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

05.2025-now: Department of Mathematics, Franciscan University of Steubenville,
Associate Professor of Mathematics

06.2023-05.2025: 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 laureate 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.

[**L10**] A. Iosevich, B. Langowski, M. Mirek, T. Z. Szarek, *Lattice points problem, equidistribution and ergodic theorems for certain arithmetic spheres*, **Math. Ann.**, 388(2) (2024), 2041-2120.

[**L11**] B. Langowski, *Oscillation inequalities for Radon averages*, **Contemp. Math.** AMS, vol. 792 (2024).

[**L12**] B. Langowski, A. Nowak, *On sharp heat kernel estimates in the context of Fourier-Dini expansions*, **J. Approx. Theory**, 304 (2024).

[**L13**] B. Langowski, A. Nowak, *On new identities involving zeros of Bessel functions*, **J. Math. Anal. Appl.** 542 (2025).

[**L14**] H. Jung, B. Langowski, A. Ortiz, T. Vu, *Expository article: "Bounded orthogonal systems and the Lambda(p)-set problem" by Jean Bourgain*, **Expo. Math.**, 43, 5 (2025).

[**L15**] D. Kosz, B. Langowski, M. Mirek, P. Plewa, *Multi-parameter maximal and oscillation inequalities*, **Adv. Math.**, 490 (2026).

[**L16**] B. Langowski, M. Mirek, T. Z. Szarek, *Discrete analogues in harmonic analysis: TT* methods*, Submitted for publication (2026).

[**L17**] A. Hejna–Łyżwa, J. Kim, B. Langowski, M. Mirek, H. Song, J. Wright, Discrete analogues in harmonic analysis: Multi-parameter Radon averages, Submitted for publication (2026).

[**L18**] B. Langowski, M. Mirek, J. Wright, B. Wróbel, Duality in Harmonic Analysis and beyond, Submitted for publication (2026).

Conference talks

2025: *Sharp ℓ^p-improving estimates for the discrete paraboloid*, Tulane University, New Orleans, LA, given at the *2025 Fall Southeastern Sectional Meeting*, 3-5.10.2025

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

2024: *Polynomial ergodic theorems*, a talk given at the **Analysis Seminar** at Indiana University Bloomington, 10.04.2024

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 Franciscan University:

2024: *MTH265: Differential Equations*, *MTH420: Introduction to Real Analysis*

2023: *MTH171: Matrix theory I*, *MTH261: Vector Calculus and Analytic Geometry*, *MTH305: Introduction to Abstract Algebra*

- 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*