



The National Science Board's **Broader Impacts** Merit Review Criterion

- Hosts:

- Kelsey Cook (kcook@nsf.gov), Chemical Measurement and Imaging, Mid-scale Research Infrastructure
- Max Funk (mfunk@nsf.gov), Chemistry of Life Processes

- Exemplars:

- Louise Charkoudian, Haverford College
- Bryan Shaw, Baylor University

- NSF PAPPG Section III.A.2:

https://www.nsf.gov/pubs/policydocs/pappg20_1/pappg_3.jsp#IIIA2b



- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to *benefit society* and contribute to the achievement of specific, desired societal outcomes.



The following elements should be considered in the review for **both** criteria:

1. What is the potential for the proposed activity to:

b. **Benefit society** or advance desired societal outcomes (Broader Impacts)?

2. To what extent do the proposed activities suggest and explore **creative, original**, or potentially transformative concepts?



3. Is the ***plan*** for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the ***plan*** incorporate a ***mechanism to assess success?***

4. How ***well qualified*** is the individual, team, or organization to conduct the proposed activities?

5. Are there ***adequate resources*** available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?



The Project Description also must contain, as a separate section within the narrative, a section labeled “Broader Impacts”. This section should provide a discussion of the broader impacts of the proposed activities. Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to the project.

[NSF supports fundamental/basic research for which there may be no readily apparent and/or immediate benefit to society. However, the research may contribute to societal benefits at present or in the future. For example, new synthetic methods may be applied to make useful compounds that may benefit society, e.g. at all, with greater efficiency/less waste.]



NSF values the advancement of scientific knowledge and activities that contribute to the achievement of societally relevant outcomes (benefits to society).

[What follows is ***not*** a checklist. A few high-impact activities (or even one) can be compelling. A lot of proposed activities can be seen as unrealistic.]

Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM);



improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security;



increased economic competitiveness of the U.S.; use of science and technology to inform public policy; and enhanced infrastructure for research and education. These examples of societally relevant outcomes should not be considered either comprehensive or prescriptive. Proposers may include appropriate outcomes not covered by these examples.



Common Broader Impacts Statement Shortcomings (Dos and) *Don'ts*



Extensive descriptions of past activities, but ***no plans*** proposed for the future (the funding period; NSF wants to know what you are going to do with the award if you get one). An excellent track record establishes the qualifications of the PI. This satisfies Criterion 4. But, if there is no ***plan***, you may (will!) be criticized.

A plan that does not include a mechanism to evaluate success/failure, ie. how will you know if there was any ***benefit to society***? If you don't know how, it is OK to get help.



The plan only addresses activities that also fulfill expectations for your faculty position, e.g. “business as usual”. You get credit for having a *plan*, but you may be criticized because there is nothing *creative* or *original* about it (Criterion 2). **A good plan can always be improved upon** from evidence-based assessment of prior outcomes, e.g. we’re going to do that again, but this time we’re going to enhance/drop something that worked/didn’t.



Make Your Broader Impacts Self-Serving!

Not the stuff NSF makes you do...

[ACS Presidential Commission on Graduate Education in the Chemical Sciences, 2012](#)



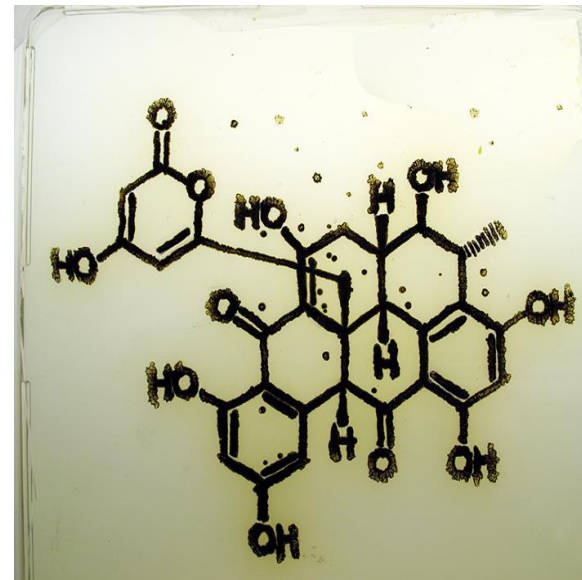
Two examples from CLP (CAREER) Awards Broader Impacts

Louise Charkoudian, Haverford College
Bryan Shaw, Baylor University

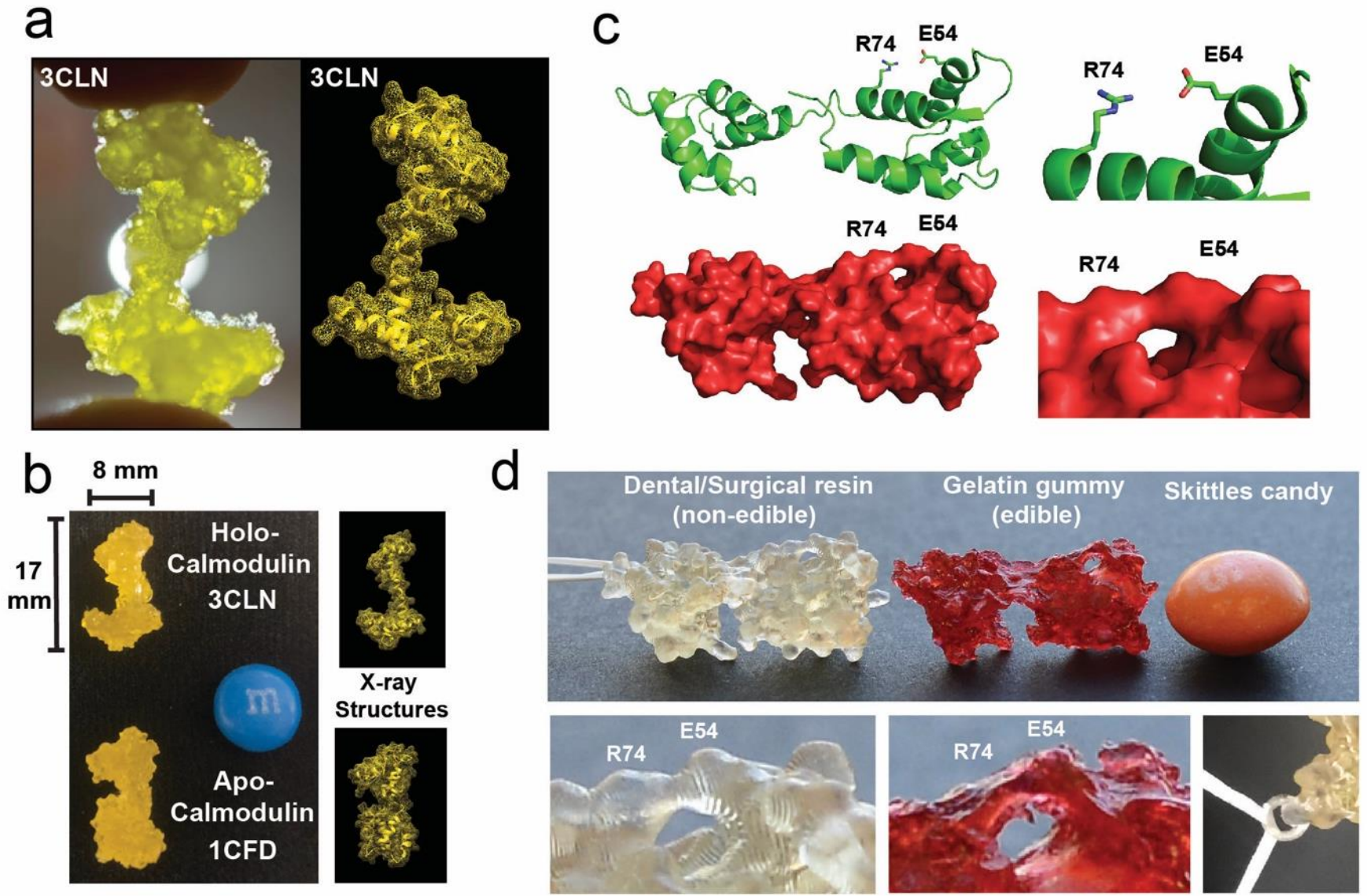
BioArt as a Medium for Outreach Experiences

- [Center for Creative Works](#) (an art studio for adults with intellectual and developmental disabilities).
- [MAST](#) participants (middle/high school students from backgrounds underrepresented in STEM).

BioArt can be created by painting bacteria on nutrient-rich agar plates



Lopes, L.E., et al.; PLOS Biology 2018, 16, e3000061



Baumer, K.M., et al.; Science Advances 2021, 7, eabhh0691