SMART Resilin

A world of Bio-based flexible materials

Human progress can be measured in terms of materials

Stone age

Obsidian, flint, bone, wood

2.5 m - 3000 BCE

Bronze age

Copper + tin = bronze
Clay ceramics, gold, papyrus, silk, rubber, processed animal products.

Iron age

Iron, glass, processed minerals

Porcelain age

Porcelain ceramics, ceramic glazes, lacquer, metal/ceramic composites

Steel age

Steel, aluminum and other metals, non-natural polymers, extracted hydrocarbons

Silicone age

Silicon, composites, polymers, nanostructures materials

Today

$41B* is spent each year in pursuit of new materials

But we still haven’t achieved a fraction
of the potential that exists in nature

*Statista

Resilin is a great example

This is the super performing protein that **enables insects to jump 100x their height**, equivalent to a human jumping to the top of the statue of liberty

While we are aware of this naturally occurring super-material, we have yet to benefit from it

Small scale

Where scientists can replicate resilin, they have been able to do so only in a lab setting, with large scale production infeasible

Cost prohibitive

Due to production techniques, resilin has been extremely expensive to manufacture, making it prohibitive for commercial applications

Use difficulties

The resilin that has been produced until now has not been applicable to commercial applications as it does not bind with all materials

SMART Resilin

What if we were able to unlock the potential of the most elastic material in existence?

SMART Resilin

SMART Resilin

Smart resilin produces resilin, a bio-based, **natural solution to pollutant and harmful materials,** providing alternative super-performing materials for sustainable applications

Inspired by Nature

We produce Resilin protein, the most elastic rubber on earth. You can stretch it, compress it, and it doesn't lose almost any energy to the environment. Resilin can be integrated into wide products replacing rubber, plastic and nylon and improving overall mechanical properties.

We develop green and healthier products using bio-based materials, produced and used with full respect to the environment.

Inspired by the flying and jumping abilities of insects

Core IP - Team lead by renowned Nanobiotechnologist *prof. Oded Shoseyov and Dr Liron Nesiel*

Protein produced in simple fermentation process
Eco-friendly

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Technology

Hurnessing Nature Power-Biomimicry

Resilin is the most elastic rubber on earth, it is what enables the amazing flight and jumping abilities of insects.

In order to exploit what nature has smartly generated, we decided to **combine the strongest material** produced by the plant kingdom **with the most elastic material** produced by the insect's kingdom: **nanocellulose with resilin.**

Cutting edge technology

How did we do it? **Using genetic engineering techniques**, we can extract the DNA that codes for resilin and clone it into bacterial cells to produce the resilin for us.

With **our patented technology**, we added a **cellulose binding domain** to the resilin coding sequence that act as a linker to **bind Resilin and Crystalline nanocellulose**.

Breakthrough

Currently there is no commercial production of Resilin in the world, putting **Smart Resilin at the forefront of innovation** as first to develop industrial scale production of Resilin.

Multiple applications

We, at Smart Resilin have identified the need to **generate "green" consumable products with unique mechanical properties**, on the basis of composite materials in which elasticity is a dominant feature.

Smart Resilin generate the IP of Resilin uses

We change the world of flexible materials

Polyurethanes, Spandex, Rubber, Polyvinyl, Plasticizers (phthalates, adipates and benzoates), Adhesives (Epoxy)

Reconstituted leather

Adhesives

Construction, Solar plates, Automotive & Aerospace industries.

Cosmetics

Hair
Nails
Skin

Sport

Shoes, Sportwear, Helmets, Impact gloves, Rackets, Squash balls, Mouth guard

Plastic replacement

Flexible electronics, high-end packaging

Shock absorbers

Construction, Automotive & Aerospace industries, Electronic devices

SMART Resilin

Sustainable

- Biodegradable materials
- Toxic Free Environment
- Lower Production energy
- Replacement for rubber, plastic, nylon
- CO2 lower emission
- We are able to multiply our production zones, sourcing material locally and minimizing the need for transport

High performance materials

- Strength
- Elasticity

Our current solutions:

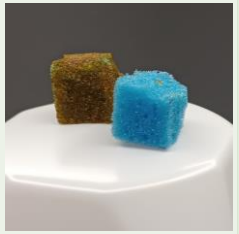
Cosmetic Formulation

Water Soluble Sachet

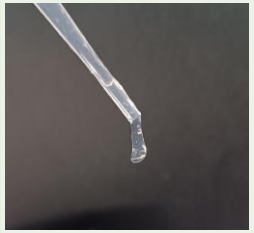
Films

Gel Beads

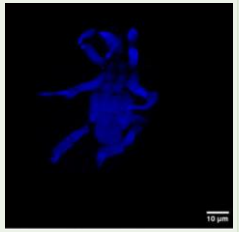
Foams



Adhesives



3D printing inks



(for) Variety of applications

- Athletic Footwear
- Flexible Displays
- Hair Straightening
- Automotive Industry
- Aerospace Industry
- 3D printing
- Adhesives
- Packaging
- And more…

(and) Rapid market penetration

- Low to non-existent regulatory barriers
- Quick and immediate market penetration potential
- A strong desire to seek innovative technology

Performance Shoe Soles

Available Today

Most effective products contain capsules made of thermoplastic polyurethane (TPU), spongy sole, stiff carbon-fiber plate, cushions, single density polyurethane foam, etc.

Loss of energy is still higher than desirable

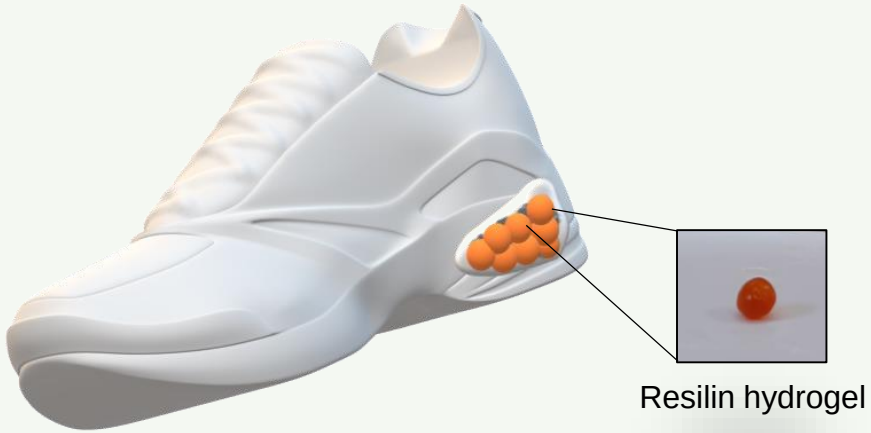
Low wear resistance

Our solution

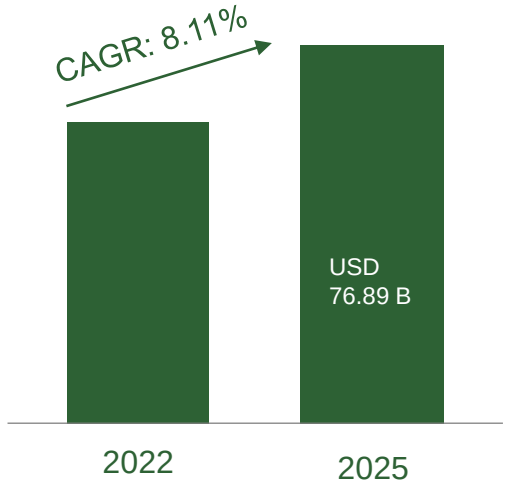
Generating capsules made of Resilin and PU (or other polymers) foams and integrate it into the sole area.

Integrates in existing production facilities.

Initial results showed an improvement of 133% in resilience when integrating resilin into PU foams

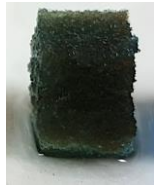


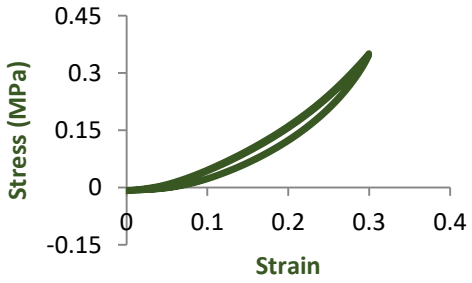
Resilin hydrogel



Source: Statista

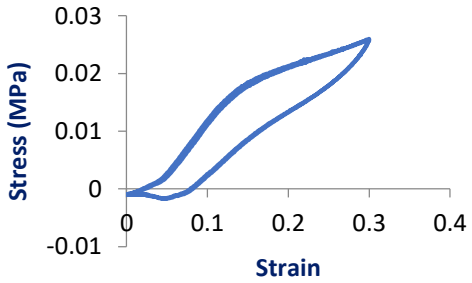
Resilin-PU foam





80% Resilience
20% Hysteresis

PU foam



58% Resilience
42% Hysteresis

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Flexible Displays

Available Today

Most effective film is polyimide.

Mechanical properties not as good as those of glass.

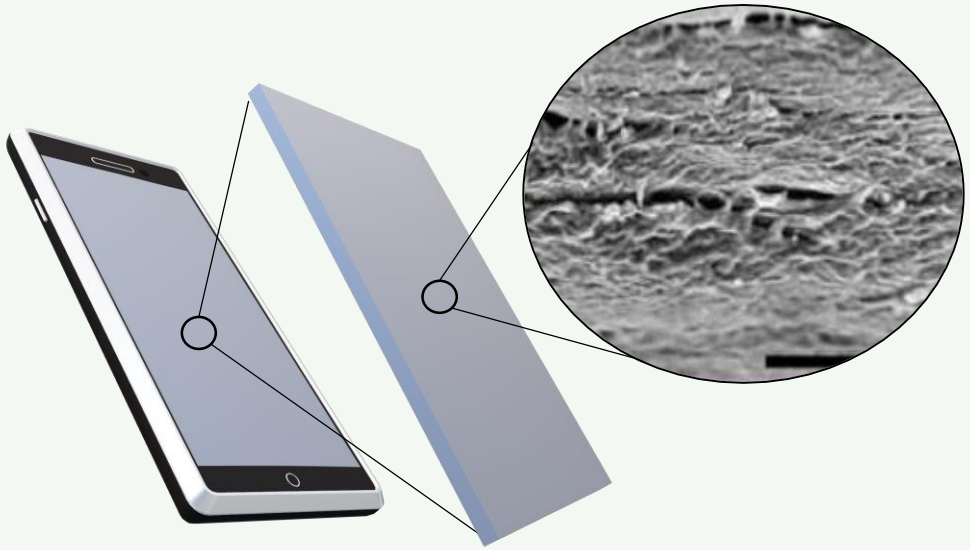
Films are too thick.

Crease often leaves mark.

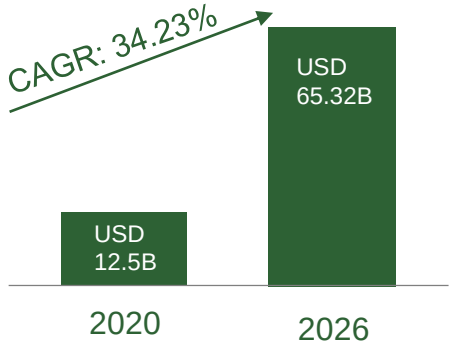
Our solution

Generating Resilin-CNC transparent films that can replace the PI used today in the flexible displays.

Resilin-CNC films are bio-based, have better strength, flexibility and lower production costs.



Flexible Displays Market



Source: Mordor Intelligence

SMART Resilin & ACIES BIO

Establish

Resilin Pro

A joint venture for producing and selling Resilin

Resilin expected production

2022	2023	2024	2025	2026
1kg	100kg	130 kg	3.5 Ton	

Getting on the podium

Target partners

natura L'ORÉAL Unilever MERCK HITACHI SUMITOMO CHEMICAL Nissan Chemical CORPORATION

WELLA P&G asics adidas LG SAMSUNG Henkel

On the way to success

Local game-changers in biofabrication

CollPlant Revolutionizing Tissue Repair

seevix spidersilk innovations

Global game-changers, unicorns

Spiber

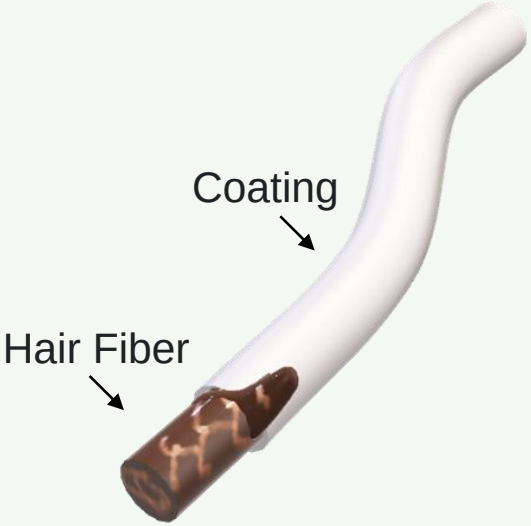
BOLT THREADS

SMART Resilin

Go to Market Strategy

Develop a novel hair straightening approach using CNC, based on Smart Resilin' IP

Resilin has a potential as a cosmetic ingredient and can be easily added to the success story at one of our scientific developments.



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Hair Straightening

Available Today

Most effective products contain hazardous chemicals
e.g. **formaldehyde**

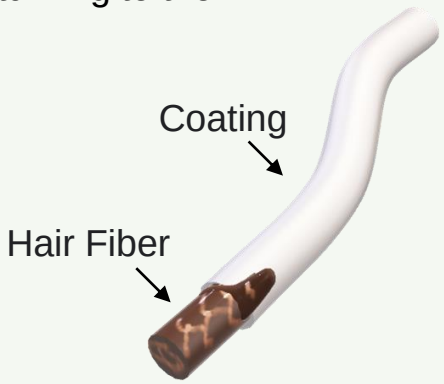
Process is expensive and preform only in the hairdressing salon

Our solution

Using only natural, healthy materials that generate a protective coat that wraps the hair and keeps it straight.

Does not interfere with the structure of the hair and therefore **does not change its nature.**

Process is expected to be cheaper, home-use maintenance formula will enable preserving the results for a longer time (less returning to the hairdresser).



Global professional hair care market

Source: Market research

Natural curly hair- before treatment

After straightening

After 27 washes with shampoo and maintenance formula

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Competitive landscape

	Japanese	Keratin	Organic	Flat Iron	CNC-Resilin
Costs	High	Medium-high	Medium-high	Low-Medium	**Low-Medium**
Hazardous chemicals	+	+	+	-	**-**
Hair damage	+	+	+	+	**-**
Reversible	NO	NO	NO	YES	**YES**

Additional disadvantages of available products:

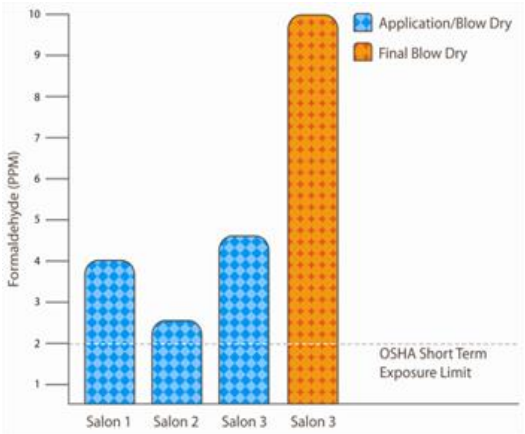
Use of high heat

Scalp burns

Chemicals distribution to the environment

Changes in the color of the hair

Formaldehyde emitted at the salon



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POC feedback

"The RESILIN routine allows straightening of the hair swatch with **good cosmeticity and a better preservation of integrity than our bench treatment"**

"Instant **straightening performance is good**"

"**Less damage than chemical treatment;** Hair integrity is preserved vs chemical benches"

"The hair swatch straightened with our bench product seems fluffy and frizzy. Smart Resilin' maintenance formula has **an impressive effect on this aspect of the swatch"**

"Smart Resilin's hair straightening formula showed **better results than our internal bench product"**

"**Coating** seems **resistant to many shampoos"**

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Growth Plan

Crawl

Develop hair-care products
Resilin mass manufacturing process

Jump

Enter and grow in-house developments
Reaching profitability

Fly

Enter different industries based on
Smart resilin developments

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Road map

2017

Intial founders investent $350k

IP

Lab scale production

Collaborations with $560k incomes

POCs

2022

Currently raising **$3m**

Lab and team set up

Develop hair care products

Paid POCs

Regulation - In vitro toxicity tests

INCI number

Resilin production scale-up

2024

Hair care products

Sale to local hairdressers

Initial customers

Client feedback

Licensing agreements

Resilin Industrial production at a target cost of up to $0.5/gr

2025

2026

Additional products

- Performance shoes
- Flexible display
- Automotive
- Aerospace
- 3D printing
- Adhesives
- Packaging
- And more

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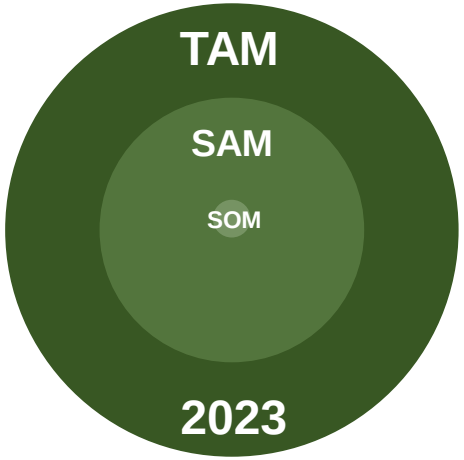
Economics

Resilin powder

	2024	2025	2026	2030
Costs of production ($)	500/kg	300/kg	300/kg	100/kg
Sale price ($)	1000/kg	600/kg	600/kg	300/kg
Expected amount	100kg	130kg	3.5 Ton	100 Ton

Use cases market



Hair straightening TAM is $4.4B, the SOM is $1 M in the first year.

Global professional hair care market is expected to reach $26B by 2026.

Performance shoes TAM is $65.78B

Flexible displays TAM is $29.7B

Expected ROI- during the 3rd year

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Projected Financials

Revenues :

CNC based hair care products

Raw material

Smart Resilin in-house developments by our scientists

Business model:

Revenues are used to develop the next application and so on...

	1st year	2nd year	3rd year	4th year	5th year
Total revenue	-	1,000,000	12,919,500	46,311,500	165,183,000
COGS	-	251,690	3,505,290	16,150,730	46,242,660
Gross profit	-	748,310	9,414,210	30,160,770	118,940,340
EBITDA	-932,137	-253,758	8,300,854	28,963,599	117,364,958
CAPEX	48,000	50,000	55,700	61,620	78,282
FCF	**-933,940**	**-509,113**	**4,456,743**	**16,985,852**	**68,907,500**

SMART Resilin

Financials - Overview

Cash flow

	1st year	2nd year	3rd year	4th year	5th year
Total revenue	-	1,000,000	12,919,500	46,311,500	165,183,000
COGS	-	251,690	3,505,290	16,150,730	46,242,660
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CAPEX	48,000	50,000	55,700	61,620	78,282
FCF	-933,940	-509,113	4,456,743	16,985,852	68,907,500

Main assumptions

The uniqueness and superior qualities of the products utilizing Smart Resilin's technology is expected to grant them a significant competitive advantage allowing them to establish themselves as leading brands within a relatively short period of time.

Funding details

The Company is seeking an investment of USD 3 million.
This is primarily for: • Lab set-up • R&D • Working capital • Sales & marketing efforts

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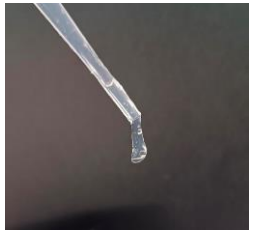
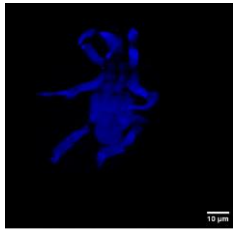
Traction

- We have produced over 20 gr of Resilin and created 6 different forms of resilin





- We collaborated with 7 industry leading international companies
- We have generated $560k in incomes through these activities
- Scaleup- Establish a JV with ACIES BIO
- POCs- in 3 different fields: hair, displays and shoes (shock absorbers).
- Climate solution prize <u>winners</u> 2022
- We Participated in accelerators and international conferences, received sealed with excellence from the EIC accelerator (Horizon EU).

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CLIMATE SOLUTIONS PRIZE

הַמְּאִיצוֹת

ImpACT365 Innovation Market Place

SEAL OF EXCELLENCE #SealOfExcellence #HorizonEU

JEC WORLD 2022 STARTUP BOOSTER FINALISTS 2022

MC MASSCHALLENGE ISRAEL FINALIST

The Impact

Reducing the use of toxic chemicals

Energy saving

Replacing synthetic non-biodegradable plasticizers such as PVC

Less CO_2 emissions

SMART Resilin

Team

Dr. Liron Nesiel
CEO

Prof. Oded Shoseyov
Chief Scientist

Nili Tunis
CFO

Management

Chen Nowogrodski
Head of Product Development

Amir Rudich
R&D

Naama Tamo
R&D

Daniel Voignac
Business Development

Operations

Shmil Sachar
Chairman

Miki Tunis

Board of Directors

Chaim Shevarzbad

Ehud Sol

Advisory Board

SMART Resilin

The opportunity

High sales potential within 3 years

Companies in the field are already **valued at over $1B**

Establishing a JV for **commercial resilin production (First in market!)**

Collaboration with leading global brands

ESG impact - ecological process that will lead to **decrease global pollution**

Solid **technology**

A strong **team**

SMART Resilin

Join us in bringing Resilin as a high-quality raw material providing the planet with a unique alternative to non-degradable materials for a cleaner environment.

Thank you!

Liron Nesiel, PhD

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