



NEWSLETTER I

July, 2014

Welcome to the first Wildlife Photo-ID newsletter!

We are pleased to present the Wildlife Photo-ID network newsletter, keeping you informed of the progress in our project and other connected issues. Of course, we appreciate a lot if you forward this newsletter to interested colleagues and potential interest groups.

This issue will bring you the latest information on the coming first workshop and especially on our great keynote speakers. This newsletter also provides info on our 'keynote Photo-ID animal': the Saimaa ringed seal.

The workshop will be held in Koli National Park in North Karelia, Finland (www.outdoors.fi/destinations/nationalparks/koli/Pages/Default.aspx). It is organized by the University of Eastern Finland (UEF). The Wildlife Photo-ID workshop info is available on our website (www.uef.fi/fi/photo-id) and you will find us also on Facebook (<https://www.facebook.com/groups/photo.identification/>).



UNIVERSITY OF
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Saimaannorppatutkimus **UEF**
Saimaa ringed seal research

Our goals

International Wildlife Photo-ID network workshops, funded by the Finnish Cultural Foundation, will be held in 2014 - 2015. The workshops bring together experts in the fields of wildlife ecology, conservation, monitoring, photo-ID, crowd sourcing, and computing from several different countries. The workshops aim at developing different photo-ID methods for animal species, including automatic photo-ID applications, especially focusing on implication for endangered species research and monitoring. The workshops offer great opportunities for researchers to network. At the end of the project a photo-ID internet application will be produced (the example will be Saimaa ringed seal - catalogue) that enables not only researchers, but anyone interested to take part in monitoring work of endangered animals. In addition, the results of the workshops will be gathered together with the final aim of producing an article, which will be offered for publishing to an international journal.

The first workshop

First workshop will be held in early November 2014 in Finland. Altogether 20 to 30 experts related to the themes will be invited to attend to the workshop. The output of the workshop will be shared to the broader audience via the website, newsletters and facebook. The themes of this workshop are 1) remote cameras / traditional camera technique and their applications and 2) photo-ID; storing and management, computer programs, and their development suitable for different species.



Photo: Tapio Kostet / WWF Finland

Workshop agenda November 3.–6. 2014 in Koli, Finland

Monday, 3. Nov

Arrival

17:50-19:00 Transport from Joensuu to Koli

19:00 Check in

19:30 Ice Breaker / dinner

Movie: Ice-loving seals

Tuesday, 4. Nov

6:00-8:30 Breakfast

9:00-9:30 **Mervi Kunnasranta (Univ. of Eastern Finland): Welcome and introduction, Saimaa ringed seal**

9:30-10:15 **KEYNOTE: Sea Mammal Research Unit (Univ. of St Andrews): ExtractCompare**

10:15-11:00 **KEYNOTE: Tanya Berger-Wolf and Chuck Stewart (Computational Population Biology Lab, Univ. of Illinois at Chicago): HotSpotter / IBEIS**

11:00 Field trip with lunch

13:30–13:45 **Olle Karlsson (Swedish Museum of Natural History): grey seals**

13:50-14:05 **Katja Holmala (Finnish Game and Fisheries Research Institute): pilot study: lynx photo-ID and alien species monitoring**

14:10 Coffee Break

14:40-14:55 **Ville Vuorio: Conservation of rare newt populations in managed forest landscapes of North Karelia, Finland: Potential benefits of Photo-ID**

15:00-15:15 **Tapio Kostet (WWF Finland LWfG Conservation Group): lesser white-fronted goose**

15:20-15:35 **John Moran (Alaska Fisheries Science Center, NOAA Fisheries): humpback whales**

15:40-15:45 Closure of the day

Free time, Koli relax spa / Koli national park

19:00 Dinner

Wednesday, 5. Nov

6:00-8:30 Breakfast

9:00-9:45 **KEYNOTE: Glenn Gailey (Cascadia Research Collective, USA and The Swire Institute of Marine Science, The University of Hong Kong) and Leszek Karczmarski (The Swire Institute of Marine Science, The University of Hong Kong): Discovery**

9:45-10:30 **KEYNOTE: Renate Reijns and Jurgen den Hartog: I3S**

10:30- 11:30 Joint Working Groups and Discussion

11:30-12:45 Lunch

12:45-14:00 Joint Working Groups and Discussion

14:00-14:30 Coffee Break

14:30-15:00 Summary remarks – Future directions

15:50-17:00 Transportation Koli-Joensuu / or to field trip

Thursday, 6. Nov

Optional field trip: wolf, wolverine and eagle watching safari

Departure

Abstracts of the keynote speakers

IBEIS: An Image-Based Ecological Information System

Tanya Berger-Wolf, Charles V. Stewart, Daniel I. Rubenstein, Jason Holmberg

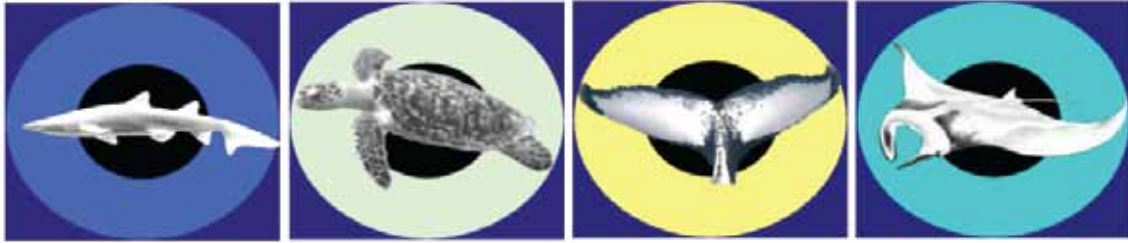
Images are rapidly becoming the most abundant, widely available, and cheapest source of information about the natural world. These images are taken by field scientists, tourists, and incidental photographers, and are gathered from camera traps and from cameras mounted on ground vehicles and UAVs. We are developing an image-based ecological information system (IBEIS) that will ingest many thousands of photos each day from all these sources, will detect animals in the images, determine their species and identify individual animals by their stripes, spots, wrinkles, or notches using our HotSpotter algorithm. Currently, humans are in the loop in each stage of the computation, but as the volume of images grows the system will be made more fully automatic. IBEIS is built around the notion of an encounter – an ecologically-meaningful collection of images localized in space and time. The redundancy of images in an encounter allows more reliable and more automatic detection and identification. The output of image analysis is a database, built using the WildBook(TM) information model that records who the animals are and where and when they are active at fine-grained resolution, allowing ecologists to determine what the animals are doing and ultimately why they are doing it. IBEIS will provide ecological queries framework to the database to support scientists, conservation, and citizen science engagement. IBEIS builds the digital view of the animal world through the lenses of individual cameras.



Scientists using HotSpotter in Kenya to monitor a Grevy's zebra population

Our field of study and the sight of the first IBEIS deployment: Ol Pejeta Nature Conservancy in Kenya (and the animals we can study using IBEIS)





I3S: Interactive Individual Identification System **Renate Reijns and Jurgen den Hartog**

Photo identification has many advantages over other, more invasive techniques such as tagging. Although being animal friendly, without proper identification tools it is far from researcher friendly. Since 2005 a still increasing family of tools called I3S (Interactive Individual Identification System) is available to support (and not replace) the researcher in the tedious identification task. In the presentation we will explain the major design philosophy behind I3S, or in other words "why should the researcher always be in control?". I3S has expanded to a family of four, and we will talk about the benefits as well as the limitations of each.

The main question we are asked is still "will I3S work for my specific species?". In a brief tutorial we will show you how to find out yourself!

Finally, as we get very few requests or comments from users we want to grab this opportunity to get some feedback from the audience and discuss which needs they have regarding photo identification. We would especially like to address the topic of organizing data and/or use of databases, and what I3S could contribute.

DISCOVERY: A Photo-Identification Data Management System **Glenn Gailey and Leszek Karczmarski**

A software system DISCOVERY was developed to provide a comprehensive approach to process, store, manage, and analyze photo-identification and other associated information. Due to the non-standard data types of information being collected across a variety of projects, DISCOVERY was designed to be highly customizable and dynamic in its ability to store all information for a any photo-identification project. The processing tools in DISCOVERY allow users to filter and manipulate their 'incoming' data efficiently and provide within group matching tools to identify the best representative image to be matched to the catalog of previously identified individuals. Matching to the catalog can be filtered by user-defined categories, sub-categories, and descriptors to narrow the list of potential matches in the defined catalog of individuals. Forms to store standard and user-defined sighting parameters are provided as well as survey effort and GPS waypoint along with track storage capabilities. GIS components allow visualization of individual, group sighting, and survey information. DISCOVERY also provides import/export of ESRI shapefiles of geographic information to/from other GIS software tools. Analytical tools were developed to provide summary information, such as discovery curves, sighting/re-sighting histories, group size frequencies, behaviour frequencies, etc. Existing data can be easily imported into DISCOVERY thanks to a dynamic import tool, and data stored in DISCOVERY's Access database can be exported into Excel, Access, SOCPROG, Mark, and GIS software for further processing and analyses of photo-identification information. We believe that DISCOVERY provides a dynamic tool that facilitates easy integration of all collected photo-identification and sighting data; a tool that efficiently stores, visualizes, processes, and maintains these data and allows export to and from other tools. The system can be particularly useful for maintaining a centralized database for research projects involving multiple-species data on a large geographic scale with multiple research teams working with different databases and species. The flexible capabilities of DISCOVERY allow the system to be adaptable to suit project-specific requirements and user-specific needs.

Introduction of the keynote speakers

QUESTIONS

1. Tell something about yourself
2. What do you do?
3. What is your specialty in the field of photo-ID?
4. What would be your contribution in the workshop?



Renate Reijns and Jurgen den Hartog: I3S

1. Jurgen den Hartog & Renate Reijns have a background in Computer Science & Astronomy and now virtually nothing of biology. During a diving holiday in South Africa in 2004 they met with Prof. Vic Peddemors and his PhD student Annemieke van Tienhoven. They were shocked when they found out that photo identification was a manual process mostly flipping pages back and forth. Being professional nerds they thought this should be much easier and therefore they developed a software tool over the Christmas holiday that same year. The first version of what is now called I3S Classic was released in January 2005. After publishing the results in the Journal of Applied Ecology, the use of I3S quickly spread to other users, both under and above water, resulting in requests for identification for other types of markings and patterns. With support from the occasional grant currently four I3S tools are available for free: Classic, Spot, Pattern and Contour.

They live together in Zoetermeer in the Netherlands with their cat (with lots of markings) and enjoy outdoor activities such as diving. Their major frustration in life is to have 2500 whale shark photos on their computer, but never have seen one for real.

2. The day time job of Jurgen is independent security consultant and working in the field of biometrics inspired the development of i3S. Renate, who studied astronomy works as project manager, trainer and mediator.

3. Developing user friendly identification software which hopefully contributes to research and conservation of endangered species.

4. Discuss the possibilities and limitations of the I3S software tools, discover user needs, and get some new ideas for future development.



Chuck Stewart and Tanya Berger-Wolf: IBEIS

Dr. Chuck Stewart is a Professor and Head of the Department of Computer Science at Rensselaer Polytechnic Institute in Troy, NY, and is also the founder and CEO of DualAlign LLC. In photo-ID, he and his students, working with colleagues at Princeton, University of Illinois-Chicago, and WildMe, develop and apply computer vision algorithms for detection and identification of individual algorithms. They also design and implement the underlying software system. In the workshop, Dr. Stewart will describe IBEIS and the computer vision algorithms, and will openly contribute ideas for new approaches, algorithms and software.

Dr. Tanya Berger-Wolf is an Associate Professor in the Department of Computer Science at the University of Illinois at Chicago, where she heads the Computational Population Biology Lab. Her research interests are in applications of computational techniques to problems in ecology, from genetics to social interactions. She has published over 60 papers and given numerous invited talks on the subject. As a legitimate part of her research she gets to fly in a super-light airplane over a nature preserve in Kenya, taking a hyper-stereo video of zebra populations.

Dr. Berger-Wolf has received her Ph.D. in Computer Science from University of Illinois at Urbana-Champaign in 2002. After spending some time as a postdoctoral fellow working in computational phylogenetics and doing research in computational epidemiology, she returned to Illinois. She has received numerous awards for her research and mentoring, including the US National Science Foundation CAREER Award in 2008 and the UIC Mentor of the Year (2009) and Graduate Mentor (2012) awards.

Charles Stewart taking pictures of rhinos to see if HotSpotter can identify them





Glenn Gailey and Leszek Karczmarski: Discovery

Dr. Glenn Gailey is a Post-Doctoral Researcher at Cascadia Research Collective in Olympia, WA, USA and Research Associate at Cetacean Ecology Lab, The Swire Institute of Marine Science, The University of Hong Kong. Prior to completing his Master degree (at Texas A&M University) that evaluated the performance of a computer-assisted photo-identification system, FinScan, he designed and developed Pythagoras, which is the leading scientific software for shore-based research on marine mammals using surveyor's theodolite. More recently, he has designed and developed several scientific software tools to facilitate data processing, visualization, management and analyses for various research techniques such as photo-identification and passive acoustic monitoring, including WhaleTrack II for passive acoustics tracking, and the recently released, jointly with Dr. L. Karczmarski, software system Discovery, which is presented at this workshop. His Ph.D. research (Texas A&M University) investigated the impacts of activities related to oil and gas exploration in the vicinity of a primary foraging ground of critically endangered gray whale population off Sakhalin Island, Russia. Dr. Gailey's current work continues to study cetacean behavioural ecology and anthropogenic factors that may influence their behaviours, such as behavioural impacts on Indo-Pacific humpback dolphins in Hong Kong, gray whales off far-east Russia, and cetacean responses to sound through controlled exposure experiments off southern California.

www.cascadiaresearch.org

<http://www.hku-cetacean-ecology.net/#!/glenn/cnv8>

Dr. Leszek Karczmarski is an Associate Professor at the School of Biological Sciences, The University of Hong Kong (HKU), and Research Scientist at The Swire Institute of Marine Science (SWIMS) where he heads the Cetacean Ecology Lab. He has completed his Master degree in a joint program at the Agricultural University of Szczecin and the University of Gdansk, Poland; and his Ph.D. at the University of Port Elizabeth, South Africa. Dr. Karczmarski's research interests focus on delphinid behavioural ecology and processes that determine population social and spatial structure; comparative socio-ecology, especially odontocete social strategies and how they compare to other known mammalian systems; population ecology and socio-demographic processes that determine population viability; range use pattern and habitat relationships; and behavioral approaches to conservation, how anthropogenic pressures influence vital socio-ecological processes and the behavior of individuals. His recent and current field research includes: socio-ecology of spinner dolphins in remote atolls of the far-western Hawaii; population ecology of Heaviside's dolphins and humpback dolphins in South Africa; socio-spatial ecology of sympatric delphinids in the archipelago systems of Philippines and Solomon Islands; conservation ecology of Indo-Pacific humpback dolphins in Hong Kong, the Pearl River Estuary and off Taiwan; 'landscape of fear' and range establishment of re-introduced lions, and socio-spatial ecology of African elephants.

<http://www.hku-cetacean-ecology.net/#!/leszek/crtq>

Our “keynote” animal: the Saimaa ringed seal

The endemic Saimaa ringed seal (*Phoca hispida saimensis*) only exists in Lake Saimaa in eastern Finland, and there are only about 300 Saimaa seals left in the whole world! This critically endangered landlocked subspecies is threaded by high by-catch mortality (especially gill net fishing) and various negative effects of changing climate.

The University of Eastern Finland (UEF) is located on the northern edge of the Lake Saimaa water system, and therefore it has a natural connection to this rare seal population. UEF (www.uef.fi/en/norppa/etusivu) carries out diverse research on conservation ecology and genetics of the Saimaa ringed seal. Traditional telemetry studies together with recent genetic approaches have provided new and much-needed data for conservation purposes of this threatened seal population. During the last years, photo-ID, especially with remote camera solutions, has become one new application in studying the ecology of Saimaa ringed seals. Every ringed seal individual has a unique permanent pelage pattern and those ring figures provide great opportunities for photo-identification studies over time.

See our publications:

<http://www.uef.fi/en/norppa/julkaisut>



Our destination: Koli

Koli has many faces. To many, Koli is Finland's most beautiful natural attraction. Koli National Park and the surroundings provide a unique combination of internationally recognized natural and cultural attractions together with a broad range of quality tourist services in all seasons.

The Koli National Park and national landscape

In 1994, Ministry of the Environment selected 27 particularly important Finnish sceneries as Finland's national landscapes. Koli was one of the regions chosen. Many people consider Koli one of the most important, or even the most important of the national landscapes. The claim that Koli is the most photographed landscape in Finland is also not very far-fetched.

The Koli National Park is one of the most famous nature sights and tourist attractions in Finland, as well as one of the best-known Finnish national landscapes. The size of the National Park is 3,000 hectares, and it is situated in the area of the municipalities of Joensuu, Kontiolahti and Lieksa. The Koli National Park was founded in 1991 and extended in 1996.

History of tourism

At the turn of the 1800s and 1900s, Koli was impressed into the minds of Finns by the works of artists such as Eero Järnefelt, Juhani Aho, Pekka Halonen, I. K. Inha and Jean Sibelius. Koli had become a symbol of the Kalevala scenery and the Finnish national spirit. During National Romanticism and Karelianism, Koli also became famous as a tourist attraction. Throughout the 1800s, people visited Koli primarily through Lake Pielinen and the harbour, until the Koli road was completed in 1913. The oldest signposted nature trail in Finland was opened in Koli on 12 July 1896. During the same summer, the first tourist lodge (the "High Lodge") was built in Koli. At that time, Koli was already one of the most popular tourist attractions in Finland. Koli also offered the possibility to enjoy downhill skiing after the first slope was opened in the late 1930s. The High Lodge, which was located on the spot of the present hotel, was extended in the early 1930s. A hotel wing was added to the High Lodge in 1967, and the actual High Lodge was converted into the present hotel building in 1970.

For the nature-lover, the Koli National Park offers several days' worth of sights worth seeing. Besides the most famous scenic points, there are many nature attractions in the park and its vicinity that are well worth experiencing: the Ryläys rocky waterfall, the Räsävaara observation tower, the Pirunkirkko ('Devil's Church') rocky cave, the Tarhapuro waterfall, the Sacrificial Crevasse, and the sandy-beached islands of Lake Pielinen, to name just a few.





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University of Eastern Finland

With approximately 15,000 students and 2,800 members of staff, the University of Eastern Finland is one of the largest universities in Finland. The university's campuses are located in Joensuu, Kuopio and Savonlinna.

The University of Eastern Finland is a multidisciplinary university, which offers teaching in more than 100 major subjects. The university comprises four faculties: the Philosophical Faculty, the Faculty of Science and Forestry, the Faculty of Health Sciences, and the Faculty of Social Sciences and Business Studies.

The activities of the university underscore multidisciplinary. The university's key interdisciplinary research areas are built around four global challenges: Ageing, lifestyles and health; Learning in a digitised society; Cultural encounters, mobilities and borders; and Environmental change and sufficiency of natural resources.

The well-being of students is among the primary concerns of the university and, in addition to the high standard of teaching, the university offers its students a modern study environment, which is under constant development.

The university has extensive international relations and it is involved in several international networks. The university's teaching and research staff and students are active in participating in various mobility programmes. The university has concluded bilateral agreements on cooperation with approximately 100 universities abroad. Moreover, the university is involved in several international networks and discipline-specific projects.

With its extensive networks, this multidisciplinary and international university constitutes a significant competence cluster, which promotes the well-being and positive development of eastern Finland. The University of Eastern Finland seeks to be among the leading 200 research universities in the world and, in our strong research areas, among the world's leading 50 research universities.





The Saimaa ringed seal research group of University of Eastern Finland (UEF) coordinates the workshops.

Organizing committee of the workshop:
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We are always pleased to hear your comments and opinions on anything relating to the Wildlife Photo-ID network and/or coming workshops. If you have any questions or suggestions, please do not hesitate to contact us by e-mail (photo-id@uef.fi) or Facebook.

Welcome to network!

Funded by



**Finnish Cultural
Foundation**