

# Karl Schwede

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CONTACT INFORMATION	Department of Mathematics University of Michigan Ann Arbor, Michigan 48109-1109	office: (734)936-9923 email: kschwede@umich.edu web: www.umich.edu/~kschwede/
RESEARCH INTERESTS	I work on the boundary between commutative algebra and algebraic geometry. Specifically, I work with singularities related to the minimal model program, notions related to Frobenius splittings and tight closure theory, and applications of these ideas. I am also interested in homological algebra, number theory, and computational commutative algebra.	
EDUCATION	<b>University of Washington</b> , Seattle, WA <i>Ph.D., Mathematics</i> <ul style="list-style-type: none"><li>• Advisor: Sándor Kovács</li><li>• Dissertation: On <math>F</math>-injective and Du Bois singularities</li></ul>	<b>August 2006</b>
	<b>Whitman College</b> , Walla Walla, WA <i>B.A., Mathematics (Honors)</i> <ul style="list-style-type: none"><li>• Minor: Computer Science</li><li>• Magna Cum Laude</li></ul>	<b>June 1999</b>
	<b>Bellevue Community College</b> , Bellevue, WA <i>Associate in Arts and Sciences</i>	<b>June 1997</b>
PROFESSIONAL EXPERIENCE	<b>MSRI</b> , Berkeley CA <i>Research Member</i>	<b>Winter 2009</b>
	<b>University of Michigan</b> , Ann Arbor MI <i>NSF Postdoc / Postdoctoral Assistant Professor / Research Fellow</i>	<b>Fall 2006– Spring 2010</b>
	<b>University of Washington</b> , Seattle WA <i>Teaching Assistant and Instructor</i>	<b>2000–2006</b>
	<b>Havas Interactive (division of Vivendi)</b> , Walla Walla WA <i>Computer Programmer</i> developing educational software	<b>1999–2000</b>
PUBLICATIONS (continued on page 2)	<ol style="list-style-type: none"><li>1. <i>Gluing Schemes and a Scheme Without Closed Points</i>. Recent progress in arithmetic and algebraic geometry, 157–172, Contemp. Math. 386. 2005</li><li>2. <i>A simple characterization of Du Bois singularities</i>. Compos. Math. 143, no. 4, 813–828. 2007</li><li>3. <i>Rational singularities associated to pairs</i>, with S. Takagi. Michigan Math. J. 57, 625–658. 2008</li><li>4. <i>Generalized test ideals, sharp <math>F</math>-purity, and sharp test elements</i>. Math. Res. Lett. 15, no. 6, 1251–1261. 2008</li><li>5. <i><math>F</math>-injective singularities are Du Bois</i>. Amer. J. Math. 131, no 2, 445–473. 2009</li><li>6. <i>Centers of <math>F</math>-purity</i>. 28 pages, submitted in 2008, to appear in Math. Z. arXiv:0807.1654</li></ol>	

7. *F-adjunction*. 31 pages, submitted in 2009, to appear in Algebra and Number Theory arXiv:0901.1154
8. *On the number of compatibly Frobenius split subvarieties, prime F-ideals, and log canonical centers*, with K. Tucker. 14 pages, submitted in 2009, to appear in Ann. Inst. Fourier (Grenoble). arXiv:0903.4112
9. *Globally F-regular and log Fano varieties*, with K. Smith. 30 pages, to appear in Adv. Math. arXiv:0905.0404
10. *Discreteness and rationality of F-jumping numbers on rings with singularities*, with M. Blickle, S. Takagi and W. Zhang. 29 pages, to appear in Math. Ann. arXiv:0906.4679
11. *Hodge theory meets the minimal model program: a survey of log canonical and Du Bois singularities*, with S. Kovács. 34 pages, submitted in 2009. To appear in the Proceedings of the MSRI Workshop on the Topology of Stratified Spaces. arXiv:0909.0993
12. *The canonical sheaf of Du Bois singularities*, with K. Smith and S. Kovács. 20 pages, submitted in 2008. arXiv:0801.1541
13. *Test ideals in non-Q-Gorenstein rings*. 20 pages, submitted in 2009. arXiv:0906.4313
14. *A refinement of strongly F-regular and sharply F-pure pairs*. 10 pages, submitted in 2009.

**Works in preparation**

15. *The behavior of test ideals and Frobenius splittings under finite maps.*, with K. Tucker.
16. *A geometric algorithm for computing seminormalization.*

TEACHING	<p><b>Instructor:</b> I have been an instructor for: high school level algebra, precalculus, calculus, multivariable calculus (Stokes theorem etc.), linear algebra, honors calculus (essentially introduction to real analysis), and introduction to schemes and cohomology (a graduate course at the University of Michigan).</p> <p><b>Teaching Assistant:</b> I have been a teaching assistant and grader for: business calculus, pre-calculus, differential calculus, integral calculus, series / beginning multivariable calculus, and abstract algebra (groups and rings).</p>	<p><b>2003–Present</b></p> <p><b>2000–2005</b></p>
ORGANIZATIONAL ACTIVITIES	<ul style="list-style-type: none"> <li>• Co-organizer of the conference <i>Frobenius splitting in algebraic geometry, commutative algebra, and representation theory</i>, see <a href="http://sites.google.com/site/frobeniussplitting/">http://sites.google.com/site/frobeniussplitting/</a></li> <li>• Assistant to the organizers of <i>Commutative algebra</i> AMS summer conference/school in Snowbird Utah</li> <li>• Organizer/co-organizer of the University of Michigan commutative algebra seminar.</li> <li>• Local organizer for Mel Hochster’s 65th birthday conference.</li> <li>• Organizer/co-organizer of the University of Michigan topics in algebraic geometry seminar.</li> <li>• Organizer of the University of Washington algebraic geometry seminar.</li> <li>• Co-organizer of the University of Washington undergraduate mathematical sciences seminar</li> </ul>	<p><b>May 2010</b></p> <p><b>June 2010</b></p> <p><b>2008–Present</b></p> <p><b>Summer 2008</b></p> <p><b>2007–2008</b></p> <p><b>2004–2005</b></p> <p><b>2004–2005</b></p>

OTHER  
PROFESSIONAL  
ACTIVITIES

- Refereed/reviewed papers for the following journals: Journal of the American Mathematical Society, American Journal of Mathematics, Advances in Mathematics, Compositio Mathematica, International Mathematics Research Notices, Discrete Math, the Illinois Journal of Mathematics, the Journal of Algebra, Communications in Algebra, and the Michigan Mathematical Journal. **2007–Present**
- Reviewed papers for AMS Math Reviews and for Zentralblatt Math. **2006–Present**
- Helped build and maintain the website *Situs Geometriae Algebraicae*, a website designed to help students in algebraic geometry find references. See <http://www.math.washington.edu/sga> **2004–2008**
- Spoke at the University of Michigan undergraduate math club. **Fall 2008**
- Helped develop the University of Washington VIGRE website. **2002–2003**

SELECTED  
RESEARCH  
TALKS

- University of Washington algebra seminar **Winter 2004**
- University of Michigan algebraic geometry seminar **Fall 2005**
- University of Washington algebra seminar **Winter 2006**
- Bellingham algebraic geometry seminar (BAGS) **Winter 2006**
- Recent trends in higher dimensional geometry conference in Banff **Spring 2006**
- Rice algebraic geometry seminar **Spring 2006**
- University of Michigan algebraic geometry seminar **Fall 2006**
- Davidson College AMS meeting **Winter 2007**
- $F$ -singularities and  $D$ -modules conference in Ann Arbor **Summer 2007**
- University of Illinois at Chicago algebraic geometry seminar **Winter 2008**
- Purdue University algebraic geometry seminar **Winter 2008**
- University of Georgia algebraic geometry seminar **Spring 2008**
- Conference in honor of Mel Hochster's 65th birthday **Summer 2008**
- University of Washington algebra seminar **Fall 2008**
- Vancouver British Columbia AMS Meeting **Fall 2008**
- University of Illinois at Urbana-Champaign algebraic geometry seminar **Fall 2008**
- University of Utah commutative algebra seminar **Fall 2008**
- Western algebraic geometry seminar (WAGS) **Fall 2008**
- Syracuse University **Winter 2009**
- University of North Carolina **Winter 2009**
- University of Illinois at Urbana Champaign, AMS meeting **Winter 2009**
- University of Illinois at Urbana-Champaign **Spring 2009**
- Purdue University algebraic geometry seminar **Spring 2009**
- Commutative Algebra and its Connections to Geometry (honoring Wolmer Vasconcelos), Pan-American Advanced Study Institute, Olinda Brazil **Summer 2009**
- University of Kansas, commutative algebra seminar **Fall 2009**
- Higher Dimensional Algebraic Geometry conference, Research Institute for Mathematical Sciences, Kyoto University, Japan **Winter 2009**

REFERENCES

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|--------------------------------------|-------------------|
| Sándor Kovács (graduate advisor)     | Mircea Mustața    |
| Karen Smith                          | Nobuo Hara        |
| Mel Hochster                         | Robert Lazarsfeld |
| Stephen DeBacker (concerns teaching) | Gennady Lyubeznik |