Reproducibility, Replicability, and Robustness in Science

MPSAC Meeting, 11/18/2016

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Response to date:

- NSF Director's Symposium on Robust and Reliable (R&R)
 Science: The Path Forward, 9 Sep 2015.
- Appointment (six-month detail, followed by a six-month detail extension), MPS Science Advisor for Robust and Reliable Science: Bogdan Mihaila (MPS/PHY). 9 May 2016.
- Goal: identify and assess opportunities in R&R science that are germane to MPS disciplines and propose approaches to capitalize on them.
- MPS revised its data management plan (DMP). Single, uniform DMP for all five disciplinary divisions. 24 Jun 2016.

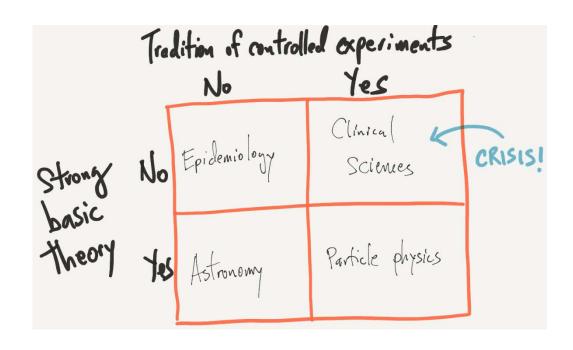
Workshop – MPS, BIO/MCB, CISE/ACI PI: Dave Weitz, Harvard University Keck Center, UCI, 2/25-26/2017

GOAL: Catalyzing a robust and reliable scientific enterprise

- Develop a lexicon: Robustness. Resilience. Rigor. Reliability.
 Repeatability. Reproducibility. Replicability. Accuracy.
 Precision.
- Identify common aspects of (ir)reproducibility across communities represented at the workshop.
- Propose a roadmap for engaging the community.
- Document findings in a report to NSF.

Topics to be discussed at the workshop:

- I. Lack of Reproducibility: Feature or Flaw?
- II. Theory and Experimentation in Science.
- III. Precision. Statistics. Software.
- IV. Fundamentals of scientific reporting.



Roger Peng (JHU) <u>A Simple Explanation for the</u>
<u>Replication Crisis in Science</u>, Simply Statistics blog

Actions:

- Develop roadmap for training, promoting effective practices, and future community-specific workshops and summer schools.
- Integrate on-going activities regarding the Public Access to Results from NSF-Supported Research.

Possible course of action for further discussion

 Explore with publishers: Store/serve data used for Figures in publications. Publishers are already committed to store publications in perpetuity.
 Additional storage capacity requirements are modest.