

Novia UAS Campus Raseborg Research & Development 2017



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Sustainable bioeconomy - our responsibility

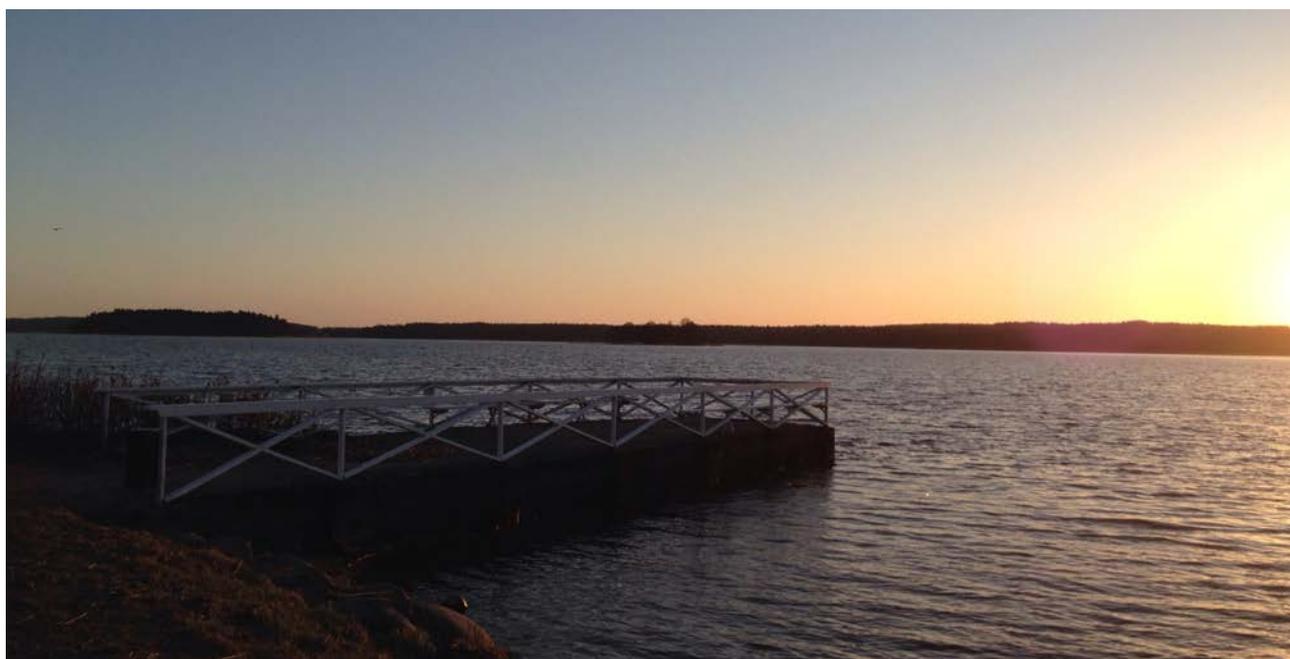
High quality research is the base for a sustainable bioeconomy. The research and development within the focal area bioeconomy at Novia UAS campus Raseborg consist of an active and diverse set-up of scientific and applied projects. This mix gives us an excellent base for our goal to promote sustainable bioeconomy where sustainable management and the use of natural resources and ecosystem services is the foundation.

This Research Report of year 2017 achievements clearly shows that we are heading in the right direction. Our wide network of collaborative partners, nationally as well as internationally, strengthens our knowledge base and at the same time acknowledges the credibility of is a proof of that our researchers in the scientific community are considered good cooperation partners.

One of our goals is also to enable our students to take part of in and to be able to get acquainted to with research work. The engagement in research projects give our Sstudents are engaged in our research projects thereby giving them insights of into the latest advances in different areas of scienceresearch and increasesing their understanding of the importance of research as the a base for sustainable bioeconomy.

Our efforts continues in building on a stronger knowledge cluster in bioeconomy and we are happy to welcome our new senior researchers joining our Bioeconomy Research Team during 2018.

Eva Sandberg-Kilpi, Dean



Climate change-induced effects on Baltic Sea plankton

Jonna Engström-Öst, Anna-Karin Almén, Olivier Glippa, Lauri Kuismanen (Åbo Akademi University), Louise Lindroos, Pankaj Pant (University of Helsinki), Matias Scheinin, Tanguy Soulié (Institut National des Sciences Appliquées Toulouse)

We study how climate change and eutrophication affect plankton in the marine environment with focus on the Baltic Sea. We measure biomarkers, reproductive output and many other variables to increase our understanding of mechanisms behind the impact of warming and ocean acidification in the coastal zone.

Highlights of the year

In March and April, Lauri Kuismanen from Åbo Akademi University collected data for his MSc thesis (Kuismanen, in prep), studying salinity effects on egg production, egg hatching, and nauplius survival of a common copepod *Eurytemora affinis*. Lauri's supervisors are Olivier Glippa, Kai Lindström and Louise Lindroos. Lauri was highly successful in his funding applications during spring 2017, and was able to participate with a poster in the 52nd European Marine Biology Symposium in Piran, Slovenia. Louise Lindroos and Olivier Glippa also took part in the meeting, presenting a poster and an oral speech, respectively.

In May Anna-Karin Almén successfully defended her PhD thesis at Åbo Akademi University, having Dr. Delphine Bonnet from Montpellier University as her opponent. The title of Anna-Karin's thesis is *Copepods in a changing sea: Ocean acidification, long-term*



Freezing? No..., seriously? Photo: Jonna Engström-Öst



A bunch of SCM and exchange students with teacher Paloma Lucena-Moya experiencing sampling and taking measurements during rough weather at Coastal Ecology I. Photo: Jonna Engström-Öst.

changes and short-term variability and it can be found online in [the Doria database](#).

During the summer Tanguy Soulié (Institut National des Sciences Appliquées Toulouse) did his internship with us at Tvärminne Zoological Station, measuring respiration rates, as oxygen consumption of *Eurytemora affinis* in different salinities. Tanguy collected zooplankton at different sites in Raseborg and Hangö archipelago, ranging between 3 and 7 in salinity. His preliminary results show that copepod respiration increased with decreasing salinity. The result is interesting considering that respiration seems to be an importing factor lowering pH levels, in addition to ocean acidification that is an increasing problem globally in the coastal zones.

Collaborators

- Alenius Pekka, Finnish Meteorological Institute, Finland (long-term data)
- Bednaršek Nina, NOAA, USA (pteropod ecology)
- Brutemark Andreas, Calluna Ab, Sweden (plankton ecology)
- Candolin Ulrika, University of Helsinki, Finland (fish behaviour)
- De Stasio Bart, Lawrence University, USA (cyanobacteria-zooplankton interactions)
- Karell Patrik, Novia UAS, Finland (Havsmanualen II)
- Kanerva Mirella, Mitsuyama University, Japan (biomarkers)
- Keister Julie, University of Washington, USA (Pacific ecology)
- Lehtinen Sirpa, Finnish Environment Institute, Finland (long-term data)
- Lehtiniemi Maiju, Finnish Environment Institute, Finland (microplastics, long-term data)
- Lindén Andreas, Novia UAS, Finland (modelling)
- Lips Inga, Tallinn University of Technology, Estonia (monitoring data)
- Pettersson Heidi, Finnish Meteorological Institute, Finland (long-term data)
- Riebesell Ulf, GEOMAR - Helmholtz Centre for Ocean Research Kiel, Germany (ocean acidification)
- Souissi Sami, University of Lille I, France (invasion ecology)
- Vuori Kristiina, University of Turku, Finland (biomarkers)



PRO MARE BALTICUM
THE WALTER AND ANDRÉE DE
NOTTBECK
FOUNDATION



**Svenska
kulturfonden**

Hur påverkas plankton av en förändrad miljö? Vi forskar i hur klimatförändringen samt övergödningen i den marina miljön påverkar plankton i Östersjön. Vi jobbar främst med djurplankton och undersöker deras reproduktionsframgång, stressnivåer samt populationsdynamik. Projektet är finansierat av Finlands Akademi, Onni Talas stiftelse och ett flertal mindre stiftelser. Vi gör också jämförande studier för att undersöka hur plankton reagerar på klimatförändring i andra hav t ex Stilla havet och Atlanten.



Happy researchers presenting zooplankton to the general public at Tvärminne Open House 16.9.2017. Photo: Tero Mustonen

Functional ecology and applications

Patrik Karell, Katja Koskenpato (University of Helsinki), Ruslan Gunko, Kati Schenk (University of Helsinki)

Our research group combines basic field- and lab-based research in ecology and evolutionary biology with approaches to apply data-based models in bioeconomy and natural resource management. The focus in basic research is on understanding evolutionary adaptations to environmental change in the study system of colour polymorphic tawny owls, whereas the applied research aims at developing tools for ecological economics in forestry, agriculture and data-based (coastal) land-use planning.

Highlights of the year

The year 2017 started with developing new networks and new projects in the emerging field of research in bioeconomy at Novia. A major transition happened in the beginning of the autumn 2017 when Patrik started his new project as Academy Research Fellow at Novia, in which the focus is on evolutionary dynamics under environmental change. Therefore, during this year we have started a



Patrik and Oscar Gordo in Seville in July. +45 degrees, but still happy...

great variety of projects in the research group ranging from basic scientific research in evolutionary biology to more applied science projects focusing on land use and ecological indicators in terrestrial and aquatic environments.

Evolutionary dynamics and environmental change

In the new 5-year project funded by the Academy of Finland we investigate the evolutionary mechanisms and ecological

processes by which organisms can adapt to climate change. As a case study to examine these topical questions we use the colour polymorphic tawny owl on which we have a lot of background information and data. We focus on molecular, physiological and behavioural studies to understand the mechanisms how natural selection favours one colour morph over the other in harsh climates and how this selection translates into evolutionary change in colour morph frequencies. We will also compare the dynamics of tawny owl colour polymorphism across the species geographical range.

The project is tightly connected to Katja Koskenpato's PhD project, which deals with ecological energetics under climate change. During field work we started to collect data on thermoregulation of adult tawny owls by inserting a small microchip under the skin. The aim with the protocol is to test the hypothesis that the grey morph survives better than the brown one by down-regulating its body temperature and reducing its activity during cold spells in winter. During the field season in spring we had assistance from Kati Schenk who is doing her MSc on habitat composition, diet and breeding performance of the tawny owl colour morphs.

Ecological economics and science-based land use planning

Our research project on understanding the impacts of forest management on bio-

diversity has progressed during 2017. In spring Ruslan Gunko made his BSc-thesis in the SCM program on this topic. In his thesis Ruslan used GIS and ringing data to compare how forestry affects the territory occupancy of a boreal forest keystone species - the northern goshawk.

We are also involved in the Havsmanualen II work at Novia led by Matias Scheinin and funded by Svenska kulturfonden. In this work we are interested in further understanding the link between land use and water quality in the coastal region.

I forskningsgruppen 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 urvals-processerna? Vi strävar även till att tillämpa data och resultat från dessa projekt inom bioekonomiskt relevanta frågeställningar genom att analysera ekologiska data ur ett samhälls- och företagsekonomiskt relevant perspektiv. I hur stor utsträckning kan man avverka skog utan att utarma biodiversiteten och ekosystemtjänster och finns det lönsamhet i en sådan ekologiskt hållbar strategi? Vilka åtgärder kan göras för att minska belastningen i haven från land och vilka är de ekonomiska fördelarna i en sådan strategi?



Katja Koskenpato and Kati Schenk ringing and measuring a tawny owl young

Collaborators

- University of Lausanne, Switzerland: Prof. Alexandre Roulin (Colour polymorphism)
- Lund University, Sweden: Prof. Staffan Bensch & prof. Jan-Åke Nilsson (Molecular immunology and ecological energetics)
- Karolinska Institute, Sweden: Dr. Muhammad Asghar, Karolinska Institute Stockholm, Sweden (Infectious diseases and senescence)
- Novia UAS: Senior Lecturer Patrik Byholm (Biodiversity and forestry), Drs. Jonna Engström-Öst and Matias Scheinin (Havsmanualen II), Dr. Andreas Lindén (Bioacoustics in tawny owls, Eider ecology)
- University of Turku: Prof. Jon E. Brommer (Quantitative genetics), Dr. Satu Ramula (Eider ecology)
- University of Helsinki: Dr. Aleksi Lehikoinen, Univ. Lecturer Hannu Pietiäinen & Dr. Jari Valkama (Owl ecology), Drs. Sanna Mäkeläinen and Daniel Burgas (Biodiversity and forestry)
- Åbo Akademi university: Univ. Lecturer Markus Öst, (Eider ecology)



Waldemar von Frenckells stiftelse



The research team: Ruslan Gunko, Katja Koskenpato, Patrik Karell and Kati Schenk. Picture: Kati Schenk

Invasive species and blue bioeconomy in Nordic waters

Ane Timenes Laugen, Hanna Partoft (University of Stirling, UK), Jack Räisanen

Our research has during 2017 been mainly focused on initiating projects on blue bioeconomy in bivalves; developing economically and ecologically sustainable harvesting of Pacific oysters, investigating the ecological status of the commercially important blue mussel and European flat oyster, and investigating the possibilities for sea ranching of European flat oysters. Additionally, we have found the invasive Pacific oysters in new locations and have conducted the first field campaign in our project aimed at developing tools for detecting invasive cyanobacteria.

Highlights of the year

Blue bioeconomy in coastal zone bivalves

The invasive Pacific oyster is a massively underused resource that could potentially generate substantial revenue in coastal areas. Together with Danish, Norwegian, and Swedish colleagues we have initiated a cross-disciplinary network aimed at developing business plans for ecologically and economically sustainable harvesting of wild Pacific oysters in Nordic waters. The Novia student Magnus Hanstén performed some of the ground-work for this project during his field season in 2016. His BSc-thesis – defended in spring 2017 – includes data that will be crucial for calculations of profitability of wild-oyster harvesting. Our recently published paper (Faust et al. 2017) indicates that the biological basis for



Jack Räisanen (Novia) and Hanna Partoft (University of Stirling) learning how to conduct surveys of Pacific oysters in Bohuslän, May 2017



Ane Timenes Laugen taking water samples in Håckebergasjön in southern Sweden.

harvesting is at least partly secured through extensive larval drift between the Scandinavian populations.

A recently funded project deals with the status of Oskar-listed mussel- and bivalve beds and the biological and environmental threats to these commercially and ecologically important species. Together with Åsa Strand at the Swedish Environment Institute we collaborate closely with national and regional authorities to develop evidence-based determination of the conservation value of local bivalve populations.

Range expansion in invasive species

This year we also continued of work on

quantifying the expansion of the Pacific oyster at its northern range limits. We detected new locations in southern Sweden confirming previously held ideas that the species can tolerate relatively low-salinity water. Interestingly, many of the new locations were in a – for Sweden – entirely new habitat; settling on walls and piers inside harbours and marinas, instead of on beaches and rocks in the shallow-water tidal zone.

While Pacific oysters are easy to detect because of their generally massive size, microscopic organisms such as cyanobacteria is not always easy to find in the wild. To develop tools for early detection of invasive micro-organisms (so-called invisible invaders), we spent some weeks in August on a field campaign in southern Sweden,

Vi undersöker orsaker och konsekvenser av främmande invasive arter i Nordiska vatten. Hur kommer de främmande arterna hit? Hur påverkar de våra ekosystem? Har de bara negativa konsekvenser eller har de någon potential som resurs? Våra modellsystem för dessa frågeställningar är invasive cyanobakterier som i stort bara har negativa effekter och StillaHavsostren som har både negativa och positiva effekter på lokala ekosystem och som kan utnyttjas ekonomisk på flera sätt.

Åland Islands, and southern Finland. We took a large number of water samples from inland lakes and ponds to be used for developing molecular methods for detecting the presence of a particular unwanted cyanobacterium, *Cylindrospermopsis raciborskii*. A recently accepted grant will fund a PhD student that will combine niche modelling, molecular methods, and laboratory experiments to further determine the invasion dynamics of this model system.

Collaborators

- Swedish University of Agricultural Sciences: Åsa Berggren, Anna Lundhagen, Christer Solbreck (evolutionary ecology in insects), Eva Forsgren and Joachim Miranda (detection of disease in honey bees) and Stina Drakare (invasive aquatic cyanobacteria)
- Göteborgs Universitet: Jon Havenhand, Matthias Obst, (invasion ecology and bioeconomy of Pacific oysters)
- Swedish Environmental Institute: Åsa Strand (Conservation and management of coastal bivalves, sustainable harvesting of wild Pacific oysters)
- Institute of Marine Research (Norway): Torjan Bodvin, Stein Mortensen (harvesting of Pacific oysters), Mikko Heino (fisheries-induced evolution)
- Orbicon (Denmark): Per Dolmer (sustainable harvesting of wild Pacific oysters)
- University of Stirling (UK): Luc Bussière (evolutionary ecology in insects, pedagogical research)
- Ifremer (France): Bruno Ernande (fishing-induced evolution)



Kari Løe looking for Pacific oysters south of the Öresund bridge (spoiler alert: there weren't any)

Statistical population ecology

Andreas Lindén, Louise Lindroos, Sara Fraixedas (University of Helsinki), Patrik Korn (Åbo Akademi), Marianne Karlemo (Åbo Akademi), Andreas Otterbeck (University of Oslo), Oscar Gordo (Doñana Biological Station)

Our aim is to produce sound scientific knowledge on issues related to population ecology and biodiversity, to support sustainable development. We do basic and applied research using effective analytical methods that provide unbiased quantitative answers.

Highlights of the year

The group consisted of seven researchers, including two PhD students, two MSc students and two associated researchers. Our core topics of research are population dynamics, demographic parameters, biodiversity indicators, monitoring, phenology (the schedule of annual cycle events) and bioacoustics. During 2017 we have worked on a wide range of topics concerning both terrestrial and aquatic ecosystems.

In January-March Dr. Oscar Gordo continued his six-month visit as a guest researcher at Novia. In collaboration with Andreas Lindén we developed novel statistical models, with which we can reliably analyse between-year phenology even with considerable amounts of missing data. For this purpose, we developed a software package in the programming environment R. These methods provide a general platform for studying phenology in a wide range of systems in biology and natural resource management, e.g. in agriculture. This is



Ringling data from bird observatories are useful for studying changes in the timing of bird migration and population changes. The Chiffchaff (*Phylloscopus collybita*) is common on autumn passage at the Hanko Bird Observatory, on its way towards Southern Europe and Africa.

important, as climate change affects the phenology of most natural and cultivated biological systems. Our collaboration will continue in 2018, when we will apply the methods to Spanish and Finnish bird observatory data.

Louise Lindroos does her PhD-thesis on plankton population dynamics in the Baltic Sea. She has now completed processing her zooplankton samples collected from her two-year field campaign. Lindroos presented her preliminary findings on the variability associated with zooplankton sampling at both the Baltic Sea Science Congress (Rostock, Germany) and at the European Marine Biology Symposium (Piran, Slovenia).

In her work on phytoplankton she developed novel observation models for annual biomasses, which combine several heterogeneous sets of phytoplankton monitoring data, simultaneously accounting for phenology and wind. Next, Lindroos is integrating these observation models into state-space models, which estimate the population effects of temperature, salinity and nutrients.

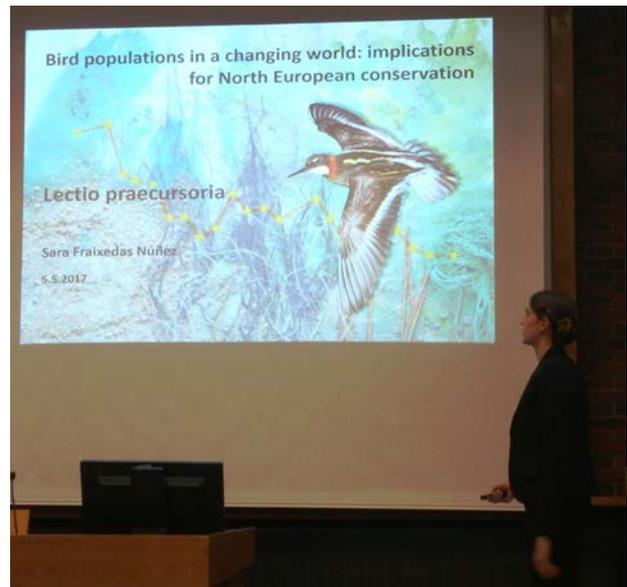
Sara Fraixedas defended her doctoral thesis in May. She developed avian biodiversity indicators for the main habitats in Finland and showed how the long-term population trends of Finnish bird species vary according to their habitat requirements. In general, many trends are pointing downwards, and for some groups, the causes can be assigned to climate change and land use. Species preferring old-growth natural forests and open mires are doing worst, due to

intensive forestry practices and ditching of mires, respectively. From a bioeconomic point of view, it is obvious that the current and past forestry practices have failed with respect to maintenance of biodiversity. To reach sustainability, forestry policy should urgently support solutions favouring biological diversity.

Patrik Korn finished his MSc-thesis about male Tawny Owl (*Strix aluco*) territorial responses to artificial playback of a strange male's territorial call. We constructed a novel measure of aggressivity, based on how the call changes with time from responding. In contrast to our hypothesis, we found no difference in response between the two colour morphs. In August, Andreas Lindén presented the results in a poster at the European Ornithologists' Union conference in Turku. Marianne Karelmo continued on her MSc-thesis, where she relates the demography of Willow Warblers (*Phylloscopus trochilus*) in Southern Finland to the timing of spring migration. After having his MSc-thesis approved in 2016, Andreas

Collaborators

- Aleksi Lehikoinen, Kalle Meller, Kaisa Välimäki, University of Helsinki, Finland
- Anna Papadopoulou, Mikael Himberg, Tom Wiklund, Markus Öst, Åbo Akademi University, Finland
- Jonas Knape, Swedish University of Agricultural Sciences, Sweden
- Jonna Engström-Öst, Patrik Karell, Mikael Kilpi, Novia UAS, Finland
- Jukka Rintala, Juha Tiainen, Natural Resources Institute Finland, Finland
- Mike S. Fowler, Swansea University, U.K.
- Satu Ramula, University of Turku, Finland
- Sirpa Lehtinen, Maiju Lehtiniemi, Finnish Environment Institute, Finland
- Torbjørn Ergon, Karl Inne Ugland, University of Oslo, Norway



The doctoral defence of Sara Frixedas was one of the absolute highlights of 2017.

Otterbeck submitted a collaborative manuscript on the reuse of old nests in Sparrowhawks (*Accipiter nisus*).

Vi studerar frågor inom populationsekologi och biodiversitet, med syftet att bidra till en kunskapsbaserad hållbar utveckling. Med statistisk analys får vi tillförlitliga kvantitativa svar på både tillämpade och mera teoretiska frågor. Våra huvudsakliga forskningsintressen omfattar populationsdynamik, demografi, bio-indikatorer, uppföljning, fenologi och bioakustik.

Dr. Oscar Gordo från Spanien fortsatte sitt forskarbesök vid Novia i januari-mars. Vi utvecklade statistiska modeller och mjukvara för effektivare analys av fenologiska data. Sara Fraixedas disputerade om Finlands fåglar som bioindikatorer och Patrik Korn fick färdigt sin *pro gradu* om kattugglans revirförsvar. Louise Lindroos fortsätter på sin doktorsavhandling om hur miljövariabler påverkar plankton i Östersjön. Marianne Karelmo jobbar vidare med sin *pro gradu* om lövsångarens tillbakagång i Finland.

Quality of democracy

Lauri Rapeli

Through several separate research projects, I study how modern representative democracy functions. I am particularly interested in how ordinary citizens form political opinions, how well informed decisions representative democracy produces and to what extent democratic policies account for future consequences. My work is primarily based on survey data, but I also use quasi-experimental data and interviews with leading civil servants and politicians.

Consequences of political sophistication

This project combines survey measures of citizen sophistication with aggregate-level measures of democratic quality. It seeks to answer whether the political sophistication of ordinary citizens matters for how well democracy works? To what extent can institutional arrangements affect the sophistication of citizens?

Facts in politics (Kone foundation, Kaks foundation, 2016-2018)

Together with Professor Matti Wiberg and MSc Sakari Nieminen (University of Turku), we have developed new methods for testing the accuracy of political statements. Additionally, we have used fact checking data from the US to examine the factual accuracy of US politicians, as well as conducted similar checks on domestic politicians.

Problems in present patterns of long-term decision-making

I lead a four-year research project at Åbo Akademi University, financed by the Strategic Research Council at the Academy of Finland. The project studies capacity for long-term decision-making in Finnish decision-making institutions and governance structures, with a particular focus on issues

Collaborators

- Professor Mikko Mattila (University of Helsinki)
- Researcher Achillefs Papageorgiu (University of Helsinki)
- Professor Matti Wiberg (University of Turku)
- PALO-consortium, led by Professor Maija Setälä (University of Turku).



Lauri Rapeli at the working place. Photo: Yle/Ville Hupa

concerning land use, regional planning and natural resources.

Jag forskar i hur den moderna demokratin fungerar. Jag är speciellt intresserad av hur vanliga människor formulerar politiska åsikter, hur faktakunskap utnyttjas i politiskt beslutsfattande och hur framtida konsekvenser tas i beaktande i politiska beslut. Mitt arbete baserar sig huvudsakligen på surveyundersökningar, men jag använder även kvasiexperimentella data och intervjuer med ledande tjänstemän och politiker i Finland. Mitt viktigaste forskningsprojekt handlar om hur de långsiktiga konsekvenserna av politiska beslut kunde bättre beaktas i det finländska politiska beslutsfattandet. Projektet, som är placerat vid Åbo Akademi, finansieras av Rådet för strategisk forskning vid Finlands Akademi under åren 2017-2021. Projektet är en del av PALO-konsortiet, som leds av professor Maija Setälä (Åbo Universitet).

Ecology of forest raptors and archipelago birds

Patrik Byholm, Heidi Björklund (University of Helsinki), Sanna Mäkeläinen (University of Helsinki), Wouter Vansteelant (University of Amsterdam), Caroline Howes (University of the Witwatersrand), Andrea Santangeli (University of Helsinki), Martin Beal (Lund University)

We study the population and conservation biology of forest raptors and the Caspian tern. By combining traditional field work with new technology, we aim to get better understanding of species' movement ecology, habitat use and factors limiting their distribution. How does migrating birds cope with wind and geographical barriers on migration, and how does breeding individuals utilize their home range?

Highlights of the year

After a slight increase in 2016, the number of breeding goshawk (*Accipiter gentilis*) pairs declined steeply in 2017 to settle on the lowest level recorded since the systematic monitoring initiated in the 1990s. The exact reason(s) for this drop is unknown, but low food abundance, bad weather and continuous heavy forestry altering the forest environment are all good explanatory variables candidates. None of these are likely to be the sole reason for the worrying situation, but considering that over 80% of goshawk nests active in 2005 have ceased to exist due to forestry practices (nest tree and/or immediate surroundings been cut) by now, the direct negative impact of forestry is clear. To that is to be added the indirect negative impact forestry has on many prey species preferred by goshawks. To live in an



The old mixed-spruce forest preferred by goshawks for breeding and hunting is disappearing from the Finnish forest landscape due to logging activities. As a result, the goshawk numbers are in decrease.

environment with no food and endless landscape alterations would be demanding for anyone!

That said, also the cold and rainy summer weather in 2017 was challenging for many bird species. This was certainly the case for the honey buzzard (*Pernis apivorus*) which relies on wasps as a food source. Due to the cold weather most insects, including wasps, were in low numbers and as a result not a single honey buzzard breeding event was recorded in the main-study area. Despite the lack of breeding pairs, the honey buzzard research did well otherwise. Thus, we in 2017 published the first scientific article on the migration ecology of Finnish honey buzzards (Vansteelant et al. 2017). In this paper, we show that the settlement area in which young inexperienced honey buzzards migrating to Africa end up in, to a high degree is explained by the decisions the birds make *en route* about how to deal with geographical barriers (sea, desert) and unpredictable wind conditions. Since early-life experiences have repercussions for the decisions individuals make later in life, the way wind and geography impact on the migration of young honey buzzards has to be accounted for when trying to understand the migration and wintering site choice of adults. This result is one of the first mechanistic evidence through which low migratory connectivity emerges. The collaborative work on the tropical ecology of honey buzzards on the wintering grounds in

South Africa has so far resulted in two manuscript drafts to be included in Caroline Howes's PhD-thesis at the University of the Witwatersrand in Johannesburg, both to be submitted for publication in the near future. As in previous years, the honey buzzard project received a good share of media attention. At the web-page: www.luomus.fi/en/satellite-honey-buzzards the migration of a few selected individuals can be followed.

In the archipelago, the study of Caspian terns (*Hydroprogne caspia*) continued. Several new birds were equipped with GPS-trackers, and breeding performance was monitored. This year we also used surveillance cameras to quantify predation and control the identity of breeding adults from ring readings in the breeding colonies. As part of the cooperation with colleagues at Lund University in Sweden, Martin Beal visited Finland to conduct field work. As a result of the cooperation, a manuscript on tern's space use and home range behavior is worked on.



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Collaborators

- Prof. Willem Bouten & Wouter Vansteelandt, University of Amsterdam, Institute for Biodiversity and Ecosystem Dynamics
- Prof. Craig T. Symes & Caroline Howes, University of the Witwatersrand, School of Animal, Plant and Environmental Sciences
- Dr. Daniel Burgas, University of Helsinki, Department of Biosciences
- Prof. Susanne Åkesson & Martin Beal, Lund University, Evolutionary ecology
- Dr. Ari Nikula, Natural Resources Institute Finland
- Dr. Heidi Björklund, Dr. Sanna Mäkeläinen, Dr. Andrea Santangeli, Dr. Jari Valkama, University of Helsinki, Finnish Museum of Natural History

Vi forskar i skogsrovfåglars och skräntärnors rörelse- och populationsbiologi. Den geografiska skalan för arbetet omfattar förutom Finland även resten av Europa och Afrika. Detta är möjligt tack vare det material GPS-sändare genererar beskrivande fåglars rörelsemönster på häcknings- och över-vintringsområdena. År 2017 var ett ovanligt svagt år för skogsrov-fåglarna duvhök och bivråk: de häckande paren var få. I skärgården lyckades emellertid vår studieart, skräntärnan, bättre och via intensifierat fältarbete erhöles mycket nytt material.



In common with other sea terns, fish is also the staple food of Caspian terns. Photo: Mauri Karonen.

Havsmanualen II pilot project

Matias Scheinin, Anna-Karin Almén, Hernán Abad Ortega, Motaz Omarien, Andreas Lindén, Patrik Karell and Jonna Engström-Öst

Havsmanualen II combines basic and applied research on coastal eutrophication. In essence, we investigated seasonal nutrient and community dynamics in shallow and sheltered ecosystems to identify potential bioindicators for their trophic state.

Highlights of the year

The work focused primarily on the foundations of the food-web. In addition to macrophytes, phytoplankton and zooplankton, we surveyed physical and chemical water characteristics in eight shallow bays in the Ekenäs archipelago. The model ecosystems form a trophic gradient. Otherwise, they were virtually identical to each other. Field sampling started in mid-April, right after the ice breakup. The samples were collected weekly until the end of October, when water temperature dropped close to zero.



Hernán and Matias returning from the weekly sampling in Åkernäsfladan

The field work was carried out mainly by Hernán Abad Ortega, Anna-Karin Almén and Matias Scheinin. The physicochemical water analyses were done at Tvärminne Zoological Station, by the field crew and the local lab staff. Phytoplankton was identified and counted by Hernán, while Matias took care of the macrophytes. The zooplankton

samples are being processed by Motaz Omarien. The data have been analyzed by Matias, with valuable support from Andreas Lindén.

The trophic state of each system varied steeply as a unimodal function of time. Corresponding differences among the systems followed an equivalent pattern. This means that the order of the systems on the trophic gradient remained the same throughout the season. By contrast, the magnitude of differences among the systems increased exponentially until the height of the summer, to decrease thereafter in a corresponding fashion. This was expressed as a temporal shift in community structure. In relation to the order of each system on the trophic gradient, vernal succession shifted backwards in time, while autumnal succession shifted forwards. Meanwhile, the length of the intermittent period dominated by opportunistic summer-time species became prolonged. The findings indicate that the structure of littoral communities is driven by high seasonal variation in trophic state, while the magnitude of this variation is determined by the level of internal nutrient loading. This warrants for temporally stable bioindicators that can reflect the average trophic state of their environment over the growing season. Macrophytes, or more specifically, the emergent properties of the resident species, showed high potential for bioindicator purposes. The structural and functional features of macrophyte assemblages could effectively summarize the high seasonal variation in the trophic state of the target

systems. Since macrophytes are sessile and comparably long-lived, they can reflect the average trophic state of shallow ecosystems over the entire growing season. However, the application of macrophytes as bio-indicators requires detailed information about the prevailing hydromorphological conditions. Unless depth, exposure and suchlike circumstances are elaborately controlled for, they confound the interpretation of the macrophyte data. Nevertheless, the emergent properties of macrophyte assemblages form a promising foundation for a cost-efficient and reliable bioindicator tool for detailed and extensive assessment of the trophic state of the coastal waters of the northern Baltic.

The outcome of the project gives support for further development of assessment methodology that applies macrophytes as bio-indicators for coastal eutrophication. We plan to continue the work by covering several types of coastal environments and higher levels of the food-web.



Hernán and Matias on the way to next sampling spot

Vi undersöker säsongsvariation i när-saltsfördelning och samhällsstruktur i grunda ekosystem för att identifiera potentiella bioindikatorer för deras ekologiska tillstånd med speciell hänsyn till övergödning.

Collaborators

- Tvärminne Zoological Station
- Finnish Natural Resources Institute (LUKE)
- Environmental offices in Hanko and Raseborg



Anna-Karin collecting water samples in Åkernäsfladan

Behavioral ecology of animal personality in blue tits

Jon Brommer

Our research group combines basic field- and lab-based research in ecology and evolutionary biology with approaches to apply data-based models in bioeconomy and natural resource management. The focus in basic research is on understanding evolutionary adaptations to environmental change in the study system of colour polymorphic tawny owls, whereas the applied research aims at developing tools for ecological economics in forestry, agriculture and data-based (coastal) land-use planning.

Highlights of the year

In 2017, my research concentrated on studies of animal personality in my blue tit population NE of Ekenäs. Animals, like humans, have what is considered personality. In practice, animal personality is characterized by individuals showing the tendency to behave similarly when their behavior is assessed repeatedly. For example, female blue tits construct the nest (Picture 1).

We showed in 2017 that blue tit females tend to construct similar nests year after year (Picture 3). Nest construction (in terms of size and in terms of how many feathers they used to build their nest) thus differed in a rather consistent manner among blue tit females. We also found some evidence that daughters inherit the specifics of nest constructions from their mother, but this so-called heritability was low (approximately 10%). This finding implies that as the environment changes (e.g. due to climate warming), blue tits nest construction will not rapidly respond through evolution.



Picture 2. Sixteen-day old blue tit offspring enjoying their warm nest. Picture by Jon Brommer



Picture 1. Each year, blue tit females construct a new nest to raise their offspring in. While the base material is typically moss, the lining of the nest cup is made of softer material such as hair of moose and deer and feathers of birds found on the forest floor. Picture by Jon Brommer

A second aspect concentrated on analysis of the fitness consequences of variation in nest construction. Analysis of experimental manipulation of nest size suggests that building a larger nest had little consequences for the growth of nestlings. This finding did not support the widespread hypothesis that birds construct thicker or larger nests as an adaptive response to colder weather conditions. Nevertheless, our study focused on the period when nestlings were small. Insulation benefits of thicker nests could be important during the early spring when females incubate the eggs.

In October 2017, Barbara Class defended her PhD thesis "evolutionary quantitative genetics of animal personality in the blue tit" (<https://www.utupub.fi/handle/10024/143920>) at the University of Turku. She worked several years in the Ekenäs blue tit population collecting data for her thesis.

I forskningsgruppen 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 urvals-processerna? Vi strävar även till att tillämpa data och resultat från dessa projekt inom bioekonomiskt relevanta frågeställningar genom att analysera ekologiska data ur ett samhälls- och företagsekonomiskt relevant perspektiv. I hur stor utsträckning kan man avverka skog utan att utarma biodiversiteten och ekosystemtjänster och finns det lönsamhet i en sådan ekologiskt hållbar strategi? Vilka åtgärder kan göras för att minska belastningen i haven från land och vilka är de ekonomiska fördelarna i en sådan strategi?

Collaborators

- Kees van Oers, Netherland Instutite of Ecology, Wageningen, The Netherlands
- Patrik Karell, Novia UAS, Finland



Picture 3. Nests constructed by two individual females (a) and (b) in three consecutive years (2014-2016). The proportions of feathers per nest (%) are displayed in the images for female (b). Female (a) uses predominantly hair as nest lining material, whereas female (b) uses feathers. These images are for illustration only as the proportion of feathers used for analyses was scored directly in the field. Pictures by Jon Brommer

Parental care strategies, reproductive success, and environmental stress in eiders

Markus Öst & Kimi Jaatinen

Our research combines intensive fieldwork, laboratory-based methods and theoretical modelling to study a range of basic and applied questions in evolutionary and behavioural ecology, population dynamics and conservation biology. Despite different objectives, each subproject benefits from the others and from a unique data set spanning nearly three decades on eider ducks, our main study species, from Tvärminne, SW Finland.

Highlights of the year

The year 2017 saw the finalization of the very productive collaboration with our Norwegian collaborators on the effects of pollutants on incubating eider females, using the Tvärminne population, assumed to be heavily affected by pollutants, as a comparison against the more pristine areas at Svalbard, Norway. As the final fruit of this collaborative effort, we investigated blood and feather concentrations of toxic elements at Tvärminne and Svalbard, also comparing these concentrations with earlier measurements from the 1990s (Fenstad et al. 2017). In general, Baltic and Svalbard eiders were exposed to element levels below the blood concentrations associated with toxic effects in birds. Compared to corresponding



Norwegian PhD students Anette Fenstad and Kristin Gabrielsen on their odyssey to polluted Tvärminne. Please note the professional Norwegian survival suits, to be compared with the rags worn by Finnish field-workers. Photo: Kristin Gabrielsen.



The eider population is going downhill, and fast...which makes the team look sour despite the lovely weather. Fresh PhD Kristina Noreikienė on the left. Photo: Heikki Eriksson.

measurements from the polluted 1990s, particularly lead (Pb) exposure has declined in Baltic eiders, and was not different from the Svalbard population. However, mercury (Hg) exposure remains similar in Baltic eiders as in the 1990s, exceeding the threshold for adverse oxidative effects reported in other bird species. This paper was also the final chapter in Anette Fenstad's PhD thesis, which she successfully defended at Norges teknisk-naturvitenskapelige universitet in 2016 (<https://brage.bibsys.no/xmlui/handle/11250/2399455>).

We have also made continued progress in understanding the connection between physiological stress and life-history strategies in female eiders, the topic of Dr. Kristina Noreikienė's PhD thesis, which she defended in December 2016 (<https://helda.helsinki.fi/handle/10138/168623>). One of the chapters of this thesis was published in 2017 (Noreikienė et al. 2017). Here, we delved deep into the relationship



A busy eider factory for producing samples ranging from stress hormone levels, pollutant concentrations to measurements of telomere length. Photo: Heikki Eriksson.

between nest-site selection, hatching success and stress physiology. We examined how nest cover and faecal glucocorticoid metabolite levels (fGCM) are linked to hatching success and telomere length in female eiders. Telomeres, nucleoprotein structures located at the ends of chromo-

somes, hold promise as an indicator of stress associated with internal and external challenges and individuals with longer than average telomeres for their age tend to have longer life expectancy and higher stress resistance. We found that individuals with higher fGCMs, and thereby enhanced anti-predator responsiveness, had the greatest reproductive output in poorly-concealed nests facilitating rapid escape, whereas individuals attaining high re-productive success in concealed nests showed lower fGCM levels, relying on crypsis instead of escape. We also found that regardless of nest cover, high levels of reproductive performance were linked to shorter telomeres. To conclude, our results help to explain the huge variation in nest concealment observed at the intraspecific level.

Ejdergruppen använder fält- och labbstudier samt matematiska modeller för att studera evolutionär ekologi, beteendekologi, populationsdynamik, och bevarandebiologi. Forskningen utnyttjar en unik nästan 30-årig tidsserie med data från skärgården runt Tvärminne i Nyland.

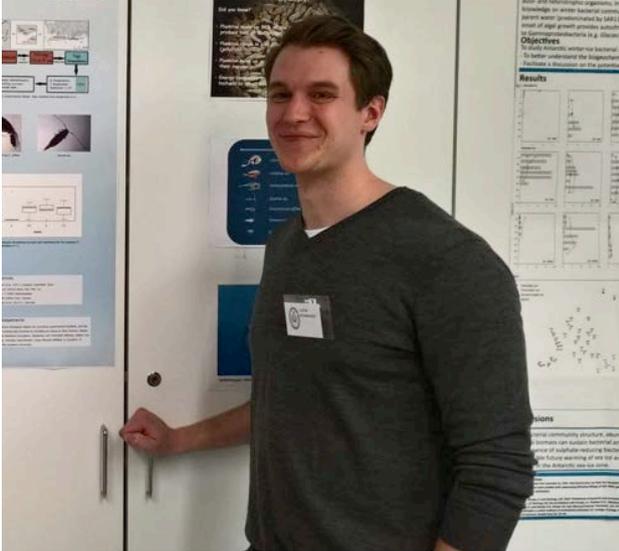


**Svenska
kulturfonden**



Collaboration with students from Novia and other universities

The members of the research team recruit and supervise several undergraduate students every year. Here are the students who worked with us in 2017



Lauri Kuismanen from Åbo Akademi University collected data for his MSc thesis in spring 2017 at Tvärminne Zoological Station. Lauri is studying zooplankton egg production, hatching and survival in different salinities. Supervised by Olivier Glippa.



Lauri Oikarinen did his Master thesis Endangered Valuable Tropical Hardwoods in Palawan Philippines - Initial survey on current availability & seeding schedule and seed germination analysis for protection, propagation and reforestation purposes. Supervised by Patrik Karell.



Tanguy Soulié from Institut National des Sciences Appliquées Toulouse did his Engineer thesis at Tvärminne Zoological Station in summer 2017. Tanguy measured O₂ consumption of zooplankton in different salinities reaching from Pojo Bay to Längden weather station. Supervised by Olivier Glippa & Jonna Enqström-Öst.



Malin Kurkisuo did her Master thesis Koulutusohjelman kehittäminen vastaamaan asiakkaiden tiedontarpeita jätehuoltoasioissa : Tapaustutkimus koskien jäteautonkuljettajia ja jäteasemanhoitajia. Supervised by Patrik Byholm.

Satu Ojala did her Master thesis Katsaus lieteuoltoon Lounais-Suomessa : Arviointia kunnan vastuulle kuuluvasta lieteuollosta jätteenkuljetusjärjestelmää koskevaa päätöksentekoa varten.

Heini Ukkonen did her Bachelor thesis Bedömning av ekologisk status i en grund havsvik, Täckbukten. Both supervised by Patrik Byholm.



Teaching

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 2017



Teachers and students participating open doors day at Tvärminne Zoological Station

Patrik Byholm

- Senior lecturer at Novia UAS
- Head of Master-programme in Natural Resources Management
- Teaching courses in research methodology statistics, GIS and ecology (BSc and MSc level)
- Supervising MSc- and BSc-thesis projects

Jonna Engström-Öst

- Coastal ecology (course teacher)
- Conservation Biology (course coordinator, course teacher)
- Supervising MSc- and BSc-thesis projects

Patrik Karell

- International agriculture (course teacher)
- Conservation Biology (course teacher)
- Supervising MSc- and BSc-thesis projects

Ane Timens Laugen

- Coastal ecology (course coordinator, course teacher)
- Fisheries Resource Management (course coordinator, course teacher)
- Supervising MSc- and BSc-thesis projects

Andreas Lindén

- Conservation Biology (course teacher)
- Statistisk analys (course coordinator, course teacher)
- Supervising MSc- and BSc-thesis projects
- Organises statistics helpdesk for students and staff at Novia

Novia Raseborg R&D Research Symposium 2017

23-24.11.2017, Raseborg

Novia Research Symposium 2017



NOVIA RESEARCH SYMPOSIUM 23-24.11

Thursday 23.11

12:00-12:30	Riina Klais	Detecting causality in observational data
12:30-12:50	Jonna Engström-Öst	Is stress a global phenomenon? Case studies from the Pacific, the Atlantic, and the Baltic
12:50-13:10	Olivier Glippa	Effect of salinity on the emergence and survival of calanoid copepods in the Baltic Sea
13:10-13:30	Anna-Karin Almén & Matias Scheinin	Macrophyte assemblages as bioindicators
13:30-13:50	Essi Parviainen	Possibilities of organic salmon production in the Baltic Sea region.
13:50-15:20	Coffee break and student poster session (sign-up required)	
15:20-15:40	Louise Lindroos	Tvärminne zooplankton study
15:40-16:00	Ane T. Laugen	Oysters on the move
16:00-16:20	Roosa Mikkola	What do flads and shallow bays have to offer?
16:20-18:00	Drinks, snacks & hangout @Novia (sign-up required)	

Friday 24.11

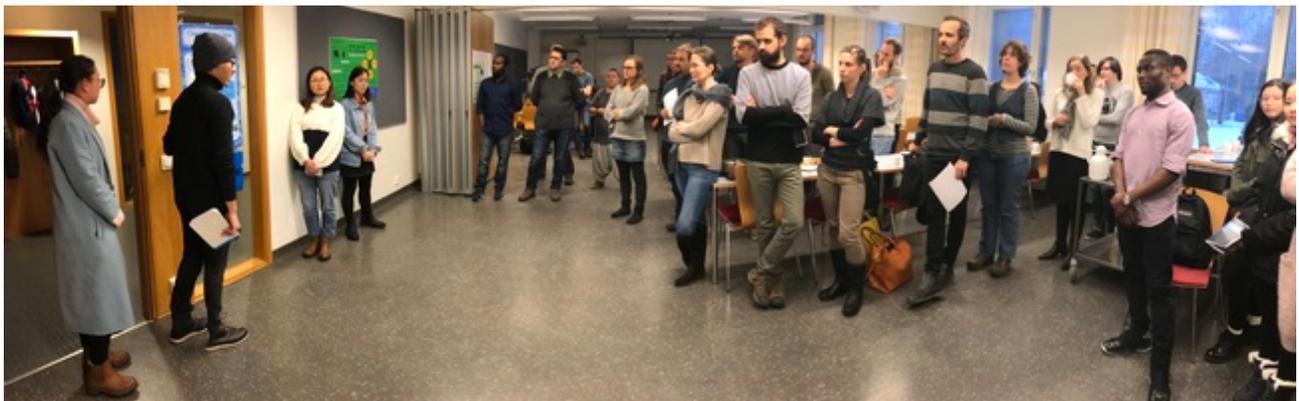
09:00-09:30	Wouter Vansteelant	From fledging to adulthood: how weather, geography and culture shape Honey Buzzard migration
09:30-10:00	Sanna Mäkeläinen	Space-use behaviour of European Honey Buzzards during breeding season
10:00-10:20	Patrik Byholm	Mortality factors in migratory birds: causes and consequences
10:20-10:50	Martin Beal	Nest-phase movement patterns among Caspian Terns of the Baltic Sea
10:50-11:10	Break	
11:10-11:40	Aleksi Lehikoinen	Impact of climate change and land use changes on bird populations in North Europe
11:40-12:00	Andreas Lindén	Climate change: a population ecologist's perspective
12:00-12:20	Patrik Karell	Why studies of owl colouration can help us understand adaptation to environmental change
12:20-12:40	Katja Koskenpato	Exploring latitudinal clines on a large geographical scale: google and tawny owl colour morphs
12:40-13:00	Kati Schenk	Habitat choice and fitness of tawny owl colour morphs
13:00-13:20	Ruslan Gunko	Associations between changes in forest structure and territory occupancy of two avian biodiversity indicator species



Riina Klais presents her research «Detecting causality in observation data». Photo: Ane Timenes Laugen



Students from the SCM's Programme presenting their work during the poster session. Photo: Anna Granberg



Publications

Scientific articles

Almén A-K, Brutemark A, Jutfelt F, Riebesell U, Engström-Öst J (2017) Ocean acidification shows no detectable effect on swimming activity and body size in a common copepod. *Hydrobiologia* 802: 235-243.

Almén A-K, Glippa O, Pettersson H, Alenius P, Engström-Öst J (2017) Changes in wintertime pH and hydrography of the Gulf of Finland with focus on depth layers. *Environmental Monitoring and Assessment* 189: 147.

Aymí R, González Y, López T, Gordo O (2017) Bird-window collisions in a city on the Iberian Mediterranean coast during autumn migration. *Revista Catalana d'Ornitologia* 33:17-28.

Brommer JE, Class B (2017) Phenotypic correlations capture between-individual correlations underlying behavioral syndromes. *Behavioral Ecology and Sociobiology* 71: 50.

Brommer JE, Wistbacka R, Selonen V (2017) Immigration ensures population survival in the Siberian flying squirrel. *Ecology and Evolution* 7: 1858-1868.

Brommer JE, Alakoski R, Selonen V, Kauhala K (2017) Population dynamics of two beaver species in Finland inferred from citizen-science census data. *Ecosphere* 8:e01947. 10.1002/ecs2.1947.

Class B, Dingemanse NJ, Araya Ajoy YG, Brommer JE (2017) A statistical methodology for estimating assortative mating for phenotypic traits that are labile or measured with error. *Methods in Ecology and Evolution* 8, 1910-1919. DOI: 10.1111/2041-210X.12837.

Engström-Öst J, Barrett N, Brutemark A, Vehmaa A, Dwyer A, Almén AK, De Stasio B (2017) Feeding, survival and reproduction of two populations of *Eurytemora* (Copepoda) exposed to local toxic cyanobacteria. *Journal of Great Lakes Research* 43: 1091-1100.

Faust E, André C, Meurling S, Kochmann J, Christiansen H, Fast-Jensen L, Charrier G, Laugen AT, Strand Å (2017) Origin and route of establishment of the invasive Pacific oyster (*Crassostrea gigas*) in Scandinavia. *Marine Ecology Progress Series* 575:95-105.

Fenstad AA, Bustnes JO, Lierhagen S, Gabrielsen KM, Öst M, Jaatinen K, Hanssen SA, Moe B, Jenssen BM, Krøkje Å (2017) Blood and feather concentrations of toxic elements in a Baltic and an Arctic seabird population. *Marine Pollution Bulletin* 114: 1152-1158.

Forsgren E, Locke B, Semberg E, Laugen AT, de Miranda JR (2017) Sample preservation, transport and processing strategies for honeybee RNA extraction: Influence on RNA yield, quality, target quantification and data normalization. *Journal of Virological Methods* 246: 81-89.

Fraixedas S, Lindén A, Meller K, Lindström Å, Keišs O, Kålås JA, Husby M, Leivits A, Leivits M, Lehtikoinen A (2017) Substantial decline of Northern European peatland bird populations: consequences of drainage. *Biological Conservation*, 214: 223-232.

Glippa O, Brutemark A, Johnson J, Spilling K, Candolin U, Engström-Öst J (2017) Early development of the threespine stickleback larvae in relation to water pH. *Frontiers in Marine Science* 4: 427.

Publications (cont.)

Järvinen P, Klun E, Tiiru M, Brommer JE (2017) Experimental manipulation of nest height does not support the thermoregulation hypothesis. *Ornis Fennica* 94: 82-91.

Karell P, Bensch S, Ahola K, Asghar M (2017) Pale and dark morphs of tawny owls show different patterns of telomere dynamics in relation to disease status. *Proceedings of the Royal Society of London Series B*, 284: 20171127. <http://dx.doi.org/10.1098/rspb.2017.1127>

Lindén A, Meller K, Knappe J (2017) An empirical comparison of models for the phenology of bird migration. *Journal of Avian Biology*, 48: 255-265.

Noreikienė K, Öst M, Seltmann MW, Boner W, Monaghan P, Jaatinen K (2017) Nest cover and faecal glucocorticoid metabolites are linked to hatching success and telomere length in breeding eiders (*Somateria mollissima*). – *Canadian Journal of Zoology* 95: 695-703.

Papadopoulou A, Dalsgaard I, Lindén A, Wiklund T (2017) In vivo adherence of *Flavobacterium psychrophilum* to mucosal external surfaces of rainbow trout (*Oncorhynchus mykiss*) fry. *Journal of Fish Diseases*, 40: 1309-1320.

Souissi Sami, Glippa Olivier, Dahms, Hans-Uwe (2017) Global shipping, ballast water and invasive species. In *Marine Pollution and Climate Change* (Eds. Arias AH, Marcovecchio JE), CRC Press. Chapter 7, pp. 166-179.

Vansteelant WMG, Kekkonen J, Byholm P (2017) Wind conditions and geography shape the first outbound migration of juvenile honey buzzards and their distribution across sub-Saharan Africa, *Proc. Roy. Soc. Ser B.*, 284: 20170387.

Newspaper columns

Engström-Öst J. Vad är det för mat idag? *Västra Nyland* 19.9.2017.

Glippa O. Vill du ha en plastpåse? *Västra Nyland* 28.11.2017.

Karell P. Handlar bioekonomi om kvantitet eller kvalitet? *Västra Nyland* 28.3.2017.

Laugen A. Kan forskarna aldrig bestämma sig? *Västra Nyland* 24.10.2017.

Lindroos L. Vetenskap för alla. *Västra Nyland* 17.1.2017.

Rapeli L. Pojkar behöver stöd. *Västra Nyland*, 1.12.2017.

Rapeli L. 1,5 procent. *Västra Nyland*, 27.10.2017.

Rapeli L. Låt ungdomarna göra misstag. *Västra Nyland*, 22.9.2017.

Rapeli L. Mr. Nash. *Västra Nyland*, 18.8.2017.

Lindén A. Helsingin idänpikkusiepon kutsuäänestä. – *Tringa*, 44: 122-124.

Lindén A. Den ekologiska dimensionen av bioekonomi. – *Västra Nyland* 15.8.2017.

PhD theses

Almén AK (2017) Copepods in a changing sea: Ocean acidification, long-term changes and short-term variability. PhD thesis, Åbo Akademi University.

Publications (cont.)

Fraixedas S (2017) Bird populations in a changing world: implications for North European conservation. PhD-thesis. Department of Biosciences, University of Helsinki.

Conference presentations

Byholm P. GPS-tracking of Finnish honey buzzards. Migrant Landbird Study Group-symposium, Turku, Finland 17-18.8.2017

Byholm P. Movement ecology and reproductive performance of Finnish Caspian terns. Seabird Movement Ecology- symposium, Lund, Sweden 6.4.2017

Byholm P. Insights from a study on Caspian terns, Ringer's meeting, Jyväskylä, Finland 4-5.2.2017

Byholm P. Uppföljning av skräntärnor i Syd-Österbotten, Närpes, Finland 10.11.2017

Engström-Öst J, Scheinin M, Karell P. Poster: Havsmanualen II: Macrophyte assemblages as bio-indicators for evidence-based coastal planning. Coastal Conference 2017, Malmö, Sweden. 28-29.3.2017

Gunko R, Byholm P, Mäkeläinen S, Burgas D, Karell P. Associations between changes in forest structure and territory occupancy of two avian biodiversity indicator species. Maaseutututkijatapaaminen, Leppävirta, Finland 31.8.2017

Karell P. Evolutionary dynamics of colour polymorphism in the tawny owl *Strix aluco*. Seminars of the Estación Biológica de Doñana (EBD-CSIC), Seville, Spain 14.7.2017

Karell P. Kiertotalous ja sen soveltaminen biotaloudessa avaa uusia liiketoimintamahdollisuuksia maaseudulle (Circular economic applications in bioeconomy). Maaseutututkijatapaaminen, Leppävirta, Finland 31.8.2017

Karell P, Bensch S, Ahola K, Asghar M. Telomere dynamics of tawny owl colour morphs differ and depend on disease status. European Ornithological Union Congress, Turku, Finland 18-22.9.2017

Karell P. Evolutionary dynamics of colour polymorphism in the tawny owl *Strix aluco*. World Owl Conference, Évora, Portugal 26-30.9.2017

Mäkeläinen S, Björklund H, Byholm P. Search for different behavioral states in summer movements of the European honey buzzard. European Ornithologist Union 2017-conference, Turku 18-22.8.2017

Vansteelant WMG, Bildstein K, Meyburg B, Byholm P. How do juvenile soaring raptors find their way on their first autumn migration? Insights from life-long tracking studies in the Old and New World. European Ornithologist Union 2017-conference, Turku 18-22.8.2017

Other publications

Brommer JE, Class B (2017) Personality from the perspective of behavioral ecology. Chapter 5 in Personality in Nonhuman Animals (eds. Vonk J, Weiss A). ISBN : 978-3-319-59299-2 Springer.

Byholm P (2017) Kesälesken elämää - uutta tietoa räyskän liikkeistä. In: Metsähallituksen luonnonsuojelujulkaisuja. Sarja A 226 (eds. Vösa, R., Höqmander, J., Nordström, M, Kosonen, E.

Publications and media appearances

Laine, J., Rönkä, M. & von Numers, M.), pp. 198-200, Metsähallitus, Vantaa, Finland

Byholm P (2017) Satellitsändaruppföljning av två havsörnar i Kvarken, OA-Natur 19: 55-60.

Byholm P (2017) Bland bivråkar i Sydafrika, Finlands Natur, 76 (2): 20-21.

Byholm P (2017) Suomen räyskät tehoseurannassa, Linnut, 52: 18-21.

Jacobsen L, Engström-Öst J Coping with environments -vegetation, turbidity and abiotics. In: (eds. Anders Nilsson, Christian Skov) Pike Biology, CRC Press (In press).

Media appearances and popular articles

Patrik Byholm

MTV3 (honey buzzard migration)

27.04.2017; <https://www.mtv.fi/uutiset/kotimaa/artikkeli/paivi-haukka-on-matkalla-suomeen-satelliittilahetin-voi-sammua-mina-hetkena-hyvansa/6407480>

19.6.2017; <https://www.mtv.fi/uutiset/kotimaa/artikkeli/suomeen-palanneen-paivi-haukan-pesinta-jaamassa-taas-valiin-viikko-armonaikaa-jaljella/6476918>

25.9.2017; <https://www.mtv.fi/uutiset/kotimaa/artikkeli/mehilaishaukoilla-huono-vuosi-pesimisen-sijaan-paivi-haukka-tutustui-uusiin-maisemiin/6588784>

15.11.2017; <https://www.mtv.fi/uutiset/kotimaa/artikkeli/paivi-haukka-yllatti-taas-saapui-etela-afrikkaan-etujoukoissa/6659174>

Syd-Österbotten (great cormorant nesting numbers)

29.6.2017

Jonna Engström-Öst

Ilmatieteen Laitos

18.12.2017; <https://ilmatieteenlaitos.fi/tiedote/455748207>

Västra Nyland

24.11.2017; <https://www.vastranyland.fi/artikel/kunskap-byts-over-flera-granser/>

Patrik Karell

Blog of the Meteorological institute of Spain. "Impact of climate change on birds".

24.02.2017; <https://aemetblog.es/2017/02/24/efectos-del-cambio-climatico-sobre-las-aves/comment-page-1/#comment-171>

ConservationBytes.com

7.09.2017; <https://conservationbytes.com/2017/09/07/less-snow-from-climate-change-pushes-evolution-of-browner-birds/#more-21143>

Landsbygdens Folk

24.02.2017; <http://extra.sl.c.fi/lf/0817/filer/assets/basic-html/page3.html>

24.02.2017; <http://extra.sl.c.fi/lf/0817/filer/assets/basic-html/page26.html>

Västra Nyland

2.5.2017; <https://www.vastranyland.fi/artikel/novia-forskare-far-betydande-finansiering/>

Applied projects in Bioeconomy at Novia 2017

Marianne Fred

The year began with a reorganisation of Novia UAS where teaching and R&D joined forces within three new geographical units (Jakobstad, Vasa and ÅboRaseborg). It felt like we were finally ready for joining forces and in the long run I am sure this will give R&D more diversity.

The financing of the EU- programme period 2014-2020 was really going full steam in 2017. At the same time, many financial instruments gave out their last calls for applications or announced that funds left were modest to small. Within the focal area of Bioeconomy we had reached a good spread of project activities in 2017. We were working on developing sustainable food-systems and gastronomy, sustainable tourism, local entrepreneurship in Bioeconomy, spreading information about projects financed from the EU fund for rural development in Uusimaa, and had several projects related to teaching Bioeconomy in Finland. The management of marine areas is important for us, and we had both applied and scientific projects working on issues related to that topic. The Bioeconomy research team together with an Academy of Finland research fellowship, and our numerous applied projects, gives us broad knowledge, orientation and important diversity in financing which is unique to Universities of Applied Science in Finland. Within R&D in Bioeconomy at Novia we want to continue working with the broad potential that Bioeconomy has in Finland and thereby offer alternatives to the conventional.

While writing this we are well into the New Year and are looking at new arenas. Building construction of wooden houses combined with 3D modelling in BIM (Building Information Modelling) is something we are very much looking forward to working on. Artisan Food and sustainable gastronomy



have found new actors in the form of associations working nationally and internationally to further the cause. At Bioeconomy we are looking into these new constellations and hope to gain traction for further development. Something I hope you can read about in the next annual report!

Efter en organisationsförändring där utbildning, forskning och utveckling gick ihop för att bilda tre enheter på Novia (Jakobstad, Vasa och ÅboRaseborg) är vi redo för nya utmaningar. Programperioden för EU-finansiering är i full gång och inom Bioekonomin har vi en fin spridning i projektverksamheten. Forskarteamet i Bioekonomi samt det akademiforskarprojekt och de utvecklingsprojekt som drivs inom Bioekonomi vid Novia ger oss en bredd i kunskap, inriktning och finansiering som är unik vid en yrkeshögskola i Finland. Vid fokusområdet för Bioekonomi går vi i bräschen för att hålla paletten bred och arbeta med hela potentialen på området för att kunna erbjuda alternativ till det konventionella

St Olav Waterway

Anna Karin Abrahamsson

The aim of the St Olav Waterway - project is to create a new cultural pilgrims trail from Finland (Turku) via the archipelago to the Åland Islands and Hudiksvall in Sweden. The route will be incorporated into other St Olav routes in Sweden on the way to its final destination Trondheim/Nidaros in Norway. The new route is unique, it is the only pilgrim trail that also includes waterways.

St Olav Waterway is named after a Norwegian saint. Sankt Olav used to be one of the most important Nordic saints and a unifying force between countries. Nidaros was one of Northern Europe's most significant pilgrimage site for 500 years. In the Middle Ages pilgrims would commemorate Sankt Olav by travelling from Novgorod to Nidaros.



Students Clara Kankaanpää, Mathilda Engström, Daniela Hautasaari, Annika Holmberg, Juan Antonia Cortés and Heidi Enqvist test walking the route.

The route St Olav Waterway will be beneficial for the whole archipelago and its businesses since it will increase the overall attractiveness of the region. The number of

Målsättningen med projektet St Olav Waterway är att skapa en ny rutt, en S:t Olavsled, från Åbo i Finland genom skärgården och Kökar, Sottunga och fasta Åland till Grisslehamn i Sverige och därifrån norrut för att bindas samman med tidigare framtagna S:t Olavsleder i Sverige och Norge. Denna nya led skulle bli den första pilgrimsleden som också kommer att dras över stora områden hav och skärgård, den blir därför unik i världen. Ett av projektets huvudmål är att öka besökarnas antal under lågsäsong dvs. från april-juni och augusti-oktober.

off-season tourists is expected to grow, mainly in the spring and autumn. In addition, it will generate more income for the local entrepreneurs and there will be new job opportunities.

The project is carried out in cooperation with Åbo Akademi University (lead partner), City of Pargas, Novia, Sottunga Municipality, The Association of St Francis on Kökar, Time for Pilgrimage in Sweden, Östhammar Municipality and Söderhamn Municipality.

Students from Novia work with different assignments in close cooperation with the St Olav Waterway-project. The students are being supervised by appointed teachers and the work is carried out with the local entrepreneurs as clients. The project functions as an excellent learning platform for the students and there is mutual benefit since the students learn about the development of a tourist destination and the entrepreneurs and the tourism industry gain from the students' enthusiasm and fresh and new ideas.

The students have test walked parts of the route, created material for the social media of the project, they have benchmarked other hiking routes, arranged workshops for entrepreneurs and assisted them in creating social media marketing.

St Olav
WATERWAY



Pro Naturbruk 2017

Niklas Andersson

The five-year project's third year focused on developing methods to connect bioeconomy research and development project with the bachelor's education. The beginning fourth year's focus is on internationalization.

The Project

Pro Naturbruk is a five year project that has four main focus areas: developing the quality of the bioeconomy education at Campus Raseborg, communication, connecting R&D with the everyday education work and finally, to strengthen the internationalization.

The first year we mostly focused on quality issues and begun working on a marketing strategy to turn around the negative trend of applicants to our Bachelor-programmes at the Campus. We developed a communication plan that includes both traditional media, publishing in relevant magazines, a blog and social media. We also included many short information events for possible future students. Finally, we developed a campaign tour for the Swedish highschoools in Finland in cooperation with the farmer's organization SLC and Helsinki University. We were able to break the trend, and by 2017 the applications to the bioeconomy programme, agriculture and forestry, had turned into a rise the second year in a row.



Agriculture students attending a technical course in cooperation with Optima

During 2017 we have continued the quality enhancing measures. We have financed external experts and lecturers during the year for about 35 000 euro. We have also financed study tours for about 10 000 euro. During the year we also financed and organized some special courses, a five study point course in small-scale timber processing and a five study point course in game economy.

One important quality issue is the continuous discussion with working life and experts in the field. During 2017 we arranged two regional symposiums with representatives from companies, firms and organizations who employ our agriculture- and forestry bachelors. Together we discussed the future of our field, bioeconomy, future competencies needed, challenges and joint strategies for cooperation.

New methods to connect R&D with the studies

After the first two years, the quality processes and marketing strategy were run good shape, and the main development focus in the project could shift to look into how to better connect our R&D with our students. To do this, we decided to engage all teaching personnel in the projects. By developing project ideas and apply for project funding with and for the teaching personnel, the teachers and lecturers would have the opportunity to directly engage their students in the projects they worked with. By winter 2017, every teacher worked in at least one project. This, in turn, led to possibilities for the students to do practical projects in courses or topics for their Bachelor's thesis.



Planning cooperation with Habari Maalum College in Tanzania, 2017.

Internationalization

The Pro Naturbruk - project has funded international study tours for bioeconomy - bachelor students at Campus Raseborg since 2014. 2017 the horticulture students did a study tour to London and the forestry students went to Sweden for a round trip to get to know the Swedish forestry sector. We have also funded teacher's study tour to seminars, fairs or research partners in order to strengthen their personal skills in their own field of expertise. For the second year, we also arranged the Nordic-Baltic course in "Forestry for enhanced storm resistance" at Campus Raseborg.

An interesting new opening in 2017 was the planning of a joint development assistance project together with FSPM (Finlands Svenska Pingstmission, the Swedish-Finnish Pentecostal Mission organization), Novia and Habari Maalum College in Arusha, Tanzania. As the projects Cluster Manager, I did a study and planning tour to Tanzania in January 2017. I visited sites in Arusha, the Forestry Training Institute and workshopped with the personnel at Habari Maalum College (HMC). Novia and HMC wrote a joint application for a project that intended to develop a curriculum in Natural Resources Management at HMC in Arusha.

During the fall 2017, we continued the internationalization process by cooperation

Projekt Pro Naturbruk är ett femårigt projekt som pågår under åren 2014 - 2019 på campus Raseborg. Målsättningen är att stärka bioekonomiklustret på campuset genom fyra områden. Vi jobbar för att stärka utbildningens kvalitet, att öka synligheten för att nå fler potentiella sökanden till branschen, förena forsknings- och utvecklingsverksamheten med undervisningen och att stärka internationaliseringen. Under 2017 har vi varit inne på projektets tredje år. I början låg tyngdpunkten på att skapa kvalitets-höjande processer och stärka kommunikationen. Fokus för år tre har varit att genomföra utvecklingsprojekt. Under året har alla lärare jobbat med olika projekt och på så sätt haft möjligheten att integrera projektverksamheten med sin undervisning och ge studerande möjligheter till case och examensarbeten. Småningom har vi fokuserat mer på internationaliseringen och under 2017 har vi förutom finansierat internationella studiebesök och fortbildning, också planerat gemensamma projekt med Habari Maalum College i Arusha, Tanzania, och Visayas State University på Filippinerna.

discussions with Visayas State University (VSU) in the Philippines. I had visited the agriculture- and forestry University back in 2014 and we have had some discussions about cooperation ever since. Then, during the fall, we found a mutual interest in exploring the possibilities to develop a Double Degree agreement between our Sustainable Coastal Management programme and VSU's Bachelor of Environmental Management. The cooperation continues in drafting agreements and discussing the details in such an agreement.

www.naturbruk.fi

www.bakommaten.fi

Stora Komet: Enhancing Career Management Skills and thinking about the future

Dana Björkström-Ljung

“Stora Komet” (translation: Big Comet) is a project that focuses on facilitating the transition from one phase of life to another. We work with Swedish-speaking young people in the Helsinki-Uusimaa region and with their teachers, counsellors and helpers. Transitions (school to school, school to work, military service to school/work) are often critical in the lives of young people and guidance is needed to make transitions smooth.

Novia University of Applied Sciences is the project owner and the third sector actor Luckan is partner in the project. Stora Komet is a three-year project funded by the European Social Fund. The project cooperates with Arcada University of Applied Sciences and vocational schools like Axxell and Prakticum and others interested in the future and in guidance.

We give career guidance visibility

Part of our material comes from a collaboration with the Institute for Future Research at the University of Turku. Our first priority is to find out what other actors have done in guidance. The aim is to make these actors, their models and methods visible and accessible.

We do this in various ways. For example, we have a Future tent where we gathered counsellors and young people to come together to take part in career guidance and to discuss the future and career management. The Future tent has appeared at fairs, schools and other places where you can find people interested in testing tools, discussing theories and focusing on the need for guidance in an ever-changing environment.

Work with mentoring and peer support

Today we need to acquire skills we don't have, or did not even think we needed before. We have developed mentorship programs and peer support programs for example for young women in male dominated environments.



Novia personnel in Future Camp in August 2017.

Career development workshops for young women and men doing military service

“Stora Komet” has developed and tested a Career Development Workshop in Nylands Brigad. We have noticed that there is a need for career guidance among the young people in Nylands Brigad. They seem to have time and need to plan their future. The concept for the Career Development Workshop is an answer to this need.

More interaction between educators

We have cooperated with a project called “Smidiga studieövergångar” (translation: Smooth transitions) and here the aim is to see what can be done for the transition between vocational school and UAS. As result, we will have preparatory courses, recognition of previous learning will be a bit clearer and it will be easier to get information about these matters. There are websites, infographics and workbooks, which include

several exercises for career management for both students and counsellors. We have also developed a process for individual study planning that includes career management. To combine these two is new. We call it the HUPS-process.

In-service training for counsellors

It is important for counsellors, teachers and helpers to have access to continuing in-service training. The project has offered opportunities to learn from different lecturers who have helped us to find the way to new Career Management Skills and have offered us possibilities to think about the future. A good example we can mention here is the Future Camp, arranged by the Institute for Future Research, for teachers and counsellors in Novia UAS.

Welcome to visit novia.fi/storakomet and to take part in our next in-service training in career management!



Time in the military gives time to thoughts about the future.

Stora Komet vill jobba för att göra övergångar smidigare och synliggöra olika typer av vägledningstjänster och verktyg. I vår värld av ständiga förändringar behöver vi lära oss nya framtidskompetenser för att kunna möta framtidens arbetsliv.



Hävkraft
från EU
2014–2020



The project leader Dana Björkström-Jung lecturing about the future and Career Management Skills

The nutrient and energy efficient farm II

Veronika Bäckman

The nutrient and energy efficient farm is a large co-operation project involving all applied universities offering higher education in farm practices in Finland (the bachelor degree) and it is financed by Finnish Ministry of Agriculture. The focus lies in demonstrations of new technologies, field trials and applying practices which lead to lower losses in nutrients and energy. Networking between universities as well as their collaborating farms and farmers is an important element in the project aiming in learning from each other. The project activities are integrated in education, for example student doing their exam for the project.

The project started 1.8.2017 and it will end 30.4.2018. Each project partner chose two or more of the project's 8 focus areas: biogas, measuring of energy efficiency, composting, solid bio-fuels, logistic of organic manure, self-sufficiency in fertilizer production, protein self-sufficiency, water protection and nutrient management.

Lecturers and researchers from Novia Raseborg together with Västankvarn gård which is Novias co-operating farm focused on water protection and nutrient management in this stage. Lecturer Paul Riesinger, PhD is responsible for field-trials about cover crops. Ten different seed-mixes were tested both on small-trial fields and on a large ordinary field. Biomass samples were collected in order to measure the effect of nutrient leaching prevention as well as how much organic matter is potentially supplied into the soils. At the same time planning of wetland has continued for which lecturer Lars Fridefors was responsible. Students and



The NOVIA's students becomes familiar with cover crops grown on the field in Västankvarn farm. Photo: Paul Riesinger, PhD., lecturer in crop science at NOVIA.

lecturers from Häme UAS visited Västankvarn gård in order to learn about the farm, its practices and solutions to more efficient use of energy. The farm has a wood-chips central heating station which supplies heat not only to the farm buildings but also to the neighboring facilities. Novias students will visit Häme UAS education farm in Mustiala. The students will get a possibility to become familiar with for instance the new equipments for field data collection and processing which were acquired by the project.

Projektet Den närings- och energieffektiva lantgården II varar från 1.8.2017 till 30.4.2018. Alla finska högskolor med agrologutbildning nätverkar med varandra i syfte att hitta och testa lösningar till ökat effektivitet i användning av näring samt energi på gårdar. Novia Raseborg i samarbete med Västankvarn gård fokuserar i det här skedet på fånggrödor och planering av våtmark. Det är viktigt att vi stöder utbildningar via projektarbete. I det här fallet drar agrologutbildningen direkt nytta av projektet via ny kunskap samt anskaffningar av högteknologiska verktyg som hjälper att kartlägga och noggrannare styra närings- och energianvändning.



Food of the coast project 2016-2018

Ann-Louise Erlund

The project is a cooperation between three coastal regions and a project team is managing the project. In the team are members from the regions. The artisan food entrepreneurs are a new growing profession and the consumers shows a growing interest for the products. More www.novia.fi/kustensmat.

The first course arranged within Artisan Food craftsmanship ended in June 2017 and the second course started in August and ends in December 2018 with 42 participants in three regions. The curriculum is mutual in both courses.

Through food craftsmanship unique products are created containing rich flavours and distinct identities, where their manufacture takes place through the gentle processing of mainly local produce. Food craftsmanship preserves, develops and reveals local food culture and the wealth of knowledge contained therein.

Especially during the fall, two important regional occasions were arranged by the project. The first seminar was information about Evira - Finnish Food Safety Authority and their new role in guidance for new business and in maintaining good knowledge in running businesses. Local authority of environmental health Sydspetsens Miljöhälsa was also informing about their cooperation with Evira and their role on local level in guidance food entrepreneurs. This cooperation and new roles of guidance are a big advance for the actual sector and entrepreneurs.



Photo: Ari Ahlfors

The second occasion was about deer and the increasing strain of white tailed deer. Game is an attractive foodstuff for Artisan Food entrepreneurs. One question is how to get the meet to the market, restaurants, stores and consumers. Game is requested by consumers but not always easy available. During the occasion information about new rules for selling game was the actual theme for the evening. The local authority of environmental health Sydspetsens Miljöhälsa and the veterinary will have the key role on the local level in cooperation with different game acts.

Those two occasions, within Artisan Food making and the different rural entrepreneur groups as game acts together constitute considerable activities in a rural context within the food sector.

Mathantverkarna är en ny växande yrkeskår som skapar unika produkter med rik smak, av hög kvalitet och med tydlig identitet. Produkterna tillverkas i huvudsak av lokala råvaror som förädlas varsamt, i liten skala och på den egna gården eller i det egna företaget. Kännetecknande för mathantverk är att människans hand och kunnande är med i hela produktionskedjan. Mathantverk tar gamla traditioner till heders eller förenar dem med ny kunskap och nya innovationer.



Finnish Championship in Food Craftmanship 2017

Ann-Louise Erlund

The Open Finnish Championship in Food Craftmanship 2017 was arranged 4-6th of October in Raseborg.

The judging of products took place in Ekenäs and the awards ceremony was arranged on October 6. During the competition, seminars, field trips and other programs that attract and unite enthusiasts in food craftmanship were organized.

The competition is organized to increase awareness of food craftmanship and encourage its development. In organizing the championship there is an aim to protect and preserve the concept of food craftmanship and the values that the term represents. Consumer awareness increases through the competition and the winning products. In the future this will lead to increased awareness and sales.

The Open Finnish Championship in Food Craftmanship 2017 was open to producers from Finland, other Nordic countries and the Baltic States. The precondition is that the products are processed in an artisanal way, and are based on local or domestic raw materials with known origins. Only products manufactured by companies which are available for general sale can compete.



Jury members tasting food.

The competition categories are: dairy products, charcuterie products, fish products, bakery products, berry and fruit products, vegetable and mushroom products, cold sauces, snacks, Nordic beverages and innovative food craftmanship.

To the competition were 130 artisan food products registered by 60 food artisan entrepreneurs all categories: Fifty jury members assessed the registered products and they nominated winners in 17 competition classes and honorary diplomas in two competition classes. The competition essentially follows rules created by Eldrimner which is a Swedish resource center for artisan food artisans (www.eldrimner.com).



Some products of the winner products 2017 - gold medalists.

Finsk mästerskap i mathantverk arrangerades i Raseborg 4-6.10.2017. 130 produkter från 60 mathantverkare deltog i 17 konkurrensklasser.



Digitalisaatiolla luonnonvarat biotalouteen - DLB

Romi Rancken

From natural resources to bioeconomy through digitalization

The Ministry of Education and Culture gave universities of applied sciences a number of grants for so-called key projects in the year 2017. One grant of 1,7 million € was awarded a consortium of 11 universities for a three year long project with the goal to strengthen digitalization in the Finnish bioeconomy education. Novia is one of the partners in the consortium, which consists of all the universities of applied science offering education within the bioeconomy sector.

The most visible product of the project will be a bioeconomy game. The computer-based game can be used as a pedagogical aid in many courses in the curricula for forestry, agrology, landscape planning and other students within the bioeconomy sector. The game will give the students a possibility to practice decision-making and to experience the economic and ecological consequences of their decisions in a safe environment. Lapland UAS is in charge of the technical development of the game, but the content is produced collaboratively by

dozens of teachers from the universities involved in the project.

Another central part of the project consists of the production of a number of web-based courses covering themes like bioenergy, production of protein-rich plants and circular bioeconomy. Novia is in charge of coordinating the work aiming at producing two GIS courses, 5 study points each. The courses will follow the recently published quality criteria for web-based courses.

DLB-projektet är ett treårigt spetsprojekt finansierat av UKM. Huvudmålsättningen är att stöda den digitala utvecklingen av undervisningen i bioekonomi på YH-nivå. Det här ska uppnås bland annat genom att utveckla ett bioekonomispel som ska stöda undervisningen i olika ämnen och överbrygga ämnes-och yrkesgränserna. Vidare utvecklas ett tiotal webbkurser på 10 studiepoäng av lärarna i de 11 yrkeshögskolor som är med i projektet.



An early version of the Bioeconomy game.

Vår Nylandsbygd - Meidän Uusimaaseutu 2017-2018

Annika Söderholm-Emas

Vår Nylandsbygd - Meidän Uusimaaseutu is a bilingual information channel for the rural development program for mainland Finland in the Uusimaa region. The project is carried out in cooperation between Häme University of applied sciences (HAMK) (lead partner) and Novia. The rural development program for mainland Finland covers most of the country, including smaller cities.

The project's stakeholders are entrepreneurs, farmers and people who are interested in local development in rural areas.

During 2017 the project arranged ca. 15 meetings for farmers where the topics were the latest news about agricultural subsidies, new technics, economical issues and development in farming.

The project also produces articles and videos showing how the money in the program has been used.

The published material is found on the page nylandsbygd.fi, uusimaaseutu.fi that opened in 2017.

The idea is to show the possibilities for development by using the tools given in the program. Enterprises can receive subsidies for various purposes including



One of the aims of the project is to show how the money reserved in the rural development program is used.

product development, marketing, testing of new concepts, globalization and collaboration.

During Spring 2018 the activities will be similar to previous years. Interviews, pictures and videos produced by the project can be found on the webpage. The project also uses Facebook and Instagram for information. The project will end 31.8.2018, but it's continuing in a bit different form with similar goals and partnerships.

The impact area of the program can be found on

<http://www.arcgis.com/home/webmap/viewer.html?webmap=816018cf62ef40899->

Vår Nylandsbygd är ett tvåspråkigt projekt som har som mål att informera om landsbygdsutveckling i Nyland. Vi informerar genom möten, informationsvideos, vår hemsida, samt sociala medier.



In august 2017 the Rural division in Uusimaa visited a goat farm in Loviisa in Eastern Uusimaa. Goatfarming is a rare production in Finland, especially in this size class. The farm has started from zero and are aiming to 1000 goats to produce ecological milk for cheese production.



Europeiska jordbruksfonden för landsbygdsutveckling: Europa investerar i landsbygdsområden

Bioeconomy in Western Uusimaa II

Klaus Yrjönen

Bioeconomy strives for an economic growth which is based on sustainable use of renewable resources. Potential of growth based on bioeconomy in the region of Western Uusimaa was identified in the six month preparatory project, Bioeconomy in Western Uusimaa I.

The current project started in August 2017 and continues to end of July 2019. The project is financed by regional EU-funding, cities and municipalities and Novia. There are two main objectives for the project. The first is to promote the small and medium scale private bioeconomy business in the region and the second objective is to build up a bioeconomy strategi for the region together with the other stakeholders. The bioeconomy business is promoted by various means as workshops, seminars and study visits. The project actively utilizes existing networks and also creates new ones in order to broaden the base for co-operation among businesses. The focus of the work is at bioeconomy themes that was defined in the preparatory part of the project: Bioenergy, nature tourism, local production and processing of agricultural product, processing of forest raw materials and water protection. The project co-operates broadly with other development projects, Novia education and associations as well as municipalities and businesses in the region. The work with bioeconomy strategy for the region will support the continuation of development based on bioeconomy in the future.

During fall 2017 several new initiatives have started: planning of seminar/mini-fair on food bio-packaging, promoting local food in public kitchens, survey about horse manure that could be utilized in biogas production, promoting construction of wooden houses, workshop in co-operation with Föreningen Kungsvägen (King's road association) and

seminar about Green Care. Important part of the project work is information, dissemination and networking by meeting key actors and experts in the sectors, which has a potential for growth.



Students from Novia in co-operation with a farmer constructed a tailor-made market stand for selling fresh berries and vegetables

Projekt Bioekonomi i Västnyland II började i augusti 2017 och slutar i juli 2019. Projektets mål är att stöda regionens företag i bioekonomi branschen samt att ta fram en bioekonomi strategi för regionen. Projektets fokus ligger på områden som identifierades under projektet fas I som avslutades i februari 2017. Områden är: Bioenergi, naturturism, förädling av jordbruksprodukter, skogsbaserade produkter samt vattenvård. Projektets viktigaste verktyg är att befrämja nätverk, sprida information via seminarier, workshops och studieresor. Seminarier ordnas bl.a. om trähus byggande, bioförpackningar för livsmedel och Green Care.

Novia Raseborg R&D, Personnel 2017

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Kilpi, Mikael (Research Leader)

Rehnman, Jill (Project Controller)

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Novia Raseborg R&D Funding

The Novia Bioeconomy Research Team

The NBRT rely on several sources of external funding. The sources of our basic funding are Raseborg6 and the private foundations Konstsamfundet and Utbildningsstiftelsen Sydväst.

Additionally, our research is supported by a range of different funders; Academy of Finland, Onni Talas Foundation, Victoriastiftelsen, Svenska Litteratursällskapet, Sophie von Julins stiftelse, Svenska Kulturfonden, Walter and Andrée de Nottbeck Foundation, Oskar Öflund Foundation, Waldemar von Frenckells Foundation, Jenni and Antti Wihuri Foundation, Otto A. Malm Donationsfond, European Maritime and Fisheries Fund, Nordic Council, Oscar and Lili Lamm Foundation.

Applied R & D project funding

Our applied projects are funded by European Social Fund, European Agricultural Foundation for Rural Development, Stiftelsen Finlandssvenska Jordfonden, European Regional Development Fund, Interreg Central Baltic, LEADER, The Ministry of Education and Culture, The Ministry of Agriculture and Forestry.

NBRT funding 2017

