



**Stanford**  
MEDICINE



**SPARK: Translating Academic  
Discovery to Patients' Benefit;  
Lessons from our 14 Years of SPARK at  
Stanford and Around the World**

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***9<sup>th</sup> International Symposium on Higher  
Order Structure of Protein Therapeutics***

April 12, 2021

- What is **SPARK**, why do it and what are its goals
- A brief guide to the entrepreneur from an ex-entrepreneur
- Why **SPARK Global** and why now

# The challenge – how to translate good ideas to great solutions?

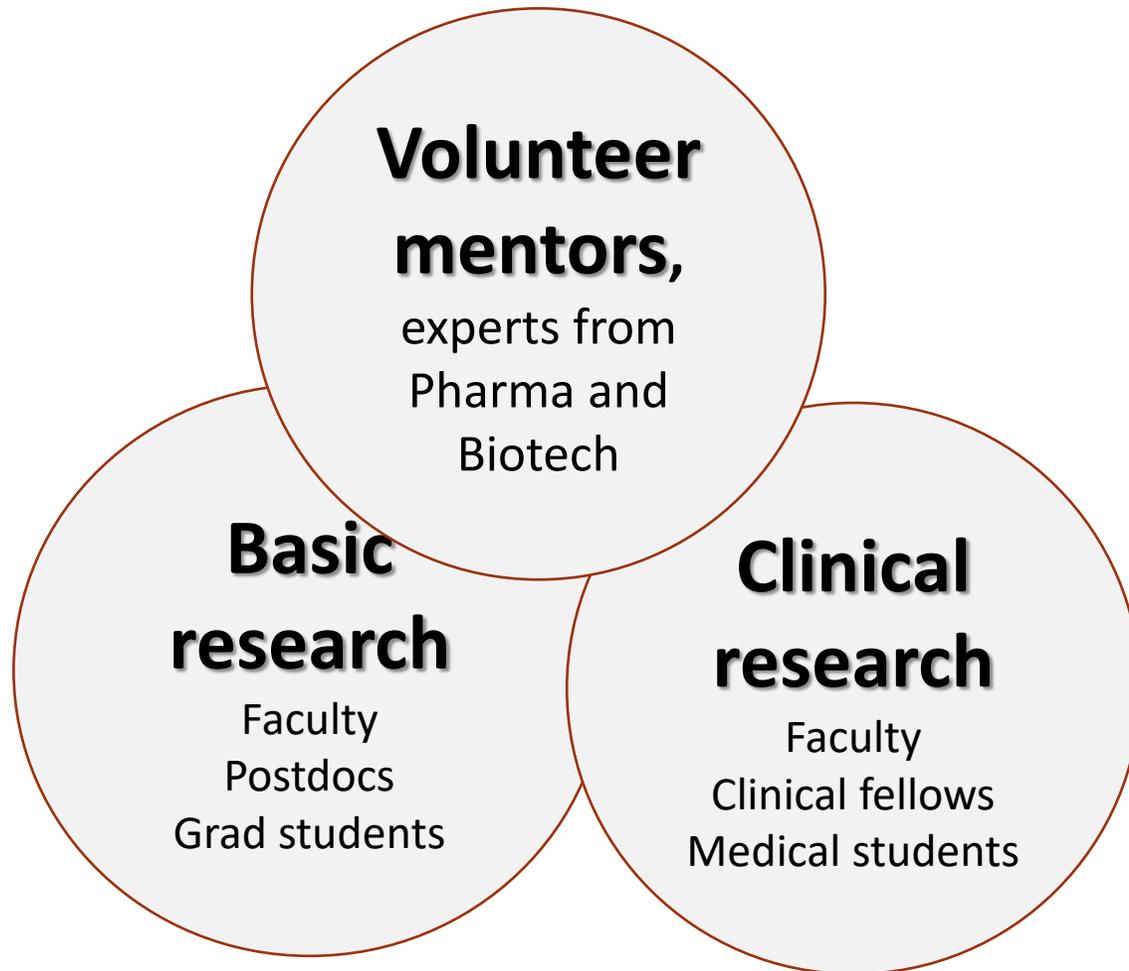
- 1. *The value gap:*** academic projects are considered premature: not robust
  - The chosen indication and/or solution are inappropriate, or not realistic
  - The findings are not reproducible
- 2. *A knowledge gap:*** Academic inventors have no knowledge in drug development
- 3. *A cultural gap:*** academic inventors do not value applied science and industry views academic as unreliable
  - Translational research is not aligned with academic reward

# Our goals – overcoming the three gaps

**SPARK** aims to *increase* the impact of academic inventions for the benefit of patients worldwide, through:

- Increase the value by adding industry standard studies, focusing on fast solutions for patients *regardless* of economic outcome.
- Increase knowhow by a unique education and mentoring of the innovative academic scientists *within* academia;
- Increasing mutual respect between industry and academic scientists

# The participants



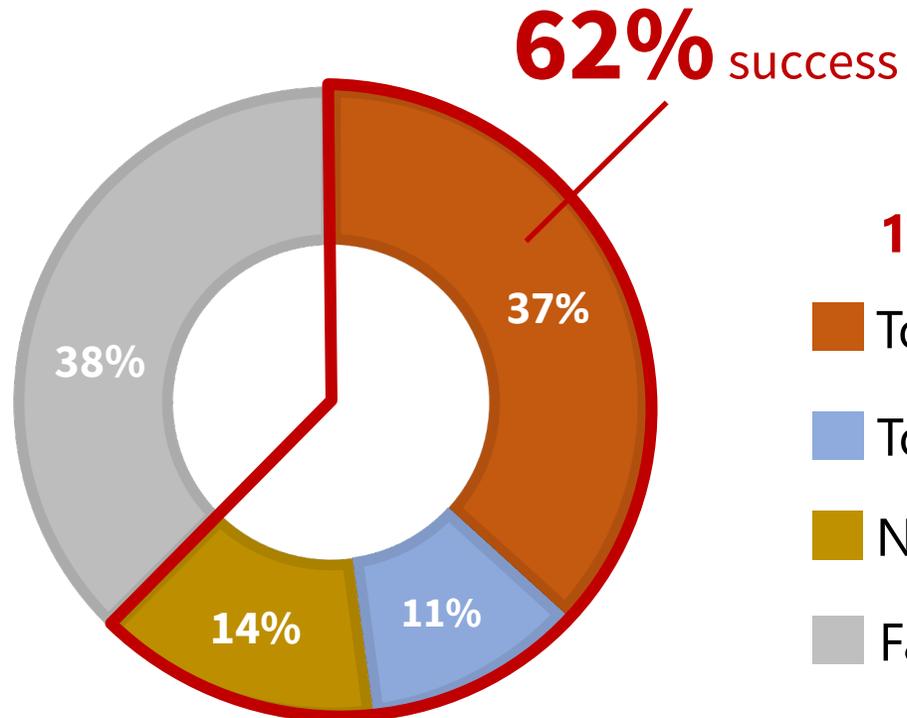
# The formula to success

- Many volunteer advisors with many academicians
- In one room, ongoing
- On university campus
- No hierarchy
- Not aiming to reach a consensus
- **Learning** from **successes AND failures**

Mix scientists from industry and academia to work on solutions



# SPARK works



**117** graduated projects

■ To start-ups: **43** projects

■ To existing companies: **13** projects

■ Non-commercial (In clinical trial): **17** projects

■ Failed POC /other – **44** projects

# Our Record

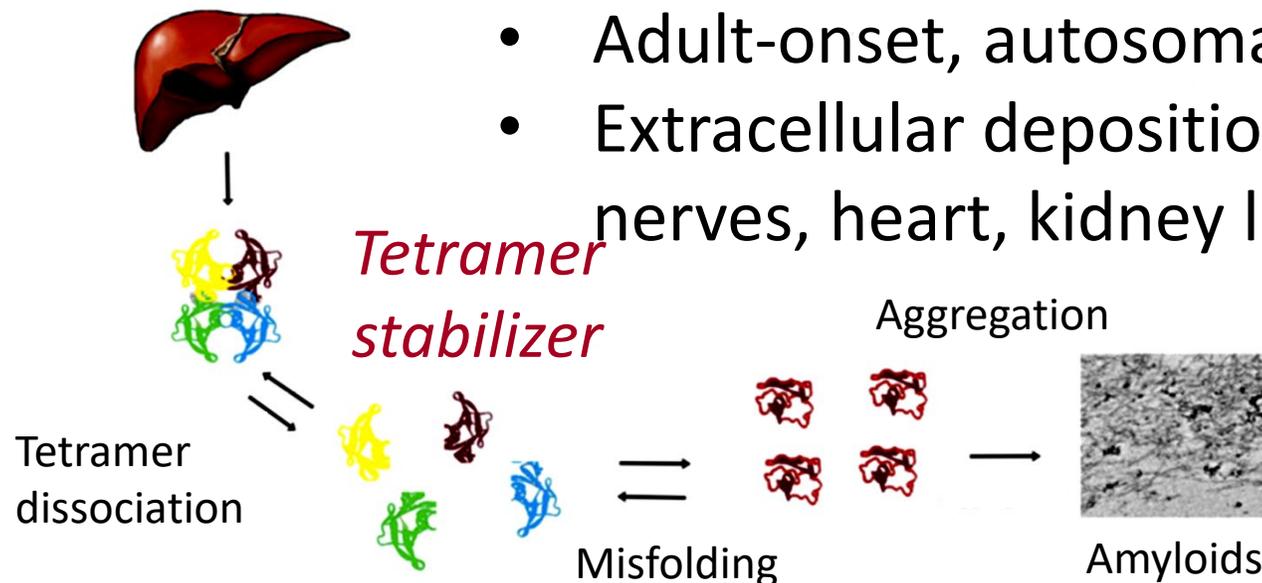
- **Return of Investment:** For every \$1 received by a SPARK project, the PI received \$8 in grant funding for Stanford.
- **Publications:** Three SPARK project-related publications per project.
- **Commercial Funding:** Start-ups based on SPARK's licensed technologies raised an average of \$16 million per project.
- **Attrition:** SPARK start-ups have less than 10% attrition rate; only 4 of the 43 start-ups folded.

# Some of the startups and their pharma partners



# Hereditary transthyretin amyloidosis, a case for a *Higher Order Structure of Protein Therapeutics*

- A rare genetic condition affects an estimated 50,000 people worldwide.
- >120 mutations associated with hATTR amyloidosis.
- In hATTR amyloidosis, mutations in the TTR gene causes misfolding



- Adult-onset, autosomal-dominant; variable penetrance
- Extracellular deposition of amyloid fibrils in peripheral nerves, heart, kidney life-threatening

# Eidos Therapeutics soars after IPO tops targets, raises \$106M



**Isabella Graef, PhD**

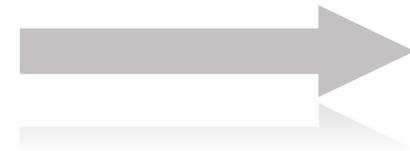
Asst. Professor of Pathology

hATTR – hereditary form of amyloidosis caused by mutation in transthyretin protein, resulting in cardiomyopathy and neuropathy

AG10 - Rationally designed small molecule to that stabilizes mutant transthyretin protein, preventing amyloid deposition in heart and nerve tissues



**SPARK**



# Why is the attrition rate so low?

**Attrition:** SPARK start-ups have less than 10% attrition rate; only 4 of the 43 start-ups folded.

- Inventors are better partners with investors- educated in pharma work
- Projects selected for and mentored by MANY industry experts
- Connections with many companies, investors & future workforce

# What do we teach?

- Start with the **end product** in mind
- Funding based on **milestones**
- Teach **project management** skills
- Provide **product development**-focused education
- Mentorship by **industry veterans**
- Provide **introductions** to collaborators, companies, contractors and investors
- Teach **entrepreneurship** skills



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**K A I**  
PHARMACEUTICALS

Dallas Sept 4, 2004



**SPARK**  
AT STANFORD

# Parsabiv approved:

**Parsabiv<sup>®</sup>** - launched in the U.S. in the first quarter of 2018.

# AMGEN

Approved in the US and Europe

 **Parsabiv<sup>®</sup>**  
(etelcalcetide) Injection for intravenous use  
2.5mg/0.5mL | 5mg/1mL | 10mg/2mL



KAI-4169 Licensed to Ono for Japan before company was acquired by Amgen

Approved in Japan, too

Product photograph



ONO PHARMACEUTICAL CO., LTD.  
Corporate Communications  
[public\\_relations@ono.co.jp](mailto:public_relations@ono.co.jp)

Worldwide sales for second quarter reporting by Amgen (\$102 M)

# Entrepreneurship in a nutshell:

Lesson 1:

Consult! Consult! Consult!

# Entrepreneurship in a nutshell:

**Lesson 1:**  
Consult! Consult! Consult!

**Lesson 2: Dare!**  
Don't fear to fail –  
because you will!

**Lesson 3: Persevere!**  
Have no ego!

**Lesson 4:**  
Diversify!

**Lesson 5:**  
Keep basic research active

**Lesson 6:**  
Think before giving up

**Lesson 7:**  
Good data are not enough –  
Know your market

**Lesson 8:** Your company is  
only as good as your team!

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# Why build a **SPARK** program?

- To translate the amazing science of academia to products that benefit patients – **our social responsibility**
- Because it provides important **education** to students and postdocs for job that they are likely to hold
- Because it may **trigger biotech** industry and contribute economically to the area.

# How to begin

1. Internal champions
2. Program director(s) with relevant experience
3. Volunteer industry advisors (many)
4. Core facilities (HTS, proteomics, formulation, etc)
5. Funding
6. Flexibility

# SPARKing in the world





# Our values

Non-for-profit

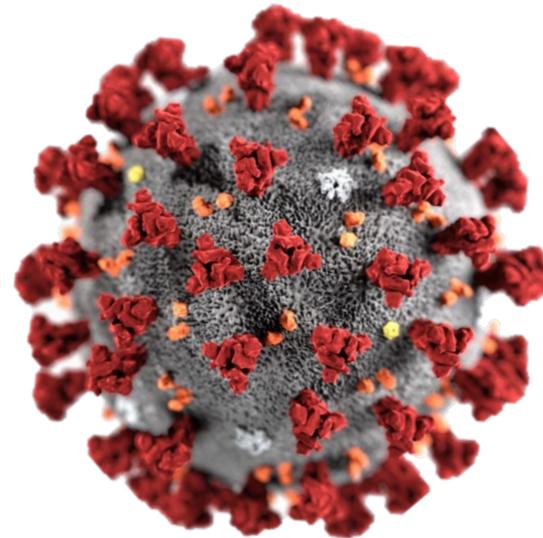
Ethical

Based on volunteering spirit

**For patients and society**

# Why **SPARK** global?

So that together, we can better address global health threats.

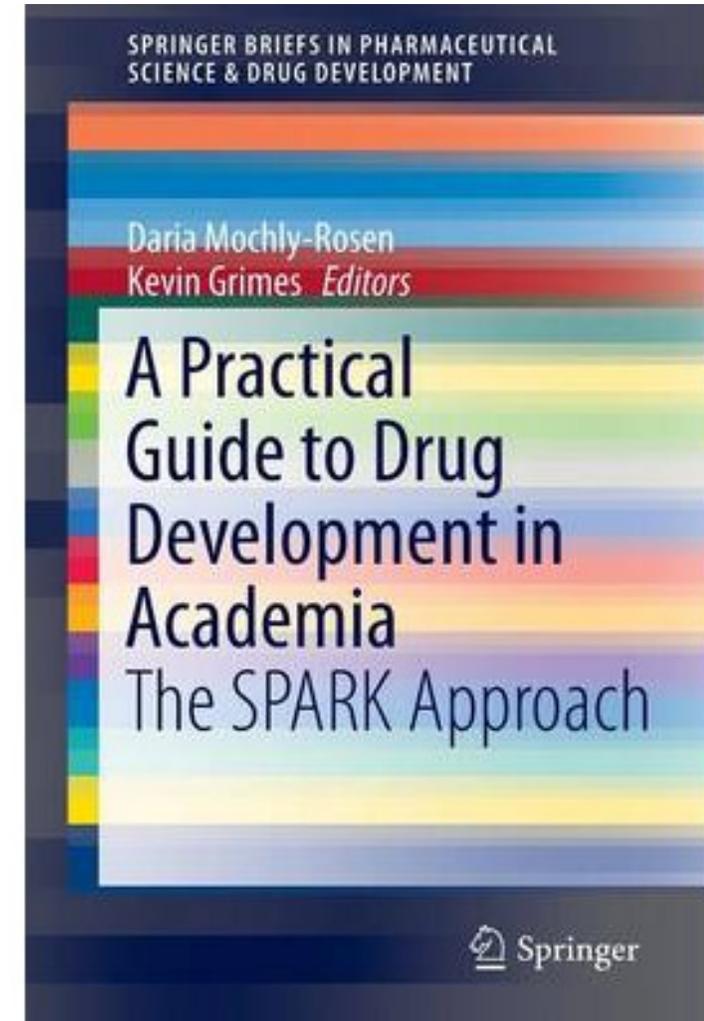


>52 projects

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# SPARKing to benefit patients and society

**Daria Mochly-Rosen,**  
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**SPARK**ing to benefit patients and society

