Oz Kira Date (12. 2025)

CURRICULUM VITAE

- **Personal Details**

Oz Kira
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ORCID: 0000-0002-1620-2323

- **Education**

B.Sc in Chemical Eng. -2003-2008, Ben Gurion University of the Negev, The Department of Chemical Engineering, Faculty of Engineering Sciences.

B.Sc in Chemistry. -2003-2008, Ben Gurion University of the Negev, The Department of Chemistry, Faculty of Natural Sciences.

M.Sc. in Environmental Eng. - 2012, The Department of Environmental, Water, and Agriculture Engineering, Faculty of Civil and Environmental Engineering, Technion, Israel Institute of Technology.
Name of advisor: Avi Shaviv and Raphael Linker
Title of thesis: "New and Innovative Measuring Method Combining FTIR-ATR Spectroscopy and Stable Isotopes to Investigate the Kinetics of Nitrogen Transformations in Soils."

Ph.D. in Environmental Eng. - 2016, The Department of Environmental, Water, and Agriculture Engineering, Faculty of Civil and Environmental Engineering, Technion, Israel Institute of Technology.
Name of advisor: Yael Dubowski and Raphael Linker
Title of thesis: "Monitoring Pesticide Drift Using Open-path FTIR."

- **Employment History**

2021 – present: Senior lecturer, tenured track faculty member, The Department of Civil and Environmental Engineering, Faculty of Engineering, Ben Gurion University of the Negev.

2021 – 2021: Research associate, The Department of Soil and Crop Science, School of Integrative Plant Science, College of Agriculture and Life Sciences, Cornell University.

2018 – 2020: Postdoctoral associate, The Department of Soil and Crop Science, School of Integrative Plant Science, College of Agriculture and Life Sciences, Cornell University.

2016 – 2018: Postdoctoral associate, The Department of Environmental, Water, and Agriculture Engineering, Faculty of Civil and Environmental Engineering, Technion.

- **Professional Activities**

(a) Positions in academic administration

2025 – present: member of the Undergraduate Teaching Committee. The Department of Civil and Environmental Engineering, Faculty of Engineering, Ben Gurion University of the Negev.

2025 – present: member of the Undergraduate Curriculum Committee. The Department of Civil and Environmental Engineering, Faculty of Engineering, Ben Gurion University of the Negev.

2025 – present: member of the International Relations Committee. The School of Sustainability and Climate Change, Ben Gurion University of the Negev.

2024 – present: Student Reservists Coordinator. The Department of Civil and Environmental Engineering, Faculty of Engineering, Ben Gurion University of the Negev.

(b) Professional functions outside universities/institutions.

2025 – 2026, Israeli Science Foundation professional scientific committee in Geography and related fields.

2022–2023, Ministry of Agriculture professional scientific committee on Water Use Efficiency – Soil Preservation and Soil Fertility – Soil and Water.

(c) Significant professional consulting

2023 – 2025, Bomvento Inc. Photocatalytic reactions to remove N_2O from the atmosphere

(e) Ad-hoc reviewer for journals

Agricultural and forest meteorology
Remote sensing of the environment
Science of the Total Environment
Chemosphere
International journal of applied earth observation and geoinformation
Journal of Environmental Management
Nature geoscience
Soil biology & biochemistry
IEEE Transactions on Geoscience & Remote Sensing
IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing

(f) Membership in professional/scientific societies

2025 – present, The Institute of Electrical and Electronics Engineers
2024 – present, European Geophysical Union
2022 – present, American Geophysical Union

• Educational activities

(a) Courses taught

Chemistry for Structural Engineers (undergraduate). The Department of Civil and Environmental Engineering, Faculty of Engineering, Ben Gurion University of the Negev.

Introduction to Environmental Engineering (undergraduate). The Department of Civil and Environmental Engineering, Faculty of Engineering, Ben Gurion University of the Negev.

Water and wastewater infrastructure (undergraduate). The Department of Civil and Environmental Engineering, Faculty of Engineering, Ben Gurion University of the Negev.

(c) Research students

M.Sc.

1. Evyatar Vaaknin, M.Sc. in Environmental Engineering, 2024. Ben Gurion University of the Negev. Title: Photocatalytic reduction of N_2O emissions from hotspots in agriculture.
2. Noa Butnaro, M.Sc. in Environmental Engineering, 2026. Title: Urban vertical agriculture
3. Sanjana Sarode (jointly with Vered Tzin), M.Sc. in Desert Studies, 2026. Title: Comprehensive analysis of volatile profile alterations in pepper infested with Aphid and White Fly-transmitted viruses.
4. Niv Betsalel (jointly with Alex Brodski), M.Sc. in Environmental Engineering, 2026. Ben Gurion University of the Negev. Title: Development of sustainable concrete structures utilizing chemically treated high-density polyethylene (HDPE) waste from agricultural applications
5. Shahar Rozenblat (jointly with Shabtai Isaac), M.Sc. in Environmental Engineering, 2026. Ben Gurion University of the Negev. Title: A green roof with agricultural cultivation and an "agrovoltaics" system in a desert area and its environmental, economic, agricultural, and energy contributions.
6. Nadav Yehuda Yefet, M.Sc. in Environmental Engineering, 2026. Ben Gurion University of the Negev. Title: Recycling concrete to an active cementitious material using thermal treatments.
7. Tomer Ginzburg, M.Sc. in Environmental Engineering, 2027. Ben Gurion University of the Negev. Title: TBD.

Ph.D.

1. Sali'it Cochavi (external, jointly with Erez Gal), Ph.D. in Environmental Engineering, 2026. Ben Gurion University of the Negev. Title: Mapping children's exposure to indoor air pollutants at schools by means of field labs, case studies in Israel.

2. Julius Bamah, Ph.D. in Environmental Engineering, 2026. Ben Gurion University of the Negev. Title: The use of satellite solar-induced chlorophyll fluorescence to monitor urban vegetation.
3. Alexander Muleta, Ph.D. in Environmental Engineering, 2026. Ben Gurion University of the Negev. Title: High-resolution carbon sequestration mapping using satellite observations and local models.
4. Amit Lotan (jointly with Tamar Makov), Ph.D. in Environmental Engineering, 2027. Ben Gurion University of the Negev. Title: The use of green walls to improve urban sustainability.
5. Shirley Bushner, Ph.D. in Environmental Engineering, 2027. Ben Gurion University of the Negev. Title: Examining the interaction between the urban fabric and the ecological services of green infrastructures using remote sensing and GIS
6. Ido Schwartz, Ph.D. in Environmental Engineering, 2028. Ben Gurion University of the Negev. Title: The effect of green infrastructure on the urban heat island and air pollution.
7. Edward Vlasenko, Ph.D. in Environmental Engineering, 2029. Ben Gurion University of the Negev. Title: TBD.
8. Keyao Li, Ph.D. in Environmental Engineering, 2029. Ben Gurion University of the Negev. Title: TBD.

• Awards, Citations, Honors, Fellowships

(a) Honors, Citation Awards

1. The BGU award for innovative lecturer 2023.
2. 1st prize for the outstanding poster – The 1st Technion-STU Workshop Recycling of Materials and Environmental Protection November 2016.
3. "Vivian Konigsberg Award for Excellence in Teaching" for the spring semester 2014-2015.
4. 1st prize for the outstanding poster - The Dahlia Greidinger International Symposium 2013. March 2013.
5. "Vivian Konigsberg Award for Excellence in Teaching" for the winter semester 2012-2013.

(b) Fellowships (e.g. Fulbright)

2018, BARD, 45,000$, Postdoctoral fellowship.

• Scientific Publications

a) H-index: 12 (ISI), 15 (GS)
b) Total number of citations of all articles: 556 (ISI), 770 (GS)
c) total number of citations without self-citations: 556 (ISI)

(1) **Kira, O**^{S,CA}., Linker, R^{PI}., Shaviv, A^{PI}. A Novel Method Combining FTIR-ATR Spectroscopy and Stable Isotopes to Investigate the Kinetics of Nitrogen Transformations in Soils. Soil Science Society of America Journal. Soil Science Society of America Journal, 78:54–60 (2014). (14 (ISI), 20 (GS), IF:2.4, ranking 29/48 (Soil science), Q3).

(2) **Kira, O^{S}.**, Linker, R^{C}., Gitelson, A. A^{PI}. Non-destructive estimation of foliar chlorophyll and carotenoid contents: Focus on informative spectral bands. International Journal of Applied Earth Observation & Geoinformation. 38:251-260 (2015). (107 (ISI), 139 (GS), IF:8.6, ranking 5/63 (Remote sensing), Q1).

(3) **Kira, O^{S,CA}.**, Dubowski, Y^{PI}., Linker. R^{PI}. Reconstruction of passive open-path FTIR ambient spectra using meteorological measurements and its application for detection of aerosol cloud drift. Optics Express. 23: no.15 (2015). (8 (ISI), 12 (GS), IF:3.2, ranking 41/125 (Optics), Q2).

(4) **Kira, O^{S}.**, Nguy-Robertson^{C}, A. L., Arkebauer^{C}, T. J., Linker^{C}, R., Gitelson, A. A^{PI}. Informative spectral bands for remote green LAI estimation in C3 and C4 crops. Agricultural and Forest Meteorology. 218-219 (2016) 243-249. (67 (ISI), 85 (GS), IF:5.7, ranking 8/129 (Agronomy), Q1).

(5) **Kira, O^{S,CA}.**, Linker, R^{PI}., Dubowski, Y^{PI}. Detection and quantification of water-based aerosols using active open-path FTIR. Scientific Reports. 6, 25110 (2016). (9 (ISI), 15 (GS), IF:3.9, ranking 25/135 (Multidisciplinary sciences), Q1).

(6) **Kira, O^{S,CA}.,** Linker, R^{PI}., Dubowski, Y^{PI}. Estimating drift of airborne pesticides during orchard spraying using active Open Path FTIR. Atmospheric Environment. 142: 264-270 (2016). (12 (ISI), 20 (GS), IF:3.7, ranking 37/111 (Atmospheric sciences), Q2).

(7) **Kira, O^{S}.**, Nguy-Robertson, A. L^{C}., Arkebauer, T. J^{C}., Linker, R^{C}., Gitelson, A. A^{PI}. Toward Generic Models for Green LAI Estimation in Maize and Soybean: Satellite Observations. Remote Sensing. 9: 1-16 (2017). (33 (ISI), 44 (GS), IF:4.1, ranking 47/258 (Geoscience), Q1).

(8) **Kira, O^{S,CA}.**, Dubowski, Y^{PI}., Linker, R^{PI}. In-situ open path FTIR measurements of the vertical profile of spray drift from air-assisted sprayers. Biosystems Engineering 169: 32-41 (2018). (16 (ISI), 24 (GS), IF:5.3, ranking 12/94 (Agriculture, multidisciplinary), Q1).

(9) **Kira, O^{PD,CA}.**, Shaviv, A^{PI}., Dubowski, Y^{PI}. Direct Tracing of NH_3 and N_2O Emissions Associated with Urea Fertilization Approaches, using Static Incubation Cells. Science of the Total Environment, 661: 75-85 (2019). (18 (ISI), 27 (GS), IF:8, ranking 39/374 (Environmental sciences), Q1)

(10) **Kira, O^{PD,CA}.**, Bareket^{S}, M., Sabach, S^{T}., Dubowski, Y^{PI}. VOC emissions from polyurethane mattresses in the sleeping environmental: comparison under different environmental conditions using chamber experiments. Environmental Science and Technology 53, 15, 9171-9180 (2019). (40 (ISI), 56 (GS), IF:11.3, ranking 19/374 (Environmental sciences), Q1).

(11) Peng, Y^{PI}., **Kira, O^{PD,CA}.**, Nguy-Robertson^{C}, A., Suyker, A^{C}., Arkebauer, T^{C}., Sun, Y^{PI}., Gitelson, A^{PI}. Gross primary production estimation in crops using solely remotely sensed data. Agronomy Journal 111(6): 1-10 (2019). (9 (ISI), 10 (GS), IF:2, ranking 44/129 (Agronomy), Q2).

(12) **Kira, O^{PD,CA}.**, Sun, Y^{PI}. Extraction of sub-pixel C3/C4 emissions of solar-induced chlorophyll fluorescence (SIF) using artificial neural network. ISPRS J. Photogramm. Remote Sens. 161: 135-146 (2020). (14 (ISI), 19 (GS), IF:12.2, ranking 2/65 (Remote sensing), Q1).

(13) Chang, C. Y[PD]., Zhou, R[S]., **Kira, O[PD]**., Marri, S[S]., Skovira, J[C]., Gu, L[C]., Sun, Y[PI]. An Unmanned Aerial System (UAS) for concurrent measurements of solar-induced chlorophyll fluorescence and hyperspectral reflectance toward improving crop monitoring. Agricultural and Forest Meteorology. 294, 108145 (2020). (54 (ISI), 88 (GS), IF:5.7, ranking 8/129 (Agronomy), Q1).

(14) **Kira, O[PD,CA]**., Chang, C. Y[PD]., Gu, L[C]., Wen, J[S]., Hong, Z[S]., Sun, Y[PI]. Partitioning Net Ecosystem Exchange (NEE) of CO_2 Using Solar-Induced Chlorophyll Fluorescence (SIF). Geophysical Research Letters. 48 (4) e2020GL091247. (2021). (10 (ISI), 16 (GS), IF:4.6, ranking 30/254 (Geosciences), Q1).

(15) Chang, C. Y[PI]., Wen, J[S]., Han, J[PD]., **Kira, O[PD]**., LeVonne, J[S]., Melkonian, J[C]., Riha, S. J[C]., Skovira, J[C]., Ng, S[C]., Gu, L., Wood, J. D[C]., Näthe, P[C]., Sun, Y[PI]. Unpacking the drivers of diurnal dynamics of sun-induced chlorophyll fluorescence (SIF): Canopy structure, plant physiology, instrument configuration and retrieval methods. Remote Sensing of Environment. 265, 112672. (2021). (64 (ISI), 81 (GS), IF:11.4, ranking 3/65 (Remote sensing), Q1).

(16) **Kira, O[PD,CA]**., Shaviv, A[PI]., Dubowski, Y[PI]. Concomitant tracking of NH_3, N_2O and soil mineral-N using steady-state incubation cells to enhance sustainability of urea fertilization approaches. Geoderma. 404, 115305. (2021). (5 (ISI), 8 (GS), IF:6.6, ranking 6/48 (Soil science), Q1).

(17) Han, J[PD]., Chang, C, Y-Y[PD]., Gu, L[C]., Zhang, Y[C]., Meeker, E.W[C]., Magney, T.S[C]., Walker, A.P[C]., Wen, J[S]., **Kira, O[C]**., McNaull, S[C]., Sun, Y[PI]. The physiological basis for estimating photosynthesis from Chla fluorescence. New Phytologist, 234: 1206-1219 (2022). (55 (ISI), 68 (GS), IF:8.1, ranking 12/273 (Plant science), Q1).

(18) Darzi, R[S]., **Kira, O[PI,CA].,** Shaviv, A[PI]., Dubowski, Y[PI]. Evaluating How Enhanced Efficiency Nitrogen Fertilizers Improve Agricultural Sustainability: Greenhouse Multi-Phase Tracking System. Agriculture, 13(7), 1384 (2023). (1 (ISI), 1 (GS), IF:3.6, ranking 19/129 (Agronomy), Q1).

(19) Tiwari, A[S]., **Kira, O[PI,CA].,** Bamah, J[S]., Boneh[S], H., Karnieli, A[PI]. Multi-Sensor Classification Framework of Urban Vegetation for Improving Ecological Services Management. Remote Sens., 16(6), 1110 (2024). (2 (ISI),6 (GS), IF:4.1, ranking 47/258 (Geoscience), Q1).

(20) **Kira, O[PI,CA].,** Wen, J[S]., Han, J[S]., McDonald, A[C]., Barrett, C[C]., Ortiz-Bobea, A[C]., Liu, Y[C]., You, L[C]., Mueller, N[C]., Sun, Y[PI]. A scalable crop yield estimation framework based on remote sensing of solar-induced chlorophyll fluorescence (SIF). Environ. Res. Lett. 19 044071 (2024). (16 (ISI), 19 (GS), IF:5.6, ranking 73/374 (Environmental Sciences), Q1).

(21) Kaplan[S], A., Gozlan, I[T]., **Kira, O[C].,** Avisar, D[PI]. Interactions between volatile air pollutants and atmospheric water production–Effects of chemical properties, mechanisms, and transfer processes. 365, 143399 (2024). (5 (ISI), 8 (GS), IF:8.1, ranking 32/358 (Environmental Sciences), Q1).

(22) *Azoulay-Kochavi, S[S]., **Kira, O[PI,CA]**., Gal, E[PI]**.** Real-Time Monitoring of Environmental Parameters in Schools to Improve Indoor Resilience Under Extreme Events. Smart Cities, 8(1), 7 (2025). (3 (ISI), 3 (GS), IF:5.5, ranking 6/76 (Urban studies), Q1).

(23) Svoboda, M[C]., **Kira, O[C].,** Sun, Y[C]., Smith, W. K[C]., Magney, T[C]., Wood, J. D[C]., Parazoo, N. C.[PI] Monitoring the Pulse of America's Natural Resources from the Orbiting Carbon Observatory Missions. AGU Advances, 6(5) (2025). (IF: 6.6, 17/258 (Geosciences, Multidisciplinary), Q1).

(24) Muleta, A. T[S]., Bamah, J[S]., Bushner, S[S]., **Kira, O[PI,CA]**. The Impact of Image Spatial Resolution and Machine Learning Algorithm on Urban Vegetation Classification: Focus on Data Loss and Misclassification. IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 18 (2025). (IF: 5.3, 12/65 (Remote Sensing), Q1).

(25) Yaakov, M[S]., Muleta, A.T[S]., Bamah, J[S]., **Kira O[PI,CA]**. In-season Corn Yield Prediction Using Satellite-derived Solar-Induced Chlorophyll Fluorescence and Machine Learning Algorithms. IEEE Transactions on Geoscience and Remote Sensing. **Accepted.** (IF: 8.6, 5/65 (Remote Sensing), Q1).

• Lectures and Presentations at Meetings and Invited Seminars

(a) Invited lectures / Plenary / keynote at conferences/meetings

(1) **Kira, O.,** Sun, Y. From Mixed Signals to Clear Insights: SIF Unmixing and Yield Prediction. SIF for Farmers, Colorado, USA. September 2025.

(b) Presentation of papers at conferences/meetings (oral or poster)

(1) **Kira, O.,** R. Linker., Avi Shaviv. A Novel Method Combining FTIR-ATR Spectroscopy and Stable Isotopes to Investigate the Kinetics of Nitrogen Transformations in Soils. The joint conference of the Israeli Society of Soil Science, and the Israeli Society for Clay Minerals Research. December 2012.

(2) **Kira, O.,** Dubowski, Y., Linker, R., Shaviv, A. New and Innovative Measuring Method Combining FTIR-ATR Spectroscopy and Stable Isotopes to Investigate the Kinetics of Nitrogen Transformations in Soils. The Dahlia Greidinger International Symposium, Technion IIT, Haifa, Israel, March 2013.

(3) **Kira, O.,** R. Linker., Avi Shaviv. A Novel Method Combining FTIR-ATR Spectroscopy and Stable Isotopes to Investigate the Kinetics of Nitrogen Transformations in Soils. CARESS, Conference on Active Research by Environmental Sciences Students. May 2013.

(4) **Kira, O.,** Dubowski, Y., Linker, R. Monitoring pesticide drift using passive measurements of open path FTIR. The 2nd Israeli Graduate Student Symposium on Environmental Health. Technion IIT, Haifa, Israel, November 2013.

(5) **Kira, O.,** Dubowski, Y., Linker. R. Monitoring Pesticide Drift Using Open-Path FTIR. EPScon, Conference on research in environmental, earth and planetary sciences. May 2015.

(6) **Kira, O.,** Nguy-Robertson. A. L., Linker. R., Gitelson. A. Algorithms for estimating green leaf area index using hyperspectral, MODIS, Landsat TM/ETM+, MERIS, Sentinel MSI/OLCI, and Venμs data. EPScon, Conference on research in

environmental, earth and planetary sciences, Weizmann Institute, Rehovot, Israel, May 2015.

(7) **Kira, O.,** Dubowski, Y., Linker, R. Remote sensing of pesticide drift: a tool for estimating and reducing air pollution in agriculture. The Dahlia Greidinger International Symposium 2016, Technion IIT, Haifa, Israel, March 2016.

(8) **Kira, O.,** Dubowski, Y., Linker, R. Remote sensing of pesticide drift using Open Path FTIR. Environmental Health: New and Noteworthy, Expo Tel-Aviv, Tel Aviv, Israel, April 2016.

(9) **Kira, O.,** Dubowski, Y., Linker, R. Remote sensing of pesticide drift: a tool for estimating and reducing air pollution in agriculture. The annual conference of the Israeli Society of Agricultural Engineering, July 2016.

(10) **Kira, O.,** Dubowski, Y., Linker, R. Remote sensing of pesticide drift: a tool for estimating and reducing air pollution in agriculture. The International Society for Environmental Epidemiology annual conference, Italy, September 2016.

(11) **Kira, O.,** Dubowski, Y., Linker, R. Detection and quantification of water-based aerosols using active open-path FTIR. The European Aerosol Conference, France, September 2016.

(12) **Kira, O.,** Dubowski, Y., Linker, R. Remote sensing of pesticide drift: a tool for estimating and reducing air pollution in agriculture. The European Aerosol Conference, France, September 2016.

(13) **Kira, O.,** Dubowski, Y., Linker, R. Remote sensing of pesticide drift: a tool for estimating and reducing air pollution in agriculture. The 1st Technion-STU Workshop on Recycling of Materials and Environmental Protection. International Convention Center, Jerusalem, Israel, November 2016.

(14) **Kira, O.,** Zivan, O., Darzi, R., Shaviv, A., Linker, R., and Dubowski, Y. The impact of agrochemicals uses on pollutants emission to the atmosphere. Gordon Research Conference in Atmospheric Chemistry, USA, July 2017.

(15) **Kira, O.,** Sun, Y. Solar induced chlorophyll fluorescence pixel un-mixing to emission sources using reflectance data and artificial neural network. AGU fall meeting, Washington D.C, USA. December 2019.

(16) **Kira, O.,** Grunzweig, J. Green infrastructure contributing to carbon sequestration and climate change mitigation in cities. Partnership for sustainability, Rehovot, Israel, March 2022.

(17) **Kira, O.,** Wen, J., McDonald, A, J., Han, J., Sun, Y. A scalable crop yield prediction framework based on solar-induced chlorophyll fluorescence (SIF) remote sensing. AGU fall meeting, Chicago, USA. December 2022.

(18) **Kira, O.,** Wen, J., McDonald, A, J., Han, J., Sun, Y. A scalable crop yield prediction framework based on solar-induced chlorophyll fluorescence (SIF) remote sensing. The 14th Dahlia Greidinger International Symposium, Haifa, Israel. March 2023.

(19) **Kira, O.,** Grunzweig, J. Green infrastructure contributing to carbon sequestration and climate change mitigation in cities. Partnership for sustainability, Beer Sheba, Israel, March 2023.

(20) **Kira, O.,** Kushmaro, A., Raz, R., Paltiel, O., Avidan, A. Quantifying Greenhouse Gas Emissions from Operating Rooms and Examining How to Reduce their Emissions. Partnership for sustainability, Beer Sheba, Israel, March 2023.

(21) **Kira, O.,** Bamah, J., Muleta, A., Bushner, S. Remote sensing-based frameworks to quantify city level carbon fluxes in urban green infrastructures. 8th International ICARB Conference, Edinburgh, Scotland, September 2023.

(22) **Kira, O.,** Bamah, J., Muleta, A., Bushner, S. Remote sensing-based frameworks to quantify city level carbon fluxes in urban green infrastructures. EGU25, Vienna, Austria, April 2024.

(23) **Kira, O.,** Wen, J., McDonald, A, J., Han, J., Sun, Y. A Scalable Crop Yield Estimation Framework Based on Remote Sensing of Solar-Induced Chlorophyll Fluorescence (SIF). AGU fall meeting, Washington D.C, USA. December 2024.

(24) **Kira, O.** Enhancing Sustainable Urban Agriculture and Climate Resilience through Outdoor Agricultural Green Walls in Semi-Arid Environments. RETASTE: Rethink Food Resources, Losses, and Waste 5th International Conference, Athens, Greece, September, 2025

(25) **Kira, O.,** Yaakov, M., Muleta, A.T., Bamah, J. Multi-Temporal SIF Time Series and Neural Network Modeling Enable Accurate In-Season Corn Yield Forecasting. Drylands, Deserts and Desertification: Sustainable Drylands - Shaping Humanity's Future. Sde-Boker, Israel. December 2025.

- **Research Grants**

(a) Competitive Grants listed by VATAT

(1) Grunzweig^{PI}, J., **Kira, O^{PI}.** Developing a remote sensing-based method for high spatial resolution mapping of carbon fluxes in urban green infrastructures. The Ministry of Innovation, Science and Technology (2024-2025). 87,000 NIS (41000 $ for the first year).

(2) **Kira, O^{PI}.** Developing a new method to estimate city-level ecological services of urban green infrastructures using remote sensing. ISF (2025-2028). 223,000 $ (55,750$ a year).

(3) **Kira, O^{PI}.** The Environmental Sensing Laboratory – Utilizing proximal and remote sensing to investigate environmental issues in the atmosphere and agriculture. ISF (2025-2028). 248,000 $.

(4) Lazarovich, N$^{Lead\text{-}PI}$., Rachmilevich, S^{PI}., Kool, D^{PI}., **Kira, O^{PI}**, Paz-Kagan, T^{PI}., Levintal, E^{PI}., Linker, R$^{Lead\text{-}PI}$., Kizel, F^{PI}., Fishbain, B^{PI}., Dubowski, Y^{PI}., Furman, A^{PI}., Moshelion M$^{Lead\text{-}PI}$., Friedlander, T^{PI}., Gavish, M^{PI}., Mau, Y^{PI}., Helman, D^{PI}. Israeli Center for Digital Agriculture. Planning and Budgeting Committee, The Council for Higher Education. ISF (2025-2028). 3,628,000 $.

(5) **Kira, O^{PI}.**, Stutz, J^{PI}. Development and application of a mobile platform for full CANopy Spectral Crop ANalysis (CAN-SCAN). BARD-ISUS (2025-2028). 310,000$.

(b) Competitive Grants

(6) **Kira, O[PI].**, Brodski, A[PI]. The use of agricultural plastic waste as raw material for concrete manufacturing. The Ministry of Agriculture (2014-2016). 167,000 NIS. (55,677$ a year).

(7) **Kira, O[PI].,** Katoshevski, D[PI]., Ronen, A[PI]. A new and innovative approach for manipulating clouds using acoustic oscillations. PAZY (2026-2030). 420,000$.

(8) **Kira, O[PI].** AI-Guided Framework for Predicting the Directional Spread of Forest Fires Using Remote Sensing and Meteorological Data in Israel. KKL (2026-2028). 300,000 NIS.

(c) Other Grants

(9) **Kira, O[PI].**, Grunzweig[PI], J. Green infrastructure contributing to carbon sequestration and climate change mitigation in cities. Partnership for sustainability – BGU and HUJI collaboration (2022). 40000$.

(10) **Kira, O[PI].**, Rachmilevich, S[PI]. Dryland vertical farming: a sustainable alternative for conventional farming in drylands? Multidisciplinary study - The School for Sustainability and Climate Change (2023). 22000$.

(11) **Kira, O[PI].**, Stutz, J[PI]. Developing a Multi-input Platform for Agricultural Productivity Prediction (MiPAPP)-based artificial neural networks. Sol Leshin Program for BGU-UCLA Academic Cooperation (2023-2024). 80000$ (40000$ a year).

(12) **Kira, O[PI].**, Karnieli, A[CO-PI]. Developing remote sensing-based algorithms for mapping and predicting carbon uptake of urban vegetation. Sustainability and Urban Resilience - the Open University Environment and Sustainability Center and BGU The School for Sustainability and Climate Change (2023). 7000 $.

(13) Brandt, M[PI]., Katoshevski, D[PI]., Mateus, C[CO-PI]., Lopez, H. P[CO-PI]., **Kira, O[CO-PI].**, Logen, C[CO-PI]., Suarez, J[CO-PI]. Effect of water temperature rise and sediment dynamics on coral growth and calcification rates USFQ-BGU Partnership for Sustainability and Conservation 2023, 10000$.

- **Present Academic Activities**

(1) Developing a remote sensing-based method for high spatial resolution mapping of carbon fluxes in urban green infrastructures. Grunzweig, J, Bamah, J, Muleta, A,. 2026.

(2) Developing a new method to estimate city-level ecological services of urban green infrastructures using remote sensing. Schwartz, I, 2028.

(3) Development and application of a mobile platform for full CANopy Spectral Crop Analysis. Stutz, J, Vlasenko, E, Li, K. 2029.

(4) The use of agricultural plastic waste as raw materials for concrete manufacturing. Brodski, A, Betsalel, N. 2027.

(5) A new and innovative approach for manipulating clouds using acoustic oscillations. Katoshevski, D, Ronen, A. 2029.

(6) AI-Guided Framework for Predicting the Directional Spread of Forest Fires Using Remote Sensing and Meteorological Data in Israel. 2028.

(7) Recycling concrete to an active cementitious material using thermal treatments. Yefet, N,Y. 2026.

Articles to be published :

(b) Submitted for publication (indicate journal)

(1) Muleta, A. T., Bamah, J., **Kira, O.** From types to species: Multi-temporal satellite mapping of urban vegetation at a Mediterranean city. ISPRS Journal of Photogrammetry and Remote Sensing.

(2) Isaac, S., Fux, B., Svoray, T., **Kira, O.** Proactive Land-use Management Under Climate Change. Environmental Modelling and Software.

(3) Bamah, J., Karnieli, A., **Kira, O.** Integrating Remote Sensing and Plant Physiology to Assess the Effects of Mining Pollution in a Desert Ecosystem. Science of the Total Environment.

(4) Bamah, J., Muleta, A. T., **Kira, O.** Evaluating Solar-Induced Chlorophyll Fluorescence as a Scalable Proxy for Urban Vegetation Productivity Across Global Cities. IEEE Transactions on Geoscience and Remote Sensing.

- **Synopsis of research**

(Publications - P#, Supporting grants - G#, Manuscripts in preparations – M#)

Understanding and sustaining the functioning of terrestrial and urban ecosystems in a rapidly changing world requires sensing tools that can reveal how human activities reshape environmental processes. My research program addresses this need by integrating advanced environmental sensing, proximal and satellite spectroscopy, and machine learning to evaluate carbon fluxes, air pollutant exposure, vegetation productivity, and the performance of sustainable materials. This work spans multiple scales, from leaf physiology to city-level ecological services. These efforts aim to generate actionable insights that enhance urban climate resilience, safeguard public health, and promote sustainable agriculture and construction.

Urban Sustainability

Cities are now the primary arena of global environmental change, yet the ecological services provided by urban vegetation remain insufficiently quantified due to their spatial heterogeneity and complex interactions with the built environment. My research advances a multi-scale sensing framework that combines satellite-based solar-induced chlorophyll fluorescence, multispectral vegetation metrics, and high-resolution flux measurements to map carbon uptake and climatic benefits of urban green infrastructures. My recent work on multi-sensor classification of urban vegetation (P19) and on scalable SIF-based modeling (P20) provides the empirical foundation for new mapping tools that resolve vegetation function at management-relevant spatial scales. These developments are directly supported by competitive funding aimed at estimating carbon fluxes in cities (G1, G2) and by a broader initiative on digital agriculture and environmental sensing (G4).

While most urban ecological research focuses on horizontal green spaces, vertical infrastructures such as green walls offer unique spatial and functional opportunities. My thirty-square-meter experimental green wall in Be’er Sheva functions as a long-term observatory for carbon sequestration, evapotranspirative cooling, pollutant uptake, stormwater retention, and the productivity of food crops under semi-arid conditions. This platform supports ongoing Ph.D. work on the environmental and climatic benefits of green walls and is part of a collaborative effort to combine sensor networks, remote sensing, and GIS-based models to scale local measurements to city-level predictions. This component of the research program is supported by grants dedicated to climate-resilient urban green infrastructure (G9, G10).

An emerging dimension of my urban work examines water circularity. As climate change intensifies drought in dryland cities, I investigate how non-traditional water sources, including greywater, condensate, and urban runoff, can sustain productive vegetation on walls, rooftops, and agrovoltaic systems. This work integrates hydrological monitoring, plant physiological sensing, and modeling of urban water budgets to identify pathways for reducing potable water demand while improving microclimatic conditions.

Human Exposure to Air Pollution

Atmospheric pollution remains a major threat to global health, and the mismatch between outdoor pollutant measurements and actual human exposure is particularly pronounced in indoor environments. My research aims to bridge this gap by deploying dense, low-cost

sensor networks and linking indoor measurements to building behavior, ventilation strategies, and outdoor pollution sources.

A central project examines children's exposure to pollutants in schools using real-time measurements of particulate matter, nitrogen oxides, carbon monoxide, ozone, and VOCs. This work documents the dynamics of indoor-outdoor pollution and identifies structural and behavioral interventions that enhance resilience during extreme pollution or heat events. A recent publication on real-time classroom monitoring P22, demonstrates the feasibility of using distributed environmental sensing to improve indoor conditions during climatic stress.

Another component addresses emissions from indoor-relevant materials. My earlier publication on VOC emissions from polyurethane products P10, established experimental and analytical protocols for quantifying VOC diffusion under controlled conditions. Building on this foundation, I now examine VOC emissions from concrete containing recycled agricultural plastic aggregates, an area supported directly by a competitive grant focused on agricultural waste (G6). Using TD-GS-MS-based gas analysis, my group quantifies emissions as a function of surface treatments and environmental conditions. These experiments inform guidelines for integrating plastic waste into construction without compromising indoor air quality. The research links material chemistry, environmental sensing, and sustainable engineering, and informs the development of new methods to chemically treat plastic-derived aggregates, thereby reducing or blocking emissions.

Sustainable Agriculture

Agriculture must strike a balance between productivity and environmental impact, particularly in the face of intensifying climatic variability. My research contributes to this balance by advancing both greenhouse gas mitigation measurements and remote sensing models for agricultural monitoring.

The first component quantifies agricultural emissions of CO_2 and N_2O using static and continuous chambers, FTIR spectrometry, and multi-phase tracking systems. Publications on tracing fertilizer-derived emissions (P9, P16) and on enhanced-efficiency fertilizers (P18) demonstrate how different fertilization approaches shape emission profiles, soil nitrogen dynamics, and greenhouse gas footprints. These insights guide management strategies that minimize environmental impacts while maintaining yields. This work shares conceptual continuity with my M.Sc. student's research on photocatalytic N_2O reduction and the broader goals of the Environmental Sensing Laboratory, which is supported under G3.

The second component develops remote sensing frameworks for estimating photosynthesis, stress, and crop yield. My contributions to chlorophyll fluorescence modeling and SIF-based analysis (P12, P14, P15, P17, P20) have established mechanistic links between SIF and plant function, enabling new yield prediction systems. A recent study presenting a scalable crop yield estimation framework, P20, and an accepted study on in-season corn yield forecasting using SIF and machine learning, P25, highlight the potential of SIF for early detection of stress and yield estimation at field-to-regional scales. These projects are supported by multiple agricultural remote-sensing grants, including the CAN-SCAN BARD initiative (G5) and the BGU–UCLA Sol Leshin collaborations on multi-input prediction (G11). Taken together, these efforts contribute to precision agriculture by enabling the earlier detection of water stress, nutrient limitations, and productivity declines, thereby allowing for more resource-efficient management practices.

Sustainable Construction and Material Circularity

A distinct but complementary strand of my research focuses on transforming waste streams from agriculture into sustainable construction materials. Supported directly by a competitive grant on concrete manufacturing using agricultural plastic waste (G6), this work investigates how high-density polyethylene (HDPE) waste can be chemically treated and incorporated as aggregates to produce durable, lower-carbon concretes. Ongoing experiments are evaluating interfacial bonding, strength, porosity, hydrophilicity, and long-term stability. Emerging manuscripts address surface treatments that enhance hydrophilic connectivity between HDPE and cementitious matrices (M1, M2 in preparation). A parallel project, conducted through a student-led M.Sc. study, explores the recycling of concrete through thermal activation to regenerate cementitious materials, integrating sensing tools for material characterization. These efforts form part of a broader program aimed at producing sustainable concrete that minimizes both embodied emissions and indoor VOC release, linking material innovation with environmental sensing and exposure assessment.

Broader Impact and Future Directions

Across urban systems, agricultural landscapes, indoor environments, and engineered materials, my research develops sensing-driven frameworks that translate environmental data into actionable insights. The combination of proximal sensing, satellite observations, and machine learning allows evaluation of environmental processes at scales relevant to planning, policy, and management. The work is strengthened by competitive funding through national science foundations, international collaborations, and sustainability partnerships (G1, G2, G3, G4, G5, G6, G9, G11).

Future directions include enhancing city-scale carbon and pollution models through data assimilation of SIF, CO_2 fluxes, and sensor networks; scaling green wall and agrovoltaic infrastructure experiments to municipal-level design tools; advancing real-time exposure prediction models for the urban areas; expanding SIF-based agricultural forecasting systems; and continuing the development of sustainable concretes with minimized emissions. Through these integrated research pathways, my objective is to support climate-resilient cities, sustainable food systems, and safe built environments while advancing the fundamental science of environmental sensing.

- **Teaching Statement**

Teaching has always been one of the most meaningful components of my academic career. I view the classroom as a place where students acquire not only knowledge but also the intellectual independence, curiosity, and professional confidence needed to address real environmental challenges. My central teaching goal is to create learning experiences that are rigorous, engaging, and deeply connected to real-world applications. I aim to cultivate students who think critically, analyze problems from multiple angles, and translate theoretical understanding into practical action.

My teaching trajectory began during my M.Sc. studies, when I served as a teaching assistant in the course Fundamentals of Environmental Engineering. Through my M.Sc., Ph.D., and postdoctoral years, I taught and tutored eight different courses, consistently receiving strong evaluations. Since joining Ben-Gurion University, I have taught Chemistry for Structural Engineers and Introduction to Environmental Engineering, as well as developing two new courses, Water and Wastewater Infrastructure and Environmental Sensing. I also created the Green Building Consultants program, which brings sustainability practice directly into the educational framework. These experiences have shaped a teaching philosophy grounded in clarity, student empowerment, and active learning.

I also established the CitySense workshop, an intensive week-long program that combines short thematic lectures with guided research sprints using real environmental datasets from satellites, urban sensor networks, and meteorological stations. The workshop enables students to engage directly with the types of data, analytical tools, and interdisciplinary questions that define modern environmental research. Working in small teams, students formulate questions, conduct reproducible analyses, and present findings in a scientific style, gaining practical experience in geospatial analysis, coding, and evidence-based reasoning. CitySense has become a cornerstone of my experiential teaching approach, providing students with a highly interactive learning environment that strengthens both their technical skills and their confidence in addressing real urban sustainability challenges.

My goals for student learning vary across courses but share common principles. In introductory courses, I focus on building conceptual foundations and scientific intuition. In applied courses, I emphasize engineering design, data literacy, and systems thinking. In all cases, I aim to move students beyond passive memorization toward analytical reasoning and real-world problem solving. I prioritize the ability to integrate scientific principles, evaluate evidence, and communicate findings clearly. These skills are essential for engineers and environmental professionals who will confront complex and interdisciplinary tasks throughout their careers.

To achieve these goals, I rely on methods that place students at the center of the learning process. Active learning is a central component of my teaching practice. I incorporate hands-on demonstrations, field-based activities, laboratory exercises, small-team problem-solving, and structured discussions. In Environmental Sensing, for example, students learn to operate real instruments and analyze data collected in the field, transforming abstract concepts into concrete understanding. In Chemistry for Structural Engineers, I have incorporated interactive and humor-based exercises to demystify challenging material and improve retention. This innovation was supported by a

competitive teaching innovation grant and culminated in receiving the Innovative Lecturer Award. These experiences reinforce my belief that creativity and intellectual playfulness can greatly enhance learning.

Modern teaching must also respond to the rapid evolution of educational technology and AI. I incorporate digital tools, data visualization platforms, and interactive apps to foster engagement and provide immediate feedback. Looking forward, I plan to expand this approach by integrating gamified learning elements, such as scenario-based challenges and escape-room-style exercises that require students to apply knowledge collaboratively under realistic constraints. I also aim to deepen the connection between academia and industry by facilitating site visits, short professional placements, and guest lectures from environmental practitioners. This integration exposes students to emerging technologies, regulatory frameworks, and career pathways.

Assessment plays a critical role in evaluating student comprehension while motivating deeper engagement. I assess learning through a combination of exams, design projects, laboratory reports, in-class activities, and reflective assignments. I value assessments that reward reasoning rather than rote answers, and I frequently include open-ended questions that invite creativity. I also evaluate student engagement throughout the semester, using short concept checks, discussions, and digital polling tools to identify misconceptions early and adapt instruction accordingly. I encourage independent learning through optional challenges that reward initiative and curiosity, helping students build confidence in their analytical abilities.

My future teaching goals center on expanding experiential learning opportunities. I intend to develop an outdoor environmental teaching laboratory where students can monitor microclimate conditions, conduct soil and water analyses, deploy sensors, and manage small-scale agricultural plots. This living laboratory will allow students to practice experimental design, data acquisition, and scientific communication while working in an authentic research environment. Such experiences not only deepen understanding but also prepare students for graduate studies, engineering practice, and interdisciplinary collaboration.

Above all, effective teaching requires a supportive and inclusive learning environment. I strive to model patience, approachability, and enthusiasm, and I view humor as a powerful pedagogical tool that lowers barriers, encourages participation, and strengthens teacher-student rapport. When students feel respected and valued, they engage more fully and take intellectual risks that lead to meaningful growth.

Ultimately, my goal as an educator is to guide students toward becoming thoughtful, capable, and innovative engineers and scientists. Through continuous reflection and adaptation, I aim to teach in a way that not only conveys knowledge but also inspires students to pursue lifelong learning and to shape a more sustainable world.