

# Joachim Jelisiejew

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## EMPLOYMENT

Oct 2019 – **University of Warsaw**  
*Samuel Eilenberg's assistant professor*

Oct 2017 – Sep 2019 **Polish Academy of Sciences**  
*assistant professor*

## EDUCATION

Oct 2013 – Sep 2017 **University of Warsaw**  
*PhD student in Mathematics*  
  
PhD Thesis *Hilbert schemes of points and their applications* (summa cum laude)  
Advisor: Jarosław Buczyński. Auxiliary advisor: Weronika Buczyńska.

## SELECTED PUBLICATIONS

1. *Components and singularities of Quot schemes and varieties of commuting matrices* with Klemen Šivic, *Journal für die reine und angewandte Mathematik (Crelles Journal)*, 2022.
2. *The Hilbert scheme of infinite affine space and algebraic K-theory* with Marc Hoyois, Denis Nardin, Burt Totaro and Maria Yakerson. To appear in *Journal of the European Mathematical Society (JEMS)*, arXiv:2002.11439, 2020.
3. *Pathologies on the Hilbert scheme of points*, *Inventiones mathematicae*, volume 220, pages 581–610 (2020).
4. *Białynicki-Birula decomposition for reductive groups in positive characteristic* with Łukasz Sienkiewicz. *Journal de Mathématiques Pures et Appliquées*, Volume 152, August 2021.
5. *Białynicki-Birula decomposition for reductive groups* with Łukasz Sienkiewicz. *Journal de Mathématiques Pures et Appliquées*, Volume 131, November 2019, Pages 290-325.
6. *Constructions of  $k$ -regular maps using finite local schemes* with Jarosław Buczyński, Tadeusz Januszkiewicz and Mateusz Michałek. *Journal of the European Mathematical Society (JEMS)* 21 (2019), no. 6, 1775–1808.
7. *Elementary components of Hilbert schemes*, *J. London Math. Soc.*, 100: 249-272, 2019.

For a complete list of publications, see  
my homepage <http://www.mimuw.edu.pl/~jjelisiejew/publications.html>,  
arXiv <https://arxiv.org/search/math?searchtype=author&query=Jelisiejew>  
mathscinet <https://mathscinet.ams.org/mathscinet/search/author.html?mrauthid=1061482>

## SCIENTIFIC INTERESTS

1. **Algebraic geometry:**
  - algebraic group actions and Białynicki-Birula decompositions,

- moduli spaces, in particular Hilbert schemes of points on higher dimensional smooth varieties and applications to algebraic homotopy theory,
  - secant varieties and their applications, tensors.
2. **Commutative algebra:** Gorenstein rings and duality, Macaulay's inverse systems, Waring, cactus and smoothable ranks, syzygies of finite algebras.
  3. **Applied algebra:** computational complexity of matrix multiplication.

## CONFERENCES AND SCIENTIFIC COOPERATION

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|----------------------|--|
| March 2022           | Invitation MFO institute workshop  |
| October 2021         | Seminar talk at IST, Vienna  |
| October 2021         | Talk at <i>Tensor Days</i> workshop  |
| August 2021          | <b>Invited talk</b> at SIAM meeting's session  |
| May 2021             | Seminar talk at University of Stanford   |
| Apr 2021             | Seminar talk at University of Trento   |
| Jan 2021             | Seminar talk at University of Stockholm  |
| Dec 2020             | Seminar talk at University of Kostanz  |
| Nov 2020             | Seminar talk at Texas A&M  |
| Oct 2020             | Seminar talk at Mumbai   |
| 14 Apr 2020          | Zoom seminar at Texas A&M, USA   |
| 7 Apr 2020           | Zoom seminar at Texas A&M, USA   |
| 3–5 Feb 2020         | EPFL visit, invitation for a <b>series of lectures</b>   |
| 22–28 Sep 2019       | Toric varieties <i>workshop in MFO institute</i> (invitation only, <b>invited talk</b> ), Oberwolfach, Germany           |
| 8–22 Sep 2019        | <i>Scientific cooperation with Mateusz Michałek</i> , Leipzig, Germany   |
| 2–7 Sep 2019         | <i>100 years of Polish Math Society</i> congress ( <b>invited talk</b> at special session, Cracow, Poland                |
| Jul 2019             | <i>Scientific cooperation with Maria Yakerson</i> , Warsaw, Poland   |
| Jun 2019             | <i>Derived Categories</i> , Warsaw, Poland   |
| Jan 2019             | <i>Scientific visit to Mateusz Michałek</i> , Leipzig, Germany (seminar talk)  |
| Nov 2018             | <i>Workshop on T-varieties</i> , Warsaw, Poland, ( <b>invited talk</b> )   |
| Sep 2018             | <i>Meeting of Polish-Italian Math Societies</i> , Wroclaw, Poland and Algebraic Geometry                                 |
| June 2018            | <i>Scientific visit to Alex Constantinescu</i> , Berlin  |
| June 2018            | <i>Scientific visit to Roberto Notari</i> , Milano   |
| 18–22 Sep 2017       | <i>8 Forum of Polish Mathematicians</i> , Lublin ( <b>invited talk</b> at the arithmetic geometry session).              |
| 5 May – 8 Jul 2017   | <i>Deformations in Turin</i> , Torino ( <b>contributed talk</b> ).   |
| 27 May – 3 Jun 2017  | Scientific visit to Maria E. Rossi and Shreedevi Masuti, Genova.   |
| 12 Aug – 11 Sep 2016 | <i>Combinatorial Algebraic Geometry</i> semester at Fields Institute, Toronto, Canada.                                   |
| 28 Nov – 2 Dec 2016  | <i>Algebra Geometry Meeting</i> , Barcelona ( <b>invited talk</b> ).   |
| 20 Aug – 3 Sep 2016  | <i>Bernd Sturmfels' apprenticeships at Combinatorial Algebraic Geometry</i> , Toronto, Canada.                           |
| 15 Aug – 19 Aug 2016 | <i>Introductory workshop at Combinatorial Algebraic Geometry</i> , Toronto, Canada.                                      |
| 1 – 4 Jul 2015       | <i>Theory and applications of syzygies</i> on the occasion of Frank-Olaf Schreyer's 60th birthday, Saarbrücken, Germany. |

- 28 – 30 Jun 2015 Scientific meeting with J. Elias on Artin Gorenstein algebras, Barcelona.
- 25 – 26 Jun 2015 Scientific meeting with Maria E. Rossi on Artin Gorenstein algebras, Genova.
- 19 – 24 Jun 2015 Scientific cooperation with G. Casnati and R. Notari on smoothability of zero-dimensional schemes, Torino.
- 14 – 19 Jun 2015 *AGaFe* conference in honour of Philippe Ellia, Ferrara.
- 9 – 14 Jun 2015 *AMS-EMS-SPM meeting* in Porto, Portugal (**invited talk** on a special session).
- 16 – 20 Jun 2014 *Nordfjordeid Summer school 2014: Toric degenerations and mirror symmetry*, Nordfjordeid, Norway.
- 7 – 11 Apr 2014 Scientific visit to Bonn.
- 26 Feb – 4 Mar 2014 Scientific cooperation with G. Casnati and R. Notari on smoothability of zero-dimensional schemes, Warsaw.
- 23 – 26 Nov 2013 Scientific visit to A.A. Iarrobino, Northeastern University, Boston, MA, USA.
- 18 – 22 Nov 2013 *Graduate Workshop on Geometry of Hilbert schemes*, Stony Brook, NY, USA (**contributed talk**).
- 1 – 7 Sep 2013 36th Autumn School *Power sum decompositions and apolarity, a geometric approach*, Łukęcin, Poland (organiser).
- 14 – 20 Jul 2013 *Classical Aspects of Ring Theory and Module Theory*, Będlewo, Poland.
- 27 – 31 May 2013 *Szygies in Berlin* summer school of Freie Universität Berlin, Berlin.
- 15 – 22 May 2013 Scientific cooperation with G. Casnati and R. Notari on smoothability of zero-dimensional schemes, Politecnico di Torino, Torino, Italy.
- 16 – 24 Jan 2013 Scientific cooperation with G. Casnati and R. Notari on smoothability of zero-dimensional schemes, Politecnico di Torino, Torino, Italy.
- 23 – 29 Sep 2012 35th Autumn School *Subgroups of Cremona groups*, Łukęcin, Poland.
- 8 – 14 Jul 2012 SMI Summer Course *Tensors: Waring problems and Geometric Complexity Theory*, Cortona, Italy.
- 17 – 24 Sep 2011 34th Autumn School *Geometric Invariant Theory, old and new.*, Łukęcin, Poland.

## PRIZES AND HONOURS

- 2021 **Scholarship for outstanding young scientists**, *Minister of Education, Poland*
- 2021 **Rector of University of Warsaw prize**, *University of Warsaw*  
<https://www.uw.edu.pl/wp-content/uploads/2021/04/wyroz%CC%87nienia-rektora-2021-1.pdf>
- 2020 **START scholarship**, *Foundation for Polish Science*
- 2019 **Kuratowski's prize**, *IMPAN and Polish Math Society*  
[www.impan.pl/pl/wydarzenia/nagrody/nagroda-kazimierza-kuratowskiego](http://www.impan.pl/pl/wydarzenia/nagrody/nagroda-kazimierza-kuratowskiego).
- 2018 **Prime Minister of Poland Prize for PhD**,

## PROJECTS

- 2021 – **Generalizations and applications of Białynicki-Birula decompositions**, Principal investigator, National Science Centre Sonata grant.
- 2015 – 2017 **Local geometry of the Hilbert scheme of points and its applications**, Principal investigator, National Science Centre Preludium grant.

## POPULARIZATION

- May 2009 – **Białystok University of Technology**  
*Coorganizer of local mathematical competition*  
The competition is designed as an intermediate step between school and Mathematical Olympiad, four relatively easy proof tasks are given/4h.  
<http://konkurs.wi.pb.edu.pl>
- Dec 2016 – Sep 2019 **High School Mathematical Olympiad**  
*Member of the Problem Committee*  
<http://www.om.mimuw.edu.pl>
- Sep 2019 – **Junior Mathematical Olympiad**  
*Member of the Committee*  
<http://www.omj.edu.pl>
- 2014 **Stowarzyszenie Edukacji Matematycznej**  
*Editor of two mathematical circles handbooks*  
Each contains around 15 full articles suitable for math-circle use.
- Oct 2006 – Jun 2014 **I LO, Białystok**  
*Teacher of High school mathematical circle*  
The circle was viewed toward Polish Math Olympiad and met each week for two hours. Homepage: <http://www.mimuw.edu.pl/~jjelisiejew/matma/>.
- 2008 – 2013 **I LO, Białystok**  
*Main organiser of math summer camps*  
Weekly summer camps for people interested in math and/or math olympiads.