



# Dr. Guido Kraemer

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## Personal Information

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Email [guido.kraemer@uni-leipzig.de](mailto:guido.kraemer@uni-leipzig.de)  
Date of birth 14/03/1985

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## Professional Experience

2019–present **Scientist**, *W1, Institute for Geology and Geophysics, Remote Sensing Centre for Earth System Research, Leipzig University*

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## Education

2021–2023 **Zertifikat Lehre, Module 1-3**, *Hochschuldidaktisches Zentrum Sachsen*, 240 Credits  
2015–2019 **PhD**, *Universitat de València/Max Planck Institute for Biogeochemistry*, Grade: outstanding  
Remote Sensing  
2013–2015 **M.Sc.**, *Friedrich-Schiller-Universität, Jena*, Grade: 1.6  
Ecology, Evolution, and Systematics  
2008–2012 **B.Sc./Ing.**, *Universidad Nacional de la Amazonía Peruana, Iquitos*, Grade: 14.88/20  
Tropical Rainforest Ecology  
2005–2008 **Undergrad studies**, *Ludwig-Maximilians-Universität, München*  
Mathematics

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## Awards

2019 Human Development Challenge Special mention “for highly-complex visualization of 621 variables from the World Development Indicators (WDI) database”  
[https://www.bgc-jena.mpg.de/~gkraemer/hdi\\_vis](https://www.bgc-jena.mpg.de/~gkraemer/hdi_vis)

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## Language

German Native  
English C2  
Spanish C2

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## Computer Skills

OS	Linux, Windows, TrueNAS	Office	LaTeX, MS Office, Libre Office
Programming	High Performance R, Julia, Python, C, Typescript	Computing	HPC Cluster, Blockchain, Docker

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## Teaching Experience

Summer term 2023	<b>12-GEO-M-DS02: Spatio-temporal Data</b> , <i>RSC4Earth</i> , Universität Leipzig
Summer term 2023	<b>12-GGR-M-GFP2: Geoinformationssysteme - Modelle und Analysen</b> , <i>Institut für Geographie</i> , Universität Leipzig
Winter term 2022/23	<b>12-GEO-M-SK01: Research Data Management</b> , <i>RSC4Earth</i> , Universität Leipzig
Summer term 2022	<b>12-GGR-M-GFP2: Geoinformationssysteme - Modelle und Analysen</b> , <i>Institut für Geographie</i> , Universität Leipzig
Summer term 2022	<b>12-GGR-M-GFA1: Geodatenanalyse in der Wirtschafts- und Sozialgeographie</b> , <i>Institut für Geographie</i> , Universität Leipzig
Winter term 2021/22	<b>12-GGR-M-AG12: Seminar Multivariate Statistik</b> , <i>Institut für Geographie</i> , Universität Leipzig
Winter term 2021/22	<b>12-GGR-B-02: Einführung in die Programmierung mit R</b> , <i>Institut für Geographie</i> , Universität Leipzig
Summer term 2021	<b>12-GGR-M-GFP2: Geoinformationssysteme - Modelle und Analysen</b> , <i>Institut für Geographie</i> , Universität Leipzig
Summer term 2021	<b>12-GGR-M-GFA1: Geodatenanalyse in der Wirtschafts- und Sozialgeographie</b> , <i>Institut für Geographie</i> , Universität Leipzig
Winter term 2020/2021	<b>12-GGR-M-AG12: Seminar Multivariate Statistik</b> , <i>Institut für Geographie</i> , Universität Leipzig
Winter term 2020/2021	<b>12-GGR-B-02: Einführung in die Programmierung mit R</b> , <i>Institut für Geographie</i> , Universität Leipzig
Summer term 2020	<b>12-GGR-M-GFA1: Geodatenanalyse in der Wirtschafts- und Sozialgeographie</b> , <i>Institut für Geographie</i> , Universität Leipzig
Mar 2020	<b>NERC Big Data Course</b> , <i>Department for Continuing Education</i> , Oxford <a href="https://web.archive.org/web/20210303213526/https://www.conted.ox.ac.uk/events/view/big-data-in-environmental-biology">https://web.archive.org/web/20210303213526/https://www.conted.ox.ac.uk/events/view/big-data-in-environmental-biology</a>
Feb 2018	<b>NERC Big Data Course</b> , <i>Department for Continuing Education</i> , Oxford <a href="https://web.archive.org/web/20171215114313/https://www.conted.ox.ac.uk/events/view/big-data-in-environmental-biology">https://web.archive.org/web/20171215114313/https://www.conted.ox.ac.uk/events/view/big-data-in-environmental-biology</a>
January 2018	<b>Advances Statistics &amp; Data Analysis</b> , <i>Max Planck Institute for Biogeochemistry</i> , Jena
August 2017	<b>Exploring the Earth system with data and models</b> , <i>Summer Akademie NAKa</i> , Papenburg <a href="https://jgw-ev.de/nachhaltigkeitsakademie/naka-2017/kurs-1-daten-modelle/">https://jgw-ev.de/nachhaltigkeitsakademie/naka-2017/kurs-1-daten-modelle/</a>
May 2017	<b>R Course: The Basics</b> , <i>Max Planck Institute for Biogeochemistry</i> , Jena
April 2016	<b>R Course: The Basics</b> , <i>Max Planck Institute for Biogeochemistry</i> , Jena

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## Third-Party Funding

DeepESDL	European Space Agency, day-to-day supervision
COCAP	HGF, day-to-day supervision
Social Data Cube	NDFI4Earth Pilot

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## Software

dimRed	Dimensionality Reduction in R, <a href="https://github.com/gdkrmr/dimRed">https://github.com/gdkrmr/dimRed</a>
coRanking	The CoRanking matrix in R, <a href="https://github.com/gdkrmr/coRanking">https://github.com/gdkrmr/coRanking</a>
DRR	Dimensionality Reduction via Regression in R, <a href="https://github.com/gdkrmr/DRR">https://github.com/gdkrmr/DRR</a>
WeightedOnlineStats.jl	Statistics for big data with $\mathcal{O}(1)$ memory in pure Julia, <a href="https://github.com/gdkrmr/WeightedOnlineStats.jl">https://github.com/gdkrmr/WeightedOnlineStats.jl</a>

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[guido-kraemer.com](https://www.guido-kraemer.com)

BTCParser.jl	Parsing the Bitcoin blockchain in pure Julia, <a href="https://github.com/gdkrmr/BTCParser.jl">https://github.com/gdkrmr/BTCParser.jl</a>
LevelDB.jl	LevelDB wrapper for Julia, <a href="https://github.com/gdkrmr/LevelDB.jl">https://github.com/gdkrmr/LevelDB.jl</a>
Ripemd.jl	Ripemd hashing in pure Julia, <a href="https://github.com/gdkrmr/Ripemd.jl">https://github.com/gdkrmr/Ripemd.jl</a>
Base58.jl	Base58 encoding in pure Julia, <a href="https://github.com/gdkrmr/Base58.jl">https://github.com/gdkrmr/Base58.jl</a>

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## References

Prof. Dr. Miguel Mahecha	Professor and head of the Earth System Data Science group <i>RSC4Earth</i> at Leipzig University. <a href="mailto:miguel.mahecha@uni-leipzig.de">miguel.mahecha@uni-leipzig.de</a>
Prof. Dr. Markus Reichstein	Director of the department for <i>Biogeochemical Integration</i> of the Max Planck Institute for Biogeochemistry, Jena. <a href="mailto:mreichstein@bgc-jena.mpg.de">mreichstein@bgc-jena.mpg.de</a>
Prof. Dr. Gustau Camps-Valls	Professor at <i>Image Processing Lab</i> , Universitat de València. <a href="mailto:gustau.camps@uv.es">gustau.camps@uv.es</a>

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## Publications

- [1] Joswig, J. S., Kattge, J., **Kraemer, G.**, Mahecha, M. D., Rüger, N., Schaepman, M. E., Schrodt, F., Schuman, M. C., “Imputing Missing Data in Plant Traits: A Guide to Improve Gap-Filling”. In: *Global Ecology and Biogeography* (May 2023). ISSN: 1466-8238. DOI: 10.1111/geb.13695. (Visited on 06/09/2023).
- [2] Pacheco-Labrador, J., Migliavacca, M., Ma, X., Mahecha, M., Carvalhais, N., Weber, U., Benavides, R., Bouriaud, O., Barnoaiea, I., Coomes, D. A., Bohn, F. J., **Kraemer, G.**, Heiden, U., Huth, A., Wirth, C., “Challenging the Link between Functional and Spectral Diversity with Radiative Transfer Modeling and Data”. In: *Remote Sensing of Environment* 280 (Oct. 2022), p. 113170. ISSN: 0034-4257. DOI: 10.1016/j.rse.2022.113170.
- [3] Pacheco-Labrador, J., Weber, U., Ma, X., Mahecha, M. D., Carvalhais, N., Wirth, C., Huth, A., Bohn, F. J., **Kraemer, G.**, Heiden, U., FunDivEUROPE members, Migliavacca, M., “Evaluating the potential of DESIS to infer plant taxonomical and functional diversities in European forests”. In: *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*. Vol. XLVI-1-W1-2021. Copernicus GmbH, Feb. 2022, pp. 49–55. DOI: 10.5194/isprs-archives-XLVI-1-W1-2021-49-2022.
- [4] Migliavacca, M., Musavi, T., Mahecha, M. D., Nelson, J. A., Knauer, J., Baldocchi, D. D., Perez-Priego, O., Christiansen, R., Peters, J., Anderson, K., Bahn, M., Black, T. A., Blanken, P. D., Bonal, D., Buchmann, N., Caldararu, S., Carrara, A., Carvalhais, N., Cescatti, A., Chen, J., Cleverly, J., Cremonese, E., Desai, A. R., El-Madany, T. S., Farella, M. M., Fernández-Martínez, M., Filippa, G., Forkel, M., Galvagno, M., Gomasasca, U., Gough, C. M., Göckede, M., Ibrom, A., Ikawa, H., Janssens, I. A., Jung, M., Kattge, J., Keenan, T. F., Knohl, A., Kobayashi, H., **Kraemer, G.**, Law, B. E., Liddell, M. J., Ma, X., Mammarella, I., Martini, D., Macfarlane, C., Matteucci, G., Montagnani, L., Pabon-Moreno, D. E., Panigada, C., Papale, D., Pendall, E., Penuelas, J., Phillips, R. P., Reich, P. B., Rossini, M., Rotenberg, E., Scott, R. L., Stahl, C., Weber, U., Wohlfahrt, G., Wolf, S., Wright, I. J., Yakir, D., Zaehle, S., Reichstein, M., “The Three Major Axes of Terrestrial Ecosystem Function”. In: *Nature* (Sept. 2021), pp. 1–5. ISSN: 1476-4687. DOI: 10.1038/s41586-021-03939-9.
- [5] Mahecha, M. D., Rzanny, M., **Kraemer, G.**, Mäder, P., Seeland, M., Wäldchen, J., “Crowd-Sourced Plant Occurrence Data Provide a Reliable Description of Macroecological Gradients”. In: *Ecography* 44 (2021). ISSN: 1600-0587. DOI: 10.1111/ecog.05492.
- [6] Krich, C., Migliavacca, M., Miralles, D. G., **Kraemer, G.**, El-Madany, T. S., Reichstein, M., Runge, J., Mahecha, M. D., “Functional Convergence of Biosphere–Atmosphere Interactions in Response to Meteorological Conditions”. In: *Biogeosciences* 18.7 (2021), pp. 2379–2404. ISSN: 1726-4170. DOI: 10.5194/bg-18-2379-2021.
- [7] **Kraemer, G.** “Low-Dimensional Representations of Earth System Processes”. Doctorado En Teledetección. Valencia: Universitat de València, 2020.
- [8] **Kraemer, G.**, Reichstein, M., Camps-Valls, G., Smits, J., Mahecha, M. D., “The Low Dimensionality of Development”. In: *Social Indicators Research* (2020). ISSN: 1573-0921. DOI: 10.1007/s11205-020-02349-0.

- [9] **Kraemer, G.**, Camps-Valls, G., Reichstein, M., Mahecha, M. D., “Summarizing the State of the Terrestrial Biosphere in Few Dimensions”. In: *Biogeosciences* 17.9 (2020), pp. 2397–2424. ISSN: 1726-4170. DOI: 10.5194/bg-17-2397-2020.
- [10] Mahecha, M. D., Guha-Sapir, D., Smits, J., Gans, F., **Kraemer, G.**, “Chapter 13 - Data Challenges Limit Our Global Understanding of Humanitarian Disasters Triggered by Climate Extremes”. In: *Climate Extremes and Their Implications for Impact and Risk Assessment*. Ed. by Jana Sillmann, Sebastian Sippel, and Simone Russo. Elsevier, 2020, pp. 243–256. ISBN: 978-0-12-814895-2. DOI: 10.1016/B978-0-12-814895-2.00013-6.
- [11] Mahecha, M. D., Gans, F., Brandt, G., Christiansen, R., Cornell, S. E., Fomferra, N., **Kraemer, G.**, Peters, J., Bodesheim, P., Camps-Valls, G., Donges, J. F., Dorigo, W., Estupinan-Suarez, L. M., Gutierrez-Velez, V. H., Gutwin, M., Jung, M., Londoño, M. C., Miralles, D. G., Papastefanou, P., Reichstein, M., “Earth System Data Cubes Unravel Global Multivariate Dynamics”. In: *Earth System Dynamics* 11.1 (2020), pp. 201–234. ISSN: 2190-4979. DOI: 10.5194/esd-11-201-2020.
- [12] **Kraemer, G.**, Reichstein, M., Mahecha, M. D., “dimRed and coRanking – Unifying Dimensionality Reduction in R”. In: *The R Journal* 10.1 (2018), pp. 342–358. DOI: 10.32614/RJ-2018-039.
- [13] Sierra, C. A., Mahecha, M., Poveda, G., Álvarez-Dávila, E., Gutierrez-Velez, V. H., Reu, B., Feilhauer, H., Anaya, J., Armenteras, D., Benavides, A. M., Buendia, C., Duque, Á., Estupiñan-Suarez, L. M., González, C., Gonzalez-Caro, S., Jimenez, R., **Kraemer, G.**, Londoño, M. C., Orrego, S. A., Posada, J. M., Ruiz-Carrascal, D., Skowronek, S., “Monitoring Ecological Change during Rapid Socio-Economic and Political Transitions: Colombian Ecosystems in the Post-Conflict Era”. In: *Environmental Science & Policy* 76 (2017), pp. 40–49. DOI: 10.1016/j.envsci.2017.06.011.
- [14] **Kraemer, G.** “Drivers of Diversity and Functional Characteristics in Broadleaf Forests – the Example of Thuringia”. Master of Science in Evolution, Ecology and Systematics. Jena: Universität Jena, 2015.
- [15] **Kraemer, G.** “Aplicación de una metodología basada en el análisis compuesto para predecir niveles de crecientes y estiajes en la cuenca del río Mazán, Loreto - Perú.” Ing. en Ecología de Bosques Tropicales. Iquitos: Universidad Nacional de la Amazonía Peruana, 2013. URL: <https://repositorio.unapiquitos.edu.pe/handle/20.500.12737/2496>.
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- [17] Angert, J., Negrón Juárez, R., Alegria Muñoz, W., **Kraemer, G.**, Ramirez Santillan, J., Chambers, J. Q., Trumbore, S. E., “The Contribution of Respiration in Tree Stems to the Dole Effect”. In: *Biogeosciences* 9.10 (2012), pp. 4037–4044. DOI: 10.5194/bg-9-4037-2012.
- [18] Angert, A., Muhr, J., Negrón Juárez, R., Alegria Muñoz, W., **Kraemer, G.**, Ramirez Santillan, J., Barkan, E., Mazeh, S., Chambers, J. Q., Trumbore, S. E., “Internal Respiration of Amazon Tree Stems Greatly Exceeds External CO<sub>2</sub> Efflux”. In: *Biogeosciences* 9.12 (2012), pp. 4979–4991. DOI: 10.5194/bg-9-4979-2012.