REMO- BAND

Assistive device for a Parkinson's Patient to help with mobility

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Hello!

We’re members of the RESS ECI Committee.

We advocate the need for equity and diversity in engineering designs and solutions.

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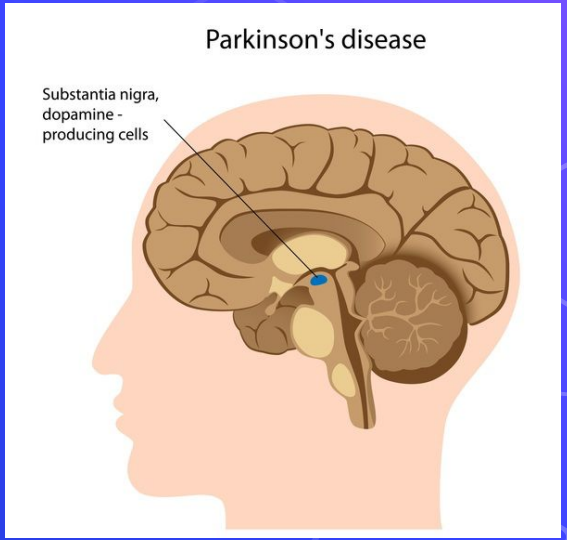
Parkinson’s Disease

Is a neurodegenerative disease that affects the dopamine producing neurons in the substantia nigra of the brain.

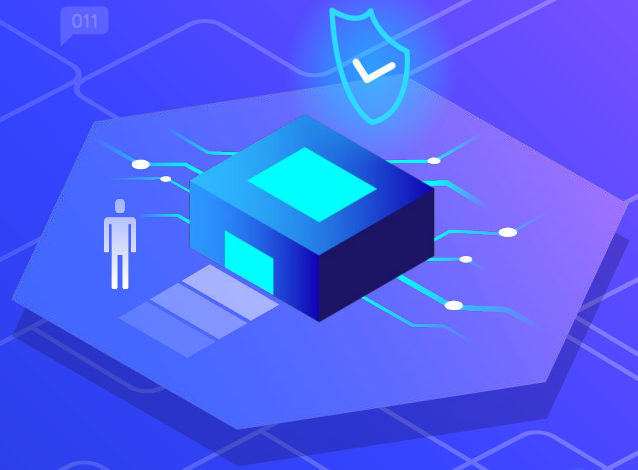
Symptoms include:

- Tremor
- Stiffness in muscles
- Bradykinesia
- Gait and balance problems



> Studies have shown that mixed tremor is common in people with Parkinson's disease. 19% of the patients with PD are found to have action tremor, 30% of the patients have resting tremor and 81% of the patients experience mixed tremor.

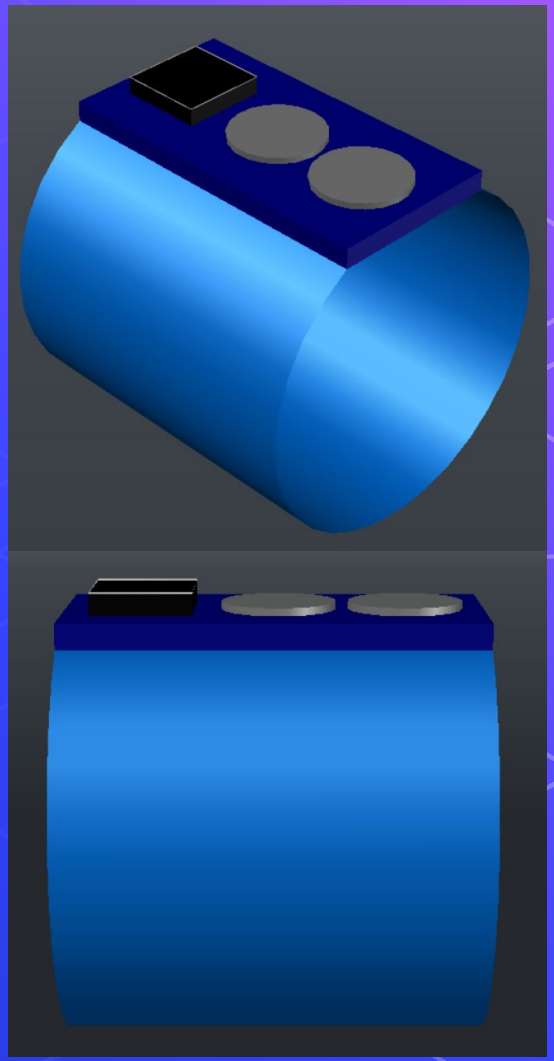
1. Design



Side view

Black box is a smart watch

- Main processor chip
- Sensitive touchscreen
- Accelerometers
- Wifi and Bluetooth
- Health-related applications: exercise monitors and heart rate monitors



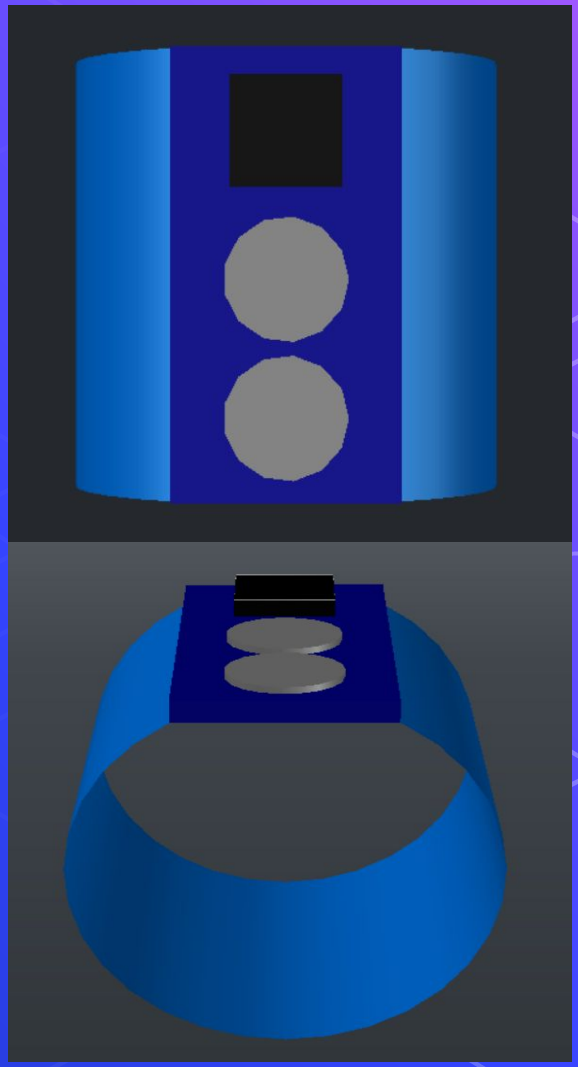
Top and front view

Two gray flat magnets

- Attach weights to reduce the shaking
- Between 0.2 lb and 0.5lb

Blue wristband

- Customized



2. Financial Consideration

Business Model Canvas

Key Partners

- Medical device Companies
- Banks (loans/investment)
- Doctors

Key Activities

- Mechanical design
- Product design
- Coding software
- Customer service
- Negotiation

Key Resources

- Mechanical equipment
- Software developers
- UX designers
- Project Fund

Revenue Streams

- Royalties
- Licensing
- Investments
- Fees charged per transaction

Value Propositions

- Easy operation
- Adjustable
- Portable
- Light weight
- Affordable

Customer Relationships

- Help Center with question and answer FAQS
- Call centre
- Detailed device manual

Channels (how do customers find out about product)

- Advertising
- LinkedIn
- Physician
- Networking
- Word of Mouth

Customer Segments

- Medical device companies
- Hospitals
- Parkinson's patients

Cost Structure

UV light per bulb	$38 - bulk
Photoresist Film	$12.99 per roll
6 inch silicon wafer	$125 per unit
Master Mold	$5 per piece
Polydimethylsiloxane	$7 per kilogram
Waterproof wire	$2.50 per 4 pack
Magnets + Weight	$6 per 6 pack + $22 per pack
Wristband	$15 per piece
Extra: Touchpad Wheelchair	$30 each $600 per wheelchair
Total:	$264 microchip + wires + magnet +touchpad Around $1000 for complete package with wheelchair

3. Technological Consideration

Safety Features Vs Safety Concerns

- Wristband to protect skin from direct contact with microchip.
- Motion detector
- Waterproof
- Magnets allow for weight which help reduce tremor
- Monitors heart rate

- Strain to limb after increased amount of usage
- Long term usage can cause radiation damage
- Risk of hacking

**Based on this information, this medical device has the ability to do more good than bad. Not only will this help with the mobility but it will also help reduce tremors and monitor health of patient.

Human Consideration

- This is especially important because we want create products that ensure efficiency and safety for user. While also making a product that is easy to use.
- Human considerations **include**:
  - Safety
  - Manufacturing - Easy to Assemble
  - Operation - Easy to use on daily basis

Risk consideration

- Wrist cannot move freely

  → all customized so that the products can be smooth and soft and bring comfort to users

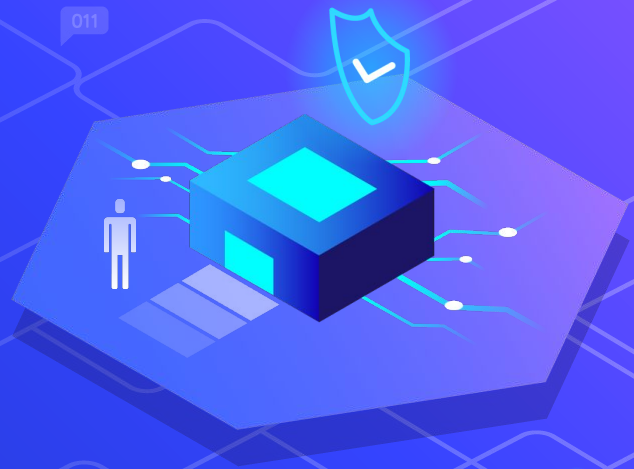
- Wrist strains

  → Can be minimized by the smart watch. Monitored by doctors. The schedule will be tracked daily. Some exercises to reduce tremors

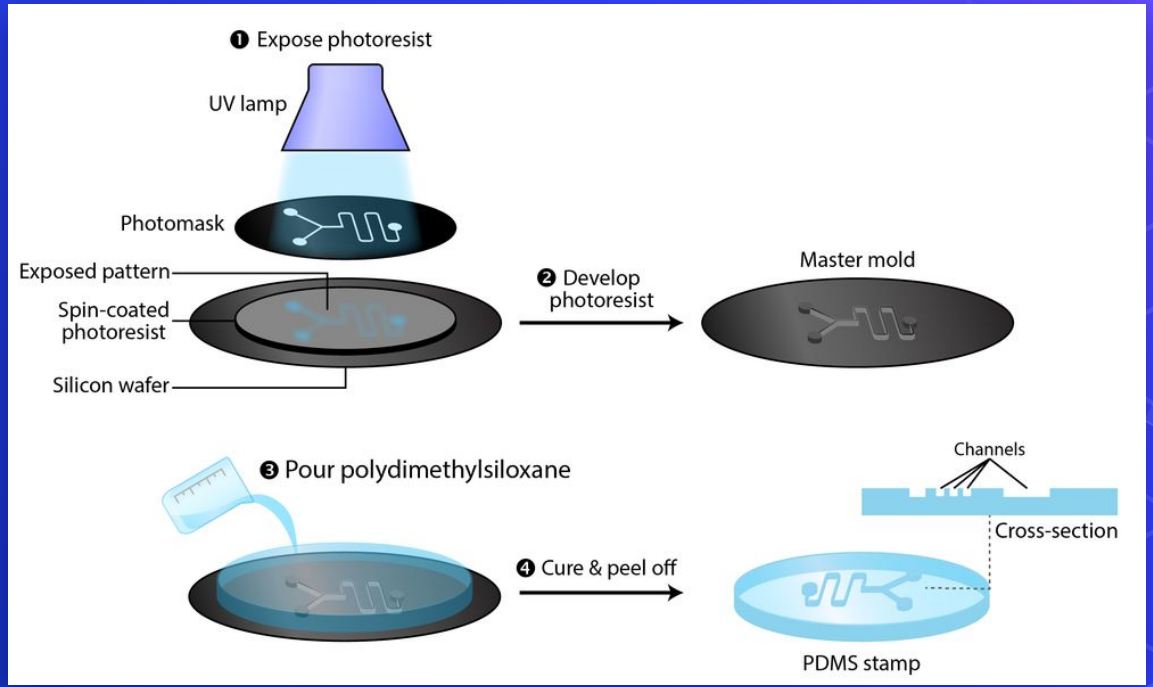
- Radiation exposure

  → The radiation does not have enough energy to cause cancer.

4. Manufacturing



Manufacturing Process



Steps & Limitations

Integrated Circuit (IC) formation

A thin silicon crystal film layer is coated with **photoresist.** The circuit pattern of the **photomask** is then projected onto the **photoresist** using UV light. The new **photoresist** is then used as a **photomask** to repeat the process to etch the shape of wiring and other components onto the oncoming layers.

Limitations

Detailed inspection and measurements of the newly etched layers are performed to ensure that there are no defects identified. If any defects are found, the entire process will have to be repeated with new changes being made to the mold.

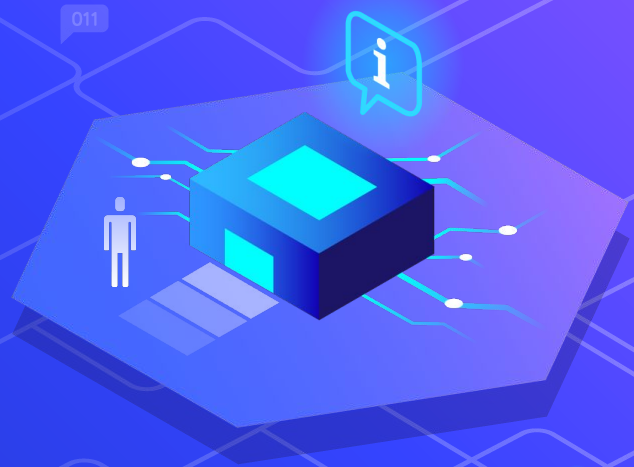
Integrated Circuit (IC) interconnection

Copper wires between multiple ICs in a microchip are coated with a **dielectric** material over each layer. These layers are then interconnected by etching holes; tungsten is then deposited within these holes through the process of **CVD**.

Limitations

Copper interconnects are used to reduce timing delays; but to prevent the copper from diffusing into its surroundings, electrically conductive barrier layers need to be used. Due to the large number of interconnect layers, planarization of previous layers is required to ensure a flat surface before moving onto further **photolithography** processes.

5. Legal & Ethical Considerations



Manufacturing Standards

- Purification and crystallization of Silicon will proceed under common factory protocols.
- Workers will also be legally required to wear protective gear (gloves, goggles, etc).

Design Laws

Domestic

- REMO-BAND will not be protected by the *Copyright Act*.
- REMO-BAND will be protected by the *Trademarks Act*.

International

- REMO-BAND is not eligible for any *Design Patent* protection.
- Our funding will be provided by shareholders within the private sector.

Ethical Principles

REMO-BAND is an external assistive device that only records user data for health purposes. Under no circumstances will this data be shared with anyone other than the user, the health professional they consult, and if requested, their immediate family members.

Thanks!

Any questions?

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