

Ilya Smirnov — Curriculum Vitae

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Education

University of Virginia , PhD in Mathematics Advisor: Craig Huneke	2013–2015
University of Kansas , PhD Candidate Moved to continue working with Craig Huneke.	2011–2012
Lomonosov Moscow State University , Diploma in Mathematics	2006–2011

Employment

KTH Royal Institute of Technology , Research fellow <i>Funded by the Swedish Research Council.</i>	2021–2025
Charles University in Prague , Researcher	2020–2021
Stockholm University , Postdoktor	2018–2020
University of Michigan , Visiting Assistant Professor	2015–2018

Research interests

Commutative algebra at the intersection with algebraic geometry and intersection theory:
positive characteristic methods, multiplicity theory, numerical invariants of singularities.

Funding and awards

Swedish Research Council , Starting grant: 3,600,000 SEK	2021–2025
Wenner-Gren foundation , Travel grant: 6000 SEK	2020
Stockholm University , Travel grant: 50,000 SEK <i>For a month-long stay at the University of Tokyo, currently postponed</i>	2020
Oberwolfach Research in Pairs	January 2020
Stockholm Mathematics Center , Master class grant: 140,000 SEK <i>A week-long summer school, currently postponed</i>	2019
Marie Skłodowska-Curie Seal of Excellence	2019
Royal Swedish Academy of Science, Magnusons fond , Travel grant: 11,200 SEK	2019
AMS–Simons Travel Grant : \$ 4000	2016–2018
Mathematics Research Community , Participant and collaboration grant: \$ 700	2015

Publications

Published & accepted

- [1] Ilya Smirnov. Differential Krull dimension in differential polynomial extensions. *J. Algebra*, 344:354–372, 2011.
- [2] Craig Huneke and Ilya Smirnov. Prime filtrations of the powers of an ideal. *Bull. Lond. Math. Soc.*, 47(4):585–592, 2015.
- [3] Ilya Smirnov. Upper semi-continuity of the Hilbert-Kunz multiplicity. *Compos. Math.*, 152(3):477–488, 2016.
- [4] Mordechai Katzman, Linqun Ma, Ilya Smirnov, and Wenliang Zhang. D -module and F -module length of local cohomology modules. *Trans. Amer. Math. Soc.*, 370(12):8551–8580, 2018.
- [5] Craig Huneke, Ilya Smirnov, and Javid Validashti. A generalization of an inequality of Lech relating multiplicity and colength. *Comm. Algebra*, 47:2436–2449, 2019.
- [6] Ilya Smirnov. Equimultiplicity in Hilbert-Kunz theory. *Math. Z*, 291(1-2):245–278, 2019.
- [7] Patricia Klein, Linqun Ma, Pham Hung Quy, Ilya Smirnov, and Yongwei Yao. Lech’s inequality, the Stückrad–Vogel conjecture, and uniform behavior of Koszul homology. *Adv. Math.*, 347:442–472, 2019.
- [8] Hailong Dao and Ilya Smirnov. The multiplicity and the number of generators of an integrally closed ideal. *J. Singularities*, 19:61–75, 2019.
- [9] Ilya Smirnov. Hilbert-Kunz multiplicity of the powers of an ideal. *Proc. Amer. Math. Soc.*, 147(8):3331–3338, 2019.
- [10] Hailong Dao and Ilya Smirnov. On the generalized Hilbert-Kunz function and multiplicity. *Israel J. Math.*, 237(1):155–184, 2020.
- [11] Luis Núñez-Betancourt and Ilya Smirnov. Hilbert–Kunz multiplicities and F -thresholds. *Bol. Soc. Mat. Mex.*, 26(1):15–25, 2020.
- [12] Linqun Ma, Pham Hung Quy, and Ilya Smirnov. Colength, multiplicity, and ideal closure operations. *Comm. Algebra*, 48(4):1601–1607, 2020.
- [13] Ilya Smirnov. On semicontinuity of multiplicities in families. *Doc. Math.*, 25:381–399, 2020.
- [14] Thomas Polstra and Ilya Smirnov. Continuity of Hilbert–Kunz multiplicity and F -signature. *Nagoya Math. J.*, 239:322–345, 2020.
- [15] Linqun Ma, Pham Hung Quy, and Ilya Smirnov. Filter regular sequence under small perturbations. *Math. Ann.*, 378(1-2):243–254, 2020.
- [16] Alessandro De Stefani and Ilya Smirnov. Decomposition of graded local cohomology tables. *Math. Z*, 297(1):1–24, 2021.
- [17] Thomas Polstra and Ilya Smirnov. Equimultiplicity theory of strongly F -regular rings. *Michigan Math. J.* Accepted.
- [18] Jack Jeffries and Ilya Smirnov. A transformation rule for natural multiplicities. *Int. Math. Res. Not. IMRN.* Accepted.
- [19] Craig Huneke, Linqun Ma, Pham Hung Quy, and Ilya Smirnov. Asymptotic Lech’s inequality. *Adv. Math.* Accepted.

Preprints

- [20] Ilya Smirnov and Kevin Tucker. Towards the theory of F-rational signature. Submitted, available at <https://arxiv.org/abs/1911.02642>.
- [21] Alessandro De Stefani and Ilya Smirnov. Stability and deformation of F-singularities. Submitted, available at <https://arxiv.org/abs/2002.00242>.
- [22] Jack Jeffries, Yusuke Nakajima, Ilya Smirnov, Kei-ichi Watanabe, and Ken-ichi Yoshida. Lower bounds on Hilbert–Kunz multiplicities and maximal F-signatures. Submitted, available at <https://arxiv.org/abs/2002.06166>.

Teaching experience

Charles University in Prague:

NMAI062: Algebra I for computer science **Fall 2020**
Tutorials on Zoom, 15 classes of 90 minutes in a semester for 8 students.

Stockholm University:

Math 3001: Mathematical Methods in Economics **Spring 2019, Fall 2019**
15 classes of 90 minutes in a semester for 30 – 40 students.

University of Michigan:

Math 425: Introduction to Probability **Spring 2017, Spring 2018**
Fully in charge, 3 classes of 50 minutes per week, 35 (2017) and 70 (2018) students.

Math 116: Calculus II **Fall 2017**
Work in small groups, flipped classroom elements, 2 sections of 18 students meeting 3 times for 75 minutes per week.

Math 214: Applied Linear Algebra **Spring 2016, Fall 2017**
Lectures, 2 sections of 60 students meeting 4 times for 50 minutes per week.

Math 115: Calculus I **Fall 2015**
Work in small groups, flipped classroom elements, 2 sections of 18 students meeting 3 times for 75 minutes per week.

University of Virginia:

Applied Calculus I, II **Spring 2013, Fall 2013, Fall 2014**
Lectures with coordinated exams, 3 classes of 50 minutes per week.

University of Kansas:

Business calculus I **Spring 2012, Fall 2012**
Lectures with coordinated exams, 3 classes of 50 minutes per week.

Invited Talks

- **Fellowship of the ring: Zoom seminar in Commutative Algebra** hosted by MSRI, <https://sites.google.com/view/fellowship-of-the-ring/home>, January 28, 2021.
- **Koç University**, February 11, 2020

- **Tulane University**, December 3, 2019
- **Freie Universität Berlin**, November 22, 2019
- **University of Osnabrück**, November 5, 2019
- **Workshop on singularities: semigroups, topology and valuations**, Universidad Complutense de Madrid, October 27-31, 2019
- **University of Genoa**, May 22, 2019
- **Johannes Gutenberg-Universität Mainz**, January 24, 2019
- **FACARD 2019**, University of Barcelona, January 16-18, 2019
- **Meiji University**, July 2, 2018
- **Kyoto University**, June 29, 2018
- **University of Nebraska-Lincoln**, May 2, 2018
- **AMS Sectional Meeting**, Nashville TN, April 14-15, 2018
- **Mini Workshop**, University of Virginia, March 26-29, 2018
- **JMM 2018**, San Diego, January 10-13, 2018
- **University of Utah**, November 10, 2017
- **KUMUNU 2017**, University of Kansas, October 21-22, 2017
- **Tulane University**, October 19, 2017
- **Georgia State University**, March 20, 2017
- **University of Kansas**, March 2, 2017
- **AMS Sectional Meeting**, Athens GA, March 5-6, 2016
- **University of Utah**, September 19, 2014
- **University of Michigan**, March 13, 2014
- **Algebra Day 2014**, University of Kansas, February 10, 2014
- **University of Illinois, Chicago**, January 29, 2014
- **JMM 2014**, Baltimore, January 15-18, 2014

Professional activities

- Referee for National Security Agency (USA) and multiple journals: London Mathematical Society, American Mathematical Society, Math. Z., Nagoya Math. J., J. Algebra., etc.
- Co-organizer, Stockholm Master Class “Local cohomology and related topics”. Stockholm, Summer 2021.
- Participant of the teaching conference of the the Stockholm University Mathematics Department. Gotland, September 25-26, 2019.
- Co-organizer of the problem solving seminar at the Stockholm University, including Zoom talks in Spring 2020.
- TA for MSRI Graduate School attached to the Thematic program in Commutative Algebra and its interactions with Algebraic Geometry, University of Notre Dame, June 3-7, 2019.
- Co-organizer of the commutative algebra seminar at the University of Michigan.