The peer review process:

Each proposal is assigned to one primary reviewer, one secondary reviewer, and one to four ad hoc reviewers. The primary, secondary, and ad hoc reviewers review and rank the proposal (Excellent, Very good, Good, Fair, and Poor) ahead of the panel meeting. During the meeting, the primary reviewer takes the lead in summarizing the assigned proposal, discussing its merits, and offering the perspectives of the ad hoc reviewers. The secondary reviewer covers additional viewpoints not mentioned by the primary panelist. The proposal is then open for discussion and anyone on the panel can join in. After the discussion the panel comes to a consensus about the strengths/weaknesses and ranking of the proposal. Proposals are ranked as ‘Must fund (high)’, ‘Should fund (medium)’, ‘May fund (low) and ‘Do not fund’. Proposals in the first two categories (high and medium) are strong in both ‘intellectual merit’ and ‘broader impacts’ as defined by NSF and therefore generally have mostly ‘Excellent’ initial reviews from panelists and ad hoc reviewers. In addition, proposals in the first category are potentially transformative. A potentially transformative project is defined as something that has the potential to move the field forward in a substantial way (i.e., a game-changer). However, this type of definition is naturally quite subjective and it is helpful to point out how/why your proposed work is ground-breaking. This makes it easier for a panelist to serve as your advocate.

Note that the panel only gives a recommendation for funding to the Program Director, who then uses the information to make funding recommendation to the Division head. The Program Director can take into account other factors, such as the geographic and demographic details of the proposal, when making funding recommendations. Therefore, what are ultimately funded are most (but not all) of the ‘High’ priority proposals, a few ‘Medium’ priority, and occasionally, a ‘Low’ priority proposal.

Who are the panelists?

They are invited by the Program Director and your fellow scientists in the community. The panel typically has a mixture of PIs from Research Institutions and Primarily Undergraduate Institutions (PUI) but the exact composition changes from panel to panel.

For more information on the peer review process:


(2) Link to a powerpoint on NSF review:

(3) Link to a mock NIH review panel: http://www.youtube.com/watch?v=kfgzdLe92c0&feature=relmfu

Although this video was created by the NIH, it will give you a good idea of how an NSF review panel is run.

Qualities reviewers look for:

1) Be clear and specific on research goals and objectives, and present your plan in a logical manner.
Use plain English, and avoid excessive use of jargon and acronyms that tend to confuse reviewers. Do not include extraneous details, and use a font size that reviewers can read reasonably. Put yourself in the shoes of the potential reviewer/panelist – nothing irritates a busy reviewer, who has to evaluate up to 15-20 proposals within two months in addition to performing other job responsibilities, more than a poorly written/presented proposal and/or one with extremely small fonts. If you think a manuscript reviewer is busy and would do almost anything to rush through your paper, then a panelist may be 20-times worse! Highlight the potentially transformative aspect(s) of your project or at least why the proposed research is unique and you are the one most suitable to carry it out. Organize your proposal into clear sections using informative headings and make judicious use of bold type face and italics; panelists need to be able to locate information very readily during a panel meeting if they were to act as your advocate – each proposal only gets up to 15 minutes of discussion time.

2) Address why your proposed plan is likely going to work, and include pitfalls and potential solutions/alternatives.

You naturally propose a methodology that you think is most likely to work but you need to explain your rationale. It is also important to admit that no plan is fool-proof, and you have back-up plans if your initial ones do not work as expected. If pertinent, briefly explain why you choose your methodology over other viable alternatives.

3) Be realistic about the amount of work, be cost effective, and provide a specific timeline with deliverables.

Panelists generally understand the challenge of performing research in a PUI so avoid proposing too much work or be overly ambitious about your research goals. A strong proposal is realistic and cost effective. Prioritize your project aims if necessary. The budget justification needs not be long but needs to address all the major needs of the project - Panelists are looking for major inconsistencies/omissions. Summarize the major outcomes/deliverables with a timeline, and provide realistic assessments.

4) Include undergraduate researchers as an integral part of your research plan.

Be very specific about the roles of the undergraduates; include descriptions of their work as you write your project description and if space permits, include a summary paragraph highlighting their roles, why this is important to the project, and what the undergraduates are learning from it. If possible, include the criteria of student recruitment, whether specific groups are targeted (try to include specific mechanisms of recruiting under-served populations), the resources available at the home institution to assist and complement what you are trying to do, and even names of specific students and successful examples of previous/present students. Emphasize the integration of teaching and research and if possible, include aspects of your research as part of a formal course. Including stipends for undergraduates formalizes the arrangement and is viewed favorably.

5) Show institutional support.
Any level of support is important and so be sure to highlight them. The most common forms of support maybe in-kind matching fund and teaching release but even a cap in teaching load or an endorsement from your chair indicating support of your plan to incorporate research into your teaching would help.

6) Be up-front about the potential weaknesses in a PUI, and highlight the strengths.

Three of the main weaknesses of a researcher in a PUI are:

i) The PI has a high teaching load and therefore, limited time to perform research.
ii) Resources may be limited.
iii) The researchers are undergraduates with limited experience/training.

Turn these into potential strengths by highlighting:

i) Your past productivity. The panelists will not expect as many publications as a PI in a research institution but you will still need to show you are capable of doing what you propose to do effectively. Having publications (reasonable number and quality of journals) is the most common measure of productivity but you can supplement with conference presentations, awards, etc. Student co-authors on publications and presentations are viewed very favorably so be sure to highlight them.

ii) How your funded grant and the proposed work can improve the learning environment and infrastructure of your home institution. Since resources in PUIs may be limited, the resources you secure as part of your grant has the potential to have a very substantial impact on the home institution. Having collaborators in research institutions to help provide some needed resources is not looked down upon as long as the responsibilities of the collaborator are clearly delineated, and you are still clearly the PI driving the intellectual development of the project.

iii) Valuable learning opportunity for the undergraduates. Specify what skills these undergraduates are learning and why this is important for their education and the society at large. Highlight the achievements of past students in your lab.

7) Outreach efforts

Try to incorporate your research/ research results into your outreach efforts so that you can argue that your research impacts not just a select group of people but rather, it also benefits the community at large. Examples of outreach efforts include lecturing and doing demonstrations in the community and K-12 classrooms. If applicable/possible, consider including high school students and teachers in your research group. Just giving an occasional tour of your lab/facility, however, is not considered to be a good outreach effort. If you can include your undergraduate students in outreach, so much the better.