VITA AND BIBLIOGRAPHY

C. HERBERT CLEMENS

Position: Professor, Mathematics Department, Ohio State University, Columbus, OH 43210
Visiting Research Professor, University of Utah, Salt Lake City, UT 84112

Birthdate: August 15, 1939
Birthplace: Dayton, Ohio

Academic Degrees:
A.B. 1961 Holy Cross College
M.A. 1964 University of California, Berkeley
Ph.D. 1966 University of California, Berkeley (Advisor: Phillip A. Griffiths)

Research Area: Complex Geometry

Professional Experience:
Research and University Teaching:
1966 Peace Corps training for Peru and Chile
1966-68 Profesor Regular de Matematicas, Universidad Técnica del Estado, Santiago de Chile
1968-70 Member, School of Mathematics, Institute for Advanced Study, Princeton
1969 (summer) Visiting Assistant Professor, University of California, Berkeley
1970 Senior Fulbright Lecturer (Chile)
1970-72 Assistant Professor, Columbia University
1972-73 Profesor UTE, Santiago, Chile, Project Coordinator, Ford Foundation grant to UTE mathematics program
1973 (winter) Visiting Assistant Professor, Harvard University
1973-75 Associate Professor, Columbia University (tenure 1975)
1975-76 Associate Professor, University of Utah
1976-2002 Professor, University of Utah (tenure 1976)
1997-98 Visiting Professor, Scuola Normale Superiore, Pisa, Italy
2001-02 Director's Visitor, Institute for Advanced Study, Princeton
2002-19 Professor, Ohio State University
2013-17 Visiting Research Professor, University of Utah
2019-present Professor Emeritus, Ohio State University

Primary and Secondary Teaching:
l979-84 Parent Cooperative Teacher in Mathematics, Rosslyn Heights Elementary School, Salt Lake City, Utah
1985-86 Geometry Teacher, Bryant Intermediate School, Salt Lake City, Utah

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Date: August 24, 2019.

1995-97 Site director, Utah site of IAS/Park City Mathematics Institute

1993-2002 Mathematical Director, 'Ndahoo'aah: A geometry/computer design/Navajo culture and craft program for middle and secondary students, Monument Valley High School, Monument Valley, Utah

Institute Administration:

1992-1995 Director, Institute for the Theory and Application of Mathematics, University of Utah

1992-1993 Organizer, MSRI Special Year in Algebraic Geometry, Berkeley, California

1990-1993 Director, NSF Regional Geometry Institute, Park City, Utah

1992-1994 Director, NSF Elementary Mathematics Through Teacher Partnerships grant, Washington Elementary School, Salt Lake City, Utah

1993-1997 Member, Steering Committee, Park City Mathematics Institute, Institute for Advanced Study, Princeton, NJ

1994-1996 Academic Director, Mathematics, National Leadership Program for Teachers, Woodrow Wilson National Fellowship Foundation

1999-2006 Chair, Steering Comm., IAS Park City Mathematics Institute

2014-2017 Director, Math for America Utah

Academic Honors and Invited Lectures:

1970 Fulbright Fellowship

1973-75 Sloan Fellowship

1974 Invited Speaker, International Congress of Mathematicians, Vancouver, Canada

1976 C.I.M.E. Lectures, Cortona, Italy

1981 C.I.M.E. Lectures, Varena, Italy

1983 Distinguished Research Award, University of Utah, Salt Lake City, Utah

1985 Invited Lecture Series, AMS Summer Institute in Algebraic Geometry, Bowdoin College, Maine

1986 Invited Speaker, International Congress of Mathematicians, Berkeley, California

2000 Silver Medal of the Italian Mathematical Union

2001 Distinguished Professor, University of Utah

2002 E.A.G.E.R. Lectures, Levico Terme, Italy

2002 Invited Speaker, Abel Bicentennial Conference, Oslo, Norway

2002 Laurea de honoris causa, Universitá di Torino, Italia

2008 American Mathematical Society Distinguished Service Award

2011 Doctor de honoris causa, Universidad de Santiago, Chile

2013 Americas Prize, 2013 Mathematical Congress of the Americas

Professional Committees:

1984-1988, 2002- Committee for Human Rights of Mathematicians, AMS

1985-1987 Committee on Mathematics, National Research Council

1985-1987 Mathematical Sciences Education Board, National Research Council

1985-1994 Editor, Pacific Journal of Mathematics

1990-1993 Member, Council of American Mathematical Society

1995-1998 Member, Commission on Development and Exchanges of the International Mathematical Union

1999-2006 Secretary/Treasurer, Commission on Development and Exchanges of the International Mathematical Union

1999-2001, 2014- Member, Committee on Education, AMS

2000-2001 National Assessment of Educational Progress 2004 Planning Committee

2002-2005 Member, U.S. National Committee for Mathematics Instruction, NRC

2004-2010 Chair, Developing Countries Strategy Group, International Mathematical Union

2005-2009, U.S. National Committee for Mathematics, NRC

2006-2007 Governor's Science and Mathematics Education Policy Advisory Council, State of Ohio

2007-2019 Mentoring African Research in Mathematics Board Member (London Math. Soc.)

2007-2019 Member, MSRI Mathematics Education Advisory Committee

2007-2009 Chair, U.S. National Committee for Mathematics, NRC

2011-2015 Secretary, Commission for Developing Countries, International Mathematical Union

2012-2014 Chair, Conference Board of the Mathematical Sciences

Consulting:

2002-2010 Africa Mathematics Millennium Science Initiative (Science Institutes Group)

2005-2015 National Assessment of Educational Progress, 12th-Grade Mathematics Standing Committee

2011-2012 Chair, Planning Committee, African Mathematics Project, Simons Foundation

2011-2014 Chair, CMBS Ad Hoc Committee on Teachers as Professionals

Bibliography:

Articles - Mathematics:

1. "Picard-Lefschetz theorem for families of algebraic varieties acquiring ordinary singularities," Trans. Amer. Math . Soc., **136**(1969), 93-108.

2. "On linear system-to-network realization," (Principal author: Carlos A. Holzmann), Proceedings of Eleventh Midwest Symposium on Circuit Theory, University of Notre Dame, May, 1968.

3. "The intermediate Jacobian of the cubic threefold," (with Phillip Griffiths), Annals of Mathematics, **95**(1972), 281-356.

4. "Some applications of Prym varieties," Proc. of International Congress of Mathematicians, Vancouver, B.C., 1974, Vol. 1, 415-422.

5. "Degeneration of Kähler manifolds," Duke Math. Journal, **44** (1977), 215-290.

6. "A result on the integral Chow ring of a generic principally polarized complex Abelian variety of dimension four," (with Charles Barton), Compositio Math., **34**(1977), 49-67.

7. "Van de Ven's Theorem," Proc. I. Coloquio de Matematicas, Agosto, 1979, Centro de Investigacion y de Estudios Avanzados, Mexico, Ed. Horacio Tapia R.

8. "Applications of asymptotic Hodge theory to the study of threefolds," Rend. del Sem. Mate. Univ. Torino, Italia. **39**(1981), no. 1.

9. "On extending Abel-Jacobi mappings," Preprint, University of Utah (1981).

10. "Degeneration techniques in the study of threefolds–six lectures," Algebraic Threefolds, Varenna, Italy, June 1981. Springer: Lecture Notes in Mathematics, No. **947** (1982), 93-154.

11. "On the one-motif associated to of a simply connected complex projective threefold," (with J. Carlson and J. Morgan), Ann. Ecole Norm. Sup. **XIV**(1982), 323-338.

12. "Double solids," Advances in Math., **47**(1983), no. 2, 107-230.

13. "On the surjectivity of Abel-Jacobi mappings," Annals of Math., **117**(1983), 71-76.

14. "The Neron model for families of intermediate Jacobians acquiring 'algebraic singularities," Publ. Math. I.H.E.S., **58**(1983), 217-230.

15. "Homological equivalence, modulo algebraic equivalence, is not finitely generated," Publ. Math. I.H.E.S., **58**(1983), 231-250.

16. "Some results on Abel-Jacobi mappings," Chapter XVI, Topics in Transcendental Algebraic Geometry, Annals of Math. Studies (1983), 289-304.

17. "A note on some formal properties of the infinitesimal Abel-Jacobi mapping," Proc. Rome Conference on Algebraic Geometry, June, 1984.

18. "The infinitesimal Abel-Jacobi mapping for hypersurfaces," Proc. Lefschetz Centennial Conference, Mexico City, Dec., 1984, Contemporary Mathematics, AMS **58**, Part I (1986) 81-89.

19. "The local geometry of the Abel-Jacobi mapping," Proc. of AMS Summer Inst. on Alg. Geom., Bowdoin College, 1985. Proc. Symp. Pure Math., AMS, **46**, 223-224.

20. "Curves on generic hypersurfaces," Ann. Ec. Norm. Sup., Paris. XIX(1986), 629-636.

21. "Higher dimensional complex geometry," Lecture Notes, University of Utah, Summer, 1987 (with J. Kollár and S. Mori), Asterisque , **166**(1988).

22. "D-modules and subcanonical deformations," (with P. Burchard), Preprint, University of Utah, 1990.

23. "The infinitesimal Abel-Jacobi mapping and moving the $\mathcal{O}(2) + \mathcal{O}(-4)$ curve," Duke Math. J., **59**(1989), 233-240.

24. "An obstruction to moving multiples of subvarieties," Proc. of Conf. on Hyperplane Sections, L'Aquila, Italy June, l988, Springer Lecture Notes in Mathematics.

25. "The quartic double solid revisited," Proceedings, AMS Symposium on Pure Mathematics, Sundance, Utah, May, 1989.

26. "The fibre of the Prym map and the period map for double solids, as given by Ron Donagi," Preprint, Univ. of Utah, 1989.

27. "Counting curves which move with threefolds," (with H. Kley) J. Alg. Geom., **9**(2000), 175-200.

28. "Normal differential operators and deformation theory," (with P. Burchard) Recent Progress in Intersection Theory Intersection Theory, Birkhäuser (2000) 33-84.

29. "A local proof of Petri's conjecture at the general curve," AG/9810010 (1999). J. Diff. Geom. **54**(2000), no.1, 139-176.

29e. "Erratum: A local proof of Petri's conjecture at the general curve," J. Diff. Geom. **77**(2007), 1-5.

30. "On the geometry of formal Kuranishi theory," math.AG/9901084 (rev. 2002) Advances in Math. **198**(2005), 311-365.

31. "Moduli schemes associated to K-trivial threefolds as gradient schemes," math.AG/0206219 (2002). J. Alg. Geom. **14**(2005), 705-739.

32. "Cohomology and Obstructions III: A variational form of the generalized Hodge conjecture on K-trivial threefolds," math.AG/9809127 (rev. 2002).

33. "A new method in Fano geometry," (principal author Z. Ran). Int'l Math. Res. Not. (Duke Univ. Press), **10**(2000), 527-549.

34. "On an example of Voisin," (with H. Kley), Michigan Math. J., **48**(2000), 93-119.

35. "On rational curves in n-space with given normal bundle," Preprint, math.AG/0011115 (2000). Advances in Algebraic Geometry Motivated by Physics. Proceedings of the 952nd AMS Meeting, Lowell, Massachusetts, April 1-2, 2000 (Special Session: Enumerative Geometry in Physics). *Contemporary Mathematics*, AMS (2001).

36. "Deformations of the trivial line bundle and vanishing theorems," (with C. Hacon), math.AG/0011244 (2000). Amer. J. Math., **124**(2002), 769-815.

37. "Twisted genus bounds for subvarieties of generic hypersurfaces," (with Z. Ran), math.AG/0204256 (2002). Amer. J. Math., **126**(2004), 89-120.

38. "A Petri theorem for rank-2 vector bundles with canonical determinant," (with E. Casini), math.AG/0103166 (2002).

39. "Bounding the genus of subvarieties of generic hypersurfaces from below," math.AG/0211257 (2002). Communications in Algebra, **31**(2003), no. 8, 3673-3712.

40. "An analogue of Abel's theorem," Preprint, math.AG/0211282 (2002), *Legacy of Niels Henrik Abel, The Abel Bicentennial Conference, Oslo, 2002*. Springer-Verlag, (2004), 511-530.

41. "A version of Abel's theorem for surfaces," *Proceedings of The Fano Conference, Torino, Italy, Oct. 2002.* Universitá di Torino, Italy (2004).

42. Book review: *Hodge theory and Complex Geometry, I&II*, by Claire Voisin, Bull. AMS, **42**(2005), no. 4, 507-520.

43. "Intersection numbers for normal functions," math.AG/10101543 (2010). J. Alg. Geom. **22**(2013) 565-573.

44. "A Global SU(5) F-theory model with Wilson line breaking," (joint with J. Marsano, T. Pantev, S. Raby, H-H. Tseng). Journal of High Energy Physics January 2013, 2013:150.

Preprints-Mathematics:

1. "Topological versions of Abel-Jacobi, the height pairing, and the Poincaré bundle," (with M. Caibar) [arXiv: math.AG/11044057] (2011).

2. "Heterotic/F-theory Duality and Narasimhan-Seshadri Equivalence." (with S. Raby) [arXiv: hep-th/1906.07238]. (2019)

3. "F-theory over a Fano threefold built from A_4-roots." (with S. Raby) [arXiv: hep-th/1908.01110]. (2019)

4. "Heterotic-**F**-theory Duality with Wilson Line Symmetry-breaking." (with S. Raby) [arXiv: hep-th/1908.01913]. (2019)

Articles - Mathematics Education:

1. "Use of school mathematics study group materials in Chile," Amer. Math. Monthly, October, l969, 895- 896.

2. "Is there a role for mathematicians in mathematics education?" Notices of the AMS, **36**(1989) 542-544.

3. "What do math teachers need to be." (Proceedings of the NCRTE Seminar for Education Policy Makers, February, 1989, Washington, D.C.), Teaching Academic Subjects to Diverse Learners, Teachers College Press (1991), 123-135.

4. "The Geometry Teacher's 'Do-It-Yourself' Kit," Mathematicians and Educational Reform, CMBS Issues in Mathematics Education, vol. 1, AMS, (1990), 181-188.

5. "The Scarlet E," UME Trends, AMS, 1, no. 6(1990).

6. "Research Mathematicians and the Education of Children–A Proposal," Notices of the AMS, **37**(1990), 412-414.

7. "The Standards: A Roadmap for Following the Math," (Book review), Educational Researcher, **22**, No. 4, May 1993, 28-30.

8. "Can university math people contribute significantly to precollege mathematics education (beyond giving a few preservice teachers a few preservice courses)?" Changing the Culture: Mathematics Education in the Research Community. CMBS series Issues in Mathematics Education 5(1995)

9. "Some random reflections on being asked to review 'Calculus from Graphical, Numerical, and Symbolic Points of View, I and II' by Arnold Ostebee and Paul Zorn of St. Olaf College" Math. Intelligencer **18**, No. 4, (1996)

10. Random reactions on browsing the "Principles and Standards for School Mathematics" Notices of the AMS (Oct. 2000).

Books - Mathematics:

1. Scrapbook of Complex Curve Theory. Plenum Press, 1980.
2. Introduction to Hodge Theory. Sc. Norm. Sup., Pisa, 1999.

Book - Secondary Mathematics:

1. Geometry for the Classroom (with M. Clemens). Springer-Verlag, 1991.

Book - Undergraduate Mathematics:

1. "Two-Dimensional Geometries: A Problem-Solving Approach" AMS Undergraduate Text, 2019.

Manuscripts - Mathematics Education:

1. "Graph Paper Fractions Book" (materials on fractions for children in primary school). Preprint, University of Utah.
2. "Graph Paper Geometry Book" (materials on the concept of area for children in primary school). Preprint, University of Utah.

Ph.D. Dissertations directed:

Mathematics:

Enrico Arbarello: Degree completed 9/73. Thesis: "Weierstrass Points and Moduli of Curves."

Leon Masiewicki: Degree completed 5/74. Thesis: "Prym Varieties and the Moduli Space of Curves of Genus Five."

Roy C. Smith: Degree completed 12/77. Thesis: "On the Degree of the Prym Mapping from Curves of Genus Six to Abelian Varieties of Dimension Five."

Guiseppe Ceresa: Degree completed 3/82. Thesis: "C is not Algebraically Equivalent to $(-C)$ in its Jacobian."

Alberto Albano: Degree completed 2/86. Thesis: "Infinite Generation of the Griffiths group–a local proof."

Jesús Jiménez: Degree completed 10/89. Thesis: "Contraction of Non-Singular Curves in Analytic Spaces."

Elham Izadi: Degree completed 6/91. Thesis: "On the Moduli Space of 4 - dimensional Principally Polarized Abelian Varieties."

Randall Westhoff: Degree completed 8/93. Thesis: "Curves and Normal Functions on Higher Dimensional Complex Varieties."

Yongnam Lee: Degree completed 8/97. Thesis: "Degeneration of Numerical Godeaux Surfaces."

Anca Mustata: Degree completed 7/03. Thesis: "The Relative Hilbert Scheme of Lines in the Dwork Pencil of Quintics."

Songyun Xun: Degree completed 6/08. Thesis: "Degree-2 curves in the Dwork pencil."

Christian Schnell: Degree completed 8/08. Thesis: "The boundary behavior of cohomology classes and singularities of normal functions."

Yu-Han Liu: Degree completed 8/10. Thesis: "Gradient ideals."

Jie Wang: Degree completed 12/10. Thesis: "Geometry of general curves via degenerations and deformations."

Xun Yu: Degree completed 6/13. Thesis: "On smooth isolated curves in general complete-intersection Calabi-Yau threefolds."

Ph.D. Theses directed at remote institutions:

Xiaolei Zhao (Univ. of Michigan/Karen Smith) Degree completed 3/15. "Topological Abel-Jacobi Mapping and Jacobi Inversion."

Erjuan Fu (Univ. of Utah/Y-P Lee)) Degree completed 7/19."Homology groups and Lefschetz Fibrations of Riemann Surfaces."

Mathematics Education:

Loreto Porte: Degree completed 6/75. Thesis: "Different Approaches to the Study of Plane Algebraic Curves."

Antonia Kasper: Degree completed 6/76. Thesis: "The Non-elementary Nature of Elliptic Integrals."