organizing Committee, 1st International Annual Meeting in Mathematics, All-Thai Conference of Mathematicians of Thailand, May 18–20, 2022.

Member of Scientific Committee, Modern Achievements in Symmetries of Differential Equations (Symmetry 2022), Suranaree University of Technology, Nakhon Ratchasima, Thailand, December 13–16, 2022.

Member of Advisory Committee, 5th International Conference on Frontiers in Industrial and Applied Mathematics (FIAM-2022), Central University Haryana, India, December 22–23, 2022.

Member of Scientific Committee, Advances in Applications of Analytical Methods in Solving Differential Equations (Symmetry 2024), Suranaree University of Technology, Nakhon Ratchasima, Thailand, January 22–25, 2024.

Member of Academic Program Review Committee, Department of Mathematics, University of Tennessee, Knoxville, April 1–3, 2024.

Chair of Organizing Committee, Meeting on Water Waves and Bores, Ningbo University, China, September 13–18, 2024.

Member of Advisory Board, *Diamond Open Access Books*, International Society of Nonlinear Mathematical Physics, 2024–

Professional Societies

American Mathematical Society (AMS)

Society for Industrial and Applied Mathematics (SIAM)

Society for the Foundations of Computational Mathematics (SFoCM)

International Society of Nonlinear Mathematical Physics (ISNMP)

Society for Natural Philosophy (SNP)