C U R R I C U L U M V I T A E

Alexander Yakovlevich HELEMSKII

BORN:

April 19, 1943, Moscow, USSR (now Russia).

EDUCATION:

1959-1964, Student of Moscow State University;

1964-1967, Aspirant (Ph.D. student) of Moscow State University;

DEGREES:

1967, Candidate of Physical-Mathematical Sciences (i.e. Russian equivalent of Ph.D.)

Thesis: "Extensions of Commutative Banach Algebras";

advisors: M.A.Naimark, G.E.Shilov.

1975, Doctor of Physical-Mathematical Sciences.

Thesis: "Homological Characteristics of Banach Algebras".

POSITION:

Professor of the Chair of Function Theory and Functional Analysis,

Faculty of Mechanics and Mathematics, Moscow State University

(Member of this Chair since 1967)

AWARDS:

A medal "The day of Soviet Science ("For contribution to fundamental sciences"), 1989.

A medal "850 years of Moscow", 1998.

"Soros Professor" of 1998, 1999 and 2001. "Moscow Grant" of 2002 and 2005.

Pacific Institute of Mathematical Studies Distinguished Chair, 2003.

Distinguished Professor of the Moscow University, 2011.

SERVICES:

Principal Investigator of the project "Homology characteristics of Banach and operator algebras", 1994-1995, in "International Science Foundation (Soros) long term research programs".

Superviser of the project "Homological characteristics of Banach and topological algebras", 1993-1995, 1996-1998, 1999-2001, 2002-2004, 2005-2007, 2008-2010, 2012-2014 and 2015-2017, supported by the Russian Foundation of Fundamental Researches.

Superviser of the project "Homology theory of algebras of analysis and noncommutative geometry", 1998-1999, supported by the program "Russian Universities - Fundamental Researches".

Member of the Editorial Board of Banach Journal of Mathematical Analysis

MEMBERSHIP:
Moscow Mathematical Society, since 1969;
London Mathematical Society, since 1990;
American Mathematical Society, since 1994.

LIST OF CANDIDATE (PH.D.) THESIS DEFENDED UNDER THE SUPERVISION OF A. Ya. HELEMSKII

1. A. A. Kurato. *Some Functional Equations in Locally Convex Spaces,* Moscow, 1974.

2. V. M. Zinde. *Artin Groups and the Analytic Properties of Spaces of Regular Orbits of Coxeter Groups of Series B and D,* Moscow, 1975.

3. M. V. Sheinberg. *On Injective and Flat Banach Modules,* Moscow, 1975.

4. Yu. V. Selivanov. *Some Problems of the Homological Classification of Banach Algebras,* Moscow, 1978.

5. L. I. Pugach. *Homological Properties of Ideals of Function Algebras and Their Connection with the Analytic Structure,* Moscow, 1983.

6. A. N. Krichevetz. *Homological Characterizations of Some Function Banach Algebras and Connected Problems of the Geometry of Banach Spaces,* Moscow, 1984.

7. O. S. Ogneva. *Homological Dimensions of Certain Algebras of Test Functions and Distributions on Manifolds,* Moscow, 1987.

8. Z. A. Lykova. *On the Homological Properties of Some Classes of Operator Algebras,* Moscow, 1987.

9. E. Sh. Kurmakaeva. *Homological Properties of Algebras of Continuous Functions,* Moscow, 1992.

10. R. N. Gumerov. *On the Homological Characteristics of Non-idempotent Commutative Banach Algebras,* Moscow, 1992.

11. O. Yu. Aristov. *On Certain Homological and Structural Characteristics of Operator Algebras,* Moscow, 1995.

12. Yu. O. Golovin. *Spatial Homological Properties of Non-selfadjoint Operator Algebras,* Moscow, 1996.

13. A. Yu. Pirkovskii. *Injectivity and homological dimensions in Frechet modules,* Moscow, 2000.

14. M. E. Polyakov. *Homological properties of Hilbert Modules and of some of their Banach versions,* Moscow, 2001.

15. S. B. Tabaldyev. *Homological Properties of some Function, Group and Operator Algebras* Moscow, 2007.

16. Yu. N. Kuznetsova. *Weighted Algebras on Locally Compact Groups* Moscow, 2007.

17. N. V. Volosova. *Cohomology of quantum Banach and polinormed algebras* Moscow, 2012.

18. N. T. Nemesh. *Metric and topological projectivity, injectivity and flatness of Banach modules.* Moscow, 2016.

FORMER STUDENTS OF A. Ya. HELEMSKII, doctors of sciences

1. A. N. Krichevetz (2001). 2. Yu. V. Selivanov (2003).

LIST OF PUBLICATIONS OF A. Ya. HELEMSKII

a) Books:

1. *Гомология в Банаховых и Топологических Алгебрах.* MSU Publishers, Moscow, 1986, 288 p. (in Russian).

Enlarged English version:

2. *The Homology of Banach and Topological Algebras.* Kluwer, Dordrecht, 1989, 334 p.

3. *Банаховы и Полинормированные Алгебры: Общая Теория, Представления, Гомологии.* Nauka, Moscow, 1989, 464 p. (in Russian)

English version:

4. *Banach and locally convex algebras.* Oxford University Press, Oxford, 1993, 446 p.

5. *Topological Homology: Helemskii Moscow Seminar.* (Editor). Nova Science Publishers, Huntigton, N.Y., 2000

6. *Лекции и упражнения по функциональному анализу.* MCCME Publishers, 2004, 552 p. (in Russian).

Enlarged 2-nd Edition, 2014.

English version:

7. *Lectures and exercises in functional analysis.* AMS Publishers, Providence, R.I., 2006, 468 p.

8. *Квантовый функциональный анализ.* MCCME Publishers, 2009, 290 p. (in Russian).

Enlarged English version:

9. *Quantum Functional Analysis.* AMS Publishers, Providence, R.I. ,2010, 468 p.

b) Articles:

10. (with G. M. Henkin). On the immersion of compacts into ellipsoids, -Vestnik MSU, No. 2, 1963, 3-12.

11. On algebras of nilpotent operators and associated categories, -Vestnik MSU, No. 4, 1963, 49-56.

12. On Banach algebras with finite-dimensional radical, -Vestnik MSU, No. 6, 1964, 7-16.

13. Description of the annihilator commutative Banach algebras, -Doklady AN USSR, v.157, No. 1, 1964, 59-62.

14. Annihilator extensions of commutative Banach algebras, -Izv. AN USSR, v.29, No. 4, 1965, 945-956.

15. On a certain analytic condition on a radical of a commutative Banach algebra and connected problems of decomposability, -Doklady AN USSR, v.167, No. 3, 1966, 525-527.

16. The strong decomposability of finite-dimensional extensions of C^*-algebras, -Vestnik MSU, No. 4, 1967, 50-52.

17. A compact set which is not an F-space but has the uniqueness property, -Mat Zametki, v.1, No. 6, 1967, 735-740.

18. Extensions of commutative Banach algebras. Candidate Thesis, MSU, 1967.

19. On singular extensions of the algebra of continuous functions on a compact set, -Sibirian Math. J., v.10, No. 3, 1969, 671-684.

21. On the connections between the structure of certain nilpotent associative algebras and the structure of the lattice of their ideals, -Doklady AN USSR, v.187, No. 3, 1969, 521-525.

22. On the homological dimension of normed modules over Banach algebras, -Math. Sbornik, v.81, No. 3, 1970, 430-444.

23. On the homological dimension of Banach algebras of analytic functions, -Math. Sbornik, v.83, No. 10, 1970, 222-233.

24. Description of relatively projective ideals in algebras $C(\Omega)$, -Doklady AN USSR, v.195, No. 6, 1970, 1286-1289.

25. Periodical product of modules over Banach algebras, -Funct. Anal. Appl., v.5, No. 1, 1971, 91-92.

26. On a certain class of flat Banach modules and its applications, -Vestnik MSU, No. 1, 1972, 29-36.

27. A method of computing and estimating the global homological dimension of Banach algebras, -Math. Sbornik, v.87, No. 1, 1972, 122-135.

28. The global dimension of a Banach function algebra is different from one, -Funct. Anal. Appl., v.6, No. 2, 1972, 95-96.

29. A locally compact Abelian group with trivial two-dimensional Banach cohomology is compact, -Doklady AN USSR, v.203, No. 5, 1972, 1004-1007.

28. (with Ya. G. Sinai). Description of derivations in algebras similar to algebras of local observations of spin systems, -Funct. Anal. Appl., v.6, No. 4, 1972, 99-100.

29. The global dimension of a Banach function algebra is different from one. II, -Proc. of the Chair of Funct. Theory and Funct. Anal., 1974, 39-58.

30. Homological characteristics of Banach algebras. Doctorate Thesis, Tbilissi, 1975.

31. Representation of derivations acting from the algebra of quasi-local observables of a spin system by Hamiltonians, -Mat. Zametki, v. 21, No. 1, 1977, 93-98.

32. (with Yu.O.Golovin). The homological dimension of some modules over tensor products of Banach algebras, -Vestnik MSU, No. 1, 1977, 54-61.

33. The lowest values taken by global homological dimensions of function Banach algebras, -Proc. Seminar Petrovskii, v. 3, 1978, 223-242.

34. (with M.V.Sheinberg). On amenable Banach algebras, -Funct. Anal. Appl., v.13, No. 1,

1979, 42-48.

35. Homological methods in the holomorphic calculus of several operators on Banach spaces, after Taylor, -Uspehi Math. Nauk, v.36, 1981, 127-172.

36. (with O.S.Ogneva). Homological dimensions of some algebras of test functions, -Mat. Zametki, v. 35, No. 2, 1984, 177-185.

37. Flat Banach modules and amenable algebras, -Trudy MMO, v. 47, 1984, 179-218.

38. Smallest values assumed by the global homological dimension of Banach function algebras, -Amer. Math. Soc. Transl., v. 124, 1984, 75-96.

39. Description of commutative Arens-Michael algebras of zero homological dimension, -Theor. and Appl. Probl. of Math., Tartu State Univ., 1985, 200-201.

40. Some remarks about ideals and results of the topological homology, -Proc. Center of Math. Anal., Austral. Nat. Univ., v. 21, 1989, 203-208.

41. The homological background of Connes amenability: the injectivity of the predual bimodule, -Math. Sbornik, v.180, No. 12, 1989, 1680-1690.

42. Homology in Banach and polinormed algebras: some results and problems, -in "Operator Theory: Advances and Applications", Birkhauser, 1990, 195-208.

43. Expression of the normal cohomology in terms of "Ext", and some applications, -Math. Nachr., v. 145, 1990, 55-58.

44. From topological homology: algebras with different properties of the homological triviality, -Lecture notes in Math., v. 1520, Springer-Verlag, Berlin, 1992, 19-40.

45. Banach cyclic (co)homology and the Connes-Tzygan exact sequence, -J. London Math. Soc., v. 46, No. 2, 1992, 449-462.

46. Banach cyclic (co)homology in terms of Banach derived functors, -St. Petersburg Math. J., v. 3, No. 5, 1992, 1149-1164.

47. (with Z.A.Lykova). On the normal version of the simplicial cohomology of operator algebras, -Bull. Austral. Math. Soc., v. 48, 1993, 1-4.

48. The spatial flatness and injectivity of Connes' operator algebras, -Extracta Math., v. 9, No. 1, 1994, 1-7.

49. Thirty one problems of the homology of the algebras of analysis, -Lecture notes in Math., v. 1573, Springer-Verlag, Berlin, 1994, 54-78.

50. Description of spatially projective von Neumann algebras, -J. Operator Theory, v. 32, 1994, 381-398.

51. Homological characterization of type I factors, -Doklady RAN, v.344, No. 4, 1995, 454-456.

52. Approximatively finite-dimensional C^*-algebras with projective Hilbert modules, their Bratteli diagrams and K_0-groups, -Math. Sbornik, No. 10, 1997, 1321-148.

53. Structure of C^*-algebras and their stock of projective Hilbert modules, -Uspehi Math. Nauk, v.52, No. 4, 1997, 221-222.

54. Projective homological classification of C^*-algebras, -Communications in Algebra, v.26(3), 1998, 977-996.

55. Description of spatially projective operator C^*-algebras, and around it. In: "Proc. of the Conference "Banach Algebras 97", Walter de Gruyter, Berlin, 1998.

56. Homology for the algebras of analysis. In: "Handbook of algebra, vol.II", M.Hazewinkel, ed. Elsevier, Dordrecht, 2000, 151-274.

57. Wedderburn-type theorems for operator algebras and modules: traditional and "quantized" homological approach. In: "Topological Homology: Helemskii Moscow Seminar", Nova Science Publishers, New York, 2000.

58. An elementary realization of a non-discrete factor,- Russian Journal of Mathematical Physics, v.7, No.2, 2000, 187-194.

59. (with M.E.Polyakov). Description of morphisms from a Hilbert module over a C^*-algebra

into this algebra,- Mat. Zametki, v.68, No.46 2000, 560-567.

60. (with F.Ghahramani and H.G.Dales). The amenability of measure algebras, -J. London Math. Soc., (2) v.66, 2002, 213-226.

61. Flat modules and harmonic analysis on groups. Intermathematical Seminar Globus of Moscow Independent University, I. MCCME, 2004, p. 238-256.

62. Some aspects of topological homology since 1995, a survey. In: "Proc. of the Conference "Banach Algebras 2003", AMS Publishers, Providence, 2004.

66. The quantum versions of the vector duality and the exponential law in the framework of the non-matricial approach,- Mat. Sb., v.197 No.12 (2006) pp. 133-156 (in Russian).

63. Tensor products in quantum functional analysis: non-coordinate approach. In: "Topological Algebras and Applications", A. Mallios, M. Haralampidou, Eds. AMS Publishers, Providence. (2007) 199-224.

64. A non-matricial version of the Arveson-Wittstock Extension Theorem and its generalization. Func. Anal. i pril., No.3 (2008).

65. Projective modules in the classical and quantum functional analysis,- J. of Math. Sci., v.159 No.5 (2009) 600-652.

66. Extreme flatness of normed modules and Arveson-Wittstock type theorems. J. Operator Theory, 64:1 (2010) 101-112.

67. Extreme flatness and Hahn-Banach type theorems for normed modules over sequence algebras. Fund. Math., 206 (2) (2011) 135-160.

68. Metric version of projectivity for normed modules over sequence algebras. Canadian J. Math, 65:3 (2012) 559-574.

69. Metric freedom and projectivity for classical and quantum normed modules. Mat. Sbornik, 204:7 (2013) 3-33.

70. What is quantum functional analysis? Intermathematical Seminar Globus of Moscow Independent University, VI. MCCME, 2013, p. 217-242.

71. Tensor products and multipliers of modules L_p over locally compact spaces. Mat. Zametki, 96:2 (2014).

72. Projectivity for operator modules: approach based on freedom. Rev. Roum. Math. Pures Appl, 53:2 (2014) 219-236.

73. Homologically best modules in classical and quantum functional analysis. To appear in the series "De Gruyter Proceedings in Math., 2015.

74. Projective tensor product of protoquantum spaces. Colloquium Mathematicum 149 (2017), no. 1, 45–73.

75. Structures on the way from classical to quantum spaces and their tensor products. Adv. Oper. Theory 2 (2017), no. 4, 447–467

76. Multi-normed spaces, based on non–discrete measures, and their tensor products. Izv. RAN ser. mathem., 82 (2018) №2, 3–25.

77. Projective quantum modules and projective ideals of C^*–algebras. Operator Theory: Advances and Applications, 262, (2018), 223–241, Springer International Publishing.

78. Projective and free matricially normed spaces. To appear in: "Banach Algebras 2017", ed. M.Filali, 2018.

c) book reviews

"Rings of Operators" by I. Kaplansky (Benjamin, New York, 1968), -New Books Abroad, No. 1, 1970, 19-21.

"Continuous Convergence on $C(X)$" by E. Binz (Springer-Verlag, Berlin, 1975), -New Books Abroad, No. 2, 1977, 7-9.

"Banach Modules and Functors on Categories of Banach Spaces" by J. Cigler, V. Losert, P. Michor (Marcel Dekker, New York, 1979), -New Books Abroad, No. 8, 1981, 22-23.

"C^*-Algebra Extensions and K-homology" by R. G. Douglas (Princeton Univ. Press, Princeton, N. J., 1980), -New Books Abroad, No. 4, 1982, 4-7.

"Casual Nets of Operator Algebras" by H. Baumgärtel, M.Wollenberg (Academie Verlag, Berlin, 1992), Acta Appl. Math, 1996.

"K-Theory and *-Algebras" by N. E. Wegge-Olsen (Oxford Univ. Press, Oxford, 1993), -Acta Appl. Math, 1996.

"Spectral Decompositions and Analytic Sheaves" by J. Eschmeier, M. Putinar (Clarendon Press, Oxford, 1996), -Bull. London Math. Soc., 1997.

PARTICIPATION IN CONFERENCES

-International Congress of Mathematicians, Moscow, 1966 (15 min. talk).

-XIIth International Conference on Operator Theory, Timişoara, 1988 (1 h. talk).

-Automatic Continuity and Banach Algebras, Canberra, 1989 (4x1 h. talks).

-North British Seminar on Functional Analysis, Edinbourg, 1990 (1,5 h. talk).

-Cambridge Conference on Banach Algebras, Cambridge, 1991 (2x1 h. talks).

-Shirshov International Algebraic Conference, Barnaul, 1991 (1 h. talk).

-Operator Theory and Banach Algebras, Warsaw, 1992 (2x1 h. talks).

-Southern California Operator Theory Meeting, Riverside, 1992 (1 h. talk).

-C^*-Algebras and their Invariants, Cork, 1995 (1 h. talk).

-Banach Algebras and Cohomology of Operator Algebras,
Newcastle-Upon-Tyne, 1995 (2x1 h. talks).

-Topological Algebras, Warsaw, 1995 (1 h. talk).

-Aegean Conference on Operator Algebras, Piphagoria (Samos), 1996 (30 min. talk).

-Workshop on Topological Algebras, Athens, 1997 (1 h. talk).

-XIIIth Conference on Banach Algebras, Blaubeuren, 1997 (1 h. talk).

-29th Annual Conference of the Iranian Mathematical Society, 1998 (1 h. talk).

-International Congress of Mathematicians, Berlin, 1998 (15 min. talk).

-C^*-algebras at Queens', Belfast, 1999 (30 min. talk).

-Banach Algebras' 99, Claremont (California), 1999 (1 h. talk).

-Topological Algebras with Applications to Differential Geometry and Mathematical Physics, Athens, 1999 (1 h. talk).

-International Workshop on General Topological Algebras, Tartu, 1999 (1 h. talk).

-International Functional Analysis Meeting, Valencia, 2000 (25 min. talk).

-International Conference on Topological Algebras and Applications, Rabat, 2000 (40 min. talk).

-International Conference "Differential Equations and Related Topics", dedicated to the 100th Anniversary of I.G.Petrovskii, Moscow, 2001 (20 min. talk).

-International Conference on Banach Algebras and Cohomology, Newcastle-Upon-Tyne, 2001 (45 min. talks).

-3rd International Conference on Topological Algebra and Applications, Oulu (Finland), 2001 (40 min. talk).

-BALTICON, Banach Algebra Theory International Conference, Odense (Denmark), 2001 (1 h. talk).

-4th International Conference on Topological Algebras and its Applications, Oahaka (Mexico), 2002 (50 min. talk).

-Banach Algebras and their Applications: Banach Algebras 2003, Edmonton (Canada), 2003 (45 min., 50 min talks, chairmanship at the workshop "Topological Homology").

-C^*-algebras and Elliptic Theory, Bedlewo (Poland), 2004 (1,5 h. talk).

-XXth International Conference on Operator Theory, Timişoara (Romania), 2004 (40 min. talk).

-5th International Conference on Topological Algebras and its Applications, Athens (Greece), 2005 (50 min. talk).

-Banach Algebras and their Applications - 2005, Bordeaux (France), 2005 (1h30m talk)

-C^*-algebras and Ellipticity, Bedlewo (Poland), 2006 (45 min. talk)

-International Congress of Mathematicians, Madrid, 2006 (20 min. talk).

-Topological Algebras, Warszawa (Poland), 2006 (1h30m talk)

-VIth Congress of Romanian Mathematicians, Bucharest (Romania), 2007 (50 min. talk)

-Banach Algebras 2007, Quebec (Canada), 2007 (30 min talk).

-C^*-algebras and Ellipticity III, Bedlewo (Poland), 2009 (45 min. talk)

-K-Theory, C^*-algebras and Topology of Manifolds, Tianjin (R. P. China), 2009 (45 min. talk)

-Banach Algebras 2009, Bedlewo (Poland), 2009 (30 min. talk)

-Banach Algebra and operator space technics in topological group theory, Leeds (England), 2010 (1 h. talk)

-K-Theory, C^*-algebras and Topology of Manifolds, Göttingen (Germany), 2010 (50 min. talk)

-Operator theory and its application, Götteborg (Sweden), 2011 (50 min. talk)

-Banach Algebras 2011, Waterloo (Canada), 2011 (25 min. talk)

-Operator Algebras and Quantum Groups, Warsaw (Poland), 2011 (30 min. talk)

-K-Theory, C^*-algebras and Topology of Manifolds II, Tianjin (China), 2012 (45 min. talk)

-Banach Algebras 2013, Götteborg (Sweden), 2013 (30 min. talk)

-I.M.Gelfand and Modern Mathematics, Moscow (Russia), 2013 (45 min. talk)

-XXVth International Conference on Operator Theory, Timişoara (Romania), 2014 (40 min. talk).

-Operator Algebras and Applications, 2014 ICM Satellite Conference, Cheongpung (Korea), 2014 (30 min. talk).

-International Congress of Mathematicians, Seoul, 2014 (20 min. talk).

-Operator Spaces and Quantum Probability, Besancon (France), 2014 (50 min. talk)

-X-th International Conference on Topological Algebras and its Applications, Bat Yam (Israel), 2015 (50 min. talk).

-International Workshop on Operator Theory and Applications, IWOTA 2015, Tbilisi (Georgia) (25 min talk)

-VI Conference of GMU - Georgian Mathematical Union, Batumi (Georgia), 2015 (50 min. talk)

-Breaking boundaries between Analysis, Geometry and Topology, Brighton (England), 2015 (50 min. talk)

-Simons semester: Noncommutative geometry the next generation, Warsaw (Poland), 2016 (1h30min. talk)

-International Conference on Function Theory, dedicated to A.F.Leont'ev, Ufa (Russia), 2017 (50 min. talk)

-Banach algebras 2017, Oulu (Finland), 2017 (55 min. talk)

-Probability Theory and Mathematical Statistics, Kazan (Russia) 2017 (50 min. talk)

-Mathematical Analysis in Athens – Katavolos and Nestoridis, Athens (Greece) 2017 (50 min. talk)