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University of Notre Dame Du Lac
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Positions held

2011– 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. Duncan 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 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– : *Advances in Geometry*
 2001– : *Milan Journal of Mathematics*
 2011– : *Journal of Algebra and its Applications*

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.

Other Honors 1997: University of Notre Dame Presidential Award

Recent Research Support:

- 2011-2012 NSF DMS 1115453 \$20,000 (PI Joseph Powers, Aerospace and Mechanical Engineering, University of Notre Dame)
Workshop on Verification and Validation in Computational Science; Fall 2011; Notre Dame, IN
- 2009-2010 NSF DMS 0902504 \$20,000 (PI Joseph Powers, Aerospace and Mechanical Engineering, University of Notre Dame)
Workshop for Model Reduction in Reactive Flows; Spring 2009; Notre Dame, IN
- 2007-2011 NSF DMS-0712910 \$360,000 (PI Andrew Sommese)
Numerical Algebraic Geometry: Computation of Exceptional Parameter Values.
- 2007-2010 NSF CBET 0650843 \$299,998 (PI Joseph Powers)
Slow Invariant Manifolds for Spatially Homogeneous and Inhomogeneous Combustion Systems with Detailed Kinetics
- 2004-2009 NSF DMS 0410047 \$302,729 (PI Andrew Sommese)
Collaborative Research : Numerical Algorithms and Software for Solving Polynomial Systems with Parameters.
- 2005-2006 NSF DMS 0509873 \$16,650 (PI Simon Tavener, Colorado State University)
Workshop on Geometry and Symmetry in Numerical Computation
- 2001-2005 NSF DMS 0105653 \$179,965 (PI Andrew Sommese)
Collaborative Research : Numerical Algorithms and Software for Decomposing Solution Sets of Polynomial Systems

Research Stays at Mathematics Institutes

- 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

Major University Committees since 1992

2012– Multi-disciplinary Research Committee
 2009– Advisory Committee for the Center for Research Computing (CRC)
 2008–2011 Hesburgh Library Renovation 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 *Kaneb Teaching and Learning Center*
 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.

Current Ph.D. Students: Wenrui Hao, Timothy McCoy.

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.

[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.

Edited Volumes

- [5] 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.
- [6] 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.
- [7] 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.

Software

- [8] D.J. Bates, J.D. Hauenstein, A.J. Sommese, and C.W. Wampler. Bertini: Software for Numerical Algebraic Geometry. Available at www.nd.edu/~sommese/bertini.

Articles

1973

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

1974

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

1975

- [14] A.J. Sommese, Criteria for quasi-projectivity, *Math. Ann.* 217 (1975), 107–116.
- [15] 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.
- [16] A.J. Sommese, Quaternionic manifolds, *Math. Ann.* 212 (1975), 191–214.
- [17] A.J. Sommese, A representable functor theorem for compact complex spaces, *Proc. Amer. Math. Soc.* 52 (1975), 11–17.

1976

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

1977

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

1978

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

1979

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

1981

- [33] A.J. Sommese, Hyperplane sections, *Springer Lect. Notes in Math.* 862 (1981), 232–271.
- [34] 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.

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

1982

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

1983

- [38] J. Carrell and A.J. Sommese, $SL(2, C)$ actions on compact Kaehler manifolds, *Trans. Amer. Math. Soc.* 276 (1983), 165–179.
- [39] 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.
- [40] 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.
- [41] A.J. Sommese, Some examples of C^* actions, *Proceedings Vancouver 1981*, Springer Lect. Notes in Math. 956 (1983), 118–124.
- [42] A.J. Sommese, A convexity theorem, *Proceedings of Symposia in Pure Math.* 40 (1983), Part 2, 497–505.
- [43] 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.
- [44] A. Bialynicki-Birula and A.J. Sommese, Quotients by C^* and $SL(2, C)$ actions, *Trans. Amer. Math. Soc.* 279 (1983), 519–543.
- [45] 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.
- [46] J. Carrell and A.J. Sommese, Filtrations of meromorphic C^* actions on complex manifolds, *Math. Scand.* 53 (1983), 25–31.
- [47] 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

- [48] A.J. Sommese, On the density of ratios of Chern numbers of algebraic surfaces, *Math. Ann.* 268 (1984), 207–221.
- [49] 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

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

1986

- [54] A.J. Sommese and A. Van de Ven, Homotopy groups of pullbacks of varieties, Nagoya Math. J. 102 (1986), 79–90.
- [55] 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.
- [56] 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.
- [57] 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.
- [58] A.J. Sommese, Ample divisors on Gorenstein varieties, Revue de l’Institut E. Cartan, Nancy, 10 (1986) Journal Complexe 1985.
- [59] 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

- [60] 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.
- [61] 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.
- [62] M. Beltrametti and A.J. Sommese, A criterion for a variety to be a cone, Comment. Math. Helv. 62 (1987), 417–422.
- [63] A.J. Sommese and A. Van de Ven, On the adjunction mapping, Math. Ann. 278 (1987), 593–603.

- [64] 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

- [65] M. Beltrametti and A.J. Sommese, On generically polarized Gorenstein surfaces of sectional genus 2, J. Reine Angew. Math. 386 (1988), 172–186.
- [66] 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.
- [67] 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.
- [68] A. Lanteri and A.J. Sommese, A vector bundle characterization of P^n , Abh. Math. Sem. University Hamburg 58 (1988), 89–96.

1989

- [69] A. Morgan and A.J. Sommese, Coefficient-parameter polynomial continuation, Appl. Math. Comput. 29 (1989), 123–160; Erratum, 51 (1992), p. 207.
- [70] 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.
- [71] 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.
- [72] M. Andreatta and A.J. Sommese, The adjunction process for singular varieties, Forum Math. 1 (1989), 143–152.
- [73] M. Beltrametti, P. Francia, and A.J. Sommese, On Reider’s method and higher order embeddings, Duke Math. J. 58 (1989), 425–439.
- [74] M. Andreatta and A.J. Sommese, Generically ample divisors on normal Gorenstein surfaces, Singularities, Contemporary Math. 90 (1989), 1–20.
- [75] M. Beltrametti, A. Biancofiore, and A.J. Sommese, Projective n -folds of log general type. I, Trans. Amer. Math. Soc. 314 (1989), 825–849.
- [76] 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.
- [77] 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.
- [78] 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

- [79] 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.

- [80] 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.
- [81] 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.
- [82] 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.
- [83] 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.
- [84] M. Beltrametti and A.J. Sommese, On the relative adjunction mapping, Math. Scand. 65 (1989), 189–205.
- [85] M. Beltrametti, M. Schneider, and A.J. Sommese, The threefolds of degree 9 and 10 in P^5 , Math. Ann. 288 (1990), 413–444.
- [86] M. Andreatta and A.J. Sommese, Classification of irreducible projective surfaces of smooth sectional genus ≤ 3 , Math. Scand. 67 (1990), 198–214.

1991

- [87] A. Morgan, A.J. Sommese, and C.W. Wampler, Computing singular solutions to nonlinear analytic systems, Numerische Math. 58 (1991), 669–684.
- [88] M. Beltrametti, M. L. Fania, and A.J. Sommese, On projective classification of algebraic varieties via adjunction theory, Math. Ann. 290 (1991), 31–62.
- [89] M. Beltrametti and A.J. Sommese, New properties of special varieties arising from adjunction theory, J. Math. Soc. Japan 43 (1991), 381–412.
- [90] 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.
- [91] 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

- [92] A. Morgan, A.J. Sommese, and C.W. Wampler, Computing singular solutions to polynomial systems, Advances in Appl. Math. 13 (1992), 305–327.
- [93] 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.

- [94] 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.
- [95] 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.
- [96] M. Beltrametti and A.J. Sommese, On the adjunction theoretic classification of polarized varieties, *J. Reine Angew. Math.* 427 (1992), 157–192.
- [97] 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.
- [98] M. Beltrametti, M.L. Fania, and A.J. Sommese, On the discriminant variety of a projective manifold, *Forum Math.* 4 (1992), 529–547.

1993

- [99] 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.
- [100] M. Beltrametti and A.J. Sommese, On the preservation of k -very ampleness under adjunction, *Math. Z.* 212 (1993), 257–284.
- [101] 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.
- [102] M. Beltrametti and A.J. Sommese, A remark on the Kawamata rationality theorem, *J. Math. Soc. Japan.* 45 (1993), 557–568.

1994

- [103] 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.
- [104] M.C. Beltrametti and A.J. Sommese, Special results in adjunction theory in dimension four and five, *Arkiv Mat.* 31 (1993), 197–208.
- [105] 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.
- [106] 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.
- [107] 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.

[108] 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).

[109] 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

[110] 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.

[111] 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.

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

[113] 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

[114] 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.

[115] 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.

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

[117] 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.

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

1997

[119] 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.

[120] 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.

[121] 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.

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

1998

- [123] M. Beltrametti and A.J. Sommese, Sharp Matsusaka-type theorems on surfaces, *Math. Nachr.* 191 (1998), 5–17.
- [124] 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.
- [125] M. Kim and A.J. Sommese, Two results on branched coverings of Grassmannians, *J. Math. Kyoto University* 38 (1998), 21–27.

1999

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

2000

- [130] 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.
- [131] 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.
- [132] 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.
- [133] M. Beltrametti and A.J. Sommese, Projective manifolds with small pluridegrees, *Trans. Amer. Math. Soc.* 352 (2000) 3045–3064.
- [134] S. Kebekus, T. Peternell, A.J. Sommese, and J.A. Wiśniewski, Projective contact manifolds, *Inventiones Math.* 142 (2000), 1–15.
- [135] 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.
- [136] A.J. Sommese, What we know about the second adjunction mapping, *Rendiconti del Seminario Matematico e Fisico di Milano* 67 (1997), 49–75 (2000).

- [137] 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

- [138] 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.
- [139] 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.
- [140] 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.
- [141] 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.
- [142] 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

- [143] S. Kebekus, T. Peternell, and A.J. Sommese, Manifolds with nef rank 1 subsheaves in Ω_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.
- [144] E.L. Allgower and A.J. Sommese, Piecewise linear approximations of smooth fibers, *J. Complexity* 18 (2002), 547–556.
- [145] M. Beltrametti, K. Chandler, and A.J. Sommese, Reducible hyperplane sections II, *Kodai Math. J.* 25 (2002), 139–150.
- [146] H. Maeda and A.J. Sommese, Very ample vector bundles of curve genus two, *Archiv der Mathematik* 79 (2002), 74–80.
- [147] 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.
- [148] 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

- [149] 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.

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

2004

- [151] 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.
- [152] A.J. Sommese, J. Verschelde, and C.W. Wampler, Numerical factorization of multivariate complex polynomials, *Theoretical Computer Science* 315 (2004), 651–669.
- [153] 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.
- [154] 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.
- [155] 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.
- [156] 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.
- [157] 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

- [158] A.J. Sommese, J. Verschelde, and C.W. Wampler, An intrinsic homotopy for intersecting algebraic varieties, *Journal of Complexity*, 21 (2005), 593–608.
- [159] 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.
- [160] H. Maeda and A.J. Sommese, Notes on very ample vector bundles on 3-folds, *Archiv der Mathematik*, 85 (2005), 527–537.
- [161] J.P. Ladwig and A.J. Sommese, Using cited half-life to adjust download statistics, *College & Research Libraries*, 66 (2005) 527–542.
- [162] 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

- [163] 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.

- [164] 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

- [165] J. Diller, D. Jackson, and A.J. Sommese, Invariant curves for birational surface maps, *Trans. Amer. Math. Soc.* 359 (2007), 2973–2991.
- [166] 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.
- [167] 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.
- [168] 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.
- [169] 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

- [170] 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.
- [171] A.J. Sommese and C.W. Wampler, Exceptional sets and fiber products, *Foundations of Computational Mathematics* 8 (2008), 171–196.
- [172] 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

- [173] D.J. Bates, J.D. Hauenstein, A.J. Sommese, and C.W. Wampler, Stepsize control for path tracking, *Contemporary Mathematics* 496 (2009), 21–31.
- [174] 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.
- [175] 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).

- [176] 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

- [177] M.C. Beltrametti, A. Lanteri, and A.J. Sommese, Hilbert curves of polarized varieties, *Journal of Pure and Applied Algebra*, 214 (2010) 461–479.
- [178] 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.
- [179] 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.
- [180] J.D. Hauenstein and A.J. Sommese, Witness sets of projections, *Applied Mathematics and Computation* 217 (2010), 3349–3354.

2011

- [181] J.D. Hauenstein, A.J. Sommese, and C.W. Wampler, Regeneration homotopies for solving systems of polynomials, *Mathematics of Computation*, 80 (2011) 345–377.
- [182] 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.
- [183] 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.
- [184] 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.
- [185] C.W. Wampler and A.J. Sommese, Numerical Algebraic Geometry and Algebraic Kinematics, *Acta Numerica* 20 (2011), 469–567.
- [186] 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.
- [187] 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.
- [188] 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.

- [189] 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. Pbay, J. M. Rojas, and D. C. Thompson, Contemporary Mathematics, 556 (2011), 25–35, American Mathematics Society.
- [190] D.J. Bates, J.D. Hauenstein, and A.J. Sommese, Efficient pathtracking methods, *Numerical Algorithms*, 58 (2011), 451–459: available at doi:10.1007/s11075-011-9463-8.

2012

- [191] 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 doi:10.1016/j.nonrwa.2011.08.010.

Articles that are accepted but have not yet appeared

- [192] 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, to appear *Journal of Scientific Computation*.

Preprints

- [193] D.J. Bates, J.D. Hauenstein, T. McCoy, C. Peterson, and A.J. Sommese, Recovering exactness from numerical data in algebraic geometry.
- [194] Z.A. Griffin, J.D. Hauenstein, C. Peterson, and A.J. Sommese, Numerical computation of the Hilbert function of a zero-scheme.
- [195] G.M. Besana, S. Di Rocco, J.D. Hauenstein, A.J. Sommese, and C.W. Wampler, Cell decomposition of almost smooth real algebraic surfaces.
- [196] W. Hao, J.D. Hauenstein, B. Hu, and A.J. Sommese, A domain decomposition algorithm for computing multiple steady states of differential equations.
- [197] 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.
- [198] W. Hao, A.J. Sommese, and Z. Zeng, An algorithm and software for computing multiplicity structures at zeros of nonlinear systems.

Book Reviews

- [199] 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.
- [200] 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.
- [201] 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.

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- 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), Complex Algebraic Geometry.

Updated: January 16, 2012