

VOLUME IV

# Into the Zooniverse

PEOPLE-POWERED RESEARCH





# Into the Zooniverse

People-powered research

VOLUME IV



# Acknowledgements

**ZOONIVERSE CO-PI** Dr. Laura Trouille

**DESIGNER** Sean Miller

**ORIGINAL CONCEPT** Helen Spiers

**WRITERS** Mary Westwood, Sean Miller,  
Brooke Simmons, Helen Spiers,  
Laura Trouille, Tasnova Adrita,  
Lola Fash, and Dylan Lussem

**ADLER ZOONIVERSE TEEN INTERNS**

Tasnova Adrita, Lola Fash, and  
Dylan Lussem

**EDITORS** Laura Trouille, Sean Miller,  
Mary Westwood, Brooke Simmons,  
and Helen Spiers

**COVER IMAGE** NASA's  
Goddard Space Flight Center;  
background, ESA / GAIA / DPAC

**ZOONIVERSE**

**FIRST PRINTING: 2022**

Zooniverse—Adler Planetarium  
1300 S. DuSable Lake Shore Dr.  
Chicago, IL, 60605  
[www.zooniverse.org](http://www.zooniverse.org)

This work is licensed under the  
Creative Commons Attribution  
4.0 International License.  
To view a copy of this license,  
visit [CREATIVECOMMONS.ORG/  
LICENSES/BY/4.0](http://CREATIVECOMMONS.ORG/LICENSES/BY/4.0)

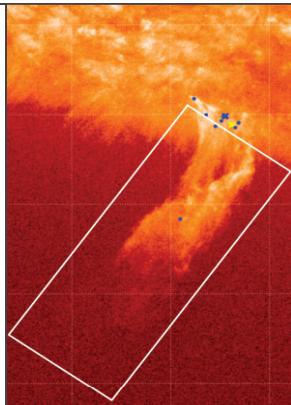
## IN MEMORIAM

This book is dedicated to Kevin Wood and Joan Arthur, and to all of  
those who we have lost this year.



# Thank you!

IMAGE | Solar Jet Hunter, p. 18

**CHECK IT OUT!**

Look for the check box near the bottom of each project page. We invite you to make a classification on each active project and keep track of your progress by checking its box. Experience first hand all the different types of research that are happening on Zooniverse!

*A quick way to find each project is to go to [ZONIVERSE.ORG/PROJECTS](https://ZONIVERSE.ORG/PROJECTS) and search for the project name. It's possible that some projects may be complete or close to completion by the time this book is published, so just skip them if that's the case.*

**WELCOME TO THIS YEAR'S** Into the Zooniverse! This publication features just 20 of the many Zooniverse projects that were active during the 2021– 2022 academic year. Since the inaugural Galaxy Zoo in 2007, Zooniverse has launched over 400 projects, participants have submitted over 700 million classifications, research teams have published over 450 articles, and millions of people from all over the world have taken part in real research.

We have continued to persevere through tremendous hardships. I am so grateful to face these times alongside the Zooniverse team and the Zooniverse community. And I am so proud of the nurturing spaces we've created together, the discoveries we've made, the connections enabled through this platform. This edition of Into the Zooniverse honors two Zooniverse community members we sadly lost this year who helped create our culture – Kevin Wood and Joan Arthur (AvastMeHearties). Kevin was one of the project leads for Old Weather and Joan was a moderator across many projects, including Old Weather, Penguin Watch, and Seabird Watch. Both helped shape the Zooniverse culture to be welcoming, kind, and compassionate. Scrolling through their posts, they are full of warmth, humor, and tremendous knowledge. They will be deeply missed. This book honors their legacy and impact.

This summer, the Zooniverse team welcomed three Adler Planetarium teen interns who assisted in the creation of this book: Tasnova Adrita, Lola Fash, and Dylan Lussem. Tasnova, Lola, and Dylan's hard work, creative ideas, inspiring stories, and enthusiasm kicked off this year's effort with a wonderful energy. The kind and thoughtful mentoring by Sean Miller, our Zooniverse Designer, guided their effort. This book is grounded in their spark.

We're also thankful to the Zooniverse's home institutions - the Adler Planetarium, the University of Oxford, and the University of Minnesota. This special mix of expertise in research, public engagement, and modern web development makes it possible for an amazing community of global participants and dedicated research teams to unlock data together – impacting research, policy, and our everyday lives. These communities are the true strength of Zooniverse: the “people” in people-powered research.

- Laura

## TABLE OF CONTENTS

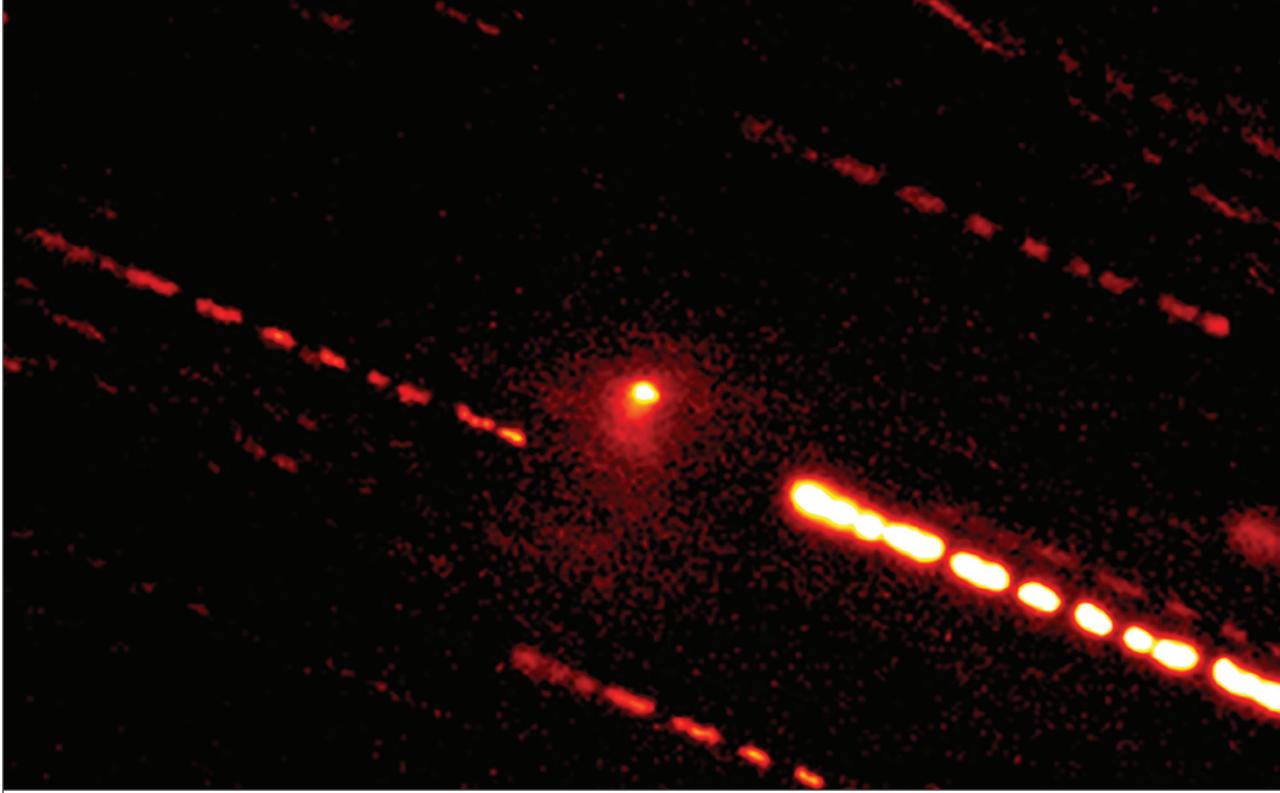
# Featured Projects

These 20 projects were chosen from the over 100 projects active on the Zooniverse platform between Sep 2021 and Aug 2022.

Active Asteroids	5	Old Weather - WW2	16
Agents of Enslavement	6	Snow Spotter	17
Angling for Data on Michigan Fishes	7	Solar Jet Hunter	18
The Arctic Bears Project	8	SquirrelMapper	19
Cedar Creek: Eyes on the Wild	9	SuperWASP: Black Hole Hunters	20
Citizen ASAS-SN	10	Transcribe Colored Conventions	21
Dental Disease Detection	11	Unfolding of Microplant Mysteries	22
FrogSong	12	Voices Through Time: The Story of Care	23
HMS NHS: The Nautical Health Service	13	Wildwatch Burrowing Owl	24
Koster Seafloor Observatory	14		
NASA GLOBE Cloud Gaze	15		



IMAGE | The Arctic Bears Project, p. 8



# Active Asteroids

Signs of water in the Solar System create trails leading scientists towards life beyond Earth. Now, astronomers have found trails behind elusive asteroids which might explain how water reached Earth.



**IMAGE CREDITS**  
Active Asteroids Project

**SUMMARY BY**  
Dylan Lussem

**CHECK IT OUT!**

Check here when you've made a classification to this project.

**OUT PAST MARS**, millions of asteroids drift silently by in the Asteroid Belt. Most are relatively unremarkable lumps of rock. However, approximately 1 in 10,000 have clouds of dry ice or water that form around and streak out behind them as they hurtle through space.

These active asteroids could have delivered water to Earth millions of years ago, fulfilling one of the conditions necessary for life. Scientists hope that by studying them, we can learn how to make space travel more sustainable, and how life might begin and flourish on other planets.

Active asteroids are promising sources of information, but their scarcity makes studying them a challenge; only 30 have been found since 1949. The Active Asteroids team hopes to quadruple

the number of known active asteroids, allowing for a more comprehensive study of these enigmatic objects, but millions of images must be classified first.

In Active Asteroids, Zooniverse volunteers help reach that goal by examining photos of the night sky for signs of asteroids with comae or tails while separating true active asteroids from lookalikes such as galaxies or cosmic rays. Once volunteers sort the dataset, scientists follow up on objects of interest by observing those that are visible, and searching through telescope archives for photos of those that are not. The results of these investigations could help scientists locate new active asteroids, as well as even rarer types of active objects, ultimately granting us a source for a fundamental ingredient of life: water. ☀

# FIVE POUNDS REWARD,

WILL be given to any person, who will safely deliver to the subscriber (living near St. Lucy's Church) a likely young black wench, called RACHAEL, with curling eye-brows; she has been absent two years, and is supposed to be harboured among the folders or sailors about the bay, in Bridge-Town, and two dollars reward will be given on the same terms for a lad called SIMON, who is now at the castle, he has a large scar just above the small of his back, and a little cast of his eye.

## Agents of Enslavement

Before slavery was outlawed across the Caribbean, enslavers used newspapers to buy and sell people. We now have the power to unlock the histories in these newly digitized records.



**IMAGE CREDITS**  
Agents of Enslavement,  
The British Library

**SUMMARY BY**  
Brooke Simmons

**CHECK  
IT OUT!**  
Check here when  
you've made a  
classification  
to this project.

**THE PRACTICE OF SLAVERY** in the Caribbean was widespread. Agents of Enslavement, a project led by the Endangered Archives Programme of the British Library, seeks to understand the ways the media of the time both facilitated and challenged slavery. Newspaper records, once in danger of being permanently lost due to nearly two centuries of storage in a tropical climate, have now been digitized. The project asks volunteers to categorize each snippet and transcribe names, occupations, and other details from the various types of articles.

Each record contains the potential to reveal important information about identities, personalities, and familial relationships of enslaved people. Some of the records contain only anonymous information about the enslaved people, and

these will help researchers understand the ways that newspapers enabled the slave trade on these islands. Other records are far more informative — particularly the announcements of runaways. Enslavers often provided rich detail on runaways in hopes this would lead to their return, and these disclosures record the uniqueness of each enslaved person.

The researchers in the project aim to create a public database of enslaved people, most of whom have been previously hidden from history. The researchers hope the database will map family and other connections between enslaved people, which will help genealogists and other academics in their research, and may help the descendants of enslaved people more fully trace their own family histories. Θ



# Angling for Data on Michigan Fishes

How have fish populations changed over the past century - particularly in response to climate change? Researchers probe these questions, and make future predictions, using archival surveys from thousands of Michigan lakes.



**IMAGE CREDITS**  
Angling for Data on Michigan Fishes Project

**SUMMARY BY**  
Mary Westwood

**CHECK IT OUT!**  
Check here when you've made a classification to this project.

**THE AMERICAN STATE** of Michigan is home to more than 11,000 inland lakes. Decades of comprehensive surveys, dating back to over a century ago, have gathered information on the fish communities, food sources, and environmental conditions of these lakes. These surveys are rich sources of information on the diversity, abundance and growth within Michigan's lakes. While the once handwritten surveys shifted to an electronic system in the mid-1990s, the historical lake survey information from decades prior continues to be housed at the Institute for Fisheries Research (IFR).



Now, researchers hope to uncover mysteries of the past and inform future predictions by coupling these data with fish specimens held by collections at the University of Michigan Museum of Zoology. New molecular, morphological and statistical methods are expanding the usefulness of museum collections for understanding the relationships between organisms and their environments. Museum collections act as "libraries of biodiversity", which when paired with historical records, power scientists to inform lake management strategies, predict the future of fish populations, and probe the impact of climate change on aquatic ecosystems. Zooniverse volunteers propel this research by transcribing the immense trove of historical surveys held by the IFR.



# The Arctic Bears Project

The Zooniverse community's efforts processing a decade's worth of pictures from a changing sub-Arctic landscape is a critical task.



## IMAGE CREDITS

Arctic Bears Project

## SUMMARY BY

Laura Trouille

## CHECK IT OUT!

Check here when you've made a classification to this project.

**THE ARCTIC ENVIRONMENT** has been undergoing drastic changes over the past few decades. The Arctic Bears Project is exploring the impact on polar, grizzly, and black bears in terms of their habitat overlap and increased interaction, as well as changes in the diversity of other mammals including caribou, moose, and more. The team is also exploring the impact on polar bears of sea ice melting sooner and freezing later. In particular, with less time to hunt for their favorite meal - ringed seals - polar bears instead may be demonstrating more willingness (and aggression) approaching camps for food.

Through the Arctic Bears Project, led by the University of Saskatchewan, Wapusk National Park, Western College of Veterinary Medicine, Churchill Northern Studies Centre, and the University of

Oxford, Zooniverse participants are tagging images from remote camp cameras in Wapusk National Park, on the west coast of Hudson Bay in Manitoba, Canada. The area was well-known as a polar bear denning habitat, and locals knew black bears lived in the forests, but the appearance of grizzly bears in the late '90s was a surprise. Wapusk National Park lies at the transition between boreal forest and Arctic tundra and is the only place in Canada where polar, grizzly, and black bears co-occur. This unique area is a hotspot for studying species interactions and their movement between the two ecosystems, as well as with the nearby ocean. ☘



# Cedar Creek: Eyes on the Wild

Take a glimpse into the secret lives of the animals at the Cedar Creek Ecosystem Science Reserve in Minnesota.



**IMAGE CREDITS**  
Cedar Creek: Eyes on the Wild Project

**SUMMARY BY**  
Mary Westwood

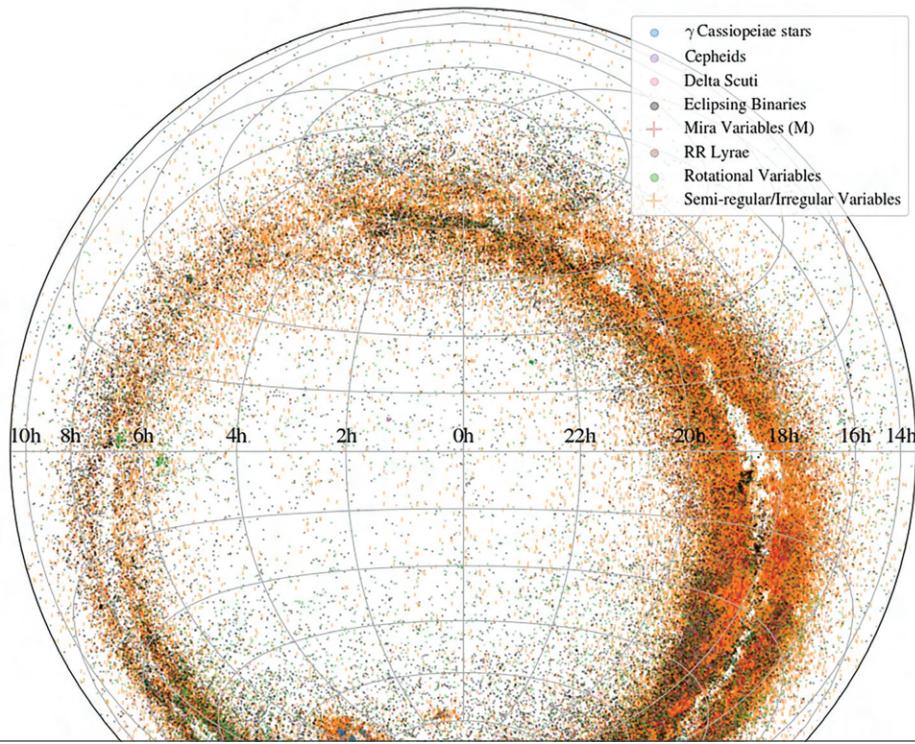
**CHECK IT OUT!**

Check here when you've made a classification to this project.

**TEEMING WITH WILDLIFE**, Cedar Creek has long been a source of scientific knowledge and inspiration. Indeed, modern ecosystem ecology was borne of research at Cedar Creek, which sits at the intersection of North America's three largest biomes: tallgrass prairie, eastern deciduous forest, and boreal coniferous forest. While most work to-date has focused on non-animal studies (two notable studies include the monitoring of plant and soil biodiversity), the more recent introduction of a network of more than 100 trail cameras now allows researchers to examine animal biodiversity and ecology at Cedar Creek.

While animal inventories produced from trail cameras are essential pieces of the Cedar Creek ecosystem puzzle, notable

"special interest" projects exist. These include probing the impact of natural wolf reintroduction on the size, age structure and behavior of prey populations, as well as examining the activities of grazing bison. Researchers are also interested in the effect of wolf predation on trophic cascades, or how wolves impact species interactions across the food web. Cedar Creek has been researched for over 75 years, and the exciting introduction of trail cameras opens the door to myriad new projects for current and future researchers. A collaboration between researchers at the University of Minnesota, the United States Geological Survey, and the Cedar Creek Science Reserve, this project propels research forward by inviting Zooniverse participants to tag animals and their behavior in these images. ☒



# Citizen ASAS-SN

Stars whose brightnesses vary periodically are only a few percent of the entire population of stars, yet they are critical to helping us understand how all stars evolve.



**IMAGE CREDITS**  
The ASAS-SN Project

**SUMMARY BY**  
Brooke Simmons



Check here when you've made a classification to this project.

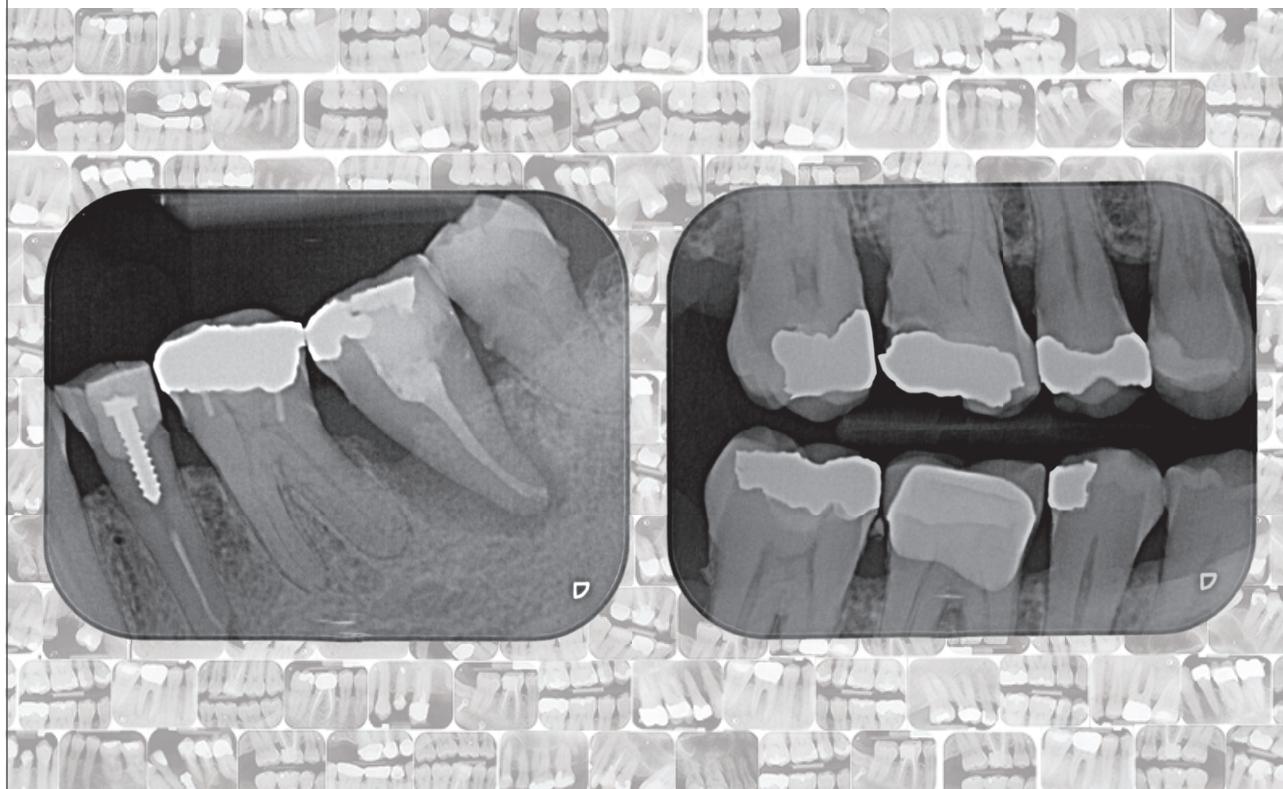
**THE ALL-SKY AUTOMATED SURVEY** for SuperNovae (ASAS-SN) uses a global network of 24 telescopes to monitor the sky every night. While its primary goal is to discover stars exploding at the end of their lives, most stars whose brightnesses are captured by ASAS-SN are not exploding. In particular, the measurements of those stars which change their brightness hour by hour and night by night (even year by year) are extremely valuable to astronomers.



The fluctuating "light curves" of these variable stars are powered by physical processes we do not yet fully understand. Some of them have signature periodic shapes that have been well-studied for decades, even helping astronomers

measure precise distances to faraway galaxies, which also contain such variable stars. Newer types of variable stars are not as well studied, and not easy for computers to automatically identify, yet they likely contain clues to unlock new knowledge about stellar evolution. The Citizen ASAS-SN project, led by Ohio State University, asks the public to label variable light curves, identify new examples of known variables, and find completely new types of variability.

In its first data release, Citizen ASAS-SN presented 10,420 new variable star discoveries, including 131 flagged as "unknown." In addition, the project's machine classifier incorporated the human labels in order to better distinguish real variability from noise, meaning the newest data on the project is even cleaner than before. ☒



# Dental Disease Detection

Gum disease, tooth decay and plaque are common dental problems that Zooniverse volunteers are helping to identify in Dental Disease Detection.



**IMAGE CREDITS**  
Dental Disease  
Detection Project

**SUMMARY BY**  
Helen Spiers

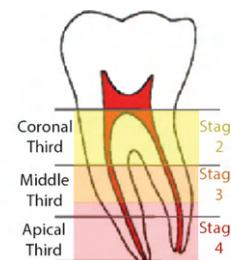
**CHECK  
IT OUT!**

Check here when  
you've made a  
classification  
to this project.

**DENTAL RADIOGRAPHY IS** an essential tool for the diagnosis of dental diseases, however, the analysis of the x-ray radiographs produced is a time-consuming and error-prone process. The Dental Disease Detection project is led by a collaboration of researchers, practitioners, and computer scientists at the University of Surrey, the London School of Medicine and Dentistry, and the Royal Surrey County Hospital. Their aim is to improve disease identification through the development of automatic approaches to spot signs of disease in dental radiographs.

The research team behind the Dental Disease Detection project are interested in automatically identifying

common dental diseases; tartar, tooth decay and gum disease. It is important to identify and treat all of these diseases quickly, as they can cause significant problems such as bone loss, which is



irreversible. However, the signs and symptoms of dental diseases can be hard to spot, making these conditions difficult to diagnose without inspection of a dental radiograph. Zooniverse volunteers are helping to improve the automatic identification of these diseases by drawing 'bounding boxes' (rectangles) on radiographs to mark the location of indicators of gum disease, tooth decay and plaque. ☒



# FrogSong

Frogs are one of the most charismatic singers in the animal kingdom. In FrogSong, researchers are training algorithms to detect the songs of various frog species to explore their behavioral ecology.



**IMAGE CREDITS**  
FrogSong Project

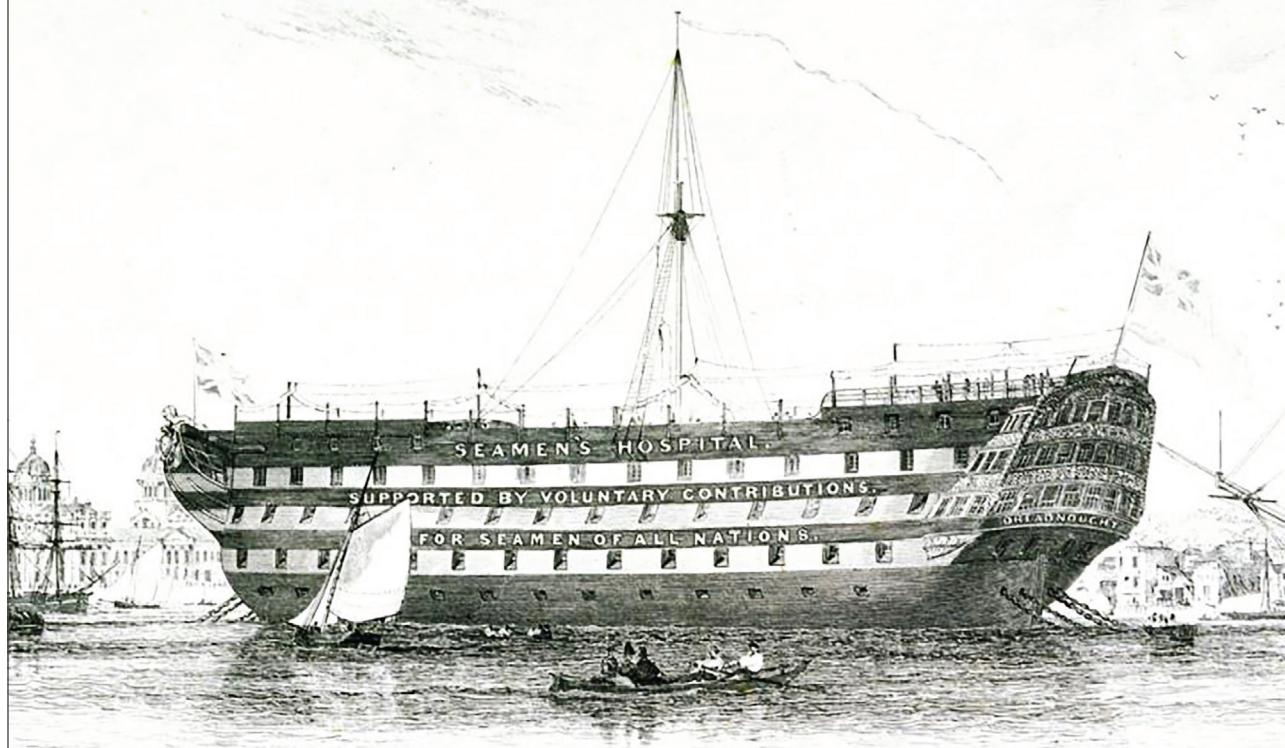
**SUMMARY BY**  
Mary Westwood

**CHECK IT OUT!**  
Check here when  
you've made a  
classification  
to this project.

**ONE KEY TO UNDERSTANDING** frog behavior, as well as their interactions amongst each other and their environments, is through their song. Frog species have unique songs, which may change in response to environmental pressures and other noise sources (e.g., insects, birds, airplanes, etc.). As such, recordings of frogs singing in their natural environment are invaluable to researchers hoping to glean insight into the secret life of our amphibious friends.

Historically, recording animals (particularly in the wild) has been limited by technological constraints. Recorders were only able to operate for so long, prior to running out of storage or battery. Scientists were limited to short

bouts of recordings; anywhere from weeks to months at a time. However, more recently, these constraints are being alleviated, and long term audio recordings have been made cheaper and more accessible to researchers worldwide. FrogSong researchers at James Cook University and Monash University are capitalizing on these technologies by collecting long term recordings of frogs in the wild, in different habitats across Australia. To parse through such lengthy recordings, they're enlisting the help of Zooniverse volunteers to classify frog songs. With this data, they will be able to train computers to detect and classify frog song from recordings, and elucidate the mysteries of wild frog communities! ☀



# HMS NHS: The Nautical Health Service

Climb aboard the HMS NHS, where volunteers are asked to transcribe historical medical records from seafarers admitted to the Dreadnought Seamen's Hospital.



**IMAGE CREDITS**  
HMS NHS: The Nautical Health Service Project

**SUMMARY BY**  
Mary Westwood

**CHECK IT OUT!**

Check here when you've made a classification to this project.

**FROM THE MID-1800S** to the early 20th century, seafarers from across the globe docked at the bustling Port of London. Those in need of medical care were brought to a floating hospital, one of three converted warships, to be administered treatment. The Dreadnought Seamen's Hospital was a charitable foundation which aimed to help all injured seafarers, regardless of nationality. Due to its global reach, the hospital gained recognition for their specialized treatment of tropical diseases. Further, in times of need (such as war or local emergencies), the hospital provided treatment to servicemen and women, and at times children as well.

The first point of entry to the floating hospital was the Admissions Registers - name, age, place of birth, rank, medical condition, amongst other things, were all recorded in immense and detailed logbooks. The HMS NHS Zooniverse project, led by the Royal Museums Greenwich with data from the National Maritime Museum, aims to transcribe these texts for use by the wider research community. While particularly enlightening for researchers interested in the evolution of disease treatment and common ailments of the Merchant Navy, volunteers will broadly help to uncover more than a hundred years of maritime history. ☒



# Koster Seafloor Observatory

Help researchers comb through over 3000 hours of footage of Sweden's first marine national park to track the effects of climate change.



**IMAGE CREDITS**  
Koster Seafloor  
Observatory Project

**SUMMARY BY**  
Sean Miller

**CHECK  
IT OUT!**  
Check here when  
you've made a  
classification  
to this project.

**FOR THE LAST 20** years, scientists have been monitoring and filming areas of the Kosterhavets National Park using Remotely Operated Vehicles. This park contains a highly diverse marine ecosystem which has been under active protection since 2009. Many deep sea bottom dwellers which live here can also be found in the open Atlantic Ocean. That's because the conditions at the bottom of the fjord here are very similar due to subsurface currents which carry in larvae of these creatures.



Researchers are interested in studying how climate change and human activity has influenced the flora and fauna in this area. Zooniverse volunteers are helping by analyzing the footage and classifying what species or plant-life is visible. These classifications allow the team to filter out crucial information from the recordings and study how the seafloor has changed in response to warmer waters, fishing activities, and changes in environmental protection. Annotations from early projects on Zooniverse have also helped the research team develop an AI based object-detection model which labels video footage of coral and other species, used in ecological research of Swedish coastal waters. The team also once sunk a whale carcass in the Koster fjord and subsequently discovered a new species of whale-bone-eating worms. Volunteers helped identify these new creatures. Maybe you will find something exciting, too! ☀



# NASA GLOBE Cloud Gaze

Clouds are one of many factors increasing global warming. The NASA GLOBE Cloud Gaze project is collecting data on clouds to understand how they contribute to climate change.



**IMAGE CREDITS**  
NASA GLOBE  
Cloud Gaze Project

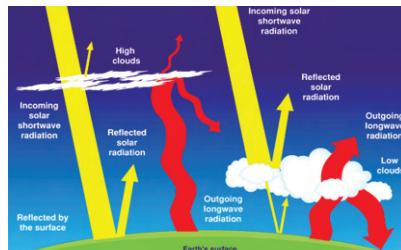
**SUMMARY BY**  
Lola Fash



Check here when  
you've made a  
classification  
to this project.

**THE EARTH'S CLIMATE** has changed tremendously over the last 130 years, with its atmosphere heating by 1.9 degrees Fahrenheit (1.1 degrees Celsius). Clouds play a significant role in maintaining the climate. The effects they have varies on the type, size, and altitude. For example, Cirrus clouds give way to incoming radiation from the sun but act as insulators, making the Earth hotter.

To better understand the changes in clouds and how they may affect our climate, NASA deployed around 20 satellites orbiting Earth and started collecting data on clouds. However, satellites can only collect data from above. For thorough research on cloud interactions, scientists need images from the ground. The GLOBE Program invites the public to submit photographs of their sky through the GLOBE Observer app.



In NASA GLOBE Cloud Gaze, Zooniverse participants help classify these images by cloud cover, type, and what else you might see (fog, haze, etc). The researchers at NASA's Langley Research Center use these classifications to verify the ground observations and gauge how clouds have changed the climate over time and how they will evolve. They also make the data available to the public. In the future, they hope to create a climatology of cloud types based on the Zooniverse volunteers' classifications and photographs and use this data for machine learning. Ø



# Old Weather - WW2

During World War II, weather observations were logged every hour on every ship, even during battle. Recovering these data can help us advance climate science.



**IMAGE CREDITS**  
Old Weather - WW2  
Project

**SUMMARY BY**  
Helen Spiers

**CHECK  
IT OUT!**  
Check here when  
you've made a  
classification  
to this project.

**MEMBERS OF THE ARMED** forces have been carefully recording marine weather observations since the 1850s. Weather observations were logged on every ship, every hour, almost without fail. This was done even in the midst of battle, in the heart of a typhoon, or while in the often-fatal grip of the Arctic ice pack (the sea ice cover of the Arctic Ocean). Now, with the challenge of climate change upon us, it is astonishing that most of this legacy remains unused and unknown, particularly as the ocean plays a major role in regulating climate and weather.

The aim of Old Weather - WW2, led by the University of Reading, the Met Office, NOAA, and the U.S. Coast Guard, is to recover hidden marine weather data recorded in the U.S. Navy ships' logbooks during World War II. Zooniverse volunteers transcribe

navigation, barometer and temperature data from the deck logs of nineteen World War II ships representative of the main classes of warship in use during the period: battleship, aircraft carrier, cruiser, destroyer, and gunboat.



These data will be used to drive sophisticated computer models that help us understand weather and climate in extraordinary detail. This work is having a lasting impact on climate science, but also shines a new light on the dedicated work of thousands of service members who collected these observations over nearly two centuries. ☒



# Snow Spotter

How much falling snow is intercepted by trees, and why does it matter? Snow Spotters use time lapse images of snowfall on trees to predict freshwater availability in watersheds.



**IMAGE CREDITS**  
Snow Spotter  
Project

**SUMMARY BY**  
Mary Westwood

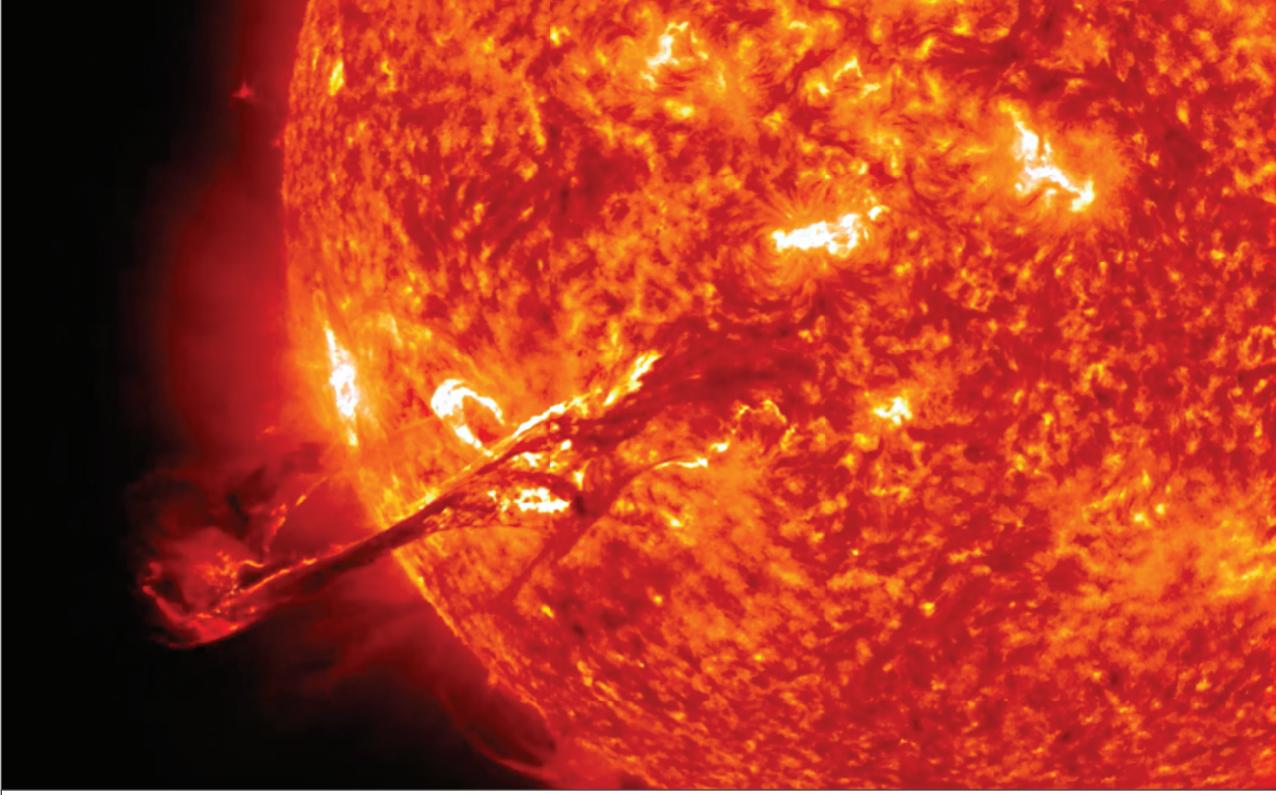
**CHECK  
IT OUT!**

Check here when  
you've made a  
classification  
to this project.

**FALLING SNOW DOESN'T** always make it to the ground. Trees break the fall, changing how much water is available in watersheds. The Snow Spotter project, led by researchers at the University of Washington, asks volunteers a single question: is there snow in the tree canopy? Addictively simple, with images so ethereal and serene you feel as though you are flipping through a coffee table book, Snow Spotter has been overwhelmingly successful on the Zooniverse. So much so, the project has expanded from the original sites in the United States, to include sites from Finland and Switzerland. An interactive map shows volunteers from where the images are taken. Snowfall interception (in this case,

particularly by trees), is an important factor for modeling the future availability of fresh water in watersheds. Snow intercepted by trees is subject to sublimation, or, evaporation back to the atmosphere. Indeed, up to 60% of falling snow may be intercepted by trees, of which 25-45% will potentially be lost via sublimation. How much snow makes it to the watershed is important; during the dry season, ecosystems depend on this freshwater availability. Collecting snow interception data and pairing it with local effects (such as forest characteristics and weather patterns), will enable researchers to fine tune their models, allowing for more accurate watershed availability predictions. Ø





# Solar Jet Hunter

Solar jets are ejections of hot plasma into the solar atmosphere. Through studying when and where they happen, we can advance our understanding of solar physics.



**IMAGE CREDITS**  
Solar Jet Hunter  
Project

**SUMMARY BY**  
Helen Spiers

**CHECK  
IT OUT!**

Check here when  
you've made a  
classification  
to this project.

**THERE ARE STILL MANY** open questions in solar physics: How is the Sun's outer atmosphere heated to millions of degrees? How is solar wind created and accelerated? How do energetic particles propagate through the solar system? Through studying the Sun, our nearest star, researchers hope to answer some of these questions to advance our understanding of stellar mechanisms.

One of the Sun's most enigmatic behaviors is its bursts of energy, which can take the form of small and narrow ejections of solar material, jetted out like water spewing from a hose. These ejections of hot plasma into the solar atmosphere are known as 'solar jets', and studying them helps us understand a range of phenomena, such as perturbations in the solar wind.

Solar Jet Hunter is led by the University of Minnesota, NASA, Lockheed Martin, the European Space Agency, New Jersey Institute of Technology, and Leiden University. To advance the study of solar jets, Zooniverse volunteers are examining data produced by the Solar Dynamics Observatory, a NASA satellite that has spent over a decade collecting data from the Sun. Through studying this data, scientists seek to establish when and where solar jets occur. Although some algorithms are capable of identifying solar jets, they are not yet as accurate as citizen scientists who, through the Solar Jet Hunter project, are helping to build a solar jet database that will be critical for future research. ☒



# SquirrelMapper

Squirrel Mapper engages the public in classifying squirrels to measure natural selection in action. Together we can crack this nut!



## IMAGE CREDITS

SquirrelMapper Project

## SUMMARY BY

Laura Trouille

### CHECK IT OUT!

Check here when you've made a classification to this project.

**SQUIRRELS OFFER A FASCINATING** lens into the complex dynamics driving species survival in our dramatically changing landscapes. Only a tiny genetic difference (in the MC1R gene controlling the amount of dark pigment) separates black versus gray squirrels, but that difference has a significant impact on survival. Until 150 years ago, black squirrels were more abundant than gray squirrels across North America. Now, the black squirrel is rare, except in cities.

Through the Squirrel Mapper project, over 140,000 images of squirrels have been uploaded into the iNaturalist platform and thousands of people have contributed over a million classifications of these images on Zooniverse.

The team, led by researchers at Hobart and William Smith Colleges and SUNY-ESF, recently published a paper using Squirrel Mapper data from 43 cities in the eastern U.S. and Canada. In the article, they note that cars are the primary driver of mortality for squirrels in cities, and consider whether the black squirrel is easier for drivers to see (and thus avoid) against the gray asphalt of cities. In contrast, gray squirrels have better camouflage from predators in forest and rural settings.

The landscape continues to change rapidly. Will the gray squirrel, and other mammals like it, be able to adapt quickly enough to better survive in urban centers? ∅



# SuperWASP: Black Hole Hunters

Many astronomers believe that the Milky Way should be teeming with black holes, but so far we have only discovered a handful. If you help to find a hidden one you will be making science history!

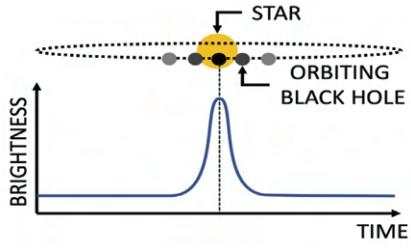


**IMAGE CREDITS**  
SuperWASP Team,  
Black Hole Hunters Project

**SUMMARY BY**  
Sean Miller

**CHECK IT OUT!**  
Check here when  
you've made a  
classification  
to this project.

**BLACK HOLES ARE MADE** when massive stars die. The majority of stars live with a companion in what's called a binary system. After a massive star's death and supernova, the resulting black hole and its companion star orbit each other around their common center of mass. Whenever a massive object passes in front of a normal star we observe 'micro-lensing', which looks like the light is bending due to the curving of space-time. When this happens we are able to detect a characteristic periodic increase in the light.



If we are able to estimate the mass and radius of the normal star, we can also do the same for the black hole. We have just found those hidden black holes!

Through the Black Hole Hunters project led by astronomers at The Open University and the University of Southampton, Zooniverse volunteers search for tell-tale signals that may reveal the black holes in our galaxy. These signals are extremely rare. Only a handful of black holes will be orbiting in a plane that passes directly in front of their companion star. Humans are especially good at seeing patterns in data that are similar to examples they are given. That is why there are simulated lensing events mixed into the subjects. This gives volunteers an example of what shapes to look for in the rare event a real lensing event is captured. ☒



THE NATIONAL COLORED CONVENTION IN SESSION AT WASHINGTON, D. C.—SKETCHED BY THEO. R. DAVIS.—[SEE FIRST PAGE.]

# Transcribe Colored Conventions

Despite being all but forgotten, the Colored Conventions are historically significant. Led by formerly enslaved African Americans, they addressed their collective struggles they faced.



**IMAGE CREDITS**  
Colored Conventions Team

**SUMMARY BY**  
Tasnova Adrita

**CHECK IT OUT!**

Check here when you've made a classification to this project.

**MORE THAN 10,000** African Americans attended these important national and state meetings in the 19th century. During these conventions, they discussed topics like education, labor, business and voting rights. In the thousands of surviving records, over 98% of the currently identified delegates are men. Black women rarely show up, despite playing important roles in the historic movement. Zooniverse participants can help this research by transcribing documents through the Transcribe Colored Conventions project, finding even more references to women and finally bringing their contributions to light.

Thus far, the team, made up of members of the Center for Black Digital Research, has been able to identify over 160 references to women's

contributions. This includes women like Mrs. Wilson, The Edmonson Sisters and Mrs. M.A Shad, who helped the conventions significantly by providing accommodations, organizing meetings, and resolving conflicts. The researchers are constantly expanding the list of women and their roles. You can find them listed on the Colored Conventions website. With your help we can finally show the importance of this often overlooked 19th century movement and help restore our collective histories. ☒

***Resolved, That woman being governed by the same laws and living in this free government where the rights of citizenship are determined by the law of equality, we deem it just, equitable and in harmony with the spirit of a true democracy and free government, that she shall exercise the same prerogative as we claim for ourselves.***



# Unfolding of Microplant Mysteries

Researchers are using biological collections from museums and academic institutions to document the fossilized and living members of the world's ecosystems and their changes over time.



**IMAGE CREDITS**  
Microplants Team,  
the Field Museum

**SUMMARY BY**  
Laura Trouille

**CHECK  
IT OUT!**  
Check here when  
you've made a  
classification  
to this project.

**GLOBALLY, THOUSANDS OF** institutions house nearly three billion scientific collections. For herbaria (dried plant collections) alone, researchers have collected over 350 million specimens. The Unfolding of MicroPlant Mysteries project was initiated and designed by two high school interns at the Field Museum in Chicago to classify and identify morphological features such as branching patterns and sexual phenotypes. Despite their small size, MicroPlants are vital to our understanding of the evolutionary history of plants, and are of great ecological and environmental significance. According to genetic research, they are the earliest diverging lineages of all extant land plants. Thus, Microplants help shed light on how plants migrated from aquatic to land environments.

In 2022, the Microplants team published an article (Pivarski et al. 2022) celebrating the intergenerational model of public engagement and research driving this project. The project team included high school interns building the Zooniverse project alongside Field Museum researchers, thousands of Zooniverse participants classifying in the online project alongside K-12 students and museum guests engaging with the Field Museum's touchscreen kiosk version of the Microplants project within their exhibit spaces, and high school, undergraduate, masters students, and senior scientists carrying out the data processing, analysis, and dissemination of results. ☒



# Voices Through Time: The Story of Care

Revealing untold stories about the lives of young people who lived at the Foundling Hospital, the UK's first children's home.



**IMAGE CREDITS**  
Voices Through Time Team

**SUMMARY BY**  
Laura Trouille

**CHECK IT OUT!**

Check here when you've made a classification to this project.

**THE FOUNDLING HOSPITAL** was established in 1739 as the UK's first home for children whose parents and guardians were unable to care for them. The Hospital's founder, Thomas Coram, was a pioneer of children's rights and welfare. He led the way in the development of supervised foster care and in championing equal education for boys and girls. The Hospital arranged for foster families to care for the babies and young children until the age of five. They were then brought back to live and be educated at The Hospital until the age of fourteen. Many were then trained for domestic or military service and took up apprenticeships until the age of 21. Today, the Coram children's charity continues to support vulnerable children and young people throughout the UK.

Over the centuries, more than 25,000 children were admitted to The Foundling Hospital. The Hospital archive contains thousands of handwritten records, going back to the 1700s. The Voices through Time project engages the Zooniverse community in transcribing these handwritten records, including petition letters from mothers seeking entry for their children to the Hospital and the billet books with fabric tokens left by the mothers as a symbol of their love. Digitizing and transcribing these documents safeguards them for future generations and opens up opportunities for research, deepening our understanding of the story of care. ☒



# Wildwatch Burrowing Owl

By observing the behavior of the last remaining population of western burrowing owls in San Diego, researchers hope to reverse the decline of the species.



**IMAGE CREDITS**  
Wildwatch Burrowing Owl Project

**SUMMARY BY**  
Sean Miller

**CHECK IT OUT!**  
Check here when you've made a classification to this project.

**THE RESEARCH TEAM**, made up of members of the San Diego Zoo Wildlife Alliance, monitors this delicate species which lives underground rather than in trees. These owls cannot dig their own burrows, and instead "reuse" excavated dens dug by ground squirrels and other fossorial (burrowing) animals. The team also makes use of artificially constructed burrows so they can check inside the nest chambers on a weekly basis. They check for eggs and count them. Then when the chicks are 3 weeks old the team tags the owls and sometimes uses GPS trackers to more closely observe the habits of these animals. These tags allow volunteers to keep track of certain birds, sometimes leading to the creation of their own nicknames. This can be rewarding when the next year's data comes out and familiar faces can be seen in new nests.

Zooniverse volunteers help the team by viewing motion-activated photos and flagging any which show interesting behavior like feeding, mating or even predators in the burrow. There were over 200,000 photos to comb through in the first project! The goal is to see how many chicks emerge from the burrow, how many fledge (leave the nest), and how predation events impact family groups and the greater population. ☀





# Thank you!

This publication and the projects highlighted here  
would not be possible without you.

We're launching new projects every week!  
Visit us online at [ZOO.NIVERSE.ORG](http://ZOO.NIVERSE.ORG).



ZOØNIVERSE

The world's  
largest platform for  
people-powered  
research.