

Curriculum Vitae for
KRISTEN A. BECK

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EDUCATION

- Ph.D.** Mathematics, May 2011, University of Texas at Arlington
Dissertation title: *On the existence of totally reflexive modules*
Dissertation advisor: Prof. David A. Jorgensen
- M.S.** Mathematics, August 2005, University of Texas at Arlington
Thesis title: *On the image of the totaling functor*
Thesis advisor: Prof. David A. Jorgensen
- B.S.** Mathematics, May 2002, University of Texas at Arlington

RESEARCH INTERESTS

Commutative algebra. Homological algebra. Differential graded (DG) algebra.

ACADEMIC APPOINTMENTS

- 2011–present **Teaching Postdoctoral Fellow**
Department of Mathematics, University of Arizona (UA)
- 2007–11/2003–05 **Graduate Teaching Assistant**
Department of Mathematics, University of Texas at Arlington (UT Arlington)

OTHER APPOINTMENTS

- 2007–08 Lecturer. Department of Kinesiology, UT Arlington.
- 2005–07 Credit Risk Analyst. AmeriCredit Corp. (GM Financial), Fort Worth, TX.

FELLOWSHIPS & SCHOLARSHIPS

- * **NSF STEM Doctoral Fellowship.** 2007–09 and 2010–11.
- * **NSF GK-12 Fellowship.** 2009–10.
- * **Hermann's Doctoral Fellowship.** UT Arlington Department of Mathematics, 2005–06.
- * **Stephen R. Bernfeld Memorial Scholarship.** UT Arlington Department of Mathematics, 2005–06.
- * **Graduate Fellowship.** UT Arlington Department of Mathematics, 2005–06.

HONORS & AWARDS

- * **Outstanding Graduate Student Award.** UT Arlington Department of Mathematics, 2010–11.
- * **Excellence Award for Effective Leadership in K-12 School Outreach Activities.** UT Arlington Department of Mathematics, NSF GK-12 MAVS Program, 2009–10.

EXTERNAL FUNDING

- * **PI: Western Alliance to Expand Student Opportunities, \$4,500.** In support of *(Non-) Periodicity of Betti Numbers Over a Class of Short Local Rings* (undergraduate research project), Summer 2013.
- * **PI: MAA Tensor Women in Mathematics Grant, \$4,500.** In support of *Women Advancing Arizona Mathematics*, 7/1/2013–6/30/2014.
- * **PI: NSF Conference Grant, \$15,692.** In support of the *2013 Southwest Local Algebra Meeting*, 1/1/2013–12/31/2013.

INTERNAL FUNDING

- * UA Department of Mathematics, \$4,500. In support of *Women Advancing Arizona Mathematics*, 2013–2014.
- * UA Department of Mathematics, \$3,200. In support of the *2013 Southwest Local Algebra Meeting*.

TEACHING EXPERIENCE

- * Undergraduate courses taught at UA:
 - **Cryptography** (Spring 2014)
 - **Matrix Analysis** (Summer 2013)
 - **Math Analysis for Engineers** (Spring 2013)
 - **Intro to Statistics** (Spring 2013, Fall 2013)
 - **Intro to Linear Algebra** (Spring 2012, Fall 2012, Fall 2013)
 - **Calculus II** (Spring 2012, Fall 2012)
 - **Vector Calculus** (Fall 2011)
 - **Calculus I** (Fall 2011)
- * Undergraduate courses taught at UT Arlington:
 - **Calculus I** (Spring 2011)
 - **College Algebra** (Fall 2010)
 - **Business Calculus** (Spring 2008, Summer 2008, Fall 2008, Spring 2009)
 - **Trigonometry** (Summer 2005, Fall 2008)
 - **Math for Liberal Arts** (Spring 2004, Fall 2004, Spring 2005)

UNDERGRADUATE RESEARCH PROJECTS

- * *(Non-)Periodicity of Betti Numbers over a Class of Short Local Rings*, with Omar Beltran, Carlos Parades, and Dillon Peña. A study of the structure of minimal free resolutions of modules over the quotient of a polynomial ring. Funded by the Western Alliance to Expand Student Opportunities. Summer 2013.
- * *New Views on the Yoneda Lemma*, with David Sidi. A mapping-diagrammatic interpretation of the Yoneda embedding and isomorphism. Applications of the Yoneda Lemma to propositional logic. Spring/Fall 2013.

PUBLICATIONS

1. *Eventually linear partially complete resolutions over a local ring with $\mathfrak{m}^4 = 0$* , J. Algebra Appl. (to appear). [arXiv:1212.0282](#)
2. *On the image of the totaling functor*, Comm. Algebra (to appear). [arXiv:1105.3869](#)
3. *A somewhat gentle introduction to differential graded commutative algebra* (with S. Sather-Wagstaff), lecture notes (Springer) on Connections Between Algebra and Geometry (to appear). [arXiv:1307.0369](#)
4. *Krull dimension for differential graded algebras* (with S. Sather-Wagstaff), Arch. Math. (Basel), **101** (2013), no. 2, 111–119. [arXiv:1210.7270](#)
5. *Asymptotic behavior of dimensions of syzygies* (with M. Leamer), Proc. Amer. Math. Soc. **141** (2013), no. 7, 2245–2252. [arXiv:1110.4582](#)
6. *Existence of totally reflexive modules via Gorenstein homomorphisms*, J. Commut. Algebra **4** (2012), no. 1, 57–77. [arXiv:1101.2658](#)

WORKS IN PROGRESS

1. *Approximations of totally acyclic complexes* (with P. Bergh, D. Jorgensen, and F. Moore).
2. *To kill an x : Quotient structures in Algebra II* (with T. Jorgensen).

INVITED CONFERENCE & SUMMER SCHOOL LECTURES

- * **Spring 2014 AMS Fall Central Sectional Meeting** (upcoming), Special Session on *Homological Methods in Algebra*. 20-minute lecture. Lubbock, TX, April 2014.
- * **2014 Joint Mathematics Meeting** (upcoming), Special Session on *Homological and Characteristic p Methods in Commutative Algebra*. 20-minute lecture. Baltimore, MD, January 2014.

INVITED CONFERENCE & SUMMER SCHOOL LECTURES, CONT'D

- * **Workshop on Representation Theory, Homological Algebra, and Free Resolutions.** 20-minute lecture on *Depth and dimension for high syzygies*. Berkeley, CA, February 2013.
- * **Further Connections Between Algebra & Geometry.** 40-minute lecture on *Two notions of Krull dimension for differential graded algebras*. Fargo, ND, February 2013.
- * **2012 CMS Summer Meeting,** AMS Special Session on *Interactions Between Algebraic Geometry & Commutative Algebra*. 20-minute lecture on *Depth and dimension of high syzygies*. Regina, SK, Canada, June 2012.
- * **Summer School on the Interactions Between Algebra and Geometry.** Lecture Assistant for Session on *Differential Graded Techniques in Commutative Algebra*. Regina, SK, Canada, May 2012.
- * **2012 Southwest Local Algebra Meeting.** 50-minute lecture *On the behavior of depth and dimension of high syzygy modules*. Lubbock, TX, March 2012.
- * **2011 Joint Mathematics Meeting,** AMS Special Session on *Commutative Algebra (MRC)*. 20-minute lecture on *Necessary conditions for the existence of totally reflexive modules*. New Orleans, LA, January 2011.
- * **Spring 2010 AMS Western Sectional Meeting,** Special Session on *Trends in Commutative Algebra*. 20-minute lecture *On the Hilbert series of an $\mathfrak{m}^4 = 0$ local ring admitting linear complete resolutions*. Albuquerque, NM, April 2010.
- * **Fall 2009 AMS Central Sectional Meeting,** Special Session on *Commutative Algebra: Module & Ideal Theory*. 20-minute lecture *On the existence of totally reflexive modules*. Waco, TX, October 2009.

CONFERENCE & WORKSHOP PARTICIPATION

- * **Mathematical Sciences Research Institute.** Workshop on *Representation Theory, Homological Algebra, and Free Resolutions*. Berkeley, CA, February, 2013.
- * **AMS Mathematics Research Communities.** Workshop on *Commutative Algebra*. Snowbird, UT, June 2010.
- * **Oberwolfach Mathematics Institute.** Workshop Seminar on *Representations of Finite Groups: Local Cohomology and Support*. Oberwolfach, Germany, May 2010.
- * **Commutative Algebra: Connections with Algebraic Topology and Representation Theory.** Lincoln, NE, May 2008.
- * **Nebraska Commutative Algebra Conference: WiegandFest.** Lincoln, NE, May 2005.

CONTRIBUTED LECTURES & POSTERS

- * **2011 KUMUNU.** Poster on *Existence of totally reflexive modules via Gorenstein homomorphisms*. Lincoln, NE, April 2011.
- * **2011 Southwest Local Algebra Meeting.** Poster on *Necessary conditions for the existence of asymmetric linear complete resolutions over short local rings*. Las Cruces, NM, March 2011.
- * **2011 Joint Mathematics Meeting,** Project NExT/YMN Poster Session. Poster *On the structure of the derived category of DG modules over a polynomial ring*. New Orleans, LA, January 2011.
- * **Conference for the Advancement of Mathematics Teachers.** 60-minute lecture/activity on *Sometimes $2 + 2 \neq 4$: An introduction to quotient structures*. San Antonio, TX, July 2010.
- * **2010 Southwest Local Algebra Meeting.** Poster *On the Hilbert series of $\mathfrak{m}^4 = 0$ rings which admit non-trivial totally reflexive modules*. Arlington, TX, March 2010.
- * **2010 Joint Mathematics Meeting,** AMS Contributed Session on *Fields & Commutative Algebra*. 10-minute lecture on *Characterizing rings which admit non-trivial totally reflexive modules*. San Francisco, CA, January 2010.
- * **UT Arlington College of Science Research Day.** Poster *On the existence of totally reflexive modules*. Arlington, TX, October 2008.
- * **UT Arlington ACES Symposium.** 20-minute lecture *On the rigidity of Tor*. Arlington, TX, March 2008.
- * **2008 Joint Mathematics Meeting,** AMS Contributed Session on *Algebra & Number Theory*. 10-minute lecture on *The image of the totalling functor*. San Diego, CA, January 2008.

SELECTED SEMINAR LECTURES

- * *UA Algebra & Number Theory Seminar*. Tucson, AZ, September 2012.
- * *Metroplex AGANT Seminar*. Arlington, TX, February 2012.
- * *Norwegian University of Science and Technology Algebra Seminar*. Trondheim, Norway, December 2011.
- * *North Dakota State University Algebra Seminar*. Fargo, ND, October 2011.
- * *University of Toronto Homological Methods Seminar*. Toronto, ON, Canada, March 2011.
- * *University of Nebraska-Lincoln Commutative Algebra Seminar*. Lincoln, NE, February 2011.
- * *Texas A&M Algebraic Geometry Seminar*. College Station, TX, April 2010.
- * *Texas Tech Algebra Seminar*. Lubbock, TX, April 2010.
- * *UT Arlington Algebra Seminar*. Arlington, TX, April 2009, April 2008, and September 2004.

EXPOSITORY LECTURES

- * *In-class student response systems* (with R. Thomas). UA Mathematics Instruction Colloquium. Fall 2013.
- * *Szyggy: More than just a funny word*. UA Undergraduate Mathematics Colloquium. November 2012.
- * *Incorporating abstraction: Getting students out of the concrete box*. UA Mathematics Instruction Colloquium. January 2012.
- * *Oh, the plentitude of primes!* UA MathCats meeting. November 2011.
- * *The field of constructible numbers: A story of how algebra solved three famous geometric problems*. UA Undergraduate Teaching Assistant Seminar. September 2011.

MEETING & SPECIAL SESSION ORGANIZATION

- * **Southwest Local Algebra Meeting** (with L. W. Christensen, L. Fouli, R. Heitmann, and D. Jorgensen). The University of Arizona, March 2013.
- * **Special Session on Topics in Commutative Algebra** (with S. Saccon), at the Fall 2012 AMS Western Sectional Meeting. Tucson, AZ, October 2012.

SEMINAR & COLLOQUIUM ORGANIZATION

- * **Math Instruction Colloquium**, with G. Hystad (<http://math.arizona.edu/~mathinst>). Bi-weekly talks on issues relevant to mathematics instructors; bi-weekly reading group focused on the scholarship of teaching and learning. UA, Fall 2013–present.
- * **Women Advancing Arizona Mathematics Colloquium** (<http://math.arizona.edu/~waam>). Weekly talks promoting the accomplishments of female mathematicians in various fields. UA, Fall 2013–Spring 2014.
- * **Mathematics Brown Bag Seminar** (<http://math.arizona.edu/~kbeck/brown-bag>). Bi-weekly research talks accessible to mid- to upper-division math majors. UA, Spring 2013–present.
- * **Teaching Postdoc Seminar**, with E. Widiasih. Monthly meetings focused on the scholarship of teaching and learning and other various aspects of teaching. UA, Fall 2012.
- * **UT Arlington Graduate Student Seminar**, with P. Veerapen. Weekly research talks given by graduate students. Fall 2010–Spring 2011.
- * **UT Arlington Algebra Seminar**. Weekly research talks accessible to advanced graduate students and faculty studying algebra. Spring/Fall 2005.

INNOVATION & METHODS IN TEACHING

- * Incorporation of an **inquiry-based, flipped classroom** model.
- * Use of the **in-class response system** ‘Learning Catalytics’ (<http://www.learningcatalytics.com>).
- * Connection of mathematics to **literature**.
- * Use of an **online discussion forum**.
- * Facilitation of **online office hours** via Google Hangouts.
- * Coordinator for credit-based **Preceptor Program for Intro to Linear Algebra**. Fall 2013–present.
- * Coordinator for **UA Undergraduate Teaching Assistant (UTA) Program & Seminar**. Spring/Fall 2012.

INNOVATION & METHODS IN TEACHING, CONT'D

- * Member of **undergraduate subcommittee on MATLAB in Linear Algebra** at UA. Fall 2013.
- * Member of **course development team** for Math for Liberal Arts at UT Arlington. Fall 2004.

MENTORING & ADVISING

- * Assistant and advisor for **Minority Calculus Advising Program**. UA, Fall 2012/2013.
- * Faculty advisor for **MathCats** (club for undergraduate math majors). UA, Fall 2011–Spring 2013.
- * Member of **AWM Mentor Network**. Spring 2011–present.

OUTREACH ACTIVITY

- * ‘Dr. Kristen von Becker’ **on social media** (Facebook and Google+). Fall 2012–present.
- * Content coordinator and facilitator for **Sam Houston High School Math Club**. Arlington, TX, 2009–10.
- * Volunteer for annual **UT Arlington Calculus Bowl**. Arlington, TX, February 2010.
- * Activity leader for **Riverside Middle School Math & Science Day**. Fort Worth, TX, February 2010 and November 2008.

PROFESSIONAL DEVELOPMENT

- * MAA minicourse on *Directing Undergraduate Research* (upcoming). Baltimore, MD, January 2014.
- * MAA PREP workshop on *Inquiry-Based Learning*. San Luis Obispo, CA, June 2013.
- * American Institute of Mathematics workshop on *Careers in Academia*. Palo Alto, CA, June 2012.

SOCIETY MEMBERSHIP

- * American Mathematical Society.
- * Association for Women in Mathematics.
- * Mathematical Association of America.
- * Pi Mu Epsilon.