

Andrew J. Sommese      Department of Applied & Computational Math. and Stat. (ACMS)  
University of Notre Dame Du Lac  
Notre Dame, Indiana 46556    Office Ph. (574) 631-6498;  
email: sommese@nd.edu    URL: www.nd.edu/~sommese

### Positions held

2015–2018      Chair, Department of ACMS  
2014–2015      Associate Chair, Department of ACMS  
2011–2013      Director of Undergraduate Studies, Department of ACMS  
2010–2011      Director of Graduate Studies, Department of ACMS  
2005–2010      Director, Center for Applied Mathematics, Univ. of Notre Dame  
1994–          Vincent J. and Annamarie Micus Duncan Professor of Mathematics  
1988–1992      Chair, Department of Mathematics, Univ. of Notre Dame  
1987–1991      Codirector, Center for Applied Mathematics, Univ. of Notre Dame  
1983–          Full Professor, Univ. of Notre Dame  
1979–1983      Associate Professor (with Tenure), Univ. of Notre Dame  
1975–1979      Assistant Professor, Cornell University, Ithaca, New York  
1973–1975      Josiah Willard Gibbs Instructor, Yale University, New Haven

### Education

1969–1972      Princeton University, Princeton, New Jersey  
Ph.D. Mathematics, June 1973 (supported by NSF Graduate Fellowship)  
1972–1973      Harvard University, Cambridge, Massachusetts, Research Assistant  
1966–1969      Fordham University, Bronx, New York  
B.A. Mathematics, June 1969, (attended on a full scholarship)  
Summer 1968    Indiana University, Bloomington, Indiana  
NSF Summer Undergraduate Research Grant

**Consulting**    General Motors Research Laboratories, Warren, Michigan  
1986–1997      Consulting on the solution of polynomial systems of equations.

**Editorships**    1986–1993: *Manuscripta Mathematica*  
2000–2015: *Advances in Geometry*  
2011–2015: *Journal of Algebra and its Applications*  
2001–          : *Milan Journal of Mathematics*  
2017–          : *Mathematics in Computer Science*

### National and International Honors

Serving on NSF Review Panels  
1979          Alfred P. Sloan Research Fellowship  
1993          Alexander von Humboldt Research Award for Senior U.S. Scientists  
2010          International Deutsche Forschungsgemeinschaft Review Panel  
Priority Programme SPP 1489/1 (Lambrecht, February 10-11) on  
*Algorithmic and Experimental Methods in Algebra, Geometry and Number Theory.*  
2011          2010 General Motors R & D Most Valued Colleague Award.  
2012          AMS Fellow (American Mathematical Society)  
2013          International Deutsche Forschungsgemeinschaft Review Panel  
Priority Programme SPP 1489/2 (Lambrecht, January 29-31) on  
*Algorithmic and Experimental Methods in Algebra, Geometry and Number Theory.*  
2017          SIAM Fellow (Society for Industrial and Applied Mathematics)

**Other Honors:**

- 1997 University of Notre Dame Presidential Award  
 2009–2013 Member of Advisory Board for the SIAM Activity Group in Algebraic Geometry

**Recent Research Support:**

- 2015–2016 Notre Dame Office of Research Equipment Restoration and Renewal Program,  
 \$191,052: the ACMS share is \$92,000 (PI A. Sommese; coPIs E. McGinn,  
 J.D. Gezelter, S. Corcelli, Z. Xu). Renewing our In-Silico Labs: Enabling  
 Computationally Based Simulation and Analysis.  
 Institute for Math. and Its Applications (IMA) Participating Institution (PI)  
 conference proposal: \$1,500 and allowance that PI members may use IMA/PI  
 funds to support personnel’s travel to this conference. (PI J. Hauenstein,  
 with coPIs D. Brake, A. Sommese, and C. Wampler). “Workshop on Software  
 and Applications of Numerical Algebraic Geometry”  
 NSF DMS 1547743 \$19,020 (PI J. Hauenstein  
 with coPIs D. Brake, A. Sommese, and C. Wampler).  
 Workshop on Software and Applications of Numerical Algebraic Geometry.  
 2014-2018 NSF ACI-1440607 \$199,847 (PI A. Sommese; coPIs B. Hu and C. Wampler)  
 SI2-SSE: Collaborative Proposal: Symbolic-Numeric Approaches to Polynomials.  
 2012-2013 DARPA/AFRL Grant G-2457-2: Air Force Office of Scientific Research:  
 Real Numerical Algebraic Geometry: Finding all Real Solutions of a Polynomial  
 System (\$394,583 with CSU [D.J. Bates] lead  
 with Notre Dame PI A. Sommese \$105,688)  
 2011-2012 NSF DMS 1115453 \$20,000 (PI J. Powers with coPI A. Sommese):  
 Workshop on Verification and Validation in Computational Science;  
 Fall 2011; Notre Dame, IN  
 2009-2010 NSF DMS 0902504 \$20,000 (PI J. Powers with coPI A. Sommese):  
 Workshop for Model Reduction in Reactive Flows;  
 Spring 2009; Notre Dame, IN  
 2007-2011 NSF DMS-0712910 \$359,999 (PI A. Sommese with coPI C. Wampler)  
 Numerical Algebraic Geometry: Computation of Exceptional Parameter Values.  
 2007-2010 NSF CBET 0650843 \$299,998 (PI J. Powers with coPIs S. Paoluci and A. Sommese)  
 Slow Invariant Manifolds for Spatially Homogeneous and Inhomogeneous  
 Combustion Systems with Detailed Kinetics  
 2004-2009 NSF DMS 0410047 \$302,729 (PI A. Sommese with coPI C. Wampler)  
 Collaborative Research : Numerical Algorithms and Software for  
 Solving Polynomial Systems with Parameters.  
 2005-2006 NSF DMS 0509873 \$16,650 (PI S. Tavener  
 with coPIs D. Estep, C. Peterson and A. Sommese)  
 Workshop on Geometry and Symmetry in Numerical Computation  
 2001-2005 NSF DMS 0105653 \$179,965 (PI A. Sommese)  
 Collaborative Research : Numerical Algorithms and Software for  
 Decomposing Solution Sets of Polynomial Systems

**Research Stays at Mathematics Institutes**

- Aug. 1 to Oct. 31, 2013 Colorado State University, Fort Collins  
 May 15 to June 15, 2011 Mittag-Leffler Institute, Stockholm, Sweden  
 June 2008 KTH, Stockholm, Sweden  
 June 2007 University of Milan, Italy  
 May/June 2007 Eidgenössische Technische Hochschule Zürich (ETH), Switzerland

Mar/Apr 2007	Colorado State University, Fort Collins
Fall 2006	Institute for Mathematics and Its Applications (IMA), Minnesota
July 2004	RiP Program Mathematisches Forschungsinstitut Oberwolfach, Germany
June/July 2001	RiP Program Mathematisches Forschungsinstitut Oberwolfach, Germany
June 2001	University of Bayreuth, Germany
May 2001	University of Milan, Italy
May 2001	University of Genova, Italy
Spring 2000	Mathematical Sciences Research Institute, Berkeley
Fall 1999	Colorado State University, Fort Collins
June 1999	KTH (Royal Institute of Technology), Stockholm, Sweden
June 1998	Max Planck Institut für Mathematik, Bonn, Germany
May 1998	University of Bayreuth, Germany
August 1997	RiP Program Mathematisches Forschungsinstitut Oberwolfach, Germany
July 1997	University of Bayreuth, Germany
June 1996	RiP Program Mathematisches Forschungsinstitut Oberwolfach, Germany
May 96	University of Bayreuth, Germany
June/July 1995	Sonderforschungsbereich 170 Mathematics Institute, University of Göttingen, Germany
June/July 1994	University of Bayreuth, Germany
1992–1993	Max Planck Institut für Mathematik, Bonn, Germany
September 1992	University of Bayreuth, Germany
July 1992	Sonderforschungsbereich 170 Mathematics Institute, University of Göttingen, Germany
October, 1991	University of Bayreuth, Germany
July 1991	Max Planck Institut für Mathematik, Bonn, Germany
August 1988	General Motors Research Laboratories, Warren, Michigan Visiting Consultant
June/July 1988	University of Bayreuth, Germany; Guest Professor
Fall 1987	Max Planck Institut für Mathematik, Bonn, Germany
June 1986	University of Genova, Italy
1984–1985	Max Planck Institut für Mathematik, Bonn, Germany
June 1983	Max Planck Institut für Mathematik, Bonn, Germany
1978–1979	Sonderforschungsbereich Theoretische Mathematik University of Bonn, Germany; Guest Professor
Sept 1978	University of Trento, Italy
July 1977	University of Göttingen, Germany; Guest Professor
1975–1976	Institute for Advanced Study, Princeton, New Jersey

#### **University Committees since 1992**

2015	Clare Boothe Luce Committee
2014	Bitcoin Committee
2013	Notebaert Committee
2012–2013	Chair, Committee for the Five-Year Review of the Dean of the College of Science
2012–2013	Multi-disciplinary Research Committee
2009–2013	Advisory Committee for the Center for Research Computing (CRC)
2008–2011	Hesburgh Library Renovation Committee

2008–2010	Member, Director of the Libraries' Five-Year Review Committee
2006–2008	Ad Hoc University Committee on Statistics
2004–2011	University Committee on Libraries Chair for 2007–2008.
2002–2005	Member, College Council of the College of Science
2000–2010	Member, Executive Committee of the Center for Applied Mathematics
2000–2003	Member, University Committee on Intellectual Property
2000–2001	Member of the Graduate Council
1995–1998	Member of the Provost's Advisory Committee
1996	PAC Subcommittee on Tenure and Promotion
1995–1997	Member, Executive Committee of the Academic Council
1995–1997	Chair, Graduate Affairs Committee of the Academic Council
1995	Member, Search Committee for Director of the <i>Kaneb Teaching and Learning Center</i>
1995	Member, Search Committee for Provost
1994–1997	Member of the Academic Council
1994–1995	Member, Search Committee for Assistant Provost for International Studies
1994	Chair of Committee evaluating Internal Review Procedures
1994	Member of the Faculty Senate (ex officio representative from Acad. Council)
1993–1995	Graduate Council
1992	Member of the Review Committee of the EE department

### Ph.D. Theses and Fellowship Research completed under A.J. Sommese

- T1 Norman Goldstein, On general manifold sections of submanifolds of homogeneous complex manifolds, Cornell University, August 1979. About 1/2 of this thesis appeared in:  
A second Lefschetz theorem for general manifold sections of complex projective space, *Math. Ann.* 246 (1979), 41–68.
- T2 Daniel Gross, On compact categorical quotients by torus actions, University of Notre Dame, June 1982. Results of this thesis appeared in:  
Compact quotients by  $C^*$  actions, *Pacific J. Math.* 114 (1984), 149–164.
- T3 Harry D Souza, Classification of threefolds whose hyperplane sections are elliptic surfaces, University of Notre Dame, June 1983. Results of this thesis appeared in:  
Threefolds whose hyperplane sections are elliptic surfaces, *Pac. J. Math.* 134 (1988), 57–78.
- T4 Elvira L. Livorni, Classification of algebraic surfaces with sectional genus less than or equal to six, University of Notre Dame, August 1983. Results of this thesis appeared in:  
Classification of algebraic surfaces with sectional genus less than or equal to six, I : Rational surfaces, *Pacific J. of Math.* 113 (1984), 93–114; II: Ruled surfaces with  $\dim \phi_{K_S \otimes L}(S) = 1$ , *Canad. Math. J.* 38 (1986); III : Ruled surfaces with  $\dim \phi_{K_S \otimes L}(S) = 2$ , *Math. Scand.* 59 (1986), 9–29.  
Classification of algebraic non-ruled surfaces with sectional genus less than or equal to six, *Nagoya Math. J.* 100 (1985), 1–9.
- T5 Maria L. Fania, Extensions of modifications of ample divisors on fourfolds, University of Notre Dame Thesis, May 1984. Results of this thesis appeared in:  
Extensions of modifications of ample divisors on fourfolds, *J. Math. Soc. Japan* 36 (1984), 107–120; II, *J. Math. Soc. Japan* 38 (1986), 285–294.
- T6 Marco Andreatta, spent the 1985/86 academic year on an Italian Government Graduate Fellowship studying hyperplane section theory at the University of Notre Dame. Though he did

not write a Ph.D. Thesis at Notre Dame, results of his work during the year on the problem Sommese gave him are published in:

The stable adjunction mapping, *Math. Ann.* 275 (1986), 305–315.

T7 Jaroslaw A. Wiśniewski, Length of extremal rays and applications, University of Notre Dame, August 1987. Results of this thesis appeared in:

Length of Extremal rays and generalized adjunction, *Math. Z.* 200 (1989), 409–427.

T8 Gian Mario Besana, The geometry of conic bundles arising in adjunction theory, University of Notre Dame, May 1992. Results of this thesis appear in:

On the geometry of conic bundles arising in adjunction theory, *Math. Nachr.* 160 (1993), 223–251.

T9 Shu Nakamura, The classification of the third reductions with a spectral value condition, University of Notre Dame, August 1995. Results of this thesis appeared in:

On the third adjoint contractions, *J. Reine Angew. Math.* 467 (1995), 51–65.

On the classification of the third reductions with a spectral value condition, *J. Math. Soc. Japan* 49 (1997), 633–646.

T10 Mark Andrea De Cataldo, Codimension two subvarieties of quadrics, University of Notre Dame, August 1995. Results of this thesis appear in:

The genus of curves on the three dimensional quadric, *Nagoya Math. J.* 147 (1997), 193–211.

Some adjunction-theoretic properties of codimension two nonsingular subvarieties of quadrics, *Canad. J. Math.* 49 (1997), 675–695.

A finiteness theorem for low-codimensional nonsingular subvarieties of quadrics, *Trans. Amer. Math. Soc.* 349 (1997), 2359–2370.

Codimension two nonsingular subvarieties of quadrics: scrolls and classification in degree  $d \leq 10$ , *J. Math. Soc. Japan* 50 (1998), 879–902

T11 Sandra Di Rocco, On higher order embeddings of surfaces, University of Notre Dame, May 1996. Results of this thesis appear in:

Projective surfaces with  $k$ -very ample line bundles of genus  $\leq 3k + 1$ , *Manuscr. Math.* 91 (1996), 35–59.

$k$ -very ample line bundles on Del Pezzo surfaces, *Math. Nachr.* 179 (1996), 47–56.

T12 Meeyoung Kim, Barth-Lefschetz type theorem for branched coverings of homogeneous spaces, University of Notre Dame, August 1996. Results of this thesis appear in:

Barth-Lefschetz type theorem for branched coverings of Grassmannians, *J. Reine Angew. Math.* 470 (1996), 109–122.

On branched coverings of Quadrics, *Arch. Math.* 67 (1996), 76–79.

T13 Daniel J. Bates, Theory and applications in numerical algebraic geometry, University of Notre Dame, May 2006. Results of this thesis appear in:

(with E.L. Allgower, A.J. Sommese, and C.W. Wampler), Solution of Polynomial systems derived from differential equations, *Computing*, 76 (2006), 1–10.

(with C. Peterson and A.J. Sommese), A numerical-symbolic algorithm for computing the multiplicity of a component of an algebraic set, *Journal of Complexity* 22 (2006), 475–489.

(with J.D. Hauenstein, A.J. Sommese, and C.W. Wampler), Adaptive multiprecision path tracking, *SIAM Journal on Numerical Analysis* 46 (2008) 722–746.

T14 Ye Lu, Finding all real solutions of polynomial systems, University of Notre Dame, August 2006. Results of this thesis appear in:

(with D.J. Bates, A.J. Sommese, and C.W. Wampler), Finding all real points of a complex curve, *Contemporary Mathematics* 448 (2007), 183–205.

- T15 Jonathan D. Hauenstein, Regeneration, local dimension, and applications in numerical algebraic geometry, University of Notre Dame, May 2009. Results of this thesis appear in:  
 (with A.J. Sommese and C.W. Wampler), Regeneration Homotopies for Solving Systems of Polynomials, *Mathematics of Computation*, 80 (2011) 345–377.  
 (with D.J. Bates, C. Peterson, and A.J. Sommese), A numerical local dimension test for points on the solution set of a system of polynomial equations, *SIAM Journal on Numerical Analysis*, 47 (2009), 3608–3623.
- T16 Wenrui Hao, Homotopy method for nonlinear partial differential equation systems, University of Notre Dame, August 2013. Results of this thesis appear in several articles including:  
 (with J.D. Hauenstein, B. Hu, and A.J. Sommese), A bootstrapping approach for computing multiple solutions of differential equations, *Journal of Computational and Applied Mathematics*, 258 (2014) 181–190.  
 (with J.D. Hauenstein, B. Hu, Y. Liu, A.J. Sommese, and Y.-T. Zhang) Continuation along bifurcation branches for a tumor model with a necrotic core, *Journal of Scientific Computing*, 53 (2012), 395–413: available online [dx.doi.org/10.1007/s10915-012-9575-x](https://doi.org/10.1007/s10915-012-9575-x).  
 (with J.D. Hauenstein, B. Hu, T. McCoy, and A.J. Sommese), Computing steady-state solutions for a free boundary problem modeling tumor growth by Stokes equation, *Journal of Computational and Applied Mathematics*, 237 (2013), 326–334: available online from Sept. 2012 at [dx.doi.org/10.1016/j.cam.2012.06.001](https://doi.org/10.1016/j.cam.2012.06.001).  
 (with J.D. Hauenstein, C.-W. Shu, A.J. Sommese, Z. Xu, Y.-T. Zhang) A homotopy method based on WENO schemes for solving steady state problems of hyperbolic conservation laws, *Journal of Computational Physics*, 250 (2013), 332–346: available online at [dx.doi.org/10.1016/j.jcp.2013.05.008](https://doi.org/10.1016/j.jcp.2013.05.008).  
 (with B. Hu and A.J. Sommese) Cell cycle control and bifurcation for a free boundary problem modeling tissue growth, *Journal of Scientific Computing*, 56 (2013), 350–365, online at [dx.doi.org/10.1007/s10915-012-9678-4](https://doi.org/10.1007/s10915-012-9678-4).
- T17 Timothy McCoy, Mesh-expanding homotopies and numerical irreducible decomposition over a number field, University of Notre Dame, August 2014.
- T18 Francesco Pancaldi (Jointly advised with Mark Alber), Mathematical models of bacteria polarity and fibrin network mechanics, University of Notre Dame, August 2017.

## Publications

### Books and Monographs

- [1] B. Shiffman and A.J. Sommese, *Vanishing theorems on complex manifolds*, Progress in Mathematics, 56 (1985), 170+xiii pages, Birkhäuser, Boston.
- [2] M. Beltrametti and A.J. Sommese, *The adjunction theory of complex projective varieties*, Expositions in Mathematics, 16 (1995), 398+xxi pages, Walter De Gruyter, Berlin. (1995 CHOICE Award for Outstanding Academic Book.)
- [3] M. Beltrametti, M. Schneider, and A.J. Sommese, *Special properties of the adjunction theory for 3-folds in  $\mathbb{P}^5$* , Memoirs of the American Mathematical Society, Number 554 (1995), 63+viii pages, American Mathematical Society, Providence, Rhode Island.
- [4] A.J. Sommese and C.W. Wampler, *Numerical solution of systems of polynomials arising in engineering and science*, (2005), 401+xxii pages, World Scientific Press, Singapore.

- [5] D.J. Bates, J.D. Hauenstein, A.J. Sommese, and C.W. Wampler, *Numerically solving polynomial systems with Bertini*, (2013), SIAM.

### Edited Volumes

- [6] A.J. Sommese, A. Biancofiore, and E.L. Livorni (editors), *Algebraic geometry : Proceedings of the international conference held in L'Aquila, Italy, May 30-June 4, 1988*, Lect. Notes in Math. 1417 (1990), 319 pages, Springer Verlag, Berlin & New York.
- [7] C. Ciliberto, E.L. Livorni, and A.J. Sommese (editors), *Classification of algebraic varieties, L'Aquila, Italy, 1992*, Contemporary Math. 162 (1994), 410+xx pages, American Mathematical Society, Providence, R.I.
- [8] A. Dickenstein, F.-O. Schreyer, and A.J. Sommese (editors), *Algorithms in Algebraic Geometry*, volume 146 of *IMA Volumes in Mathematics and Its Applications*, 2007, Springer Verlag.
- [9] G.-M. Greuel, T. Koch, P. Paule, and A.J. Sommese (editors), *Mathematical Software – ICMS 2016*, Lecture Notes in Computer Science, 0725 (2016).

### Software

- [10] D.J. Bates, J.D. Hauenstein, A.J. Sommese, and C.W. Wampler. Bertini: Software for Numerical Algebraic Geometry. Available at [bertini.nd.edu](http://bertini.nd.edu) with permanent doi [dx.doi.org/10.7274/ROH41PB5](https://doi.org/10.7274/ROH41PB5).

### Articles

1973

- [11] A.J. Sommese, Algebraic properties of the period mapping, Ph. D. Thesis, Princeton University, June 1973.
- [12] A.J. Sommese, Some algebraic properties of the image of the period mapping, *Rice University Study* (2) 59 (1973), 123–128.
- [13] A.J. Sommese, Borel s fixed point theorem for Kaehler manifolds and an application, *Proc. Amer. Math. Soc.* 41 (1973), 51–54.

1974

- [14] A.J. Sommese, Reversing the Ahlfors estimate, *Proc. A. M. S.* 45 (1974), 242–244.
- [15] A.J. Sommese, Holomorphic vector-fields on compact Kaehler manifolds, *Math. Ann.* 210 (1974), 75–82.

1975

- [16] A.J. Sommese, Criteria for quasi-projectivity, *Math. Ann.* 217 (1975), 107–116.
- [17] A.J. Sommese, Extension theorems for reductive group actions on compact Kaehler manifolds, *Math. Ann.* 218 (1975), 107–116; research notice with same title, *Bull. A.M.S.* 81 (1975), 729–732.
- [18] A.J. Sommese, Quaternionic manifolds, *Math. Ann.* 212 (1975), 191–214.
- [19] A.J. Sommese, A representable functor theorem for compact complex spaces, *Proc. Amer. Math. Soc.* 52 (1975), 11–17.

1976

- [20] A.J. Sommese, Addendum to Criteria for quasi-projectivity, *Math. Ann.* 221 (1976), 95–96.
- [21] A.J. Sommese, On manifolds that cannot be ample divisors, *Math. Ann.* 221 (1976), 55–72.

1977

- [22] A.J. Sommese, On ample divisors, *Proc. Symp. Pure Math.* 30 (1977), 289–292.
- [23] A.J. Sommese, Theorems of Barth-Lefschetz type for homogeneous complex manifolds, *Proc. Nat. Acad. Sci.* 74 (1977), 1332–1333.
- [24] A.J. Sommese, Real algebraic spaces, *Ann. Scuola Norm. Sup. Pisa Cl. Sci. Ser. (4)* 4 (1977), 599–612.
- [25] A.J. Sommese, On the holomorphic jet bundles, *Proc. Symp. Pure Math.* 30 (1977), 49–52.

1978

- [26] A.J. Sommese, On the rationality of the period mapping, *Ann. Scuola Norm. Sup. Pisa Cl. Sci. Ser. (4)* 4 (1978), 683–717.
- [27] A.J. Sommese, Compact complex manifolds possessing a line bundle with a trivial jet bundle, *Abh. Math. Sem. University Hamburg*, 47 (1978), 79–91.
- [28] A.J. Sommese, Submanifolds of Abelian varieties, *Math. Ann.* 233 (1978), 229–256.
- [29] A.J. Sommese, Concavity theorems, *Math. Ann.* 235 (1978), 37–53.
- [30] J. Carrell and A.J. Sommese,  $C^*$  actions, *Math. Scand.* 43 (1978), 49–59. [correction to *Math. Scand.* 53 (1983), 32].

1979

- [31] A.J. Sommese, Hyperplane sections of projective surfaces, I: The adjunction mapping, *Duke Math. J.* 46 (1979), 377–401.
- [32] A.J. Sommese, Non-smoothable varieties, *Comment. Math. Helv.* 54 (1979), 140–146.
- [33] A.J. Sommese, Complex subspaces of homogeneous complex manifolds I: Transplanting theorems, *Duke Math. J.* 46 (1979), 527–548.
- [34] J. Carrell and A.J. Sommese, Some topological aspects of  $C^*$  actions on compact Kaehler manifolds, *Comment. Math. Helv.* 54 (1979), 567–582.

1981

- [35] A.J. Sommese, Hyperplane sections, *Springer Lect. Notes in Math.* 862 (1981), 232–271.
- [36] A. Howard and A.J. Sommese, On the orders of the automorphism groups of certain projective manifolds, in honor of Yozo Matsushima, ed. by Hano, A. Morimoto, S. Murakami, K. Ozeki, *Progress in Mathematics*, Birkhäuser, 14 (1981), 145–158.



- [37] A.J. Sommese, On the minimality of hyperplane sections of projective threefolds, *J. Reine Angew. Math.* 329 (1981), 16–41.

1982

- [38] A.J. Sommese, Complex subspaces of homogeneous complex manifolds II - Homotopy results, *Nagoya Math. J.* 86 (1982), 101–129.
- [39] A.J. Sommese, Ample divisors on 3-folds, *Algebraic 3-folds (Proceedings Varenna 1981)*, Springer Lect. Notes in Math. 947 (1982), 229–240.

1983

- [40] J. Carrell and A.J. Sommese,  $SL(2, C)$  actions on compact Kaehler manifolds, *Trans. Amer. Math. Soc.* 276 (1983), 165–179.
- [41] J. Carrell and A.J. Sommese, A generalization of a theorem of Horrocks, *Proceedings Vancouver 1981*, Springer Lect. Notes in Math. 956 (1983), 23–28.
- [42] J. Carrell and A.J. Sommese, Almost homogeneous  $C^*$  actions on compact complex surfaces, *Proceedings Vancouver 1981*, Springer Lect. Notes in Math. 956 (1983), 29–33.
- [43] A.J. Sommese, Some examples of  $C^*$  actions, *Proceedings Vancouver 1981*, Springer Lect. Notes in Math. 956 (1983), 118–124.
- [44] A.J. Sommese, A convexity theorem, *Proceedings of Symposia in Pure Math.* 40 (1983), Part 2, 497–505.
- [45] E. Akyldiz, J. Carrell, D. I. Lieberman and A.J. Sommese, On the graded rings associated to holomorphic vector fields with exactly one zero, *Proceedings of Symposia in Pure Math.* 40 (1983), Part 1, 55–56.
- [46] A. Bialynicki-Birula and A.J. Sommese, Quotients by  $C^*$  and  $SL(2, C)$  actions, *Trans. Amer. Math. Soc.* 279 (1983), 519–543.
- [47] A.J. Sommese, Configurations of  $-2$  rational curves on hyperplane sections of projective threefolds, *Classification of algebraic and analytic manifolds*, edited by K. Ueno, *Progress in Mathematics*, Birkhäuser, 39 (1983), 465–497.
- [48] J. Carrell and A.J. Sommese, Filtrations of meromorphic  $C^*$  actions on complex manifolds, *Math. Scand.* 53 (1983), 25–31.
- [49] A. Howard and A.J. Sommese, On the theorem of de Franchis, *Ann. Scuola Norm. Sup. Pisa Cl. Sci. Ser. (4)* 10 (1983), 429–436.

1984

- [50] A.J. Sommese, On the density of ratios of Chern numbers of algebraic surfaces, *Math. Ann.* 268 (1984), 207–221.
- [51] B. Smyth and A.J. Sommese, The degree of the Gauss mapping of submanifolds of Abelian varieties, *Comment. Math. Helv.* 59 (1984), 341–346.

1985

- [52] B. Shiffman and A.J. Sommese, Vanishing theorems for weakly positive vector bundles, Pitman Research Notes 112 (1985), 61–68.
- [53] A. Bialynicki-Birula and A.J. Sommese, Quotients by  $C^* \times C^*$  actions, Trans. Amer. Math. Soc. 289 (1985), 519–543.
- [54] J. Lipman and A.J. Sommese, On blowing down projective spaces in singular varieties, J. Reine Angew. Math. 362 (1985), 52–62.
- [55] A.J. Sommese, Ample divisors on normal Gorenstein surfaces, Abh. Math. Sem. University Hamburg 55 (1985), 151–170.

1986

- [56] A.J. Sommese and A. Van de Ven, Homotopy groups of pullbacks of varieties, Nagoya Math. J. 102 (1986), 79–90.
- [57] A.J. Sommese, On the adjunction theoretic structure of projective varieties, in *Proceedings of the Complex analysis and algebraic geometry conference*, ed. by H. Grauert, Göttingen, 1985, Springer Lect. Notes in Math. 1194 (1986), 175–213.
- [58] M. L. Fania and A.J. Sommese, On the minimality of hyperplane sections of Gorenstein threefolds, Contributions to several complex variables, ed. by A. Howard and P.M. Wong, Aspects of Math. E9 (1986), 89–114, Vieweg.
- [59] E. L. Livorni and A.J. Sommese, Threefolds of nonnegative Kodaira dimension with sectional genus less than or equal to 15, Ann. Scuola Norm. Sup. Pisa Cl. Sci. Ser. (4) 13 (1986), 537–558.
- [60] A.J. Sommese, Ample divisors on Gorenstein varieties, Revue de l’Institut E. Cartan, Nancy, 10 (1986) Journal Complexe 1985.
- [61] A. Bialynicki-Birula and A.J. Sommese, A conjecture about compact quotients by tori, Complex Analytic Singularities, ed. by T. Suwa and P. Wagreich, Advanced Stud. in Pure Math. 8 (1986), 59–68, Kinokuniya.

1987

- [62] A. Morgan and A.J. Sommese, A homotopy for solving general polynomial systems that respects  $m$ -homogeneous structures, Appl. Math. Comput. 24 (1987), 101–113.
- [63] A. Morgan and A.J. Sommese, Computing all solutions to polynomial systems using homotopy continuation, Appl. Math. Comput. 24 (1987), 115–138; Erratum, 51 (1992), p. 209.
- [64] M. Beltrametti and A.J. Sommese, A criterion for a variety to be a cone, Comment. Math. Helv. 62 (1987), 417–422.
- [65] A.J. Sommese and A. Van de Ven, On the adjunction mapping, Math. Ann. 278 (1987), 593–603.

- [66] M. L. Fania, E. Sato, and A.J. Sommese, On the structure of fourfolds with a hyperplane section which is a  $P^1$  bundles over a surface that fibres over a curve, Nagoya Math. J. 108 (1987), 1–14.

1988

- [67] M. Beltrametti and A.J. Sommese, On generically polarized Gorenstein surfaces of sectional genus 2, J. Reine Angew. Math. 386 (1988), 172–186.
- [68] M. Beltrametti and A.J. Sommese, On normal Gorenstein polarized varieties of sectional genus 3 and 4, Indiana University Math. J. 37 (1988), 667–686.
- [69] M. L. Fania and A.J. Sommese, Varieties whose hyperplane sections are  $P_C^k$  bundles, Ann. Scuola Norm. Sup. Pisa Cl. Sci. Ser. (4) 15 (1988), 193–218.
- [70] A. Lanteri and A.J. Sommese, A vector bundle characterization of  $P^n$ , Abh. Math. Sem. University Hamburg 58 (1988), 89–96.

1989

- [71] A. Morgan and A.J. Sommese, Coefficient-parameter polynomial continuation, Appl. Math. Comput. 29 (1989), 123–160; Erratum, 51 (1992), p. 207.
- [72] A. Morgan, A.J. Sommese, and L. Watson, Finding all solutions to polynomial systems using HOMPACK, ACM Trans. on Math. Software 15 (1989), 93–122.
- [73] A. Morgan, A.J. Sommese, and L. Watson, The mathematical reduction of a heart dipole model, J. of Comput. Appl. Math. 27 (1989), 407–410.
- [74] M. Andreatta and A.J. Sommese, The adjunction process for singular varieties, Forum Math. 1 (1989), 143–152.
- [75] M. Beltrametti, P. Francia, and A.J. Sommese, On Reider’s method and higher order embeddings, Duke Math. J. 58 (1989), 425–439.
- [76] M. Andreatta and A.J. Sommese, Generically ample divisors on normal Gorenstein surfaces, Singularities, Contemporary Math. 90 (1989), 1–20.
- [77] M. Beltrametti, A. Biancofiore, and A.J. Sommese, Projective  $n$ -folds of log general type. I, Trans. Amer. Math. Soc. 314 (1989), 825–849.
- [78] M. L. Fania and A.J. Sommese, On the projective classification of smooth  $n$ -folds with  $n$  even, Arkiv för Matematik 27 (1989), 245–256.
- [79] A.J. Sommese, On the nonemptiness of the adjoint linear system of a hyperplane section of a threefold, J. Reine Angew. Math. 402 (1989), 211–220; Erratum, 411 (1990), 122–123.
- [80] A. Lanteri, M. Palleschi, and A.J. Sommese, Very ampleness of  $K_X \otimes \mathcal{L}^{\dim X}$  for an ample and spanned line bundle  $\mathcal{L}$ , Osaka J. Math. 26 (1989), 647–664.

1990

- [81] A. Morgan and A.J. Sommese, Generically nonsingular polynomial continuation, Proc. AMS-SIAM Summer Seminars on Computational Solution of Nonlinear Systems of Equations, Lectures in Applied Math. 26 (1990), 467–493.

- [82] A. Morgan, A.J. Sommese, and C.W. Wampler, Polynomial continuation for mechanism design problems, Proc. AMS-SIAM Summer Seminars on Computational Solution of Non-linear Systems of Equations, Lectures in Applied Math. 26 (1990), 495–517.
- [83] C.W. Wampler, A. Morgan, and A.J. Sommese, Numerical continuation methods for solving polynomial systems arising in kinematics, ASME Journal of Mechanical Design 112 (1990), 59–68.
- [84] M. Beltrametti and A.J. Sommese, On  $k$ -spannedness for projective surfaces, in *Algebraic Geometry, Proceedings of Conference on Hyperplane Sections*, ed. by A.J. Sommese, A. Biancofiore, and E.L. Livorni, L Aquila, Italy 1988, Springer Lect. Notes in Math. 1417 (1990), 24–51.
- [85] M. Andreatta, M. Beltrametti, and A.J. Sommese, Generic properties of the adjunction mapping for singular surfaces and applications, Pacific J. Math. 142 (1990), 1–15.
- [86] M. Beltrametti and A.J. Sommese, On the relative adjunction mapping, Math. Scand. 65 (1989), 189–205.
- [87] M. Beltrametti, M. Schneider, and A.J. Sommese, The threefolds of degree 9 and 10 in  $P^5$ , Math. Ann. 288 (1990), 413–444.
- [88] M. Andreatta and A.J. Sommese, Classification of irreducible projective surfaces of smooth sectional genus  $\leq 3$ , Math. Scand. 67 (1990), 198–214.

1991

- [89] A. Morgan, A.J. Sommese, and C.W. Wampler, Computing singular solutions to nonlinear analytic systems, Numerische Math. 58 (1991), 669–684.
- [90] M. Beltrametti, M. L. Fania, and A.J. Sommese, On projective classification of algebraic varieties via adjunction theory, Math. Ann. 290 (1991), 31–62.
- [91] M. Beltrametti and A.J. Sommese, New properties of special varieties arising from adjunction theory, J. Math. Soc. Japan 43 (1991), 381–412.
- [92] M. Andreatta and A.J. Sommese, On the projective normality of the adjunction bundles (with an appendix by M. Andreatta, E. Ballico, and A.J. Sommese), Comment. Math. Helv. 66 (1991), 362–367.
- [93] M. Beltrametti and A.J. Sommese, Zero cycles and  $k$ -th order embeddings of smooth projective surfaces (with an appendix by L. Göttsche), 1988 Cortona Proceedings on Projective Surfaces and their Classification, ed. by C. Ciliberto and F. Catanese, Symposia Mathematica XXXII (1991), 32–48.

1992

- [94] A. Morgan, A.J. Sommese, and C.W. Wampler, Computing singular solutions to polynomial systems, Advances in Appl. Math. 13 (1992), 305–327.
- [95] C.W. Wampler, A. Morgan, and A.J. Sommese, Complete solution of the nine-point path synthesis problem for four-bar linkages, ASME Journal of Mechanical Design 114 (1992), 153–159.

- [96] A. Morgan, A.J. Sommese, and C.W. Wampler, A power series method for computing singular solutions to nonlinear analytic systems, *Numerische Math.* 63 (1992), 391–409.
- [97] M. Beltrametti, A.J. Sommese, and J. A. Wiśniewski, Results on varieties with many lines and their applications to adjunction theory (with an appendix by M. Beltrametti and A.J. Sommese), in *Complex Algebraic Varieties; Bayreuth 1990*, ed. by K. Hulek, T. Peternell, M. Schneider, and F.-O. Schreyer, Springer Lect. Notes in Math. 1507 (1992), 16–38.
- [98] M. Beltrametti and A.J. Sommese, On the adjunction theoretic classification of polarized varieties, *J. Reine Angew. Math.* 427 (1992), 157–192.
- [99] M. Beltrametti, M. Schneider, and A.J. Sommese, The threefolds of degree 11 in  $P^5$ , *Complex Projective Geometry*, London Math. Soc. Lect. Notes, 179 (1992), 59–80.
- [100] M. Beltrametti, M.L. Fania, and A.J. Sommese, On the discriminant variety of a projective manifold, *Forum Math.* 4 (1992), 529–547.

1993

- [101] M. Beltrametti and A.J. Sommese, On  $k$ -jet ampleness, in *Complex Analysis and geometry*, ed. by V. Ancona and A. Silva, 355–376 (1993), Plenum Press, New York.
- [102] M. Beltrametti and A.J. Sommese, On the preservation of  $k$ -very ampleness under adjunction, *Math. Z.* 212 (1993), 257–284.
- [103] M. Beltrametti and A.J. Sommese, Comparing the classical and the adjunction theoretic definition of scrolls, *Proceedings of the 1990 Cetraro Conference Geometry of Complex Projective Varieties*, ed. by A. Lanteri, M. Palleschi, and D.C. Struppa, (1993), Mediterranean Press, Rende, Italy.
- [104] M. Beltrametti and A.J. Sommese, A remark on the Kawamata rationality theorem, *J. Math. Soc. Japan.* 45 (1993), 557–568.

1994

- [105] M.C. Beltrametti, M. Schneider, and A.J. Sommese, Applications of the Ein-Lazarsfeld criterion for spannedness of adjoint bundles, *Math. Z.* 214 (1994), 593–599.
- [106] M.C. Beltrametti and A.J. Sommese, Special results in adjunction theory in dimension four and five, *Arkiv Mat.* 31 (1993), 197–208.
- [107] M.C. Beltrametti, G.M. Besana, and A.J. Sommese, On the dimension of the adjoint linear system for quadric fibrations, in *Algebraic Geometry and its Applications, Proceedings of the 8-th Algebraic Geometry Conference, Yaroslavl', 1992*, ed. by A. Tikhomirov and A. Tyurin, *Aspects of Math.* E25 (1994), 9–20, Vieweg, Braunschweig.
- [108] M.C. Beltrametti and Andrew J. Sommese, Some effects of the spectral values on reductions, in *Classification of Algebraic varieties, L'Aquila, Italy, 1992*, ed. by C. Ciliberto, E.L. Livorni, and A.J. Sommese, *Contemporary Math.* 162 (1994), 31–48.
- [109] A. Lanteri, M. Palleschi, and A.J. Sommese, On triple covers of  $\mathbf{P}^n$  as very ample divisors, in *Classification of Algebraic varieties, L'Aquila, Italy, 1992*, ed. by C. Ciliberto, E.L. Livorni, and A.J. Sommese, *Contemporary Math.* 162 (1994), 277–292.

[110] M. Beltrametti and A.J. Sommese, Remarks on numerically positive and big line bundles, in *Projective geometry with applications*, ed. by E. Ballico, 9–18, Marcel Dekker, New York (1994).

[111] E. Ballico and A.J. Sommese, Projective surfaces with  $k$ -very ample line bundles of degree  $\leq 4k + 4$ , *Nagoya Math. J.* 136 (1994), 57–79.

1995

[112] A. Morgan, A.J. Sommese, and C.W. Wampler, A product-decomposition bound for Bezout numbers, *SIAM Journal on Numerical Analysis* 32 (1995), 1308–1325.

[113] M. Beltrametti and A.J. Sommese, On the dimension of the adjoint linear system for threefolds, *Ann. Scuola Norm. Sup. Pisa Cl. Sci. Ser. (4)*, XXII (1995), 1–24.

[114] A. Lanteri, M. Palleschi, and A.J. Sommese, Double covers of  $P^n$  as very ample divisors, *Nagoya Math. J.* 137 (1995), 1–32.

[115] A. Biancofiore, E.L. Livorni, and A.J. Sommese, On the complexity of the projective classification of surfaces, *Monatsh. Math.* 120 (1995), 1–23.

1996

[116] A.J. Sommese and C.W. Wampler, Numerical algebraic geometry, *The Mathematics of Numerical Analysis: Real Number Algorithms, Park City, Utah, Summer 1995*, ed. by J. Renegar, M. Shub, and S. Smale, *Lectures in Applied Math.* 32 (1996), 749–763.

[117] M. Beltrametti, M. Schneider, and A.J. Sommese, Chern inequalities and spannedness of the adjoint bundle, *Proceedings of the Hirzebruch 65 conference at Bar-Ilan University*, ed. by M. Teicher, *Israel Mathematical Conf. Proc.* 9 (1996), 97–107, American Mathematical Society, Providence, Rhode Island.

[118] A. Lanteri, H. Maeda, and A.J. Sommese, Ample and spanned vector bundles of minimal curve genus, *Archiv der Math.* 66 (1996), 141–149.

[119] A. Lanteri, M. Palleschi, and A.J. Sommese, On the discriminant locus of an ample and spanned line bundle, *J. Reine Angew. Math.* 477 (1996), 199–219.

[120] M. Beltrametti and A.J. Sommese, Notes on embeddings of blowups, *J. of Algebra*, 186 (1996), 861–871.

1997

[121] C.W. Wampler, A. Morgan, and A. Sommese, Complete solution of the nine-point path synthesis problem for four-bar linkages – Authors’ Closure, *ASME Journal of Mechanical Design* 119 (1997), 150–152.

[122] M. Beltrametti and A.J. Sommese, On the second adjunction mapping. The case of a 1-dimensional image, *Trans. Amer. Math. Soc.* 349 (1997), 3277–3302.

[123] M. Beltrametti and A.J. Sommese, On the second adjunction mapping and the very ampleness of the triadjoint bundle, In *Birational Algebraic Geometry*, edited by Y. Kawamata and V. Shokurov, *Contemporary Mathematics* 207 (1997), 1–24, American Mathematical Society, Providence, Rhode Island.

- [124] A. Lanteri, M. Palleschi, and A.J. Sommese, Del Pezzo surfaces as hyperplane sections, *J. Math. Soc. Japan.* 49 (1997), 501–529.

1998

- [125] M. Beltrametti and A.J. Sommese, Sharp Matsusaka-type theorems on surfaces, *Math. Nachr.* 191 (1998), 5–17.
- [126] M. Beltrametti, S. Di Rocco, and A.J. Sommese, On higher order embeddings of Fano threefolds by the anticanonical linear system, *J. Math. Sci. University Tokyo* 5 (1998), 75–97.
- [127] M. Kim and A.J. Sommese, Two results on branched coverings of Grassmannians, *J. Math. Kyoto University* 38 (1998), 21–27.

1999

- [128] M. Beltrametti, S. Di Rocco, and A.J. Sommese, On generation of jets for vector bundles, *Revista Matematica Complutense* 12 (1999), 27–45.
- [129] K. Chandler, A. Howard, and A.J. Sommese, Reducible hyperplane sections I, *Jour. Math. Soc. of Japan* 51 (1999), 887–910.
- [130] M. Beltrametti and A.J. Sommese, On the degree and the birationality of the second adjunction mapping, *Int. Jour. of Math.* 10 (1999), 707–719.
- [131] T. Peternell, M. Schneider, and A.J. Sommese, Kodaira dimension of subvarieties, *Int. Jour. of Math.* 10 (1999), 1065–1079.

2000

- [132] A.J. Sommese and J. Verschelde, Numerical homotopies to compute generic points on positive dimensional algebraic sets, in *Complexity theory, real machines and homotopy* (Oxford, 1999), *J. Complexity* 16 (2000), no. 3, 572–602.
- [133] S.M. Wise, A.J. Sommese, and L.T. Watson, Algorithm 801: POLSYS\_PLP: A partitioned linear product homotopy code for solving polynomial systems of equations, *ACM Trans. on Math. Software* 26 (2000), 176–200.
- [134] M. Beltrametti, A. Howard, M. Schneider, and A.J. Sommese, Projections from subvarieties, in *Complex Analysis and Algebraic Geometry, Bayreuth, June 1998*, edited by T. Peternell and F.O. Schreyer, (2000), 71–108, Walter de Gruyter, Berlin.
- [135] M. Beltrametti and A.J. Sommese, Projective manifolds with small pluridegrees, *Trans. Amer. Math. Soc.* 352 (2000) 3045–3064.
- [136] S. Kebekus, T. Peternell, A.J. Sommese, and J.A. Wiśniewski, Projective contact manifolds, *Inventiones Math.* 142 (2000), 1–15.
- [137] A. Lanteri, M. Palleschi, and A.J. Sommese, Discriminant loci of varieties with smooth normalization, *Comm. Algebra* 28 (2000), 4179–4200. Erratum, *Comm. Algebra* 31 (2003), 2027–2028.
- [138] A.J. Sommese, What we know about the second adjunction mapping, *Rendiconti del Seminario Matematico e Fisico di Milano* 67 (1997), 49–75 (2000).

- [139] T. Peternell and A.J. Sommese, Ample vector bundles and branched coverings (with an appendix by R. Lazarsfeld), *Communications in Algebra* 28 (2000), 5573–5599.

2001

- [140] A.J. Sommese, J. Verschelde, and C.W. Wampler, Numerical decomposition of the solution sets of polynomial systems into irreducible components, *SIAM Journal on Numerical Analysis* 38 (2001), 2022–2046.
- [141] S. Di Rocco and A.J. Sommese, On line bundles for which a projectivized jet bundle is a product, *Proceedings of the Amer. Math. Soc.* 129 (2001), 1659–1663.
- [142] A.J. Sommese, J. Verschelde and C.W. Wampler, Using Monodromy to Decompose Solution Sets of Polynomial Systems into Irreducible Components, in *Proceedings of the 2001 NATO Advance Research Conference, Eilat, Israel, on Applications of Algebraic Geometry to Coding Theory, Physics, and Computation*, edited by C. Ciliberto, F. Hirzebruch, R. Miranda, and M. Teicher, (2001) 297–315.
- [143] A.J. Sommese, J. Verschelde, and C.W. Wampler, Numerical irreducible decomposition using projections from points on the components, in *Symbolic Computation: Solving Equations in Algebra, Geometry, and Engineering*, ed. by Green, Hosten, Laubenbacher, and Power, *Contemporary Mathematics* 206 (2001), 37–51.
- [144] M.C. Beltrametti and A.J. Sommese, On the bicanonical map of a surface section of a threefold, *Abh. Math. Hamburg* 71 (2001), 269–277.

2002

- [145] S. Kebekus, T. Peternell, and A.J. Sommese, Manifolds with nef rank 1 subsheaves in  $\Omega_X^1$ , in *Complex Geometry: A Collection of Papers dedicated to Hans Grauert*, edited by I. Bauer, F. Catanese, Y. Kawamata, T. Peternell, and Y.-T. Siu, (2002) 159–164.
- [146] E.L. Allgower and A.J. Sommese, Piecewise linear approximations of smooth fibers, *J. Complexity* 18 (2002), 547–556.
- [147] M. Beltrametti, K. Chandler, and A.J. Sommese, Reducible hyperplane sections II, *Kodai Math. J.* 25 (2002), 139–150.
- [148] H. Maeda and A.J. Sommese, Very ample vector bundles of curve genus two, *Archiv der Mathematik* 79 (2002), 74–80.
- [149] A.J. Sommese, J. Verschelde, and C.W. Wampler, A method for tracking singular paths with application to the numerical irreducible decomposition, in *Algebraic Geometry, a Volume in Memory of Paolo Francia*, ed. by M.C. Beltrametti, F. Catanese, C. Ciliberto, A. Lanteri, and C. Pedrini; De Gruyter (2002), 329–345.
- [150] A.J. Sommese, J. Verschelde, and C.W. Wampler, Symmetric functions applied to decomposing solution sets of polynomial systems, *SIAM Journal on Numerical Analysis* 40 (2002), 2026–2046.

2003

- [151] A.J. Sommese, J. Verschelde, and C.W. Wampler, Numerical Irreducible Decomposition using PHCpack, In “Algebra, Geometry and Software Systems,” edited by M. Joswig and N. Takayama, Springer-Verlag (2003), 109–130.



- [152] A. Lanteri and A.J. Sommese, Ample vector bundles with zero loci having a hyperelliptic curve section, *Forum Math.* 15 (2003), 525–542.

2004

- [153] S. Di Rocco and A.J. Sommese, Chern numbers of ample rank two vector bundles on toric surfaces, *Trans. Amer. Math. Soc.* 356 (2004), 587–598.
- [154] A.J. Sommese, J. Verschelde, and C.W. Wampler, Numerical factorization of multivariate complex polynomials, *Theoretical Computer Science* 315 (2004), 651–669.
- [155] A.J. Sommese, J. Verschelde, and C.W. Wampler, Advances in polynomial continuation for solving problems in kinematics, Paper DETC2002/MECH-34254, Proc. ASME Design Engineering Technical Conf. (CDROM), Montreal, Quebec, Sept. 29–Oct. 2, 2002. ASME *Journal of Mechanical Design* 126 (2004), 262–268.
- [156] A. Lanteri, M. Palleschi, and A.J. Sommese, On the adjunction mapping of very ample vector bundles of corank one, *Trans. Amer. Math. Soc.* 356 (2004), 2307–2324.
- [157] M. Beltrametti, M.L. Fania, and A.J. Sommese, Mukai varieties as hyperplane sections, *Proceedings of the 2002 Fano Conference, Torino*, edited by A. Collino, A. Conte, and M. Marchisio, (2004), 185–208.
- [158] T. Peternell and A.J. Sommese, Ample vector bundles and branched coverings, II, *Proceedings of the 2002 Fano Conference, Torino*, edited by A. Collino, A. Conte, and M. Marchisio, (2004), 625–645.
- [159] A.J. Sommese, J. Verschelde, and C.W. Wampler, Homotopies for intersecting solution components of polynomial systems, *SIAM Journal on Numerical Analysis*, 42 (2004), 1552–1571.

2005

- [160] A.J. Sommese, J. Verschelde, and C.W. Wampler, An intrinsic homotopy for intersecting algebraic varieties, *Journal of Complexity*, 21 (2005), 593–608.
- [161] A.J. Sommese, J. Verschelde, and C.W. Wampler, Introduction to numerical algebraic geometry, in *Solving Polynomial Equations: Foundations, algorithms, and applications*, ed. by A. Dickenstein and I. Emiris, 301–337 (2005), Springer Verlag.
- [162] H. Maeda and A.J. Sommese, Notes on very ample vector bundles on 3-folds, *Archiv der Mathematik*, 85 (2005), 527–537.
- [163] J.P. Ladwig and A.J. Sommese, Using cited half-life to adjust download statistics, *College & Research Libraries*, 66 (2005) 527–542.
- [164] M. Beltrametti, M.L. Fania, and A.J. Sommese, A note on  $\mathbb{P}^1$ -bundles as hyperplane sections, *Kyushu J. Math.* 59 (2005), 301–306.

2006

- [165] E.L. Allgower, D.J. Bates, A.J. Sommese, and C.W. Wampler, Solution of Polynomial systems derived from differential equations, *Computing*, 76 (2006), 1–10.

- [166] D.J. Bates, C. Peterson, and A.J. Sommese, A numerical-symbolic algorithm for computing the multiplicity of a component of an algebraic set, *Journal of Complexity* 22 (2006), 475–489.

2007

- [167] J. Diller, D. Jackson, and A.J. Sommese, Invariant curves for birational surface maps, *Trans. Amer. Math. Soc.* 359 (2007), 2973–2991.
- [168] M.C. Beltrametti, C. Ciliberto, A. Lanteri, and A.J. Sommese, On the birationality of the bicanonical map of a surface section of a threefold, *Comm. Algebra* 35 (2007), 1627–1650.
- [169] Y. Lu, D.J. Bates, A.J. Sommese, and C.W. Wampler, Finding all real points of a complex curve, In *Algebra, Geometry and Their Interactions*, edited by A. Corso, J. Migliore, and C. Polini, *Contemporary Mathematics* 448 (2007), 183–205, American Mathematics Society.
- [170] A.J. Sommese, J. Verschelde, and C.W. Wampler, Solving Polynomial Systems Equation by Equation. In *Algorithms in Algebraic Geometry*, edited by A. Dickenstein, F.-O. Schreyer, and A.J. Sommese, volume 146 of *IMA Volumes in Mathematics and Its Applications*, pages 133–152, 2007, Springer Verlag.
- [171] D.J. Bates, C. Peterson, and A.J. Sommese, Applications of a numerical version of Terracini’s lemma for secants and joins. In *Algorithms in Algebraic Geometry*, edited by A. Dickenstein, F.-O. Schreyer, and A.J. Sommese, volume 146 of *IMA Volumes in Mathematics and Its Applications*, pages 1–14, 2007, Springer Verlag.

2008

- [172] D.J. Bates, J.D. Hauenstein, A.J. Sommese, and C.W. Wampler, Software for numerical algebraic geometry: a paradigm and progress towards its implementation. In *Software for Algebraic Geometry*, edited by M.E. Stillman, N. Takayama, and J. Verschelde, volume 148 of *IMA Volumes in Mathematics and Its Applications*, pages 1–14, 2008, Springer Verlag.
- [173] A.J. Sommese and C.W. Wampler, Exceptional sets and fiber products, *Foundations of Computational Mathematics* 8 (2008), 171–196.
- [174] D.J. Bates, J.D. Hauenstein, A.J. Sommese, and C.W. Wampler, Adaptive multiprecision path tracking, *SIAM Journal on Numerical Analysis* 46 (2008) 722–746.

2009

- [175] D.J. Bates, J.D. Hauenstein, A.J. Sommese, and C.W. Wampler, Stepsize control for path tracking, *Contemporary Mathematics* 496 (2009), 21–31.
- [176] J.D. Hauenstein, J.C. Migliore, C. Peterson, and A.J. Sommese, Numerical computation of the dimension of linear systems and of the cohomology of twists of ideal sheaves for reduced curves and surfaces, *Contemporary Mathematics* 496 (2009), 235–242.
- [177] A.N. Al-Khateeb, J.M. Powers, S. Paolucci, A.J. Sommese, J.A. Diller, J.D. Hauenstein, and J. Mengers, One-dimensional slow invariant manifolds for spatially homogenous reactive systems, *Journal of Chemical Physics*, 131, 024118 (2009) (19 pages).

- [178] D.J. Bates, J.D. Hauenstein, C. Peterson, and A.J. Sommese, A numerical local dimension test for points on the solution set of a system of polynomial equations, *SIAM Journal on Numerical Analysis*, 47 (2009), 3608–3623.

2010

- [179] M.C. Beltrametti, A. Lanteri, and A.J. Sommese, Hilbert curves of polarized varieties, *Journal of Pure and Applied Algebra*, 214 (2010) 461–479.
- [180] D.J. Bates, J.D. Hauenstein, C. Peterson, and A.J. Sommese, Numerical decomposition of the rank-deficiency set of a matrix of multivariate polynomials, in *Approximate Commutative Algebra*, ed. by L. Robbiano and J. Abbott, Texts and Monographs in Symbolic Computation, Vol. 14, Springer (2010), 55–77.
- [181] S. Di Rocco, D. Eklund, A.J. Sommese, and C.W. Wampler, Algebraic  $\mathbb{C}^*$ -actions and the inverse kinematics of a general 6R manipulator, *Applied Mathematics and Computation*, 216 (2010) 2512–2524.
- [182] J.D. Hauenstein and A.J. Sommese, Witness sets of projections, *Applied Mathematics and Computation* 217 (2010), 3349–3354.

2011

- [183] J.D. Hauenstein, A.J. Sommese, and C.W. Wampler, Regeneration homotopies for solving systems of polynomials, *Mathematics of Computation*, 80 (2011) 345–377.
- [184] W. Hao, J.D. Hauenstein, B. Hu, Y. Liu, A.J. Sommese, and Y.-T. Zhang, Multiple stable steady states of a reaction-diffusion model on zebrafish dorsal-ventral patterning, *Discrete and Continuous Dynamical Systems - Series S*, 4 (2011), 1413–1428.
- [185] S. Di Rocco, D. Eklund, C. Peterson, and A.J. Sommese, Chern numbers of smooth varieties via homotopy continuation and intersection theory, *Journal of Symbolic Computation*, 46 (2011), 23–33.
- [186] D.J. Bates, C. Peterson, A.J. Sommese, and C.W. Wampler, Numerical computation of the genus of an irreducible curve within an algebraic set, *Journal of Pure and Applied Algebra*, 215 (2011), 1844–1851.
- [187] C.W. Wampler and A.J. Sommese, Numerical Algebraic Geometry and Algebraic Kinematics, *Acta Numerica* 20 (2011), 469–567.
- [188] C.W. Wampler, A.J. Sommese, and J.D. Hauenstein, Mechanism Mobility and a Local Dimension Test, *Mechanism and Machine Theory*, 46 (2011), 1193–1206, [www.sciencedirect.com/science/article/pii/S0094114X11000814](http://www.sciencedirect.com/science/article/pii/S0094114X11000814).
- [189] J.D. Hauenstein, A.J. Sommese, and C.W. Wampler, Regenerative cascade homotopies for solving polynomial systems, *Applied Mathematics and Computation* 218 (2011), pp. 1240–1246.
- [190] W. Hao, J.D. Hauenstein, B. Hu, and A.J. Sommese, A three-dimensional steady-state tumor system, *Applied Mathematics and Computation*, 218 (2011), 2661–2669.

[191] D.J. Bates, J.D. Hauenstein, and A.J. Sommese, A parallel endgame, in the *Proceedings of the Workshop on Randomization, Relaxation, and Complexity*, Edited by: L. Gurvits, P.P. Pébay, J. M. Rojas, and D. C. Thompson, Contemporary Mathematics, 556 (2011), 25–35, American Mathematics Society.

[192] D.J. Bates, J.D. Hauenstein, and A.J. Sommese, Efficient pathtracking methods, *Numerical Algorithms*, 58 (2011), 451–459: available at [dx.doi.org/10.1007/s11075-011-9463-8](http://dx.doi.org/10.1007/s11075-011-9463-8).

#### 2012

[193] W. Hao, J.D. Hauenstein, B. Hu, Y. Liu, A.J. Sommese, and Y.-T. Zhang, Bifurcation for a free boundary problem modeling the growth of a tumor with a necrotic core, *Nonlinear Analysis Series B: Real World Applications*, 13 (2012), 694–709: available at [dx.doi.org/10.1016/j.nonrwa.2011.08.010](http://dx.doi.org/10.1016/j.nonrwa.2011.08.010).

[194] W. Hao, J.D. Hauenstein, B. Hu, Y. Liu, A.J. Sommese, and Y.-T. Zhang, Continuation along bifurcation branches for a tumor model with a necrotic core, *Journal of Scientific Computing: Volume 53, Issue 2* (2012), 395–413: available online [10.1007/s10915-012-9575-x](http://10.1007/s10915-012-9575-x).

[195] C.W. Wampler and A.J. Sommese, Applying numerical algebraic geometry to kinematics, In *21st Century Kinematics: The 2012 NSF Workshop*, ed. by J.M. McCarthy, (2012), 125–159, Springer.

#### 2013

[196] J.D. Hauenstein and A.J. Sommese, Membership tests for images of algebraic sets by linear projections, *Applied Mathematics and Computation*, 219 (2013), 6809–6818: available online [dx.doi.org/10.1016/j.amc.2012.12.060](http://dx.doi.org/10.1016/j.amc.2012.12.060).

[197] D.J. Bates, J.D. Hauenstein, T. McCoy, C. Peterson, and A.J. Sommese, Recovering exact results from inexact numerical data in algebraic geometry, *Experimental Mathematics*, 22 (2013), 38–50: available online [dx.doi.org/10.1080/10586458.2013.737640](http://dx.doi.org/10.1080/10586458.2013.737640).

[198] W. Hao, J.D. Hauenstein, B. Hu, T. McCoy, and A.J. Sommese, Computing steady-state solutions for a free boundary problem modeling tumor growth by Stokes equation, *Journal of Computational and Applied Mathematics*, 237 (2013), 326–334: available online from Sept. 2012 at [dx.doi.org/10.1016/j.cam.2012.06.001](http://dx.doi.org/10.1016/j.cam.2012.06.001).

[199] W. Hao, J.D. Hauenstein, C.-W. Shu, A.J. Sommese, Z. Xu, Y.-T. Zhang, A homotopy method based on WENO schemes for solving steady state problems of hyperbolic conservation laws, *Journal of Computational Physics*, 250 (2013), 332–346, online at <http://dx.doi.org/10.1016/j.jcp.2013.05.008>.

[200] W. Hao, B. Hu, and A.J. Sommese, Cell cycle control and bifurcation for a free boundary problem modeling tissue growth, *Journal of Scientific Computing*, 56 (2013), 350–365, online at <http://dx.doi.org/10.1007/s10915-012-9678-4>.

[201] G.M. Besana, S. Di Rocco, J.D. Hauenstein, A.J. Sommese, and C.W. Wampler, Cell decomposition of almost smooth real algebraic surfaces, *Numerical Algorithms*, article Cell decomposition of almost smooth real algebraic surfaces has now been published in the following paginated issue of 63 (2013), 645–678: available online from Sept. 2012 at [dx.doi.org/10.1007/s11075-012-9646-y](http://dx.doi.org/10.1007/s11075-012-9646-y).

[202] W. Hao, R.I. Nepomechie, and A.J. Sommese, On the completeness of solutions of Bethe's equations, *Physical Review E*, 88, 052113 (2013): appears online at [dx.doi.org/10.1103/PhysRevE.88.052113](https://doi.org/10.1103/PhysRevE.88.052113).

[203] W. Hao, A.J. Sommese, and Z. Zeng, Algorithm 931: An algorithm and software for computing multiplicity structures at zeros of nonlinear systems, *Transactions of Mathematical Software*, 40 (2013), Article 5: appears online at [dx.doi.org/10.1145/2513109.2513114](https://doi.org/10.1145/2513109.2513114).

2014

[204] W. Hao, J.D. Hauenstein, B. Hu, and A.J. Sommese, A bootstrapping approach for computing multiple solutions of differential equations, *Journal of Computational and Applied Mathematics*, 258 (2014) 181–190.

[205] W. Hao, R.I. Nepomechie, and A.J. Sommese, Singular solutions, repeated roots and completeness for higher-spin chains, *Journal of Statistical Mechanics: Theory and Experiment*: appears online at [dx.doi.org/10.1088/1742-5468/2014/03/P03024](https://doi.org/10.1088/1742-5468/2014/03/P03024).

[206] D.J. Bates, W. Decker, J.D. Hauenstein, C. Peterson, G. Pfister, F.-O. Schreyer, A.J. Sommese, and C.W. Wampler, Probabilistic algorithms to analyze the components of an affine algebraic variety, *Applied Mathematics and Computation*, 231 (2014), 619–633.

[207] M.C. Beltrametti, A. Lanteri, and A.J. Sommese, Adjunction and singular loci of hyperplane sections, II, *Rendiconti del Circolo Matematico di Palermo*, Volume 63 (2014), 247–255.

[208] W. Hao, B. Hu, and A.J. Sommese, Numerical algebraic geometry and differential equations, in *Future Vision and Trends on Shapes, Geometry and Algebra*, edited by R. De Amicis and G. Conti, Springer Proceedings in Mathematics & Statistics, Vol. 84 (2014), 39–54.

[209] D.J. Bates, D.A. Brake, J.D. Hauenstein, A.J. Sommese, and C.W. Wampler, On computing a cell decomposition of a real surface containing infinitely many singularities, *Mathematical Software - ICMS 2014, Lecture Notes in Computer Science*, 8592 (2014), 246–252.

[210] Daniel A. Brake, Daniel J. Bates, Wenrui Hao, Jonathan D. Hauenstein, Andrew J. Sommese, and Charles W. Wampler, Bertini\_real: Software for one- and two-dimensional real algebraic sets. *Mathematical Software - ICMS 2014, Lecture Notes in Computer Science*, 8592 (2014), 175–182.

[211] Z.A. Griffin, J.D. Hauenstein, C. Peterson, and A.J. Sommese, Numerical computation of the Hilbert function of a zero-scheme, *Connections Between Algebra, Combinatorics, and Geometry* (S.M. Cooper and S. Sather-Wagstaff, eds.), Springer Proceedings in Mathematics & Statistics, 76 (2014), 235–250, Springer New York.

2015

[212] M.C. Beltrametti, A. Lanteri, and A.J. Sommese, Adjunction and singular loci of hyperplane sections, to appear *Journal of the Mathematical Society of Japan*, 67 (2015), 861–875.

[213] A.M. Gainutdinov, W. Hao, R.I. Nepomechie, A.J. Sommese, Counting solutions of the Bethe equations of the quantum group invariant open XXZ chain at roots of unity, *Journal*

of Physics A: Mathematical and Theoretical, 2015 J. Phys. A: Math. Theor. 48 494003: available online [dx.doi.org/10.1088/1751-8113/48/49/494003](https://doi.org/10.1088/1751-8113/48/49/494003).

2016

- [214] A.E. Lindsay, W. Hao, and A.J. Sommese, Vibrations of thin plates with small clamped patches, Proceedings of the Royal Society A. (2015), Vol. 471 No. 2184.
- [215] D.A. Brake, J.D. Hauenstein, and A.J. Sommese, Numerical local irreducible decomposition, in Proceedings of 6th International Conference on Mathematical Aspects of Computer and Information Sciences, ed. by S.I. Kotsireas, S.M. Rump, and K.C. Yap, Springer Lecture Notes in Computer Science, 9582 (2016), 124–129.
- [216] J.D. Hauenstein, L. Oeding, G. Ottaviani, and A.J. Sommese, (2016). Homotopy techniques for tensor decomposition and perfect identifiability, to appear J. Reine Angew. Math. Available at <https://doi.org/10.1515/crelle-2016-0067>

2017

- [217] M.-L. Torrente, M. Beltrametti, and A.J. Sommese, Perturbation results on the zero-locus of a polynomial, Journal of Symbolic Computation, 80 (2017), 307–328. Available at <https://doi.org/10.1016/j.jsc.2016.04.001>.
- [218] J.D. Hauenstein and A.J. Sommese, What is numerical algebraic geometry? Foreword, Journal of Symbolic Computation, 79 Special Issue (2017), 499–507.
- [219] D.A. Brake, D.J. Bates, W. Hao, J.D. Hauenstein, A.J. Sommese, and C.W. Wampler, Algorithm 976: Bertini\_real: Numerical Decomposition of Real Algebraic Curves and Surfaces, ACM Transactions of Mathematical Software, 44 (2017). Available at <http://dx.doi.org/10.1145/3056528>
- [220] D.J. Bates, D.A. Brake, J.D. Hauenstein, A.J. Sommese, and C.W. Wampler, Homotopies for connected components of algebraic sets with application to computing critical sets, Proceeding of “Mathematical Aspects of Computer and Information Sciences” (MACIS 2017), Springer Lecture Notes in Computer Science, 10693 (2017), 107–120.

2018

- [221] T.M. McCoy, C. Peterson, and A.J. Sommese, The numerical irreducible decomposition over a number field, Journal of Algebra and Its Applications, 17 (2018), Available at <http://dx.doi.org/10.1142/S0219498818501955>.

#### Articles that are accepted but have not yet appeared

- [222] D.A. Brake, J.D. Hauenstein, F.-O. Schreyer, A.J. Sommese, and M.E. Stillman, Singular value decomposition of complexes, to appear SIAM Journal on Applied Algebra and Geometry.

#### Book Reviews

- [223] A.J. Sommese, Review of *Complex manifolds and deformation of complex structures*, by K. Kodaira, Grund. der math. Wissen. 283, Springer, in Bull. A. M. S. 16 (1987), 308–310.

- [224] A.J. Sommese, Review of *Classification of polarized manifolds*, by T. Fujita, London Math. Society Lect. Note Series, (1990) 155, Cambridge University Press, in Bull. A. M. S. 26 (1992), 179–182.
- [225] A.J. Sommese, Review of *Ideals, varieties, and algorithms—An introduction to computational algebraic geometry and commutative algebra*, by D. Cox, J. Little, and D. O’Shea, (1992) Springer, New York, in SIAM Review 35 (1993), pg. 682.

### Colloquia, Conference, and Major Workshop Talks since 1979

- 2019 Classical Algebraic Geometry in Milano.  
University of Milan, Italy, July 11.  
Title: Real Critical Sets of Cyclotomic Polynomials.
- 2018 Seminar Talk at Penn State, October 28, 2018.  
Title: A survey of Numerical Algebraic Geometry with Applications.  
International Symposium on Symbolic and Algebraic Computation (ISSAC), New York  
CUNY Graduate Center and Courant Institute, July 18.  
Title: Polynomial Systems Arising From Discretizing Systems of  
Nonlinear Differential Equations.  
Classical Algebraic Geometry and related topics, Genoa.  
University of Genoa, Italy, July 2.  
Title: Polynomial Systems Arising From Discretizing Systems of  
Nonlinear Differential Equations.
- 2015 Algebraic Geometry, Warsaw 1960 - 2015  
University of Warsaw, Poland, March 20.  
Title: Numerical Algebraic Geometry.
- 2014 University of Illinois at Urbana-Champaign  
Algebraic Geometry Seminar (Mathematics Department), November 13.  
Title: Numerical Algebraic Geometry: Theory and Practice.  
International Conference on Mathematical Software (ICMS 2014)  
Hanyang University, Seoul, Korea, August 8.  
Plenary Lecture: Numerical Algebraic Geometry: Theory and Practice.  
MIDA Group Seminar, University of Genoa, Italy, April 28  
Title: Numerical algebraic geometry over number fields.  
Joint Mathematics Meetings, Baltimore, MD.  
Session on Nonlinear Systems, January 16.  
Title: Numerical algebraic geometry over number fields.
- 2013 SIAM Conference on Applied Algebraic Geometry, CSU, Fort Collins, CO.  
Session on Algorithms in Numerical Algebraic Geometry, August 2.  
Title: Polynomial systems and algebraic number fields.  
North Carolina State University  
Numerical Analysis Seminar (Mathematics Department), April 2.  
Title: Numerical algebraic geometry and differential equations.
- 2012 SAGA III Workshop  
Fondazione GraphiTech, University of Trento, Italy, Oct. 9-11.  
Plenary Lecture: Numerical algebraic geometry and differential equations.  
Department of Mathematics, University of Genova, Italy, June 6  
Colloquium Title: Numerical Algebraic Geometry and Solution  
of Systems of Nonlinear Differential Equations.
- 2011 Special Session: Applications of Numerical Algebraic Geometry

- SIAM Conference on Applied Algebraic geometry, Raleigh, NC, October 7  
 Title: Tumor Growth Models and Numerical Algebraic Geometry.
- Mittag-Leffler Institute, Stockholm, May 17.  
 Title: Numerical algebraic geometry and differential equations.
- AMS-SIAM Special Session on Applications of Algebraic Geometry, I  
 Joint Mathematics Meeting, San Francisco, CA, January 16  
 Title: Zebra Fish, Tumor Growth, and Algebraic Geometry.
- 2010 New geometric and numeric tools for the analysis of differential equations  
 Banff International Research Station, Canada, August 13-15.  
 Title: Zebra Fish, Tumor Growth, and Algebraic Geometry.
- Midwest Algebra, Geometry and Their Interactions Conference (MAGIC'10)  
 University of Notre Dame, Indiana, April 23-25.  
 Title: Recent Work in Numerical Algebraic Geometry.
- Workshop on Randomization, Relaxation, and Complexity  
 Banff International Research Station, Canada, March 4  
 Title: Recent Results in Numerical Algebraic Geometry.
- Fraunhofer Institute ITWM, Kaiserslautern, Germany, February 11  
 Title: Four-bars, Zebra Fish, and Tumor Growth.
- AMS-SIAM Special Session on Applications of Algebraic Geometry, I  
 Joint Mathematics Meeting, San Francisco, CA, January 16  
 Title: Zebra Fish, Tumor Growth, and Algebraic Geometry.
- 2009 Workshop on Complexity of Numerical Computation  
 Fields Institute, Toronto, October 21  
 Title: Zebra Fish, Tumor Growth, and Algebraic Geometry.
- Department of Mathematics  
 Western Michigan University, October 1  
 Colloquium Title: Zebra Fish, Tumor Growth, and Algebraic Geometry.
- Projective Algebraic Geometry in Milano  
 University of Milan, Italy, June 11-12  
 Title: Zebra Fish, Cancer, and Algebraic Geometry.
- Joint Mathematics Meeting, Washington, D.C., January 7  
 AMS Special Session on Computational Algebra and Convexity  
 Title: A Numerical Local Dimension Test for Algebraic Sets
- 2008 ApCoA 2008: Workshop on Approximate Commutative Algebra  
 Research Institute for Symbolic Computation (RISC)  
 Hagenberg-Linz, Austria, July 24–26  
 Title: Recent Results in Numerical Algebraic Geometry.
- Department of Mathematics, KTH, Stockholm, Sweden, June 11  
 Colloquium Title: A Brief Introduction to Numerical Algebraic Geometry.
- 2007 Electrical and Computer Engineering Department  
 North Carolina State University, Raleigh, October 19  
 Title: Numerical Algebraic Geometry.
- De Paul University, Chicago, October 5  
 American Mathematical Society Sectional Meeting  
 Numerical and Symbolic Techniques in Algebraic Geometry and Its Applications  
 Title: Recent Results in Numerical Algebraic Geometry.
- Mathematics Department, University of California at Berkeley, October 2  
 Commutative Algebra and Algebraic Geometry Seminar  
 Title: Recent Results in Numerical Algebraic Geometry.



- Mathematics Department, University of Western Ontario, Canada, July 24  
 Title: Numerical Algebraic Geometry.
- Projective Geometry and Commutative Algebra in Applications  
 Department of Mathematics, University of Genova, Italy, June 15–16  
 Title: Recent Results in Numerical Algebraic Geometry
- University of Zurich, Switzerland, June 11  
 Oberseminar: Algebraische Geometrie  
 Title: A Survey of Numerical Algebraic Geometry
- Algebraic Geometry in Higher Dimensions, Levico Terme, Trento, Italy, June 3–9  
 Title: Recent Progress in Numerical Algebraic Geometry.
- University of Zurich, Switzerland, May 23  
 Arbeitsgemeinschaft in Codierungstheorie und Kryptographie  
 Title: Numerical Algebraic Geometry: using numerical analysis  
 to do algebraic geometry computations
- Mathematics Department, Colorado State University, Fort Collins, April 17  
 Algebra Seminar: An introduction to numeric algebraic geometry
- Department of Mathematics, University of Connecticut at Storrs, March 15  
 Colloquium Title: Overview of Numerical Algebraic Geometry.
- Air Force Office of Scientific Research/National Science Foundation Conference  
 New Directions in Complex Data Analysis for Emerging Applications,  
 Breckenridge, Colorado, March 4–7.  
 Talk Title: Numerical Algebraic Geometry.
- 2006 School of Mathematics, University of Minnesota, October 6  
 Colloquium Title: Computing the Genus of a Curve Numerically.
- Algebraic geometry and applications seminar,  
 Institute for Mathematics and Its Applications IMA,  
 University of Minnesota, September 13  
 Talk Title: Solving Polynomial Systems by Homotopy Continuation.
- Komplexe Analysis, Oberwolfach, Germany, August 31  
 Talk Title: Exceptional Sets and Fiber Products
- Satellite Conference on Algebraic Geometry  
 Segovia, Spain, August 16–19, 2006  
 Plenary Lecture: Numerical Algebraic Geometry.
- Mathematics Roundtable (together with Parker Ladwig)  
 of the Physics-Astronomy-Mathematics Division,  
 Special Libraries Association Meeting, Baltimore, Maryland, June 13  
 Topic presented and discussed: Half-life of Journal Citations.
- Approximate Commutative Algebra,  
 Johann Radon Institute for Computational and Applied Mathematics,  
 Linz, Austria, February 20–24, 2006  
 Keynote Address: Adaptive Multiprecision and Numerical Algebraic Geometry.
- Computer Science Department, University of Utah, Salt Lake City, January 31  
 Colloquium Title: Adaptive Multiprecision and  
 Efficient Numerical Solution of Polynomial Systems.
- Special Session on Symbolic-Numeric Computation and Applications,  
 American Mathematical Society Meeting, San Antonio, Texas, January 16  
 Talk Title: Exceptional Sets and Fiber Products.
- 2005 Challenges in Linear and Polynomial Algebra in Symbolic Computation  
 Software, Banff International Research Station, Canada,

- October 1–6, 2005  
 Workshop on geometry and symmetry in numerical computation, in honor  
 of Eugene Allgower, Colorado State University, August 8–10, 2005  
 Symposium on Dynamical System and Numerical Analysis, in honor of  
 Tien-Yien Li, Hsinchu, Taiwan, May 10–12, 2005
- 2004 Fall AMS Central Section Meeting, Northwestern University  
 Special Session on “Solving Polynomial Systems”  
 Komplexe Analysis, Oberwolfach, Germany  
 Universität des Saarlandes, Saarbrücken, Germany  
 Asymptotic and Effective Results in Complex Geometry,  
 Johns Hopkins Univ.
- 2003 University of Minnesota, Minneapolis
- 2002 Presentation of the Milan Journal of Mathematics and  
 Its Editorial Board, Milan, Italy  
 Applied Mathematics Seminar, University of Illinois at Chicago  
 Foundations of Computational Mathematics  
 Institute for Mathematics and Its Applications, Minneapolis
- 2001 Conference in Honor of Alan Huckleberry, Bochum, Germany  
 NATO Advance Research Workshop: Application of Algebraic Geometry  
 to Coding Theory, Physics, and Computation, Eilat, Israel  
 University of Bayreuth, Germany  
 University of Milan, Italy  
 University of Genova, Italy  
 The Johns Hopkins University, Baltimore, Maryland
- 2000 Komplexe Analysis, Oberwolfach, Germany  
 (Clay Mathematics Institute Emissary to the Conference)  
 AMS-IMS-SIAM Conference on Algorithms, Computational Complexity, and  
 Models of Computation for Nonlinear and Multivariate Problems,  
 Mount Holyoke College, South Hadley, Massachusetts  
 University of California at Riverside, California  
 Michigan State University, Lansing, Michigan  
 University of British Columbia, Vancouver, Canada
- 1999 Foundations of Computational Mathematics 99, Oxford University, England  
 Colorado State University, Fort Collins, Colorado  
 K.T.H. (Royal Institute of Technology), Stockholm, Sweden
- 1998 Conference in honor of Michael Schneider, University of Bayreuth, Germany  
 Hirzebruch 70 Conference, University of Warsaw, Poland  
 University of Bayreuth, Germany
- 1997 University of Milan, Italy (four talks)  
 University of Genova, Italy  
 University of Bayreuth, Germany
- 1996 Washington University, St. Louis, Missouri  
 University of Leiden, The Netherlands  
 University of Bayreuth, Germany (two talks)  
 Mathematical Sciences Research Institute, Berkeley, California  
 Japan–U.S.A. Conference on Algebraic Geometry  
 The Johns Hopkins University, Baltimore, Maryland
- 1995 Oklahoma State University, Stillwater, Oklahoma (2 talks)  
 AMS-SIAM Summer Seminar on Numerical Analysis, Park City, Utah

- University of Göttingen
- 1994 University of Bayreuth, Germany  
Complex Geometry, Trento, Italy
- 1993 Max-Planck-Institut für Mathematik, Bonn, Germany (2 talks)  
Complex Algebraic Geometry, Bayreuth, Germany  
Hirzebruch 65 Conference at Bar Ilan University, Tel Aviv, Israel  
University of Trento, Italy (2 talks)  
University of Illinois at Chicago
- 1992 University of Bayreuth, Germany  
University of Göttingen, Germany
- 1991 University of Bayreuth, Germany  
Max Planck Institute for Mathematics, Bonn, Germany (2 talks)  
Projective Classification of Varieties, Oberwolfach, Germany  
U.S.-Japan Complex Algebraic Geometry Conference  
The Johns Hopkins University, Baltimore, Maryland
- 1990 University of L'Aquila, Italy (4 talks)  
Geometry of Complex Algebraic Varieties, Cetraro, Italy  
Complex Algebraic Varieties, University of Bayreuth, Germany
- 1989 University of Milan, Italy (3 talks)  
University of Genova, Italy  
University of Missouri at Columbia, Missouri  
Vector Bundles and Special Projective Embeddings, Bergen, Norway  
Midwest Algebraic Geometry Conference, Ann Arbor, Michigan
- 1988 University of Bayreuth, Germany  
Yale University  
University of Albuquerque, New Mexico (2 talks)  
Hyperplane Sections and Related Topics, L'Aquila, Italy  
(Principal Speaker—4 talks)  
Complex Geometry VII, Trento, Italy
- 1987 University of L'Aquila, Italy (2 talks)  
University of Genova, Italy (2 talks)  
University of Milan, Italy (2 talks)  
University of Essen  
University of Göttingen  
University of Heidelberg  
Max Planck Institute for Mathematik, Bonn, Germany  
Complex Geometry VI, Trento, Italy  
Algebraic Geometry, Columbia University, New York, N.Y.
- 1986 General Motors Research Laboratories, Warren, Michigan  
University of Regina, Regina, Saskatchewan, Canada  
University of Munich, Germany  
University of Bayreuth, Germany  
University of Genova, Italy, (six lectures)  
University of Milan, Italy (2 talks)  
Singularities, University of Iowa City, Iowa  
Complex Geometry V, Trento, Italy
- 1985 Complex Analysis and Algebraic Geometry,  
Math. Inst., Göttingen, Germany  
Complex Geometry, University of Nancy I, Nancy, France

- AMS, Regional Meeting, Columbia, Missouri (Principal Speaker)
- 1984 Tokyo Metropolitan University  
 University of Bonn, Germany  
 Max Planck Institute for Mathematics, Bonn, Germany  
 University of Leiden, The Netherlands  
 University of Essen, Germany  
 University of Hamburg, Germany  
 Complex Geometry V, Trento, Italy  
 Joint USA/Japan Complex Singularities Conference,  
 Tsukuba, Ibaraki, Japan  
 Complex Singularities, Research Inst. for Math, Science, Kyoto, Japan  
 Complex Geometry III, Trento, Italy  
 Algebraic Geometry, Lake Wigry, Poland, (Principal Speaker–7 lectures)  
 Complex Analysis, Oberwolfach, Germany
- 1983 USA-France Conference on Singularities, Ecole Poly., Paris, France  
 Purdue University
- 1982 Algebraic Group Actions on Algebraic Varieties, Nowy Sacz, Poland  
 Classification of Algebraic and Analytic Manifolds  
 Taniguchi Foundation Conference, Katata, Japan  
 Algebraic Geometry, Kobe, Japan  
 AMS Symposium on Several Complex Variables,  
 University of Wisconsin, Madison  
 The Johns Hopkins University  
 University of Osaka, Japan  
 University of Tokyo, Japan  
 University of Hokkaido at Sapporo, Japan  
 University of Warsaw, Poland
- 1981 Threefolds Conference, Varenna, Italy  
 $G_m$  Action Conference, Univ. of British Columbia  
 AMS Symposium on Singularities, Humboldt Univ., Arcata, California  
 University of Washington, Seattle  
 University of Kentucky  
 University of British Columbia, Vancouver, B.C.
- 1980 University of Washington, Seattle  
 University of Michigan, Ann Arbor  
 Midwest Algebraic Geometry Conference, Univ. of Illinois at Chicago  
 Pacific Northwest Geometry Conference, Univ. of Washington, Seattle
- 1979 University of Kaiserslautern  
 University of Bonn  
 University of Notre Dame  
 University of Regensburg  
 Invariant Theory, Oberwolfach, Germany

**Meetings attended by Invitation since 1979 (with no talk given)**

- 2008 Interactions of Classical & Numerical Algebraic Geometry  
 University of Notre Dame, Indiana
- 2004 Workshop on Some New Mathematical Opportunities at DARPA  
 Classical Algebraic Geometry, Oberwolfach, Germany

**Professional Society Affiliations** Society for Industrial and Applied Mathematics, American Mathematical Society.

Other Affiliations: Member of Phi Beta Kappa, American Friends of the Alexander von Humboldt Foundation.

**Research Specialities** Numerical Algebraic Geometry (Numerical Analysis of Polynomial Systems), Numerical Partial Differential Equations, Complex Algebraic Geometry.

**Updated: August 20, 2019**