

University of Groningen

Rudi Drent Chair in Global Flyway Ecology

Piersma, Theunis

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Rudi Drent Chair In Global Flyway Ecology



Annual Report 2020 – 2021



university of
 groningen





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OPENING STATEMENTS



“Theunis Piersma's contribution to ornithology goes far beyond his 500 plus peer-reviewed scientific papers and 14 books, generally focused on migratory birds, to his role in their conservation including via innovative use of the arts as well as influencing policies and management prescriptions. The strength of influence in the scientific and conservation worlds of ‘waderologists’ is in no small part due to the infectious enthusiasm and energy of the ever-questioning Theunis”.

“The strength and breadth of Theunis’ work within ornithology makes him an outstandingly deserving recipient of the BOU Goldman Salvin Prize, and for it to be awarded during his beloved International Wader Study Group’s 50th anniversary conference is a fitting and fine tribute to an exceptional ornithologist”.

“The strength and breadth of Theunis’ work within ornithology makes him an outstandingly deserving recipient of the BOU Goldman Salvin Prize, and for it to be awarded during his beloved International Wader Study Group’s 50th anniversary conference is a fitting and fine tribute to an exceptional ornithologist”.



Nicola Crockford & William Sutherland

British Ornithologists’ Union

Godman Salvin Prize, *October 2020*

<https://doi.org/10.1111/ibi.12883>



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This year marks the 10th anniversary of the initiation of Rudi Drent Chair in Global Flyway Ecology. The Chair's decade of work has given us not only the insight and credibility to tackle some of the urgent environmental issues that migratory birds and their habitats are facing worldwide, but also a trust platform of exchange.



Acknowledgement

The Chair expresses sincere thanks to the **University of Groningen (RUG)**, **BirdLife Netherlands (VBN)** and **World Wildlife Fund Netherlands (WNF)** for the trust and initiation of this unique academic Chair.

Sincere thanks are given to **Triodos Foundation** and the **Global Flyway Network (GFN)** for their enormous support for the Chair.

Much appreciation goes to the staff who assisted the Chair over the years, particularly **Yvonne Verkuil** and **Tienke Koning**.



SYNOPSIS

1. The recipient of the British Ornithologists' Union Goldman Salvin Prize

The Godman-Salvin Medal of the British Ornithologists' Union is a prestigious medal awarded as an honour for people with distinguished ornithological work. Since its initiation in 1919, it has been awarded to only 32 people including Theunis Piersma. The chair is the second Dutch scientist to receive it after Niko Tinbergen who was awarded in 1969.



Bou Page | Free Access

British Ornithologists' Union

Godman Salvin Prize

Theunis Piersma

First published: 10 October 2020 | <https://doi.org/10.1111/ibi.12883>



2. First NWO Stairway to Impact Award awarded to Theunis Piersma

The Chair has been awarded the first Stairway to Impact Award, one of five new Science Awards introduced by NWO. The Stairway to Impact Award rewards scientists who take effective steps to utilise their scientific findings to tackle a societal problem. The Chair was seen by the jury as an inspiration in the fields of social impact, team science, role model, diversity and communication. The Chair received €50,000 to spend on further steps promoting his fields of inspiration.



University Groningen

@univgroningen

...

Hoogleraar
Trekvoegecologie Theunis
#Piersma 🐦 heeft de
Stairway to Impact Award
ontvangen, 1 van 5 nieuwe
#NWO wetenschapsprijzen!
💪 De prijs is bedoeld voor
onderzoekers die met hun
werk maatschappelijke
impact weten te creëren
rug.nl/news/2020/12/f...
[@GlobalFlyway](https://twitter.com/GlobalFlyway)
[@NIOZnieuws](https://twitter.com/NIOZnieuws)

2:02 PM · Dec 3, 2020 · Coosto

3. Part of a Zambia documentary: “Het excuus van de Boerenleenbank”



The Chair and his team took side on a nature documentary on the actual status of the Dutch farming system. The team made elegant argumentations on how important the **ecology-based farming** is for the sustainability and health of the land. They shed light on a significant, but largely forgotten, component of a healthy and profitable farming system: **the fauna of the soil such as earth worms**. Worms not only recycle nutrients and ameliorate the soil conditions but also feed our meadow birds. The Chair made it clear to the farmers and stakeholders that the actual intensive farming has created a lifeless **“junky land”** with no future. <https://www.bnnvara.nl/zembla/artikelen/de-uitgeputte-bodem>




4. Workshop on the research and agricultural practices in Netherlands and along the East Atlantic Flyway

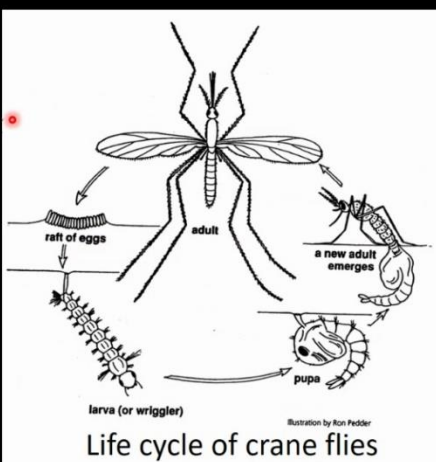
The Chair and team organized a regional workshop to update the different stakeholders in the Netherlands and Germany on the latest discoveries, research and plans related on the importance of black-tailed godwits as an integrator species to sustainable agricultural practices along the flyway.

Aims of this study

1. Quantify diversity, biomass and function of Arthropods, along land-use intensity gradient


Flies






Life cycle of crane flies
Illustration by Ron Pedder


Beetles




Butterflies & Moths




Bugs




Springtails & Mites



Spiders

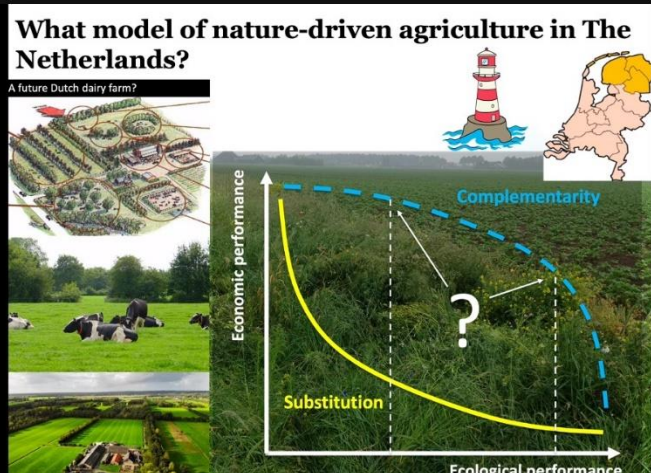


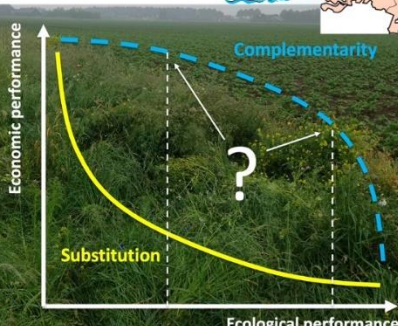


REC P.A. Tiftonell is presenting

What model of nature-driven agriculture in The Netherlands?


A future Dutch dairy farm?





Michella Ligtelijn and 37 more

49 3:56 PM You



5. Presenting at different national and international conferences

The team gave significant presentations at the Netherlands Annual Ecology Meeting as well as international conferences across the globe.

#ISTC20 // 7 - 8 October 2020

KEYNOTE
Prof Theunis Piersma
@GlobalFlyway
University of Groningen
& NIOZ Netherlands
Institute for Sea Research

BOU IWSG

International Shorebird Twitter Conference 2020

Jian Kike CC BY 2.0 Wikimedia Commons

**Site fidelity of two shorebird species
in an imperiled flyway**

Ginny Ying-Chi Chan, Tsz-Chung Chan,
T. Lee Tibbitts, Chris Hassell, Theunis Piersma
NAEM Feb 2021

university of groningen NIOZ USGS Global Flyway Network

Ginny Chan (Thematic Session 2-6)

EAAPP World Migratory Bird Day

World Migratory Bird Day 2020

"BRINGING GOOD
CONNECTIONS TO LIFE"

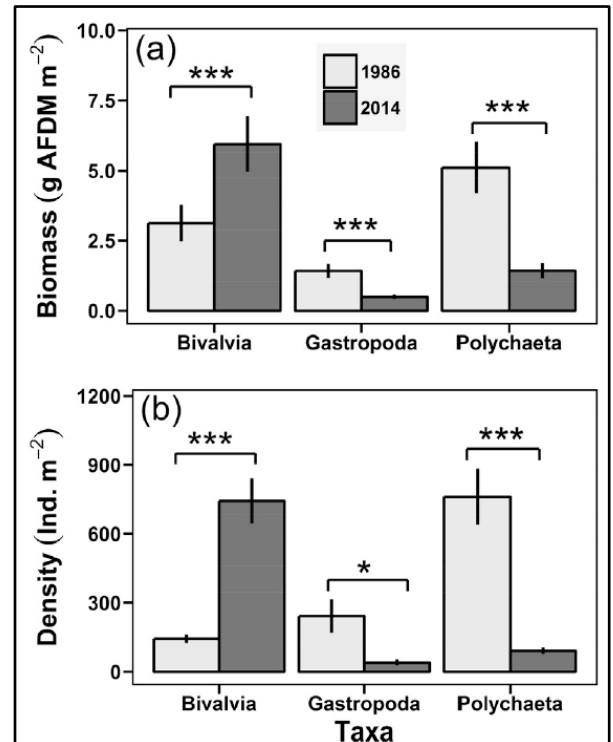
Prof. Theunis Piersma
LIVE WEBINAR

Wed, April 29, 9am CET / 4pm KST

REGISTER AT bit.ly/34N2OHV

6. High Impact Publications

A Long-term study on the dynamic of Banc d'Arguin intertidal systems resulted in an **important publication in Global Ecology and Conservation led by Hacen El-Hacen**. Here, we unravelled the long-term changes in seagrass cover and benthic community at a landscape scale and subsequently how the change in benthic community might have affected the migratory shorebirds. We found that seagrass cover has doubled over the last 30 years and as consequent the benthos shifted from a rather diverse community to one dominated by a few species of bivalve, with a loss of polychaete worms. This study is the result of a long-term monitoring and collaboration between the Dutch research institutes and the Parc National du Banc d'Arguin.



Global Ecology and Conservation 24 (2020) e01364

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)



Global Ecology and Conservation

journal homepage: <http://www.elsevier.com/locate/gecco>



Long-term changes in seagrass and benthos at Banc d'Arguin, Mauritania, the premier intertidal system along the East Atlantic Flyway

El-Hacen M. El-Hacen ^{a, b, *}, Mohamed A. Sidi Cheikh ^{a, b}, Tjeerd J. Bouma ^{a, c}, Han Olf ^a, Theunis Piersma ^{a, d}



7. Continuing Demographic Series in COVID-19 Times

Despite the restrictions due to Covid-19, many local teams continued the long-term demographic studies *around the globe*. This highlights the importance of international collaboration and the existence of highly trained locals, particularly in remote areas, for the sustainability of monitoring and conservation measures. The photos below show the efforts in coastal China

(collaboration with Beijing Forestry University) and Mauritania (collaboration with the PNBA). The GFN monitoring of Red Knots passing through Bohai Bay on northward migration concluded its 13th year in a row <http://globalflywaynetwork.com.au/wp-content/uploads/2020/08/GFN-Bohai-Report-2020.pdf>



Local teams doing some long-term monitoring activities at Bohai Bay, China (above) and at Banc d' Arguin, Mauritania (below).

8. New Website of Real Time Tracking of Birds

A pivotal goal for the Chair is to bring scientific outcomes closer to a wider public to improve public awareness, and make others advocates for flyway conservation. To reach this goal, the Chair **launched a new website that display a real-time tracking of shorebirds** that are equipped with satellite transmitters www.globalflywaynetwork.org built by Bastiaan Blaauw. A narrative chronological of bird migration is presented to the public via regular tweets <https://twitter.com/GlobalFlyway>. Our outreach via twitter @GlobalFlyway (4172 followers), from April 2020-July 2021, earned 4.3 million ‘impressions’, and 81,000 profile visits and had a lot of engagement from all across the globe!



Global Flyway Network
@GlobalFlyway



GLOBAL FLYWAY NETWORK

Fifteen years in the making, some [#marathonmigrants](#) are now enabled to demonstrate their capacity as integrative, down-to-Earth Observers - at appropriate spatial scales!

See: globalflywaynetwork.org/flyway/bridgin...

[#migration](#) [#conservation](#)
[#agriculture](#) [#ClimateChange](#)

11:39 AM · Jun 14, 2020 · Twitter Web App

58 Retweets 9 Quote Tweets 151 Likes



SUMMARY

The Rudi Drent Chair in Global Flyway Ecology has the overarching goal of using the latest technology and scientific expertise to protect migratory birds and their habitats. The Chair uses a two-pillar approach to meet these goals: **(1)** conducting timely and cutting-edge research related to migratory birds and their habitats (***Research activities***) and **(2)** work closely with the different stakeholders and reach out for the wider public (***Outreach and Media***).

Over the last year, we have continued and further developed the portfolio of long-term **demographic studies on long-distance migrating shorebirds in several major flyways**. These demographic studies are embedded in on-the-ground descriptive work on the ecological context in which the demographic changes take place. Knowing the vital rates remains crucial to keep a close eye on the health of the populations, and to detect where in the annual cycle the bottlenecks occur before population collapse. The magnitude of this undertaking required the continuous input of the two

major research institutions in the northern Netherlands (**RUG** and **NIOZ**). Significant steps have been taken over the last year to cover a new and important staging site for migratory bird along the East Asian-Australasian Flyway (EAAF), **the Nijhum Dweep National Park and Char Birbira, Bangladesh**. A promising young researcher from Bangladesh, Delip Das, has just started a PhD at RUG under the supervision of the Chair.

The long-term demographic work as well as the advanced satellite tracking studies have continued to reveal important and timely-good information on migratory birds and their habitats. The Chair also continued with **capacity building** among the young generations, especially in places where it is needed most, to help implementing conservation and management plans along the flyways. Further, the Chair dedicated a significant amount of time and energy into outreach and public awareness via both the main stream as well as the social media. The Chair has been invited to many national and international TV and radio programs

talking about different aspects of flyway ecology and conservation.

Over the last year, the team has contributed significantly to more than **32 scientific publications** (of which 26 were peer-reviewed), gave more than **18 national and international presentations**, and **51 interviews/segments on media** related to flyway ecology. In addition, the Chair and team have continued to apply and seek extra funding to ensure the achievement of the long-term goals set for the position. For example, the multi-national and disciplinary application for **IKI fund**, Germany was successful. The Chair and his team are the **main**

coordinator of the **Research and monitoring** Working packages of this application. This fund will ensure, starting from Jan 2023, a high-quality monitoring and an extensive **capacity building program** in **West Africa** for at least 8 years. Finally, the chair received a **large grant from the ministry of from the Dutch Ministry of Agriculture, Nature and Food Quality for their long-term research on black-tailed godwits. Five PhD students and three postdocs** have been recruited within the framework of this grant to ensure the continuity of the long-term research on godwits along the EAF, **which has been running since 2004.**

Over the last year (July 2020–July 2021), the major research programs that the Chair coordinates and/or is actively involving in have significantly contributed to the overarching goals of the position. This includes:

- Two major projects that have been continued with independent funding:

(1) SIBES: Synoptic Intertidal Benthic Surveys of **the Wadden Sea**, a programme so far funded by NIOZ and NAM, and **(2) Godwit-demography:** the large-scale demography study of black-tailed godwits in **southwest Fryslân** that started in 2004, received a large anonymous donation and major funding from the Province of Fryslân for the period 2018-2020.

- Two long-term programmes underwent major developments: **(3) The Waakvogels** projects on black-tailed godwits funded by **Gieskes-Strijbis Fund** (2018-2023)

which includes two fulltime postdoc and one technical position over two years, have continued. However, our integrative fundamental and applied **Wadden Sea work has remained largely unfunded since 2016**: in 2020 and 2021 again much effort went into seeking renewed funding of our long-term research programmes as established during *Metawad* (with five year support from Waddenfonds in 2011-2016) to investigate the ecological processes explaining long-term changes in numbers and distribution of the characteristic long-distance migrants: red knots, bar-tailed godwits, sanderling, Eurasian spoonbills and brent geese.

- **Research in West-Africa** has continued in three programmes: **(4)** Our work since 2002 at *Banc d'Arguin* in Mauritania is supported by core-funding from NIOZ for the annual demographic efforts in December-January. Since 2019 we have additional support through the GEBA project of MAVA *Foundation* administered by the Parc National du Banc d'Arguin. **(5)** The *Bijagós Archipelago* in Guinea-Bissau is the focus of attentions in a 2018-2022 project funded by the MAVA foundation in collaboration with Guinean and Portuguese research institutions, NIOZ and colleagues from the RUG Conservation Ecology Group. The project is fully under way, including jointly supervised PhD students that includes locals. **(6)** With travel-support from BirdLife Netherlands we have been able to continue our fieldwork in **Senegal** on wintering Netherlands-breeding black-tailed godwits.

- **Research along the East Asian-Australasian Flyway (EEAF): (7)** The continuation of the research on four species (red knot, great knot, bar-tailed godwit, black-tailed godwit) in the EEAF, the most threatened flyway in the world, has been ensured by the initiation of a science unit of the EEAF Partnership based at Beijing Forestry University under leadership of *Prof. Guangchan Lei, Director of Centre for East Asian-Australasian Flyway Studies* (CEEAF). The CEEAF is working in close collaboration with the RUG, NIOZ, Beijing Normal University and Fudan University-Shanghai. Since 2019, the CEEAF took major responsibility for the financing of the Global Flyway Network team in Bohai Bay, China, during northward migration, coordinated by GFN's Chris Hassell (<http://globalflywaynet->

work.com.au/). The GFN team also continued their work on the ground in NW Australia during the non-breeding season. **Using solar-panelled satellite trackers** we have since 2014 successfully tracked individual bar-tailed godwits, red knots, great knots and black-tailed godwits for one to five full migrations to their breeding grounds. The trackers were applied in NW Australia and Bohai Bay, China (with crucial funds from the Spinoza Premium, WWF-Netherlands [in collaboration with WWF-China] and MAVA foundation, and with smaller contributions from BirdLife NL). The unique data have allowed us to zoom in on the movements during stopovers along the southern China coasts, the Yellow Sea and inland China and Mongolia. In 2019 and 2020 we have published a range of papers establishing the scope for adaptation of the extremely rapid changes for mudflats and the migrant shorebirds in the Flyway depending on them (see scientific papers 7, 8, 10, 11, 12, 13, 14, 15, 24, 25).

RESEARCH ACTIVITIES

PhD projects

Over the reporting period July 2020–July 2021 the following PhD student defended their PhD theses:

1. **Eva Kok** (nationality: Dutch) “Ontogeny of habitat choice in red knots: experimental and observational approaches” (promotor). Current appointment: NIOZ, the Netherlands.
2. **Mo Verhoeven** (nationality: Dutch) “Genesis of migration routines in back-tailed godwits: observational approaches” (promotor). Appointment: RUG, the Netherlands.
3. **Jelle Loonstra** (nationality: Dutch) “Genesis of migration routines in back-tailed godwits: experimental approaches” (promotor). Appointment: RUG, the Netherlands.
4. **Ying Chi (Ginny) Chan** (nationality: HongKong/UK) “Exploration and migration in shorebirds along the East Asian flyway” (promotor). Current appointment: RUG, with NIOZ, the Netherlands.



The following thesis PhD projects are currently under way, and in various stages of advancement:

1. **Hong-Yan Yang (Nicky)** (nationality: Chinese) “Foraging ecology of red knots in Bohai Bay” (promotor). Current appointment: Beijing Forestry University, China.

2. **Mohamed Ahmed Ould Sidi Cheikh** (nationality: Mauritanian) “Temporal dynamics of intertidal flats” (2e promotor). Current appointment: Parc National du Banc d’Arguin (PNBA), Mauretania.
3. **Obe Brandsma** (nationality: Dutch) “Ecology of meadow birds: observations and experiments” (promotor). Appointment: Province of Overijssel, Netherlands.
4. **Jan van der Winden** (nationality: Dutch) “Migration ecology of piscivores” (promotor). Current appointment: Self-employed.
5. **Tom Versluijs** (nationality: Dutch) “Coping with phenological mismatch: how an insectivorous migrant shorebird may mitigate the negative effects of a warming Arctic” (promotor). Appointment: NIOZ, the Netherlands. Project together with Dr Jeroen Reneerkens and Dr Jan van Gils.
6. **Hebo Peng** (nationality: Chinese) “The food distribution and habitat choice of migratory shorebirds in a threatened staging area” (promotor). Appointment: RUG, the Netherlands with NIOZ, the Netherlands.
7. **Bing Run Zhu** (nationality: Chinese) “Flyway structure, migration and habitat use of black-tailed godwits in China” (copromotor). Current employment: Beijing Normal University.
8. **Emma Penning** (nationality: Dutch) “Habitat use of Sanderlings in staging on Griend in relation to food abundance and their wintering area” (promotor). Appointment: RUG, the Netherlands, based at NIOZ, the Netherlands
9. **Sidi Yahya Lemrabott** (nationality: Mauritanian) “Population dynamics and ecological role of sharks and rays at Banc d’Arguin, Mauritania” (copromotor). Employment: Institut Mauritanien de Recherches Océanographiques et des Pêches (IMROP), Mauritania.
10. **Sjoerd van Hasselt** (nationality: Dutch) “The ecology of sleep in long-distance migrating Brent *Branta bernicla*” (copromotor). Appointment: RUG. Project together with Prof. Peter Meerlo, RUG, and Dr Niels Rattenborg of the Max Planck Institute

11. **Mohammed Faza Henriques Baldé** (nationality: Guinea Bissauan) “The role of migratory shorebirds on trophic networks of a mangrove-influenced tropical intertidal ecosystem” (copromotor). Appointment: University of Lisbon. Project together with Prof. José Pedro Granadeiro and Dr Teresa Catry

12. **Ana Coelho** (nationality: Portuguese). “Winter biology and migration preparations of long-distance migrating shorebirds in the Bijagos Archipelago”. (copromotor). Appointment: University of Aveiro with funding from MAVA. Project together with Dr José A. Alves, University of Aveiro, Portugal.

13. **Pratik Rajan Gupte** (nationality: Indian) “Integrating short-term causes and long-term consequences of adaptations to environmental change” (cosupervisor). Appointment: RUG (scholarship), the Netherlands. Project together with Prof. Franjo Weissing, Dr Allert Bijleveld, Prof. Ton Groothuis



14. **Selin Ersoy** (nationality: Turkish) “Integrating short-term causes and long-term consequences of adaptations to environmental change” (promotor).

Appointment: RUG, based at NIOZ, the Netherlands. Project together with Dr Allert Bijleveld, Prof. Franjo Weissing, Prof. Ton Groothuis

15. **Micha Zhemchuzhnikova** (nationality: Russian) “Changes in arthropod abundance and diversity in warming Arctic tundra and its potential influence on red knot chicks’ development.” (promotor). Appointment: NIOZ, the Netherlands. Project together with Dr Jan van Gils

16. **Shou-Dong Zhang** (nationality: Chinese) “Rapid changes in the food base and the foraging ecology of shorebirds at the Yalu Jang nature reserve, China” (promotor). Appointment: Fudan University, Shanghai, China (Prof. Zhijun Ma), in collaboration with NIOZ and NIOZ, the Netherlands.
17. **Tim Oortwijn** (nationality: Dutch) “Arctic warming and migrant shorebirds” (copromotor). Appointment: NIOZ, the Netherlands.

The following PhD projects started over the last year:

18. **Taylor Craft** (nationality: USA) “Assessing agricultural sustainability by integrating remote sensing and animal ecology with agricultural practices” (copromotor). Appointment: RUG, the Netherlands. Project together with Prof. Anne Beaulieu and Dr Heinrich Belting.



19. **Delip Das** (nationality: Bangladesh) “Why some Black-tailed Godwits winter in coastal mudflats while others choose inland freshwater habitats?” (promotor). Appointment: RUG, the Netherlands.



20. **René Veenstra** (nationality: Dutch) “The role of soil fauna in the ecosystem processes of regenerative dairy farming?” (promotor). Appointment: RUG, the Netherlands.
21. **Marie Stessens** (nationality: Belgian) “Recovery demographics of the sentinel of sustainable farming practices along the flyway” (promotor). Appointment: RUG, the Netherlands.
22. **Michella Ligtelijn** (nationality: Dutch) “Ecology of Arthropod populations impacted by agriculture. Netherlands” (promotor). Appointment: RUG, the Netherlands.

Highlights from peer-reviewed outcomes published during the reported year

- In a new paper led by the Chair published in *Frontiers in Ecology and Evolution*, the group revealed extreme physiomorphic changes in Bar-tailed Godwits (*Limosa lapponica baueri*) during their fuelling period. The heart, flight muscles, and organs related to digestion and homeostasis were heavier in fuelling godwits compared to flying godwits.

<https://doi.org/10.3389/fevo.2021.685764>

- In a paper published in *Ibis*, the Chair led a study where they confirmed, using high-tech tags (PTTs and 1.0-g geolocators), an existing evidence that Red Knots of the *piersmai* subspecies migrate from NW Australia and breed on the New Siberian Islands in the Russian Arctic and that they stage along the coasts of south-eastern Asia, especially in the northern Yellow Sea in China. They showed also that the subspecies used multiple suitable stopover sites along the flyway. <https://onlinelibrary.wiley.com/doi/10.1111/ibi.12964>

- The group showed in a paper published in *Frontiers in Ecology and Evolution* that the loss of saltpans could negatively affect the population of avocets and other ground-nesting waterbirds. We found that

the nesting success of Pied Avocets (*Recurvirostra avocetta*) in the Nanpu saltpans was negatively affected by precipitation, season and nest density.

<https://www.frontiersin.org/articles/10.3389/fevo.2021.622756/full>

- In the *Journal of Diversity and Distributions*, we showed that few cultured species dominated the intertidal mollusc communities along the Chinese coastline, taking over the ecological roles of the native species. We demonstrated that aquaculture practices created a homogenized benthic community with tremendous loss of biodiversity gradients. <https://onlinelibrary.wiley.com/doi/10.1111/ddi.13302>

- Using electroencephalogram (EEG) data loggers to measure sleep in summer and winter of 13 Barnacle Geese (*Branta leucopsis*) under semi-natural conditions, we were able to reveal that barnacle geese display season-dependent homeostatic regulation of sleep. These results demonstrate that sleep homeostasis is not a rigid phenomenon and suggest that some species may tolerate sleep loss under certain conditions or during certain periods of the year. <https://academic.oup.com/sleep/article/44/4/zsaa244/5998104>

- In a paper in *Environmental Pollution*, the group measured sleep in Barnacle Geese (*Branta leucopsis*) under semi-natural conditions in relation to moon phase, artificial light at night, and cloud cover. Our findings suggest that cloud cover can, in a rather dramatic way, amplify the immediate effects of artificial light at night on wildlife. Sleep appears to be highly sensitive to artificial light at night and may therefore be a good indicator of its biological effects. <https://doi.org/10.1016/j.envpol.2021.116444>

- The team showed in a long-term study in Banc d'Arguin published in *Global Ecology and Conservation* that over time, the benthos of the area changed from a diverse community to one dominated by a few species of bivalve, with a loss of polychaete worms. The change was associated with a twofold increase in the seagrass cover. Our results suggest that the intertidal habitats of Banc d'Arguin have altered markedly over the last three decades with a factor of four decrease in benthic secondary production by.

<https://doi.org/10.1016/j.gecco.2020.e01364>

- In a paper published in *Journal of Avian Biology*, the group examined the use of orientation mechanisms during migra-

tory flights across the Greenland Icecap using a novel 2 g solar-powered satellite transmitters. The geometry of the paths suggests that knots can migrate across the Greenland Icecap along the shortest path instead of the previously suggested loxodrome path. This particular bird's ability to return to locations visited in a previous year together with its sudden course changes suggest a map sense that enables Red Knots to determine location, so that they can tailor their route depending on local conditions. <https://onlinelibrary.wiley.com/doi/10.1111/jav.02464>

- Using satellite-tracking data from 36 adult Black-tailed Godwits (*Limosa limosa limosa*), the team extend our understanding of the migration of godwits along the EAF. Most sites were used consistently by the same individuals across years. However, sites in Morocco were used during northward migration by 75% of individuals, but not revisited by the same individual across years. After southward migration, a small proportion (15%) of godwits spent the entire non-breeding period north of the Sahara, but most (85%) crossed the Sahara and spent at least part of the non-breeding season among seven coastal sites in West Africa and one site in the Inner Niger Delta. <https://link.springer.com/article/10.1007/s10336-020-01807-3>

- The team evaluated the changes in the numbers of waterbirds in Banc d'Arguin National Park by compiling the existing total counts since 1979 with additional yearly count at Iwik since 2003. Total waterbird numbers showed a decrease between 1980 and 2017, with a significant change in species composition over time caused mainly by declines in the species depending on the intertidal mudflats for feeding vs. the species depending on fish and crustaceans in the sublittoral and offshore zones (often showing increase). DOI: [10.1017/S0959270919000431](https://doi.org/10.1017/S0959270919000431)

- In an experimental study to address the mechanisms of mass regulation in birds conducted on captive Red Knots (*Calidris canutus islandica*) at NIOZ, we showed that decreases in body mass in knots exposed to cues of predation coincide with decreased foraging effort and increased activity. Furthermore, the within-individual changes in mass trajectories can be predicted by individual differences in the extent of foraging restraint and activity up-regulation. We also provide evidence that both dieting and activity play a role in maintaining body mass under changing diet quality. DOI: [10.1242/jeb.231993](https://doi.org/10.1242/jeb.231993)

- In an experimental study published in *Ethology*, the group introduced a new idea that seasonally changing preference

for habitat could motivate migrants to embark on migration and that this cognitive process could also guide them to seasonally appropriate places. We established that knots are able to distinguish and memorize projected images. <https://onlinelibrary.wiley.com/doi/10.1111/eth.13036>

- The team showed in a new study published in *Ibis* using morphometrics and mitochondrial genome (mtDNA) that the Bohai Godwits were indeed significantly larger than *melanuroides*, resembling *limosa* more than *islandica*, but with relatively longer bills than *islandica*. The level of genetic differentiation between Bohai Godwits and the three recognized subspecies was of similar magnitude to the differentiation among previously recognized subspecies. Based on these segregating morphological and genetic characteristics, we propose that these birds belong to a distinct population, which may be treated and described as a new subspecies. The chosen scientific name of new subspecies *bohail* refers to the area in China (Bohai) where the story of this subspecies unfolded. <https://onlinelibrary.wiley.com/doi/10.1111/ibi.12890>

- In a paper published in *Oecologia*, the group studied how demographic processes (survival, reproduction and migra-

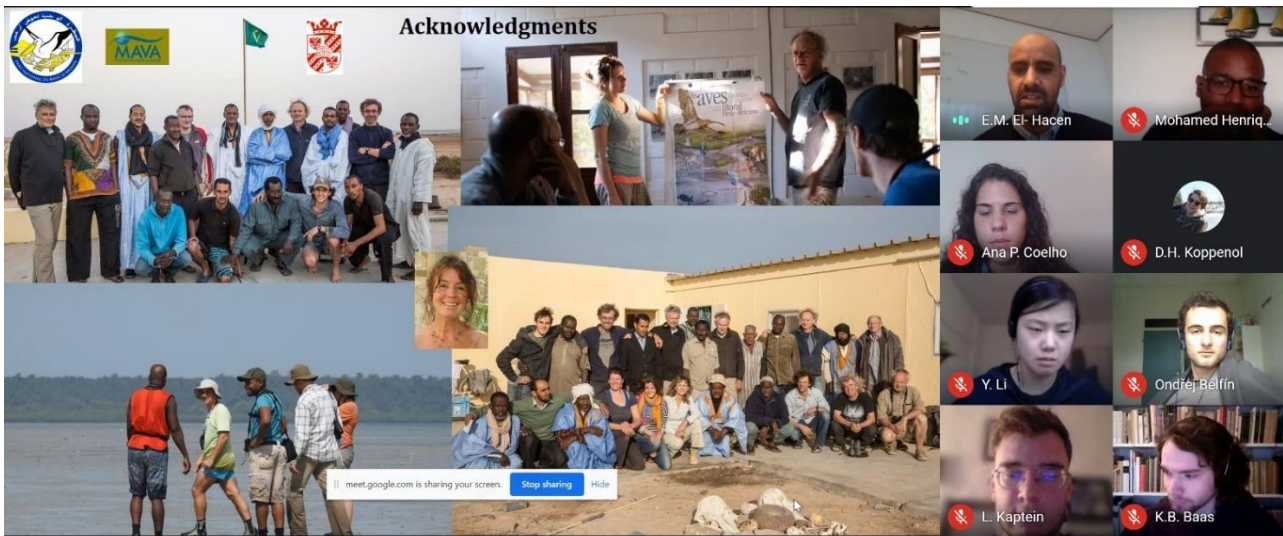
tion) and associated ecological requirements of species may change with ontogenetic stage (juvenile, adult) and across the migratory range (breeding, non-breeding). Consistent with the idea that ontogenetic niche shifts are an important driver of seasonal migration, we find that growth and survival of juvenile life stages profit most from ecological conditions that are specific to breeding areas. We suggest that matrix population modelling techniques are promising to detect the importance of the ontogenetic niche shifts in maintaining migratory strategies.

<https://link.springer.com/article/10.1007%2Fs00442-020-04682-0>

- The increasing reclamation and demand on the intertidal flats, particularly in Southern Asia, led the team built an integrated coastal model “Building with Nature” to minimize coastal habitat loss. This model demonstrates the potential and importance of using morphological characteristics as well as habitat suitability modeling when designing large-scale reclamations and port constructions, especially in dynamic areas such as Tongzhou Bay, China. <https://www.mdpi.com/2073-4441/12/8/2134/htm>

Education

- The Chair 3-week **Master Course in Flyway Ecology** took place in Nov-Dec 2020. "<https://www.rug.nl/ocasys/rug/vak/show?code=WMEV010-05>". **28 students** and **2 PhDs** followed the course and were taught the latest research related to the biology of migration and methodological advances in the field of flyway ecology. The group already yielded four people starting very successful MSc project on the theme of the course. This Covid-19 round opened a new virtual era, in which many collaborators from **Australia, China, Ghana, Guinea-Bissau, Mauritania, Spain, Portugal, USA, Sweden, and Dutch** contributed and enriched the course significantly.



- A new research project led by a master student Ondrej Belfin has opened a new perspective of our understanding to black-tailed godwits communication with implication for their conservation. This research project on the mutual communication of godwits pick up what Dane Hans Lind started 60 years ago on the behavior and sound of black-tailed godwits but using more advanced techniques that revealed an astonishing outcomes. For more details see <https://www.vogelbescherming.nl/actueel/bericht/wat-gruttos-elkaar-vertellen>



Fieldwork & expeditions

Due to the COVID pandemic, much of the field work abroad by the Chair and his team had to be cancelled or delegated to the local collaborating investigators. Luckily, both

the shorebird team at NIOZ as well as the godwit team based at RUG were able to continue their research in Mauritania, the Netherlands and Germany.



In addition, the local collaborating teams, especially along the East Asian-Australasian Flyway (EAAF) and East Atlantic Flyway (EAF), were able to continue their work in Australia and China as well as in Banc d'Arguin, respectively.

IMPACT: OUTREACH & MEDIA

Between July 2020 and July 2021, the Chair participated in **many cultural and outreach events**. He gave more than **18 lectures** at national and international events, and at scientific conferences and steering meetings (see Appendix). The Chair wrote a well appreciated **book on the migration and biology of Spoonbills**. In this book, The Chair connected birds, people, and places in a smooth and easily to grasp stories. The book is being translated into **English, French, and Spanish**.



The team actively contributed to national debates around landscape and agriculture. In the reporting period the Chair and his team appeared **148 times in the media**, incl. **many**

times in international press. **Awarded the prestigious international Godman-Salvin Medal** of the British Ornithologists' Union. Winning the first Stairway to Impact Award of **NWO**. See Appendix for most popular ones.

← Project

Magazine LETTER

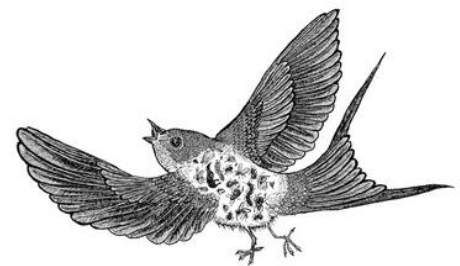
Vragenovervloed



Voorlezen

Eind mei 2021. De wereld licht ons toe
Gelukkig is het toch nog warm geword
vrijheid komt snel dichterbij. Het is eer

Tekst: Theunis Piersma | Illustratie: Willie Darktrousers



Gestaag bouwen aan een duurzaam Noord-Nederland

KARIN DE MIK

TERP 10 COMMUNICATIE

ONDERZOEK

WWW.RUG.NL/STAFF/C.F.VAN.DEN.BERG
WWW.RUG.NL/INBEELD-PIERSMA

Het klimaat verandert, de biodiversiteit verschaamt en delen van Noord-Nederland vergrijzen. Om al die problemen te lijf te gaan is een duurzame langetermijnvisie nodig. Een visie waarbij economie en ecologie samengaan en een die verder reikt dan 2030, stellen RUG-hoogleraren Caspar van den Berg en Theunis Piersma.



FOTO PHIL NIJHUIS



FOTO VAR PEL/NWO

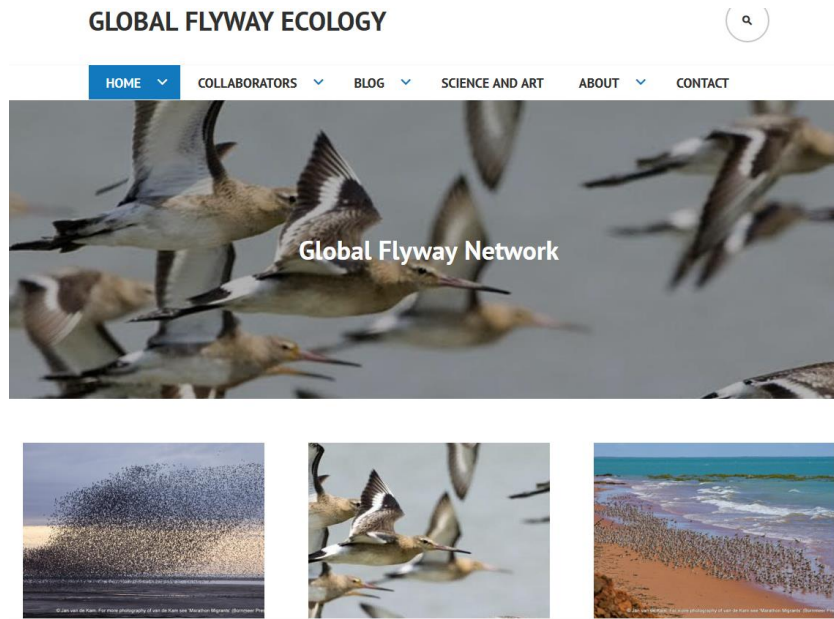
De vraag is hóé het Noorden de komende zestig jaar toekomstbestendig duurzaam kan worden. Zowel wat betreft het landschap met zijn flora en fauna als zijn inwoners. Van den Berg: 'We bedoelen dat er zowel materiële als immateriële welvaart is. Kort gezegd: dat het hier fijn wonen en werken is in een gezonde omgeving.' Een omgeving waarin de soortenrijkdom versterkt wordt en het open landschap blijft bestaan. Waar gezond voedsel wordt geproduceerd, zonder gebruik van kunstmest en bestrijdingsmiddelen. En een regio waar burgers en boeren een goede boterham kunnen verdienen.

Kathedralen

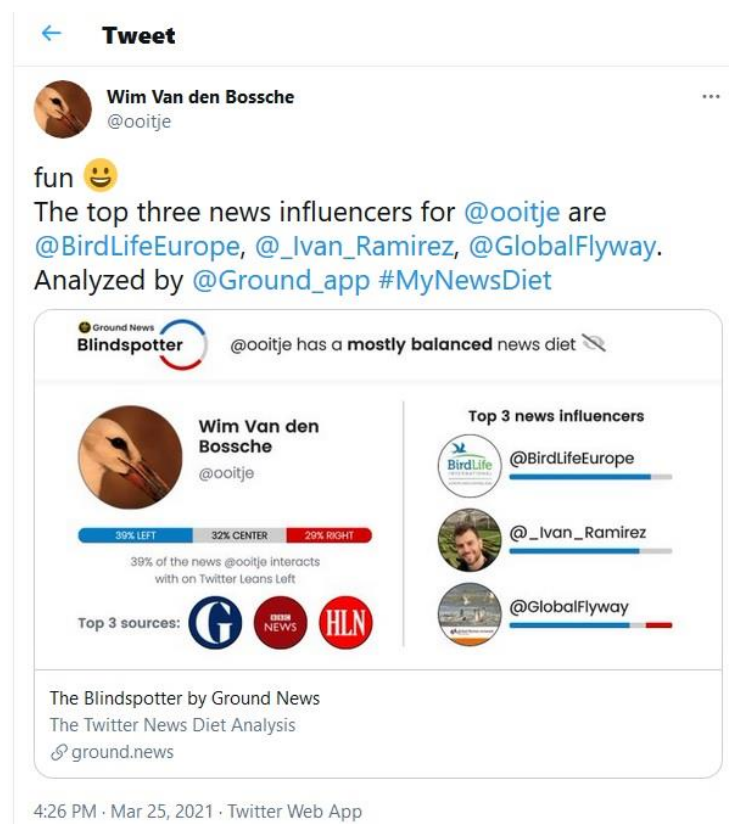
Hoe je zo'n langetermijnvisie vorm geeft? Kijk daarbij verder dan je eigen leven, adviseren ze. Het recente boek *De goede voorouder* van Roman Krznaric inspireert hen daarbij. 'De bouw van kathedralen in de middeleeuwen duurde decennia,' licht Van den Berg toe. 'Bouwers zagen zelf meestal niet het eindresultaat van hun ontwerp. Zo moeten ook wij naar onze toekomst kijken. Wat kun je in je leven

Our own outreach channels are:

1. The new website **Global Flyway Ecology – Team Piersma** (www.teampiersma.org) summarizes the work of all researchers associated with the Chair. This website has a blog teampiersma.org/blog, reporting news of our research in all flyways.

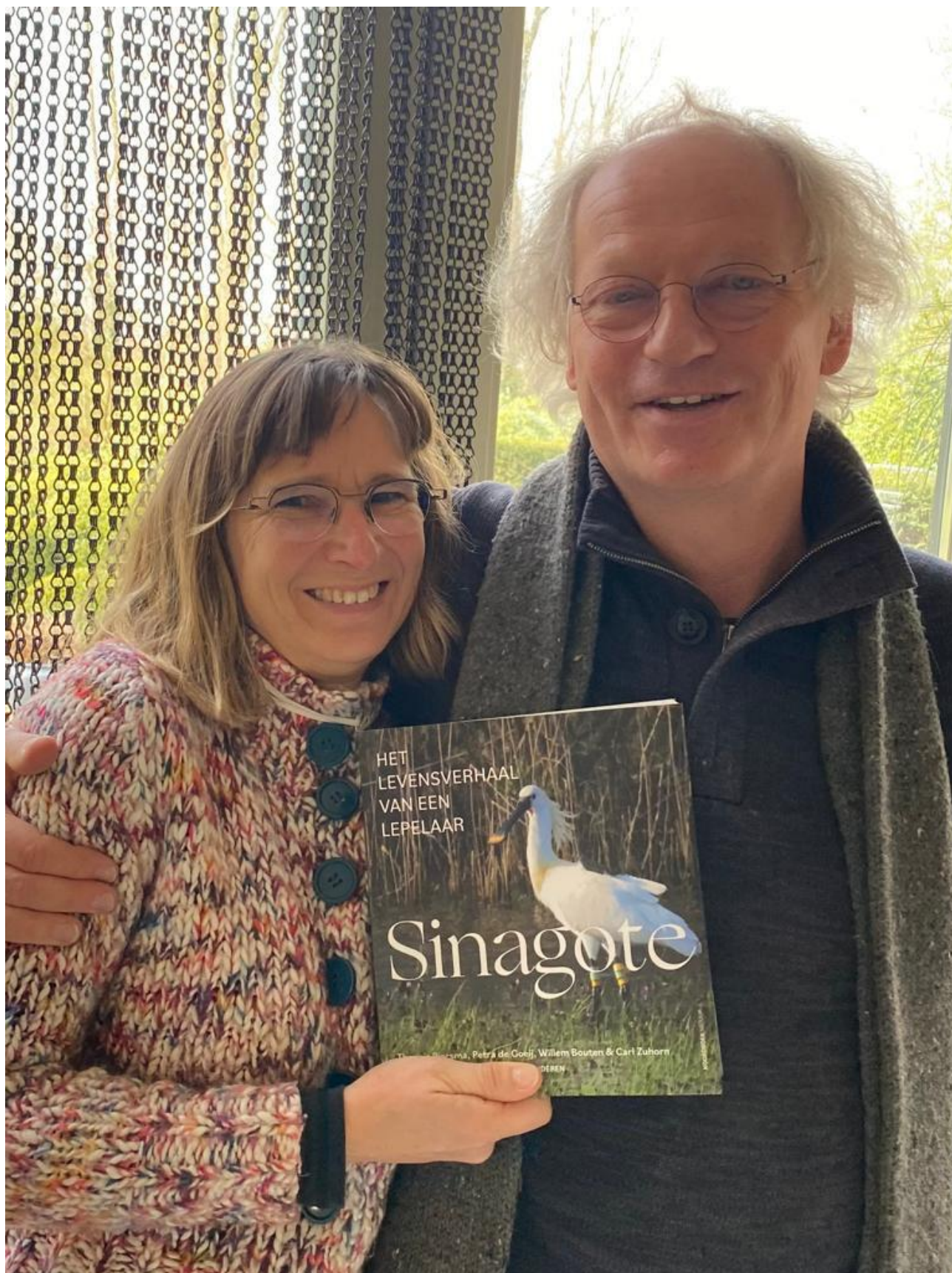


2. Via the **Twitter account** [@GlobalFlyway](https://twitter.com/GlobalFlyway), we publicize recent publications, blogs from above website and related news.



Book

- Piersma, T., de Goeij, P., Bouten, W., & Zuhorn, C. (2021). 'Sinagote, het verhaal van één lepelaar'. Noordboek, Gorredijk, 224 pp.



Editorials, popular & opinion

- Hooijmeijer, J., T. Piersma and T. Zeegers. (2021). "Meer insecten op kruidenrijke grutto-weilanden in Súdwest Fryslân." Nature Today 01 April 2021. <https://www.naturetoday.com/intl/nl/nature-reports/message/?msg=27498>
- Piersma, T. (2020). 'Ornithology from the Flatlands: Satellite sensing of greenness and the resource landscapes of birds'. *Ardea*, 108, 111–114. <https://doi.org/10.5253/arde.v108i2.a11>
- Piersma, T. (2020). Voices of a living planet: migratory shorebirds as sentinels of a rapidly changing Earth. Voices for a Living Planet - Special Edition Living Planet Report 2020. M. Grooten, S. Dillingh and T. Petersen. Gland, Switzerland, WWF: 20-21. <https://livingplanet.panda.org/voices/migratory-shorebirds-sentinels-rapidly-changing-earth>
- Piersma, T., P. de Goeij, W. Bouten and C. Zuhorn. (2021). "Sinagote, het verhaal van één lepelaar." Nature Today 27 March 2021. <https://www.naturetoday.com/intl/nl/nature-reports/message/?msg=27468>
- van den Berg, C. F., T. Piersma and K. S. Spoelstra (2020). "Opinie: Golven van onheil of verandering?" Leeuwarder Courant(donderdag 24 september 2020): 21. <https://www.lc.nl/opinie/Golven-van-onheil-of-verandering-26045258.html>

Peer-reviewed papers (2020–2021)

1. de Fouw, J., E. M. van der Zee, J. A. van Gils, B. K. Eriksson, E. J. Weerman, S. Donadi, H. W. van der Veer, H. Olf, T. Piersma and T. van der Heide (2020). "The interactive role of predation, competition and habitat conditions in structuring an intertidal bivalve population." *Journal of Experimental Marine Biology and Ecology* 523: 151267.
2. El-Hacen, E.-H. M., M. A. Sidi Cheikh, T. J. Bouma, H. Olf and T. Piersma (2020). "Long-term changes in seagrass and benthos at Banc d'Arguin, Mauritania, the premier intertidal system along the East Atlantic Flyway." *Global Ecology and Conservation* 24: e01364.
3. Fokkema, W., H. P. van der Jeugd, T. K. Lameris, A. M. Dokter, B. S. Ebbinge, A. M. de Roos, B. A. Nolet, T. Piersma and H. Olf (2020). "Ontogenetic niche shifts as a driver of seasonal migration." *Oecologia* 193: 285-297.
4. Henriques, M., J. P. Granadeiro, T. Piersma, S. Leao, S. Pontes and T. Catry (2021). "Assessing the contribution of mangrove carbon and other basal sources to intertidal flats adjacent to one of the largest West African mangrove forests." *Marine Environmental Research* 169: 105331.
5. Kok, E. M. A., J. A. Hogan and T. Piersma (2020). "Experimental tests of a seasonally changing visual preference for habitat in a long-distance migratory shorebird." *Ethology* 126: 681–693.
6. Kok, E. M. A., T. L. Tibbitts, D. C. Douglas, P. W. Howey, A. Dekinga, B. Gnep and T. Piersma (2020). "A red knot as a black swan: how a single bird shows navigational abilities during repeat crossings of the Greenland Icecap." *Journal of Avian Biology* 51: e02464.
7. Lei, W., J. A. Masero, C. Dingle, Y. Liu, Z. Chai, B.-R. Zhu, H.-B. Peng, Z.-W. Zhang and T. Piersma (2021). "The value of coastal salt pans for migratory shorebirds: conservation insight from a stable isotope approach based on feeding guild and body size." *Animal Conservation*.

8. Lei, W., Y. Wu, F. Wu, T. Piersma, Z. W. Zhang and J. A. Masero (2021). "Artificial wetlands as breeding habitats for shorebirds: a case study on Pied Avocets in China's largest saltpan complex." *Frontiers in Ecology and Evolution* 9: 622756.
9. Mathot, K. J., E. M. A. Kok, P. van den Hout, A. Dekinga and T. Piersma (2020). "Red knots (*Calidris canutus islandica*) manage body mass with dieting and activity." *Journal of Experimental Biology* 223: jeb231993.
10. Muller, J. R. M., Y.-C. Chan, T. Piersma, Y.-P. Chen, S. G. J. Aarninkhof, C. J. Hassell, J.-F. Tao, Z. Gong, Z. B. Wang and D. S. van Maren (2020). "Building for nature: Preserving threatened bird habitat in port design." *Water* 12: 2134.
11. Muller, J. R. M., Y.-P. Chen, S. G. J. Aarninkhof, Y.-C. Chan, T. Piersma, D. S. van Maren, J.-F. Tao, Z. B. Wang and Z. Gong (2020). "Ecological impact of land reclamation on Jiangsu coast (China): A novel ecotop assessment for Tongzhou Bay." *Water Science and Engineering* 13: 57-64.
12. Oudman, T., H. Schekkerman, A. Kidee, M. van Roomen, M. Camara, C. J. Smit, J. Ten Horn, T. Piersma and E.-H. M. El-Hacen (2020). "Changes in the waterbird community of the Parc National du Banc d'Arguin, Mauritania, 1980-2017." *Bird Conservation International* 30: 618-633.
13. Peng, H.-B., Y.-C. Chan, T. J. Compton, X.-F. Cheng, D. S. Melville, S.-D. Zhang, Z. W. Zhang, G. Lei, Z. Ma and T. Piersma (2021). "Mollusc aquaculture homogenizes intertidal soft-sediment communities along the 18,400 km long coastline of China." *Diversity and Distributions*.
14. Piersma, T., R. E. Gill, Jr. and D. R. Ruthrauff (2021). "Physiomorphic transformation in extreme endurance migrants: revisiting the case of bar-tailed godwits preparing for Trans-Pacific flights." *Frontiers in Ecology and Evolution* 9: 685764.
15. Piersma, T., E. M. A. Kok, C. J. Hassell, H.-B. Peng, Y. I. Verkuil, G. Lei, J. Karagicheva, E. Rakhimberdiev, P. W. Howey, T. L. Tibbitts and Y.-C. Chan (2021). "When a typical jumper skips: itineraries and staging habitats used by Red Knots (*Calidris canutus piersmai*) migrating between northwest Australia and the New Siberian Islands." *Ibis*.
16. Piersma, T., A. H. J. Loonstra, M. A. Verhoeven and T. Oudman (2020). "Rethinking classic starling displacement experiments: evidence for innate or for learned migratory directions?" *Journal of Avian Biology* 51: e02337.
17. Reneerkens, J., T. S. L. Versluijs, T. Piersma, J. A. Alves, M. Boorman, C. Corse, O. Gilg, G. T. Hallgrimsson, J. Lang, B. Loos, Y. Ntiamoa-Baidu, A. A. Nuoh, P. M. Potts, J. ten Horn and T. Lok (2020). "Low fitness at low latitudes: Wintering in the tropics increases migratory delays and mortality rates in an Arctic breeding shorebird." *Journal of Animal Ecology* 89: 691-703.
18. van den Bremer, L., C. van Turnhout, T. Piersma, J. Nienhuis and A. de Jong (2020). "Broedprestaties van Nederlandse Huiszwaluwen. (Breeding performance of Dutch House Martins *Delichon urbicum*)." *Limosa* 93: 34-44.
19. van der Velde, E., R. Kentie, T. Piersma, E. Rakhimberdiev and J. Hooijmeijer (2020). De Grutto Monitor 2012-2019. Eindrapportage. De vinger aan de pols van de grutto-populatie met een actueel overzicht van de demografische parameters op basis van langjarig veldonderzoek in SUDWEST FRYSLÂN Groningen, Rijksuniversiteit Groningen, GELIFES: 1-44.
20. van Hasselt, S. J., R. A. Hut, G. Allocca, A. L. Vyssotski, T. Piersma, N. C. Rattenborg and P. Meerloo (2021). "Cloud cover amplifies the sleep-suppressing effect of artificial light at night in geese." *Environmental Pollution* 273: 116444.
21. van Hasselt, S. J., G.-J. Mekenkamp, J. Komdeur, G. Allocca, A. L. Vyssotski, T. Piersma, N. C. Rattenborg and P. Meerloo (2021). "Seasonal variation in sleep homeostasis in migratory geese: a rebound of NREM sleep following sleep deprivation in summer but not in winter." *Sleep* 44: zsa244.
22. Verhoeven, M. A., A. H. J. Loonstra, A. D. McBride, P. Macia, W. Kaspersma, J. C. E. W. Hooijmeijer, E. van der Velde, C. Both, N. R. Senner and T. Piersma (2020). "Geolocators lead to better measures of timing and reneesting in black-tailed godwits and reveal the bias of traditional observational methods." *Journal of Avian Biology* 51: e02259.
23. Verhoeven, M.A., Loonstra, A.H.J., McBride, A.D., Both, C., Senner, N.R. & Piersma, T. (2020) Migration route, stopping sites, and non-breeding destinations of adult Black-tailed Godwits breeding in southwest Fryslân, The Netherlands. *Journal of Ornithology* 162: 61–76. doi: 10.1007/s10336-020-01807-3
24. Zhu, B.-R., C. J. Hassell, Y. I. Verkuil, T. G. Gunnarsson, J. C. E. W. Hooijmeijer, Z.-W. Zhang and T. Piersma (2020). "Size, shape and sex differences in three subspecies of Black-tailed Godwits *Limosa limosa*." *Bird Study* 67: 45-52.
25. Zhu, B.-R., Y. I. Verkuil, J. R. Conklin, A. Yang, W. Lei, J. A. Alves, C. J. Hassell, D. Dorofeev, Z.-W. Zhang and T. Piersma (2021). "Discovery of a morphologically and genetically distinct population of Black-tailed Godwits in the East Asian-Australasian Flyway." *Ibis* 163: 448-462.
26. El-Hacen M. E., K. J. Meijer, L. L. Govers, M. Lavaleye, T. Piersma and H. Olf (2021). "Mangrove-mudflat connectivity shapes benthic communities in a tropical intertidal system." *Ecological Indicators*, In press.

External Functions

- Chairman of the *Global Flyway Network*, an international foundation
- Member of KNAW, Amsterdam
- Member of KHMW, Haarlem
- Editor-in-Chief of *Ardea* (from January 2014)
- Editorial board of *Journal of Ornithology*
- Editorial board of *Science and Development*, journal of the University of Ghana College of Basic and Applied Sciences

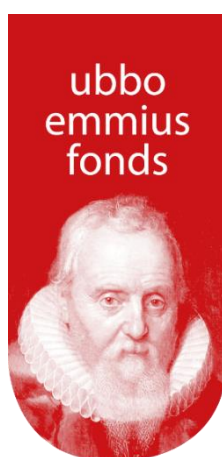
Fundraising for research

The Chair's work is funded by a range of organizations, foundations and private donors. The sponsors make it possible to conduct cutting-edge scientific research at the organizations where the Chair is based, the University of Groningen (RUG) and the NIOZ Royal Netherlands Institute for Sea research. Sponsors for ongoing programs are listed in the section Plans for 2021-2022. The full list of sponsors can be accessed here: <https://teampiersma.org/sponsors/>.

To ensure the continuation of the long-term research of the team as well as the use of the latest advances satellite tracking and communication techniques, the Chair additionally relies on other funding from National and International Foundations and Funds, like Gieskes-Strijbis Fund, Triodos Foundation, Ubbo Emmius Fund, WWF, MAVA Foundation (and many others) and on anonymous private donors.

Over the reported period, the Chair and his team were fortunate to partner-up with the Dutch Ministry of Agriculture, Nature and Food Quality and the Province of Fryslân in a long-term project to continue the long-term demographic study of the godwits in Fryslân. During the same period, the Chair's team was able, together with scientists from the State Agency of Bird Protection, Nature Conservation Center Dümmer, Lower Saxony (Germany), to get funding for an international innovative research project on migrating meadow birds from the EU Life programme (for 10 years). A very motivating success.

Another very interesting project 'WereldGrutto's', for which the Chair still seeks funding, aims to unravel the weaved connection between ecosystems and migratory birds. This project will show how godwits' movements can be used as sentinels for the state of the earth: godwits are able to predict intensively used, dry, and polluted meadows from healthy ones.



Ministerie van Landbouw,
Natuur en Voedselkwaliteit



GIESKES · STRIJBIS FONDS

provinsje fryslân
provincie fryslân 



PERSPECTIVES

Demography programmes

- Black-tailed Godwits as sentinels of the ecological transition of Dutch dairy farming (*Funding: Ministry of Agriculture*)
- Demography & ontogeny of Spoonbills (with Petra de Goeij, Tamar Lok, Werkgroep Lepelaar) (*Funding: Chair funding to Petra de Goeij, RUG*)
- East Asian–Australasian Flyway (EAAF) demography of Great Knot, Red Knot, Bar- and Black-tailed Godwits (*Funding: WWF-NL; private*)
- East Atlantic Flyway (EAF) demography of Red Knot, Bar-tailed Godwit and Sanderling (*Funding: NIOZ; and pending*)



Ecology programs

- Social interactions in red knots in Wadden Sea (with Allert Bijleveld, NIOZ, Ton Groothuis and Franjo Weising, RUG) (*Funding*: NWO VENI grant to Allert Bijleveld, NIOZ/RUG)

Sentinel tracking programs, incl. ecological on-the-ground research

- East Asian–Australasian Flyway (EAAF) sentinels: Bar-tailed Godwits, Great Knots Red Knots (with Chinese collaborators at Beijing Forestry University, Beijing Normal University and Fudan University) (*Funding*: Chinese sources; WWF-NL; Ubbo Emmius Fund; private)
- West Africa/Wadden Sea/Arctic sentinels: Red Knots, Bar-tailed Godwits, Sanderling & Spoonbills (with international team) (*Funding*: NIOZ; MAVA foundation; pending)
- West-Africa and Iberia sentinels in freshwater wetlands: Black-tailed Godwits (*Funding*: Gieskes-Strijbis Fonds, BirdLife-NL and core funding RUG)
- Bijagós Archipelago to Arctic sentinels: Bar-tailed Godwits and Whimbrel (with international team) (*Funding*: MAVA foundation; pending)
- Remote sensing ecosystem functioning (with Eldar Rakhimberdiev and Ruth Howison, RUG) (*Funding*: Gieskes-Strijbis Fonds)

Arctic breeding programmes

- Greenland breeding phenology and general biology of Sanderling (with Jeroen Reneerkens, RUG) (*Funding*: Polar Program NWO)
- Taimyr breeding phenology (*Funding*: NWO VICI grant to Jan van Gils; NIOZ)

Wadden Sea programs

- Griend restoration: how do Sanderlings use intertidal habitats? (with Laura Govers, RUG) (*Funding*: NIOZ; grant to Natuurmonumenten from Waddenfonds)

- Long-term monitoring of food resources (SIBES) (*Funding*: NIOZ with NAM and Rijkswaterstaat)
- Spoonbill monitoring; solve the mystery of the flattening offspring numbers on Schiermonnikoog (*funding*: private foundations; pending)

Evolution of flyways programmes

- What are the barriers to gene flow? (with Jesse Conklin, RUG) (*Past funding*: NWO ALW)
- Developing genetic markers for flyway populations (with Jesse Conklin, GFN) (*Funding*: pending)

Education programme 2021–2022

In November 2022 the Chair will teach the 3-week MSc course Flyway Ecology for the 5th time. We offer this course since 2015. Since 2018 the MSc track “Ecology & Conservation” offers (international) students to specialize in conservation ecology; our Flyway Ecology course is part of this specialization and part of the international Master of Science education at the University of Groningen.

The goal of the course is to introduce a new generation of biologists to the world of flyway ecology, to reach a level of understanding in this research field that will allow students to ask new study questions and develop societally relevant research programs integrating available ecological and evolutionary knowledge.

In summary

The Rudi Drent Chair in Global Flyway Ecology at the University of Groningen has contributed significantly to waterbirds conservation worldwide. The team conducted cutting-edge and high impact science to inform decision makers and the wider public on the status of many flyways across the globe as well as the challenges and solutions. Over the last year, the Chair and his team published more than 32 publications, of which 26 are peer-reviewed. The Chair gave more than 18 presentations to audiences of all backgrounds and hierarchies. Our twitter account (4172 followers) received over the reported year 4.3 million ‘impressions’ and 81,000 profile visits. In addition, the Chair continued the battle for the protection of shorebirds and their habitats at the national and international media via constant outreaches and influential tweets. At the scientific frontier, the team continue expanding the PhD and research network of people working on flyways globally. Special attention has been given to students that are less fortunate such as in West Africa and southeast Asia. At the issue of habitat management, the Chair kept trying to close the gap between science, managers and local stakeholders. The Chair and his team continue to strive to provide a platform of trust where all involved find themselves respected. Clearly, building on the organizational strengthening and the immense outreach achieved, it is becoming urgent that new and hopefully longer-term funding will be established.

SUPPLEMENT

Media

1. Vragenovervloed

Theunis Piersma

10/07/2021

1 Media contribution

Press/Media: Public Engagement Activities ›
Popular

2. Wat grutto's elkaar vertellen

Theunis Piersma & Ondrej Belfin

08/04/2021 → 10/07/2021

3 items of Media coverage

Press/Media: Research › Academic

3. Suggesties voor een integraal toekomstbeeld: het landschap als kathedraal

Theunis Piersma, T., & C. van den Berg

16/01/2021 → 05/07/2021

1 item of Media coverage, 1 Media contribution

Press/Media: Research › Professional

4. Marloes Fopma van Terschelling draagt haar grote liefde voor vogels uit in het nieuwe boek 'Vogels van de Wadden'

Theunis Piersma

17/06/2021 → 05/07/2021

3 items of Media coverage

Press/Media: Public Engagement Activities ›
Popular

5. Thúsakademy met Theunis Piersma

Theunis Piersma

28/06/2021 → 01/07/2021

4 items of Media coverage, 1 Media contribution

Press/Media: Public Engagement Activities ›
Popular

6. Een mens kan iedere dag besluiten een nieuw leven te leiden

Theunis Piersma

24/06/2021 → 26/06/2021

2 items of Media coverage

Press/Media: Public Engagement Activities ›
Popular

7. Wat grutto's elkaar vertellen

Ondrej Belfin & Theunis Piersma

24/06/2021

1 item of Media coverage

Press/Media: Research › Academic

8. Een scholekster is meer onder de indruk van een transportvliegtuig dan van een F-16

Theunis Piersma

22/06/2021 → 23/06/2021

2 items of Media coverage

Press/Media: Expert Comment › Popular

9. Het mysterie van de lepelaar - Waarom sterven er zoveel kuikens?

Petra de Goeij, Theunis Piersma, Yvonne Verkuil & Jesse Conklin

22/06/2021

2 Media contributions

Press/Media: Research › Academic

10. Wethouder bezoekt vogelonderzoekers

Jos Hooijmeijer & Theunis Piersma

13/06/2021

1 Media contribution

Press/Media: Public Engagement Activities ›
Professional

- 11. Aquaculture turns biodiversity into uniformity along the coast of China**
 He-Bo Peng, Theunis Piersma, Ying-Chi Chan & Shou-Dong Zhang
 26/05/2021 → 30/05/2021
 10 items of Media coverage
 Press/Media: Research › Academic
- 12. Simpel beleid geeft klimaat een slinger**
 Esther Bijlo & Theunis Piersma
 25/05/2021
 1 Media contribution
 Press/Media: Public Engagement Activities › Popular
- 13. Burgen kan boer bij weidevogels helpen**
 Theo Klein & Theunis Piersma
 22/05/2021
 1 Media contribution
 Press/Media: Public Engagement Activities › Popular
- 14. Verboden bestrijdingsmiddel DDT aangetroffen in elf Friese grutto-eieren en drie dode grutto's**
 Theunis Piersma
 30/04/2021
 1 item of Media coverage
 Press/Media: Expert Comment › Professional
- 15. De grutto is de nieuwe dodo - Weidevogelbeheer kan neergang niet stoppen**
 Theunis Piersma & Egbert van der Velde
 29/04/2021
 1 Media contribution
 Press/Media: Expert Comment › Professional
- 16. Sinagote, het verhaal van één lepelaar**
 Theunis Piersma & Petra de Goeij
 27/03/2021 → 24/04/2021
 9 items of Media coverage, 3 Media contributions
 Press/Media: Research › Popular
- 17. Friese 'gruttoer' hoopt voorzichtig op een goed broedseizoen**
 Theunis Piersma
 24/04/2021
 1 item of Media coverage
 Press/Media: Expert Comment › Popular
- 18. Heechleararen kritysk op stroomkabel troch Skiermûntseach**
 Tjisse van der Heide, Theunis Piersma & Han Olf
 22/04/2021
 2 items of Media coverage, 1 Media contribution
 Press/Media: Expert Comment › Popular
- 19. Belg reddt Fries kemphanen-onderzoek**
 Raf Vervoort & Theunis Piersma
 19/04/2021
 1 item of Media coverage
 Press/Media: Research › Academic
- 20. De lepelaar Sinagote reist wat af**
 Rob Buitter & Theunis Piersma
 15/04/2021
 1 Media contribution
 Press/Media: Public Engagement Activities › Popular
- 21. Hoe vinden trekvogels hun nest terug?**
 Theunis Piersma
 03/04/2021
 1 item of Media coverage
 Press/Media: Expert Comment › Academic
- 22. Meer insecten op kruidenrijke grutto-weiden in Súdwest Fryslân**
 Jos Hooijmeijer, Theunis Piersma & Theo Zegers
 01/04/2021 → 02/04/2021
 2 items of Media coverage, 1 Media contribution
 Press/Media: Research › Professional

- 23. Naturalist traces the 'astounding' flyways of migratory birds**
Theunis Piersma
29/03/2021
1 item of Media coverage
Press/Media: Public Engagement Activities › Popular
- 24. Honderden mensen doen mee aan 'klimaat-
alarm' bij de Oldehove in Leeuwarden**
Theunis Piersma
14/03/2021 → 15/03/2021
6 items of Media coverage, 1 Media contribution
Press/Media: Public Engagement Activities › Popular
- 25. Fryslân DOK 'Gruttoleven'**
Jelle Loonstra, Mo Verhoeven & Theunis Piersma
24/02/2021 → 14/03/2021
4 items of Media coverage, 2 Media contributions
Press/Media: Research › Popular
- 26. Provincie Fryslân gaat werk maken van
zorgplicht van boeren voor weidevogels**
Jos Hooijmeijer & Theunis Piersma
07/03/2021
1 item of Media coverage, 1 Media contribution
Press/Media: Expert Comment › Professional
- 27. Grutto-lobby wint vooral tijd in slag om Por-
tugees vliegveld**
Theunis Piersma
03/03/2021
3 items of Media coverage
Press/Media: Other › Professional
- 28. De Gouden Gehaktbal**
Theunis Piersma
27/02/2021
1 item of Media coverage
Press/Media: Public Engagement Activities › Popular
- 29. Wildcamera's moeten predatoren in Zuid-
west-Fryslân in kaart brengen**
Theunis Piersma, Rienk Fokkema, Jos Hooijmeijer & Ruth Howison
08/02/2021
2 items of Media coverage
Press/Media: Research › Academic
- 30. Het excuus van de Boerenleenbank**
Jeroen Onrust & Theunis Piersma
21/01/2021 → 28/01/2021
1 item of Media coverage, 1 Media contribution
Press/Media: Expert Comment › Popular
- 31. 'Trekvogels volgen heel netjes de flyways'**
Theunis Piersma
18/12/2020
1 Media contribution
Press/Media: Research › Popular
- 32. Grutto's hebben het belabberdste broedseizoen in 17 jaar: Nauwelijks jonge kuikens**
Jos Hooijmeijer, Jelle Loonstra & Theunis Piersma
21/08/2020 → 14/12/2020
7 items of Media coverage, 5 Media contributions
Press/Media: Research › Academic
- 33. Manure injection detrimental to meadow birds**
Jeroen Onrust, Theunis Piersma & Han Olff
08/03/2019 → 11/12/2020
16 items of Media coverage, 2 Media contributions
Press/Media: Research › Academic
- 34. De teloorgang van de grutto, de 'Kening fan 'e Greide' op een verarmd boerenland**
Theunis Piersma & Jos Hooijmeijer
15/04/2020 → 21/11/2020
2 items of Media coverage
Press/Media: Public Engagement Activities › Popular
- 35. Reddingsplan weidevogels - Ja, de grutto heeft het moeilijk, maar geef de vos er niet de schuld van**
Jos Hooijmeijer & Theunis Piersma

17/11/2020 → 19/11/2020

2 items of Media coverage

Press/Media: Expert Comment › Professional

36. Migrerende dieren leven snel en sterven jong

Theunis Piersma

18/11/2020

1 item of Media coverage

Press/Media: Other › Popular

37. New research suggests diet and exercise are for the birds

Eva Kok & Theunis Piersma

05/11/2020 → 07/11/2020

3 items of Media coverage

Press/Media: Research › Academic

38. Tijdens jaarlijkse trek werkt vleermuisafweer anders

Theunis Piersma

28/10/2020

1 item of Media coverage

Press/Media: Expert Comment › Academic

39. Rosse grutto verpulvert wereldrecord ver vliegen met bijna dertienduizend kilometer over de Stille Oceaan

Theunis Piersma & Jesse Conklin

10/10/2020 → 21/10/2020

19 items of Media coverage

Press/Media: Research › Academic

40. Godman Salvin-medaille voor vogelprofessor Theunis Piersma

Theunis Piersma

10/10/2020 → 13/10/2020

4 items of Media coverage, 1 Media contribution

Press/Media: Research › Academic

41. 'Duurzaamste Docent' komt uit de Greidhoeke

Maarten Pennewaard & Theunis Piersma

12/10/2020

1 Media contribution

Press/Media: Public Engagement Activities › Professional

42. Ardeola: International Journal of Ornithology

Mo Verhoeven, Jelle Loonstra, Alice McBride, Christiaan Both, Nathan Senner & Theunis Piersma

29/09/2020

1 Media contribution

Press/Media: Public Engagement Activities › Academic

43. Friezen botsen met boeren: 'landschapspijn' door uitbreiding melkveehouderij

Karin de Mik & Theunis Piersma

29/09/2020

1 Media contribution

Press/Media: Public Engagement Activities › Popular

44. Hoog tijd om duidelijk keuzes te maken

Caspar van den Berg, Theunis Piersma & Klaas Sietse Spoelstra

28/09/2020

1 Media contribution

Press/Media: Public Engagement Activities › Popular

45. Golven van onheil of verandering?

Caspar van den Berg, Theunis Piersma & Klaas Sietse Spoelstra

24/09/2020

1 Media contribution

Press/Media: Expert Comment › Professional

46. Geachte koning,

Jeroen Onrust & Theunis Piersma

16/09/2020 → 17/09/2020

3 items of Media coverage

Press/Media: Research › Academic

47. 'Lijn de kat aan om weidevogels te beschermen'

Theunis Piersma & Christian Smit

14/09/2020

1 Media contribution

Press/Media: Expert Comment › Professional

48. Provincie telt insecten alleen regionaal

Theunis Piersma

05/08/2020

1 item of Media coverage

Press/Media: Expert Comment › Popular

49. Volg de grutto's in de Krimpenerwaard

Theunis Piersma

11/07/2020

1 item of Media coverage

Press/Media: Public Engagement Activities › Professional

50. Hongersnood onder gruttokuikens in Fryslân door tekort aan insecten

Egbert van der Velde, Theunis Piersma & Jos Hooijmeijer

27/02/2020 → 01/07/2020

12 items of Media coverage, 3 Media contributions

Selected lectures and presentations by the Chair

01-July-2020 Invited lecturer at De Balie of Amsterdam: **Grutto's in De Balie**. In: Amsterdam, The Netherlands. <https://debalie.nl/programma/vogelen-in-de-balie-de-grutto-01-07-2020/>

13-July-2020 Invited lecturer at Banc d'Arguin scientific days symposium: **Joint long-term ecological monitoring of flyway systems**. In: Chami, Mauritania.

28-July-2020 Presenting at SymbioSE-2020 scientific program: **Migratory birds as integrative, down-to-Earth, observers of the state of habitat: developing a sentinel system**. In: Groningen, The Netherlands. <https://www.symbiose-europe.org/info/scientific>

4-Aug-2020 Invited presenter during lecture series on coastal ecology, Fudan University: **Satellite-based tracking of migratory shorebirds**. In: Shanghai, China.

4-Aug-2020 Invited presenter during lecture series on coastal ecology, Fudan University: **What happens to a migratory bird in one place will affect its options in the next place: carry-over effects in shorebirds**. In: Shanghai, China.

29-Apr-2020 Invited speaker at the EAAFP 2020 World Migratory Bird Day Webinar: **Bringing Good Connections to Life**. Virtual conference.

10-Sep-2020 Seminar at NIOZ: **The migration of red knots of the *piersmai* subspecies in East Asian-Australasian Flyway**. Texel, The Netherlands.

10-Oct-2020 Invited presenter for the annual International Wader Study Group conference: **Tracking Red Knots in the East Asian-Australasian Flyway**. Virtual conference.

- 4-Nov-2020 Planery speaket at East Asian-Australasian Flyway Shorebird Science Meeting: **The mission of *Global Flyway Network*: Cooperative down-to-Earth observations in Asia-Pacific**. In: Yeonsu-gu, Incheon, Republic of Korea.
- 21-Jan-2021 Presenting at NIOZ: **Sinagote Het levensverhaal van een lepelaar**. Texel, The Netherlands.
- 15-Feb-2021 Presenting at RUG: **Sinagote Het levensverhaal van een lepelaar**. Groningen, The Netherlands.
- 6-May-2021 Invited speaket at NWO: **Sinagote Het levensverhaal van een lepelaar**. Virtual meeting.
- 31-Mar-2021 Invited speaker at Van Hall Larenstein: **Duurzame melkveehouderij: grutto's als waakvogels en inspiratiebronnen**. University of applied science, Leeuwarden, The Netherlands.
- 21-Apr-2021 Invited speaker for a local seminar on Schiermonnikoog: **Een natuurbeschermingsbelang dat over het hoofd is gezien: belang voor foeragerende lepelaars en lepelaars in de rui**. Schiermonnikoog, The Netherlands.
- 6-May-2021 GELIFES Seminar: **Migratory birds as sentinels of the world around us**. Groningen, The Netherlands.
- 25-May-2021 Seminar for LIFE-IP GrassBirdHabitats project: **The conservation of wet grassland breeding bird habitats in the Atlantic Region**. Germany.
- 8-June-2021 Invited speaker at Campus Fryslan: **Voices of a living planet: can migratory birds help us?** Leeuwarden, The Netherlands
- 16-June-2021 Invited speaker at the Argos Bird Telemetry webinar. **Satellite tracking of shorebirds: voices of living planet**. Virtual conference.
- 26-June-2021 Invited speaker at a workshop on Tiaozini wetlands, Jiangsu, China: **The importance of habitat quality for migratory shorebirds**. Virtual workshop.