Technology Isn't The Hard Part

Can bioinfo cores and research computing/software/data teams learn from each other?

ISMB 2022
Bioinfo-Core Workshop

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Congratulations!

Research deserves the best support we can offer

Where I'm Coming From

- Working in the "supporting research with computing and data" mines for a long time

  - Astrophysics

  - HPC center

  - Coordinating HPC centres

  - Genomics (*along*, but not *in*, bioinformatics core facilities)

  - Building a national data sharing platform

- Have talked with and helped a number of other teams over the years

It's A Hard, Weird Job

- Salaries, processes make hiring hard

- Things move slowly

- Working with trainees and staff

- Long term products, programmes, cobbled together with short term project funding

- Technology changes quickly

- Needs change quickly

- Lack of external clarity on priorities

- Presenting problem not real problem

- Difficulty explaining team's value to senior leadership

photo credit: Nubelson Fernandes on unsplash.com

It's A Hard, Weird Job - But Can Learn From Others

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Academic & Government support teams

Academia & Nonprofits

Tech Startups

Consultancies

We have a huge advantage!

Goal for teams is the same — advance science as far as we can

Our scientific training gives us superpowers as managers —
if we choose to use them

Strongest teams have learned to apply that scientific mindset to
how they work as managers,
not just **the stuff they work on**

The Juggling Act

- People ⎫
  ⎬── Internal, Present
- Processes ⎭

- Products ── Interface, Present & Future

- Potentialities ── External, Future

photo credit: Desiray Green on unsplash.com

The Juggling Act

- People

- **Processes** ⬅

- Products

- Potentialities

Bad(?) Things Happen
Focus only on the present work: sucker punch

- Key staff member hands in two week's notice

- Biggest client starts taking work elsewhere

- Discover an error in a workflow; a client just published results using old version

- Data you were processing is found somewhere public it shouldn't be

- Funders announce key funding source for clients is ending

- Boss announces departure; replacement has always been skeptical of your group

- Ex-client starts publicly trashing quality of your work

Good(?) Things Happen
Focus only on the present work: unprepared

- Single large new client comes in, would take 50% of your current capacity

- New large funding opportunity in area sort-of adjacent to your core work

- Well timed success on high-profile project: increase for demand for a service quickly doubles, mostly from people with no previous experience with it

- You don't have any reqs open, but a fantastic possible hire just came on the job market

- Another service provider providing similar services just closed their door

The Juggling Act

- People
- Processes
- Products
- Potentialities

All four are essential

The Juggling Act

- People - Science taught us advanced skills; just need to learn the basics

- Processes - Protocols for all the things!

- Products - Bundle expertise like papers; experiment and gather data

- Potentialities - PI-like focus: how to have the biggest impact

The Juggling Act

- People ⬅
- Processes
- Products
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People
Google Oxygen, 2009: People Mangers Matter!

Things Great Managers Do

1. Good coaches.
2. Empower their team, not micro-manage.
3. Express interest in their team members' success and personal well-being.
4. Productive and results-oriented.
5. Good communicators and they listen to the team.
6. Help employees with career development.
7. Have a clear vision and strategy for the team.
8. Have key technical skills that help them advise the team

Key Shortcomings of Poor Managers

1. Have trouble making a transition to manager
2. Lack a consistent approach to performance management and career development
3. Spend too little time managing and communicating

People
Well understood, time-tested, people management practices

- **Weekly one-on-ones** with team members

- **Frequent, specific, feedback** - positive and negative - to team members

- **Judiciously and increasingly delegate responsibility** to team members

photo credit: Christina @ wocintechchat.com on unsplash.com

People

Good Teams Avoid Common Pitfalls of Poor People Managers

1. Having trouble making a transition to manager
2. Lacking a consistent approach to performance management
3. Spending too little time managing and communicating

✓ Delegation
✓ Feedback

✓ One-on-ones

The Juggling Act

- People

- Processes ⬅

- Products

- Potentialities

Processes
Good teams ensure reproducible protocols

- People and task processes are important

- Like protocols, they're only valuable when written down

  - Can verify results

  - Can improve them - changes are experiments

  - Can hand them off - with one-on-ones (who?) and feedback (how?)

  - Can automate parts

- *Really* good teams start documenting processes early on

Processes

To Make It Hurt Less, Do It More Often

- Important processes that don't happen very often - periodic dumpster fires

- Lose "muscle memory"

- Good teams try to find a way to do important things more often:

  - Hiring: frequently hire interns & students?

  - New offerings: pilot programs?

  - Performance reviews: quarterly? (Plus frequent feedback, of course)

  - Software releases: CI/CD?

photo credit: Graham Mansfield on unsplash.com

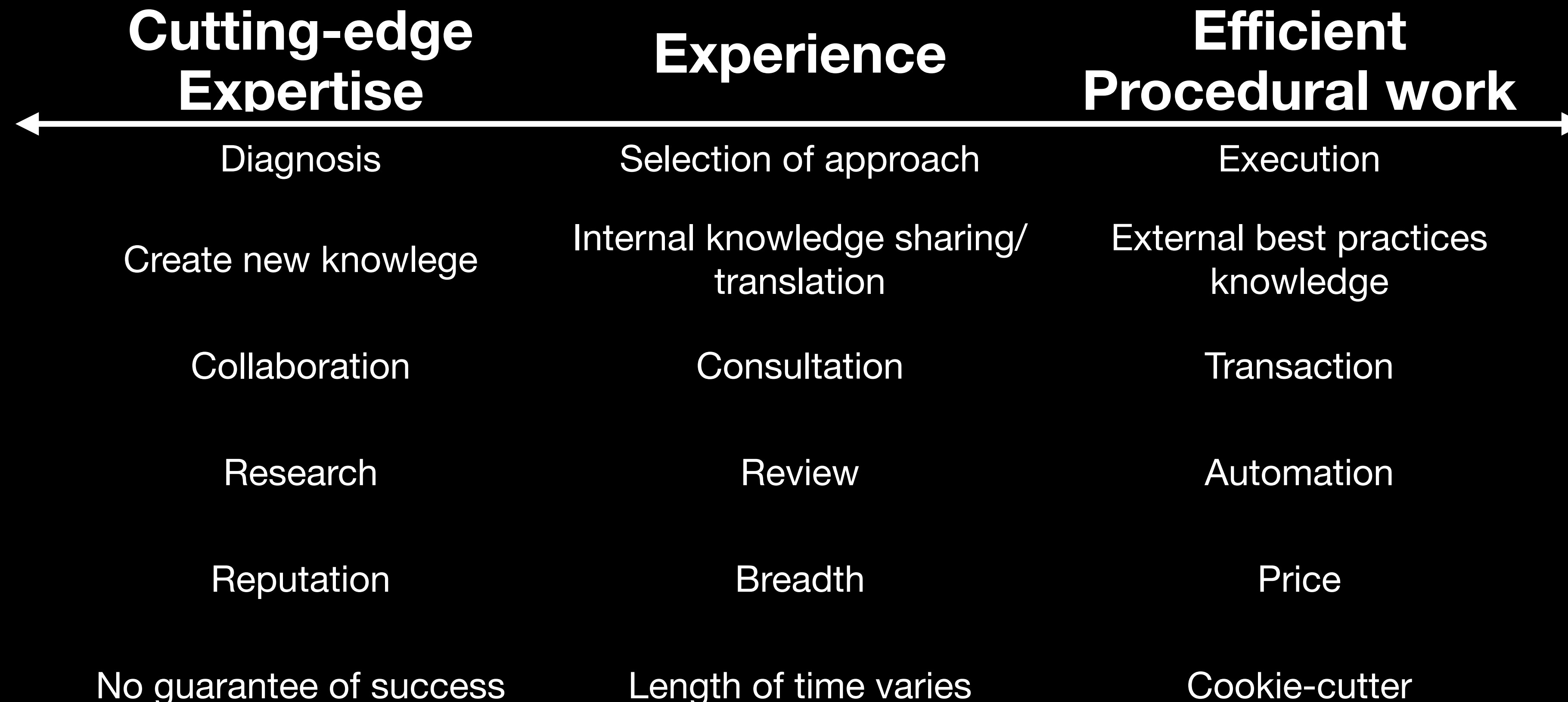# The Juggling Act

- People

- Processes

- Products ⬅

- Potentialities

Products

Spectrum of what we do for/with our researcher clients

Cutting-edge Expertise	Experience	Efficient Procedural work
Diagnosis	Selection of approach	Execution
Create new knowlege	Internal knowledge sharing/ translation	External best practices knowledge
Collaboration	Consultation	Transaction
Research	Review	Automation
Reputation	Breadth	Price
No guarantee of success	Length of time varies	Cookie-cutter

Adapted from "Managing the Professional Services Firm", David H. Maister

Products

Spectrum of what we do for/with our researcher clients

Cutting-edge Expertise	Experience	Efficient Procedural work

←——————————————————————————→

Long engagements	Productized Services	Products

- Possibly open-ended
- Success not guaranteed

- Fixed scope
- Reproducible process
- Clear deliverable

- Semi- or fully-automated
- Turnkey
- Cookie-cutter
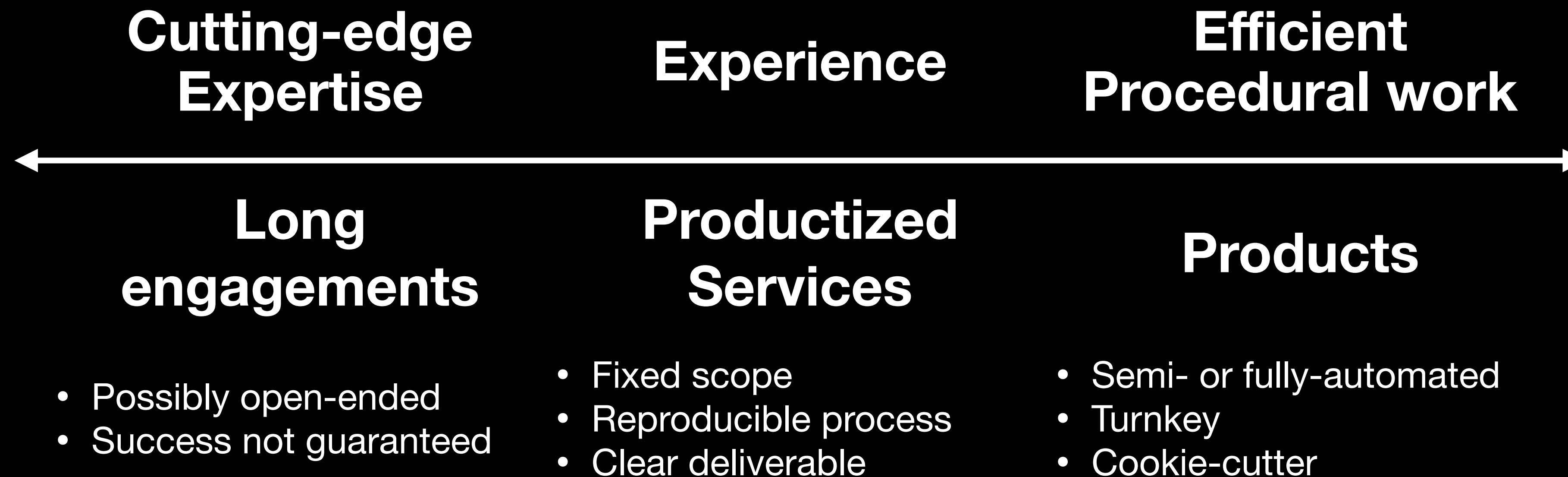
Products
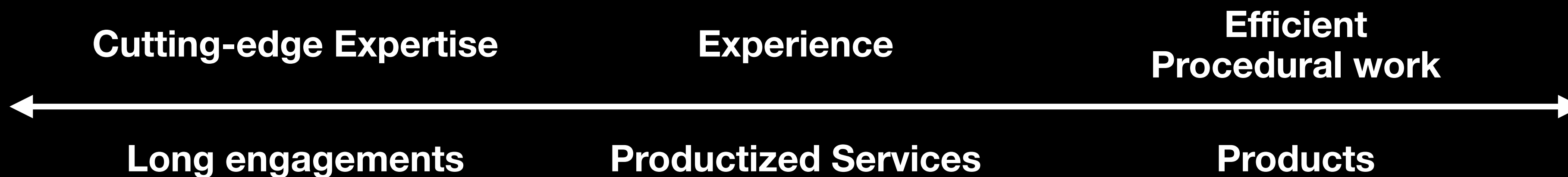## Spectrum of what we do for/with our researcher clients

This is a hard place to live

Pros:

- Lots of steady business

Cons:

- Boring work, not much room for skills growth
- Race to bottom with pricing
- Scientific contributions minimized
- Inflexible

Cutting-edge Expertise   **Experience**   **Efficient Procedural work**

Long engagements   **Productized Services**   **Products**

Products
Spectrum of what we do for/with our researcher clients

This is also a hard place to live

Pros:
- Challenging work with high, obvious, scientific impact
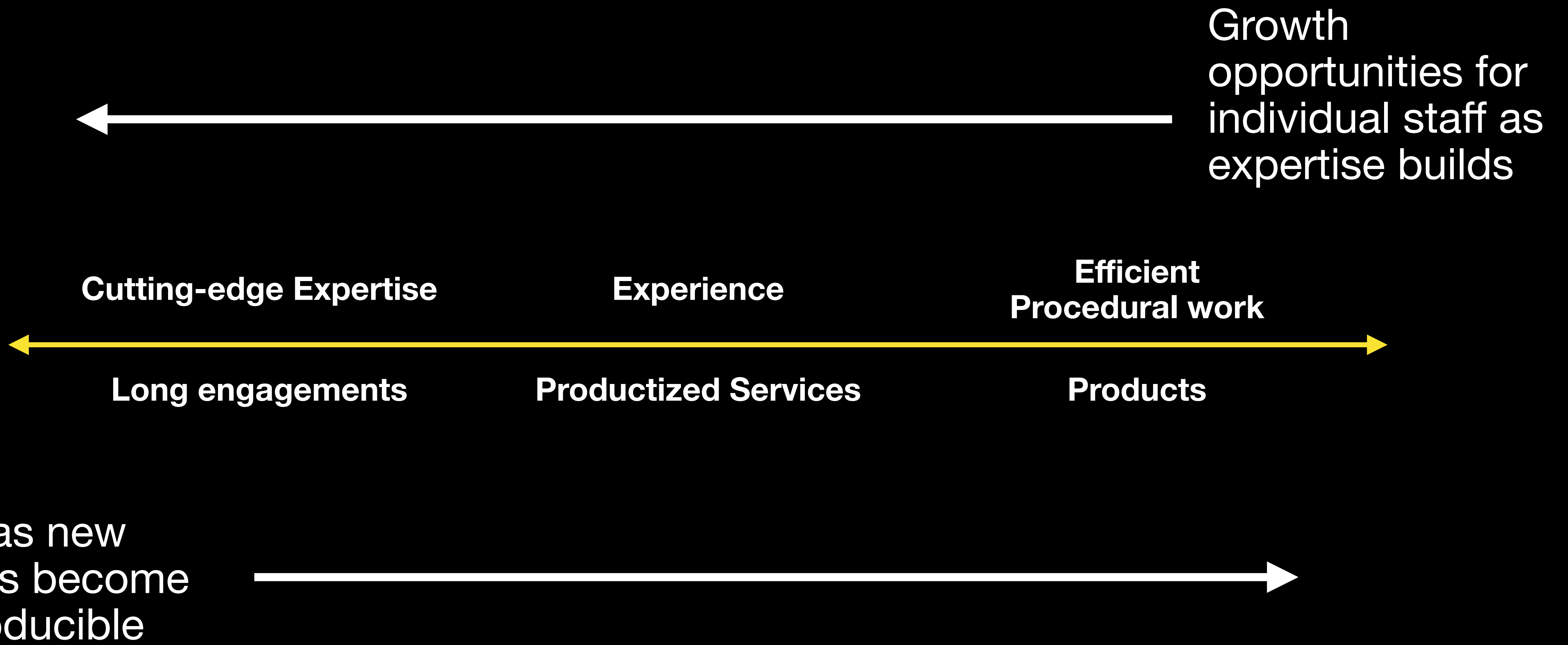- Lots of opportunities for skills growth

Cons:
- Work is intermittent
- Hard to explain value to people not already collaborating with you

Cutting-edge Expertise   **Experience**   **Efficient Procedural work**

Long engagements   **Productized Services**   **Products**

Products

Spectrum of what we do for/with our researcher clients

Ideally a team will have a portfolio of ways to engage along spectrum

Growth opportunities for individual staff as expertise builds

Cutting-edge Expertise　　　　**Experience**　　　　**Efficient Procedural work**

Long engagements　　　　**Productized Services**　　　　**Products**

Efficiency as new approaches become more reproducible

Products

How to bundle expertise into products?

- Science to the rescue - experiment! (And talk to people - qualitative research)

- Try to make as reproducible as possible as early on as possible

  - Then can move down the expertise ladder

- Bundle deliverables/outcomes into the smallest chunks feasible for reproducibility

Cutting-edge Expertise   Experience   Efficient Procedural work

←——————————————————————————————————————→

Long engagements   Productized Services   Products

Products

What New Products/Services Should We Offer?

Bad ways I've often seen this question answered

- "What we've always done"

- "Whatever researchers ask for"

- "What the other centres are doing"

The Juggling Act

- People

- Processes

- Products

- Potentialities ⬅

Potentialities

Look for focused way of applying strengths to gaps

- Technology changes ✓

- Science changes and needs ✓

- Funding changes ✓

- Priority areas for our clients/institution ~

- Where the team fits in ✗

Potentialities

Look for focused way of applying strengths to gaps

Goal: Advance high-priority science as much as possible

Method: Matching research needs to applications of team's expertise

Fact: We have finite resources

⇒ *Can not do everything*

⇒ *Worthwhile things will be left undone (by us)*

Potentialities
Choosing Between *Good* Options

Help many researchers with basic support ⟷ Help few researchers with extensive support

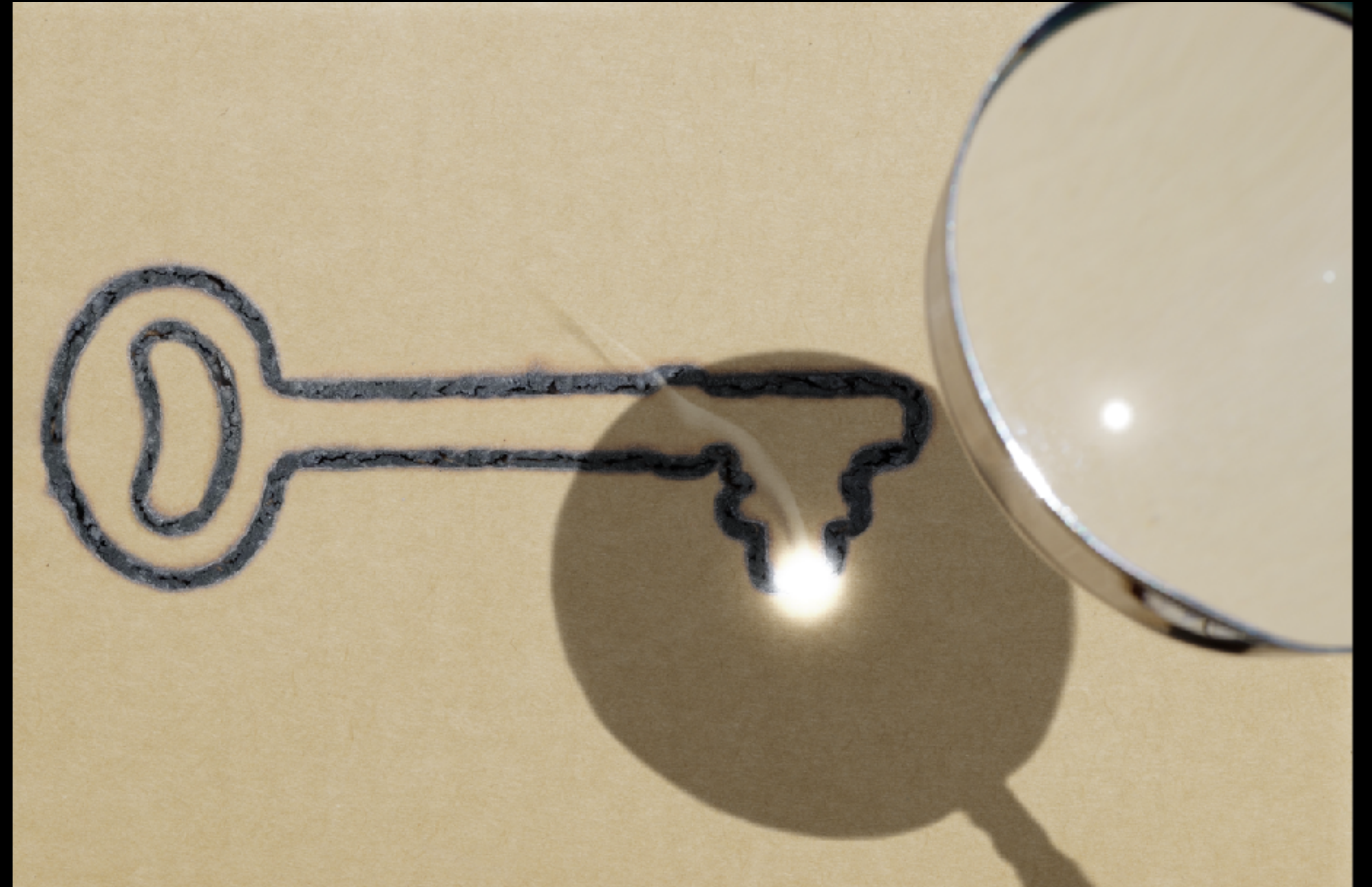Experts on problem area ⟷ Experts on methods

Very Inexpensive ⟷ Very fast
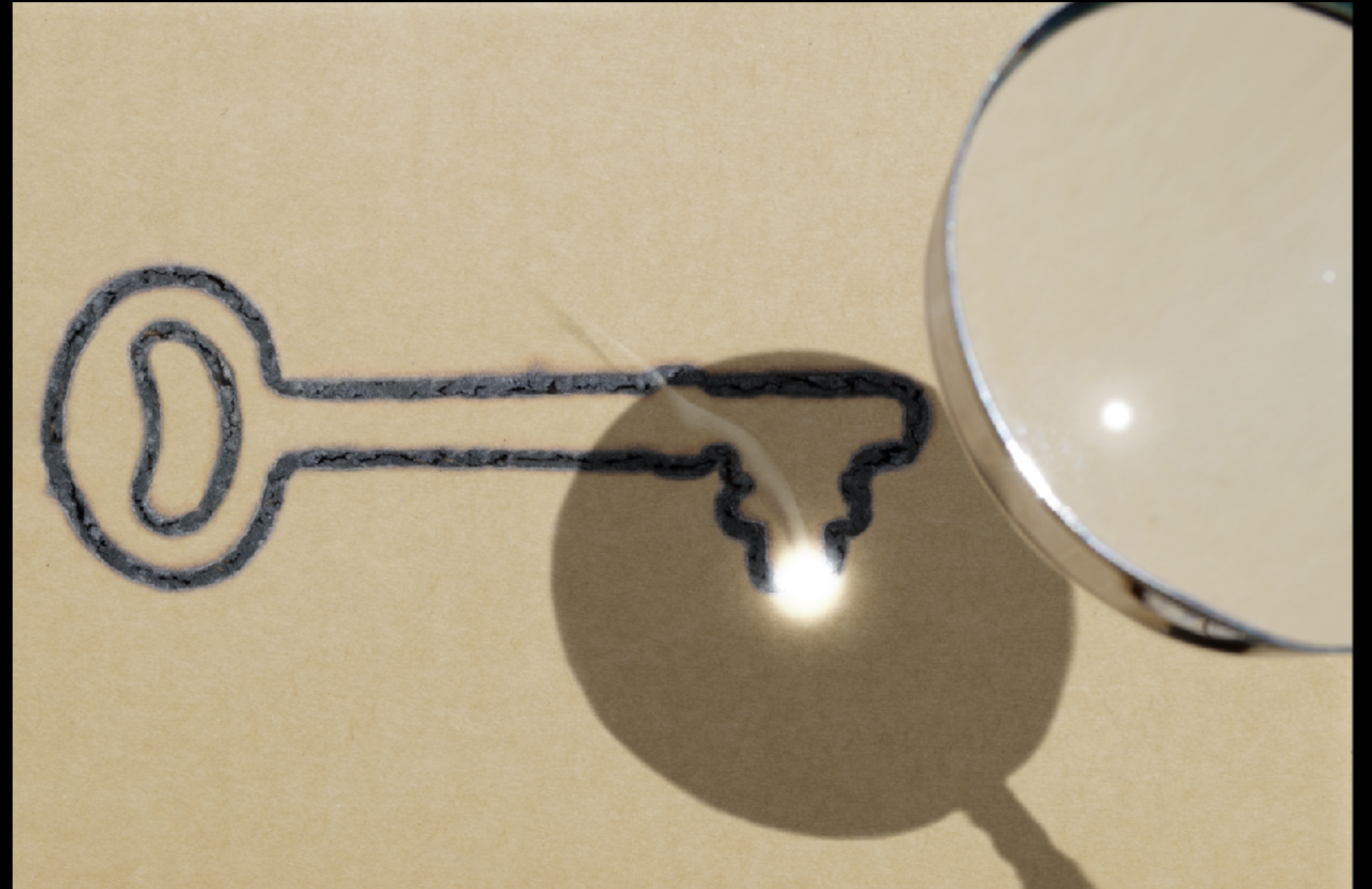
Potentialities
How to find a focus

- What is standing in the way of the science for our population of clients/institution?

- What are we really good at?

- What "unfair advantages" do we have?

- What other teams can we collaborate with/outsource to?

Potentialities

Benefits of a focus

- Team members build skill much faster when there's a focus

- Vastly easier to communicate what you do to researchers, institutions, funders

- Have a framework to make decisions about handling new opportunities, setbacks

- Informs products, processes, people

The Juggling Act

- People - Science taught us advanced skills; just need to learn the basics

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- Products - Bundle expertise like papers; experiment and gather data

- Potentialities - PI-like focus: how to have the biggest impact

Our Job is to Advance Science As Best We Can

We Can Learn From, Work With, Each Other

There's Common Failure Modes

There's Existing Practices That Can Help

It's Still A Hard Job

We can do this

People
Resources

- <u>The Effective Manager</u>, or <u>Manager Tools Basics</u> (a very opinionated guide to the basics of management, with step-by-step and reasons why)

- <u>The Leader Lab</u>: Tania Luna & LeeAnn Renninger (more fundamental soft skills/habits)

photo credit: <u>Christina @ wocintechchat.com</u> on <u>unsplash.com</u>

Processes

Resources

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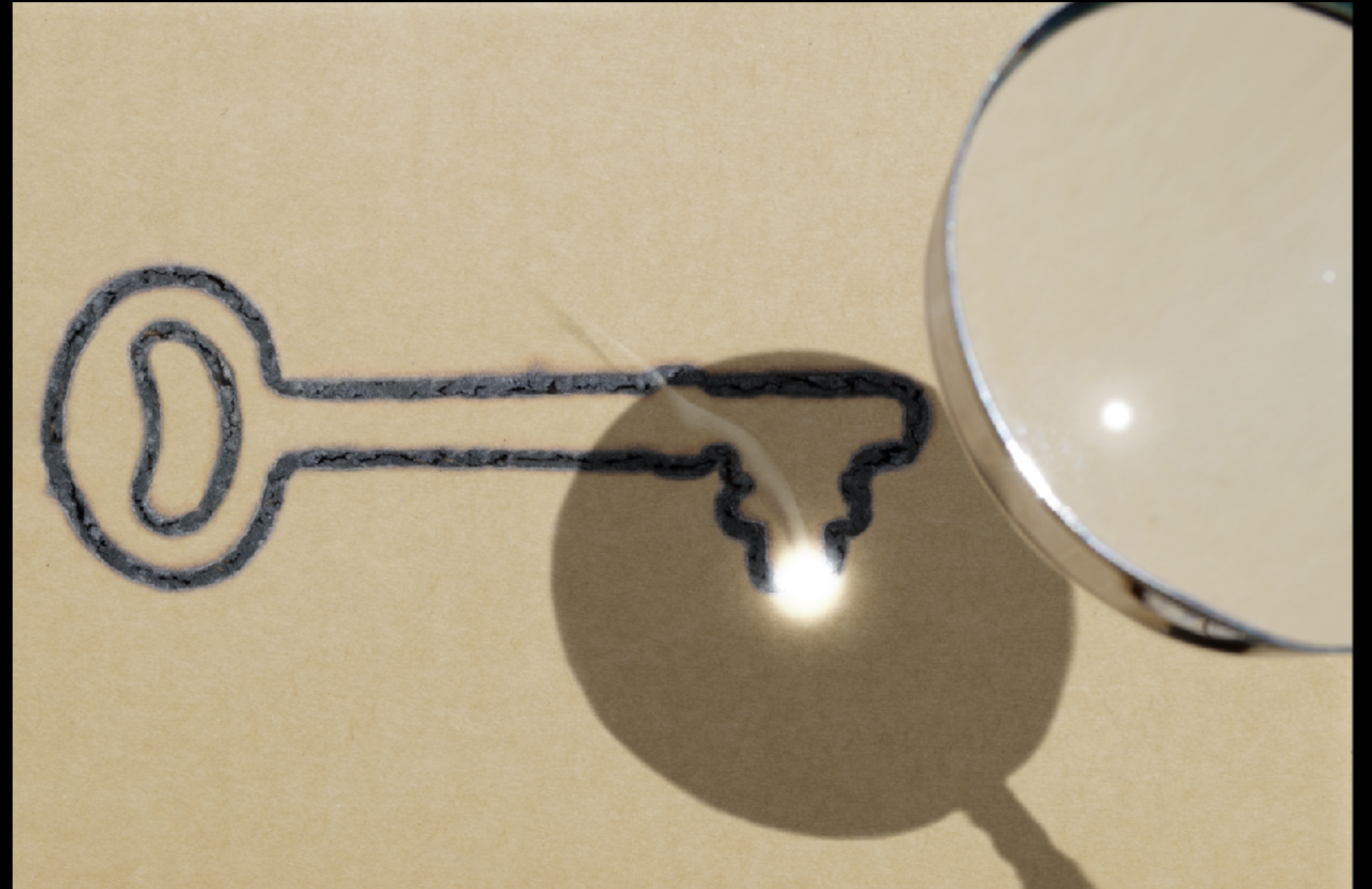
Products
Resources

- <u>Managing the Professional Services Firm</u>: David H. Maister (s/profits/sustainability/, and skip partner governance sections)

- <u>Hourly Billing Is Nuts</u>: Jonathan Stark

Cutting-edge Expertise   Experience   Efficient Procedural work

Long engagements   Productized Services   Products

Potentialities
Resources

- <u>Good Strategy/Bad Strategy</u>: Richard Rumelt

- Any of a number of nonprofit leadership books, esp. on working with boards or setting direction

Becoming a Manager

Resources

- <u>The Manager's Path</u>: Camille Fournier

- <u>Rands (tech) leadership slack</u>

- I have a <u>weekly link roundup newsletter</u> on the topic of managing research computing and data teams

photo credit: <u>Zak Neilson</u> on <u>unsplash.com</u>

Slides & Resources: www.ResearchComputingTeams.org/Bioinfo22