







Simon Besnard

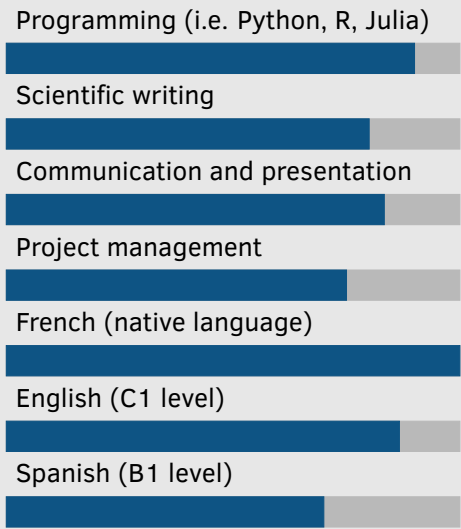
Remote Sensing Scientist and Data Modeller

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About me

Simon is currently a Lead Data Scientist at South Pole and a former researcher at the Max Planck Institute for Biogeochemistry, Germany, and the Laboratory of Geo-information Science and Remote Sensing, Wageningen University, The Netherlands. His current work mainly focuses on the design and development of digital technologies for monitoring South Pole nature-based solution projects, and the integration of partner's models and algorithms into South Pole's digital technologies.

Skills



(*)[The skill scale is from 0 (Fundamental Awareness) to 6 (Expert).]

Interests

Motivated and passionate about integrating environmental science, data science, and Machine Learning/Deep Learning technologies. Strong interests in tackling environmental issues through the development of data-oriented solutions.

Education

- Sept. 2019 Ph.D. Max Planck Institute for Biogeochemistry, Germany and Laboratory of Geo-information Science and Remote Sensing, Wageningen University, The Netherlands
Controls of forest age and ecological memory effects on biosphere-atmosphere CO₂ exchange
- March 2015 MSc. Wageningen University, The Netherlands
Majoring in Remote Sensing and Geo-Information Science
- Nov. 2010 MSc. Montpellier SupAgro/Institut des Regions Chaudes (IRC), France
Majoring in International Land Management
- June 2008 BSc. University of Rennes 1, France
Majoring in Environmental Sciences

Experience

- present Lead Data Scientist, Nature-based Solutions South Pole, The Netherlands
Development and integration of data-driven models into digital Monitoring, Reporting and Verification systems for Nature-based Solution projects
- 2019 Post-doctoral researcher Max Planck Institute for Biogeochemistry, Germany
Integration of long-term above-ground biomass time-series into carbon cycle modeling framework
- 2014 Visiting researcher Wageningen University, The Netherlands
Participation in the Global Comparative Study on REDD+, CIFOR (MSc. Thesis)
- 2013 Consultant GIZ GmbH, Germany
Development of recommendations on how to streamline GIZ REDD+ MRV activities to comply with the developing UNFCCC modalities on MRV
- 2013 Consultant Ecosystem Marketplace, United States
Participation in the annual State of the Voluntary Carbon Markets and State of the Forest Markets reports
- 2012 Research intern Environmental Defense Fund, United States
Research on the State of Soil Carbon Sequestration Offset Policy Design
- 2011 Project Manager Global Green Carbon, Nicaragua
Implementation of a reforestation/afforestation carbon offset project with forestry and agroforestry systems
- 2010 Visiting Researcher Institute of Research for Development, South Africa
Research on the relationship between farming practices and land degradation in a communal watershed (MSc. Thesis)
- 2009 Intern CERAI, Tunisia
Research on the introduction of new farming practices and on the implementation of new economic activities in agro-forestry irrigated systems
- 2008 Research Assistant INRA, France
Research on the spatiotemporal evolution of the soil hydrodynamics properties with conventional and conservation tillage practices (BSc. Thesis)

Recent peer-reviewed articles, book chapters and datasets

- 2021 Walther, S., Besnard, S., et al. Technical note: A view from space on global flux towers by MODIS and Landsat: The FluxnetEO dataset. *Biogeosciences*, <https://doi.org/10.5194/bg-2021-314>
- 2021 Besnard, S., et al. Global sensitivities of forest carbon changes to environmental conditions. *Global Change Biology*, <https://doi.org/10.1111/gcb.15877>
- 2021 Besnard, S., et al. Mapping global forest age from forest inventories, biomass and climate data, ESSD, <https://doi.org/10.5194/essd-2021-77>
- 2021 Besnard, S., et al. The MPI-BGC global forest age datasets, MPI-BGC, <https://doi.org/10.17871/ForestAgeBGI.2021>.
- 2021 Kraft, B., Besnard, S., and Koirala, S. Emulating Ecological Memory with Recurrent Neural Networks. *Deep Learning for the Earth Sciences: A Comprehensive Approach to Remote Sensing, Climate Science, and Geosciences*: 269-281, Wiley & Sons, inc, <https://doi.org/10.1002/9781119646181.ch18>
- 2021 Bao, S., et al. Environment-sensitivity functions for gross primary productivity in light use efficiency models. *Agricultural and Forest Meteorology*, <https://doi.org/10.1016/j.agrformet.2021.108708>
- 2020 Nelson, J. et al. Ecosystem transpiration and evaporation: insights from three water flux partitioning methods across FLUXNET sites. *Global Change Biology*, <https://doi.org/10.1111/gcb.15314>
- 2019 Jung, M., et al. Scaling carbon fluxes from eddy covariance sites to globe: Synthesis and evaluation of the FLUXCOM approach. *Biogeosciences*, <https://doi.org/10.5194/bg-2019-368>
- 2019 Besnard, S., et al. Memory effects of climate and vegetation affecting net ecosystem CO₂ fluxes in global forests. *PLoS ONE* 14(2), <https://doi.org/10.1371/journal.pone.0211510>
- 2018 Besnard, S., et al. Quantifying the effect of forest age in annual net forest carbon balance. *Environmental Research Letters*, 13(12), 124018, <https://doi.org/10.1088/1748-9326/aaeab>
- 2018 Reichstein, M., Besnard, S., et al. Modelling Landsurface Time-Series with Recurrent Neural Nets. In *IGARSS 2018-2018 IEEE International Geoscience and Remote Sensing Symposium*, <https://doi.org/https://doi.org/10.1109/IGARSS.2018.8518007>

Conference contributions

- 2020 Besnard, S., Santoro, M., Cartus, O., Fan, N., Koirala, S., Linscheid, N., Weber, U., Carvalhais, N. (2020). Global controls of environmental and land surface conditions on forest carbon stock dynamics, AGU Fall Meeting
- 2020 Besnard, S., Carvalhais, N., Clevers, J. G., Gans, F., Herold, M., Jung, M., Weber, U. and Reichstein, M. (2020). Constraining carbon allocation in a terrestrial ecosystem model using forest biomass data, EGU General Assembly
- 2019 Besnard, S., Carvalhais, N., Clevers, J. G., Gans, F., Herold, M., Jung, M., Weber, U. and Reichstein, M. (2019). Dynamic lag effects of climate and vegetation on biosphere-atmosphere CO₂ exchange: a global analysis, AGU Fall Meeting
- 2019 Ciais, P., Besnard, S., Yao, Y., Yue, C., Carvalhais, N., Poulter, B., Pugh, T., Chave, J., Rozendaal, D., Stoy, P.C., Piao, S. and Reichstein, M. (2019). The global carbon balance of forests based on flux towers and forest age data, AGU Fall Meeting
- 2019 Besnard, S., Carvalhais, N., Clevers, J. G., Gans, F., Herold, M., Jung, M., Weber, U. and Reichstein, M. (2019). Memory effects of climate and vegetation affecting net ecosystem CO₂ fluxes in global forests, Living Planet Symposium
- 2019 Walther, S., Jung, M., Bodesheim, P., Nelson, J. Carvalhais, N., Migliavacca, M. Besnard, S., Weber, U., and Reichstein, M. (2019). Advances in data-driven modeling of terrestrial carbon fluxes: resolving the diurnal cycle and efforts towards FLUXCOM 2.0, Living Planet Symposium
- 2017 Besnard, S., Carvalhais, N., Clevers, J. G., Dutrieux, L., Gans, F., Herold, M., Jung, M., Weber, U. and Reichstein, M. (2017) Modelling effects of forest disturbance history on carbon balance: a deep learning approach using Landsat-time series, AGU Fall Meeting
- 2016 Besnard, S., Carvalhais, N. Clevers, J. G., Herold, M., Jung, M. and Reichstein, M. (2016). Stand age and climate drive forest carbon balance recovery, EGU General Assembly

References

1. Dr. Nuno Carvalhais: Leader of the Model-Data Integration Group at the Max Planck Institute for Biogeochemistry. Email: ncarval@bgc-jena.mpg.de
2. Prof. Dr. Markus Reichstein: Executive/managing director of the Max Planck Institute for Biogeochemistry, Jena, and the director of the department for Biogeochemical Integration. Email: mreichstein@bgc-jena.mpg.de
3. Prof. Dr. Martin Herold: Professor at the Laboratory of Geo-Information Science and Remote Sensing, Wageningen University. Email: martin.herold@wur.nl