



# Harnessing Data with the Citizen Scientist

Monica Pereira, Cal. State University, Channel Islands  
Cynthia Prosser, University of Georgia

# Complex Questions

Large amounts of data enhance the quality of experiments. Data must be collected, reported, recorded, analyzed, or some combination of these activities.

- Collecting: dinosaur bones, precipitation;
- Reporting: earthquakes, fireballs, light pollution, tornados;
- Recording: earthquakes, stream flow;
- Analyzing: crater counts, seafloor surface descriptions, identifying objects of interest.

# Oodles of Data

Time and economic constraints can hamper a research agenda. The citizen scientist stands ready to assist.

- Mark craters and flag notable elements in images.  
**Asteroid Mappers: Vesta** (Project ends: 2015)  
[http://cosmoquest.org/projects/vesta\\_mappers/](http://cosmoquest.org/projects/vesta_mappers/)
- Search for exoplanets.  
**Disk Detectives** (Project ends: 2017)  
<http://www.diskdetective.org/>
- Photograph, measure and describe NEOs.  
**Target Asteroids!** (Project ends: 2023)  
<http://www.asteroidmission.org/>

# What is Citizen Science?

- Citizen science is the practice of involving the participation of ordinary people, who may or may not be scientists, to **collect** data, **report** or **record** phenomena, and **analyze** artifacts.
- Citizen science is a form of crowdsourcing with the intent to support scientific discovery, and data-driven outcomes.

# Collecting Data

- **Fireballs**  
<http://www.amsmeteors.org/fireballs/>
- **Fossil Finders**  
<http://www.fossilfinders.org/>
- **Marine Debris Tracker**  
<http://www.marinedebris.engr.uga.edu/>
- **Open Dinosaur Project** (Project completed 2010)  
<http://opendino.wordpress.com/about/>

# Reporting Phenomena

- **Did You Feel It?**  
<http://www.usgs.gov/science/cite-view.php?cite=1107>
- **The Quake-Catcher Network**  
<http://qcn.stanford.edu/>
- **River Instream Flow Stewards**  
<http://www.rifls.org/>
- **SkyWARN**  
<http://skywarn.org/>

# Recording Phenomena

- **AirCasting**  
<http://aircasting.org/>
- **CoCoRaHs**  
<http://www.cocorahs.org/>
- **Dark Skies Awareness**  
<http://www.darks skiesawareness.org/gan.php>
- **SETI@home**  
[http://setiathome.berkeley.edu/sah\\_about.php](http://setiathome.berkeley.edu/sah_about.php)

# Analyzing Artifacts

- **Cyclone Center**  
<http://www.cyclonecenter.org/>
- **Moon Mappers**  
[http://cosmoquest.org/projects/moon\\_mappers/](http://cosmoquest.org/projects/moon_mappers/)
- **Old Weather**  
<http://www.oldweather.org/>
- **Sunspotter**  
<http://www.sunspotter.org/>



# Citizen Participation

Citizen science benefits schools and communities:

- Provides opportunities for a wide variety of people to become involved;
- Increases the amount of incoming data, and possibly the scope of the project;
- Training and tutorials show citizens the scope of research, and build technical and observation skills;
- Creates a vested interest in research objectives;
- Teaches useful skills.

# Finding Projects

- Projects are easy discoverable using the Web. A simple web browser search on citizen science and [subject area] will yield results.
- Available books include:
  - Landgraf, G. (2013). *Citizen science guide for families: taking part in real science*. Chicago, IL: Huron Street Press.
  - Trautmann, N. M. (2013). *Citizen science: 15 lessons that bring biology to life, 6-12*. Arlington, VA: NSTA Press.
- The number of articles in magazines and journals discussing projects continues to increase as more scientists invite citizens to contribute.

# Choosing a Project

- Consider the project and the age of participants.
- Time and commitment levels vary by project.
- Online tutorials and FAQs provide project orientation. Some projects require in-person training.
- Most projects require the use of smartphones, or computers.
- Specialized recording equipment may be required for some projects. There may be a modest fee for this.

# Tools & Promotion for Projects

- Websites that offer tools for building and maintaining projects.
  - **Crowdcrafting**  
<http://crowdcrafting.org/>
  - **SENSR**  
<http://www.sensr.org/>
- Websites that promote projects.
  - **Citizen Science Alliance**  
<http://www.citizensciencealliance.org/projects.html>
  - **SciStarter**  
<http://scistarter.com/>
  - **Zooniverse**  
<https://www.zooniverse.org/>

# References

- Cooper, C. B., Dickinson, J., Kelling, S., Phillips, T., Rosenberg, K. V., Shirk, J., & Bonney, R. (2009). Citizen science: A developing tool for expanding science knowledge and scientific literacy. *BioScience*, 59(11), 977-984. doi: 10.1525/bio.2009.59.11.9
- Haywood, B. K., & Besley, J. C. (2014). Education, outreach, and inclusive engagement: Towards integrated indicators of successful program outcomes in participatory science. *Public Understanding of Science*, 23(1), 92-106. doi: 10.1177/0963662513494560
- Howell, E. (Mar. 24, 2014). Counting moon craters: Amateurs, scientists do equally well. Retrieved from <http://www.space.com/25200-citizen-science-counting-moon-craters.html>
- News Staff. (Sep. 22, 2013). Citizen Scientists Find Fireballs In Jupiter's Atmosphere. Retrieved from [http://www.science20.com/news\\_articles/citizen\\_scientists\\_find\\_fireballs\\_jupiters\\_atmosphere-120881](http://www.science20.com/news_articles/citizen_scientists_find_fireballs_jupiters_atmosphere-120881)
- Vianna, G. M. S., Meekan, M. G., Bornovski, T. H., & Meeuwig, J. J. (2014). Acoustic telemetry validates a citizen science approach for monitoring sharks on coral reefs. *PLOS ONE*, 9(4), e95565. doi: 10.1371/journal.pone.0095565



Comments

Feedback

Questions

- **Monica Pereira ([monica.pereira@csuci.edu](mailto:monica.pereira@csuci.edu))**
- **Cynthia Prosser ([cprosser@uga.edu](mailto:cprosser@uga.edu))**