Lessons Learned from 20 Years of ASAP/PSAAP Programs

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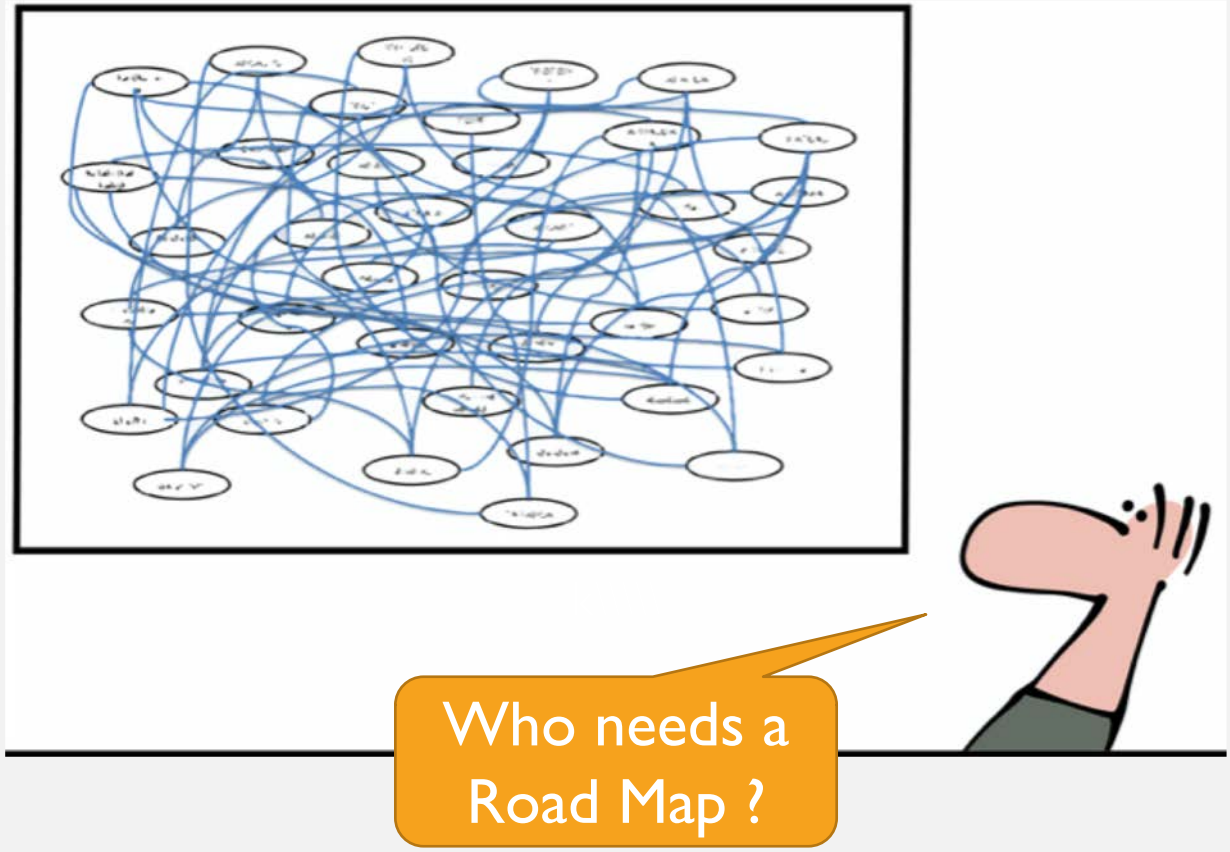
For the AST

Integration:
A Center is More than the Sum of its Parts

- Getting everyone on the same page across different departments can be challenging
- Some ideas
  - Frequent meetings including "all hands"
  - Joint publications and presentations
  - Collocation of participants, especially students
  - Student co-advisors from different departments

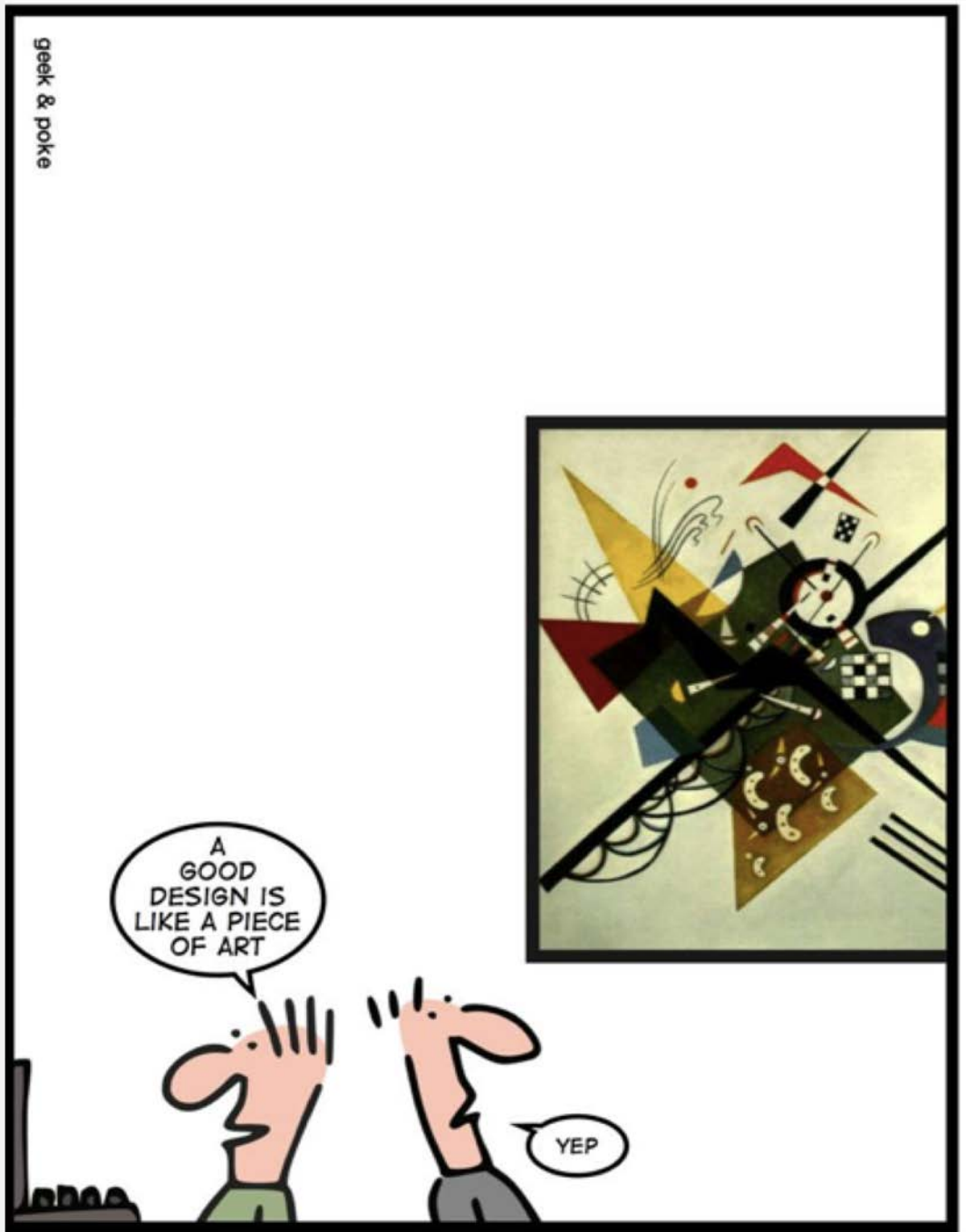
Some More Ideas

- Develop and maintain a Road Map illustrating the integration of Center activities
- As many people as possible participate in TST and Review meetings
- Communicate, communicate, communicate



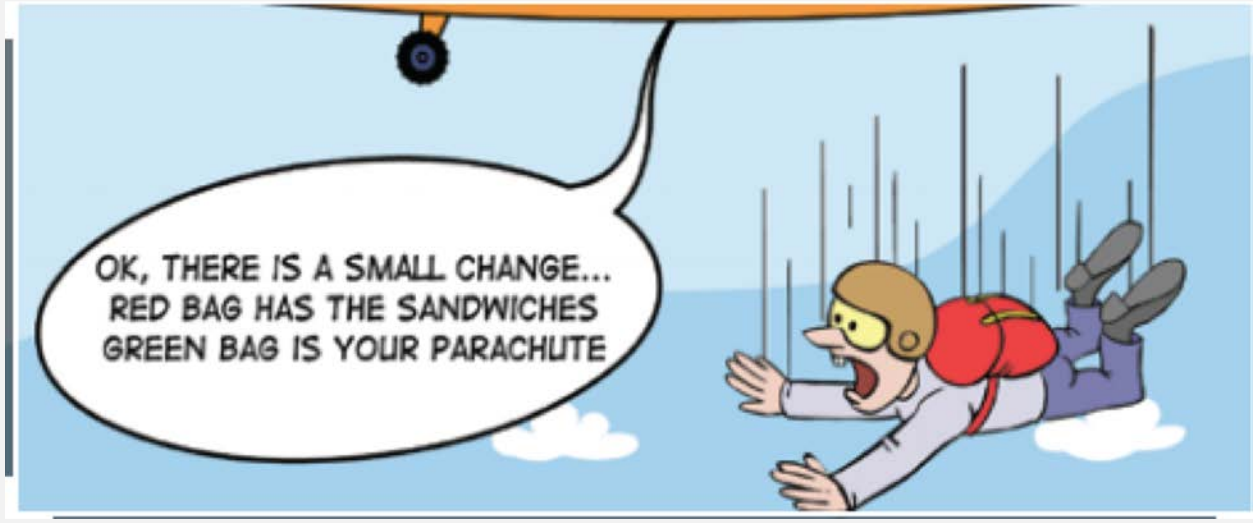
Embrace Change
All Will Not Go Well

- Software/hardware will not be the same in 5 years
  - Simulation software will become increasingly complex
  - Key algorithms will have to be replaced
  - Consider a software architect
  - Stay flexible
- Utilize open source tools; avoid "not invented here"



Reacting to Change

- Faculty, staff and students will come and go
- Resources will have to be reallocated
- Cost-share can be valuable in filling holes; use it wisely



Compute Early and Often

- You will get valuable insight even with missing physics
- It will help identify what is important and what is not
- Unexpected things happen at scale

- Year 5 will come sooner than expected

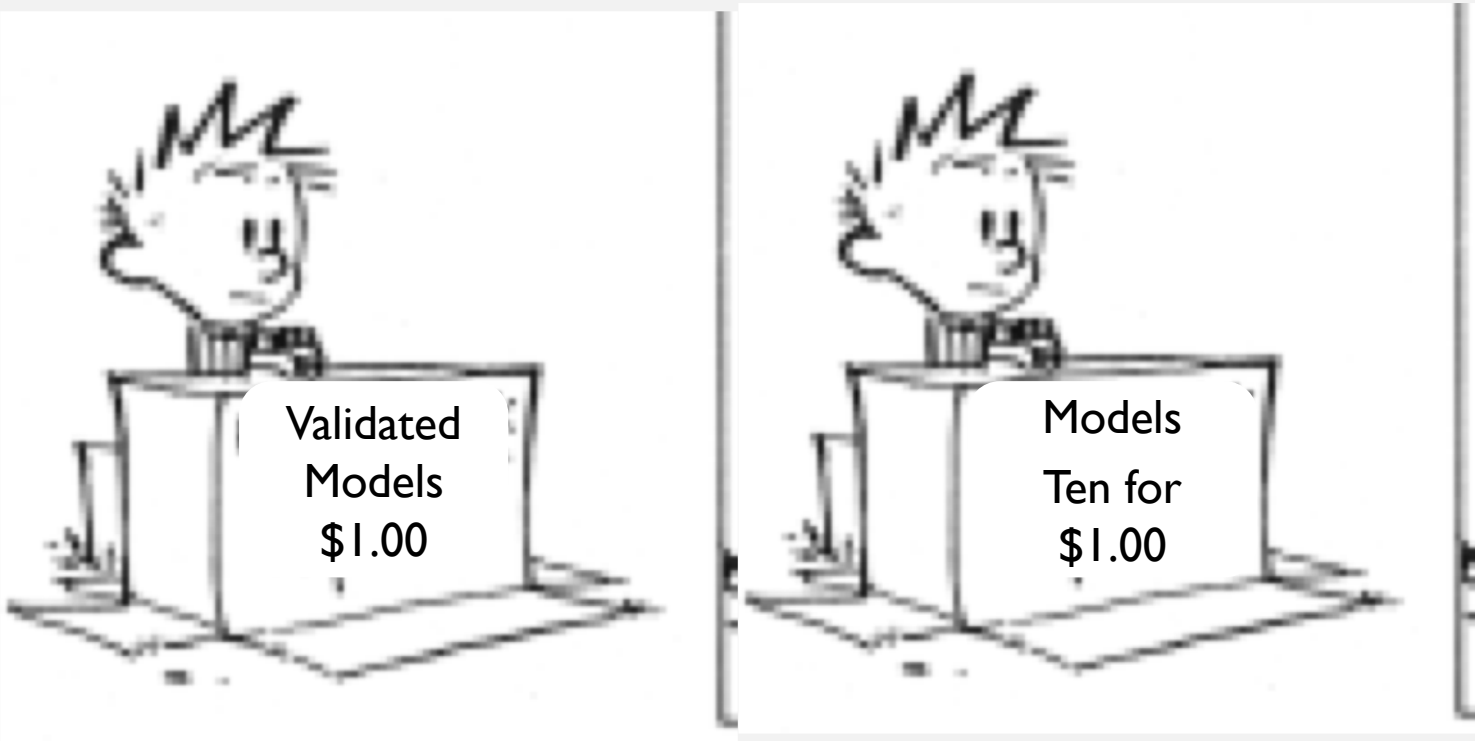
Students

- Co-location is a big contributor to integration and a multi-disciplinary education
- Manage the tension between a thesis topic and research that will contribute to the Center goals
- Lab researchers on thesis committees can be very valuable

Student Internships

- Organizing Lab internships can be a challenge
  - Consider posting brief bios on web page
  - Consider having all students give ~2 minute talks at TST/Review meetings
  - Use the TST/AST/Review Team
  - Plan ahead; start early

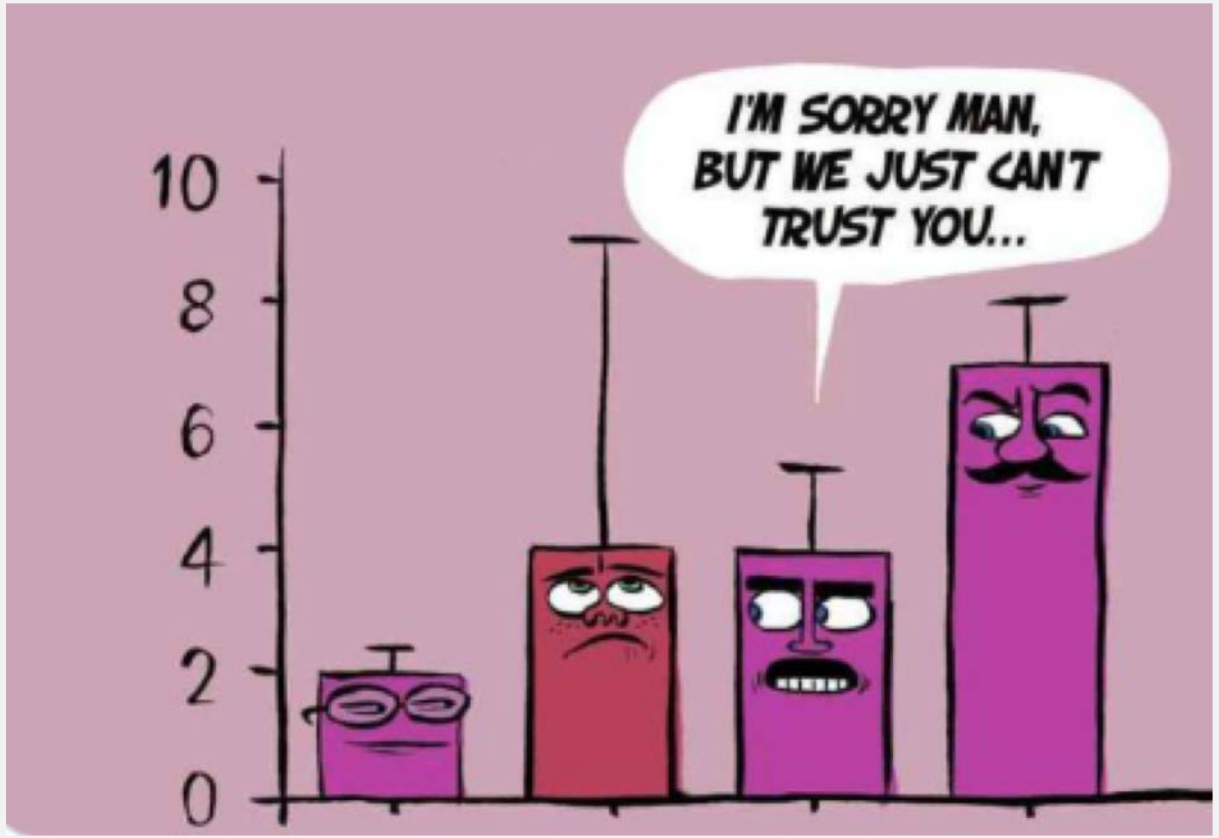
V&V/UQ



- Everything is a model
- Dealing with the evolution of
  resolved physics, modeled physics, and missing physics
- Stay flexible on quantities of interest
- Use sensitivity analysis to identify important physics

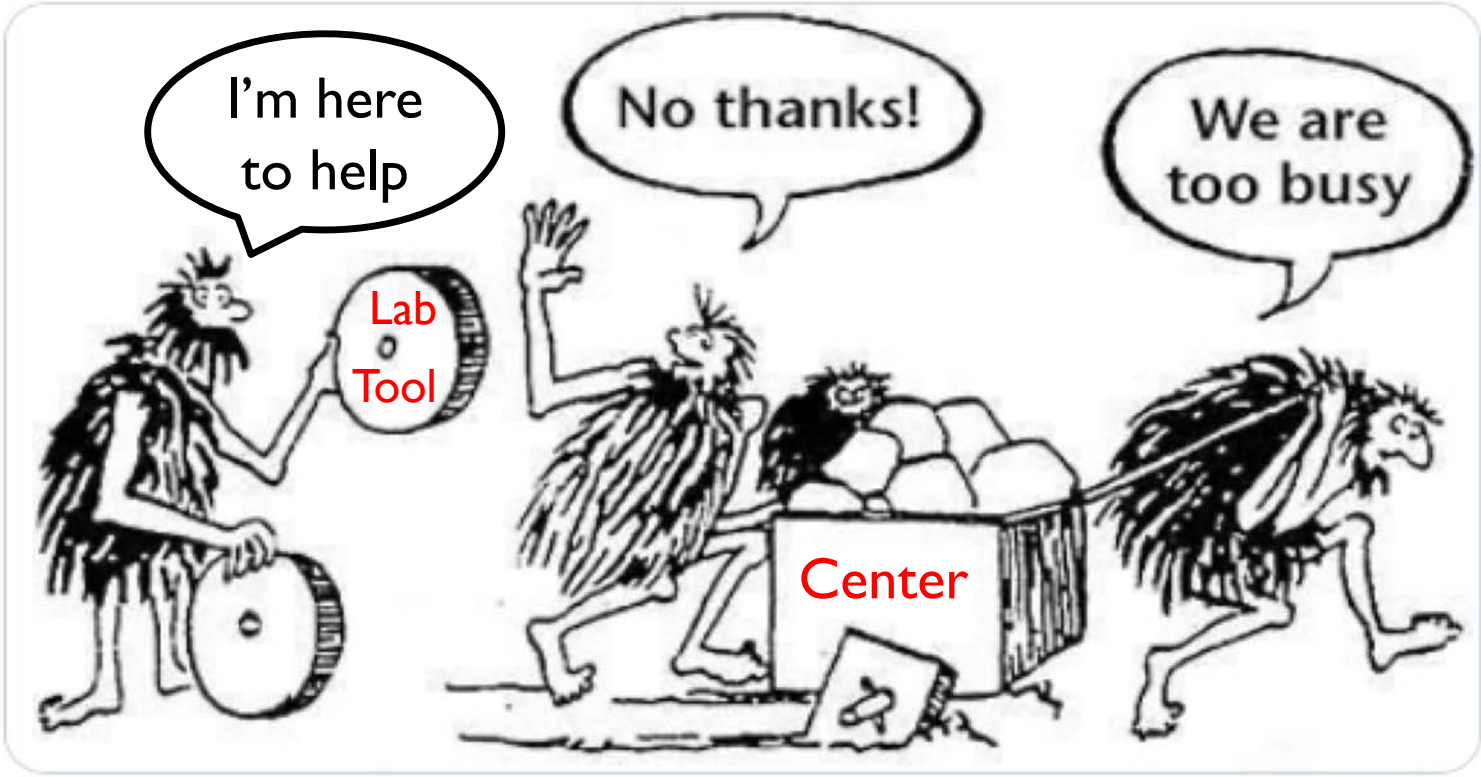
Experiments

- Can be a challenge to integrate
- Simulations can be effective in guiding experiments
- Experimental data will not be as expected
- Material for experiments will not meet specifications
- Experiments are models too



Interaction with the Labs

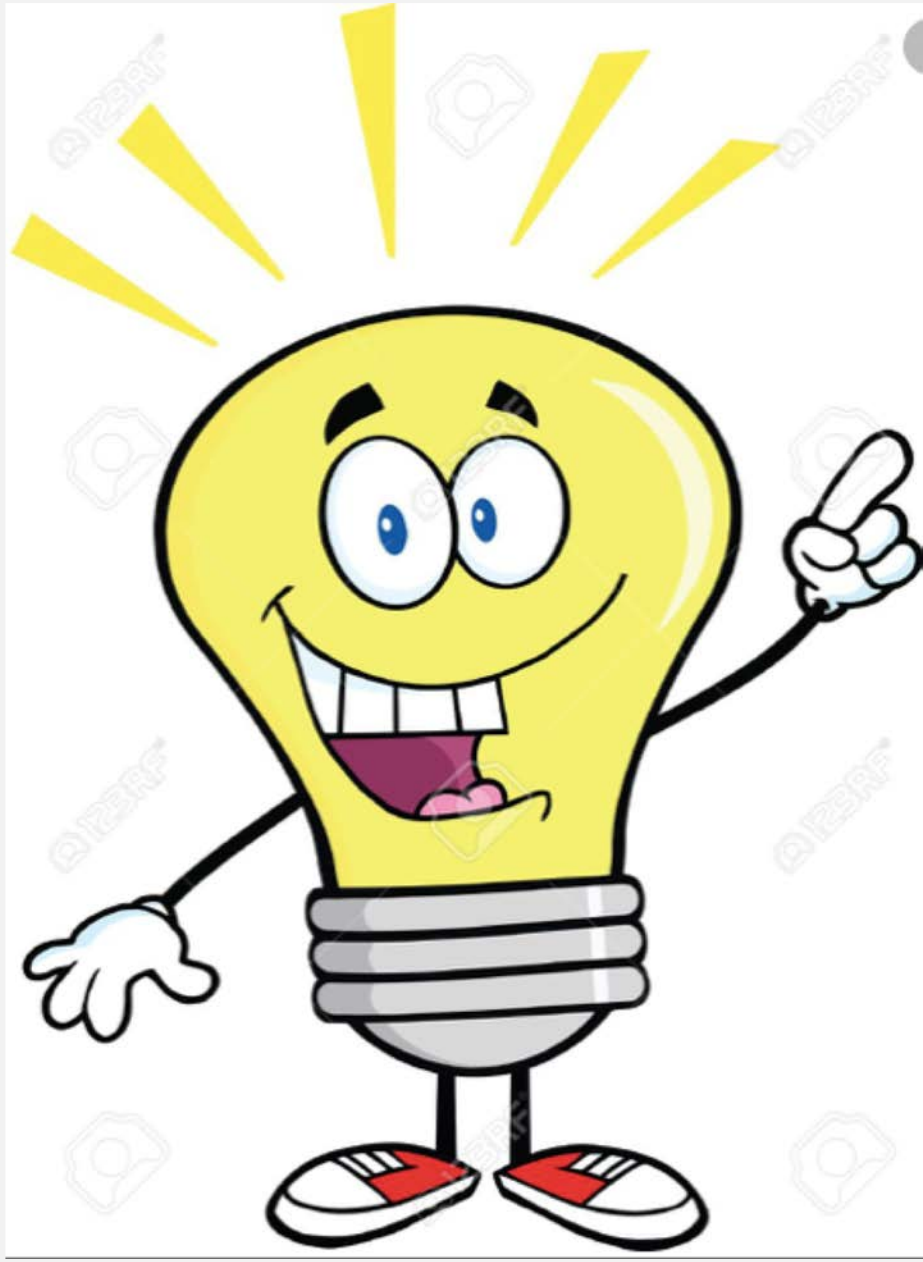
- Labs are a resource particularly the TST and Review Team
- PI and faculty Lab visits can be very valuable
- Utilize the monthly CRT telecons; raise specific issues



Interaction with the TSTs

- TST meetings are NOT reviews
  - Suggest specific topics/issues/questions for discussion prior to the meetings
  - Negative results can be very valuable
  - Be honest about what is not working
  - Embrace attendance of non-TST experts to address specific topics

Capture and archive "Aha" moments



And Then There is the Impact of Covid-19