

# Maximilian H.K. Hesselbarth (he/him)

## Research Scholar

Biodiversity, Ecology, and Conservation Group

International Institute for Applied Systems Analysis (IIASA)

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## Professional Appointments

International Institute for Applied Systems Analysis (IIASA)

Laxenburg, Austria

Research Scholar; Biodiversity, Ecology, and Conservation Group

2023/02/15 - ongoing

University of Michigan

Ann Arbor, USA

Postdoctoral Fellow; Coastal Ecology and Conservation Lab

2020/08/01 - 2022/12/31

## Education

University of Goettingen

Goettingen, Germany

Dr. rer. nat; Department of Ecosystem Modelling

2016/10/01 - 2020/04/06

University of Goettingen

Goettingen, Germany

Master of Sciences; Ecosystem Analysis and Modelling

2014/10/01 - 2016/11/15

University of Applied Sciences and Arts

Goettingen, Germany

Bachelor of Sciences; Forestry

2011/10/01 - 2014/07/07

## Internships / Research visits

Iowa State University

Ames, USA

Department of Ecology, Evolution and Organismal Biology

2017/10/18 - 2017/12/21

University of KwaZulu-Natal

Pietermaritzburg, South Africa

School of Life Sciences

2016/03/07 - 2016/08/01

North-West University

Potchefstroom, South Africa

Land Degradation and Restoration Ecology

2016/03/07 - 2016/08/01

Northwest German Forestry Research Institute

Goettingen, Germany

Department of Growth Modeling

2015/09/01 - 2015/10/01

SilvaTerra Ltd.

Lilongwe, Malawi

Forest Consulting and Research

2013/11/04 - 2014/03/30

Wise Batten Inc.

Estill, USA

Forestry Services and Wildlife Management

2011/06/02 - 2011/08/01

State Forestry Department Heuberg

Messtetten, Germany

Forest Managment

2010/08/02 - 2010/08/27

State Forestry Department Heuberg

Messtetten, Germany

Forest Managment

2009/08/31 - 2009/09/11

## Conferences / Workshops (attended)

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52nd Annual Meeting of the Ecological Society of Germany, Austria and Switzerland	Leipzig, Germany 2023/09/12 - 2023/09/16
World Congress International Association of Landscape Ecology	Milano, Italy 2019/07/01 - 2019/07/05
48th Annual Meeting of the Ecological Society of Germany, Austria and Switzerland	Vienna, Austria 2018/09/10 - 2018/09/14
Spatial Modelling <i>inlabru</i>	St. Andrews, UK 2018/03/26 - 2018/03/30
Deep Learning with <i>Keras</i> and <i>TensorFlow</i>	Solingen, Germany 2018/01/18 - 2018/01/19
Young Modellers in Ecology	Freiburg, Germany 2017/04/29 - 2017/05/05
Advances in Spatial Analysis of Multivariate Ecological Data	Port Talbot, UK 2017/04/02 - 2017/04/07
Fire Protection and Management	Prodromos, Cyprus 2013/09/07 - 2013/09/22

## Publications

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Copies of all publications and talks can be found on my homepage. † Authors contributed equally

### Articles

- Hesselbarth, M.H.K. †, Allgeier, J.E. † (In press). *High fish biomass and low nutrient enrichment synergistically enhance stability in a seagrass meta-ecosystem*. Conservation Letters.
- Munsterman, K.S., Hesselbarth, M.H.K., Allgeier, J.E. (In press). *Smaller and bolder fish enhance ecosystem-scale primary production around artificial reefs in seagrass beds*. Ecological Applications.
- Nowosad, J., Hesselbarth, M.H.K. (2024). *The landscapemetrics and motif packages for measuring landscape patterns and processes*. arxiv, stat.ME. <https://doi.org/10.48550/arxiv.2405.06559>
- Hesselbarth, M.H.K., Wiegand, K. (2024). *A simulation study comparing common methods for analyzing species-habitat associations of plants*. Journal of Vegetation Science 35, e13243. <https://doi.org/10.1111/jvs.13243>
- Shayka, B.F., Hesselbarth, M.H.K., Schill, S.R., Currie, W.S., Allgeier, J.E. (2023). *The natural capital of seagrass beds in the Caribbean: evaluating their ecosystem services and blue carbon trade potential*. Biology Letters 19:20230075. <https://doi.org/10.1098/rsbl.2023.0075>
- Rubio-Camacho, E.A., Hesselbarth, M.H.K., Flores-Garnica, J.-G., Acosta-Mireles, M. (2023). *Tree mortality in mature temperate forests of central Mexico: A spatial approach*. European Journal of Forest Research 142, 565–577. <https://doi.org/10.1007/s10342-023-01542-3>
- Simpkins, C.E., Hanss, S., Spangenberg, M.C., Salecker, J., Hesselbarth, M.H.K., Wiegand, K. (2022). *spectre: An R package to estimate spatially-explicit community composition using sparse data*. Ecography 2022 (12), e06272 <https://doi.org/10.1111/ecog.06272>

- Esquivel, K.E. †, Hesselbarth, M.H.K. †, Allgeier, J.E. (2022). *Mechanistic support for increased primary production around artificial reefs*. *Ecological Applications* 32 (6), e2617. <https://doi.org/10.1002/eap.2617>
- Hesselbarth, M.H.K. (2021). *shar: An R package to analyze species-habitat associations using point pattern analysis*. *Journal of Open Source Software* 6 (68), 3811. <https://doi.org/10.21105/joss.03811>
- Hesselbarth, M.H.K., Nowosad, J., Signer, J., Graham, L.J. (2021). *Open-source tools in R for landscape ecology*. *Current Landscape Ecology Reports* 6 (3), 97-111. <https://doi.org/10.1007/s40823-021-00067-y>
- Borthwick, R. †, de Flamingh, A. †, Hesselbarth, M.H.K. †, Parandhaman, A. †, Wagner, H.H., Abdel Moniem, H.E.M. (2020). *Alternative Quantifications of Landscape Complementarity to Model Gene Flow in Banded Longhorn Beetles [Typocerus v. velutinus (Olivier)]*. *Frontiers in Genetics* 11, 307. <https://doi.org/10.3389/fgene.2020.00307>
- Hesselbarth, M.H.K. (2020). *Analysing and modelling spatial patterns to infer the influence of environmental heterogeneity using point pattern analysis, individual-based simulation modelling and landscape metrics* (Dissertation). University of Goettingen, Goettingen, Germany. <http://dx.doi.org/10.53846/goediss-7959>
- Hesselbarth, M.H.K., Sciaini, M., With, K.A., Wiegand, K., Nowosad, J. (2019). *landscapemetrics: An open-source R tool to calculate landscape metrics*. *Ecography* 42 (10), 1648-1657. <https://doi.org/10.1111/ecog.04617>
- Hesselbarth, M.H.K., Wiegand, K., Dreber, N., Kellner, K., Esser, D., Tsvuura, Z. (2018). *Density-dependent spatial patterning of woody plants differs between a semi-arid and a mesic savanna in South Africa*. *Journal of Arid Environments* 157, 103-112. <https://doi.org/10.1016/j.jaridenv.2018.06.002>

## Presentations

- Hesselbarth, M.H.K., Jung, M., Visconti, P. (2024). *Forest biodiversity under changing climate and forest structure*. 2nd ForestNavigator Stakeholder Workshop. Brussels (Belgium).
- Hesselbarth, M.H.K., Jung, M., Visconti, P. (2023). *Evaluating the impact of European forest management on forest-related species using iSDMs*. 52nd Annual Meeting of the Ecological Society of Germany, Austria and Switzerland. Leipzig (Germany).
- Hesselbarth, M.H.K., Jung, M., Visconti, P. (2023). *Biodiversity indicators and species distribution modeling*. 1st ForestNavigator Stakeholder Workshop. Laxenburg (Austria).
- Hesselbarth, M.H.K., Munsterman, K.S. (2022). *Advanced R Workshop*. Ecology and Evolutionary Biology Department, University of Michigan. Ann Arbor (USA). Workshop.
- Hesselbarth, M.H.K. (2022). *Artificial reefs to promote primary production in tropical seagrass ecosystems: A simulation study using individual-based modelling*. Ecology and Evolutionary Biology Department Seminar, University of Michigan. Ann Arbor (USA). Talk.
- Hesselbarth, M.H.K. (2022). *Introduction to R Workshop*. Ecology and Evolutionary Biology Department, University of Michigan. Ann Arbor (USA). Workshop.
- Hesselbarth, M.H.K. (2021). *Spatial patterns in ecology and what we (hopefully) can learn from them*. Ecology and Evolutionary Biology Department Seminar, University of Michigan. Ann Arbor (USA). Talk.
- Nowosad, J., Hesselbarth, M.H.K. (2020). *Introduction to landscape ecology with R*. Annual Meeting International Association of Landscape Ecology North America. Toronto (Canada). Workshop.
- Hesselbarth, M.H.K., Sciaini, M., Nowosad, J., Hanss, S. (2019). *landscapemetrics: Introducing a new R tool to characterize landscapes*. 10th World Congress International Association of Landscape Ecology. Milano (Italy). Conference poster.
- Hesselbarth, M.H.K., Wiegand K. (2018). *A simulation study comparing methods to analyze species-habitat associations of forest trees*. 48th Annual Meeting of the Ecological Society of Germany, Austria and Switzerland. Vienna (Austria). Conference poster.

## Software

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**arrR** Simulating artificial reefs in R

<https://allgeier-lab.github.io/arrR/>

**landscapemetrics** Landscape Metrics for Categorical Map Patterns.

[https://r-](https://r-spatialecology.github.io/landscapemetrics/)

[spatialecology.github.io/landscapemetrics/](https://r-spatialecology.github.io/landscapemetrics/)

**shar** Species-Habitat Associations.

<https://r-sptialecology.github.io/shar/>

**onpoint** Helper Functions related to Point Pattern Analysis.

<https://r-spatialecology.github.io/onpoint/>

## Peer reviewer for scientific journals

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Ecological Indicators; Global Ecology and Biogeography; Journal of Animal Ecology; Journal of Open Source Software; Journal of Tropical Ecology; Journal of Vegetation Science; Landscape Ecology; Methods in Ecology and Evolution; PeerJ; Perspective in Plant Ecology, Evolution and Systematics; Plant and Soil; Plant Ecology; PLOS One; Restoration Ecology; Scientific Reports; Synthesis Centre for Biodiversity Sciences; Web Ecology

## Skills

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Languages: German (native), English (fluent)

R: ●●●●●

C++: ●●●○○

NetLogo: ●●○○○

HTML, CSS: ●○○○○

SQL/SQLite: ●○○○○

LaTeX: ●●●○○

git: ●●●○○

QGIS: ●●○○○