

**Name: Florian Enescu**  
**Rank: Professor with tenure**  
**Department of Mathematics and Statistics**  
**College of Arts and Sciences**  
**Georgia State University**

#### **a) EDUCATION**

- Ph.D. in Mathematics (August 2001), **University of Michigan at Ann Arbor**  
(thesis advisor: **Professor Melvin Hochster**)
- Master of Science (August 1999), **University of Michigan at Ann Arbor**
- Diploma (B.Sc.) in Mathematics, (June 1996), **University of Bucharest, Romania**

#### **b) PROFESSIONAL CREDENTIALS**

##### **POSITIONS**

- (August 2014-present) Professor, **Georgia State University**
- (August 2009 – July 2014) Associate Professor, **Georgia State University**
- (August 2004 – July 2009) Assistant Professor, **Georgia State University**
- (August 2001 - August 2004) Scott Assistant Professor, **University of Utah**
- (Fall 2002) Postdoctoral Research Fellow, **Mathematical Sciences Research Institute, Berkeley, California**
- (1996 - 1999) Graduate Student Instructor, **University of Michigan at Ann Arbor**
- (1999 - 2000) Research Assistant, **University of Michigan at Ann Arbor**

#### **c) SCHOLARSHIP AND PROFESSIONAL DEVELOPMENT**

##### **RESEARCH INTERESTS**

- Commutative Algebra, Algebraic Geometry

##### **GRANTS**

- (07/15/2019-07/14/2022) National Science Foundation, 1910368 (P.I.) –**SFH: Small: Collaborative Proposal: Rectification of Arithmetic Circuits with Craig Interpolants in Algebraic Geometry**, \$189,860 (\$63,288 annually)
- (08/01/2013-07/31/2016-no cost extension until 01/31/2018) National Science Foundation, 1300835 (P.I.) –**SFH: Small: Collaborative Proposal: Efficient Computer Algebra Techniques for Scalable Verification of Galois Field Arithmetic Circuits**, \$188,241 (\$62,787 annually)

- (02/15/2015-01/31/2016) (co-P.I.), National Science Foundation - **Conference Grant for Recent developments in positive characteristic methods in commutative algebra: Frobenius operators and Cartier algebras**, \$24,530.
- (05/01/2014-06/30/2015) STEM Mini-grant, STEM II Funding University System of Georgia (co-P.I.), **Reading, Writing and Comprehending Mathematical Proofs and Transitioning to Secondary School Classroom**, \$6340.
- (03/01/2012-02/28/2014) National Security Agency, Young Investigators Grant (P.I.) – **Contributions to problems on multiplicities and local cohomology in positive characteristic**, \$39,914 (\$19,957 annually).
- (07/01/2012-06/30/2013) STEM Mini-grant, STEM II Funding University System of Georgia (co-P.I.) - **A Collaborative Teaching Model in Redesigning, Examining, and Integrating CCSS-M in a Secondary Mathematics Methods Course: Focus on a Module of Statistics**, \$6,000.
- (02/16/2010-02/15/2012) National Security Agency, Young Investigators Grant (P.I.) - **Hilbert-Kunz multiplicities and local cohomology questions in positive characteristic**, \$29,882 (\$14,991 annually)
- (09/24/2010-09/26/2010) (co-P.I.), Georgia State University Research Foundation - **Conference Grant for Commutative Algebra in the Southeast**, \$3,000.
- (03/01/2010-5/30/2010) (co-P.I.), National Science Foundation - **Conference Grant for Frobenius Splittings in Algebraic Geometry, Commutative Algebra, and Representation Theory**, \$25,000.
- (10/29/2008-10/28/2010) National Security Agency/University of South Carolina Subcontract (P.I.) - **GSU-USC Commutative Algebra Seminar** , \$15,280 (\$7,640 annually).
- (01/01/2007-12/31/2009) National Security Agency, Young Investigators Grant (P.I.) - **Special chapters in the theory of rings of positive characteristic**, \$29,130 (\$14,565 annually)
- (08/01/2005-07/31/2006, with a no-cost extension until 04/30/2007) NSF Grant CCF-0515010 (P.I.) - **Collaborative research: a new theoretical and algorithmic framework for RTL datapath verification using polynomial algebra over finite rings** \$36,190.
- (2005) Research Initiation Grant, **Georgia State University**, \$8600.
- (1999, 2000) Rackham Travel Grant, **University of Michigan at Ann Arbor**

## **AWARDS, HONORS**

- (April 2016) Outstanding Service Award, **Department of Mathematics and Statistics, Georgia State University.**
- (April 2014) Outstanding Research Award, **Department of Mathematics and Statistics, Georgia State University.**
- former member of the **Institute of Mathematics of the Romanian Academy**
- (5-17 March 2013) Fellow, **Hambidge Center for Creative Arts and Sciences.**
- (May 2012) BITDEFENDER Invited Professor, **Institute of Mathematics of the Romania Academy.**
- (2004) Outstanding Instructor Award, **University of Utah**
- (Fall 2002) Postdoctoral Research Fellow, **Mathematical Sciences Research Institute, Berkeley, California**

- (Fall 2000 – Summer 2001) Rackham Predoctoral Fellowship, **University of Michigan at Ann Arbor**
- (1991 - 1996) National Merit Fellowship, **University of Bucharest, Romania**

## PAPERS

### Algebra:

- Strong test ideals associated to Cartier algebras, joint work with Irina Iliaoaia, **Journal of Algebra and Its Applications**, accepted for publication, 2019.
- The Frobenius exponent of Cartier subalgebras, joint work with Felipe Perez, **Journal of Pure and Applied Algebra**, 2019.
- On the resolution of fan algebras of principal ideals over a Noetherian ring, joint work with Teresa Cortadellas Benitez, Carlos D'Andrea, arXiv: 1612.02939 [math.AC], accepted 2019, **Journal of Algebra**.
- Computing the invariants of intersection algebras of principal monomial ideals, joint work with Sandra Spiroff, **International Journal of Algebra and Computation**, 2019.
- On the Frobenius complexity of determinantal rings, joint work with Yongwei Yao, **Journal of Pure and Applied Algebra** (2018), no 2, 414-432.
- Test ideals in rings with finitely generated anti-canonical algebras, joint work with Alberto Chiechio, Lance E. Miller, Karl Schwede, arXiv: 1412.6453 [math.AG], **Journal of the Institute of Mathematics of Jussieu**, vol 17, issue 1, February 2018, 171--206, published online January 2016 (corrigendum: vol 17, issue 4, 979--980).
- On subfield-compatible polynomials and a class of Vandermonde-like matrices, joint work with John Hull, **Bull. Math. Soc. Sci. Math. Roumanie** (special volume dedicated to Dorin Popescu), tome 60 (108) no.4 2017, 387-397.
- The Frobenius complexity of a local ring of prime characteristic, joint work with Yongwei Yao, arXiv: 1401.0234v2 [math.AC], **Journal of Algebra**, 459 (2016), 133--156.
- Intersection algebras for principal monomial ideals in polynomial rings, joint work with Sara Malec, **Journal of Algebra and its Applications**, vol 14 (07) 2015.
- New estimates for Hilbert-Kunz multiplicities for local rings of fixed dimension, joint work with I. M. Aberbach, **Nagoya Math Journal**, vol 212, 59—85, 2013.
- Finite-dimensional vector spaces with Frobenius action, "**Progress in Commutative Algebra. Ring Theory, Homology, and Decompositions**" edited by C. Francisco, Lee Klingler, S. Sather-Wagstaff, and J. C. Vassilev, publisher: De Gruyter, Germany, 2012.

- A finiteness condition on local cohomology in positive characteristic, **J. Pure and Appl. Algebra** 261 (2011) no. 1, 115--118.
- The lower semi-continuity of the Frobenius splitting numbers, joint work with Y. Yao, **Math. Proc. Cambridge Phil. Soc.**, vol 150, no.1, pages 35-46, 2010.
- Local cohomology and F-stability, **Journal of Algebra** 322 (2009) no. 2 3063--3077 (special issue dedicated to Paul C. Roberts)
- Frobenius structure of local cohomology, joint work with M. Hochster, **Algebra and Number Theory** 2 (2008) no 7, 721--754
- Lower bounds for Hilbert-Kunz multiplicities for local rings of fixed dimension, joint work with I. M. Aberbach, **Michigan Math. Journal** volume 57 (2008) 1--16 (special issue in the honor of M. Hochster).
- Briançon-Skoda for Noetherian filtrations, **Analele Stiintifice Univ. Ovidius Seria Math**, (special issue dedicated to D. Popescu) vol XV 2007, fasc. 1, pages 91--96
- Asymptotic growth of powers of ideals, joint work with C. Ciupercă, Sandra Spiroff, **Illinois Jour. Math** (special issue dedicated to P. Griffith), 51 (2007), no. 1, 29--39 (electronic)
- When does the F-signature exist?, joint work with I. M. Aberbach, **Annales Math. de Toulouse**, 15, 2 (2006) 195--201
- On the upper semi-continuity of the Hilbert-Kunz multiplicity, joint work with K. Shimomoto, **Journal of Algebra**, 285 (2005), no. 1, 222--237
- The structure of F-pure rings, joint work with I.M. Aberbach, **Mathematische Zeitschrift**, 250 (2005) no. 4, 791--806
- An inequality involving tight closure and parameter ideals, joint work with C. Ciuperca, **Bulletin of the London Math. Society**, 36 (2004), no. 3, 351--357
- On rings with small Hilbert-Kunz multiplicity, joint work with M. Blickle, **Proceedings of the Amer. Math. Soc.**, 132 (2004), 2505--2509
- Applications of pseudocanonical covers to tight closure theory, **Journal of Pure and Applied Algebra**, (178) 2003, no. 2, 150--167
- Test ideals and flat base change problems in tight closure theory, joint work with I.M. Aberbach, **Trans. Amer. Math. Soc.**, 355 (2003), no. 2, 619--636

- F-injective rings and F-stable primes, **Proceedings of the Amer. Math. Soc.**, 131 (2003), 3379--3386
- Strong test modules and multiplier ideal, **manuscripta mathematica**, vol. 111, (4) 2003, 487--498
- On the behavior of F-rational rings via flat base change, **Journal of Algebra** (November 2000), 232, no. 2, 543--566
- Infinitesimal module deformations in the Thom-Sebastiani problem, joint work with D. Popescu and G. Pfister, **Arch. Math. (Basel)**, (69) 1997, no. 3, 196--208

### **Applications of algebra to circuit design:**

- Efficient Symbolic Computation for Word-Level Abstraction from Combinational Circuits for Verification over Finite Fields, Tim Pruss, Priyank Kalla, Florian Enescu, **IEEE-Transactions on Computer-Aided Design of Integrated Circuits and Systems**, IEEE Transactions on CAD of Integrated Circ. And Systems, 35(7) 2016, 1206--1218.
- Efficient Groebner Basis Reductions for Formal Verification of Galois Arithmetic Field Circuits, Jinpeng Lv, Priyank Kalla, Florian Enescu, **IEEE Transactions on CAD**, vol 32, issue 9, 1409-1420, Sept 2013.
- Simulation Bounds for Equivalence Verification of Polynomial Datapaths using Finite Ring Algebra, Namrata Shekhar, Priyank Kalla, M. Brandon Meredith, Florian Enescu, **IEEE Trans. on VLSI, special section on Design Validation and Verification**, Volume 16, Issue 4, April 2008, 376--387
- Equivalence Verification of Polynomial Datapaths using Ideal Membership Testing, Namrata Shekhar, Priyank Kalla, Florian Enescu, **IEEE Trans. on CAD**, Volume 26, Issue 7, July 2007 1320 - -133

### **Proceedings (refereed):**

- On the Rectifiability of Arithmetic Circuits using Craig Interpolants in Finite Fields, by Utkarsh Gupta, Irina Iliaea, Vikas Rao, Arpitha Srinath, Priyank Kalla and Florian Enescu, book chapter in *VLSI-SoC: Design and Engineering of Electronics Systems Based on New Computing Paradigms*, Springer 2019, extended version of conference paper at VLSI-SoC 2018.
- [Exploring Algebraic Interpolants for Rectification of Finite Field Arithmetic Circuits with Gröbner Bases](#) by Utkarsh Gupta, Irina Iliaea, Priyank Kala and Florian Enescu, accepted at **IEEE European Test Symposium 2019**.

- Post-Verification Debugging and Rectification of Finite Field Arithmetic Circuits using Computer Algebra Techniques, by Vikas Rao, Utkarsh Gupta, Arpitha Srinath, Irina Iliaea, Priyank Kala and Florian Enescu, accepted at **FMCAD 2018**.
- On the Rectifiability of Arithmetic Circuits using Craig Interpolants in Finite Fields, by Utkarsh Gupta, Irina Iliaea, Vikas Rao, Arpitha Srinath, Priyank Kalla and Florian Enescu, accepted, **VLSI-SoC 2018**. Nominated for best paper award.
- Craig Interpolants in Finite Fields using Algebraic Geometry: Theory and Application, by Utkarsh Gupta, Irina Iliaea, Priyank Kalla and Florian Enescu, accepted at **27th International Workshop on Logic & Synthesis (IWLS), 2018**.
- Resolving Unknown Components in Arithmetic Circuits using Computer Algebra Methods, by Vikas Rao, Utkarsh Gupta, Irina-Georgeana Iliaea, Priyank Kalla and Florian Enescu, refereed poster, accepted at **27th International Workshop on Logic & Synthesis (IWLS), 2018**.
- Finding Unsatisfiable Cores of a Set of Polynomials Using the Gröbner Basis Algorithm, Xiaojun Sun, Irina Iliaea, Priyank Kalla, Florian Enescu, **CP Conference 2016**, France, *Principles and practice of constraint programming*, 859–875, [Lecture Notes in Comput. Sci., 9892](#), Springer, 2016.
- Formal Verification of Sequential Galois Field Arithmetic Circuits using Algebraic Geometry, Xiaojun Sun, Priyank Kalla, Tim Pruss and Florian Enescu, **Design Automation Testing in Europe (DATE 2015)**.
- Equivalence Verification of Large Galois Field Arithmetic Circuits Using Word-Level Abstraction via Groebner Bases, Tim Pruss, Priyank Kalla, and Florian Enescu, **Design Automation Conf. (Dac 2014)**.
- Efficient Groebner Basis Reductions for Formal Verification of Galois Field Multipliers, Jinpeng Lv, Priyank Kalla, and Florian Enescu, **Design Automation and Test in Europe (DATE) Conf., 899--904, IEEE 2012**.
- Verification of Composite Galois Field Multipliers over  $GF((2^m)^n)$  using Computer Algebra Techniques, Jinpeng Lv, Priyank Kalla, and Florian Enescu, in **IEEE High-Level Design Validation and Test Workshop (HLDVT 2011)**, 2011.
- Finding linear building-blocks for RTL synthesis of polynomial datapaths with fixed-size bit-vectors, joint work with Sivaram Gopalakrishnan, Priyank Kalla, M. Brandon Meredith, Florian Enescu **Computer-Aided Design, 2007. ICCAD 2007. IEEE/ACM International Conference** on 4-8 Nov. 2007 Page(s):143 - 148
- Optimization of Arithmetic Datapaths with Finite Word-Length Operands, joint work with Sivaram Gopalakrishnan, Priyank Kalla, Florian Enescu, **Asia/South-Pacific DAC, ASP-DAC (2007)**.

- Simulation Bounds for Equivalence Verification of Arithmetic Datapaths with Finite Word-Length Operands, Namrata Shekhar, Priyank Kalla, M Brandon Meredith, Florian Enescu, **Formal Methods in Computer-Aided Design, FMCAD - 2006.**
- Optimizing Fixed-Size Bit-Vector Arithmetic using Finite Ring Algebra, Sivaram Gopalakrishnan, Priyank Kalla, F. Enescu, **Intl. Workshop on Logic and Synthesis, IWLS, 2006.**
- Equivalence Verification of Arithmetic Datapaths with Multiple Word-Length Operands, Namrata Shekhar, Priyank Kalla, Florian Enescu, **Proceedings of the Design Automation and Test in Europe (DATE) Conf., March 2006.**
- Equivalence verification of polynomial datapaths with fixed-size bit-vectors using finite ring algebra, Namrata Shekhar, Priyank Kalla, Florian Enescu and Sivaram Gopalakrishnan, **Proceedings of the Intl. Conf. on Computer-Aided Design ICCAD, Nov. 2005.**
- Exploiting vanishing polynomials for equivalence verification of fixed-size arithmetic datapaths, Namrata Shekhar, Priyank Kalla, Florian Enescu and Sivaram Gopalakrishnan. **Proceedings of the Intl. Conf. on Computer Design ICCD, Oct. 2005.**

#### **Ph.D. THESIS**

A study of F-rationality and F-injectivity, University of Michigan at Ann Arbor, August 2001

#### **CONFERENCE ORGANIZER**

- Co-organizer (with Yongwei Yao) of the Special Session in Commutative Algebra at Southeastern Meeting of the Amer. Math. Soc. at Vanderbilt University, Nashville, April 14-15 2018.
- Co-organizer (with Carlos D'Andrea) of the mini-symposium "Free resolutions governed by geometric and/or combinatorial data", SIAM on Applied Algebraic Geometry Meeting, August 4 2017, Georgia Tech, Atlanta.
- Co-organizer (with Yongwei Yao) of the meeting "Recent developments in positive characteristic methods in commutative algebra: Frobenius operators and Cartier algebras", 03/13/15-03/15/15, Georgia State University, Atlanta.
- Co-organizer (with Cristodor Ionescu) of the Special Session in Commutative Algebra at the Joint International Meeting between the Amer. Math. Soc. and the Romanian Math. Soc. in Romania, June 26-30 2013.
- Co-organizer (with Yongwei Yao) of the meeting "Commutative Algebra at Georgia State", 02/10/12-02/12/12, Georgia State University.

- Co-organizer (with Yongwei Yao) of the meetings “Commutative Algebra in the Southeast” at Georgia State University. A national meeting was held between September 24-26 2010, and a regional meeting between March 20-21 2010.
- (May 17-May 22 2010) Co-organizer (together with M. Blickle, M. Brion, S. Kumar, M. Mustață, K. Schwede) of the conference “Frobenius splittings in algebraic geometry, commutative algebra and representation theory” held at the University of Michigan.
- Co-organizer (together with Sandra Spiroff, March 27-29 2009) of the Special Session “Local and Homological Methods in Commutative Algebra” at the AMS 2009 Spring Central Sectional Meeting held at the University of Illinois at Urbana-Champaign
- Co-organizer (together with Yongwei Yao, Oct 20 2006, March 17-18 2007, Sept 16 2007, April 25-27 2008, September 13-14 2008) of the GSU-USC Commutative Algebra Meeting, held at GSU, Atlanta. Two meetings are held in Atlanta every academic year: one regional and one national.
- (March 3-4, 2007) Co-organizer (together with A. Kustin, A. Vraciu) of the Special Session Commutative Algebra and Algebraic Geometry, AMS South-East Section, Davidson College.
- (October 16-17, 2004) Co-organizer (together with A. Vraciu) of the Special Session Local and homological algebra, AMS South-East Section, Nashville, Tennessee
- (June 2004) Co-organizer (together with P.C. Roberts) of the mini-course “Fundamental Problems in Commutative Algebra”, with the participation of graduate students nationwide and leading experts in the field, at the University of Utah. I have also given five one hour lectures on Local cohomology, local duality and basic notions of tight closure theory at this mini-course.
- (March 13, 2002) American Mathematical Society Meeting, Special Session on Commutative Algebra, Ann Arbor, Michigan (together with A. K. Singh and K. E. Smith)
- (2002 – 2004) Co-organizer of the Commutative Algebra Seminar, University of Utah
- (1998 – 2001) Organizer of the Student Commutative Algebra / Algebraic Geometry Seminar, University of Michigan at Ann Arbor

## INVITED TALKS

- (July 2019), The Hilbert quasipolynomial of a polynomial ring and generating functions related the Frobenius complexity for various classes of singularities. Minisymposium on *Syzygies and Applications to Geometry*, SIAM Conference on Applied Algebraic Geometry, Bern, Switzerland.



- (March 2019) Generating functions associated to the twisted construction of a graded ring, AMS Southeastern meeting, Special Session on Developments in Commutative Algebra, Auburn, Alabama.
- (September 2018), Generating functions and the twisted construction for graded rings, Special Session on Commutative Algebra, Amer. Math. Soc. Sectional Meeting, Univ of Delaware.
- (June 2018), The generating function of the twisted construction of a local ring, “Nicolae Radu Algebra Seminar”, University of Bucharest, Romania.
- (April 2018), The Frobenius complexity, its generating function and non-standard gradings on the polynomial ring over a field, Meeting on Applied Algebraic Geometry, Georgia Tech.
- (January 2018), The Frobenius complexity in graded setting, Commutative Algebra Seminar, University of Utah.
- (September 2017), The free resolution of fan algebras in the plane, Commutative Algebra Seminar, University of Michigan.
- (June 2017), On certain aspects of the Frobenius homomorphism, Commutative Algebra meets Algebraic Geometry International Conference, Bucharest.
- (March 2017), On finiteness of the Frobenius complexity, AMS Southeastern Meeting, Special Session on Commutative Algebra, Charleston, South Carolina.
- (November 2016), Free Resolution of Fan Algebras of Principal Ideals in the Plane, North Carolina State University, AMS Southeastern Meeting, Special Session in Homological Methods in Commutative Algebra.
- (April 2016), Frobenius Complexity, University of Michigan, Commutative Algebra Seminar
- (March 2016), Fan Algebras, University of Georgia, AMS Southeastern Meeting, Special Session in Commutative Algebra.
- (October 2015), The Frobenius Complexity of Determinantal Rings, University of Memphis, Special Session on Recent Advances in Commutative Algebra.
- (July 2015), The Frobenius Complexity of a Local Ring, University of Kentucky, International Conference in Homological Algebra in Honor of E. Enochs.
- (June 2015), The Frobenius Complexity of a Local Ring, University of Barcelona, Algebra Seminar.
- (June 2015), The Frobenius Complexity of a Local Ring, Iasi, The Congress of Romanian Mathematicians, Commutative Algebra Session.
- (April 2015), The Frobenius Complexity of Local Rings, Commutative Algebra Seminar, Department of Mathematics, University of Utah.
- (February 2015), Intersection algebras, Colloquium, Department of Mathematics, University of Mississippi.
- (April 2014), The Frobenius complexity of a local ring of prime characteristic, Special Session on Commutative Algebra, Western AMS Meeting, University of New Mexico, Albuquerque, NM.
- (October 2013), The Frobenius complexity of a local ring, Special Session on Commutative Algebra, Central AMS Meeting, Washington University, Saint Louis, MO.
- (October 2013), Intersection algebras in one variable, Special Session on Recent Advances on Commutative Algebra and Its Applications, Southeastern AMS Meeting, University of Louisville, KY.

- (July 2013), The Frobenius Complexity of a Local Ring of Prime Characteristic and Frobenius Operators, Conference on ‘Commutative Algebra and Interactions with Algebraic Geometry’, Luminy, Centre International de Recontres Mathematiques, France.
- (April 2013), Hilbert-Kunz multiplicities, Colloquium, University of Missouri.
- (April 2013), Strong test ideals, Algebra Seminar, University of Missouri.
- (March 2013), On strong test ideals, Commutative Algebra Seminar, University of Michigan.
- (March 2013), Algebra pairs and strong test ideals, Special Session on Commutative Algebra, Southeastern AMS Meeting, University of Mississippi.
- (November 2012), Strong test ideals, Algebra Seminar, Georgia Tech.
- (May 2012), Lectures on Hilbert-Kunz multiplicities, four one hour talks. Institute of Mathematics of the Romanian Academy.
- (May 2012), Estimates of Hilbert-Kunz multiplicities and the Watanabe-Yoshida conjecture, Computational workshop on Frobenius singularities and invariants, University of Michigan, Ann Arbor.
- (February 2012), Hilbert-Kunz multiplicities, Algebra Seminar, Penn State University.
- (November 2011), A finiteness condition on local cohomology modules, Commutative Algebra and Algebraic Geometry at Urbana-Champaign Conference, University of Illinois.
- (October 2011), Hilbert-Kunz multiplicities, Algebra Seminar, Georgia Tech.
- (May 2011), Local cohomology in positive characteristic, Institute of Mathematics of the Romanian Academy, Romania.
- (May 2011), Hilbert-Kunz multiplicities, University of Bucharest, “Nicolae Radu” Algebra Seminar, Romania.
- (May 2011), The Hilbert-Kunz multiplicity, Algebraic Geometry Seminar, Mainz University, Germany
- (November 2010), A finiteness condition on local cohomology modules, Commutative Algebra Seminar, University of Utah.
- (April 2010), The lower semicontinuity of the Frobenius splitting numbers, Western Section, AMS meeting, Session on Trends in commutative algebra, University of New Mexico.
- (November 2009), Multiplicity in algebra and geometry, Colloquium, University of Mississippi.
- (November 2009), Local cohomology, F-purity and antinilpotency, Southeastern AMS meeting, Florida Atlantic University
- (October 2009), Hilbert-Kunz multiplicities: open questions and applications, Algebra Seminar (joint with Algebraic Geometry Seminar), University of Georgia.
- (September 2009), The lower semicontinuity of Frobenius splitting numbers, GSU-USC Commutative Algebra Regional Meeting, South Carolina.
- (April 2009), Finite dimensional vector space with Frobenius action, GSU-USC Commutative Algebra Regional Meeting, South Carolina
- (March 2009), Antinilpotent modules, Commutative Algebra Seminar, University of Illinois at Urbana-Champaign
- (August 2008), Hilbert-Kunz multiplicities, Commutative Algebra and Its Interactions Conference, University of Michigan.
- (April 2008), Local Cohomology and F-stability, Commutative Algebra Seminar, University of Minnesota.

- (March 2008), The Frobenius Structure of Local Cohomology, Algebraic Geometry Seminar, University of Barcelona, Spain.
- (January 2008), On the behavior of F-injectivity under flat base change, GSU-USC Joint Commutative Algebra Seminar, University of South Carolina.
- (November 2007), A question on F-injectivity with implications for F-stability, GSU-USC Joint Commutative Algebra Seminar, University of South Carolina
- (November 2007), A question on F-injectivity with implications for F-stability, GSU-USC Joint Commutative Algebra Seminar, University of South Carolina
- (July 2007), Local cohomology and F-stability, International Conference on Homological and Combinatorial aspects in Commutative Algebra, Busteni, Romania.
- (March 2007), Frobenius depth, GSU-USC Commutative Algebra Seminar, University of South Carolina.
- (March 2007), Hilbert-Kunz multiplicities, Colloquium, North Dakota State University.
- (November 2006), Lower bounds for Hilbert-Kunz multiplicities, Algebra Seminar, University of South Carolina.
- (October 2006), Lower bounds for Hilbert-Kunz multiplicities, AMS Sectional Meeting, Salt Lake City, Utah.
- (May 2006), On almost regular sequences, Homological Conjectures in Commutative Algebra Snowbird, Utah.
- (April 2006), Almost regular sequences, AMS Sectional Meeting, San Francisco State University, San Francisco.
- (March 2006), Local cohomology and Frobenius depth, AMS Sectional Meeting, Florida International University, Miami.
- (February 2006), Positive characteristic techniques in algebra and geometry, Colloquium, Miami University at Ohio
- (October 2005), Local cohomology and F-stable primes, AMS Sectional Meeting, Bard College.
- (October 2005), Local cohomology and F-stable primes, Commutative Algebra Seminar, University of Michigan.
- (August 2005), Local cohomology and the Cohen-Macaulay property, supporting talk (prepared with Sara Faridi), the Minnowbrook workshop on Commutative Algebra.
- (April 2005), Ideals and cones, Algebra Seminar, Emory University.
- (October 2004), The Hilbert-Kunz multiplicity and complete intersections, Algebra Seminar, University of South Carolina.
- (May 2004), The structure of F-pure rings, The Sixth AMS-SSM Joint Meeting, Houston
- (March 2004), Rings with small Hilbert-Kunz multiplicities, University of Missouri
- (March 2004), A new perspective on classical problems in algebra, Colloquium, Kent State University
- (February 2004), A new perspective on classical problems in algebra and geometry, Colloquium, Georgia State University
- (February 2004), Powers of ideals in polynomial rings, Graduate Colloquium, University of Utah
- (March 2003) F-pure rings and the splitting dimension, University of Michigan
- (November 2002) Parameter ideals, multiplicities and tight closure theory, University of California at Riverside

- (October 2002) A few characteristic  $p$  concepts in commutative algebra, MSRI, Berkeley, California
- (September 2002) Aspects of the tight closure theory of parameter ideals, MSRI, Berkeley, California
- (March 2002) An incursion into commutative algebra on the path of a simple example, Graduate Student Colloquium, University of Utah
- (January 2002)  $F$ -injective rings and  $F$ -stable primes, AMS meeting, San Diego, California
- (April 2001) Rings with small Hilbert-Kunz multiplicities, Algebra Weekend, University of Missouri, Columbia
- (March 2001) Test ideals and flat base change problems in tight closure theory, AMS meeting, University of Kansas
- (March 2001) Frobenius structure of local cohomology, University of Utah
- (September 2000) Applications of pseudocanonical covers to tight closure theory, AMS meeting, Toronto
- (March 2000)  $F$ -injective rings and  $F$ -stable primes, AMS meeting, South Bend, Indiana
- (September 1999)  $F$ -rational rings and flat base change, AMS meeting, Salt Lake City

#### **d) INSTRUCTION, INCLUDING ADVISING**

##### **TEACHING EXPERIENCE**

- Math 3000, **Bridge to Higher Math**, Fall 2019, Georgia State University.
- Math 2641, **Linear Algebra I**, Fall 2018, Georgia State University.
- Math 7610, GOML, **Special problems and solving strategies**, Fall 2012-2014, Fall 2017, Summer 2018 and 2019, Georgia State University.
- Math 8250, **Commutative ring theory**, Fall 2010, Spring 2017, Georgia State University
- Math 8240, **Introduction to commutative algebra and algebraic geometry**, Spring 2010, Spring 2015, Fall 2016, Georgia State University
- Freshman Honors Seminar, **Imagining Numbers**, Fall 2008, Fall 2011, Fall 2017, Georgia State University
- Math 1101, **Intro to mathematics modeling**, Fall 2007, Spring 2008, Summer 2017, Georgia State University
- Math 4444/6444, **Polynomials**, Spring 2007, Fall 2010, Spring 2018, Georgia State University
- Math 8221, **Abstract Algebra II**, Spring 2009, Georgia State University.
- Math 8220, **Abstract Algebra**, Fall 2006, Fall 2008, Fall 2011, Fall 2012, Fall 2015, Fall 2017, Georgia State University
- Math 8800, **Introduction to commutative algebra and algebraic geometry**, Summer 2006, Georgia State University
- Math 4442/6442, **Modern Algebra II**, Spring 2006, Fall 2007, Spring 2014, Spring 2019 Georgia State University
- Math 4441/6441, **Modern Algebra I**, multiple times, Georgia State University
- Math 4450/6450, **Theory of Numbers**, Fall 2005, Georgia State University
- Math 3420/7420, **Applied Combinatorics**, Spring 2005, Georgia State University

- Math 1090, **Discrete Mathematics**, Fall 2004, Spring 2005, Fall 2006, Fall 2018, Fall 2019  
Georgia State University
- Math 1090, **College Algebra**, Spring 2004, University of Utah
- Math 1100, **Business Calculus**, Fall 2001, Fall 2003, University of Utah
- Math 1030, **Precalculus**, Spring 2002, University of Utah
- Math 3220, **Foundations of Analysis II**, Summer 2003, University of Utah
- Math 3100, **Foundations of Geometry**, Fall 2003, University of Utah
- Math 6350, **Commutative Algebra**, Spring 2003, University of Utah
- Math 115, **Calculus I**, Fall 1998 and Spring 1999, University of Michigan
- Math 216, Discussion class: **Ordinary Differential Equations**, Fall 1996, Winter and Fall 1997, Winter 1998, Fall 1999, University of Michigan

### **Independent study courses:**

- Honors Thesis Courses with John Hull, Fall 2013, Spring 2014, Georgia State University
- Independent Study Courses with Adil Virani, Summer 2013, Georgia State University
- Independent Research Courses with John Hull, Anthony Preslicka, Josh Liu, George Whiteaker in relation with RIMMES, Georgia State University
- Independent Research Course with Harrison Stalvey, Summer 2006, Number Theory, Georgia State University
- Independent Study Course with Kazuma Shimomoto, Fall 2003 and Spring 2004, Tight Closure Theory, University of Utah
- Independent Study Course with David Groulx, Fall 2003, Algebra, University of Utah

### **Mentoring of undergraduate students:**

- Mentor for Jesse Jaramillo, Aram Mathivanan, Jovany Louis and Arun B. Suresh, as RIMMES students 2019-2020. Jovany and Arun presented their work at GSURC 2019, Georgia Research Day 2019. Jovany Louis is a Sloan Fellow (CASA) and presented his work at CASA Research Symposium, August 2019.
- Mentor for Jovany Louis and Arun B. Suresh, as RIMMES students 2017-2018 and 2018-2019. Arun Suresh presented his work at GSURC 2018, Georgia Research Day 2018, Undergraduate Research Symposium at University of Illinois at Chicago 2018.
- Judge at the annual Undergraduate Research Conference at Georgia State University, March 2008, March 2009, March 2010, March 2012, March 2016, 2017, 2018, 2019. Judge at Research Day, Spelman College, April 2013.

- Mentor for John Hull, student enrolled in RIMMES 2012-2013, 2013-2014. He received third prize at the 2013 Georgia State University Conference (GSURC) and the Patterson prize for his presentation at the MAA Southeastern Meeting in SC, 2013. He received the 1<sup>st</sup> prize for oral presentation and the Provost Award at GSURC 2014. His research was published in the Rose Hulman Undergraduate Mathematics Journal.
- Mentor for Thomas Polstra, student enrolled in RIMMES 2010-2011, 2011-2012. He received second prize at the 2011 GSURC for his poster (out of over 80 participants) and published his research in the Rose Hulman Undergraduate Mathematics Journal.
- Mentor for Neal Aronson, student enrolled in RIMMES 2009-2010. Presenter at the End of the Year Math and Stat Event at GSU and at the Walton symposium of Undergraduate Research at Morehouse College in April 2010.
- Mentor for George Ryun Whiteaker, Brian Hall, students enrolled in RIMMES, 2006-2007. Presenters at the Undergraduate Research Conference at GSU in April 2007 and at the End-of-the-Year Math and Stat Event at GSU, April 2006
- Mentor for Anthony Preslicka, Josh Liu students enrolled in RIMMES, 2005-2006 at GSU. Presenters at the End-of-the-Year Math and Stat Event at GSU, April 2006
- (Fall 2003) Research Experiences for Undergraduates (REU) mentor for Hyrum Nielsen, University of Utah.
- (April 2003) The Magic of Numbers, two lectures given under the Math Circle program at University of Utah (Math Circle is a program open to high-school students)

### **Mentoring of graduate students:**

- Current graduate students: Irina Iliaoaia and Alan Dills (PhD).
- Kevin Slote: MS, 2017.
- Adil Virani. MS, Defended in April 2015. Thesis: Frobenius-like permutation and their cycle structure.
- Sara Malec, Ph.D. Defense date: June 20, 2013, graduated Summer 2013.
- M.S. thesis advisor for Anthony Preslicka at Georgia State University. Thesis: The Topology and Algebraic Functions on Affine Algebraic Sets Over an Arbitrary Field. Defended Fall 2012.
- Masters thesis advisor for Muslim Baig at Georgia State University. Thesis: Primary decomposition and secondary representation of modules over a commutative ring. Defended Spring 2009.

- Masters thesis advisor for Sara Malec at Georgia State University. Thesis: Noetherian filtrations and intersection algebras. Defended Summer 2008
- Outside Committee Member for the Ph.D. dissertation of Namrata Shekhar, Department of Electrical Engineering at University of Utah, August 2007 (the work generated several joint papers)
- Masters thesis advisor for M Brandon Meredith at Georgia State University. Thesis: Polynomial functions over finite rings of integers. Defended Summer 2007 (the work generated several joint papers)
- Masters thesis advisor for Christopher Zagrodny at Georgia State University. Thesis: Algebraic concepts in the study of graphs and simplicial complexes. Defended Summer 2006.]

#### **Mentoring of postdoctoral faculty:**

- 2015-2017: Co-mentor of Felipe Perez, Visiting Assistant Professor.
- 2012-2013: Co-mentor of Yu Xie, Visiting Assistant Professor.

#### **e) SERVICE**

- Career Empowering Education committee (member, 2018)
- Hiring Plans Committee (member, 2018-2019)
- Goldwater Scholarship University Committee (member-present)
- College Promotion and Tenure Committee (ad hoc member, Spring 2018)
- Affiliate Faculty (Honors College)
- Faculty Supervisor for University Assistantship Positions with Research component (Honors College)
- Interviewer for University Presidential Scholarships (Honors College, 2016, 2018, 2019)
- Director of Graduate Studies, (2015-2018)
- Chair of Promotion and Tenure Committee (2011-2018)
- (2005 – present) Founder and organizer of the program undergraduate **R**esearch **I**nitiations in **M**athematics, **M**athematics **E**ducation and **S**tatistics (RIMMES, for short)

- (2008 – 2017, 2018-2020) Member of the University Senate (member of the Library Committee and Research Committee, currently on Planning and Development Committee and Library Committee)
- Judge at Scientific Computing Day (2016)
- Chair of NTT Promotion Committee (Nov 2016)
- Chair of Visiting AP Hiring Committee, 2015
- Chair Ad-hoc Evaluation Committee (Chair), 2015
- (2008 – 2017) Member of the Departmental Executive Committee
- Member of GSU Undergraduate Research Conference Advisory Board (2015-present)
- (2005---Fall 2015) Co-founder (with Dr. Phillips) of the Mathematics and Statistics Club at Georgia State University. Co-wrote the constitution, bylaws, and supervised funding applications. The main faculty advisor coordinating the Board of Advisors and relations of the Club with the College of Arts and Sciences.
- (2005 – present) Founder and co-organizer of the Undergraduate Mathematics Competition at Georgia State University held every April.
- (2013 – 2014) Member of the Academic Program Review Committee
- (2011 – 2015 ) Chair of the Mathematics Undergraduate Committee
- (2006 – present) Chair of the Outreach Committee
- (2007– 2012) Co-chair of the Colloquium Subcommittee
- (2006 – present) Member of the Research Committee. The final version for the pure mathematics concentration of our Ph.D. program is based on my draft.
- (2006 – present) Member of the Graduate Committee
- (Spring 2010) Acting Associate Chair.
- (2010 – 2012) Member of the College of Arts and Sciences Executive Committee
- (2006, 2011, 2012) Member of the Hiring Committee (ad hoc committee)



- (April 2003, 2004) Co-organizer of the Calculus Challenge (Math contest open to all undergraduate students), University of Utah
- (1997) Preparation of course pack for Math 216 (Ordinary Differential Equations), under the guidance of Professor Ch. Doering, joint work with J. Korman, University of Michigan at Ann Arbor

## **MATHEMATICAL COMMUNITY SERVICE**

- (2017 – 2018, 2018-2019) NSF reviewer and panelist.
- (2010 – present) Reviewer for the National Security Agency and the Research Grants Council, Hong Kong, Fullbright.
- (2001 – present) Referee for various mathematical journals (*Advances in Mathematics, Communications in Algebra, Journal of Algebra and Its Applications, Journal of Algebra, Proceedings of the AMS, Mathematics of Computation, Journal of Symbolic Computation, Acta Mathematica Universitatis Comeniana, International Journal of Mathematics and Mathematical Sciences, Algebra and Number Theory, Mathematical Research Letters, Transactions of the AMS, Compositio, Journal of Pure and Applied Algebra, Linear Algebra and Its Applications, Journal of Algebra and Its Applications*)
- (2001 – present) Reviewer for Mathematical Reviews, Zentralblatt für Mathematik
- (2011 – 2013) Editor of *CAA Undergraduate Research Journal*
- (2002 – 2004) Co-organizer of the Commutative Algebra Seminar, University of Utah
- (1998 – 2001) Organizer of the Student Commutative Algebra / Algebraic Geometry Seminar, University of Michigan at Ann Arbor

## **MEMBERSHIP TO PROFESSIONAL ORGANIZATIONS**

- Member of the American Mathematical Society