



# Moving Textiles into the 21<sup>st</sup> Century Through Technology



October 2018

Argaman Technologies Ltd.


# *Argaman's Corporate Goal*

*We seek to dominate the specialty textile industry by producing superior and proprietary textiles by introducing low cost, environmentally compatible finishing processes at fiber level entry into textiles and master batch entry into polymers.*



# Jeff Gabbay - CEO

## Career Highlights:

 *More than 30 patents*

 *Published over 20 scientific publications*

 *Founder of Cupron, Inc. (exited in 2010)*

 *Advisor to NASA*

 *Advisor to IDF*



# *Present Generic Technologies*

 *Cavitation*

 *Healthcare*


 *Cosmetic*

 *Mosquito repellent – in development*

 *Non-ignitable cotton – going into pilot production*

 *Accelerated Metal Oxides in Master Batch*

 *Moisture Management -Bi Component  
Fabrics (Temperature Control )*

 *All Covered by patent applications*



# Projects and Their Status

## Development ready or in final stage:

### **Master batch System – Production ready**

### **Cavitation System-Final stages of first mass manufacturing prototype line**

#### Products:

- Bio-inhibitive polymer fiber (PET)
- Bio-inhibitive cotton fiber
- Non-ignitable cotton fiber
- Core body temperature control
- Wound healing fibers (PP)
- Multi-functional fibers (FR + Bio-inhibitive)
- Cosmetic wrinkle reduction fabrics

## In the pipeline:

- Mosquito repellent (natural) fabrics
- Anti-bed bug
- Water proof cotton
- Transdermal medical delivery
- Radiation protection
- Sutures
- Infection reduction catheters
- Viral blood deactivation
- Wound healing matrix
- Membranes



# **ULTRASONIC CAVITATION AND MASTER BATCH**

**Argaman's SOUND technology**

# What is Ultrasonic Cavitation?

Applying high-intensity ultrasound to water introduces enormous mechanical strains. These are powerful enough to actually rupture (“tear apart”) the liquid, leaving small cavities in the water.

These cavitation bubbles rapidly collapse, releasing tremendous amounts of energy as **heat** and **intense shockwaves**.

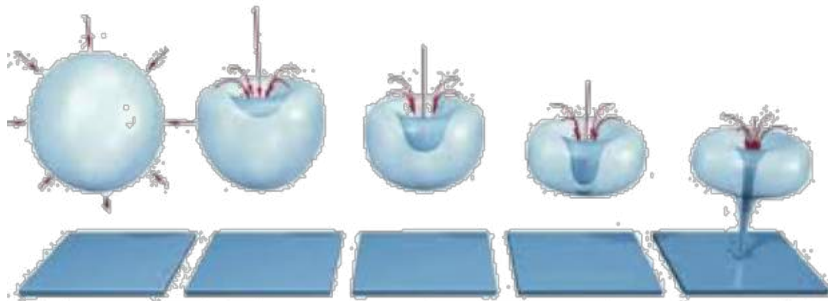
# Our Ultrasonic Magic

Cavitation bubbles collapse at 2,000 atmospheres and 5,000C, causing extraordinarily powerful **shockwaves**.

Using the clean **energy** of ultrasound, we simply **blast** our chemistry into fibers.

The high-speed chemical particles embed into fibers like **arrows shot into a tree**.

Our fibers now have unique and value-added properties .

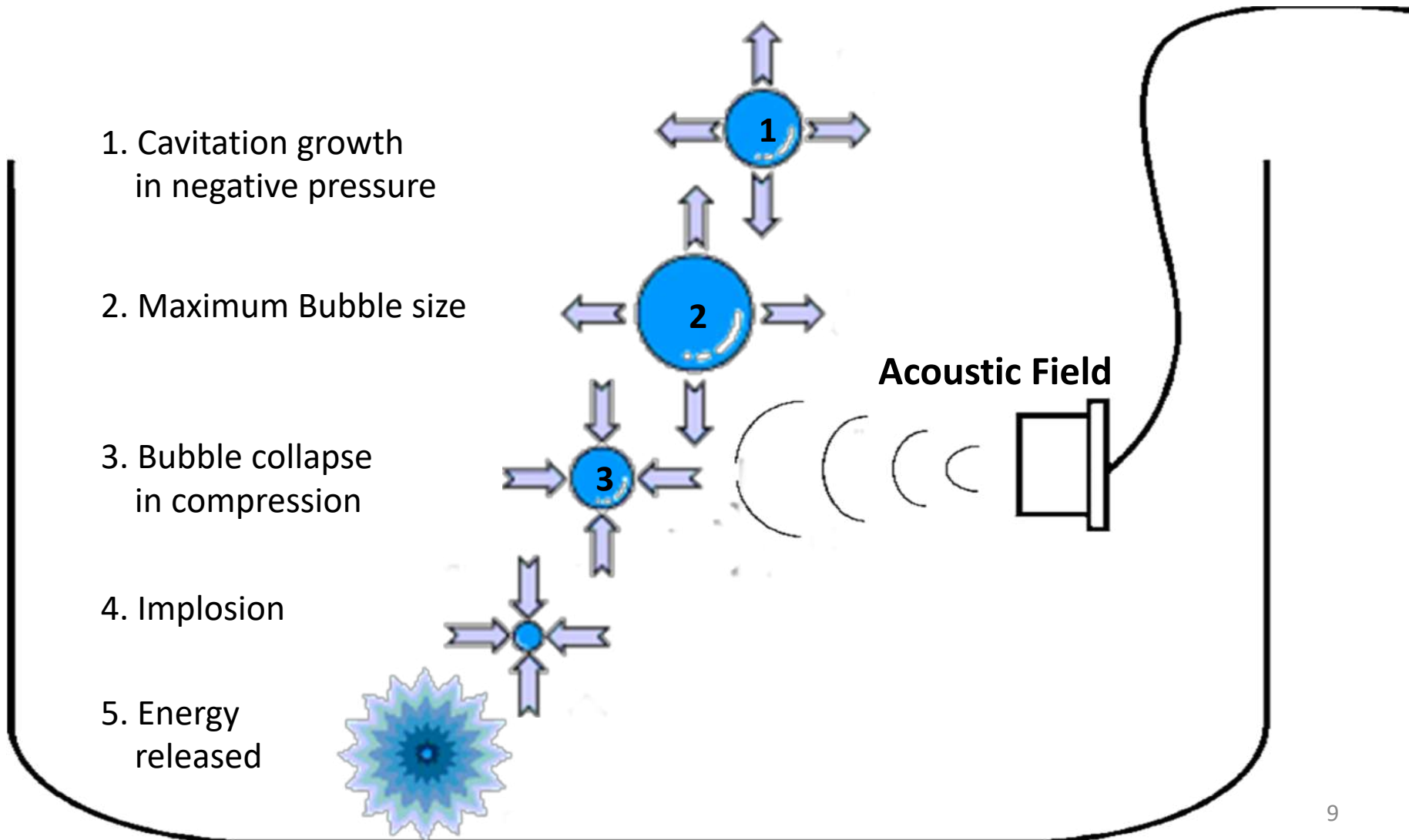


**Shockwave!**





# The Secret: Cavitation Shockwaves



# Hospital Acquired Infections

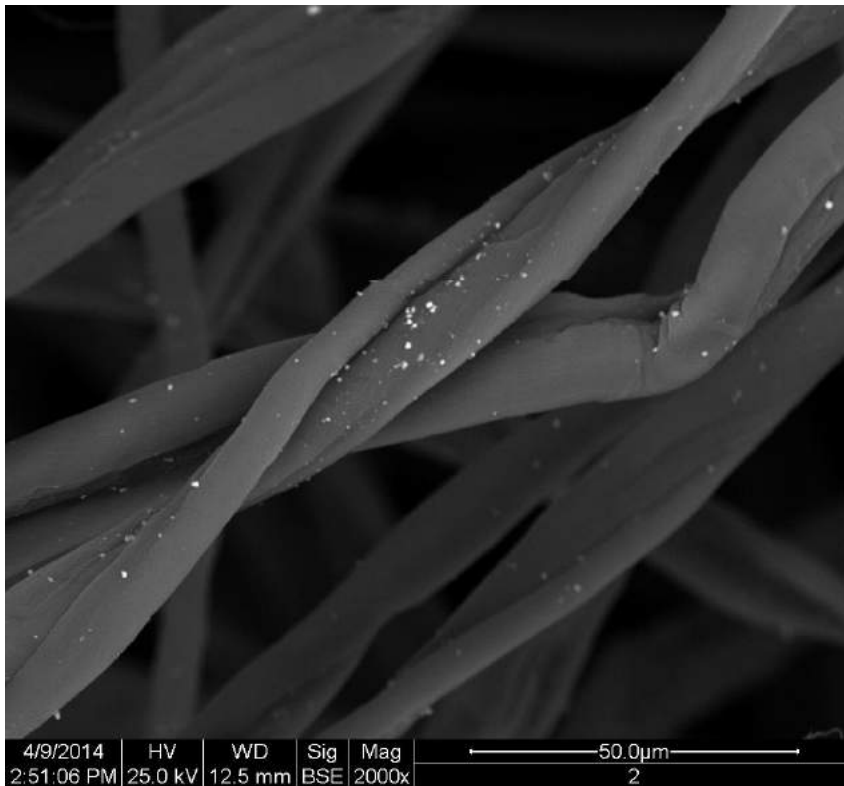
100,000 deaths a years in the USA alone  
10,000 deaths a year in the UK

	2010-2011	2011-2012	Percent Decrease	P value
<b>Total # of HIA Infections</b>	73	49	25%	<0.05
<b># of times patients given Antibiotics</b>	53	37	30%	<0.05
<b>Total Days of Antibiotics</b>	762	497	34.8%	<0.0001
<b>Fever &gt;38.5°C</b>	58	18	70%	<0.0001

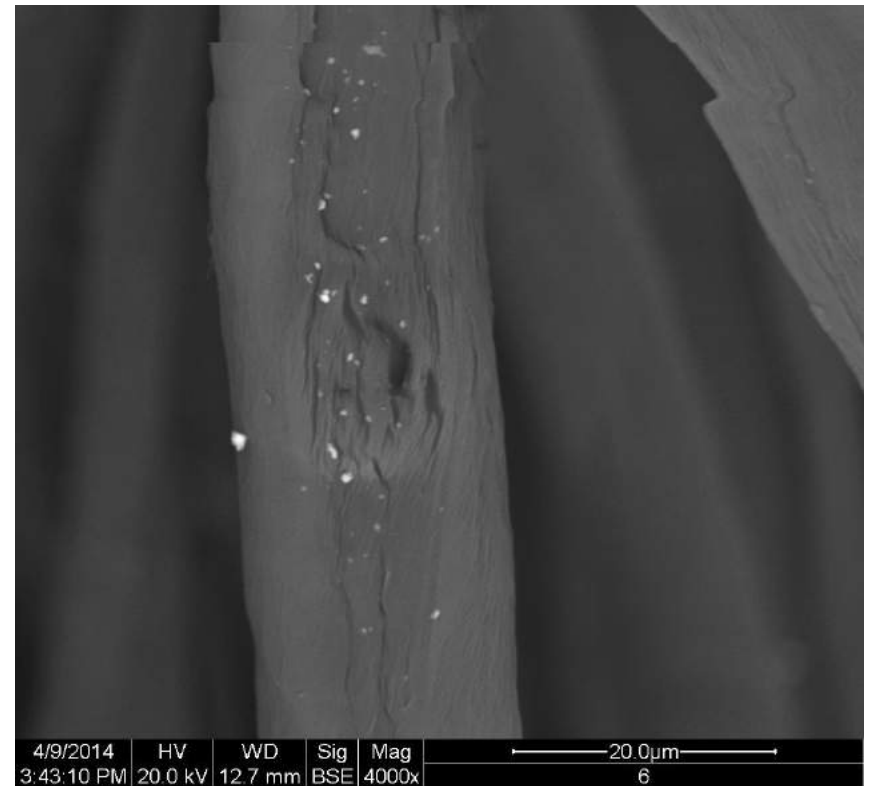


# Bio-inhibiting Cavitated Fibers

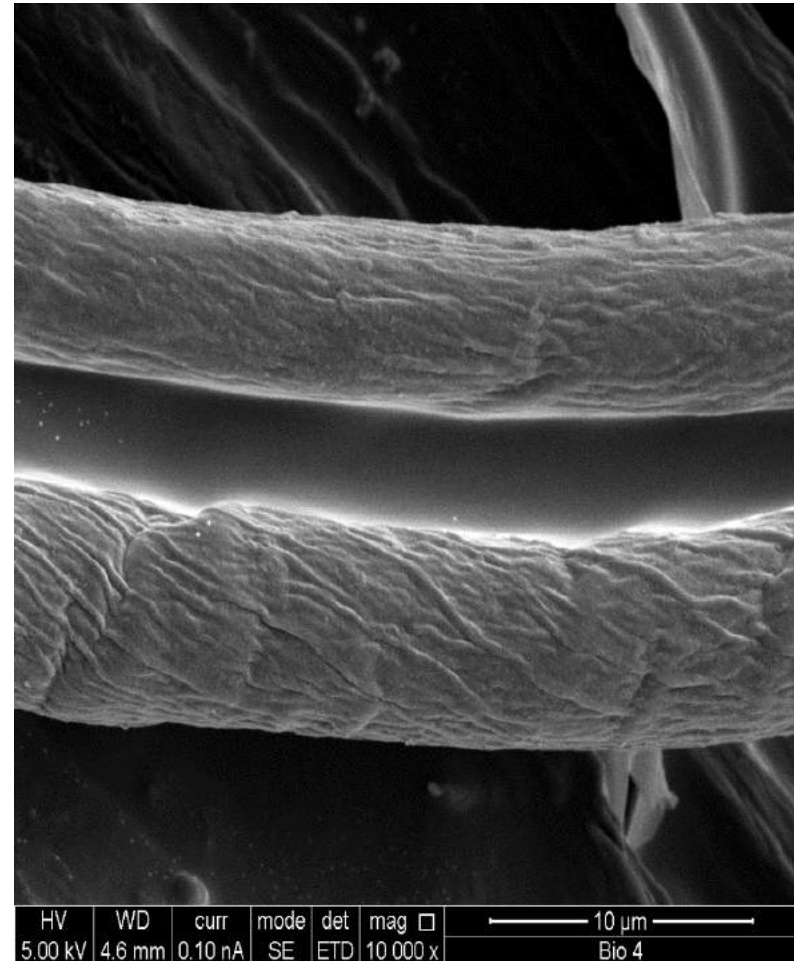
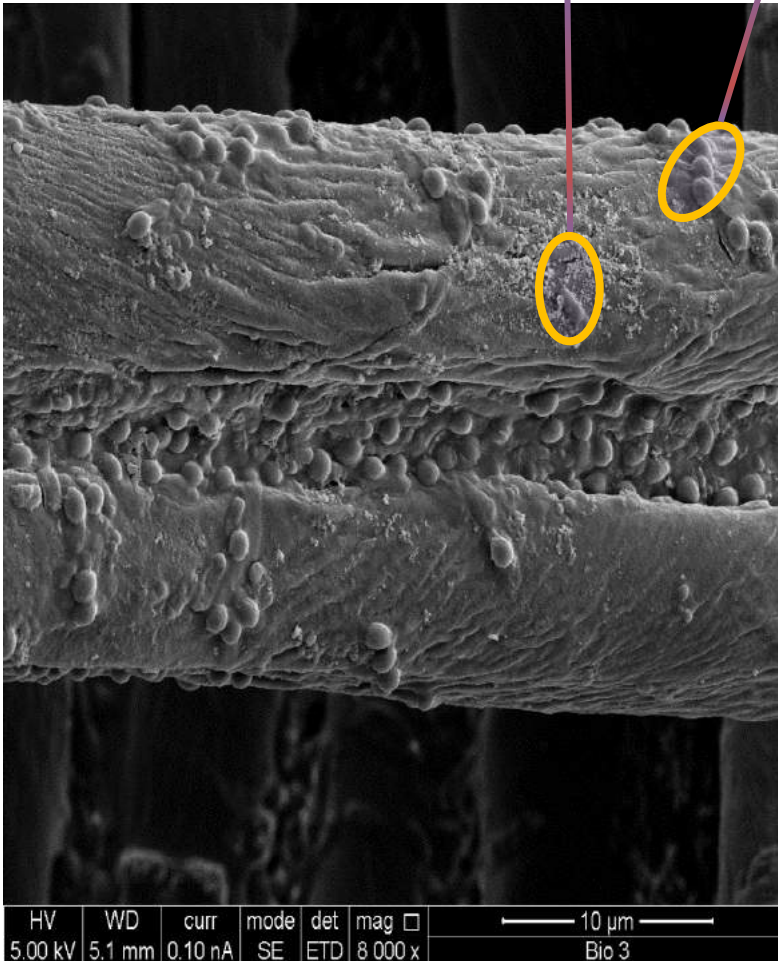
**After 20 abrasive washings**



**Internal examination of fiber**



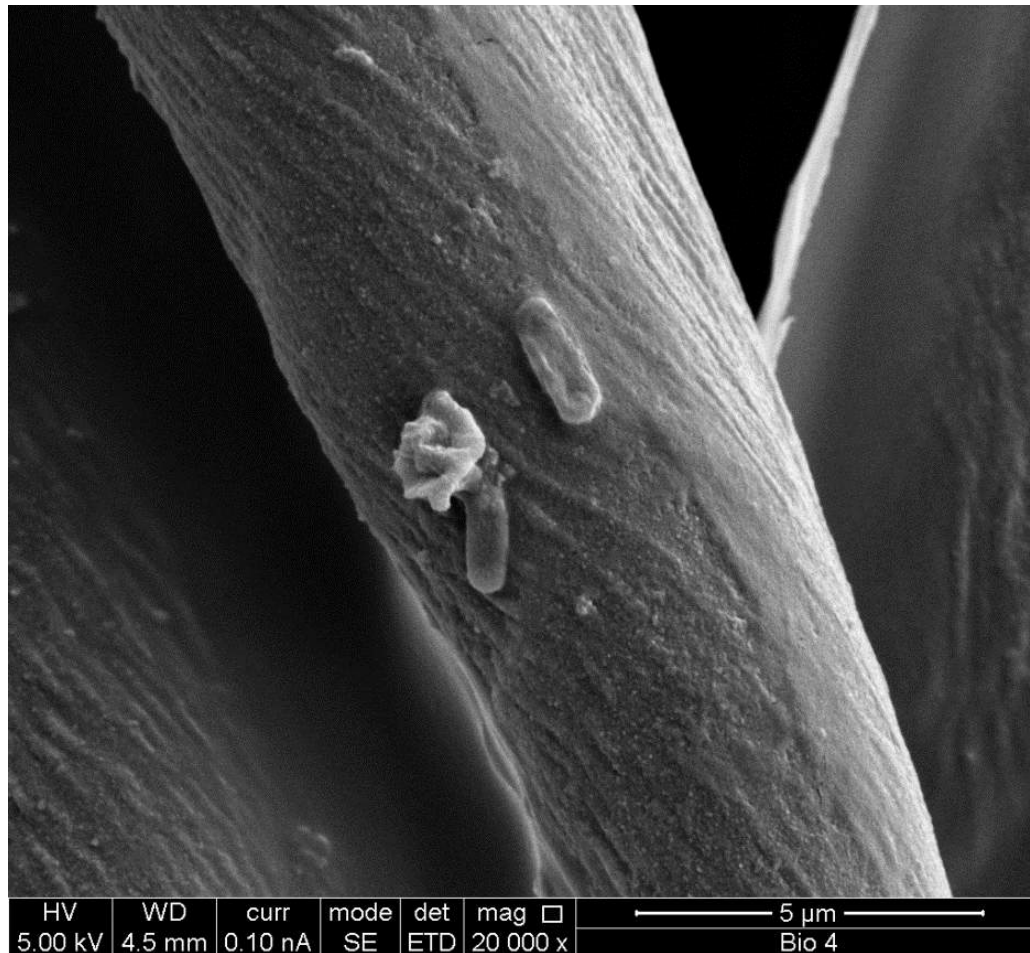
E.coli Streptococcus



Cotton Fiber

Treated Cotton Fiber

# Single Cotton Fiber Showing Cavitated Copper Oxide Particle and Two Destroyed *E. coli* Bacteria



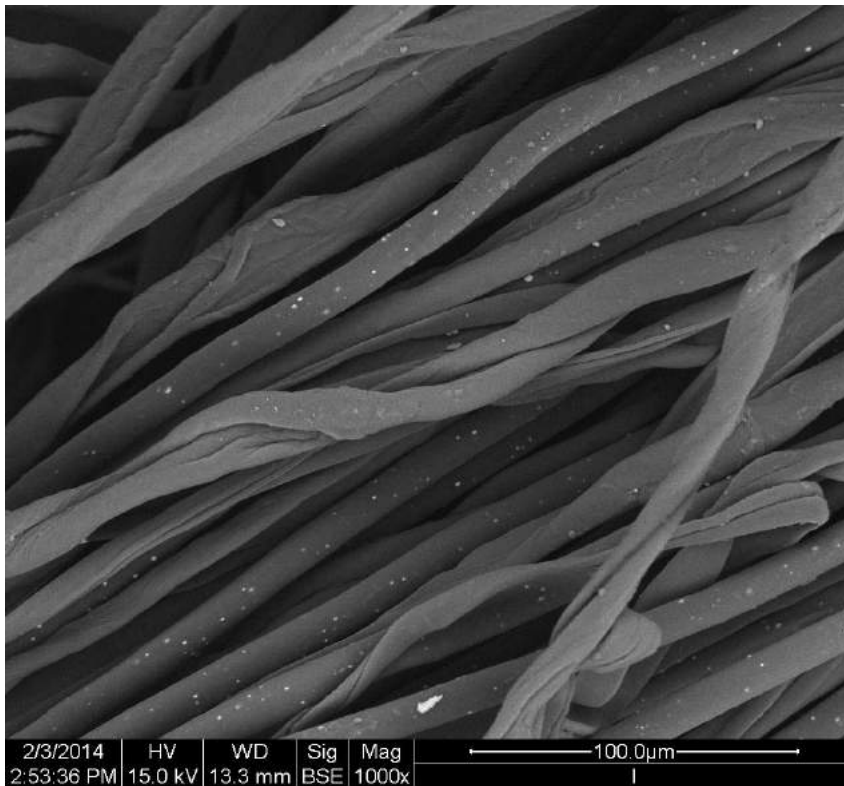
# Master Batch Products

- Accelerated Metal Oxides
  - Microbial inhibition HAIs soft surface control
  - Personal hygiene (socks, underwear)
  - Wound healing (gauze, diabetic socks)
  - Cosmetics (creams, ointments)
  - Application to films for HAI hard surfaces control
  - Food packaging for extended shelf life

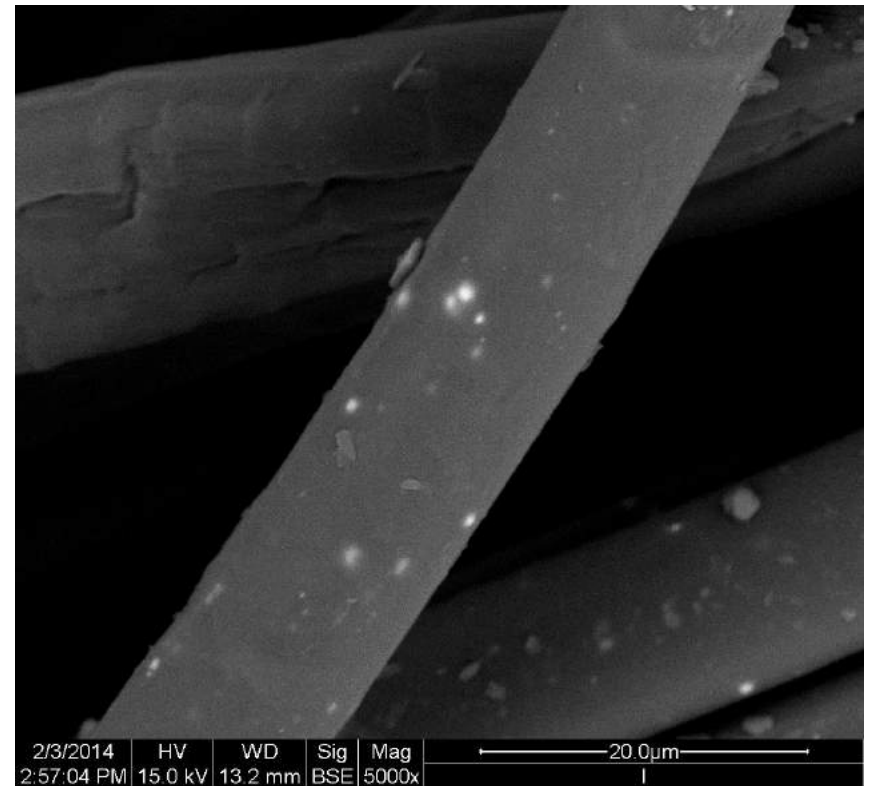


# Accelerated Metal Oxide Extruded in a Fiber

Cotton/Polyester Blend Yarn



Single Polyester Fiber





# CottonX™ Pillowcases Achieve True Beauty While You Sleep

*(results after 4 weeks) Study done at ONYX GH Ltd. in Israel*

Before



After



Before



After





# *Fire Retardant Textiles*

*A new level in efficacy*

## COTTON

Cotton is generally not used due to lack of durability, high cost, fabric hand issues, environmental problems with current processes, and allergic reactions to people wearing treated fabrics.

*Argaman's Breakthrough Technology is:*

- *Permanent*
- *Inexpensive To Produce*
- *Soft To The Touch*
- *Hyperallergenic - natural additives*





## Wound Dressing

**Argaman's Quality Dressing**

Published Evidence of the effect of Copper Oxide on Diabetic Ulcers  
Note: Reduced scar tissue indicating cell regeneration rather than cell repair

#3423, 55 YO Diabetic  
Started Cupron 04-19-2006

Start  
treatment



2 Weeks  
of  
treatment



4 Months  
of  
treatment



#1875 71 YO diabetic,  
Started Cupron 04-18-2006

Start  
treatment



2 Weeks  
of  
treatment



4 Weeks  
of  
treatment



10 Weeks  
of  
treatment



62 YO WF Diabetic



09-09



10-07






# **Moisture Management for Consumer and Healthcare**

**CORE BODY TEMPERATURE CONTROL**




# *Bi-component Fabrics*

## *Variations*

Performance attributes of our fabrics

-  *Reduction of heartbeat rate in exercise regimen*
-  *Removal of exudates from wounds through moisture movement*
-  *Instantaneous heating (scuba suit concept)*

*NASA is currently testing our garments in the International Space Station  
Additional fabric and garment combinations we are now producing*

-  *Accelerated Bio-inhibition*
-  *Fire Retardant with or without Bio-inhibitor*
-  *Seamless version in development of garments*

 Argaman Technologies LTD.



# Cooling Garments

**Temperature Control Apparel**

# Our Cooling Technology

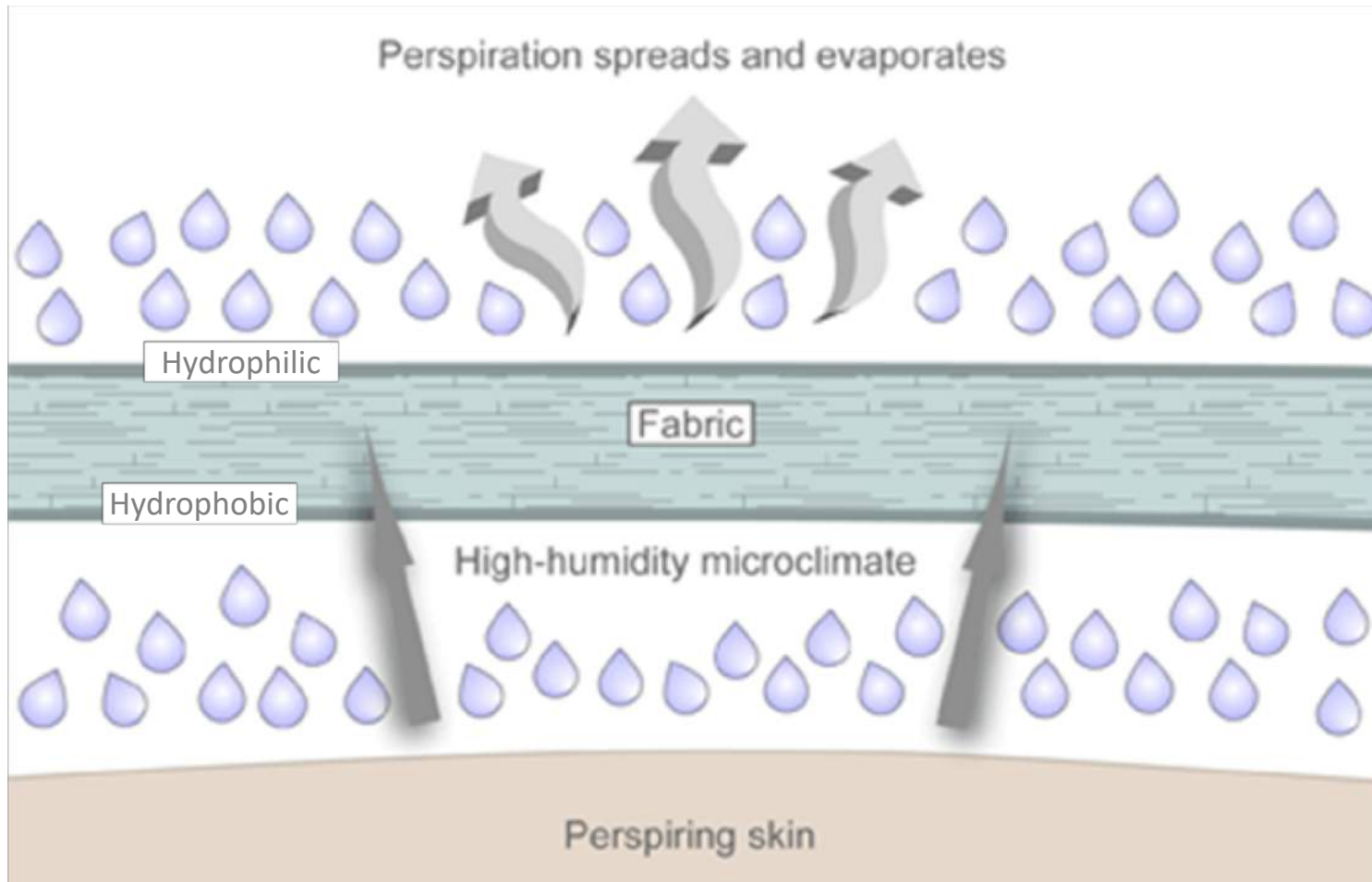
## HOW DOES IT WORK?

- When the hydrostatic pressure of the water drop overcomes the hydrophobicity of the fiber, there is a cascade effect of movement of complete moisture movement from one side of the fabric to the other side. This keeps the inside of the fabric and the person wearing the garment dry.
- This is NOT a wicking effect which leaves the moisture in the fabric.
- Knit into the outer layer of the fabric are yarns with massive surface area which captures and spreads the water drop over a large surface area. The large surface area spreads the moisture and maximizes evaporation and cooling.

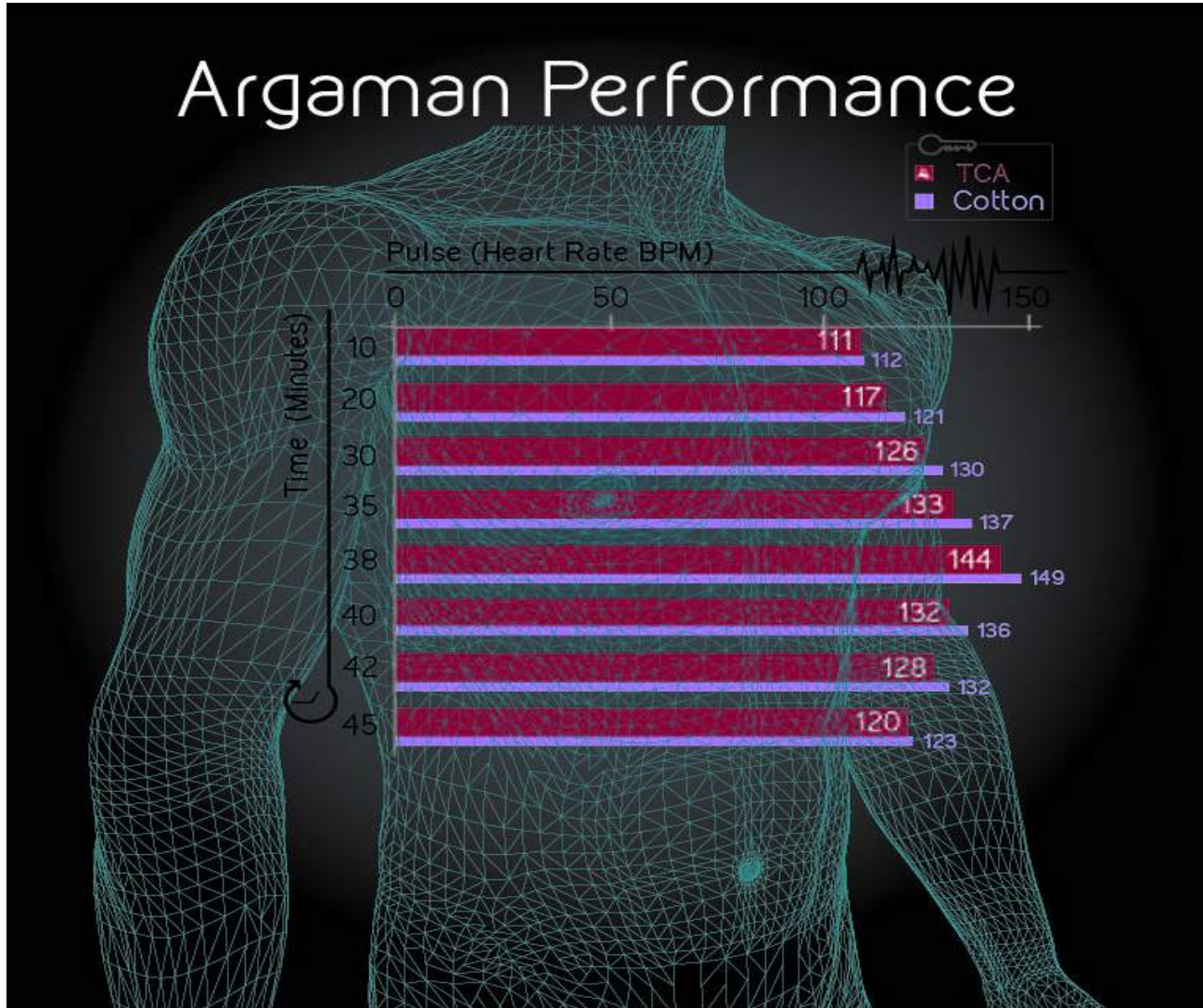
*Accelerated moisture transport and evaporation lead to **faster** and **better** body **cooling**, resulting in **better performance** for longer periods of time.*



# Our Cooling Technology



# Demonstration of Reduced Cardiac Activity in an Aerobic Regimen



# Cooling Argaman Compared

		Argaman Technologies	Polyester (PET)	Cotton
<b>MOISTURE MANAGEMENT</b>	<b>Coolness during exercise</b>	<b>Excellent</b>	Good	Poor
	<b>Wicking action</b>	<b>No wicking</b>	Good	Poor
	<b>Moisture transport</b>	<b>Excellent</b>	Poor – wicking only	Poor
	<b>Quick drying</b>	<b>Excellent</b>	Good	Poor
<b>RESISTANCE TO DAMAGE</b>	<b>Stain resistance</b>	<b>High</b>	Low	Low

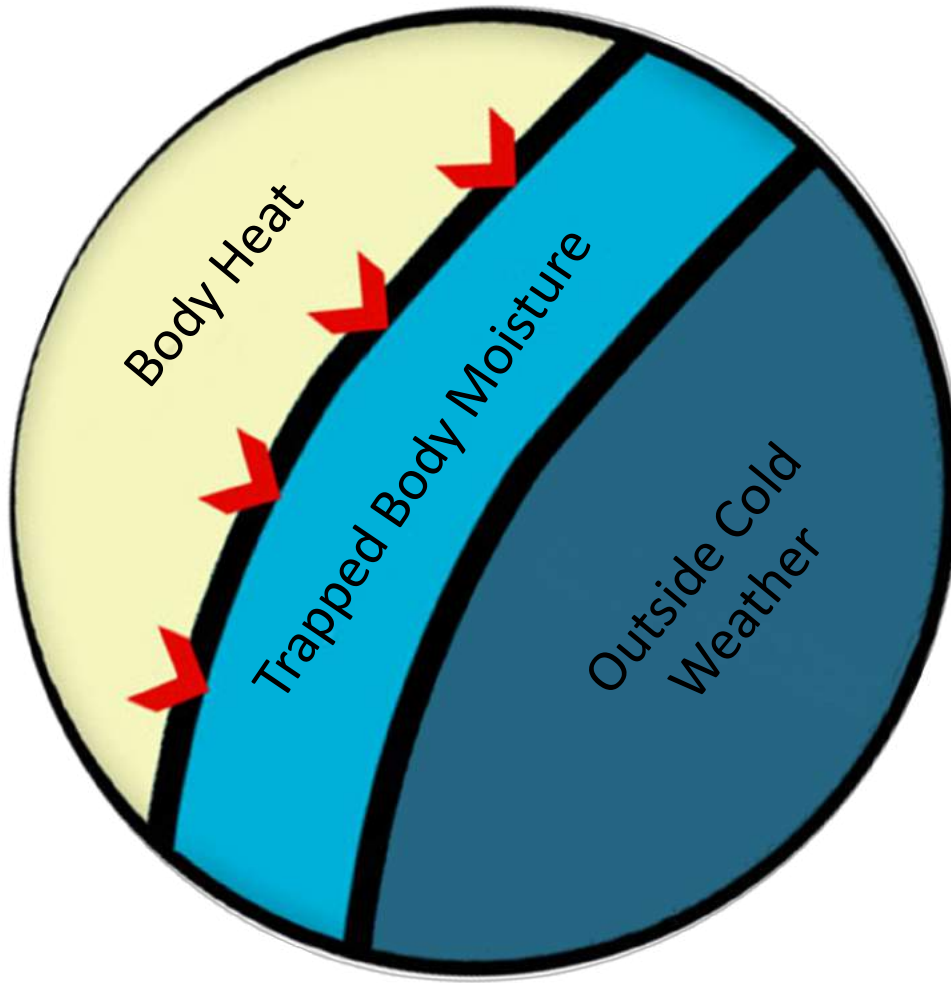
 Argaman Technologies LTD.



**Thermal  
garments**

**Temperature Control Apparel**

# Our Thermal Technology



# Our Thermal Technology

## HOW DOES IT WORK?

- The outer layer is a superb, **superlight thermal insulator**. Warmth Without Weight.
- The body's natural moisture gets trapped in the inner absorbing layer. The trapped water is then warmed by the body - much **like a wet suit!**
- Compared to other thermals, Argaman's patent-pending combination fabric gives **the best thermal insulation possible for a given weight**.
- Increased **comfort** as well – soft to the touch, and with good draping quality.

# Thermal Materials Compared

		Argaman Technologies	Polyester (PET)	Cotton
THERMAL	Warmth	Excellent	Average	Only if heavy
	Light weight	30% less	Average	Heavy
MOISTURE MANAGEMENT	Wet-suit action	Excellent	None	None
RESISTANCE TO DAMAGE	Stain resistance	High	Low	Low

# Market Opportunities





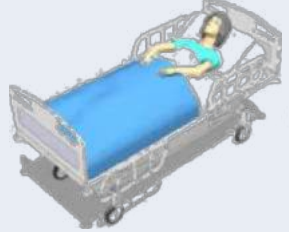

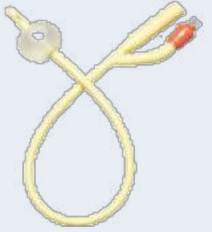
## Cross-Technology Products

	CONSUMER		INDUSTRIAL		HEALTHCARE	
						
<b>Product Examples</b>	<ul style="list-style-type: none"> <li>• Bedding</li> <li>• Clothing</li> <li>• Footwear</li> </ul>	<ul style="list-style-type: none"> <li>• Athletic Wear</li> <li>• Mattress Covers</li> <li>• Bath</li> </ul>	<ul style="list-style-type: none"> <li>• Airline Fabrics</li> <li>• Clothing (military)</li> </ul>	<ul style="list-style-type: none"> <li>• Carpeting</li> <li>• Personal Protective Equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Garments</li> <li>• Wound Dressings</li> </ul>	<ul style="list-style-type: none"> <li>• Diabetic Socks</li> <li>• Bed Linens</li> </ul>
<b>Estimated Market Size</b>	<b>&gt; \$5 Billion</b>		<b>&gt; \$5 Billion</b>		<b>&gt; \$2 Billion</b>	



# Sample Product Line

## Introduction of Accelerated Copper into:

Polymer Fibers		Cotton Fibers			Raw Polymers	
Treated Polymer Fibers		Treated Copper Fibers			Treated Master Batch	
						
Antiviral Respirators	Antibacterial Surgical Masks	Antifungal Socks	Anti-mite Mattress Covers	Antibacterial Bedding	Packaging	Biofilm Reduction
Hospitals, military, epidemics, airports, first responders		Athlete's foot, diabetics	Dust mite allergies	Hospitals (HAIs)	Food/agri-cultural industry	Catheters

# Technical Textiles with Concentrated Ultrasound Energy



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