Progress Report - Campus Sustainability Fund

Thank you for submitting a Progress Report for your Campus Sustainability Fund grant! We look forward to hearing about the advancements of your project.

Progress Reports are due the first week of every March, May, August, and December for the duration of the project. This link will open at the start of the week. Progress Report due dates for 2022: May 6th at 5PM and August 5th at 5PM.

Please be aware of the responses minimums and maximums for each question. While this form does not enforce our minimums, we strongly encourage following them. Should we feel that not sufficient information is provided, the Committee might request a new submission.

Should your project not yet have progress to report in some areas, you may type "No progress or updates to report." However, this will be vetted by Committee Members. If you have no progress to report, that should be made evident in meetings with the Committee Member who is your direct contact.

Should your project already be completed, please note in your responses to "Next Steps" and "Progress Support" that neither questions are applicable considering your project's timeline.

Uploading photos is required for Progress Reports - if you have no photos to share because your project has not yet begun, please omit.

Email *

chrislim@arizona.edu

Project Manager Name *

Who is submitting this Progress Report?

Chris Lim

Project Name *

The University of Arizona Air Pollution Sensor Network

Project Subaccount Number *

22.04

Project Summary Snapshot *

Please copy and paste the “Summary Snapshot” you provided in your project application. Responses are limited to 800 characters (~60-100 words).

Low-cost air pollution sensors will be installed across the UA campus. The collected data will be used to create machine learning-based models to predict and visualize real-time air pollution levels across the entire campus. The data and visualizations will be shared online so that community members can see and better understand air quality patterns and their personal exposures.

Requested Metrics *

Please add your project's metrics and their most recent number or response here.

We have calibrated and installed 20 sensors

Project Accomplishments *

Please describe what aspects of the project have been accomplished. Be as descriptive and specific as possible. Responses must be 500 characters at minimum and no longer than 2,000 characters, spaces included.

Examples of accomplishments could include: Held 4 public meetings totaling 130 attendees; Transitioned 300 square feet of dirt into usable garden space and signed on 14 community garden volunteers. Other examples of accomplishments could include sharing a confirmed schedule of events, the connections/contacts that have been established, or providing an update on an FM quote.

We describe the initial aims of the project as outlined in the application and discuss accomplishments.
1) Calibrate and Install 15 outdoor sensors and 5 indoor sensors: We modified and met the aim. After consulting with facilities, we focused on outdoor only instead. The installation costs were higher than expected (at around 300 per unit), so the budget was shifted so that installation costs were covered by PI. We first calibrated these sensors at a site run by Pima Department of Environmental Quality for a month. We then installed 20 PurpleAir sensors across campus. After installation, 1 sensor was lost as it was removed from the wall by someone. We also had issues with some sensors being unplugged sometimes. Of the 19 that were installed, many had connection issues although we had tested WiFi strength at installation locations. Currently we are working with facilities to move two sensors elsewhere due to power outlet issues this week; for 5 sensors, we purchased WiFi hotspot devices.
2) Work with Office of Sustainability and Facilities to choose locations: We met this aim. Office of Sustainability provided many potential install locations, while Facilities gave us input on their feasibility (e.g., worries or vetoes by building manager).
3) Organize a week-long sampling campaign by recruiting students: We met this aim. During a 5-day period, they carried around mobile sensors (AirBeam) during their typical daily routine. 5 students completed their sessions. Average and high readings for student 1 was 6 and 33 ug/m3; for student 2 it was 17 and 186; for student 3 it was 45.4 and 850; for student 4 it was 8.8 and 65; and for student 5 it was 1 and 2200. This shows substantial differences in daily exposures.
4) Construct a machine learning model that will predict air quality across campus. This aim was not met and is in progress. We do not have sufficient data collected from sensors at the moment.

Next Steps *

Please detail the next steps for your project, numbering each step. (ie, 1.Connect with X Department to collaborate on the event, 2. Contact the catering options to confirm pricing, 3. Interview candidates for internship). If your project is completed, you can note "Project is Completed." Responses must be 500 characters at minimum and no longer than 2,000 characters, spaces included.

Project is completed. However, we will continue to work on the project. This includes troubleshooting sensors especially as new issues rise up; we have acquired and processed GIS data for model building, and machine learning model will developed; and dashboard will continually be improved with new features. We have also made connections with community organizations to install additional sensors in neighborhoods surrounding University of Arizona (e.g., Sam Hughes). This will allow us to broaden sensor coverage which will improve the amount of data and model performance.

Challenges Faced *

Please identify and describe any obstacles/roadblocks you or your team have experienced, and detail how you've managed them/ will manage them. Should your project already be completed, please note what challenges you faced and what you would do differently. Responses must be 500 characters at minimum and no longer than 2,000 characters, spaces included.

One initial challenge was balancing sensor location needs (e.g. near large roads) vs. reality (e.g. such location may not have outlets or wifi). The biggest challenge was working with facilities management. They were very helpful but had a lot of work going on, especially during the school year. During the summer they were much more responsive and quicker. Now that I have connections within FM, if a similar project was carried out, it would be done quicker, but if I were to do it again I would do the installations during summer. Other issues include sensors being unplugged/lost, and Wi-Fi issues, which is/was remedied with wifi hotspots.

Project Support *

Can the CSF support you in addressing any roadblocks you've encountered? How else can the CSF support your project? Responses must be 500 characters at minimum and no longer than 2,000 characters, spaces included.

After troubleshooting is completed, help with dissemination over social media and/or connecting with university officials would be needed. Feedback with dashboard design would be helpful.

Photos

Please upload or provide link (below) to relevant photos. Providing photos to your project is required. Please include event photos, any and all relevant photos, as well as flyers or advertisements.

Photo Link

Please copy hyperlinks to photos here should you not be able to individually upload photos. Please include event photos, any and all relevant photos, as well as flyers or advertisements.

Media/Links

Please include links to any media coverage or events information (e.g. news, social media, websites, interviews, etc.)

https://aq-sensors.shinyapps.io/UASensors/