

## Contact

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## Education

2007 – 2013: **PhD** (*direct track*), Racah Institute of Physics, Hebrew University of Jerusalem

**Thesis advisors:** Prof. D. Davidov, Dr. M. Golosovsky and Prof. B. Aroeti

**Thesis title:** "Living Cell Studies Using Infrared Surface Plasmon Spectroscopy"

2004 – 2007: **BSc** in Physics, Hebrew University of Jerusalem (HUJI)

## Academic Appointments

2022 – **Assistant professor**

*present:* The Swiss Institute for Dryland Environmental and Energy Research (SIDEER), The Jacob Blaustein Institutes for Desert Research, Ben-Gurion University of the Negev

2015 – 2019: **Postdoctoral fellow**

*Structure and dynamics relationship in multicellular systems - «active nematics»*

**Host:** Dr. Pascal Silberzan, Laboratoire Physico-Chimie, Institut Curie, Paris, France

2013 – 2015: **Postdoctoral fellow**

*Freezing of complex solution, Direction solidification, Cryopreservation of tissues*

**Host:** Prof. Ido Braslavsky, HUJI, Rehovot, Israel

## Teaching and Mentoring Experience

2023 – **Assistant professor**, Ben-Gurion, University, Israel.

*present:* **Courses Taught:**

"Fluid Mechanics for Biomedical Engineering" (3rd-year undergraduate course)

"Mechanics and Dynamics of Living Multicellular Systems" (Graduate course)

**Mentoring Experience:**

Mentor for Biomedical Engineering 4th-year Project Students

2018 – 2019: **Lecturer**, Department of Biomedical Engineering, Ben-Gurion University, Israel

Taught "Heat and mass transfer" (4th-year undergraduate course)

2008 – 2013: **Teaching assistant** at Prof. Jay Fineberg undergraduate laboratory, HUJI, Israel

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## Review services

*Funding Agencies:* • **Israel-USA Bi-National Science Foundation (BSF)**

*Scientific Journals:* • **Soft Matter** • **Biophysical Reports** • **Tissue Engineering** • **Langmuir** • **Journal of Crystal Growth** • **Biosensors and Bioelectronics** • **Sensors and Actuators B** • **Journal of Biomedical Optics**

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## Honors, Awards

2024 – 2027: Personal research grant, Israel Science Foundation (**ISF**) (\$325,000)

2024 – 2027: New-faculty equipment grant, Israel Science Foundation (**ISF**) (\$325,000)

2016 – 2018: **PRESTIGE** Co-funded fellow and a **Marie Curie** fellow in Institut Curie (€15,000)

2016: Travel grant, ICAM, USA (€1,000)

2015 – 2016: **Labex CeTisPHYBio** postdoctoral fellowship in Institut Curie (€45,000)

2014: The Hebrew University candidate for the **Rothschild postdoctoral fellowship**

2007 – 2012: Full scholarship for graduate studies from Racah Institute of Physics, HUJI

2010: Best research project award at HUJI faculty day (1,000 NIS)

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## Academic References ( <sup>PD</sup> postdoc hosts, <sup>C</sup> collaborators/co-authors)

- <sup>PD</sup> **Pascal Silberzan** - Institut Curie, [Pascal.Silberzan@curie.fr](mailto:Pascal.Silberzan@curie.fr)
- <sup>PD</sup> **Ido Braslavsky** - Biochemistry Institute, Hebrew University, [ido.braslavsky@mail.huji.ac.il](mailto:ido.braslavsky@mail.huji.ac.il)
- <sup>C</sup> **Jacques Prost** - Institut Curie and National University Singapore, [Jacques.Prost@curie.fr](mailto:Jacques.Prost@curie.fr)
- <sup>C</sup> **Jean-François Joanny** - Institut Curie and Collège de France, [Jean-Francois.Joanny@curie.fr](mailto:Jean-Francois.Joanny@curie.fr)
- <sup>C</sup> **Luca Giomi** - Universiteit Leiden, [giomi@lorentz.leidenuniv.nl](mailto:giomi@lorentz.leidenuniv.nl)
- <sup>C</sup> **Vincenzo Vitelli** - The University of Chicago, [vitelli@uchicago.edu](mailto:vitelli@uchicago.edu)
- **Francesc Sagués** - Physical Chemistry, Universitat de Barcelona, [f.sagues@ub.edu](mailto:f.sagues@ub.edu)
- **Eran Sharon** - Department of Physics, Hebrew University, [erans@mail.huji.ac.il](mailto:erans@mail.huji.ac.il)
- **Nir Gov** - Weizmann Institute of Science, [nir.gov@weizmann.ac.il](mailto:nir.gov@weizmann.ac.il)

**1835** Times Cited By Others, H-index = **15**, i10-index = **13** (according to [GS](#))

**33** Peer-Reviewed Publications, **13** as First Author, **13** as Corresponding Author

**17** PAPERS / **8** PROCEEDINGS / **5** BOOK CHAPTERS / **4** PATENTS

**PUBLISHED AS:** [PI \(BGU\)](#) | [POSTDOC \(INSTITUT CURIE & HUJI\)](#) | [PHD \(HIJI\)](#)



## Peer-reviewed articles

- 2024 **Topological defects in multi-layered swarming bacteria,**  
**Yashunsky V\***<sup>§</sup>, Pearce DJ, Ariel<sup>§</sup> G, Be'er A<sup>§</sup>, *Soft Matter* (2024) (<sup>§</sup>Corresponding author), [IF: 3.4; (Q2), Rank in Physics, Multidisciplinary: 42 from 112; **Times Cited by others: 17**]
- 2024 **Extended temperature range of the ice-binding protein activity,**  
 Sirotinskaya V, Bar-Dolev M, **Yashunsky V**, Bahari L, Braslavsky I, *Langmuir* (2024), 40(14), 7395–7404, [IF: 3.9; (Q2), Rank in Chemistry, Multidisciplinary: 81 from 230; **Times Cited by others: 8**]
- 2023 **Crisscross multilayering of cell sheets,**  
 Sarkar T, **Yashunsky V**, Brézin L, Blanch-Mercader C, Aryaksama T, Lacroix M, Risler T, Joanny JF, Silberzan P, *PNAS Nexus*, (2023), pgad034, [IF: 3; (Q1), Rank in Multidisciplinary: 20 from 135; **Times Cited by others: 37**]
- 2022 **Chiral edge current in nematic cell monolayers,**  
**Yashunsky V\***<sup>§</sup>, Pearce D. J. G\*, Blanch-Mercader C\*, Ascione F, Silberzan P and Giomi L, *Physical Review X* (2022), 12(4):041017 (\*Equal contribution, <sup>§</sup>Corresponding author), [IF: 12.5; (Q1), Rank in Physics, Multidisciplinary: 3 from 111; **Times Cited by others: 50**]
- 2021 **Heat flux balance description of unidirectional freezing and melting dynamics on a translational temperature gradient stage,**  
 Chasnitsky M<sup>§</sup>, **Yashunsky V**<sup>§</sup>, and Braslavsky I, *International Journal of Thermal Sciences*, (2021) 161:106734, (<sup>§</sup>Corresponding author), [IF: 4.8; (Q1), Rank in Engineering, Mechanical: 25 from 177; **Times Cited by others: 1**]
- 2020 **The 2020 motile active matter roadmap,**  
 Gompper G, [...], **Yashunsky V**, et al., *Journal of Physics-Condensed Matter*, (2020) 32(19):193001, [IF: 2.3; (Q3), Rank in Physics, Condensed Matter: 43 from 77; **Times Cited by others: 646**], **Invited review**
- 2019 **Labyrinth ice pattern formation induced by near-infrared irradiation,**  
 Guy-Preis S, Hayet H, Katz A, **Yashunsky V**, Kaner A, Ullman S, Braslavsky I, *Science Advances*, (2019) 5(3): eaav1598, [IF: 13.1; (Q1), Rank in Multidisciplinary: 3 from 126; **Times Cited by others: 5**], **Highlighted in Nature**
- 2018 **Turbulent dynamics of epithelial cell cultures,**  
 Blanch-Mercader C\*<sup>§</sup>, **Yashunsky V\***<sup>§</sup>, Garcia S, Duclos G, Giomi L, Silberzan P, *Physical Review Letters*, (2018), 120(20): 208101, (\*Equal contribution, <sup>§</sup>Corresponding author), [IF: 9.2; (Q1), Rank in Physics, Multidisciplinary: 4 from 104; **Times Cited by others: 233**]

- 2018 **Spontaneous shear flow in confined cellular nematics**,  
 Duclos G\*, Blanch-Mercader C\*, **Yashunsky V\***, Salbreux G, Joanny JF, Prost J, Silberzan P, *Nature Physics*, (2018), 14(7): 728-732, (\*Equal contribution), [IF: 20.1; (Q1), Rank in Physics, Multidisciplinary: 2 from 104; **Times Cited by others: 291**]
- 2018 **Directional freezing for the cryopreservation of adherent mammalian cells on a substrate**,  
 Bahari L\*, Bein A\*, **Yashunsky V\***, Braslavsky I, *PLoS One*, (2018) 13(2): e0192265, (\*Equal contribution), [IF: 2.8; (Q1), Rank in Multidisciplinary Sciences: 24 from 121; **Times Cited by others: 60**]
- 2017 **Structure of a 1.5-MDa adhesin that binds its Antarctic bacterium to diatoms and ice**,  
 Guo S, Stevens C, Vance T, Olijve L, Graham L, Campbell R, Yazdi S, Escobedo C, Bar-Dolev M, **Yashunsky V**, Braslavsky I, Atkins D, Langelaan D, Smith S, Allingham J, Voets I and Davies P, *Science Advances*, (2017) 3(8): e1701440, IF: 11.5; (Q1), Rank in Multidisciplinary: 4 from 115; **Times Cited by others: 127**]

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 Post-graduation publications

PhD publication 

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- 2013 **Real-time sensing of enteropathogenic E. coli-induced effects on epithelial host cell height, cell-substrate interactions, and endocytic processes by infrared surface plasmon spectroscopy**,  
**Yashunsky V\***<sup>§</sup>, Kharilker L\*, Zlotkin-Rivkin E, Rund D, Melamed-Book N, Zahavi EE, Perlson E, Mercone S, Golosovsky M, Davidov D, Aroeti B, *PLoS One*, (2013) 8 (10): e78431, (\*Equal contribution, <sup>§</sup>Corresponding author), [IF: 3.5; (Q1), Rank in Multidisciplinary Sciences: 8 from 55; **Times Cited by others: 9**]
- 2012 **Real-time sensing of cell morphology by infrared waveguide spectroscopy**,  
**Yashunsky V\***<sup>§</sup>, Marciano T\*, Lirtsman V, Golosovsky M, Davidov D, Aroeti B, *PLoS One*, (2012) 7 (10): e48454, (\*Equal contribution, <sup>§</sup>Corresponding author), [IF: 3.7; (Q1), Rank in Multidisciplinary Sciences: 7 from 56; **Times Cited by others: 19**]
- 2012 **Surface plasmon-based infrared spectroscopy for cell biosensing**,  
**Yashunsky V**<sup>§</sup>, Lirtsman V, Zilbershtein A, Bein A, Schwartz B, Aroeti B, Golosovsky M, Davidov D, *Journal of Biomedical Optics*, (2012) 17 (8): 081409, (<sup>§</sup>Corresponding author), [IF: 2.9; (Q1), Rank in Optics 9 from 80; **Times Cited by others: 21**]
- 2010 **Real-time monitoring of epithelial cell-cell and cell-substrate interactions by infrared surface plasmon spectroscopy**,  
**Yashunsky V**<sup>§</sup>, Lirtsman V, Golosovsky M, Davidov D, Aroeti B, *Biophysical Journal*, (2010) 99 (12): 4028-4036, (<sup>§</sup>Corresponding author), [IF: 4.2; (Q1), Rank in Biophysics: 18 from 73; **Times Cited by others: 74**] **Feature article**
- 2009 **Real-time monitoring of transferrin-induced endocytic vesicle formation by mid-infrared surface plasmon resonance**,  
**Yashunsky V**, Shimron S, Lirtsman V, Weiss AM, Melamed-Book N, Golosovsky M, Davidov D, Aroeti B, *Biophysical Journal*, (2009) 97 (4): 1003-1012, [IF: 4.4; (Q1), Rank in Biophysics: 10 from 74; **Times Cited by others: 41**]

- 2009 **Midinfrared surface-plasmon resonance: A novel biophysical tool for studying living cells,**  
Golosoovsky M, Lirtsman V, **Yashunsky V**, Davidov D, Aroeti B, *Journal of Applied Physics*, (2009) 105 (10): 1020-1021, [IF: 2.1; (Q1), Rank in Physics: 24 from 108; **Times Cited by others: 74**]

## Peer-reviewed proceedings

- 2019 **The effect of ice binding proteins on devitrification of Me2SO solutions,** Sirotinskaya V, Bahari L, **Yashunsky V**, Braslavsky I, *Cryobiology*, (2019), 91: 192, [**Times Cited by others: 2**]
- 2019 **Labyrinth ice pattern formation induced by near-infrared irradiation,** Guy-Preis S, Lyn Y, Katz A, **Yashunsky V**, Kaner A, Hayet H, Ullman S, Braslavsky I, *Cryobiology*, (2019), 91: 174
- 2018 **Cryopreservation of adherent mammalian cells on substrate by slow freezing,** Bahari L, Bein A, **Yashunsky V**, Sirotinskaya V, Braslavsky I, *Cryobiology*, (2018), 80: 160 [**Times Cited by others: 4**]
- 2018 **Bovine ovary tissue cryopreservation,** Savchenko I, Roth Z, Braslavsky I, **Yashunsky V**, *Cryobiology*, (2018), 80: 185, [**Times Cited by others: 1**]
- 2015 **Microscopic investigation of antifreeze proteins activity at cryogenic temperatures,** Bahari L, **Yashunsky V**, Braslavsky I, *Cryobiology*, (2015), 71: 570-573, [**Times Cited by others: 3**]
- 2012 **Infrared surface plasmon spectroscopy and biosensing,** **Yashunsky V**<sup>§</sup>, Zilbershtein A, Lirtsman V, Marciano T, Aroeti B, Golosoovsky M, Davidov D, *Proceedings of SPIE*, (2012), 8234:823419-823411, (<sup>§</sup>Corresponding author) [**Times Cited by others: 3**]
- 2010 **Infrared surface plasmon spectroscopy of living cells,** **Yashunsky V**<sup>§</sup>, Zilberstein A, Marciano T, Lirtsman V, Golosoovsky M, Davidov D, Aroeti B, *AIP Conference Proceedings*, (2010), 1:1617-1621 (<sup>§</sup>Corresponding author) [**Times Cited by others: 6**]
- 2009 **Mid-infrared surface-plasmon-resonance technique and its biological applications,** Golosoovsky M, **Yashunsky V**, Lirtsman V, Davidov D, Aroeti B, *3P3 Plasmonics, Metamaterials, and Magneto-Optics*, (2009), 2:306

## Book chapters

- 2026 **Topological defects in multicellular systems,** Singh P, Neimand ED, **Yashunsky V**<sup>§</sup>, *In Biophysics of Tissue Self-Organization in Morphogenesis* (2026), 95-114. Academic Press, (<sup>§</sup>Corresponding author)
- 2018 **Controlling confinement and topology to study collective cell behaviors,** Duclos G, Deforet M, Yevick H, Cochet-Escartin O, Ascione F, Moitrier S, Sarkar S, **Yashunsky V**, Bonnet I, Buguin A, Silberzan P, *Cell Migration. Methods in Molecular Biology*, (2018), 1749: 387-399, Humana Press, New York, NY [**Times Cited by others: 6**]

- 2015 **Infrared surface plasmon spectroscopy decodes early processes in epithelial host cells upon enteropathogenic Escherichia coli infection**, **Yashunsky V<sup>§</sup>** and Aroeti B, *Label-Free Biosensor Methods in Drug Discovery. Methods in Pharmacology and Toxicology*, (2015), 353-371, Humana Press, New York, NY, (<sup>§</sup>Corresponding author)
- 2012 **Studying living cells by infrared surface plasmon spectroscopy**, **Yashunsky V<sup>§</sup>**, Zilberstein A, Marciano T, Lirtsman V, Golosovsky M, Aroeti B, Davidov D, *Plasmons: Structure, Properties and Applications*, (2012), 131-144, Nova Science Publishers, New York, NY (<sup>§</sup>Corresponding author) [Times Cited by others: 1]
- 2010 **Infrared Surface Plasmon Spectroscopy of Living Cells**, Golosovsky M, **Yashunsky V**, Zilberstein A, Marciano T, Lirtsman V, Davidov D, Aroeti B, *Plasmons: Theory and Applications*, (2010), 327-343, Nova Science Publishers, New York, NY

## Patents

- 2023 **US202163274551P: Micromixer and method for concentration measurement of unknown sample**, Mizrahi N, **Yashunsky V**, Zohar O, Ezra Y, *Pending at WO*, Application filed by E.F.A. Engineering For All Ltd 2022. [Times Cited by others: 1\*]
- 2017 **US20200077642A1: Cryopreservation method of biological specimen**, Braslavsky I, **Yashunsky V**, Bein, A, Bahari L, Schwartz B, *PCT, Pending at EP WO US*, Application filed 2017. [Times Cited by others: 7\*]
- 2016 **US20180192686A1: 3-dimensional printing of food**, Shoseyov O, Braslavsky I, **Yashunsky V**, Baruch-Sharon S, *Granted at AU, Pending at EP WO US CN*, Application filed 2016, Commercialized by SavorEat [Times Cited by others: 37\*]
- 2015 **US10669390B2: Porous nanocrystalline cellulose structures**, Lapidot S, Roth Shalev S, Slattegard R, Shoseyov O, Azerraf C, Braslavsky I, **Yashunsky V**, *Granted at EP CN JP KR AU US CN WO IL*, Application filed 2015, Commercialized by Melodea [Times Cited by others: 43\*]

\* Google Patents citations

## Articles (preprints under review and in submission)

- preprint* **Biomimetic Engineering of a Fortified Ice Composite with Enhanced Mechanical Properties**, Adar C, Baron Y, Rofman B, Bar-Dolev M, Bahari L, **Yashunsky V**, Sirotinskaya V, Shoseyov O, Braslavsky I, *arXiv:2507.22068* (2025)
- preprint* **Chirality across scales in tissue dynamics**, Chen S, Gökmen DE, Fruchart M, Krumbein M, Silberzan P, **Yashunsky V<sup>§</sup>** and Vitelli V<sup>§</sup>, *arXiv.2506.12276* (2025) (<sup>§</sup>Corresponding author)
- preprint* **Irreversibility and symmetry breaking in the creation and annihilation of defects in active living matter**, Beer A, Neimand ED, Corbett D, Pearce DJ, Ariel G, **Yashunsky V<sup>§</sup>**, *arXiv.2508.15622* (2025) (<sup>§</sup>Corresponding author)
- preprint* **Particle Ice Front Interaction-The Brownian Ratchet Model**, Chasnitsky M<sup>§</sup>, **Yashunsky V<sup>§</sup>**, and Braslavsky I, *arXiv:1712.10258* (2017), (<sup>§</sup>Corresponding author)

## Talks at conferences and seminars (TALK | POSTER | OTHER)

- 2026           
- | ILANIT 2026, Eilat, Israel, (*Invited talk*)
  - | Complex Systems Seminar, Physics Department, Bar Ilan University, Israel, (*Seminar*)
- 2025
- | [TAU BioSoft Day #6, Israel, \(poster\)](#)
  - | [The 70th Annual Meeting of the Israel Physical Society, Technion, Israel, \(chair of Biophysics session\)](#)
  - | 2025 Mechanobiology Conference III, ICISE, Quy Nhon, Vietnam, (*talk*)
  - | Physics of Collective Cell Dynamics and Morphogenesis, University of Oxford, UK, (*talk*)
  - | The Israel Society for Theoretical and Applied Mechanics, Israel, (*Invited talk*)
- 2024
- | Racah **HUJI**, Material Eng. **BGU**, Env. Phys. **BGU**, Mol. Biology **Ariel Univ.**, (*Seminars*)
  - | **Oscillations and Dynamic Instabilities in Chemical Systems, Gordon Research Conference, Switzerland, (Invited talk)**
  - | [TAU BioSoft Day #5, Israel, \(poster\)](#)
  - | [57th Annual Meeting of the Israel Society for Microscopy, Israel, \(poster\)](#)
- 2023
- | [Physics of Living Systems, EMBO Workshop, Dresden, Germany, \(poster\)](#)
  - | **BGU vs Cancer, Ben-Gurion University, Israel, (Invited talk)**
  - | **The Sackler Biophysics Prize Symposium, Tel-Aviv University, Israel, (Invited talk)**
  - | **Racah Institute of Physics, Hebrew University, Israel, (Seminar)**
  - | **Leiden Institute of Physics seminar, Leiden University, Netherlands, (Seminar)**
  - | **Laboratoire Physico-Chimie Curie seminar, Institut Curie, Paris, France, (Seminar)**
  - | **Biological and soft-matter physics seminar, Ben-Gurion University, Israel, (Seminar)**
  - | **Bio-Soft seminar, Tel-Aviv University, Israel, (Seminar)**
- 2022 **Biomedical Engineering Department, Ben-Gurion University, Israel, (Seminar)**
- before
- 2020 **School of Mechanical Engineering, Tel-Aviv University, Israel, (Seminar)**
- | **Physics Department, Bar-Ilan University, Israel, (Seminar)**
  - | **Environmental Physics Department, Ben-Gurion University, Israel, (Seminar)**
  - | **Mechanical Engineering Faculty, Technion, Israel, (Seminar)**
  - | **Bio-Soft, Tel-Aviv University, Israel, (Seminar)**
  - | **Chemical Physics, Tel-Aviv University, Israel, (Seminar)**
  - | **Clore seminar, Biological Physics Center at Weizmann Institute, Israel, (Seminar)**
  - | **Institutes for Desert Research, Ben-Gurion University, Israel, (Seminar)**
  - | **Applied Physics Department, Hebrew University, Israel, (Seminar)**
  - | **Racah Institute of Physics, Hebrew University, Israel, (Seminar)**
  - | **Chemical and Biological Physics, Weizmann Institute, Israel, (Seminar)**
  - | **Physics Faculty, Technion, Israel, (Seminar)**
  - | **Biomedical Engineering Department, Ben-Gurion University, Israel, (Seminar)**
  - | **ESPCI-ENS, École Normale Supérieure, Paris, France, (Seminar)**
  - | **Chemical Engineering Department, Ben-Gurion University, Israel, (Seminar)**
  - | **Topology in Complex Fluids, Lorentz center, Netherlands, (Invited talk)**

| **Physics Department, Bar-Ilan University, Israel, (*Seminar*)**  
| **Biotechnology Engineering Department, Ben-Gurion University, Israel, (*Seminar*)**  
| **Physics Department, Tel-Aviv University, Israel, (*Seminar*)**  
| **International Physics of Living Systems (iPoLS), IPGG, Paris, France, (*Invited talk*)**  
| **LabEx annual meeting, Institut Curie, Paris, France, (*Invited talk*)**  
| **Active and Smart Matter conference, Syracuse University, NY, USA (*Invited talk*)**  
| **Laboratoire Ondes et Matière d'Aquitaine, L'université de Bordeaux, France, (*Seminar*)**  
| **6th International on Delivery of Functionality in Complex Food Systems, Paris, France**  
| **Institute of Physics, Academia Sinica, Taipei, Taiwan, (*Seminar*)**  
| **Israel Society for Biotechnology Engineering conference (ISBE), Tel-Aviv, Israel**  
| **Biosensors and Bioelectronics Centre, IFM, Linköping, Sweden, (*Seminar*)**  
| **The Racah Institute of Physics, Hebrew University, Jerusalem, Israel**  
| **1st International Biophotonics meeting in Israel, Tel-Aviv, Israel**  
| **The International Society for Optical Engineering (SPIE), San Francisco, CA, USA**  
| **Israel Society for Biotechnology Engineering (ISBE), Tel-Aviv, Israel**  
| **Israel Societies for Experimental Biology (ILANIT) conference, Eilat, Israel**

