Aleksandra Lelito

al. Mickiewicza 30 ⋄ 30-059 Kraków, Poland
AGH University of Science and Technology ⋄ Faculty of Applied Mathematics
alelito@agh.edu.pl

EDUCATION

Ph.D. in Mathematics May 2019 (expected)
AGH University of Science and Technology, Kraków, Poland
Dissertation title: *Symmetries, exact solutions and nonlocal conservation laws of nonlinear partial differential equations* (In English and available in electronic form on request)
Supervisor: Dr hab. Oleg I. Morozov

M.Sc. in Applied Mathematics July 2014
AGH University of Science and Technology, Kraków, Poland
Thesis title: *Prawa zachowania dla równania konwekcji-dyfuzji* (*Conservation laws of the convection-diffusion equation*)
Supervisor: Dr hab. Vsevolod Vladimirov, AGH professor
Major in *Mathematics in Technical and Natural Sciences* with overall average grade: 4.81/5.00[1]

Stockholm University, Stockholm, Sweden January – May 2014
I spent spring semester at the Department of Mathematics within the Erasmus programme.

B.Sc. in Applied Mathematics June 2012
AGH University of Science and Technology, Kraków, Poland
Thesis title: *Warunki dostateczne linearyzowalności równań różniczkowych drugiego rzedu* (*Sufficient conditions for linearising ordinary differential equations of second order*)
Supervisor: Dr hab. Vsevolod Vladimirov, AGH professor

SELECTED COURSES

AGH University of Science and Technology, Kraków, Poland

- Undergraduate level (all in Polish)

  Statistics – A (5.0)

  Ordinary differential equations – A (5.0)
- Graduate level (all in Polish)

  Equations of Mathematical Physics I – A (5.0), Equations of Mathematical Physics II – A (5.0)

  Nonlinear Models of Natural Sciences Phenomena – A (5.0)

  Nonlinear and Chaotic Oscillations – A (5.0)

  Categorical Data Analysis – A (5.0)

Stockholm University, Stockholm, Sweden

- Mathematical Dynamical Models in Biology (in English) – B (4.5)

[1] Full academic transcript and details about the university grade scale available on request.

PROFESSIONAL EXPERIENCE

AGH University of Science and Technology October 2014 – present
Doctoral researcher *Kraków, Poland*

My research (performed in cooperation with Dr hab. Oleg I. Morozov) in the Department of Differential Equations at the Faculty of Applied Mathematics was devoted to geometric structures which are predominantly associated with integrable differential equations (indeed, all equations I examined were integrable). More specifically, I used local symmetries of two partial differential equations to find their exact solutions, and I found nonlocal symmetries and nonlocal conservation laws for other partial differential equations. I actively participated in two faculty seminars: *Symmetries, ansatzes and solutions* and *Stability of nonlinear waves*.

AGH University of Science and Technology October 2014 – June 2018
Teaching Assistant *Kraków, Poland*

- Introduction to Mathematics, exercise sessions, 30 hours. 2017 – 2018
- Differential Equations, exercise sessions, 126 hours. 2016 – 2018
- Calculus, exercise sessions, 244 hours. 2015 – 2018
- Linear Algebra, exercise sessions, 56 hours. 2015 – 2016
- Introduction to Mathematics, exercise sessions, 60 hours. 2014 – 2015

Silesian University November 2017
Visiting researcher *Opava, Czech Republic*

I spent a week at the Institute of Mathematics of the Silesian University in Opava. I worked together with doc. RNDr. Artur Sergyeyev on improving my results regarding three-component conservation laws for some integrable partial differential equations.

Arcana Institute September 2014 – June 2015
Junior Pharmacoeconomist *Kraków, Poland*

I was engaged in performing a literature review and creation of a database. I prepared, as a part of a team, simulations of financial consequences on a healthcare system resulting from a health technology reimbursement (budget impact analyses). My main duties comprised of identification of costs for intervention and comparator groups, estimation of the target population based on a systematic literature review as well as experts' opinions, and identification of the "current practice" in the defined health problem.

Institute of Nature Conservation, Polish Academy of Sciences 2014
Intern *Kraków, Poland*

My two-week internship at the Department of Ecosystem Conservation was divided in two parts. One week of the internship (in July) comprised of the field work: fishing mussels (Unio crassus, in the Biala River), bird-catching (Acrocephalus schoenobaenus, in the natural wetlands situated in the Nida River valley) and catching butterflies (Parnassius apollo, in the Pieniny National Park). During the other week (in September) I worked with the collected data in Statistica. I also gave a presentation, at the department meeting, of a known mathematical model which involved application of a diffusion equation to the analysis of behaviour of butterflies.

PUBLICATIONS

All articles listed below are published in peer-reviewed journals.

[4] *Three-component nonlocal conservation laws for Lax-integrable 3D partial differential equations*, with Oleg I. Morozov, Journal of Geometry and Physics 131: 89–100 (2018).
DOI: 10.1016/j.geomphys.2018.05.004

[3] *Nonlocal symmetries of Plebański's second heavenly equation*, with Oleg I. Morozov, Journal of Nonlinear Mathematical Physics 25 (2): 188–197 (2018).
DOI: 10.1080/14029251.2018.1452669

[2] *Invariant solutions to the Khokhlov–Zabolotskaya singular manifold equation and their application*, with Oleg I. Morozov, Reports on Mathematical Physics 81 (1): 65–79 (2018).
DOI: 10.1016/S0034-4877(18)30020-X

[1] *The Gibbons-Tsarev equation: symmetries, invariant solutions, and applications*, with Oleg I. Morozov, Journal of Nonlinear Mathematical Physics 23 (2): 243–255 (2016).
DOI: 10.1080/14029251.2016.1175821

SELECTED TALKS

Symmetries, exact solutions, and nonlocal conservation laws April 2019
Geometry and Differential Equations Seminar (Institute of Mathematics, Polish Academy of Sciences), Warsaw, Poland.

Nonlocal conservation laws for some three-dimensional partial differential equations November 2017
Differential Geometry and Applications seminar (Mathematical Institute, Silesian University in Opava), Opava, Czech Republic.

Nonlocal symmetries of Plebański's second heavenly equation September 2017
15th Conference "Mathematics in Technical and Natural Sciences" (Faculty of Applied Mathematics, AGH), Kościelisko, Poland.

Group-invariant solutions of the Khokhlov-Zabolotskaya equation December 2016
Symmetry and Integrability of Equations of Mathematical Physics, International workshop in honor of Wilhelm Fushchych (Institute of Mathematics of NAS of Ukraine), Kyiv, Ukraine.

Group-invariant solutions of the Gibbons-Tsarev equation June 2016
36th Max Born Symposium (Institute of Theoretical Physics of the University of Wrocław), Wrocław, Poland.

Group-invariant solutions of the Gibbons-Tsarev equation September 2015
14th Conference "Mathematics in Technical and Natural Sciences" (Faculty of Applied Mathematics, AGH), Kościelisko, Poland.

TECHNICAL SKILLS

I use LaTeX 2_ε on a daily basis. I obtained the results of my work as a doctoral researcher using *Maple*. During my graduate studies I prepared a project in Categorical Data Analysis with the use of *R*.
I know *Python*, including numpy and pandas libraries, and basics of *VBA*.

LANGUAGE SKILLS

My mother tongue is Polish. I am a fluent English speaker and I have a good knowledge of French (B1).