

Curriculum Vitae

Heather Reese

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Gothenburg, Sweden
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Summary

Geodata scientist with long expertise in optical satellite data remote sensing for large area mapping of terrestrial cover types. Keeps up with current technology by integrating optical data with new sensor data such as Lidar, UAV acquired optical and thermal data, and hyperspectral data. Early user of Machine Learning algorithms (published 2005). Passion for the environment and alpine areas in particular. Cooperation with different disciplines from ecology to meteorology to archaeology. Sought after co-applicant for interdisciplinary grant applications. An engaged teacher who strives to instill excitement about remote sensing in her students.

1. Birthdate

August 27, 1964

2. Higher education qualifications

Academic degree: Associate Professor (Docent), received October 2016

2011 Ph.D., Forest Management
Swedish University of Agricultural Sciences, Umeå, Sweden

Dissertation title: "Classification of Sweden's Forest and Alpine Vegetation Using Optical Satellite and Inventory Data" Main supervisor: Professor Håkan Olsson

1995 M.Sc., Environmental Monitoring
University of Wisconsin-Madison, Madison, WI, USA

Thesis title: "The Utility of Multi-temporal Digital Landsat Data and Ancillary Data for Land Cover Classification in the Brazilian Amazon"

1986 B.A., Anthropology (archaeology emphasis) & B.A., Psychology
University of Montana, Missoula, MT, USA

3. Present position

April 2018 Senior Lecturer, GIS/Remote Sensing
Department of Earth Sciences
University of Gothenburg, Sweden

Current Administrative tasks

Departmental advisory group (Sept 2018 – present)
Strategic Task Force, (Sept 2018 – present) Chairperson from April 2020
Earth Science Program Committee member (August 2019 – present)

4. Previous positions and periods of appointment

2012-2018 Senior Lecturer

and Head of Section

Division of Forest Remote Sensing

Department of Forest Resource Management

Swedish University of Agricultural Sciences (SLU), Umeå, Sweden

1998-2012 Research Assistant

PhD student (2006-2011)

Project Leader (2002-2003) for SLU CORINE/Swedish Land Cover Data Project

Section of Forest Remote Sensing, Department of Forest Resource Management

Swedish University of Agricultural Sciences (SLU), Umeå, Sweden

1993-1998 Senior Remote Sensing Analyst/Geographic Data Professional

Team Leader (1995-1998), Wisconsin Land Cover Mapping Project

Geographic Information Services Section

Wisconsin Department of Natural Resources, Madison, WI, USA

5. Publications

h-index: 17 with 1520 total citations (source: Google Scholar, Oct 10, 2020)

Peer-reviewed publications

1. Olvmo, M., Holmer, B., Thorsson, S., **Reese, H.**, and Lindberg, F., 2020. Sub-arctic palsa degradation and the role of climatic drivers in the largest coherent palsa mire complex in Sweden (Vissátvuopmi), 1955–2016. *Scientific Reports* 10(1): 1-10.
2. Karlson, M., Ostwald, M., Bayala, J., Bazié, HR., Ouedraogo, AS., Soro, B., Sanou, J., and **Reese, H.**, 2020. The Potential of Sentinel-2 for Crop Production Estimation in a Smallholder Agroforestry Landscape, Burkina Faso. *Frontiers in Environmental Science* 8, 85.
3. Miura, Y., Eriksson, LEB, Ostwald, M., Karlson, M., Bazié, HR., Soja, MJ., Sanou, J., Bayala, J., and Reese, H., 2019. Soil Moisture Monitoring of Agricultural Fields in Burkina Faso Using Dual Polarized Sentinel-1a Data. *IGARSS 2019-2019 IEEE International Geoscience and Remote Sensing Symposium*, pp 7045-7048.
4. Persson, M., Lindberg, E., and **Reese, H.**, 2018. Tree species classification with multi-temporal Sentinel-2 data. *Remote Sensing*, 10 (11), 1794

5. Forsman, M., Börlin, M., Olofsson, K., **Reese, H.**, Holmgren, J. 2018. Bias of cylinder diameter estimation from ground-based laser scanners with different beam widths: A simulation study. *ISPRS Journal of Photogrammetry and Remote Sensing*, Vol 135: 84-92.
6. Husson, E., **Reese, H.**, and Ecke, F. 2017. Combining spectral data and a DSM from UAS-images for improved classification of non-submerged aquatic vegetation. *Remote Sensing*, Vol. 9 (3): Article Nr. 247.
7. Husson, E., Ecke, F., and **Reese, H.** 2016. Comparison of manual mapping and automated object-based image analysis of non-submerged aquatic vegetation from very-high-resolution UAS images. *Remote Sensing*, Vol. 8 (9): Article Nr. 724.
8. Karlson, M., Ostwald, M., **Reese, H.**, Bazie, H. R., and Tankoano, B., 2016. Assessing the potential of multi-seasonal WorldView-2 imagery for mapping West African agroforestry tree species. *International Journal of Applied Earth Observation and Geoinformation*, Vol 50: 80-88.
9. Roberge, C., Wulff, S., **Reese, H.** and Ståhl, G., 2016. Improving sample-based forest damage inventories through two-phase sampling and post-stratification using remotely sensed auxiliary information. *Environmental Monitoring and Assessment*, Vol. 188 (4), Article Nr. UNSP 213.
10. Karlson, M., Ostwald, M., **Reese, H.**, Sanou, J., Tankoano, B., Mattsson, E., 2015. Mapping tree canopy cover and aboveground biomass in Sudano-Sahelian woodlands using Landsat 8 and Random Forest. *Remote Sensing* 7(8):10017-10041.
11. Lindgren, N., Christensen, P., Nilsson, B., Åkerholm, M., Allard, A., **Reese, H.**, and Olsson, H., 2015. Using optical satellite data and airborne LiDAR data for a nationwide sampling survey. *Remote Sensing* 7(4): 4253-4267.
12. **Reese, H.**, Nordkvist, K., Nyström, M., Bohlin, J., and Olsson, H., 2015. Combining point clouds from image matching with SPOT 5 multispectral data for mountain vegetation classification. *International Journal of Remote Sensing*, Vol. 36 (2): 403-416.
13. Karlson, M., **Reese, H.**, and Ostwald, M., 2014. Tree Crown Mapping in Managed Woodlands (Parklands) of Semi-Arid West Africa Using WorldView-2 Imagery and Geographic Object Based Image Analysis. *Sensors*, Vol. 14, 22643-22669.
14. Bargués-Tobella, A., **Reese, H.**, Almaw, A., Malmer, A., Laudon, H., Nyberg, G., Bayala, J., and Ilstedt, U., 2014. The effect of trees on preferential flow and soil infiltrability in an agroforestry parkland in semiarid Burkina Faso. *Water Resources Research*, Vol. 50(4): 3342-3354.
15. **Reese, H.**, Nyström, M., Nordkvist, K., and Olsson, H., 2014. Combining airborne laser scanning data and optical satellite data for classification of alpine vegetation. *International Journal of Applied Earth Observation and Geoinformation*, Vol. 27:81-90.

16. **Reese, H.**, and Olsson, H., 2011. C-correction of optical satellite data over alpine vegetation areas: A comparison of sampling strategies for determining the empirical c-parameter. *Remote Sensing of Environment*, Vol. 115(6):1387-1400.
17. Gilichinsky, M., Sandström, P., **Reese, H.**, Kivinen, S., Moen, J., and Nilsson, M. 2011. Mapping ground lichens using forest inventory and optical satellite data. *International Journal of Remote Sensing*, Vol. 32(2):455-472.
18. **Reese, H.**, Nilsson, M., and Olsson, H., 2009. Comparison of Resourcesat-1 AWiFS and SPOT-5 data over managed boreal forest stands. *International Journal of Remote Sensing*, Vol. 30(19): 4957-4978.
19. Nilsson, M., Holm, S., Wallerman, J., **Reese, H.**, and Olsson, H. 2009. Estimating annual cuttings using multi-temporal satellite data and field data from the Swedish NFI. *International Journal of Remote Sensing*, Vol. 30(19): 5109-5116.
20. Hagner, O., and **Reese, H.**, 2007. A method for calibrated Maximum Likelihood classification of forest types. *Remote Sensing of Environment*, Vol. 110(4):438-444.
21. **Reese, H.**, Nilsson, M., Granqvist Pahlén, T., Hagner, O., Joyce, S., Tingelöf, U., Egberth, M., and Olsson, H., 2003. Countrywide estimates of forest variables using satellite data and field data from the National Forest Inventory. *Ambio*, Vol. 32(8):542-548.
22. **Reese, H.**, Nilsson, M., Sandström, P., and Olsson, H., 2002. Applications using estimates of forest parameters derived from satellite and forest inventory data. *Computers and Electronics in Agriculture*, Vol. 37(1):37-55.
23. **Reese, H.**, Lillesand, T., Nagel, D., Stewart, J., Goldmann, R., Simmons, T., Chipman, J., and Tessar, P., 2002. Statewide landcover derived from multi-seasonal Landsat TM data: a retrospective of the WISCLAND project. *Remote Sensing of Environment*, Vol. 82(2-3):224-237.

Co-authored manuscripts currently under review

24. Axelsson, A., et al., Tree Species Classification Using Sentinel-2 Imagery and Bayesian Inference, submitted to *International Journal of Remote Sensing* (final revision)
25. Wolters, S., et al, Upscaling proximal sensor N-uptake predictions in winter wheat (*Triticum aestivum* L.) with Sentinel-2 satellite data for use in a Decision Support System submitted to *Frontiers in Environmental Science* (final revision).
26. Soja, M., et al., Individual Tree Height Estimation in the Parklands of Burkina Faso with TanDEM-X Spotlight Data (1st revision)
27. Miura, Y., et al., Soil Moisture Monitoring of Agricultural Fields in Burkina Faso Using Dual Polarized Sentinel-1a Data. (1st revision)
28. Minola, L., et al., Wind stilling-reversal across Sweden: The impact of land-use and large-scale atmospheric circulation changes (1st revision).
29. Reese, H. et al., Using HMM for alpine vegetation classification. Submitted to *Remote Sensing*. (1st revision)

Peer-reviewed publications including dissertations, theses, books and book chapters

1. **Reese, H.**, 2011. Classification of Sweden's Forest and Alpine Vegetation Using Optical Satellite and Inventory Data. Acta Universitatis Agriculturae Sueciae, Doctoral Thesis No. 2011:86. Faculty of Forest Sciences, Swedish University of Agricultural Sciences.
2. Hagner, O., Nilsson, M., **Reese, H.**, Egberth, M., and Olsson, H. 2005. Procedure for classification of forests for CORINE land cover in Sweden, *In* New Strategies for European Remote Sensing. Millpress, Rotterdam. 523-530.

6. Grants received (last 5 years)

- 2020-21 234 000 SEK, BECC - "Heat stress in tropical trees and its implications for tree community composition and plantation success." Main applicant: J. Uddling-Fredin. Co-applicant: H.Reese.
- 2020-21 500,000 sek MERGE - "Towards improved understanding of albedo-climate interaction of common land uses across Sweden" Main applicant: A-M. Reurslag Gärdenäs. Co-applicants: H.Reese and D. Chen.
- 2019-22 10,000,000 sek Formas, "Nya ansatser för att möjliggöra tillförlitlig validering av Modellerade eller uppskattade växthusgasflöden" Main applicant, D. Bastviken (Linköping Univ.). Co-applicants: M Gålfalk, M Karlson (Linköping U), J Karlsson, (Umeå U), H.Reese and L. Klemedtsson (GU).
- 2019 100,000 sek. Kungliga Vetenskapliga Akademin. For purchase of UAV Thermal sensor
- 2017-2019 4,200,000 sek from Swedish National Space Board Research Grant ("Rymdstyrlesen") "An integrated approach to explore the unknown role of trees in dryland crop production" Main applicant, M. Ostwald (Chalmers Univ./Linköping Univ.). Co-applicants: H., Reese, SLU, L. Eriksson and M. Soja, Chalmers Univ., M. Karlson, Linköping Univ.
- 2017-2018 200,000 sek from Swedish Environmental Protection Agency. "Is topographic normalization necessary in the creation of the new National Landcover Map?" Main applicant, H. Reese.
- 2016- 2019 3,100,000 SEK from Swedish National Space Board Research Grant Iterative land cover classification using assimilation of multiple Sentinel-2 images with Hidden Markov Models. Main applicant: H. Reese, SLU. Co-applicants: E. Lindberg, H. Olsson, and A. Grafström, SLU
- 2014-2016 6,000,000 SEK from Ljungbergsfond, where 2,000,000 SEK went to my Work Package New teaching material for Departmental compendium Main applicant: A. Alanära, SLU; Applicants for Work Package: H. Reese and H. Olsson, SLU

7. Supervision

PhD student

Co-supervisor

Julia Kukulies, "Dynamics and importance of convection for precipitation in the third Pole region: Satellite and ground-based observation versus model simulations", Univ. of Gothenburg. Began Sept 2018. Main supervisor: Deliang Chen, GU.

Sandra Wolters, "Crop production recommendations for precision agriculture in smart decision support systems", SLU. Began Sept 2018. Main supervisor: Mats Söderström, SLU.

Magnus Persson, "Application of remote sensing to efficiency in silviculture", Linné University. Began Feb 2018.

Arvid Axelsson, "New remote sensing methods for tree species identification", SLU. Began Dec 2017. Main advisor: Eva Lindberg, SLU.

Mona Forsman, "Tree stem estimation using terrestrial and airborne remote sensing methods", SLU. Began 2011 with disputation date October 11, 2018 (delay due to parental leave). Main supervisor Johan Holmgren; Co-supervisors Nicolas Borlin, Umeå University and Kenneth Olofsson, SLU.

Eva Husson, "Unmanned aircraft systems for environmental monitoring and assessment of aquatic vegetation", SLU. 50% part-time student. Disputation date March 2017. Main supervisor Frauke Ecke, SLU; Co-supervisor Richard Johnson, SLU.

Martin Karlsson, "Remote Sensing of Vegetation in the Sudano-Sahelian Zone -New applications for use in agro-forestry parklands", Linköping University. Began 2011 with disputation date October 27, 2015. Main supervisor Madelene Ostwald, Linköping University; Co-supervisor Tina Naasset, Linköping University.

Masters students

Main supervisor

Eimantas Preskienis, "Examining the spatial and temporal aspects of albedo from multi-source remote sensing data", 60 hp. Sept 2019-June 2020. Co-supervisor, Annemarie Reurslag Gärdenäs, GU.

Ntandokazi Masimula, "Cropland and tree cover mapping using Sentinel- 2 data in an agroforestry landscape, Burkina Faso", 60 hp. Sept 2019-June 2020.

Julie Magiera, "The effects of tractor driving on Arctic vegetation at Kapp Linné, Svalbard", 60 hp. Sept 2019-June 2020. Co-supervisor, Veiko Lehsten, Lund University.

Magnus Persson, "Tree species classification with multi-temporal Sentinel-2 data", 30 hp. Sept 2017 - Feb 2018, SLU. Co-supervisor Eva Lindberg, SLU.

Helen Larsson, "Classification of ground lichen using Sentinel-2 and airborne laser data", 30 hp. Sept 2016 - Jan 2017, SLU. Co-supervisor Henrik Hedenäs and Per Sandström, SLU.

Daniel Bertilsson, "Examining the role of Coherence from TanDEM-X data in estimating stem volume", 30hp, SLU. September 2015 - April 2016. Co-supervisor Henrik Persson, SLU.

Björnerik Lilja, "Improving Laser Scanning Operations for SCA", 30 hp. June 2013 - June 2015 (delay due to taking job with SCA), SLU. Co-supervisor Johan Holmgren, SLU.

Jennifer Martin, "Wetland Mapping in Forested Watersheds Using Radarsat-2 and Landsat Data", 30 hp. November 2011 - June 2012, SLU. Co-supervisors Brigitte Leblon and Armand LeRoque, University of New Brunswick, Canada and Kara Webster, Canadian Forest Service, Canada.

Co-supervisor

Emil Larsson, "Lidar data in wildlife ecology - how 3D vegetation structure influence presence of boreal forest bird species ", 30hp. February 2015 - December 2015, SLU. Main supervisor: Johan Svensson, SLU; Co-supervisors: Eva Lindberg and Karin Nordkvist, SLU.

Johanna Blombäck, "Update of forest management plans from Södra using stereo matching of aerial images, the national terrain model and data from the National Forest Inventory", 30hp. April 2014 - March 2015, SLU. Main supervisor Jörgen Wallerman, SLU; Co-supervisor Jonas Bohlin, SLU.

Addisu Semeneh, "Effects of Trees and Termite Nests in Agroforestry Parklands on Preferential Flows Assessed by Image Analysis of Soil Profiles After Rain Simulation and Dye Experiments" 30 hp. November 2011 - June 2012, SLU. Main supervisor Ulrik Ilstedt, SLU; Co-supervisor Aida BARGUES-TOBELLA.

Filip Hajek, "Mapping of Intact Forest Landscapes in Sweden according to Global Forest Watch rules" 30 hp. February 2002 - December 2002, SLU. Main supervisor Håkan Olsson, SLU; Co-supervisor Mats Högström and Per Löfgren, SLU.

8. Teaching

Undergraduate

Course leader, NGN235 (annual course since 2018) "GIS: Introduction to remote sensing", 7.5 hp, University of Gothenburg. Newly developed distance course

Course leader, NGN240 (annual course since 2019) "Remote sensing and GIS", 7.5 hp , University of Gothenburg

Course leader, GVN400 (annual course since 2020) "Methods for Earth Science", 15 hp, University of Gothenburg.

GIS and project assistance, NG0210 (Fall term 2018) "Subarktisk fältkurs", 7.5 hp, University of Gothenburg.

Course leader, (2012-2017), "Remote Sensing and Forest Inventory", 15 hp, SLU

Course leader, (2013 and 2017), "Laser Scanning and Digital Photogrammetry", Internet-based distance course, 7.5 hp, SLU.

Lecturer, (2015-2017) "Geographic Information Technology (GIT I)", 7.5 hp, SLU.

Graduate

Guest lecturer (Oct 2018), Climbeco course "Applied Land Remote Sensing", 3 ECTS. Lund and Univ of Gothenburg.

Guest lecturer (May 2017), Introduction to hyperspectral imaging with focus on near-infrared spectroscopy, 3 hp, SLU.

Internal

Drone flying and regulation education for co-workers

External

Jordbruksverket, (Nov 2018), satellite data training day

Fönster mot Naturen (Oct 2018 - present), annual lecture to high school students

9. PhD grading committees

June 2020 - Altaaf Mechiche-Alami, Lund University, "Food security in a changing climate: The role of cropland intensification and land acquisitions across Africa"

Dec 2019, Dorothy Furberg, Kungliga Tekniska Högskolan (KTH), "Satellite Monitoring of Urbanization and Indicator-based Assessment of Environmental Impact".

Jan 2019 Zhanzhang Cai, Lund Univ., "Vegetation Observation in the Big Data Era: Sentinel-2 data for mapping the seasonality of land vegetation"

June 2018 (reserve) - Yumei Hu, GU, "Road climate studies with emphasis on road surface temperature variations and hoar frost risk"

June 2018 (reserve) - Filip Schleusner, GU, "Nitrous Oxide production in agricultural soil"

May 2018 - Wilhelm Dubber, Lund University, "Natural and social dimensions of forest carbon accounting"

May 2017 - Thomas Möckel, Lund University, "Hyperspectral and multispectral remote sensing for mapping grassland vegetation"

10. Professional membership

- ISPRS

11. External cooperation

- Swedish Environmental Protection Agency, Working group member for national

landcover map (NMD). 2017-present
- Swedish AI Hackathon judge

12. Board and Reference group membership

- Global Earth Observation (GEO) Validation Task Group, Member (2014-present)
- European Spatial Data Research (EuroSDR) organization, Delegate as Swedish University representative (2013- present)
- GIS Väst, Board member (2018-present)
- SITES Skogaryd, Board member (2018-present)
- Reference group, New National Landcover Map. (2017- present)

13. Assignments

- NASA Land cover/Land use in Mountain Environments, grant review panel (Jan. 2014)
- Over 60 peer reviews completed since 2002 for 12 international journals, including Remote Sensing of Environment, International Journal of Remote Sensing, Remote Sensing, IEEE Geoscience and Remote Sensing, International Journal of Applied Earth Observation and Geoinformation, Photogrammetric Engineering and Remote Sensing, Ambio, Southern Journal of Forestry, and Remote Sensing Letters.

14. Other relevant information

Languages - English (native); Swedish (fluent); French (reading); Spanish (reading); German (reading)
Citizenship - United States of America; Sweden