CURRICULUM VITAE

Last name: Seregin
First name: Gregory
Middle name: Alexander

Address: V.A.Steklov Mathematical Institute, St.Petersburg Department, POMI, Fontanka 27, St.Petersburg 191023, RUSSIA

Education

M.D. Leningrad Polytechnical Institute, 1974
Ph.D. Leningrad Polytechnical Institute, 1979
Dr.Sci. V.A. Steklov Mathematical Institute, St.Petersburg Branch, 1990

Professor (diploma) in speciality "Applied Mathematics"
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Employment

1974-1982: Assistant Professor, Chair of High Mathematics, St.Petersburg State Technical University (St.PSTU)}(former Leningrad Polytechnical Institute)
1982-1986: Associate Professor, Chair of High Mathematics, St.PSTU
1986-1990: Associate Professor, Chair of Applied Mathematics, St.PSTU
1990-1991: Senior Scientific Researcher, V.A.Steklov Mathematical Institute, and Associate Professor, Chair of Applied Mathematics, St.PSTU
1991-1993: Senior Scientific Researcher, V.A.Steklov Mathematical Institute, and Professor, Chair of Applied Mathematics, St.PSTU
1993 -2000: Leading Scientific Researcher, V.A.Steklov Mathematical Institute, and Professor, Chair of Applied Mathematics, St.PSTU

2000 -..... : Head of the Laboratory of Mathematical Physics,
V. A. Steklov Mathematical Institute

Teaching Experience

20 years

Undergraduate courses in Linear Algebra, Mathematical Analysis, Functional Analysis

Graduated courses in Mathematical Methods in the Mechanics of Solids, Sobolev Spaces

Membership

Member of St.Petersburg Mathematical Society

Visiting scientist

1990: University of Trento (Italy), 3 weeks
1992: Technische Hochschule Darmstadt (Germany), 2 weeks
1992: University of Jyvaskyla (Finland), one week
1993: Technische Hochschule Darmstadt and Universitat des Saarlandes (Germany), 2.5 weeks
1993: Universite Paris 7 (France), 6 months
1994: Institut fur Angewandte Mathematik der Universitat Bonn (Germany), one month
1994: Keio University (Yokohama, Japan), one month
1995: Chalmers University of Technology (Goteborg, Sweden), one month
1995: Institut fur Angewandte Mathematik der Universitat Bonn (Germany), one month
1996: Institut fur Angewandte Mathematik der Universitat Bonn (Germany), one month
1996: Universitat des Saarlandes, (Germany), two months
1996: University of Westminster, (London), three weeks
1997: Institut fur Angewandte Mathematik der Universitat Bonn (Germany), one month

1997: Universitat des Saarlandes,(Germany), one month
1997: Scuola Normale Superiore, Pisa, (Italy), 10 days
1998: Institut fur Angewandte Mathematik der Universitat Bonn (Germany), one month
1998: Iowa State University (USA), one month
1998: Max Plank Institute (Leipzig, Germany), three months
1999: Institut fur Angewandte Mathematik der Universitat Bonn (Germany), two months
1999: Universitat des Saarlandes (Germany), two months
1999: Iowa State University (USA), two months
2000: University of Parma (Italy), five weeks
2000: Universitat des Saarlandes (Germany), DAAD stipend, visiting professorship for the period of 2000, April 1 - 2001, March 31
2001: Iowa State University (USA), two months
2001: University of Minnesota (USA), visiting professorship for the period of 2001, September 1 - 2002, May 31
2003: University of Minnesota and Arizona State University (USA), three weeks
2003: Keio University (Japan), visiting professorship for the period of 2003, April 1 - 2004, March 31
2004: Universitat des Saarlandes (Germany), Humboldt Research Award for the period of 2004, September 15 - 2005, July 15
2005: USA, University of Chicago, University of Minnesota, American Institute of Mathematics in Palo-Alto, Arizona State University, March 1-28
2005: Arizona State University (USA), CRDF grant, 45 days
2006: Kyoto University, Research Institute of Mathematical Sciences (Japan), visiting professorship for the period of 2006, January 5 - 2006, April 14
2006: University of Minnesota and University of Maryland (USA), two weeks
2006: University of Bonn (Germany), four weeks
2007: University of Minnesota USA), (visiting professorship)five months

Awards and Honors

1. Humboldt Research Award, 2002
2. Sophja Kovalevskaya Prize of the Russian Academy of Sciences, 2003
3. Pathway Lecture Series in Mathematics, Keio University, Japan, February, 2006
4. Ordway Distinguished Lecture Series, University of Minnesota, USA, April, 2007

Editorial Activity

1. The editor of Volume 288(2002), journal "Zapiski Nauchn. Seminar. POMI"
2. The editor of Volume 295(2003), journal "Zapiski Nauchn. Seminar. POMI"
3. The editor of Volume 306(2003), journal "Zapiski Nauchn. Seminar. POMI"
4. The member of the editorial board of the journal "Applications of Mathematics"
5. The editor of Volume 310(2004), journal "Zapiski Nauchn. Seminar. POMI"
6. The editor of Volume 318(2004), journal "Zapiski Nauchn. Seminar. POMI"
7. The editor (together with J. F. Rodrigues and J. M. Urbano) of the Volume " Trends in Partial Differential Equations of Mathematical Physics", Series: Progress in Nonlinear Differential Equations and Their Applications, Vol. 61, 2005, XIV, 282 p.
8. The editor of Volume 336(2006), journal "Zapiski Nauchn. Seminar. POMI"

Organizing conferences and workshops

1. Trends in Partial Differential Equations of Mathematical Physics, Obidos, June, 2003.

2. Workshop on the Navier-Stokes equations, May 6-8, 2004,

Keio University, Yokohama.

3. Partial Differential Equations in Mathematical Physics, in memory of Olga A. Ladyzhenskaya (G. Hotel Bellavista, Levico T., Oct. 24-30, 2004).

4. Classics in PDE. A meeting in Honor of Nina Nikolaevna Uraltseva's 70'th Birthday, June 1 - 4, 2005 KTH, Stockholm

5. Conference on Parabolic and Navier-Stokes equations, Bedlewo, Poland, 10-17 September, 2006

6. Mathematical Hydrodynamics: Euler Equations and Related Topics, June 7-9, 2007, Saint-Petersburg, Russia

Invited Lectures (from 2004)

1. Conference "Partial Differential Equations in Mathematical Physics" in memory of Olga A. Ladyzhenskaya in Trento (Italy), Oct. 24-30, 2004 .

2. Conference "Fabes Lectures on Real Analysis and PDE", Bilbao, Spain, September 9-11, 2004.

3. "Interregional Colloquium of Mathematics" Kaiserslautern, Germany, October 14-15, 2004.

4. Workshop "Deterministic and stochastic Navier-Stokes equations", Palo-Alto, American Institute of Mathematics, March 14-18, 2005.

5. Conference "Classics in PDE's" , Stockholm, Sweden, June 1-5, 2005".

6. The Fourth International Conference on Differential and Functional Differential Equations, Moscow, Russia, August 14-21, 2005.

7. Conference "Self-similar solutions in nonlinear PDE's", Bedlewo, Poland, September 5-9, 2005,.

8. Kyoto Conference on the Navier Stokes equations and related topics,

Kyoto, Japan, January 6-10, 2006.

9. COE-workshop on nonlinear PDE's in analysis and geometry, Yokohama, Japan, January 16-18, 2006.

10. Conference “Mathematical Hydrodynamics”, Moscow, June 12-17, 2006.

11. Jean Leray Centennial Conference “Topological Methods in Nonlinear Problems, Bedlewo, Poland, June 25-30, 2006.

12. Conference “Geometric Methods in Nonlinear PDE’s and Free Boundary problems”, St. Petersburg, August 17-20, 2006.

13. Conference “Parabolic and Navier-Stokes equations”, Bedlewo, Poland, September 10-17, 2006.

14. The Center for Scientific Computation and Mathematical Modeling (CSCAMM) at the University of Maryland, workshop **October 23-26, 2006**, on “**Challenges of Incompressible Flows at High Reynolds Number**".

Some of my grants:

1. JSPS (Japan Society for the Promotion of Science), 2004, April 01 -May 31, 2004

2. CRDF (the United States Civilian Research and Development Foundation), RU-M1-2596-ST-04, Regularity of nonlinear problems in the theory of fluids and geophysics, 01.06.2004-31.05.2006, Principal Investigator.

3. RFBI (Russian Foundation of Basic Researches), 03-01-00638, Mathematical questions of the dynamics of viscous incompressible fluids and related questions in the theory of PDE’s, 2004-2007, Principal Investigator.

4. INTAS, 96-0835, Mathematical problems in nonlinear mechanics of solids and fluids, 01.10.97-01.10.00, Principal Investigator

Research and Publications

Main activities in applications of the Calculus of Variations and general theory of nonlinear partial differential equations to problems motivated by the mechanics of solids and fluids. At present, the main areas are:

mathematical problems in plasticity theory: existence and regularity for solutions to boundary value and initial-boundary problems

variational problems in the theory of phase transitions in solids: existence and regularity for minimizers

variational problems in nonlinear elasticity: existence and regularity for minimizers

the general theory of the Calculus of Variations: existence and regularity for minimizers of functionals with linear growth

mathematical problems of non-Newtonian fluids: existence and regularity for solutions to the corresponding boundary value and initial boundary value problems

attractors of semigroups for initial-boundary value problems: the of visco-plastic and generalized Newtonian fluid of visco-plastic and generalized Newtonian fluids

regularity for weak solutions to the Navier-Stokes equations

unique continuation for parabolic equations

The author of more than 80 publications

LIST OF PUBLICATIONS for 2002 -2007

General Theory of the Calculus of Variations and nonlinear PDE's

1. *On backward uniqueness for parabolic equations*, Zapiski Nauchn. Seminar. POMI, 288(2002), 100-103 (with L. Escauriaza and V. Sverak).

2. *On backward uniqueness for parabolic equations*, Arch. Rational Mech. Anal., 169(2003)2, 147--157 (with L. Escauriaza and V. Sverak).

3. *Backward uniqueness for the heat operator in half space*, Algebra and Analysis, 15(2003), no. 1, 201—214 (with L. Escauriaza and V. Sverak).

Mathematical Problems in the theory of Newtonian and non-Newtonian fluids

1. *Local regularity of suitable weak solutions to the Navier-Stokes equations near the boundary*, J. math. fluid mech., 4(2002), no.1, pp. 1-29.

2. *Differentiability properties of suitable weak solutions to the Navier-Stokes equations*, Algebra and Analysis, 14(2002), No. 1, pp. 193-237.

3. *Navier-Stokes equations with lower bounds on pressure*, Arch. Rational Mech. Anal. 163 (2002) 1, 65-86 (with V. Sverak).

4. *The Navier-Stokes equations and backward uniqueness*, Nonlinear Problems in Mathematical Physics II, In Honor of Professor O.A. Ladyzhenskaya, International Mathematical Series II, 2002, pp. 353--366 (with V. *Sverak*).

5. *Ol'ga Alexandrovna Ladyzhenskaya (on her 80th birthday),* Russ. Math. Surv., 2003, 58(2), pp. 395-425 (with N.N. Ural'tseva).

6. *$L_{3,\infty}$-solutions to the Navier-Stokes equations and backward uniqueness*, Uspekhi Matematicheskih Nauk, v. 58, 2(350), pp. 3--44. English translation in Russian Mathematical Surveys, 58(2003)2, pp. 211-250 (with L. Escauriaza and V. Sverak).

7. *Remarks on regularity of weak solutions to the Navier-Stokes equations near the boundary*, Zapiski Nauchn. Seminar, POMI, 295(2003), pp. 168-179.

8. *Regularity results for parabolic system related to a class of non-Newtonian fluids,* Ann. I. H. Poincare—AN 21 (2004), pp. 25-60 (with E. Acerbi and G. Mingione).

9. *Boundary partial regularity for the Navier-Stokes equations*, Zapiski Nauchn. Seminar, POMI, 310(2004), pp. 158-190 (with T. Shilkin and V.Solonnikov).

10. *Olga Alexandrovna Ladyzhenskaya (1922—2004),* Notice of AMS, 2004, vol. 51, no. 11, pp. 1320-1331 (with Susan Friedlander, Peter Lax, Cathleen Morawetz, Louis Nirenberg, Nina Ural'tseva, and Mark Vishik).

11. *On smoothness of $L_{3,\infty}$-solutions to the Navier-Stokes equations up to boundary*, Preprint PDMI-16/2003, Mathematische Annalen, 332(2005), pp. 219-238.

12. *Navier-Stokes equations: almost $L_{3,\infty}$-cases*, Journal of mathematical fluid mechanics, 9(2007), pp. 34-43.

13. *New version of Ladyzhenskaya-Prodi-Serrin condition,* Algebra i Analiz, 18 (2006), No: 1 (in Russian), English translation: St.Petersburg Math Journal, 18(2007), No.1, pp. 89-103.

14. *New Sufficient Conditions of Local Regularity for Solutions to the Navier-Stokes Equations*, Journal of mathematical fluid mechanics, first on-line (with A. Mahalov and B. Nicolaenko).

15. *A sufficient condition of local regularity for the Navier-Stokes equations*, Zapiski Nauchn. Seminar, POMI, 336(2006), pp. 46-54 (with W. Zajaczkowski).

16. *Estimates of suitable weak solutions to the Navier-Stokes equations in critical Morrey spaces*, Zapiski Nauchn. Seminar, POMI, 336(2006), pp. 199-210.

17. *Local regularity theory of the Navier-Stokes equations*, Handbook of Mathematical Fluid Mechanics, Vol. 4, Edited by Friedlander, D. Serre, pp, 159-200.

18. *Weak solutions to the Cauchy problem for the Navier-Stokes equations satisfying the local energy inequality*, AMS translations, Series 2, Volume 220, pp. 141-164 (with N. Kikuchi).

19. *A global nonlinear evolution problem for generalized Newtonian fluids: Local initial regularity of the strong solution*, Computers and Mathematics with applications, 53(2007), pp. 509-520 (with M. Fuchs).

20. *On local regularity of suitable weak solutions to the Navier-Stokes equations*, accepted for publications in Uspekhi Matemat. Nauk (Russian Mathematical Surveys)

21. *A sufficient condition of regularity for axially symmetric solutions to the Navier-Stokes equations*, accepted for publication in SIMA, (with W. Zajaczkowski)

Monographs

1. *Variational Methods for Problems from Plasticity Theory and from the Theory of Generalized Newtonian Fluids*, Lecture Notes in Mathematics, Springer, 1749 (with M. Fuchs).