

# Curriculum Vitae

January 30, 2019

## DMYTRO SAVCHUK

Department of Mathematics and Statistics  
University of South Florida  
4202 E Fowler ave, CMC 342, Tampa, FL, 33620

<http://savchuk.myweb.usf.edu>  
[savchuk@usf.edu](mailto:savchuk@usf.edu)  
office: 813-974-4989

## RESEARCH INTERESTS

Geometric and combinatorial group theory. Groups acting on rooted trees: self-similar, generated by automata, iterated monodromy groups, contracting and branch groups. Algorithmic aspects of self-similar groups. Thompson's groups. Developing software for computations in group theory. Geometry of  $Out(F_n)$ . Free and relatively free groups. Low-dimensional topology.

## EDUCATION

- 06/2003 – 08/2009     *Ph.D. in Mathematics*  
Texas A&M University, College Station, TX  
Advisors: Dr. R. Grigorchuk and Dr. V. Nekrashevych  
Title:     Asymptotic, algorithmic and geometric aspects of  
             groups generated by automata
- 09/2001 – 07/2002     *M.S. in Mathematics, Summa Cum Laude*  
Kyiv Taras Shevchenko University, Kyiv, Ukraine
- 09/1997 – 07/2001     *B.S. in Mathematics, Summa Cum Laude*  
Kyiv Taras Shevchenko University, Kyiv, Ukraine

## WORK EXPERIENCE

- 08/2016 – present     *Associate Professor*  
University of South Florida, Tampa, FL
- 09/2012 – 08/2016     *Assistant Professor*  
University of South Florida, Tampa, FL
- 09/2009 – 09/2012     *Riley Assistant Professor*  
Binghamton University, Binghamton, NY
- 09/2003 – 08/2009     *Teaching Assistant and Instructor*  
Texas A&M University, College Station, TX
- 01/2002 – 05/2002     *Teaching Assistant*  
Kyiv Taras Shevchenko University, Kyiv, Ukraine

# PUBLICATIONS

## In Preparation

1. *On duality of the affine actions on trees* (with I. Bondarenko), preprint available per request
2. *Connection between Moore and Mealy automata via  $d$ -adic dynamics* (with R. Grigorchuk), preprint available per request
3. *Explicit generating sets of the stabilizers of rational numbers in Thompson's group  $F$*  (with K. Baker), preprint available per request

## Preprints

4. *Submanifold Projection* (with L. Sabalka), preprint, 2012, 30 pages, <http://arxiv.org/abs/1211.3111>
5. *Endomorphisms of regular rooted trees induced by the action of polynomials on the ring  $\mathbb{Z}_d$  of  $d$ -adic integers* (with E. Ahmed), submitted, 2018, 16 pages, <http://arxiv.org/abs/1711.06735>

## Published or Accepted

6. *The lamplighter group of rank two generated by a bireversible automaton* (with E. Ahmed), accepted to *Communications in Algebra*, 2018, 18 pages, <https://arxiv.org/abs/1802.03695>
7. *A connected 3-state reversible Mealy automaton cannot generate an infinite Burnside group (extended version)* (with I. Klimann and M. Picantin), *International Journal of Foundations of Computer Science*, 29 (2018), no. 2, 297–314
8. *Affine Automorphisms of Rooted Trees* (with S. Sidki), *Geom. Dedicata*, 183 (2016), 195–213 <http://arxiv.org/abs/1510.08434>
9. *Orbit automata as a new tool to attack the order problem in automaton groups* (with I. Klimann and M. Picantin), *Journal of Algebra*, 445 (2016), 433–457, <http://arxiv.org/abs/1411.0158>
10. *Ergodic decomposition of group actions on rooted trees* (with R. Grigorchuk), *Proceedings of the Steklov Institute of Mathematics*, V.292 (2016), Issue 1, 94–111 <http://arxiv.org/abs/1412.8020>
11. *A connected 3-state reversible Mealy automaton cannot generate an infinite Burnside group* (with Ines Klimann and Matthieu Picantin), *Lecture Notes in Computer Science*, V. 9168, 313–325, *The 19th International Conference on Developments in Language Theory (DLT 2015)*, 2015, 12 pp., <http://arxiv.org/abs/1409.6142>
12. *An Example of an Automatic Graph of Intermediate Growth* (with A. Miasnikov), *Annals of Pure and Applied Logic*, 166 (2015), no. 10, 1037–1048, <http://arxiv.org/abs/1312.3710>
13. *Schreier graphs of actions of Thompson's group  $F$  on the unit interval and on the Cantor set*, *Geometriae Dedicata*, V.175 (2015), 355–372, <http://arxiv.org/abs/1105.4017>

14. *On the geometry of the edge splitting complex* (with L. Sabalka), Groups, Geometry and Dynamics, 8 (2014), no. 2, 565–598, <http://arxiv.org/abs/1007.1998>
15. *Self-similar groups acting essentially freely on the boundary of the binary rooted tree* (with R. Grigorchuk), Contemporary Mathematics, V.611, 9–48, 2014  
<http://arxiv.org/abs/1212.0605>
16. *Essentially Free Actions of Self-similar Groups* (with R. Grigorchuk), Bulletin of Chernivtsi National University, Mathematics, V.2 (2012), no.2-3, 53–58.
17. *On restricting subsets of bases in relatively free groups* (with L. Sabalka), IJAC, V.22 (2012), no.4, <http://arxiv.org/abs/1103.2992>
18. *Automata generating free products of groups of order 2*, (with Y. Vorobets), Journal of Algebra, V.336 (2011), Issue 1, 53–66, 2011, available at <http://arxiv.org/abs/0806.4801>
19. *Some graphs related to the Thompson’s group  $F$* , in *Combinatorial and geometric group theory*, Trends in Mathematics (Birkhäuser), edited by O.Bogopolski, I.Bumagin, O.Kharlampovich and E.Ventura, 2010, 279–296, <http://arxiv.org/abs/0803.0043>
20. *Groups generated by 3-state automata over a 2-letter alphabet, II* (with I. Bondarenko, R. Grigorchuk, R. Kravchenko, Y. Muntyan, V. Nekrashevych and Z. Sunic), Journal of Math. Science (New York), V. 156 (2009), no.1, 187–208, <http://www.arxiv.org/abs/0704.3876>
21. *Classification of groups generated by 3-state automata over a 2-letter alphabet* (with I. Bondarenko, R. Grigorchuk, R. Kravchenko, Y. Muntyan, V. Nekrashevych and Z. Sunic), Algebra and Discrete Mathematics (2008), no.1, 1–163, <http://arxiv.org/abs/0803.3555>
22. *The spectral problem, substitutions and iterated monodromy* (with R. Grigorchuk and Z. Sunik), CRM Proceedings and Lecture Notes 42 (2007), 225–248,  
<http://arxiv.org/abs/math.GR/0703443>
23. *Groups generated by 3-state automata over a 2-letter alphabet, I*, (with I. Bondarenko, R. Grigorchuk, R. Kravchenko, Y. Muntyan, V. Nekrashevych and Z. Sunic), São Paulo Journal of Math. Sciences, 1 (2007), no.1, 1–40, <http://arxiv.org/abs/math.GR/0612178>
24. *On Sushchansky  $p$ -groups* (with I. Bondarenko), Algebra Discrete Math., 2007, no.2, 22–42,  
<http://arxiv.org/abs/math.GR/0612200>
25. *On word problem in contracting automorphism groups of rooted trees*, Bulletin of the University of Kiev, Series: Physics & Mathematics, 2003, no.1, 51–56

## Reports

26. *About classification of groups generated by automata with three states over an alphabet with two letters, and about some questions concerning these groups* (with I. Bondarenko, R. Grigorchuk, R. Kravchenko, Y. Muntyan, V. Nekrashevych and Z. Sunic), Bulletin of Chernivtsi National University, Mathematics, Issue 336–337 (2007), 29–39.

## Undergraduate Exposition

27. (with N. Rudomino-Dusyatska) *Is gambling worth it?* (Ukrainian), In the world of Mathematics, V.5 (1999), no.3, 77–82
28. (with N. Rudomino-Dusyatska) *About D. Grave and some of his works on probability theory*, Abstracts of the Third Ukrainian-Scandinavian Conference in Probability Theory and Mathematical Statistics. June 8-12, 1999, Kyiv, Ukraine
29. *Projecting points on the exponent* (Ukrainian), In the world of Mathematics, V.4 (1998), no.4, 26–32
30. *Nobel Prize and Mathematicians* (Ukrainian), In the world of Mathematics, V.3 (1997), no.4, 62–64

## SOFTWARE

- Package AutomGrp V.1.3.1 (last release on 30/09/2018) for GAP system for computations in groups and semigroups generated by automata (joint with Y. Muntyan), accepted GAP package <http://www.gap-system.org/Packages/automgrp.html>
- Frontend for the database of (3,2)-automata (developed jointly with Junyi Tu), <http://savchuk.myweb.usf.edu/autom32new.html>

## AWARDS AND GRANTS

- Conference Support Grant, ResearchOne, USF 2018
- Conference Support Grant, USF Internal Award 2017
- AIM SQuaREs program (2017-2020)
- Grant from Helmsley foundation to enhance Calculus Curriculum at USF 2016
- Collaboration Grant for Mathematicians, Simons Foundation 2014
- Proposal Enhancement Grant, USF Internal Award 2014
- New Researcher Grant, USF Internal Award 2013
- Ostrogradsky Prize for Researchers among Ukrainian University Students at the Institute of Mathematics of NAS in Ukraine, Kyiv, Ukraine 2001
- Soros Fellowship for Undergraduate Students, Kyiv, Ukraine 1998

# SELECTED TALKS

## Conference Talks

- July 2018** *Geometric and Asymptotic Group Theory with Applications*, Korea Institute for Advanced Study, Seoul, Korea
- April 2018** (invited) *AMS Spring Eastern Sectional Meeting #1139*, Northeastern University, Boston, MA
- July 2017** (invited) *MealyM Final Event*, Paris, France
- July 2017** *11th International Algebraic Conference in Ukraine*, Kyiv, Ukraine
- May 2017** (invited, 1st talk) *AMS Sectional Meeting #1129*, Hunter College, CUNY, New York
- May 2017** (invited, 2nd talk) *AMS Sectional Meeting #1129*, Hunter College, CUNY, New York
- December 2016** (invited) *Groups and Actions: Geometry and Dynamics*, Kyiv, Ukraine
- August 2016** (invited) *Connections Between Complex Dynamics, Statistical Physics, and Limiting Spectra of Self-similar Group Actions*, IUPUI, Indianapolis, IN
- August 2016** (invited) *Computational Group Theory Oberwolfach Workshop*, Oberwolfach, Germany
- June 2016** (invited) *GAGTA-10*, Stevens Institute of Technology, Hoboken, NJ
- Jan 2016** (invited) *AMS Joint Meeting*, Seattle, WA
- Jun 2015** *AMS-EMS-PMS international meeting*, Porto, Portugal
- May 2015** (invited) *Zassenhaus Group Theory Conference*, Binghamton, NY
- Jan 2015** (invited) *AMS Joint Meeting*, San Antonio, TX
- June 2014** (invited) *Topological Methods in Group Theory*, Ohio State University, Columbus, OH
- May 2014** (invited) *Groups and Dynamics Workshop*, Texas A&M University, College Station, TX
- Dec 2013** (invited) *Winter Meeting of Canadian Mathematical Society*, Ottawa, QC, Canada
- August 2013** *Groups St Andrews 2013*, St Andrews, Scotland, UK
- July 2013** (invited) *The 9-th International algebraic conference in Ukraine*, Lviv, Ukraine
- May 2013** (invited) *GAGTA-7*, CUNY, New York, NY
- April 2013** (invited) *AMS Sectional Meeting #1088*, Boston College, Chestnut Hill, MA
- Dec 2012** (invited) *Winter Meeting of Canadian Mathematical Society*, Montreal, QC, Canada
- Oct 2012** *Group Theory, Combinatorics, and Computing*, Boca Raton, FL
- Jan 2012** (invited, 2 talks) *AMS Joint Meeting*, Boston, MA
- Oct 2011** (invited) *AMS Sectional Meeting #1075*, Salt Lake City, UT
- Oct 2011** (invited) *AMS Sectional Meeting #1074*, Lincoln, NE
- Mar 2011** (invited) *Spring Topology and Dynamics Conference*, University of Texas at Tyler, Tyler, TX
- Dec 2010** (invited) *Second Manhattan Group Theory Day*, Graduate Center, CUNY

- May 2010** (invited) *AMS Sectional Meeting #1060*,  
Newark, NJ
- Oct 2008** (invited) *AMS Fall Central Sectional Meeting #1043*  
Kalamazoo, MI
- Oct 2008** (invited) *Self-similarity and Branching in Group Theory Workshop*,  
Banff International Research Station, Banff, Alberta, Canada
- Aug 2008** *Computational Group Theory and Cohomology*,  
Grantham, United Kingdom
- Jul 2008** (invited) *Group theory and complexity*,  
Steklov Mathematical Institute, Moscow, Russia
- Jul 2008** (invited) *Groups generated by automata and related questions*,  
Kyiv National Taras Shevchenko University, Ukraine
- Dec 2007** (invited) *Fields Workshop in Asymptotic Group Theory and Cryptography*,  
Carleton University, Canada
- Jul 2007** *Groups and their actions*,  
Bedlewo, Poland
- Jan 2007** *Geometric Groups on the Gulf Coast*,  
New Orleans, LA
- Jul 2006** (invited) *Algebra, Topology, Functional and Stochastic Analysis*,  
Koziova, Ukraine
- May 2006** *The 10-th Midrasha Mathematicae in: "Asymptotic Group Theory"*,  
The Hebrew University of Jerusalem, The Institute for Advanced Studies
- Jul 2005** (invited) *5-th International Algebraic Conference in Ukraine*,  
Odessa I.I. Mechnikov National University, Odessa, Ukraine
- Jun 2005** (invited) *Geometric and Asymptotic Methods in Group Theory Workshop*,  
Banff International Research Station, Banff, Alberta, Canada
- Nov 2004** *Asymptotic Group Invariants and their Applications Workshop*,  
Texas A&M University, College Station, TX
- Jul 2004** *Advanced Course on Automata Groups*,  
Centre de Recerca Matemàtica, Barcelona, Spain

### Seminar Talks

- May 2018** *Groups and Dynamics Seminar*, Texas A&M University
- Jan 2017** *Colloquium*, Indiana University Purdue University Indiana
- Nov 2016** *Discrete Mathematics Seminar*, University of South Florida
- Oct 2016** *New York Group Theory Seminar*, CUNY Graduate Center, NY
- Jan 2016** *Colloquium*, Oregon State University, Corvallis, OR
- Oct 2015** *Discrete Mathematics Seminar*, University of South Florida
- Oct 2015** *Analysis Seminar (2 talks)*, University of South Florida
- Mar 2015** *Discrete Mathematics Seminar*, University of South Florida
- Oct 2014** *Discrete Mathematics Seminar*, University of South Florida
- Aug 2014** *Groups and Dynamics Seminar*, Texas A&M University
- May 2014** *CS Seminar of Laboratoire d'Informatique Algorithmique:  
Fondements et Applications*, Université Paris Diderot – Paris 7
- Oct 2013** *Group Theory International Webinar*, hosted by Stevens institute of technology
- Sep 2013** *Discrete Mathematics Seminar*, University of South Florida
- Aug 2013** *Algebra seminar*, Universidade de Brasília, Brasília, Brazil



- Apr 2013** *Discrete Mathematics Seminar*, University of South Florida
- Mar 2013** *Topology seminar*, Saint Louis University, Saint Louis, MO
- Nov 2012** *Discrete Mathematics Seminar*, University of South Florida
- Oct 2012** *Discrete Mathematics Seminar*, University of South Florida (2 talks)
- May 2012** *New York Group Theory Seminar*, CUNY Graduate Center, NY
- Mar 2012** *Groups and Dynamics Seminar*, Texas A&M University
- Feb 2012** *Colloquium*, University of South Florida, FL
- Feb 2012** *Colloquium*, Western Carolina University, Cullowhee, NC
- Jan 2012** *Algebra Colloquium*, Graduate Center, City University of New York
- Jan 2012** *Colloquium*, Bowling Green State University, Ohio
- Nov 2011** *Geometry & Topology seminar*, Graduate Center, City University of New York
- Mar 2011** *Topology/Geometry seminar*, Yale University
- Mar 2011** *Algebra Seminar*, Carleton University, Canada
- Nov 2010** *Groups and Dynamics Seminar*, Texas A&M University
- Nov 2010** *Geometry & Topology seminar*, Binghamton University
- May 2010** *Group Theory International Webinar*, hosted by Stevens institute of technology
- Mar 2010** *Geometry & Topology seminar*, Binghamton University
- Mar 2010** *Algebra seminar*, Binghamton University
- Nov 2009** *Topology & Geometric Group Theory Seminar*, Cornell University
- Oct 2009** *New York Group Theory Seminar*, Graduate Center, City University of New York
- Sep 2009** *Geometry & Topology seminar*, Binghamton University (2 talks)
- Feb 2009** *Colloquium*, Binghamton University
- Jan 2009** *Groups and Dynamics Seminar*, Texas A&M University
- Dec 2008** *Groups and Dynamics Seminar*, Texas A&M University

### Talks for Students and K-12

- Apr 2015** “Algebra around us”,  
Pi Mu Epsilon (Florida Epsilon chapter) Induction Banquet Keynote speaker
- May 2014** “What do mathematicians do?”,  
Interactive presentation for 3-rd graders at Chiles Elementary School, Tampa, FL
- Oct 2013** “Elliptic curves and their use in cryptography”,  
Math Club, University of South Florida
- Oct 2012** “Fractals and where do we see them”, Math Club, University of South Florida
- Apr 2012** “On the notions of dimension”,  
Undergraduate Math Club, Binghamton University
- Feb 2012** “DNA computations and Graph theory”,  
Undergraduate Math Club, Binghamton University
- Oct 2011** “Open Key Cryptography and how RSA works”,  
Undergraduate Math Club, Binghamton University
- May 2011** “Lickorish-Wallace theorem on 3-manifolds”,  
Toeholds in Topology Graduate seminar, Binghamton University
- Sep 2010** “Asymptotic dimension of spaces and groups I, II”,  
Toeholds in Topology Graduate seminar, Binghamton University (2 talks)
- Feb 2010** “What are the fractals and where do we see them”,  
Undergraduate Math Club, Binghamton University
- Oct 2009** “Introduction to the world of groups”,  
Undergraduate Math Club, Binghamton University

- Sep 2009** “Introduction to groups generated by automata I, II”,  
Toeholds in Topology Graduate seminar, Binghamton University (2 talks)
- Oct 2006** “Automata groups from different points of view”,  
Graduate Student Seminar, Texas A&M University

## TEACHING

### University of South Florida

- MAT 6932 *Groups Generated by Automata (graduate level)*  
Fall 2016
- MAT 5932 *Combinatorial and Geometric Group Theory (graduate level)*  
Spring 2014, Spring 2018
- MTG 5317 *Topology II (graduate level)*  
Spring 2013
- MAS 5311 *Algebra I (graduate level)*  
Fall 2015
- MAS 5312 *Algebra II (graduate level)*  
Spring 2016
- MAT 4930 *Cryptography and Coding Theory (developed course materials)*  
Fall 2013, Fall 2014
- MAS 4302 *Elementary Abstract Algebra II*  
Spring 2017
- MTG 4302 *Introduction to Topology*  
Spring 2019
- MAS 3105 *Linear Algebra*  
Fall 2012, Fall 2013, Spring 2014, Spring 2018, Fall 2018
- MAC 2312 *Calculus II*  
Spring 2013, Fall 2018
- MAC 2282 *Engineering Calculus II*  
Spring 2015
- MAC 2311 *Calculus I (including course coordination)*  
Spring 2015, Fall 2016, Spring 2017
- MAC 2281 *Engineering Calculus I*  
Fall 2014, Fall 2015, Spring 2015, Spring 2016



## **Binghamton University**

- Math 130      *Mathematics in Action*  
Spring 2011 (250 students), Fall 2011 (280 students)
- Math 304      *Linear Algebra*  
Fall 2009 (44 students), Fall 2010 (50 students)
- Math 330      *Number Systems*  
Spring 2010 (25 students)
- Math 371      *Ordinary Differential Equations*  
Fall 2009 (40 students)
- Math 372      *Dynamical Systems*  
Fall 2010 (36 students)
- Math 375      *Complex Variables*  
Spring 2012
- Math 461      *Topology I (undergraduate level)*  
Fall 2011 (21 students)

## **Texas A&M University**

- Math 142      *Business Mathematics II*  
Instructor (Summer 2006)
- Math 152      *Calculus II (with Maple<sup>®</sup>)*  
Teacher Assistant (Fall 2007 (honors), Spring 2007, Fall 2005)
- Math 253      *Calculus III (with Maple<sup>®</sup>)*  
Teacher Assistant (Fall 2006 (honors), Spring 2005)

Grader for the following courses:

- Math 166      *Topics in Contemporary Mathematics II*
- Math 308      *Differential Equations*
- Math 367      *Basic Concepts of Geometry*
- Math 414      *Fourier Series and Wavelets*
- Math 416      *Modern Algebra II*
- Math 433      *Applied Algebra*
- Math 645      *A Survey of Mathematical Problems I*
- Math 662      *Applied Algebra (Graduate Course)*

## **Kyiv Taras Shevchenko University, Ukraine**

- Abstract Algebra*  
Teacher Assistant (Spring 2002)

## SERVICE

- Referee for the following journals and conference proceedings:
  - Advances in Mathematics;
  - Groups, Geometry and Dynamics;
  - Geometriae Dedicata;
  - Journal of Modern Dynamics;
  - London Mathematical Society Lecture Note Series;
  - Journal of Symbolic Computation;
  - STACS 2013 (Symposium on Theoretical Aspects of Computer Science);
  - CiE2014 (Computability in Europe);
  - CiE2015 (Computability in Europe);
  - CiE2016 (Computability in Europe);
  - ISSAC 2016 (The 41-st International Symposium on Symbolic and Algebraic Computation);
  - Theoretical Computer Science;
  - St. Petersburg Math Journal;
  - International Journal of Algebra and Computation;
  - Semigroup Forum;
  - European Journal of Combinatorics;
  - Expositiones Matheamticae;
  - Topology Proceedings;
  - Contemporary Mathematics.
  - Buletinul Academiei de Ştiinţe a Republicii Moldova. Matematica.
- Reviewer for the National Science Centre (Narodowe Centrum Nauki - NCN), Poland
- Reviewer for the USF Internal Awards Program
- Reviewer for Mathscinet (since 06/2006, 33 papers reviewed)
- Organizer of DLT-2020 (Developments in Language Theory) conference, University of South Florida, Tampa, FL, May 2020
- Organizer of “Zassenhaus groups and friends” international conference, University of South Florida, Tampa, FL, April 6-8, 2018
- Organizer of a Special Session “Combinatorial/Geometric/Probabilistic Methods in Group Theory” at the AMS Fall Central Sectional Meeting (#1131), Denton, TX, September 2017
- Organizer of a conference “Geometric and Probabilistic Methods in Group Theory and Dynamical Systems”, Texas A&M University, College Station, TX, November 9-12, 2015

- Organizer of a Special Session “New trends in automata groups and semigroups” at the Joint International Meeting of AMS-EMS-PMS (#1111), Porto, June 2015
- Organizer of “Groups and Dynamics Workshop”, Texas A&M University, May 6, 2014
- Organizer of “Groups Acting on Rooted Trees and Around” workshop, Institut Henri Poincaré, Paris, France, February 24-28, 2014
- Organizer of Geometry and Topology seminar at Binghamton University (2011-2012)
- Organizer of Toeholds in Topology seminar for graduate students at Binghamton University (2010-2012)
- Graduate Admissions Director at the Mathematics and Statistics Department at USF since September 2018
- Developed the curriculum for an undergraduate course on “Cryptography and Coding Theory”. Taught to mathematics students at the University of South Florida in Fall 2013 and Fall 2014.
- Advisor of Undergraduate Math Club at Binghamton University (2009-2012)
- Chapter Advisor for Pi Mu Epsilon Honor Society (2010-2012)

## STUDENTS

- Elsayed Ahmed (Ph.D., December 2018), USF
- Krystofer Baker (B.S. Honors Thesis, May 2017), USF
- Allen Pennington (M.S., May 2017), USF
- Suzana Milea (M.S., May 2014), USF
- Louis Caponi (M.S., May 2014), USF
- Tracy Stefanovic (B.S. Honors Thesis, 2014), USF

## SKILLS

Languages	Ukrainian and Russian (native), English (fluent)
Computer	I have experience working and programming in different Computer Algebra Systems, including GAP, Maple <sup>®</sup> , R Proficient in publishing scientific documents with L <sup>A</sup> T <sub>E</sub> X