
AVADAIN
THE GRAPHENE AGE HAS DAWNED
February 2023

Forward Looking Statements

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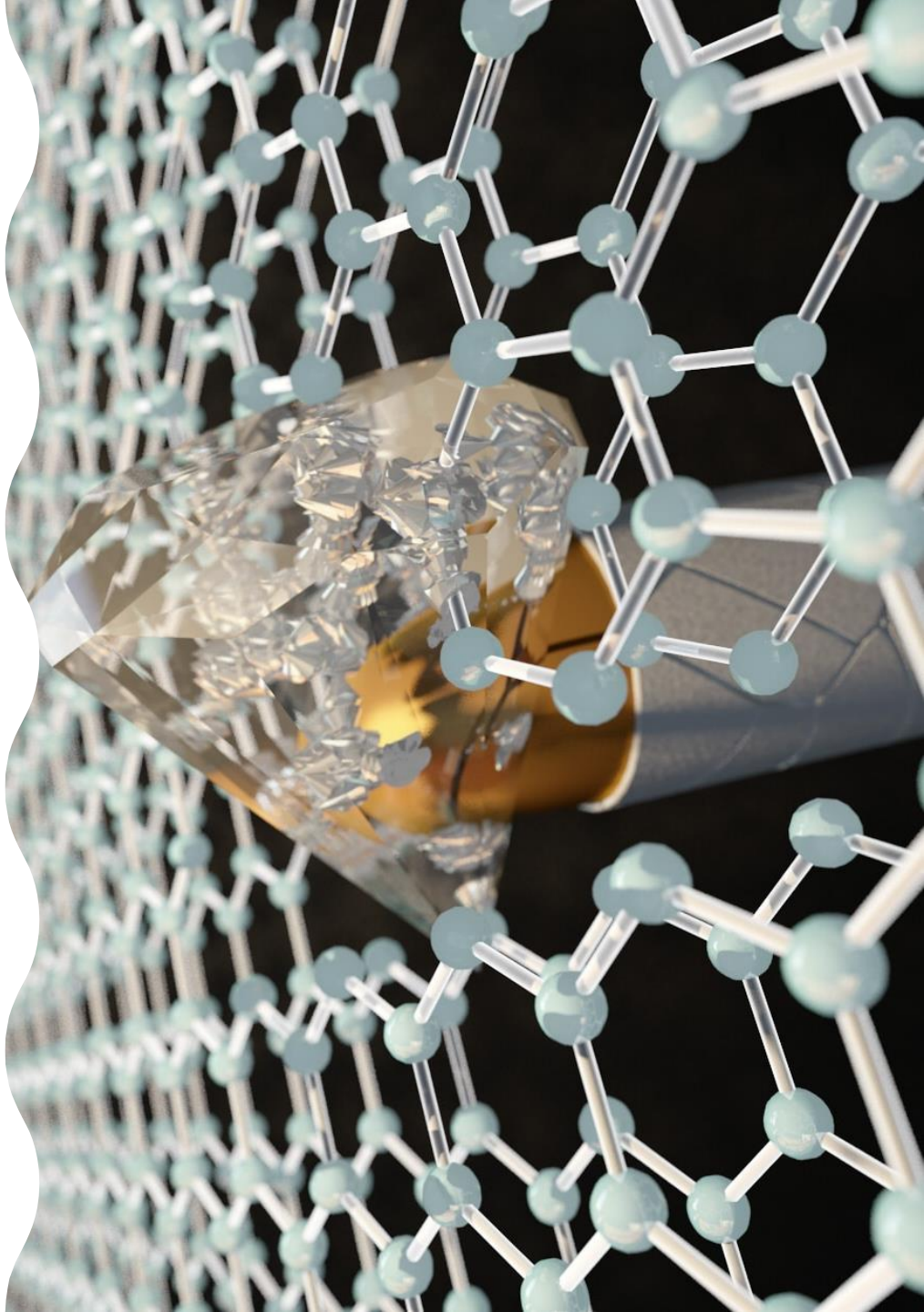
INVESTMENT OPPORTUNITY

- Graphene has the potential to change our world
- Many leading tech companies & numerous startups are poised to enhance hundreds of products with large, thin & defect free (high quality) graphene flakes
- Thousands of graphene-enabled high value products are held back because **there is no source for industrial quantities of reasonably priced high quality graphene flakes**
- Avadain has **successfully demonstrated a breakthrough, globally patented & green manufacturing process** to meet US & global demand
- We are currently **upscaling to high-throughput, continuous production** using a non-dilutive $3.77 million Federal grant
- Driven by our experienced team, ***Avadain plans to*** **license its technology starting in late 2023**, enabling rapid growth & unleashing the Graphene Revolution
- **If we achieve lucrative, recurring licensing revenue streams, Avadain could be an attractive acquisition candidate**

Graphene: the wonder material not many people have heard of…yet

- Graphene is a form of carbon which, at a few atoms in thickness, possesses truly fantastic characteristics
- High quality graphene is the lightest, strongest, most transparent, best thermal conducting & best electrical conducting material ever discovered
  - High quality graphene is 200*x* stronger than steel, yet 1 gram can cover a soccer field
  - It has 1,000,000*x* the current density of copper & 100*x* the electron mobility of silicon
  - Flexible & bendable
- Adding a tiny amount of graphene to a broad range of products can add strength, durability, flexibility and/or conductivity



Problem

Tens of billions of dollars of graphene-enhanced, high value products are sidelined

Today, companies are forced to work with suboptimal quality materials referred to as “graphene” but are graphene oxide, nanoplatelets, carbon black, activated carbon & graphite

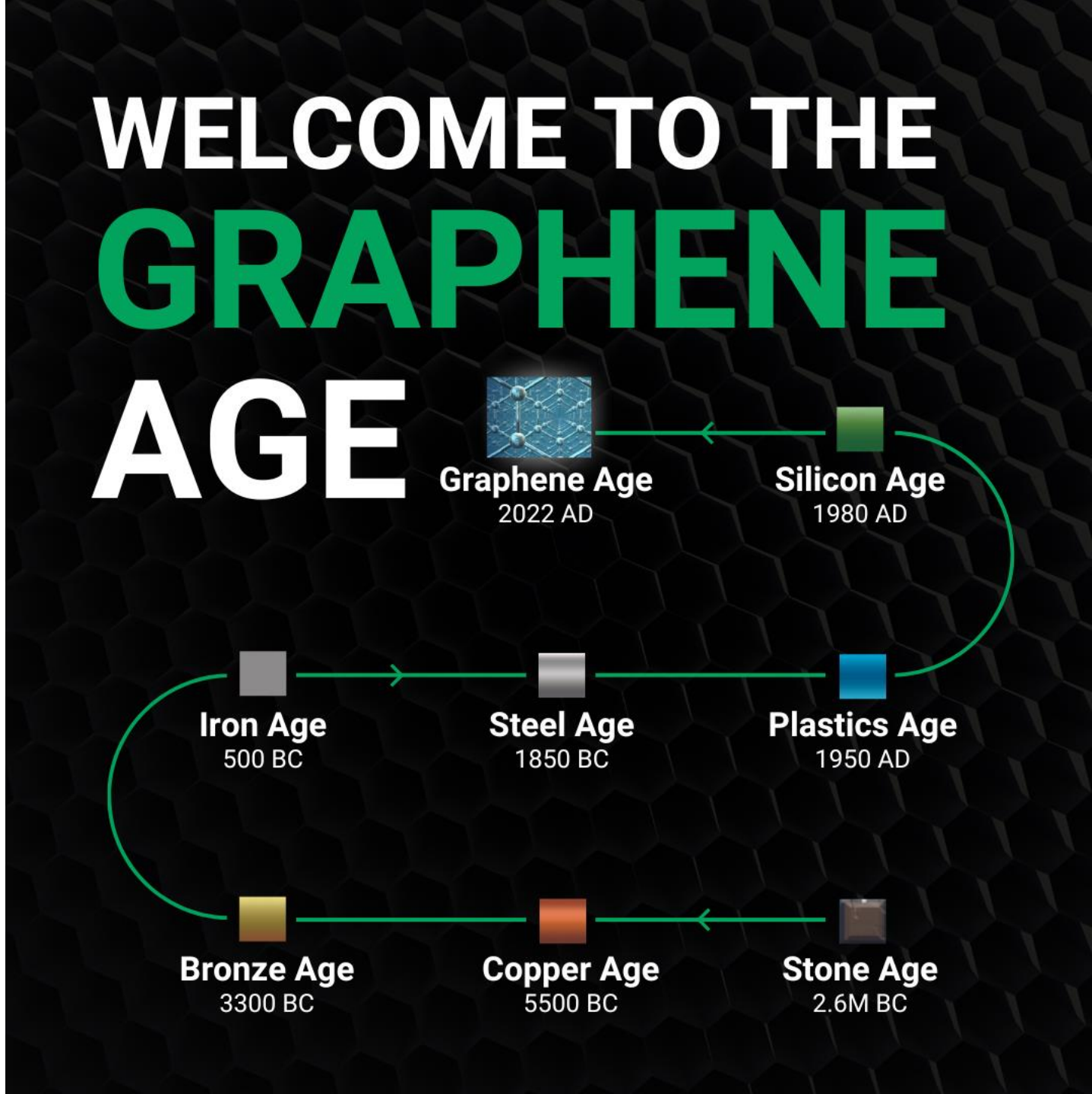
Flakes are industry’s preferred form factor for high value graphene applications. But there is no source of consistently **large** (≥30 µm lateral size), **thin** (≤1 nm thin) & almost **defect free** graphene flakes

Solution

Avadain has a globally patented & **highly differentiated platform technology** to reliably manufacture large, thin & nearly defect free graphene flakes using a safe, environmentally friendly process

Avadain's superior quality flakes, produced in industrial volumes, should meet the need of >80% of the tens of billions of dollars market

There is significant demand from many clean tech, deep tech, industrial & defense companies



Hundreds of Applications for High Quality Graphene Across Key Growth Industries

Electric Vehicles

- Faster charging batteries
- Vastly more efficient coils
- Lightweighted composite parts

Defense

- Ballistic protection
- Stealth
- Lightweighting

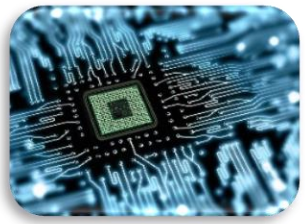
Renewable Energy

- Solar cells
- Wind turbine blades
- Battery storage

Supercapacitors

- Transportation
- Consumer electronics
- Energy

Filtration



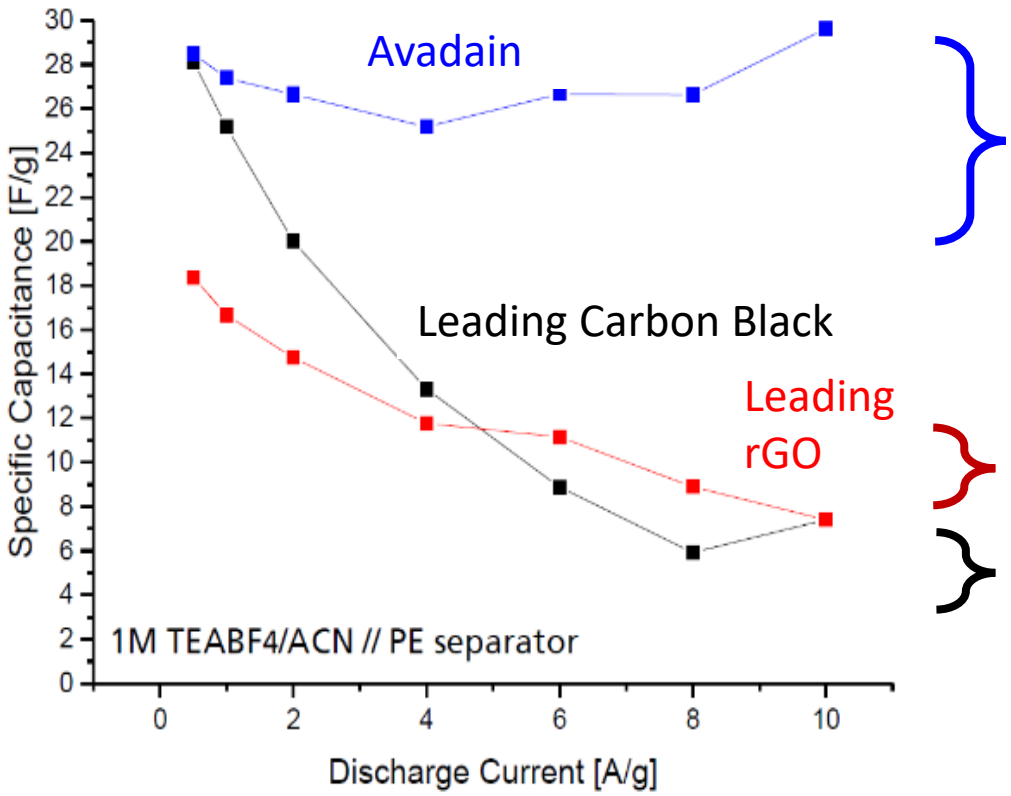
Electronics

Medicine

Aviation

Energy Storage

Avadain Graphene Flakes' Superior Performance In Supercapacitors



With Avadain's flakes, specific capacitance is constant as the discharge current increases

100% depth of discharge and excellent power density

Ideal for boosting supercapacitors for EVs, buses, trams & grid buffering

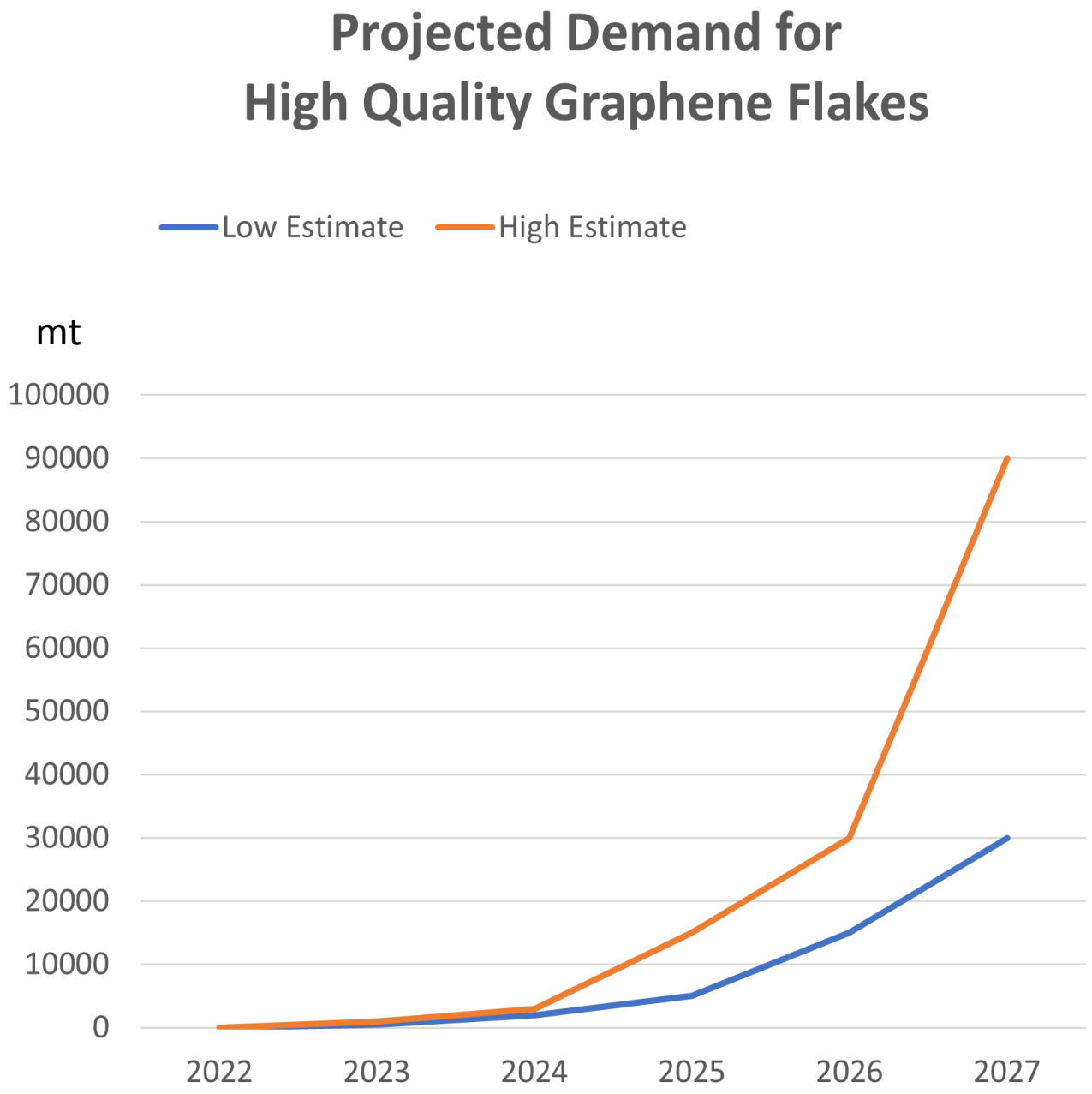
The conductive carbon black (activated carbon) & **rGO** showed rapidly declining specific capacitance

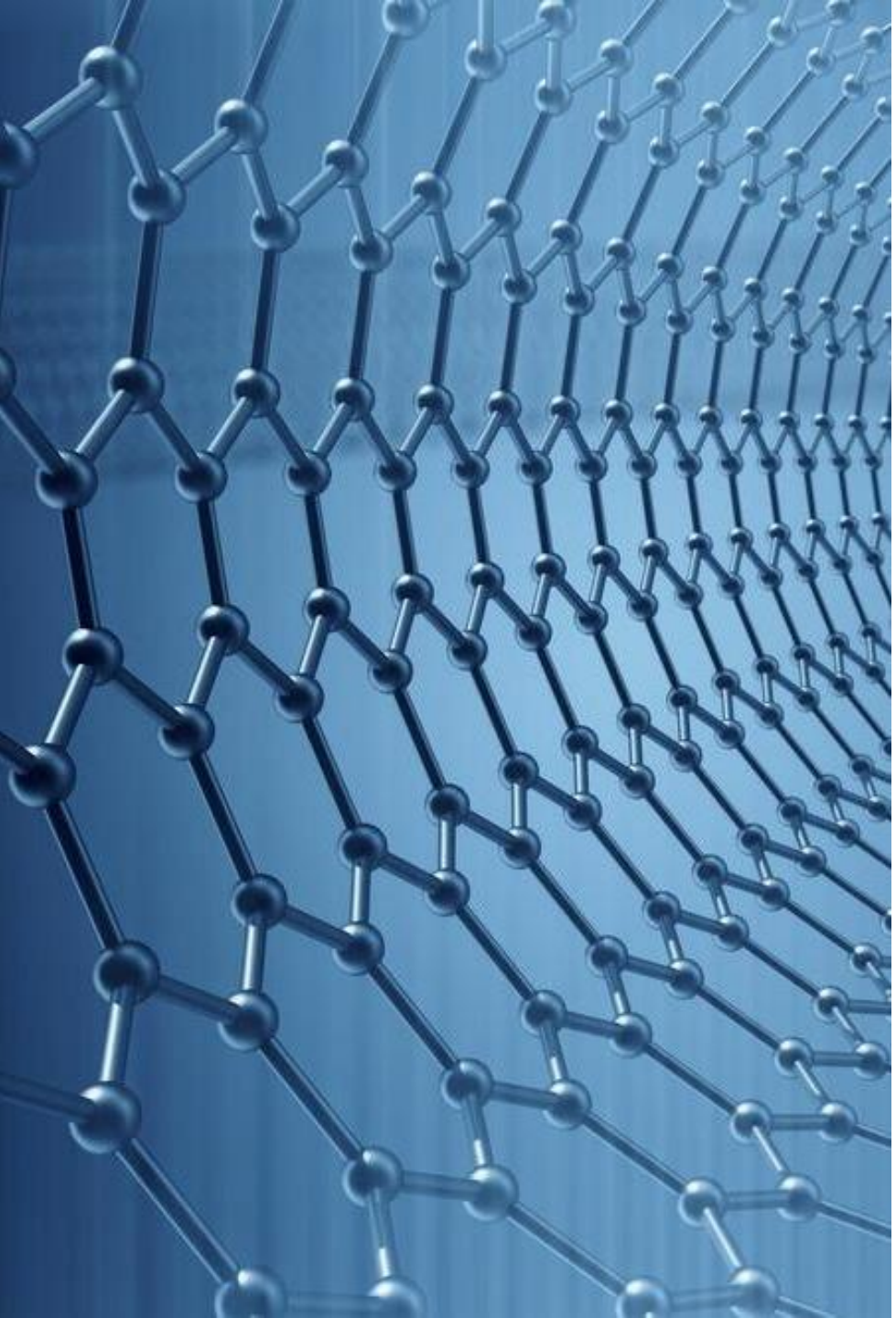
Other key benefits are expected to include:

- ***Faster charging/discharging***
- ***Better heat management and safety***
- ***Broader operating range***
- ***Better power density supporting smaller, lighter cell designs***
- ***Longer cycle life***
- ***Enable new chemistries***

2022 Inflection Point – Burgeoning Demand

- 2022 was the inflection point for low quality graphene in low value/low tech products
- The Graphene Council projects graphene demand will grow to 300,000-600,000 mt in 3-5 years. Of this, 10%-15% would be for large, thin & defect free graphene in high tech/high value uses
- This means the market for large, thin & defect free graphene flakes might grow to $50 billion by the end of this decade





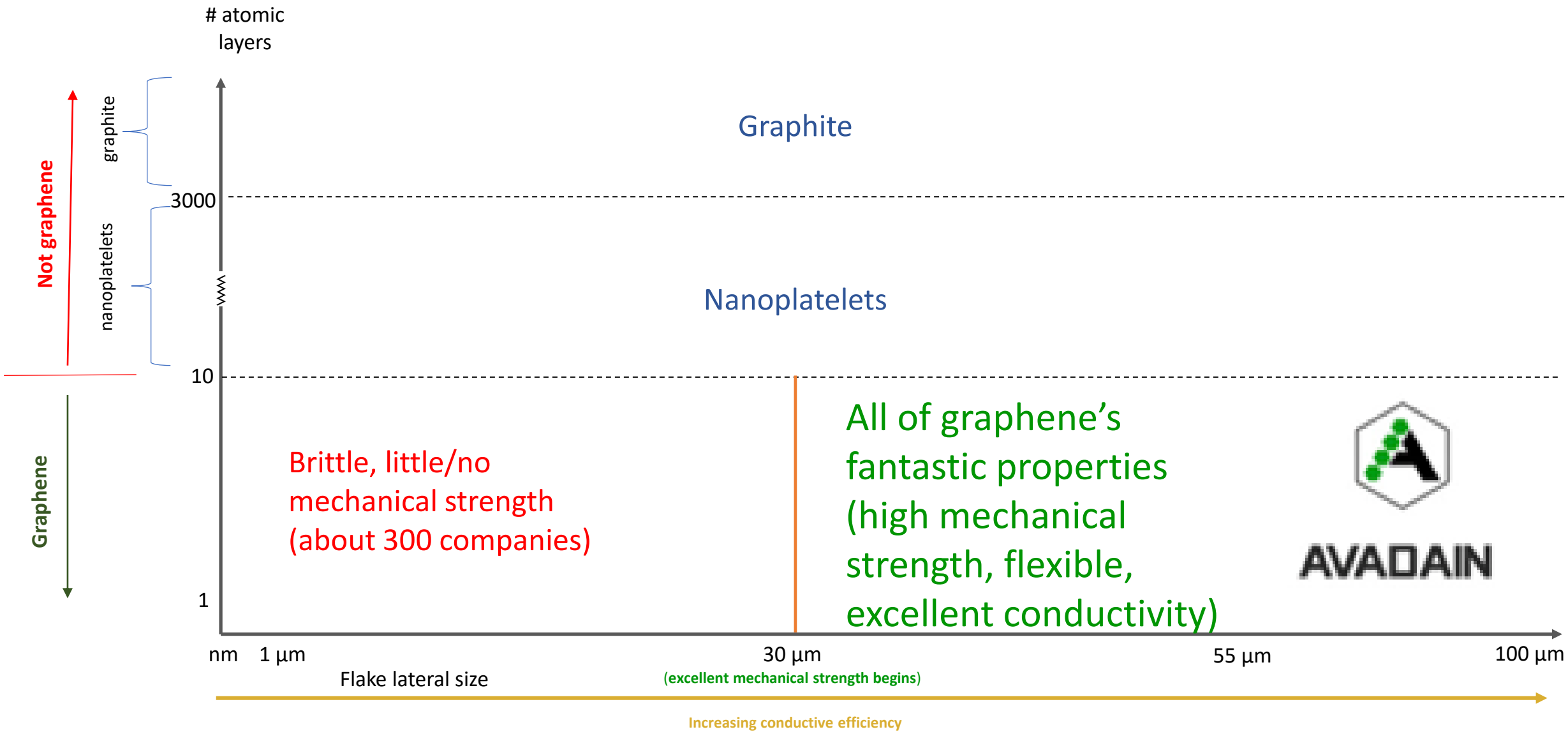
Competitive Landscape

Avadain knows of no competitor capable of producing large, thin & nearly defect free graphene flakes

- International standard defines graphene as 10 or fewer atomic layers. Between 10-3,000 atomic layers is a material called “nanoplatelets”. Above 3,000 atomic layers is graphite, the material we refer to as pencil lead

- Graphene’s fantastic strength and flexibility/bendability starts at 30 microns in lateral flake size. Moreover, as the German company Bosch found in a three-year study, the larger the flake size, the more efficient the electrical conductivity. Thus, the graphene market is segmented based on lateral flake size

Competitive Landscape



Funding History

Avadain has benefited from $7.4 million in funding ($3.5 dilutive & $3.87 non-dilutive)

- Avadain has no debt
- No preferred stock issued
- No convertible notes

Pre-incorporation	Seed	Federal Grant	Crowdfunding	State Grant	Angels
$1.35 million Panasonic & Bastille	$190,000	$3.77 million to upscale technology & demonstrate	$1.36 million	$100,000 Tennessee	$605,000

Who We're Working With

- Our technology was invented by the Fraunhofer Institute for Applied Solid State Physics
- Panasonic & Bastille funded Fraunhofer's R&D 2017-2020
- Department of Commerce/NIST $3.77 million grant to upscale our technology to mass production & test in 2 high profile apps
- Our green technology is being upscaled to mass production by Southwest Research Institute in San Antonio
- The RAPID Manufacturing Institute, a part of the Manufacturing USA network, is our project manager

Panasonic
ideas for life

NIST
National Institute of Standards and Technology
U.S. Department of Commerce

RAPID
Transforming Process Industries

SwRI®
SOUTHWEST RESEARCH INSTITUTE

Panasonic Relationship

- 2016: Bastille gains exclusive rights to Fraunhofer's technology
  - 1st German patent filed in 2016
  - 1st US patent filed in 2017
- 2017: Bastille brings in Panasonic
  - Panasonic asks Nomura Research to undertake due diligence on technology & market potential
  - Panasonic invests $1.35 million pre-incorporation to fund R&D
- 2020: Fraunhofer's R&D successfully concluded
  - Fraunhofer transfers patents & production units to Avadain
- 2021: Bastille & Panasonic form Avadain with Panasonic holding a Board seat

Strong Intellectual Property Strategy

- The US' #1 IP law firm, Fish & Richardson, filed four patent applications to date
- We plan to file additional patents to continue to build a moat around our highly differentiated technology
- Avadain owns all patents & applications
  - We have 100% ownership of any IP developed by SwRI & RAPID

FISH.
FISH & RICHARDSON

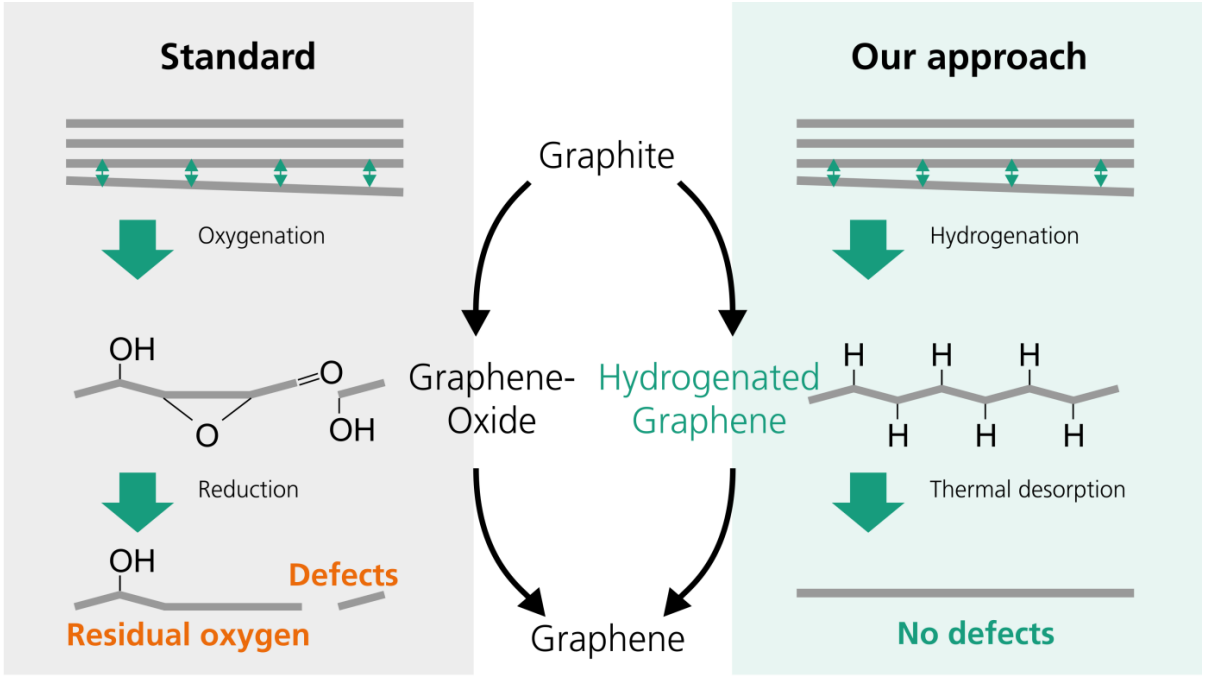
No known competitors *producing industrial volumes of large, thin & nearly defect free graphene flakes*

Strong IP Is Core to Avadain's Value Creation

- Parent patent granted in the US (#10,662,537), Brazil, China, Europe, Germany, India, Israel, Japan, Korea, Russia & Singapore
- Patents pending in Australia, Canada, Chile, Finland, France, Indonesia, Israel, Italy, Japan, Korea, Malaysia, Mexico, the Netherlands, Poland, Switzerland, Sweden, Turkey & Vietnam
- The 2nd patent was filed in 2019 in the US (#16/569,264), followed by a PCT in September 2020
- The 3rd (16/882,579) US patent application is a divisional of '537
- The 4th (17/858,906) US patent application is a continuation of '537

Avadain's Breakthrough, Patented Technology

Avadain's technology uses optimized Electrochemical Exfoliation & Expansion to produce high quality graphene flakes with ≥70% yield. Our green process is being upscaled to mass-production.



Chemisorption of reducing hydrogen helps exfoliate graphite into low-defect graphene flakes with little oxidation in the graphene structure.

Avadain's process uses no harsh or toxic chemicals. We use an off-the-shelf electrolyte and polar solvent. Avadain's process is green compared with the popular Hummer's Method using very strong oxidizing agents to exfoliate graphite into graphene oxide flakes with too many hard-to-remove defects.

Licensing Strategy

Target licensees:

- Advanced materials manufacturing companies (*e.g.*, DuPont, DOW, BASF)
- Graphene applications companies
- End users with mission-critical need (*e.g.*, defense contractors, spacecraft makers & satellite companies)

We plan to provide plant design, implementation support, patents & trade secrets

Capital Light Licensing Enables Rapid Scaling

- De-risks Avadain
- Allows Avadain to rapidly, flexibly scale
- Meets the significant pent-up & rapidly growing demand

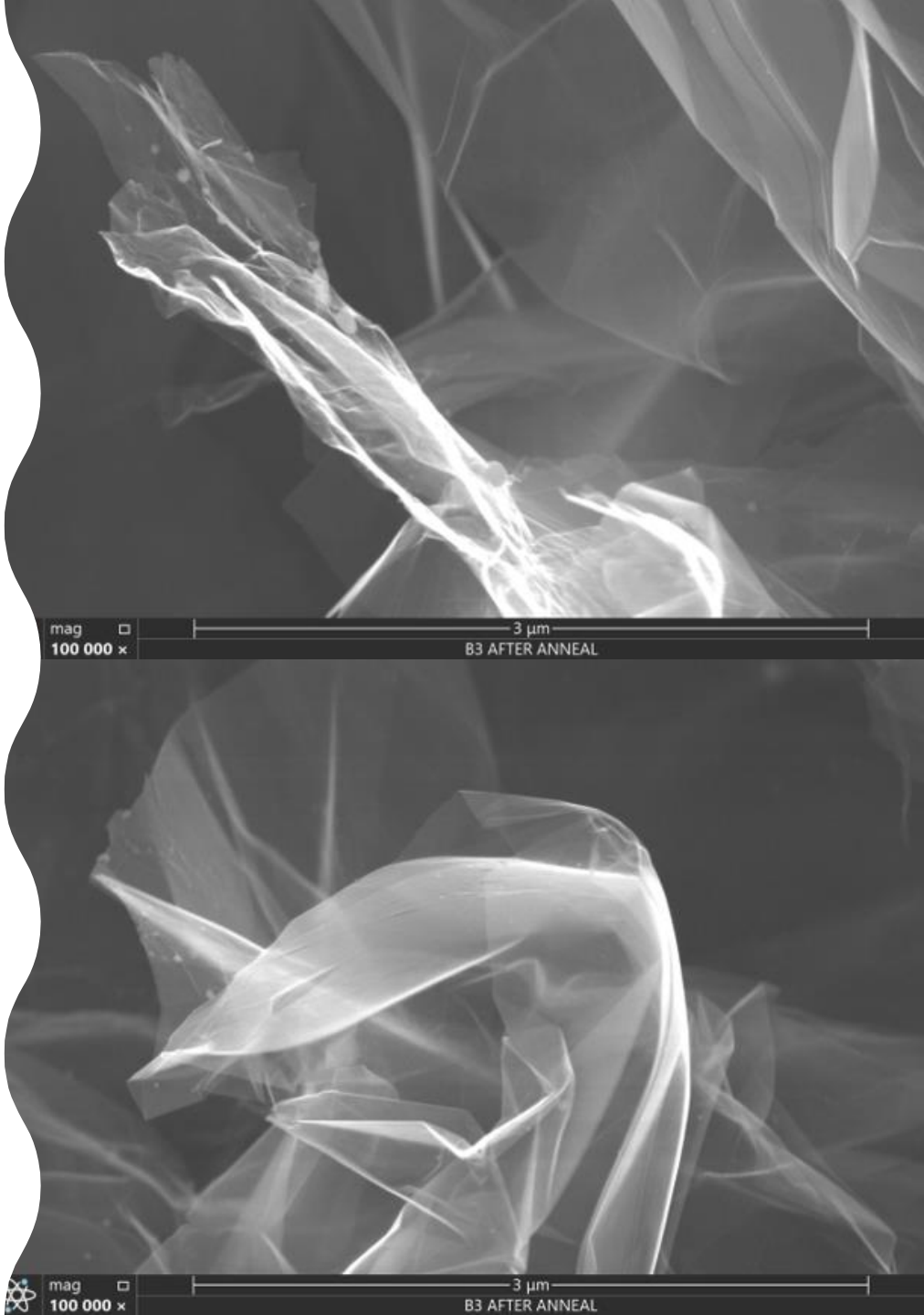
Example:

ARM: FY 2021 revenue $2.7 billion

- ARM doesn’t make anything. It licenses its chip designs to chipmakers
- Through 900 licenses with 250 manufacturers, ARM-designed chips are reportedly in 95% of smartphones & tablets, and 70% of laptops

Technology Status

- Avadain's platform technology was developed between 2016-2020 & proven in a batch process to reliably & consistently produce high quality flakes with a >70% yield
- Our technology was published in a respected peer reviewed journal
- SwRI began upscaling to mass production in May 2022 and has already validated and improved the original batch process
- SwRI is building two GEN 2 batch reactors that incorporate these & other improvements to make multiple grams per run
- In 2023, we plan to begin supplying samples from these reactors to potential licensees & end users, paving the way for licensing discussions
- We expect to demonstrate the mass production process in a pilot plant scale by late 2023/early 2024 for producing industrial quantities of pristine graphene flakes (as these images show) at acceptable cost
- The pilot scale facility will be engineered into a commercial scale design package for licensees



Avadain Team

Brad Larschan

CEO

15 years experience leading two technology licensing companies. Serial entrepreneur with 35 years experience leadership of start-up companies

Ericka Wojack

COO/CFO

27 years experience as COO/CFO of start-up companies, the last 15 of which were with IP licensing companies

Phil Van Wormer

CCO

40 years experience as executive at Fortune 100 companies including DuPont and GE as well as CEO of several technology start-ups

Identified/conf.

EVP Licensing

Currently SVP/Licensing at one of the world's leading industrial companies (17 years), responsible for licensing & transferring manufacturing technology worldwide. Prior to this, 15 years licensing experience for another household name company, rising to Director of Intellectual Property Transactions

Dr. Sarah Roscher

Graphene Electrochemist

Sarah was the key team member who developed our graphene flake manufacturing technology at Fraunhofer's Institute for Applied Solid State Physics. She did her PhD thesis on electrochemical exfoliation of graphene.

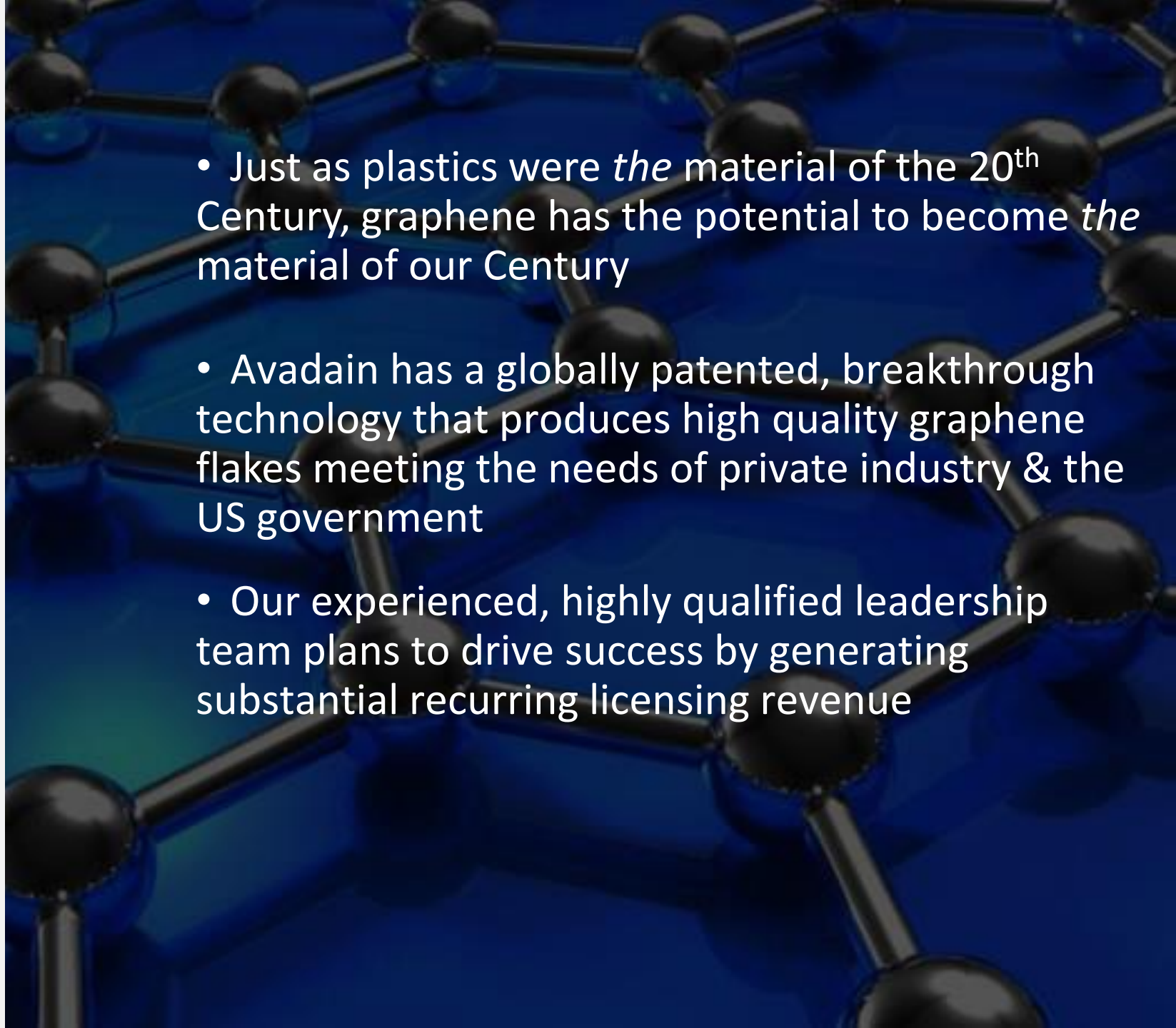
Dr. William Grieco

Chemical Engineering Advisor

Bill is an experienced chemical engineer, entrepreneur and leader taking opportunities from early-stage concept through commercial deployment. He was the founding CEO of the RAPID Manufacturing Institute, which is Avadain's project manager. Bill did his PhD at MIT and is an expert in nanotechnology.

Summary

- ✓Disruptive technology
- ✓Environmentally friendly
- ✓Patented globally
- ✓Pent-up demand, huge global market
- ✓No known competitors
- ✓Panasonic backed
- ✓Federal grant
- ✓Top tier angel investors
- ✓Capital-light licensing model
- ✓Great team/complementary skills
- ✓Proven in supercapacitors



- Just as plastics were *the* material of the 20th Century, graphene has the potential to become *the* material of our Century
- Avadain has a globally patented, breakthrough technology that produces high quality graphene flakes meeting the needs of private industry & the US government
- Our experienced, highly qualified leadership team plans to drive success by generating substantial recurring licensing revenue

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