Christopher A. Francisco
Curriculum Vitae

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Employment:

- Assistant Professor of Mathematics, Oklahoma State University, 2007-present
- Postdoctoral Fellow in Mathematics, University of Missouri-Columbia, 2004-2007

Education:

- Ph.D., Mathematics, Cornell University, August 2004
  Ph.D. Thesis: Hilbert functions and graded free resolutions
  Advisor: Michael Stillman
- M.S., Mathematics, Cornell University, January 2002
- B.S., Mathematics, University of Illinois at Urbana-Champaign (UIUC), May 1999
- A.B., Economics, University of Illinois at Urbana-Champaign, May 1999
  Graduated Summa Cum Laude with Highest Distinction in Mathematics

Research Interests:

- Commutative algebra, interactions with combinatorics, and computational algebra

Publications:

1. Minimal graded Betti numbers and stable ideals, *Comm. Algebra* **31** (2003), no. 10, 4971-4987.
2. Almost complete intersections and the Lex-Plus-Powers Conjecture, *J. Algebra* **276** (2004), no. 2, 737-760.
3. Resolutions of small sets of fat points, *J. Pure Appl. Algebra* **203** (2005), 220-236.
4. New approaches to bounding the multiplicity of an ideal, *J. Algebra* **299** (2006), no. 1, 309-328.
5. On the componentwise linearity and the minimal free resolution of a tetrahedral curve (with J. Migliore and U. Nagel), *J. Algebra* **299** (2006), no. 2, 535-569.
6. Sequentially Cohen-Macaulay edge ideals (with A. Van Tuyl), *Proc. Amer. Math. Soc.* **135** (2007), no. 8, 2327-2337.
7. Lex-plus-powers ideals (with B. Richert), in *Syzygies and Hilbert functions*, I. Peeva (ed.), Lect. Notes Pure Appl. Math. **254**, *Chapman & Hall/CRC, Boca Raton, FL*, 2007, 113-144.
8. Multiplicity conjectures (with H. Srinivasan), in *Syzygies and Hilbert* functions, I. Peeva (ed.), Lect. Notes Pure Appl. Math. **254**, *Chapman & Hall/CRC, Boca Raton, FL*, 2007, 145-178.
9. Some families of componentwise linear monomial ideals (with A. Van Tuyl), to appear, *Nagoya Math. J.* Preprint at math.AC/0508589.
10. Tetrahedral curves via graphs and Alexander duality, to appear, *J. Pure Appl. Algebra*. Preprint at math.AC/0605588.
11. Whiskers and sequentially Cohen-Macaulay graphs (with H. Tài Hà), to appear, *J. Combin. Theory Ser. A*. Preprint at math.AC/0605487.
12. Grassmannians and representations (with D. Edidin), 2006. Preprint at math.AG/0507482.

Selected Fellowships and Scholarships:

- NSF Graduate Research Fellow, 1999-2002
- Cornell Graduate School Olin Fellow, 2003-2004
- Barry M. Goldwater Scholar, 1998-1999

Teaching Awards:

- Clark Award for Distinguished Teaching in Cornell University College of Arts and Sciences, 2004
- Graduate Student Teaching Award for Cornell mathematics department's most outstanding graduate student teacher, 2002
- "Incomplete List of Teachers Ranked as Excellent by Their Students" at UIUC; appeared twice with instructor ratings "outstanding" (top 10% of all TA's), 1998-1999

Selected Academic Awards:

- Eleanor Norton York Award for "excellent academic performance" as a Cornell mathematics graduate student, 2001
- Phi Beta Kappa member, 1999-
- Greenwood-Trjitzinsky Prize; received twice for best undergraduate mathematics research papers at UIUC, 1998-1999

Computer Package Authored:

- Author of a Macaulay 2 package enabling users to work with lexicographic and other similar monomial ideals and to investigate a conjecture on multiplicity

Conferences Organized:

- Co-organizer (with S. Cooper and B. Richert), Special Session on Hilbert Functions and Free Resolutions at Fall AMS Western Section Meeting in Vancouver, Oct. 2008
- Co-organizer (with I. Peeva), Special Session on Resolutions at Fall AMS Western Section Meeting in Eugene, Nov. 2005
- Co-organizer (with I. Peeva), Special Session on Syzygies and Hilbert Functions at Spring AMS Southeastern Section Meeting in Tallahassee, Mar. 2004

Invited Talks:

- "Commutative algebra, graphs, and Alexander duality," in the Oklahoma State math colloquium, Mar. 2007
- "Commutative algebra, graphs, and Alexander duality," in the UNC-Greensboro math colloquium, Mar. 2007
- "Commutative algebra, graphs, and Alexander duality," in the North Dakota State math colloquium, Feb. 2007
- "Commutative algebra, graphs, and Alexander duality," in the University of Missouri math colloquium, Feb. 2007
- "Commutative algebra, graphs, and Alexander duality," in the Penn State Combinatorics/Partitions Seminar, Jan. 2007
- "(Sequentially) Cohen-Macaulay graphs," in the "Syzygies and Hilbert Functions" workshop at the Banff International Research Station (BIRS), Oct. 2006

- "Making a graph sequentially Cohen-Macaulay," at the AMS Spring Central Section Meeting at Notre Dame, Apr. 2006
- "Sequential Cohen-Macaulayness of edge ideals," at the AMS Spring Southeastern Section Meeting in Miami, Apr. 2006
- "Some componentwise linear monomial ideals," at the Joint Mathematics Meetings in San Antonio, Jan. 2006
- "Some families of componentwise linear monomial ideals," at the AMS Fall Eastern Section Meeting at Bard College, Oct. 2005
- "Fat points and componentwise linear ideals," at the Second Workshop on Resolutions, Inverse Systems, and Coinvariants at the University of Ottawa, Jan. 2005
- "Bounds on the multiplicity of an ideal," at the KUMUNU 6 Algebra Day at the University of Kansas, Oct. 2004
- "Bounds on the multiplicity of an ideal," at the AMS Fall Southeastern Section Meeting in Nashville, Oct. 2004
- "Resolutions of small sets of general fat points," at the Route 81 Conference in Honor of Graham Evans at Cornell University, Sep. 2004
- "Some computational work on the Multiplicity Conjecture," at the Route 81 Conference on Commutative Algebra and Algebraic Geometry, Oct. 2003
- "The Lex-Plus-Powers Conjecture," at the AMS Spring Eastern Section Meeting in Montreal, May 2002
- "Almost complete intersections and the Lex-Plus-Powers Conjecture," at the Route 81 Conference on Commutative Algebra and Algebraic Geometry, Oct. 2002

Seminar Talks:

- "A combinatorial approach to tetrahedral curves," in University of Kansas Algebra Seminar, Apr. 2007
- "A combinatorial approach to tetrahedral curves," in University of Missouri Algebra Seminar, Oct. 2006
- "Edge ideals of graphs and (sequential) Cohen-Macaulayness," in University of Missouri Algebra Seminar, Feb. 2006
- "Families of componentwise linear monomial ideals," in University of Kansas Algebra Seminar, Sep. 2005
- "Intersections of Veronese ideals," in University of Missouri Algebra Seminar, Aug. 2005
- "Some componentwise linear monomial ideals," in UIUC Commutative Ring Theory Seminar, Apr. 2005
- "Fat points and componentwise linear ideals," in University of Missouri Algebra Seminar, Feb. 2005
- "Multiplicity and resolutions for a given Hilbert function," in University of Missouri Algebra Seminar, Sep. 2004 (2 talks)
- "Inverse systems of fat points and Waring's Problem, " in Cornell Computational and Commutative Algebra Seminar, Feb. 2004 (3 talks)
- "The Multiplicity Conjecture," in Cornell Computational and Commutative Algebra Seminar, Sep. 2003
- "The Lex-Plus-Powers Conjecture," in Cornell Computational and Commutative Algebra Seminar, Feb. 2003
- "Hilbert functions and the Eisenbud-Green-Harris Conjecture," in Cornell Computational and Commutative Algebra Seminar, Oct. 2002
- "Some conjectures on lex-plus-powers ideals," in Cornell Combinatorial and Algebraic Geometry Seminar, Jan. 2002

- "Hilbert functions and graded Betti numbers," in Cornell Combinatorial and Algebraic Geometry Seminar at Cornell, Feb. 2001
- "The group structure of supersingular elliptic curves," in UIUC Algebraic Number Theory Seminar, Feb. 1999
- "A problem in computational group theory," in the Graduate Student Program on Algorithmic Algebra and Geometry at MSRI, Jul. 1998

Referee/Reviewer for:

- *Mathematical Research Letters, Journal of Algebra, Proceedings of the AMS, Journal of Combinatorial Theory, Series A, Journal of Pure and Applied Algebra, Communications in Algebra, Contemporary Mathematics, Journal of Approximation Theory, Mathematical Reviews*

Graduate Student Advised:

- Burke McCray, University of Missouri, M.S. in mathematics, Dec. 2006 (co-advised with I. Aberbach)

Teaching Experience:

- Instructor for Math 2144 at Oklahoma State, a first-semester calculus course
- Designed and taught Math 8102 at Missouri, a graduate course on doing research in commutative algebra using the computer algebra system Macaulay 2, Fall 2005
- Gave graduate readings course (Math 8085) in computational commutative algebra, Fall 2006
- Instructor for Math 4070 at Missouri, a basic abstract algebra course for prospective middle-school math teachers
- Instructor for Math 1400 at Missouri, a first-semester calculus course for students in the biological sciences, Fall 2005, Fall 2006, Winter 2007
- Instructor for two sections of Math 1300 at Missouri, a finite mathematics course for business majors, Fall 2004, Winter 2005, Winter 2006
- As a graduate student at Cornell: Instructor for Math 111 (first-semester calculus), recitation TA for Math 221 (linear algebra) and Math 106 (calculus for biologists and social scientists)
- As an undergraduate at Illinois: Recitation instructor for Math 120 (first-semester calculus)

Service:

- Panelist at forum on going to graduate school, AMS Central Section Meeting in Lincoln, Oct. 2005
- Graduate student class representative in Cornell mathematics department, 2000-2001, 2002-2003
- Undergraduate member of three departmental and campus teaching awards committees at UIUC
- Undergraduate member, UIUC math department Undergraduate Affairs Committee, 1997-1998
- Reviewer, Kansas Association of Teachers of Mathematics contest exam, 1996