

Roman M. CHERNIHA

CURRICULUM VITAE and PUBLICATIONS

Born: December 21, 1958, Lviv Region, Ukraine

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Research Summary

My current research is mostly focused on the aims and activities described in the application for the British Academy Researchers at Risk Fellowship Grant.

In particular:

- conducting research in order to obtain new theoretical results for further development of the conditional-symmetry concept for partial differential equations (PDEs), in particular, for nonlinear systems of reaction-diffusion equations
- application of existing symmetry-based methods and new theoretical results in the investigation of real-world models based on systems of nonlinear PDEs. In particular, to derive new Lie and non-Lie symmetries, exact solutions and to provide their physical and biomedical interpretations;
- constructing and solving mathematical models describing deformations of poroelastic materials caused by fluid and solute transport;
- developing mathematical models describing the COVID-19 pandemic based on PDEs, exact solving of the models derived and comparison of the results with available data from public sources.

I have a wide range of research interests and am looking for prospective collaborators (experienced researchers, Postdocs) and PhD students in order to collaborate and apply for joint grants, especially within the EU Horizon-Europe Programme.

Pedagogical Summary

I have circa 10 years of pedagogical experience in four different universities in Ukraine. My preferable courses of lectures are Equations of Mathematical Physics, Mathematical Biology, Nonlinear Differential Equations, and Nonlinear Processes and Models.

I acted as a supervisor for 5 PhD students and for 7 Master students.

I am still looking for talented students having a strong desire to conduct research in the areas of Mathematical Physics, Mathematical Biology and Mathematical Modelling.

Educational data and scientific degrees

- 1976—1981 : Kyiv Taras Shevchenko State University (now: Taras Shevchenko National University of Kyiv), Faculty of Mechanics and Mathematics, majoring in mathematical physics
- 1981 : M.Sc. with Honours, Kyiv Taras Shevchenko State University
- 1987 : Ph.D. dissertation. Institute of Mathematics, NAS of Ukraine, Kyiv. Supervisor: Prof. Wilhelm Fushchych.
- July 2003: Dr. Sci. dissertation (habilitation) 'Nonlinear evolution equations: Galilei invariance, exact solutions and their applications'. Institute of Mathematics, NAS of Ukraine, Kyiv
- May 2012: Professor in Mathematics (the state title given by the Government of Ukraine for the considerable achievements in both scientific and pedagogical activities)

Research experience

- 1981–1992 : Research Assistant and Research Associate, Institute of Technical Heat Physics, Academy of Sciences of Ukraine, Kyiv, Ukraine
- 1992 – 2004: Senior Scientist, Department of Applied Research, Institute of Mathematics, NAS of Ukraine, Kyiv, Ukraine
- 2004 – 2024: Professor -- Leading Scientist, Department of Mathematical Methods in Statistical Mechanics (2004– 2007), Department of Applied Research (2007 – 2015) and Department of Mathematical Physics (2016--till now), Institute of Mathematics, NAS of Ukraine, Kyiv, Ukraine

- 2003, 2008 and 2009: Researcher (temporary CNRS positions), Laboratoire de Physique des Matériaux, Université Henri Poincaré Nancy I, Nancy, France
- 2013 – 2015: Marie Curie Research Fellow, School of Mathematical Sciences, University of Nottingham, UK
- 2022—till now: Researcher, School of Mathematical Sciences, University of Nottingham, UK

Pedagogical experience

- Sept. 1987—June 1988: Assistant professor (part-time position), Department of Mathematics of Kyiv Polytechnic Institute (now National University 'Kyiv Polytechnic Institute')
- Sept. 2004—Sept.2009: Professor (part-time position), Department of Applied Mathematics of University 'Inter-regional Academy of Personal Management', Kyiv, Ukraine
- Sept. 2007 – May 2010: Professor (part-time position), Department of Mathematical Physics, Lesya Ukrayinka Volyn National University, Lutsk, Ukraine
- May 2010— June 2014: Professor (part-time position), Department of Mathematics, National University 'Kyiv Mohyla Academy', Kyiv, Ukraine
- From Sept. 2024 : Professor (part-time position), Department of Mathematics, National University 'Kyiv Mohyla Academy', Kyiv, Ukraine

Courses of lectures: Mathematical Analysis and Complex Analysis (Calculus), Equations of Mathematical Physics, Mathematical Biology, Nonlinear Differential Equations, Nonlinear Processes and Models.

Supervisor of the following Ph.D. Thesis:

- Oleksii Pliukhin 'Conditional symmetries and exact solutions of reaction-diffusion systems with power coefficients of diffusion' (defended in 2009)
- Lillia Myroniuk 'Symmetries and exact solutions of non-linear systems with cross-diffusion' (defended in 2011)
- Sergii Kovalenko 'Exact solutions of some nonlinear boundary value problems with moving boundaries' (defended in 2012)
- Vasyl Davydovych 'Reaction–diffusion systems: conditional symmetries, exact solutions and their properties' (defended in 2014)

I also acted as the supervisor for 7 students who defended their Master Thesis with Honours.

Main fields of research

- Non-linear partial differential equations (PDEs): Lie and conditional symmetries, exact solutions and their properties.
- Development of new methods for analytical solving non-linear PDEs.
- Application of modern methods for analytical solving nonlinear boundary value problems,

arising in mathematical physics and mathematical biology.

- Analytical and numerical solving boundary value problems with moving boundaries (including Stefan problems)
- Development of mathematical models describing the specific processes arising in physics, biology and medicine.

Research Keywords: nonlinear PDE; non-linear reaction-diffusion equation; Lie symmetry; conditional symmetry; nonclassical symmetry; exact solution; numerical solution; nonlinear BVP; mathematical modelling in life sciences.

2020MSC: 35B06, 35CXX, 35K57, 35K61 – main subjects

Awards

- March 2008: Visiting professor for a month, Departement de Physique de la Matiere et des Materiaux, Institut Jean Lamour, Universite Nancy, Nancy, France
- May- June 2009: Visiting professor for a month, Departement de Physique de la Matiere et des Materiaux, Institut Jean Lamour, Universite Nancy, Nancy, France
- May 2012: Professor in Mathematics (the state title given by the Government of Ukraine for the considerable achievements in both scientific and pedagogical activities)
- May 2017- July 2023 : I was elected (2017) and re-elected (2019) as a member of the Scientific Committee of the National Council on the Science and Technology Development of Ukraine (an advisory body for the government of Ukraine)

The project leader/co-leader of the international projects (since 2000)

2001—2004: The Royal Society International Joint Project 14184 ‘Symmetries and Solutions of Nonlinear Reaction-Diffusion-Convection Systems’ (together with Prof. JR King)

2003—2005: The project ‘Applications of modern mathematical methods for solving nonlinear patterns arising in peritoneal dialysis’ (together with Prof. J.Waniewski). The project funded jointly by NAS of Ukraine and Polish Academy of Sciences

2006—2007: The project “ ‘Mathematical models of fluid and solute transport in normal, pathological, and tumour tissue’ (together with Prof. J.Waniewski). The project funded jointly by NAS of Ukraine and Polish Academy of Sciences

2006: A project (together with Prof. M. Serov) within the program ‘Research in Pairs’, Mathematisches Forschung Institut Oberwolfach, Oberwolfach (Germany).

2010: The project ‘Mathematical models of fluid and solute transport in normal and pathological tissue’ funded by the Mianowski Fund (Warsaw, Poland)

2011—2014: The project 'Mathematical modeling of transport processes in tissue during peritoneal dialysis' (together with Prof. J.Waniewski). The project funded jointly by NAS of Ukraine and Polish Academy of Sciences

2013—2015: Marie Curie Individual International Incoming Fellowship Grant (Project number 328563). The project funded by EU within FP7-PEOPLE-2012-IIF

2016—2017: Marie Curie Individual International Incoming Fellowship Grant (Project number 912563). Return Phase. The project funded by EU within FP7-PEOPLE-2012-IIF

2018—2023: The project 'Mathematical models of hydration-related structural tissue deformations' (together with Prof. J.Waniewski). The project funded jointly by NAS of Ukraine and Polish Academy of Sciences

2022: The National Centre of Science of Poland (NCN) grant for Ukrainian researchers (project number UMO-2022/01/3/ST1/00097)

2023—2024: The project 'Constructing and solving mathematical models describing deformations of poroelastic materials caused by fluid and solute transport' (LTRSF\ 100025). The project is funded by British Academy/Cara/Leverhulme Researchers at Risk Research Support Grants Programme

Participation in major international conferences

My plenary and session talks were presented at 22 international conferences during the last 10 years. The most important conferences :

- International Conference on Symmetry Methods, Applications, and Related Fields, Vancouver, Canada, May 13—16, 2014 (plenary talk) <http://www.pims.math.ca/files/Abstracts-preliminary.pdf>
- BIOMAT 2014 – 14th International Symposium on Mathematical and Computational Biology, Bedlewo, Poland, 2—8 November, 2014 (plenary talk) <http://biomat.org/biomat2014/scientificprogramme2014v3.pdf>
- 14-th International Conference Geometry, Integrability and Quantization, Varna, Bulgaria, June 6—12, 2014 (plenary talk) http://www.bio21.bas.bg/conference/Varna_14.htm
- 9th European Conference on Mathematical and Theoretical Biology, Gothenburg, Sweden (two session talks) June 14—19, 2014 <http://conferences.chalmers.se/index.php/ecmtb/ecmtb/paper/view/1319>
- International Conference on Free Boundary Problems: Theory and Applications, Cambridge, UK, 23 – 27 June, 2014 (session talk) <http://www-old.newton.ac.uk/programmes/FRB/seminars/2014062511151.html>
- 10th AIMS International Conference on Dynamical Systems, Differential Equations, and Applications, Madrid, July 7—11, 2014 (session talk) http://www.aims sciences.org/conferences/2014/session_schedule/ps08ss115.pdf
- The Joint British Mathematical Colloquium & British Applied Mathematics Colloquium 2015, Cambridge, 30th March – 2nd April, 2015 (section talk). <http://www.bmc-bamc2015.maths.cam.ac.uk/proceedings/abstract.php?id=46>
- The 9th International Conference on Differential Equations and Dynamical Systems, Dallas, Texas, USA, May 14-16, 2015 (plenary talk) <http://www.watsci.org/deds2015/>

- The 7th European Congress of Mathematics, Berlin, July 18-22, 2016. http://www.7ecm.de/program/contributed_talks.html (two session talks).
- Symmetry 2017- The First International Conference on Symmetry, Barcelona, Spain, October 16-18, 2017 (plenary talk) <http://sciforum.net/conference/symmetry2017/symmetry2017-S4>
- SIAM Annual Meeting, Pittsburgh, USA, July 10-14, 2017 http://meetings.siam.org/sess/dsp_programsess.cfm?SESSIONCODE=62608
- Application of Nonlinear Diffusion equations, Melbourne, Australia, June 19—21, 2019 (plenary talk) . <https://www2.math.kyushu-u.ac.jp/~ande2019/>
- Symmetry, Invariants, and their Applications: A Celebration Peter Olver's 70th Birthday, Halifax, Canada, August 3—5, 2022 (plenary talk, online format) <https://www.math.mun.ca/~movingframes2022/>
- 27th International Conference on Integrable Systems and Quantum Symmetries' and 'XII. International Symposium on Quantum Theory and Symmetries', Prague, Czech Rep., July 24—28, 2023 (section talk) <http://qts12.com/>; <http://qts12.com/wp-content/uploads/2023/07/thursday.pdf>
- The 65th British Applied Mathematics Colloquium. Newcastle, UK, April 9—11, 2024 (section talk) <https://conferences.ncl.ac.uk/media/sites/conferencewebsites/bamc2024/BAMC%20Book%20of%20Abstracts.pdf>
- The 44th Conference Dynamics Days Europe, Bremen, July 29- Aug.2, 2024 <https://dynamicsdays.eu/bremen2024/Program/bookofabstracts.pdf>

I was the organizer of workshops and special sessions at the following international conferences

- 7th Baltic-Nordic AGMP Workshop: “Algebra, Geometry, and Mathematical Physics”, Mulhouse, France, October, 2011.
- 8th Baltic-Nordic AGMP Workshop: “Algebra, Geometry, and Mathematical Physics”, Brno, Czech Rep., October, 2012.
- SIAM Annual Meeting, Pittsburgh, USA, July, 2017 http://meetings.siam.org/sess/dsp_programsess.cfm?SESSIONCODE=62608
- Polish-Ukrainian Workshop Mathematical Models of Transport Processes in Health and Disease’ Kyiv, Ukraine, June 13, 2019 <http://iammp.uk/en/activities-and-annual-reports/conferences-and-seminars/>

Professional Service as Expert, Referee etc.

In 2016, acted as an expert in evaluation process (subject: Mathematics) of projects within the call Horizon 2020-MSCA-IF-2016.

In 2018, acted as an expert in evaluation process (subject: Mathematics) of projects within the call Horizon 2020-Widespread-03-2018-Twinning.

The member of the Scientific Committee of the National Council for Science and Technology Development of Ukraine (2017--2023).

The Editorial Board member of the journal SYMMETRY (since 2015)

<http://www.mdpi.com/journal/symmetry/editors>

The Editorial Board member of the journal AXIOMS (since 2021)

https://www.mdpi.com/journal/axioms/sectioneditors/mathematical_analysis

Served as Guest Editor-in-Chief for the following special issues published in SYMMETRY:

Lie Theory and Its Application, 2015

http://www.mdpi.com/journal/symmetry/special_issues/lie_theory

Lie and Conditional Symmetries and Their Applications for Solving Nonlinear Models, 2016

http://www.mdpi.com/journal/symmetry/special_issues/Lie_Conditional_Symmetries

Lie and Conditional Symmetries and Their Applications for Solving Nonlinear Models, II. 2017

http://www.mdpi.com/journal/symmetry/special_issues/Lie_Cond_symmetries

Symmetry and Biomathematics: Recent Developments and Challenges, 2021-22

https://www.mdpi.com/journal/symmetry/special_issues/Symmetry_Biomathematics_Recent_Developments_Challenges

ENTROPY:

Applications of Nonlinear Diffusion Equations, 2019

https://www.mdpi.com/journal/entropy/special_issues/appl_NDE

Acted as a referee for dozens international scientific journals including: SYMMETRY, J. of Mathematical Analysis and Applications, Reports on Mathematical Physics, J. of Engineering Mathematics, Applied Mathematics Letters, Math.& Comp. Modelling, Phys. Scripta, Com. Nonlin. Sci.& Num.Sim., J. Phys. A:Math. Teor., Applied Mathematics & Computation, Intl. J. of Heat & Mass Transfer, IJDSDE, Appl. Math. & Comp., Proc. Roy. Soc..A.

Membership in scientific societies

Co-founder and head of the non-governmental and non-profitable organisation 'Institute of Applied Mathematics and Mathematical Physics' <http://iammp.uk/en/> (since 2017 till now)

Society for Industrial and Applied Mathematics (SIAM) (since 2017 till 2023)

<https://www.siam.org/membership/>

European Society for Mathematical and Theoretical Biology (since 1996 till 2015)

<http://euro-math-soc.eu/corporate/european-society-mathematical-and-theoretical-biology>

Kyiv Mathematical Society (since 1993 till now) <http://www.mathsociety.kiev.ua/>

Books, Papers and Citations

Approximately 130 scientific papers and four books are published up to date the October 15, 2024 (thesis of conferences and preprints are not taken into account).

According to the WEB of Science (Core collection) data base, **79** papers were indexed, which were cited **906 times** and the Hirsch index is **h=19** (up to date Dec. 1, 2023).

According to the Scopus data base **88** papers were indexed, which were cited **1281 times** and the Hirsch index is **h=22** (up to date Oct.15, 2024).

My most cited publications:

Cherniha R. and Serov M. Symmetries, Ansatzes and Exact Solutions of Nonlinear Second-order Evolution Equations with Convection Terms. *European J. of Appl. Math.* 1998. vol. 9. P.527-542.

Cherniha R. and King J. R. Lie symmetries of nonlinear multidimensional reaction-diffusion systems. II. *J. Phys. A: Math. and Gen.* 2003. vol.36. P.405—425.

My most cited work among recently published: R. Cherniha, M. Serov, O. Pliukhin. *Nonlinear reaction-diffusion-convection equations: Lie and conditional symmetry, exact solutions and their applications*. CRC Press, Boca Raton, FL, USA, 2018.

Monographs

Roman Cherniha and Vasyl' Davydovych. Nonlinear reaction-diffusion systems -- conditional symmetry, exact solutions and their applications in biology. -- Lecture Notes in Mathematics. Vol. 2196 .Springer , 2017.

<https://www.springer.com/gp/book/9783319654652>

R. Cherniha, M. Serov, O. Pliukhin. Nonlinear reaction-diffusion-convection equations: Lie and conditional symmetry, exact solutions and their applications. CRC Press (USA), 2018.

<https://www.taylorfrancis.com/books/9781498776196>

Book

'Lie and Non-Lie Symmetries: Theory and Applications for Solving Nonlinear Models.' Edited by Roman M. Cherniha. MDPI, Basel, 2017.

<https://www.mdpi.com/books/pdfview/book/369>

Textbook

R.M. Cherniha. Equations of Mathematical Physics. Kyiv: Publishing house 'Kyiv-Mohyla Academy', 2012 (in Ukrainian, summary in English) ISBN 978-966-2410-14-3

Most recent papers published during the last five years (2020—2024)

- 1 Cherniha, R., Davydovych, V. Lie symmetries, reduction and exact solutions of the (1+2)-dimensional nonlinear problem modeling the solid tumour growth. *Commun Nonlinear Sci Numer Simulat.* 2020. Vol.80, 104980
<https://doi.org/10.1016/j.cnsns.2019.104980>
- 2 R. Cherniha. Comments on the paper «Lie symmetry analysis, explicit solutions, and conservation laws of a spatially two-dimensional burgers-huxley equation.» *Symmetry*, 2020, 12(6), 900. <https://doi.org/10.3390/sym12060900>
- 3 Cherniha, R.; Davydovych, V. A Mathematical Model for the COVID-19 Outbreak and Its Applications. *Symmetry* **2020**, *12*, 990. <https://doi.org/10.3390/sym12060990>
- 4 Cherniha, R.; Davydovych, V. Exact Solutions of a Mathematical Model Describing Competition and Co-Existence of Different Language Speakers. *Entropy* **2020**, *22*, 154. <https://doi.org/10.3390/e22020154>
- 5 Cherniha, R.; Stachowska-Pietka, J.; Waniewski, J. A Mathematical Model for Transport in Poroelastic Materials with Variable Volume: Derivation, Lie Symmetry Analysis, and Examples. *Symmetry* **2020**, *12*, 396. <https://doi.org/10.3390/sym12030396>
- 6 R. Cherniha, M. Serov, Y. Prystavka, A complete Lie symmetry classification of a class of (1+2)-dimensional reaction-diffusion-convection equation, *Commun Nonlinear Sci Numer Simulat.* **92** (2021), 105466 <https://doi.org/10.1016/j.cnsns.2020.105466>
- 7 R. Cherniha, Comments on the paper "Exact solutions of nonlinear diffusion-convection-reaction equation: A Lie symmetry approach" *Commun Nonlinear Sci Numer Simulat.* **102** (2021), 105922 <https://doi.org/10.1016/j.cnsns.2021.105922>
- 8 Cherniha R., Davydovych V., Conditional symmetries and exact solutions of a nonlinear three-component reaction-diffusion model, *Euro. J. Appl. Math.* **32** (2021), 280–300. <https://doi.org/10.1017/S0956792520000121>
- 9 Cherniha R., Davydovych V., New conditional symmetries and exact solutions of the diffusive two-component Lotka–Volterra system, *Mathematics* **9** (2021), no. 16, 1984, 17 pp. <https://doi.org/10.3390/math9161984>
- 10 Davydovych V. V., Cherniha R. M., On a nonlinear mathematical model for the description of the competition and coexistence of different-language speakers, *J. Math. Sci.* **256** (2021), 628–639. <https://doi.org/10.1007/s10958-021-05449-5>
- 11 Cherniha R., Davydovych V., Stachowska-Pietka J., Waniewski J., A mathematical model for transport in poroelastic materials with variable volume: derivation, Lie symmetry analysis and examples—Part 2, *Symmetry* **14** (2022), no. 1, 109, 18 pp. <https://doi.org/10.3390/sym14010109>
- 12 Cherniha R., Davydovych V., A reaction–diffusion system with cross-diffusion: Lie symmetry, exact solutions and their applications in the pandemic modelling, *Euro. J. Appl. Math.* **33** (2022), no. 5, 785–802. <https://doi.org/10.1017/S095679252100022X>
- 13 Cherniha R., Davydovych V., Construction and application of exact solutions of the diffusive Lotka–Volterra system: A review and new results, *Commun. Nonlinear Sci.*

- Numer. Simulat.* **113** (2022), 106579. <https://doi.org/10.1016/j.cnsns.2022.106579>
- 14 Cherniha R., Davydovych V., A hunter-gatherer–farmer population model: new conditional symmetries and exact solutions with biological interpretation, *Acta Appl. Math.* **182** (2022), no. 1, 25 pp. <https://doi.org/10.1007/s10440-022-00537-3>
 - 15 Davydovych, V.; Dutka, V.; Cherniha, R. Reaction–Diffusion Equations in Mathematical Models Arising in Epidemiology. *Symmetry* **15** (2023), 2025, 23 pp. <https://doi.org/10.3390/sym15112025>
 - 16 P. Broadbridge, R. M. Cherniha and J. M. Goard. Exact nonclassical symmetry solutions of Lotka–Volterra-type population systems. *European Journal of Applied Mathematics* **34** (2023), pp. 998–1016 doi:10.1017/S095679252200033X
 - 17 Roman Cherniha, Vasyl’ Davydovych , John R. King The Shigesada–Kawasaki–Teramoto model: Conditional symmetries, exact solutions and their properties, *Commun. Nonlinear Sci. Numer. Simulat.* **124** (2023) 107313 <https://doi.org/10.1016/j.cnsns.2023.107313>
 - 18 Roman Cherniha; Vasyl’ Davydovych. Symmetries and Exact Solutions of the Diffusive Holling–Tanner Prey-Predator Model. *Acta Appl. Math* **187**:8 (2023). <https://doi.org/10.1007/s10440-023-00600-7>
 - 19 Cherniha R., Stachowska-Pietka J., Waniewski J. A mathematical model for two solutes transport in a poroelastic material and its applications. *Nonlinear Sci. Numer. Simulat.* **132** (2024) 107905 <https://doi.org/10.1016/j.cnsns.2024.107905>
 - 20 Cherniha, R.; Davydovych, V.; Vorobyova, A. New Lie Symmetries and Exact Solutions of a Mathematical Model Describing Solute Transport in Poroelastic Materials. *Math. Comput. Appl.* 2024, 29, 43. <https://doi.org/10.3390/mca29030043>
 - 21 Cherniha R., King J. Nonlinear systems of PDEs admitting infinite-dimensional Lie algebras and their connection with Ricci flows. *Stud Appl Math.* 2024;e12737 <https://doi.org/10.1111/sapm.12737>
 - 22 Roman Cherniha. Letter to the editor: Comments on the paper “derivation of lump solutions to a variety of Boussinesq equations with distinct dimensions”. *International Journal of Numerical Methods for Heat & Fluid Flow*, Vol. 34 No. 3, 2024 pp. 1149-1150 DOI [10.1108/HFF-03-2024-941](https://doi.org/10.1108/HFF-03-2024-941)

**Most important papers published before 2020
in major international journals with impact-factor
(Web of Science <http://thomsonreuters.com/web-of-science/>)**

- 1 Fushchych W.I and Cherniha R.M The Galilean relativistic principle and nonlinear partial differential equations. *J.Phys.A.:Math. and Gen.*--1985.-v.18, N 18.--P.3491—3503.
- 2 Cherniha R. and Cherniha N. Exact solution of a class of nonlinear boundary value problems with moving boundaries. *J.Phys.A.:Math. and Gen.* 1993.-v.26, N 18.--P. L935-940.
- 3 Fushchych W.I and Cherniha R.M. Galilei-invariant systems of nonlinear systems of evolution equations. *J.Phys.A: Math.Gen.* -1995. -vol. 28, P.5569-5579.
- 4 Cherniha R. A constructive method for obtaining new exact solutions of nonlinear evolution equations. *Rept. Math. Phys.*-1996.- vol. 38, P.301-312.
- 5 Cherniha R. and Serov M. Symmetries, Ansatzes and Exact Solutions of Nonlinear

- Second-order Evolution Equations with Convection Terms. *European J. of Appl. Math.*-- 1998. - vol. 9, No 5, P.527-542.
- 6 Cherniha R. New Non-Lie Ansatzes and Exact Solutions of Nonlinear Reaction-Diffusion-Convection Equations. *J. Phys. A: Math.Gen.* -- 1998.-vol. 31, No 40, P.8179-8198.
 - 7 Cherniha R. and Fehribach J. New exact solutions for a free boundary system. *J.Phys. A: Math. and Gen.* — 1998. -- vol. 31, No 16, P.3815-3829.
 - 8 Cherniha R. New Exact Solutions of Nonlinear Reaction-Diffusion Equations. *Rept. Math. Phys.* —1998.—V.41, No 2, P. 333-349.
 - 9 Cherniha R. and King J. R. Lie symmetries of nonlinear multidimensional reaction-diffusion systems: I. *J. Phys. A: Math. and Gen.* -- 2000.-- V.33, No 2-- P.267-282.
 - 10 Cherniha R. and King J. R. Addendum. Lie symmetries of nonlinear multidimensional reaction-diffusion systems: I. *J. Phys. A: Math. and Gen.*-- 2000.-- V.33, No 43-- P.7839-41.
 - 11 Cherniha R. Lie Symmetries of Nonlinear Two-dimensional Reaction-Diffusion Systems. *Rept. Math. Phys.*--2000. —v.46. —P. 63-76.
 - 12 Cherniha R. and Dutka V. Exact and Numerical Solutions of the Generalized Fisher Equation. *Rept. Math. Phys.*--2001.-v.47.--P. 393-411.
 - 13 Cherniha R. M. Nonlinear Galilei-invariant PDEs with infinite-dimensional Lie symmetry. *J.Math.Anal.Appl.*--2001.-v.253.-- P.126-141.
 - 14 Cherniha R and Serov M. Nonlinear Systems of the Burgers-type Equations: Lie and Q-conditional Symmetries, Ansatzes and Solutions. *J.Math. Anal. Appl.*--2003.-v.282.-- P.305-328.
 - 15 Cherniha R. and King J. R. Lie symmetries of nonlinear multidimensional reaction-diffusion systems. II. *J. Phys. A: Math. and Gen.*--- 2003.-- vol.36. -- P.~405—425.
 - 16 Cherniha R. and Henkel M On nonlinear partial differential equations with an infinite-dimensional conditional symmetry. *J.Math.Anal.Appl.*--2004.-v.298.-- P.487--500.
 - 17 Cherniha R. and King J. R. Nonlinear Reaction-Diffusion Systems with Variable Diffusivities: Lie Symmetries, Ansatzes and Exact Solution. *J.Math.Anal.Appl.*--2005.-v.308.-- P.11--35.
 - 18 Cherniha R. and King J. R. Lie Symmetries and Conservation Laws of Nonlinear Multidimensional Reaction-Diffusion Systems with Variable Diffusivities. *IMA J. Appl. Math.* 2006 -vol.71 – P.391-408.
 - 19 Cherniha R. and Serov M. Symmetries, Ansatzes and Exact Solutions of Nonlinear Second-order Evolution Equations with Convection Terms, II. *European J. of Appl. Math.* –2006.-v.17.—597-605.
 - 20 R. Cherniha, V.Dutka, J.Stachowska-Pietka and J.Waniewski. Fluid transport in peritoneal dialysis: a mathematical model and numerical solutions. In:*Mathematical Modeling of Biological Systems, Vol..I.* Ed. by A.Deutsch et al., Birkhaeuser, P.291-298, 2007
 - 21 Cherniha R. New Q-conditional symmetries and exact solutions reaction-diffusion-convection equations arising in mathematical biology. *J.Math.Anal.Appl.* --2007.-v.326.- P.783—799. doi:10.1016/j.jmaa.2006.03.026
 - 22 Cherniha R. and Pliukhin O. New conditional symmetries and exact solutions of nonlinear -reaction-diffusion-convection equations. *J. Phys. A: Math. and Theor.*--- 2007.-- vol.40. -- P.~10049—10070.
 - 23 Cherniha R., Serov M. and Rassokha I. Lie Symmetries and Form-preserving

- Transformations of Reaction-Diffusion-Convection Equations. *J.Math.Anal.Appl.* -- 2008.-v.342.-- P.1363—1379.
- 24 Cherniha R. and Pliukhin O. New conditional symmetries and exact solutions of reaction-diffusion systems with power diffusivities. *J. Phys. A: Math. and Theor.*--- 2008.-- vol.41, 185208 (14pp).
 - 25 Cherniha R. and Myroniuk L. New exact solutions of a nonlinear cross-diffusion system. *J. Phys. A: Math. and Theor.*--- 2008.-- vol.41, 395204 (15pp).
 - 26 Cherniha R. and Kovalenko S. Exact solutions of nonlinear boundary value problems of the Stefan type. *J. Phys. A: Math. and Theor.*--- 2009.-- vol.42, 355202 (14pp).
 - 27 Cherniha R. and Henkel M. The exotic conformal Galilei algebra and nonlinear partial differential equations. *J.Math.Anal.Appl.*--2010.-v.369.-- P.120--132.
<https://doi.org/10.1016/j.jmaa.2010.02.025>
 - 28 Cherniha R. Conditional symmetries for systems of PDEs: new definitions and their application for reaction-diffusion systems. *J. Phys. A: Math. and Theor.*--- 2010.-- vol.43, 405207 (13pp). doi:10.1088/1751-8113/43/40/405207
 - 29 Cherniha R. and Kovalenko S. Lie symmetries and reductions of multidimensional boundary value problems of the Stefan type. *J. Phys. A : Math. Theor.* --2011.--Vol. 44.,485202 (25 pp).
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I am also the (co-)author of over 60 papers published in leading Ukrainian scientific journals (such as *Ukrainian Mathematical J.*, *Ukrainian Physical J.*, *Proceedings of NAS of Ukraine*) and in proceedings of international scientific conferences.

Main publications (in English) published in other scientific journals

- A1. Fushchich W. and Cherniga R.. Galilei-invariant nonlinear equations of Schroedinger-type and their exact solutions I. *Ukrainian Math.J.* 1989.- vol.41, P. 1161-67 .
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Outreach activities

I carried out a substantial work (on voluntary basis) as a member of the Scientific Committee of the National Council for Science and Technology Development of Ukraine, which is known for the Ukrainian scientific community (since July 2017 till August 2023).

I am the author of dozens of publications in leading Ukrainian mas-media (such as *Dzerkalo Tyzhnia* (Weekly Mirror), *Den'* (Day), *Holos Ukrainy* (Voice of Ukraine)), which are devoted to problems of science and education in Ukraine.

Some Internet links are below:

Newspaper “Weekly Mirror”

<http://gazeta.dt.ua/science/koli-profesor-v-ukrayini-stane-gordistyuvitchiznyanoyi-nauki-u-sistemi-prisvoyennya-naukovih-stupeniv-i-zvan-za-ponad-pivtora-rokunovoyi-vladi-ne-vidbulosya-zhodnih-reform-.html>

<http://gazeta.dt.ua/science/nauka-v-ukrayini-osobliviy-shlyah-rozvitku-chi-glibokiy-zanepad-.html>

<https://zn.ua/ukr/science/uzakoneni-atavizmi-sovkovist-i-populizm-yak-galmo-reformi-u-naukovo-tehnichniy-sferi-.html>

Newspaper “Voice of Ukraine”

<http://www.golos.com.ua/article/304819>

Internet-portal “VoxUkraine”

<https://voxukraine.org/uk/ukrayina-bez-nauki-abo-yak-provalili-sprobu-naukovogokomitetu-zupiniti-val-fejkovih-disertatsij/>

https://voxukraine.org/integratsiya-ukrayiny-v-yevropejskyj-naukovyj-prostir-ta-analiz-uchasti-ukrayiny-u-programi-goryzont-2020/?fbclid=IwAR1weBnLeAJQ97nXJDc15vyAqfxXaHeB2XE39U9_hYcPZDVyapYc39SOj1M

Internet-portal “ZBRUCH”
<https://zbruc.eu/node/109201>

Facebook: <https://www.facebook.com/BVPsymmetry/?ref=profile>

Languages: Ukrainian (native speaker), English (very good), Russian (very good),
Polish and German (basic communicative skills, reading, translation)

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