

# Reda Fekry Abdelkawy KHALIEL

**Address:** 108 Shoubra Street, Rod elfarag, Cairo, Egypt.

**Phone:** +201020460202

**E-Mail:** [fekry.khaliel@connect.polyu.hk](mailto:fekry.khaliel@connect.polyu.hk) ; [reda.abdelkawy@feng.bu.edu.eg](mailto:reda.abdelkawy@feng.bu.edu.eg)

**Website:** <https://bu.edu.eg/staff/redaabdelkawy3>



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## PERSONAL DETAILS

- Marital status: Married
- Nationality: Egyptian
- Military status: Completed
- Date of birth: November 26, 1988
- Place of birth: Beheira, Egypt

## BIO

Reda Fekry, who is originally from Beheira in Egypt got his bachelor's degree at the Faculty of Engineering Shoubra Benha University in 2011. In 2023, he completed his **Ph.D.** at The Hong Kong Polytechnic University (HK PolyU), Hong Kong, China. Reda is currently an Assistant Professor in the Geomatics Engineering Department under the Faculty of Engineering (Shoubra) at Benha University, Egypt. With **12 years** of combined experience in academia and practical fields, Reda's expertise spans various domains. Reda teaching experience includes classical, mathematical, and satellite geodesy; map projection, GNSS, spatial data acquisition remote sensing for both undergraduate and postgraduate students at Benha University as well as HK PolyU. Reda's research interests encompass interdisciplinary studies in geodesy and remote sensing. In these fields, he focuses on resolving critical problems including deep learning-based point processing and modelling; detailed indoor and outdoor scenery modeling; object segmentation and classification.

In the past five years, Reda has published a significant body of work in esteemed international journals and conferences. These publications mainly focus on advanced techniques like graph neural networks for processing remote sensing data, with a specific emphasis on environmental and engineering applications. Other educational and research activities include assistance in the supervision of MSc and PhD students, assistance in supervision of graduation projects of students in different geomatics fields, also he is a reviewer for a set of reputable indexed journals and a member of the International Society of Photogrammetry and Remote Sensing (ISPRS).

Additionally, Reda possesses extensive expertise in the engineering industry such that he has participated and supervised the geospatial data collection and analysis for several projects. Notable examples include his involvement in the development of Egyptian railways crossings (2014-2017), establishment of the electric power station at Alfarafra (2016), and implementation of petrol stations along the Cairo-Suez Road (2017-2018). Recently, he has participated in the establishment of Almohanad Charity Hospital and the High-Speed Rail (HSR) in Egypt.

Furthermore, Reda possesses a wealth of experience in various software and programming skills that greatly contribute to his educational, engineering, and research pursuits. Notably, he is proficient in GNSS data processing software such as Trimble Business Center and Leica Geomatics Office, and has expertise in utilizing GUI software like LiDAR360, MeshLab, and CloudCompare as well as python programming for LiDAR data processing. Reda is well-versed in deep learning architectures, particularly PyTorch. It is worth highlighting that Reda is fluent in both Arabic and English languages, enabling effective communication in diverse settings.

## RESEARCH INTEREST

- Photogrammetry, remote sensing, and image analysis.
- LiDAR data processing
- Marker-free LiDAR data registration.
- Deep learning-based point processing and modeling
- Object segmentation and classification.
- InSAR Time series for deformation monitoring.

## JOURNAL PUBLICATIONS

- 1) Abubakar Sani-Mohammed, M.D., Yao, W. and **Fekry, Reda**. 2024 ‘Applications of Deep Learning in Remote Sensing-based Forest Health Studies – A Comprehensive Systematic Review’. *Under Review*
- 2) Abubakar Sani-Mohammed, M.D., Yao, W. and **Fekry, Reda**. 2024 “Characterizing Forest Plot Decay Levels based on Leaf Area Index, Gap Fraction, and L-moments from Airborne LiDAR”. *Under Review*
- 3) Amr, Doha, Xiao-Li Ding, and **Reda Fekry**. 2024. "A Multi-Satellite SBAS for Retrieving Long-Term Ground Displacement Time Series" *Remote Sensing* 16, no. 9: 1520. <https://doi.org/10.3390/rs16091520>.
- 4) Amr, D., Ding, X. and **Fekry, Reda**. 2024 ‘A machine learning-based method for multi-satellite SAR data integration’, *The Egyptian Journal of Remote Sensing and Space Sciences*, 27(1), pp. 1–9. <https://doi.org/10.1016/j.ejrs.2023.12.001>. (Q1 & IF = 4.4).
- 5) **Fekry, Reda**, Wei Yao, Lin Cao, and Xin Shen. 2022. “Ground-Based/UAV-LiDAR Data Fusion for Quantitative Structure Modeling and Tree Parameter Retrieval in Subtropical Planted Forest.” *Forest Ecosystems* 9: 100065. <https://doi.org/10.1016/j.fecs.2022.100065>. (Q1 & IF = 4.27).
- 6) **Fekry, Reda**, Wei Yao, Lin Cao, and Xin Shen. 2021. "Marker-Less UAV-LiDAR Strip Alignment in Plantation Forests Based on Topological Persistence Analysis of Clustered Canopy Cover" *ISPRS International Journal of Geo-Information* 10, no. 5: 284. <https://doi.org/10.3390/ijgi10050284>. (Q3 & IF = 3.099).
- 7) **Reda Fekry**; Abdallah Saad; Ayman Rashad Elshehaby; Mervat Ameen. “Using GCPs to validate DEM generated by InSAR data”. *IJRDO-Journal Electr Electron Eng* 2016:21–35.
- 8) Saad A, Elshehaby A, Refaat MM, **Reda Fekry**. “Estimating Earth’s Surface Deformation from GPS and DInSAR Data Integration”. *Aust J Basic Appl Sci* 2018; 12:1–7.

## CONFERENCES AND WORKSHOPS PUBLICATIONS

- 1) Abubakar Sani-Mohammed, Wei Yao, **Reda Fekry**, Tsz-Chung Wong, Marco Heurich (2024):” Forest Plot Decay Level Classification from ALS-Derived L-moments”. *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*.
- 2) <https://doi.org/10.5194/isprs-archives-XLVIII-1-2024-587-2024>.
- 3) **Reda. Fekry**, Wei. Yao\*, Abubakar Sani-Mohammed, and Doha Amr (2023) “Individual tree segmentation from BLS data based on graph AUTOENCODER”, *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences*. <https://doi.org/10.5194/isprs-annals-X-1-W1-2023-547-2023>.
- 4) **Reda. Fekry**, Wei. Yao\*, and Lin. Cao, “Fusion of LiDAR Point Clouds Based on Clustered Forest Canopy”, in *International Graduate Workshop on Geo-Informatics*. Peking University, China, pp. 75, 2021.
- 5) **Reda. Fekry**, Wei. Yao\*, and Lin. Cao, “Automated UAV-LiDAR Strip Alignment in Forested Areas Using Density Based Canopy Clustering”, in *ISPRS Annals of Photogrammetry and Remote Sensing. Spat. Inf. Sci.*, pp. 81-88, 2020.

- 6) **Reda. Fekry**, Wei. Yao\*, and Lin. Cao, “Automated Co-registration of UAV and Backpack LiDAR Data in Forested Areas based on Density-based Canopy Clustering”, in International Graduate Workshop on Geo-Informatics. Wuhan, China, 2020.
- 7) **Reda. Fekry**, Wei. Yao\*, and Lin. Cao, “Applying Individual Tree Based Graph Matching to Automated Strip Adjustment of UAV Lidar (ULS) Point Clouds”, in International Conference on Mobile Mapping Technology (MMT). Shenzhen, China, pp. 75, 2019.

## SEMINARS

- 1) Impact and Mitigation of Ionospheric Scintillation Effects on GNSS Positioning.
- 2) Change Detection using Point Clouds - Photogrammetry meets BIM.
- 3) Big Data and the City.
- 4) Use of GPS for Geophysical Applications: from Secular to Second.
- 5) Polarization of remote sensing.
- 6) Evaluation of Mobility-as-a-Service Alternatives.
- 7) Big Data and Intelligent Policing.
- 8) Point Cloud Processing at GI Lab.
- 9) Recent Progress in Image-based Planetary Remote Sensing.
- 10) Earthquake magnitude forecasting from inter-seismic locking distribution along the subduction megathrust.
- 11) Optimal Laser Scanner Viewpoint Placement and Multi-Camera System Calibration
- 12) 3D Indoor Models based on Sparse Data for Smart Cities
- 13) Static and Kinematic GNSS PPP Performance Assessment of the Huawei Mate 20X Smartphone
- 14) GNSS – Let’s Talk About its Vulnerability.
- 15) GIScience beyond Absolute Space: A Space-Place (Splatial) GIScience Framework.
- 16) Running a Convolutional Neural Networks Application on UBDA Platform.
- 17) Using Stochastic Optimization Algorithms for Big Data Analytics on UBDA Platform.
- 18) Digital Construction with BIM, GIS, IoT for Smart City Development.
- 19) A Journey of Integrated Applications of BIM, GIS and other Technologies for Build Environment
- 20) BIM Auditing.
- 21) Use of Big Data in Weather Services at the Hong Kong Observatory.
- 22) Connected Construction with openBIM.
- 23) Urban informatics and smart cities.

## EDUCATION

- **September 2018 – February 2023**      **PhD Degree**  
The Department of Land Surveying and Geo-Informatics (LSGI), The Hong Kong Polytechnic University (PolyU), Hung Hom, Kowloon, Hong Kong.  
PhD Research Area: Point cloud co-registration in forested areas and areas without artificial targets
- **September 2011 – April 2017**      **M.Sc. Degree**  
Surveying and Geodesy, Surveying Engineering Department, Faculty of Engineering-Shoubra, Benha University.  
Detecting Earth’s surface change by integrating DInSAR and GPS Data
- **September 2006 – May 2011**      **B.Sc. Degree**  
Surveying Engineering Department, Faculty of Engineering-Shoubra, Benha University.  
Very good with Honor Degree, 83.56% ranked 1<sup>st</sup> among 100 students.

## RESEARCH ACTIVITIES

- Assistance in the supervision of MSc and PhD students.

- Assistance in supervision of graduation projects of students in different geomatics fields.
- Reviewer for a set of indexed journals.

## OBJECTIVES

- Joining practical applications and multinational corporation.
- Applying for funded projects for future.
- Finding my own work to service the community.
- Increase my work communication skills.
- Raise my paper publishing quality in higher impact factor journals.

## AWARDS

- Supervision of graduation project awarded a sponsorship from the Egyptian Space Agency (EgSA) and the Academy of Scientific Research & Technology (ASRT) – Title “Satellite Image Processing”, 2024.
- PhD studentship from the HK polytechnic university 2018-2022.
- Benha University Annual fellowships for distinguished undergraduate academic year 2010/2011
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- Benha University Annual fellowships for distinguished undergraduate academic year 2008/2009
- Benha University Annual fellowships for distinguished undergraduate academic year 2007/2008

## ATTENDED COURSES AND WORKSHOPS

- Laser scanning data collection, Faculty of Engineering-Shoubra, Benha University 2014.
- Using technology in teaching, Faculty of Engineering-Shoubra, Benha University 2014.
- Mobile Mapping Systems, Faculty of Engineering, Ain Shams University 2015.
- Terrestrial Laser Scanners - Faculty of Engineering at Shoubra, Benha University 2016.
- Mobile Mapping Technology conference in Shenzhen – China 2019.
- The 2020 International Graduate Workshop on Geoinformatics (IGWG2020) was held online by Wuhan University (December 2020).
- Terrestrial Laser scanning equipment - VZ-400i. RIEGL Laser Measurement Systems. (June. 17, 2020).
- The point cloud processing software, Cyclone (September 2020).
- ConstrTech Summit II, Cairo, Egypt (2024).

## SOFTWARE AND INSTRUMENTS SKILLS

- Drone surveying for mapping and 3D modeling (Data collection and processing).
- Digital Mapping Packages such as AutoCAD, and Autodesk Civil 3D.
- Microsoft Office Applications (Word, Excel, PowerPoint) (daily use for research and work).
- Land Surveying instruments such as total station and GPS/GNSS instruments as well as Terrestrial laser scanners.
- Land Surveying and GNSS positioning applications such as Trimble business center, Cyclone software, CloudCompare.
- ArcGIS Pro.
- Glab software for PPP GNSS solutions.

## PROGRAMMING SKILLS

- Python.
- MATLAB.

## INTERPERSONAL SKILLS

- Self-motivated, highly able to learn fast and very keen to improve my skills and performance.
- Ability to deal with new technologies.
- High ability to work under pressure.
- Excellent communication and teaching skills.
- Excellent eye for detail.

## MEMBERSHIPS

- ISPRS (International Society for Photogrammetry and Remote Sensing) 2020 to present.
- Member of Benha University Club, 2011 – present.
- Member, Egyptian Engineers Syndicate, 2011 – Present.

## ACADEMIC EXPERIENCE

- **Assistant Professor, February 2023 till present**  
Geomatics Department, Faculty of Engineering at Shoubra, Benha University.  
Supervision of MSc students in the field of remote sensing.  
Teaching Surveying, Photogrammetry, and Remote sensing courses for undergraduate and postgraduate students.
- **Part-time research associate September 2021 till September 2022.**  
Department of Land Surveying and Geoinformatics, The Hong Kong Polytechnic University
- **PhD candidate, September 2018 till September 2022**  
Department of Land Surveying and Geoinformatics, The Hong Kong Polytechnic University
- **Teaching Assistant, November 2011 till August 2018**  
Surveying Department, Faculty of Engineering at Shoubra, Benha University.  
Teaching Surveying, Photogrammetry, and Remote sensing courses for undergraduate students.  
Supervision of the graduation projects of the undergraduate students.

## INDUSTRY EXPERIENCE

- **Topographic mapping of Aziziya City (900 fed.) using GNSS techniques 2024.**
- **Topographic mapping of several kilometers of the HSR project (2024).**
- **Design of GNSS control points for SODIC Co. in Northern coast projects (2023).**
- **Supervision of the surveying work at different portions of HSR national project 2023.**
- **Supervision of implementing the surveying work at Almohand Charity Hospital at the 5th Settlement district in 2023.**
- **Supervising the implementation of petrol stations along the Cairo-Suez Road 2017-2018**
- **Development of Egyptian railways crossings 2014 – 2017**  
The work includes the supervision of surveying and stakeout of the crossings before and after construction works.
- **Surveying work of the electric power station at Alfarafra-Egypt 2016**

- **Management of the surveying and mapping of Engineers Syndicate Club, Alzohor Club, and Al shams Club 2015 -2016**

## TEACHING EXPERIENCE

### A. Undergraduate Courses

- Advanced Geodesy and Global Navigation Satellite Systems (GNSS).
- Terrestrial and Topographic Surveying.
- Hydrographic Surveying.
- Classical, Mathematical, and Satellite Geodesy.
- Highway Roads Design.
- Python Programming.
- Map Projection.
- Remote Sensing and image interpretation.
- Engineering Reports.
- English technical writing.

### B. Postgraduate Courses

- Satellite Geodesy I
- Remote sensing II
- Cartography I and II

## LANGUAGES

- Arabic: Fluent (read, written, and spoken).
- English: Very good (IELTS proficiency).

## WEBSITES

- **Linkedin:** <https://www.linkedin.com/in/reda-fekry-phd-65155084/>
- **Scopus:** <https://www.scopus.com/authid/detail.uri?authorId=57219029908>
- **ResearchGate:** [https://www.researchgate.net/profile/Reda-Khaliel?ev=hdr\\_xprf](https://www.researchgate.net/profile/Reda-Khaliel?ev=hdr_xprf)
- **Orcid:** <https://orcid.org/0000-0002-5966-1415>

## REFERENCES

- **Prof. Dr.-Ing YAO Wei** (PhD Supervisor)  
Assistant professor, Department of Land Surveying and Geoinformatics, Hong Kong Polytechnic University.  
Email: [wei.hn.yao@polyu.edu.hk](mailto:wei.hn.yao@polyu.edu.hk)
- **Professor: DING Xiao-Li** (PhD Co-Supervisor)  
Chair Professor of Geomatics, Department of Land Surveying and Geoinformatics, Hong Kong Polytechnic University.  
Email: [xl.ding@polyu.edu.hk](mailto:xl.ding@polyu.edu.hk)
- **Professor: Ayman Elshehaby** (MSc. Co-Supervisor)  
Faculty Dean, Professor of Photo. & Remote sensing, Department of Geomatics Engineering, Faculty of Engineering at Shoubra, Benha University.  
Email: [Elshehaby@mail.com](mailto:Elshehaby@mail.com)