

# Piotr Achinger

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Born July 28, 1986 in Warsaw, Poland  
Nationality: Polish

## Academic interests

**Algebraic geometry** algebraic geometry in positive characteristic, deformation theory, ramification of  $\ell$ -adic sheaves, logarithmic geometry

**Arithmetic geometry**  $p$ -adic Hodge theory, arithmetic of Calabi–Yau varieties

## Education and employment

- 2017– *Assistant Professor (adiunkt)* at IMPAN (Warsaw, Poland)
- Jan–May 2019 *Berlekamp Postdoc*, MSRI program *Derived Algebraic Geometry*, Berkeley.
- 2016–2017 *EPDI postdoc*, IHES (Bures-sur-Yvette, France)  
2015–2016 *EPDI postdoc*, Banach Center (Warsaw, Poland)
- 2011–2015 PhD in Mathematics, University of California, Berkeley  
Thesis: [K\( \$\pi\$ , 1\) Spaces in Algebraic Geometry](#)  
Advisor: Arthur Ogus
- 2005–2011 M. Sc. Programme in Computer Science at University of Warsaw,  
[Faculty of Mathematics, Informatics and Mechanics](#)  
Advisor: Mikołaj Bojańczyk
- 2005–2010 M. Sc. Programme in Mathematics at University of Warsaw,  
[Faculty of Mathematics, Informatics and Mechanics](#)  
Advisor: Adrian Langer

## Research grants

- 2018–2021 [Deformations and Degenerations of Algebraic Varieties](#), funded by the National Science Centre (NCN), grant number 2017/26/D/ST1/00913 (SONATA 13), total funding: 452 000 PLN.

## Research visits

- Jun–Apr 2018 *Periods in Number Theory, Algebraic Geometry, and Physics*, Hausdorff Center for Mathematics / MPIM Bonn.
- Jun 2017 *Hypergeometric Motives and Calabi–Yau Differential Equations*, MATRIX Institute, Creswick, Australia
- Apr 2016 University of Utah (host: Karl Schwede)
- Sep 2015 IHES (host: Ahmed Abbes)
- Jun 2015 University of Tokyo (host: Takeshi Saito)
- Jun 2014 IHES (host: Ahmed Abbes)

## Prizes and scholarships

- 2016 The Kazimierz Kuratowski Award of the Polish Mathematical Society and IMPAN (awarded yearly to one top Polish researcher in mathematics under the age of 30)
- 2016 The START award of the Foundation for Polish Science
- 2015 Kenneth Ribet and Lisa Goldberg Award in Algebra (for PhD thesis)
- 2014 UC Berkeley Outstanding Graduate Student Instructor Award
- 2011–2014 International Fulbright Science and Technology Award
- 2010 Józef Marcinkiewicz Memorial Prize for Best Student Paper in Mathematics (2nd prize)
- 2007–2009 First Prize, 14th, 15th, and 16th International Mathematics Competition
- 2006 Second Prize, 13th International Mathematics Competition
- 2005 Bronze Medal, 46th International Mathematical Olympiad, Merida, Mexico

## Publications

### Journal articles

- 2017 Piotr Achinger *Wild ramification and  $K(\pi, 1)$  spaces*, *Invent. Math.* **210** (2017), no. 2, 453–499.
- 2017 Piotr Achinger and Maciej Zdanowicz *Some elementary examples of non-liftable varieties*, *Proc. Amer. Math. Soc.* **145** (2017), 4717–4729.
- 2017 Piotr Achinger, Nathan Ilten, and Hendrik Süß *F-split and F-Regular Varieties with a Diagonalizable Group Action*, *J. Algebraic Geom.* **26** (2017), 603–654.
- 2015 Piotr Achinger  *$K(\pi, 1)$ -neighborhoods and comparison theorems*, *Compositio Mathematica* **151** (2015), no. 10, 1945–1964.
- 2015 Piotr Achinger *A characterization of toric varieties in positive characteristic*, *International Mathematics Research Notices* 2015, no. 16, 6879–6892.
- 2012 Piotr Achinger and Nicolas Perrin *Spherical multiple flags*, in *Schubert Calculus — Osaka 2012*, *Advanced Studies of Pure Mathematics* vol. 71, 2017
- 2012 Piotr Achinger *Frobenius Push-Forwards on Quadrics*, *Communications in Algebra* 40:8 (2012)

### Preprints

- 2018 Piotr Achinger and Maciej Zdanowicz *Serre–Tate theory for Calabi–Yau varieties*, Preprint 2018, <http://achinger.impan.pl/serretate.pdf>, 40 pages.

- 2018 Piotr Achinger and Arthur Ogus *Monodromy and Log Geometry*, preprint 2018, [arXiv:1802.02234](https://arxiv.org/abs/1802.02234), 70 pages, submitted.
- 2017 Piotr Achinger, Jakub Witaszek, and Maciej Zdanowicz *Liftability of the Frobenius morphism and images of toric varieties*, Preprint 2017, [arXiv:1708.03777](https://arxiv.org/abs/1708.03777), 60 pages, submitted.

## Reports

- 2018 Piotr Achinger *The logarithmic de Rham–Witt complex* (after L. Hesselholt, I. Madsen *On the K-theory of local fields*), Arbeitsgemeinschaft Topological Cyclic Homology. To appear in Oberwolfach Reports, Report 15/2018, DOI: 10.4171/OWR/2018/15, [https://www.mfo.de/occasion/1814/www\\_view](https://www.mfo.de/occasion/1814/www_view).

## Invited talks

- Sep 2018 The 4th KTGU Mathematics Workshop for Young Researchers, Kyoto University  
 Sep 2018 *Serre–Tate theory for Calabi–Yau varieties*, Belgian–Dutch AG seminar (Ben Moonen 50), Nijmegen.
- Sep 2018 *Serre–Tate theory for Calabi–Yau varieties*, UMI–SIMAI–PTM Joint Meeting, Wrocław.  
 Jul 2018 *Liftability of Frobenius and images of toric varieties*, Conference Witt Vectors, Deformations and Absolute Geometry, University of Vermont
- Jan 2018  *$K(\pi, 1)$  spaces and wild ramification*, conference Arithmetic and Algebraic Geometry, University of Tokyo
- Nov 2017 *Liftability of Frobenius and images of toric varieties*, EPFL  
 Nov 2017  *$K(\pi, 1)$  spaces and wild ramification*, IMPAN, Warsaw  
 Sep 2017 *Log geometry, monodromy, and Betti realization of varieties defined by formal power series*, Workshop Étale and motivic homotopy theory, Universität Heidelberg
- Aug 2017  *$K(\pi, 1)$  spaces and wild ramification*, Conference Algebraic K-theory and Arithmetic, Banach Center, Bedlewo
- Jul 2017 *Log geometry, monodromy, and Betti realization of varieties defined by formal power series*, Workshop on Higgs bundles, K3 surfaces and moduli, HU Berlin
- Jul 2017  *$K(\pi, 1)$  spaces and wild ramification*, Universität Frankfurt  
 Jun 2017  *$K(\pi, 1)$  spaces and wild ramification*, Universität Heidelberg  
 Jun 2017  *$K(\pi, 1)$  spaces and wild ramification*, ENS Lyon  
 May 2017  *$K(\pi, 1)$  spaces and wild ramification*, Universität Zürich  
 May 2017 *Images of toric varieties and liftability of the Frobenius morphism*, Workshop Beyond Toric Geometry, CMO Oaxaca
- Apr 2017  *$K(\pi, 1)$  spaces and wild ramification*, Jussieu  
 Apr 2017  *$K(\pi, 1)$  spaces and wild ramification*, ENS Paris  
 Feb 2017  *$K(\pi, 1)$  spaces and wild ramification*, Universität Münster  
 Jan 2017 *Canonical liftings of ordinary Calabi–Yau varieties*, MATRIX, Creswick, Australia  
 Dec 2016  *$K(\pi, 1)$  spaces and wild ramification*, IHES  
 Sep 2016 *Deformations and Degenerations in Algebraic and Arithmetic Geometry*, plenary address at the 7th Forum of the Polish Mathematical Society, Olsztyn
- Feb 2015 *F-split varieties with a diagonalizable group action*, University of Tokyo  
 Feb 2015  *$K(\pi, 1)$  spaces and wild ramification*, University of Tokyo  
 Dec 2014  *$K(\pi, 1)$  spaces and wild ramification*, Berkeley Number Theory Seminar  
 Jun 2014  *$K(\pi, 1)$  neighborhoods and comparison theorems*, IHES  
 Mar 2014  *$K(\pi, 1)$  spaces in algebraic geometry*, Stanford Special Algebraic Geometry Seminar  
 Nov 2013 *Frobenius splitting of toric varieties and matroids*, Algebra Seminar at University College Dublin  
 May 2013 *A characterization of toric varieties in characteristic  $p$* , Frobenius Singularity Day, MSRI  
 Sep 2012 *A characterization of toric varieties in characteristic  $p$* , Berkeley Algebraic Geometry and Commutative Algebra Seminar

## Organization

Fall 2018	Simons Semester <i>Varieties: Arithmetic and Transformations</i> at the Institute of Mathematics of the Polish Academy of Sciences (member of organization committee)
2017–	Member of the Scientific Board of IMPAN
2016–	Member of the Warsaw regional committee of the Polish Mathematical Society
2015–2016	Young Researchers Colloquium, IMPAN
2015–2016	Junior Algebraic Geometry Seminar, University of Warsaw
2011–2014	Student Algebraic Geometry Seminar, UC Berkeley
2011–2013	Conference <i>Géométrie Algébrique en Liberté (GAeL)</i> , editions XX and XXI.

## Teaching

Fall 2014	TA for Math 202A (Graduate Level Topology and Analysis), UC Berkeley
Fall 2013	TA for Math 32 (Precalculus), UC Berkeley
Spring 2013	Assistant for the Berkeley Math Circle
Fall 2012	TA for Math H1B (Honors Calculus), UC Berkeley
Spring 2012	TA for Math 1A (Calculus), UC Berkeley

## PhD students

2017	Maciej Zdanowicz (University of Warsaw), secondary supervisor Principal supervisor: Adrian Langer Thesis title: <i>Liftableity of schemes and their Frobenius morphism</i>
2017	Paweł Karasek (Polish Academy of Sciences, with distinction), secondary supervisor Principal supervisor: Maciej Radziejewski Thesis title: <i>Almost primes in different settings</i>

## Outreach

2015–	Tutor at the <b>Polish Children's Fund</b> (Krajowy Fundusz na rzecz Dzieci)
2013–2014	Problem selection committee of the Bay Area Math Olympiad
2012–2015	Teaching for the Berkeley, Stanford, and Marin Math Circles
2008–2010	Co-organizer of the <b>Scientific Summer Workshops</b> (Wakacyjne Warsztaty Wielodyscyplinarne), aimed at exceptional high-school students interested in mathematics, computer science and physics
2007–2008	Problem selection committee of the Polish Mathematical Olympiad