

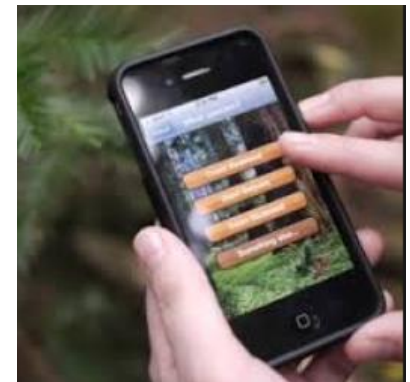
What is

MOBILE ENVIRONMENTAL CITIZEN SCIENCE @ *Michigan Tech*

- Mobile and web-based apps are designed by Michigan Tech students to collect environmental data.
- We have two primary goals for the project:
 - put mobile and web-based tools in the hands of citizens for collecting information that will be valuable to scientists and managers studying natural and social environments
 - encourage computer science students to harness their skills to solve environmental problems, by engaging them in real-world projects with scientists as collaborators.



boingboing.net



ctaudubon.blogspot.com

Why Citizen Science?

- Citizen science employs the public to collect scientific information, offering everyone an opportunity to contribute to a better understanding of the natural and social world.
- For scientists, the advantage of citizen science is that citizens gather important data that would be too expensive or otherwise difficult to obtain.
- Citizen science makes citizens stakeholders in the scientific process and thus they may become more supportive of scientific endeavors.
- As citizens learn more about science, in particular, environmental science, their attitudes and behavior towards the environment may change...for the better.

Imagine unleashing 100s, 1,000s, even millions of citizens to act as remote sensors for all sorts of data- from concentrations of air pollutants to counts of plant or animal species- as they move through their normal routines or exploring nature.

Why develop mobile and web-based apps?

- Mobile devices can automate collection of important data types, such as images, audio, and text, with a single handheld device that easily "stamps" the date, time, and geographic location of the observations.
- External sensors with other functions- measurements of water and air conditions, for example- can be connected to mobile devices, either wirelessly or through cables.
- The prevalence of mobile devices and social networking sites is growing exponentially, especially with younger people.



- The popularity of data-gathering activities for products and services suggests that the public may be motivated to assist the scientific community in collecting data.

What apps have been developed?



LICHEN AQ

Monitor the marine west coast air quality by observing lichens.



RIOMIO

Look into the watershed health around the Zona de Xalapa.



BEACH

Find out about the conditions of selected Midwest Beaches.



MUSHROOM MAPPER

Contribute to the collection of mushroom observations all over the country.



WATERLEVEL

View Stream and Record Waterlevels.



MEGA CRYSTALS

Learn about the geological area by counting rocks



THUNDER BAY

Find sunken treasure in Lake Superior.

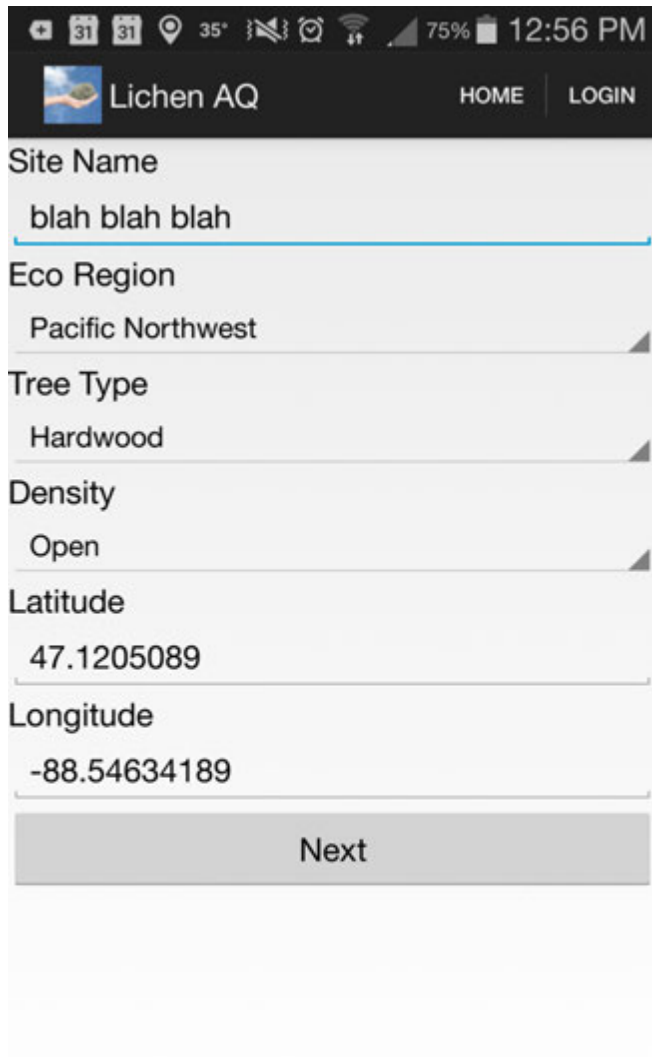
Development of apps

- Professionals express need for data-gathering and specify data types, usability needs, etc.
- Students participate in groups from three courses
 - Undergraduate & Graduate Human-Computer Interactions
 - Undergraduate Usability and Instructions Writing
- Student groups choose apps for semester-long project.
- Students interact with professionals throughout the project and iterate the product according to the professionals' suggestions.

Example: Lichen AQ



Enter site data



The screenshot shows a mobile application interface for entering site data. At the top, there is a status bar with various icons and the time 12:56 PM. Below the status bar is a dark header with a logo on the left, the text "Lichen AQ", and two buttons labeled "HOME" and "LOGIN". The main content area consists of several input fields, each with a label and a value:

- Site Name:** blah blah blah
- Eco Region:** Pacific Northwest
- Tree Type:** Hardwood
- Density:** Open
- Latitude:** 47.1205089
- Longitude:** -88.54634189

At the bottom of the form is a large grey button labeled "Next".

Novice Version

Enter lichen coverage data

The screenshot shows the Lichen AQ app interface for data entry. The top bar includes the app logo, 'HOME', and 'LOGIN' buttons. The main area displays five rows, each representing a tree with a number (3, 4, 5, 6, 7) and a slider indicating coverage percentage. The percentages are 77%, 75%, 91%, 83%, and 45% respectively. Each row has a 'Delete' button. At the bottom, there are two buttons: 'Add Tree' and 'Next', which are enclosed in a black rectangular border.

Tree ID	Coverage Percentage	Action
3	77%	Delete
4	75%	Delete
5	91%	Delete
6	83%	Delete
7	45%	Delete

Buttons: Add Tree, Next

AQ score calculation!

The screenshot shows the Lichen AQ app interface displaying the calculated AQ score. The top bar includes the app logo, 'HOME', and 'LOGIN' buttons. The main area displays the text 'AQ Score:' followed by 'Fair' and '75.0'. At the bottom, there is a 'Return To Start' button.

AQ Score:
Fair
75.0

Return To Start

Intermediate Version

Enter lichen coverage data

The screenshot shows the Lichen AQ app interface for data entry. At the top, there is a status bar with the time 12:57 PM and 75% battery. Below the status bar is a navigation bar with the app logo and the text "Lichen AQ", and two buttons: "HOME" and "LOGIN". The main content area consists of a list of lichen species, each with a small image, the species name, a minus button, a text input field containing "0: No lichens of this kind", and a plus button. The species listed are: Alectoria, soreciate Bryoria, Candelaria, Evernia prunastri, Hypogymnia, gray-black interior, Hypogymnia, white, and Hypotrachyna. At the bottom of the screen is a large gray button labeled "Next".

AQ score calculation!

The screenshot shows the Lichen AQ app interface displaying the calculated air quality score. At the top, there is a status bar with the time 12:59 PM and 75% battery. Below the status bar is a navigation bar with the app logo and the text "Lichen AQ", and two buttons: "HOME" and "LOGIN". The main content area displays the following information: "air quality:" followed by "Fair to Good" in a large font. Below this, it says "Pollution:" followed by "N Deposition: 4.10". Underneath, it says "Explanation:" followed by a paragraph of text: "Air quality is fair to good. Deposition of fertilizing nitrogen containing air pollutants is above natural background ranges and is favoring pollution tolerant species, but most sensitive species are still present, though often in low abundance." At the bottom of the screen is a large gray button labeled "Return to beginning".

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WE NEED YOU



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