Daniel Krashen **Curriculum Vitæ** September 25, 2016

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Current Position	Associate Professor, Department of Mathematics, University of Georgia
PhD Thesis	*Birational Isomorphisms between Severi-Brauer Varieties* University of Texas at Austin, under the direction of David J. Saltman

Appointments

Associate Professor, 2012-present, University of Georgia

Assistant Professor, 2008-2012, University of Georgia

Visiting Scholar, 2007-2008, University of Pennsylvania

Member, Fall 2006, Institute for Advanced Study, Princeton

Member, 2004-2005, Institute for Advanced Study, Princeton

Gibbs Assistant Professor, 2003-2007, Yale University

Visiting Scholar, 2002-2003, University of Michigan, Ann Arbor

VIGRE Assistant Professor, 2001-2003, University of California, Los Angeles

Graduate Instructor, 1997-2001, University of Texas at Austin

Research

Research Manuscripts

Publications

1. *Derived categories for torsors for Abelian schemes*, with Benjamin Antieau and Matthew Ward (preprint posted in 2014).
   http://arxiv.org/abs/1409.2580.
2. *Torsion in Chow groups of zero cycles of homogeneous projective varieties* (preprint posted in 2014).
   http://arxiv.org/abs/1409.1888.
3. *Period and index, symbol lengths, and generic splittings in Galois cohomology*, to appear in the Bulletin of the London Mathematical Society (accepted in 2016).
   http://arxiv.org/abs/1305.5217.
4. *Local-global principles for torsors over arithmetic curves*, with David Harbater and Julia Hartmann, American Journal of Mathematics, 137 (2015), no. 6, 1559–1612.
   http://arxiv.org/abs/1108.3323.

5. *Diophantine and cohomological dimensions*, with Eliyahu Matzri, Proceedings of the AMS, 143 (2015), no. 7, 2779–2788. http://arxiv.org/abs/1305.5295.

6. *Refinements to patching and applications to field invariants*, with David Harbater and Julia Hartmann, International Math. Research Notices, doi: 10.1093/imrn/rnu278 (2015). http://arxiv.org/abs/1404.4349.

7. *Local-global principles for Galois cohomology*, with David Harbater and Julia Hartmann, Comment. Math. Helv., 89 (2014), no. 1, 215–253. http://arxiv.org/abs/1208.6359.

8. *Weierstrass preparation and algebraic invariants*, with David Harbater and Julia Hartmann, Math. Ann., 356 (2013), no. 4, 1405–1424. http://arxiv.org/abs/1109.6362.

9. *Relative Brauer groups of genus 1 curves*, with Mirela Ciperiani, Israel J. Math., 192 (2012), no. 2, 921–949. http://arxiv.org/abs/math/0701614.

10. *Appendix to: Period and index in the Brauer group of an arithmetic surface*, J. Reine Angew. Math., 659 (2011), 1–41. http://arxiv.org/abs/math/0702240.

11. *Patching subfields of division algebras*, with David Harbater and Julia Hartmann, Trans. Amer. Math. Soc., 363 (2011), no. 6, 3335–3349. http://arxiv.org/abs/0904.1594.

12. *Distinguishing division algebras by finite splitting fields*, with Kelly McKinnie, Manuscripta Math., 134 (2011), no. 1-2, 171–182. http://arxiv.org/abs/1001.3685.

13. *Field patching, factorization, and local-global principles*, Quadratic forms, linear algebraic groups, and cohomology, 57–82, Dev. Math., 18, Springer, New York, 2010. http://arxiv.org/abs/0909.3115.

14. *Corestrictions of algebras and splitting fields*, Trans. Amer. Math. Soc., 362 (2010), no. 9, 4781–4792. http://arxiv.org/abs/0704.3443.

15. *Zero cycles on homogeneous varieties*, Adv. Math., 223 (2010), no. 6, 2022–2048. http://arxiv.org/abs/math/0501399.

16. *Applications of patching to quadratic forms and central simple algebras*, with David Harbater and Julia Hartmann, Invent. Math., 178 (2010), no. 2, 231–263. http://arxiv.org/abs/0809.4481.

17. *Pointed trees of projective spaces.*, with Linda Chen and Angela Gibney, J. Algebraic Geom., 18 (2009), no. 3, 477–509. http://arxiv.org/abs/math/0505296.

18. *Index reduction for Brauer classes via stable sheaves*, with Max Lieblich, Int. Math. Res. Not. IMRN, no. 8 (2008), Art. ID rnn010, 31 pp. http://arxiv.org/abs/0706.1072.

19. *Birational maps between generalized Severi-Brauer varieties*, J. Pure Appl. Algebra, 212 (2008), no. 4, 689–703. http://arxiv.org/abs/math/0203117.

20. *Motives of unitary and orthogonal homogeneous varieties*, J. Algebra, 318 (2007), no. 1, 135–139. http://arxiv.org/abs/math/0603389.

21. *Severi-Brauer varieties and symmetric powers*, with David J. Saltman, Algebraic transformation groups and algebraic varieties, 59–70, Encyclopaedia Math. Sci., 132, Springer, Berlin, 2004.

22. *Severi-Brauer varieties of semidirect product algebras*, Doc. Math., 8 (2003), 527–546 (electronic). http://arxiv.org/abs/math/0206154.

Recent Awards and Honors

1. Invited to join the Fellows of the American Mathematical Society (2017)
2. Presidental Early Career Award for Scientists and Engineers (PECASE) (2016)
3. University of Georgia Outstanding Professor Award (2016)
4. Associate editor, American Mathematical Monthly (2014-)
5. University of Georgia Creative Research Medal (2012)

Grants

Active Grants

1. *FRG: Collaborative Research: Obstructions to Local-Global Principles and Applications to Algebraic Structures, National Science Foundation (07/01/15-06/31/18),*
   PI: Daniel Krashen.
   Description: *This proposal funds research activities including faculty summer salary, and graduate student support. It is a collaborative proposal in conjunction with parallel proposals by David Harbater and Julia Hartmann at the University of Pennsylvania, Parimala and V. Suresh at Emory University, and also involving Jean-Louis Colliot-Thelene as an additional participant at the Universite Paris-Sud.*

2. *Collaborative Research: Georgia Algebraic Geometry Symposium, National Science Foundation (06/15/15-05/31/18),*
   PI: Valery Alexeev, coPIs: Valery Alexeev, Noah Giansiracusa, Daniel Krashen, Angela Gibney, Dino Lorenzini.
   Description: *Joint proposal together with Emory and Georgia Tech. For an Algebraic Geometry conference in each of the 3 years, rotating institutions each year.*

3. *RTG: Algebra, Algebraic Geometry, and Number Theory, National Science Foundation (DMS-1344994 , 05/01/14-04/30/19)*
   PI: Dino Lorenzini, coPIs: Valery Alexeev, Pete L. Clark, Daniel Krashen, Angela Gibney.
   Description: *The AGANT (Algebraic Geometry, Algebra and Number Theory) Research and Training Group at the University of Georgia Mathematics Department grant supports a number of programs and activities the the UGA Math department at a variety of levels, from high school students to postdoctoral fellows.*
   http://agant.torsor.org.

4. *CAREER: The Arithmetic of Fields and the Complexity of Algebraic Structures, National Science Foundation (DMS-1151252 , 07/01/12-06/30/17)*
   PI: Daniel Krashen.
   Description: *This is a research grant for work in Algebra, Arithmetic Geometry and Algebraic Geometry, drawing on ideas from Homotopy theory. The grant*

provides summer faculty support, travel funding, graduate stipends and a number of outreach activities.
http://dkrashen.github.io.

Previous Grants Awarded

5. *The 12th Brauer Group Meeting, National Science Foundation (04/01/15-03/31/16),* PI: Kelly McKinnie, coPIs: Daniel Krashen, Eric Brussel.
   Description: *For a conference which was held summer 2015 at Pingree Park Colorado on the study of the Brauer group.*
   http://torsor.github.io/brauer/index2015/.
6. *The structure of invariants in algebra and geometry, National Science Foundation (DMS-1007462 , 09/01/10-08/31/13)* PI: Daniel Krashen.
7. *The 10th Brauer Group Meeting, National Science Foundation (DMS-1214939 , 06/01/12-05/31/13)* PI: Kelly McKinnie, coPIs: Daniel Krashen, Eric Brussel.
8. *Young Investigator's Grant, National Security Agency (2009-2010),* PI: Daniel Krashen.
9. *University of Georgia Foreign travel grant, University of Georgia (2009),* PI: Daniel Krashen.
10. *Young Investigator's Grant, National Security Agency (H98230-08-1-0109 , 2008-2009)* PI: Daniel Krashen.
11. *Young Investigator's Grant, National Security Agency (H98230-06-1-0032 , 2006-2007)* PI: Daniel Krashen.

Research Presentations

(2016) *Clifford Algebras and the search for Ulrich bundles*, Algebraic Geometry Northeastern Series (AGNES), Yale University, New Haven, Connecticut.

(2015) *The Clifford Algebra of a finite morphism of schemes*, Banff International Research Station, Banff, Canada.

(2015) *Local-global principles and the patching Meyer-Vietoris sequence*, Local-Global Principles and Their Obstructions, FRG workshop.

(2015) *The Clifford Algebra of a finite morphism*, Special Session on Quadratic Forms in Arithmetic and Geometry, AMS Sectional Meeting, Huntsville, Alabama.

(2014) *Birational isomorphisms between noncommutative surfaces, finite over their centers*, Special Algebraic Geometry Seminar, UT Austin.

(2014) *Higer dimensional local-global principles for torsors under linear algebraic groups*, Special Session on Exceptional Groups in Physics, Algebra, and Geometry, AMS Southeastern Sectional Meeting University of North Carolina at Greensboro.

(2014) Workshop on Algebraic and Geometric Invariants of Linear Algebraic Groups and Homogeneous Spaces, University of Ottawa.

(2014) *Algebraic structures and the arithmetic of fields*, Invited address at the Sectional Meeting of the AMS, Knoxville, TN.

(2013) *Derived categories of torsors for Abelian varieties*, Winter Meeting of the Canadian Mathematical Society.

(2013) *Field patching and local-global principles*, Thematic Program on Torsors, Nonassociative Algebras and Cohomological Invariants, Fields Institute.

(2013) *The Clifford algebra of a morphism*, RIMS workshop, Kyoto, Japan.

(2013) *Bounding the symbol length in Galois cohomology*, Conference on Brauer groups, the Technion University, Haifa, Israel.

(2013) *Splitting dimension and symbol length in Galois cohomology*, AMS MAA Joint Meeting, Special session on the Brauer group on algebra and geometry, San Diego.

(2012) *Linear algebraic groups, local-global principles and patching*, Oberwolfach Seminar: Algebraic Groups and Patching, Oberwolfach, Germany.

(2010) *Field patching and local-global principles for Galois cohomology*, Motives and the Homotopy Theory of Schemes, Oberwolfach MFO, Germany.

(2009) *Field patching and local-global principles for Galois cohomology*, Quadratic Forms and Linear Algebraic Groups Oberwolfach MFO, Germany.

(2009) *Patching topologies and local-global principles*, Linear Algebraic Groups and Related Structures, Banff International Research Station.

(2009) *Patching subfields of division algebras*, Special session on Brauer groups, Quadratic Forms, Algebraic Groups, and Lie Algebras, AMS Southeastern Section Meeting Raleigh, NC.

(2008) *Local global principles for field patching and applications to quadratic forms and division algebras*, Quadratic forms, linear algebraic groups and cohomology, Hyderabad, India.

(2008) *Field patching, quadratic forms and division algebras*, Algebraic Groups session of the 2nd Canada-France Math Congress.

(2007) *Corestriction and splitting fields of algebras*, Linear Algebraic Groups and Cohomology, Emory University.

(2006) *Index reduction for genux* 1 *curves*, Algebraic Groups, Quadratic Forms and Related Topics, Banff International Research Station.

(2006) *Relative Brauer groups and index reduction for genus* 1 *curves*, Quadratic Forms and Linear Algebraic Groups, Mathematisches Forschungsinstitut Oberwolfach.

(2005) *Zero cycles on homogeneous varieties Applications of torsors to Galois cohomology and Lie theory*, Banff International Research Station.

(2005) *Zero cycles on homogeneous varieties*, AMS Summer Institute on Algebraic Geometry, Seattle.

(2004) *Cycles on homogeneous varieties and subfields of divison algebras*, Conference on Brauer Groups, Pingree Park, Colorado.

(2002) *Moduli of subfields of central simple algebras*, Conference on Brauer Groups, Pingree Park, Colorado.

(2002) *Birational isomorphisms between generalized Severi-Brauer varieties*, Joint Mathematics Meetings, special session on forms, algebras and algebraic groups.

(2001) *Birational isomorphisms between generalized Severi-Brauer varieties*, Conference on K-Theory and Linear Algebraic Groups, Duisburg, Germany.

(1999) *Rational morphisms between Severi-Brauer varieties*, Summer Conference on Brauer Groups, University of Montana.

Workshops

1. Local-Global Principles and Their Obstructions, University of Pennsylvania (organizer, presenter), 2015.
2. Algebraic Geometry in Seattle: New connections for recent PhDs (mentor), 2014.

3. Brauer groups and obstruction problems: moduli spaces and arithmetic, American Institute of Mathematics (organizer, participant), 2013.

4. Oberwolfach Seminar: Algebraic Groups and Patching (organizer, presenter), 2012.

5. Rational curves and $\mathbb{A}^1$-homotopy theory, American Institute of Mathematics (participant), 2009.

Conference Organization

1. The Georgia Algebraic Geometry Symposium at Emory, co-organized with A. Gibney, R. Parimala, V. Suresh, D. Zurich-Brown, 2015.
https://sites.google.com/site/galgeoms/

2. Workshop: Local-Global Principles and Their Obstructions, co-organized with D. Harbater, J. Hartmann, R. Parimala, V. Suresh, 2015.
https://www.math.upenn.edu/~hartmann/sha/

3. The 12th Brauer Group Meeting at Pingree Park, co-organized with Eric Brussel and Kelly McKinnie, 2015.
http://torsor.github.io/brauer/index2015/

4. The Georgia Algebraic Geometry Symposium, co-organized with Valery Alexeev, Noah Giansiracusa and Angela Gibney, 2014.
http://gags.torsor.org/conf2014/

5. AMS special session: Galois Cohomology and the Brauer Group, Knoxville, TN, co-organized with Ben Antieau and V. Suresh, 2014.
http://www.ams.org/meetings/sectional/2216_special.html

6. The Georgia Algebraic Geometry Symposium, co-organized with Valery Alexeev and Angela Gibney, 2013.
http://gags.torsor.org/conf2013/

7. Algebraic Groups and Patching, Oberwolfach Mathematical Research Institute, Oberwolfach, Germany, co-organized with Karim Becher, David Harbater and Julia Hartmann, 2012.

8. The 10th Brauer Group Meeting at Pingree Park, co-organized with Eric Brussel and Kelly McKinnie, 2012.

9. The Georgia Algebraic Geometry Symposium and Summer School Program, University of Georgia, co-organized with Valery Alexeev, Angela Gibney and Elham Izadi, 2012.

10. Ramification in Algebra and Geometry at Emory, co-organized with Asher Auel, Eric Brussel, Skip Garibaldi and R. Parimala, 2011.

11. Deformation theory, patching, quadratic forms, and the Bruaer group, American Institute of Mathematics, co-organized with Max Lieblich, 2011.

12. Local-global principles for étale cohomology, Banff International Research Station, Research in Teams program, co-organized with David Harbater and Julia Hartmann, 2010.

13. The Brauer group in Israel, Kibbutz Ketura, Israel, co-organized with Skip Garibaldi, Louis Rowen, David Saltman, Jack Sonn and Uziel Vishne, 2010.

14. Conference on the Brauer group at Pingree Park, co-organized with Skip Garibaldi and Kelly McKinnie, 2008.

PhD students

Current PhD students

1. Riley Ellis
   Topic: Ulrich bundles and Clifford algebras.

2. Saurabh Gosavi
   Topic: Splitting behavior of quadratic forms.

3. Ernest Guico
   Topic: Field patching.

Former PhD students

4. Patrick McFaddin,
   Visiting Research Assistant Professor at the University of South Carolina,
   Thesis: *K-Cohomology of Generalized Severi-Brauer Varieties, 2016.*

5. Maren Turbow,
   Statistical Modeler at LexisNexis Risk Solutions,
   Thesis: *The Structure Theory of Graded Central Simple Algebras, 2016.*

6. Kate Thompson (coadvised with Jonathan Hanke),
   Assistant Professor DePaul University,
   Thesis: *Explicit Representation Results of Quadratic Forms over* $\mathbb{Q}$ *and* $\mathbb{Q}\sqrt{5}$ *by Analytic Methods, 2014.*

7. Stacy Musgrave,
   Assistant Professor of Mathematics at Cal Poly Pomona,
   Thesis: *Structure and Representation of Alternative Clifford Algebras of Quadratic Forms, 2013.*

Departmental Service

Departmental service

1. Professional development seminar (2016)
   Grant applications at UGA and NSF
   http://dkrashen.org/announcements/2016/09/24/grant-workshops/

2. Professional development seminar (2016)
   Writing for mathematicians
   http://dkrashen.org/announcements/2016/09/24/grant-workshops/

3. Graduate committee (2016-)

4. Executive committee (2014-2016)
5. Graduate student professional development seminar (2014)
   Developing and maintaining a professional webpage: what, why, and how
6. Graduate admissions applications (2014)
   Created, with Laura Ackerly, a online application survey for our graduate admissions, in order to automatically generate spreadsheet data concerning our applicants.
7. Facilities Committee (2011-2014)
8. Algebra Qualifying exam committee (2011)
9. Cantrell Lecture Series Committee (2010-2011)
10. Personnel Committee (2008-2011)

Other Contributions

1. Developed a LaTex templating tool (TransTex), available on a public domain code repository (used to produce this document)
   `http://dkrashen.github.io/TransTex/`
2. Set up and maintained a bug-tracker for Martin Olssen's book on Algbraic Stacks
   `https://github.com/dkrashen/stacks-issues`
3. Set up website for AGANT RTG grant
   `http://agant.torsor.org`
4. Set up and maintained a public domain code repository with jekyll templates for creating websites for personal professional use, including courses and seminars
   `https://github.com/dkrashen/jekyll_templates`