Shaqed Carasso, Ph.D.

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PROFILE

I study how gut bacteria, their bacteriophages and the human host shape one another, combining metagenomic and genomic analysis with in vitro and mouse-model experiments. My PhD showed that reversible DNA inversions (phase variation) in *Bacteroides* reshape bacterial function, immune modulation and long-term phage co-existence, in work published in Cell Host & Microbe, Gut Microbes and Nature Communications. At the Broad Institute I am extending this work from microbe–phage dynamics to microbe–host interactions. I have authored 17 peer-reviewed articles, 9 of them as first or co-first author.

RESEARCH INTERESTS

Gut microbiome · Bacterial genomics and phase variation · Phage–bacteria dynamics · Microbe–host interactions · Bioinformatics

EDUCATION

2021–2025 **Ph.D.** · Faculty of Medicine, Technion – Israel Institute of Technology, Haifa
Thesis: *Phase Variations of the Bacteroides Genus*. Advisors: Assoc. Prof. Naama Geva-Zatorsky (Technion) and Dr. Itai Sharon (MIGAL Galilee Research Institute).

2018–2021 **M.Sc., Medical Sciences (cum laude)** · Technion
Thesis: *Fecal Microbiota Transplantation and Phage Therapy to Eradicate Antibiotic-Resistant Bacteria*. Advisor: Assoc. Prof. Naama Geva-Zatorsky.

2014–2018 **B.Sc., Biology** · Technion

POSITIONS

08/2025–present **Postdoctoral Associate** · Broad Institute, Cambridge, MA
Advisor: Prof. Ramnik Xavier.

10/2021–03/2025 **Teaching Assistant** · Medical Bacteriology Laboratory, Technion, Haifa
Undergraduate medical school course.

PUBLICATIONS

Phase variation, phages and microbe–host interactions

1. **Carasso S**, Kasher-Dvora M, Gefen T, Geva-Zatorsky N. Phase variation-mediated bacterial functional plasticity as a lens for understanding microbe–host interactions. *Gut Microbes.* 2026;18(1):2687913.
2. Gal-Mandelbaum N, **Carasso S**, Kedem A, Ziv T, Keshet-David R, Abboud R, Zaatry R, Gefen T, Geva-Zatorsky N. Dietary carbohydrates alter immune-modulatory functionalities and DNA inversions in *Bacteroides thetaiotaomicron*. *Nat Commun.* 2025;16:4938.
3. †**Carasso S**, †Keshet-David R, Zhang J, Hajjo H, Kadosh-Kariti D, Gefen T, Geva-Zatorsky N. Bacteriophage-driven DNA inversions shape bacterial functionality and long-term co-existence in *Bacteroides fragilis*. *Gut Microbes.* 2025;17(1):2501492.
4. †**Carasso S**, †Zaatry R, †Hajjo H, †Kadosh-Kariti D, Ben-Assa N, Naddaf R, Mandelbaum N, Pressman S, Chowers Y, Gefen T, Jeffrey KL, Jofre J, Coyne MJ, Comstock LE, Sharon I, Geva-Zatorsky N. Inflammation and bacteriophages affect DNA inversion states and functionality of the gut microbiota. *Cell Host Microbe.* 2024;32(3):322–334.e9.
5. Mandelbaum N, Zhang L, **Carasso S**, Ziv T, Lifshiz-Simon S, Davidovich I, Luz I, Berinstein E, Gefen T, Cooks T, Talmon Y, Balskus EP, Geva-Zatorsky N. Extracellular vesicles of the Gram-positive gut symbiont *Bifidobacterium longum* induce immune-modulatory, anti-inflammatory effects. *npj Biofilms Microbiomes.* 2023;9:30.

6. Ben-Assa N, Coyne MJ, Fomenkov A, Livny J, Robins WP, Muniesa M, Carey V, **Carasso S**, Gefen T, Jofre J, Roberts RJ, Comstock LE, Geva-Zatorsky N. Analysis of a phase-variable restriction modification system of the human gut symbiont *Bacteroides fragilis*. *Nucleic Acids Res.* 2020;48(19):11040–11053.

Preprint. Ghezzi H, Wolff R, Jain A, Burckhardt JC, Hunter M, Ng KM, **Carasso S**, Geva-Zatorsky N, Garud N, Tropini C. Growth capacity and mortality burden shape microbial persistence under osmotic stress in *Bacteroides thetaiotaomicron*. *bioRxiv*. 2026.

Preview. **Carasso S**, Hajjo H, Geva-Zatorsky N. Phage-bacteria associations: analyze, match, develop therapies. *Cell Host Microbe*. 2020;28:353–355.

Microbiome, infection and clinical studies

1. **Carasso S**, Gefen T, Bakria R, Bar-Yoseph H, Geva-Zatorsky N. Microbiome changes associated with FMT-mediated clearance of antibiotic-resistant *Klebsiella pneumoniae* in a murine carriage model. *BMC Microbiol.* 2026;26:898.
2. Ben-Assa N, Naddaf R, **Carasso S**, Dagan O, Sason A, Gefen T, Geva-Zatorsky N. Intra-species competition combats vancomycin-resistant enterococci. *Gut Microbes*. 2026;18(1):2647529.
3. †Naddaf R, †Shmilovich H, †**Carasso S**, Keshet-David R, Herren R, Gefen T, Goshen-Lago T, Zwang Y, Livyatan I, Shental N, Haberfeld O, Straussman R, Markar SR, Nilsson M, Kashtan H, Ben-Aharon I, Geva-Zatorsky N. Esophageal microbiome correlates with post-esophagectomy anastomotic leak in cancer patients. *ESMO Gastrointest Oncol.* 2025;8:100172.
4. †Naddaf R, †**Carasso S**, Reznick-Levi G, Hasnis E, Qarawani A, Maza I, Gefen T, Half EE, Geva-Zatorsky N. Gut microbial signatures are associated with Lynch syndrome and cancer history in Druze communities in Israel. *Sci Rep.* 2023;13:20677.
5. †Mudrik-Zohar H, †**Carasso S**, Gefen T, Zalmanovich A, Katzir M, Cohen Y, Paitan Y, Geva-Zatorsky N, Chowers M. Microbiome characterization of infected diabetic foot ulcers in association with clinical outcomes: traditional cultures versus molecular sequencing methods. *Front Cell Infect Microbiol.* 2022;12:836699.
6. **Carasso S**, Fishman B, Lask LS, Shochat T, Geva-Zatorsky N, Tauber E. Metagenomic analysis reveals the signature of gut microbiota associated with human chronotypes. *FASEB J.* 2021;35(11):e22011.
7. Berkowitz E, Kopelman Y, Kadosh D, **Carasso S**, Tiosano B, Kesler A, Geva-Zatorsky N. "More guts than brains?" The role of gut microbiota in idiopathic intracranial hypertension. *J Neuroophthalmol.* 2022;42(1):e70–e77.
8. †Bar-Yoseph H, †**Carasso S**, Shklar S, Korytny A, Even Dar R, Daoud H, Nassar R, Maharshak N, Hussein K, Geffen Y, Chowers Y, Geva-Zatorsky N, Paul M. Oral capsulized fecal microbiota transplantation for eradication of carbapenemase-producing Enterobacteriaceae colonization with a metagenomic perspective. *Clin Infect Dis.* 2021;73(1):e166–e175.

Other collaborations

1. Ohayon C, Gross N, Capucha T, **Carasso S**, Shkedy Y, Rachmiel A, Emodi O. Efficiency and outcomes in microvascular anastomosis: a meta-analysis of mechanical versus manual techniques. *J Cranio-Maxillofac Surg*. 2025;53(10):1720–1730.
2. Ohayon C, Ritschl LM, Capucha T, **Carasso S**, Fichter AM, Gross N, Rachmiel A, Wolff KD, Emodi O. The never-ending story: single versus dual venous anastomoses in microsurgical radial forearm free flap for head and neck reconstruction. *J Cranio-Maxillofac Surg*. 2025;53(9):1326–1333.
3. Marai I, Carasso D, Carasso S, Carasso S. The mechanical cost of decreasing conduction velocity: a mathematical model of pacing-induced lower strain. *J Atr Fibrillation.* 2021;14(1):20200444.

Patent applications (pending)

1. Geva-Zatorsky N, **Carasso S**, Gefen T, Keshet R, Hajjo H, Zaatry R, Sharon I. Reversible bacterial phase-variations and uses thereof in diagnostic and therapeutic applications. WO2024176230A1, 2024; US Patent App. 19/157,833, 2026.
2. Geva-Zatorsky N, Gefen T, Kariti D, Ben-Assa N, Abboud R, **Carasso S**, Zaatry R. Bacteriophages as a tool to manipulate gut commensal immune-modulation activity. WO2024194876A1, 2024.

AWARDS AND HONORS

2025	**Best Lecture Award, Technion Faculty of Medicine Graduate Research Day**
2024	**Jacobs Award for an Excellent Publication, Technion**
2024	**Best Poster Award, Technion Faculty of Medicine Graduate Research Day**
2023	**Gutwirth Excellence Scholarship**

2022	**Teva BioInnovation Student Fellowship and Mentorship Program**
2020–2024	**Faculty of Medicine Excellence Scholarship for Graduate Students (five semesters)**
2017–2018	**Outstanding Bachelor Student Award and Dean's List (three semesters), Faculty of Biology, Technion**

CONFERENCE PRESENTATIONS

2024	**"Long-term impact: bacteriophage-driven DNA inversions shape *Bacteroides fragilis* functionality"** 10th International Human Microbiome Consortium Congress, Rome, Italy (short talk)
2024	**"Bacterial DNA inversions and functional plasticity during inflammation and encounter with bacteriophages"** Israel Society for Microbiology Annual Meeting, Ramat Gan, Israel (poster)
2024	**"Bacterial DNA inversions and functional plasticity during inflammation and encounter with bacteriophages"** Jacobs Graduate Research Day, Technion, Haifa, Israel (poster)
2023	**"Bacterial DNA inversions and functional plasticity during inflammation and encounter with bacteriophages"** EMBL Symposium: The Human Microbiome, Heidelberg, Germany (talk)
2023	**"Inflammation and bacteriophages affect DNA inversion states and functionality of the gut microbiota"** 10th Annual Broad-ISF Symposium, Jerusalem, Israel (poster)
2023	**"Gut *Bacteroides* exhibit genomic phase variations under inflammatory conditions"** ILANIT | FISEB Experimental Biology Conference, Eilat, Israel (talk)