

# PAUL BAGINSKI

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## PERSONAL

Citizenship: USA

## RESEARCH INTERESTS

Logic: Model theory of groups and rings; stable groups; groups with bounded chains of centralizers;  $\aleph_0$ -categorical structures.

Algebra: commutative rings and monoids; additive number theory; non-unique factorization; Dedekind domains; Krull monoids.

## EDUCATION

Ph.D. in Mathematics, University of California, Berkeley, 2009.

Dissertation: *Stable  $\aleph_0$ -Categorical Algebraic Structures*

Committee: Thomas Scanlon (chair), Leo Harrington, Christos Papadimitriou

M.S. in Mathematics, Carnegie Mellon University, 2003. Master's thesis: *The Jet Space Proof of the Mordell-Lang Conjecture in Characteristic Zero*, director: Andrés Villaveces.

B.S. in Mathematics, Carnegie Mellon University, 2003.

## POST-GRADUATE EMPLOYMENT

2013–present    Assistant Professor. Fairfield University.

2011–2013      Visiting Assistant Professor. Smith College.  
McCoy Fellowship (2012–2013)

2009–2011      National Science Foundation International Research Fellow. Université Lyon 1.  
Mentor: Tuna Altinel.

## PUBLICATIONS

1. “Elasticity of monoids generated by a homogeneous linear Diophantine equation” (with M. Handschy, K. Meyer, K. Phillips, and J. Sadler). *In preparation*.
2. “Lengths of factorizations in numerical semigroup rings.” *In preparation*.
3. “Stable, countably categorical alternative rings.” *In preparation*.
4. “Arithmetic congruence monoids: a survey” (with S. Chapman). To appear in **Combinatorial and Additive Number Theory: Contributions from CANT 2011**. Ed. Melvyn Nathanson. Springer Proceedings in Mathematics & Statistics.

5. “Definable envelopes of nilpotent subgroups of groups with chain conditions on centralizers” (with T. Altinel). To appear in *Proc. Amer. Math. Soc.*.
6. “Products of two atoms in Krull monoids and arithmetical characterizations of class groups.” (with A. Geroldinger, D. Gryniewicz, and A. Philipp). *Eur. J. Comb.* **34** (2013), no. 8, 1244–1268.
7. “Factorizations of algebraic integers, block monoids, and additive number theory” (with S. Chapman) *Amer. Math. Monthly* **118** (2011), no. 10, 901–920.
8. “A new characterization of half-factorial Krull monoids” (with R. Kravitz) *J. Algebra Appl.* **9** (2010), no. 5, 825–837.
9. “On the Delta set and catenary degree of Krull monoids with infinite cyclic divisor class group” (with S. Chapman, R. Rodriguez, G. Schaeffer, and Y. She) *J. Pure Appl. Alg.*, **214** (2010), no. 8, 1334–1339.
10. “On the Delta-set of a singular arithmetical congruence monoid,” (with S. Chapman and G. Schaeffer) *J. Théor. Nombres Bordeaux* **20** (2008), no. 1, 45–59.
11. “On the asymptotic behavior of unions of sets of lengths in atomic monoids,” (with S. Chapman, N. Hine and J. Paixão) *Involve* **1** (2008), no. 1, 101–110.
12. “Elastic properties and prime elements,” (with S. Chapman, C. Crutchfield, K. Kennedy and M. Wright) *Results Math.* **49** (2006), no. 3-4, 1–14.
13. “Asymptotic elasticity in atomic monoids,” (with S. Chapman, M. Holden and T. Moore) *Semigroup Forum* **72** (2006), no. 1, 134–142.
14. “A generalization of a Ramsey-type theorem on hypermatchings,” *J. Graph Theory* **50** (2005), no. 2, 142–149.
15. “On cross numbers of minimal zero sequences in certain cyclic groups,” (with S. Chapman, K. McDonald and L. Pudwell) *Ars Combin.* **70** (2004), 47–60.

## GRANTS, AWARDS, AND FUNDED RESEARCH

AMS–NSF Travel Grant to attend the Mathematical Congress of the Americas, Guanajuato, Mexico August 2013. \$1800.

Project NExT. July 2012 – August 2013.

NSF REU Site: San Diego State University Mathematics REU. September 2011–August 2014.

Role: Senior Personnel. PI: Vadim Ponomarenko. Budget: \$394,126. DMS Grant #1061366.

NSF International Research Fellowship. Université Lyon 1. July 2009–June 2011.

Role: PI. Budget: \$136,072. IRFP Grant # 0853293.

Chateaubriand Fellowship, French Embassy to the United States. Project: The Model Theory of Groups. Host: Université Lyon 1. September 2009–July 2010. (declined)

Department of Education Foreign Language and Area Studies (FLAS)

Fellowship to learn French for academic and career advancement. September 2007–May 2008.

Mathematical Logic and Applications (MATHLOGAPS) fellowship at Université Lyon 1, France. May–August 2007.

Department of Homeland Security Fellowship. September 2003–August 2006.

Department of Homeland Security Internship at the Center for Applied Scientific Computing, Lawrence Livermore National Laboratory, Livermore, California. Mentor: Van Henson. Summer 2004.

Carnegie Mellon Presidential Scholarship. August 1999–May 2003.

## TEACHING

Asst. Prof. <i>Fairfield Univ.</i>	MA 119 Applied Calculus I (Fall 2013, 2 sec.)
Visiting Asst. Prof. <i>Smith College</i>	MTH 400 Special Studies: Algebraic Number Theory (2 students, Spring 2013) MTH 246 Probability (Fall 2011) MTH 238 Topics in Number Theory (Fall 2012) MTH 233 Introduction to Modern Algebra (Spring 2013) MTH 211 Linear Algebra (Spring 2013) MTH 114 Calculus: Diff. Equations and Power Series (Fall 2012; Fall 2011, 2 sec.) MTH 112 Calculus II (Spring 2012, 2 sections)
Teaching Asst. <i>UC Berkeley</i>	CS 70 Discrete Mathematics and Probability (Fall 2008, 2 sec.) Instructors: Christos Papadimitriou and Anant Sahai. Math 1B Calculus II (Spring 2007, 2 sec.) Instructor: Ole Hald.
Teaching Asst. <i>Carnegie Mellon</i>	15-151 Discrete Mathematics for Computer Scientists (Fall 2000) Instructor: Klaus Sutner.
Grader <i>Carnegie Mellon</i>	21-610 Algebra I. Graduate level (Spring 2002) 21-600 Mathematical Logic I. Graduate level (Fall 2001) 21-374 Field Theory. Undergraduate level (Spring 2002) 21-300 Basic Logic. Undergraduate level (Fall 2001)

## SUPERVISED STUDENT RESEARCH

Fall 2012	Project director. MTH 301 Topics in Advanced Mathematics: Research in Mathematics. Smith College, Massachusetts. Course director: Jim Henle. Directed 4 undergraduate and postbac students in number theory research.
Summer 2012	Technical Consultant. NSF Research Experience for Undergraduates (REU) San Diego State University, California. Director: Vadim Ponomarenko. Devised research projects and provided week of background lectures to students.
Summers of 2008, 2006, 2005	Graduate Mentor. NSF Research Experience for Undergraduates (REU) Trinity University, San Antonio, Texas. Director: Scott Chapman. Students mentored: 2 (2008), 7 (jointly, 2006), 3 (2005).

## INVITED TALKS

*Length Multiset-Complete Krull Monoids.* AMS Sectional Meeting, Iowa State University, Ames, Iowa. (April 2013)

*Full Elasticity in Atomic Monoids.* AMS Special Session on Arithmetic and Ideal Theory of Integral Domains and Monoids, AMS/MAA Joint Meetings, San Diego, California. (January 2013)

- Stability and Countable Categoricity in Nonassociative Rings.* Connecticut Logic Seminar. Wesleyan University, Middletown, Connecticut. (November 2012)
- Model Theoretic Advances for Groups With Bounded Chains of Centralizers.* Connecticut Logic Seminar. Wesleyan University, Middletown, Connecticut. (January 2012)
- Factoring Within Arithmetic Progressions.* Plenary Lecture, Undergraduate Research Symposium. University of North Texas, Denton, Texas. (August 2011)
- Baer-Suzuki Theorems for Infinite Groups.* AMS Special Session on Model Theory of Fields and Applications (Mathematics Research Communities session), AMS/MAA Joint Meetings, New Orleans, Louisiana. (January 2011)
- Tautness: Stretched Between Half-Factoriality and Bounded Factorization.* Karl-Franzens Universität Graz, Austria. (December 2010)
- Factorization in Numerical Semigroup Rings.* University of Stockholm, Stockholm, Sweden. (September 2010)
- Factorization in Semigroup Rings.* Second Annual Iberian Meeting on Numerical Semigroups, Granada, Spain. (February 2010)
- Equivalence Relations and Factorization.* Karl-Franzens Universität Graz, Graz, Austria. (November 2009)
- Stable  $\aleph_0$ -categorical Algebraic Structures.* Special Session on Model Theory and Its Applications, AMS Meeting Fall Eastern Section, Wesleyan University, Middletown, CT. (October 2008)
- Stable  $\aleph_0$ -categorical Algebraic Structures.* McMaster University, Hamilton, Canada. (October 2007)
- A Case Study in Factorization Theory: Arithmetic Congruence Monoids.* The Art of Factorization in Multiplicative Structures (MAA PREP Workshop), Trinity University, San Antonio, TX. (May 2007)
- Monoids and Combinatorics I, II, and III.* The Art of Factorization in Multiplicative Structures (MAA PREP Workshop), Trinity University, San Antonio, TX. (May 2007)
- Elasticity in Polynomial Rings and Block Monoids.* Karl-Franzens Universität Graz, Austria. (December 2006)
- Stable  $\aleph_0$ -Categorical Rings.* Université Denis Diderot - Paris VII, France. (November 2006)
- Centralizers and Connectedness in Group Theory.* Trinity University, San Antonio, TX. (March 2006)
- Elasticity in Polynomial and Power Series Rings.* Special Session on Commutative Rings and Monoids, AMS/MAA Joint Meetings, San Antonio, TX (January 2006)
- Uniwersalne Grafy z Zabronionymi Podgrafami (Universal Graphs with Forbidden Subgraphs).* University of Wrocław, Poland. (March 2005)
- Ax's Theorem.* Trinity University, San Antonio, TX. (June 2004)

## CONFERENCE TALKS

- Stability and Countable Categoricity in Nonassociative Rings.* Models and Groups, Boğaziçi University, Istanbul, Turkey. (September 2013)

*Length Multiset-Complete Krull Monoids.* Journées estivales de la Méthode Polynomiale, Université Lille 1, Lille, France. (June 2013)

*Length Multiset-Complete Krull Monoids.* Combinatorics and Additive Number Theory (CANT), City University of New York, New York City, NY. (May 2013)

*Stable  $\aleph_0$ -Categorical Nonassociative Rings.* AMS/MAA Joint Meetings, San Diego, California. (January 2013)

*Model Theory and Nilpotence in Groups with Bounded Chains of Centralizers.* Antalya Algebra Days XIV, Çeşme, Turkey. (May 2012)

*Nilpotence in Groups with Bounded Chains of Centralizers.* AMS/MAA Joint Meetings, Boston, Massachusetts. (January 2012)

*Factoring Within Arithmetic Progressions.* Combinatorics and Additive Number Theory (CANT), City University of New York, New York City, NY. (May 2011)

*Baer-Suzuki Theorems for Infinite Groups.* British Postgraduate Model Theory Conference, Leeds, England. (January 2011)

*Factorization Techniques for Numerical Semigroup Rings.* AMS Session on Commutative Rings and Fields, AMS/MAA Joint Meetings, New Orleans, Louisiana. (January 2011)

*Lengths of Factorizations in Numerical Semigroup Rings.* Third International Meeting on Integer Valued Polynomials and Problems in Commutative Algebra, CIRM, Luminy, France. (November 2010)

*Elimination of Imaginaries for the  $p$ -adics.* Model Theory of Fields, AMS Mathematics Research Community, Snowbird Resort, Utah. (June 2010)

*Factorization in Numerical Semigroup Rings.* Combinatorics and Additive Number Theory (CANT), City University of New York, New York City, NY. (May 2010)

*Model Theory of Stable Groups.* AMS Session on Algebras, AMS/MAA Joint Meetings, San Francisco, California. (January 2010)

*Stable,  $\aleph_0$ -Categorical Algebraic Structures.* Fourth MATHLOGAPS training workshop, University of Manchester, England. (July 2008)

*Explicit Computation of the Modular Equation.* Undergraduate Mathematics Day, University of Dayton, OH (November 2003)

## INFORMAL TALKS

*Factoring Within Arithmetic Progressions I and II.* San Diego State University REU, San Diego, California. (June 2012)

*Stable, Countably Categorical Algebraic Structures.* Institut Camille Jordan, Université Lyon 1, Lyon, France. (October 2009)

*Countably Categorical Groups via Boolean Algebra.* Student Logic Colloquium, UC Berkeley. (October 2008)

*Ax's Theorem* REU Colloquium, Trinity University. (June 2008)

*Independence Property and Hyperbolic Groups.* Model Theory Seminar, UC Berkeley. (April 2008)

- Stable,  $\aleph_0$ -Categorical Algebraic Structures.* Institut Camille Jordan, Université Lyon-1, France. (November 2006)
- $\aleph_0$ -Categorical, Stable Rngs.* Model Theory Seminar, UC Berkeley. (March 2006)
- 2-Sylow Subgroups in Groups of Finite Morley Rank.* Model Theory Seminar, UC Berkeley. (October 2005)
- Ax's Theorem and Grothendieck Rings.* Student Logic Colloquium, University of California, Berkeley. (September 2005)
- Ax's Theorem.* REU Colloquium, Trinity University, San Antonio, TX. (July 2005)
- Lie Coordinatization.* Model Theory Research Seminar, UC Berkeley. (October 2004)
- Universal Omitting Graphs.* Model Theory Research Seminar, UC Berkeley. (March 2004)
- My Favorite Color is Zero.* Many Cheerful Facts, University of California, Berkeley. (February 2004)
- Explicit Computation of the Modular Equation.* MASSfest, Pennsylvania State University. (August 2003)
- The Mordell-Lang Conjecture in Characteristic Zero.* Mathematical Logic Seminar, Carnegie Mellon University. (April 2003)
- On Ramsey Numbers for Matchings and Hypermatchings.* REU presentations, University of Idaho. (August 2002)
- Cross Numbers of Minimal Zero Sequences.* REU presentations, Trinity University. (August 2001)

## CONFERENCES ATTENDED

- Mathematical Congress of the Americas, Guanajuato, Mexico. August 2013.
- Conference on Model-Theoretic Algebra in Honor of Carol Wood, Wesleyan University, Middletown, Connecticut. May 2013.
- Women in Mathematics in New England (WiMiN), Smith College, Northampton, Massachusetts. September 2012.
- Mathfest, Madison, Wisconsin. August 2012.
- Additive Combinatorics in Paris, Paris, France. July 2012
- Combinatorics and Additive Number Theory (CANT), CUNY, New York City, New York. May 2012
- Antalya Algebra Days XIV, Çeşme, Turkey. May 2012
- AMS/MAA Joint Meetings, Boston, Massachusetts. January 2012
- Undergraduate Research Symposium, University of North Texas, Denton, Texas. August 2011
- Combinatorics and Additive Number Theory (CANT), CUNY, New York City, New York. May 2011
- British Postgraduate Model Theory Conference, Leeds, England. January 2011
- AMS/MAA Joint Meetings, New Orleans, Louisiana. January 2011

Third International Meeting on Integer Valued Polynomials and Problems in Commutative Algebra, CIRM, Luminy, France. November 2010

Model Theory of Fields, AMS Mathematics Research Community, Snowbird Resort, Utah. June 2010

Combinatorics and Additive Number Theory (CANT), CUNY, New York City, New York. May 2010

Second Annual Iberian Meeting on Numerical Semigroups, Granada, Spain. February 2010

AMS/MAA Joint Meetings, San Francisco, California. January 2010

European Science Foundation Conference in Model Theory, Mathematical Research and Conference Center, Będlewo, Poland. August 2009

Model Theory in Wrocław, University of Wrocław, Wrocław, Poland. August 2009

Permutation Groups, Banff International Research Station, Banff, Canada. July 2009

Logicum Urbanae Lugduni, Université Lyon 1, Lyon, France. July 2009

AMS/MAA Joint Meetings, Washington, D.C. January 2009

AMS Meeting Fall Eastern Section, Wesleyan University, Middletown, CT. October 2008

Fourth MATHLOGAPS Workshop, Manchester, England. July 2008

Third MATHLOGAPS Workshop, Aussois, France. June 2007

Art of Factorization in Multiplicative Structures (MAA PREP Workshop), Trinity University, San Antonio, TX. May 2007

MODNET Midterm Conference, Antalya, Turkey. November 2006

Model Theory of Metric Structures, American Institute of Mathematics, Palo Alto, CA. September 2006

Analysis, Logic, and Number Theory; Honoring Paul Cohen on his 72nd Birthday, Stanford University, California. September 2006

Introductory Workshop in Rational and Integral Points on Higher-Dimensional Varieties, MSRI, Berkeley, California. January 2006

AMS/MAA Joint Meetings, San Antonio, Texas. January 2006

Young Mathematicians Conference, Ohio State University, Ohio. August 2005

Model Theory and Applications to Algebra and Analysis, Isaac Newton Institute, University of Cambridge, England. January 2005 - May 2005

Undergraduate Mathematics Day, University of Dayton, Ohio. November 2003

Scottfest, a conference in honor of Dana Scott on his 70th birthday, Carnegie Mellon University, Pennsylvania. Spring 2003

AMS/MAA Joint Meetings, Baltimore, Maryland. January 2003

MAMLS Conference, Carnegie Mellon University, Pennsylvania. November 2002

MAMLS Conference, Rutgers University, New Jersey. October 2001

## EXTENDED VISITS

Université Lyon 1, Lyon, France. Working with Tuna Altınel and Frank Wagner.  
Feb. 2009 – Apr. 2009; May 2007 – Aug. 2007; Oct. 2006 – Dec. 2006.

Isaac Newton Institute, Cambridge, England. Attending the workshop on *Model Theory and Applications to Algebra and Analysis*. January 2005 – May 2005.

## PROFESSIONAL AFFILIATIONS

American Mathematical Society  
Association for Symbolic Logic  
Mathematical Association of America

## SERVICE

Women of Distinction, Smith College, Northampton, Massachusetts. November 2011 and 2012.

Organized an activity booth for the Mathematics and Statistics Department during an open house of STEM majors for prospective female students of color.

Science Center Committee on Diversity, Smith College, 2011–2013. Attended monthly mentoring teas to meet and support students of color in an informal setting.

Presentations on number theory and cryptography for MTH 300, a 1-credit course preparing students for graduate school and careers in mathematics. Fall 2012.

Department meeting minutes, Smith College, 2012–present.

Logic Group, Université Lyon 1, Webmaster, 2010–2011.

Mathematics Graduate Student Association, UC Berkeley, Officer and Webmaster, 2006–2008.

Mathematics Department Computer Committee, UC Berkeley, 2006–2008.

## REFEREING & REVIEWING

Refereed papers for *American Mathematical Monthly*; *Annals of Pure and Applied Logic*; *Czechoslovak Mathematical Journal*; *Discrete Applied Mathematics*; *Discrete Mathematics*; *Graphs and Combinatorics*; *Involve*; *Journal of Number Theory*; *Journal of Number Theory Bordeaux*; *Results in Mathematics*; *Semigroup Forum*; and *Transactions of the American Mathematical Society* (informal).

Reviewed papers for *Zentralblatt MATH*

## OTHER SKILLS

Languages: Native Speaker in English and Polish. Intermediate in French and German.

Computer Skills: Java, Javascript, Mathematica, Matlab