



Global Challenges: Biobased materials and synthetic biology.

Scaling Up Canada
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Synthetic Biology: Disruptive innovation

“When commercializing disruptive technologies, they found or developed new markets that valued the attributes of the disruptive products, rather than search for a technological breakthrough so that the disruptive product could compete as a sustaining technology in mainstream markets.”

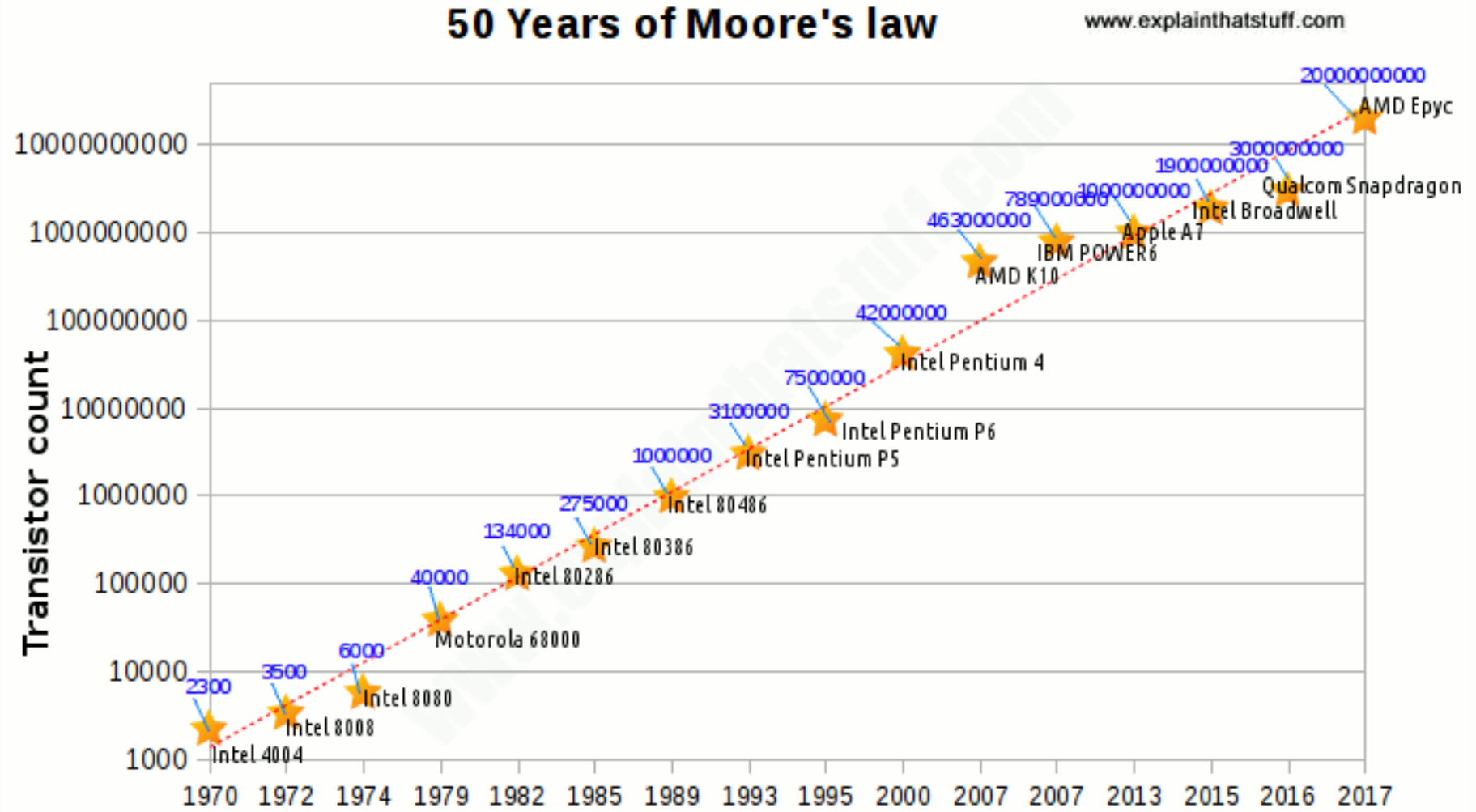
“A disruptive innovation is a technologically simple innovation in the form of a product, service, or business model that takes root in a tier of the market that is unattractive to the established leaders in an industry.”

— [Clayton M. Christensen, The Innovator's Dilemma](#)

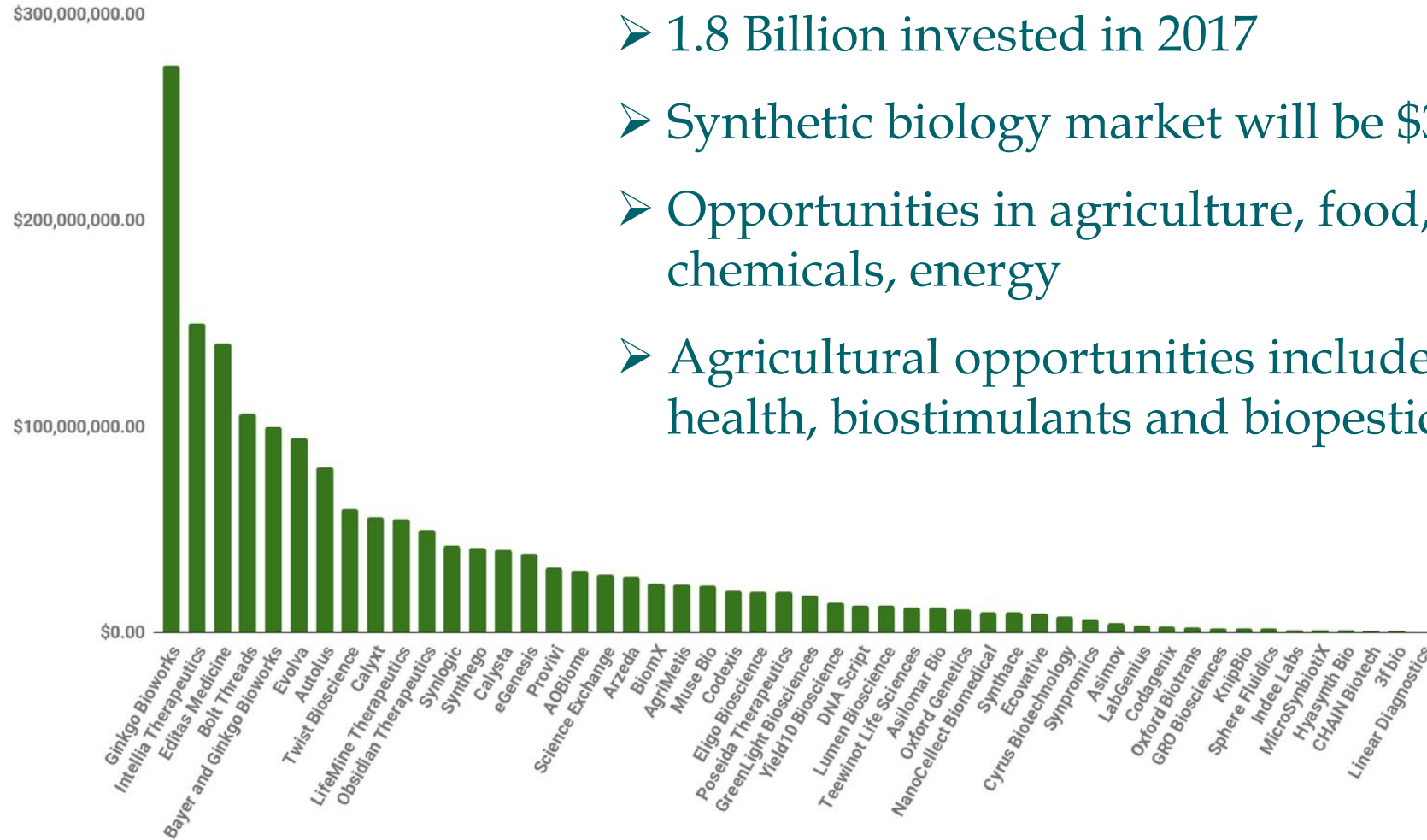


Disruptive innovation redefines markets

- Moore's law defined the most famous disruption in markets
- Synthetic biology is positioned to follow this trajectory
- Synbio has entered the commercial phase of development



The Investment Picture



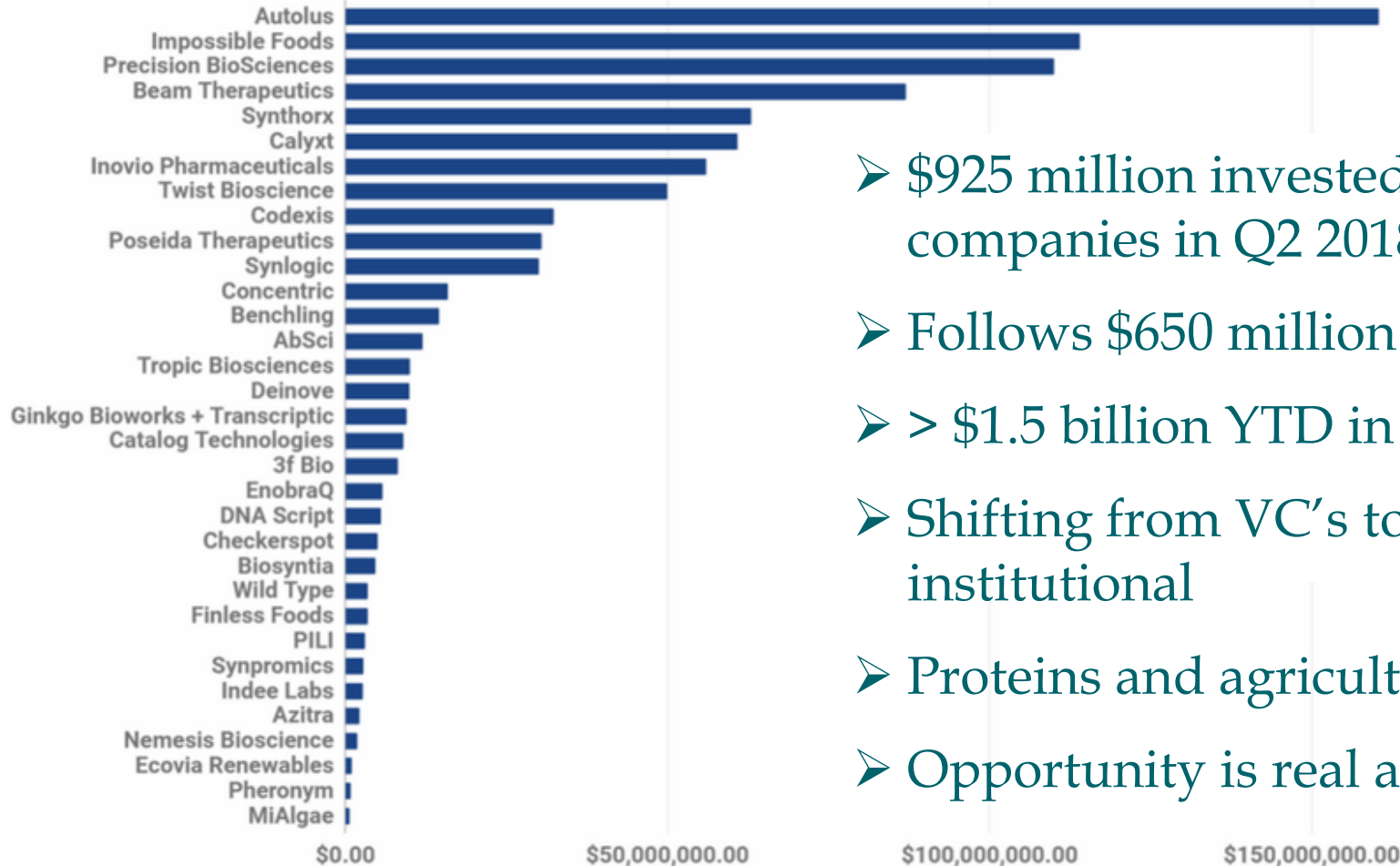
- 1.8 Billion invested in 2017
- Synthetic biology market will be \$38.7 billion in 2020
- Opportunities in agriculture, food, nutrition, pharma, chemicals, energy
- Agricultural opportunities include improved cultivars, soil health, biostimulants and biopesticides

 **synbiobeta**
Synthetic Biology Funding - 2017



Market Opportunity Commercial Products

Funding for Synthetic Biology Companies - Q2 2018



- \$925 million invested 33 synthetic biology companies in Q2 2018
- Follows \$650 million in Q1 2018 w/27 companies
- > \$1.5 billion YTD in 2018 vs. \$1.8 billion in all 2017
- Shifting from VC's to private equity and institutional
- Proteins and agriculture materials are early drivers
- Opportunity is real and it's accelerating

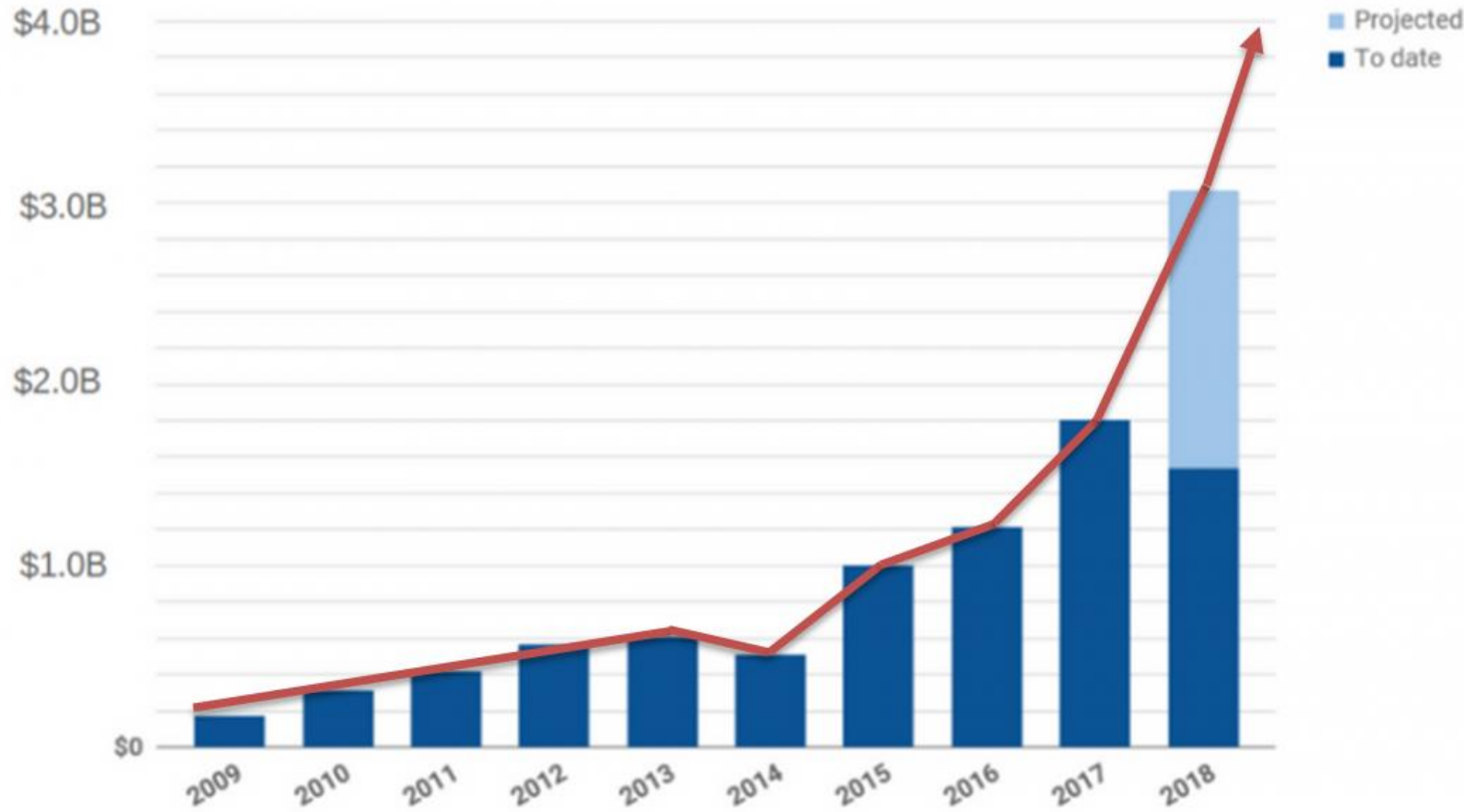


Moore's law investment curve

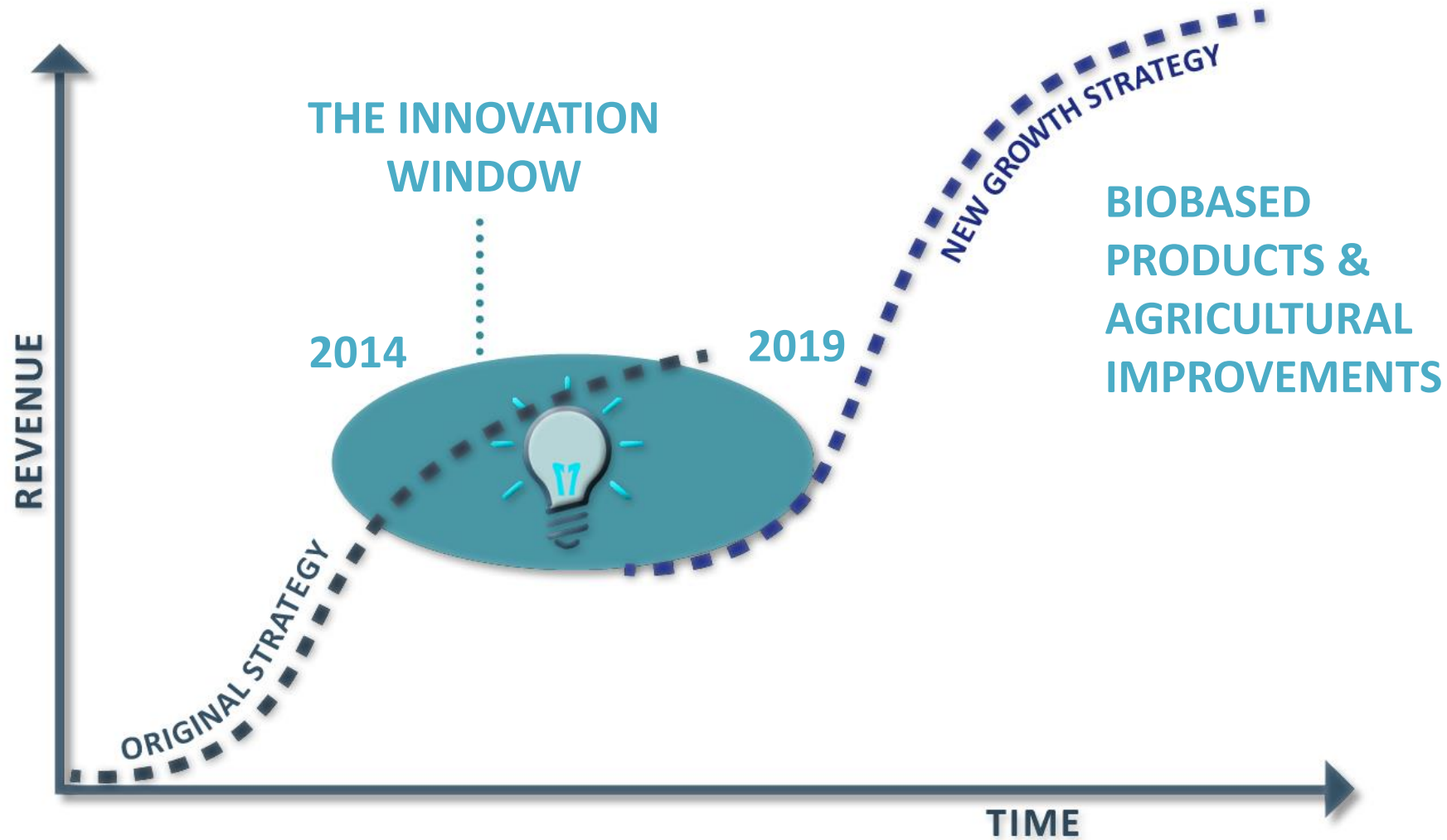
Funding for Synthetic Biology Companies



\$7 billion invested since 2015



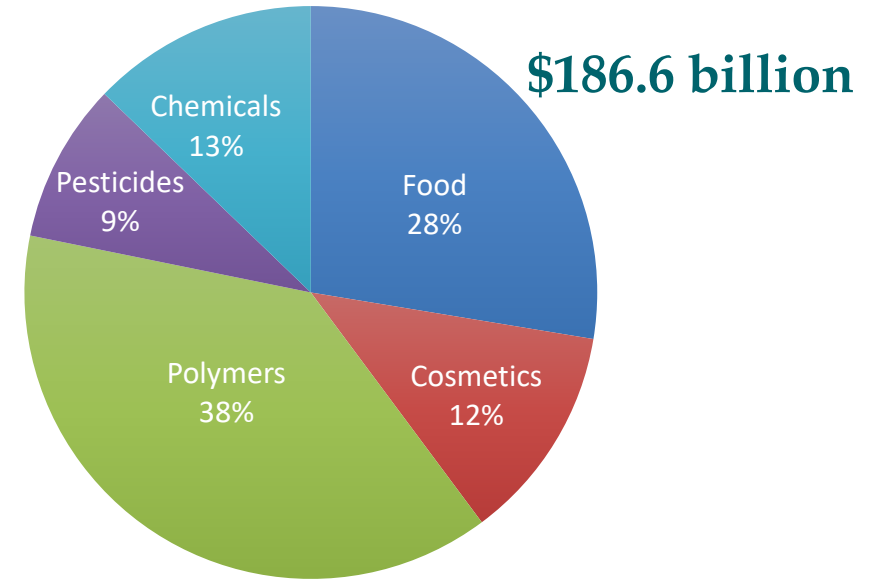
Establishing a new growth trajectory



Market opportunities

Identify and focus on high value customer needs:

- Food proteins (e.g. Impossible Foods, Perfect Day, Amai Proteins)
- Food ingredients (e.g. Amyris, Blue Marble, Sensient, Givaudan)
- Enzymes (e.g. Metgen Oy, DuPont, Novozymes)
- Agriculture / Bio-pesticides (e.g. Agbiome, Concentric, American BioSciences, Indigo, Vestaron, Marrone Bio)
- Organic Acids / Bio-chemicals (e.g. Ginkgo, Ecovia, Lygos, Kalion, Genomatica, Zymergen, Arzeda)
- Algae (e.g. Triton, DSM, Algenol, others)



Market	2020 Sales
Food & Flavors	\$51.5
Cosmetics & Fragrances	\$22.8
Bio-Polymers	\$71.6
Bio-Chemicals	\$23.9
Bio-Pesticides	\$16.8



Conclusions

- Synthetic Biology driven by CrispR Cas9 (digital biology) is reshaping our products for the future
- We are on a trajectory to experience rapidly changing markets, products, and services within the biomaterials and agricultural products areas
- Demand for biomass based sugars will increase exponentially as fermentation based product offerings expand
- Improved growth rates and health of forests (and other agricultural crops) can be impacted by new biostimulants, biopesticides, and soil health (microbiome) products and services.
- Synthetic biology is an enabler of a sustainable Bioeconomy much like transistors and CPU improvements have changed our everyday lives since 1970.





Thank you
Collaborative Expert Advice
Outcome: Success Stories

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