

Alexander Yu. Gelfgat**CURRICULUM VITAE****PERSONAL:**

Name	Alexander Yu. Gelfgat
Date and Place of Birth:	13 August 1961, Riga, Latvia
I.D. number	311710602
Date of Immigration:	6 October 1993
Citizenship	Israeli
Marital Status:	Married, 2 children
Present Address	17 Hayarkon str., Kefar Yona, Israel, 40300
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ACADEMIC DEGREES:

- 1983: M.Sc., Faculty of Physics and Mathematics, Latvian State University.
Thesis: "Investigation of buoyancy and thermocapillary convection in a cavity with different temperature on the horizontal and vertical walls".
- 1989 : Ph.D. (Cand. Sci.), Leningrad Polytechnic Institute,
(at present: S.Petersburg Technical University).
Thesis "Instability and oscillatory supercritical regimes
of free convection in a laterally heated square cavity".

PROFESSIONAL EXPERIENCE

- | | |
|------------------------------|---|
| 1980 - 1981 | Assistant, Faculty of Physics and Mathematics, University of Latvia |
| 1982 -1983 | Assistant, Computer Center, University of Latvia |
| 1984 -1986 | Ph.D. student, University of Latvia |
| 1987 - 1989 | Research Fellow, Department of Mathematical Physics, Computer Center (recently Institute of Mathematics and Computer Science), University of Latvia |
| 1990 - 1991 | Leading Research Associate, Department of Mathematical Physics, Institute of Mathematics and Computer Science, University of Latvia |
| January –
August
1992 | Senior Researcher, Department of Mathematical Physics, Institute of Mathematics and Computer Science, University of Latvia |
| August 1992 -
August 1993 | Post-doctoral Fellow, Institute of Industrial Science, University of Tokyo. |

March 1994 – March 2000	Research Associate, Faculty of Mechanical Engineering, Technion
June 1999	Visiting Fellow, Institute of Fundamental Technological Research, Polish Academy of Sciences
April 2000 – September 2002	Senior Research Associate, Mechanical Engineering, Technion, Haifa, Israel (in the framework of KAMEA program)
August 2000	Visiting fellow, LIMSI CNRS, France
October 2001	Visiting Fellow, Toyo University, Japan
July 2002	Visiting Fellow, Polytechnic University of Catalunya, Spain
October 2002 – April 2006	Senior Lecturer, Department of Fluid Dynamics and Heat Transfer, Faculty of Engineering, Tel-Aviv University.
Since April 2006 –	Associate Professor with tenure, School of Mechanical Engineering, Faculty of Engineering, Tel-Aviv University.
August 2009 – July 2010	Senior Marie Curie Fellow, School of Mechanical Materials & Manufacturing Engineering and School of Mathematical Sciences, University of Nottingham, UK. Sabbatical leave supported by Marie Curie Mobility Grant

RESEARCH INTERESTS:

- Thermal, mechanical and electromagnetic control of stability of flows driven by convection and rotation in crystal growth processes and devices.
- Electrohydrodynamic control of thermocapillary drift of drops and bubbles.
- Numerical tracking of moving phase-change fronts and capillary boundaries.
- Heat and mass transfer enhancement by vortical flows induced by hydrodynamic instabilities.
- Modeling of three-dimensional instabilities of convective and rotating flows.
- MHD applications in materials processing.
- Generalized stability theory, non-modal perturbation growth, bypass transition.
- Direct Numerical Simulation (DNS) of 3D flows.
- Spatially developing instabilities in shear flows.
- Spectral methods for numerical fluid dynamics and heat/mass transfer.
- Finite volume method in computational fluid dynamics and heat/mass transfer.
- Pressure-velocity coupled CFD
- Experimental studies on flow instabilities.
- Numerical application of stability analysis in computational fluid dynamics and heat transfer.
- Parallelization of CFD codes on parallel computers
- Benchmarking and experimental validation of numerical codes.

TEACHING EXPERIENCE

- Technological University of Latvia, Dept. of Computer Science. "*Programming and Numerical Methods*". 1991-1992. Lecturer
- Technion - Israel Institute of Technology, Faculty of Mathematics. "*Fourier series and integral transforms*". Winter semester, 1997-1998. Lecturer.
- Technion - Israel Institute of Technology, Faculty of Mechanical Engineering. "*Numerical Analysis*". Spring semester, 1998. Lecturer.
- Technion - Israel Institute of Technology, Faculty of Mechanical Engineering. "*Finite element methods in engineering*". Winter semester, 1998-1999. Lecturer.
- Haifa University, Department of Mathematics. "Partial Differential Equations and Applications", Winter semester 2000-2001, 2001-2002, 2002-2003, Lecturer.
- Haifa University, Department of Mathematics. "Parallel Computing", Spring semester 2001, 2002, Lecturer.
- Tel Aviv University, Department of Fluid Mechanics and Heat Transfer. "Heat Transfer", Winter semester 2003-2009, 2010-2012, Lecturer.
- Tel Aviv University, Department of Fluid Mechanics and Heat Transfer. "Convection Heat Transfer", Spring semester 2003, 2005, Lecturer.
- Tel Aviv University, Department of Fluid Mechanics and Heat Transfer. "Mechanics of particles", Winter semester 2003-2004, Lecturer.
- Tel Aviv University, Department of Fluid Mechanics and Heat Transfer. "Laboratory for thermal packaging", Spring semester 2004-2009, Lecturer.
- Tel Aviv University, Department of Fluid Mechanics and Heat Transfer. "Fluid Mechanics - 1", Spring semester 2006, 2007-2009, 2011, Lecturer.
- Tel Aviv University, Department of Fluid Mechanics and Heat Transfer. "Advanced Fluid Mechanics," Spring semester 2011, 2012, Lecturer.

PUBLIC PROFESSIONAL ACTIVITIES:**Reviewer for journals:**

Journal of Fluid Mechanics
 Physics of Fluids
 European Journal of Mechanics. B/Fluids
 Journal of Fluids Engineering
 Journal of Crystal Growth
 Journal of Computational Physics
 Physica D (Nonlinear phenomena)
 Fluid Dynamic Research
 Acta Mechanica
 Theoretical and Computational Fluid Dynamics
 International Journal for Numerical Methods in Fluids
 International Journal of Heat and Fluid Flow
 International Journal of Heat and Mass Transfer
 Magnetohydrodynamics

Numerical Heat Transfer
 Computers and Fluids
 Computers and Structures
 Crystal Research and Design
 Microgravity Science and Technology
 International Journal of Thermal Sciences
 Chemical Engineering Science
 Langmuir
 Europhysics Letters
 Canadian Journal of Physics
 Computational Fluid Dynamics Journal
 Computational Thermal Sciences
 Computer Modeling in Engineering & Sciences
 Archives of Mechanics
 Proceedings of Royal Society of Edinburg A
 Journal of Engineering Mathematics
 Journal of Solar Energy Engineering
 Journal of Aerospace Computing, Information, and Communication
 International Journal of Turbo & Jet Engines
 Journal of Enhanced Heat Transfer
 The Open Mechanical Engineering Journal
 Journal of Zhejiang University – Science A (*published by Springer*)

Reviewer for conferences:

- 2nd International Symposium on Two-Phase Flow Modeling and Experimentation. Pisa, Italy, May 23-25, 1999.
- 8th International Symposium on Computational Fluid Dynamics. Bremen, Germany, September 5-10, 1999.
- 14th International Crystal Growth Conference, Grenoble, France, August 9-13, 2004.
- 13th International Heat Transfer Conference, Sydney, Australia, August 13-18, 2006.
- 7th PAMIR International Conference on Fundamental and Applied MHD, Presqu'île de Giens - France, September 8 - 12, 2008.

Reviewer for research proposals:

- 2004, 2006 – Israel Science Foundation
- 2006 – German – Israeli Foundation
- 2006 – Ministry of Science and Technology, Israel; Infrastructures grants program
- 2007 – Czech Science Foundation
- 2008 – Ministry of Science and Technology, Israel; Israel-Croatia cooperation program
- 2009, 2010 – Applied Fund for Research, Hebrew University of Jerusalem
- 2009 – Foundation for Polish Science, Poland

MEMBERSHIP IN PROFESSIONAL SOCIETIES

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| EUROMECH | - European Mechanics Society |
| IACM | - International Association for Computational Mechanics |
| IACMM | - Israel Association for Computational Methods in Mechanics |

IACG - Israel Association for Crystal Growth
IVC - Israel Vacuum Society

MEMBER OF EDITORIAL BOARD OR EDITORIAL ADVISORY BOARD:

2005 to 2007 - Computational Fluid Dynamics Journal
2005 to date - Fluid Dynamics and Material Processing
2009 to date - The Open Numerical Methods Journal (Open access)
2010 to date - ISRN Mechanical Engineering Journal (Open access)

2007 - Journal of Physics: Conference Series, vol. 64. Proceedings of the Second International Symposium on Bifurcations and Instabilities in Fluid Dynamics.

2010 - Journal of Physics: Conference Series, vol. 216. Proceedings of the Third International Symposium on Bifurcations and Instabilities in Fluid Dynamics.

HONORARY EDITOR:

2007 to date - Computational Fluid Dynamics Journal

AWARDS :

1992 – JSPS (Japan Society for Promotion of Science) Post-Doctoral Fellowship for 1 year research in Heat Transfer Laboratory (Head - Prof. I.Tanasawa) of Institute of Industrial Science, University of Tokyo.

1998 – Best poster presentation award, 11th International Heat Transfer Conference (IHTC), August 23-28, 1998, Kyongju, Korea

1999 – European Science Foundation Visiting Grant (for a visit to Institute of Fundamental Technological Research, Polish Academy of Sciences).

1999 – National Science Foundation (U.S.A.) Participant Support Award (for participation in the Conference “Interfaces for the Twenty-First Century”).

2000 – Standard Performance Evaluation Corporation (SPEC) award for the benchmark computer code (the code GALGEL included in SPEC CPU2000 distribution).

2000 – French Academy of Sciences visiting grant for the project “Développement d’une méthodologie de type contrôle optimal pour la maîtrise des écoulements thermo convectifs en espaces confinés: application á la croissance cristalline” (visit to LIMSI CNRS).

2001 – Japan Society for Promotion of Science and Israeli Ministry of Science, Culture and Sport. Visiting grant for the project “Numerical modeling of stability control in bulk crystal growth” (visit to Toyo University, Japan)

2002 – Israeli Ministry of Science, Culture and Sport. Visiting grant for the project “Numerical modeling of three-dimensional nonlinear dynamics of confined swirling flows” (visit to Universidad Politécnica de Cataluña, Departamento de Física Aplicada, Barcelona, Spain).

2003 – Haifa University. Excellent lecturer award.

2005 – Israel Academy of Science and Latvian Academy of Science. Visiting grant to Institute of Physics, University of Latvia

2010 – Certificate of Valued Reviewer from Journal of Crystal Growth

INVITED LECTURES

Gelfgat A.Yu. “Two- and Three-dimensional Instabilities of Confined Flows: Numerical Study by a Global Galerkin Method”, 8th International Symposium on Computational Fluid Dynamics, Bremen, Germany, September 5-10, 1999 (plenary lecture).

Gelfgat A.Yu. and Bar-Yoseph P.Z. “Multiple Solutions and Stability of Confined Convective and Swirling Flows”, Fifth World Congress on Computational Mechanics, Vienna, Austria, July 7-12, 2002 (keynote lecture).

Gelfgat A.Yu. "Stability analysis of fluids flows", 14th Symp. of Israel Association for Computational Methods in Mechanics, (tutorial lecture). Haifa, Israel, October 2003.

Bar-Yoseph P.Z., Gelfgat A.Yu. "Bifurcation and stability analysis for crystal growth processes", 29th Israel Mechanical Engineering Conference, Technion, Haifa, May 2003 (keynote lecture).

Bar-Yoseph P.Z., Gelfgat A.Yu. "Stability and bifurcation analysis for crystal growth processes", International Conference on Computational and Experimental Engineering and Sciences, Madeira, Portugal, 26-29 July, 2004 (keynote lecture).

Gelfgat A.Yu. "On some essential problems in numerical modeling of melt flow in bulk crystal growth", 23rd IVS Annual Conference and Technical Workshop. Tel Aviv, September 27, 2004 (keynote lecture).

Gelfgat A.Yu. “Numerical Modeling of Instabilities of Confined Flows: From Highest-Order to Lowest-Order Numerical Methods”, Workshop “Conceptual aspects of hydrodynamic stability”, Vienna, Austria, October 9-14, 2006 (invited lecture).

Feldman Yu. and Gelfgat A.Yu. “A novel multigrid approach for solving incompressible Navier-Stokes equations on massively parallel computers”, 29th Israel Symposium on Computational Mechanics, Haifa, Technion, October 14, 2010 (keynote lecture) .

Gelfgat A.Yu. "Computational modelling of instabilities of confined flows: concepts, achievements, benchmarks, and comparison with experiments", Workshop "Tipping Points in Complex Flows", Leiden, The Netherlands, October 31 – November 4, 2011 (planned).

GRADUATE STUDENT SUPERVISED

Hvorova I. (M.Sc., Faculty of Physics and Mathematics, University of Latvia)

"Galerkin Method for Solution of PDE Problems in Domains of Complicated Geometry". M.Sc. Thesis, Faculty of Physics and Mathematics, The University of Latvia. 1991 (in Russian).

Perlin A. (M.Sc., Faculty of Mechanical Engineering, Technion)

"Soldering of optical fiber in an optical device", M.Sc. without thesis, Faculty of Mechanical Engineering, Technion – Israel Institute of Technology, 2003-2004. Co-supervisor (together with Prof. G. Hetsroni).

Reuveni Yu. (M.Sc., Department of Geophysics, Tel-Aviv University)

"Study of counter-propagating Rossby waves in a stratified mixing layer". Tel-Aviv University, Dept. of Geophysics and Planetary Sciences, Faculty of Exact Sciences, 2003-2005 (together with Dr. E. Heifetz).

Fattal B. (M.Sc., School of Mechanical Engineering, Tel-Aviv University)

"Computational model of melting driven by natural convection". Tel-Aviv University, School of Mechanical Engineering, Faculty of Engineering. 2004-2007.

Vitoshkin H. (M.Sc., School of Mechanical Engineering, Tel-Aviv University)

"Computational modeling of spatially developing instabilities". Tel-Aviv University, School of Mechanical Engineering, Faculty of Engineering. 2005-2007.

Teitel M. (M.Sc., School of Mechanical Engineering, Tel-Aviv University)

"Experimental observation of instabilities in a large Prandtl number Czochralski melt". Tel-Aviv University, School of Mechanical Engineering, Faculty of Engineering (co-supervisor, together with Prof. E. Kit). 2005-2007.

Gringrenovich S. (M.Sc., School of Mechanical Engineering, Tel-Aviv University)

"Experimental study of parametrically forced mixing layer". Tel-Aviv University, School of Mechanical Engineering, Faculty of Engineering. 2005-2007.

Trevolsky E. (M.Sc., School of Mechanical Engineering, Tel-Aviv University)

"Development of thermal packaging of an electronic block". M.Sc. without thesis. Tel-Aviv University, School of Mechanical Engineering, Faculty of Engineering. 2006-2008.

Feldman Yu. (Ph.D., School of Mechanical Engineering, Tel-Aviv University)

"Direct numerical simulation of supercritical convective flows". Tel-Aviv University, School of Mechanical Engineering, Faculty of Engineering. 2006-2010.

Shitrit S., (Ph.D., School of Mechanical Engineering, Tel-Aviv University)

"Transonic flow computations by algebraic multigrid". Tel-Aviv University, School of Mechanical Engineering, Faculty of Engineering (co-supervisor together with Dr. D. Sidilkover). 2007-2010.

Haslavsky V., (Ph.D., School of Mechanical Engineering, Tel-Aviv University)

"Experimental studies of Czochralski melt flow". Tel-Aviv University, School of Mechanical Engineering, Faculty of Engineering (co-supervisor together with Prof. E. Kit). Started in 2007.

Vitoshkin H. (Ph. D., School of Mechanical Engineering, Tel-Aviv University)

"Computational modeling of spatially developing instabilities". Tel-Aviv University, School of Mechanical Engineering, Faculty of Engineering. Started in 2007.

Shtein I. (M.Sc., School of Mechanical Engineering, Tel-Aviv University)

"Experiments on natural ventilation under effect of wind and buoyancy". M.Sc. without thesis. Tel-Aviv University, School of Mechanical Engineering, Faculty of Engineering. 2006-2008.

Nedelko M. (M.Sc., School of Mechanical Engineering, Tel-Aviv University)

"Numerical simulation of natural ventilation under effect of wind and buoyancy". M.Sc. without thesis. Tel-Aviv University, School of Mechanical Engineering, Faculty of Engineering. 2006-2008.

Markman S. (M.Sc., School of Mechanical Engineering, Tel-Aviv University)

"Numerical simulation of electromagnetic control of semiconductor melt flows". Started in October, 2010.

SUPERVISION OF POST-DOCS AND REPATRIATED SCIENTISTS

Dr. Rubinov A. (repatriate scientist, 1999 - 2002)

"Krylov subspace iteration based methods for direct solution of stability problems in fluid dynamics"

Dr. Potapov A. (repatriate scientist, 2000 - 2001)

"Numerical Modeling of Crystallization Processes Affected by Melt Flow and Heat / Mass Transfer"

Dr. Erenburg V. (repatriate scientist, 1998 - 2003)

"Transport Phenomena in Microgravity"

Dr. Punjabi S. (post-doctoral researcher, June 2005 – June 2006)

"Instabilities of confined flows driven by convection and rotation"

Vorobyov R. (post-doctoral researcher, January – December 2007),

"Effect of radiative heat transfer on the growth of optical crystals"

RESEARCH GRANTS

1992 - 1993: MONBUSHO (Ministry of Education, Science, Sports and Culture of Japan) Grant No.92024, "**Numerical Investigation of Convection in Electromagnetic Field**" (with Prof. I. Tanasawa of Tokyo University). 1,000,000 yen .

1995 - 1997: German-Israeli Foundation for Scientific Research and Development. Grant No. I-284.046.10/93 . "**Influence of a Magnetic Field on the Oscillatory Instability of**

- Buoyancy-Thermocapillary Convection in Long Horizontal Cavities".** (with Profs. A. Yarin and P. Bar-Yoseph of Technion, Drs. G. Gerbeth and J. Priede of Forschungszentrum Rossendorf). 273,500 DM.
- 1996 - 1998:** MONBUSHO (Ministry of Education, Science, Sports and Culture of Japan) International Scientific Research Program "**Control of Transport Processes in Manufacturing of Materials**" (with Profs. I. Tanasawa and M. Nishio of Tokyo University, Prof. T. Maekawa of Toyo University, Prof. P. Bar-Yoseph of Technion, and Prof. Yu. Gelfgat of Institute of Physics, Latvian Academy of Sciences). 3,000,000 yen.
- 1997 - 1999:** Israel Science Foundation. "**Axisymmetry Breaking Instabilities in Axially Symmetric Rotating Flows**" (with Profs. P. Bar-Yoseph and A. Solan). Grant No.110/96-1. \$70,000.
- 1998-2000:** Ministry of Science, Israel. "**Numerical Modeling of Electromagnetic Control of the Production of Monocrystalline Materials**" (with Profs. P. Bar-Yoseph, A. Solan (Technion) and E. Kit (Tel-Aviv University)). \$150,000.
- 1999-2001:** United States - Israel Binational Science Foundation. "**Hydrodynamics and Mass Transfer in a Novel Bioseparation / Bioreactor Design: Numerical and Experimental Study**" (with Profs. A. Yarin, P. Bar-Yoseph, M. Graham and E. Lightfoot). \$50,000 per year.
- 2001-2005:** Israel Science Foundation. "**Transitional Phenomena in Stratified Shear Flows**". (with Profs. E. Kit and I. Wignjansky). \$50,000 per year.
- 2001:** Norman and Helen Asher Space Research Institute. "**Processes of Heat and Mass Transfer in Microgravity**", (with Profs. A. Solan and P. Bar-Yoseph). \$10,000 per 1 year.
- 2003:** Gordon Center for Energy Studies. "**Low energy consumptions electromagnetic control of fluid flows in bulk crystal growth processes**". \$5,000 per 1 year.
- 2003:** Center for Academic and Educational Relations with the C.I.S. and the Baltic States. "**Electromagnetic control of semiconductor crystal growth processes: experimental and computational modeling**". 30,000 NIS per 1 year.
- 2005-2007:** German-Israeli Foundation for Scientific Research and Development. "**Experimental and numerical study of hydrodynamic instabilities during growth of optical crystals from the melt**" (PI, with Prof. E. Kit) €75,000 for 3 years for Israeli team.
- 2005:** Gordon Center for Energy Studies. "**Numerical modeling of confined swirling flow in steam-air vortex energizer of steam-enhanced vortex plant**". \$2,500 per 1 year.
- 2005:** Ministry of National Infrastructures. "**Numerical Study of Confined Vortex Flow in Steam-Air Swirler**". (together with Prof. N. Eisenberg, Jerusalem College of Technology). 60,000 NIS for 6 months.
- 2006-2008:** Israel Science Foundation. "**Experimental and numerical study of thermal and mechanical control of BBO crystal growth from solutions**" (PI, together with Prof. M. Roth, Hebrew University of Jerusalem). 198,000 NIS per year.
- 2005-2009:** Binational Science Foundation: "**Relating spatial to temporal instability of meteorological shear flows**" (PI, together with Dr. E. Heifetz (TAU) and Prof. H. Fernando (ASU)). \$35,000 per year.

- 2006:** Gordon Center for Energy Studies. "**Numerical modeling of spatially developing instabilities around a system of wind power stations**", \$8,000 per 1 year.
- 2008-2009:** Ministry of Science, Culture and Sport, Israel (cooperation with France). "**Development of novel ideas for Navier-Stokes solvers**", Euro 10,000 for 2 years.
- 2009-2010:** Ministry of Science, Culture and Sport, Israel (cooperation with France). "**Improving scalability of state-of-the-art computational fluid dynamics by state-of-the-art numerical linear algebra**", NIS 156,000 for 2 years.
- 2009-2011:** German-Israeli Foundation for Scientific Research and Development. "**Experimental and numerical study of hydrodynamic instabilities during growth of optical crystals from the melt**", continuation grant (PI, with Prof. E. Kit) €94,700 for 3 years for Israeli team.
- 2009-2010:** EU FP7 Marie Curie Actions. "**Computational modelling of electromagnetic control of melt flows and heat/mass transfer during manufacturing of bulk photovoltaic materials**", mobility grant for one-year stay at the University of Nottingham. €121,700
- 2011:** Gordon Center for Energy Studies. "**Electromagnetically controlled growth of striations-free photovoltaic semiconductor materials**", \$6,000 per 1 year.

PERSONAL CONTRACTS:

- 01.12.1993 – 31.03.1994:** Contract with Research Center Rossendorf, Germany. "Numerical simulation of thermocapillary drop migration".
- 01.01.2001 – 31.12.2003:** Consultancy contract with Hertwich Engineering GmbH, Austria. "Numerical modeling of MHD liquid metal flows".

PUBLICATIONS:**Book edited**

Studies of Flow Instabilities in Bulk Crystal Growth, ed. A. Gelfgat, Transworld Research Network, 2007.

Chapters in books

1. Gelfgat A.Yu. 1998. On Different Modes of Rayleigh-Bénard Instability in Two- and Three-Dimensional Rectangular Enclosures. *In: Continuation methods in Fluid Dynamics*, eds. D. Henry and A. Bergeon, Vieweg, 1998, pp.119-132.
2. Gelfgat A.Yu. 2008. Numerical Study of Three-Dimensional Instabilities of Czochralski Melt Flow Driven by Buoyancy Convection, Thermocapillarity and Rotation. *In: Studies of Flow Instabilities in Bulk Crystal Growth*, ed. A. Gelfgat, Transworld Research Network, 2007, pp. 57-82.

Refereed papers in professional journals:

1. Gelfgat A.Yu. and Perets I.V. 1987. Suppression of forced and convective flows of a stably stratified fluid in vertical channels, *Mechanika Zhidkosti i Gaza*, 1987, No.2, 172-174 (rus., English translation in: *Fluid Dynamics*, 1987, **22**(2) 310-312).
2. Gelfgat A.Yu. 1988. Effects of the magnetic field magnitude and direction on the oscillatory thermogravitational convection regimes in a rectangular cavity, *Magnetic Hydrodynamics*, 1988, No.3, 70-75 (rus., English translation in: *Magnetohydrodynamics*, 1988, **24**(3) 324-328).
3. Gelfgat A.Yu. and Martuzans B.J. 1990. Investigation of thermogravitational-thermocapillary steady-state convective flow stability at low Prandtl numbers, *Mechanika Zhidkosti i Gaza*, 1990, No.2, 8-12 (rus., English translation in: *Fluid Dynamics*, 1990, **25**(2) 169-174).
4. Gelfgat A.Yu. 1990. The magnetic field as it affects the three-dimensional structure of the self-oscillation regimes in free convection, *Magnitnaya Gidrodynamika*, 1990, No.1, 13-22 (rus., English translation in: *Magnetohydrodynamics*, 1990, **26**(1), 8-16).
5. Gelfgat A.Yu. 1991. Development and instability of steady convective flows in the square cavity heated from below in a field of vertically directed vibration forces, *Mechanika Zhidkosti i Gaza*, 1991, No.2, 8-12 (rus., English translation in: *Fluid Dynamics*, 1991, **26**(2), 165-172).
6. Gelfgat A.Yu. and Tanasawa I. 1994. Numerical analysis of oscillatory instability of buoyancy convection with the Galerkin spectral method, *Numerical Heat Transfer. Part A: Applications*, **25**(6), 627-648.
7. Gelfgat A.Yu. and Tanasawa I. 1995. Numerical investigation of the thermocapillary drift of a bubble in an electric field, *Microgravity Science and Technology*, **8**(1), 16-22.
8. Gelfgat A.Yu., Bar-Yoseph P.Z. and Solan A. 1996. Stability of confined swirling flow with and without vortex breakdown, *Journal of Fluid Mechanics*, **311**, 1-36.
9. Gelfgat A.Yu., Bar-Yoseph P.Z. and Solan A. 1996. Steady states and oscillatory instability of swirling flow in a cylinder with rotating top and bottom, *Physics of Fluids*, **8**(10), 2614-2625.
10. Gelfgat A.Yu., Bar-Yoseph P.Z. and Yarin A.L. 1997. On oscillatory instability of convective flows at low Prandtl number, *Journal of Fluids Engineering*, **119**, 823-830.

11. Gelfgat A.Yu., Bar-Yoseph P.Z. and Yarin A.L. 1999. Stability of multiple steady states of convection in laterally heated cavities, *Journal of Fluid Mechanics*, **388**, 315-334.
12. Gelfgat A.Yu., Bar-Yoseph P.Z. and Yarin A.L. 1999. Non-Symmetric convective flows in laterally heated rectangular cavities, *Int. J. Computational Fluid Dynamics*, **11**, 261-273.
13. Gelfgat A.Yu. 1999. Different modes of Rayleigh-Bénard instability in two- and three-dimensional rectangular enclosures, *Journal of Computational Physics*. **156**, 300-324.
14. Priede J., Cramer A., A.Bojarevics, Gelfgat A.Yu., Bar-Yoseph P.Z., Yarin A.L., Gerbeth G. 1999. Experimental and numerical study of anomalous thermocapillary convection in liquid gallium, *Physics of Fluids*, **11**, 3331-3339.
15. Gelfgat A.Yu., Bar-Yoseph P.Z., Solan A., Kowalewski T. 1999. An axisymmetry- breaking instability in axially symmetric natural convection, *International Journal of Transport Phenomena*, **1**, 173-190.
16. Gelfgat A.Yu., Bar-Yoseph P.Z., and Solan A. 2000. Axisymmetry breaking instabilities of natural convection in a vertical Bridgman growth configurations, *Journal of Crystal Growth*, **220**, 316-325.
17. Gelfgat A.Yu. 2001. Two- and three-dimensional instabilities of confined flows: numerical study by a global Galerkin method, *Computational Fluid Dynamics Journal*, **9**, 437-448.
18. Gelfgat A.Yu., Bar-Yoseph P.Z., and Solan A. 2001. Three-dimensional instability of axisymmetric flow in a rotating lid - cylinder enclosure, *Journal of Fluid Mechanics*, **438**, 363-377.
19. Gelfgat A.Yu., Bar-Yoseph P.Z., and Solan A. 2001. Effect of axial magnetic field on three-dimensional instability of natural convection in a vertical Bridgman growth configuration, *Journal of Crystal Growth*, **230**, 63-72.
20. Gelfgat A.Yu. and Bar-Yoseph P.Z., 2001. The effect of an external magnetic field on oscillatory instability of convective flows in a rectangular cavity, *Physics of Fluids*, **13**, 2269-2278.
21. Gelfgat A.Yu., Yarin A.L., and Bar-Yoseph P.Z. 2001. Three-dimensional instability of a two-layer Dean flow, *Physics of Fluids*, **13**, 3185-3195.
22. Yarin A.L., Gelfgat A.Yu. and Bar-Yoseph P.Z. 2002. Enhancement of mass transfer in a two-layer Taylor-Couette apparatus with axial flow, *Int. J. Heat and Mass Transfer*, **45**, 555-570.
23. Gelfgat A.Yu. 2002. Three-dimensionality of trajectories of experimental tracers in a steady axisymmetric swirling flow: effect of density mismatch, *Theoretical and Computational Fluid Dynamics*, **16**, 29-41.
24. Gelfgat A.Yu., Yarin A.L., and Bar-Yoseph P.Z. 2003. Dean vortices – induced enhancement of mass transfer through an interface separating two immiscible liquids, *Physics of Fluids*, **15**, 330-347.
25. Gelfgat A.Yu., Yarin A.L., and Bar-Yoseph P.Z. 2003. Convection – induced enhancement of mass transfer through an interface separating two immiscible liquids in a two-layer horizontal annulus, *Physics of Fluids*, **15**, 790-800.
26. Marques F., Gelfgat A.Yu., and Lopez J. M. 2003. Tangent double Hopf bifurcation in a differentially rotating cylinder flow, *Physical Review E*, **68**, pp. 06310-1 – 06310-13 .
27. Erenburg V., Gelfgat A.Yu., Kit E., Bar-Yoseph P.Z., and Solan A. 2003. Multiple states, stability and bifurcations of natural convection in rectangular cavity with partially heated vertical walls, *Journal of Fluid Mechanics*, **492**, 63-89.

28. Gelfgat A.Yu. 2004. Stability and slightly supercritical oscillatory regimes of natural convection in a 8:1 cavity: solution of benchmark problem by a global Galerkin method, *Int. J. Numerical Methods in Fluids*, **44**, 135-146.
29. Gelfgat A.Yu., Bar-Yoseph P.Z. 2004. Multiple solutions and stability of confined convective and swirling flows – a continuing challenge, *Int. J. Numer. Meth. Heat and Fluid Flow*, **14**, 213-241.
30. Gelfgat Yu.M., Gelfgat A.Yu. 2004. Experimental and numerical study of rotating magnetic field driven flow in cylindrical enclosures with different aspect ratios, *Magnetohydrodynamics*, **40**, 147-160.
31. Rubinov A., Erenburg V., Gelfgat A.Yu., Kit E., Bar-Yoseph P.Z., Solan A. 2004. Three-dimensional instabilities of natural convection in a vertical cylinder with partially heated sidewalls, *Journal of Heat Transfer*, **126**, 586-599.
32. Gelfgat A.Yu., Yarin A.L., Bar-Yoseph P.Z., Graham M., Bai G. 2004. Numerical modeling of two-fluid Taylor-Couette flow with deformable capillary liquid-liquid interface, *Physics of Fluids*, **16**, 4066-4074.
33. Gelfgat A.Yu., Rubinov A., Bar-Yoseph P.Z., Solan A. 2005. Numerical study of three-dimensional instabilities in a hydrodynamic model of Czochralski growth, *Journal of Crystal Growth*, **275**, e7-e13.
34. Gelfgat A.Yu. 2005. On three-dimensional instability of a traveling magnetic field driven flow in a cylindrical container, *J. Crystal Growth*, **279**, 276-288.
35. Gelfgat A.Yu., Rubinov A., Bar-Yoseph P.Z., Solan A. 2005. On the Three-Dimensional Instability of Thermocapillary Convection in Arbitrary Heating Floating Zones in Microgravity Environment, *Fluid Dynamics & Material Processing*, **1**, 21-31.
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5. Gelfgat A.Yu. 1993. Influence of the magnetic field on the oscillatory instability and supercritical regimes of buoyancy convection, *Proceedings of the Sixth International Symposium on Transport Phenomena in Thermal Engineering*. Seoul, Korea, May 9-13, 1993, 287-292.
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13. Gelfgat A.Yu., Bar-Yoseph P.Z. and Solan A.L. 1997. Axisymmetry-breaking instabilities of axially symmetric convective flows, *Proc. 10th Int. Conf. on Transport Phenomena in Thermal Science and Process Engineering*. Kyoto, December 1-4, 1997, Vol.1, 263-268.
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16. Gelfgat A.Yu., Bar-Yoseph P.Z. and Solan A.L. 1998. Stability of axisymmetric convective flows with respect to three-dimensional perturbations, *Proc. 27th Israeli Mechanical Engineering Conference* , Technion City, Haifa, May 21-22, 315-317.
17. Gelfgat A.Yu. 1999. Global spectral approach to stability problems in continuum dynamics and transport processes, *Proc. European Conference on Computational Mechanics*, Munich, Germany, August 31-September 3, 1999, 1-20.
18. Erenburg V., Gelfgat A.Yu., Kit E., Bar-Yoseph P.Z. and Solan A. 2002. Natural convection in a rectangular cavity with piece-wise heated vertical walls: multiple states, stability and bifurcations, *12th Int. Heat Transfer Conf., Grenoble, France, August 18-23, 2002*.
19. Bar-Yoseph P.Z., Gelfgat A.Yu. Stability and bifurcation analysis for crystal growth processes, *Proc. 2004 Int. Conf. on Advances in Computational & Experimental Engineering & Sciences, July 30 – August 3, Madeira, Portugal*, pp. 976-981.
20. Kit E., Gelfgat A.Yu. Interconnection between spatial and temporal instability in a forced mixing layer, *Proc. 2004 Int. Conf. on Advances in Computational & Experimental Engineering & Sciences, July 30 – August 3, Madeira, Portugal*, pp. 1052-1057.
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22. Gelfgat A. Yu. Destabilization of convection by weak rotation. *Proc. 7th Int. Symp. on Stratified Flows*, Rome, Italy, August 22-26, 2011.

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(III) Abstracts of Conference Lectures :

1. Vinokurov V., Gelfgat A.Yu., Ivanova G., Ljumkis E. and Martuzans B. 1985. Numerical modeling of heat transfer, flow, and shape of growing crystal during Czochralski growth of paratellurite (rus.), *Heat and Mass Transfer in Crystal Growth*, Abstracts of Lectures, Moscow, 57.
2. Gelfgat A.Yu. and Martuzans B. 1987. Suppression of thermogravitational convection in rectangular cavity by the magnetic field (rus.), *4th U.S.S.R. Seminar on Hydromechanics, Heat and Mass Transfer in Microgravity*, Abstracts of Lectures, Novosibirsk, 53.
3. Gelfgat A.Yu. 1987. Influence of the magnetic field on oscillatory instability of convective flows in rectangular cavity (rus.), *12th Riga MHD Seminar*, Abstracts of Lectures, Riga, 195-198.
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5. Gelfgat A.Yu. and Martuzans B. 1989. Oscillatory instability of the stationary regimes of thermogravitational-thermocapillary convection of low prandtl number fluid (rus.), *Numerical Methods for Modeling of Technological Processes*, Abstracts of Lectures, Riga, November 24-26, 46-47.
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26. Bar-Yoseph P., Gelfgat A.Yu., and Solan A. 2001. axisymmetric and three-dimensional instabilities of swirling flow in a cylinder with rotating lid, *Abstracts of 12th International Couette-Taylor Workshop. Evanston, IL, September 6-8, 2001*.
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35. Rubinov A., Bar-Yoseph P.Z., Solan A., Gelfgat A.Yu. 2003. Three-dimensional instability of thermocapillary convection in liquid bridges in zero gravity under different heating conditions, *The 5th European Fluid Mechanics Conference, August 24-28, Toulouse, France*. Book of Abstracts, p. 497.
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38. Gelfgat A.Yu. 2005. Treatment of pressure term in global Galerkin method with an arbitrary inner product for incompressible Navier-Stokes equations, *The 30th Israel Conference on Mechanical Engineering, May 29-30, Tel-Aviv, Israel*, pp. 98-99.
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45. Teitel M., Gelfgat A.Yu., Schwabe D. 2007. Experimental and computational study of flow instabilities in a model of Czochralski growth, *Abstracts of 15th Int. Conf. on Crystal Growth, Aug. 12-17, Salt Lake City, Utah, USA, abstract No. 524.*
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47. Vitoshkin H., Gelfgat A. Yu. 2008. Non-modal instability of mixing layer flow, *EUROMECH Fluid Mechanics Conference 7. Manchester, September 14-18, 2008, Book of Abstracts, p. 358.*
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49. Vitoshkin H., Gelfgat A. Yu. 2009. Non-modal energy and enstrophy norm growth in the viscous mixing layer flow. *3rd Int. Symp. Bifurcations and Instabilities in Fluid Dynamics, Nottingham, UK, August 2009. Book of Abstracts, pp. 65-66.*
50. Feldman Yu., Tuckerman L., Gelfgat A. Time-marching-based CFD for modeling instabilities and bifurcations of 3D flows: full pressure-velocity coupled multigrid approach. *3rd Int. Symp. Bifurcations and Instabilities in Fluid Dynamics, Nottingham, UK, August 2009. Book of Abstracts, p. 69.*
51. Haslavsky V., Miroshnichenko E., Kit E., Gelfgat A.Yu. 2010. On experimental and numerical prediction of instabilities in Czochralski melt flow configuration. *EUROMECH Fluid Mechanics Conference 7. Bad Reichenhall, Germany, September 13-16, 2010. Book of abstracts, S1-34.*
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(IV) Refereed papers in Transactions of Institutions

1. Gelfgat A.Yu. and Pavlov S.I. 1982. Analytical calculation of the electromagnetic field and flow of melt in the zone of contact of inductive furnace with cold crucible (rus.), *Electrodynamics and Mechanics of Continuous Media, University of Latvia, 20-29.*
2. Gelfgat A.Yu. and Martuzans B. 1985. Stability of thermocapillary convection in liquid cylinder created by an external heater with axial temperature gradient (rus), *Applied Problems of Mathematical Physics. University of Latvia, 73-82.*
3. Gelfgat A.Yu. and Martuzans B. 1987. Oscillatory convective flows in laterally heated square cavity (rus.), *Transport Processes in Forced and Free Convective Flows, Institute of Thermophysics, Novosibirsk, 108-117.*
4. Gelfgat A.Yu. 1987. A variational method for solution of the fluid flow problems in rectangular enclosures (rus.), *Applied Problems of Mathematical Physics. (rus.) University of Latvia, 14-24.*
5. Gelfgat A.Yu. and Martuzans B. 1988. Stability and oscillatory supercritical regimes of the natural convection in the laterally heated rectangular cavity (rus.), *Applied Problems of Mathematical Physics. University of Latvia, 31-40.*

6. Gelfgat A.Yu. 1989. Solution of thermal convection problems with Galerkin technique: test calculations (rus.), *Applied Problems of Mathematical Physics*. University of Latvia, 46-55.
7. Gelfgat A.Yu. and Tanasawa I. 1993 Systems of basis functions for calculation of three-dimensional fluid flows in cylindrical containers with the Galerkin spectral method, *Proc. of Institute of Industrial Science*, The Univ. of Tokyo, vol. 45, No.8, pp.60-63.

PARTICIPATION IN ORGANIZING OF CONFERENCES

Organizing:

- 1998** Computational Mechanics Session, 27th Israel Conference on Mechanical Engineering, Technion, Haifa, May, 1998.
- 2003** 29th Israel Mechanical Engineering Conference. Member of Program Committee.
- 2003** 15th IACMM Congress on Computational Mechanics. Member of Organizing Committee.
- 2004** International Conference on Computational and Experimental Engineering and Sciences. Co-organizes of minisymposium "Instabilities and Bifurcations in Fluid Mechanics".
- 2006** Graduate Students Conference, School of Mechanical Engineering, Faculty of Engineering, Tel Aviv University.
- 2006** 20th IACMM Congress on Computational Mechanics. Member of Organizing Committee.
- 2006** Second International Symposium on Instabilities and Bifurcations in Fluid Dynamics. Member of Organizing Committee.
- 2006** Workshop "Conceptual Aspects of Hydrodynamic Stability". Member of Organizing Committee.
- 2008** 24th IACMM Congress on Computational Mechanics. Member of Organizing Committee.
- 2008** 9th Biennial ASME Conference on Engineering Systems Design and Analysis. Track chair, session "Computational Mechanics".
- 2009** 7th World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics. Member of Scientific Committee.
- 2009** 3rd International Symposium "Bifurcations and Instabilities in Fluid Dynamics". Member of Organizing Committee.
- 2011** 30th IACMM Congress on Computational Mechanics. Member of Organizing Committee.
- 2011** 4th International Symposium "Bifurcations and Instabilities in Fluid Dynamics". Member of Organizing Committee.
- 2012** 6th Conference of the International Marangoni Association "Interfacial Phenomena in Fluid Mechanics". Member of Organizing Committee.
- 2013** 8th World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics. Member of Scientific Committee.
- 2013** 5th International Symposium "Bifurcations and Instabilities in Fluid Dynamics". Member of Organizing Committee.

Chairmanship:

- 1996** Chairman, Computational Mechanics Session, 26th Israel Conference on Mechanical Engineering, Technion, Haifa, May 21-22, 1996.
- 1997** co-Chairman, Session 28, 10th International Symposium on Transport Phenomena in Thermal Science and Engineering. Kyoto, November 30-December 4, 1997.
- 1998** Chairman, Computational Mechanics Session, 27th Israel Conference on Mechanical Engineering, Technion, Haifa, May, 1998.
Chairman, Session #4 “Convection”, ERCOFTAC/EUROMECH Colloquium 383 “Continuation Methods in Fluid Dynamics”, Aussois, France, September 6-9, 1998.
- 1999** Chairman, Session “Incompressible Flows”, 8th International Symposium on Computational Fluid Dynamics, Bremen, September 5-10, 1999.
- 2000** Chairman. Session “Application of Vortical Flows”, 11th International Couette Taylor Workshop, Evanston, IL, USA, September 6-8, 2001.
- 2002** Chairman, Afternoon session, Twelfth Israel Symposium on Computational Mechanics, Technion, Haifa, Israel, April 11, 2002.
- 2003** Chairman, Heat and Mass Transfer Session, 29th Israel Conference on Mechanical Engineering, Technion, Haifa, May, 2003.
Chairman, Afternoon Session, 15th Meeting of Israel Association for Computational Mechanics, Tel-Aviv University, October 2003.
- 2006** Chairman, Bioengineering Session, 20th IACMM Congress on Computational Mechanics.
Chairman, Natural Convection Session, 2nd International Symposium on Instabilities and Bifurcations in Fluid Dynamics, Lyngby, Denmark, August 15-28, 2006.
- 2008** Chairman, Afternoon Session, 24th Meeting of Israel Association for Computational Mechanics, Tel-Aviv University, April 2008.
Chairman, COST meeting “MHD fundamentals, from liquid-metals to astrophysics”, Brussels, April 14-16, 2008.
- 2009** Chairman, plenary session, 3rd International Symposium "Bifurcations and Instabilities in Fluid Dynamics". Nottingham, UK, August 10-14, 2009.
- 2011** Chairman, Afternoon Session, 30th Meeting of Israel Association for Computational Mechanics, Tel-Aviv University, March 2011.
- 2011** Chairman, sessions “Multiphase flows” and “Bifurcations and Instabilities in Technological Applications”, 4th International Symposium "Bifurcations and Instabilities in Fluid Dynamics". Barcelona, Spain, July 18-21, 2011.