

Qingyu Li

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EDUCATION

- 04/2019 – 11/2022 **Doctor of Engineering** in Geoscience, *Technical University of Munich, Germany*
Thesis: Deep learning for building footprint generation from optical imagery.
- 09/2015 – 06/2019 **Master of Engineering** in Photogrammetry and Remote Sensing, *Wuhan University, China*
Thesis: Building footprint generation using deep learning methods
- 10/2016 – 11/2018 **Master of Science** in Earth Oriented Space Science and Technology, *Technical University of Munich, Germany*
Thesis: Building footprint generation using deep learning methods
- 09/2011 – 06/2015 **Bachelor of Engineering** in Remote Sensing Science and Technology, *Wuhan University, China*
Thesis: Integrating multiple textural features for remote sensing image change detection

PROFESSIONAL APPOINTMENTS

- 11/2022 – Now **Postdoctoral researcher**, *Technical University of Munich, Germany*
Project: “Earth Care” (Technical University of Munich): Exploration of earth observation through different case studies and using AI and innovative modeling technologies
- 04/2019 – 11/2022 **Research associate**, *Technical University of Munich & German Aerospace Center, Germany*
Project: “So2Sat” (European Research Council): Development of AI-based frameworks for global building footprint generation
Project: “Investigation of building cases using AI” (Bavarian Agency for Digitization, High-Speed Internet and Surveying): Development of AI-based frameworks for undocumented building detection

TEACHING EXPERIENCE

- 12/2023 - Now **Supervision of Master thesis:** Roof material classification from remote sensing imagery using deep learning methods
- 12/2022 - 05/2023 **Supervision of Master thesis:** Remote sensing intelligent monitoring and analysis of in-terrestrial aquaculture ponds under the background of "blue transformation"
- 10/2021 - 03/2022 **Teaching assistant:** Remote Sensing Seminar, Road extraction using deep learning methods
- 10/2019 - 03/2020 **Teaching assistant:** Remote Sensing Seminar, Instance segmentation of buildings using deep learning methods

SERVICE & LEADERSHIP

- **Session chair**
(1) 2022 IEEE International Geoscience and Remote Sensing Symposium – WE3.O1: Image Segmentation and Mapping; (2) 2021 IEEE International Geoscience and Remote Sensing Symposium – WE1.O.3: Advanced Segmentation and Land Cover Methods for Optical Data
- **Reviewer** for Scholarly Journals
(1) IEEE Transactions on Geoscience and Remote Sensing; (2) International Journal of Applied Earth Observation and Geoinformation; (3) ISPRS Journal of Photogrammetry and Remote Sensing; (4) Remote sensing of Environment; (5) Remote Sensing; (6) Photogrammetric Engineering & Remote Sensing; (7) IEEE Geoscience and Remote Sensing Letters; (8) IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing; (9) IEEE Transactions on Industrial Informatics; (10) Geo-Spatial Information Science; (11) Earth System Science Data;

SELECTED AWARDS

- 10/2020 **Geodesy Award** of German Association for Geodesy, Geoinformation, and Land Management

TALKS

05/2023	"Semi-supervised segmentation of individual buildings from SAR imagery." Oral presentation in 2023 Joint Urban Remote Sensing Event.
07/2022	"Feature and Output Consistency Training for Semi-supervised Building Footprint Generation." Oral presentation in 2022 IEEE International Geoscience and Remote Sensing Symposium.
07/2021	"End-to-End Semantic Segmentation and Boundary Regularization of Buildings from Satellite Imagery." Oral presentation in 2021 IEEE International Geoscience and Remote Sensing Symposium.
10/2020	"Mapping the land cover of Africa at 10 m resolution from multi-source remote sensing data with Google Earth Engine." Oral presentation in 2020 Phi-week, European Space Agency
09/2020	"Instance Segmentation of Buildings Using Keypoints." Oral presentation in 2020 IEEE International Geoscience and Remote Sensing Symposium.
09/2020	"Detection of Undocumented Buildings using Convolutional Neural Network and Official Geodata." Oral presentation in 2020 XXIVth ISPRS Congress.

PUBLICATIONS

Book chapters

[1] Roschlaub, R., Glock, C., Möst, K., **Li, Q.**, Auer, S., & Zhu, X. X. (2022). "Mit Deep Learning und amtlichen Daten zur landesweiten Detektion von Gebäuden und Gebäudeveränderungen." in *Künstliche Intelligenz in Geodäsie und Geoinformatik - Potenziale und Best-Practice-Beispiele*, edited by Grunau, Wilfried. Germany: Wichmann Verlag.

Journal papers

- [2] **Li, Q.**, Krapf, S., Mou, L., Shi, Y., & Zhu, X. X. (2024). Deep learning-based framework for city-scale rooftop solar potential estimation by considering roof superstructures. *Applied Energy*, 374, 123839.
- [3] **Li, Q.**, Xu, G., & Gu, Z. (2024). A novel framework for multi-city building energy simulation: Coupling urban microclimate and energy dynamics at high spatiotemporal resolutions. *Sustainable Cities and Society*.
- [4] **Li, Q.**, Mou, L., Sun, Y., Hua, Y., Shi, Y., & Zhu, X. X. (2024). A Review of Building Extraction from Remote Sensing Imagery: Geometrical Structures and Semantic Attributes. *IEEE Transactions on Geoscience and Remote Sensing*, 62, 1-15.
- [5] Liu, C., Albrecht, C. M., Wang, Y., **Li, Q.**, & Zhu, X. X. (2024). AIO2: Online Correction of Object Labels for Deep Learning with Incomplete Annotation in Remote Sensing Image Segmentation. *IEEE Transactions on Geoscience and Remote Sensing*.
- [6] **Li, Q.**, Mou, L., Hua, Y., Shi, Y., Chen, S., Sun, Y., & Zhu, X. X. (2023). 3DCentripetalNet: Building height retrieval from monocular remote sensing imagery. *International Journal of Applied Earth Observation and Geoinformation*, 120, 103311.
- [7] **Li, Q.**, Krapf, S., Shi, Y., & Zhu, X. X. (2023). SolarNet: A convolutional neural network-based framework for rooftop solar potential estimation from aerial imagery. *International Journal of Applied Earth Observation and Geoinformation*, 116, 103098.
- [8] **Li, Q.**, Taubenböck, H., Shi, Y., Auer, S., Roschlaub, R., Glock, C., Kruspe, A., & Zhu, X. X. (2022). Identification of undocumented buildings in cadastral data using remote sensing: Construction period, morphology, and landscape. *International Journal of Applied Earth Observation and Geoinformation*, 112, 102909.
- [9] Roschlaub, R., Glock, C., Möst, K., Hümmer, F., **Li, Q.**, Auer, S., Kruspe, A., & Zhu, X. X. (2022). Implementierung einer KI-Infrastruktur zur automatisierten Erkennung von landesweiten Gebäudeveränderungen aus Luftbildern. *ZfV-Zeitschrift für Geodäsie, Geoinformation und Landmanagement*, (zfv 3/2022).
- [10] **Li, Q.**, Shi, Y., & Zhu, X. X. (2022). Semi-supervised building footprint generation with feature and output consistency training. *IEEE Transactions on Geoscience and Remote Sensing*, 60, 1-17.
- [11] **Li, Q.**, Zorzi, S., Shi, Y., Fraundorfer, F., & Zhu, X. X. (2022). RegGAN: An end-to-end network for building footprint generation with boundary regularization. *Remote Sensing*, 14(8), 1835.
- [12] **Li, Q.**, Mou, L., Hua, Y., Shi, Y., & Zhu, X. X. (2022). CrossGeoNet: A framework for building footprint generation of label-scarce geographical regions. *International Journal of Applied Earth Observation and Geoinformation*, 111, 102824.
- [13] **Li, Q.**, Mou, L., Hua, Y., Shi, Y., & Zhu, X. X. (2021). Building footprint generation through convolutional neural networks with attraction field representation. *IEEE Transactions on Geoscience and Remote Sensing*, 60, 1-17.
- [14] **Li, Q.**, Shi, Y., Auer, S., Roschlaub, R., Möst, K., Schmitt, M., Glock, C., & Zhu, X. X. (2020). Detection of undocumented building constructions from official geodata using a convolutional neural network. *Remote Sensing*, 12(21), 3537.

- [15] **Li, Q.**, Shi, Y., Huang, X., & Zhu, X. X. (2020). Building footprint generation by integrating convolution neural network with feature pairwise conditional random field (FPCRF). *IEEE Transactions on Geoscience and Remote Sensing*, 58(11), 7502-7519.
- [16] **Li, Q.**, Qiu, C., Ma, L., Schmitt, M., & Zhu, X. X. (2020). Mapping the land cover of Africa at 10 m resolution from multi-source remote sensing data with Google Earth Engine. *Remote Sensing*, 12(4), 602.
- [17] Roschlaub, R., **Li, Q.**, Auer, S., Möst, K., Glock, C., Schmitt, M., Shi, Y & Zhu, X. X. (2020). KI-basierte Detektion von Gebäuden mittels Deep Learning und amtlichen Geodaten zur Baufallerkundung. *ZfV-Zeitschrift für Geodäsie, Geoinformation und Landmanagement*, (3), 180-189.
- [18] Shi, Y., **Li, Q.**, & Zhu, X. X. (2020). Building segmentation through a gated graph convolutional neural network with deep structured feature embedding. *ISPRS Journal of Photogrammetry and Remote Sensing*, 159, 184-197.
- [19] Shi, Y., **Li, Q.**, & Zhu, X. X. (2018). Building footprint generation using improved generative adversarial networks. *IEEE Geoscience and Remote Sensing Letters*, 16(4), 603-607.
- [20] **Li, Q.**, Huang, X., Wen, D., & Liu, H. (2017). Integrating multiple textural features for remote sensing image change detection. *Photogrammetric Engineering & Remote Sensing*, 83(2), 109-121.
- [21] Huang, X., **Li, Q.**, Liu, H., & Li, J. (2016). Assessing and improving the accuracy of GlobeLand30 data for urban area delineation by combining multisource remote sensing data. *IEEE Geoscience and Remote Sensing Letters*, 13(12), 1860-1864.

Conference papers

- [22] Lin, W., Zhu, J., Hua, Y., **Li, Q.**, Mou, L., & Zhu, X. X. (2024). Towards Sustainable Urban Energy: A Robust Deep Learning Framework for Solar Potential Estimation. *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, 48, 371-378.
- [23] **Li, Q.**, Krapf, S., Mou, L., Shi, Y., & Zhu, X. X. (2023). Roof superstructure detection from aerial imagery. In *IGARSS 2023-2023 IEEE International Geoscience and Remote Sensing Symposium*. IEEE.
- [24] **Li, Q.**, Sun, Y., Mou, L., Shi, Y., & Zhu, X. X. (2023). Semi-supervised segmentation of individual buildings from SAR imagery. In *2023 Joint Urban Remote Sensing Event (JURSE)*. IEEE.
- [25] **Li, Q.**, Shi, Y., & Zhu, X. X. (2022). Feature and output consistency training for semi-supervised building footprint generation. In *IGARSS 2022-2022 IEEE International Geoscience and Remote Sensing Symposium*. IEEE.
- [26] **Li, Q.**, Zorzi, S., Shi, Y., Fraundorfer, F., & Zhu, X. X. (2021). End-to-end semantic segmentation and boundary regularization of buildings from satellite imagery. In *IGARSS 2021-2021 IEEE International Geoscience and Remote Sensing Symposium*. IEEE.
- [27] Chen, S., Mou, L., **Li, Q.**, Sun, Y., & Zhu, X. X. (2021). Mask-height R-CNN: An end-to-end network for 3D building reconstruction from monocular remote sensing imagery. In *IGARSS 2021-2021 IEEE International Geoscience and Remote Sensing Symposium*. IEEE.
- [28] **Li, Q.**, Mou, L., Hua, Y., Sun, Y., Jin, P., Shi, Y., & Zhu, X. X. (2020). Instance segmentation of buildings using keypoints. In *IGARSS 2020-2020 IEEE International Geoscience and Remote Sensing Symposium*. IEEE.
- [29] **Li, Q.**, Shi, Y., Auer, S., Roschlaub, R., Möst, K., Schmitt, M., & Zhu, X. X. (2020). Detection of Undocumented Buildings Using Convolutional Neural Network and Official Geodata. *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, 2, 517-524.
- [30] Shi, Y., **Li, Q.**, & Zhu, X. X. (2020). Building extraction by gated graph convolutional neural network with deep structured feature embedding. In *IGARSS 2020-2020 IEEE International Geoscience and Remote Sensing Symposium*. IEEE.
- [31] Shi, Y., **Li, Q.**, & Zhu, X. X. (2019). Building footprint extraction with graph convolutional network. In *IGARSS 2019-2019 IEEE International Geoscience and Remote Sensing Symposium*. IEEE.
- [32] Shi, Y., **Li, Q.**, & Zhu, X. X. (2019). BFGAN—building footprint extraction from satellite images. In *2019 Joint Urban Remote Sensing Event (JURSE)*. IEEE.