Nico Lang

Address:	Bjarkesvej 13, 2000 Frederiksberg, Denmark
Date of birth:	24th of January 1992
Email:	nila@di.ku.dk
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Education

09/2018 – 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, Learning from imbalanced data, Fine-grained categorization, Deep learning for environmental monitoring.

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

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)

Tutorials on "Deep Learning for Geospatial Data Analysis"
09/2019 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

Publications

Journals

Lang, N., Jetz, W., Schindler, K., & Wegner, J. D. (2022). A high-resolution canopy height model of the Earth. *Nature Ecology and Evolution*, accepted for publication

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.

Kälin, 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

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. (submitted)

Conferences, Workshops, 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.

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 3rd 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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