

# Max Douglas Wakefield

## Curriculum Vita

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Citizenship: USA  
Born: 7-15-1977, Kodiak, Alaska.

- Education**     **Ph.D. in Mathematics**, UNIVERSITY OF OREGON, June 2006.  
Dissertation: *On the derivation module and apolar algebra of an arrangement of hyperplanes*.  
Advisor: Sergey Yuzvinsky.  
**M.S. in Mathematics**, UNIVERSITY OF OREGON, June 2003.  
**B.S. in Mathematics**, SEATTLE UNIVERSITY, June 2001.
- Academic Positions**     **Visiting Associate Professor**, University of Oregon, Fall 2014.  
**Associate Professor**, United States Naval Academy, August 2013- Present.  
**Assistant Professor**, United States Naval Academy, August 2008- July 2013.  
**NSF International Research Fellow**, Hokkaido University, September 2006 - July 2008.  
**Research Associate**, Mathematical Sciences Research Institute, August 2004 - December 2004.  
**Graduate Teaching Fellow**, University of Oregon, September 2001 - June 2006.
- Research Interests**     Commutative algebra, combinatorics, algebraic geometry, algebraic topology, arrangements of hyperplanes, cryptography, and error-correcting codes.
- Publications**     [1] Derivations of an effective divisor on the complex projective line, *Trans. Amer. Math. Soc.* 359 (2007), 4389-4403. (with S. Yuzvinsky)
- [2] The characteristic polynomial of a multiarrangement, *Adv. Math.* 215 (2007), 825-838. (with T. Abe and H. Terao)
- [3] The Euler multiplicity and addition-deletion theorems for multiarrangements, *J. London Math. Soc.*(2) 77 (2008), no. 2, 335–348. (with T. Abe and H. Terao)
- [4] The Jacobian ideal of a hyperplane arrangement, *Math. Res. Let.* 15 (2008), no. 4, 795-799. (with M. Yoshinaga)
- [5] Pascal arrangements, *Proc. Amer. Math. Soc.* 139 (2011), no. 12, 4461-4766. (with Matthew Miller)
- [6] Derivation radical subspace arrangements, *J. Pure Appl. Algebra*, 215 (2011), no. 6, 1492-1501. (with William Traves)
- [7] Edge colored hypergraphic subspace arrangements, *Pure Appl. Math. Q.*, 8 (2012), no. 3, 757-779. (with Matthew Miller)
- [8] Local cohomology of logarithmic forms on complements of hyperplane arrangements, *Annales de l Institut Fourier*, 63 no. 3 (2013), p. 1177–1203 . (with Graham Denham, Hal Schenck, Mathias Schulze, and Uli Walther)

- [9] Equivalence classes of Latin squares and nets in  $\mathbb{C}\mathbb{P}^2$ , *Ann. Fac. Sci. Toulouse Math.*, (6) 23 (2014), no. 2, 335–351. (with Corey Dunn, Matthew Miller, and Sebastian Zwicknagl)
- [10] Skeleton Simplicial Evaluation Codes, *Des. Codes Cryptogr.*, 72 (2014), no. 3, 609–625. (with James Berg)
- [11] Limits with braid arrangements, submitted, arXiv:1211.5678. (with Matthew Miller)
- [12] The enumerative geometry of hyperplane arrangements, submitted, arXiv:1409.6275. (with Thomas Paul and Will Traves)
- [13] Kazhdan-Lusztig Polynomials for Matroids, submitted, arXiv:1412.7408. (with Ben Elias and Nick Proudfoot)
- [14] Intersection cohomology of the symmetric reciprocal plane, submitted, arXiv:1504.07348. (with Nick Proudfoot and Ben Young)
- [15] Combinatorics of the cohomology of  $k$ -equal arrangements, in preparation. (with Matthew Miller)
- [16] Addition theorems for generators of logarithmic derivation modules, in preparation. (with Takuro Abe and Hiroaki Terao)

#### Grants and Awards

- Dan Kimble Teaching Award**, University of Oregon, 2002.
- Johnson Research Fellowship**, Department of Mathematics, University of Oregon, 2004 & 2005.
- Harrison Research Award**, Department of Mathematics, University of Oregon, 2006.
- NSF International Research Fellowship**, grant # 0600893, September 2006 - July 2008. Extended for Summer 2009.
- Office of Naval Research Grant**, Naval Academy Research Council, June 2008-September 2011.
- Project Next Fellow**, MD-DC-VA Section of MAA, 2009-2010.
- SQUARE Grant**, American Institute of Mathematics, February 2009-February 2011.
- NSF Conference Grant**, Hyperplane arrangements and applications, grant # 1101606, August 2011.
- Departmental Nominee, **Apgar Teaching Award**, US Naval Academy, November 2011.
- Collaboration Grant**, Simons Foundation, 2012-2017.
- Departmental Nominee, **Class of 1951 Excellence in Research Award**, US Naval Academy, November 2012.
- JSPS Fellow Grant**, Japan Society for Promotion of Science, Invitation Fellowship, 2015.

#### Conferences Organized

- Co-organizer “Computational Geometric Topology in Arrangement Theory”**, Topical Workshop at ICERM, Providence, RI, July 6-10 2015.
- Co-organizer “Hyperplane arrangements and applications”**, Special Session at the Joint National Meetings, Baltimore, USA, January 15-16 2014.
- Co-organizer “Hyperplane arrangements and applications: a conference in honor of Hiroaki Terao”**, Pacific Institute of Mathematical Sciences, Vancouver, BC Canada, August 8-12, 2011.

**Co-organizer of Mini-Workshops on Hyperplane Arrangements**, Department of Mathematics, Hokkaido University, November 2006 and October 2007.

**Co-organizer of Hyperplane Arrangement Seminar**, Department of Mathematics, Hokkaido University, September 2006 - Present.

**Co-organizer of Summer School** in Arrangements of Hyperplanes, Mathematical Sciences Research Institute, August 2004.

### Advising

**James Berg**, “Subspace Arrangement Codes and Cryptosystems”, USNA Trident Program, August 2010-June 2011. (The Trident program is for advanced students to conduct original research. There were 9 out of a class of approximately 1200 that year. This project won the Harry Ward Prize.)

**Thomas Paul**, “Enumerative Geometry of Hyperplane Arrangements”, USNA Trident Program, August 2011-June 2012. (The Trident program is for advanced students to conduct original research. There are 7 out of a class of approximately 1200 this year.)

**Eric Peart**, “Macaulay Inverse systems of hyperplane arrangements”, Honors Project, August 2013-June 2014.

### Teaching Experience

#### University of Oregon:

Error-correcting codes  
 Discrete Math III (Introductory Group Theory)  
 Calculus III  
 Calculus II  
 Calculus I  
 Business Calculus II  
 Introductory Statistics for Business  
 Precalculus I & II  
 College Mathematics (Game Theory and Tessellations)  
**Course Coordinator**, Precalculus, Winter 2005

#### US Naval Academy:

Calculus I, II, and III (also honors Calculus and “experimental” Calculus)  
 Differential Equations  
 Linear Algebra  
 Discrete Mathematics  
 Linear Programming  
 Introduction to Cryptography  
 Topology  
 Introduction to Cryptography and Coding Theory (Reading Course)  
 Algebraic Geometry Codes (Reading Course)  
 Hyperplane arrangements (Reading Course)  
 Matroid Theory (Reading Course)  
 Undergraduate Research Project (Trident Scholar Program): “Subspace arrangement codes and cyptosystems”  
 Undergraduate Research Project (Trident Scholar Program): “Enumerative geometry of hyperplane arrangements”.

### Service

**NSF grant review pannel**, Arlington VA, 2014.

**Faculty Senate Personnel Committee**, US Naval Academy, Fall 2013-Present.

**Organizer of Basic Notions Seminar**, US Naval Academy, Fall 2009-Present.

**Majors Curriculum Committee**, elected member by US Naval Academy Mathematics Department, August 2009-present.

**Department Hiring Committee**, US Naval Academy, Fall 2013-Present.

**Chair of Colloquium Committee**, US Naval Academy, 2011-2012.

**Faculty Representative for Mens Soccer**, US Naval Academy, academic year 2010-2011.

**Character Development Seminar**, Table Facilitator, US Naval Academy, Fall 2009.

**Colloquium Committee**, US Naval Academy, August 2008-present.

**Assessment Committee**, US Naval Academy, August 2008-present.

**Person of Contact for the Writing Center**, US Naval Academy, August 2008-present.

**Organizer** of the math session for “Connections”, the University of Oregon’s primary educational advocacy program for high school students of color and economically disadvantaged backgrounds, April 2006.

**Organizer** of the math sessions for “Reach for Success”, the University of Oregon’s primary educational advocacy program for middle school students of color, April 2005 and February 2006.

**Chair of Executive Council**, Graduate Teaching Fellows Federation, University of Oregon, 2003-2004.

**Steward**, Department of Mathematics, Graduate Teaching Fellows Federation, University of Oregon, 2002-2005.

**Panel for Experienced Graduate Teaching Fellows**, Department of Mathematics, University of Oregon, 2003 and 2005.

**Volunteer Math Tutor**, Seattle University, 2000-2001.

**Volunteer Math Tutor**, Garfield High School, Seattle, Washington, 1999-2001.

## Selected Lectures

**Kyoto University, Algebraic geometry Seminar**, “Kazhdan-Lusztig polynomials for matroids”, Kyoto, Japan May 2015.

**Hokkaido University, Arrangement Seminar**, “Applications for the multiple addition theorem on non-free arrangements”, Sapporo, Japan April 2015.

**Centro di Ricerca Matematica Ennio De Giorgi**, “Kazhdan-Lusztig polynomials for matroids”, Pisa, Italy Feb 2015.

**Geometry, Algebra, Singularities, Combinatorics Seminar**, “Limits of rational models of  $k$ -equal arrangements”, Northeastern University, Boston MA, March 24, 2014.

**Arrangements and Characteristic Classes**, “Counting arrangements and the multivariable Tutte polynomial”, at RIMS in Kyoto, Japan, November 2013.

**Joint AMS and Romanian Mathematical Society Meeting**, “Enumerative geometry of hyperplane arrangements”, Alba Iulia, Romania, June 2013.

**Arrangements in the Pyrenees**, “Limits of  $k$ -equal arrangements”, Pau, France, June 2012.

**Warwick Mathematics Institute**, Workshop on Free Divisors, “Syzygies of the Jacobian ideal of a hyperplane arrangement”, Warwick, England, June 4, 2011.

**Spring Eastern Section Meeting of the AMS**, Special Session on The Algebraic Geometry and Topology of Hyperplane Arrangements, ”On syzygies of the Jacobian ideal of a hyperplane arrangement”, College of the Holy Cross, Worcester, MA, April 10 2010.

**Centro di Ricerca Matematica Ennio De Giorgi**, Configuration Spaces: Geometry, Combinatorics and Topology, “Derivation Radical Subspace Arrangements”, June 3, 2010.

**The 2nd Mathematical Society of Japan’s Seasonal Institute**, Arrangements of Hyperplanes, “Formality of Subspace Arrangements”, August 12, 2009.

**A.M.S. Spring Southeastern sectional**, L.S.U., Special Session on Arrangements and Related topics, “The Jacobian ideal of a hyperplane arrangement”, March 29, 2008.

**Tokyo University of Agriculture and Technology**, Tokyo, Japan, Geometry and Analysis on Algebraic Varieties, “Derivations of an effective divisor on the complex projective line”, November 2007.

**A.M.S. National**, New Orleans, LA, Special Session on Arrangements and Related Topics, “The characteristic polynomial of multiarrangements”, January 2007.

**Mathematical Sciences Research Institute**, Recent Developments in Arrangements and Configuration Spaces, “Degeneration Varieties”, August 2006.

**A.M.S. Spring Eastern Sectional**, Durham, NH, Special Session on Arrangements and Configuration Spaces, “On nets and Latin squares”, April 2006.

**Centro Stefano Franscini**, Ascona, Switzerland, Arrangements of Hyperplanes - Algebra, Combinatorics, Geometry and Topology, “Complete Intersection Apolar Algebras”, May 2005.

**Mathematical Sciences Research Institute**, Arrangements of Hyperplanes Program, “Derivation module of points with multiplicity on the projective line”, November 2004.

**Mathematical Sciences Research Institute**, Arrangements of Hyperplanes Program, “Exponents of generic multi-2-arrangements”, October 2004.

**Mathematical Sciences Research Institute**, Arrangements of Hyperplanes Program, “Derivations of Multiarrangements”, September 2004.

**Graduate  
Summer  
Schools**

Commutative Algebra: Local cohomology and its interactions with algebra, geometry, and analysis, Snowbird, UT, June 2005

Arrangements of Hyperplanes, Mathematical Sciences Research Institute, Eugene, OR, August 2004.

Knots and 3-Manifolds, Pacific Institute of Mathematical Sciences, Vancouver, B.C., July 2004.

Triangulations of Point Sets: Applications, Structures, Algorithms, Mathematical Sciences Research Institute, July 2003.

**Industry  
Experience**

**Aerospace Machinist**, Boeing Commercial Airplanes Group, September 1996 - July 2001.

**Memberships**

American Mathematical Society, Mathematical Association of America