Dear Dr. Steindel,

Thank you for the feedback on how to improve the manuscript. We are grateful for the opportunity to implement changes and submit a revised version. We have endeavored to address each reviewer comment and editorial comment in full, through the revisions detailed below. In the attached revised manuscript, **new or edited text is marked in red** (removed text is not marked).

Additionally, we have uploaded all figures in the requested svg format, and have converted our table to the requested xlsx format.

Individually addressing the comments:

Comment: *"Please take this opportunity to thoroughly proofread the manuscript to ensure that there are no spelling or grammar issues."*

> Grammar or spelling changes were made in the following line numbers:
> **57, 113, 147, 149, 166, 176, 191, 234-235, 300, 544, 617, 621, 629**

Comment: "*1. The Protocol should contain only action items that direct the reader to do something. Please move the discussion about the protocol to the Discussion."*

> We have relocated discussion about the protocol to the Discussion section, from five of the protocol steps. The text removed for these relocations was as follows:
>
> - **1.1:** "(An example species meeting the selection criteria is the climbing common bean, P. vulgaris.)"
> - **1.1.1:** "This will mean that, in the selected species, the phototropins (light-receptor proteins) in the plant will absorb photons corresponding to wavelengths 340–500 nm. When the receptors are triggered, first swelling will occur in the stem by the preferential relocation of water to the stem tissues opposing the triggered receptors, causing a reversible directional response. Then, within the stem auxin (plant patterning hormone) is directed to the same tissue location, perpetuating the directional response and fixing stem tissues as they stiffen."
> - **1.2:** "as in the setup the plants will be exposed only to isolated blue light and isolated red light. The phototropism reaction in the plant will respond to light from blue diodes with peak emission λmax = 465 nm, and photosynthesis(19-20) in the plant will be supported by red diodes with peak emission λmax = 650 nm."
> - **2.3.3:** "for instance, the shade-avoidance response(21-22)."

- **4.1.3:** "for example roughly 3 l of commercial gardening soil per pot for P. vulgaris that will grow to several meters in height."

The new text in the **Discussion section**, relevant to these relocations is:

"In the presented methodology, an example plant species meeting the protocol selection criteria is the climbing common bean, P. vulgaris. This is the species used in the representative results. As P. vulgaris has strong positive phototropism to UV-A and blue light, the phototropins (light-receptor proteins) in the plant will absorb photons corresponding to wavelengths 340–500 nm. When the receptors are triggered, first swelling will occur in the stem by the preferential relocation of water to the stem tissues opposing the triggered receptors, causing a reversible directional response. Then, within the stem, auxin (plant patterning hormone) is directed to the same tissue location, perpetuating the directional response and fixing stem tissues as they stiffen. This behavior can be used for shaping the plants in these controlled indoor conditions, as the plants are exposed only to isolated blue light and isolated red light, with incident far-red light from IR-proximity sensors at low enough levels that it does not interfere with behaviors such as the shade-avoidance response(20-21). The phototropism reaction in the plant responds in the setup to light from blue diodes with peak emission λmax = 465 nm, and photosynthesis(22-23) in the plant is supported by red diodes with peak emission λmax = 650 nm. P. vulgaris growing up to several meters in height is suitable in the overall setup, as the roughly 3 l of commercial gardening soil needed per pot fits the setup scale."

Additional minor text edits were made in the Discussion section to support the relocation **(see line 662-663)**, and also **references 19-23** were reordered.

In a wide array of other locations in the protocol, we identified cases where we erroneously used discursive language instead of directive language. We have corrected the language style in those cases, to help the reader understand these as clear directions. The locations of these corrections are:

Protocol steps **2.2.2, 2.2.3, 2.3.1, 2.3.2, 2.3.3, 2.4.1, 2.4.3.3, 2.4.4, 2.4.5, 2.4.6.1, 2.4.6.2, 2.4.6.3, 2.5, 2.5.1, 2.5.2, 2.5.3, 4.1.1, 4.1.2.1, 4.1.2.2, 4.1.3, 4.1.4, 4.1.5, 5.1, 5.3.1.1, 5.3.1.2, 5.3.2.1, 5.3.2.2, 5.3.3.1, 5.3.3.2, 5.3.3.2.3, 6.4**

Comment: "*Please add more details to your protocol steps. Please ensure you answer the "how" question, i.e., how is the step performed (in particular, for researchers who are unfamiliar with this work)*"

More protocol steps and substeps were added to clarify the process and provide more details. Steps in the revised manuscript that are new are as follows:

2.4.7, 2.4.7.1, 2.4.7.2, 2.4.7.3, 2.4.7.4, 2.5.4.1, 2.5.4.2, 2.5.6, 2.5.6.1, 2.5.6.2, 2.5.6.4, 2.5.6.5, 2.5.6.6, 2.5.6.7, 3.1, 3.3.1, 3.3.2

Steps in the revised manuscript that have additional details added are as follows:

2.2.3, 2.4.6.1, 2.4.6.2, 2.4.6.3, 3.2, 3.6.2, 5.3.1.2, 5.3.2.2, 5.3.3.2

Comment: "*1, 2, 5: Note that selection and experimental design steps are fairly vague and usually can't be filmed.*"

We have tried to eliminate highlights on steps that are too vague to easily be filmed. To the best of our knowledge all currently highlighted portions are concrete enough to be filmed. However, we are very open to the advice of the editors in this matter, and would be happy to adjust the highlight further.

Comment: "*2: Please include more information about how exactly to repeat these steps; e.g., how exactly are robots assembles, and how are the supports assembled? Please include more specific measurements, etc.*"

We added the following new steps (or added new information) regarding robot assembly, including measurements where relevant:

2.2.3, 2.4.6.1, 2.4.6.2, 2.4.6.3, 2.4.7, 2.4.7.1, 2.4.7.2, 2.4.7.3, 2.4.7.4

We also added a block diagram of robot components **(Figure 2)** to help with the clarity of robot assembly protocol.

We added the following steps (or added new information) regarding the assembly of the supports and the mechanical setup, including many new and specific measurements:

2.5.4.1, 2.5.4.2, 2.5.6, 2.5.6.1, 2.5.6.2, 2.5.6.3, 2.5.6.4, 2.5.6.5, 2.5.6.6, 2.5.6.7

Comment: "*3.2, 3.3: If this is to be filmed, please include more specific information about how exactly to program the robots to do this.*"

We added the following new steps (or added new information) to help clarify the programming of the robots:
3.1, 3.2, 3.3.1, 3.3.2, 3.6.2

We believe the steps here can be shown in a concrete way when filmed, by demonstrating the behavior of the robot that is triggered (visible on the hardware) during the relevant software state. However, if the editors prefer that this is not filmed, we are of course open to those modifications.

Comment: *"If revisions cause a step to have more than 2-3 actions and 4 sentences per step, please split into separate steps or substeps."*

The new steps added have been structured into substeps whenever possible, as seen in the following:

Steps **2.4.6 - 2.4.7.4** and **2.5.6 - 2.5.6.7**

We also split existing overly long steps into separate steps or substeps. The following steps represent new subdivisions:

- **2.4.3.1, 2.4.3.2, and 2.4.3.3** have been added, as subdivisions from 2.4.3
- 2.4.6 is split into **2.4.6.1, 2.4.6.2, 2.4.6.3**
- 3.4 (formerly 3.3.) is split into **3.4, 3.5, and 3.6.1**
- 4.1.2 is split into **4.1.2.1, 4.1.2.2, 4.1.2.3, 4.1.2.4**
- 5.3.1 is split into **5.3.1.1 and 5.3.1.2**
- 5.3.2 is split into **5.3.2.1 and 5.3.2.2**
- 5.3.3 is split into **5.3.3.1 and 5.3.3.2**

We also restructured the following as substeps one or two list levels lower, to help increase clarity:

3.6.1, 3.6.2, 3.6.3, 3.6.4, 3.7.1, 3.7.2, 3.7.3, 3.7.3.1, 3.7.3.2, 3.7.3.3, 3.7.4, 3.7.5, 3.7.6, 3.7.7

Comment: "*Please cite all figures at least once in the manuscript (outside the legends).*"

Figure 1 is now referenced at protocol step **2.1, line 183**.

Figure 2 (a new figure) is referenced at protocol step **2.1, line 183**.

Figure 3B (previously 2B) is now referenced at protocol step **2.3, line 209-210**.

Comment: "*1. Please ensure the Table of Materials has information on all materials and equipment used, especially those mentioned in the Protocol.*"

The **Table of Materials** has been updated to contain all information mentioned in the protocol.

Reviewer #3:

Comment: *"The methodology is comprehensively described and seems complete, but for a schematics of the electronics inside the robotic node. Here a simple block diagram might go a long way."*

We have added a new figure **(Figure 2)** that contains a simple block diagram of the robotic node electronics.

Comment: *"Along these lines, the authors might also publish the pseudo-code for the robotic node program."*

In protocol step **3.2**, we have added a reference to our published pseudo-code for the robotic node program, **line 361-362**.

Thank you in advance for your time and your consideration.
Best regards,
Mostafa Wahby, on behalf of all authors