

# R E S U M E

Amir Gat

Full name: Amir D. Gat

Date and place of birth: 29/7/1979 Tel Aviv

Marital status: Married + 4

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## ACADEMIC DEGREES

- |             |   |
|-------------|---|
| 2005 – 2010 | Ph.D. ( <i>special track</i> )<br>Faculty of Aerospace Engineering, Technion - Israel Institute of Technology   |
| 2001 – 2005 | B.Sc. ( <i>summa cum laude</i> )<br>Faculty of Aerospace Engineering, Technion – Israel Institute of Technology |

## ACADEMIC APPOINTMENTS

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|----------------|--|
| 2019 – current | Associate Professor, Faculty of Mechanical Engineering, Technion - Israel Institute of Technology. |
| 2013 – 2019    | Assistant Professor, Faculty of Mechanical Engineering, Technion - Israel Institute of Technology. |
| 2010 – 2012    | Postdoctoral researcher, Graduate Aerospace Laboratories, California Institute of Technology.      |
| 2005 – 2010    | Teaching assistant, Faculty of Mechanical Engineering, Technion - Israel Institute of Technology.  |

## PROFESSIONAL EXPERIENCE

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|-------------|--|
| 2003 – 2005 | Student position aerodynamics team - aeronautical systems division, Rafael Advanced Defense Systems. |
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## RESEARCH INTERESTS

- Theoretical research of fluid mechanics, specifically low-Reynolds and free-surface flows.
- Interaction of internal viscous flows with deformation and motion of elastic structures.
- Dynamics of elastic deformation due to embedded fluidic networks.
- Mechanical properties of composite fluid-solid structures.

## **TEACHING EXPERIENCE**

- 2012 – current    *Instructor*  
Faculty of Mechanical Engineering, Technion – Israel Institute of  
Technology  
*034013 (undergraduate) – Fluid Mechanics 1*  
*035035 (undergraduate) – Fluid Mechanics 2*  
*036032 (undergraduate/graduate) – Analytical Fluid Mechanics*  
*038810 (graduate) – Analytical Methods in Fluid Mechanics. (This*  
*course was suggested and developed by AG.)*  
*036008 (undergraduate/graduate) – Compressible Fluid Mechanics*  
*036001(undergraduate/graduate) – Analytical Methods in*  
*Mechanical Engineering 1*
- 2005 – 2010    *Teaching Assistant*  
Faculty of Aerospace Engineering, Technion – Israel Institute of  
Technology  
*084314 Viscous Flow and Heat Transfer (undergraduate)*  
*084505 Solid Mechanics (undergraduate)*

## **DEPARTMENTAL ACTIVITIES**

- 2013 – 2016    Seminar coordinator for the Faculty of Mechanical Engineering
- 2017 – current    Responsible on faculty website and faculty meetings
- 2020 – current    Head of Mechanical Engineering track in the Technion International  
School
- 2020 – current    Technion Senate Member

## **PUBLIC PROFESSIONAL ACTIVITIES**

- 2013 – Current    Secretary of The Israel Society for Theoretical and Applied Mechanics  
(ISTAM)
- 2012 – Current    Reviewer for J. Fluid Mechanics, Physical Review Letters, Physics of  
Fluids, Langmuir, Physical Review Fluids, Applied Physical Letters,  
Applied Physics A, Colloids and Surfaces A: Physicochemical and  
Engineering Aspects, Microfluidics and Nanofluidics, Soft Robotics, J.  
Fluids Engineering, AIChE, PLOS ONE, IEEE Access, Frontiers in  
Zoology, J. Applied Physics, Acta Mechanica, Elsevier (book  
proposals), Israel Annual Conference on Aerospace Sciences  
(conference proceedings), Israeli Conference on Mechanical  
Engineering (conference proceedings)

## MEMBERSHIP IN PROFESSIONAL SOCIETIES

- The Israel Society for Theoretical and Applied Mechanics (ISTAM)
- American Physical Society, Division of Fluid Dynamics
- IEEE member
- European Mechanics Society (EuroMech)

## AWARDS & HONORS

2015	Halevy Innovative Applied Engineering Award
2015	Rich Technion Innovation Award
2013	Tark award for research of aerospace structures
2010	The Lester-Deutsch fellowship for postdoctoral studies
2009	Jacobs prize for best publication of the year 2009 from the Technion - Israel Institute of Technology.
2008	Gutwirth award based on doctoral achievements
2008	Ilan Ramon award based on doctoral achievements
2006	Rubin award for the Technion's Ramtech project (two-stage ramjet)
2006	Excellence scholarship based on undergraduate studies
2005	<i>Summa cum laude</i> , B.Sc in Aerospace Engineering

## GRADUATE STUDENTS AND POSTDOCS

*(Sole advisor unless otherwise mentioned. J – published journal paper, S – submitted journal paper, P – patent, I – invited talk, R – conference paper & T – conference talk.)*

### **Postdoctoral Researchers [4]**

#### Current [3]

1. **Dotan Illsar**, 2017-  
Subject: Dynamics of inertial flow within bi-stable spheres
2. **Shai Elbaz**, 2018-  
Subject: Aeroelasticity of soft shape-morphing wings
3. **Anna Zigelman**, 2020-  
Subject: Fluid mechanics of Metafluids

Previous [1]

4. **Yoav Green**, 2015-2016  
Subject: Interaction between droplets in a Hele-Shaw cell  
(currently Assistant Prof. at Ben-Gurion University)

**Ph.D Students [12]**

In progress [7]

1. **Lior Salem**, 2015-present (TASP, direct PhD, co-supervised by Yizhar Or)  
Subject: Soft-robots based on embedded fluidic networks. [J22, S3]
2. **Ofek Peretz**, 2017-present (direct PhD)  
Subject: Bi-stability in viscous-elastic dynamics. [J27, P5, I3]. Recipient of the Sherman research award.
3. **Peter Breitman**, 2017-present  
Subject: Viscous peeling dynamics of elastic solids.
4. **Eran Ben-Haim**, 2016-present (co-supervised by Yizhar Or, expected 2020)  
Subject: Leveraging bi-stability for soft-robotic applications. [J22,S4]
5. **Israel Gabay**, 2019-present (co-supervised by Moran Bercovici)  
Subject: Dielectrophoretic-driven deformations of a lubricated elastic sheet
6. **Sofi Kuperman**, 2020-present (external)  
Subject: Fluid mechanics of flow batteries
7. **Netanel Chen**, 2020-present (external)  
Subject: Aeroelasticity of soft airfoils

Completed [5]

8. **Evgeniy Boyko**, 2014-2002 (co-advisor with Assoc. Prof. Moran Bercovici, currently a Postdoc at Princeton)  
Subject: Electro-osmotic flow in elastic Hele-Shaw configurations with non-uniform wall surface charge distributions. [J13, J17, J20, J26, R1, T31, T34, T39, T43, T44, T45, T50, T56, T58]. Recipient of the 2017-2019 Adams fellowship.
9. **Arie Tulchinsky**, 2013-2018 (currently at KAMAG research facility)  
Subject: Dynamics of elastic Hele-Shaw cells. [J12, J15, J18, J25, P4, T19, T25, T29, T41, T46]. Recipient of the 2017 Jacobs fellowship.
10. **Shai Elbaz**, 2013-2018 (currently postdoc at Technion)  
Subject: Viscous flows in elastic channels. [J10, J16, J23, S1, S5, P2, P4, R2, T2, T18, T22, T24, T26, T30, T33, T35, T40, T49]. Recipient of the 2013 Sherman and 2014 Fine research awards.
11. **Yoav Matia**, 2013-2019 (currently postdoc at Cornell University)

Subject: Viscous-elastic diffusion in channel networks embedded in elastic beams. [J11, J19, S2, P2, T27, T28, T42, T51, T59]. Recipient of the 2016-2018 Ministry of Science fellowship and 2014 KLA-TENCOR Excellence in Research Award. Recipient of the Zuckerman postdoctoral award.

12. **Benny Gamus**, 2016-2020 (co-advisor is Yizhar Or)

Subject: Dynamic legged locomotion of soft robots actuated by embedded fluidic networks. [J22, S3, T53, T54]. Recipient of the 2017-2019 Lev-Zion fellowship.

### M.Sc. Students [13]

(\* denotes students in the Brakim excellence program for B.Sc and M.Sc. degree in 5 years.)

#### In progress [5]

1. **Michael Pukshansky**, (co-supervised by Yizhar Or) 2019-present  
Subject: Fluid-driven locomotion of soft robots [P4]
2. **Eldar Zackrin**, 2019-present  
Subject: Aeroelasticity of soft airfoils
3. **Ezra ben-Abu**, 2020-present  
Subject: Fluid Mechanics of Metafluids
4. **Nitzan Popper**, 2020-present  
Subject: Phase-change and elasticity
5. **Dor Suki**, (co-supervised by Moran Bercovici), 2020-present  
Subject: Thermal effects in solidification of thin films

#### Completed [11]

1. **Max Linshits\***, 2012-2014  
Subject: Study of the effects of viscous flow through an elastic cylinder on the geometry and buckling failure mode of the cylinder. [T22]
2. **Yonatan Achache**, (TASP, co-supervised by Yossi Elimellech) 2013-2016  
Subject: Innovative Propulsion and Maneuvering Techniques for Micro-Scale Autonomous Systems.
3. **Roey Elfassy**, (TASP, co-supervised by Yossi Elimellech), 2013-2016  
Subject: Interaction forces between two closely-spaced oscillating flagella. [J24]
4. **Itai Sarig\***, (co-supervisor, primary advisor is Yuli Starosvetsky) 2014-2016  
Subject: Flows of pancake droplets in a Hele-Shaw cell [J14, T31, T36]
5. **Yoni Friedman\***, 2014-2017

Subject: Acoustic waves interacting with an elastic membrane and a viscous liquid. [J21, T47, T51]

6. **Tsah Elimellech\***, 2014-2017

Subject: Experimental studies of deformation of elastic plate by internal fluidic network. [J19, T41]

7. **Amit Vurgaft\***, 2016-2017

Subject: Forced motion of a cylinder within a liquid-filled elastic tube: a model of minimally invasive medical procedures. [S5]

8. **Netanel Hassan\***, 2015-2018

Subject: Analysis of aeroelastic properties of morphing wings actuated by embedded fluidic networks." [S1]

9. **Hila Jacob\***, 2014-2018

Subject: Compressible viscous flow through an elastic cylinder. [J23, T48]

10. **Lior Goldstein (external student)**, 2013-2019

Subject: Dynamics of viscous flow and elastic deformation in annular recoil systems.

11. **Aviv Tahar**, 2016-2020

Subject: Experimental investigation of impact mitigation in liquid-solid composite structures. [P4]

## RESEARCH GRANTS

*(Sole principal investigator unless otherwise mentioned. External grants over 100,000USD marked in **bold**. Total funds raised since October 2012 are over 1,800,000USD.)*

**2013-2017**      **Israel Science Foundation (ISF)**, 205,000USD, 818/13, "Creating Complex Deformation Patterns and Increasing Effective Rigidity of Elastic Plates or Shells via Viscous Flows in Complex Internal Channel Networks."

2014              Tark award for research of Aerospace Structures, 15,000USD, "Energy Harvesting and Propulsion via Complex Fluidic Networks Imbedded within Elastic Axisymmetric Shells."

2014              Center for Security Science & Technology (CSST), 20,000USD "Energy Harvesting and Propulsion via Complex Fluidic Networks Imbedded within Elastic Axisymmetric Shells."

**2015-2018**      **Maffat**, 528,000USD, "Soft-robots based on embedded fluidic networks," co-PIs: Amir Gat & Yizhar Or.

2015              Technion Autonomous System Program (TASP), 92,000USD "Autonomous Endoscopy Based on Photometric 3D Sensing and

- Guidance Control and Viscous-Elastic Propulsion Mechanism" co-PIs: Amir Gat, Ron Kimmel & Alfred M. Bruckstein.
- 2015 Uzi Halevi Fund 20,000USD "Soft-robots based on embedded fluidic networks" Pls: Amir Gat and Yizhar Or.
- 2015 Technion Autonomous System Program (TASP), 27,000 USD "Soft robots with autonomous legged locomotion" Pls: Amir Gat & Yizhar Or.
- 2016-2019 Center for Security Science & Technology (CSST), 82,000USD "Design, Construction and Testing of a Prototype Morphing Wing Actuated via Embedded Fluidic Network."
- 2016-2018 KAMIN Israel Innovation Authority grant, 238,000USD** "Design, Construction and Testing of a Prototype Morphing Wing Actuated via Embedded Fluidic Network."
- 2017-2018 Charles Haar Grant, 20,000USD "Transient dynamics of composite solid-liquid structures due to external forces."
- 2018-2021 Ministry of Science and Technology (MOST), 298,000USD,** "Dynamic Legged Locomotion of a Soft Robot Actuated by flow in an Embedded Channel Network." Pls: Amir Gat & Yizhar Or.
- 2017-2018 Broida Fund for Applied Research, 50,000USD, "Shape-Morphing of Aircrafts via Embedded Fluidic Networks."
- 2018-2019 Tark award for research of Aerospace Structures, 15,000USD, "Aircraft shape-morphing via internal fluidic networks."
- 2019-2020 MEIMAD Israel Innovation Authority grant, 150,000USD,** "Development of a soft deformable robot for locomotion in unstructured narrow passages." Pls: Amir Gat & Yizhar Or.
- 2019-2020 Maffat, 100,000USD,** "Leveraging viscous flow and bi-stable elastic structures to modify the texture of soft surfaces with application to camouflage and haptics." Pls: Amir Gat & Robert Shepherd.
- 2019-2020 Uzi Halevi Fund 20,000USD "Fluid-driven shape-morphing wings."
- 2020-2024 Israel Science Foundation (ISF), 275,000USD, 1285/20,** "Fluid mechanics of suspensions of bi-stable particles"
- 2019-2021 KAMIN Israel Innovation Authority grant, 238,000USD** "Soft Robotic Catheter for Minimally Invasive Surgery."
- 2020-2023 Ministry of Science and Technology grant, 182,000 USD** "Robotic Catheter for Minimally Invasive Surgery."

## PUBLICATIONS

(Graduate students underlined. AG marked in bold)

### Theses

**Gat A.D.** (2010), PhD thesis entitled "Flow in shallow micro-channels," Faculty of Aerospace Engineering, Technion - Israel Institute of Technology. Under the supervision of Dist. Prof. Daniel Weihs and Prof. Itzchak Frankel.

### Books chapters

Navaz, H., Zand, A., **Gat, A.D.**, & Atkinson, T. (2015) "A General-Purpose Multi-Phase/Multi-Species Model to Predict the Spread, Percutaneous Hazard, and Contact Dynamics in Porous Substrates and Membranes" in the book "Surface Energy and Wetting ", ISBN 978-953-51-4240-9.

### Refereed papers in professional journals

- J1. **Gat A.D.**, Frankel I. & Weihs D. (2008) "Gas flows through constricted shallow micro-channels," *J. Fluid Mech.* 602, 427-442.
- J2. **Gat A.D.**, Frankel I. & Weihs D. (2009) "A higher-order Hele-Shaw approximation with application to gas flows through shallow micro-channels," *J. Fluid Mech.* 638, 141-160. (Won the Jacobs prize for best publication of the year 2009 from the Technion - Israel Institute of Technology.)
- J3. **Gat A.D.**, Frankel I. & Weihs D. (2010) "Compressible flows through micro channels with sharp edged turns and bifurcations," *Microfluidics and Nanofluidics* 602, 427-442, 8(5), 619-629.
- J4. **Gat A.D.**, Frankel I. & Weihs D. (2010) "Gas flows through shallow T-junctions and parallel micro-channel networks," *Physics of Fluids* 22, 092001-1 - 092001-8.
- J5. **Gat A.D.**, Navaz H. & Gharib M. (2011) "Dynamics of freely moving plates connected by a shallow liquid bridge," *Physics of Fluids* 23, 097101-1 - 097101-8.
- J6. **Gat A.D.**, Navaz H. & Gharib M. (2012) "Wicking of a liquid bridge connected to a moving porous surface," *J. Fluid Mech.* 703, 315-325.
- J7. **Gat A.D.** & Gharib M. (2013) "Elasto-capillary coalescence of multiple parallel sheets," *J. Fluid Mech.* 723, 692-705.
- J8. **Gat A.D.**, Vahdani A., Navaz H., Nowakowski A. & Gharib M. (2013) "Asymmetric Wicking and Reduced Evaporation Time of Droplets Penetrating a thin double-layered porous material," *Appl. Phys. Lett.* 103, 134104-1 - 134104-4.



- J9. Navaz H., Zand A., Atkinson T., **Gat A.D.**, Nowakowski, A. & Paikoff, S. (2013) "Contact dynamic modeling of a liquid droplet between two approaching porous materials," *AIChE* 60, 2346–2353.
- J10. Elbaz S.B. & **Gat A.D.** (2014) "Dynamics of Viscous Liquid within a Closed Elastic Cylinder Subject to External Forces with Application to Soft-Robotics," *J. Fluid Mech.* 758, 221-237.
- J11. Matia Y. & **Gat A.D.** (2014) "Dynamics of elastic beams with embedded fluid-filled parallel-channel networks," *J. Soft Robots* 2(1) 42-47.
- J12. Tulchinsky A. & **Gat A.D.** (2015) "Viscous-poroelastic interaction as mechanism to create adhesion in frogs' toe pads," *J. Fluid Mech.* 758, 288-303.
- J13. Boyko E., Rubin S., **Gat A.D.** & Bercovici, M. (2015) "Flow Patterning in Hele-Shaw Configurations using Non-Uniform Electroosmotic Slip," *Physics of Fluids* 27(10) 102001, 1-16. (Rubin is a postdoc in Bercovici's group.)
- J14. Sarig I., Starosvetsky Y. & **Gat A.D.** (2016) "Interaction Forces Between Microfluidic Droplets in a Hele-Shaw Cell," *J. Fluid Mech.* 800, 264-177.
- J15. Tulchinsky A. & **Gat A.D.** (2016) "Transient Dynamics of Elastic Hele-Shaw Cell Due to External Forces with Application to Impulse Mitigation," *J. Fluid Mech.* 800, 517-530.
- J16. Elbaz S. & **Gat, A.D.** (2016) "Axial Creeping Flow in the Gap between a Rigid Cylinder and a Concentric Elastic Tube," *J. Fluid Mech.* 806, 580-602.
- J17. Boyko E., Bercovici M. & **Gat A.D.** (2016) "Flow of Power-Law Liquids in a Hele-Shaw Cell Driven by Non-Uniform Electroosmotic Slip in the Case of Strong Depletion." *J. Fluid Mech.* 807, 235-257.
- J18. Rubin S., Tulchinsky A., **Gat A.D.** & Bercovici, M. (2017) "Elastic deformations driven by non-uniform lubrication flows," *J. Fluid Mech.* 812, 841-865. (Rubin is a postdoc in Bercovici's group).
- J19. Matia Y., Elimelech T., & **Gat A.D.** (2017). "Leveraging internal viscous flow to extend the capabilities of beam-shaped soft robotic actuators," *Soft robotics*, 4(2), 126-134.
- J20. Boyko E., Bercovici M. & **Gat A.D.** (2017) "Viscous-elastic dynamics of power-law fluids within an elastic cylinder," *Physical Review Fluids* 2, 073301, 1-19.
- J21. Friedman Y. & **Gat A.D.** (2017) "Dynamics of an elastic sphere containing a thin creeping region and immersed in an acoustic region for similar viscous-elastic and acoustic time- and length-scales," *J. Fluid Mech.* 818, 100-115.
- J22. Gamus B., Ben-Haim E., Salem L., **Gat A.D.** & Or Y. (2018) "Interaction between Inertia, Viscosity and Elasticity in Soft Robotic Actuator with Fluidic Network," *IEEE Transactions on Robotics* 34(1), 81-90.

- J23. Elbaz S., Jacob H. & Gat A.D. (2018) "Transient gas flow in elastic microchannels," *J. Fluid Mech.* 846, 460-481.
- J24. Elfassy R., Elimelech Y. & Gat A.D. (2018) "Propulsion and Maneuvering of an Artificial Micro-Swimmer by Two Closely-Spaced Waving Elastic Filaments," *Physical Review Fluids*, 3, 044203, 1-14.
- J25. Tulchinsky A., Gat A.D. (2019) "Frequency Response and Resonance of Elastic Hele-Shaw Cells with Application to Mechanical Filters," *J. Sound & Vibration*, 438, 83-98.
- J26. Boyko E., Eshel R., Gommed K., Gat A.D. & Bercovici M. (2019) "Elastohydrodynamics of a pre-stretched finite elastic sheet lubricated by a thin viscous film with application to microfluidic soft-actuators," *J. Fluid Mech.*, 862, 732-752. (Graduate student Eshel and lab engineer Gommed are both part of Bercovici's group)
- J27. Peretz O. & Gat A.D. (2019) "Forced vibrations as a mechanism to suppress flutter - an aeroelastic Kapitza's pendulum," *J. Fluids and Structures*, 85, 138-148.
- J28. Vurgaft A., Elbaz S.B. & Gat A.D. (2019) "Forced motion of a cylinder within a liquid-filled elastic tube - a model of minimally invasive medical procedures," *J. Fluid Mech. Journal of Fluid Mechanics* 881, 1048-1072.
- J29. Gamus B., Salem, L., Gat A.D. & Or, Y. (2020) "Understanding Legged Crawling for Soft-Robotics" *IEEE Robotics and Automation Letters* 5 (2), 1397-1404.
- J30. Ilssar D., & Gat A.D. (2020) "On the inflation and deflation dynamics of liquid-filled, hyperelastic balloons" *J. Fluids and Structures* 94, 102936.
- J31. Boyko E., Eshel R., Gat A.D. & Bercovici M. (2020) "Non-uniform electro-osmotic flow drives fluid–structure instability," *Physical Review Letters* 124 (2), 024501.
- J32. Peretz O., Mishra A.K., Shepherd R.K. & Gat A.D. (2020) "Fluidic control of continuously multistable structures," *proceedings of the National Academy of Sciences* 117 (10), 5217-5221.
- J33. Brietman P. & Gat A.D. (2020) "Fluid Mechanics in Miniaturized Pneumatic Soft Robots," *Soft Robotics* DOI: 10.1089/soro.2020.0037.
- J34. Goldstein L., Ilssar D. & Gat A.D. (2020) "On Non-Newtonian Effects in Fluidic Shock-Absorbers," *Applied Physical Letters* 117, 153701
- J35. Boyko E., Bercovici M. & Gat A.D. (2020) "Interfacial instability of thin films in soft microfluidic configurations actuated by electro-osmotic flow," *Physical Review Fluids*.
- J36. Ben-Haim E., Salem L., Or Y. & Gat A.D. (2020) "Single-Input Control of Multiple Fluid-Driven Elastic Actuators Via Interaction Between Bi-Stability and Viscosity," *Soft Robotics*, 7(2), 259-265.
- J37. Salem L., Gamus B., Or Y. & Gat A.D. (2020) "Leveraging viscous peeling in soft actuators and reconfigurable microchannel networks," *Soft Robotics*, 7(1), 76-84.

- J38. Gamus, B., Salem, L., Gat, A. D., & Or, Y. (2020). Understanding inchworm crawling for soft-robotics. *IEEE Robotics and Automation Letters*, 5(2), 1397-1404.

### Submitted manuscripts

- J39. Chen N., Elbaz S. & **Gat A.D.** (2019) "Dynamics and instabilities of an arbitrarily clamped elastic sheet in potential flow with application to shape-morphing airfoils."
- J40. Matia Y., & **Gat A.D.** (2019). "The Effect of Connections Between Fluid-Filled Cavities on the Dynamics of Solid-Liquid Composite Beams."

### Patents

- P1. **Gat A.D.**, Vahdani A., & Gharib M. (2014) "Multi-Layered Liquid-Diode Fabric and Products," U.S. Patent No. 20,140,162,048.
- P2. **Gat A.D.**, Elbaz S., & Matia Y. (2014) "Solid-Liquid Composite Structure" GB1420644.5, US20170320559A1.
- P3. Rubin S., Bercovici M. & **Gat A.D.** (2015) "Reconfigurable elastic microfluidic structures," Provisional Patent Application, September 2015.
- P4. **Gat A.D.**, Tulchinsky A., & Tahar A. (2016) "Blunt force protection system" PCT, U62/424,580.
- P5. **Gat A.D.**, Elbaz S., & Peretz O. (2019) "Embedded fluidic network aircraft skin" Provisional 07035-P0129A.

### CONFERENCES

*(Graduate students underlined. Presenter bold)*

#### Participation in organizing conferences

- Organizing committee of the International conference: *Micro-Swimmers and Soft-Robotics*, 3-5/Feb/2020.
- Organizing committee of The Israel Society for Theoretical and Applied Mechanics Symposia, Tel Aviv, 1/Dec/2013, 21/Dec/2014, 13/Dec/2015, 22/Feb/2017, 11/Dec/2018.
- Symposium organizer of the "Soft Actuators" symposium, Haifa, 19/12/2016.

- Session Chair in Israel Annual Conference on Aerospace Sciences – Israel 2014, Israeli Conference Mechanical Engineering - Israel 2015/2018, American Physical Society - Division of Fluid Dynamics – US 2017/2018, Advanced Problems in Mechanics – Russia 2017, the 12<sup>th</sup> European Fluid Mechanics Conference 2018.

### Invited and keynote conference talks

11. **Gat A.D.**, (2017) "Dynamics of Elastic Structures Containing a Viscous Liquid within Internal Cavities," The Batsheva de Rothschild Seminar Physics of Microfluidics, Sde Boker, Israel. (invited)
12. **Gat A.D.**, (2017) "Leveraging Internal Viscous Flow to Extend the Capabilities of Soft-Robots", 45th APM "Advanced Problems in Mechanics" International Summer School-Conference, Saint-Petersburg, Russia. (keynote)
13. Peretz O. & **Gat A.D.** (2018) "Viscous flow in bistable elastic channels-analogy to Stefan's solidification problem," 71th Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, Georgia. (invited to focus session)
14. **Gat A.D.** (2019) "Leveraging viscous-elastic dynamics for microfluidic devices," Physics of Microfluidics, Austin, Texas. (invited)
15. Chen N., Elbaz S. & **Gat A.D.** (2019) "Dynamics and Instabilities of Shape-Morphing Airfoil," IEEE international conference on soft robotics, Seoul, Korea. (invited focus session)

### Invited seminars

16. **Gat A.D.**, (2011) "Dynamics of solid bodies connected by a shallow liquid bridge," Engineering Faculty, Tel Aviv University, Israel.
17. **Gat A.D.**, (2011) "Theoretical Research of Flows in Complex Micro-Channel Networks and Liquid Bridges Connecting Moving Solid Bodies," Mechanical Engineering Faculty, Technion, Israel.
18. **Gat A.D.**, (2011) "Dynamics of solid bodies connected by a shallow liquid bridge," Mechanical Engineering, Ben Gurion University, Israel.
19. **Gat A.D.**, (2012) "On Capillography - The Fluidic-Elastic Instability of Parallel Sheets Immersed in Liquid," GALCIT Fluid Mechanics Research Seminar, Caltech, USA.
110. **Gat A.D.**, (2017) "Problems in Low-Reynolds-Number Fluid-Structure-Interactions", Fluid Dynamics Seminars in the Mathematics Department, Imperial College, UK.

### Refereed papers in conference proceedings

- R1. Paratore, F., Boyko, E., Gat, A.D., Kaigala, G. V., & **Bercovici, M.** (2018, February). Toward microscale flow control using non-uniform electro-osmotic flow. In *Microfluidics*,

*BioMEMS, and Medical Microsystems XVI* (Vol. 10491, p. 104910P). International Society for Optics and Photonics.

- R2. **Elbaz S.B.** & Gat A.D. (2014) Dynamics of Viscous Liquid within a Closed Elastic Cylinder Subject to External Forces with Application to Soft-Robotics, 54<sup>th</sup> Israel Annual Conference on Aerospace Sciences, Tel-Aviv.

### Conference talks

- T1. **Gat A.D.**, Frankel I. & Weihs D. (2007) "Effects of straight-walled constrictions on flow in shallow micro-channels," Israel Society for Theo. and App. Mech. Annual Symposium, Tel-Aviv.
- T2. Avital-Kaufman O., Elbaz S. Gat A.D., Zeisel A. Greenberg I. & **Gany A.** (2007) "Development and flight-testing of a solid fuel Ramjet vehicle", 18th International Sym. of Air Breathing Engines, Beijing.
- T3. **Gat A.D.**, Frankel I. & Weihs D. (2008) "Gas flows through constricted shallow micro-channels," 48th Israel Annual Conference on Aerospace Sciences, Haifa.
- T4. **Gat A.D.**, Frankel I. & Weihs D. (2008) "Gas flows through shallow non-uniform microchannels," 22nd International Congress of Theoretical and Applied Mechanics, Adelaide.
- T5. **Gat A.D.**, Frankel I. & Weihs D. (2009) "Gas flows through shallow microchannel junctions and networks," 62nd Annual Meeting of the APS Division of Fluid Dynamics, Minneapolis, USA.
- T6. **Gat A.D.**, Frankel I. & Weihs D. (2009) "A higher-order Hele-Shaw approximation," 62nd Annual Meeting of the APS Division of Fluid Dynamics, Minneapolis.
- T7. **Gat A.D.**, Frankel I. & Weihs D. (2009) "Gas flows through shallow micro-configurations I. A higher-order Hele-Shaw approximation," 1st Gasmems Workshop, Eindhoven.
- T8. Gat A.D., **Frankel I.** & Weihs D. (2009) "Gas flows through shallow micro-configurations II. Microchannel junctions and networks," 1st Gasmems Workshop, Eindhoven.
- T9. **Gat A.D.**, Navaz H. & Gharib M. (2011) "Dynamics of solid bodies connected by a liquid bridge," Fluid Mechanics Research Conference, Graduate Aeronautical Laboratories, California Institute of Technology, Pasadena.
- T10. **Gat A.D.**, Navaz H. & Gharib M. (2011) "Dynamics of Freely Moving Solid Bodies Connected by a Shallow Liquid Bridge," Chemical and Biological Defense Science and Technology (CBD S&T) Conference, Las Vegas, Nevada (poster).
- T11. **Navaz H.**, Zand, A., Markicevic B., Herman A., Nowakowski T., Atkinson M., Gat A., & Gharib M. (2011) "Numerical Modeling of Liquid Spread and Absorption between Two Contacting Porous or Non-Porous Media to Assess the Contact Hazard," Chemical and Biological Defense Science and Technology (CBD S&T) Conference, Las Vegas, Nevada.

- T12. Gharib M., **Gat A.D.** & Navaz H. (2011) "A liquid bridge connecting moving porous surfaces," 64th Annual Meeting of the APS Division of Fluid Dynamics, Baltimore.
- T13. **Gat A.D.**, Navaz H. & Gharib M. (2011) "Dynamics of freely moving plates connected by a shallow liquid bridge," 64th Annual Meeting of the APS Division of Fluid Dynamics, Baltimore.
- T14. **Lyon B.**, Aria A.I., Gat A.D., Cosse J., Montemayor L., Beizaie, M. & Gharib M. (2012) "Carbon Nanotube Micro-Needles for Rapid Transdermal Drug Delivery," 65th Annual Meeting of the APS Division of Fluid Dynamics, San Diego.
- T15. **Gat A.D.**, Navaz H. & Gharib M. (2012) "Dynamics of solid bodies connected by shallow liquid bridges," 32nd Israel Conference Mechanical Engineering, Tel Aviv.
- T16. **Gat A.D.** & Gharib M. (2012) "Elasto-Capillary Coalescence of Multiple Parallel Sheets," Israel Society for Theoretical and Applied Mechanics Annual Symposium, Tel-Aviv.
- T17. **Gat A.D.** & Gharib M. (2012) "Elasto-Capillary Coalescence of Multiple Parallel Sheets," 65th Annual Meeting of the APS Division of Fluid Dynamics, San Diego.
- T18. **Elbaz S.B.** & Gat A.D. (2013) "Shape Morphing of an Elastic Cylinder via Time-Varying Internal Viscous Flows," 66th Annual Meeting of the APS Division of Fluid Dynamics, Pittsburgh, USA.
- T19. **Tulchinsky A.** & Gat A.D. (2013) "Viscous-elastic interaction as a mechanism to create adhesion in frogs' toe pads," 66th Annual Meeting of the APS Division of Fluid Dynamics, Pittsburgh, USA.
- T20. **Gat A.D.**, Vahdani A., Navaz H., Nowakowski, A. & Gharib M. (2013) Asymmetric Wicking and Reduced Evaporation Time of Droplets Penetrating a Thin Double-Layered Porous Material, 66th Annual Meeting of the APS Division of Fluid Dynamics, Pittsburgh.
- T21. **Gat A.D.** & Gharib M. (2013) Elasto-capillary instability and coalescence of multiple parallel sheets, 5th Int. Symposium of Bifurcations and instabilities in fluid dynamics, Haifa, Israel.
- T22. **Elbaz S.B.** & Gat A.D. (2013) Shape Morphing of an Elastic Cylinder via Time-Varying Internal Viscous Flows, Israel Society for Theoretical and Applied Mechanics Annual Symposium, Tel-Aviv.
- T23. **Linshits M.** & **Gat A.D.** (2014) Preventing Buckling Failure of Elastic Structures by Internal Viscous Flows, 1st International Conference on MICRO & NANOFUIDICS Fundamentals and Applications 18-21 May 2014 University of Twente - The Netherlands
- T24. **Elbaz S.B.** & Gat A.D. (2014) Time-varying creeping flow in an elastic shell enveloping a slender rigid center-body, 2014 Israel Society for Theoretical and Applied Mechanics Annual Symposium, Tel-Aviv. (*Won best student lecture*).

- T25. **Tulchinsky A.** & Gat A.D. (2014) Viscous-elastic interaction as a mechanism to create adhesion in frogs' toe pads, 2014 Israel Society for Theoretical and Applied Mechanics Annual Symposium, Tel-Aviv.
- T26. **Elbaz S.B.** & Gat A.D. (2014) Time-varying creeping flow in an elastic shell enveloping a slender rigid center-body, 67th Annual Meeting of the APS Division of Fluid Dynamics, San Francisco.
- T27. **Matia Y.** & Gat A.D. (2014) Viscous flow within an embedded serpentine channel as a mechanism to create time-dependent deformation patterns of elastic beams, 67th Annual Meeting of the APS Division of Fluid Dynamics, San Francisco USA.
- T28. **Matia Y.** & Gat A.D. (2015) Creating Time-Dependent Deformation Patterns in Elastic Beams via Viscous Flows in Internal Channel Networks, 33rd Israel Conference Mechanical Engineering, Tel Aviv.
- T29. **Tulchinsky A.** & Gat A.D. (2015) Viscous-Poroelastic Interaction as Mechanism to Create Adhesion in Frogs Toe Pads, 33rd Israel Conference Mechanical Engineering, Tel Aviv.
- T30. **Elbaz S.B.** & Gat A.D. (2015) Creeping Annular Flow within an Elastic Shell, 33rd Israel Conference Mechanical Engineering, Tel Aviv.
- T31. **Boyko E.**, Rubin S., Gat A.D. & Bercovici M (2015) 2D Flow Patterning Using Non-Uniform Electroosmotic Flow, 33rd Israel Conference Mechanical Engineering, Tel Aviv.
- T32. **Sarig I.**, Gat A.D. & Starosvetsky Y, (2015) Non-Linear Interaction Between Ensembles of Liquid Droplets in a Hele-Shaw Cell, 33rd Israel Conference Mechanical Engineering, Tel Aviv.
- T33. **Elbaz S.** & Gat A.D. (2015) Dynamics of viscous liquid within a closed elastic cylinder subject to external forces with application to soft robotics, Fluids and Elasticity, Biarritz, France.
- T34. **Gat A.D.**, Rubin S., **Boyko E.**, Bercovici M. (2015) Elastic surface deformations driven by non-uniform electroosmotic flow in a Hele-Shaw cell, Fluids and Elasticity, Biarritz, France.
- T35. **Gat A.D.** & **Elbaz S.** (2015) Dynamics of viscous liquid within a closed elastic cylinder subject to external forces with application to soft-robotics, Bifurcations and Instabilities in Fluid Mechanics, ESPCI, Paris, France.
- T36. Danila M., **Gat A.D.** & Y. Starosvetsky (2015) Nonlinear Dynamics of Droplets in a Hele-Shaw Cell: Short-Lived Solitary Waves in a 1D Lattice, 68th Annual Meeting of the APS Division of Fluid Dynamics, Boston.
- T37. **Sarig I.**, Starosvetsky, Y. & **Gat A.D.** & (2015) Interaction between microfluidic droplets in a Hele-Shaw cell, 68th Annual Meeting of the APS Division of Fluid Dynamics, Boston.

- T38. **Rubin S.**, Gat A.D. & Bercovici M. (2015) Elastic deformations in a Hele-Shaw cell driven by local non-homogeneities of fluid properties, 68th Annual Meeting of the APS Division of Fluid Dynamics, Boston.
- T39. **Boyko E.**, Rubin S., Gat A.D. & Bercovici M. (2015) 2D Flow patterning in Hele-Shaw configurations using Non-Uniform Electroosmotic Slip, 68th Annual Meeting of the APS Division of Fluid Dynamics, Boston.
- T40. **Elbaz S.** & Gat A.D. (2015) Non-linear dynamics of annular creeping flow enclosed by an elastic membrane, 68th Annual Meeting of the APS Division of Fluid Dynamics, Boston USA.
- T41. **Tulchinsky A.** & Gat A.D. (2015) Transient Dynamics of Elastic Hele-Shaw Cell due to External Forces with Application to Impact Mitigation, 68th Annual Meeting of the APS Division of Fluid Dynamics, Boston USA.
- T42. **Matia Y.**, Elimellech T. & Gat A.D. (2015) Deformation of an Elastic beam due to Viscous Flow in an Embedded Channel Network, 68th Annual Meeting of the APS Division of Fluid Dynamics, Boston USA.
- T43. **Boyko E.**, **Bercovici M.** & Gat A.D. (2016) Deformations of a pre-stretched elastic membrane driven by non-uniform electroosmotic flow, 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland USA.
- T44. **Boyko E.**, **Gat A.D.** & Bercovici M. (2016) Viscous-elastic dynamics of power-law fluids within an elastic cylinder, 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland.
- T45. **Boyko E.**, Bercovici M. & Gat A.D. (2016) Flow of Power-Law Liquids in a Hele-Shaw Cell Driven by Non Uniform Electroosmotic Slip in the Case of Strong Depletion, 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland.
- T46. **Tulchinsky A.** & Gat A.D. (2016) Transient Dynamics of Elastic Hele-Shaw Cell due to External Forces with Application to Impact Mitigation, 24th ICTAM conference, Montreal, Canada.
- T47. **Gat A.D.** (2017) "Fluid mechanics of soft robots," Form and deformation in solid and fluid mechanics conference, Cambridge, UK.
- T48. **Friedman Y.** & **Gat A.D.** (2017) "Dynamics of an elastic sphere containing a thin creeping region and immersed in an acoustic region for similar viscous-elastic and acoustic time- and length-scales," 33rd Israel Conference Mechanical Engineering, Tel Aviv.
- T49. **Elbaz S.**, **Jacob H.** & Gat A.D. (2017) "Gaseous Viscous Peeling of Linearly Elastic Substrates," 70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, Colorado.
- T50. **Boyko E.**, Gat A.D. & Bercovici M. (2017) "Deformations of a pre-stretched and lubricated finite elastic membrane driven by non-uniform external forcing," 70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, Colorado.



- T51. **Matia Y.** & Gat A.D. (2017) "Dynamics of Solid-Liquid Composite Beams," 70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, Colorado.
- T52. **Friedman Y.** & **Gat A.D.** (2017) "Dynamics of an elastic sphere containing a thin creeping region and immersed in an acoustic region for similar viscous-elastic and acoustic time- and length-scales," 70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, Colorado.
- T53. **Gamus B.**, Or Y. & Gat A.D. (2017) "Model of a Soft Robotic Actuator with Embedded Fluidic Network," 70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, Colorado.
- T54. **Gamus B.**, Or Y. & Gat A.D. (2018) "Interaction Between Inertia, Viscosity, and Elasticity in Soft Robotic Actuator With Fluidic Network," 2018 IEEE RoboSoft Conference, Livorno, Italy.
- T55. **Elbaz S.B.**, **Jacob H.** & **Gat A.D.** (2018) "Transient gas flows in elastic microchannels," The 12<sup>th</sup> European Fluid Mechanics Conference, Vienna, Austria.
- T56. **Boyko E.**, Gat A.D. & Bercovici M. (2018) "Elastic deformation instability in soft microfluidic configurations induced by non-uniform electro-osmotic flow," The 12<sup>th</sup> European Fluid Mechanics Conference, Vienna, Austria.
- T57. **Elbaz S.B.**, **Jacob H.** & **Gat A.D.** (2018) "Transient gas flows in elastic microchannels," 9th Conference of the International Marangoni Association, Guilin, China.
- T58. **Boyko E.**, Gat A.D. & Bercovici M. (2018) "Elastic deformation instability in soft microfluidic configurations induced by non-uniform electro-osmotic flow," 9th Conference of the International Marangoni Association, Guilin, China.
- T59. **Matia Y.** & **Gat A.D.** (2019) "The Effect of Connections Between Fluid-Filled Cavities on the Dynamics of Solid-Liquid Composite Beams," Colloidal Science and Metamaterials, Paris, France.