

Wabi-Sabi Electronics

DIY Devices to Nourish the Soul



Rob Faludi



- ITP
- Making Things
- Electronics
- Wireless
- Connected Devices
- Product Management
- Instructor
- UX/UI
- Cognitive Psychology
- Humane Interactions with Technology

Selected Projects: Nature, Tech, People



Rust Garden
Beauty of decay



Wind Lantern
Remote connections to meaningful places



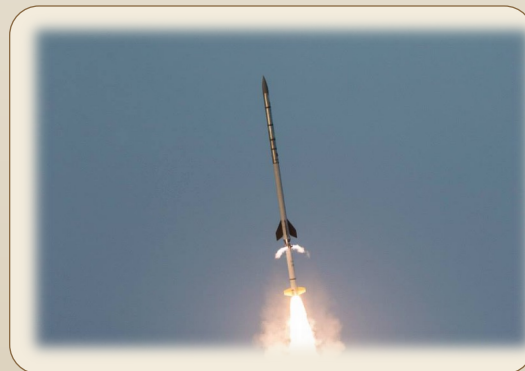
Solar Cricket
Natural sounds from natural power



Botanicalls
Thirsty plants that call for help



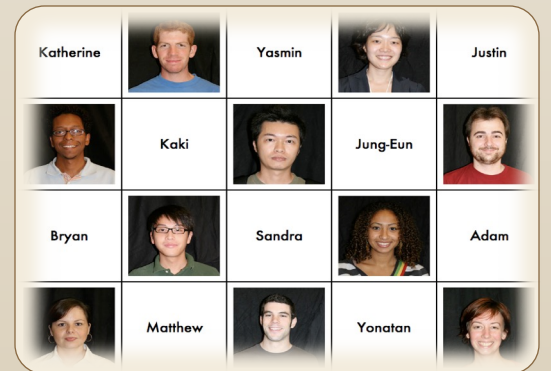
Connecting Light
400 giant illuminated balloons



Xbees in Space
NASA sounding rocket wireless monitoring



Sensor Lab
Wireless sensing with 20+ sensor types



Social Genius
Name-learning system

Digital Naturalism

Month-long outdoor conferences where field biologists, interaction designers, engineers, artists and educators explore new ways of interacting with nature.



Thailand



Panama

Not an Expert



- **Not an electrical engineer**

I've taught physical computing and built commercial prototypes

- **Not a computer scientist**

I've taught programming classes and written a lot of code

- **Not an authority on Japanese culture**

I'm well-read and have attended tea ceremonies, bonsai classes, Japanese gardens and visited Japan

- **Not a Zen practitioner, or scholar on Shinto, Tao or Buddhism**

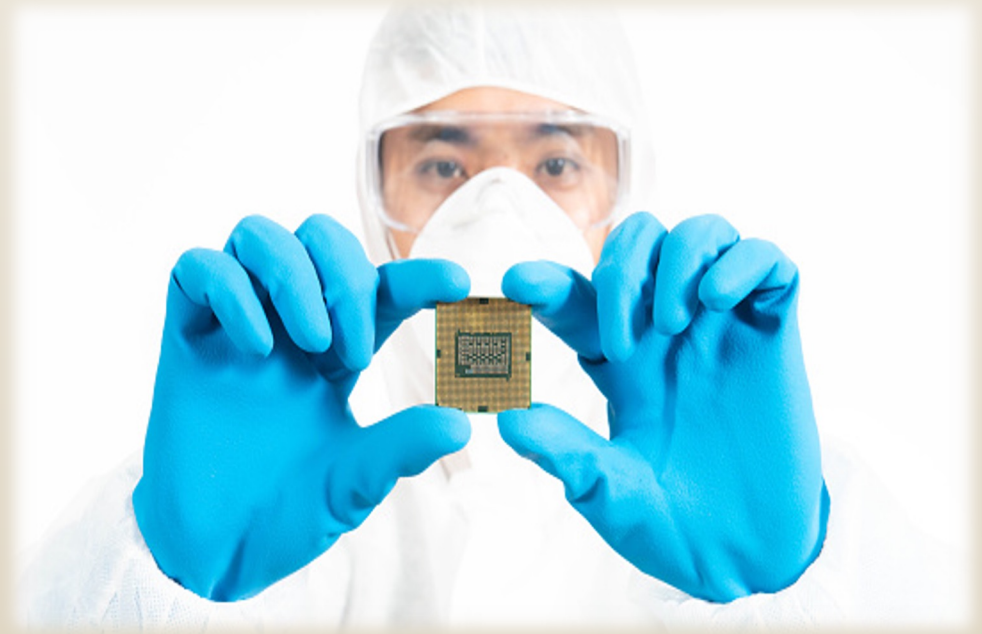
Have studied about each and deeply respect these practices

Wabi-sabi frees you to explore your own imperfections and make mistakes.

No need to be an expert, just respectful!

The Problem with Modern Electronics

- Modern electronics worship **sleek perfection** — seamless glass, uniform plastic, hidden seams
- **Planned obsolescence** — devices designed to be replaced, not repaired
- **Flashing screens**— beeping & lights create constant distraction
- **Anxiety by design** — invasive notifications, goals we can't achieve, compulsive checking, always-on stress
- **Stuck indoors** — electronic devices are agoraphobic
- **Inhumane interfaces** — interactions designed for efficiency, not for people
- **Dehumanizing mechanization** — technology that alienates us from our own bodies and senses
- Each new invention seems to take us **further from the natural world**



What if We Designed Differently?

Wabi-sabi is a Japanese aesthetic that embraces the beauty of **imperfection**, **impermanence**, and **simplicity**.

It finds value in the natural, the humble, and the flawed.



What is Wabi-Sabi?

"Nothing lasts, nothing is finished, and nothing is perfect."

Wabi — the beauty found in simplicity, rusticity, and solitude

Sabi — the beauty that comes with age and the passage of time

Nature is the universe — and the foundation of wabi-sabi



What is Wabi-Sabi?

Asymmetry & Imperfection

Only ideas can be perfect; nature is messy, organic, irregular

Flow & Impermanence

Nothing lasts except cycles of death and renewal; wear is natural

Stillness & Presence

Meditativeness, being present, non-striving (Wu Wei)

Simplicity & Emptiness

Decluttered, unfinished, leaving room for potential

Earthiness

Muted colors, organic textures, natural light, limited palette

Handcraft & Repurposing

The human side of objects; everything in nature gets repurposed

Welcoming & Caretaking

Timelessness through nurturing what already exists

Nature as Guide

Connecting humans to the natural world around them



Wabi-Sabi in Everyday Life



Kintsugi Pottery

Broken ceramics repaired with gold — the cracks become the art, not a flaw to hide



Japanese Architecture

Exposed wood, natural materials, structures that age gracefully with moss and patina



Wabi-Sabi in Everyday Life



Sashiko Textiles

Visible mending with decorative stitching — repair becomes ornament, extending a garment's life



Tea Ceremony

Handmade bowls, seasonal flowers, rustic settings — finding depth in quiet, simple ritual



Wabi-Sabi in Four Minutes

Simple Essence

YT: @SimpleEssence-s



Wabi-Sabi Is Undefinable

Despite these definitions of wabi-sabi, it is generally described as **undefinable**.

- Wabi-sabi is **not a property of an object** — it is the feeling inside you that the object creates
- It is fundamentally an **individual human experience**
- This is why it is so **hard to nail down** — the experience varies and is deeply personal
- Wabi-sabi is an overall positive feeling, complex with elements of melancholy, peace, longing, acceptance and beauty.



From Within



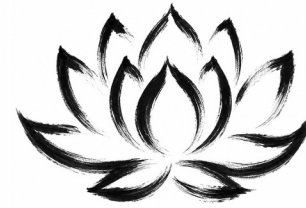
Azumi Uchitani
YT: @JapaneseSalon

<https://youtu.be/H5mf8SAfz-s>

Underpinnings



Taoism



Buddhism



Shinto



Zen

A Bit about Zen

Zen roots of wabi-sabi

- Wabi-sabi grew out of Zen Buddhism in 15th-century Japan — tea masters like Sen no Rikyū rejected ornate Chinese ceremony and hierarchy for humility, simplicity and weathered, hand-made utensils
- Three Zen marks of existence shape the aesthetic: impermanence (mujō), suffering or imperfection (ku), and emptiness or non-self (kū)
- Zen prizes direct experience over abstraction — the cracked bowl in your hands matters more than the idea of a perfect one

Zen for makers

- Impermanence → design for decay: allow for tarnish and age to bring beauty, celebrate change over time, highlight imperfections
- Imperfection and Non-attachment → ship your rough prototypes: a working device in cardboard is superior to polished product that never leaves the bench
- Emptiness and Beginner's mind → use intuition to guide design, then invite the next maker to open, repair, and remix

Who is This For?

- Artists
- Designers
- Makers
- Hackers
- Students
- Tinkerers
- Naturalists
- Crafters
- Inventors
- Design Students
- Teachers
- Outdoor Enthusiasts
- Mindfulness Enthusiasts
- Hobbyists
- Professors
- Japanese Culture Fans
- Dispirited Engineers

...and more



Concepts and Examples



Embrace Imperfection

The crack is where the light gets in.

- **Exposed circuits** — let the inner workings become the surface design
- **Hand-crafting**— each device carries the maker's unique touch
- **Visible mending** — invite repairs that celebrate the history of use
- **Asymmetric layouts** — naturally inspired irregularity over factory uniformity



Example: Mushroom-Mushroom Lamp

A mushroom-shaped lamp grown from actual mycelium — the material **is** the mushroom. Created by Cris Silva at Dinacon 2022, DreamSpace BioLab, Sri Lanka.

- Part of Dreamfungi — a grassroots project researching mycelium biocomposites from local biomass
- Molds shaped from coconut shells (cap) and cardboard rolls (stem) — imperfect, organic forms
- PVC pipe routed inside the stem for wiring — the living material wraps around the technology
- Each lamp is unique — grown, not manufactured — embracing natural variation



Connect to Nature

Technology that breathes with the living world.

- **Living components** — moss, plants, and microorganisms as active partners
- **Natural materials** — wood, stone, clay, natural fabrics, found materials
- **Organic forms** — curves, asymmetry, and textures inspired by nature
- **Environmental coupling** — connect the senses to wind, rain, temperature, moonlight and other beings



Example: Human:Nature

Jill Haefele's headphones populated with live crickets that rustle and chirp behind a mesh screen.

- Visitors don headphones expecting recorded audio but hear real crickets next to their ears
- Glass globes filled with ferns and dirt — low-tech that only looks high-tech
- Emotional arc: curiosity → surprise → unease → calm; a meditative break from the modern world
- wabitronics.com/examples/human-nature



Age Gracefully

The most beautiful things are those that show the passage of time.

- **Patina finishes** — copper, brass, and iron that oxidize into unique surfaces
- **Repairable design** — modular parts that can be swapped, not discarded
- **Evolving devices** — objects that gain character and story through wear
- **Paradox of permanence** — devices designed to stay the same don't adapt to change and become obsolete
- **Open hardware** — designs shared so anyone can maintain and modify, granting new life as your device matures



Example: Rust Garden

By Rob Faludi at Dinacon 2019 in Gamboa, Panama — a garden planted not with seeds, but with scrap iron and steel.

- Metal shaped by weather, time, and chemistry — "planted" outdoors to weather organically
- Patina of ochre, red, orange, and sienna offsets the tropical greenery
- Right angles collapse and edges decay into jagged, organic landscapes
- Process can be accelerated with vinegar, peroxide, and salt — or left to time



Natural Materials

Wabi-sabi finds beauty in materials that clearly come from the natural world. These materials carry their origins with them and continue to change over time.

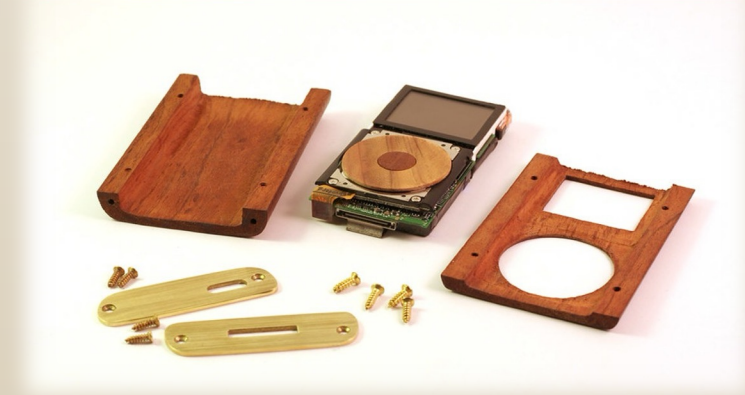
- **Grain, texture, and variation** — wood knots, clay irregularities, and metal patina are features, not flaws
- **Carry a story**— natural materials develop character through use: scratches, wear, and weathering tell a story
- **Warmth and humanity** — organic forms and textures feel approachable, replacing the cold precision of machined plastic and glass
- **Humble origins** — scrap lumber, foraged clay, or recycled brass connect the device to a place and a process
- **Biodegradable by nature** — unlike e-waste plastics, natural enclosures can return to the earth when their useful life ends



Example: Wooden iPod Mini

A fully functional iPod Mini rebuilt inside a hand-carved Australian cedar case — by Josh Darrah.

- Original internals, screen, and clickwheel transplanted into hand-shaped wood
- Wooden clickwheel actually works — cedar disc on the capacitive sensor
- Brass end caps, hand-filed ports, and matching wooden iTrip and dock
- Natural grain and imperfections celebrated — hand-shaped enclosures connect user to creator



Celebrate the Serene

Quiet technology that calms rather than demands.

- **Ambient displays** — information at the periphery, glanceable not intrusive
- **Slower interactions** — devices that reward patience, not urgency
- **Single-purpose devices** — do one thing well, without distraction
- **Relaxed interactions**— calm peripherals over attention-grabbing alerts



Example: Wind Lantern

Remotely displays the wind from a place that matters to you, as a flickering virtual candle in a real lantern you can put anywhere.

- A weather feed or wind sensor transmits real-time air movement to a lantern display
- LED flame flickers in response to real wind — gentle breeze to gusty storms
- Connects you to a distant landscape through a calm, ambient presence
- github.com/faludi/wind-lantern



Find Stillness

Much of nature stays still — rocks, mountains, even the oceans stay in their place.

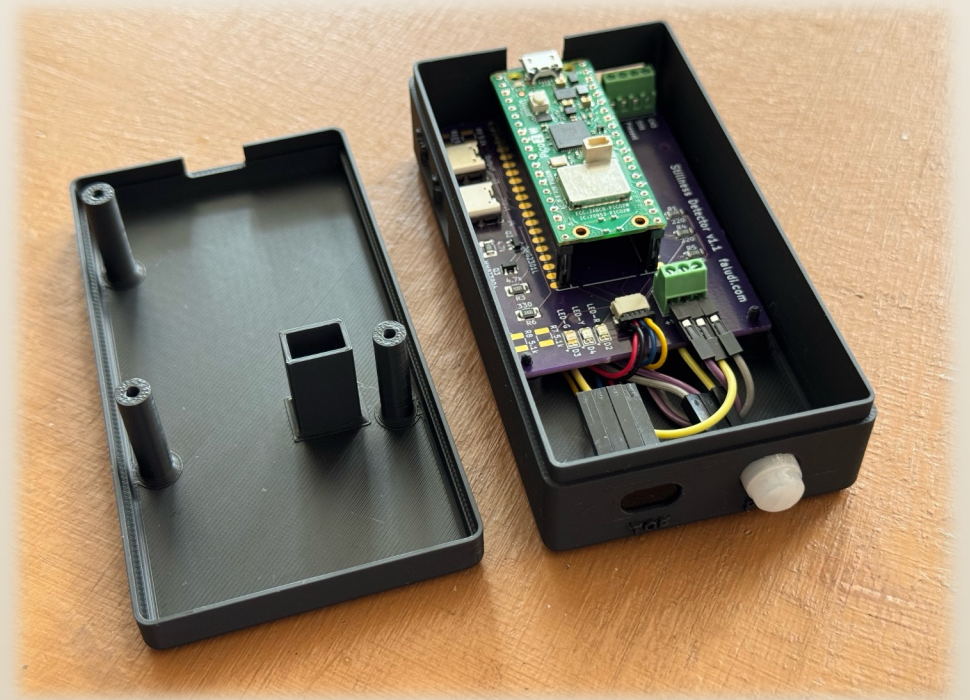
- **Meditativeness** — devices that invite pause and reflection, not constant interaction
- **Being present** — experiences that ground viewers in the here and now
- **Non-striving (Wu Wei)** — technology that acts without forcing, responds without demanding
- **Create calm** — allow users space and time to feel their own humanity



Example: Stillness Detector

A trigger for interactive art that rewards stillness rather than action from the viewer. Senses presence and motion to determine there's a person here, and standing still.

- Three output states: Absent, Present, and Still — artwork can respond to each
- Configurable sensitivity modes (relaxed, normal, strict) with adjustable distance and timing thresholds
- Raspberry Pi Pico 2 with PIR motion sensor & VL53L1X time-of-flight distance sensor. USB-C power switching feature for easy implementation
- github.com/faludi/stillness-detector



Beautiful Humility

Leave room for potential — what is absent matters as much as what is present.

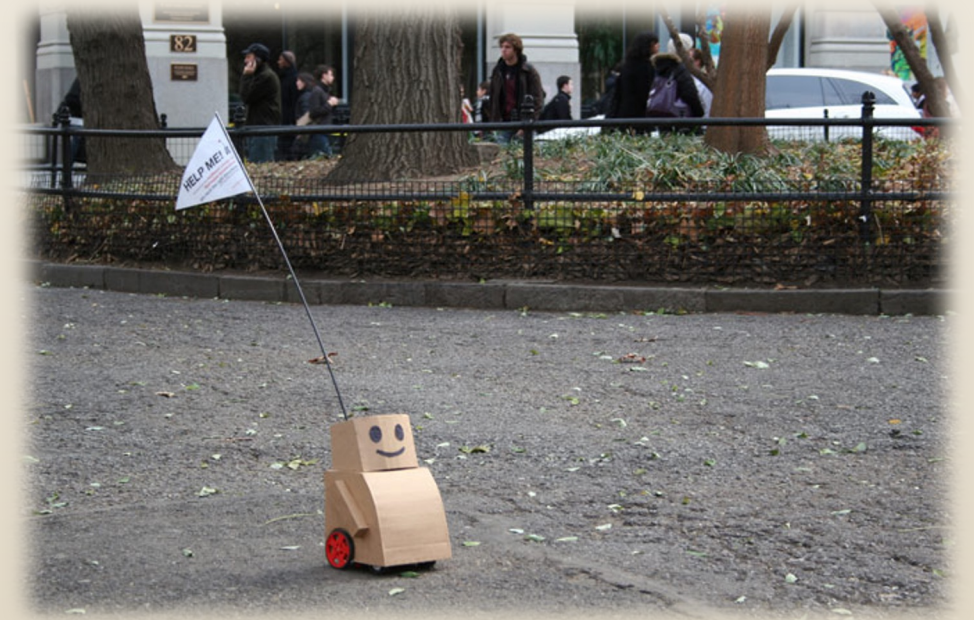
- **Decluttered design** — strip away every feature that isn't essential
- **Emptiness as potential** — open space invites the user to bring their own meaning
- **Unfinished by intention** — devices that leave room for growth and imagination
- **Limited palette** — muted colors, earthiness, and restraint over spectacle



Example: Tweenbots

Cardboard robots that depend on the kindness of strangers to reach their destination — by Kacie Kinzer (NYU ITP). Now in the MoMA permanent collection.

- Simple cardboard body with drawn-on smile — no sensors, no AI, no remote control
- Rolls forward at constant speed; a flag requests help reaching its destination
- Strangers always helped — forming groups, steering it away from danger
- Evokes empathy, humility, and imperfection — wabi-sabi in motion



Welcome & Caretake

Everything in nature gets repurposed — nothing is truly discarded.

- **Hospitality in design** — devices that welcome you, adapt to you, feel like home
- **Timelessness through care** — objects that last because someone is tending to them
- **Nurturing what exists** — maintain and rehabilitate to enhance, rather than replace
- **Repurposing** — give old devices and materials new life
- **Humane intent** — make people and other beings your primary concern



Example: Botanicalls

Houseplants that call you on the telephone when they need water — by Rob Faludi, Kate Hartman, Kati London & Rebecca Bray at NYU ITP (2006).

- Soil moisture sensors let each plant place a voice phone call when it needs watering
- Callers can phone the plants back to hear about their botanical characteristics
- Opens a new channel of communication between plants and people — empowering both
- botanicalls.com



Example: Mud Tub

An organic computer interface that lets people control software by playing in mud — by Tom Gerhardt at NYU ITP.

- Sloshing, squishing, and molding wet dirt controls games and expressive tools
- No buttons, no gestures — users create states in the mud surface however they choose
- Rich tactile feedback closes the gap between our bodies and the digital world
- tomgerhardt.com/mudtub



What's Next?

Summer Camp sessions

Workshop A: The Stillness Detector

A sensor system that detects when a person is present and **motionless** — then sends a signal to trigger your artwork or device

What You Get

- Complete electronics hardware + working code
- Code, schematics, enclosure model: github.com/faludi/stillness-detector

What You Design

- Kinetic artwork, sound installation, light sculpture, or any other dynamic output

Design Brief

- Using concepts from wabi-sabi electronics, employ stillness as an input. Embrace calm, celebrate serenity, and create an interaction that values presence over motion.

Workshop B: The Nature API

An API that makes it easy to incorporate **real-time natural phenomena** in your creative projects.

What You Get

- Basic hardware to run the Nature API codebase
- Code library: github.com/faludi/nature-api

What You Design

- Any device or artwork that responds to natural phenomena — tides, moon phase, sunrise, weather, seasons

Design Brief

- Using concepts from wabi-sabi electronics, nature drives an interaction joining the digital world to the rhythms of the living one.



Your Turn

I hope you're inspired by Wabi-Sabi Electronics and ready to explore it.

No matter what, try taking the aesthetic and world view to heart. Appreciate imperfections, stillness, humility and nature. Bring that to whatever work you do.