Technology Isn’t The Hard Part

Can bioinfo cores and research computing/software/data teams learn from each other?
Congratulations!
Research deserves the best support we can offer

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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

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

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<table>
<thead>
<tr>
<th>Academic &amp; Government support teams</th>
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<tr>
<td>Academia &amp; Nonprofits</td>
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<td>Tech Startups</td>
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<td>Consultancies</td>
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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
  - Interface, Present & Future
- Products
  - External, Future
- Potentialities

Photo credit: Desiray Green on unsplash.com
The Juggling Act

- People
- Processes
- Products
- Potentialities

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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
- Potentialities
People

Google Oxygen, 2009: People Managers 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

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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?

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The Juggling Act

- People
- Processes
- Products
- Potentialities
Spectrum of what we do for/with our researcher clients

- **Cutting-edge Expertise**
  - Diagnosis
  - Create new knowledge
  - Collaboration
  - Research
  - Reputation
  - No guarantee of success

- **Experience**
  - Selection of approach
  - Internal knowledge sharing/translation
  - Consultation
  - Review
  - Breadth
  - Length of time varies

- **Efficient Procedural work**
  - Execution
  - External best practices knowledge
  - Transaction
  - Automation
  - Price
  - 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
- Long engagements
  - Possibly open-ended
  - Success not guaranteed

Experience
- Productized Services
  - Fixed scope
  - Reproducible process
  - Clear deliverable

Efficient Procedural work
- Products
  - Semi- or fully-automated
  - Turnkey
  - Cookie-cutter
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
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
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
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 \( \leftrightarrow \) Help few researchers with extensive support

Experts on problem area \( \leftrightarrow \) Experts on methods

Very Inexpensive \( \leftrightarrow \) 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*

• 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*
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

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

• The Leader Lab: Tania Luna & LeeAnn Renninger (more fundamental soft skills/habits)
Processes

Resources

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

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Products

Resources

• Managing the Professional Services Firm: David H. Maister (skip profits/sustainability/ and skip partner governance sections)

• Hourly Billing Is Nuts: Jonathan Stark
Potentialilities

Resources

• **Good Strategy/Bad Strategy:** Richard Rumelt

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

Resources

• The Manager’s Path: Camille Fournier

• Rands (tech) leadership slack

• I have a weekly link roundup newsletter on the topic of managing research computing and data teams

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Slides & Resources: www.ResearchComputingTeams.org/Bioinfo22