

Curriculum vitae
Jakub Skrzeczkowski

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(a) Career summary

Main academic positions:

10.2025–09.2029: St John's College, University of Oxford, Career Development Research Fellow
09.2023–09.2025: University of Oxford, postdoc under supervision of José A. Carrillo
10.2019–09.2023: Institute of Mathematics, Polish Academy of Sciences, PhD studies with Piotr Gwiazda

Visiting positions:

19.10–22.11.2026: Banach Center, Warsaw, leader of the Simons Semester *Beyond hydrodynamic equations*
01.2022–08.2023: LJLL, Sorbonne Université, visiting PhD student, hosted by Benoît Perthame
03.2020–08.2020: LJLL, Sorbonne Université, visiting PhD student, hosted by Benoît Perthame
03.2019–05.2019: Heidelberg University, visiting MSc student, hosted by Anna Marciniak-Czochra

Education:

06.2023: PhD in Mathematics, Polish Academy of Sciences, supervisor: Piotr Gwiazda
07.2019: MSc in Mathematics, University of Warsaw (with one year exchange at Hausdorff Center in Bonn)
07.2017: BSc in Mathematics, University of Warsaw
05.2013: Academic High School, Nicolaus Copernicus University in Torun, Poland

(b) Publications

Published/accepted articles:

1. J.A. Carrillo, Y. Salmani, J. Skrzeczkowski. Well-posedness of aggregation-diffusion systems with irregular kernels. *Ann. Inst. H. Poincaré C Anal. Non Linéaire*, 43 (5), 1201–1258, 2026.
2. J.A. Carrillo, C. Elbar, S. Fronzoni, J. Skrzeczkowski. Rate of Convergence for a Nonlocal-to-local Limit in One Dimension. *Commun. Pure Appl. Anal.*, 31, 230–244, 2026.
3. C. Elbar, J. Skrzeczkowski. Nonlocal-to-local convergence of the Cahn-Hilliard equation with degenerate mobility and the Flory-Huggins potential. *Nonlinear Anal.*, 261, art. 113870, 2025.
4. J.A. Carrillo, C. Elbar, J. Skrzeczkowski. Degenerate Cahn-Hilliard systems: From nonlocal to local. *Commun. Contemp. Math.*, 27 (6), 2025.
5. J.A. Carrillo, J. Skrzeczkowski. Convergence and stability results for the particle system in the Stein gradient descent method. *Math. Comp.*, 94, no. 354, 1793–1814, 2025.
6. C. Elbar, J. Skrzeczkowski. On the inviscid limit connecting Brinkman's and Darcy's models of tissue growth with nonlinear pressure. *J. Math. Fluid Mech.*, 27, art. 28, 2025.
7. P. Gwiazda, J. Skrzeczkowski, L. Trussardi. On the rate of convergence of Yosida approximation for the nonlocal Cahn-Hilliard equation. *IMA J. Numer. Anal.*, 45, 68–86, 2025.
8. C. Elbar, P. Gwiazda, J. Skrzeczkowski, A. Świerczewska-Gwiazda. From nonlocal Euler-Korteweg to local Cahn-Hilliard via the high-friction limit. *J. Differential Equations*, 422, 264–305, 2025.

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9. C. Elbar, B. Perthame, J. Skrzeczkowski. On the limit problem arising in the kinetic derivation of the Cahn-Hilliard equation. *Comm. Math. Phys.*, 405, art. 273, 2024.
 10. C. Elbar, B. Perthame, A. Poiatti, J. Skrzeczkowski. Nonlocal Cahn-Hilliard equation with degenerate mobility: Incompressible limit and convergence to stationary states. *Arch. Ration. Mech. Anal.*, 248, art. 41, 2024.
 11. C. Düll, A. Marciniak-Czochra, P. Gwiazda, J. Skrzeczkowski. Structured Population Models on Polish Spaces: A unified approach including Graphs, Riemannian Manifolds and Measure Spaces to Describe Dynamics of Heterogeneous Populations. *Math. Models Methods Appl. Sci.*, 34 (1), 109-143, 2024.
 12. C. Elbar, B. Perthame, J. Skrzeczkowski. Pressure jump and radial stationary solutions of the degenerate Cahn-Hilliard equation. *C. R. Méc. Acad. Sci. Paris*, 351 (S1), 375-394, 2023 (special issue in honour of Roland Glowinski).
 13. C. Elbar, M. Mason, B. Perthame, J. Skrzeczkowski. From Vlasov equation to degenerate nonlocal Cahn-Hilliard equation. *Comm. Math. Phys.*, 401, 1033–1057, 2023.
 14. B. Perthame, J. Skrzeczkowski. Fast reaction limit with nonmonotone reaction function. *Comm. Pure Appl. Math.*, 76 (7), 2023.
 15. C. Düll, A. Marciniak-Czochra, P. Gwiazda, J. Skrzeczkowski. Measure Differential Equation with a nonlinear growth/decay term. *Nonlinear Anal. Real World Appl.*, 73, 2023 (art. 103917).
 16. C. Elbar, J. Skrzeczkowski. Degenerate Cahn-Hilliard equation: From nonlocal to local. *J. Differential Equations*, 364, 576-611, 2023.
 17. M. Bulíček, P. Gwiazda, J. Skrzeczkowski, J. Woźnicki. Non-Newtonian fluids with discontinuous-in-time stress tensor. *J. Funct. Anal.*, 285 (2), 2023 (art. 109943).
 18. P. Gwiazda, B. Miasojedow, J. Skrzeczkowski, Z. Szymańska. Convergence of the EBT method for a non-local model of cell proliferation with discontinuous interaction kernel. *IMA J. Numer. Anal.*, 43(1), 590-626, 2023.
 19. M. Bulíček, P. Gwiazda, J. Skrzeczkowski. On a range of exponents for absence of Lavrentiev phenomenon for double phase functionals. *Arch. Ration. Mech. Anal.*, 246, 209-240, 2022.
 20. J. Skrzeczkowski. Fast reaction limit and forward-backward diffusion: a Radon-Nikodym approach. *C. R. Math. Acad. Sci. Paris*, tome 360, p. 189-203, 2022.
 21. Z. Szymańska, J. Skrzeczkowski, B. Miasojedow, P. Gwiazda. Bayesian inference of a non-local proliferation model. *Royal Soc. Open Sci.*, 8: 211279, 2021.
 22. C. Düll, A. Marciniak-Czochra, P. Gwiazda, J. Skrzeczkowski. Spaces of measures and their applications to structured population models. *Cambridge Monographs on Applied and Computational Mathematics*, ISBN: 9781316519103, Cambridge University Press, 2021.
 23. M. Bulíček, P. Gwiazda, J. Skrzeczkowski. Parabolic equations in Musielak-Orlicz spaces with discontinuous in time N -function. *J. Differential Equations*, 290, 17-56, 2021.
 24. A.S. Ackleh, N. Saintier, J. Skrzeczkowski. Sensitivity equation for measure-valued solutions to transport equations. *Math. Biosci. Eng.*, 17(1), 514-537, 2020.
 25. J. Skrzeczkowski. Measure solutions to perturbed structured population models - differentiability with respect to perturbation parameter. *J. Differential Equations*, 268 (8), 4119-4182, 2020.
 26. M. Merski, J. Skrzeczkowski, J.K. Roth, M.W. Górna. A Geometric Definition of Short to Medium Range Hydrogen-Mediated Interactions in Proteins. *Molecules*, 25 (22), 5326, 2020.
 27. M. Merski, K. Młynarczyk, J. Ludwiczak, J. Skrzeczkowski, S. Dunin-Horkawicz, M.W. Górna. Self-analysis of repeat proteins reveals evolutionarily conserved patterns. *BMC Bioinformatics*, 21, 179, 2020.

Preprints:

1. J.A. Carrillo, A. Jüngel, J. Skrzeczkowski, Y. Yao. Non-uniqueness of weak solutions to cross-diffusion systems with advection. Preprint arXiv:2606.25783.
2. J.A. Carrillo, J. Skrzeczkowski, J. Warnett. Stein Variational Gradient Descent dynamics for highly concentrated kernels. Preprint arXiv:2605.03627.
3. J.A. Carrillo, P. Gwiazda, J. Skrzeczkowski. A new formula for the Wasserstein distance between solutions to (nonlinear) continuity equations. Preprint arXiv:2603.25634.
4. J. Skrzeczkowski. Global solutions to cross-diffusion systems with independent advections in one dimension. Preprint arXiv:2603.20153.
5. J.A. Carrillo, J. Skrzeczkowski, J. Warnett. The Stein-log-Sobolev inequality and the exponential rate of convergence for the continuous Stein variational gradient descent method. Preprint arXiv:2412.10295.
6. J.A. Carrillo, A. Esposito, J. Skrzeczkowski, J. S.-H. Wu. Nonlocal particle approximation for linear and fast diffusion equations. Preprint arXiv:2408.02345.

(c) Talks at the conferences, workshops, schools

Invited talks:

Dec 2026: workshop *Mathematical Analysis of Interfaces in Cell Biology*, ESI Institute, Vienna
Oct 2026: workshop *Interacting Particle Systems and Their Applications*, IMS, NUS, Singapore
Sep 2026: Feishu International Mathematics Symposium on *Optimal transport, calculus of variations, free boundaries, and applications*, Shanghai
Sep 2026: conference *XIV Forum of Partial Differential Equations*, Bedlewo, Poland
Aug 2026: workshop *Nonlocal Aggregation Models in the Life Sciences*, BIRS, Banff, Canada
Aug 2026: workshop *Partial Differential Equations for Many Particles Systems*, ICERM, USA
Mar 2026: joint event of the *International Workshop on Stability Analysis for Nonlinear PDEs across Multiscale Applications* and the *15th Oxbridge PDE Conference*, Oxford
Feb 2026: workshop *Phase separation in Vienna: from modeling to theory*, Vienna, Austria
Nov 2025: workshop *Particles, Flows, and Maps for Sampling Complex Distributions*, EPFL Bernoulli
Sep 2025: conference *Mathflows*, Île de Porquerolles, France
Sep 2025: workshop *Gradient Flows face-to-face*, Granada, Spain
Sep 2025: conference *10th Forum of the Polish Mathematical Society*, Bialystok, Poland
Jul 2025: workshop *New Perspectives in Nonlocal and Nonlinear PDEs*, Anacapri
Jun 2025: workshop *Hydrodynamic limits of interacting agent systems*, Warwick Venice Center, Venice
Apr 2025: *Oxbridge PDE conference*, Cambridge
Jan 2025: conference *3rd Chinese-Czech Conference on Mathematical Fluid Mechanics*, Xi' An, China
Nov 2024: workshop *Stability Analysis for Nonlinear PDEs and Multiscale Applications*, Madison, USA
Jun 2024: conference *VIII Symposium on Nonlinear Analysis*, Schauder Center, Torun, Poland
Mar 2024: workshop *Particle Systems in Dynamics, Optimization and Learning*, Lagrange Center, Paris
Jul 2023: workshop *Topics on neuroscience, collective migration and parameter estimation*, Oxford
Jul 2022: conference *30th Birthday of Acta Numerica*, Bedlewo, Poland
Feb 2022: conference *Mathematical challenges in modelling population dynamics*, LJLL, Paris
Nov 2020: workshop *Multiscale Models for Complex Fluids: Modeling and Analysis*, Banff (online)

Full-length talks at conferences (by application):

Apr 2024: conference *Aggregation-Diffusion Equations & Collective Behavior: Analysis, Numerics and Applications*, CIRM, Marseille

Invited talks at sessions:

Jul 2026: session *Models of emergence and collective dynamics* at 15th AIMS Conference in Athens

Jun 2026: session *Multiscale Analysis of Self-Organization: Hydrodynamic and Kinetic Frameworks* at Equadiff '26, Prague

Aug 2024: session *Phase field models* at the conference *Free Boundary Problems: Theory and Applications*, João Pessoa, Brasil

Mar 2022: session *Population dynamics: Individual-based and continuum models* at the SIAM Conference on Analysis of PDEs, Berlin, Germany (online)

Dec 2019: session *Transport Equations - Mathematical Biology and Other Applications* at the SIAM Conference on Analysis of PDEs (PD19), La Quinta, US

(d) Supervision**PhD/DPhil students:**

- Daniel Kelly (Oxford): DPhil project started in 10.2025, jointly supervised with José A. Carrillo, on gradient flow methods in data science and machine learning, in particular on transformers.
- Jethro Warnett (Oxford): DPhil project started in 10.2023, jointly supervised with José A. Carrillo, on PDE methods in data science and machine learning, in particular on SVGD (Jethro has been officially co-supervised by me since December 2025).

Undergraduate students:

- Natalia Błaszczuk, Agata Lonc (ICM, Warsaw): MSc project in 2025/26, jointly supervised with Piotr Gwiazda, on fitting parameters to a traffic flow model via solving Bayesian inverse problems.
- Daniel Kelly (Oxford): Part C dissertation in 2024/25 on Gradient flows approach to PDEs and statistics with a particular focus on problems in statistics and Fisher-Rao gradient flows. Dan received Gibbs Prize for this work.
- Simon Foldvik (Oxford): Part C dissertation in 2024/25 on Gradient flows approach to PDEs and statistics with a particular focus on nonlocal models of tissue growth of Brinkman's type.

Summer students:

- Somsuryagni Das (Oxford): summer project on compensated compactness and the div-curl lemma.

(e) Principal investigator in research projects

03.2022–02.2023: *Singular limits in parabolic equations*, Bekker 2021, cost: 115k PLN, funded by National Agency for Academic Exchange (Poland)

06.2020–05.2023: *Transport equation in modern theory of partial differential equations*, Preludium 18, cost: 90k PLN, funded by National Science Center (Poland)

(f) Honors, awards, prizes

- 07/2026: Juliusz Schauder Prize for young mathematicians for achievements in nonlinear analysis awarded by Schauder Center for Nonlinear Studies in Toruń, Poland
- 07/2024: Distinction in the International Stefan Banach Prize for people defending PhD last year in the post-Soviet countries (one prize and two distinctions were awarded)
- 05/2024: First Prize in the Prof. Urszula Ledzewicz Competition for the doctoral thesis in Applied Mathematics (organized by the Łódź Technical University)
- 10/2023: Marek Waclawek Prize (prize of the Director of the Institute of Mathematics of Polish Academy of Sciences for the PhD thesis with distinction)
- 06/2023: Distinction in Juliusz Schauder Prize for young mathematicians for achievements in nonlinear analysis awarded by Schauder Center for Nonlinear Studies in Toruń, Poland (one prize and two distinctions were awarded for people up to 4 years after PhD)
- 02/2023: Elected as a member of the European Mathematical Society Young Academy (EMYA) (the EMS selected 30 members from mathematicians working in all areas of mathematics in Europe and being up to 5 years after PhD)
- 07/2022: Scholarship for outstanding young researchers awarded by the Minister of Science of Poland (17th edition, $\approx$ 200k PLN, only 5 in mathematics and only 1 for people before PhD)
- 05/2022: Scholarship START awarded by Foundation for Polish Science for young researchers (100 scholarships for researchers below 30 years old from all disciplines were awarded)
- 04/2022: Kazimierz Kuratowski Prize for achievements in mathematics awarded jointly by Institute of Mathematics (Polish Academy of Sciences) and Polish Mathematical Society (only one prize for people below 30 years old was awarded; considered as the most prestigious prize for young mathematicians in Poland)
- 03/2022: Prize for the best young Polish mathematicians awarded by Polish Mathematical Society (only two such prizes for people below 27 years old were awarded)
- 12/2021: Scholarship of the President of the Polish Academy of Sciences for outstanding academic achievements (only 10 such scholarships are awarded among PhD students in all disciplines represented in the Academy)
- 04/2020: Special Prize in competition for best student thesis in mathematics *Step towards the future* funded by mBank (Poland)
- 02/2020: First Award in LIII Competition for best student paper in probability and applied mathematics, Polish Society of Mathematics
- 08/2019: Eugeniusz Fidelis First Prize for best work presented by young mathematicians on 48th National Conference of Applied Mathematics
- 2012, 2013: Laureate title in 58th and 59th National Chemistry Olympiad

(g) Peer-reviewing activity

Reviewing papers for SIAM J. Math. Anal. (1), J. Funct. Anal. (1), Comm. Partial Differential Equations (1), Proc. Lond. Math. Soc. (1), J. Math. Biol. (1), Nonlinear Anal. Real World Appl. (2), Eur. J. Appl. Math. (1), IMA J. Appl. Math. (1), Discrete Contin. Dyn. Syst. (2), Topol. Methods Nonlinear Anal. (1), J. Nonlinear Sci. (1), J. Evol. Equ. (1), Bull. Math. Biol. (1).

Reviewing grant proposals for National Science Centre in Poland (1).

(h) Organization of events

- Session *Local and nonlocal diffusion in mathematical biology*, 16-20.12.2024, session during the 14th AIMS Conference in Abu Dhabi (with J.A. Carrillo, Y. Du)
- Conference *The Cahn-Hilliard equation - recent advances and new challenges*, 21-26.04.2024, Chęciny, Poland (with P. Gwiazda, Z. Szymańska)
- Workshop *Crossing the borderlines in fluids and biology*, 12-16.06.2023, Chęciny, Poland (with M. Bulíček and A. Świerczewska-Gwiazda)
- Workshop *Recent Advances in Kinetic Theory and Fluid Dynamics Models* in honour of Claude Bardos, 8-12.08.2022, Banach Center, Warsaw (with P. Gwiazda, A. Świerczewska-Gwiazda, E. Titi)

(i) Courses at (summer/winter) schools

May 2023: course *Structured population models in measure spaces: from functional analysis to model-based data analysis* during the school *Structured Population Models* at University of Warsaw, jointly with A. Marciniak–Czochra

(j) Invited talks at the seminars

Jan 2026: Analysis & PDE Seminar, National University of Singapore
Nov 2025: Applied Analysis Seminar, University of Graz (online)
Mar 2025: PDE Seminar, University of Oxford
Feb 2025: Differential Equations Seminar, Polish Academy of Sciences
Dec 2024: Analysis & PDEs Seminar, Durham University
Nov 2024: Partial Differential Equations and their Applications Seminar, University of Warwick
Nov 2024: Analysis Seminar at the University of Bath
Nov 2023: Colloquium of Institute of Mathematics, Polish Academy of Sciences
Oct 2023: Applied PDEs seminar at KAUST, Saudi Arabia
Jun 2023: MAMBA café seminar, LJLL, Paris
Mar 2023: Junior Analysis Seminar, Imperial College, London
Dec 2022: PDEs seminar, University of Freiburg
Oct 2022: PDE team seminar, University of Versailles
Jun 2022: Oberseminar Partielle Differentialgleichungen, University of Konstanz
Oct 2021: Applied Analysis Seminar, Heidelberg University
Jul 2021: Applied Analysis Seminar, Heidelberg University

(k) Shorter academic visits

- Y. Yao (NUS, Singapore): 01.2026
- A. Tzavaras (KAUST, Saudi Arabia): 10.2023
- E. Zatorska (Imperial College, London): 03.2023
- M. Růžička, A. Kaltenbach (Freiburg): 12.2022
- L. Trussardi (Konstanz): 06.2022
- A. Marciniak-Czochra (Heidelberg): 07.2026, 10.2021, 07.2021, 07.2020, 02.2020
- M. Bulíček (Prague): 11.2024, 11.2022, 07.2022, 10.2019

(l) Committee membership (upon appointment)

2025-2028: member of the jury of the Kazimierz Kuratowski Prize (the most prestigious prize for young mathematicians ≤ 30 years in Poland)

2023-2026: EMS Young Academy (first cohort, 30 members)

(m) Teaching

St John's College, University of Oxford

TT 25/26: Analysis 3 (1st year)

HT 25/26: Numerical Analysis (2nd year)

MT 25/26: Metric spaces (2nd year)

Mathematical Institute, University of Oxford

MT 25/26: Applied PDEs (2 groups, tutorials, for MMSC students)

MT 23/24: Functional Analytic Methods for PDEs (4th year, tutorials)

Queen's College, University of Oxford

In AY 2023/24 I served as a non-stipendiary lecturer and in AY 2024/25 as a stipendiary lecturer, organizing small-group tutorials for 1st and 2nd year students in Mathematics in the Queen's College.

TT 24/25: Calculus of variations (1st year)

HT 24/25: Dynamics, Computational Mathematics (1st year), Integral Transforms (2nd year)

MT 24/25: Introductory Calculus (1st year)

TT 23/24: Constructive Mathematics (1st year), Special Relativity, Multidimensional Analysis and Geometry (2nd year)

HT 23/24: Dynamics (1st year), Fluids and Waves (2nd year)

University of Warsaw

AY 20/21 - 22/23: Interdisciplinary Seminar on PDEs (seminar, jointly with A. Swierczewska-Gwiazda)

SS 20/21: Introduction to PDEs (tutorials for 3rd year students)

WS 20/21: Hyperbolic Conservation Laws (tutorials 4-5th year and PhD students)

WS 19/20, 20/21: Functional Analysis (tutorials for 3rd year students)