Roee Ben Nissan email: roeebn@gmail.com | mobile: (+972) 54-228-5285

Education:

2025-present: **Postdoctoral fellow**, Ben-Gurion university in collaboration with Weizmann Institute of Science
Project: Evaluating the impact of sea level rise on land vertebrates.
Advisors: *Prof. Uri Roll and Prof. Ron Milo*

2019 – 2024: **Ph.D.- Biochemistry**, Weizmann Institute of Science.
Thesis title: "Genetic reconstruction and metabolic enhancement of synthetic CO_2 fixation in *E. coli*".
Advisor: *Prof. Ron Milo.*

2022 – 2024: **Teaching Certificate**, Science Teaching Department, Weizmann Institute of Science.

2016 – 2019: **M.Sc.**, Weizmann Institute of Science.
Thesis title: "Directed evolution and metabolic engineering of *E. coli* towards autotrophic growth".
Advisor: *Prof. Ron Milo*.

2013 – 2016: **B.Sc.**, Life Sciences, with honors. Ben-Gurion University in the Negev.

Fellowships and Honors:

2025: Jacob Blaustein Center for Scientific Cooperation (BCSC) **Fellow**, Ben-Gurion University, Israel.

2024: Environmental and Plant Sciences department's **Outstanding Student Award**, Weizmann Institute of Science, Israel.

2020-2024: Sustainability and Energy Research Initiative (SAERI) **Fellow**, Weizmann Institute of Science, Israel.

2023: Young Scientists Summer Program (YSSP) 2023 **Fellow,** The International Institute for Applied Systems Analysis (IIASA), Austria.

2021: Micro-Eco conference **best flash-talk award**.

2020: Azrieli **"Innovative students" award** ($10K).

2018: **Best poster award**, "Synthetic Biology: applications for a livable future".

2017: Ben-Gurion University **Green Campus award**, for outstanding research with environmental impact.

2013-2016: "Ashalim", **BSc Honors Program for interdisciplinary studies**, Ben Gurion University.

2013-2016: "Dkalim", **BSc Honors Program for scientific research**, Ben Gurion University.

Conference talks and Invited Lectures:

December 2024: **Seminar**, Department of Desert Ecology, Ben-Gurion University, Israel. Title: "Teaching Bacteria to Eat CO_2: A path towards sustainable bioproduction.

December 2024: **Seminar**, Microbiology department, Hebrew university, Israel. Title: "Autotrophic growth of E. coli is achieved by a small number of genetic changes".

September 2024: **Conference talk** at the Annual Conference for Science and the Environment, Israel.

April 2024: **Conference talk** at MAgPIE workshop & stories, Potsdam Institute for Climate Impact Research (PIK). Potsdam, Germany. Title: "Towards an integrated assessment of microbial protein production from H_2 and CO_2".

March 2023: **Webinar**, Archimedes Center, Tel Aviv University, Israel. Title:"Towards an integrated assessment of microbial protein production from H_2 and CO_2".

December 2022: **Seminar**, Biochemistry & Synthetic Metabolism Department, Max Planck Institute for Terrestrial Microbiology. Marburg, Germany. Title: "A compact set of mutations enables autotrophic growth in *E. coli*".

December 2022: **Seminar**, Interfaculty Institute of Microbiology and Infection Medicine Bacterial Metabolomics, University of Tübingen, Germany. Title: "A compact set of mutations enables autotrophic growth in *E. coli*".

May 2022: **Seminar**, Plant & Environmental Sciences department, Weizmann Institute of Science, Israel. Title: "From heterotroph to autotroph A case study of synthetic autotrophy in *E. coli*".

Publications:

1. **Ben-Nissan, R.**, et al. 2024. Autotrophic growth of Escherichia coli is achieved by a small number of genetic changes. *Elife*, *12*, p.RP88793.

2. Gleizer, S., **Ben-Nissan, R**., et al. 2019. Conversion of Escherichia coli to generate all biomass carbon from CO2. *Cell*, *179*(6), pp.1255-1263.
3. Lovat, S. J., **Ben-Nissan, R.**, et al. 2025. Electro-microbial production techno-economic viability and environmental implications. Nature Biotechnology, 1-6.
4. Fedorova, D., **Ben-Nissan, R**., et al. 2025. Demonstration of bioplastic production from CO2 and formate using the reductive Glycine pathway in E. coli. PloS one, 20(7), e0327512.
5. Gleizer, S.*, Bar-On, Y.M.*, **Ben-Nissan, R.*** and Milo, R., 2020. Engineering microbes to produce fuel, commodities, and food from CO2. *Cell Reports Physical Science*, *1*(10).
6. de Pins, B., Greenspoon, L., Bar-On, Y. M., Shamshoum, M., **Ben-Nissan, R**., et al. 2024. A systematic exploration of bacterial form I rubisco maximal carboxylation rates. *The EMBO Journal*, 1-12.
7. Flamholz, A.I., Dugan, E., Blikstad, C., Gleizer, S., **Ben-Nissan, R.**, et al. 2020. Functional reconstitution of a bacterial CO_2 concentrating mechanism in Escherichia coli. *Elife*, *9*, p.e59882.
8. Siani,M., Levkovich, O., **Ben-Nissan R.**, et al. 2025. Keeping Pace with Discovery: The Role of Newsletters in Biology Education. The American Biology Teacher.
9. **בן ניסן ר** ואחרים. 2022. ללמד חיידקים לקבע פחמן דו-חמצני – מצרכן ליצרן באמצעות אבולוציה מעבדתית והנדסה מטבולית. אקולוגיה וסביבה 13(3): 9– 11, Ecology & Environment, a hebrew journal for science and environmental policy.
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Additional research experience:

2023 – 2024: **Guest researcher** in the Energy, Climate, and Environment group at the International Institute for Applied Systems Analysis (IIASA), Austria.
Advisor: *Prof. Keywan Riahi*.
Project title: "Towards an integrated assessment of electro-microbial protein production from CO_2".

2021: **Data science project** at *Prof. Naama Barkai*'s laboratory for gene regulation research, Weizmann Institute of Science.

2017: **Intern** at *Dr. Schraga Schwartz*'s laboratory for Epitranscriptome research, Weizmann institute of Science.

2017: **Intern** at *Prof. Sarel Fleishman*'s laboratory of Protein Design, Weizmann Institute of Science.

2016: **BSc excellence program**, "Dkalim", student-based independent research group focusing on plastic degradation by bacteria. Advisors: *Prof. Lital Alfonta, Dr. Ramon Birnbaum*, Ben-Gurion University

2016: **BSc Research project** a collaboration between *Prof. Amos Bouskila* laboratory for Behavioral Ecology, and *Prof. Dan Mishmar*'s Genetics laboratory, studying speciation of the Sinai Chameleon, Ben-Gurion University.

2015: **Intern** at *Prof. Amir Aharoni*'s laboratory of Protein Engineering, Ben-Gurion University.

Volunteering:

2020: COVID-19 PCR testing, Sheba hospital, Israel.

2019 – Present: "iScientist" exposing high-school students to scientific research, Davidson institute, Israel.

2018 – 2020: Science tutor, The Arab School Ort - Lod.

2016: Surveyor - reptiles, Avrona oil spill site, Israel.

2013: Surveyor - wild bats, National Parks and Nature Reserves, Israel.

2012: Volunteer - wildlife sanctuary, Comunidad Inti Wara Yassi, Bolivia.

Other activities:

- **Patent**: "Engineered Autotrophic Bacteria for CO_2 Conversions to Organic Materials" US Provisional Patent Application US17/768,228.
- **Mentoring** of 2 Master's students, 5 interns, 6 rotation students and >10 bachelor's students in the Milo lab.
- **Scientific consultant and editor**, weekly biological newsletter initiative for high school teachers.
- **Conference chair organizer** of the student-run conference; "Synthetic Biology 2019: recent advancements in academia and industry".
- **Reviewing**: Participation in peer-reviewing processes of articles for Science, Nature portfolio, PNAS and other journals, under Prof. Ron Milo's supervision.
- **Grant writing**: Participation in grant writing of over 5 lab grants, under Prof. Ron Milo's supervision.

Languages:

Hebrew, English (native speaker).
Spanish, German (A2 level).