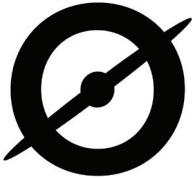


VOLUME III

Into the Zooniverse

PEOPLE-POWERED RESEARCH





Into the Zooniverse

People-powered research

VOLUME III



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COVER IMAGE Curiosity Self-Portrait at 'Big Sky' Drilling Site on Mars, *Credit: NASA/JPL-Caltech/MSSS*

THANK YOU *Laura and the entire Zooniverse team would like to extend a heartfelt thanks to Maggie Kraft and Kei Smith (our Adler Zooniverse Teen Interns), to Paige Yeung (our Zooniverse Teen Intern), and to Alex Gurvich and Renée Manzagol-Harwood (Northwestern University graduate students who co-mentored our Teen Interns). This book would not have been possible without them (and was so fun to create because of them!).*

ZOONIVERSE

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Thank you!

IMAGE | Tag Along with Adler, p. 22



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 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.

OVER THE PAST year, the world has faced tremendous hardships. I have been so grateful to be a part of the Zooniverse community during this time, and am so proud of how we responded and supported one another. From the research teams and participants coming together to create welcoming and nurturing online spaces to carry out awesome research together to our Zooniverse team continuing to cultivate a work environment aligned with our values.

This year's 'Into the Zooniverse' (Vol. III) highlights just 20 of the many projects that were active during the 2020 – 2021 academic year. They represent the wide range of project types on Zooniverse. There are many projects we haven't yet been able to highlight through these books. Since the inaugural Galaxy Zoo in 2007, Zooniverse has launched over 380 projects, participants have submitted over 600 million classifications, research teams have published over 250 articles, and millions of people from all over the world have taken part in real research. We hope to continue creating 'Into the Zooniverse' each year and showcasing as many projects and discoveries as possible.

This year, the Zooniverse team welcomed three teen interns who assisted in the creation of this book: Maggie Kraft, Kei Smith, and Paige Yeung. Maggie, Kei, and Paige's creative ideas and growth throughout the summer were a motivating and inspiring force. Two Northwestern University graduate students, Alex Gurvich and Renée Manzagol-Harwood, co-mentored the teens. Alex and Renée's thoughtful and attentive approach, as well as their adaptability, were essential to the success of the intern experience and the project as a whole. This book could not have been completed without them!

We're also thankful to the Zooniverse's host institutions, particularly the Adler Planetarium, the University of Oxford, and the University of Minnesota, Twin Cities. This special mix of expertise in research, public engagement, and modern web development supports an amazing community of global participants and dedicated research teams using the Zooniverse platform. These collaborations 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 ~100 projects active on the Zooniverse platform between Sep 2020 and Aug 2021 (71 new projects launched during this time, in addition to the dozens that remained active from previous years).

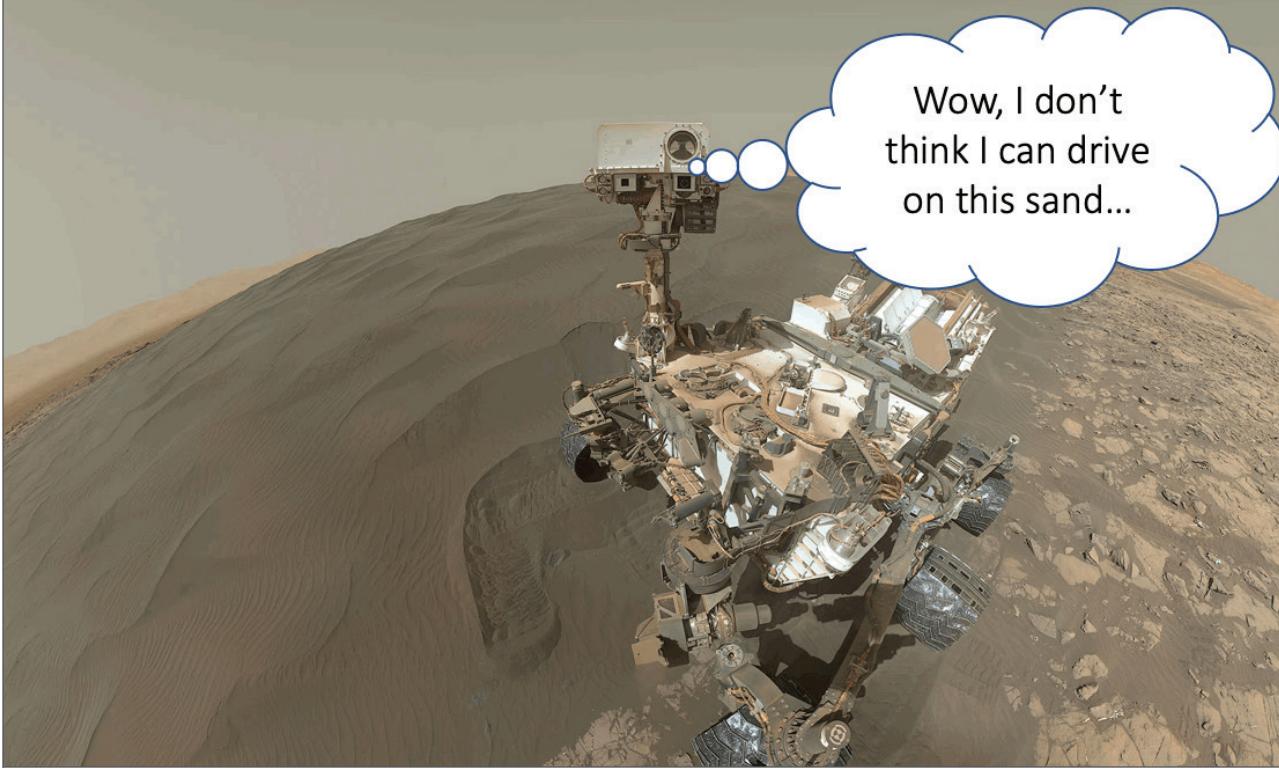
AI4Mars	5	London Bird Records	14
American WWI Burial Cards	6	NestCams	15
Athena: Spot Species in Fine Art	7	OceanEYES	16
Beyond Borders: Transcribing Historic Maine Land Documents	8	Plankton Portals	17
Burst From Space	9	Rebuild Maastricht	18
Buzzy Bee: African Canopy Pollinators	10	Science Scribbler: Placenta Profiles	19
Cradle of Humanity	11	Seabird Watch	20
Earthquake Detective	12	Supernova Hunters	21
Fancy a Cup of Marchantia?	13	Tag Along with Adler	22
		UK Tides	23
		World Architecture Unlocked	24



IMAGE | Seabird Watch, p. 20



Wow, I don't
think I can drive
on this sand...



AI4Mars

To safely drive on Mars, future rovers will need to identify terrain types, such as sand or rock. NASA researchers are using Zooniverse data to train ML models for Martian terrain identification.



IMAGE CREDITS
NASA / JPL / Caltech /
MSSS / Andrew Bodrov

SUMMARY BY
Paige Yeung

**CHECK
IT OUT!**

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

DRIVING ON THE Red Planet is an exciting venture that has led to a number of unimaginable discoveries. However, the rovers have to rely on manual driving by engineers on Earth on complex terrains, partially due to the lack of onboard ability to identify terrain types. In particular, sandy terrains caused a number of issues to the rovers, including Spirit, which ended her mission after getting trapped in sand. At the NASA Jet Propulsion Laboratory, researchers are working to train a new machine learning (ML) model for terrain identification using classifications from Zooniverse participants.

Currently the researchers are training a deep learning algorithm known as SPOC (Soil Property and Object Classification), which is designed to automatically classify terrain for Mars missions.

AI4Mars participants are helping to train SPOC by classifying terrain in images from the Mars Curiosity rover. Once fully trained, SPOC will carry out automated classifications and create a visual map for mission team members on Earth to use in navigating rovers safely through Martian terrain. In the future, SPOC could also help automated driving on Mars as an onboard software.

The AI4Mars team is training the SPOC model SPOCv2 using over 400,000 labels from AI4Mars participants. So far, the model has achieved an accuracy of 96.7%, and the AI4Mars team is continuing to refine the algorithm for current and future planetary exploration endeavors. ☘



American WWI Burial Cards

By transcribing the burial cards of World War I soldiers, we honor them. We also make the data more publicly accessible for researchers, genealogists, historians, and family members.



IMAGE CREDITS
National Archives catalog.archives.gov/id/86738662.

SUMMARY BY
Kei Smith

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

THE NATIONAL ARCHIVES 'Card

Register of Burials of Deceased American Soldiers, 1917 - 1922' includes scanned copies of the burial cards documenting the death and burial information of over 78,000 American soldiers from World War I (WWI). Each card contains the name of the individual who died, the unit they were assigned to, the nature of their death and the burial location(s) of the soldier, up to and including their final resting place. The American WWI Burial Cards project was created by members of the Meuse-Argonne.com Facebook group to make these data more publicly accessible and honor WWI soldiers and their families. Weldon Hoppe led the effort in collaboration with team members Andrew Capets, Susi Adler, Eric Mueller and Todd Adler and project-building support from Zooniverse participant Peter Mason.

In total there were over 15 phases to the American WWI Burial Cards project, breaking down the transcription effort into more manageable subtasks. All phases were completed in just over six months' time, with 6000 participants providing over 3.9 million classifications.

The digitized records are publicly available on Fold3. The project results will also be accessible through the National WWI Museum and Memorial in Kansas City (as part of their database of all soldiers who served in WWI) as well as the Minnesota Military. A map-based visualization of the data is available at <https://arcg.is/Xm1SO>.



ATHENA: Spot Species in Fine Art

Through classifying the flora and fauna of 16th century Dutch paintings, researchers unlock the history of biodiversity in the Netherlands using the keys Dutch painters left behind.



IMAGE CREDITS

Melchior d'Hondecoeter,
Rijksmuseum

SUMMARY BY

Kei Smith

CHECK IT OUT!

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

ENTER THE RIJKSMUSEUM in Amsterdam and audiences will see paintings from the likes of Rembrandt, Vermeer, and Van Gogh. But ATHENA: Spot Species in Fine Art participants do more than enjoy the paintings as passersby: through Zooniverse, they classify the flora and fauna of these paintings from the comfort of their own home, while still enjoying the classics.

ATHENA: Spot Species in Fine Art, led by researchers at Utrecht University, Radboud University, and Wageningen University, in collaboration with the Rijksmuseum, includes masterpieces of the 16th century up to modern times. Tagging the species depicted in these paintings opens up an enormous collection of art to researchers studying biodiversity from a historical perspective. By classifying these works of art,

Zooniverse participants contribute to building out the ATHENA research portal documenting the history of biodiversity in the Netherlands. ATHENA brings together a wide variety of historical, archaeological and ecological sources, from species distributions data to paintings data from Zooniverse, and from bestiaria to newspaper articles. The aim of the ATHENA database is for researchers from multiple scientific disciplines to be able to carry out large-scale, comparative (both in space and time) and multilevel studies of human-nature relationships. ☒



Lincoln A July 19th 1793 then personally appred the
above Named persiale and after being Carefully examined & duly
cautious to testify the truthe Relating to the cause wherein
this Deposition is to be used made Solom oath to the truth
of the the above Deposition by him subscribed taken at the
Request of Josiah Little and to be used on an action, where in
the Commonwealth is Plaintiff and Josiah Little is Defendant
to be d & tried at the Supreme Judicial Court to

Beyond Borders:

Transcribing Historic Maine Land Documents

The Kennebec and Pejepscot Proprietors papers and the Barclay Collection are significant manuscript collections collectively spanning 1625-1893, and contain aspects of Maine's history, geography, and land.



IMAGE CREDITS
Maine Historical Society

SUMMARY BY
Samantha Blickhan

**CHECK
IT OUT!**

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

IN BEYOND BORDERS, the Maine Historical Society invites the public to help them digitize three significant manuscript collections: 1) the papers of the Proprietors of the Township of Brunswick, Collection 61 (Pejepscot Proprietors); 2) the papers of the Plymouth Company, or Kennebec Purchase, Collection 60 (Kennebec Proprietors); and 3) the Northeast Boundary Collection, Collection 26 (Barclay Collections). The goal of the project is to make these important documents accessible to a wider audience.

All three collections were donated to the Maine Historical Society in the second half of the 19th century, and cover the history of what we now know as the state of Maine from 1625 to 1893. Topics within the collections include discussions

of land use and environmental attitudes, relations with Indigenous nations, the creation of international borders, the economic development of Maine, and foreign and domestic political relations. They document the historical development of Maine as its own entity: its separation from British colonial rule, and eventually from the Commonwealth of Massachusetts, through to its statehood following the Missouri Compromise of 1820.

Full-text access to the transcribed documents will be available through the Maine Historical Society's digital history platform, the Maine Memory Network (MNN), a free digital resource that is open to the public. The documents will be keyword searchable through the MNN as well as findable through Internet search engines. Q



Bursts From Space

Fast Radio Bursts, 'FRBs' are millisecond long, large bursts of energy, coming from far across the universe, but resemble radio frequencies that are also generated by humans on Earth.



IMAGE CREDITS
CHIME
chime-experiment.ca/

SUMMARY BY
Renée Manzagol-Harwood

CHECK IT OUT!

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

ZOONIVERSE PARTICIPANTS ARE helping scientists identify, teach machines, and advance research related to Fast Radio Bursts, known as 'FRBs' or 'furbies'. What are FRBs? We don't really know! They could be from hyper-magnetized neutron stars, neutron stars collapsing into black holes, sparks from cosmic strings, or maybe something else entirely. Using data collected by the CHIME telescope in British Columbia, researchers are looking to identify FRBs as well as their source. There is a major hurdle, though: FRBs are very similar to radio signals that are generated by humans on Earth. This means that radios, microwaves, and cell phones are all creating interference that needs to be discarded.

While scientists do not know what the source of these FRBs is, nor when they will go off, they do know that the visual signature is different from radio waves produced on Earth. Zooniverse participants are helping to distinguish the FRBs from the noise created by humans. This data is then fed into a machine learning program to refine the automatic classifications that are being made. Ultimately the team is using this data to look for patterns, repeating signals, common areas of the sky, and more to try to untangle the mystery behind the origins of FRBs. ☒



Buzzy Bee: African Canopy Pollinators

What secrets lie in the canopy? The more we understand insect pollination, the better we can preserve our tropical forests.



IMAGE CREDITS
Edouard Coenraets,
Buzzy Bee

SUMMARY BY
Maggie Kraft

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

CENTRAL AFRICA HOSTS the second largest block of tropical forests worldwide, with timber species reaching up to 60m (and usually branchless up to 30m). As a result of their height, studies of reproduction cycles are often limited to the phases that can be monitored from the ground, leaving cycles that occur within the canopy layer virtually unknown. Pollination, a crucial step of tree reproduction, occurs only within the canopy and its flowers. At the same time, insect pollinators have been declining worldwide for decades and approximately a third of Central Africa's tropical forests are exploited for timber production. To fully understand and better preserve tropical forests, we need access to the canopy to better understand its ecosystem.

For this study, researchers at the Université libre de Bruxelles and a dozen other collaborating institutions collected 600 hours of video from home-made camera traps in 12 trees belonging to 9 different timber tree species in Cameroon and Gabon. By identifying arthropods in these video clips, Zooniverse participants are helping to improve our understanding of which timber tree species rely upon which pollinators. This fundamental knowledge will allow the interpretation of gene flow in an ecological context, which will further our ability to assess the impact of logging on timber species natural regeneration. Ultimately, the team's goal is to develop better informed and sustainable forest management practices. ☒



Cradle of Humanity

Understanding the impact of climate change on animals is vital, and we especially need to learn more about impacts on the earliest stages of life.



IMAGE CREDITS

Stephen Maikweki

SUMMARY BY

Laura Trouille

CHECK IT OUT!

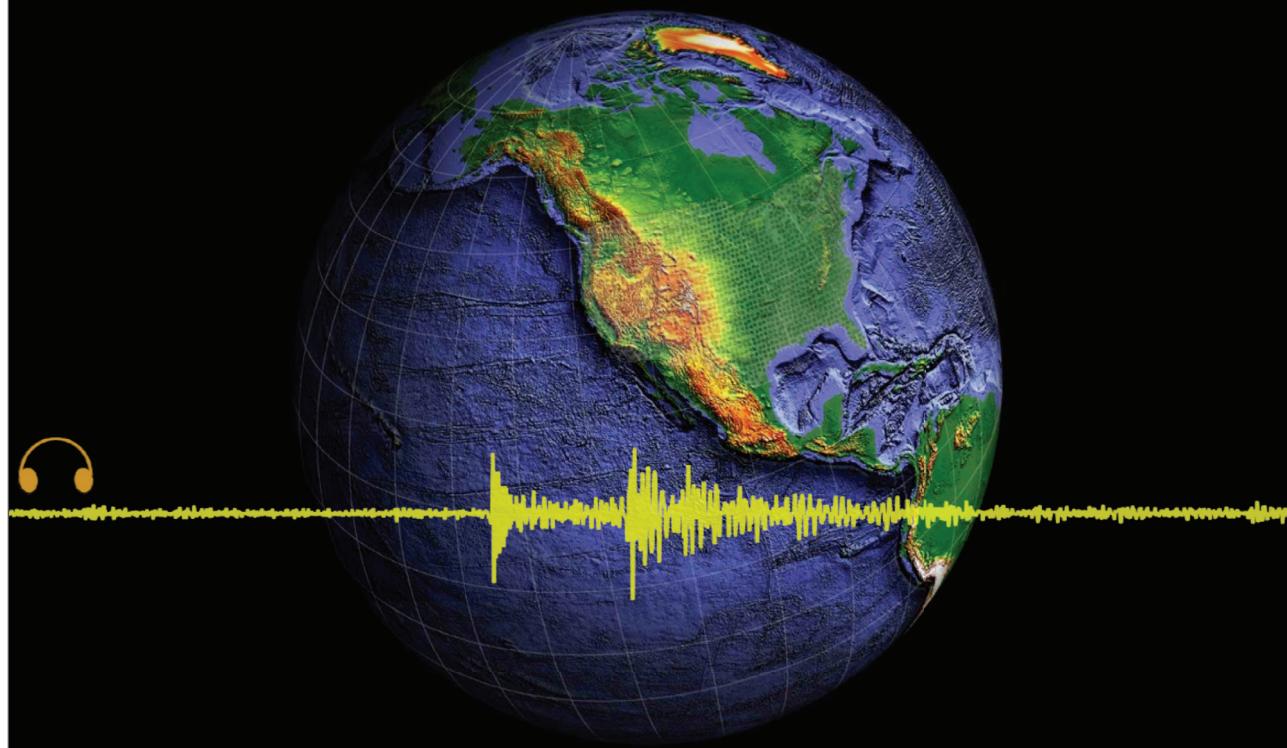
Check here when you've made a classification to this project.

NATIONAL MUSEUMS OF Kenya houses over 200,000 fossil specimens from more than 100 fossil sites across Kenya's Rift Valley, including some of the best hominid specimens in the world. The collection holds three main fossil groups: vertebrates, invertebrates, and plants representing different geological periods from over 30 million years ago to 100,000 years ago.

At the time of collection, fossil specimens are well documented in the field and during the process of accession. In the early days, the information of these specimens was handwritten in field slips and index cards. Cataloguing this information is too large a task for the museum's small staff. Through this collaborative project between the National Museums of Kenya and the Finnish Museum of Natural History,

Zooniverse participants help transcribe the handwritten specimen cards. These digital data will ultimately be uploaded into an online searchable database for researchers, students, and the general public. They will be used to help answer fundamental questions around human and mammalian evolution and in the reconstruction of Palaeoenvironments.

The project initially launched in November 2020. After just the first week, a thousand participants had contributed over 50,000 classifications. By January 2021, the Zooniverse community had completed the first set of over 9,000 specimen cards. The impact of COVID paused the project through much of 2021, but the team anticipates starting to upload new image sets by 2022. ☀



Earthquake Detective

Using seismographs spread across the United States, researchers record countless “audio” snippets of Earth’s tremors and use the power of the human ear to study what moves beneath our feet.



IMAGE CREDITS
EarthScope and
Earthquake
Detective

SUMMARY BY
Alex Gurvich

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

THE EARTH IS constantly trembling under our feet due to plate tectonics. If our hearing were sensitive enough we could press our ear to the ground and distinguish the different tones of rock grinding against rock. Much like a microphone captures the quivering of air and enhances the sound waves we are familiar with in everyday life, a seismograph captures the quivering of stone. The sound waves that travel through the Earth are similar to those that travel through the air — just at a lower frequency that is inaudible to human ears. However, by speeding up the sound waves captured by a seismograph to a frequency perceptible to humans we can actually listen to the earthquakes and tremors and categorize the different sounds.

Some events sound like a slamming door, others like crumpling aluminum foil, and still others like the whistling of the wind.

In Earthquake Detective, participants explore, sort, and categorize “audio” samples from Earthscope, a network of thousands of seismographs laid out in a grid across the United States. While progress has been made in understanding how small earthquakes might be triggered by the surface waves from large earthquakes, there is no consensus on the physical mechanism. Earthquake Detective helps increase our general understanding of this phenomenon, and provides clues to the physical mechanisms that connect different types of earthquakes and tremors. ☒



Fancy a Cup of Marchantia?

Through identifying gemma cups in images of the *Marchantia polymorpha* liverwort, scientists seek to understand the mechanisms plants use to grow and reproduce and how they evolutionarily diverged.



IMAGE CREDITS

Fancy a Cup of Marchantia

SUMMARY BY

Paige Yeung

CHECK IT OUT!

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

THE COMMON LIVERWORT—a bryophyte also known as the *Marchantia polymorpha*—reproduces asexually using gemmae produced within gemma cups, cup-like structures giving rise to new *Marchantia* plants. Studying gemma cups in *Marchantia* helps researchers trace the evolution of ancestral plants into bryophytes and vascular plants.

Without vascular systems, bryophytes like *Marchantia* are better suited for moist environments. Rain droplets landing in gemmae cups carry and disperse gemmae, allowing *Marchantia* to reproduce and propagate quickly across land. Researchers in Fancy a Cup of Marchantia? sought to study this developmental feature by examining it in images of *Marchantia*.

In this project, Zooniverse participants identify gemma cups in images of *Marchantia* plants, and their identifications will be used to train a model to detect them automatically. Researchers are using these data to investigate the ancestral history of bryophytes and vascular plants, prior to the evolutionary divergence of the *Marchantia* 450 million years ago, and how they came to spread across land. 



SURREY 1966

KINGFISHER

258

NEW HAW AREA. THORPE PARISH.		1 pr 1 pr.	bred 4 young. } both successful bred 3 " } first year ♂ ringed. adult female -	{ G.H.GURAT.
" G.P.	20 AUG	1		~
" "	21 AUG	1		~
" "	4 SEPT.	1		~
DISTILLERS SPORTS GROUND, E.MOLESEY	?		Observer understands from keeper that 1 or 2 have been seen. No dates. Also on 4 th SEPT.	{ P.J STRANGEMAN
EAST MOLESEY.	20 MAR	1		P.J. OLIVER. M. J. WELLS.
RICHMOND PARK	12 MAR	1		M. JW.
	23 OCT.	1	(see next card)	
RE BROOKLANDS.	JAN	1-2	present // 21 APR - 1. R.Wey.	C.O.
BROOKLANDS.	6 JULY	1	on R.Wey.	C. OGSON.
GODSTONE.	3 SEPT.	1	Also on 16 + 23 OCT, + 5 NOV.	A.J. HOLCOMBE.
TOWPATH at SYON PK.	13 JAN.	1		K.J. HERBERT.

London Bird Records

Through crowdsourced transcription of its handwritten bird observation cards, the public is helping the London Natural History Society uncover historic biodiversity data from the 1900s.



IMAGE CREDITS
London Bird
Records

SUMMARY BY
Laura Trouille

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

THE LONDON NATURAL History Society (LNHS) has collected boxes upon boxes of record cards of bird sightings spanning the last century. The handwritten record cards include the species and locations of birds, as well as the name of the observer. After transcribing the record cards covering the 1980s, the LNHS team quickly realized that it would take them over seventy years to digitize all the cards at their current rate. Harnessing the power of the crowd through the London Bird Records project, the team is making its way through the decades in record time. Because most of these record cards haven't been examined since they were first written by the original recorder, there is ample opportunity to discover surprises within the cards, including the diverse and idiosyncratic handwriting of the bird observers.

Once digitized, these data are then uploaded into the Greenspace Information for Greater London (GiGL), the environmental record center for Greater London. GiGL mobilises, curates and shares access to data that underpin our knowledge of London's natural environment. Ecologists, scientists, students, community groups, local non-governmental organizations (NGOs), artists, interested residents and journalists all utilize GiGL for research and to inform decisions in policy and practice. Ø



NestCams

By monitoring the behavior at the nest in two avian model species, researchers aim to understand the behavioral patterns influencing breeding performance and reproductive success in birds.

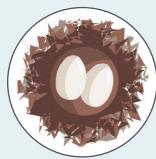


IMAGE CREDITS
Joseph Hemetsberger

SUMMARY BY
Paige Yeung

CHECK IT OUT!

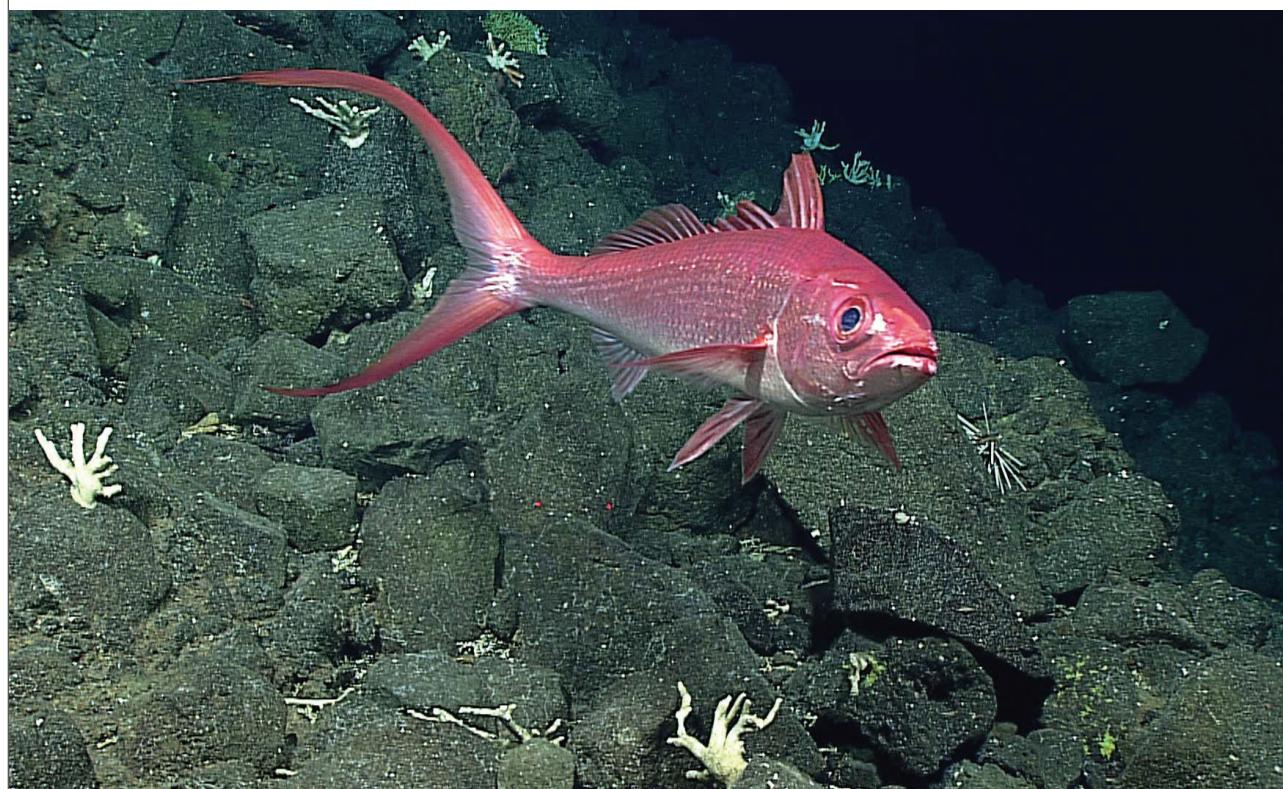
Check here when you've made a classification to this project.

CAMERAS AT NESTS allow observing breeding behavior without disturbing the breeders. They also provide valuable information on the complexities of behavioral patterns and their role with respect to breeding performance and reproductive success in avian species.

Researchers at the Konrad Lorenz Research Center in Austria seek to understand the behavioral factors influencing breeding performance in two avian species with different breeding strategies: the graylag goose and the northern bald ibis. Graylag geese are precocial (able to feed themselves almost immediately at birth) and long-term monogamous, with the female alone providing care at the nest. Northern bald ibis are altricial (require feeding from their parents) and seasonally monogamous, with both pair-partners

caring for the offspring. The study populations are individually banded, long-term monitored, and habituated to the presence of human observers. Such aspects make them ideal candidates for such observations.

The project was funded by the Austrian Research Promotion Agency (FFG) and is a collaboration between a research institution and a private company, the Cumberland Game Park, where most of the observed nests are located. NestCams was completed in June 2021 and involved about 10,000 participants around the world in identifying and learning about avian reproductive behaviors through video footage. These contributions enable researchers to further scientific understanding of the mechanisms of avian behaviors during incubation and their connection to reproductive success. ☀



OceanEYES

Through OceanEYES, Zooniverse participants help to improve scientific information for the economically and culturally important Hawai'i 'Deep 7' bottomfish stock.



IMAGE CREDITS
Hawaii Undersea Research Lab (HURL)

SUMMARY BY
Kei Smith

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

THE NOAA PACIFIC Islands Fisheries Science Center (PIFSC) Stock Assessment Program is responsible for monitoring fish stocks to help guide fisheries management. This includes establishing sustainable fish harvesting rates for the 'Deep 7'—seven species of bottomfish that are economically and culturally important in Hawai'i. The program gathers data on abundance, biology (e.g., growth speeds and offspring numbers), and catch rates. Until recently, bottomfish stock assessments relied on "fishery-dependent" data to estimate abundance (i.e., reports from the commercial fishing industry). But these data can be affected by a variety of market forces such as market price, fuel cost, etc. In its efforts to continually improve the data used for its stock assessments, the PIFSC has developed a multi-gear fishery-independent survey,

which is less affected by market forces. This survey utilizes underwater cameras to count fish in their natural habitats. However, the volume of camera data can quickly overwhelm human analyst capacity and limits the information that can be extracted.

Through OceanEYES, Zooniverse participants assist PIFSC scientists by identifying and counting fish in the millions of images collected by NOAA's underwater cameras each fall. The team is also using these Zooniverse classifications to train machine-learning algorithms to further improve efficiency and standardization. These efforts are making it possible to provide a more accurate representation of fish abundance in Hawai'i. ☀



Plankton Portal

Plankton are heroes of our oceans as the base for the entire marine food web. In Plankton Portal, participants tag plankton in underwater images to help our understanding of ocean health.



IMAGE CREDITS
Mark Farley,
Kelsey Swieca

SUMMARY BY
Paige Yeung

CHECK IT OUT!

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

A SINGLE DROP of seawater can contain countless plankton, small organisms that play a vital role in the functioning of the ocean ecosystem. In addition to being a critically important food source, plankton are an important part of the global carbon cycle, capturing the Sun's energy and the atmosphere's CO₂ at the surface of the ocean and releasing it to other organisms and other areas of the ocean. Understanding where and when plankton occur at different depths in the ocean allows scientists to gain a global understanding of the function and health of the ocean from small to global scales.



In Plankton Portal, participants tag and identify plankton in images taken by Oregon State University researchers using the In Situ Ichthyoplankton Imaging System (ISIIS) of underwater cameras. Because of the large amount of data ISIIS produces, the Plankton Portal team sought help from the Zooniverse community. There are two separate workflows for the winter and the summer, allowing the researchers to identify how the diversity of plankton differs across seasons. Participants' classifications also help the research team assess the comparative effectiveness of computer-automated approaches to classifying plankton in images.

Through Zooniverse, Plankton Portal helps researchers answer scientific questions about the marine environment while also educating the public about plankton and their role in our oceans. Ø



Rebuild Maastricht

Using a scale model from the mid 18th century, researchers are working to build a new digital 3D-reconstruction of the Dutch city of Maastricht.



IMAGE CREDITS
Giorgio Verdiani

SUMMARY BY
Paige Yeung

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

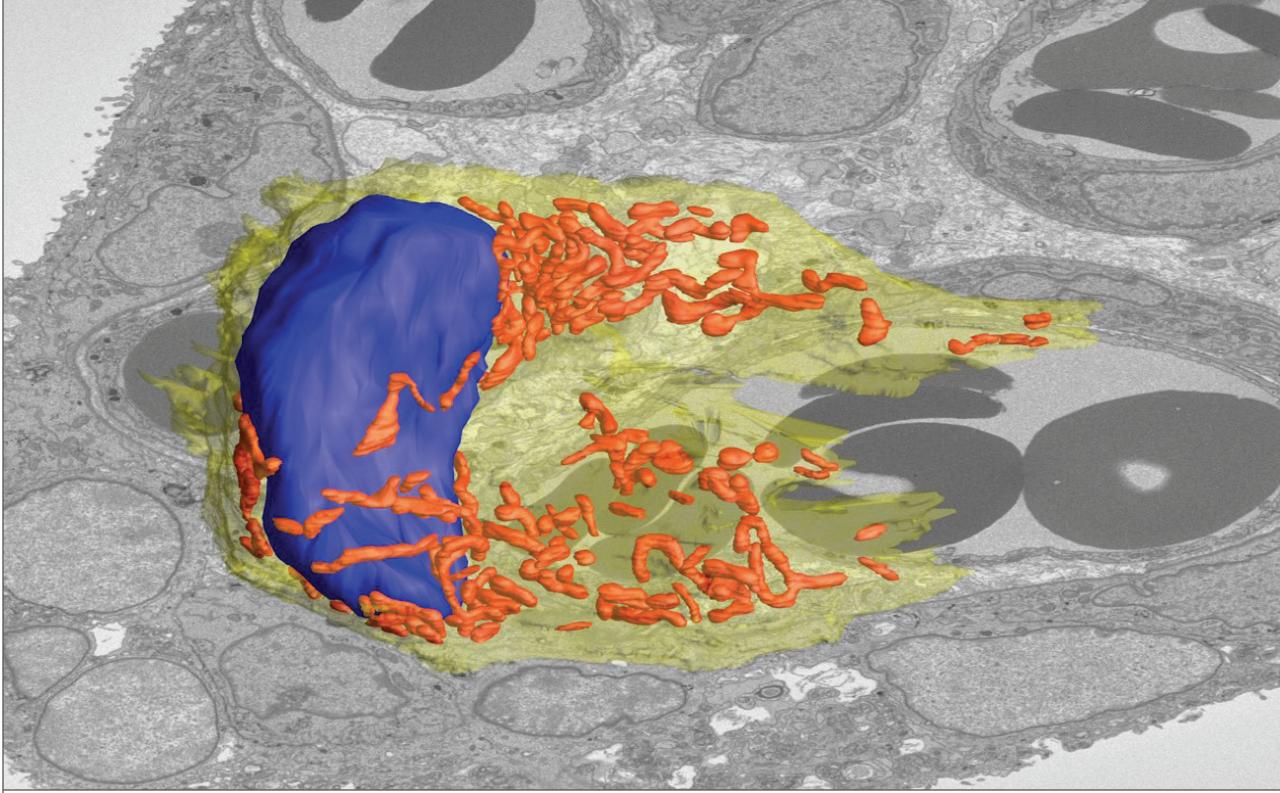
DURING THE TIME of the French expansion in the 17th and 18th centuries, the French military created three-dimensional scale models (called plans-reliefs) of Dutch towns and cities to plan strategic attacks and defense. Maastricht was one such city; during the mid to late 18th century, many plans-relief of the city were constructed.

While most of these models of Maastricht have not been preserved, one model constructed between 1749 and 1752 still remains in France. Researchers have been working to digitize this model. Unfortunately, scanning the original 3D structure produced a digital copy that required too much computational power to be compatible with most computers.

To create a more usable digital model, the Rebuild Maastricht team is turning to an alternative method. Using

the animated software application Houdini, the researchers will project the properties of each building onto an empty house connected to a coordinate system. Since this method requires each building in the model to be classified and tagged, Zooniverse participants help by identifying and tagging physical characteristics in images of each individual building. The researchers then enter the Zooniverse results into the Houdini software.

Through the project, researchers and Zooniverse participants work together to preserve historical accuracy, bring the historical city of Maastricht back to life, and ultimately make it accessible to a larger audience. Ø



Science Scribbler: Placenta Profiles

The placenta supports the growth and survival of the baby during pregnancy. Understanding how and why this complex organ fails is a critical step in finding solutions to pregnancy complications.



IMAGE CREDITS
Michelle Desforges,
Daman Adlam,
U. of Manchester

SUMMARY BY
Laura Trouille

CHECK IT OUT!

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

PLACENTA PROFILES USES high magnification images of placentas donated to research from normal healthy pregnancies and from pregnancies complicated by pre-eclampsia or fetal growth restriction. Both these complications are associated with failure of the placenta to develop or function properly. The Placenta Profiles project is helping to deepen our understanding of normal placenta structures and uncover changes that could help explain how and why the placenta fails during pregnancy complications.

The project team is composed of computer and imaging scientists from Diamond Light Source and the Rosalind Franklin Institute, and placental research scientists based at the Universities of Manchester and Southampton. They were drawn together by their shared interest

in using cellular imaging to understand changes that affect a placenta's ability to function properly.

However, processing the many placenta images takes a really long time, so the team needs the public's help. This involves placing marks on the images to "annotate" the different areas of interest. These annotations can be processed into segmentations (outlines of the areas of interest) to give 3D information about the structures inside cells and how different cell types in the placenta are organized. In addition to using the direct results from Placenta Profiles to deepen our biological understanding of placenta, these data will also be used to develop new algorithms to help researchers analyze similar images more easily and quickly in the future. ☘



Seabird Watch

Studying seabirds helps us understand the impact of human activities and climate change on marine environments.



IMAGE CREDITS
Seabird Watch

SUMMARY BY
Paige Yeung

CHECK IT OUT!

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

SEABIRDS FEED NEAR the top of the food chain in marine ecosystems. As a result, their populations are key indicators of the health of the ocean. Unfortunately, global declines in seabird populations have occurred, making them the most threatened group of birds globally. By monitoring seabirds across a range of locations, researchers can better understand the factors leading to the decline of seabird populations and help inform effective conservation.

The Seabird Watch team uses camera technology to record seabirds in multiple colonies, generating a large amount of data otherwise impossible to collect and process. For camera images to be useful, the researchers need help identifying and counting the seabirds. Zooniverse participants help tag a range of seabird species as well as their chicks (and

sometimes predators) in time-lapse images. These data help scientists address questions on the patterns of seabird breeding and the relationship with environmental conditions.

With the data contributed by Zooniverse participants thus far, the team has been able to identify intriguing patterns in seabird breeding habits over time. This includes observations of poor breeding success and earlier breeding in some years related to climatic conditions. The researchers are constantly expanding the range of species and sites covered to expand their understanding of the causes of declines in seabird populations. ☒



Supernova Hunters

Studying supernovae helps researchers tackle questions on the widest of scales, from the lives of stars to the history and future of our universe.



IMAGE CREDITS
Rob Ratkowski,
PS1SC

SUMMARY BY
Paige Yeung

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AT THE END of its life, a high-mass star will have burned through all its nuclear fuel. No longer able to support itself against gravity, it collapses. The inward falling outer layers bounce off the dense inner core and are cast off into space in a spectacular outburst we call a supernova. Other supernovae are the result of a white dwarf star accreting material from a companion star. If enough material is accreted, nuclear fusion rapidly ignites, imparting so much energy that the star bursts apart. These supernovae present astronomers with a unique opportunity to study physics under extreme conditions, gain insights into stellar evolution, and enable us to calculate distances across the nearby universe.

We expect to observe ~1 supernova per galaxy every ~100 years. To find them, it is important to study many galaxies at once with telescopes scanning large areas of the sky. Supernova Hunters uses images from the Pan-STARRS1 telescope, collecting vast amounts of data every night. The team developed artificial intelligence (AI) to help weed out bogus supernova detections due to image artifacts, but it isn't perfect. Zooniverse participants help by classifying the remaining artifacts the AI missed. This powerful combination of humans and AI is more accurate than either individually. Real supernova discoveries are announced to the Transient Name Server, allowing astronomers worldwide to coordinate further observations. ☒



Tag Along with Adler

Tag Along with Adler seeks to incorporate voices beyond those of museum professionals in labeling the Adler's numerous collections for online search access.



IMAGE CREDITS
Collections of the Adler Planetarium

SUMMARY BY
Paige Yeung

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WITH 10,000 OBJECTS split between three collections, Chicago's Adler Planetarium has an extensive searchable catalogue of historic objects described using metadata. Researchers at the Adler are seeking to incorporate a broader range of tags into these digitized collections, providing a greater quantity and variety of access points to the images and objects.

In Tag Along with Adler, Zooniverse participants help bring more voices to the cataloguing of objects. Looking at images from the Adler collections, participants add new keywords based on what they see. These new keywords help expand access to the images and objects by using the museum public's own language. The project further seeks to examine the use of AI-generated tags on the collection of images at the Adler: in a second

workflow, participants select applicable AI-generated tags before adding their own keywords to the images they see. Researchers are able to demonstrate to the public the promises and shortcomings of AI models that underpin the searches performed throughout daily life.

In expanding the range of voices involved in tagging images at the Adler, the project increases public accessibility of the Adler's digital collections and provides a transparent way for the public to engage and improve the Adler's collections. Thus far, Tag Along with Adler has seen participation yield 2 to 15 times more access points, with 87% of these tags on average being new to the catalogue. ☒



LIVERPOOL DOCKS.

REGISTER of TIDES observed at the Tide Gauge,

George's Pier for September 1868

Date. 2nd							Date. 3rd						
Time.	Height.	Time.	Height.	Range of Tide.	Moon's Age.	WIND.	Time.	Height.	Time.	Height.	Range of Tide.	Moon's Age.	WIND.
P.M.	F.	I.	A.M.	F.	I.		P.M.	F.	I.	A.M.	F.	I.	
0.15	16	6	0.15	17	11	d h	0.15	17	6	0.15	18	4	d h
30	15	10	30	17	5	16.6	30	17	5	30	18	5	17.6
45	14	10	45	16	7		45	16	10	45	18	1	Variable
1. 0	13	10	1. 0	15	7		1. 0	16	4	1. 0	17	6	
15	12	6	15	14	3	P.M.	15	15	4	15	16	8	P.M.
30	11	1	30	12	10		30	14	2	30	15	7	
45	9	9	45	11	5	W.N.W.	45	12	10	45	14	3	Variable
2. 0	8	4	2. 0	10	1	Mean Barometer	2. 0	11	6	2. 0	12	11	Mean Barometer
15	7	1	15	8	9		15	10	1	15	11	6	
30	6	0	30	7	5	30.135	30	8	8	30	10	1	30.134
45	4	9	45	6	3		45	7	5	45	8	8	
3. 0	3	7	3. 0	5	0		3. 0	6	3	3. 0	7	4	
15	2	6	15	3	9		15	5	0	15	6	1	
30	1	4	30	2	6		30	3	9	30	4	9	

UK Tides

A quarter of the world's population lives along coastlines, including ~11% on land less than 10m above sea level. These communities face major concerns around rising sea levels due to climate change.



IMAGE CREDITS
British Oceanographic Data Centre

SUMMARY BY
Laura Trouille

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

THROUGH UK TIDES, Zooniverse participants transcribe sea level measurements from historical handwritten ledgers. The project focuses on two locations: George's Pier in Liverpool and Hilbre Island, a tidal island on the Wirral peninsula. These registers are in the form of large, leather-bound volumes dating back to 1853 for Hilbre Island and 1857 for George's Pier, providing one of the earliest long records in the UK of sea level variations throughout the complete tidal cycle. There are over 100 ledgers, some of which include meteorological data alongside the tidal information.

These data will be used to study climate change and sea level rise and will be included in the Permanent Service for

Mean Sea Level (PSMSL) dataset, used by the Intergovernmental Panel on Climate Change (IPCC).

Extending long records, such as the one at Liverpool, is critical for identifying long-term trends in sea level, but also for studying coastal land movement. Furthermore, because the sea level was measured every 15 minutes, it can be used to study high-frequency variability. It will reveal whether tides in the area have changed over the past 200 years, and the height of surges caused by individual storms. The recovered data will also make a vital contribution to our knowledge of extreme events in the area, which is crucial when planning future coastal defenses. ☐



World Architecture Unlocked

Help transcribe one of the most comprehensive and mysterious collections of architectural photography in the world and reveal its secrets.



IMAGE CREDITS
Conway Library,
The Courtauld

SUMMARY BY
Laura Trouille

**CHECK
IT OUT!**
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classification
to this project.

THE COURTAULD'S CONWAY Library in the UK is home to one of the world's largest collections of architectural photography, capturing buildings and monuments from across the globe and throughout the ages. The library's collections are an invaluable resource for research and include 1.2 million images of photographs and cuttings of world architecture, architectural drawings, sculpture, wall paintings, and much more. For the first time, this collection is being digitised and made publicly accessible online.

The data gathered through World Architecture Unlocked (such as location, architect/artist, date, and image description) will be added to the collection's database, becoming searchable information in the collection's website.

Interested in browsing 1930s European architecture? No problem! Want to see a list of all the buildings by Le Corbusier? Of course! Working on decolonising architecture? What a perfect starting point! Item-level descriptions will make this kind of research easier and will provide a more intuitive search experience.

As the project leads note on the website, "On Zooniverse, you can drop in for 5 minutes or settle in for a few hours, each and every contribution makes a big difference in sharing our collections and making them more accessible for everyone – enjoy!" Ø



Thank you!

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