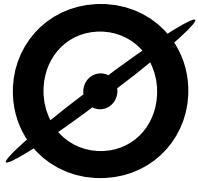


VOLUME II

# Into the Zooniverse

PEOPLE-POWERED RESEARCH





# Into the Zooniverse

People-Powered Research

VOLUME II | 2020



## Acknowledgements

### ZOONIVERSE CO-PI AND

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### ADLER ZOONIVERSE TEEN INTERNS

Alejandro Sanchez and Mattie Williams

**EDITING** Samantha Blickhan,

Lucy Fortson, Chris Lintott,

Helen Spiers, and Laura Trouille

**COVER IMAGE** Fishing in the Past, p. 17

*A Watercourse near Abcoude, Paul Joseph  
Constantin Gabriël, 1878*

### ZOONIVERSE

#### FIRST PRINTING: 2020

Zooniverse—Adler Planetarium

1300 S Lake Shore Dr

Chicago, IL, 60605

[www.zooniverse.org](http://www.zooniverse.org)

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**THANK YOU** Becky and the entire Zooniverse team would like to extend a heartfelt thanks to Aleksandra Kuznetsova, who conducted interviews and wrote the majority of these summaries while defending her PhD, mentoring teen interns, and preparing for a cross-country move. This book would not have been possible without her.



# Thank you!

IMAGE | Mapping Historic Skies, p.26



## 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 THE** second volume of *Into the Zooniverse*. This year's publication features some of the Zooniverse projects that were active during the 2019–20 academic year.

Since the first edition of *Into the Zooniverse*, the Zooniverse launched 65 projects, volunteers submitted 84 million classifications, research teams published 35 papers, and hundreds of thousands of people from all over the world have taken part in real research.

Facing unprecedented challenges and an uncertain future, people who were able to have come together in pursuit of a common goal: to use their time for good, to answer big questions, and to unlock the secrets of the Universe. Whether through identifying the spiral arms of distant galaxies or naming raccoons in Wyoming, Zooniverse creates connections. Parents and children bond over educational activities, volunteers around the globe come together over shared interests and project discoveries, and project owners are able to connect with an increasingly large community of people powering research.

This book highlights just 40 of the many projects that were active this academic year. We chose a sample that included a wide range of the project types on Zooniverse. There are many projects we haven't highlighted yet, and we hope to do so in the future.

This year, the Zooniverse team welcomed three interns who assisted in the creation of this book. Dr. Aleksandra Kuznetsova from the University of Michigan conducted interviews, wrote summaries, and worked with our other two interns, Alejandro Sanchez and Mattie Williams, who joined us from the Adler Planetarium teen intern program. 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 volunteers and dedicated research teams using the Zooniverse platform. These collaborations are the true strength of Zooniverse: the "people" in people-powered research.

**BECKY, ALEKSANDRA, AND LAURA**

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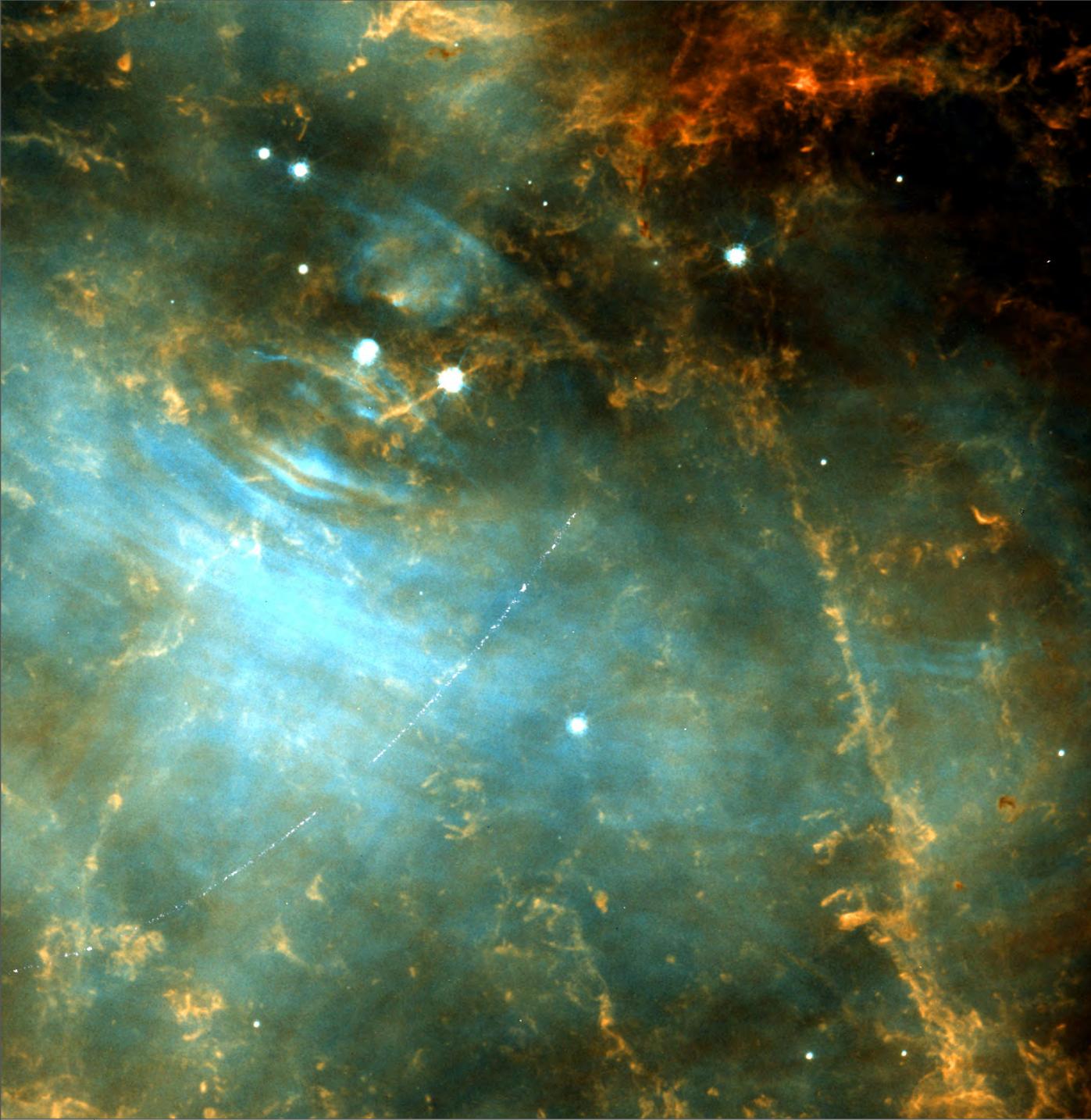
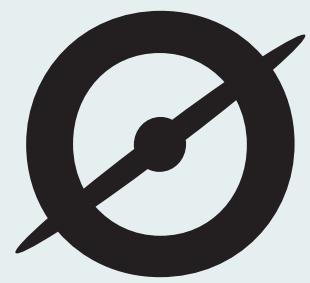


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- 1  I don't feel strongly about it at all  
 2  I don't feel so strongly about it  
 3  I feel fairly strongly about it  
 4  I feel very strongly about it

77. If you have any other things to say about radio in the ETO -- suggestions, gripes or criticisms -- please write them below: Certain stations

should take steps to remove strong CW interference from their frequency. Relay programs from at least one station I know carry a loud hummin noise that should be eliminated.  
more programs should be broadcast to please the taste of "hillbilly" audiences.  
(such as more of the "Grand Ole Opry" & National Barn Dance.) (more effort should be made to inform G.I. listeners of the names & times at every program)

# The American Soldier

By transcribing the uncensored thoughts and experiences of Americans who served in WWII, The American Soldier is creating a searchable public record.



**IMAGE CREDITS**  
The American Soldier

**SUMMARY BY**  
Samantha Blickhan

**CHECK IT OUT!**

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

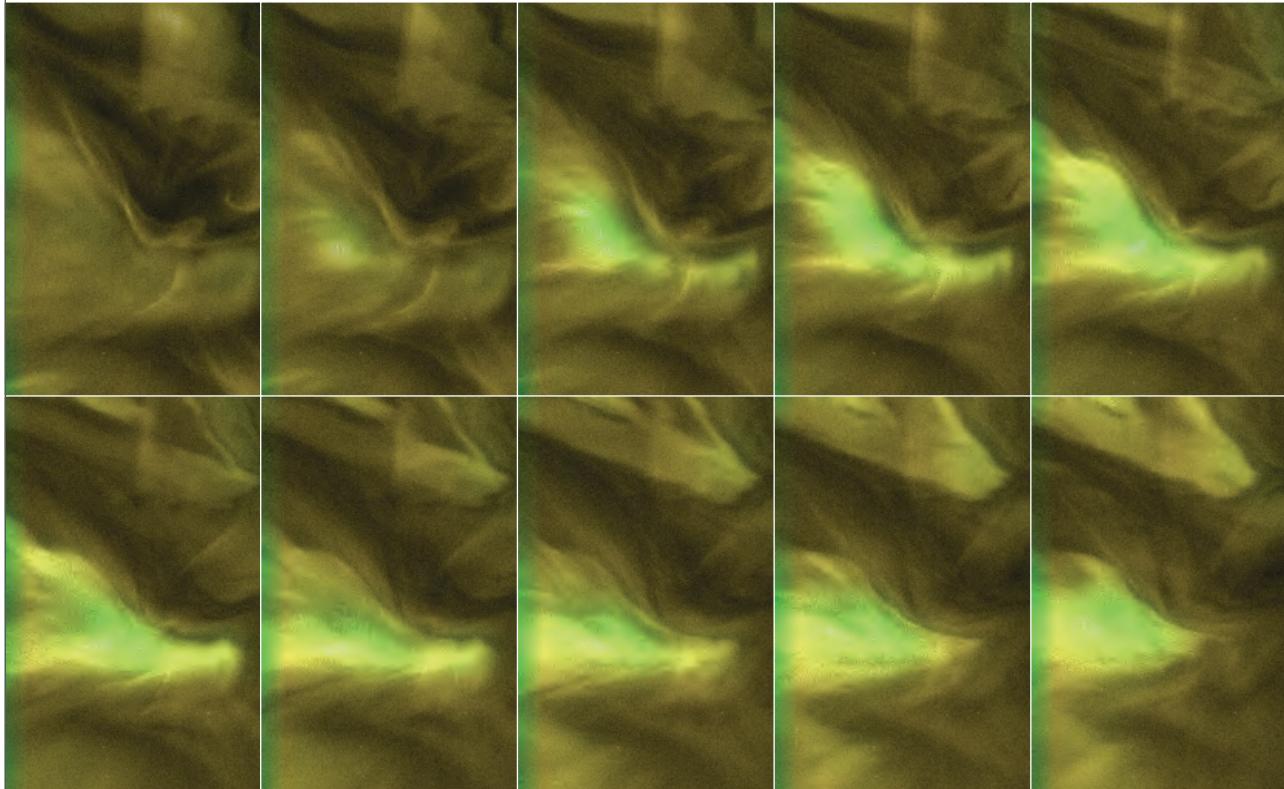
**ONLY A FRACTION** of the approximately 16 million American men and women who served in World War II had prior military experience, meaning that for some the transition came easily, but for many others it was much more difficult.

Over the course of the war, the U.S. Army Research Branch surveyed around half a million American troops. Tens of thousands of these participants not only completed the survey, but also offered additional reflections in the form of handwritten responses which detail their thoughts on everything from army rations to the experience of being Black while serving abroad and at home.

The National Archives digitized around 65,000 of these handwritten survey responses. By transcribing this rich historical record, The American Soldier

project aims to make these sources text-searchable. A second phase of the project will reunite the comments with the survey data. As of V.E. Day 2020 – two years since the project launched – all 44 scanned microfilm reels have been transcribed and annotated in triplicate.

Ultimately, The American Soldier aims to provide the most complete and comprehensive portrait of the largest army in U.S. history, an invaluable public resource as well as a benefit for researchers and scholars in history and American studies, behavioral and social sciences, Black studies, psychiatry, military studies, and others. ()



# Aurora Zoo

Watching videos of aurorae can help scientists figure out what goes on backstage at one of nature's most spectacular shows.



**IMAGE CREDITS**  
Aurora Zoo,  
Dan Whiter

**SUMMARY BY**  
Aleksandra  
Kuznetsova



**CHECK  
IT OUT!**

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

**PARTICLES FROM THE** Sun travel millions of miles across space, then ride along the Earth's magnetic field lines until they collide with the atmosphere near the poles in an electrifying and energetic spectacle that we know as the aurora. Renowned for its dancing and shimmering ribbons of color high above the clouds produced by interactions with molecules in our atmosphere, the aurora is also a natural physics laboratory unlike no other.

University of Southampton scientists set up a specialized camera system in the high Arctic to film auroral motions. Zooniverse volunteers can watch videos of aurora and help scientists identify and decode the source of the many kinds of auroral movements.



By studying the physical processes behind aurora, scientists can gain a better understanding of Earth's atmosphere and how it reacts to space weather like solar storms. Ø



explore.org

# Beluga Bits

Beluga Bits collects underwater photos to better understand the social structure, habitat preferences, and life stories of beluga whales in Northern Manitoba, Canada.



**IMAGE CREDITS**  
Beluga Bits

**SUMMARY BY**  
Laura Trouille

**CHECK IT OUT!**

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

**EACH SUMMER, MORE** than 50 thousand beluga gather in the estuaries in Hudson Bay, Canada. The beluga are gregarious, assembling in small to large groups up to several hundreds. Beluga spend their winters in ice-covered waters hundreds of kilometers to the north. When the sea ice melts in the spring, they travel to these estuaries. But it is not fully clear what benefits they gain from this journey: Do the estuaries provide safe havens from killer whales or refuges to care for their young? Or warmer waters to help molt their skin? Or something else?

Led by the Conservation and Research team at the Assiniboine Park Zoo in Winnipeg, Manitoba, Canada, Beluga Bits explores the social structure and natural history of the beluga that visit the Churchill River estuary. In partnership with Explore.org, the team livestreams

underwater video from a Zodiac boat and asks viewers to capture beluga snapshots. These snapshots are then uploaded into the Beluga Bits project for participants to identify the age, sex, and group size.

Participants also flag identifying marks like scars or pigmentation to help the team recognize beluga that return to this same location year after year. In 2020 alone, more than 5,500 participants provided more than 200,000 classifications!

## R/V CAPE HATTERAS LOG OF SCIENTIFIC EVENTS

Sheet No.		O. 1114 RPH7 G. LEWIS Master and Mates		M. COOK Oceanographic Party Chief		A. KUAP - R. DOW Principal Investigator		CA-23-93 Cruise Number		
Station Number	1	2	3	4	5	6	7	8	9	10
Date	4/13/93	4/14/93	4/14/93	4/14/93	4/14/93	4/14/93	4/14/93	4/14/93	4/14/93	4/14/93
Time	2056	0240	0400	0445	0515	0740	0915	1230	1300	1405
Loran										
Latitude	31° 48.46'	31-49.46	31-49.75	31-49.9	31-50.06	31° 49.45'	31° 50.65'	31-50.02	31-49.98	31-50.27
Longitude	64° 11.0	64-11.68	64-11.5	64-12.00	64-13.10	64° 11.54	64° 13.27	64-11.69	64-12.54	64-14.02
Sonic Depth										
Date	4/16	4/14	4/14	4/14/93		4/14	4/15	4/14/93	4/14/93	4/14/93
Time	2020	0340	0440	0505		2022	0715	1245	1322	1443
Loran						+R 26555	27195			
Latitude	32° 02.51'					31° 52.2	31° 51.5			
Longitude	64° 14.18'					64° 11.3	64° 13.5			
Sonic Depth										
Cores										
Trawls										
Plankton Nets										
Biological Gear										
Cameras										
Hydrographic Gear										
Dredges										
Other	PITS	KEVLER	KEVLER	KEVLER	KEVLER	IN SITU	IN SITU	BOP		
						RED PAPER	WHITE PAPER			

# Castaway

Historic documents and the materials upon and within which they are stored are beginning to deteriorate. We have entered a critical period of digitization and transcription to preserve these invaluable records.



**IMAGE CREDITS**  
Castaway

**SUMMARY BY**  
Laura Trouille

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

**THE WORLD'S OCEANS** continue to face an uncertain future due to climate change, pollution, and more. Ship records provide critical historical information to contextualize and more accurately forecast the response of marine species to environmental change.

To this end, the North Carolina Museum of Natural Sciences has digitized the station logs from three research vessels operating in the Atlantic from 1964 to 2013. The records vary in content, from science logs including climate and marine species information to cruise reports and maps, all of which give insight into the region's natural history. The data collected will form the foundation for studies spanning fields as diverse as taxonomy, ecology, conservation, and habitat management.

Castaway engages Zooniverse volunteers in transcribing these ship logs, accelerating access to these records. The data from this project are made available to the public via [COLLECTIONS](#). **NATURALSCIENCES.ORG**. With each transcription that is completed, we increase our understanding of what these vessels encountered, thereby unlocking the true potential of these historical data.

As we enter a time when regions all over our planet are changing at a historically unprecedented pace, digitizing, transcribing, and providing public access to this information has become more critical than ever. ☀



Jz1

If ~~deceit~~ pity dwelt within thy breast.  
If soft humanity informs thy mind  
Then couldst thou not deprive my soul of rest  
My soul to woe and misery ~~were~~ <sup>must be as</sup> hard as stone. W. C.  
the thy cruel heart is hard as stone  
To leave me thus unpitied and alone. To leave me thus my  
the skin I think in the ~~dangrous~~ was absence to bemoan  
My heart is fill'd with agony and fear. 167  
Let's some ~~the~~ wind blow cold sinto thee in the deep,  
But some ~~the~~ sharp teeth'd shark thy form shold tear  
Before my eyes all wet with bring tears  
Half the wan face of corross and of pain.  
One single hope ~~silences~~ my anxious soul  
The hope that thou will come again ~~shortly~~

# Davy Notebooks Project

Sir Humphry Davy is renowned for his contributions to the then-developing field of chemistry. His unpublished personal notebooks, however, reveal another side.



**IMAGE CREDITS**  
Davy Notebooks Project

**SUMMARY BY**  
Aleksandra Kuznetsova

**CHECK IT OUT!**

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

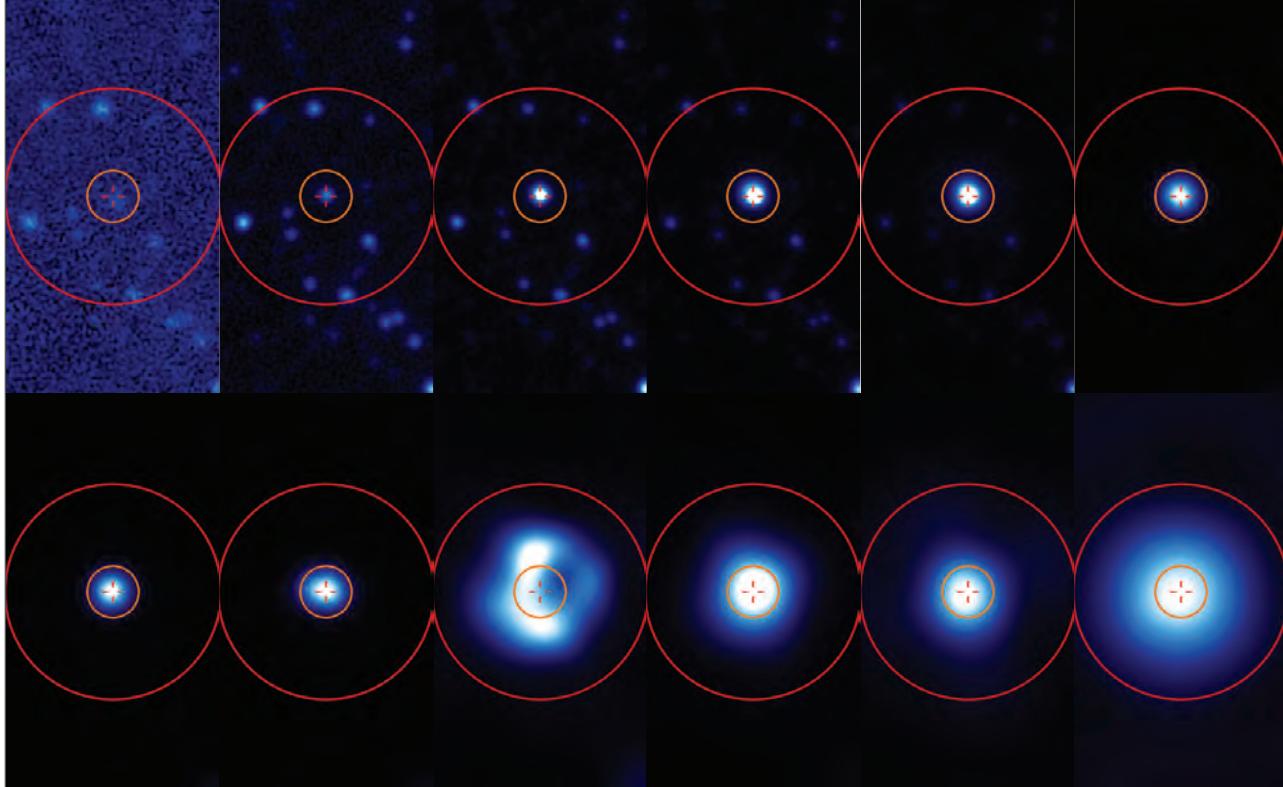
**A CONTEMPORARY OF** 19th century Romantics like Samuel Taylor Coleridge and Robert Southey, Davy's professional achievements focused on scientific discovery. As a member and eventual president of the Royal Society, he was responsible for the isolation and naming of several chemical elements, advances in electrochemistry, and experimentation with medical gases, earning him acclaim in scientific circles.

In his personal notebooks, however, a different side of Davy emerges as he intersperses pages of chemistry, philosophy, travel writings, and even poetry, mixing genre and content alike. Like many intellectuals of the Romantic era, his artistic endeavours were intertwined with his understanding of the growing body of knowledge of the natural world. Within these notebooks,

one can see how both art and science together motivated Davy as a thinker and as a scientist.

The Davy Notebooks Project, led by researchers at Lancaster University, is a transcription effort that aims to learn more about Davy's early life and the development of his thinking from his personal notebooks hosted at the Royal Institution of Great Britain.

By transcribing these previously unpublished notebooks, Zooniverse volunteers can be some of the first people to read these historical documents. The transcribed notebooks have been made publicly available at [HUMPHRYDAVY.ORG](http://HUMPHRYDAVY.ORG). **UK/NOTEBOOKS**, ensuring access to historical records of Humphry Davy's life. ☘



# Disk Detective

Astronomers look for debris disks as evidence of exoplanets around a star. But with over a billion stars to look through, they need help to find possible candidates.



IMAGE CREDITS  
Disk Detective

SUMMARY BY  
Becky Rother

CHECK  
IT OUT!

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

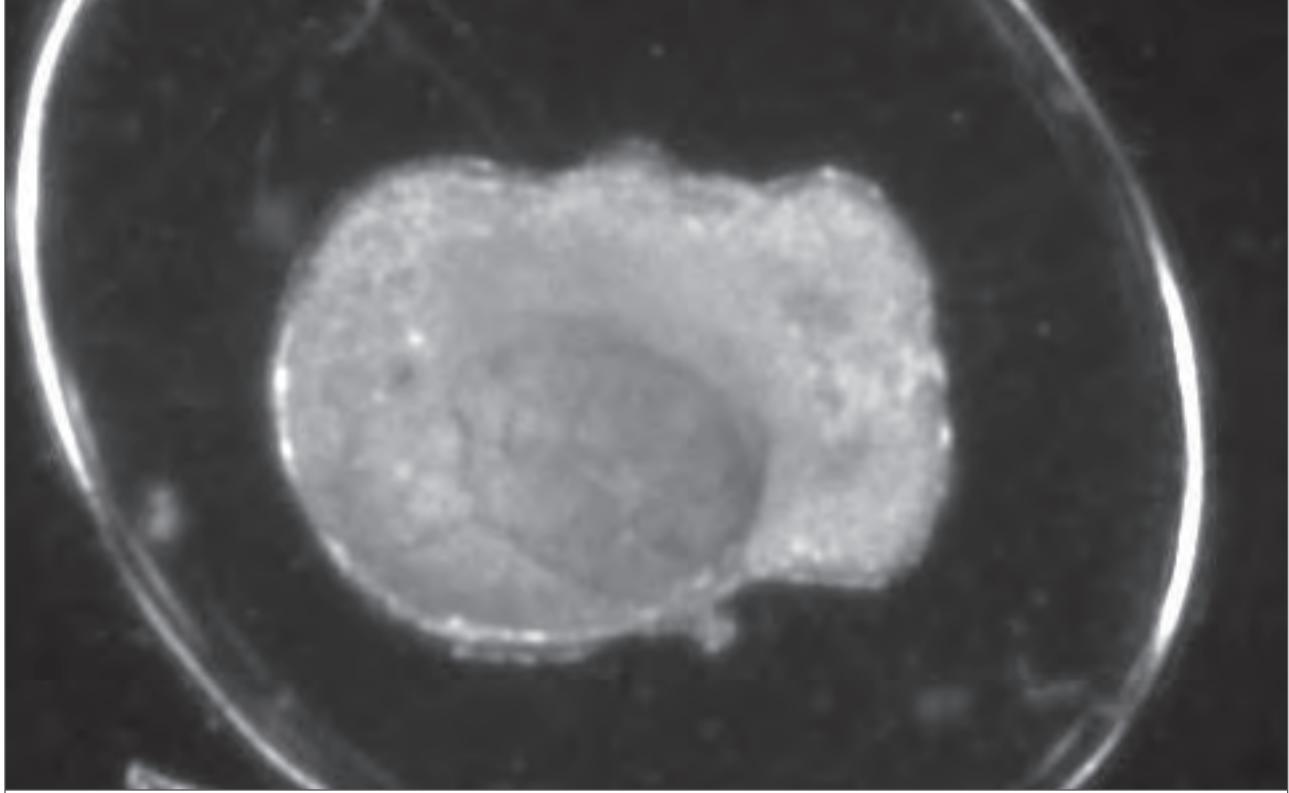
**DEBRIS DISKS ARE** made up of dust, gas, and asteroids: evidence of planetary collisions early in a planetary system's formation that often indicate the presence of exoplanets. Within this swirling belt of debris, light from the star it orbits is absorbed and reprocessed, reemitted as infrared light detectable by sky surveys. By examining stars that have more light than expected, astronomers can find and catalog these stars with debris disks.

Not all light emissions indicate debris disks, however. In infrared light images, a star that emits more light than expected could have a disk, or it could be a star embedded in the interstellar medium or in front of a galaxy, or several stars whose light all blends together. With over a billion sources of light to examine and many possibilities, astronomers turned to

Zooniverse to help identify prospective debris disk candidates.

Disk Detective launched for the first time in 2014 using images from NASA's WISE mission. The project has resulted in around 300 new debris disks so far and led to the discovery of a new class of disk, called the Peter Pan disk.

Now in its second iteration, Disk Detective combines four different astronomical surveys: the SkyMapper Southern Sky Survey, the Pan-STARRS survey, the Two Micron All Sky Survey (2MASS), and the unWISE coadds of data from the WISE mission. By comparing the images from multiple surveys at different wavelengths, volunteers can help the team identify even more possible debris disks. ☀



# Embryo Cam

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**  
Embryo Cam

**SUMMARY BY**  
Laura Trouille

**CHECK IT OUT!**

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

**WE KNOW THAT** in the early stages of life, aquatic animals are sensitive to their environments, but we don't know how sensitive they are or what they are most sensitive to.

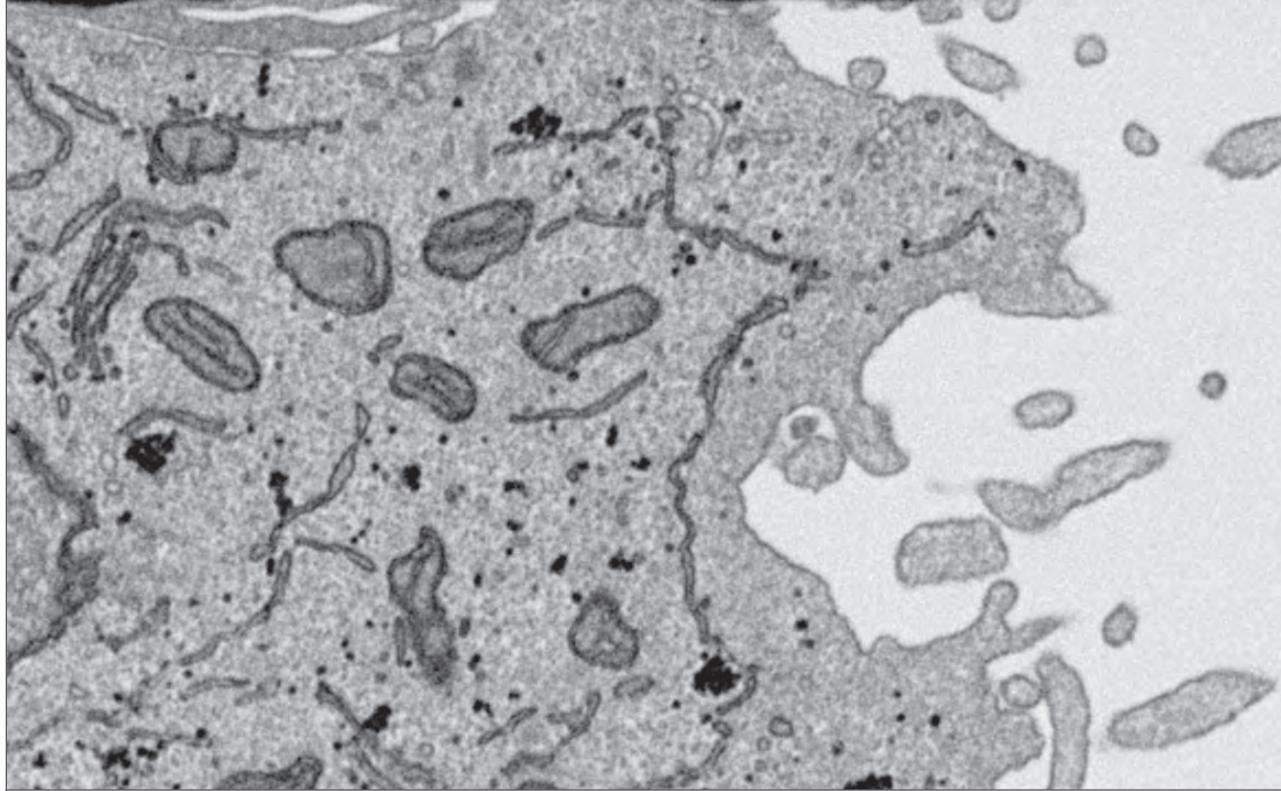
To help address this knowledge gap, researchers at the University of Plymouth built an autonomous bioimaging platform capable of capturing the development of aquatic embryos under experimental conditions that simulate climate change scenarios. These snail embryos change on a minute-by-minute, hour-by-hour and day-by-day basis, and trying to capture this dynamic process presents a formidable challenge. The team has generated millions of images of developing aquatic animals



and partnered with the Zooniverse to analyze them.

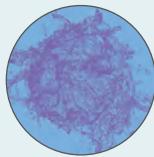
Through Embryo Cam, Zooniverse participants measure and identify key developmental events of embryos developing under different climate

change scenarios. They then tag embryo behaviors in video clips and annotate embryo structures in still images. This effort is essential to helping the research team better understand how early life stages are responding to environmental change. They are also using Zooniverse data to build algorithms that will quickly and accurately analyze new data, accelerating the pace of research and understanding.



# Etch a Cell – Powerhouse Hunt

Nearly every cell in your body contains hundreds to thousands of mitochondria, the ‘powerhouses’ of the cell that produce energy from fats, proteins, and sugars.



**IMAGE CREDITS**  
Chris Peddie,  
Francis Crick  
Institute

**SUMMARY BY**  
Laura Trouille

**CHECK  
IT OUT!**

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

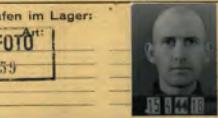
**USING ELECTRON MICROSCOPES,** researchers are able to capture incredibly detailed images of cells, helping us understand the biological changes associated with health and disease. Recent developments in electron microscopy have made it possible to collect images automatically, leading to huge amounts of data. Looking at a single cell alone can produce several terabytes of data! This flood of data has caused an analytical bottleneck, which led the Francis Crick Institute to create the Etch a Cell project on Zooniverse.

Through the Etch a Cell — Powerhouse Hunt project, Zooniverse participants trace mitochondria in each cell slice. It would take days for a single researcher to complete this effort alone for each cell. In addition, the variation in mitochondria structure does not allow easy automated

analysis with computers. Thus, the Zooniverse effort helps the researchers better understand mitochondrial biology and train computers to analyze new data even faster.

With the Zooniverse, Etch a Cell is helping to improve our understanding of cell biology, essential for working towards finding new treatments and cures for diseases. ☒



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Fam.-Name: Dumont Vorname: Maurice Geb. am: 14.9.91 in Chambreson (Côte d'Or) Stand: vh Kinder 5 Wohnort: Mad-aux-Seines Strasse: (Côte d'Or) Religion: rk Staatssang. Christ Wohnort d. Angehörigen: Blufreutz Henriette D., Nord & Seine wo. Eingewiesen am: 24.1.44 durch: BDS Paris in KL: Buchenwald Grund: Polit. Franz. Vorstrafen: ---		
Überstellt: an KL Personen-Beschreibung: Größe: 166 cm Gesicht: sonst Augen: braun Nase: gerade Mund: gew Oren: abet Zahne: lacken Haare: dibraren Sprache: franz.		
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Fam.-Name: Schlaus Vorname: Erich, Israel Geb. am: 11.4.09 in Wehlheim Stand: verh. Kinder: 2 Wohnort: Wehlheim, Kr. Bonn am Rhein Strasse: Auf dem Acker 12. Religion: gestund. Staatssang: D.R. Wohnort d. Angehörigen: Gerda Schl. Lehrer Wehlheim, wo. Eingewiesen am: 15.4.1944 durch: Stape - KZlin in KL: Buchenwald Grund: Politisch-Geltungsjude Vorstrafen: 1 mal politisch		
Überstellt: an KL Personen-Beschreibung: Größe: 172 cm Gesicht: mittelstark linslich Augen: blau Nase: groß, gebogen Mund: unlustig Oren: abatshend Zahne: 4 fehlen Haare: dunkelblond Sprache: deutsch		
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Körperliche Verfassung:		

# Every Name Counts

Creating an archive of records from the Holocaust is a vital step in preserving the memory of the victims of Nazi persecution in Europe.



## IMAGE CREDITS

Every Name Counts

## SUMMARY BY

Becky Rother

### CHECK IT OUT!

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

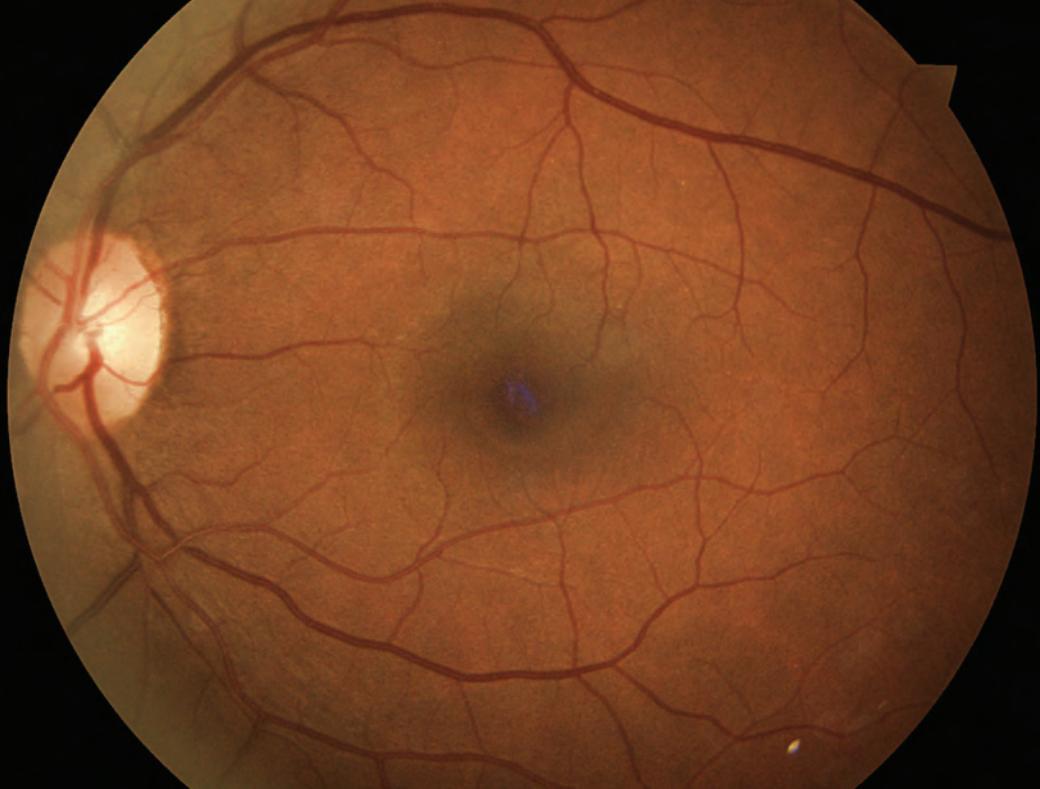
**2020 MARKS THE** 75th anniversary of the liberation of concentration camps in Europe after the Second World War. To commemorate this anniversary and connect students in Germany with first hand accounts, the Arolsen Archives, an international center on Nazi persecution, created Every Name Counts.

The Arolsen Archives holds the world's most comprehensive collection on the victims and survivors of the National Socialist (Nazi) Party. The collection has information on more than 17.5 million people and belongs to UNESCO's Memory of the World.

When COVID-19 forced the cancellation of in-person memorials and ceremonies, the Every Name Counts team were able to broaden their volunteer base from the initial 27 German schools to people

throughout Europe and the rest of the world. Through transcribing records, volunteers could study first-hand accounts and find a personal link to the fate of individuals, families, and places, building empathy and a personal bond to events that happened nearly a century ago.

Since the project's public launch in May 2020, volunteers have created or edited metadata from more than 900,000 documents. This will allow the Arolsen's digital archive to be searched and a new generation of scholars to unlock data from this period. Ø



# Eye for Diabetes

Images of the back of your eye can help detect warning signs of a variety of diseases. An algorithm is being trained to more accurately identify these signs.

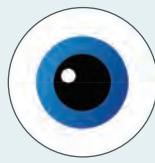


IMAGE CREDITS  
EyePACS

SUMMARY BY  
Becky Rother

CHECK  
IT OUT!

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

**WHAT CAN THE** back of your eye tell you about your blood glucose levels? For diabetics, sugar levels can get too high in the blood, causing tiny blood vessels in the brain to weaken and eventually leak. This can lead to complications such as dark spots in vision or – in extreme cases – blindness. This is called diabetic retinopathy.

Researchers in Belgium are seeking a way to identify diabetic retinopathy at an early stage to stop and possibly reverse its spread. To do so, images of the back of the eye are created through a process called digital retinal photography. In addition to diabetic retinopathy, the photographs also help optometrists identify glaucoma, macular degeneration, cataracts, and more. The images are often used as a baseline for further examinations.

Through Eye for Diabetes, these images will be used to create a computer model that can detect diabetic retinopathy sooner, helping doctors catch and treat the complication early on. In the project, Zooniverse volunteers mark dark areas that may indicate a microaneurysm or hemorrhage. The project was finished in March 2020, and researchers from the project are now using the resulting data to train an algorithm that will assist doctors in detecting signs of diabetic retinopathy earlier. Ø



# Fishing in the Past

By examining and identifying depictions of fish in historical works of art, researchers are learning about a myriad of related subjects.



**IMAGE CREDITS**  
Jacob van  
Hulsdonck, ca.  
1615, *Table laid with  
cheese, herring and  
ham*

**SUMMARY BY**  
Alejandro Sanchez

**CHECK  
IT OUT!**

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

**BETWEEN 1500 – 1850**, fish were a popular subject for European painters. By examining and identifying types of fish in works of art from this period, we can learn more about biodiversity and the history of our culture.

The Fishing in the Past team seeks to link the occurrence of fish species in paintings with their commercial purpose and to learn what kind of fish species inspired artists back then.

Zooniverse volunteers can help the Fishing in the Past research team by examining paintings with fish in over 2,000 pieces of art from the two major art institutions in the Netherlands: Rijksmuseum and RKD Institute of Dutch painters. The annotations can help the research team understand the distribution of fish in Europe,

commercial use, study fish consumption of the time, and even learn about species that are now extinct.

With more than 2,200 volunteers, the Fishing in the Past team has been able to classify the thousands of artworks that will contribute to the understanding of fish biodiversity in Europe.

By joining them, you can not only enjoy looking at artworks from the 16th — 19th centuries in Europe, but also help understand the historical relationship between humans and fish. ☘



# FISHstory

A photo from a fishing trip can bring to mind a nice day on the water, but a collection of images documenting catches can also help understand historical fish populations.



**IMAGE CREDITS**  
Rusty Hudson;  
Hudson, Stone, and  
Timmons Families;  
FISHstory

**SUMMARY BY**  
Aleksandra  
Kuznetsova

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

**WHILE THE SOUTH** Atlantic Fishery Management Council (SAFMC) currently relies on many dedicated monitoring programs of contemporary fish populations to inform management decisions, getting accurate fish counts from the past requires a little more creativity.

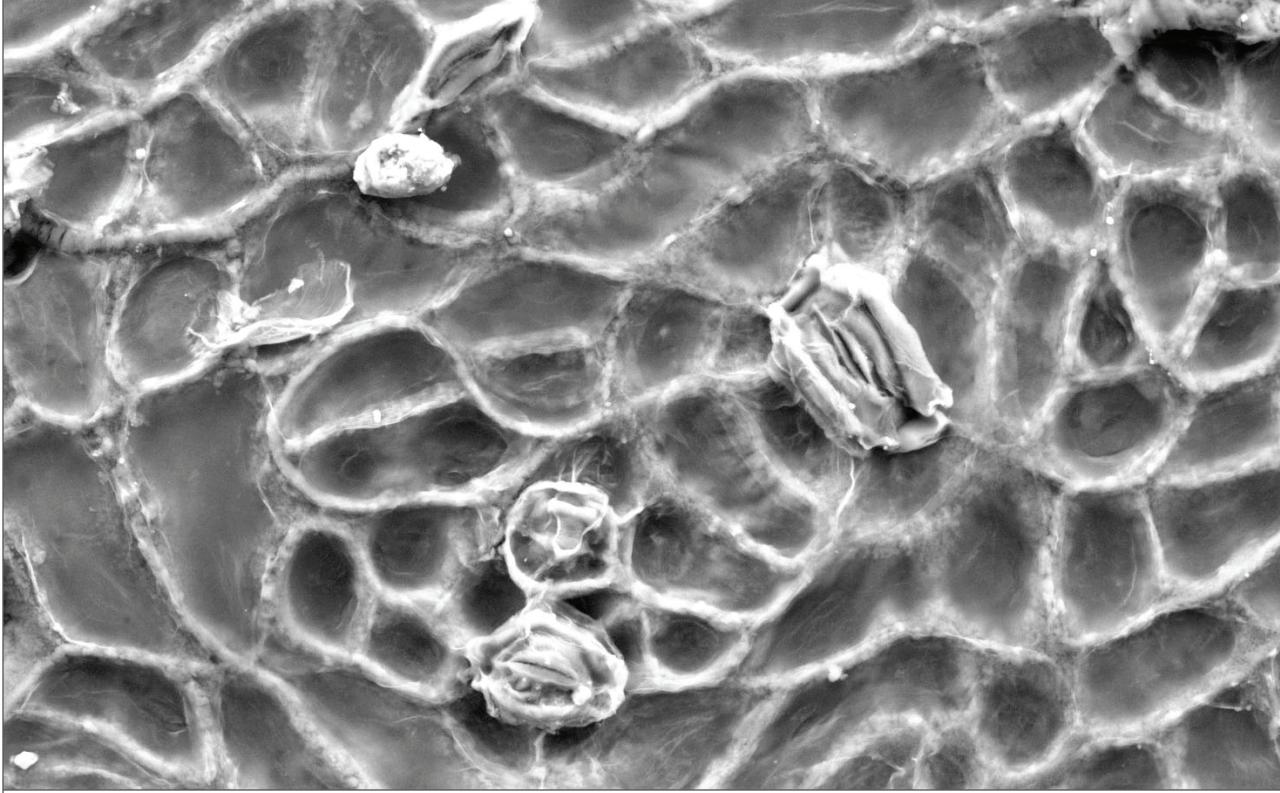
With the FISHstory project, researchers for the SAFMC's Citizen Science Program can get an idea about historic catches and stock productivity from periods in which there was limited formal documentation. Photos to document daily catches made during chartered fishing trips popular in the mid-20th century can help fill in gaps in the data.

A local fisherman, Rusty Hudson, who worked out of Daytona Beach, was

instrumental in recognizing the value of these photos as historical and scientific records and provided the collected photographs from his family's fishing fleet to the FISHstory project.

A delightful blend of public history and scientific data, the photos analyzed by Zooniverse volunteers show the importance of fishing to coastal communities in the South Atlantic. Participants tag and identify fish species in the shots of fisherman proudly posing with their catches on display.

The data collected will help tell the story of fishing along the Atlantic coast of Florida and help scientists understand the distributions of common fish populations and their catch statistics over time. ☘



# Fossil Atmospheres

Microscopic structures within the leaves of the Ginkgo tree contain an important clue towards investigating climate in Earth's past and planning for its future.



**IMAGE CREDITS**  
Fossil Atmospheres

**SUMMARY BY**  
Aleksandra  
Kuznetsova

**CHECK  
IT OUT!**

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

**GINKO BILOBA TREES** now line many urban sidewalks in North America, but these geologic mainstays have been around since the age of the dinosaurs, surviving three mass extinction events.

Like all plants, Ginkgo leaves contain tiny structures called stomata which help the plant exchange carbon dioxide and water with the surrounding air during photosynthesis. The percentage of cells on their leaves that are stomata, also called stomatal index, is known to be an indicator of the concentration of carbon dioxide in the atmosphere. With stomata visible in fossil and modern leaves alike, the Ginkgo's long tenure on Earth makes them good candidates for investigating environmental conditions in the past 300 million years.

The Fossil Atmospheres project, based in the Smithsonian Museum of Natural History, needs volunteers to identify and count stomata in images of Ginkgo leaves taken by a scanning electron microscope.

In addition to fossilized Ginkgo leaves, the Smithsonian also grows living Ginkgo trees under different experimental conditions by varying carbon dioxide concentrations in their environments. By comparing stomata numbers in living and fossilized Ginkgo leaves, scientists can infer a relationship between how many stomata correspond to a specific concentration of carbon dioxide. The efforts of volunteers will allow climate scientists to closely connect past climate and atmospheric conditions and make more accurate predictions of future environmental change.



# Hawk Talk

In a project generated through a collaboration between scientists and the bird cam community, researchers are listening to baby hawks to learn how birds grow up.



**IMAGE CREDITS**  
Photo by Cynthia Sedlacek;  
Illustration by Anna Rettberg

**SUMMARY BY**  
Aleksandra Kuznetsova

**CHECK IT OUT!**

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

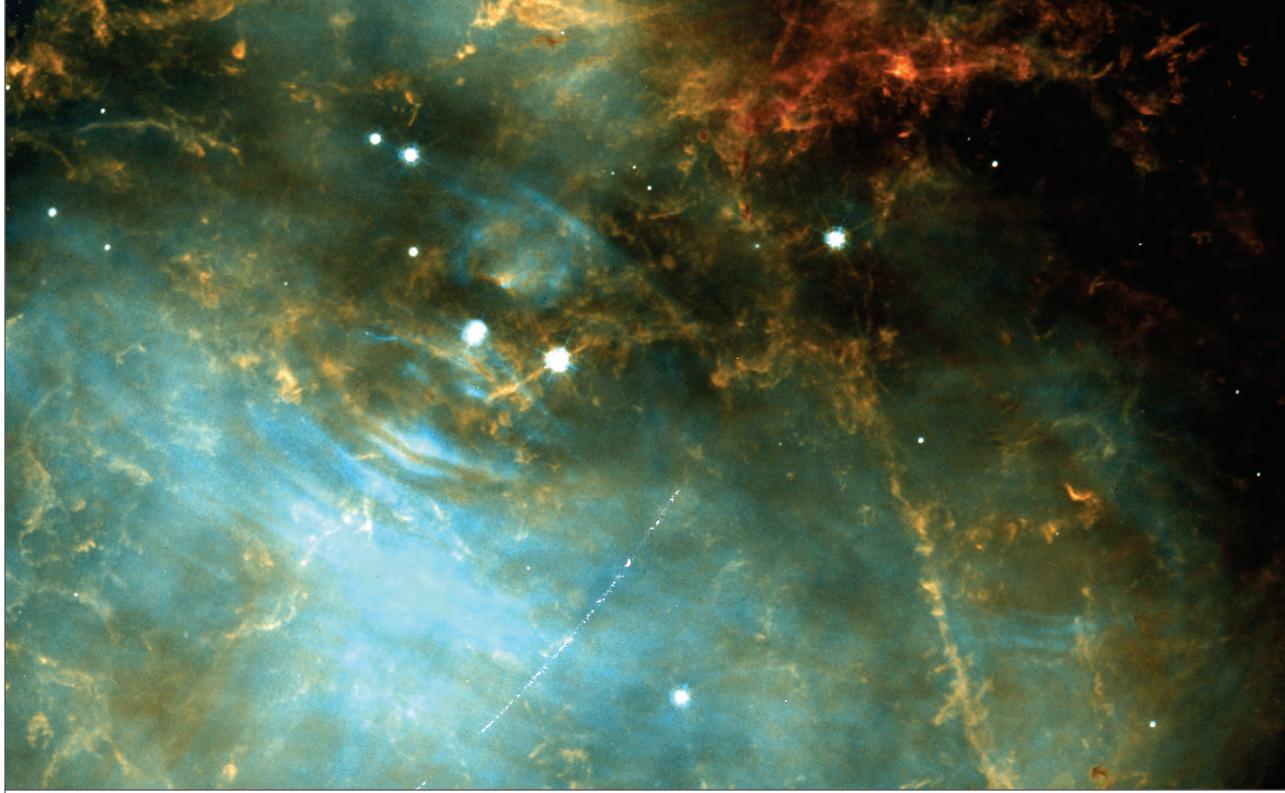
**THANKS TO THE** Bird Cams Lab at the Cornell Lab of Ornithology, viewers can watch birds via livestreamed camera footage of their nests. Communities of dedicated virtual bird watchers can tune in to see bird families grow up right before their eyes.

Before cameras were set up at a red-tailed hawk nest on the Cornell University campus, their vocalizations could only be heard from the ground or during nest checks. With a camera at the nesting site, the red-tailed hawks can be constantly monitored in a non-intrusive manner.

Viewers of the red-tailed hawk camera worked together with researchers to come up with the science question behind the Hawk Talk project. Watching and listening to hawks squawk, Bird Cams viewers were led to wonder

whether the hawks' vocalizations depended on the situation in the nest. Do baby hawks change their vocalizations over time as they get older? Do certain situations call for different kinds of peeps or chirps?

Watching 10-second video clips, volunteers identified which bird is on camera, what's going on in the nest, and what kind of noises are being made. By watching and cataloging what goes on in the daily lives of hawk families, Zooniverse contributors helped Bird Cam viewers and researchers find out more about how these birds communicate. ☀



# Hubble Asteroid Hunter

Through images from the Hubble Space Telescope in the pursuit of asteroid trails, astronomers are learning more about these remnants of planetary formation.



**IMAGE CREDITS**  
ESA/Hubble &  
NASA, M. Thévenot  
(@AstroMelina)

**SUMMARY BY**  
Aleksandra  
Kuznetsova

**CHECK  
IT OUT!**

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

**ABOUT 4.5 BILLION** years ago, the Solar System formed in a whirlwind of interstellar gas and rocky collisions. Today, we can see the leftover debris from the planet making process – asteroids – as they streak across telescope images.

Often considered to be the fossils of planet formation, asteroids are important subjects of study for astronomers. While space agencies like ESA and NASA like to keep an eye on where asteroids are headed, they are notoriously difficult to detect for many telescopes, as they are faint and fast-moving. Serendipitously, while looking out deep into the cosmos, the Hubble Space Telescope (HST) picks up trails of nearby asteroids as they

pass into the frame. With thousands of archival images to tag, the Hubble Asteroid Hunter team seeks to find more of these interplanetary photobombers with the help of Zooniverse volunteers.

By identifying trails of asteroids in these frames, Zooniverse participants help researchers narrow down which shots actually contain asteroids. The data from these images can be used to better predict future orbits of asteroids, determine whether they will ever get close to Earth, and even make brand-new discoveries of previously unknown asteroids! ☀

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**NOTE** The image above was created by Zooniverse volunteer Melina Thévenot. Color composition using HST ACS/WFC F550M and F606W filters.



# Invader ID

They live on boat hulls under the sea. Often found in these ‘fouling communities,’ marine invertebrates actually make up most of macroscopic ocean life.



IMAGE CREDITS  
Invader ID

SUMMARY BY  
Aleksandra  
Kuznetsova

CHECK  
IT OUT!

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

**MARINE INVERTEBRATES FLY** under the radar in many ways, often getting picked up by ships and other ocean vessels and transported as stowaways all the way around the world. Once at their new ports of call, many of these small creatures become invasive species, supplanting and competing for space and resources with native sea life. Researchers at the Smithsonian Environmental Research Center (SERC) launched Invader ID to figure out where these ocean critters are ending up after their lengthy sea voyages as a means of understanding how coastal communities are changing over time.

The project focuses on fouling communities: organisms like barnacles, sea sponges, and algae that usually live on the undersides of docks and ship hulls. Zooniverse volunteers identify

and tag these organisms from images of small PVC tiles placed in coastal waters for three months. With tiles collected from sites all over the world, including Alaska, Panama, Belize, Australia, and San Francisco Bay, participants can help researchers build an understanding of how marine invertebrates get around and how they affect coastal environments around the globe.

With this ambitious census of invertebrate interlopers, researchers hope to intervene before the new barnacles in town take over. ☀



Mac. 115.

McDonald, Donald (1831-1906) came from Canada and lived in the Herston dist. for over 40 years. He took up land there and also bought a section on the Lake Flat. He took various big building contracts in the Herston dist. marr. Harriett Hewson He d. at his home in Wood 13.7.06.

surv. by 3 sons. in Ch. Ch.  
a son lawyer in Eng.

daug. Flora marr. 21.5.98 T.W. Went: she went to live in Palm. North.

On the death of his wife he leased his farms to J. McClelland and went to live at Ch. Ch.

Eva Youngson - daug d. Orpington, Kent - 27.5.41 ag 58  
Ann Woods twin d. Port Pirie 20.12.09 ag 29.

OVER

LT. 21.7.06: 20.7.06:

# Macdonald Dictionary

What began as a personal project by a volunteer at a local museum has become one of the most-used public resources for family history in New Zealand.



**IMAGE CREDITS**  
Macdonald  
Dictionary

**SUMMARY BY**  
Becky Rother

**CHECK  
IT OUT!**

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

**FOR 13 YEARS** in the mid-20th century, farmer and local historian George Ranald Macdonald compiled the family histories of more than 22,000 New Zealanders who lived in the Canterbury region between 1850 and 1900. Macdonald used newspaper clippings, public records, and other information held at the Canterbury Museum to write over 12,000 handwritten index cards, which are now referred to as the Macdonald Dictionary. These cards contain not only names and relations but also information about local businesses, institutions, and daily life in Canterbury during that period.

The dictionary is held in the Canterbury Museum and can be accessed digitally through the museum's website. While the website is searchable by men's first or last names, researchers at the museum are seeking to transcribe the entirety of

the cards, expanding searchability to related women and children, as well as local businesses and other information included in the cards.

In the Macdonald Dictionary project, a collaboration between Canterbury Museum and the University of Canterbury's Digital Humanities program, volunteers transcribe the information on the cards in order to enhance the existing searchable database.

By expanding the database to include names of women and children, the project aims to provide a more authentic glimpse into the public history of Canterbury and bring new perspectives to the history of this region.



# Manatee Chat

Manatee Chat collects manatee vocalizations to better understand how these aquatic herbivores use sound to communicate.



**IMAGE CREDITS**  
Cetalingua Project

**SUMMARY BY**  
Will Granger

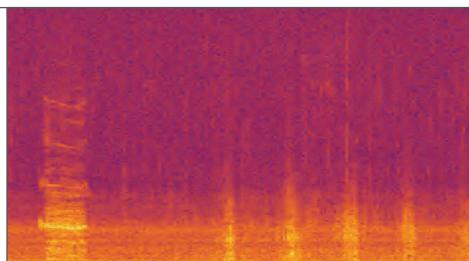
**CHECK  
IT OUT!**

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

**RESEARCH ON MANATEE** vocalizations is in its early stages, and scientists are just beginning to understand their form and function. Many researchers believe that manatees have a limited communication system and mainly communicate between mother and calf. Manatee Chat shows that manatees produce quite a diverse range of sounds, indicating that manatees are more social and more vocal than we once thought.

The goal of this project, sponsored by the Cetalingua Project, is to document those diverse sounds, from chewing to chirping, and create a catalogue of the results.

Since the project launched, thousands of volunteers have listened to short sound clips collected from the ZooTampa Manatee Hospital in Florida, and more



recently, from the wild manatees in freshwater and saltwater habitats. Using the sounds classified by volunteers, researchers with the Cetalingua Project will use the data to develop deep learning models to help identify new manatee sounds. They hope to create a system that can identify manatees' presence in a body of water and, potentially, identify individual animals. This would enable researchers to use this information to notify boaters of manatees' presence, and help reduce instances of boats colliding with manatees. ☀



HERBARIUM OF  
THE NEW YORK BOTANICAL GARDEN

Plants of UTAH

*Polygonum amphibium* L.

GARFIELD CO.: Aquarius Plateau, Dixie National Forest, Posy Lake, 15 miles north of Escalante. T. 34 S., R. 2 E., Sec. 17. Elevation 8,800 feet.

Common around edge of lake, rooted in water up to 4 feet in depth.

Pink inflorescence above surface.

Noel H. Holmgren 2425 August 11, 1965  
James L. Reveal

# Mapping Change

By studying over 100 years of specimens collected across the Great Lakes region, researchers plan to create an atlas celebrating Minnesota's biodiversity.



## IMAGE CREDITS

Mapping Change

## SUMMARY BY

Aleksandra Kuznetsova

## CHECK IT OUT!

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

**HOME TO THREE** of the world's largest terrestrial ecosystems, the upper Midwest is a valuable testing ground for understanding how climate shapes our environment.

The Bell Museum houses more than 1 million specimens of wildlife, plants, and fungi collected over the past 150 years in an area that encompasses Mississippi to the western Great Lakes region. These specimens represent more than a century of data on the species that make up the interconnected ecological systems in the region. With access to information about the specimens such as where they were collected and when, researchers are able to map the geographic extent of flora and fauna over time. Mapping the change in historical distributions allows researchers to understand the environmental conditions

of the past and predict how wildlife may be affected by future environmental and climate change.

By transcribing the handwritten labels of the specimens in this expansive collection, Zooniverse volunteers are aiding in the construction of the Minnesota Biodiversity Atlas, a publicly available resource of the many plant and animal species found in the Midwest. The atlas will be used to aid land managers and conservation planners in interpreting and planning for changes to ecological systems in the region. ☀



# Mapping Historic Skies

Throughout human history, the night sky has been full of stories. All around the world, people have crafted constellations from the stars.



**IMAGE CREDITS**  
Adler Planetarium  
Collections  
Department

**SUMMARY BY**  
Aleksandra  
Kuznetsova

**CHECK  
IT OUT!**

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

## NEARLY 4,000 REPRESENTATIONS

of the night sky spanning almost 600 years are part of the Adler Planetarium's collection of historical objects and works on paper. The Adler Collections team has digitized these constellation maps and depictions from all over the world.

With the Mapping Historic Skies project, a collaboration between the Adler Collections Department and Adler-Zooniverse teams, artistic representations of constellations throughout time are identified and collected so that any search for a particular constellation will be able to bring up all of its depictions.

Zooniverse volunteers mark and identify historic images of constellations among the records of stargazers of the past.

In addition to the traditional online version of this project, visitors to the Adler Planetarium were also able to submit classifications: this project was part of the *Chicago's Night Sky* exhibit, which opened in November 2019 and ran until the planetarium was closed in March 2020 due to COVID-19. Since that time, the project has moved back online and volunteers continue to submit classifications.

This work will enable access to all the artistic representations of a specific constellation in the collection, unlocking a treasure trove of astronomical images for art historians and historians of science alike.



# Maturity of Baby Sounds

There are more than 7,000 languages in the world, but over two-thirds of studies on language acquisition focus on English. What can we learn from other languages?



**IMAGE CREDITS**  
Maturity of Baby Sounds

**SUMMARY BY**  
Laura Trouille

**CHECK IT OUT!**

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

**OVER TIME, BABIES** generate increasingly complex sounds. But we don't know if this happens at a similar rate across languages because most studies have focused on English. And most studies on baby language have taken place in a lab setting, restricting scientists' ability to sample the rich linguistic diversity that exists.

Maturity of Baby Sounds addresses these questions. Data was collected from countries around the world, in North America and South America, Europe, Africa, India, Asia, and Oceania. Unlike many studies, rather than taking recordings in lab settings, babies wore small recording devices in their own home settings for 10 – 16 hours a day.

Through this project, Zooniverse volunteers listen to short audio clips

from these recordings and sort them into broad speech and emotional categories.

The team is using the data from Zooniverse to answer a few important questions: Do babies everywhere produce more speech and fewer crying sounds as they grow? Is the ratio of more versus fewer complex baby speech sounds the same regardless of which language the baby is learning? For example, are there differences between children learning English versus a Pidgin language that has only 10 consonants, or a Khoisan language that has 100 consonants? Additionally, do changes happen at the same rate in children at risk of language impairment? Ø



# Measuring Giraffes

By marking the height of giraffes in Tanzania and Kenya, researchers are able to discover factors that lead to healthy wildlife, better aiding conservation efforts.



**IMAGE CREDITS**  
Measuring Giraffes

**SUMMARY BY**  
Will Granger

**CHECK  
IT OUT!**

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

**MASAI GIRAFFES** ARE native to Tanzania and Kenya, but over the past few decades their numbers have declined by over 50 percent. To counter this, the Wild Nature Institute, in collaboration with Microsoft AI for Earth, launched Measuring Giraffes, a large-scale project focused on tracking giraffe populations in a 25,000 square kilometer area in the Tarangire and Serengeti ecosystems.

Measuring Giraffes asks volunteers to mark giraffe keypoints that are used



to measure heights, such as the tip of the animal's horn-like tuft of hair and the bottom of the hoof. These data, in combination with giraffes' unique fur patterns, enable researchers to track how individual giraffes grow and progress. Ultimately this project will help researchers better understand which factors contribute to a healthier environment and inform conservationists on how to help reverse the trend of a declining population.

Early results have proven successful and are allowing researchers to better estimate giraffe height in different areas of the ecosystem. Aside from Measuring Giraffes, the Wild Nature Institute also spearheads grassroots initiatives in environmental education and anti-poaching efforts to ensure the future of wildlife in the savanna. ☒



# Michigan ZoomIN

Michigan ZoomIN captures candid shots of urban and rural wildlife, offering a unique glimpse at some of the animal communities with whom we share our habitats.



## IMAGE CREDITS

Michigan ZoomIN

## SUMMARY BY

Aleksandra Kuznetsova

## CHECK IT OUT!

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

**WHILE HUMANS MAY** have changed the Michigan landscape and climate, the native wildlife hasn't necessarily left the neighborhood.

The Michigan ZoomIN project, led by the Applied Wildlife Ecology (AWE) lab at the University of Michigan, seeks to find out more about how our animal neighbors are adapting to our presence. Michigan wildlife like coyotes, wolves, and deer have natural predator-prey relationships whose rhythms affect their entire ecosystems.

Zooniverse volunteers can look out for all sorts of wild mammals and birds: common sights such as wild turkeys, opossums, squirrels, and domestic cats, but also the occasional elusive outdoor denizen such as moose and porcupines.



Identifying critters in the camera footage helps map the distribution and activity times of animals in different regions. With cameras throughout Michigan – from Detroit City Parks to the Upper Peninsula – the Michigan ZoomIN team hopes to understand how varying environmental conditions and levels of human disturbance affect animal communities. ☘



New York, n.y.

My dear Mr. Welles;

Please do not be disturbed  
at the welter of abuse following your broadcast  
of The War of the Worlds. Bear in mind  
that the reaction to it was chiefly due to the  
fact that it was superbly well done. I had  
read the book long ago and yet was scared to  
death at the broadcast since we tuned in  
after the preliminary announcement! The  
surrounding world looked a lot better to me

# My Dear Mr. Welles

Orson Welles' 1938 radio broadcast of 'War of the Worlds' elicited reactions across the country as the faux news report painted a terrifying picture of invasion.



**IMAGE CREDITS**  
The Screen Arts Mavericks and Makers Collection at the University of Michigan Library

**SUMMARY BY**  
Aleksandra Kuznetsova

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

**ON OCTOBER 30, 1938**, listeners tuned into a radio broadcast and heard reports of a Martian invasion in the Northeastern U.S. Nearly 1,350 letters sent in the aftermath capture the mix of emotions in reaction to the now infamous "War of the Worlds" broadcast.

The 1938 broadcast is best known for reports of public panic as listeners who tuned in mid-broadcast heard what sounded like a real-time alien invasion. Heavily sensationalized in newspapers at the time, the fan and hate mail received at Orson Welles' Mercury Theater offer a unique glimpse into the real reactions of those who wrote in. The letters provide a more expansive view of public reception to the broadcast, offering unique perspectives and personal stories. From congratulating Mr. Welles on a well-adapted play to

demanding compensation for a panicked long-distance phone call to a sibling in Philadelphia, a fascinating glimpse into American history lies within.

In spring 2020, Zooniverse participants transcribed the full set of letters held at the University of Michigan Library's Screen Arts Mavericks and Makers collection, making these primary sources about this significant media event accessible to researchers, students and the public online. Ø



# Nest Quest Go!

'Like a grosbeak with a seed, take a good crack at unearthing the secrets contained within the nests of these songbirds!' – *Nest Quest Go: Grosbeaks! rallying cry.*



## IMAGE CREDITS

Nest Quest Go!

## SUMMARY BY

Laura Trouille

## CHECK IT OUT!

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

**A TREASURE-TROVE OF** bird history is stored within the Cornell Lab of Ornithology second-floor archives. For over 30 years, from the 1960s through the early 2000s, citizen scientists provided more than 300,000 completed nest record cards, including details on the nest site, clutch size, hatched young, fledged young, competitors, disruptive activities, and more.

Valuable scientific questions can be asked and answered regarding the nesting behavior of birds over time through digitizing, transcribing, and analyzing these historical records. A major goal of Nest Quest Go! is to learn more about how nesting bird behaviors and bird populations are changing over time in order to better understand the challenges facing birds now and into the future.

Nest Quest Go! consists of many Zooniverse projects under one organizational umbrella; each project focuses on a different bird species or collection of species.

Since its launch in July 2019, thousands of volunteers have completed more than 3 million transcriptions on more than 50,000 cards across 22 different Nest Quest Go! projects. These volunteers are helping to establish a robust baseline for bird nesting behaviors and population trends and are bringing new discoveries to light using these previously hidden datasets. Ø



# Planet Four

Weather patterns on Mars cause changes in features on the surface of the planet. By tracking these patterns, scientists can learn more about the Martian climate.



**IMAGE CREDITS**  
Planet Four

**SUMMARY BY**  
Aleksandra  
Kuznetsova

**CHECK  
IT OUT!**

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

**EVERY SPRING IN** the Martian polar regions, carbon dioxide jets burst from the ice. Carried by the wind, eroded dust and dirt spreads in fan-like shapes and are seen by the camera aboard the Mars Reconnaissance Orbiter.

This otherworldly seasonal phenomenon has no counterpart on Earth, though seasonal melting and winds are thought to be the major architects of the Martian landscape. Planetary scientists infer that the size and direction of the fans dotting the polar landscape depend on the winds and weather conditions on the surface of the planet.

The High Resolution Imaging Science Experiment (HiRISE) camera on board the orbiter takes detailed images as it continuously orbits the planet, crossing the poles regularly. With years of images

to analyze, scientists can figure out how weather and surface conditions on Mars change over time and learn about the climate of one of our nearest planetary neighbors.

By marking and measuring surface features across the thousands of available images, Zooniverse volunteers have identified nearly 400,000 seasonal fans in the south polar region. This immense catalog helps provide invaluable data for scientists to model the climate and weather patterns on Mars. ☀



vegeta entre os rochedos graníticos  
do deserto de pedra grande o fructu-  
tou ai vés, ate seis gomos Conus  
ou em maio a V. Sota; parece se  
desgajou o fructo e não sei se não

## Plant Letters

In the 19th century, botanists, scientists, and amateur naturalists alike advanced the field of botany through correspondence.



### IMAGE CREDITS

Plant Letters

### SUMMARY BY

Becky Rother

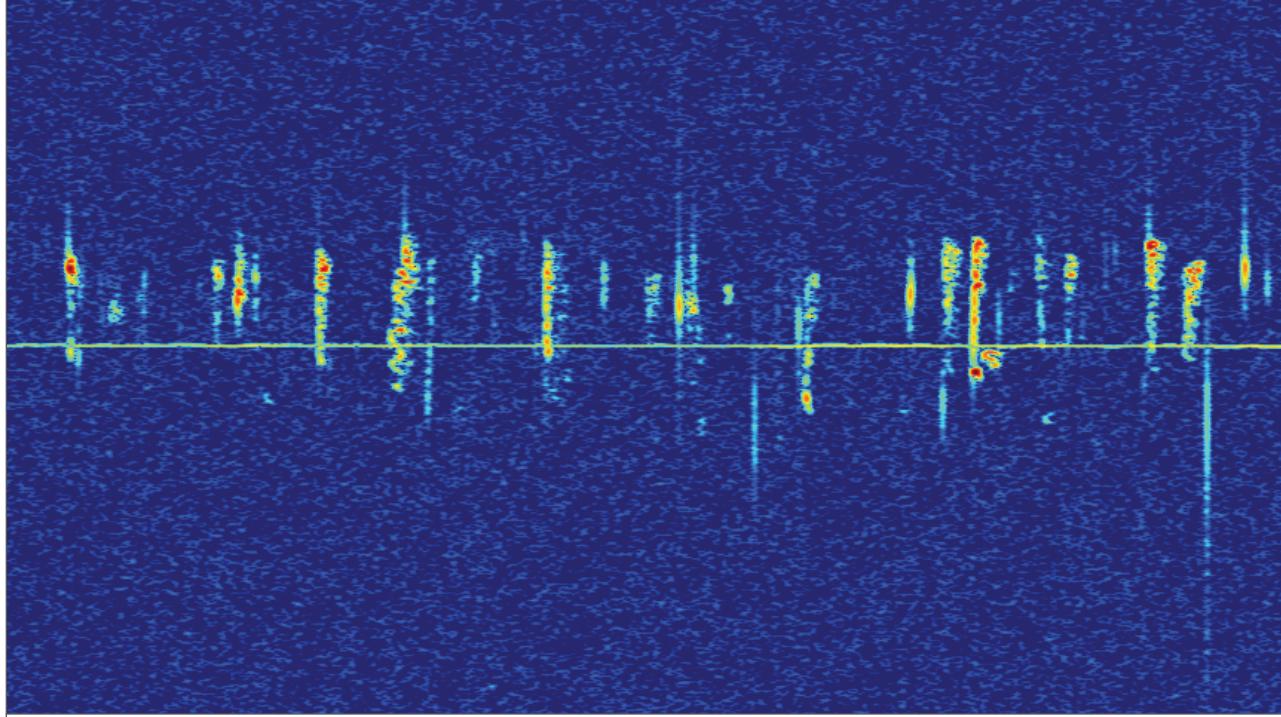
### CHECK IT OUT!

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

**WHEN YOU FIND** an interesting plant in nature, how do you identify it? Today, you might turn to the internet, but in the 19th century, one option was to send a sample or illustration to a botanic garden along with relevant information like the location and time of year it was found, and hope to hear back.

The Life Sciences Department of the University of Coimbra in Portugal safeguards almost 5,000 such letters addressed to the directors, gardeners and other collaborators of the Botanic Garden. Written in Portuguese, English, French, and other European languages, these letters are from academics and non-academics alike and contain valuable information about the growth and history of plant species in the 19th and 20th centuries.

In order to unlock the data within the letters, the UNESCO Chair in Biodiversity of the University of Coimbra, the Centre for Functional Ecology and the Botanic Garden of the University of Coimbra created Plant Letters, asking volunteers to transcribe the letters, postcards, and other ephemera. Using the data from this project, researchers will be able to track historical plant species locations, distribution records, and abundance; learn about plant and seed exchanges of the time; and trace networks of botanical knowledge around the world. ☒



# Radio Meteor Zoo

Patterns in meteor echoes show evidence of meteoroids entering Earth's atmosphere, helping astronomers study the creation of our Solar System.



**IMAGE CREDITS**  
Radio Meteor Zoo

**SUMMARY BY**  
Becky Rother

**CHECK  
IT OUT!**

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

**WHEN A METEOROID** enters Earth's atmosphere, it is typically travelling at high speeds and burns up before it reaches the planet's surface. During its fiery entry, it leaves behind a trail of ionization, which can reflect radio waves and be detected as echoes.

A meteor shower like the Perseids shower occurs when the Earth is crossing the orbit of a comet resulting in a large increase of meteors, some visible to the eye and many more visible only through ionization echoes.

Across Belgium, receiving stations have been set up to record these meteor echoes using radio signals from a dedicated transmitter. This network, known as Belgian RAdio Meteor Stations (BRAMS), runs continuously since radio waves can be recorded regardless of

weather or time of day. As a result, there is a huge amount of data to sift through: more than 8,000 images are created every day.

In the 10 years since BRAMS has been active, programmers have created algorithms that detect single, sporadic meteor echoes. However, meteor showers pose a different challenge: because there are so many meteor echoes with complex shapes contained in the image, the best way to identify meteors remains the human eye. Radio Meteor Zoo was created to leverage the power of the crowd to assist researchers in this identification task. ☒

**60**  
galway.

Cregg Park  
5 Jr. m. fro near Gort, and 10 Jr. m. fro Ennis.  
Robt. Jn. Lattey. Co. Galway

5 in + Ground 3ft. Sea Level 130ft.  
Shannon, R. bank - 5.

YEAR --	1860	1861	1862	1863	1864	1865	1866	1867	1868	1869	MEANS.
January --					2.23	4.23	6.79	3.49	3.27	4.09	
February --					1.98	3.38	3.28	4.10	3.46	3.99	
March -- -					3.10	2.58	2.85	3.09	4.08	2.04	
April - - -					1.35	1.32	1.42	3.95	2.45	2.87	
May - - - -					2.07	3.44	1.41	4.55	2.25	3.97	
June - - - -					2.45	1.75	2.17	1.47	.80	1.43	
July - - - -					1.17	5.66	1.54	2.31	1.27	1.80	
August - - -											

# Rainfall Rescue



**IMAGE CREDITS**  
Rainfall Rescue,  
National  
Meteorological  
Archive

**SUMMARY BY**  
Samantha  
Blickhan

**CHECK  
IT OUT!**

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

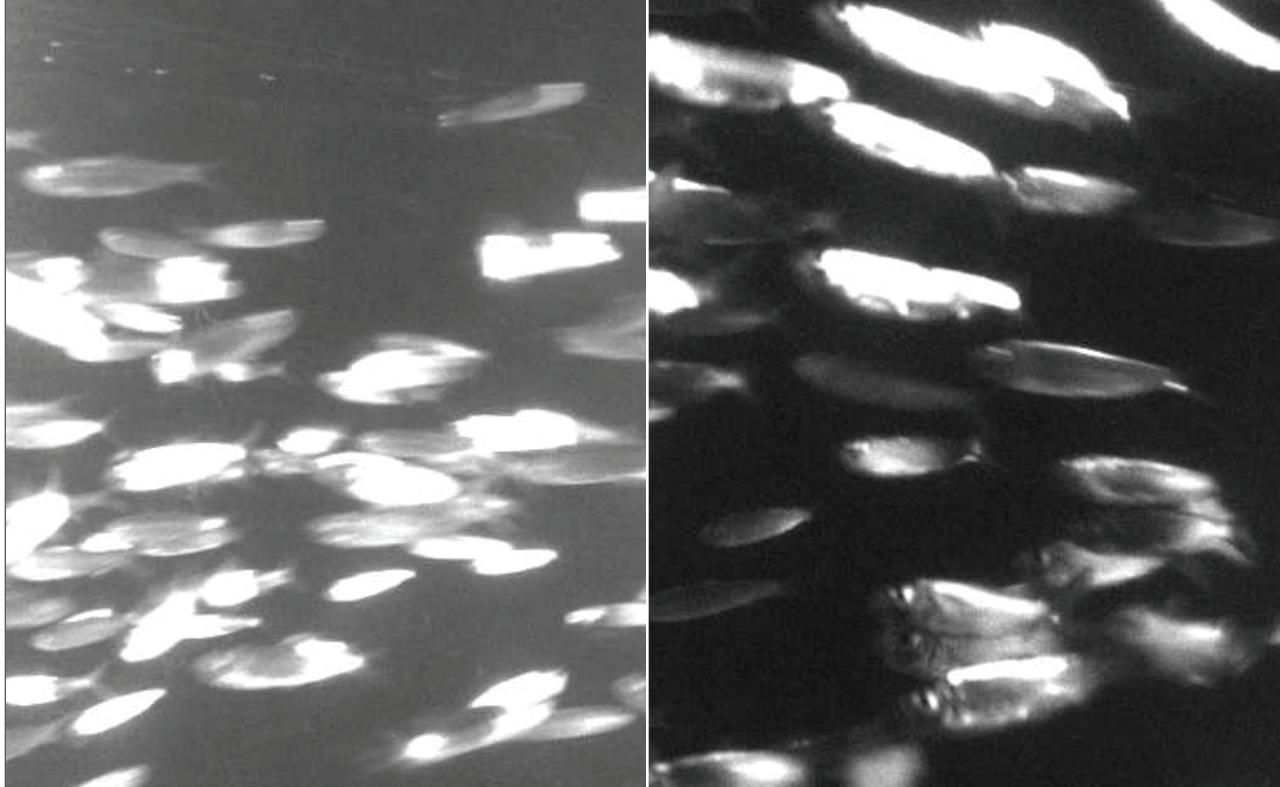
By transcribing historic, handwritten rainfall records, climate scientists are unlocking answers to questions about our weather and changing climate.

**RAIN GAUGES HELP** scientists map out variations in rainfall from month to month. While there are currently robust digital records from the 1960s to the present, pre-1961 records have not yet been digitized.

Rainfall Rescue invited volunteers to help transcribe these handwritten paper records to transform them into accessible, digital resources that can be used to track weather data over time. The aim is to better understand wet, dry, and normal periods in our history and help water companies plan for every eventuality. More data will help

researchers to map out the variations with much greater precision.

Rainfall Rescue launched on March 25, 2020. In only a matter of weeks, 16,000 volunteers transcribed all the data from 66,000 pages, producing 5.28 million measurements covering 1677 to 1960. ☒



# Run, Herring, Run!

Born inland in freshwater lakes and ponds, juvenile herring undergo a long journey to the ocean, where they'll live out their lives before returning to spawn.



**IMAGE CREDITS**  
Run, Herring, Run!

**SUMMARY BY**  
Aleksandra  
Kuznetsova



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

**KNOWN AS THE "fish that feeds all,"** river herring have been a valued food source for Native American communities in North America. Alternatively called "the potato chip of the ocean," the river herring is also a consistent part of the diet for many marine and freshwater predators like bass, cod, and various seabirds.

Splitting their time between freshwater lakes and ponds and the ocean, river herring play a part in both ecosystems and aid in the transport of nutrients between lakes and oceans. Despite the river herring's ubiquity, scientists don't know exactly what environmental conditions trigger their migration toward the ocean.

The research team behind Run, Herring, Run! has set up cameras along the

Monument River in Massachusetts to capture river herring as they head out to sea. Because river herring make their journeys in the nighttime, the team uses special cameras to register their appearance as silvery silhouettes in the inky water.

Zooniverse volunteers tag the river herring as they cross into the frame. With accurate counts and studies of river herring during their freshwater stages, scientists can aid conservation efforts as they learn more about the river herring's life cycle. ☒



WINGSCAPES



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22 DEC 2017 01:26 pm

# Skink Spotter

This project aims to predict how climate change will affect the behavior – and chance for survival – of New Zealand's skinks.



**IMAGE CREDITS**  
Skink Spotter,  
inset by  
Vanitha Elangovan

**SUMMARY BY**  
Laura Trouille

**CHECK  
IT OUT!**

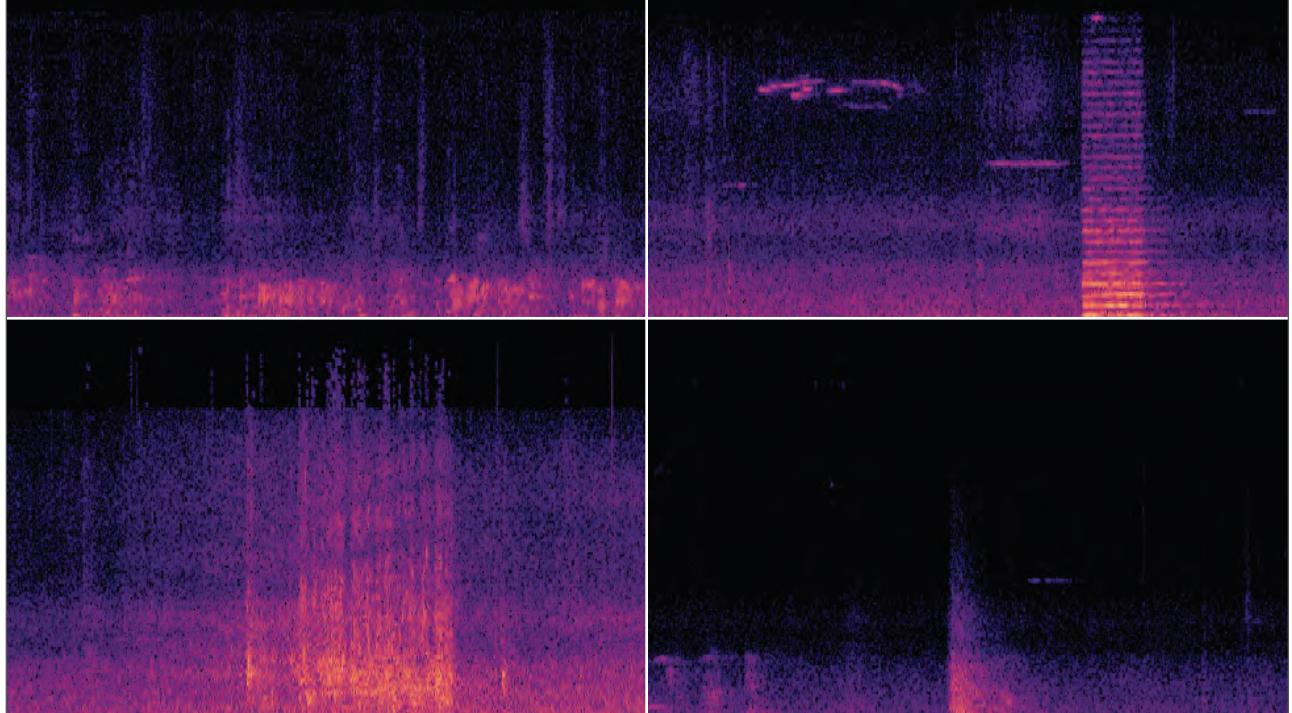
Check here when  
you've made a  
classification  
to this project.

**SKINKS ARE AMONG** the most charismatic of lizards. New Zealand is home to a tremendous variety, with more than 60 species of skinks. Unfortunately, many are endangered, further threatened by introduced predators, continued habitat loss, and the climate crisis.

Skinks are highly sensitive to temperature: whether they are too warm or too cold leads to increased hours of restricted activity in which they are unable to seek food or defend their territory. Researchers at the Department of Zoology (Te Tari Mātai Kararehe) at the University of Otago in Dunedin, New Zealand, created Skink Spotter to explore how air temperature, wind and clouds work together to affect how warm skinks can get, and how often they can be active.



Through Skink Spotter, volunteers flag the presence or absence of skinks in time-lapse footage recorded from within the Otago skink habitat. The research team will use this information, coupled with future climate projections, to model how skink activity will change over the next decades, and whether this change will make them more vulnerable to extinction. ☒



# Sounds of NYC

New York City has a reputation as a brash, bustling metropolis. By identifying sources of loud street sounds, researchers hope to help New Yorkers get some rest.



IMAGE CREDITS  
Sounds of NYC

SUMMARY BY  
Aleksandra  
Kuznetsova

CHECK  
IT OUT!

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

**NOISE POLLUTION IS** one of the biggest quality-of-life concerns for residents of New York City, but finding out what exactly is making all the racket can be quite a challenge.

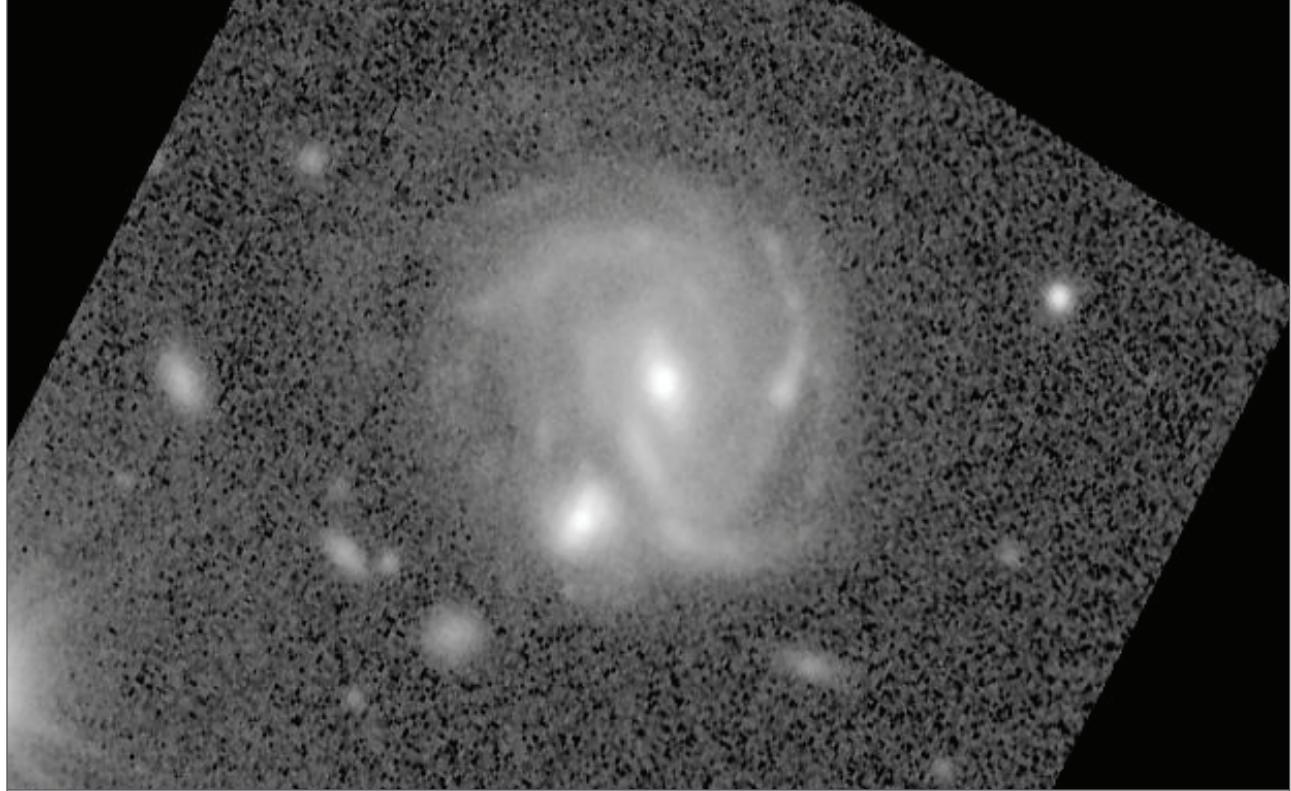
It has been estimated that nearly 90 percent of adults in New York City are exposed to street noise levels at an average of 73dB, well beyond the limit of what the EPA considers to be harmful, 55dB. When applied to U.S. cities of more than 4 million inhabitants, such estimates extend to over 72 million people.

With many different sources of noise, decoding the city's unique acoustic landscape will take the combined efforts of humans and machines. The Sounds of New York City project (SONYC), a joint initiative between scientists at New York

University and The Ohio State University, monitors and analyzes urban noise sources.

By listening to short audio clips taken at monitoring stations throughout the city, Zooniverse volunteers identify and tag individual noises. These identifications will be used to help train computer algorithms to detect and classify noise sources in audio recordings and aid in civic noise mitigation efforts.

By listening in, volunteers can help bring about a little more peace and quiet for city dwellers. ☒



# Spiral Graph

What is the connection between a galaxy's spiral arms and the size of the black hole at its core? By identifying interesting galaxies, astronomers hope to find out.



**IMAGE CREDITS**  
Spiral Graph

**SUMMARY BY**  
Becky Rother

**CHECK IT OUT!**

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

**SPIRAL GALAXIES COMPRIZE** about 70 percent of the galaxies in the local Universe. This class of galaxy can be identified by – as the name suggests – spiral arms branching out from the center of the galaxy. Every galaxy is unique in terms of how tightly wound its spiral arms are. This characteristic is referred to as “pitch angle.” Astronomers have found interesting correlations between pitch angle and key galaxy characteristics like the mass of the central black hole, total stellar mass, and dark matter content.

Automated algorithms need human assistance to accurately measure a galaxy's pitch angle. The North Carolina Museum of Natural Sciences Spiral Graph project asks Spiral Graph volunteers to do just that: trace over the spiral arms in images from the Dark



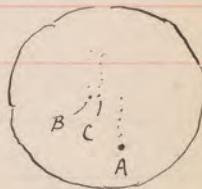
Energy Camera Legacy Survey (DECaLS) to guide the algorithms in providing robust pitch angle measurements. The research team uses these results to then identify interesting galaxies to follow up with other telescopes, like galaxies hosting intermediate mass black holes at their center, which are more difficult to find through other methods. Ø



March 29, 1917  
 Scales to be cut from MC 12670, (Praesep)  
 8 Exposures of 5°, 8, 15, 30, 60, 120, 240, 480°  
 (Identified on MC 12669)

Two scales marked for Measuring Machine,  
 one of which is to be sent to Prof. Chant.

A = $2m + 20^{\circ} 21' 78$	Numbered 0 to 6
B = $+21^{\circ} 18' 91$	" 4 " 11
C = " "	" 7 " 14



# Star Notes

Women astronomers at Harvard College Observatory played an important part in major astrophysical advances throughout the 19th and 20th centuries.



**IMAGE CREDITS**  
Star Notes

**SUMMARY BY**  
Aleksandra  
Kuznetsova

**CHECK  
IT OUT!**

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

**BEGINNING IN THE** late 19th century, teams of women astronomers at the Harvard College Observatory analyzed some of the first photographs of the known Universe, setting the foundation for our understanding of the cosmos.

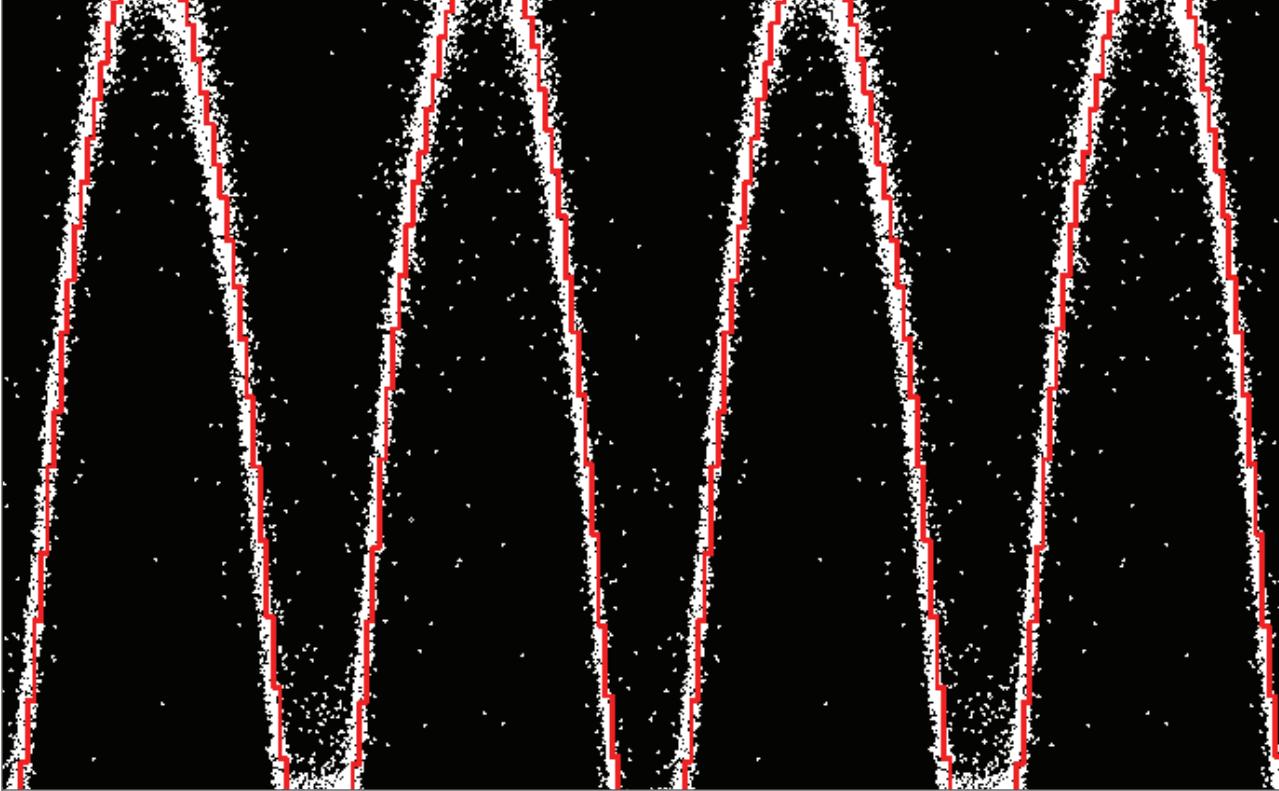
Today, Project PHaEDRA (Preserving Harvard's Early Data and Research in Astronomy) wants to tell their stories. Over 2,500 logbooks and research notebooks written by women employed as "human computers" are now being digitized and transcribed in the hopes of ensuring access to the original research and data behind major astrophysical advances of the early 20th century.

The Star Notes project is an initiative by the Wolbach Library at the Harvard-Smithsonian Center for Astrophysics that aims to connect the research notebooks

of early women astronomers like Annie Jump Cannon, Williamina Fleming, Adelaide Ames, and Dorrit Hoffleit to the 500,000 glass plate photographs in the Astronomical Photographic Plate Collection that represent the subjects of their work.

Looking through the original handwritten research notebooks, Zooniverse participants find and transcribe the identifying plate numbers.

By connecting the notebook records to the plates, the research and history behind thousands of the earliest photos of the known universe can be unlocked and credited to the original researchers, linking the history of modern astrophysics to over 100 years of previously unattributed astronomical observations.



# SuperWASP Variable Stars



**IMAGE CREDITS**  
SuperWASP  
Variable Stars

**SUMMARY BY**  
Aleksandra  
Kuznetsova

**CHECK  
IT OUT!**

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

Stellar observations lay the foundation for modern astrophysics: by measuring stellar properties and classifying stars, astronomers have mapped our galaxy, determined the chemical makeup of the Universe, and told the origin story of the Milky Way.

**STUDYING STARS IS** how astronomers learn about our place in the Universe. Using stars, astronomers learned to be connoisseurs of light. The color, intensity, and variation of light from stars can tell epic stories of celestial goings-on spanning millions and billions of years.

Variable stars have fluctuations in the amount of light we receive over time, and the rhythms of these changes can be used to determine their properties.

Sometimes, it is pulsating stars that are expanding and contracting, their changes in brightness driven by acoustic harmonics within. Other times, eclipsing binary stars – two stars locked in an

orbital dance – are the ones producing dips in light as they pass in front of each other. And sometimes, the shifting brightness in light does not match a well-known pattern and hints at something never seen before.

The SuperWASP Variable Stars project aims to classify stars by their light curves – plots of the stellar brightness over time. Volunteers look through light curves from a survey of the entire night sky, classifying the patterns in the changes of their brightness, thus helping scientists determine what kind of celestial objects are flickering in the night. ☺



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# Taranaki Mounga

Taranaki Mounga, or Mount Taranaki, located on the west coast of the north island of New Zealand, is affected by many invasive species introduced to the mountain by colonizers, and now its citizens are trying to restore the native flora and fauna.



**IMAGE CREDITS**  
Taranaki Mounga

**SUMMARY BY**  
Alejandro Sanchez

**CHECK  
IT OUT!**

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

**TARANAKI MOUNGA IS** considered by Māori communities of New Zealand to be a living and pivotal component of their culture. European colonization introduced many invasive species to the mountain, but native communities are now trying to restore the original ecosystem.

The Taranaki Mounga research team, along with the Department of Conservation (DOC), eight Taranaki *iwi* (Māori communities) and philanthropic investor NEXT Foundation, is seeking to secure the Mounga against animal and weed pests, restore and strengthen native species, and build community support and commitment to ensure the transformational changes are valued and secure for the long-term. Their ultimate goal is to free the Mounga by 2050 from predators like wild goats, weasels, stoats,

possums, and rats so that native birds can proliferate once again.

Zooniverse volunteers from all around the world help classify and identify animals captured by the wildlife cameras, helping the Taranaki Mounga team to estimate population levels of predator species in contrast with native wildlife and to establish a baseline to inform evidence-based decision making.

Since the Taranaki Mounga team launched this project, volunteers have made over 60,500 classifications, and with your help, the team will make more and will be able to save this awesome ecosystem which is so important for native New Zealanders. ☺



11 William 7 issue.

a x = cs 86R; 50; 158; 131; 81; 116; 71; 1

b e + epenthetic i > ei:ssire > éissir 86R

c past participle of this verb issu proba  
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Developed hypothetically it might  
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# Transcribe Cooper

Would you like to take a closer look at the life of an early 20th century scholar?  
Transcribe Cooper explores the personal documents of Anna Julia Cooper.



IMAGE CREDITS  
Transcribe Cooper

SUMMARY BY  
Mattie Williams

CHECK  
IT OUT!

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

**BORN INTO SLAVERY**, Anna Julia Cooper was revolutionary for her time. She was a civil rights activist and educator who challenged the Jim Crow laws for education and wrote the famous feminist book, "A Voice from the South by a Black Woman of the South." By transcribing letters, notes, manuscripts, and even poetry, Transcribe Cooper strives to learn more about the life of this incredible woman.

As part of the team's ongoing efforts to #CiteBlackWomen and #TranscribeBlackWomen of the 19th century, Transcribe Cooper was the featured project for the 2020 Douglass Day Celebration. During the celebration on February 14, people gathered at 75 simultaneous events around the country to engage with Black history and transcribe Cooper's papers.

After just two months, all documents in the Transcribe Cooper project on

Zooniverse were fully transcribed. There is still more to come: many documents in the collection are waiting to be added to the site.

Partners on the project include the Moorland-Spingarn Research Center at Howard University, the Center for Digital Humanities at Princeton University, Penn State University Libraries, Penn State's Center for Humanities and Information, and the Penn State College of the Liberal Arts.

The Transcribe Cooper team's goal is to recover lost or buried Black intellectual history and to make Cooper's work accessible to a wider public. Anna Julia Cooper was a very important figure in history but she is still unknown to many. Transcribe Cooper is one step closer to elevating an important voice in Black history. ☀



# University of Wyoming Raccoon Project

Just how smart are raccoons? University of Wyoming researchers hope to find out what it takes to outsmart these crafty urban residents.



**IMAGE CREDITS**  
University of Wyoming Raccoon Project

**SUMMARY BY**  
Aleksandra Kuznetsova

**CHECK IT OUT!**

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

**AS URBANIZATION SPREADS** and human and animal habitats merge, some species, like the raccoon, have proven to be remarkably adept at adapting to their new environments. While many people who have had encounters with raccoons will attest to their cunning and problem-solving abilities, formal studies of raccoon cognition are rare. As part of the University of Wyoming Raccoon Project, researchers hope to understand

what kinds of raccoon behaviors aid in their adaptability as they figure out just what raccoons are capable of.

Camera traps around puzzle boxes monitor attempted night-time heists and allow researchers to keep track of how raccoons solve problems, but monitoring hundreds of thousands of camera images for raccoons is a big task. Zooniverse volunteers spot and tag raccoons (and other night time interlopers like skunks and foxes) in the images to help train computer algorithms to eventually automatically identify individual raccoons in the footage. Advances in raccoon recognition software will help researchers understand what makes raccoons able to learn, innovate, and adapt in a changing world. ☀





# Vintage Cuban Radio

*Universidad del Aire* was on the Cuban airwaves from the 1930s – 60s, featuring prominent Cuban thinkers discussing art, history, politics, and music.



**IMAGE CREDITS**  
Vintage Cuban  
Radio

**SUMMARY BY**  
Aleksandra  
Kuznetsova

**CHECK  
IT OUT!**

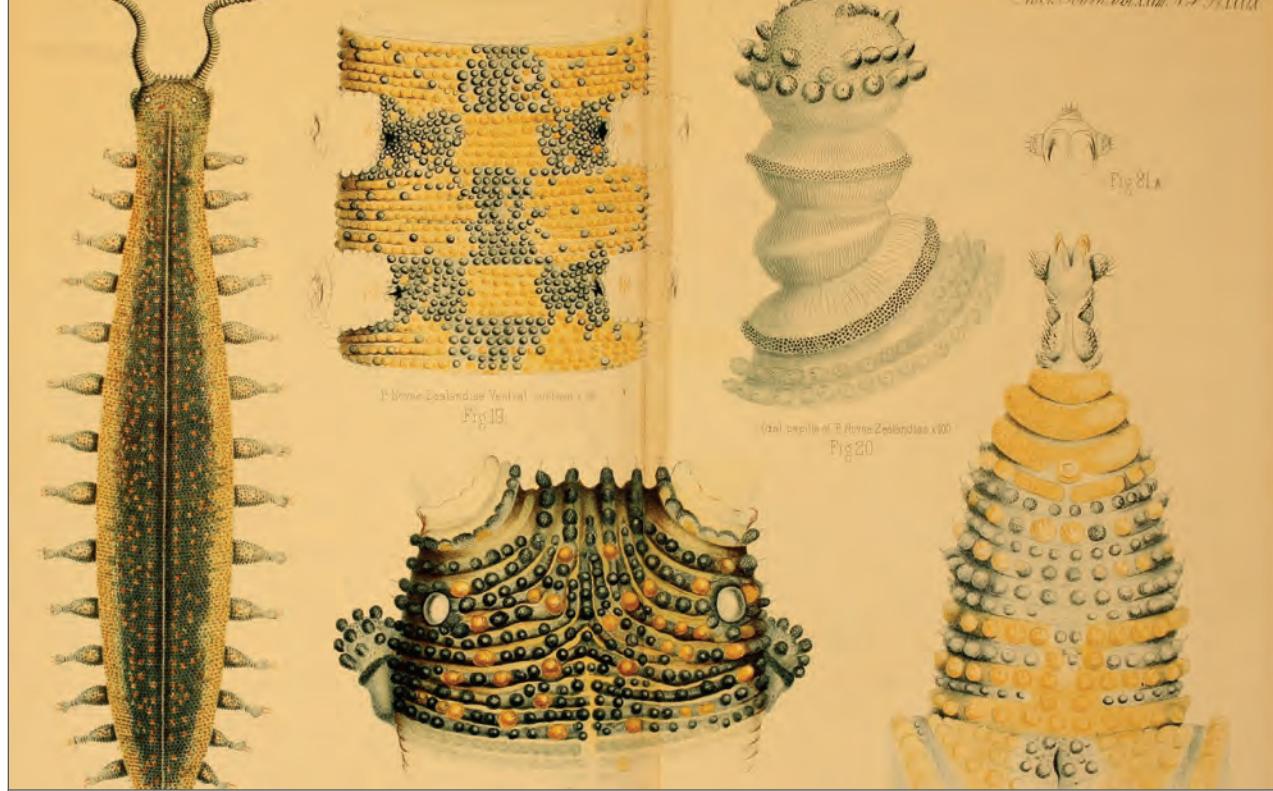
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you've made a  
classification  
to this project.

**UNTIL 2017, THE** only known recordings of *Universidad del Aire* (*University on the Air*) were held on fragile lacquer discs donated by Radio CMQ to the Instituto de Historia de Cuba (Institute of Cuban History, or IHC) in Havana, Cuba. Of interest to scholars of Latin American and Caribbean Studies around the world, the IHC aimed to provide access to these historical records. As part of the International Digital Ephemera Project, the recordings were finally digitized in a joint venture between the UCLA Library and the IHC.

Now researchers need the help of volunteers to provide transcripts and metadata to make these recordings searchable and accessible.

The Vintage Cuban Radio project, led by researchers at the UCLA Library,

offers two workflows for Zooniverse participants. Volunteers can help identify the types of voices and content within the recordings, which can aid researchers in the study of the historical and cultural context of the era, helping scholars answer questions like how gender affected participation in *Universidad del Aire*. Participants who understand Spanish can also help transcribe the content of the lectures themselves, opening up these unique records of Cuban history and culture to a wider audience around the world. ☒



# Worlds of Wonder

In the mid-19th century, exploring the hidden worlds of creatures too tiny for the human eye was open to anyone who procured a microscope.



**IMAGE CREDITS**  
Worlds of Wonder

**SUMMARY BY**  
Aleksandra  
Kuznetsova

**CHECK  
IT OUT!**

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

**MICROSCOPY FLOURISHED IN** the 19th century, coinciding with the advent of scientific journals brimming with correspondences between avid observers of the minuscule. Illustrations capturing the exciting new subject matter allowed microscopists to compare and exchange knowledge. These depictions made the rounds, often getting reprinted across various publications aimed at different audiences.

At the precipice of professionalization, the field of microscopy was populated by individuals with a mix of experience in naturalism, optics, biology, and art. At that time, disciplinary boundaries were blurrier than they are now, so studying the emergence of this field can help us better understand the history of science and how it has been communicated in the past. Founded by researchers at

Maastricht University, the Worlds of Wonder project seeks to understand the transmission of information and collaboration between the diverse sets of educational backgrounds, disciplines, and geographic origins of the members of the budding microscopy community.

Pages of 19th century scientific journals from the Biodiversity Heritage Library are uploaded to Zooniverse where volunteers tag and classify illustrations, identifying their artists and other contributors. This information will help researchers track the routes that illustrations took across Europe and America as this unique scientific community was built. ☀



# Thank you!

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

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