NBD Nanotechnologies

Using nanotechnology & biomimicry to solve the world's water crisis

Deckard Sorensen (B.S. Biology c. Bioinformatics 2012)
Miguel Galvez (B.S. Biology 2012)
Andy McTeague (B.S. Chemistry 2012, MIT PhD 2016)

Advisor: Dr. Anamarija Frankic, UMass Boston

Market Analysis

Target Markets:

- Arid climates in the U.S. $30B
- Eco-friendly consumer ($300B worldwide)
- Middle east: $1 Trillion invest in water projects by 2020
- Latin America- Poor water infrastructure
- NGOs/Non Profits
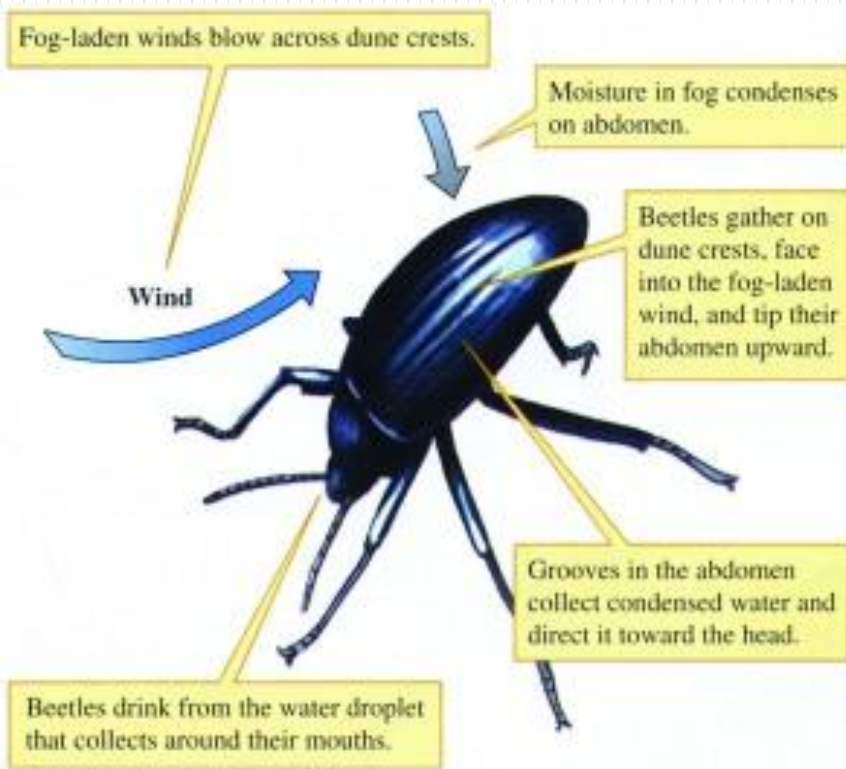- Government/Military (clean tech) $1.2B

$10B investing by 2030

Problem:

- By 2030 water will be worth more than oil.
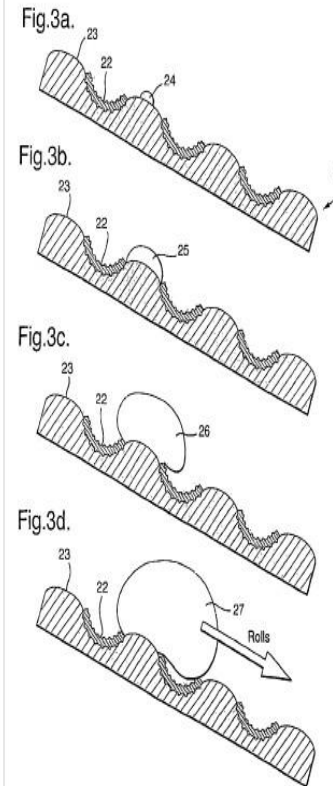- Third world has on average 20x less clean drinking water

Solution?
Namib Desert Beetle

Fog-laden winds blow across dune crests.

Moisture in fog condenses on abdomen.

Wind

Beetles gather on dune crests, face into the fog-laden wind, and tip their abdomen upward.

Grooves in the abdomen collect condensed water and direct it toward the head.

Beetles drink from the water droplet that collects around their mouths.

http://www.technovelgy.com/ct/Science-Fiction-News.asp?NewsNum=655

Fig.3a.
Fig.3b.
Fig.3c.
Fig.3d.
Rolls

Superhydrophobic/ superhydrophillic **Nanotechnology**

Inspired from research at MIT, Sandia National labs, Berkley

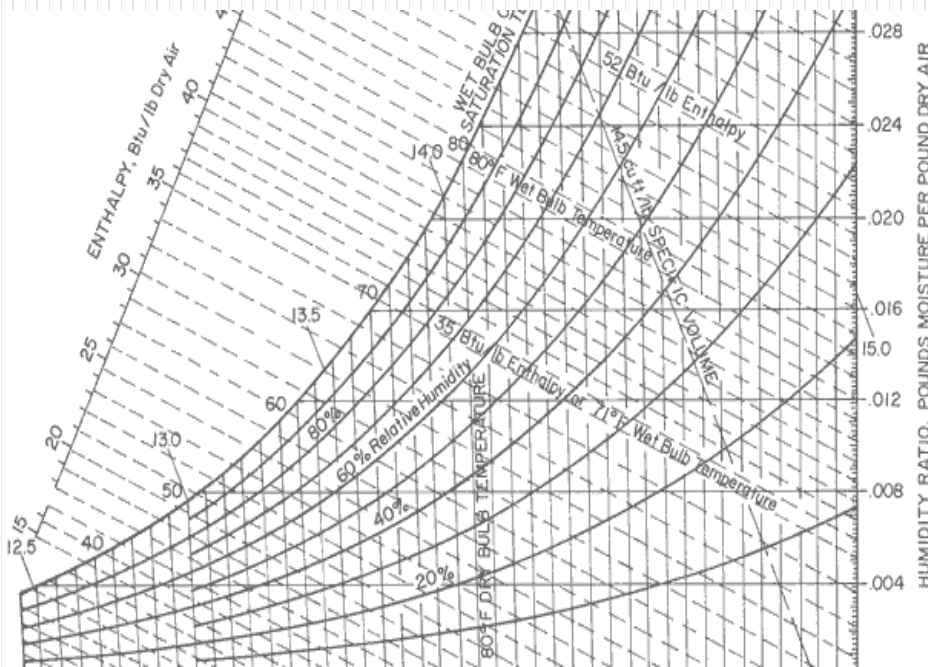nbd
nano

Nanotech samples we've made...
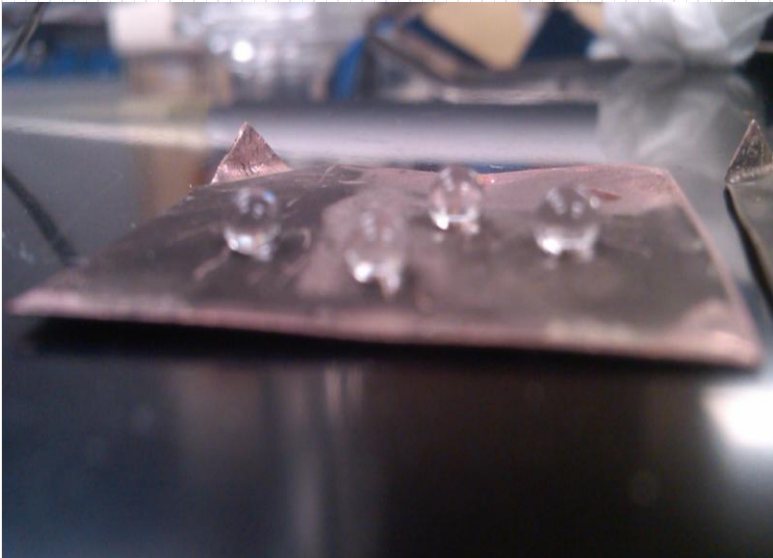
Superhydrophobic- Droplets look like tennis balls

Movie of superhydrophibic/phillic Notice some droplets stick and some roll off easily….

Create water from the air

Psychrometric chart

Tells you the temperature gradient you need to create water
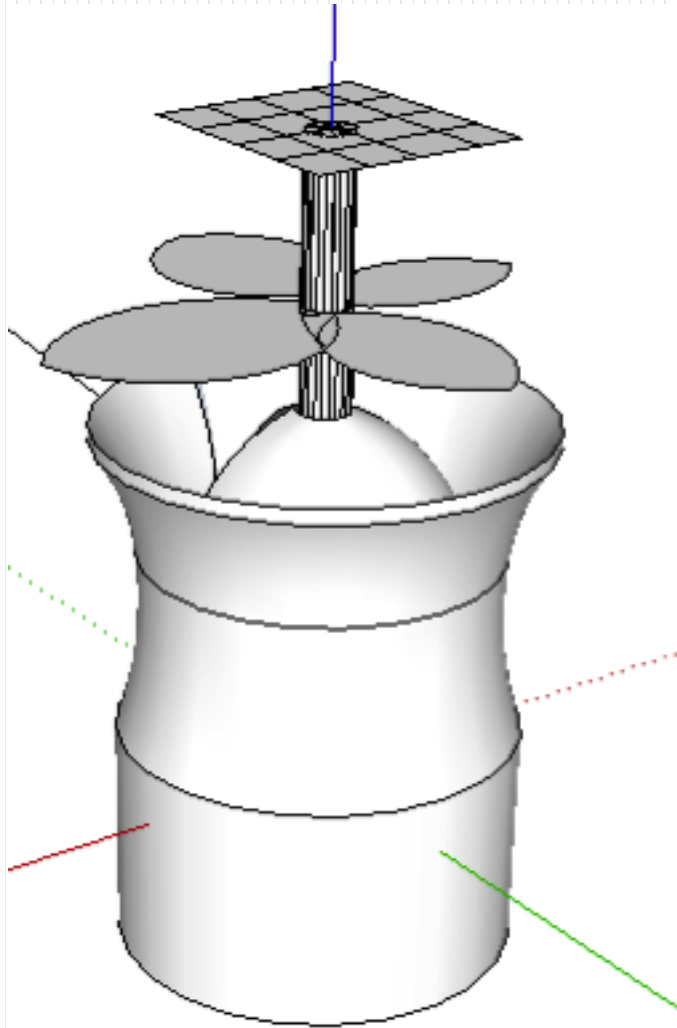
Room temp & .02 Humidity: 17 degrees F

Condensation from airplane cabin air flow. Miguel took this picture

80 F outside, 65 F inside

Flagship product: Individual consumer

1. Use solar energy to create temperature gradient for condensation
2. Collect water with nanomaterials
3. Filter water
4. Collect water

Solar powered

Intellectual Property

- Provisional Patent Serial No.61/634,571 .

- We are patenting the business method of creating a temperature gradient to commence condensation and using a superhydrophobic/superhydrophillic material to collect water.

  - We are not patenting the nanomaterial. This has been made thousands of times since research commenced in this area in 1970.

  - However, we have novel application for this material

Financial Growth

$$ Profit over 5 years
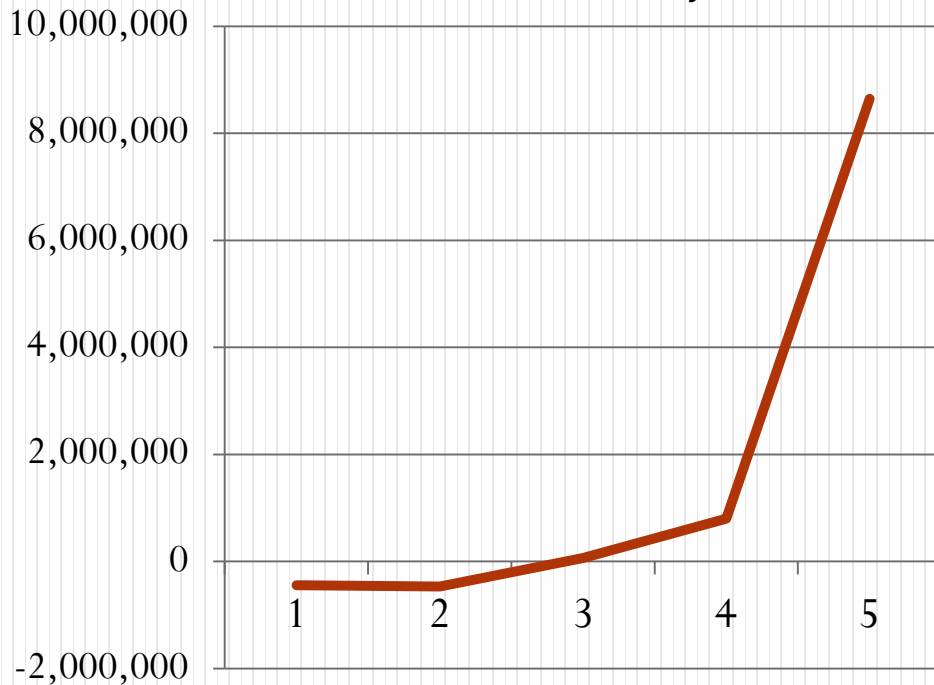
- Affordable- range: $50.00-$10,000 per unit (size/complexity variance)

- (½) Liter/hour (24x8in) ($50-$200)

Current methods/ Competition

- *Current Methods to extract clean water:*

  1. **Fog Nets**: Low yield/ require fog-540 cubic meters for 200L/day
  2. **Desalination processes**: Very expensive. Not viable for third world. $87M to implement.
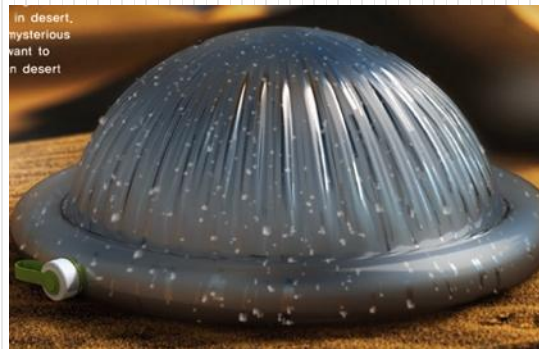
- *Competition: (Namib Desert Beetle Biomimicry)*

  1. **Dew Bank Bottle:**
     1. **1L/day**
     2. **fog**
     3. **no nano**
  2. **The Airdrop**
     1. **3L/day**
     2. **no nanotech**

Timeline

- Building a manufacture grade prototype (3 months): $10-40k (Seed)

- R&D Phase 3-12 months ($1M series A)
  - Office/Manufacturing space: $200k
  - Inventory: $300k
  - Human Capital: $500k

- Commercial Phase 12++ ($5-10M series B)
  - International distribution and scale

Team

- **Deckard Sorensen** (B.S. Biology c. Bioinformatics 2012): Solid knowledge of Biology/ Nanotechnology/ Programming (Java, HTML, CSS, Python, Matlab)

- **Miguel Galvez** (B.S. Biology 2012) Three years lab experience, TechStars Associate, founded mobile application in iTunes app store.

- **Andy McTeague** (B.S. Chemistry 2012, MIT PhD 2016) Featured in over 10 chemistry publications, International chemistry fellow

Use of accelerator funds

- $250 chemicals
- $150 hardware
- $325 provisional patent
- $100 MassChallenge accelerator application
- $50 miscellaneous costs

=$875

We could use 10k more…..

The future of clean water is here