Grigorii Kaplan, Ph.D.

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https://sciprofiles.com/profile/729846

Core Expertise

- Establishing successful collaborations, partnerships;
- Research and Development;
- Earth Observation/Remote Sensing;
- Product development;
- Project management;
- Data analysis;
- Algorithms development.

Earth Observation/Remote Sensing Expertise

- Multispectral and hyperspectral optical remote sensing;
- Synthetic Aperture Radar (SAR);
- SAR Interferometry (InSAR);
- LIDAR;
- Optical and SAR instrument calibration and validation;
- Development of SAR, InSAR, and Optical image processing chains (Levels 0-2);
- Ground subsidence, erosion monitoring;
- Drone imagery processing;
- Forest monitoring and carbon stocks estimation;
- Wildfire detection and burn severity estimation;
- Soil moisture estimation;
- Environmental monitoring;
- Flood prediction and monitoring;
- Atmospheric remote sensing; greenhouse gases, methane emitters detection;
- Agricultural monitoring and recommendation (irrigation, fertilization, disease detection, yield prediction, etc.);
- Evapotranspiration measurements and monitoring.

Other Expertise

- Presentation of businesses, concepts, technologies, and achievements;
- Market research and analysis;
- Software development management and Software implementation;
- Scientific Programming (Python, JavaScript, SQL);
- Machine Learning;
- Radar;
- Optical instrument calibration, validation, and testing;

- Wildfire modeling;
- Spectroscopy;
- Geography;
- Cartography;
- GIS;
- GNSS;
- Climate Science;
- Statistics;
- Scientific and technical writing and publishing;
- QA;
- UX/UI design.

Software Skills

SQL, Python, JavaScript, Clipper languages; Machine Learning; Google Earth Engine, ArcGIS Pro, ArcMap, ArcGIS Online, ArcView, MATLAB PLS Toolbox, MapInfo, ERDAS Imagine, Global Mapper, ENVI, QGIS, ESA SNAP, Sen2Cor, Pix4D, FlamMap, DSSAT, MS Excel and Access, SharePoint, WIX.

Professional experience

11.2023 – **Independent earth observation scientist.**

- Scientific research on the subjects of SAR and Optical Remote Sensing;
- Peer-reviewing for MDPI and other scientific publishers;
- Developing an image processing application.

02.2022 – 10.2023 – **Senior Remote Sensing Product Development Manager, Terra Space Lab, Israel (**https://www.terraspacelab.com/**).**

- Led the developent of various aspects of a future satellite system;
- Managed the development of the Company's software;
- Defined satellite applications;
- Developed satellite calibration and validation plans;
- Defined satellite calibration parameters and characteristics;
- Interviewed job candidates;
- Established successful collaborations with various organizations;
- Grant, RFP, SoW preparation;
- Developed technical specifications;
- Sub-contractors management;
- Writing scientific articles;
- Earth Observation market analysis;
- R & D on the subjects of Remote sensing;
- SAR and Optical image processing algorithms development (Level-0 to Level-2);
- SAR and Optical image cross-calibration;
- Scientific programming in Python;
- Raster and vector data processing and analysis in GIS and Python;
- Presented the organization at international conferences and meetings.

03.2021 – 02.2022 – **Remote Sensing Agronomist, CropX, Israel** (http://www.cropx.com).

- Led the Remote sensing activities within the organization;
- Transformed the soil sensor company to the Remote sensing and soil sensor company;
- Developed algorithms and math models for the estimation of vegetation variables and soil parameters based on Sentinel-1 SAR and optical Remote sensing data;
- Developed innovative SAR image processing methods for the estimation of vegetation variables and soil moisture (published in three papers [1, 2, 3]);
- Developed DEM-assisted SAR backscatter normalization algorithm;
- Developed Machine learning-based image processing nitrogen application recommendation tool for efficient and environmental-friendly farming;
- SAR and Optical Satellite image processing (Level 1-2);
- Developed radiometric cross-calibration functions (SPOT-5 and Sentinel-2, Landsat-7/8 and Sentinel-2, etc);
- R & D on the subjects of Remote sensing and agronomy;
- Developed machine learning-based image processing algorithms;
- Developed a GEE-based application for the estimation of vegetation variables;
- Raster and vector data processing and analysis in GIS, GEE, and Python;
- Developed and implementing standard operating procedures;
- Led meetings with international partners and customers;
- Cross-timezone team coordination.

04.2017 – 02.2021 – **Senior Research engineer** - Department of Environmental Physics and Irrigation, Institute of Soil, Water and Environmental Sciences, Agricultural Research Organization, **Volcani Institute, Israel** (http://www.agri.gov.il/en/home/default.aspx).

- Invented two incidence angle normalization methods of Sentinel-1 SAR imagery processing (published in Land journal);
- Developed two effective vegetation indices (published in Land journal);
- Developed efficient math models for the estimation of many vegetation variables based on Sentinel-1 SAR and optical Remote sensing data;
- Developed first End-To-End Sentinel-1 InSAR subsidence map preparation workflow for ESA SNAP image processing software;
- Analyzed and compared the capabilities of satellites, developed multi-sensor cross-calibration algorithms and functions (Sentinel-2 and VENμS (published in Remote Sensing journal), BGU SAT and MODIS (earned 200,000 NIS for the lab), etc);
- SAR and Optical Satellite, LIDAR, and UAV imagery processing (levels 0-3);
- Developed a corner reflector that was used as a calibration target in the radar-related research;
- Performed research on Atmospheric correction;
- Performed research on crops biophysics;
- Prepared maps, wind roses, geospatial layers, etc.;
- Performed spatial and statistical analyses of various phenomena;

- Worked with multi-domain data including remote sensing imagery, geospatial layers, meteorological databases, and ground reference data;
- Prepared and wrote scientific articles and reports, technical manuals, and specifications;
- Performed programming in SQL and Python, including developing image processing and machine learning algorithms;
- Developed automatic and semi-automatic image processing workflows;
- Raster and vector data processing and analysis;
- Tested pieces of software and algorithms, scientific hardware, and remote sensing products. Defined their optimal software and hardware specifications for the lab's needs;
- Was in charge of interactions on technical subjects with internal and external (including international) partners;
- Managed IT, equipment, and licenses within the Lab;
- Performed server administration duties;
- Gave training to other lab members, colleagues from other labs, and students;
- Participated in scientific meetings, discussions, and conferences;
- Designed, managed, and provided field experiments;
- Worked with scientific equipment and taught colleagues to use the equipment;
- Developed a Model for Evaluation of Water Consumption (Evapotranspiration) in Sensitive Field Crops, Annual Report on the VENμS Project, Submitted to the Ministry of Science, Technology and Space, October 2019.

08.2016 – 03.2017 – **QA tester** - Military and civilian electronics industry, Israel.

04.2007 – 11.2015 – ***Software engineer*** - **Stavropol regional clinical advisory-diagnostic centre, Russia** (http://www.skkdc.ru/).

- Prepared STD, STP, and STR for manual QA, while overseeing the execution of manual test cycles;
- Developed technical documentation, specifications, and assistance manuals for employees;
- Led the successful development and implementation of a state-of-the-art Medical Expert system to replace legacy MS-DOS software;
- UX/UI development;
- Was in charge of defining users' requirements, interfaces, writing technical specifications, and all the activities related to testing and error tracking;
- Developed software testing tasks and plans for a group of 4 co-workers;
- Worked with Oracle and dBase databases, PL/SQL and Clipper programming languages;
- Wrote many views and complex queries in PL/SQL;
- Provided SW and HW Technical support;
- Taught around 30 people how to use the new software.

Patents and Inventions

SAR satellite image processing

1. Kaplan, G., Fine, L., Lukyanov, V., Manivasagam, V.S., Tanny, J., Rozenstein, O., 2021. Normalizing the Local Incidence Angle in Sentinel-1 Imagery to Improve Leaf Area Index, Vegetation Height, and Crop Coefficient Estimations. Land 10, 680. https://doi.org/10.3390/land10070680
2. Kaplan, G.; Gross, M.; Badakhova, G. New Sentinel-1 SAR imagery processing algorithm improves the estimation of cotton water consumption and field soil moisture. In Proceedings of the Hydrometeorology, climate change and environmental monitoring: current problems and ways of their solution; Tashkent, Uzbekistan, 2021; pp. 19–21. Link
3. Kaplan, G., Gross, M., Michel-Meyer, I., Rahav, M., & Sela, G. (2022). DEM-assisted in-season soil moisture estimation based on normalized Sentinel-1 SAR imagery. EarthArXiv, 1–12. https://doi.org/https://doi.org/10.31223/X5XD0X

Optical satellite image processing

1. Kaplan, G., Fine, L., Lukyanov, V., Manivasagam, V.S., Malachy, N., Tanny, J., Rozenstein, O., 2021. Estimating Processing Tomato Water Consumption, Leaf Area Index, and Height Using Sentinel-2 and VENµS Imagery. Remote Sens. 13, 1046. https://doi.org/10.3390/rs13061046
2. Kaplan, G., Rozenstein, O., 2021. Spaceborne Estimation of Leaf Area Index in Cotton, Tomato, and Wheat Using Sentinel-2. Land 10, 505. https://doi.org/10.3390/land10050505
3. Rozenstein, O., Tanny, J., Kaplan, G., 2024. Estimation of a crop coefficient vector based on multispectral remote sensing. US Patent App. 18/279,084. https://www.freepatentsonline.com/y2024/0144674.html

Academic accomplishments

- 60+ Scientific publications:
  https://scholar.google.com/citations/GregoriyKaplan
  https://orcid.org/0000-0002-7873-5619
- ~30 Peer-reviews of scientific articles for MDPI, ELSEVIER and other publishers: *Sensors*, *Agronomy, Remote Sensing, Energies, GIScience and Remote Sensing, International Journal of Digital Earth, International Journal of Applied Earth Observation and Geoinformation, Precision Agriculture, Geomatica; European Journal of Remote Sensing* journals:
  https://publons.com/wos-op/researcher/3084567/gregoriy-kaplan/peer-review/

Education

- ***Ph.D., Geography***, 2006-2010, Stavropol State University, Russia. ***Cum laude***. (Confirmed in Israel);
- ***M.Sc., Geographic Information Science and Cartography***, 2001-2006, Stavropol State University, Russia. ***Cum laude***. (Confirmed in Israel);
- ***B.A., Organizational Management***, 2001-2006, Institute of Friendship of the people of Caucasus, Russia. (Confirmed in Israel);
- ***Professional communication translator Diploma***, 2001-2005, Stavropol State University, Russia.

Professional courses and pieces of training completed

- Python (40 hours) and Remote sensing image processing (40 hours) courses, Volcani Institute;

- Numerous courses on the subjects of SAR, Remote sensing, Project management, GIS, etc.
  Certificates:
  https://www.dropbox.com/sh/5at7px2rprzfbbx/AADc0VJ8S8xUIEYSsvvW8nlJa?dl=0