

Curriculum Vitae

Personal data

Name: Bartosz Langowski
Date and place of birth: 29 June 1988, Wrocław
E-mail: blangowski@franciscan.edu

Languages

English (fluent), Spanish (fluent), Polish (native)

Degrees

- 2016:** Faculty of Pure and Applied Mathematics of Wrocław University of Technology, Wrocław, Poland
PhD in Mathematics, thesis defended with distinction
Title: *Riesz transforms, square functions and Sobolev spaces related to classical and symmetrized Jacobi expansions,*
Advisor: Professor Adam Nowak
- 2012:** Faculty of Pure and Applied Mathematics (previously: Faculty of Fundamental Problems of Science) of Wrocław University of Technology, Wrocław, Poland
Master's degree in Mathematics
Title: *Harmonic analysis related to Jacobi-Dunkl type expansions,*
Advisor: Professor Adam Nowak

Employment history

- 08.2023-now:** Department of Mathematics, Franciscan University of Steubenville, Assistant Professor of Mathematics
- 08.2021-05.2023:** Department of Mathematics, Indiana University Bloomington, Visiting Lecturer
- 08.2018-05.2021:** Department of Mathematics, Indiana University Bloomington, Zorn Postdoctoral Fellow
- 10.2017-08.2018:** Faculty of Pure and Applied Mathematics of Wrocław University of Technology, Wrocław, Poland
Assistant Professor
- 09.2016-10.2017:** Faculty of Pure and Applied Mathematics of Wrocław University of Technology, Wrocław, Poland
Assistant
- 04.2014-09.2016:** Faculty of Pure and Applied Mathematics of Wrocław University of Technology, Wrocław, Poland
Assistant, 1/3 full time equivalent

Participation in research projects

- 2017-2021** Grant researcher in the project OPUS of the National Science Centre of Poland, duration: 04.2018-04.2021
- 2014-2017:** Grant manager in the project PRELUDIUM of the National Science Centre of Poland, duration: 04.2014-04.2017

Mathematical interests

Harmonic analysis of orthogonal expansions: expansions into Jacobi polynomials, expansions into Jacobi functions, expansions into Bessel functions

Theory of singular integrals: Riesz transforms, spectral multipliers, square functions of Littlewood-Paley-Stein type, maximal operators

Real harmonic analysis: Sobolev spaces, potential operators, potential spaces, oscillation and variational inequalities

Discrete harmonic analysis: discrete Radon transforms, maximal operators of the averages over subsets of integers

Awards

2017: Award of the Prime Minister of the Republic of Poland for the doctoral dissertation

2012: II prize in the LVI Józef Marcinkiewicz competition for the best student's work in Mathematics

2012: Prize of the Dean of the Faculty of Fundamental Problems of Science

Achievements in mathematical competitions

2007: title of finalist of V Polish Mathematical Linguistics Olympiad

2006: title of the finalist of LVII Polish Mathematical Olympiad

List of publications

- [L1] B. Langowski, *Harmonic analysis operators related to symmetrized Jacobi expansions*, **Acta Math. Hungar.** 140 (2013), 248–292.
- [L2] B. Langowski, *Sobolev spaces associated with Jacobi expansions*, **J. Math. Anal. Appl.** 420 (2014), 1533–1551.
- [L3] B. Langowski, *On potential spaces related to Jacobi expansions*, **J. Math. Anal. Appl.** 432 (2015), 374–397.
- [L4] B. Langowski, *Potential and Sobolev spaces related to symmetrized Jacobi expansions*, **Symmetry, Integrability and Geometry: Methods and Applications; SIGMA** 11 (2015), 073, 17 pages.
- [L5] B. Langowski, *Harmonic analysis operators related to symmetrized Jacobi expansions for all admissible parameters*, **Acta Math. Hungar.** 150 (2016), 49–82.
- [L6] B. Langowski, A. Nowak, *Mapping properties of fundamental harmonic analysis operators in the exotic Bessel framework*, **J. Math. Anal. Appl.** 499, 2 (2021).
- [L7] S. Dasu and C. Demeter, B. Langowski, *Sharp l^p -improving estimates for the discrete paraboloid*, **J. Fourier Anal. Appl.**, 27, 3 (2021).
- [L8] B. Langowski, A. Nowak, *On derivatives, Riesz transforms and Sobolev spaces for Fourier-Bessel expansions*, **J. Fourier Anal. Appl.**, 28, 1 (2022).
- [L9] C. Demeter, B. Langowski, *Restriction of exponential sums to hypersurfaces*, **Int. Math. Res. Not.** (2023), no. 2, 1292–1354, arXiv:2104.11367.
- [L10] A. Iosevich, B. Langowski, M. Mirek, T. Z. Szarek, *Lattice points problem, equidistribution and ergodic theorems for certain arithmetic spheres*, accepted for publication in **Math. Ann.** arXiv:2106.12015.

- [L11] B. Langowski, *Oscillation inequalities for Radon averages*, accepted for publication in **Contemp. Math.**.
- [L12] D. Kosz, B. Langowski, M. Mirek, P. Plewa, *Multi-parameter maximal and oscillation inequalities*, submitted for publication, [arXiv:2304.03802](https://arxiv.org/abs/2304.03802).
- [L13] B. Langowski, M. Mirek, T. Z. Szarek, *TT* methods in discrete harmonic analysis*. Preprint, (2023), 20 pages.
- [L14] B. Langowski, *Maximal estimates for certain arithmetic c-spheres*, in preparation.

Conference talks

- 2022:** *Restriction of exponential sums to hypersurfaces*, El Escorial, Spain, given at the *XI International Conference on Harmonic Analysis and Partial Differential Equations, El Escorial*, 06.2022
- 2022:** *Moment estimates for exponential sums*, online talk given at the *2022 Spring Eastern Sectional Meeting at Tufts University, Medford, MA*, 19–20.03.2022
- 2022:** *Lattice points problem for certain arithmetic spheres*, online talk at the *2022 Spring Central Virtual Sectional Meeting*, 26.03.2022
- 2021:** *Lattice point problems, equidistribution and ergodic theorems for certain arithmetic spheres*, online talk at the *2021 AMS Spring Central Virtual Sectional Meeting*, 18.03.2021
- 2018:** *Discrete harmonic analysis in the non-commutative setting*, Indiana University Bloomington, talk given at the *Midwestern Workshop on Asymptotic Analysis*, 06.10.2018
- 2016:** *Sobolev and potential spaces related to Jacobi expansions*, talk given at the international conference *Harmonic Analysis, Complex Analysis, Spectral Theory and all that*, Będlewo (Poland), 1-5.08.2016
- 2016:** *On Sobolev and potential spaces related to Jacobi expansions*, talk given at the international conference *Function Spaces, Differential Operators and Nonlinear Analysis*, Prague (Czech Republic), 4-9.06.2016
- 2015:** *On Sobolev and potential spaces related to Jacobi expansions*, talk given at the international conference *Analytic, Algebraic and Geometric Aspects of Differential Equations*, Będlewo (Poland), 6-12.09.2015
- 2015:** *Potential spaces related to Jacobi expansions*, talk given at the international conference *International Conference on Harmonic Analysis and Approximations VI*, Tsaghkadzor (Armenia), 12-18.09.2015
- 2015:** *Inequalities for the noncentered Hardy-Littlewood maximal operator*, talk given at workshops *Maximal functions and related topics*, Będlewo (Poland), 9-12.04.2015
- 2014:** *On potential spaces related to Jacobi expansions*, talk given at the international conference *Joint Meeting of the German Mathematical Society (DMV) and the Polish Mathematical Society (PTM)*, Poznań (Poland), 17-20.09.2014
- 2014:** *Sobolev spaces associated with Jacobi expansions*, talk given at the international conference *Probabilistic aspect of Harmonic Analysis*, Będlewo (Poland), 26.04-03.05.2014

Conference organization (as a co-organizer)

- 2017:** *Analysis and Applications in honor of Professor Elias M. Stein*, Wrocław (Poland), 4-8.10.2017

Research seminar talks

- 2022:** $\Lambda(p)$ problem -entropy estimates, a series of 7 talks given at the online reading seminar AIM Reading Group 2022
- 2020:** *Counting lattice points*, Indiana University Bloomington, talk given at the **IU Bloomington Math Club**, 18.11.2020
- 2020:** *Lattice points problem, equidistribution and ergodic theorems for certain arithmetic spheres*, talk given at the **Online Analysis Research Seminar**, 19.10.2020
- 2017:** *Discrete harmonic analysis in the non-commutative setting*, University of Wisconsin, talk given at the **UW Analysis Seminar**, 04.12.2017
- 2016:** *Harmonic analysis in the context of symmetrized Jacobi expansions; full range of the parameters of type, part 2*, Mathematical Institute of Polish Academy of Sciences, talk given at the seminar **Harmonic analysis and orthogonal expansions**, Wrocław (Poland), 20.01.2016
- 2016:** *Harmonic analysis in the context of symmetrized Jacobi expansions; full range of the parameters of type, part 1*, Mathematical Institute of Polish Academy of Sciences, talk given at the seminar **Harmonic analysis and orthogonal expansions**, Wrocław, 13.01.2016
- 2015:** *Whitney-type extensions - report from the workshops in Luminy*, Mathematical Institute of Polish Academy of Sciences, talk given at the seminar **Harmonic analysis and orthogonal expansions**, Wrocław (Poland), 16.12.2015
- 2015:** *Potential spaces for symmetrized Jacobi expansions*, Mathematical Institute of Polish Academy of Sciences, talk given at the seminar **Harmonic analysis and orthogonal expansions**, Wrocław (Poland), 18.03.2015
- 2014:** *Potential spaces in the setting of Jacobi expansions, part 2*, Mathematical Institute of Polish Academy of Sciences, talk given at the seminar **Harmonic analysis and orthogonal expansions**, Wrocław (Poland), 21.05.2014
- 2014:** *Potential spaces in the setting of Jacobi expansions, part 1*, Mathematical Institute of Polish Academy of Sciences, talk given at the seminar **Harmonic analysis and orthogonal expansions**, Wrocław (Poland), 14.05.2014
- 2014:** *l^2 -theory for the discrete maximal operator along polynomials*, University of Wrocław, talk given at the seminar **Ergodic theorems for arithmetic sets**, Wrocław (Poland), 04.2014
- 2014:** *l^p -estimates for the discrete Hilbert transform along prime numbers*, University of Wrocław, talk given at the seminar **Ergodic theorems for arithmetic sets**, Wrocław (Poland), Wrocław, 03.2014
- 2013:** *Sobolev and potential spaces in the context of Jacobi expansions*, Mathematical Institute of Polish Academy of Sciences, talk given at the seminar **Harmonic analysis and orthogonal expansions**, Wrocław (Poland), 22.05.2013
- 2012:** *Harmonic analysis operators in the setting of symmetrized Jacobi expansions, part 2*, Mathematical Institute of Polish Academy of Sciences, talk given at the seminar **Harmonic analysis and orthogonal expansions**, Wrocław (Poland), 14.11.2012
- 2012:** *Harmonic analysis operators in the setting of symmetrized Jacobi expansions, part 1*, Mathematical Institute of Polish Academy of Sciences, talk given at the seminar **Harmonic analysis and orthogonal expansions**, Wrocław (Poland), 7.11.2012

Teaching experience

Curriculum development:

2022: A grant manager in Summer Instructional Development Fellowship 2022. The purpose of the project was to redesign the curriculum of the Precalculus courses at IU.

Course coordination:

2020-2022: *M125: Precalculus* and *M127: Precalculus with Trigonometry*

Lectures:

- At Indiana University Bloomington:

2022: *M119: Brief survey of calculus I*, *M118: Finite Mathematics*, *M125: Precalculus*

2021: *311: Calculus III*, *M125: Precalculus*, *M127: Precalculus with Trigonometry*

2020: *M511: Real variables I*, *M211: Calculus I*

2019: *M119: Brief survey of calculus I*, *M511: Real variables I*

2018: *M119: Brief survey of calculus I*

- At Wroclaw University of Science and Technology:

2017: *Mathematics*

Problem sessions (all at Wroclaw University of Science and Technology):

2017: *Algebra M2, Functional analysis, Calculus 2*

2016: *Algebra with the elements of analytic geometry*

2015: *Analysis 1.1B, Analysis 2.2 A, Analysis 2.2 B*

2014: *Algebra with the elements of analytic geometry, Analysis 1.2*

2013: *Algebra with the elements of analytic geometry (two groups), Algebra with the elements of analytic geometry B, Analysis, Analysis 1, Analysis 1.1 B*

2012: *Algebra with the elements of analytic geometry*

Teacher training courses realized:

2014: *University teacher training course, part 2*

2013: *University teacher training course, part 1*