

# **RESEARCH & DEVELOPMENT**

## **2021**



**Novia UAS Institution of Bioeconomy**

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Research & Development Report 2021. Institution of Bioeconomy

Publisher: Yrkeshögskolan Novia, Wolffskavägen 33, 65200 Vasa, Finland © Yrkeshögskolan Novia  
and Ruslan Gunko

Novia Publikation och produktion, serie R: Serie: R Rapporter 5/2022 Online

ISBN: 978-952-7048-83-2 (Online) ISSN: 1799- 4179

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# Research, development and innovation at the institution for Bioeconomy

Marianne Fred

Writing this I think 2021 will go to history as the second year of the covid-pandemic for many of us. The year that just passed while waiting for things to change, but not getting hopes up anymore. The year when working in front of our screens, from home, in our covid-longjohns became legit. The RDI-activities in 2021 show a year full of events and research-activities nonetheless. The transition into the digital world happened almost overnight and in 2021, we had already gained some experience and were getting quite good at organizing ourselves remotely. Fieldwork season was for many a welcome relief from screens, and I hope you will read all about it in this report.

Writing this in April 2022, all those problems we were facing in 2021 seem small and manageable. The situation in the world has taken a blow and moved into insecure times when the decoupling from fossil fuels has become a political action we have to take today, not in 5-10 years. Where food sovereignty is on the agenda of every EU-nation in a way we have not experienced since the great wars. However, most of all in 2022 war came close again and the suffering of countless people, the environment, the culture, creatures big and small are ever present in our minds. It is now we need that resilience we have been building, we need

## NOVIA R & D IN BIOECONOMY

The invisible year of 2021, year two of the pandemic



to transform systems and we need solidarity. I think we can all achieve something and working together for freedom is a worthy cause for anyone. Freedom as nations, freedom as individuals, freedom to make choices, freedom to change, freedom to learn, and freedom to work together. However small our contribution at RDI in Bioeconomy in Novia to this global transformation may be, it is evident that also we have been contributing to freedom and a better world in the invisible year of 2021. I read this report in a different light now that the needs for transformative action are all the more pressing. I read of hope and solutions, co-operation and knowledge in this report. I hope you do too, and I hope that next years oversight will be one of resolution, purpose and freedom.

# Birds and wind farms

Fabio Balotari-Chiebao and Patrik Byholm

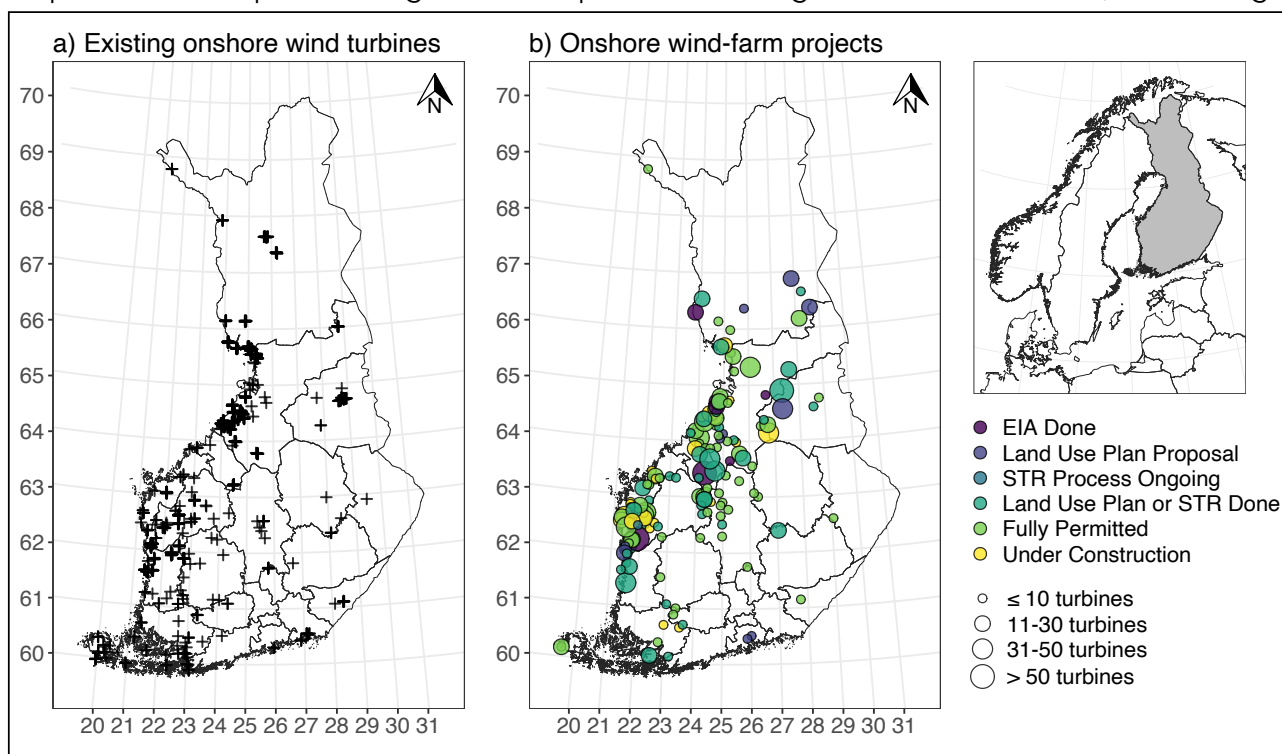
## RESEARCH GROUPS

We study birds in the context of wind energy in Finland. We rely on large datasets that inform us about the spatial distribution of birds and wind farms. Our primary aim is to prevent conflicts between birds and wind-energy development. Notable study questions include: What is the exposure of different bird species to the currently existing and planned wind farms? Which species or species groups are at greatest risk? Which areas should be avoided by wind-energy planners in order to protect at-risk bird populations?

### Highlights of the year

In 2021, we published a study entitled “Assessing the vulnerability of breeding-bird populations to onshore wind-energy developments in Finland”. Wind-energy expansion is a cause of concern for the future protection of birds. Birds can be affected in various ways, including collision with turbines or associated infrastructure, habitat loss or fragmentation, and displacement due to disturbance. In particular, species that have long generation times, low reproductive output and high habitat spe-

cialisation are more likely to be impacted. Despite this general guideline, it was not known which species are actually more vulnerable to population-level impacts in Finland. In that study, we applied a quantitative prioritisation method to assess the vulnerability of 214 species to onshore wind-energy developments by means of so-called priority scores. A high priority score would indicate species that require special attention in future wind-energy planning. We used the national census data for the breeding distributions of birds, and a range



Location of existing turbines and proposed wind farms at various development phases in Finland. (Figure produced from data compiled by Etha Wind Oy in collaboration with the Finnish Wind Power Association; last updated in February 2020).

of other relevant data. We then computed the priority scores based on a combination of species-specific life-history traits, habitat specialisation, wind-energy exposure and national conservation status. In the results, it became clear that, given the differences in species characteristics and exposure to wind energy, the studied species vary markedly in their vulnerability to population-level impacts. In general, high-priority species include terns (e.g., *Sternula albifrons*), raptors (e.g., *Aquila chrysaetos*), gulls (e.g., *Larus fuscus*), some forest-dwelling passerines (e.g., *Poecile montanus*) and ducks (e.g., *Aythya ferina*). Conversely, low-priority species include woodpeckers (e.g., *Picus canus*) and many passerines. These differences in priority scores can have direct implications for bird conservation, wind-energy planning and research.

Following the completion of that study, we started working on a related study that aims

to provide explicit spatial guidance to wind-energy planners for the protection of birds at the regional and national scale. This study is rooted in the concept of impact avoidance via so-called spatial conservation prioritisation, which is used to help to direct environmentally-harmful activities towards low-priority areas. Siting wind farms in areas that pose little risk to vulnerable bird populations is the first, and most important, stage in the mitigation hierarchy. To achieve our objectives, we rely on an analysis of relevant spatially-structured data within Zonation, a spatial conservation prioritisation software that is highly regarded in decision-making processes for environmental protection and biodiversity conservation. The results of this study will help to identify bird areas that should be avoided by wind-energy development, as well as bird areas that may conflict with the wind farms that are currently proposed in Finland.

#### Collaborators

- Jari Valkama, Andrea Santangeli and Sirke Piirainen (University of Helsinki)

Det utförda arbetet behandlar viktiga aspekter av fågelskydd i samband med utvecklingen av vindenergi i Finland. I ett arbete som publicerades 2021 visar vi att hotet från vindenergi kan variera kraftigt mellan arter. Detta beror på att arterna är mycket olika varandra när det gäller livshistoriska egenskaper, habitatspecialisering, exponering för nuvarande och föreslagna vindkraftsparker och bevarandestatus. Artgrupper som kräver särskild uppmärksamhet i samband med vindenergiplanering inkluderar tärnor, rovfåglar, måsar, vissa skogslevande tättingar och änder. I en annan påbörjad studie påbörjade vi arbete kring begreppet undvikande av påverkan via rumslig bevarandeprioritering. I den här studien använder vi programvaran Zonation för att identifiera för fåglar viktiga områden som bör besparas från utbyggnation av vindkraft.



# Ecology of forest raptors and archipelago birds

Patrik Byholm, Martin Beal (Lund University & ISPA - Instituto Universitário), Fábio Balotari-Chiebáo, Julia Gómez-Catasús

## Highlights of the year

Although the active field work phase involving Northern goshawks ceased already years ago, old data continues to deliver. Thus, two scientific papers involving goshawks were published in 2021. In the first study we tested whether goshawks exert both positive and negative effects on spatial distribution of other species, and if these effects persist even after the predator disappears. From the results from a Bayesian joint species distribution model, we found that large bird species (preferred prey) are less abundant in the proximity of nests occupied by goshawks, whereas smaller species - expected to get protection from subordinate predators displaced by goshawks - more often showed an opposite association. These spatial differences levelled off gradually with time, but still persisted for years after the goshawks have disappeared. This indicates that the composition of local bird populations and communities might be conditional on past species interactions. In the second study we report that about 30% of the female goshawks in our study performed breeding dispersal. We found no evidence that territorial landscape barrenness (proxy on habitat quality) affects the probability of breeding dispersal, but when females dispersed they chose to settle in less barren

## RESEARCH GROUPS

We study the population and conservation biology of forest raptors and the Caspian tern. By combining traditional field work with new technology and statistical modelling, we aim to get better understanding of species' movement ecology, habitat use and factors limiting their distribution.



Old and lush mixed-spruce forest is an important habitat for Finnish Northern goshawks. Photo: Patrik Byholm.

territories than the one they left. These findings show that female goshawks in opposite to what hitherto has been believed in fact often change breeding territory and when they do so they upgraded themselves to more benign territories.

In a third paper involving Caspian terns - world's largest tern species - we investigated the breeding season habitat preference and foraging site fidelity of Caspian terns breeding in Finland and Sweden using GPS devices. We found that daily time spent away from the colony increased throughout the breeding season in general, but we also found that birds breeding in different colonies differed in terms of distance travelled per day. Terns selected shallow waters between 0-5 meters in depth for foraging, some also regularly frequented inland lakes. Individual Caspian terns were faithful to foraging sites throughout the breeding season. At the moment we have also initiated new effort to model the Baltic Sea population of Caspian

terns fitting individual-based models using an Approximate Bayesian Computation-approach.

Given the potential negative effects of the expansion of wind power on birds, we assessed the sensitivity of bird species that regularly breed in the country towards wind power. We are able to show clear distinctions between species, a minority of species being high-ranked while a majority

being low-ranked species. More detailed information on this initiative is reported in Fábio Balotari-Chiebáo's project text found elsewhere in this report. However, most importantly, our results indicate that the priority species are not limited to the more highly regarded large raptors, and that wind-energy impact assessments need to pay special attention to high-ranked species inhabiting coastal areas.

De vetenskapliga artiklar som publicerades 2021 tangerade tre olika teman: (a) skogsrovfåglars ekologi och naturskydds-biologi, (b) skräntärnors habitat-utnyttjande under häckningsperioden samt (c) temat vindkraft och fåglar. Gällande skogsrovfåglar visar vi i den ena studien att närvaron av duvhökar ha både negativ och positiv inverkan på på andra fågelarters förekomst och att denna effekt syns ännu flera år efter att rovfågeln försvunnit från området i fråga. I den andra studien rapporterar vi närmare 30% av vuxna duvhökshonor - en art som hittills ansetts starkt ortstrogen - under något skede av sitt liv byter häckningsrevir och att när så sker söker de sig typiskt till områden av högre habitatskvalitet. Gällande skräntärnorna så kan vi m.h.a. GPS-uppföljning visa att skräntärnor har individuella fiske-platser och att dessa hålls förvånansvärt konstanta även om individerna häckar i samma koloni. I studien som tangerar temat vindkraft och fåglar bedömer vi hur sårbara 214 finländska fågelarter är för vindkraft (se Fabio-Balotaris separata projektrapport för fler detaljer).

### Collaborators

- Jari Valkama and Otso Ovaskainen (University of Helsinki)
- Daniel Burgas (University of Jyväskylä)
- Guillaume Blanchet (Université de Sherbrooke, Canada)
- Andreas Lindén (Natural Resources Institute Finland)
- Tom J. Evans (Marine Scotland Science, UK)
- Susanne Åkesson (Lund University, Sweden)
- Kouze Shiomi (National Institute of Polar Research, Japan)
- Ulrik Lötberg (BirdLife Sweden)



During fieldwork with the Caspian terns you might also get to know less common weather phenomena: a fog bow in the end of June in the archipelago of Southern Ostrobothnia. Photo: Patrik Byholm.



# Climate change: plankton ecology and eco-physiology

Jonna Engström-Öst, Ella von Weissenberg, Nonni Linman, Anna Jansson

We participated in a mesocosm experiment *Impact of salinity change on food web interactions in marine plankton communities* at Tvärminne Zoological Station (University of Helsinki), funded by Aquacosc Transnational Access. We studied copepod eco-physiological responses to changing salinity in the western Gulf of Finland. The field experiment was conducted in mesocosms off the field station in May and June 2021. The enclosures were treated with different mixture of freshwater and brackish water. Main collaborators were:

Aleksandra Lewandowska (University of Helsinki UH), Clio Hall (UH) and Sultana Zervoudaki (Hellenic Centre for Marine Research).

Louise Forsblom et al. (2021) published a paper in *Ecology and Evolution* on benthic-pelagic coupling. The main aim was to investigate the nature of the population level

The main interest of our research group is to increase the understanding of ecological and eco-physiological responses to climate change in the marine pelagic environment. We use long-term data and work in field and lab using comparative approaches.

biotic interactions between and within these two seemingly independent communities, both dependent on the pelagic primary production, while simultaneously accounting for salinity, temperature, and oxygen conditions. We were not able to detect any direct coupling between sediment-dwelling benthic taxa and pelagic copepods and cladocerans on the annual scale, but the most parsimonious model indicated that interactions within the benthic community are essential. The paper is a collaboration between Yrkeshögskolan Novia, Åbo Akademi, SYKE Finlands Miljöcentral and LUKE Nature Resource Institute.

Nonni Linman worked in the field and collected MSc thesis data in summer 2021. He worked along a salinity gradient to measure zooplankton body size in relation to environmental conditions temperature, salinity and chlorophyll *a*. Nonni's super-



visors are Jonna Engström-Öst and Christian Hattich-Pansch (Åbo Akademi). Nonni is analysing data, preparing his thesis, and aiming to submit the final version before summer 2022.

Hur påverkas plankton av en förändrad miljö? Kan djurplankton anpassa sig till klimatförändringen? Vi forskar i hur klimatförändringen samt övergödningen i den marina miljön påverkar plankton i Östersjön. Vi jobbar främst med djurplankton och undersöker deras eko-fysiologi, reproduktionsframgång, stressnivåer samt fettsyresammansättning. Projektet var år 2021 finansierat av Svenska kulturfonden, Walter och Andrée de Nottbecks stiftelse, Societas Pro Fauna et Flora Fennica, Onni Talaan säätiö och Waldemar von Frenckells stiftelse, samt LUOVA graduate school och Ilkka Hanskin rahasto vid Helsingfors universitet.



Nonni Linman doing his Masters on functional traits and environmental variability.



Ella von Weissenberg collecting water during the salinity mesocosm experiment in Tvärminne.

#### Collaborators

- Bednaršek Nina (Southern California Water Research Project, USA)
- Candolin Ulrika, Lewandowska Aleksandra and Hall Clio (University of Helsinki)
- Feely, Richard A. (National Atmospheric and Oceanic Administration, USA)
- Hattich-Pansch Christian (Åbo Akademi University)
- Lehtiniemi Maiju and Forsblom Louise (Finnish Environment Institute)
- Lindén Andreas (LUKE Nature Resource Institute)
- Långvik Otto (Novia)
- Riebesell Ulf (GEOMAR - Helmholtz Centre for Ocean Research Kiel, Germany)
- Almén Anna-Karin & Scheinin Matias (Tvärminne Zoological Station)
- Vuori Kristiina (University of Turku)
- Zervoudaki Soultana (Hellenic Centre for Marine Research, Greece)

## Functional ecology and applications

Patrik Karell, Chiara Morosinotto,  
Arianna Passarotto, Ruslan Gunko,  
Charlotte Perrault, Gian Luigi Bucciolini,  
Giuseppe Orlando



### Highlights of the year

In 2021 our research group continued with activities in both Finland and Sweden, with a main focus on studies of tawny owls in our facilities at Lund University. We have done behavioural and physiological experiments and collected lots of detailed data on growth and development of tawny owls in the facilities and surrounding infrastructure. The LES-project made great progress with the first publication in press and two more studies analysed and in preparation. We started a new Pan-European project where we collaborate with several tawny owl researchers with the aim to produce comparative analyses of variation and similarities in ecology of the species in different landscapes and climates. Another new project was started with Arianna where the aim is to understand how urbanization and human-induced noise and light pollution affect the use of adaptive traits in night-active tawny owls. Katja finalized her PhD thesis and prepared it for submission for pre-examination in January 2022. Our research group also increased in size as Gian Luigi and Giuseppe arrived in Novia through Erasmus internships and established new projects within the research group. In March I gave a plenary lecture at the OIKOS Finland

Our research group focusses both on fundamental questions dealing with the understanding of evolutionary adaptations to and demographic consequences of environmental change in natural populations, and on understanding the societal impacts of environmental variation, biodiversity and land use in an interdisciplinary framework. We collect and use individual-based field data from natural populations, and we use experimental set ups, citizen science data approaches, and surveys in our research. Currently our main financiers are the Academy of Finland, Kone foundation and the Swedish Cultural Foundation.

meeting (on Zoom), where I presented our results on adaptation to climate change in the colour polymorphic tawny owl.

The Tawny owl project: In the beginning of the year Gian Luigi came to Novia to work with the long-term tawny owl data collected by our collaborators in Sweden, Norway, Czech republic, Netherlands and Slovenia. Charlotte run behavioural experiments with the owls in Lund and followed up her mobbing experiments in Ingå in spring and autumn to understand the mobbing effects on tawny owls in different seasons. In spring Giuseppe came on an Erasmus internship to participate in our experimental studies at Lund University and to work on a long-term data set on population dynamics in the tawny owls. The tawny owls which we raised and studied at our Stadio Owlmpico aviaries in Lund University were released in spring and carefully monitored by our BSc students Klara and Emil from Uppsala University. Later



Stadio Owlmpico owl

on a new batch of owls were taken to the aviaries for a repetition of the studies and to run some additional studies. Simultaneously in spring we conducted field work also in Finland (led by Chiara, together with Jon Brommer). During summer Arianna and Giuseppe worked in the project with the owls at our Stadio Owlímpico in Lund, where we collected detailed data on growth, behaviour and physiology. In addition they conducted experiments to test how night-time noise impairs the hunting behaviour in tawny owl juveniles. Altogether the data we are collecting on tawny owls allow us to test predictions about mechanisms for coping with variable climatic conditions and stressful environments. The data on tawny owl



Cavity (nest box) in the forest.

### **Funktionell ekologi och dess tillämpningar**

I vår forskningsgrupp försöker vi förstå processer i naturen på olika plan genom att studera olika modellsystem. Hur anpassar sig organismer till förändringar i miljön och vilka är urvalsprocesserna? Hur påverkas djurs adaptiva beteenden och egenskaper av att människan förändrar deras livsmiljöer och vilka är konsekvenserna? Vi strävar även till att tillämpa data och resultat från dessa projekt med samhällsekoniskt relevanta frågeställningar där vi kopplar ihop ekologiska data med kvantitativa enkätundersökningar. I hur stor utsträckning kan man avverka skog utan att utarma biodiversiteten och ekosystemtjänster och finns det lönsamhet i en sådan ekologiskt hållbar strategi? Vilken betydelse har närmiljöns vattenkvalitet för människors välbefinnande och hur påverkar olika typer av mark-användning belastningen i kustvattnen?

reproductive biology collected in the field in Finland and in Sweden will allow us to connect the experimental work at Stadio Owlímpico with data from natural settings. In autumn after defending her MSc, Charlotte started her PhD project, Arianna started in the post doc project at Novia. Both Arianna's and Charlotte's projects include work at Stadio Owlímpico in Lund.

The LES project: Ruslan published his first manuscript dealing with the usefulness of citizen science to assess water quality variation. The results show that the water quality assessment by the public corresponds well with assessment using scientific sampling methods. Also, the second manuscript on links between environmental quality and life quality was submitted and a third manuscript on COVID19 effects on people-nature relationships has been in preparation. The work in LES greatly shows how we can engage people in society in data collection and simultaneously make people more aware of scientific research and the results we can achieve. Our aim is to understand how the state of the coastal environment affects life quality and its implications for society.

### **Collaborators**

- Staffan Bensch and Jan-Åke Nilsson (Lund University, Sweden)
- Davide Dominioni (University of Glasgow, UK)
- Al Vrezec (University of Ljubljana, Slovenia)
- Patrik Byholm and Jonna Engström-Öst (Novia)
- Jon E. Brommer, Miguel Soares, Timo Vuorisalo and Daniele Baroni (University of Turku)
- Aleksi Lehikoinen, Hannu Pietiäinen and Jari Valkama (University of Helsinki)
- Matias Scheinin (Department of Environmental Protection, Hanko)
- Markus Öst and Lauri Rapeli (Åbo Akademi University)
- Heikki Helanterä (University of Oulu)

# Energy transition and society

Farid Karimi

At the beginning of the year 2021, we got seed money fund from the Svenska Institutet for the project "Routing Deployment of CCUS in the BSR", in collaboration with Uppsala University, BASRECCS Association, Tallinn University of Technology, Polish Geological Institute-National Research Institute and Åland University of Applied Sciences. The overall objective of this ongoing project is to strengthen networking between stakeholders such as authorities, companies and universities on tackling climate change through technologies such as Carbon Capture, Use and Storage (CCUS) in the Baltic Sea Region (BSR) in order to facilitate deployment of a large-scale CCUS project. Full-scale CCUS projects play a vital role in meeting the objectives of the Paris

## RESEARCH GROUPS

I started my work at Novia UAS in February 2021 as a senior researcher. My primary goal is to establish a research group, "Energy Transition and Society Research Group, ETSRG", to address energy questions concerning bioeconomy and sustainable development based on my previous experience at the University of Greifswald, Germany.

Agreement and in mitigating climate change.

In addition, I joined a few international consortia aiming for international funds. The European-American consortium of several institutes and organisations, "Issues and solutions for the capture, transmission, and storage of Intermittent CO2 Emissions (ICE)", applied for a two-stage call from the Nordic Energy Research. Although we were successful in the first stage, we failed for the final stage of the call. However, we have kept this momentum to target another call. Furthermore, in collaboration with colleagues at the Campus Vaasa and IOM Law Firm in Norway, we participated in a call for tender "Hydrogen, electro-fuels, CCU and CCS in a Nordic context" by Nordic Energy Research. Despite the fact that we did not win the tender, we



got a promising final evaluation. This project also led to mapping the common fields of interest to strengthen collaboration between Campus Raseborg and Campus Vaasa. Furthermore, we joined a large pan-European consortium, "Zero-emission net-work to facilitate CCUS uptake in the industry" led by Sintef, Norway. The proposal was submitted to an EU Horizon Europe call. The selected project will be announced by August 2022. In addition, in collaboration with Fabio Balotari, a postdoc researcher at the Faculty of Bioeconomy, we submitted a research proposal to Svenska Kulturfonden to develop a novel approach for social acceptance study of wind energy based on the nexus of social sciences and ecology.

In late 2021, I got a generous grant from the Stiftelsen för Ekenäs Sparbank to support the Open Access (OA) of my upcoming book "Energy Transition in the Baltic Sea Region: Understanding Stakeholder Engagement and Community Acceptance" (Routledge). The book will be published in 2022; however, the major

Farid Karimi är specialforskare och föreläsare. Han började sitt arbete vid Yrkeshögskolan Novia i februari 2021. Farid är samhällsvetare. Hans huvudsakliga forskningsintressen ligger inom samhällsvetenskaperna, med särskild inriktning på frågor om energiomställningen, klimatförändringar, energisäkerhet och energipolitik. Under 2021 har hans arbete huvudsakligen ägnats åt publikationer av några artiklar och en bok. Han har också lämnat in några projektansökningar för nationella och internationella extern finansiering. Dessutom har han delat sina analyser och åsikter om energikriserna i EU genom att delta i paneler organiserade av t.ex. det Danska institutet för internationella studier, och intervjuer med, t.ex. Yle Svenska.

major work of this book has been done during 2021.

I have published two peer-reviewed articles (see the list of publications in this report). In the latest one, in contrast to the mainstream research, the paper hypothesises that both laypeople and experts are affected by common cultural denominators, therefore, might have similar patterns of risk perceptions of new energy technologies. Thanks to the support of the faculty, this paper is available OA.

Concerning dissemination, outreach activities and internationalisation, I was invited as a speaker and panellist to a few seminars and conferences by the Institute for Climate Protection, Energy and Mobility (at Greifswald, on an energy transition in the Balt Sea Region), Baltic Carbon Forum (online, on CCUS) and the Danish Institute for International Studies (online, on the energy crisis in the EU). Furthermore, I was invited to be a member of an international research advisory board of the project "Systemic lock-ins of carbon capture utilisation and storage: Implications for sustainability and societal legitimacy" at Aalborg University, Denmark, led by Associate Professor Ivar Lyhne. The board includes three other scholars from the Netherlands and the UK.

When it comes to education, apart from my teaching responsibilities, I supervised two interns from Institution of Technology and Seafaring and was examiner of two theses (a bachelor and a master).

#### Collaborators

- Michael Rodi (University of Greifswald and IKEM, Germany)
- Monika Ivandic (Uppsala University, Sweden)
- Ingvild Ombudstvedt (IOM Law, Norway)



# Occurrence and consequence of chemicals and pharmaceuticals in the water environment

Otto Långvik and Jonna Engström-Öst

## RESEARCH GROUPS

The project “Organic pollutants in coastal waters, plankton communities and benthic fauna” focuses to determine how selected chemical and pharmaceutical residues are localized and the effects they have on the water environment. The research project couples a strong knowledge of synthetic, organic as well as materials chemistry with environmental sciences and marine biology.

The insight of how phenomena and reactions in the environment occur on a molecular level, are interesting and beneficial for the whole Novia bioeconomy research team. The results will improve our know-how and understanding of specific biological systems in the coastal environment are affected and react to new challenges due to human interference.

We have focused to clarify to what extent chemicals, especially pharmaceuticals, are occurring in the surrounding environment. The objective is to conduct a detailed analysis of the local occurrences and concentrations of selected pharmaceutical compounds, both in surface waters and plankton and mussel populations. We have

carried out experiments, under controlled conditions, to study the interaction, distribution and effect of pharmaceuticals and chemicals with the surrounding environment and organisms. The mussels are being collected and various analysis, e.g., chemical and biomarkers, will be carried out to ensure a complete understanding of the effects caused.

When entering the watershed, the fate of organic contaminants and their subsequent metabolites are eventually determined by the different sedimentation, photo degradation, redox as well as metabolic processes and reactions. However, the effect of individual compounds depends on several properties including bioaccumulation and



The research group conducted an experiment to determine how Diclofenac, Ibuprofen and PFHxS interact with *Limecola Balthica* under controlled aquarium conditions.

concentration factors. It is known that when organic contaminants enter the environment, they can cause various and highly unwanted severe effects.

Furthermore, the group have been actively taking part in the education at Novia, organizing seminars and meeting, pub-

lication activities and applying for external project funding. We have together with CH-Bioforce Oy and Åbo Akademi University managed to initiate a working collaboration and joint development projects.

Research questions:	Hypotheses:
-To what extent does the organic pollutant bioconcentration depend on environmental factors, such as salinity, temperature, pH and oxygen?	We assume that pollutant profiles differ in the different areas; the highest effect is found where chemical pollution and oxidative stress as well as temperatures are the highest.
- Is the health status of benthos communities coupled to organic pharmaceuticals, or emerging pollutants (PFASs)?	We hypothesise that pollutants are associated with the health status of the studied organisms and will cause stress responses and decreased fatty acids in the experimental organisms.
-To what extent does elevated temperature and the different identities of contaminants contribute to the oxidative stress on benthic communities?	Controlled experiments will show that the elevated temperature in combination with the contaminants will show significant oxidative stress in communities.

#### Collaborators

- Patrik Eklund (Åbo Akademi University)
- Matilda Kråkström (Turku Bioscience Centre)

En av målsättningarna är att klargöra effekten av och på lång sikt minska kemikaliseringsen av miljön. Det är avgörande att kartlägga förekomsten och ackumuleringen av läkemedels- och kemikalierester i de lokala vattenmiljöerna samt bestämma i vilken utsträckning de individuella komponenterna överförs från vatten till plankton och andra organismer så som östersjömusslan.



# Ecophysiological adaptations to climate change

Chiara Morosinotto

I tested if tawny owls telomere length, a useful molecular biomarker of aging and condition, is heritable and if parental traits like color morph and age, affect offspring telomere length. I found that indeed telomere length is highly heritable in this species, but father age affects offspring telomere length, with offspring of older fathers having shorter telomeres, while there were no differences according to mother's age and parental color morphs. Meaning that the telomere length of the offspring will depend on the telomere length of both their parents and that having an older father will be a disadvantage for the offspring. The manuscript is currently under review in the journal *Physiological and Biochemical Zoology*.

To further understand tawny owl morph-specific physiology I also analyzed data on mitochondrial density, i.e. on the number of mitochondria in the blood of tawny owls and found that the two morphs strongly differ: brown individuals have more mitochondria than grey. This could suggest a stronger ability to respond to oxidative stress or, if mitochondria are more but less efficient than in grey morph, it may suggest similar abilities but at higher energetic costs. Data on oxidative stress and hormones are currently being analyzed in the lab by our collaborators Dr. Suvi Ruuskanen, Dr. Antoine Stier and Dr. Bin-Yan Hsu.

In the past year I also collaborated in a paper on morph-specific natal dispersal dynamics led by Dr. Arianna Passarotto.

## RESEARCH GROUPS

I am a postdoctoral researcher in the group of Dr. Patrik Karell working on evolutionary dynamics under environmental change. During this year I analyzed data to investigate several aspects of ecophysiology in the color polymorphic tawny owl (*Strix aluco*).



Chiara with a tawny owl chick of approximately 25 days

I also organized the monitoring of the long-term breeding population we have in Uusimaa and helped to collect biometric and physiological data on breeding individuals. During autumn 2021 I coordinated a large scale European-wide comparison on tawny owl cavity use. Together with collaborators in Slovenia, Sweden and Italy we set infrared camera-traps in nest boxes and are planning to monitor owl activity throughout the year. At the same time, I also visited the aviary built at Lund University to take care of the owls, collect data on aggression behavior and on owl respirometry. For this latter experiment, we used special equipment to measure owls metabolism, and in particular oxygen and carbon dioxide levels, at different temperatures. These data will be analyzed in

2022 and will help us to understand how owl morphs are adapted to climatic conditions. This year was also rich of students that joined the team. I co-supervised, together with Dr. Patrik Karell, the MSc thesis of Gian Luigi Bucciolini (Erasmus+, MSc in Conservation and Evolution; University of Pisa, Italy) investigating tawny owl morph-specific life history strategies across 6 populations in Europe. At the same time, I also co-supervised, together with Dr. Patrik Karell, the BSc thesis of Klara Martinovic and Emil Eriksson (BSc in Biology, Uppsala University, Sweden) investigating behavioral traits and conservation biology aspects of an owl release project, taking advantage of the owls released from our aviary in Sweden. From January 2021 I am also co-supervising with Dr. Patrik Karell and Prof. Jon E. Brommer the PhD thesis of Charlotte Perrault, at Novia and the University of Turku. Charlotte's project focuses on camouflage ability of owl morphs and interspecific interactions in different climatic and environmental conditions. This

Jag jobbar som post dok forskare i Patrik Karells akademiforskarprojekt om eko-evolutionär dynamik i respons till miljöförändringar med fokus på kattugglan och dess gråa och bruna genetiska morfer. Det här året har jag undersökt fysiologiska skillnader mellan kattugglemorferna i fråga om kopplingar mellan telomerers ärftlighet och livshistoria, mitokondriefunktion och ungars tillväxt i förhållande till födointag. Syftet är att förstå kopplingar mellan fysiologiska skillnader och evolutionära anpassningar. Jag samhandledde fyra studenter detta år: Gian Luigi Bucciolinis Erasmus+ MSc avhandling vid University of Pisa (Italien) om livshistorie ekologi, Klara Martinovic's och Emil Erikssons BSc avhandlingar vid Uppsala universitet (Sverige) inom naturskyddsbiologi, och inledde som handledare för Charlotte Perraults doktorsavhandling vid Åbo universitet och Novia.

year was also successful from a teaching point of view since I organized the course in Conservation Biology at Novia and I also got my title of docent in evolutionary ecology at University of Turku.

In addition to my main project, I collaborated on a project with the University of Turku investigating habitat characteristics in breeding and food hoarding sites of pygmy owls (published in *Forest Ecology and Management*). I also collaborated with Luke and University of Cape Town to study redstart nest cavity choice depending on multiple environmental stressors, from predation to brood parasitism risk (published in *Behavioral Ecology*).

Finally, this past year has been also very productive in terms of science communication. I wrote four articles for an Italian science magazine for kids and I am currently finalizing a book for kids explaining fear in animals and predator-prey interactions, which will be published in March 2022.

#### Collaborators

- Jon E. Brommer, Bin-Yan Hsu, Toni Laaksonen, Erkki Korpimäki, Giulia Masoero and Daniele Baroni (University of Turku)
- Jukka Forsman and Jere Tolvanen (Luke)
- Suvi Ruuskanen (University of Jvaskylä)
- Staffan Bensch, Jan-Åke Nilsson, Maja Tarka, Johan Nilsson and Hannah Watson (Lund University, Sweden)
- Peter Ericsson, Daniel Ericsson and Lars-Ove Nilsson (Sweden)
- Al Vrezec (University of Ljubljana, Slovenia)
- Antoine Stier (University of Lyon, France)
- Robert L. Thomson and Angela Moreras (University of Cape Town, South Africa)

# Seizing bioeconomy opportunities in sustainable food developments

Ashkan Pakseresht

My Main activities in 2021 included networking, teaching, publication (*PLOS ONE* and *Appetite*), and writing a new manuscript (extensive systematic review). I am also granted a seed money fund (together with Swedish University of Agricultural Sciences) for conducting a survey on the consumers' acceptance of fish fed with insects.

**Manuscript #1:** *"Tentative Title: Blockchain Technology Characteristics Essential for Agri-food Sector: A systematic review"*.

We've seen a boom in interest in blockchain technology and its potential uses in a variety of industries over the last decade. Blockchain is a digital unchangeable decentralized record of transactions (that is copied and distributed throughout the blockchain's network of computer systems). By improving food supply chain management, establishing smart agriculture, and leveraging blockchain-backed insurance systems, blockchain technology has the potential to revolutionize the agriculture and food production industries. However, majority of the existing blockchain-based system designs are based on trial-and-error methods, and important blockchain features evaluation remains scattered across implementation domains. As a result, the goal of this study is to identify blockchain qualities that promote its deployment in the

## RESEARCH GROUPS

I am doing research on sustainable consumption and bio-based economy. My contribution to the Novia Bioeconomy Research Team (NBRT) involve business research and economics with application to food, agriculture, and natural resources. Examples of specific research interests include examining the role of bioeconomy in transition towards a sustainable food system, social acceptance of novel food technologies, and business models in sustainable circular economies.



agri-food sector, as well as to assess the efficacy of various characteristics. We concentrated on a high-level overview of important qualities that are relevant to existing blockchain-based systems in the agriculture and food industries, therefore technical features and advances are outside the scope of this assessment.

**Ongoing project #1:** *"Consumer acceptance and risk perception of insect-based aquafeed"*.

Insects are increasingly considered as sustainable source of protein as fish feed, but what are the consumers' attitudes towards fish fed insects instead of conventional protein sources?

Insect-based aquafeed as an important source of protein has the potential to increase food and feed safety and contribute

to circular economy. However, our knowledge is limited in this respect, and hence it is essential to examine consumers' acceptance and risk perception regarding fish fed with insects.

We will conduct a survey comprising of three sections. In the first section, respondents' general attitude towards rearing insects as substitutes for conventional protein sources (e.g., soy and fishmeal) and using insects as an ingredient combined with other conventional ingredients will be assessed. Second, participants' risk-benefit attitudes will be elicited, and, finally, consumers' willingness to purchase and willingness-to-pay for fish fed with insects compared to conventional feed will be examined. We are also aiming to examine how provision of information regarding environmental advantages, particularly the potential to contribute to circular economy, of the insect-based meals would impact consumers' choice.

**Ongoing project #2:** *"Is blockchain a key to the circular economy in the agri-food sector"*.

Circular economy (CE) is increasingly

Ashkan forskar om hållbar konsumtion och en biobaserad ekonomi. Hans bidrag till Novia Bioeconomy Research Team (NBRT) involverar företagsforskning och ekonomi med tillämpning på livsmedel, jordbruk och naturresurser. Exempel på specifika forskningsintressen inkluderar att undersöka bioekonomins roll i en övergång till ett hållbart livsmedelssystem, social acceptans av nya livsmedelsteknologier och affärs-modeller i hållbara cirkulära ekonomier. Ashkan forskar just nu om konsumenternas acceptans av labbodlad mat och insekter som mat/foder. Han undersöker också cirkulära affärsmodeller inom jordbruks- och livsmedelssektorn.

gaining interest as an alternative to the linear economy model. Along with economic progress, the circular economy focuses on strengthening sustainability and social responsibility. The circular economy strives to keep resources, goods, and outputs in circulation for as long as possible by keeping their value within the loop. Proponents of digitalization of agriculture and food systems advocate that Blockchain technology accelerates a shift towards circular economy and revolutionize food supply chain.

Within this narrative review, we summarize and highlight the existing and potential alignment of blockchain with circular economy. Literature broadly discusses three main strategies to achieve shifting towards circular economy such as Reduce, Recycle, and Regenerative practices. Reduce strategies refer to preventive actions to reduce food surplus and optimizing resources employed in the food production. Recycling strategies are recovering resources and biomaterial extraction from organic waste, so outputs act as inputs in the economy. Regenerative agricultural practices refer to using technologies that restore and revitalize the soil and environment including permaculture and organic farming. Therefore, this review aims to analyze empirical evidence on the link between these circular economy strategies and Blockchain technology.

#### **Collaborators**

- Maurizio Canavari (Bologna University, Italy)
- Carl Johan Lagerkvist, Karin Hakelis and Aleksandar Vidakovic (Swedish University of Agricultural Sciences, Sweden)
- Sina Ahmadi (Sari Agricultural Sciences and Natural Resources University, Iran)

# Dispersal in a polymorphic raptor

Arianna Passarotto

In the frame of this project, I planned and performed behavioural experiments with adult captive tawny owls to study the effects of noise and light pollution on hunting behaviour in this species. In particular, I aim to understand whether and how changes in the hunting behaviour may be linked to possible changes in the functionality of the facial disc, an overlooked phenotypic trait with important implications for a nocturnal lifestyle. To this end, I took pictures of each owl to study the morphology of the facial disc through image-based analyses. The first



Arianna holding a tawny owl for facial disc measurements

## RESEARCH GROUPS

Through 2021, I worked within different projects led by Dr. Patrik Karell. Until April, I worked as a research assistant within the project on evolutionary dynamics under environmental change. My main tasks were to take care of the owls at the facilities at Lund University (Sweden) and gather detailed biometrical and behavioural measures, as well as blood samples. Then, I worked as a postdoctoral researcher within the project "effects of human-induced environmental changes on nocturnality" funded by Svenska Kulturfonden.

experiments were successfully performed and I am currently measuring the facial discs. I presented the project in a talk at the Novia Research Seminars in April. In summer, MSc Giuseppe Orlando, from University of Turin, joined our group in Sweden. I co-supervised his Erasmus traineeship and, together, we performed further experiments under manipulated noise conditions with fledglings, to investigate the effects of noise pollution on early life stages.

In addition, I performed a comparative study including almost all recognised species of owls to identify the key predictors of the evolution of facial disc. The analyses revealed that the facial disc has been lost and acquired many times along the evolutionary history of this group. This finding is important because it supports the hypothesis that facial disc might be under an ongoing selective process due to human-induced landscape alterations. Furthermore, I found that owls inhabiting open habitats show more frequently a prominent facial disc. A manuscript is currently in preparation. During this year, I also finalized and published two manuscripts. One manuscript dealt with the ecogeographical patterns of owl plumage coloration and was a chapter of my doctoral thesis, which is now fully

published. The other manuscript was about morph-specific patterns of natal dispersal distances in tawny owls in relation to winter temperature. Both are in press. To continue with the study of movement ecology of morphs, I organized and analysed an extensive dataset to investigate the causes and consequences of breeding dispersal (i.e. movements of adult owls between breeding seasons) in this polymorphic species. Tawny owls are typically monogamous and strongly territorial and pairs can occupy the same territory for years. Analyses showed that mate change is the variable better explaining both the propensity to move to another breeding site and the distances travelled by the individuals. Furthermore, analyses also showed that the owls that changed partner and moved have a higher possibility to skip breeding and have lower breeding success. A manuscript

based on these results is currently in preparation.

While in Lund, I gave a talk within the Molecular Ecology and Evolution seminars at Lund University, about the main findings of my PhD thesis in relation to the importance of activity rhythm in shaping colour variation in owls. In spring, I was invited to the online conference "Women in Ornithology" organized by CISO (Italian Centre for Ornithological Studies), for the International Day of Women and Girls in Science, where I talked about my research in ornithology. Finally, in autumn, I helped with field work in the project about cavity use in tawny owls, led by Patrik Karell and Chiara Morosinotto, by placing video-cameras in nest boxes in a monitored Swedish population.

#### **Collaborators**

- Jesús M. Avilés (EEZA, Estación Experimental de Zonas Áridas, CSIC, Spain)
- Ángel Cruz-Miralles (University of Extremadura, Spain)
- Emilio Rodríguez-Caballero (University of Almería, Spain)
- Jon Brommer (University of Turku)

Mitt namn är Arianna Passarotto och jag jobbar som post dok i Patrik Karells forskningsprojekt om effekter av ljus- och bullerföroreningar på nattaktivitet. Under 2021 har jag gjort beteendeförsök med kattugglor i vår anläggning vid Lunds universitet där jag undersökt hur beteenden och användningen av morfologiska adaptationer vid jakt påverkas av buller och ljus på natten. Jag har också samlat in biometriska mått och sampel från kattugglorna för att undersöka detta. Genom att analysera långtidsdata har jag även undersökt orsaker bakom och konsekvenser av sporadiskt förekommande revir- och partnerbyten hos kattugglan, som är ytterst revir- och partnertrogen.

# Camouflage and space use of the color polymorphic tawny owl under predation risk and mobbing

Charlotte Perrault

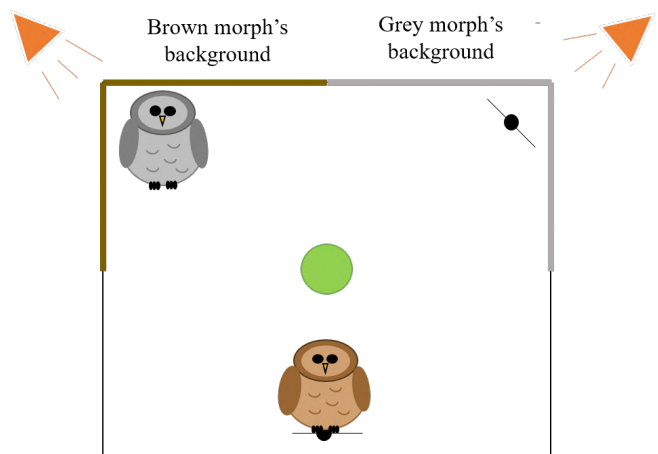
The different camouflage abilities could influence the survival and behavior of the two different morphs. Considering the modification of the environment, due to climate change, those survival advantages could be altered. From these results, we can predict how survival and behavior, overall owl fitness, and interspecific interactions will be affected in the future. Thus the effects on fitness and interactions will give us indirect information on population dynamics and predator-prey interactions.

This year, I mainly focused on the two experiments involving the captive tawny owls in Sweden, LU field station. They were conducted in March and in October 2020. The first experiment consisted in exposing the owls to mobbing (sounds and visual cues), as well as predation (sounds and visual cues) in an experimental room (Figure 1). This room was composed of 3 different perches where the owls could go to rest. Two of those perches were installed in front of a camouflaged background. One was grey and the other brown, to mimic the owls' morphs. I was then recording where the owls were choosing to perch accordingly to their own color morph and to the biostressor they were encountering. This experiment allowed

In February 2020, I came from the University of Paris-Saclay in France to Novia as an Erasmus student for my MSc thesis. Since January 2021, I am a PhD student both at Novia University of Applied Sciences and at the University of Turku supervised by Patrik Karell, Chiara Morosinotto, and Jon Brommer. The aim of my research is to experimentally test the camouflage abilities of tawny owls (*Strix aluco*) in the wild using stuffed owls and study how tawny owls are coping with mobbing and predation risk, using captive tawny owls in Sweden.



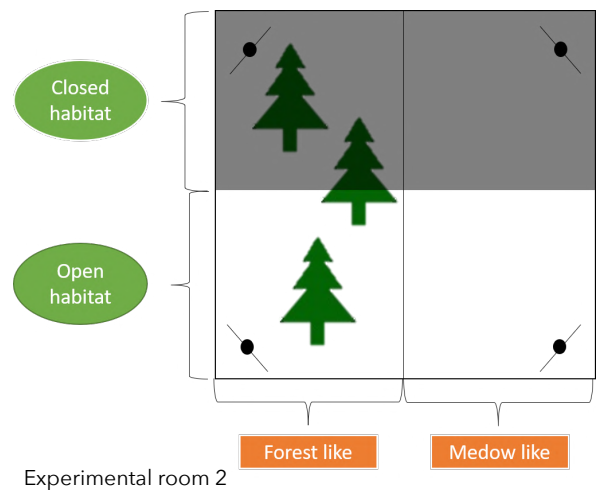
to highlight that the grey morph is using more its camouflage abilities to escape mobbing and predation than the brown one.



Experimental room 1

The aim of the second experiment was to understand how tawny owls were using their space differently according to their color morph. In order to study this question, I used an experimental room (Figure 2) composed of 4 different perches and three fake Christmas trees. The Christmas trees were put on one side or the other of the room, to create a forest environment. The other side of the room was empty. It is also important to note that one part of the aviary was covered by a roof (closed habitat) and one part was not (open habitat). Without being exposed to any stress, the owl was then choosing one perch to rest. This experiment highlighted that the two morphs were choosing the same type of habitat to roost: the closed habitat.

I also conducted three rounds of experiments with stuffed tawny owls in Finland, in Ingå, västra Nyland, following the 2020 experiments. Those experiments allow us to study how tawny owls are perceived in the wild according to their color morph and the surrounding environment. Indeed, it is



already known that the grey morph is perceived less easily when the landscape is snowy than the brown one. One was carried out in spring 2021, one in autumn 2021, and finally one currently in winter 2022. I was lucky to speak about my work at the Aura symposium in spring, at the LU seminar in autumn and I will also present it at the MEEL seminar series in February.

In 2021, I will continue my PhD thesis on those questions and I will start a new experiment in the wild with the stuffed tawny owls, aiming to study density dependence effect on mobbing behavior.

Jag är doktorand vid Yrkeshögskolan Novia och Åbo universitet med Patrik Karell, Chiara Morosinotto och Jon Brommer som handledare. I min forskning gör jag beteendeeexperiment där jag undersöker hur gråa och bruna kattugglor använder sin kamouflagefärg under olika miljöförhållanden. En del av det praktiska arbetet gör jag i fält i Ingå och en del vid Lunds universitet i Sverige.



# Ecological drivers of altered bird migration in a changing climate

Andreas Otterbeck

## Highlights of the year

The year 2021 was another year highly influenced by the pandemic situation, posing numerous constraints such as mainly working from distance. Nevertheless, I held a presentation on the Oikos Finland conference in the start of the year on how reuse of nests increases the predation risk of Eurasian Sparrowhawks. As part of my doctoral school at University of Helsinki, the year was packed with doctoral courses which were arranged online due to the social restrictions. I also submitted two manuscripts to peer-reviewed journals. I wrote the two popular-science contributions "Fåglarna blir mera urbana" in Västra Nyland 15.06 and "Finlands klimat förändras och fåglarna måste hänga med" in Vaasabladet 2.10. My current aim is to submit my doctoral thesis by summer 2022.

Syftet med min doktorsavhandling är att klagöra olösta frågor om ekologiska drivkrafter och klimateffekter på fåglars migrationsbeteende. Jag är inskriven på LUOVAs doktorandprogram och mina handledare är Andreas Lindén (LUKE) och Aleksi Lehikoinen (Helsingfors universitet).

## RESEARCH GROUPS

The aim with my PhD is to unravel unsolved puzzles regarding the ecological pressures and population dynamics of climate responses in migration. For this thesis, Nordic birds offer the most suitable model system, with a wealth of long-term datasets.



Here a photo of Andreas Lindén from a combined birdwatching/supervisor meeting.

## Collaborators

- Patrik Byholm and Ruslan Gunko (Novia)
- Laura Bosco and Markus Piha (University of Helsinki)
- Robin Cristofari (University of Turku)
- Karl Inne Ugland, Stein Fredriksen and Kjell Magnus Norderhaug (University of Oslo, Norway)
- Vidar Selås (Norwegian University of Life Sciences, Norway)
- Eeva Ylinen (University of Eastern Finland)
- Independent: Jan Tøttrup Nielsen (Denmark) and Eric Roulét (Norway)



Svenska  
kulturfonden

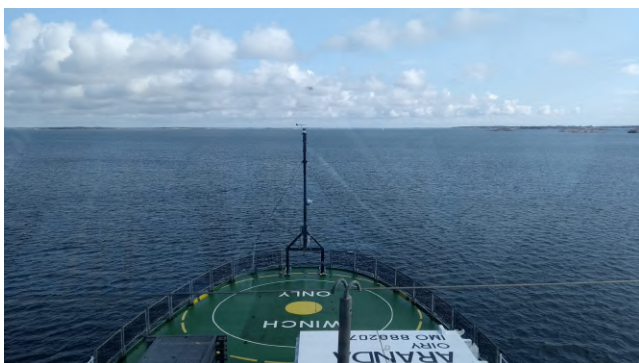


 KONE FOUNDATION

# Biomarker and lipid profiles reveal salinity and warming induced forcing in marine zooplankton

Ella von Weissenberg, Lisa Naeve, Anna Jansson, Jonna Engström-Öst

I study the effects of climate change on oxidative status and reproductive output in marine zooplankton, and I am being funded by Onni Talas Foundation and Svenska kulturfonden. During the third year of my PhD I and research assistant Lisa Naeve joined the COMBINE III cruise, organised by the Finnish



R/V Aranda heading north to the Gulf of Bothnia.

I min doktorsavhandling undersöker jag hur sjunkande salthalt och stigande temperatur påverkar djurplanktons reproduktion och ekofysiologi. Jag samlar data i fält, från fältexperiment samt analyserar proven i labb. Jag använder också långtidsdata från Tvärminne zoologiska station.

## RESEARCH GROUPS

I study the effects of climate change on oxidative status and reproductive output in marine zooplankton, and I am being funded by Onni Talas Foundation and Svenska kulturfonden.



Ella von Weissenberg and Lisa Naeve before the start of the cruise.

Environment Institute to the Gulf of Finland and the Gulf of Bothnia to sample zooplankton for lipid community composition and oxidative stress biomarkers. I am currently analysing the fatty acid samples in Prof. Reijo Käkelä's Lipidomics unit at University of Helsinki. I am simultaneously preparing a manuscript on salinity effects on zooplankton eco-physiology in collaboration with Assoc. prof. Katja Anttila and her team Giovanna Mottola and Tytti Uurasmaa in University of Turku.

In the spring 2021, I held a number of talks in Oikos Finland, LUOVA graduate Spring Symposium, as well as Novia Result Seminar.

### Collaborators

- Anttila Katja, Uurasmaa Tytti, Mottola Giovanna and Vuori Kristiina (University of Turku)
- Käkelä Reijo (University of Helsinki)

# Early life climate effects on life history components across Europe in the color polymorphic tawny owl

Gian Luigi Bucciolini  
(University of Pisa)

In this project I investigated if variation in climate and the environment have effects on the major determinants of tawny owl's fitness by comparing different populations at different latitudes, and therefore under different climatic and environmental conditions.

It is important to understand if and how changes in climate influence the life history traits because it allows us to understand population dynamics and whether different phenotypes (i.e. colour morphs) have different advantages in different climate conditions.

In my master thesis project, I compiled data on nest box breeding tawny owls collected by ringers in six countries across Europe, which are characterized by different climatic conditions and habitats.

My aim was to study if winter climate experienced in early life has an effect on the major components of fitness. Investigating differences in life history traits across all populations, I found that there are differences in fitness between morphs in the different populations and that, in tawny owl,

Jag kom till Novia från universitetet i Pisa, Italien, i Erasmus utbyte för att göra min magistersavhandling om skillnader i livshistoria hos kattugglans färgmorfer beroende på klimat variation. Patrik Karell och Chiara Morosinotto fungerade som mina handledare.

## RESEARCH GROUPS

In March 2021, I came as an Erasmus student to Novia from the University of Pisa in Italy for my MSc thesis.



harsh climate in early life may have differential effects on fitness of the morphs. Thus, at large geographical scale, these findings suggest that different phenotypes show different life history which are likely to be linked to the variation in climate conditions. As part of my MSc thesis work at Novia I took part in data collection of the long-term breeding population of tawny owls in västra Nyland.



Tawny owl distribution within the west Palearctic and in red the six populations considered

# Erasmus exchange on tawny owl behaviour and population

Giuseppe Orlando

During my stay, I aided in fieldwork to collect tawny owl juveniles from a natural Swedish population and provided assistance at Stensoffa field station with the ongoing research: blood sampling, morphometric measurements, behavioural observations and pellets analyses and feeding of captive tawny owls. Furthermore, in the frame of an ongoing project about the effects of environmental changes on nocturnality, we carried out an experimental study to investigate the influence of anthropogenic noise on the hunting behaviour of these captive owls at different stages of their development. The results support a significant negative effect of noise on hunting abilities both as young and adults, providing useful insights regarding their behaviour in urban settings. In addition, I also explored and analysed the effects of winter climate and prey availability on tawny owl population size

Mitt namn är Giuseppe Orlando och efter min MSc vid University of Torino gjorde jag en Erasmus+ praktik i Patrik Karells forskningsgrupp. Forskningen som jag deltog i gjordes vid Lunds universitets fältstation i Lund, Sverige. Efter praktikperioden fortsatte jag jobba i forskningsgruppen under hösten med fältarbete i Sverige inom kattuggleprojektet.

## RESEARCH GROUPS

In April 2021 I achieved my MSc in Environmental Biology at the University of Turin (Italy) with a thesis concerning the effects of urbanisation on the distribution of the tawny owl (*Strix aluco*).

Afterwards, in May 2021, I joined Patrik Karell's research group to conduct a three-month Erasmus+ Traineeship based in Lund (Sweden).



Giuseppe with a tawny owl nestling just after measuring and ringing (Tibro, Sweden)"

and productivity by using a long-term dataset from a Finnish population.

From November 2021 onwards, I worked in the group as a field and research assistant based at Lund University in the frame of an international project about tawny owls and the use of natural cavities. I was involved in installing infrared cameras inside nest-boxes and in conducting a playback survey to detect the owl presence in the Swedish study area. In the follow-up phase of the project planned for winter/spring 2022, I am expected to collaborate with the collection of data from the nest-box cameras, new playback surveys and measuring of noise and light intensity within the nest-box area.

# LES: Life quality in Raseborg

Ruslan Gunko, Patrik Karell, Lauri Rapeli, Matias Scheinin, Timo Vuorisalo

## RESEARCH PROJECT

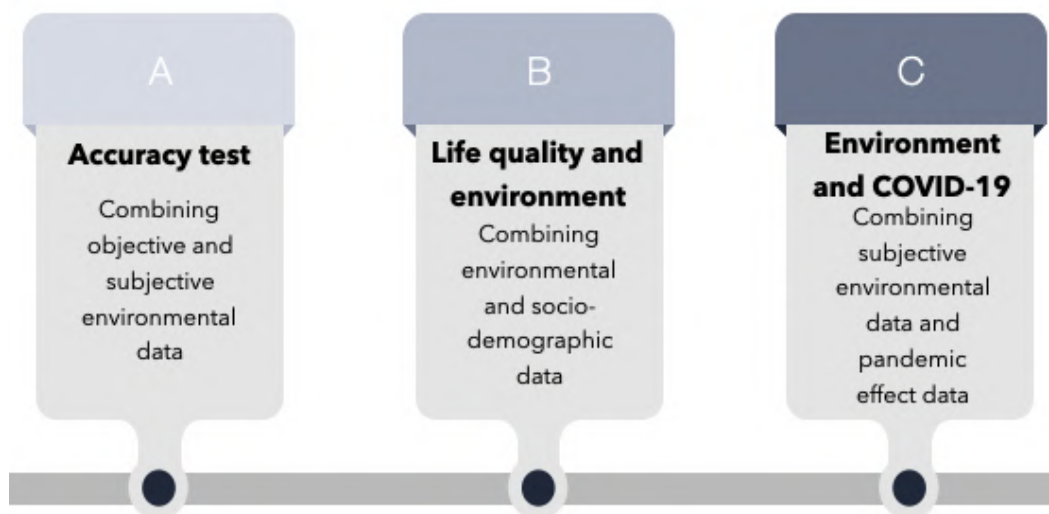
LES is a simple acronym meaning Linking Environment and Society, which itself describes the main idea of the project. This is a PhD project executed at Novia and University of Turku in collaboration with Åbo Akademi University. LES is an interdisciplinary project aiming to link objective environmental data of coastal waters and subjective survey data on a local scale. Therefore, the research team consists of a wide expertise in both environmental and social sciences.



In 2021 we achieved many goals. First of all, we finished the largest part of the analysis of all collected data and successfully submitted our results to scientific journals. The basis of our research was to investigate the reliability of the data collected by citizens and its potential use for scientific purposes. The subjective data represented citizens' evaluation of water conditions and the socio-demographic background of the respondents (e.g. gender, age, education, etc. parameters) in Raseborg, Finland. The objective data was represented by parameters that can be potentially reflected in visual conditions of the water: the amount of Chlorophyll-a, water turbidity, and dissolved organic matters. In other words, we tested

the accuracy of lay people's water quality evaluation by visual parameters. Our main findings showed strong connections between people's evaluation and amount of dissolved organic matters: over 70% of the respondents assessed water quality in the right direction and almost 60% were correct in their estimates. Thus, we concluded that data collected by citizens is reliable and can be used for the water quality assessments on a local scale. The results are submitted in *Environmental Policy and Governance* journal and accepted for publication in the beginning of 2022.

The second part of our project is aiming to understand the importance of the environment for people's life quality. For this,



Project progress. Completed tasks and intermediate stages of the project.

we are comparing how objectively determined vs subjectively assessed water quality affects overall assessment of life satisfaction (subjective measurement of life quality). We also investigated the effects of other socio-economic factors (e.g., income, health). Our results displayed the significant importance of the subjectively assessed water quality indicator for people's life quality and highlighted the importance of how people perceive environment on a local level. However, the effect of the objectively measure water quality was weak. At the same time, we found the prevailing effect of income factor for life quality. The results submitted to one of the scientific journals and currently under review.

Thirdly, we studied the effect of the pandemic on people's perception of the local environment and its potential impact on the environmental behavior of the society. Our aim here is to find out if pandemic changed the approach to the local environment from inhabitants and changed their life quality. For this, we repeated the survey of inhabitants in Raseborg by adding pandemic-related questions. We analyzed the changes happened during the pandemic in people-nature relationships and potential changes in life quality level due to the pandemic personal effects. In 2022 we planning to submit our results to the scientific journal.

#### **Affiliations**

- Lauri Rapeli (Åbo Akademi University)
- Matias Scheinin (Department of Environmental Protection, Hanko)
- Timo Vuorisalo (University of Turku)

LES är ett fyraårigt tvärvetenskapligt doktorandprojekt som utförs vid Yrkeshögskolan Novia och Åbo universitet. Projektet kopplar ihop detaljerade mätningar av vattenkvalitet och avrinningsdata i Raseborg med enkätundersökningar av ortsbefolkningen för att förstå betydelsen och uppfattningen av miljöns tillstånd för välbefinnande på ett lokalt plan.



# CoastGIS 2021 - online international GIS conference

Stefan Heinänen, Jack Raisanen, Lisa Naeve, Ruslan Gunko, Jonna Engstrom-Öst, Romi Rancken and Paloma Lucena Moya



The theme of the conference was Sustainable Coastal Planning in a changing world and the aim was to reach out to practitioners and researchers in the international fields of marine and coastal Geographic Information Systems, remote sensing, and computer cartography around the world. In total, more than 114 people from five of the world's continents participated in the conference. Of these guests, 69 people joined from outside of Finland, so well over half. More than 40 researchers and practitioners gave presentations at the event from 15 different countries. We welcomed professors, directors, students, researchers, civil servants (including EU level), and industry. Novia was represented by three scientific presentations, presented by Ruslan Gunko "Does



Photo: Ekenäs Old Town in Raseborg by Johan Ljungqvist for Visit Raseborg.

## COASTGIS 2021

HYBRID SYMPOSIUM  
—  
SEPTEMBER 16 - 18  
—  
RASEBORG, FINLAND & ONLINE  
—

## NOVIA R & D IN BIOECONOMY

The CoastGIS 2021 conference was finally organised as an online event in September 2021. We began planning for CoastGIS already in 2019. Serious preparations were undertaken in the beginning of 2020, then in March the COVID-19 pandemic hit Finland. The arrival of the pandemic created significant uncertainty about the possibility of holding such an event. In mid-2020, we decided to postpone the conference to 2021. Eventually, in May 2021 when it was still uncertain if we would be able to meet in person or not, we decided to move to an all-online format and it turned out to be a very successful event.

local water quality affect people's life quality? A case study in a coastal community", Jack Raisanen "Destructive Flooding of Cultural Heritage: Our Future and New Normal? An Investigation of Vulnerabilities in Ekenäs Old Town" and Stefan Heinänen "The macrophyte story: What can macrophytes tell us about water quality?". Romi Ranken took part in planning of one of the two scientific workshops called "UAVs for coastal monitoring, mapping and modelling". Jonna Engström-Öst, Ruslan Gunko, Stefan Heinänen and Jack Raisanen shared the responsibilities of chairing the 11 scientific (oral) session, poster session, three keynote sessions and 2 workshop sessions.

The conference helped advance coastal and GIS research and promote better, more informed decision-making regarding management of coastal areas in the face of climate change, resource depletion, and other sustainability challenges. The conference furthermore has raised the profile of Novia University of Applied Sciences as an international institution.

The conference was particularly beneficial for the study programmes Sustainable

Coastal Management and Natural Resources Management and the Bioeconomy Research Group at Novia, considering the close topic alignment. In addition to scientific talks, participants enjoyed learning about the region through a presentation kept by Visit Raseborg. New networks were developed through the process that will carry into coming work and research.

The conference home page with abstract book and recorded presentation will also function as a long-term resource for GIS knowledge:

<https://www.novia.fi/coastgis2021/presentations>.

Please visit and enjoy the presentation and read more about the conference.

En internationell GIS konferens ordnades online vid Novia i september 2021. Temat för konferensen var "Hållbar kustplanering i en föränderlig värld". Mer än 40 forskare presenterade sina arbeten under konferensen och vi hade total 114 deltagare från 15 olika länder. De flest presentationer har publicerats på hemsidan

<https://www.novia.fi/coastgis2021/presentations>



Federation of Finnish  
Learned Societies



Svenska  
kulturfonden

**SPRINGER NATURE**



**BLUE MARBLE  
GEOGRAPHICS**



# Lantbruk 2.0 – sustainable agriculture in Uusimaa

Ulrika Dahlberg and  
Markus Backman

## Natural fibers

During the second year of project activities, a new focus area was found: Natural fibers, produced from fiber crops and sheep wool. Fiber crops can be grown in crop rotation together with other agricultural products, with relatively small amounts or no pesticides and fertilizers, and then processed into different products, such as textiles. Examples of such crops are hemp and flax, but also cattail, reed, and willow, which can be produced through practicing paludiculture on peatlands. These also have potential in greenhouse gas mitigation. Sheep wool, on the other hand, has been underused in Finland, but there are strong

## NOVIA R & D IN BIOECONOMY

Lantbruk 2.0 (Agriculture 2.0) is a project focused on identifying concepts for sustainable agriculture and entrepreneurship in the Uusimaa region in Finland. The project is funded by The Swedish Cultural Foundation in Finland. The time span is 23.3.2020-31.3.2023.

Ulrika Dahlberg is managing the project and from august 2021 Markus Backman was working as a project assistant, bringing his skills in media and communication to the project.

signs that the interest for domestic sheep wool is growing.

The project organized the seminar *Natural Fibers - Sustainable Alternatives for Finnish Agriculture?* the 27th of October 2021, where paludiculture, cultivation of hemp and flax and the use of natural fibers in textiles and construction was discussed. The planning of natural fibers courses for 2022-2023 was initiated after the seminar.

## Direct sales and artisan food

Another focus area for Lantbruk 2.0 is small scale production and selling agricultural products directly to customers. Market Gardening courses started at Novia Open

**NATURAL FIBERS**  
SUSTAINABLE ALTERNATIVES FOR FINNISH AGRICULTURE?  
27/10/2021

LANTBRUK<sup>2.0</sup>

NOVIA  
UNIVERSITY OF APPLIED SCIENCES

Advertisement for the Natural Fibers seminar. Design by Markus Backman.

UAS in October 2021, in cooperation with project Pro Bioekonomi 2.0. The aim of the courses is to provide the students with competences needed for starting up small scale vegetable production with ecological methods. In association with the project KUMAKKA at the Ruralia institute at Helsinki university, Lantbruk 2.0 has been producing material, mainly film clips, about community supported agriculture, i.e., the possibility for producers to buy shares in agricultural production and share both risks and successes with the farmer.

As many small-scale producers also make artisanal food products, a short course about

product labelling was organized, together with Resource Center HALD. The event will be followed up by other similar events with good-to-know information about food facilities and hygiene requirements.

Educating, and learning together with farmers and producers, as well as building networks with people interested in environmentally friendly agriculture, biodiversity and local economy has proven to be the most effective ways to work within the project.



**Svenska  
kulturfonden**

Lantbruk 2.0 jobbar med att lyfta fram hållbart lantbruk och entreprenörskap i Nyland. Under året 2021 började projektet med att ta fram information om odling och förädling av fibergrödor, såsom spånadslin och fiberhampa. Också användning av inhemska fårull kommer att ligga i fokus i framtiden. Andra viktiga områden för projektet är småskalig odling med ekologiska metoder, mat-hantverk och direktförsäljning. Projektet finansieras av Svenska kulturfonden.

# Tulevaisuuden maanviljelijät - Farmers of the future

Heidi Barman-Geust

The aim of the project is to promote sustainable food production and educate farmers for the future. There are numerous factors that challenge food production and education is a critical agent in addressing these issues. The focus in this project will be to increase knowledge and boost skills about the following themes: recycling of nutrients, sustainable energy solutions, circular economy, and mitigation of and adaption to climate change.

The project wants to create better cooperation between the educational institutions and improve both teaching methods and materials. Focus will be on trying out and

## NOVIA R & D IN BIOECONOMY

Project Tulevaisuuden maanviljelijät (Farmers of the Future) develops agricultural education as a collaboration between nine educational institutions to promote sustainable food production and modern pedagogical methods. The project is led by Häme University of Applied Sciences and is funded by the Ministry of Agriculture and Forestry in Finland. It started in autumn 2021 and continues to autumn 2022.

developing things together, sharing knowledge, data, and information with each other and building a national network with experts. During the first year, the project conducted a survey directed to students and teachers in agriculture. The aim was to map what teaching methods and materials are used today and what is desired in the future. The result showed that both students and teachers want multimedia material, and the project will therefore develop new material, for example virtual study visits, short films with facts and demos during the second year. Novia UAS will contribute with a virtual study visit to the barn at Västankvarn gård, a virtual tour showing the field trials at



Västankvarn gård and several short films concerning animal husbandry, crop production, energy solutions and water care solutions.

#### Project partners

- Häme University of Applied Sciences
- JAMK University of Applied Sciences
- Oulu University of Applied Sciences
- Savonia University of Applied Sciences
- Seinäjoki University of Applied Sciences
- Ahlmanin koulun säätiö
- Hämeen ammatti-instituutti
- Jokilaaksojen koulutuskuntayhtymä

Projektet Tulevaisuuden maanviljelijät (Framtidens jordbrukare) är ett samarbetsprojekt mellan nio olika läroanstalter med utbildning inom lantbruksnäringarna. Målsättningen är att främja en hållbar matproduktion och att utbilda jordbrukare för framtiden, genom att öka kunskaperna och färdigheterna kring återvinning av näringsämnen, hållbara energilösningar, cirkulär ekonomi och begränsning av och anpassning till klimatförändringar. Projektet är finansierat av Jord- och skogsbruksministeriet och pågår från hösten 2021 till hösten 2022.



## Välmående av vilt - Hyvinvointia riiststa

Gunnel Englund and  
Marianne Fred

Under pandemiåret 2021 har största delen av verksamheten genomförts via webinar. Bland gällande anläggande av viltårkrar, vad rapporten visade gällande hur jaktlag och jaktföreningar upplever situationen för hur man klarar av stammens storlek, funderingar kring företagandet inom viltnäringarna samt hurdana skadliga verkningar blykulorna kan förorsaka i viltköttet. Under 2021 har också landsbygdspolitiska helhetsprogrammet utformats och viltet/viltnäringen tagits med som en framtidsmöjlighet för landsbygden. Det har också ordnats styckningskurser för jägare runt om på projektområdet. Videor

Projektet handhas av YH Novia och som samarbetsparter är Finlands Viltcentral, Åbo Universitet Brahea centret samt Hanken Svenska Handelshögskolan. Projektet fokuserar på den växande vitsvanshjortstammen i syd-västra Finland och Nyland och strävar till att ge de jaktföreningar/jaktlag som fungerar som piloter, verktyg att bemästra stammen på en hållbar nivå. Företagandet gällande jakten och förädlingen av köttet kan i framtiden ge landsbygden nya möjligheter.

och pod casts har inbandats bland gällande livsmedelslagstiftningen, hur man borde kommunicera från jägarhåll gällande jakt och vilt samt hur jägarna upplever att man bättre kunde få ut mera viltkött till konsumenterna.

Eftersom projektet avslutas i början av 2022 har arbetet med rapportering och publikationen som samlat stor del av det material som inkommit under projektets gång gjorts under året. Ett antal diskussionstillfällen har hållits gällande tankar kring en fortsättning på detta projekt eftersom man kunnat konstatera att inom ämnet finns



väldigt mycket att utveckla och förbättra. Arbetsgruppen har regelbundet sammankommit ca två gånger per månad och styrgruppen har under 2021 haft två möten.



### Project partners

- Mikael Wikström, Klaus Ekman, Petteri Pietarinen, Mikko Toivola (Finlands Viltcentral)
- Helena Liewendahl, Minna Pura (Hanken Svenska Handelshögskolan)
- Leena Erälinna, Johanna Mattila (Åbo Universitet, Brahea Center)

In the project we develop new operating models for hunting white tailed deer and increasing the availability of uninspected game meat on the market. The financing comes from the EU agricultural fund for rural development and the Finnish state. Partners are Novia University of Applied Science, The Finnish Wildlife Agency, Brahea Center at Turku University and Hanken School of Economics CERS. Project runs from 1.1.2019 - March.2022.

Communication has been a red wire throughout the project's operations in 2020. The project has arranged webinars about hygiene in meat management, the requirements of meat sales and the arrangement of guest hunting. The project has also arranged practical meat cutting courses at the pilot associations and the possibility of game meat processing has been addressed.



Europeiska jordbrukstonden för  
landsbygdsutveckling: Europa  
investerar i landsbygdsområden



# Matregion Nyland - mapping the food identity of Nyland (Uusimaa)

Christos Granqvist, Eduardo  
Grisales Jaramillo, Ulrika  
Dahlberg, Markus Backman



## NOVIA R & D IN BIOECONOMY

Can Uusimaa become a region with its own gastronomic identity? This was the question that started the work of the project Matregion Nyland - Ruokamaakunta Uusimaa in 2018. In the final project year in 2021 the conclusion was that Uusimaa already has a lot to offer, but there is still a lot to do, especially in strengthening the cooperation between producers and creating local brands.

### GIS-maps about suitable areas for agricultural production

Project researcher Eduardo Grisales Jaramillo worked with mapping suitable areas for growing early-potato, apples, pastures (grazing land) and cultural grains in Uusimaa, using a methodology integrating Geographical Information Systems (GIS) and a Multi-criteria Evaluation (MCE). These crops are within the range of crops that can be cultivated in Uusimaa and reinforce a sustainable food-system and the local economy. The analysis and classification of the fields is divided in three categories: highly suitable areas, acceptable areas, and areas with low suitability for the cultivation of

the crops. The maps are intended to be used in upcoming development projects at Novia UAS, but can also be used by farmers as a tool to evaluate the suitability of their land to grow the crops mentioned above.

### Taste, diversity, technology, and nature - final seminar and inspirational material

The 2 December 2021 a final seminar was organized, with themes revolving around the four products that had been identified as significant for the project: apples, early potatoes, cultural grains and pasture raised meat. At the seminar, we also presented film clips about the project and the producers in Uusimaa, made for the project by Multifoto in Tammisaari. In addition, Multifoto



Ulrika Dahlberg, Eduardo Grisales Jaramillo and Rikard Korkman looking at apple yards at Råbäck farm in Espoo.

produced articles for the project, about the central products and producers, and themes such as export, public kitchens and sustainability goals.

All the above-mentioned material, film clips, articles, GIS-maps and seminar recordings can be found (in Swedish) on the project webpage:

<https://www.novia.fi/matregionnyland>.

The project was funded by the European agricultural fund for rural development and Stiftelsen Finlandssvenska Jordfonden.

Matregion Nyland - Ruokamaakunta Uusimaa var ett treårigt projekt ägnat att lyfta och profilera Nyland som gastronomisk region, samt att skapa en långsiktig handlingsplan för att föra landskapet till nya gastronomiska landvinningar. Projektet avslutades 31.12.2021 och material som artiklar, filmklipp, GIS-kartor och seminarieinspelningar finns samlade på hemsidan <https://www.novia.fi/matregionnyland>. Projektet finansierades av Europeiska jordbruksfonden för landsbygdsutveckling samt från Stiftelsen Finlandssvenska jordfonden.



Europeiska jordbruksfonden för landsbygdsutveckling: Europa investerar i landsbygdsområden



Etikoinn - liikenne- ja ympäristökeskus  
Närings-, trafik- och miljöcentralen  
Centre for Economic Development, Transport and the Environment



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JORDFONDEN



# BALSAMIN project - invasive aliens project

Kaisa Kauranen, Hanna  
Tsyvinskaya, Dmitrii Plekhanov,  
Jonna Engström-Öst

The project was run in 2021 and ~80 alien species removal campaigns for voluntary workers were organised in collaboration with Raseborgs city, Raseborgs Nature protection association, and a number of village societies. Main species removed were *Impatiens glandulifera* (Himalayan balsamine) and *Arion vulgaris* (Spanish slug). The project organized altogether four thematic days about invasive alien species for students in Sustainable Coastal Management and Forestry Engineering degree programs in Novia. Two interns mapped invasive species distributions and documented the results of the voluntary work. We also increased people's awareness of alien species in information events and through media. We acknowledge funding

## NOVIA R & D IN BIOECONOMY

Invasive alien species may reduce biodiversity. Especially in protected areas hosting rare species and a high biodiversity this can be a problem.



Cynthia Moed-Ring participated in a Himalayan balsamine removal campaign

from the Centre for Economic Development, Transport and the Environment and from Svenska kulturfonden.



The protected alder bog behind Ekenäs City Council

Biodiversiteten i vår natur kan minska pga invasiva arter som har en konkurrensfördel i en ny miljö. Balsamin och Ängsblommor i Raseborg projekten ordnade totalt 80 tillfällen på 15 orter i Raseborg för att bekämpa invasiva främmande arter, t ex spansk skogssnigel och jättebalsamin. Frivilligarbetet ordnades i samarbete med Raseborgs stad, Raseborgs Natur rf, samt byaföreningar.

Projekten ordnade temadagar för studerande med anknytning till främmande arter. Studerandena på utbildningsprogrammet Sustainable Coastal Management fick bekanta sig med parkslide, spansk skogssnigel och jättebalsamin som bekämpades i den fridlysta klubbalslunden bakom stadshuset i Ekenäs. Skogsökonomistuderande bekämpade vresros i skärgården. Praktikanter från Novia kartlade främmande arters livsmiljöer, dokumenterade resultaten och deltog i frivilligarbete. Vi ökade också människors medvetenhet om främmande arter via informationsmöten och media. Projektet var finansierat av Svenska kulturfonden, samt Närings-, transport- och miljöcentralen (NTM).



Tousif Nayem takes part in course

# GeolCT4e - geospatial tools and methods for sustainability and employability

Romi Rancken

## NOVIA R & D IN BIOECONOMY

Since August 2020 a consortium consisting of Novia UAS, University of Turku and Turku UAS, participates in a project that aims at strengthening the geospatial skills for students in Tanzanian universities. The project received funding from HEI ICI, a programme financed by the Ministry of Foreign Affairs and administered by the Finnish National Agency for Education.

The 4-year project, named GeolCT4e, aims at improving entrepreneurial skills for university students in five Tanzanian universities, skills related to geospatial sciences (GIS) and to sustainability in a broad sense. The university sector in Tanzania grows at a rapid pace, and the millions of graduates expected to enter the workforce in the coming years cannot only rely on being employed as government officials, a typical

career for previous generations of university graduates. Instead, they have to employ themselves, or develops skills that make them attractive on the job market. University of Turku has previously implemented two similar HEI ICI projects in Tanzania, then aiming at developing the infrastructure at the universities such as GIS labs, as well as training the university staff in geospatial matters. The current project takes



Planning MCL campaigns in Dar-es-Salaam, Tanzania, in November 2021.

a step closer to the society as it builds on a learning method that we call MCL, Multi-Competence Learning, and is implemented through so called challenge campaigns, where students solve multi-faceted problems in a real-world setting.

The project looks at the world through a sustainability lens, and consists of several themes, the most important being climate change and its implications, geospatial technologies and ICT, innovation and entrepreneurship and natural resources management. As Novia's input is channeled through the Faculty of Bioeconomy, our main focus is on natural resources management and sustainable coastal management issues, but we will also take part in development and testing of the MCL method and other activities during the project.

Due to covid-19 the project has been replanned, with extensive travelling and face-to-face replaced by regular web meetings and workshops. Two local workshops were however arranged in Tanzania in 2021 with Finnish experts present.

The main emphasis during 2021 has been on the development of so called "mini-MOOCs" for use at the universities in Tanzania. The courses will be uploaded to the Moodle platform at DigiCampus, open sourced and made available for anyone to use.

Planning of the MCL campaigns also started during late 2021, and the first campaigns will be arranged in August-September 2022.



Projektet GeoICT4e strävar efter att förbättra entreprenöriellt kunnande hos studerande inom branscherna för GIS och hållbar utveckling vid fem universitet i Tanzania. Universitetssektorn i Tanzania växer i snabb takt och miljoner utexaminerade förväntas komma in i arbetslivet under de kommande åren. Tidigare generationer har kunnat förlita sig på en karriär som tjänsteman inom offentliga sektorn, men nu behöver studerande utveckla färdigheter som gör dem attraktiva på arbetsmarknaden. Hållbar utveckling, klimatförändringen och dess konsekvenser genomsyrar projektet. Teman som lyftas fram är bland annat geospatial teknik och ICT, innovation och entreprenörskap samt förvaltning av naturresurser.



# Bondenyttn

Paul Riesinger

Projektet Bondenyttn påbörjades våren 2018 vid agrologutbildningen på Yrkes högskolan Novia i Raseborg. Arbetet finansieras av Finlandssvenska Jordfonden. Ansvarig för Bondenyttn är AFD Paul Riesinger, lektor i växtodling vid YH Novia

## Utbildning i tiden!

Vår personlighet formas genom konkreta möten med verkligheten. Genom utbildning kan vi skapa den kompetens som hjälper oss att bygga vår livsväg och att vara samhället till nytta. Utbildning behöver således omfatta allmänbildning, social kompetens och fackkunskap. Bondenyttn skapar en plattform för möten, där kunskap och erfarenheter delas mellan lantbrukare, agrologutbildningen, rådgivningen och forskare.

Verkligheten är komplex, och så fort som vi löser ett problem dyker det upp nya utmaningar. Det ökade informationsflödet

innebär att vi har allt svårare att skilja mellan ogrundade påståenden och faktabaserad kunskap. För att vara en oegennyttig tjänare behöver utbildning utgå från beprövad teori, samt kunskap om praktiska tillämpningar. Den aktuella kunskapsfronten nås genom trovärdiga försök.

Inom Bondenyttn undersöks skördebegränsande faktorer på gårdsnivå, på Västankvarn försöksgård, genom litteraturstudier och med hjälp av experter. Undersökningarna planeras och utförs i samarbete mellan den projektansvarige, lantbrukare och agrologstuderande. Bondenyttn med-



Agrologstuderande undersöker jordhälsan i NSL:s jordbearbetningsförsök på Västankvarn.

ger ett deltagardrivet och variationsrikt utbildningskoncept, där arbetet utgår från lantbrukets praktiska frågor. Samarbetsparterna tillägnar sig kunskap, samtidigt som de inspireras av det gemensamma arbetet.

Lärdomarna från undersökningarna och försöken görs tillgängligt genom fältstigar, studiebesök, seminarier, föredrag och publikationer. Bondenyttnan utgör en del av ett redan befintligt naturbrukskluster. Vid sidan om kunskapsnyttan och den pedagogiska nyttan resulterar samarbetet i positiva sociala effekter. Lantbrukare och agrologstuderande bekräftas i sin yrkesroll.

Aktiviteterna 2021:

1. Förutsättningar för odling av lusern (Mårten Holmberg)
2. Art- och sort- samt odlingstekniska försök med lusern (Västankvarn försöksgård)
3. Förekomsten av ärtrotröta i Nyland, Åboland och Österbotten (publikationer)
4. Växtföljdsbaserad modell för kolbalanser (publikationer)
5. Utvecklingen av ett arbetspaket för bedömningen av jordhälsan (praktisk tillämpning med agrologstuderande, publikationer)
6. Design av tio fältförsök som kommer att ligga till grund för YH-examensarbeten

Bondenyttnan contributes to sustainable agricultural practices and participatory learning, bringing together farmers, students, teachers, extension services and research. Goals are achieved by farm studies, field trials, literature studies and personal communication. Recent activities comprehend the designs of ten on-farm field trials (BSc projects), ongoing field trials with lucerne, publications (occurrence of pea root rot, carbon balances), and the development of a work package for the investigation of soil health. Bondenyttnan contributes to the development of agricultural practices, mobilises the resources at hand for agricultural education and endorses the social self-esteem of farmers.

STIFTELSEN  
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Dahlberg U (2021) REKO i nyländska stads- och landsbygdsområden. Vilka produkter säljs och hur långt färdas maten? - *Novias serier* R.

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Forsman R & Riesinger P (2021) Integrera växtodling och djurhållning! - *Landsbygdens folk* 15.1.2021: 14-15.

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Lindblad U (2021) Förändringar i färgmorfer - ett tecken på att klimatet blir varmare. - *Bioekonomi - bloggen*.

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### Newspaper columns

- Dahlberg U. Odlar grönsaker och påverka din omgivning. Västra Nyland, 24.8.2021.
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- Engström-Öst J. Tvättar du grönt? Västra Nyland, 11.5.2021.
- Fred M & Barman-Geust H. Tänk som en permakultivist! Västra Nyland, 20.7.2021.
- Granqvist C. På jakt efter den nyländska gastronomiska identiteten. Västra Nyland, 26.1.2021.
- Karimi F. Energiomställning och gräsrotskraft. Västra Nyland, 8.12.2021.
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- Otterbeck A. Fåglarna blir mer urbana. Västra Nyland, 15.6.2021.
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### Scientific presentations

- Balotari-Chiebao F. Expert Forum by the International Energy Agency (IEA; Working Together to Resolve Environmental Effects of Wind Energy; 2021-2022).
- Byholm, P. Taantuva mehiläishaukka uuden tutkimusaloitteen kohteena. Rengastajakokouksen webinaari, 6.2.2021.
- Byholm, P. Satellite tracking of European honey buzzards (*Pernis apivorus*) from Finland to Africa. Virtual African Bird Fair 2021, 31.7.2021.
- Byholm P & Lindén A. Merimetson paikallisvaikutukset kalakantoihin Suomenlahdella. Varsinais-Suomen ja Satakunnan alueellisen merimetsotyöryhmä, kokous, 27.9.2021.
- Byholm P. Uhkaavatko torjunta-ainejäämät kimalaisiamme? Kasvinsuojeluaineiden jäämäryhmän kokous, 11.11.2021.
- Engström-Öst J. Läget i Östersjön - najs eller bajs? Vetenskapskarnevalen, Vasa, 19.11.2021.
- Gunko R. Does local water quality affect people's life quality? A case study in a coastal community, AURA Symposium, 8.4.2021.

- Gunko R, Karell P, Rapeli L, Scheinin M & Vuorisalo T. Does local water quality affect people's life quality? A case study in a coastal community, CoastGIS, 17.9.2021.
- Heinänen S & Scheinin M. The macrophyte story: What can macrophytes tell us about water quality? CoastGIS, 17.9.2021.
- Karell P. Invited plenary speaker at OIKOS Finland congress, Jyväskylä, Finland, 1.3.2021.
- Karimi F. The energy transition in the Baltic Sea Region (BSR): dividing or unifying? Case study of the Nord Stream 2. BUP symposium 2021. Online, 19-20.11.2021.
- Passarotto A. Invited speaker to the online conference organized by CISO (Italian Centre for Ornithological Studies) "Women in Ornithology", for the International Day of Women and Girls in Science, 25.2.2021.
- von Weissenberg E. Combined effect of salinity and temperature on reproductive success and oxidative stress in brackish-water copepods. OIKOS Finland 2021, University of Jyväskylä, Finland, 3.2.2021.
- von Weissenberg E. Combined effect of salinity and temperature on reproductive success and oxidative stress in brackish-water copepods. LUOVA Spring Symposium, University of Helsinki, Finland, 8.3.2021.

### Media appearances

#### *Patrik Byholm*

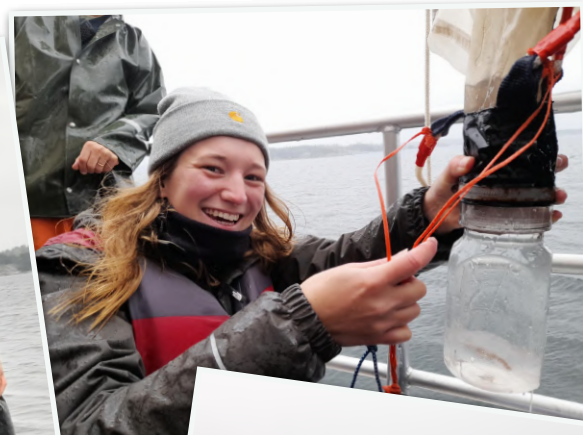
- Finlands skogar är fulla av möjligheter - men nu tvingas skogsindustrin och skogsägarna att tänka om, <https://arenan.yle.fi/audio/1-50792774> (interview). *Yle Vega*, 4.5.2021.
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#### *Jonna Engström-Öst*

- Salthaltens effekt på marina ekosystem. *TV-Nytt, YLE*, 3.6.2021.
- Flytande akvarier ger viktiga fakta. *Västra Nyland*, 18.6.2021.

#### *Farid Karimi*

- Nord Stream 2 delar Europas politik - Forskare: "Polariseringen är ett misslyckande för EU som borde hålla samman". <https://svenska.yle.fi/artikel/2021/02/14/nord-stream-2-delar-europas-politik-forskare-polariseringen-ar-ett-misslyckande> *YLE Svenska*, 14.2.2021.



The members of the research team contributes to the education at Novia University of Applied Sciences. Here is an overview of our teaching activities in 2021

*Jonna Engström-Öst*

- Coastal Ecology I and II: field work, lectures, and lab assignments
- Research Methodology: lectures and assignments
- Sustainable Coastal Management: workshops and lectures
- Monitoring of Aquatic Bodies I: field visits, lectures, workshops
- Supervising PhD, MSc- and BSc-thesis projects

*Patrik Karell*

- Supervising PhD and MSc-thesis projects

*Farid Karimi*

- Environmental Outreach
- Examiner for BSc-thesis & MSc thesis projects

*Otto Långvik*

- Bioeconomy Innovations
- Kemisk virkesförädling
- Management systems

*Chiara Morosinotto*

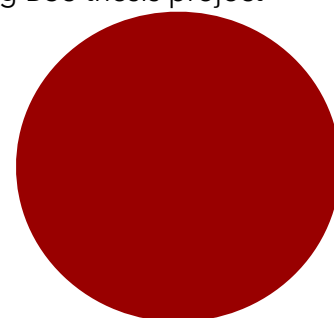
- Conservation Biology
- Supervising PhD and MSc-thesis projects

*Ashkan Pakseresht*

- Bioeconomics
- Supervising MSc-thesis projects

*Ruslan Gunko*

- GIS Project
- Supervising BSc-thesis project



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Rancken, Romi  
Räisänen Jack  
Tsyvinskaya, Hanna

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Bioeconomy)  
Liinamaa, Johanna (Head of RDI Novia)  
Långvik Otto (RDI Coordinator)

Gustafsson, Pia (RDI Assistant)  
Lindblad, Ulrika (RDI Assistant)  
Sandberg-Kilpi, Eva (Dean)

### The Novia Bioeconomy Research Team

The NBRT rely on several sources of external funding. The sources of our basic funding are City of Raseborg and the private foundations Föreningen Konstsamfundet r.f and Utbildningsstiftelsen Sydväst sr. Additionally, our research is supported by a range of different funders: Academy of Finland, Svenska Kulturfonden, Waldemar von Frenckells stiftelse, Svenska Litteratursällskapet i Finland, Kone Foundation, Nordenskiöld-Samfundet, Otto A. Malm Donationsfond, Societas pro Fauna et Flora Fennica, Onni Talas Foundation, Jenni and Antti Wihuri Foundation.

### Applied R & D project funding

Our applied projects are funded by LEADER (EU), Stiftelsen Finlandssvenska Jordfonden r.s., Ministry of Culture and Education, Stiftelsen för Åbo Akademi , European Agricultural Fund for Rural Development, City of Raseborg, Föreningen Konstsamfundet r.f., Utbildningsstiftelsen Sydväst sr, Regional Council of Southwest Finland, Maa ja vesitekniikan tuki r.y., Interreg Central Baltic (EU), European Social Fund (EU), European Rural Development Fund (EU), Egentliga Finlands Förbund.

**NBRT FUNDING 2021**

