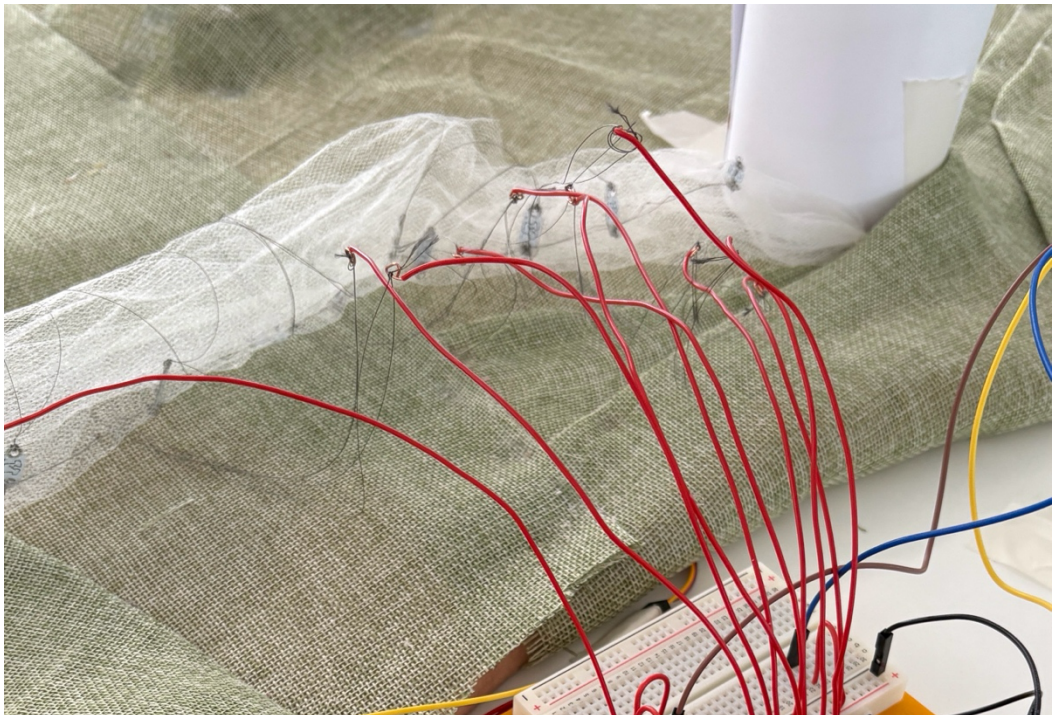
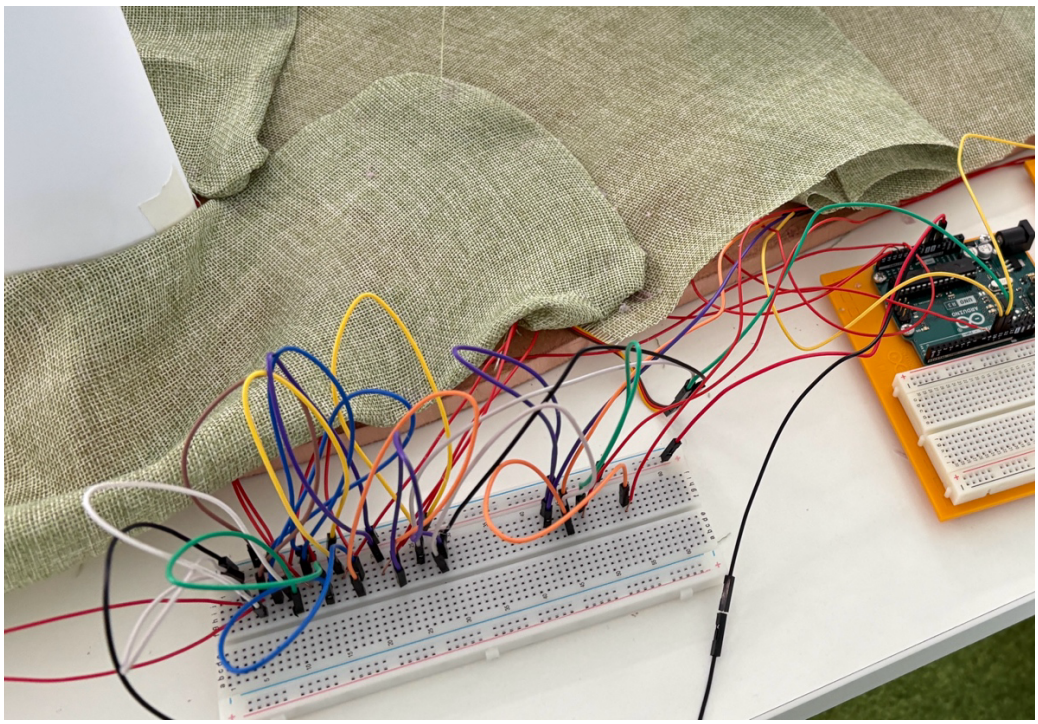
Research and inspirations

- Sewable LEDs (x10)



Used to simulate root signal transmission beneath the flowers. Controlled by a potentiometer and arranged sequentially to light up like signals traveling through a network.

- Breadboard + Jumper Wires

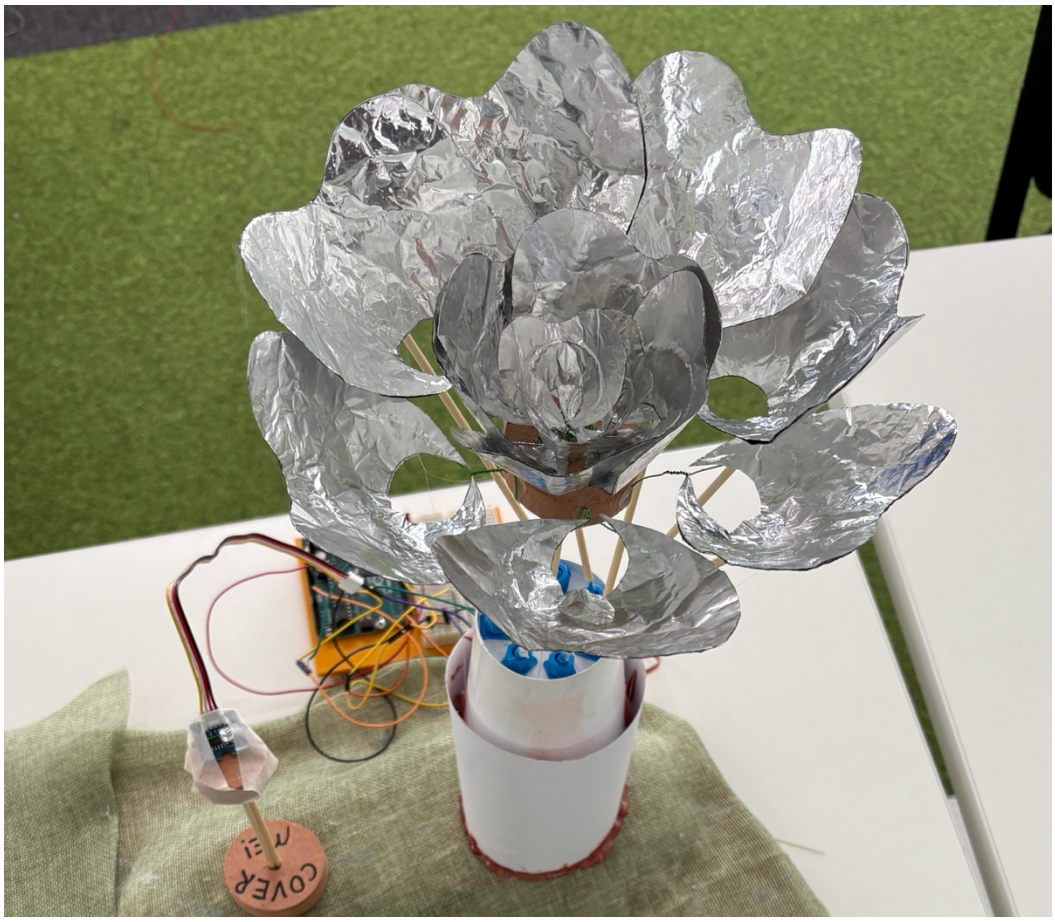


Used to connect all components to the Arduino in a modular and reconfigurable way.

- Power Supply (via Arduino USB)

  Powers the entire system through USB, with careful management of voltage and current for multiple motors and LEDs.

- Structural Materials



- Tin foil for petals (lightweight and formable)
- 3D-printed disks and joints
- Wooden base to support all flowers and components
- **Universal joint mechanisms to improve petal linkage flexibility**

Hardware & Physical Construction

The mechanical flower system combines electronic hardware, lightweight materials, and custom mechanical structures to create an installation that is both responsive and expressive. Each flower shares a core structure but varies slightly in size, petal layout, and movement range, reflecting the organic diversity found in natural ecosystems.

Flower Construction

- Petals are made from multi-layered tin foil, reinforced with internal wire to allow precise shaping while remaining lightweight. These are individually hot-glued onto a circular disk, forming a full 3D bloom.
- A servo motor is mounted at the base of each flower. Connected via a vertical support stick, the motor rotates the disk, which drives the petal movement.
- Beneath the flower head, a paper cup serves as a lightweight housing that conceals the electronics and holds a potentiometer used for manual input or feedback.

- To translate rotary motion into petal articulation, we use universal joints, mounted on the cup. These are linked to wooden rods, which connect directly to the petals and act as levers.

Petal Movement Logic

- When the servo motor rotates the disk, the attached universal joints pull or push the wooden rods, causing the petals to open or close in a radial motion.
- By adjusting rod length and disk diameter, each flower can exhibit unique motion characteristics, some open gently, others bloom more rapidly adding diversity and personality to the network.

LED Integration: Root Signal Simulation

To simulate root-like communication, we embedded a series of sewable LEDs into sheer fabric laid across the base. The fabric diffuses light softly, mimicking the subsurface glow of mycelium or root signals.

While the original plan was to make each LED respond to its corresponding flower, time constraints led us to simplify the system: all LEDs are now controlled by a single potentiometer, which modulates a flowing light sequence, simulating signals moving through a connected underground network.

Base Structure & Wiring

All components are mounted onto a custom wooden base, which serves as the installation's foundation. It offers:

- Mechanical stability for the flowers,
- Space for mounting motors and potentiometers, and
- Organization for internal wiring.

Each motor and potentiometer are fixed securely to the base, with exposed shafts or knobs for interaction. Behind the scenes, breadboards and jumper wires connect all electronics in a modular layout. Wiring was labelled and routed to minimize clutter and simplify debugging.

This modular approach allows for future upgrades such as:

- Per-flower LED responses,
- Wireless controls base on the interface control
- Enhanced motion systems based on cam mechanisms.

Together, the hardware and structure of this project form an integrated system where mechanical design, electronic control, and biomimicry come together to simulate the silent intelligence of natural communication.