List of Publications

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Peer-reviewed articles

1. **L. Beilina**, Adaptive hybrid FEM/FDM methods for inverse scattering problems. *Inverse Problems and Information Technologies*, V.1, N.3, pp.73-116, 2002.

2. **L. Beilina**, Adaptive hybrid finite element/difference methods: application to inverse elastic scattering. *Inverse and Ill-Posed Problems*, V.11, N.6, pp.585-618, 2003.

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4. **L. Beilina**, Adaptive Finite Element/Difference Method for inverse elastic scattering waves , *Applied and Computational Mathematics*, V.2, pp.119-134, 2003.

5. **L. Beilina**, S. Korotov, M. Krizek, Local Nonobtuse tetrahedral refinement techniques near Fichera-like corners. *Applications of Mathematics*, N.50, pp. 569-581, 2005.

6. **L. Beilina**, C. Johnson, A posteriori error estimation in computational inverse scattering, *Mathematical Models and Methods in Applied Sciences*, V.15, N.1, pp.23-37, 2005.

7. **L. Beilina** and C. Clason, An adaptive hybrid FEM/FDM method for an inverse scattering problem in scanning acoustic microscopy, *SIAM Sci.Comp.*, V.28, I.1, pp.382-402, 2006.

8. **L. Beilina**, M. V. Klibanov, A globally convergent numerical method for some coefficient inverse problems with resulting second order elliptic equations, *SIAM Sci.Comp.*, V.31, N.1, 478-509, 2008.

9. **L. Beilina**, M. P. Hatlo, H. E. Krogstad, Adaptive algorithm for an inverse electromagnetic scattering problem, *Applicable Analysis*, V.88, N.1, 15-28, 2009.

10. **L. Beilina** and M. V. Klibanov. A posteriori error estimates for the adaptivity technique for the Tikhonov functional and global convergence for a coefficient inverse problem, *J. Inverse Problems*, 26, 045012, 2010.

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12. M.V. Klibanov, M.A. Fiddy, **L. Beilina**, N. Pantong and J. Schenk, Picosecond scale experimental verification of a globally convergent numerical method for a coefficient inverse problem, *J. Inverse problems*, 26, 045003, 2010.

13. J. Xin, **L. Beilina**, Michael V.Klibanov, Globally convergent numerical methods for coefficient inverse problems for imaging inhomogeneities, accepted for publication in *CISE*, 2010.

14. **L. Beilina**, M.V.Klibanov and M.Yu.Kokurin, Adaptivity with relaxation for ill-posed problems and global convergence for a coefficient inverse problem, *Journal of Mathematical Sciences, JMS*, Springer, 167(3), 279-325, 2010.

15. **L. Beilina**, Adaptive Finite Element Method for a coefficient inverse problem for the Maxwell's system, *Applicable Analysis*, V.90(10), pp.1461-1479, 2011.

16. **L. Beilina**, Adaptive Hybrid Finite Element/Difference Method for Maxwell's Equations: An a Priori Error Estimate and Efficiency, *Applied and Computational Mathematics (ACM)*, V.9(2), 2010.

17. M. Asadzadeh and **L. Beilina**, A posteriori error analysis in a globally convergent numerical method for a hyperbolic coefficient inverse problem, *Inverse Problems*, 26, 115007, 2010.

18. **L. Beilina**, M. Grote, Adaptive Hybrid Finite Element/Difference Method for Maxwell's equations, *TWMS J. of Pure and Applied Mathematics*, V.1(2), pp.176-197, 2010.

19. A.Kuzhuget, **L. Beilina**, M.V.Klibanov, Global convergence and quasi-reversibility for a coefficient inverse problem with backscattered data, *Journal of Mathematical Sciences, JMS*, Springer, 2012.

20. **L. Beilina**, M.V.Klibanov, A.Kuzhuget, New a posteriori error estimates for adaptivity technique and global convergence for a hyperbolic coefficient inverse problem, *Journal of Mathematical Sciences, JMS*, Springer, 172, 4, 449-476, 2011.

21. **L. Beilina**, M.V.Klibanov, Reconstruction of dielectrics from experimental data via a hybrid globally convergent/adaptive inverse algorithm, *Inverse Problems*, 26, 125009, 2010.

22. M.V.Klibanov, A.B.Bakushinsky, **L. Beilina**, Why a minimizer of the Tikhonov functional is closer to the exact solution than the first guess, *J. Inverse and Ill-posed problems*, 19, pp.83-105, 2011.

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24. **L. Beilina**, Energy estimates and numerical verification of the stabilized domain decomposition finite element/finite difference approach for the Maxwell's system in time domain, *CEJM*, 11(4), pp.702-733, DOI: 10.2478/s11533-013-0202-3, 2013.

25. **L. Beilina** and M.V. Klibanov, A new approximate mathematical model for global convergence for a coefficient inverse problem with backscattering data, J. Inverse and Ill-Posed Problems, 20, pp.513-565, 2012.

26. A.V. Kuzhuget, **L. Beilina**, M.V. Klibanov, A. Sullivan, L. Nguyen and M.A . Fiddy, Blind backscattering experimental data collected in the field and an approximately globally convergent inverse algorithm, Inverse Problems, 28, 095007, 2012.

27. A.V. Kuzhuget, **L. Beilina**, M.V. Klibanov, A. Sullivan, L. Nguyen and M.A. Fiddy, Quantitative image recovery from measured blind backscattered data using a globally convergent inverse method, IEEE Transactions of Geoscience and Remote Sensing, DOI 10.1109/TGRS.2012.2211885, 2012.

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30. N. Koshev and **L. Beilina**, An Adaptive Finite Element Method for Fredholm Integral Equations of the first kind and its verification on experimental data, *CEJM*, 11(8), pp. 1489-1509 2013.

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33. E. M. Karchevskii, A. O. Spiridonov, A. I. Repina and **L. Beilina**, "Reconstruction of Dielectric Constants of Core and Cladding of Optical Fibers Using Propagation Constants Measurements," Physics Research International, ID 253435, 2014. doi:10.1155/2014/253435.

34. **L. Beilina**, Nguyen Trung Thành, M. V. Klibanov and J. B. Malmberg, Reconstruction of shapes and refractive indices from backscattering experimental data using the adaptivity, *Inverse Problems*, 30, 105007, 2014.

35. **L. Beilina**, M. V. Klibanov, Globally strongly convex cost functional for a coefficient inverse problem, *Nonlinear analysis: real world applications*, 22, 272-288, 2015.

36. **L. Beilina**, Nguyen Trung Thanh, M.V. Klibanov and J. B. Malmberg, Globally convergent and adaptive finite element methods in imaging of buried objects from experimental backscattering radar measurements, *Journal of Computational and Applied Mathematics*, Elsevier, DOI: 10.1016/j.cam.2014.11.055, 2015.

37. N. T. Thanh, **L. Beilina**, M. V. Klibanov, M. A. Fiddy, Imaging of Buried Objects from Experimental Backscattering Time-Dependent Measurements Using a Globally Convergent Inverse Algorithm, *SIAM Journal on Imaging Sciences*, 8(1), 757-786, 2015.

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40. **L. Beilina**, Domain decomposition finite element/finite difference method for the conductivity reconstruction in a hyperbolic equation, *Communications in Nonlinear Science and Numerical Simulation*, Elsevier, 2016, doi:10.1016/j.cnsns.2016.01.016

41. E. M. Karchevskii, **L. Beilina**, A. O. Spiridonov, A. I. Repina, Reconstruction of dielectric constants of multi-layered optical fibers using propagation constants measurements, *ACM*, 15(3), 346-358, 2016.

42. **L. Beilina**, Application of the finite element method in a quantitative imaging technique, J. Comput. Methods Sci. Eng., 1, 1-17, 2016. DOI 10.3233/JCM-160689.

43. A. Eriksson, **L. Beilina**, T. M. Larsson, Reconstruction of annular bi-layered media in cylindrical waveguide section, *Journal of Mathematics in Industry*, 7(6), Springer, 2017. DOI: 10.1186/s13362-017-0036-x

44. J. Vētra, V. Sklarevich, G. Anoufriev, I. Kalniņš, S. Umbraško, J. Vētra Jr., V. Kotovs, **L. Beilina**, Significant change in muscular strength based on the head and neck position, *Papers on Anthropology*, XXVI/1, 114-124, 2017.
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48. **L. Beilina**, M. Cristofol and S. Li, Determining the conductivity for a nonautonomous hyperbolic operator in a cylindrical domain, *Math. Meth. Appl. Sci.*, 1-19, 2018. DOI: 10.1002/mma.4728

49. M. Asadzadeh, **L. Beilina**, M. Naseer, C. Standar, A Priori Error Estimates and Computational Studies for a Fermi Pencil-Beam Equation, *Journal of Computational and Theoretical Transport*, 47, 1-3, 125-151, 2019. DOI: 10.1080/23324309.2018.1496937

50. **L.Beilina**, Numerical analysis of least squares and perceptron learning for classification problems, *Open J. Discret. Appl. Math.*, 3(2), 30-49; doi:10.30538/psrp-odam2020.0035, 2020.

51. M. G. Aram, **L. Beilina**, H. Dobsicek Trefna, Microwave Thermometry with Potential Application in Non-invasive Monitoring of Hyperthermia,*Journal of Inverse and Ill-posed problems*, 28(5), 739-750, 2020; https://doi.org/10.1515/jiip-2020-0102

Peer-reviewed conference proceedings

1. **L. Beilina**, A posteriori error estimation in biomedical imaging, IEEE ISBI2007, *Proceedings of International Symposium on Biomedical Imaging: from nano to macro*, pp.1372-1375, 2007.

2. **L. Beilina**, A posteriori error estimation for an inverse scattering problem, *Proceedings of ECCOMAS thematic conference Computational Methods in Structural Dynamic and Earthquake Engineering*, 2007.

3. **L. Beilina**, M.V.Klibanov, Global convergence for Inverse Problems, *Proceedings of ICNAAM2010, AIP (American Institute of Physics) Conference Proceedings*, 2010.

4. **L. Beilina**, Adaptive Finite Element Method for an electromagnetic coefficient inverse problem, *Proceedings of ICNAAM2010, AIP (American Institute of Physics) Conference Proceedings*, 2010.

5. **L. Beilina**, Hybrid Discontinuous Finite Element/Finite Difference Method for Maxwell's equations, *Proceedings of ICNAAM2010, AIP (American Institute of Physics) Conference Proceedings*, 2010.

6. **L. Beilina** and M. V. Klibanov, Approximate global convergence in imaging of land mines from backscattered data, *Applied Inverse Problems, Springer Proceedings in Mathematics & Statistics* , Vol. 48, 2013.

7. **L. Beilina** and I.Gainova, Time-adaptive FEM for distributed parameter identification in biological models, *Applied Inverse Problems, Springer Proceedings in Mathematics & Statistics* , Vol. 48, 2013.

8. **L. Beilina**, M. P. Hatlo Andresen, H. E. Krogstad, Adaptive finite element method in reconstruction of dielectrics from backscattered data, *Applied Inverse Problems, Springer Proceedings in Mathematics & Statistics* , Vol. 48, 2013.

9. N. Koshev and **L. Beilina**, A posteriori error estimates for Fredholm integral equations of the first kind, *Applied Inverse Problems, Springer Proceedings in Mathematics & Statistics* , Vol. 48, 2013.

10. **L. Beilina** and M. V. Klibanov, Adaptive FEM with relaxation for a hyperbolic coefficient inverse problem, *Applied Inverse Problems, Springer Proceedings in Mathematics Statistics* , Vol. 48, 2013.

11. M. Asadzadeh and **L. Beilina**, Adaptive approximate globally convergent algorithm with backscattered data, *Inverse Problems and Large-Scale Computations, Springer Proceedings in Mathematics & Statistics* , Vol. 52, 2013.

12. J. B. Malmberg and **L. Beilina**, Approximate globally convergent algorithm with applications in electrical prospecting, *Inverse Problems and Large-Scale Computations, Springer Proceedings in Mathematics & Statistics* , Vol. 52, 2013.

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14. Evgenii Karchevskii, Alexandr Spiridonov, and **L. Beilina**, Determination of permittivity from propagation constant measurements in optical fibers, *Inverse Problems and Applications, Springer Proceedings in Mathematics & Statistics* , Vol. 120, 2015.

15. **L. Beilina** and Anders Eriksson, Reconstruction of dielectric constants in a cylindrical waveguide, *Inverse Problems and Applications, Springer Proceedings in Mathematics & Statistics* , Vol. 120, 2015.

16. **L. Beilina** and Irina Gainova, Time-adaptive FEM for distributed parameter identification in mathematical model of HIV infection with drug therapy, *Inverse Problems and Applications, Springer Proceedings in Mathematics & Statistics* , Vol. 120, 2015.

17. **L. Beilina** and Evgenii Karchevskii, The layer-stripping algorithm for reconstruction of dielectrics in an optical fiber, *Inverse Problems and Applications, Springer Proceedings in Mathematics Statistics* , Vol. 120, 2015.

18. **L. Beilina**, M. Cristofol and K. Niinimäki, Simultaneous reconstruction of Maxwell's coefficients from backscattering data, *Inverse Problems and Applications, Springer Proceedings in Mathematics Statistics* , Vol. 120, 2015.

19. J. B. Malmberg, **L. Beilina**, Adaptive finite element method for the solution of electromagnetic inverse problem using limited observations, *IEEE, Proceedings of the 2016 International Conference on Electromagnetics in Advanced Applications, ICEAA 2016*, pp. 424-427, 2016, doi:10.1109/ICEAA.2016.7731417

20. **L. Beilina**, L. Mpinganzima, P. Tassin, Adaptive optimization algorithm for the computational design of nanophotonic structures, *IEEE, Proceedings of the 2016 International Conference on Electromagnetics in Advanced Applications, ICEAA 2016*, pp. 420-423, 2016, doi:10.1109/ICEAA.2016.7731416.

21. M. Asadzadeh, **L. Beilina**, M. Naseer, C. Standar, Finite element schemes for Fermi equation, *AIP Conference Proceedings*, 1863, art. no. 370007, 2017. DOI: 10.1063/1.4992554

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28. Asadzadeh M., **Beilina L.** Convergence of Stabilized P1 Finite Element Scheme for Time Harmonic Maxwell's Equations. In *Mathematical and Numerical Approaches for Multi-Wave Inverse Problems. CIRM 2019*. Springer Proceedings in Mathematics & Statistics, vol 328. Springer, Cham (2020). https://doi.org/10.1007/978-3-030-48634-1_4

29. **L. Beilina**, V. Ruas, Convergence of Explicit P_1 Finite-Element Solutions to Maxwell's Equations, In: *Mathematical and Numerical Approaches for Multi-Wave Inverse Problems* CIRM 2019. Springer Proceedings in Mathematics & Statistics, vol 328. Springer, Cham (2020) https://doi.org/10.1007/978-3-030-48634-1_7

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Books

- **L. Beilina**, M. Bergounioux, M. Cristofol, A. Da Silva, A. Litman, (eds) *Mathematical and Numerical Approaches for Multi-Wave Inverse Problems*, Springer, PROMS 328, 2020.
- **L. Beilina**, Yu. G. Smirnov, *Nonlinear and inverse problems in electromagnetics*, Springer, New-York, PROMS 243, 2018.
- **L. Beilina**, M.V. Klibanov, *Approximate global convergence and adaptivity for coefficient inverse problems*, Springer, New-York, 2012 (Number of citations:*Google scholar* 262.)
- **L. Beilina**, E. Karchevskii, M. Karchevskii, *Numerical Linear Algebra: Theory and Applications*, Springer, New-York, 2017.
- **L. Beilina** (Ed.), *Applied Inverse Problems*, Series: Springer Proceedings in Mathematics Statistics, Vol. 48, DOI 10.1007/978-1-4614-7816-4, 2013.
- **L. Beilina**, Shestopalov, Yury V. (Eds.), *Inverse Problems and Large-Scale Computations*, Series: Springer Proceedings in Mathematics Statistics, Vol. 52, DOI: 10.1007/978-3-319-00660-4, 2013.
- **L. Beilina**, (Ed.), *Inverse Problems and Applications*, Series: Springer Proceedings in Mathematics & Statistics, Vol.120, ISBN 978-3-319-12498-8, 2015.

Open-access computer programs

- Software package **WavES** for the numerical solution of different types of time-dependent wave equations (acoustic, elastic and electromagnetic).

  Project cite: *http://waves24.com/*

- GitHub library of Matlab and PETSc programs for algorithms in the book *"Numerical Linear Algebra: theory and applications"*, Springer, 2017.

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Popular science articles/presentations

- I. Gainova, **L. Beilina**, J. Argilaguet, A. Meyerhans, G. Bocharov, *"Mathematical modelling of HIV infection: a system approach"*, El Pais,

  https://elpais.com/elpais/2018/11/29/ciencia/1543520090_602839.html

- **L. Beilina**, Solving the unsolvable, International Innovation, March 2013, (Research Media, UK, pp.112-114) ISSN 2041-4552.

Patents

- *"Determining an Internal structure of an object"*,
  Inventor: **L. Beilina**, US Provisional patent application, application nr. 62/770,235

- *System and Method for Multiphase Flow Measurements*,
  Patent No.:108. (WO2015121365)
  International Application No.: PCT/EP2015/053002.
  Inventors: Eriksson, Anders; (SE)
  Beilina, Larisa; (SE).