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# Nico Lang

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Address: Bjarkesvej 13, 2000 Frederiksberg, Denmark  
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## Education

- 02/2018 – 05/2022 **PhD student in the Photogrammetry and Remote Sensing group at ETH Zürich.**  
Supervisors: Prof. Konrad Schindler and Prof. Jan Dirk Wegner  
Research topic: Global vegetation structure mapping and uncertainty estimation with satellite data and deep learning
- 09/2015 – 09/2017 **Master of Science ETH in Geomatics**  
Majors: Engineering Geodesy and Photogrammetry, Space Geodesy and Navigation  
Master Thesis: Deep learning and Google Maps for tree monitoring
- 09/2011 – 08/2014 **Bachelor of Science ETH in Geomatik und Planung**  
Majors: Geodäsie und Geodätische Messtechnik, GIS, Photogrammetrie und Kartografie  
Bachelor Thesis: Klassifizierung von Gebäudefassaden in einer Laserscan-Punktwolke

## Research and work experience

- 09/2022 – Present **Postdoc at the Department of Computer Science (DIKU), University of Copenhagen affiliated with the Pioneer Centre for AI**  
Advisors: Prof. Serge Belongie and Prof. Christian Igel  
Research topics: Open-set recognition, Fine-grained categorization, Multi-modal representation learning, Deep learning for environmental monitoring.
- 02/2018 – 05/2022 **Research assistant – Photogrammetry and Remote Sensing group (ETH Zürich)**  
Supervision of several Bachelor and Master theses, Teaching assistant in Photogrammetry
- 02/2016 – 10/2017 **Research assistant – Photogrammetry and Remote Sensing group (ETH Zürich)**  
Project: *RegisTree* (<https://registree.ethz.ch/>) in cooperation with Pietro Perona's Computational Vision group at Caltech
- 02/2015 – 04/2015 **Internship at Computer Vision R&D, LOGITECH UPICTO GmbH**  
10/2014 – 01/2015 **Internship as Computer Vision Developer, upicto GmbH (Spinoff ETH Zürich)**
- 03/2013 – 05/2014 **Research Assistant – Photogrammetry and Remote Sensing group (ETH Zürich)**  
Processing and labelling of the [ISPRS benchmark Potsdam and Vaihingen](#)

## Teaching experience

- 02/2018 – 05/2022 **Teaching assistant - Photogrammetry and Remote Sensing group (ETH Zürich)**  
Photogrammetry lecture: designing and assisting practical lab exercises,  
Supervision of several student theses (Bachelor and Master level)
- 09/2019 **Tutorials on “Deep Learning for Geospatial Data Analysis”**  
Practical tutorial, ECML/PKDD Summer School (EPSS19) in Würzburg, Germany.  
06/2019 Lecture and practical tutorial, ISPRS Geospatial week in Enschede, Netherlands.  
01/2019 Practical tutorial, 1st Swiss “Workshop on Machine Learning for Environmental and Geosciences” (MLEG2019) in Zürich, Switzerland.  
01/2018 Practical tutorial, ISPRS Technical Commission II Symposium 2018 in Riva, Italy.
- 03/2013 – 09/2017 **Teaching assistant at ETH Zürich**  
Geodätische Messtechnik Grundzüge, Geographic Information Systems (GIS)
- 08/2010 – 08/2017 **Teaching Volleyball (J+S school sport) at several schools in Switzerland**
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## Publications

### Journals and Conferences

- Lang, N.**, Snæbjarnarson, V., Cole, E., Mac Aodha, O., Igel, C., & Belongie, S. (2024). From Coarse to Fine-Grained Open-Set Recognition. *In Proceedings of the IEEE/CVF conference on Computer Vision and Pattern Recognition (CVPR)*.
- Lang, N.**, Jetz, W., Schindler, K., & Wegner, J. D. (2023). A high-resolution canopy height model of the Earth. *Nature Ecology & Evolution*, 7(11), 1778-1789.
- Liu, S., Brandt, M., Nord-Larsen, T., Chave, J., Reiner, F., **Lang, N.**, ... & Fensholt, R. (2023). The overlooked contribution of trees outside forests to tree cover and woody biomass across Europe. *Science Advances*, 9 (37).
- Kalischek, N., **Lang, N.**, Renier, C., Daudt, R. C., Addoah, T., Thompson, W., ... & Wegner, J. D. (2022). Satellite-based high-resolution maps of cocoa for Côte d'Ivoire and Ghana. *Nature Food*.
- Becker, A., Russo, S., Puliti, S., **Lang, N.**, Schindler, K., & Wegner, J. D. (2023). Country-wide retrieval of forest structure from optical and SAR satellite imagery with deep ensembles. *ISPRS Journal of Photogrammetry and Remote Sensing*, 195, 269-286.
- Lang, N.**, Kalischek, N., Armston, J., Schindler, K., Dubayah, R., & Wegner, J. D. (2022). Global canopy height regression and uncertainty estimation from GEDI LIDAR waveforms with deep ensembles. *Remote Sensing of Environment*, 268, 112760.
- Lang, N.**, Irniger, A., Rozniak, A., Hunziker, R., Wegner, J. D., & Schindler, K. (2021). GRAINet: mapping grain size distributions in river beds from UAV images with convolutional neural networks. *Hydrology and Earth System Sciences*, 25(5), 2567-2597.
- Laumer, D., **Lang, N.**, van Doorn, N., Mac Aodha, O., Perona, P., & Wegner, J. D. (2020). Geocoding of trees from street addresses and street-level images. *ISPRS Journal of Photogrammetry and Remote Sensing*, 162, 125-136.
- Lang, N.**, Schindler, K., & Wegner, J. D. (2019). Country-wide high-resolution vegetation height mapping with Sentinel-2. *Remote Sensing of Environment*, 233, 111347.
- Källin, U., **Lang, N.**, Hug, C., Gessler, A., & Wegner, J. D. (2019). Defoliation estimation of forest trees from ground-level images. *Remote Sensing of Environment*, 223, 143-153.
- Branson, S., Wegner, J. D., Hall, D., **Lang, N.**, Schindler, K., & Perona, P. (2018). From Google Maps to a fine-grained catalog of street trees. *ISPRS Journal of Photogrammetry and Remote Sensing*, 135, 13-30. **(Awarded best paper ISPRS Journal 2018)**

### Preprints

- Nedungadi, V., Kariryaa, A., Oehmcke, S., Belongie, S., Igel, C., & **Lang, N.** (2024) MMEarth: Exploring Multi-Modal Pretext Tasks For Geospatial Representation Learning. *Under review*.
- Lang, N.**, Schindler, K., & Wegner, J. D. (2021). High carbon stock mapping at large scale with optical satellite imagery and spaceborne LIDAR. *arXiv preprint arXiv:2107.07431*.

### Workshop papers, Abstracts, Magazines

- Enevoldsen, P., Gundersen C., **Lang N.**, Belongie S., Igel C. (2023). *Familiarity-Based Open-Set Recognition Under Adversarial Attacks*. In The 2nd Workshop and Challenges for Out-of-Distribution Generalization in Computer Vision, International Conference on Computer Vision
- Lang, N.**, Schindler K., Wegner, J. D. (2022, May). *Forest canopy height mapping at global scale by fusing Sentinel-2 and GEDI*. In ESA Living Planet Symposium 2022. (oral talk)
- Kalischek, N., **Lang, N.**, Daudt, R. C., Addoah, T., Thompson, W., Blaser-Hart, W. J., ... & Wegner, J. D. (2022, May). *Towards traceable, transparent and sustainable cocoa farming in Côte d'Ivoire and Ghana using publicly available satellite imagery and deep learning*. In ESA Living Planet Symposium 2022.
- Rüetschi, M., Jiang, Y., **Lang, N.**, Becker, A., Waser, L. T., Marty, M., ... & Ginzler, C. (2022, May). *Annual vegetation height maps based on Sentinel-2 data-Potential applications for the Swiss National Forest Inventory*. In ESA Living Planet Symposium 2022.
- Nassar, A. S., **Lang, N.**, Lefèvre, S., & Wegner, J. D. (2019, May). *Learning geometric soft constraints for multi-view instance matching across street-level panoramas*. In Joint Urban Remote Sensing Event (JURSE) (pp. 1-4). IEEE.
- Lang, N.**, Wegner, J. D., & Schindler, K. (2019, May). *Mapping Vegetation Height from Multispectral Sentinel-2 Images at Country Scale using Deep Learning*. In ESA Living Planet Symposium 2019.
- Lang, N.**, Ginzler, C., Schindler, K., & Wegner, J. D. (2019). *Landesweite Vegetationshöhenmodelle mit Deep Learning und Sentinel-2*. *Geomatik Schweiz*, 2019(9), 256-259.

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## Selected News Media

Swiss national TV "SRF" in the news program "10 vor 10": [«Living Planet Symposium» mit Schweizer Beteiligung](#). (2022)

News article by NASA: ["Scientists Show How Forests Measure Up"](#) (2022)

News article by NVIDIA: ["Neural Network Generates Global Tree Height Map, Reveals Carbon Stock Potential"](#) (2022)

News article by ETH Zürich: ["Neuronales Netzwerk kann Baumhöhen von Satellitenbildern ablesen"](#) [[English version](#)] (2022)

Live radio interview with the Swiss national radio SRF1: ["Die Vermessung der Wälder \(Measuring the forests\)"](#) (2021)

News article by Mongabay: ["Chocolate giant funds high resolution carbon map to protect forests"](#) (2021)

News article by the High Carbon Stock Approach: ["Publicly available indicative High Carbon Stock Forest maps for Malaysia, Indonesia, and the Philippines"](#) (2021)

News article by ETH Zürich Industry Relations: ["A global tool against deforestation"](#) (2020)

## Grants and Awards

07/2023

### The Culmann Prize (ETH Zürich)

The Culmann Prize, named after the German-Swiss civil engineer Carl Culmann (1821-81), recognizes outstanding doctoral theses and includes a financial award.

06/2023

### CVPR 2023 Outstanding Reviewer

For exceptional efforts in reviewing for the Computer Vision and Pattern Recognition Conference 2023.

03/2019

**The U.V. Helava Award for best paper 2018 in ISPRS Journal of Photogrammetry and Remote Sensing** (with Jan D. Wegner, Konrad Schindler, and Steve Branson, David Hall, Pietro Perona from the Caltech Computational Vision Group)

08/2016

### Degen Stiftung (ETH Zürich) for travel costs

Summer research visit to California Institute of Technology (Caltech), Los Angeles (Ca, USA), in the course of the interdisciplinary project thesis during the 3<sup>rd</sup> Master semester.

03/2015

### Awarded for entering the final round of the Karl-Kraus-Nachwuchsförderpreis

Shortpaper about the Bachelor thesis on the classification of building facades in point clouds

## Programming skills

Python (main), Bash, Matlab  
Pytorch (main), Keras, GDAL

## Cluster skills

IBM LSF (Load Sharing Facility) batch system, Slurm, Amazon Web Services (AWS Batch)

## Software experience

LaTeX, QGIS, GDAL, ArcGis, Photoshop, Illustrator, Metashape, Inpho, Faro-Scene, MS Office

## Languages

German (mother tongue), English

## Interests

I enjoy spending my free time outdoors hiking, snowboarding, kitesurfing, and playing volleyball. I play the drums and like making music with others, also at conferences.

## References

References are available upon request.

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