Jakub Witaszek

Education

2014– 2018	**Imperial College London**, PhD (Supervisor: Prof. Paolo Cascini), Mathematics
2012– 2014	**Bonn University, Germany**, MSc (Supervisor: Prof. Daniel Huybrechts), Mathematics
2009 – 2012	**Warsaw University, Poland**, BSc (Supervisor: Prof. Jaroslaw Wisniewski), Mathematics

Appointments

2025 – now	**Northwestern University**, Assistant Professor
2022 – 2025	**Princeton University**, Assistant Professor
2019 – 2022	**University of Michigan, Ann Arbor**, D.J. Lewis Postdoctoral Assistant Professor
Jan/2019 – May/2019	**Mathematical Sciences Research Institute, Berkeley**, Postdoctoral Fellow
2018 – 2019	**Institute for Advanced Study, Princeton**, Postdoctoral Fellow (Member)

Honors, scholarships, grants, and selected invited lectures

2025	**Plenary lecture**, Summer Research Institute in Algebraic Geometry (decennial), Colorado
2024	**Junior Faculty Teaching Award**, Department of Mathematics, Princeton University
2024–2027	**NSF Research Grant**, *Positive and Mixed Characteristic Birational Geometry and its Connections with Commutative Algebra and Arithmetic Geometry*
2021–2024	**NSF Research Grant**, *The Minimal Model Program in Positive and Mixed Characteristics*
2018	**Doris Chen Award**, Imperial College London
2012–2014	**Bonn International Graduate School scholarship**
2011–2012	**Scholarship of the Minister of Science and Higher Education**, Poland
2009	**50th International Mathematics Olympiad**, Bremen – bronze medal
2009	**60th Polish Mathematics Olympiad** – 4th place, silver medal

Publications

2024 **Quasi-F-splittings in birational geometry II**
Proceedings of the London Mathematical Society, to appear
(Kawakami-Takamatsu-Tanaka-Witaszek-Yobuko-Yoshikawa)

2024 **Quasi-F-splittings in birational geometry**
Annales scientifiques de l'École normale supérieure, to appear
(Kawakami-Takamatsu-Tanaka-Witaszek-Yobuko-Yoshikawa)

2024 **Lifting globally F-split surfaces to characteristic zero**
Journal für die reine und angewandte Mathematik, Crelles Journal
(Bernasconi-Brivio-Kawakami-Witaszek)

2024 **Relative semiampleness in mixed characteristic**
Duke Mathematical Journal (Witaszek)

2024 **Resolution and alteration with ample exceptional divisor**
Science China Mathematics, Special Issue on Algebraic Geometry (Kollár-Witaszek)

2023 **Globally +-regular varieties and the MMP for 3-folds in mixed characteristic**
Publications Mathématiques de l'IHÉS
(Bhatt-Ma-Patakfalvi-Schwede-Tucker-Waldron-Witaszek)

2023 **On the relative Minimal Model Program for 4-folds in positive and mixed characteristic**
Forum of Mathematics, PI (Hacon-Witaszek)

2023 **The Du Bois complex of a hypersurface and the minimal exponent**
Duke Mathematical Journal (Mustata-Olano-Popa-Witaszek)

2022 **Keel's base point free theorem and quotients in mixed characteristic**
Annals of Mathematics (Witaszek)

2022 **An analog of adjoint ideals and PLT singularities in mixed characteristic**
Journal of Algebraic Geometry (Ma-Schwede-Tucker-Waldron-Witaszek)

2021 **Tamely ramified morphisms of curves and Belyi's theorem in positive characteristic**
International Mathematics Research Notices (Kedlaya-Litt-Witaszek)

2021 **The Minimal Model Program for threefolds in characteristic five**
Duke Mathematical Journal (Hacon-Witaszek)

2021 **Global Frobenius Liftability II: Surfaces and Fano threefolds**
Annali della Scuola Normale Superiore di Pisa (Achinger-Witaszek-Zdanowicz)

2021 **On the canonical bundle formula and log abundance in positive characteristic**
Mathematische Annalen (Witaszek)

2021 **On the relative Minimal Model Program for threefolds in low characteristics**
Peking Mathematical Journal (Hacon-Witaszek)

2021 **Global Frobenius Liftability I**
Journal of the European Mathematical Society (Achinger-Witaszek-Zdanowicz)

2019 **On the rationality of Kawamata log terminal singularities in positive characteristic**
Algebraic Geometry (Hacon-Witaszek)

2018 **Klt del Pezzo surfaces which are not globally F-split**
International Mathematics Research Notices (Cascini-Tanaka-Witaszek)

2017 **On log del Pezzo surfaces in large characteristic**
Compositio Mathematica (Cascini-Tanaka-Witaszek)

2017 **On the base point free theorem and Mori dream spaces for log canonical threefolds over the algebraic closure of a finite field**
Mathematische Zeitschrift (Nakamura-Witaszek)

2017 **Effective bounds on singular surfaces in positive characteristic**
Michigan Mathematical Journal (Witaszek)

2015 **On the basepoint-free theorem for log canonical threefolds over the algebraic closure of a finite field**
Algebra and Number Theory (Martinelli-Nakamura-Witaszek)

2015 **The degeneration of the Grassmannian into a toric variety and the calculation of the eigenspaces of a torus action**
Journal of Algebraic Statistics (Witaszek)

Preprints

2025 **Frobenius liftable hypersurfaces**
arXiv (Kawakami-Sarkar-Witaszek)

2024 **Higher F-injective singularities**
arXiv (Kawakami-Witaszek)

2024 **Perfectoid pure singularities**
arXiv (Bhatt-Ma-Patakfalvi-Schwede-Tucker-Waldron-Witaszek)

2024 **Quasi-F-splittings in birational geometry III**
arXiv (Kawakami-Takamatsu-Tanaka-Witaszek-Yobuko-Yoshikawa)

2024 **Quasi-F^e-splittings and quasi-F-regularity in birational geometry**
arXiv (Tanaka-Witaszek-Yobuko)

2023 **Test ideals in mixed characteristic: a unified theory up to perturbation**
arXiv (Bhatt-Ma-Patakfalvi-Schwede-Tucker-Waldron-Witaszek)

2022 **Quasi-F-splittings in birational geometry**
arXiv (Kawakami-Takamatsu-Tanaka-Witaszek-Yobuko-Yoshikawa)

Professional activities and educational outreach

Organising:

- Learning seminar on Hodge modules and V-filtration (Princeton, Spring 2025)
- Learning workshop on p-adic Hodge theory (Princeton, October 2023)
- Learning workshop on Hodge modules and Hodge ideals (Princeton, March 2023)
- Learning workshop on Crystalline Cohomology (Princeton, November 2022)
- Algebraic Geometry seminar (Princeton, 2022–now)
- Learning seminar on Deligne-Du Bois singularities (Michigan, Autumn 2020)
- Learning seminar on derived splinters and the direct summand conjecture (London, 2018)

- Postgraduate school *New advances in Fano manifolds* (Cambridge, December 2017)

Academic service: PhD admission committee (Princeton, 2023-2024), PhD thesis reader (Shiji Lyu), PhD general exam at Princeton (×6), undergraduate senior thesis committee at Princeton (×2), Princeton AI committee

Graduate students mentoring: co-supervising two graduate students (Princeton, 2022-), mentoring 8 graduate students at 2025 SRI in Algebraic Geometry Bootcamp

Undergraduate students mentoring: supervising a senior thesis (Princeton 2024-2025) and six students at summer program for mathematics majors (Princeton, 2023-2025), undergraduate reading seminar on scheme theory (Princeton 2023-2024)

Non-research postdoc mentoring: three graduate students (Michigan, 2019-2021)

Grant referee: European Research Council starting grant, Panelist for National Science Foundation (×2), National Science Centre (Poland)

Referee: Algebraic Geometry, Compositio Mathematica, Duke Mathematical Journal, European Journal of Mathematics, Journal für die reine und angewandte Mathematik, Journal of Algebra, Journal of London Mathematical Society, Manuscripta Mathematica, Mathematische Annalen, Selecta Mathematica

Outreach:

- Princeton Undegraduate Math Club, talk: *Complex and arithmetic singularities* (Princeton, 2024)
- Princeton University Mathematics Competition, *Commutators in mathematics*, talk for high school students (Princeton, 2023)
- Michigan Math and Science Scholars, *Cryptography and Number Theory* for high school students (Michigan, June 14 - July 2 in 2021)
- Participating in a workshop on Inquiry Based Learning (flipped classroom) (Michigan, 2020)
- U(M) Undegraduate Math Club, talk: *Algebraic curves and classical geometry* (Michigan, 2019)
- Polish Children's Fund outreach program (Poland, 2010-2013)
  - volunteering, tutoring, and evaluating applications
  - holding week-long workshops: *Algebraic curves and Cayley-Bacharach theorem*, *Introduction to group theory*, *Vectors in geometry*
- *Stanisław Staszic High School* in Warsaw: teaching at a math circle; organising three, week-long, workshops in mathematics and computer science; organising outreach lectures given by undergraduate students and university faculty (Poland, 2008-2011)

Teaching

2025 *Honors Linear Algebra*, lecturer, Spring term, Princeton University
2024 *Algebra I*, lecturer, Fall term, Princeton University
2024 *Honors Linear Algebra*, lecturer, Spring term, Princeton University
2023 *Algebra I*, lecturer, Fall term, Princeton University
2023 *Linear Algebra with Applications*, lecturer, Spring term, Princeton University
2022 *Multivariable Calculus*, lecturer, Fall term, Princeton University
2021 *Abstract Algebra*, inquiry-based learning instructor, Fall term, University of Michigan
2020 *Linear Algebra*, inquiry-based learning instructor, Fall term, University of Michigan
2020 *Algebraic Geometry 2*, for graduate students, lecturer, Winter term, University of Michigan
2019 *Linear Algebra*, inquiry-based learning instructor, Fall term, University of Michigan
2017 *Real analysis*, demonstrating and marking, Autumn trimester, Imperial College London
2016 *Algebra 2*, demonstrating and marking, Autumn trimester, Imperial College London
2016 *Real analysis*, demonstrating and marking, Autumn trimester, Imperial College London
2016 *Analysis*, demonstrating and marking, Spring trimester, Imperial College London
2015 *Linear algebra*, demonstrating, Autumn trimester, Imperial College London
2015 *Galois theory*, marking, Autumn trimester, Imperial College London
2015 *Analysis*, demonstrating, Spring trimester, Imperial College London
2015–2017 Invigilating and 2nd-marking, Imperial College London

Lecture series

2025 RGAS Summer School, La Cristalera, Spain
Riemann-Hilbert Correspondence and Applications to Singularities
2024 Fall School, Mainz, Germany
Riemann-Hilbert Correspondence and Applications to Singularities

Invited research talks

2025 Bootcamp for 2025 SRI in Algebraic Geometry, Colorado
Singularities in positive and mixed characteristic
2025 p-adic and Characteristic p Methods in Algebraic Geometry conference, EPFL, Switzerland
Hodge Theory of Singularities in Positive Characteristic
2025 Algebraic Geometry seminar, University of Washington, Seattle
Hodge Theory of Singularities in Positive Characteristic
2025 Commutative algebra in mixed characteristic conference, University of Nebraska-Lincoln
Hodge Theory of Singularities in Positive Characteristic

2025 Algebraic Geometry seminar, Columbia University
Mixed characteristic analogues of Frobenius-split singularities

2025 Joint Number Theory seminar, New York University
Hodge theory of singularities in positive characteristic

2024 Arithmetic Geometry conference in Shenzhen, China
Mixed characteristic analogues of F-split singularities

2024 Moduli of Varieties conference, University of Utah, Salt Lake City
Hodge Theory of Singularities in Positive Characteristic

2024 AIM workshop, Los Angeles
Hodge Theory of Singularities in Positive Characteristic

2024 EPIGA conference 2024, Paris
Singularities in mixed characteristic via the Riemann-Hilbert correspondence

2024 SLMath seminar, Berkeley
Quasi-F-regularity

2024 Algebraic Geometry seminar, Stanford University
Singularities in mixed characteristic via the Riemann-Hilbert correspondence

2024 Simons Collaboration Conference, New York City
Singularities in mixed characteristic via the Riemann-Hilbert correspondence

2023 Colloquium, Polish National Academy of Science, Warsaw
Interplay between complex and analytic singularities

2023 Algebraic Geometry seminar, University of Warsaw
Singularities in mixed characteristic via the Riemann-Hilbert correspondence

2023 Algebraic Geometry seminar, Harvard University
Singularities in mixed characteristic via the Riemann-Hilbert correspondence

2023 KUMUNU, conference in commutative algebra at University of Missouri, Columbia
Singularities in mixed characteristic via the Riemann-Hilbert correspondence

2023 Fellowship of the Ring, worldwide commutative algebra seminar
Singularities in mixed characteristic via the Riemann-Hilbert correspondence

2023 FRG Special Month, University of Michigan
Singularities in mixed characteristic via the Riemann-Hilbert correspondence

2023 Algebraic Geometry and Cohomology in Mixed Characteristic conference at Northwestern University
Singularities in mixed characteristic via the Riemann-Hilbert correspondence

2023 Algebraic Geometry seminar, Tokyo University
Singularities in mixed characteristic via the Riemann-Hilbert correspondence

2023 Algebraic Geometry seminar, Kyoto University
Singularities in mixed characteristic via the Riemann-Hilbert correspondence

2023 Algebraic Geometry seminar, Stony Brook University
Singularities in mixed characteristic via the Riemann-Hilbert correspondence

2023 Algebraic Geometry seminar, Columbia University
Singularities in mixed characteristic via the Riemann-Hilbert correspondence

2023 Algebraic Geometry seminar, University of Utah
Quasi-F-splittings

2022 Midwest Arithmetic Geometry and Number Theory Conference, UIC, Chicago
Quasi-F-splittings

2022 AGNES Fall, UMass Amherst
Classification of algebraic varieties in mixed characteristic

2022 Algebraic Geometry seminar, Princeton University
Quasi-F-splittings

2022 Recent Advances in Classical Algebraic Geometry, ICM satellite conference, Cracow
Quasi-F-splittings

2022 Advances in Mixed Characteristic Commutative Algebra and Geometric Connections, Oaxaca
Quasi-F-splittings

2022 London Geometry and Topology seminar, Imperial College
Quasi-F-splittings

2022 Algebraic Geometry seminar, EPFL
Quasi-F-splittings

2022 MPS Conference on Higher Dimensional Geometry, Simons Foundation, NYC
Classification of algebraic varieties in positive and mixed characteristic

2022 Algebraic Geometry seminar, University of Michigan
Relative semiampleness in mixed characteristic

2021 Algebraic Geometry seminar, Northwestern
Classification of algebraic varieties in positive and mixed characteristic, colloquium talk

2021 Special Month on Singularities and K-stability, University of Utah
Mixed characteristic vanishing theorems and application IV, part of lecture series

2021 Workshop on birational geometry, Moscow
Global +-regularity and the Minimal Model Program for arithmetic threefolds

2021 Zoom Algebraic Geometry Seminar
Relative semiampleness in mixed characteristic

2021 Algebraic geometry seminar, UC San Diego
Global +-regularity and the Minimal Model Program for arithmetic threefolds

2021 Number theory seminar, UC Irvine
On applications of arithmetic geometry in commutative algebra and algebraic geometry

2021 Algebraic geometry seminar, Princeton University
Global +-regularity and the Minimal Model Program for arithmetic threefolds

2020 Algebraic geometry seminar, Hannover
Relative four-dimensional Minimal Model Program in positive characteristic

2020 Algebraic geometry in East Asia

On the four-dimensional MMP for singularities and families in positive characteristic

2020 Algebraic geometry seminar, University of Michigan

Keel's base point free theorem and quotients in mixed characteristic

2020 Algebraic geometry seminar, Tokyo University

Keel's base point free theorem and quotients in mixed characteristic

2020 Singularities and Arithmetics conference, Tohoku University, Sendai

Adjunction for mixed characteristic singularities

2019 Western Algebraic Geometry Symposium, University of Utah

Keel's base point free theorem and quotients in mixed characteristic

2019 New postdoctoral researchers talks, University of Michigan

The geometry of mixed characteristic varieties

2019 Birational geometry and Moduli Spaces seminar, MSRI, Berkeley

Birational geometry in large and low characteristic

2018 Algebraic geometry seminar, John Hopkins University

On the Minimal Model Program in low characteristics

2018 Algebraic geometry seminar, Columbia University

Liftability of the Frobenius morphism and images of toric varieties

2018 Algebraic geometry seminar, Stony Brook University

Liftability of the Frobenius morphism and images of toric varieties

2018 Algebraic geometry seminar, Princeton University

On the Minimal Model Program in low characteristics

2018 New members talks, Institute for Advanced Study

Classification of algebraic varieties

2018 London-Tokyo workshop in birational geometry, Imperial College London

Log non-vanishing conjecture for threefolds in positive characteristic

2018 Algebraic geometry seminar, EPFL, Lausanne

On the canonical bundle formula in positive characteristic

2018 Algebraic geometry seminar, University of Warsaw

On the canonical bundle formula in positive characteristic

2017 Workshop on birational geometry, Higher School of Economics, Moscow

Liftability of the Frobenius morphism and images of toric varieties

2017 Geometry & Topology seminar, Imperial College London

Liftability of the Frobenius morphism and images of toric varieties

2017 Algebraic geometry seminar, University of Utah

Liftability of the Frobenius morphism and images of toric varieties

2016 Edge days, University of Edinburgh

Birational geometry over the algebraic closure of a finite field

2016 Tokyo-Princeton algebraic geometry conference, Princeton University

Global F-regularity of projective surfaces and liftability to the second Witt vectors

2016 Workshop on birational geometry, Warwick University

Frobenius splittings in birational geometry

2016 Oberseminar: Algebra, Zahlentheorie und Algebraische Geometrie, Freiburg University

Frobenius splittings in birational geometry

2016 Seminar IMPANGA, IMPAN, Warsaw

Frobenius splittings in birational geometry

2015 Seminar Algebra & Geometry, Basel University

Effective bounds on positive characteristic singular surfaces

2015 Postgraduate Conference in Complex Geometry, Cambridge University

Effective bounds on positive characteristic singular surfaces

2015 Géométrie Algébrique en Liberté, Leuven

Base point freeness of line bundles in positive characteristic

2014 Workshop in Birational Geometry and Fano Varieties, Imperial College London

On base point free theorem for log canonical threefolds over $\overline{\mathbb{F}}_p$

2014 University of Tokyo

The degeneration of the Grassmannian into a toric variety and the eigenspaces of a torus action

Other activities and skills

2012-2014	Experience in using *Mathematica, Magma, Macaulay2, and Sage*
2012	Undegraduate research school, Weizmann Institute of Science, Israel – eight weeks
2011	Internship at Google, *Software Engineer*, London – three months