

## Dr. Gijsbert D.A. Werner

Junior Research Fellow (Oxford) & Senior Scientific Staff Member (WRR)

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### Research Interests

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I am interested in the evolution and maintenance of cooperation in both the natural world and among humans. My research applies evolutionary and economic theory to study cooperative interactions within and between species. My research focuses on cooperative interactions among plants and microbes and on social insects, but I am interested in social evolution and cooperation in general. Currently, I am working as a scientific policy advisor to the Dutch government in the Hague.

### Employment

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**2018 – pres. Senior Scientific Staff Member, Scientific Council for Government Policy (WRR – Wetenschappelijke Raad voor het Regeringsbeleid), Dutch Government, Ministry of General Affairs, the Hague.**

I work as a scientific policy advisor at the WRR in the Hague.

**2016 – pres. Junior Research Fellow, Dep. of Zoology & Balliol College, University of Oxford**

I am using comparative and theoretical approaches to study evolution of mutualism, symbioses and eusociality. Since November 2018, I am holding this position part-time, alongside my position as scientific advisor to the Dutch government.

**2018 Research Associate, Calleva Research Centre for Evolution and Human Sciences, University of Oxford**

**2016 – 2018 Newton International Fellow (Royal Society), Department of Zoology, University of Oxford**

### Education and training

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**2011 – 2015 Vrije Universiteit (VU) Amsterdam, Department of Ecological Science**

PhD. Thesis titel: *Plants, microbes and markets. Evolution and maintenance of belowground cooperation*. I was awarded my PhD *cum laude* (with Distinction).

**2015 Nationale DenkTank 2015 (National Think-Tank)**

During my PhD, I worked on a project to help make the Dutch education system future-proof. The Nationale DenkTank is a non-profit trying to help solve societal challenges by bridging academia, business and government.

**2012 – 2013 Utrecht University, Department of Biology, Guest Researcher**

**2010 – 2011 University of Oxford, Department of Zoology and Lincoln College**

Master of Science in Biology (Distinction). I graduated top of my programme (out of 16 students) and completed two independent research projects.

**2006 – 2010 Utrecht University, Department of Biology and Department of Philosophy**

Bachelor of Science (*Cum Laude*, top 5%). I completed the University-wide Honours Program of Utrecht University and a minor programme in Philosophy.

**2008 – 2009 Vrije Universiteit Amsterdam, Department of Political Science**

As part of my undergraduate degree, I completed a minor programme in Political Science at the VU, focusing on International Relations and Comparative Politics.

## Peer-reviewed Publications

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- Bell-Roberts, L., Douglas, A. E., & **Werner, G. D. A.** (2019). Match and mismatch between dietary switches and microbial partners in plant sap-feeding insects. *Proceedings of the Royal Society B: Biological Sciences*, 286(1902), 20190065.
- Steidinger, B. S., Crowther, T. W., Liang, J., Van Nuland, M. E., **Werner, G. D. A.**, Reich, P. B., *et al.* (2019). Climatic controls of decomposition drive the global biogeography of forest-tree symbioses. *Nature*, 569(7756), 404–408.
- Werner, G.D.A.**, Cornelissen, J.H.C., Cornwell, W.K., Soudzilovskaia, N.A., Kattge, J., West, S.A., Kiers E.T. Symbiont switching and alternative resource acquisition strategies drive mutualism breakdown. *Proc. Natl. Acad. Sci. USA*, 115(20): 5229-5234
- Paterno, G.B., Penone, C., **Werner, G.D.A.** (2018) sensiPhy: an R-package for sensitivity analysis in phylogenetic comparative methods. *Methods in Ecology and Evolution*, 9(6): 1461-1467
- Werner, G.D.A.**, Zhou, Y., Pieterse, C.M.J., Kiers E.T. (2017) Tracking plant preference for higher-quality mycorrhizal symbionts under varying CO<sub>2</sub>-conditions over multiple generations. *Ecology and Evolution*. 8: 78–87
- Kiers, E.T., West, S.A., Wyatt, G.A.K., Gardner, A., Bücking, H., **Werner, G.D.A.** (2016). Misconceptions on the application of biological market theory to the mycorrhizal symbiosis. *Nature Plants*. 2(5): 16063
- Knecht, B., Jansa, J., Franken, O., Engelmoer D.J.P., **Werner, G.D.A.**, Bücking, H., Kiers, E.T. (2016). Host plant quality mediates competition between arbuscular mycorrhizal fungi. *Fungal Ecology*. 20: 233-240
- Werner, G.D.A.**, Cornwell, W.K., Cornelissen, J.H.C., Kiers, E.T. (2015). Evolutionary signals of symbiotic persistence in the legume–rhizobia mutualism. *Proc. Natl. Acad. Sci. USA*. 112: 10262–10269
- Werner, G.D.A.**, Kiers, E.T. (2015). Partner selection in the mycorrhizal mutualism. *New Phytologist*. 205: 1437–1442
- Werner, G.D.A.**, Kiers, E.T. (2015). Order of arrival structures arbuscular mycorrhizal colonisation of plants. *New Phytologist*. 205: 1515-1524
- Werner, G.D.A.**, Cornwell, W.K., Sprent, J.I., Kattge, J. Kiers, E.T. (2014). A single evolutionary innovation drives the deep evolution of symbiotic N<sub>2</sub>-fixation in angiosperms. *Nature Communications*. 5: 4087
- Werner, G.D.A.**, Strassmann, J.E., Ivens, A.B.F., Engelmoer, D.J.P., Verbruggen, E., Queller, D.C., Noë, R., Johnson, N.C., Hammerstein, P., Kiers, E.T. (2014). Evolution of Microbial Markets. *Proc. Natl. Acad. Sci. USA*, 111(4): 1237–1244
- Werner, G.D.A.**, Gemmell, P., Grosser, S., Hamer, S. and Shimeld, S. (2013). Analysis of a deep transcriptome from the mantle tissue of *Patella vulgata* Linnaeus (*Mollusca: Gastropoda: Patellidae*) reveals candidate biomineralising genes. *Marine Biotechnology*, 15(2): 230-243

## Grants and Fellowships

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- 2017 **Balliol Interdisciplinary Institute, Balliol College Oxford.** Project grant ‘*What can evolutionary methods teach textual and literary scholars?*’ £3,000
- 2017 **Balliol Interdisciplinary Institute, Balliol College Oxford.** Project grant ‘*Can evolutionary biology help explain why people behave economically irrational?*’ £2,600
- 2016 **Junior Research Fellowship Balliol College Oxford.** I was awarded a non-stipendiary Junior Research Fellowship in the Sciences at Balliol College Oxford

- 2016 **Newton International Fellowship.** I was awarded a Newton Fellowship by the Royal Society, the British Academy and the Academy of Medical Sciences for my research proposal *The Deep History of Mutualistic Cooperation*. Value: ~ GBP £90,500
- 2015 **Support to attend 65<sup>th</sup> Lindau Nobel Laureate Meetings,** Royal Netherlands Academy of Arts and Sciences (KNAW). Value: €5,000
- 2010 **Huygens Scholarship.** Full scholarship for my MSc-degree in Oxford. Value: € 21,000

## Awards and Prizes

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- 2018 **Jasper Loftus-Hills Young Investigator Award,** American Society of Naturalists
- 2017 **Royal Holland Society of Sciences and Humanities (KHMW) Essay Prize.** I won the annual essay prize of KHMW and Dutch newspaper NRC Handelsblad for my essay on the evolution and future development of human consciousness.
- 2017 **Hugo de Vries Prize 2016.** I have been awarded the Hugo de Vries Prize for best Dutch PhD thesis in the area of Botany by the Royal Dutch Botanical Society (KNBV). Value: €5,000
- 2015 **First Prize NERN Best Paper Award 2015.** Netherlands Ecological Research Network (NERN). Value: €750
- 2014 **Best Student Oral Presentation** at the Modern Phylogenetic Comparative Methods Conference, Estación Biológica de Doñana, Sevilla, Spain
- 2014 **Student Research Award, American Society of Naturalists.** Value: US\$ 2,000
- 2013 **Award for Best IPCC Review, Netherlands Environmental Assessment Agency (PBL).** My team (2 PhD-students) was awarded first place for best review of the Intergovernmental Panel on Climate Change's Fifth Assessment report (Working Group II).
- 2011 **Graduate Prize, Lincoln College, University of Oxford.** I received the annual prize awarded by Lincoln College to postgraduate students who obtain a Distinction.
- 2011 **ABG VN Essay Prize 2011.** My essay 'Making people better...or making better people?' was shortlisted for the annual ABG VN Essay Prize and was published in ABG.

## Teaching and Organisation

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- 2012 - 2018** I have **supervised** eight bachelor and master students' thesis and research projects, both in Oxford (three) and at Vrije Universiteit Amsterdam (seven).
- 2016 – 2018** I work as a **tutor** in a number of undergraduate biology courses in Oxford (*Evolution, Social Evolution, Soils Roots & Food Security, Plants & People*). I have completed the Departmental Graduate Teacher Training Course (**Preparation for Learning and Teaching Qualification**) and am currently participating in the University's *Enhancing Teaching Programme* (SEDA).
- 2016 - 2018** I was one of the **admissions** tutors, co-responsible for interviews and admissions decisions for the Biological Sciences degree at Balliol College.
- 2016** I have **examined** one PhD thesis (University of Groningen, the Netherlands).
- 2016** I **lectured** in the undergraduate honours course *Evolution and Human Behavior* jointly organised by the VU and the University of Amsterdam.
- 2012 - 2015** I **taught** and **supervised** student research projects for the undergraduate course *Evolutionary Ecology and Behaviour* at VU Amsterdam. My responsibilities included helping students design their field research projects, assisting data collection and statistical analysis, and providing feedback on and marking their final essays and reports.
- 2014 - 2015** I **lectured** in the MSc-course *Evolution of Species Interactions* jointly

- organised by the VU and the University of Amsterdam.
- 2013 - 2015** I was co-organiser of the monthly lecture series *Nature of Life* in the Department of Ecological Science at the VU.
- 2009** During my undergraduate I worked as a **Teaching Assistant** in the undergraduate course in Molecular Genetics at Utrecht University

## Reviewing

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I have served as a referee for various scientific journals, including *Oikos*, *Ecology Letters*, *Evolution Letters*, *Nature Communications*, *Trends in Ecology and Evolution*, *Journal of Evolutionary Biology*, *New Phytologist*, *Communications Biology*, *Journal of Ecology*, *Proceedings of the Royal Society B*, *Functional Ecology*, *Evolution*, *ISME*, *Botany*, *Scientific Data*, *Symbiosis*, *Mycorrhiza* and *The American Naturalist*. I have also reviewed grants for the *US National Science Foundation*, the *Austrian Science Fund (FWF)* and for the *European Research Council (ERC)*.

## Skills

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- IT & Statistics: R, Mathematica, Linux, various bioinformatics and phylogenetic packages, basic Perl and MatLab.
- Laboratory: DNA Extraction, PCR, quantitative PCR, microscopy.
- Languages: Dutch (Native), English (Excellent), German (Good), French (Basic)

## Software & Data

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I am one of the authors of *sensiPhy*, an R-package to perform sensitivity analysis for comparative methods, available for download through CRAN and on Github.

I have compiled the world's largest and most comprehensive database of global plant nodulation status, and made this database available on Dryad (<http://dx.doi.org/10.5061/dryad.05k14>).

## Conferences & Seminars

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- Aug 2018 **Invited prize award talk.** Evolution 2018 (Joint ESEB, SSE, ASN), Montpellier
- Nov 2017 **Participant** Advanced Methods in Cultural Evolution Workshop, University of Exeter
- Aug 2017 **Contributed talk** European Society of Evolutionary Biology (ESEB), Groningen, NL
- Aug 2017 **Invited Plenary talk** 9<sup>th</sup> International Conference on Mycorrhiza (ICOM), Prague.
- May 2017 **Plenary talk** at the 2017 Meeting of Minds conference at the Royal Society, London
- April 2017 **Invited Participant** workshop 'Predicting Evolution' Lorentz Center in Leiden, NL
- April 2017 **Invited plenary prize award talk** Experimental Plants Sciences Meeting in Lunteren, Netherlands
- Sep 2016 **Contributed talk** UK Plant Evolution Conference, University of Cambridge, UK.
- Aug 2016 **Contributed talk** International Society for the Study of Social Insects. Helsinki
- July 2016 **Contributed talk** British Ecological Society Macroecology and Macroevolution
- June 2016 **Contributed talk** Evolution 2016, Austin, Texas. My talk was **nominated for the WD Hamilton Award for Outstanding Student Presentation.**

- June 2015 **Selected participant** in the 65th Lindau Nobel Laureate Meeting in Lindau, Germany
- April 2015 **Invited participant** NESCENT (National Evolutionary Synthesis Center) Meeting in Durham, North Carolina, USA
- Feb. 2015 **Contributed Talk** Netherlands Annual Ecology Meeting 2015, Lunteren, Netherlands
- Nov. 2014 **Contributed talk** Modern Phylogenetic Comparative Methods and their Applications in Evolutionary Biology Conference, Sevilla. Awarded **Best Student Talk Prize**.
- Sep. 2014 **Contributed talk** 11<sup>th</sup> European Nitrogen Fixation Conference in Tenerife, Spain.
- May 2014 **Invited seminar** Department of Plant Sciences, University of Oxford.
- April 2012 **Invited plenary talk and workshop:** *Cohabitation and collaboration: cities in biology?* Interdisciplinary Congress Amsterdam, University of Amsterdam.
- Jan. 2012 **Invited participant:** *Cooperation in multi-partner settings: biological markets and social dilemmas*, Netherlands Institute of Advanced Studies. I drafted a perspective paper resulting from one of the discussion groups, which was published in *PNAS*.

## General outreach

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- Gijsbert Werner** “The human mind unique? Think again!” National newspaper *NRC Handelsblad*. Winner essay competition *KHMW & NRC Handelsblad*. October 13, 2017. †
- Gijsbert Werner** & Toby Kiers. “The hidden underground fungal network”. Chapter in popular science book ‘Mighty Microbes’. Publisher Microcanon Foundation. October 23, 2017
- Gijsbert Werner** & Bram Eidhof. “The academic career of your child will often already have been determined at the age of 11. We can do better than that.” Online national newspaper *De Correspondent*, November 25, 2015 †
- Gijsbert Werner** (2015). “Q&A: Microbe cheerleader.” Interview with Nobel Laureate Sir Richard Roberts. *Nature*. 526: S58–S59
- Gijsbert Werner** (2014) “EU and flight MH17”, *The Economist*, Letter to the Editor. August 2, 2014
- Gijsbert Werner** and Herman Philipse. “Crisis at VU University should be blamed on miserliness: No Harvard on the Rhine for us.” National newspapers *NRC Handelsblad* and *NRC Next*, April 4, 2013 †
- Gijsbert Werner**. “Evolution of Cooperation.” Weekly Magazine *Groene Amsterdammer*, May 24, 2012 †
- Gijsbert Werner** and Toby Kiers (2012). “Friends in Fungi.” Letter to the Editor. *Science*, 337: 1452
- Gijsbert Werner** ‘Making people better...or making better people?’. Academic Bookguide (ABG), January 2012 †
- Gijsbert Werner** and Cas van Kleef. “Not a lottery but selection at the University of Amsterdam.” Newspaper *Parool*, September 9, 2010 †
- Gijsbert Werner** and Jolien van Hooff. “You don’t need meat to survive. Tax it as a luxury product according to the ‘Polluter pays principle’.” *NRC Next*, January 21, 2010 †
- Gijsbert Werner** and Fleur de Groot. “Reward ambition: keep a second degree affordable.” National newspaper *Volkskrant*, January 29, 2009 †

† All of these publications were written in Dutch. Translation of publication titles are my own.