Day 3 Discussion: Collegeville 2021
Cultural Approaches to Improved Software Teams

Overview: The content your discussion group creates in this document will be synthesized in a blog posting for https://bssw.io

Instructions:
1. Pick one person in your discussion group to create a new copy of this Google Doc
2. Make a copy of this template in a new Google Doc (the person from step 1)
3. Share the edit link to the document in step 2 with others (copy and paste into Zoom chat
4. Co-edit the document: Can have one lead writer with others modifying, or another approach
5. Send the document to Mike Heroux at the end of the session by email (mheroux@csbsju.edu)

Add group member names for anyone who wants attribution in the blog post:
1. Name, affiliation, and GitHub ID (if available), as you would like it listed in the blog post
2. Johanna Cohoon, UT Austin, @jlcohoon
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6. Elaine Raybourn, Sandia National Labs @elaineraybourn
7. Nur Fadel, Swiss National Supercomputing Centre, nuraiman

Discuss as a group the most promising cultural approaches you see as opportunities for scientific software teams. Summarize discussion in outline form.
- Culture == shared assumptions among a group of people
    - Expectation of what you do, and repercussions
    - What assumptions are there on teams?
    - Are we taking a funder's perspective or a developer's perspective?
- What does improvement mean for a team?
    - Improving the means of production -- how they do their work and the tools that they use to enable that work -- with the idea being that improving that in turn improves the quality of a product, the software.
    - How does the team function to begin with?
    - How long does the team need to be a team? Short-term or long-term?
- Wants for a team:
    - To like where you work
    - Retain members, reduce turnover
        - Challenged by having students as workers
- Approaches:
    - Training the manager

- Asking for help when you need help (self awareness)
- Building a coalition of the willing
    - Students, postdocs might be more tactical choices than PIs
- Change everyone around you until you are dissatisfied with yourself
- Future you as a stakeholder; less stress by improving now
- Reward being helpful, not a lone wolf
- Redefining or defining at all what you concept of a team is can make change happen (bringing people in, e.g.)
- Model what behavior you want
- Align incentives
    - What do the employees *want*—time flexibility? Accumulating personal accomplishments? Creating something of quality?
    - Don't reward bad behavior
- Hire people and implement change for the long term
- Diffusion of innovations (e.g. version control became popular over time because it became the norm, people saw other people doing it, peer pressure!)
- Encouraging pride and promoting personal investment/ownership of a project
    - Stated authority must correspond to actual authority
- Intrinsic and extrinsic motives
- Teach research collaboration and software practices in school or at work
    - Teach to lead and to follow
    - Teach how to work with labs/universities
- Mentors are important!
- Increase transparency
    - Make clear what options are available and to whom
    - Gives knowledge to broader organization rather than just managers
- Overcoming incompatible incentives
    - Difficult to overcome. E.g., when you say you value teamwork, but measure individual performance create dissonance
    - How do you measure teamwork and value?
- Onboarding and offboarding are important as teams evolve dynamically
    - How the team functions
    - How you celebrate
    - What retrospectives you have
- If you have a good culture, it tends to self perpetuate
- Culture in which direction? What do we want to change?
    - Moving the needle in terms of open science?
    - This can be a strategic decision
- Open Science
    - Hannah: The discussion around open science is value-laden, perhaps alienating for a lot of people because people do the exact same actions for many different reasons. Telling people the reason why they should share their data may indicate to them that they shouldn't do it if it doesn't line up with how they see themselves as professional researchers?

- - Sam: This also ties into the broader discussion about the competitive/cooperative nature of scientific publishing. There are situations where researchers want to share and be open, and there are situation in which researchers want to be closed off and private.
    - Hannah: It seems pretty uncontroversial to say "teamwork is good!" but I've heard people, even at our workshop, say things that would suggest that improving the practice of scientific software development would imply reducing the reliance on teams.
    - Sam: Making people able to function independently doesn't reduce the desire to work together.
  - Todd: There's a mix, really. You have people who work in tight-knit groups, and others that are highly independent and need to be directed by leadership to move in the same direction. All kinds of groups across that spectrum are referred to as teams. The definition of "team" is part of your culture.
  - Hannah: I'd be curious about how someone like Anshu defines teams. She's looking to create a peer production environment and in those situations you have people who are traditionally outside the "team" (like a user) be integral to the project success
  - Reed: If we only look at software artifacts (e.g. commit logs) we don't see the whole picture: we need a more holistic idea of team and team members. The software and those artifacts might not signal the whole picture and might also be a means to an end. Don't be too prescriptive in our definition of teams.
  - Culture change:
    - Do not underestimate peer pressure and modeling the behavior you want
    - Align rewards and incentives with the culture that you want; do not reward bad behavior
    - Hire for the long term culture change that you want
  - Structure follows strategy
  - Focus on teams that are willing to; bootstrapping
  - Rotational assignments; cannot mandate or force it; must be willing
    - Get perspective on how good teams function
    - Todd: not necessarily full time -- 10-20% appointment with a fixed goal for a finite time has worked for me
  - Collaborators want a good outcome
  - Improving transparency

About 20 prior to the end of the session, around 1:40 pm CDT, try to reach consensus on 3 - 5 high-level cultural approaches your team identified
  - **The Power of Peer Pressure through Visibility**: New ways of thinking and doing have to overcome the inertia of the status quo, but when certain teams demonstrate visible successes, others are likely to follow (e.g. version control becoming the norm among scientific software developers). Change can also come from within a team: new members can introduce new and good culture to a group.

- **Mentorship, Training, and Education**: Researchers are continually learning and reinforcing the skills and values of their profession, especially during pivotal points in their career (e.g. entering grad school, changing jobs) or when they face pressure to change and adapt (e.g. apply cognitive dissonance theory to interject change--a key point being the temporal element to the adoption of change).
- **Intrinsic Motivation, Carrots, and Sticks**: Carrots (e.g. peer recognition, better research results) and sticks (e.g. journal requirements, funding requirements) absolutely influence culture and individual behavior, but a carrot to one person can be a stick to another. By better understanding/application of researchers' intrinsic and extrinsic motivations can help effect culture change