

Lukas Koch

German. Born 19.01.1995 in Heidelberg, Germany

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Education

- since 10/2021 Postdoc at MPI for Mathematics in the Sciences, Leipzig, in the group of Felix Otto
- 10/2017-10/2021 PhD student at University of Oxford, supervised by Jan Kristensen
- 10/2013-07/2017 studies for Master of Mathematics at Merton College, University of Oxford. (07/2017: MMath 1st class; highest achievable grade in the UK)
- summer 2016 summer research project "On maximum principles for Second Order Elliptic PDE" at the Mathematical Institute, University of Oxford, supervised by Yves Capdeboscq

Research visits

- 28.3.-15.4.2022 "Regularity of optimal transport maps for L^p costs", Research in Paris programme of the IHP, Paris, with Michael Goldman and Felix Otto

Publications and preprints

- A. Guerra, L. Koch, and S. Lindberg. The Dirichlet problem for the Jacobian equation in critical and supercritical Sobolev spaces. *Calc. Var. Part. Differ. Equat.* 60 (55) (2021)
- L. Koch. Global improved integrability for minimisers of convex functionals with (p,q) -growth. *Calc. Var. Part. Differ. Equat.* 60 (63) (2021).
- A. Guerra, L. Koch, and S. Lindberg. Energy minimisers with prescribed Jacobian. *Arch. Ration. Mech. Anal.* 242:1059–1090 (2021).
- I. Chlebicka, C. de Filippis, and L. Koch. Boundary regularity for manifold constrained $p(x)$ -Harmonic maps. *J. London Math. Soc.* 104 (5):2335-2375 (2021).
- A. Guerra, L. Koch, and S. Lindberg. Nonlinear open mapping principles, with applications to the Jacobian equation and other scale-invariant PDEs. *arXiv:2010.10497*, 2020. Submitted.
- L. Koch. Regularity for quasilinear vectorial elliptic systems through an iterative scheme with numerical applications. *arXiv:2104.09114*. Submitted.

L. Koch. Global higher integrability for minimisers of convex obstacle problems with (p,q) -growth. *arXiv:2109.09845*. Submitted.

C. de Filippis, L. Koch, and J. Kristensen. Regularity in relaxed convex problems, 2020. In preparation.

L. Koch, and J. Kristensen. On the Euler-Lagrange system for integrands without upper bound. In preparation.

Awards

since 10/2017 EPSRC grant covering PhD fees and living stipend

10/2016-08/2017 scholar of Stiftung der deutschen Wirtschaft (SdW), covering tuition fees and living stipend. SdW is part of the German scholarship system aiming to support the top 1% of German students.

Invited talks

2021 at University College London/Imperial College London analysis and PDE seminar, on 29.1.

2020 "A general nonlinear mapping theorem and applications to the incompressible Euler equations", at PDE CDT lunchtime seminar, Oxford, UK, on 22.10.

"Global higher integrability for minimisers of convex functionals with (p,q) -growth", at online seminar "Monday's Nonstandard Seminar", <https://www.mimuw.edu.pl/~ichlebicka/nonstandard-seminar.html>, on 16.11.

"A nonlinear open mapping principle, with applications to nonlinear PDEs", at Oberseminar Analysis, Regensburg, Germany, on 30.11.

"A nonlinear open mapping principle, with applications to nonlinear PDEs", at Oberseminar Analysis, Hamburg, Germany, on 9.12.

"A nonlinear open mapping principle, with applications to nonlinear PDEs", at Oberseminar Analysis, Heidelberg, Germany, on 10.12.

"Some results on the Jacobian equation and a nonlinear open mapping principle", at Seminar der Arbeitsgruppe Analysis, Leipzig, Germany, on 14.12.

Conferences

Talks Joint CDT student conference (Oxford, Cambridge, Edinburgh, Warwick), online, 7.-10.12.2020

Posters Winterschool on Analysis and Applied Mathematics (Münster), online, 22.-26.2.2021

Attended Conference on Fluids and Variational Methods, Budapest, 10.-14.6.2019

Mathematics and Science: In Honour of Sir John Ball, Oxford, 17.-19.5.2018

Oxbridge PDE conference, annually 2018-2021

Teaching experience

- 10/2019-10/2021 annual stipendiary lectureship at St. Hilda's College, University of Oxford, renewed for the academic year 2020/21. Marking and teaching three 1-hour problem classes per week with 2-3 students each covering second-year undergraduate Mathematics courses in Metric spaces and Complex Analysis, Numerical Analysis, Integration, Integral Transforms, Calculus of Variations
- summer 2019 tutor for second year course Calculus of Variations; marking and teaching bi-weekly problem classes for 2-3 students
- spring 2019 tutor for second year courses on differential equations and integral transforms; marking and teaching bi-weekly problem classes for 2-3 students
- fall 2018 teaching assistant for 4th year undergraduate course on Functional Analytic Methods for PDEs; marking and some teaching for a bi-weekly problem class of 10-15 students.
- fall 2018 teaching assistant for graduate level introductory course to function spaces and distribution; marking and some teaching for a weekly class of 10-15 students

Academic and outreach activities

- 06/2019-06/2020 co-organiser of the weekly Oxford CDT in PDEs lunchtime seminar series
- summer 2016 tutor for Problem Solving Matters (outreach program by the Mathematical Institute, Oxford preparing students for MAT)

Languages

languages German: native speaker. English: fluent. French: beginner.

Non-academic internships

- 06/2015-09/2015 Internship with Morgan Stanley, London, United Kingdom: Proof of concept for a dynamic failover mechanism

Oxford, 23 September 2021