Portal Stargaze

source, map, and predict innovation with hybrid-AI.

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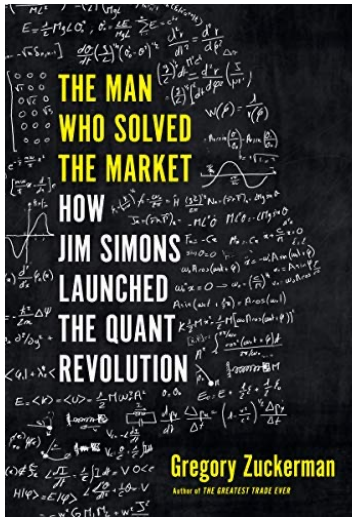
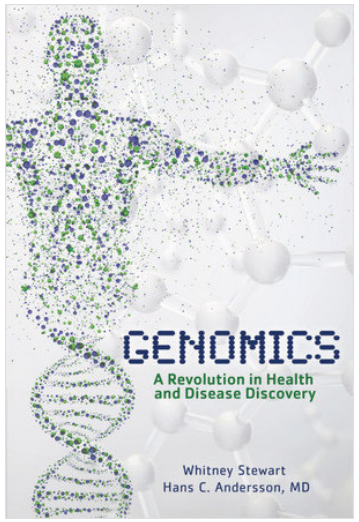
Other disciplines use machine learning to understand trends and uncover leads

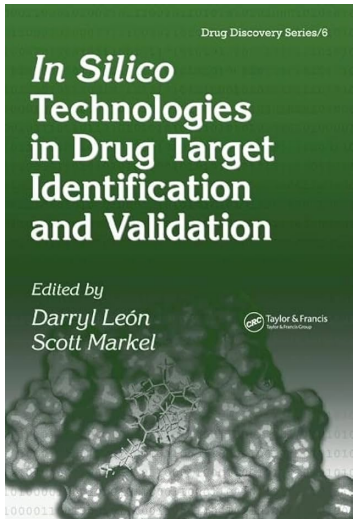
Finance



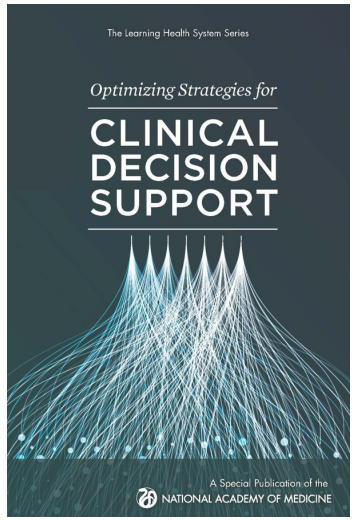
Genomics



Drug Discovery



Medicine



Stargaze does this for Innovation

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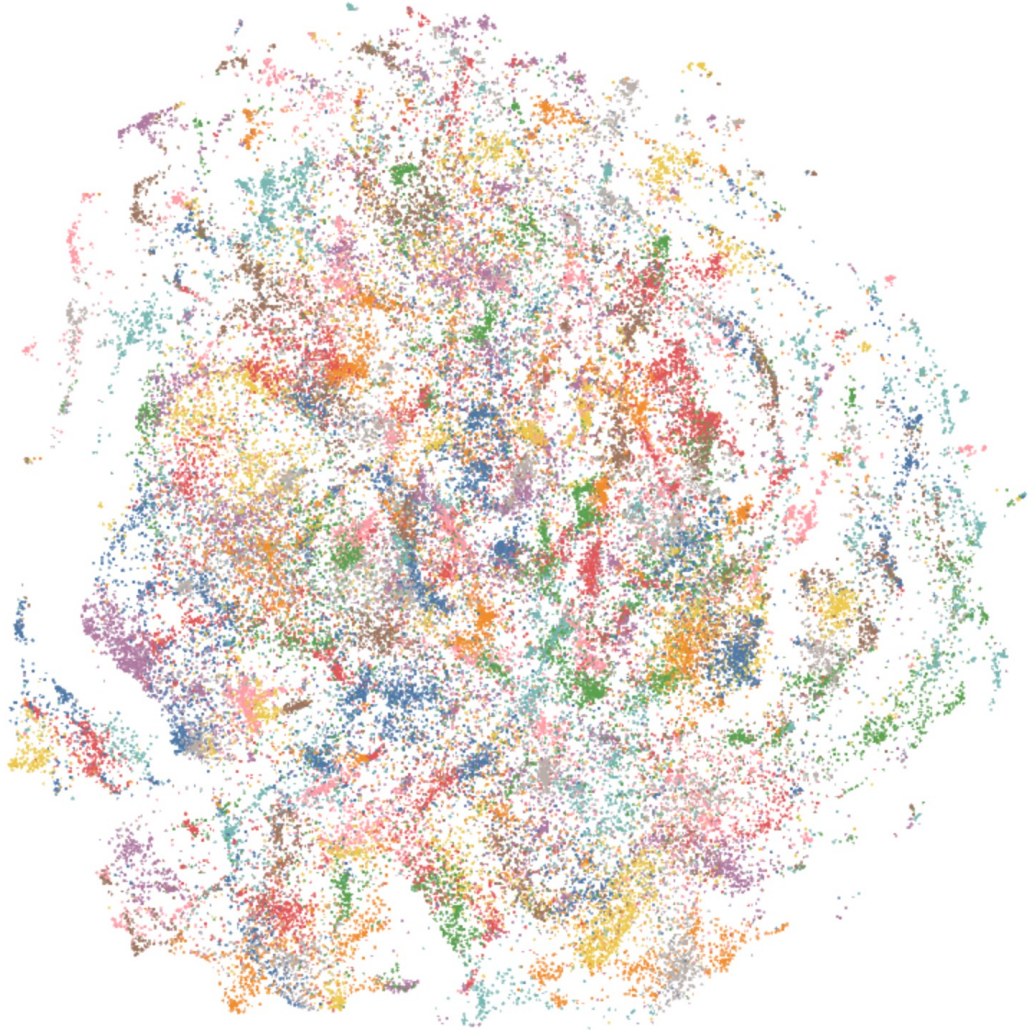
Envision science as a universe containing millions of stars.

Each star is a patent, a paper, a grant, a clinical trial, an inventor, or a company.

Like in our universe, these stars form galaxies that move, collide, change shape, heat up, and cool down.

Stargaze uses breakthroughs in AI and metascience to resolve their coordinates, track their motion, and measure their properties.



100 Years of Innovation at Mayo Clinic

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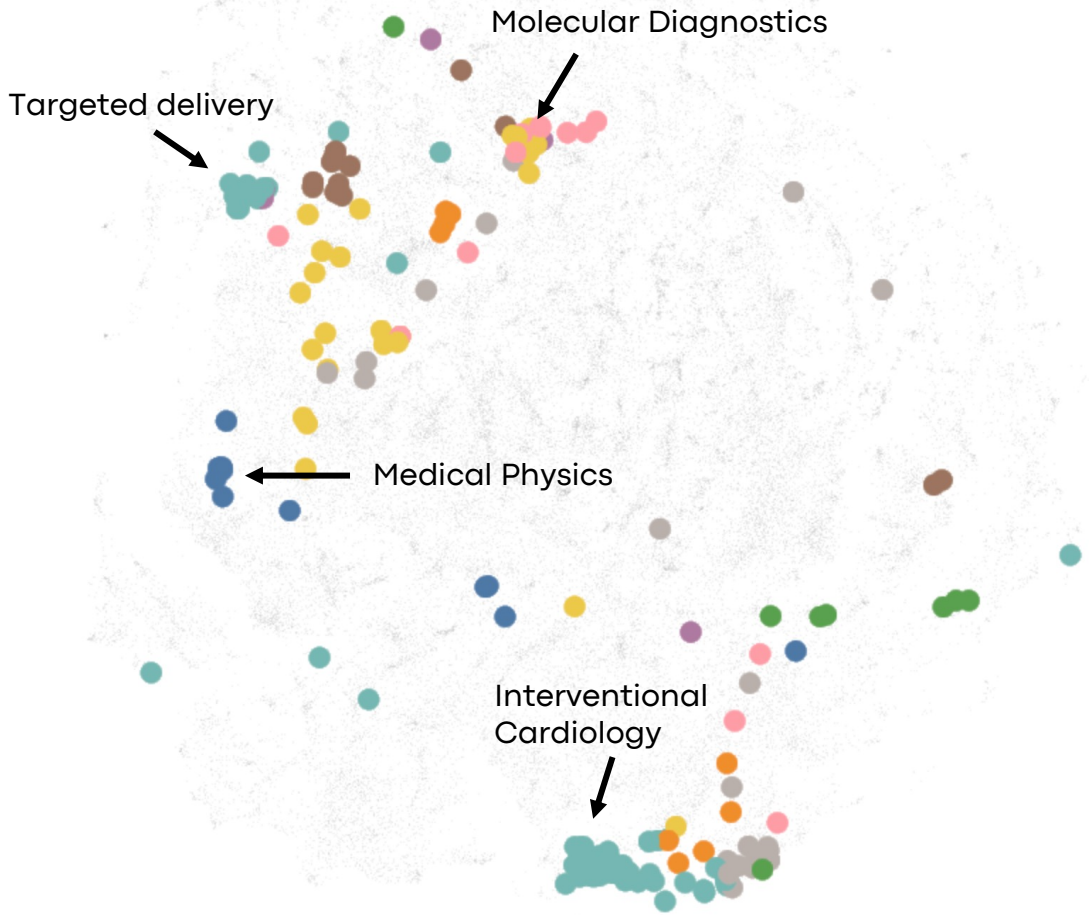
With Stargaze we can see the landscape of innovation with unmatched depth & richness

Predict where biotech innovation is headed next

Discover “innovation biomarkers” that identify startup-ready science

Surface early-career superstars, before they make their splash

Harness these signals to make investments



100 Years of Innovation at Mayo Clinic

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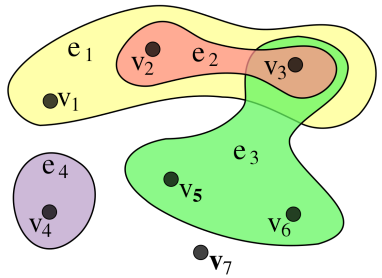
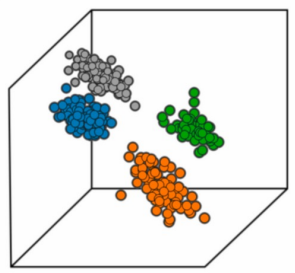
Our fine-tuned models build on the most recent advances in AI



BIOTECH HYPERGRAPH™

At the heart of Stargaze is Biotech Hypergraph, a quantitative representation of biotech innovation over the last 20 years.

We utilize context-trained language models to "read" every biotech patent, grant, publication, and financing. We then connect and plot them, like stars, in a 500-dimension representation of the biotech universe.



KNOWLEDGE CLUSTERS™

Having mapped each star in the biotech universe, we use proprietary algorithms to identify clusters of scientific activity. Like astronomers, we zoom out to look at clusters as large as galaxies (e.g. SynBio) or zoom in to look at clusters as small as solar systems (e.g. virus-like nanoparticles).

By tracking clusters over time, we see which are growing, and which are shrinking. We track which are moving closer together, and which are moving apart. And we foresee which are more likely to generate massive stars and those that are on the fast track to cosmic dust.

INNOVATION ECOTYPES™

Each cluster contains hundreds of unique stars: each a single scientific researcher with a unique research fingerprint.

By measuring how all these stars change over time, we predict the path that a star is likely to follow.

Most will remain relatively small and low energy. Some will become big, but in the wrong innovation cluster they will lose energy fast. A select few will become massive, high energy stars that change the course of biotech.

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Example Outputs

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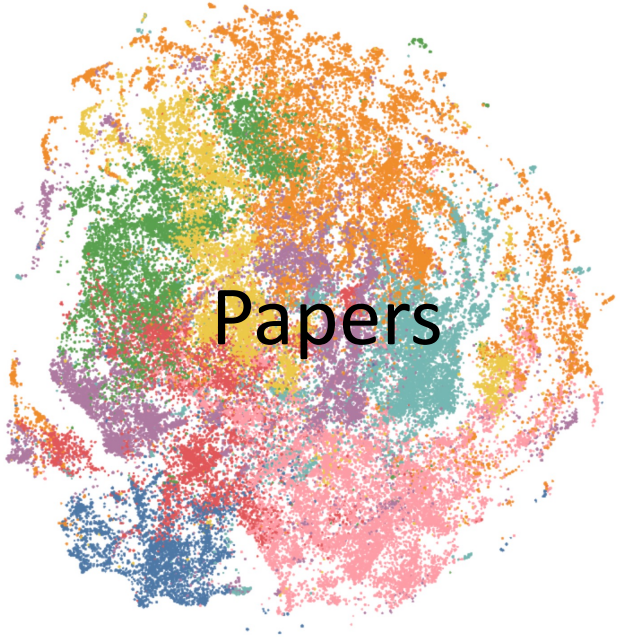
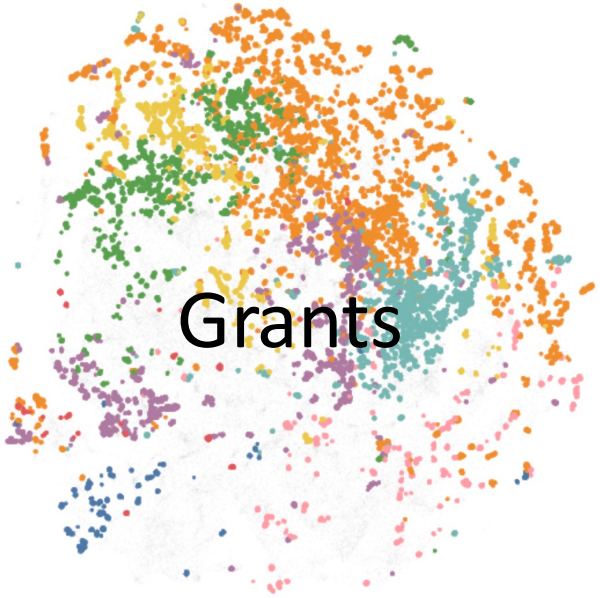
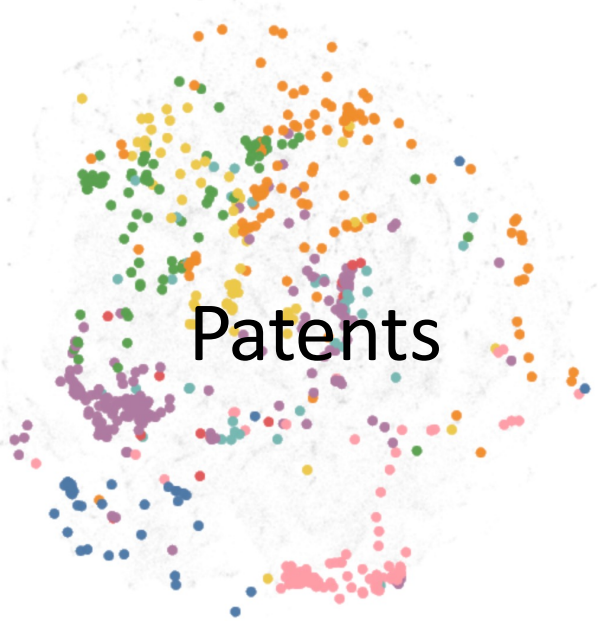
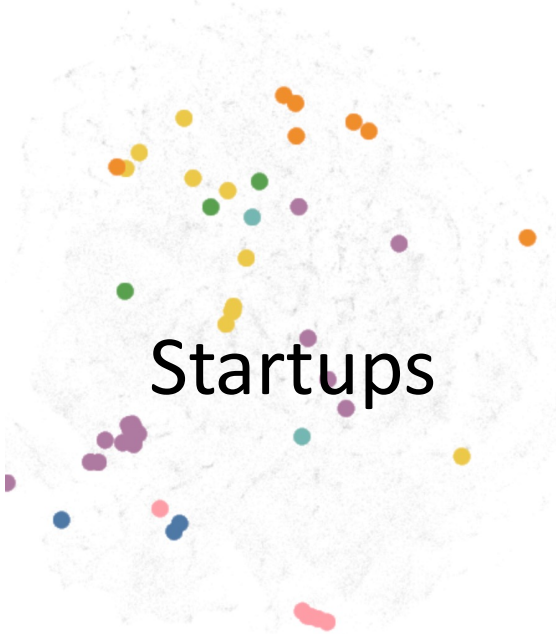
Vector Atlas uncovers clusters of innovation









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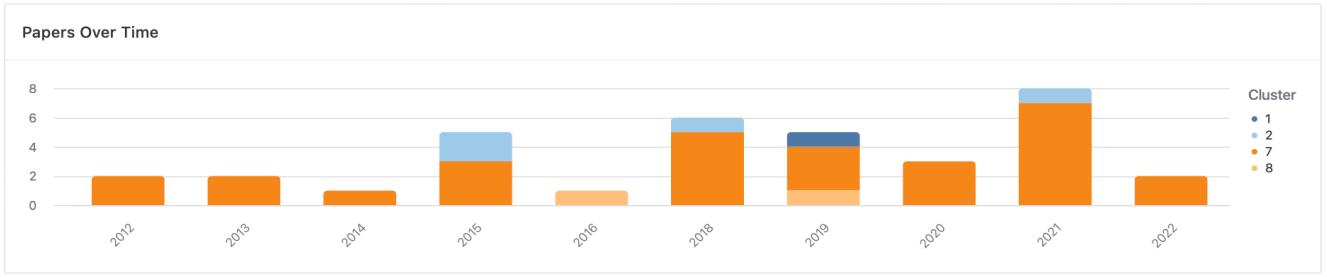
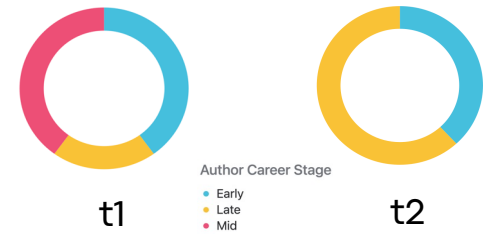
Innovation biomarkers predict where clusters of innovation are headed

Papers Over Time, Grouped by Cluster

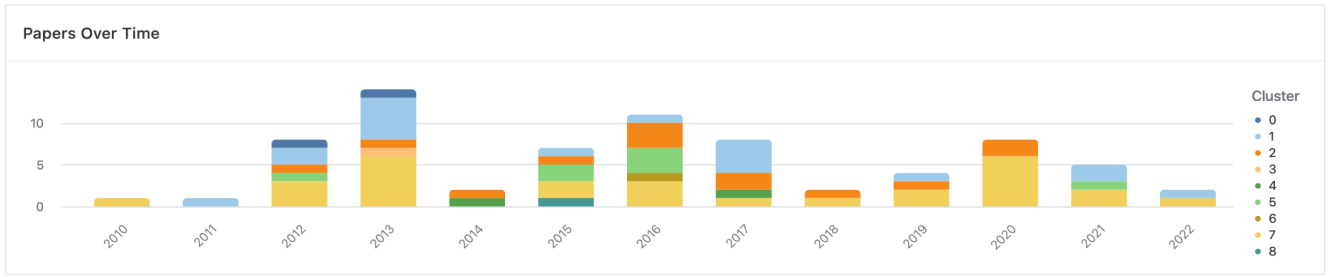
Papers by Author Career Stage @ Publication

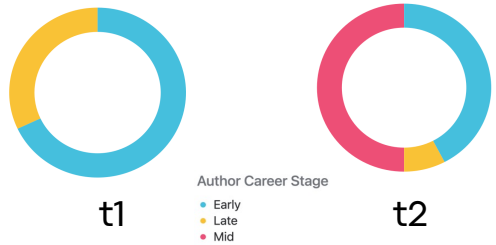
LNP



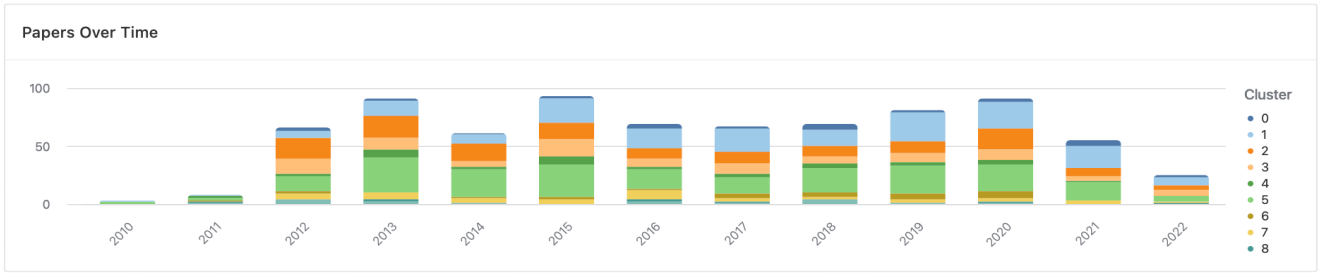


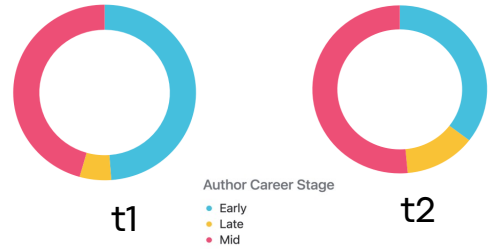
non-Viral





AAV & Lenti





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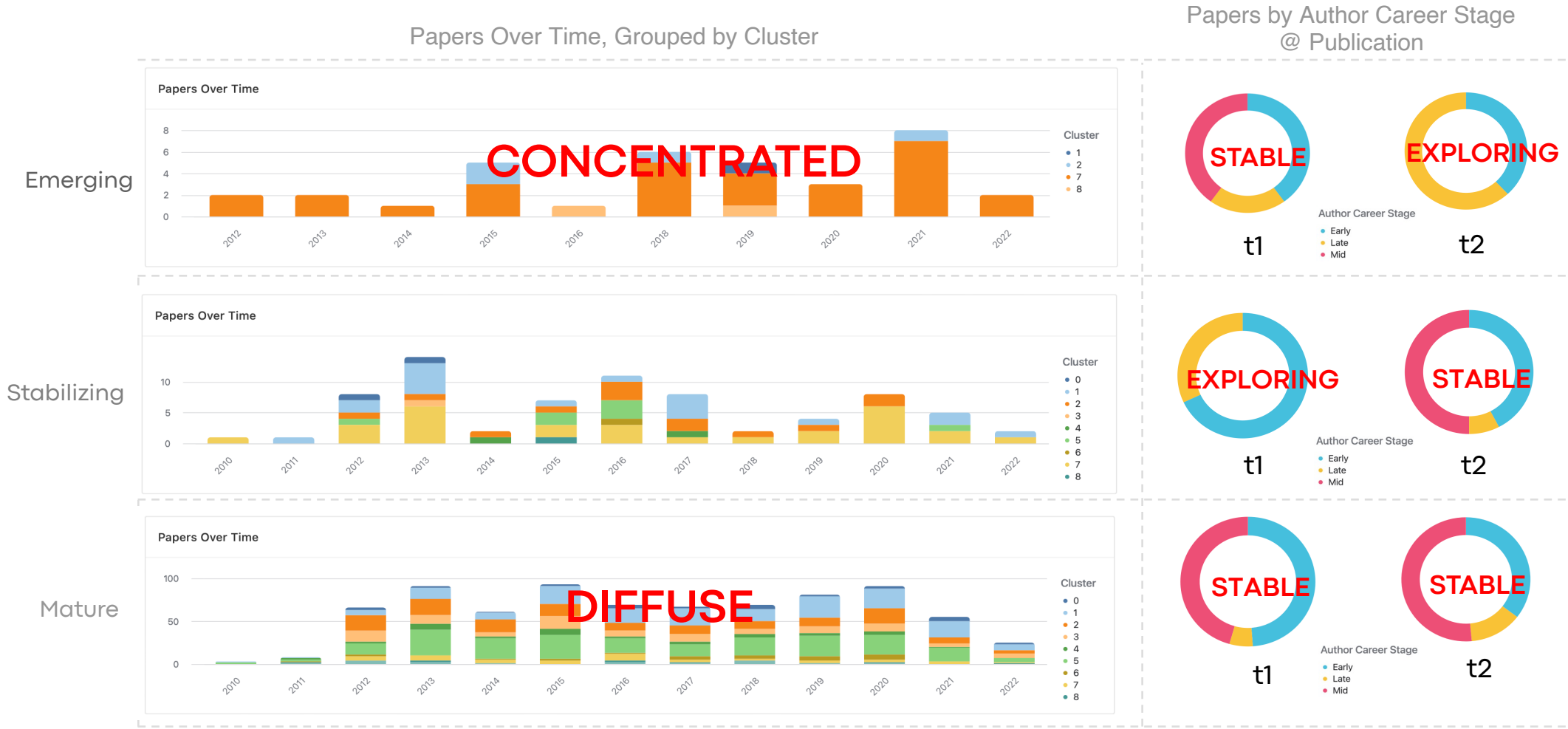
Innovation biomarkers predict where clusters of innovation are headed



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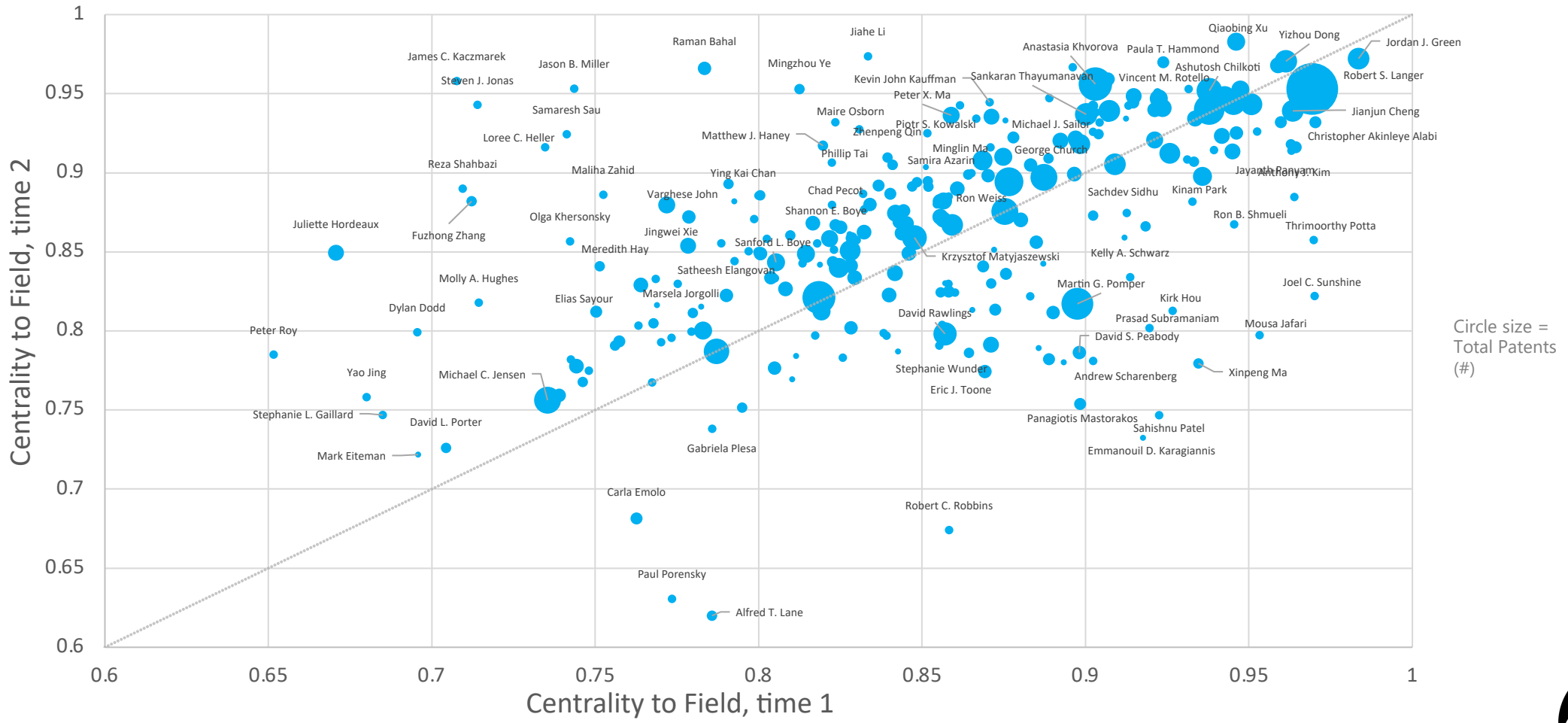
Celestial motion models track innovators within innovation hotbeds



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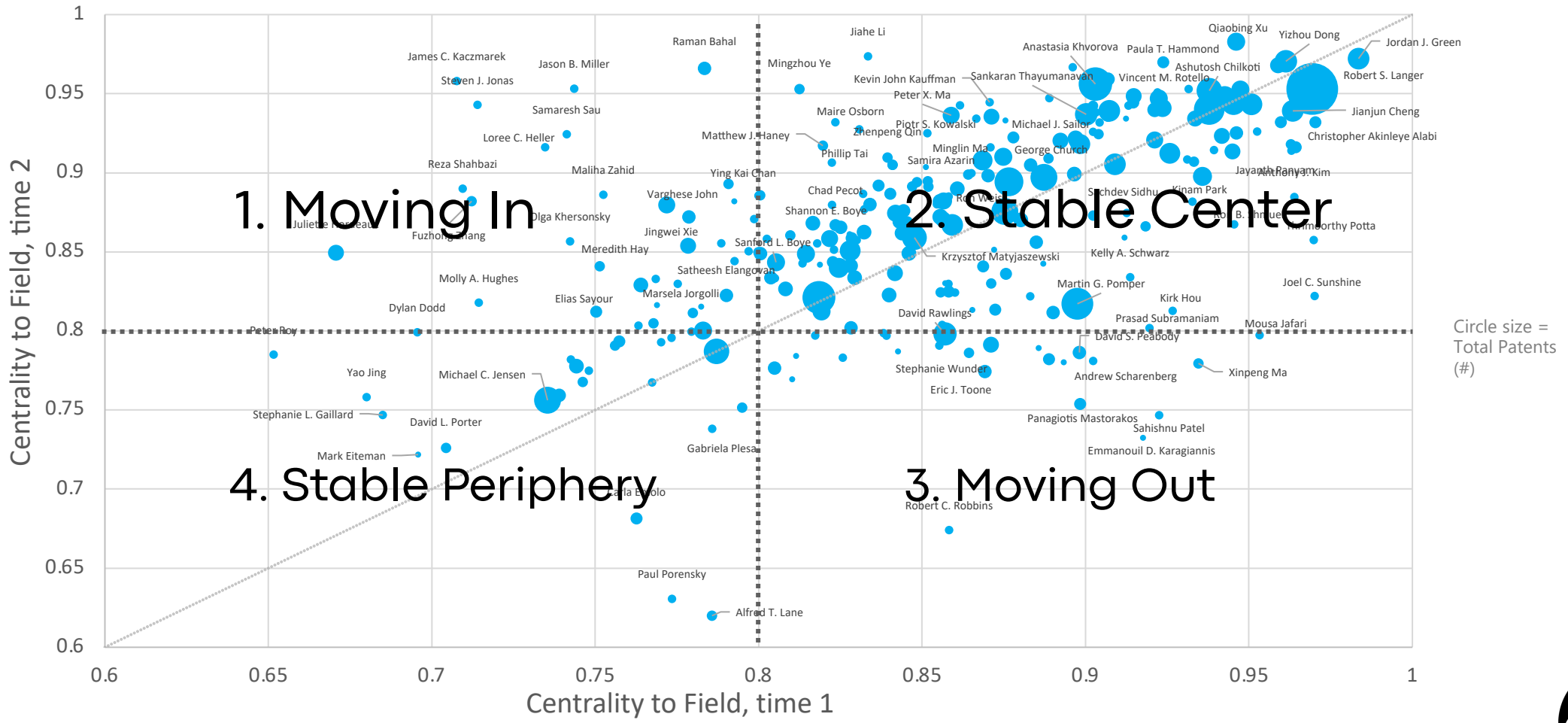
Celestial motion models track innovators within innovation hotbeds



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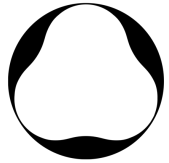
Celestial Motion Takeaways

- The cluster has a strong gravitational pull
  - Significant majority of researchers fall above the x=y line

- The "core" is very stable and patent-dense (quadrant 2)
  - Suggests that the researchers at the center are staying there
  - Suggests that the questions animating them are *translational (*as opposed to theoretical).
  - Suggests that this cluster remains very hot

- Emerging core researchers are young and hungry (quadrant 1)
  - James Kaczmarek (Sana)
  - Steven Jonas (UCLA)
  - Raman Bahal (Uconn)

- Very few core researchers are moving on (quadrant 3)
  - Robert C. Robbins – became Chancellor at University of Arizona
  - Emmanouil Karagiannis – Left academia to launch Senda Biosciences
  - Sahishnu Patel -



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Supervised learning models predict which researchers will make groundbreaking discoveries

	Portal In...	Name	First Active Year	Nova Score (T1)	Nova Score (T2)	Nova Delta	total patents / year	total grants / year	Startups
1	104412	Kenneth Kinzler	1986	98%	98%	0%	0.1	$272,339	Thrive Earlier Detection
2	107724	Martin G. Pomper	1988	97%	95%	-2%	0.8	$238,196	
3	106207	Gregg L. Semenza	1987	97%	95%	-2%	0.1	$267,297	
4	113506	Samira Kiani	2004	91%	93%	2%	0.4	$109,226	GenexGen
5	113652	Samuel Lai	2005	89%	93%	4%	0.4	$406,728	Mucommune, Inhalon Biopharma
6	112560	Justin Hanes	1994	96%	93%	-3%	1.0	$270,930	Graybug Vision (NAS: GRAY)
7	102504	Jordan J. Green	2006	95%	91%	-4%	0.9	$129,252	AsclepiX Therapeutics
8	104416	Kenneth Pienta	1984	93%	91%	-2%	0.0	$369,369	
9	108656	Ajay Goel	1991	70%	89%	20%	0.2	$245,652	
10	112604	Geoffrey C. Gurtner	1988	75%	88%	13%	0.2	$184,871	
11	110430	Gordon Tomaselli	1988	85%	88%	2%	0.1	$199,087	
12	104574	Shibin Zhou	2002	73%	86%	13%	0.3	$119,632	
13	113221	Chhinder P. Sodhi	1996	74%	85%	10%	0.1	$241,032	
14	106833	Jef Boeke	1978	87%	84%	-3%	0.1	$107,404	
15	112728	Honggang Cui	2004	89%	84%	-5%	0.5	$58,211	
	64 records 6846175		Sum 127784	Sum 3541%	Sum 3346%	Sum -195%	Sum 13.7	Sum $6,516,012	

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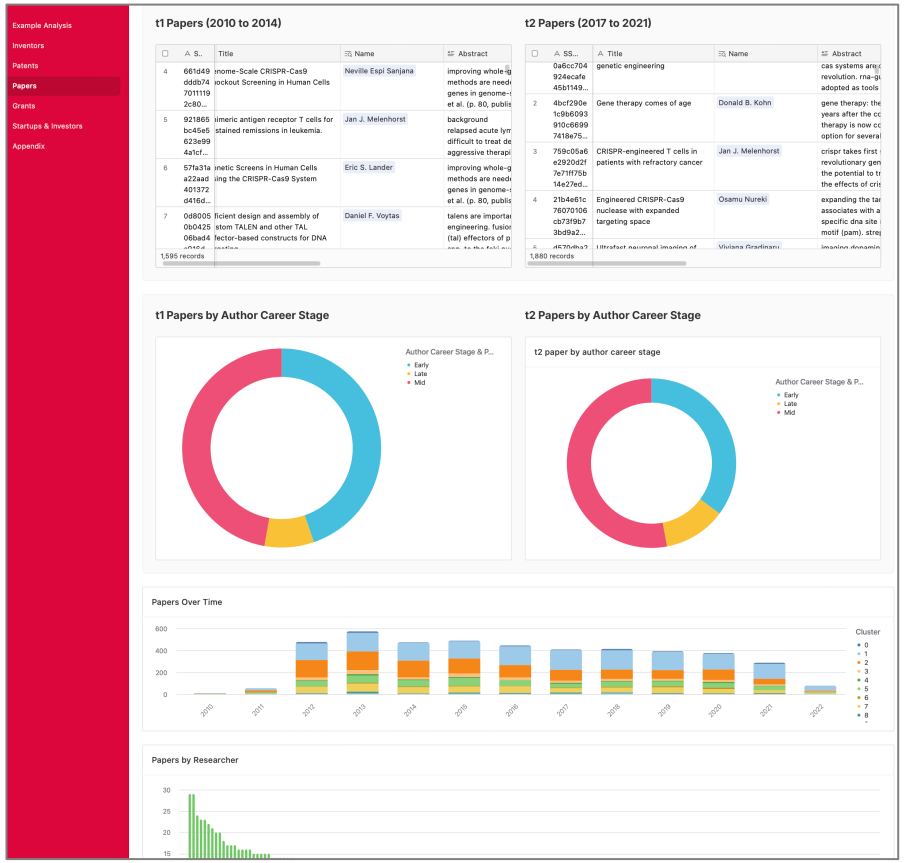
Starcharts make it interactive & accessible

Intuitive, custom dashboards:

- interact with the data
- visualize insights
- explore your own hypotheses



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Case Studies

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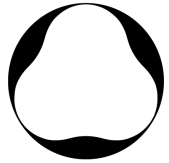
Case Study: Align innovation strategy with the pace of science

Questions we answered:

- What is the structure of (e.g.) nucleic acid delivery in the US?
- What are the most promising subfields for startup creation?
- Which fields are most heavily crosspollinating?
- How does this map to geographies and institutions?
- Which labs are driving the next wave?
- How is this changing over time?



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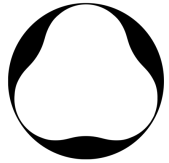
Case Study: Sourcing-as-a-service

Questions we answered:

- How do I skep the TTO and go right to the source of innovation?
- Who are the true innovators in the ocean of researchers we're seeing?
- We've found a great lab with research we love. How do we surround it with the right people and resources, and create a VC-backable venture?



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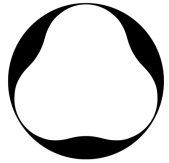
Case Study: Protect and expand a strategic asset class

Questions we answered:

- How do I spot the most promising technologies in gut inflammation?
- Which early researchers do I need to forge a relationship with?
- Which geographies should I focus on?
- How do I maintain an informational edge over my competitors?
- How do I inject AI into my internal BD / External Innovation capabilities?
- How do I do this FAST, before my competitors?



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Case Study: Exact Sciences

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Exact Sciences & David Ahlquist

In 2008, Exact Sciences, a cancer detection company based on a discovery out of Case Western, was on the rocks and nearly out of runway.

In June 2009, they cleared the deck, hired a new management team, and ”re-founded” the company on a technology developed by David Ahlquist and his lab at Mayo Clinic.

Their big bet turned a near-failure into a thriving name-brand in a matter of years.

- Why did Exact Science‘s bet on David Ahlquist pay off?
- Stargaze uncovers “innovation biomarkers” in his research leading up to the Mayo/Exact Sciences deal that changed everything.
- Stargaze can apply these biomarkers to the search for future David Ahlquists.

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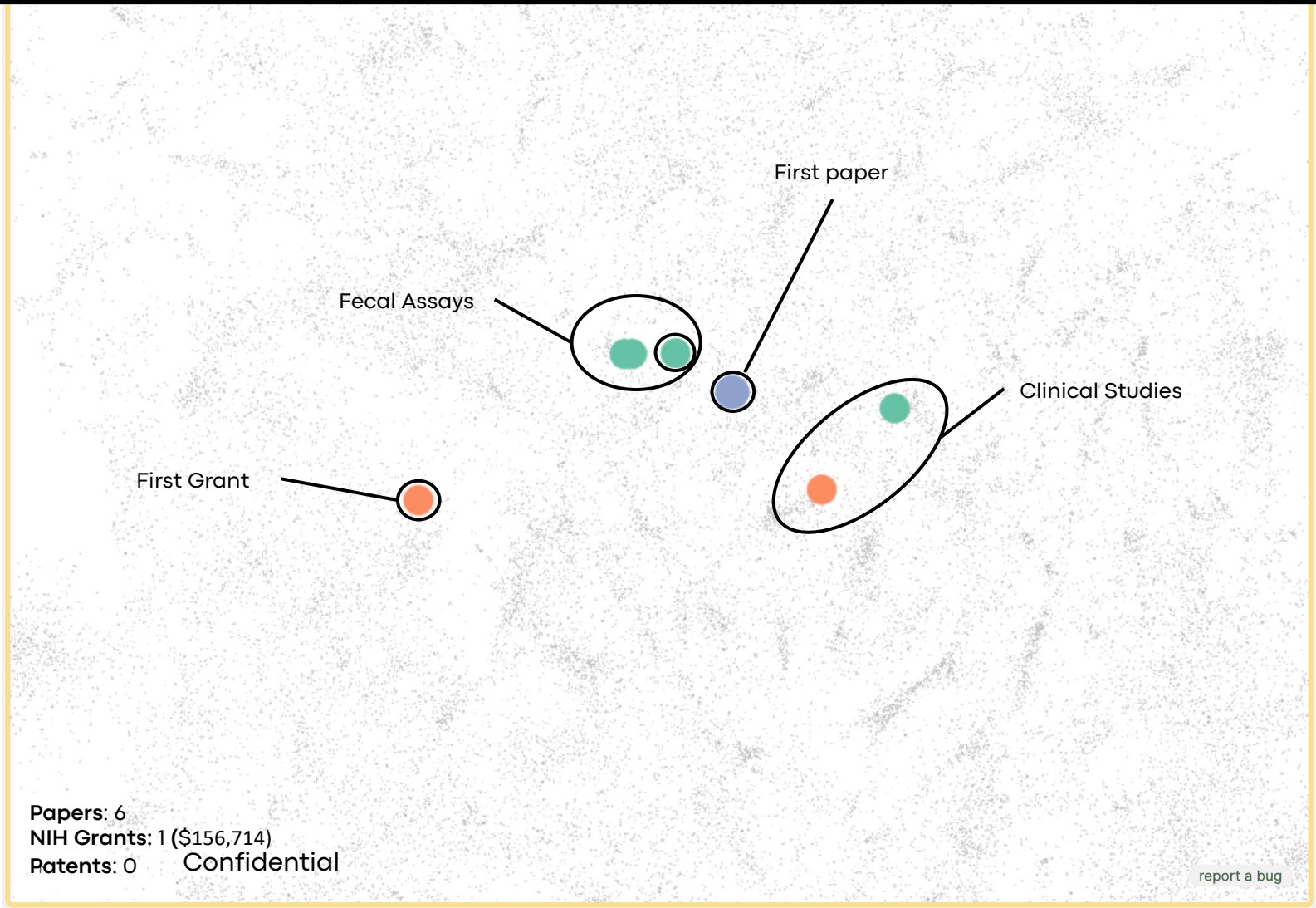
1975-1985: Setting Anchor

- **1975:** First paper describes a new assay for hemoglobin in the stool.
- **1983:** Joins Mayo Faculty
- **1983:** Publishes first of a series of "HemoQuant Test" papers
- **1985:** First big grant – Apply HemoQuant to Cancer

Insights:

- No Patents during this period
- "Anchor Research" area– Fecal Assays – has already taken hold.
- First grant predicts where his core patents will appear, 30 years later!

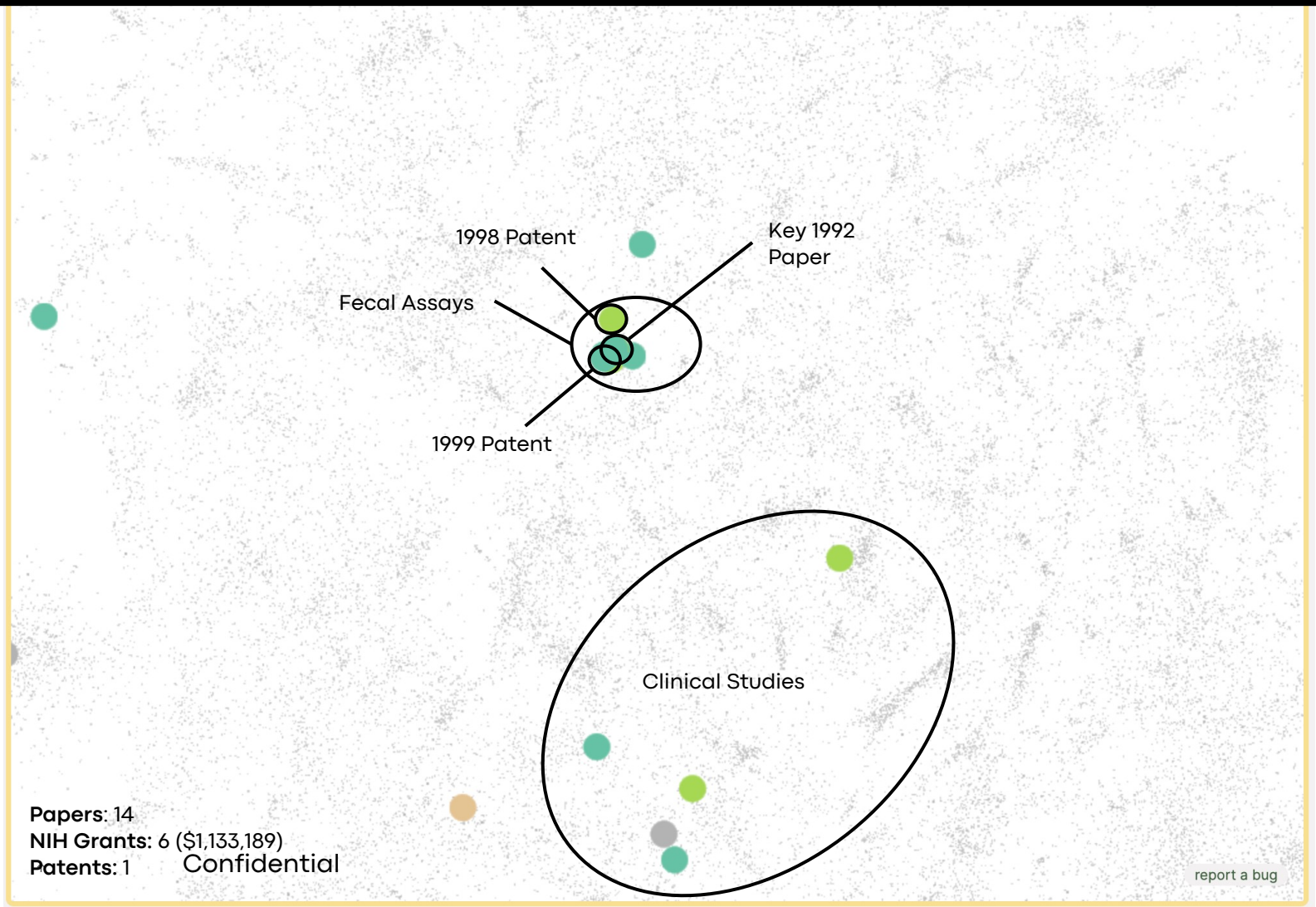


1985-1999: Zeroing In

- **1985-1992:** Ahlquist goes all in on blood-based assays of the stool.
- **1992:** Publishes a retrospective concluding that blood-based stools are not the way forward.
- **1992-1999:** First patent emerge as he begins searching for a new path.

First Patents:

- US62178196 (1998): "Chemoprevention of metachronous adenomatous colorectal polyps"
- US62501596 (1999): "Methods of recovering colorectal epithelial cells or fragments thereof from stool"



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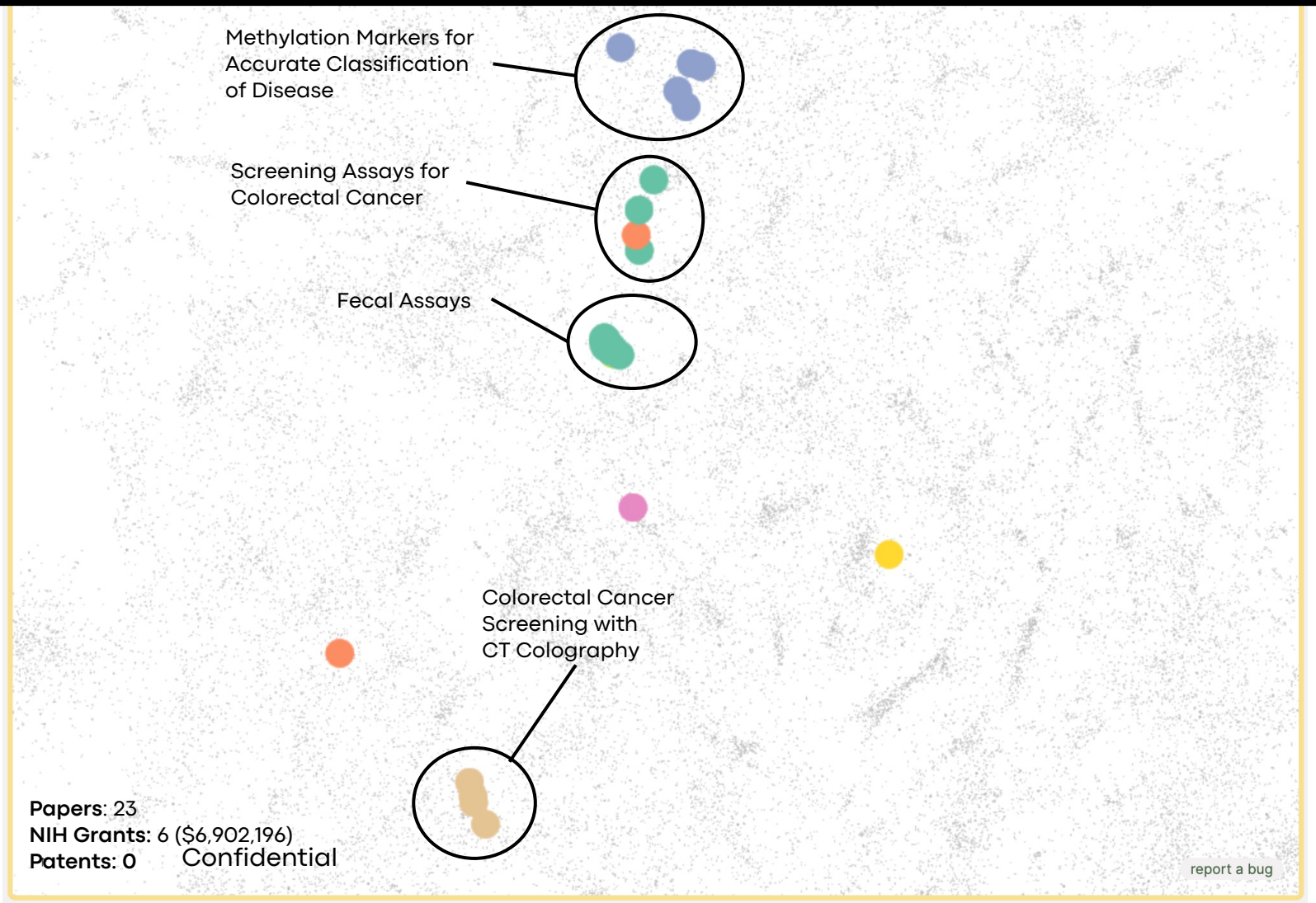
1999-2008: Exploring New Avenues

As Ahlquist searches for alternatives to blood-based screening, he expands his aperture to focus on three distinct topics.

- DNA Methylation
- Screening Assay techniques
- CT Colography

Insights:
In the cycle that leads to Ahlquists transformational agreement with Cologuard, we see:

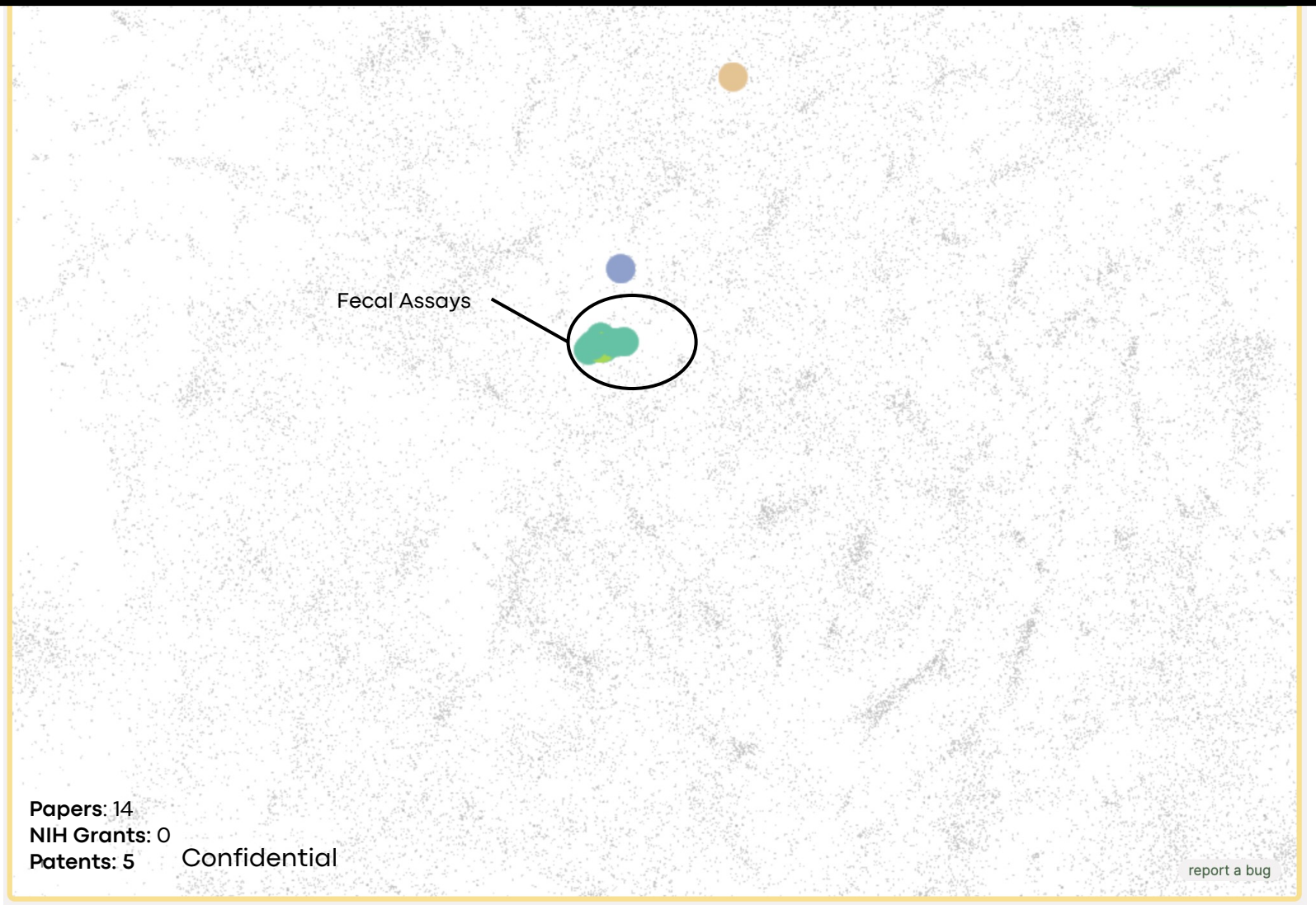
- A major ***increase*** in publishing and grant getting in his anchor
- A major ***expansion*** of his topics of inquiry outside of his anchor
- A 9-year ***pause*** in patenting



2008-2014: Doubling Down

From 2008 onward, Ahlquist is focused on advancing his innovations via Exact Sciences.

- No NIH Grants
- Lots of Patents & Papers, ***all focused*** on fecal assays



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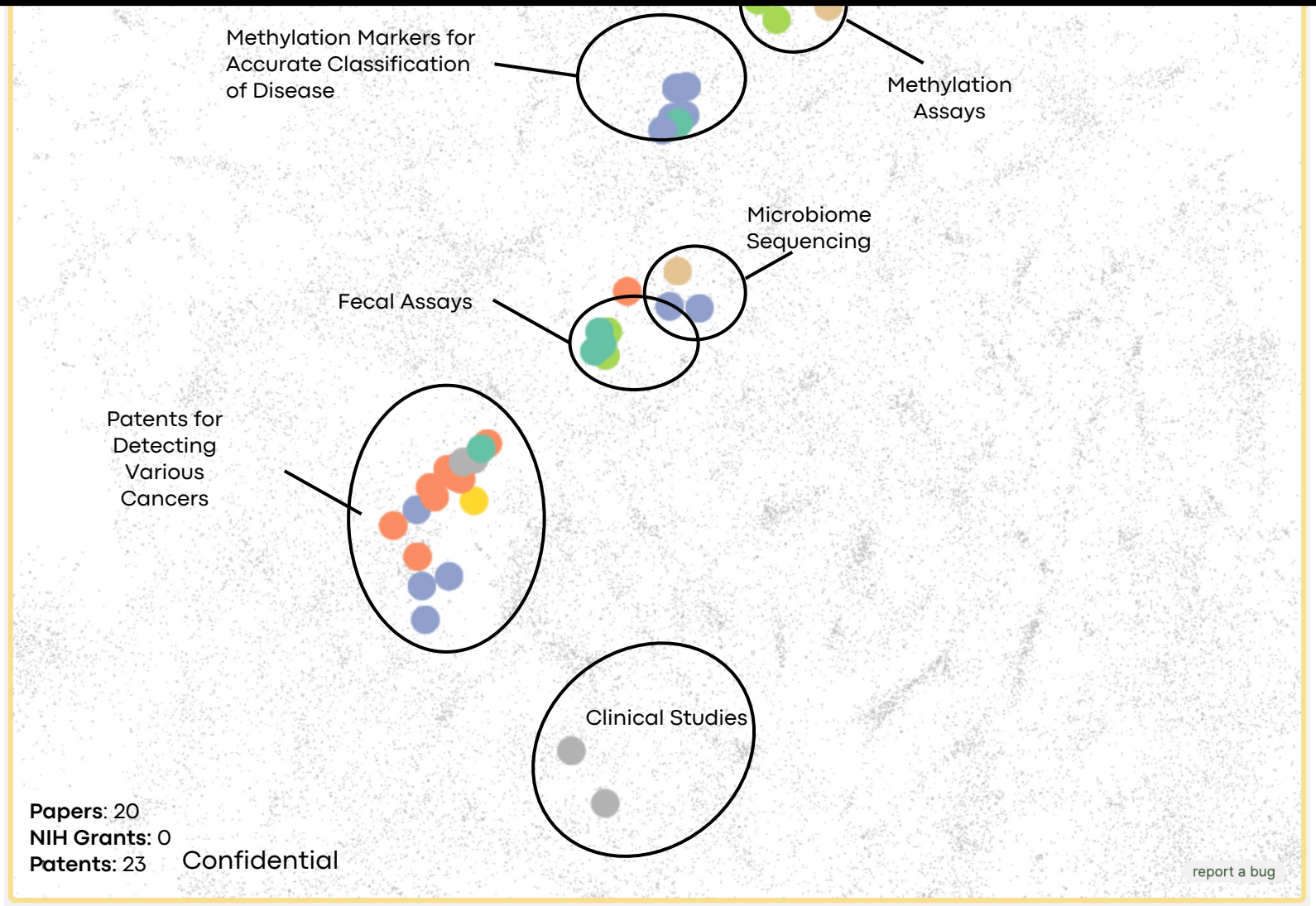
2014-2020: Applying the breakthrough

- Patenting explodes, focusing on detecting a slew of specific cancers.
- Patents *directly* overlay his first major grant.
- Ahlquist broadens his scope again, focusing on the next big discovery.
- 2020 – Ahlquist passes away from ALS after a life spent transforming how CRC is detected and treated.



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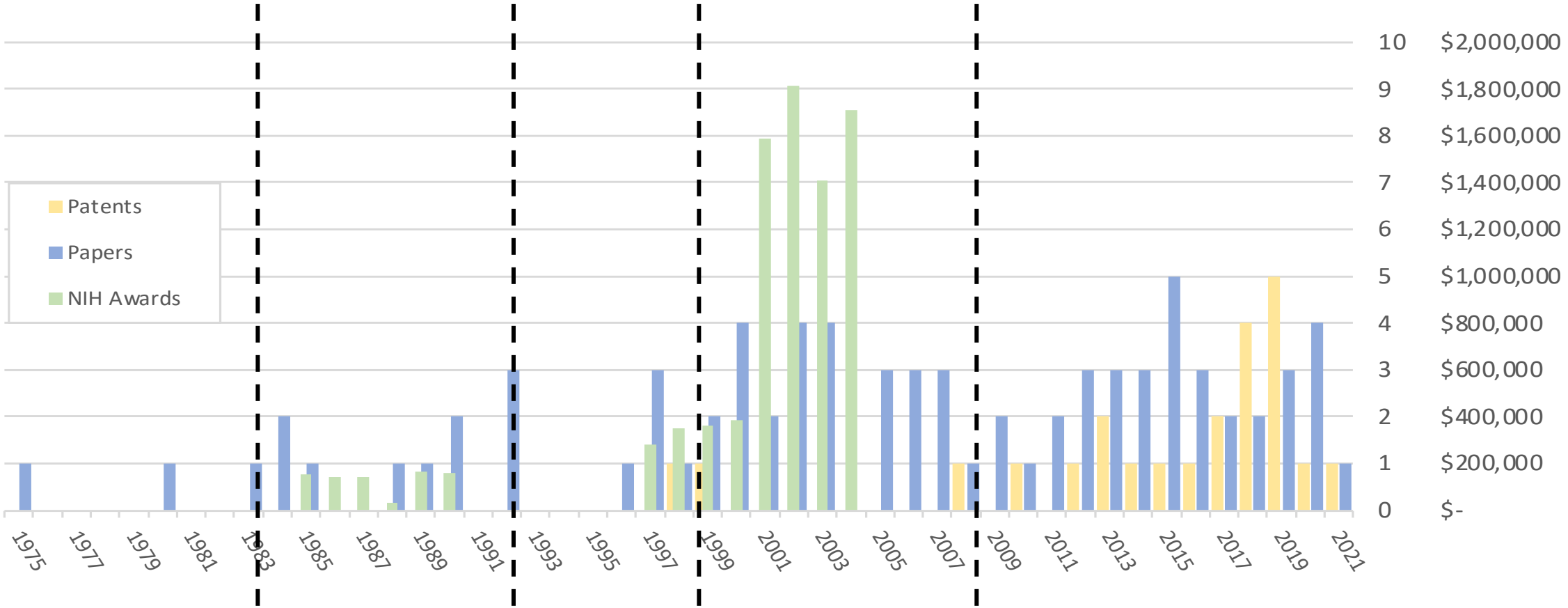
Distinct innovation cycles predict when an innovator is ready to translate



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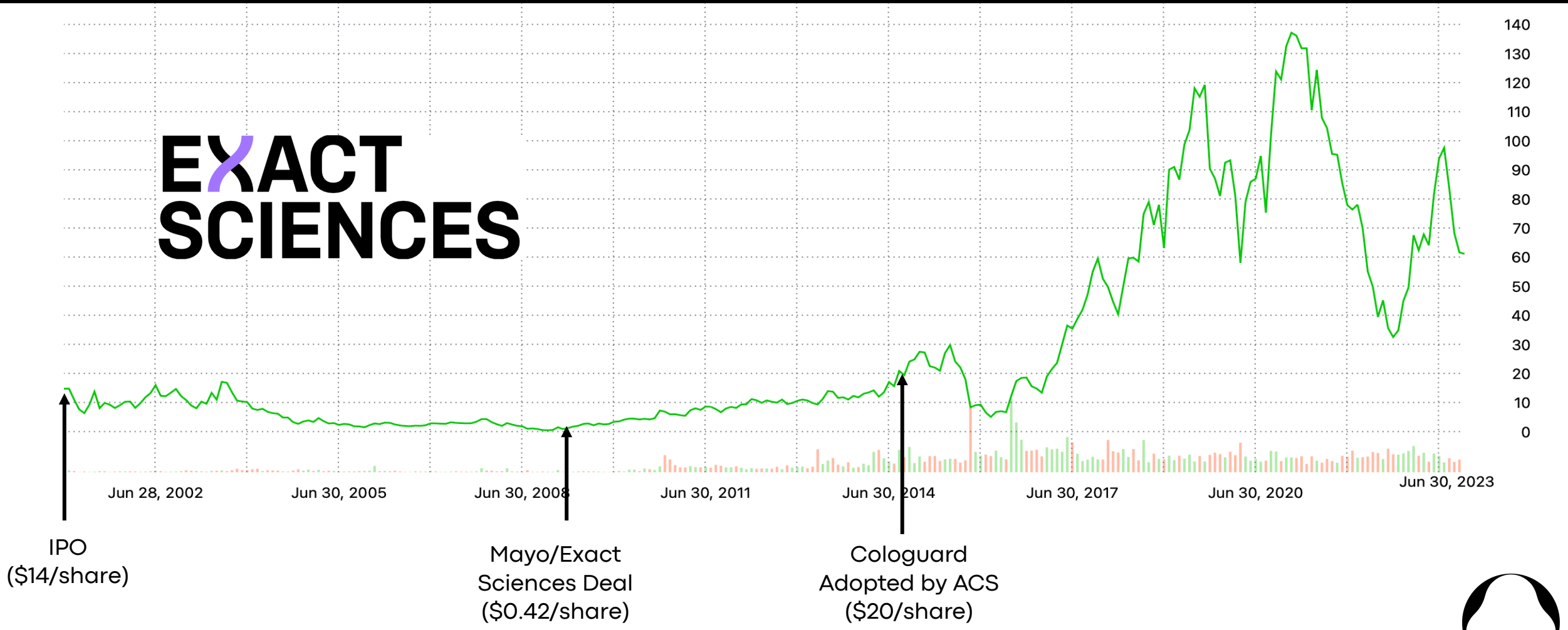
Timing the Innovation Cycle Right Matters



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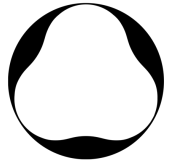
Lessons from the Mayo / Exact Sciences

1) Visualizing a scientist's "research anchor" shows ***where*** they are most likely to generate a breakthrough.

2) Understanding their "innovation cycle" shows ***when*** their innovation is ripe for commercialization (and when it is not).

3) Stargaze makes this possible, quantitatively and at scale, for the first time.



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A recipe for finding future Ahlquists

1. Quantify & visualize the innovation landscape of interest
2. Zero in on clusters that exhibit promising Innovation Biomarkers
3. Classify specific researchers likely to generate a breakthrough
4. Zoom in on those within the ”translational phase” of their innovation cycle.
5. Engage.
6. Repeat

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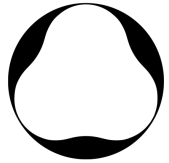

Partner with us

- Introductory Starchart: 50k
- Diligence Advisory: 25k to 50k / deal
- Innovation Advisory: 250 to 750k / engagement
  - *Quickly understand an emerging technology*
  - *Protect / expand an asset or technology class*
  - *Understand an innovation cluster*
- Sourcing-as-a-Service: bespoke

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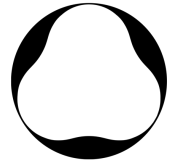

GenAI for the Scientific Knowledge Graph

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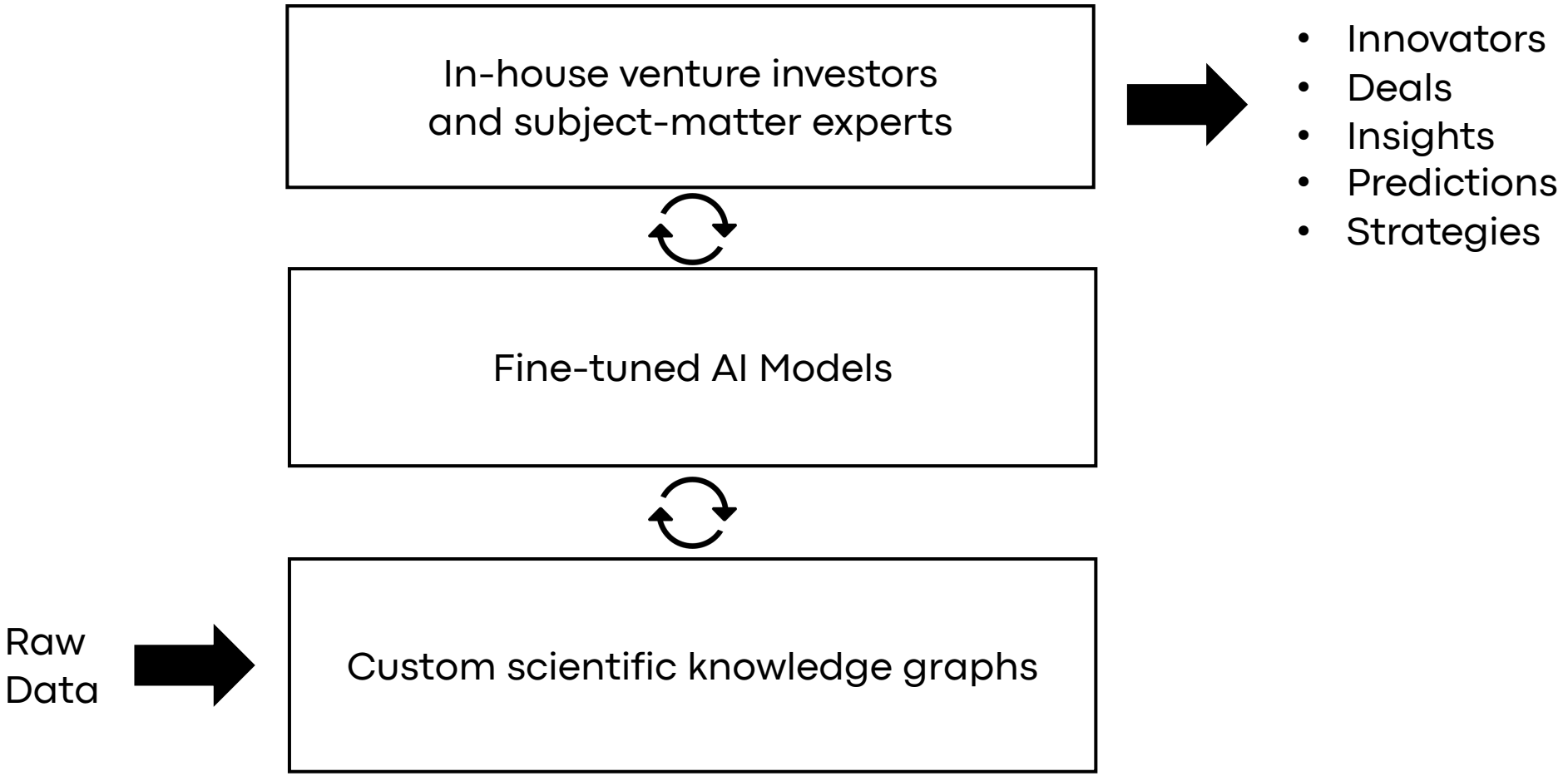
Hybrid-AI: Experts & AI work better together



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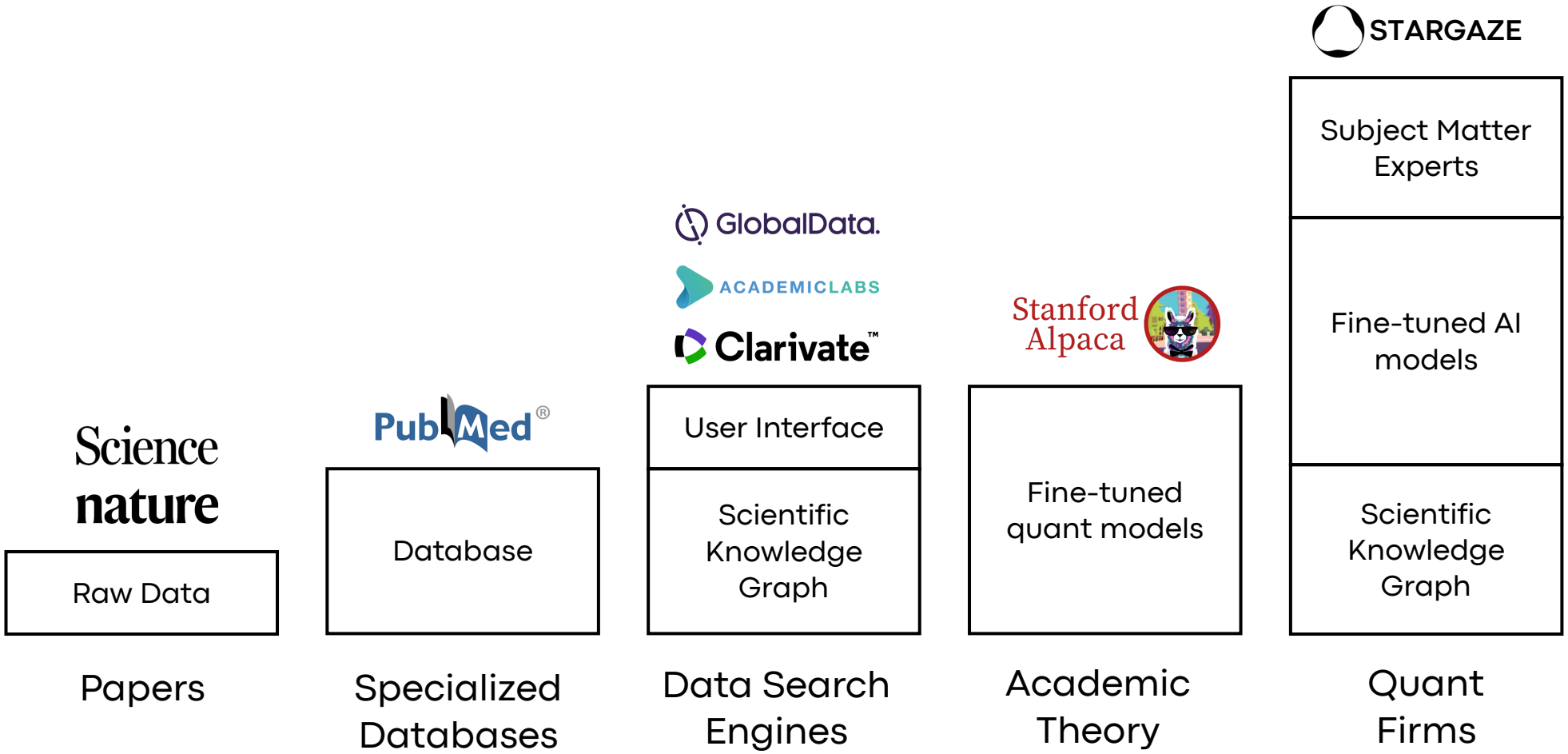
Where Stargaze™ Stacks Up



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