NanoPack

For NanoView Biosciences

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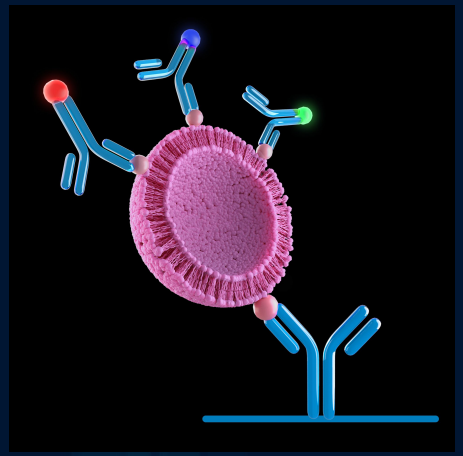
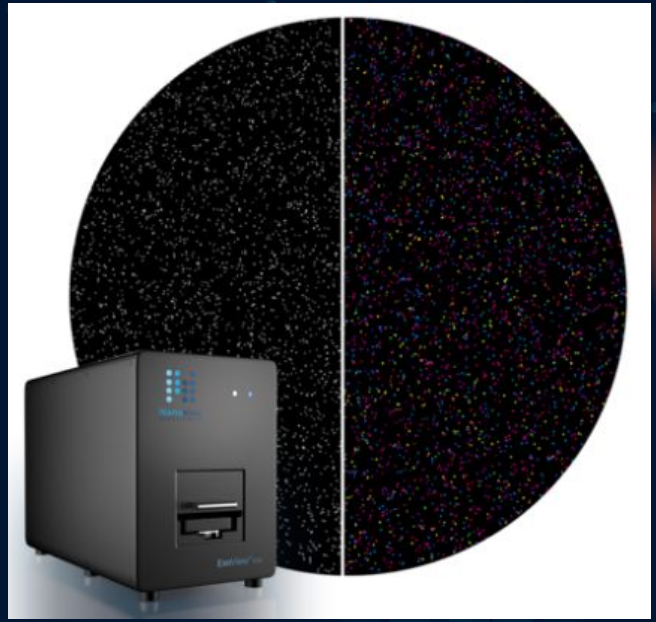
Background

Nanoview Biosciences:
Makers of a machine and technology which is capable of measuring markers on single exosomes and other extracellular vesicles.





Problem Statement

- NanoView currently uses a person with tweezers when they transfer silicon chips from their lab container, “the traveler” into user cases, “clamshells.”

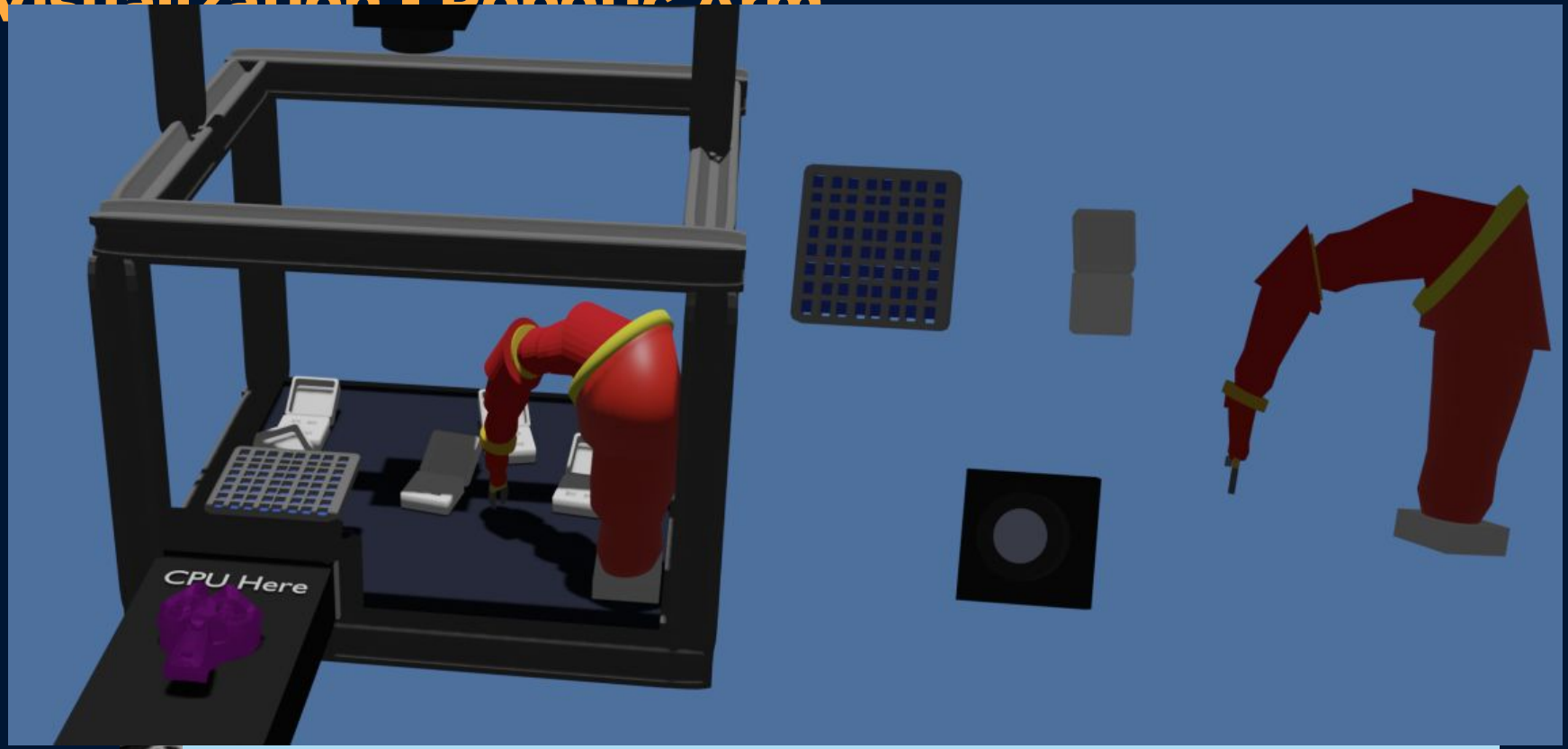
- Our job is to automate the process of transferring the chips from the traveler to clamshell

- This will speed up the process, prevent human error, and reduce risk of contamination.

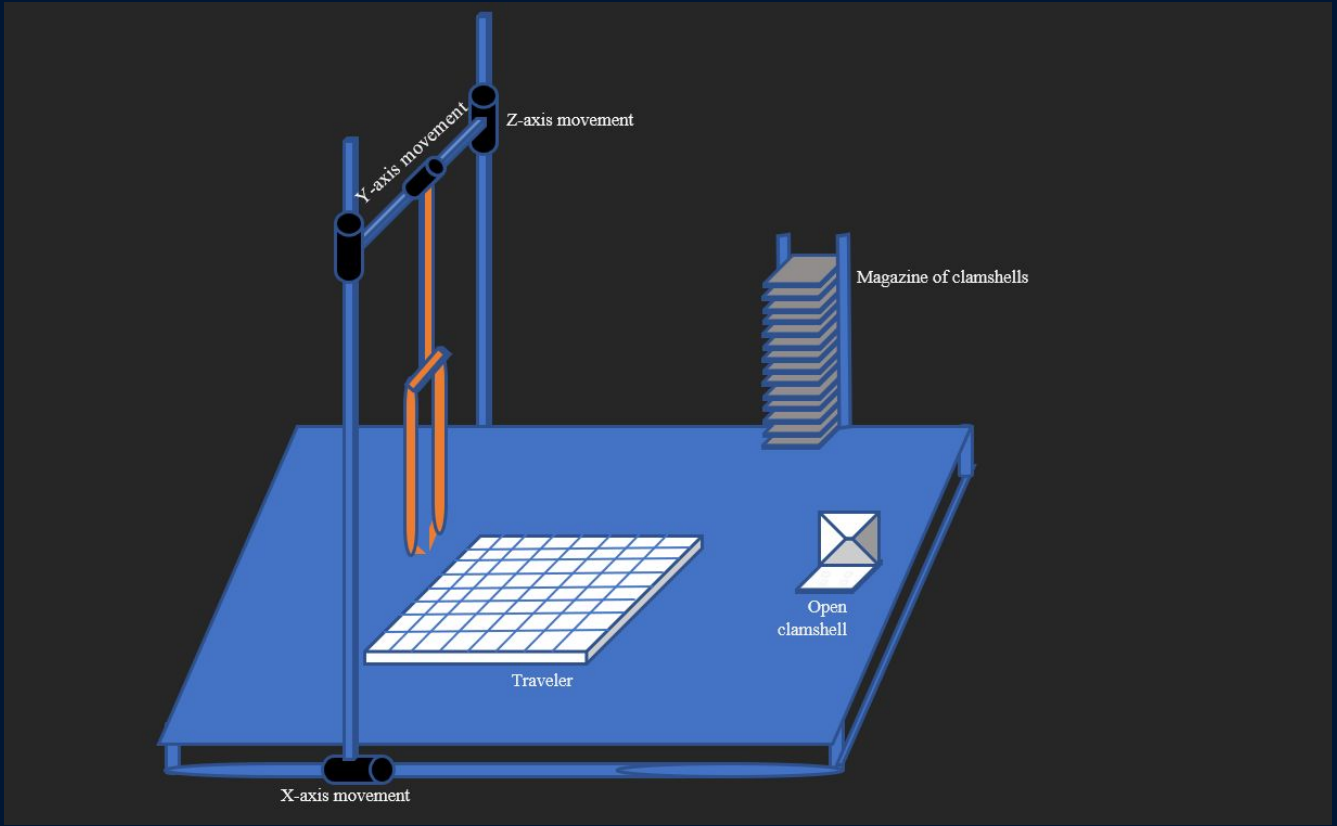
Proposed Solution

- A packing machine that can fully automate the process of chip transfer.
- A robot will pick up and deposit the chips.
  - Robotic arm or CNC-style robot
  - Soft robotic claw to pick up chips
- Machine vision will be used to detect the location and orientation of the clamshell.

Visualization - Robotic Arm



Visualization - CNC machine (numerical control)



Deliverables

A packing machine with:

- A robot with the ability to transfer chips from traveler to clamshell
- A computer vision system that can:
  - Read chip codes to decipher plate maps
  - Detect clamshell placement to guide arm
- A software application to control the machine and document the chips

Functions + Objectives

1. Read chip identifiers
2. Detect exact clamshell locations
3. Open clamshell
4. Pick up chips from traveler w/o damage
5. Decide where to place chip based on input data file
6. Drop chip into correct spot in clamshell
7. Close clamshell

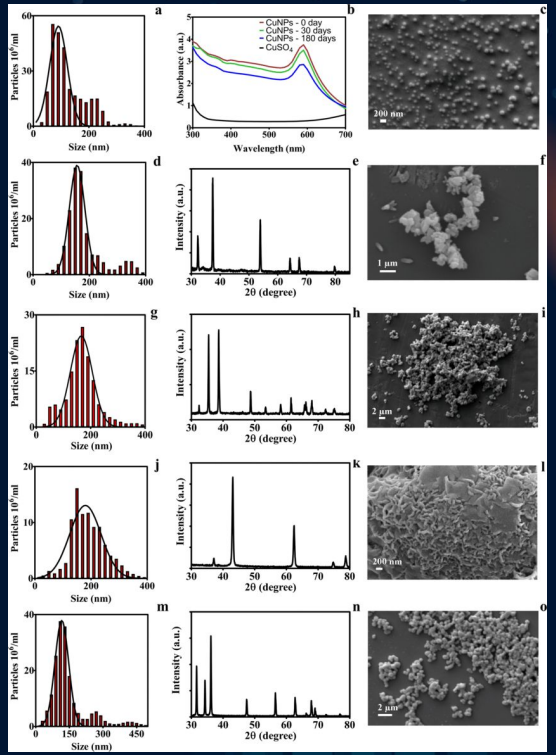
Constraints

1. Packer must cover a 200x100mm area
2. Precision capture and release of a chip
3. High throughput - 1000 clamshells/day
4. Low or zero error rate

Competing Technologies (NanoView)

Nanoparticle Tracking Analysis (NTA) Microscope:

- utilizes the properties of both light scattering and Brownian motion in order to obtain the nanoparticle size distribution of samples in liquid suspension
- manufactured by various companies such as Malvern Panalytical or ZetaView
- NanoView is able to measure details with greater accurately at smaller sizes



Competing Manufacturing Processes

Because of the dimensions of the chip and the fragile nature of the coating only custom manufacturing solutions would be suitable.

- Kuka - Custom Robotics Solutions
  - Mobile robot, battery operated
  - Custom patented “grippers”
  - High Cost
- Isel Wafer Handling robot
  - “Scoops” chips
  - Not very scalable
  - High Cost

Questions?