Emails:

Radhika Wijetunge:

Dear Ms. Wijetunge,

This is Ayaan Kalra, the Outreach officer from Atholton High School's Electronics Club, and we'd like to request your support for our Aqua Guardian autonomous water quality testing project. We received your email from Carolyn Parsa through Bob Marrietta. This is a project focused on advancing water quality monitoring with innovative technology. We'd love to get your feedback and a quote to help us move forward. We are currently in the initial phase of the Samsung Solve for Tomorrow competition.

About Aqua-Guardian:

Our project addresses the existing data gap in water quality monitoring by focusing on three key components:

1. AI-Enhanced Risk Scoring: We process raw sensor data to generate clear, actionable indicators, such as an automatic flag for Nutrient Enrichment (potential sewage) and an Algal Bloom Risk Score.

2. Policy & Advocacy Focus: This system directs human attention to high-risk areas and provides the suitable evidence needed for citizens and officials to advocate for stronger environmental policy.

3. Testing & Validation: We plan to conduct a local pilot program where sensor data from Lake Elkhorn is continuously fed into the system. We will validate the AI's risk scores by cross-referencing them with independent, lab-certified environmental data to confirm accuracy and reliability.

We believe that building a high-impact, open-source technology is a direct way to help the community.

Your Quote & Feedback Request:

To help us strengthen our submission, we are seeking your expert opinion on the value and innovation of our project. We would like to use your response as a direct quote in our official competition materials, with your approval.

Please consider the following five questions:

1. Significance: How valuable is the Aqua-Guardian system's potential to provide suitable, policy-driven evidence for addressing water quality issues in our community?

2. Innovation: What part of the AI-enhanced platform, for example, the Algal Bloom Risk Score, do you see as the most innovative for local monitoring?

3. Testing: When testing, we would like your feedback on the quality of our sensor's readouts and the integrity of our AI model's derived trends (i.e. Algae Bloom Risk Score).

4. Materials: If we are using quality sensors or if we should add any to help with our project objective?

5. Community Impact: What is your perspective on the value of students creating high-impact, open-source technology to benefit the community?

Your insights are invaluable to our team as we seek to advance in the competition. Thank you so much for your time and support of student-led innovation.

Sincerely,

Electronics Club Team

Atholton High School

Good afternoon,

Thank you for reaching out to me, and I think this project has great potential! Let me verify with County that they're OK with me providing feedback and support.

In the meantime, I also encourage you to take a look at the Stockholm Junior Water Prize (https://www.wef.org/membership--community/students--young-professionals/sjwp/) because there is a company that has grants for students participating in this competition to get equipment - I think the deadline for application for the grant is coming up soon, and definitely encourage your group to apply for that. The water monitoring project appears to be a good fit for the SJWP.

I will respond to your questions as soon as I get the green light for me to assist.

Thank you,

Radhika Wijetunge

Good afternoon,

Thank you for reaching out. The County has approved my providing feedback and support.

Below are the questions you've asked, with my responses in blue:

1. Significance: How valuable is the Aqua-Guardian system's potential to provide suitable, policy-driven evidence for addressing water quality issues in our community?

Water monitoring is generally an expensive and time-consuming effort, so having the ability to acquire this data in a remote and reliable format is very valuable to us. There have been varying numbers of algal blooms in county water bodies - in 2025 there was a recreational water contact advisory issued for the Triadelphia Reservoir due to high concentrations of blue-green algae. The Aqua-Guardian could potentially serve to get us sufficient data to address our water quality issues.

2. Innovation: What part of the AI-enhanced platform, for example, the Algal Bloom Risk Score, do you see as the most innovative for local monitoring?

Most of the AI-enhanced platform analysis would be valuable, but both the Nutrient Enrichment Indicator and the Algal Bloom Risk Score would be the most innovative. The Nutrient Enrichment Indicator, tracking spikes in EC and drops in ORP/DO after a precipitation event would help identify and alert us on water safety, allowing us time to alert the public on restricted use of these waters. Similarly, the Algal Bloom Score would provide us alerts for more testing and/or safety alerts to the public.

3. Testing: When testing, we would like your feedback on the quality of our sensor's readouts and the integrity of our AI model's derived trends (i.e. Algae Bloom Risk Score).

I would be happy to review and give feedback on the quality of your data when you have deployed the buoy.

4. Materials: If we are using quality sensors or if we should add any to help with our project objective?

The sensor equipment appears to be good quality. I am not sure what overall housing you're using with the buoy and how you're waterproofing some of the electrical elements, but I assume you have that under control.

5. Community Impact: What is your perspective on the value of students creating high-impact, open-source technology to benefit the community?

I believe projects like this, where students create a high-impact, easily replicated, open-source technology benefits the local community as well as adds to our body of scientific data and knowledge. In many areas, water monitoring and sampling are not done frequently because of cost, and this type of deployable equipment would make this much easier. The ability to warn of

a potential exposure will allow for safer water uses for the community and provide updates to advisories.

Please let me know if you have any further questions or need additional information.

Thank you,

Radhika Wijetunge

Good morning,

In thinking about your project further, I wonder whether you've reached out to Columbia Association? They manage the lake and so it would be good for them to be informed about the possible buoy deployment down the line. If you haven't reached out and would like me to do so, please let me know - I work with the Watershed Manager and their Program Managers often.

My apologies for the multiple emails.

The Maryland Water Monitoring Council will have it's Annual Conference on November 20th (Thursday before Thanksgiving) at the Maritime Institute in Linthicum, MD. I strongly urge your group to put together a poster for this event. There are prizes for the best posters, which will no doubt help you with your fundraising for the project.

Conference details can be found here: https://dnr.maryland.gov/streams/pages/mwmc/conference.aspx

You will also have the opportunity to speak with federal, state, and local officials, as well as to meet private engineering firms that will attend. I think it will be great exposure for your project.

I am part of the organizing committee for this conference, so if you decide to submit a poster, please give me a heads-up.

Mark Southerland:
Hello Mark,

Anwar Khan is a Junior at Atholton and is designing a water quality monitor along with a team of other students to compete in the Samsung Solve for Tomorrow competition.

Would you be willing to take a look at this proposal and meet with him and his team to discuss the proposal? If not, is there another person you would recommend?

He is cc'd on this email if you have any questions for him about the project.

Thank you for considering.

Anwar,

I think the key is ensuring that they can accurately capture conditions over time (e.g., the sensor remains accurate due to fouling etc.) – maybe some manual measurement to verify periodically. They would also need to determine what filtering out weather and external factors would consist of – precipitation/temperature thresholds? deviations from what are considered “natural conditions” for other factors?

The algal bloom risk score should probably focus on conditions that promote a bloom – just because the conditions are right doesn’t always mean a bloom will occur. Ideal conditions usually occur after runoff/nutrient delivery, and when water temperatures and stratification are maximal. Some of the parameters they are measuring may also need to be captured in this (i.e., thresholds).

AI would definitely be able to help provided the right thresholds or deviations from natural conditions are determined.

Happy to talk with though doubt I have more to say than this.

Mark

Thank you so much for your help. We have begun researching these thresholds and “normal conditions” to program into our data model. Once we have a rough framework for identifying each condition we would be more than happy to reach back out to you and have you review our logic and findings.

Sincerely,
Anwar K.

Sounds good

Carolyn Parsa:
Good News! The Howard County Sierra Club voted last night to pledge $250.00 towards your project, should it be accepted.

The board, cc'd here also had another good idea. We have a presentation at the Miller Library about citizen science and stormwater management. The link is below. We recommend that your team come to the presentation and then talk afterwards to the speakers. The link has a description of the event. I think they would be good resources for your group and that they would enjoy hearing about your project.

https://howardcounty.librarycalendar.com/event/think-planet-318044

I highly encourage you to attend this presentation. If you want to contact them sooner, let me know and I can email introduce you to them.

Mark Southerland said that he would look at your proposal and he also forwarded it to Mandy DeLeo who runs the water quality program at Patapsco Heritage Greenway and was previously a Howard County school teacher.

I will let you know if I hear anything more. It will be very exciting to see where your project leads.

Thank you so much for the great news!, we will come to the presentation.