**Proposal Template for Research Honors**

 *Research Honors applicants should use the following template for their proposal, following the directions with reasonable care.*

 *However, if your Mentor would rather you adapt an NSF project format (Project Summary and Project Description covering Criterion I and II) or other template more appropriate to their field, they can provide you with proper directions. All Research Proposals should include a Title and Abstract page and no more than three and a half pages of proposal narrative. Your Mentor will be expected to indicate this change and the rationale in their letter of support.*

 *Scholar Honors applicants are advised to follow the template below, particularly for anyone working with a Mentor who is typically funded by NIH or disease-related foundations. However, Scholars can opt to provide their proposal in any format approved by their Mentor, as long as this is noted by the Mentor in their letter of support.*

 *After populating this template, the proposal section will consist of up to five pages for the Title and Abstract (one page), Specific Aims (one page) and Approach (three pages) plus the Bibliography (typically two pages), protections (as needed) and Addendum (up to ten pages). The full proposal and addendum will be provided as the final parts of a pdf Application, also including the Cover Letter and Supporting Documentation.*

 *Format: All pages will use 0.5" margins all around without headers or footers, single column, with text in black, Arial 11 font, single spaced, with diagrams and tables embedded along with their figure legends in the text close to where they are first referred. Spell out any unusual acronyms on first use. Avoid use of Bold, Italics, Underlining, etc. except where particularly critical to highlight an idea or statement. Tabs will be 0.25". Figure legends and table entries will be Arial 9. No text in figures or diagrams will be smaller than Arial 9.*

**Investigator**

 ***Your name.***

**Title**

 ***A short, descriptive title as you might use for your thesis.***

**Abstract**

 ***A ≤ 100 word description of the thesis project, taking into account what you (the Investigator) wrote for Specific Aims and Research Plan. Avoid unusual acronyms other than gene names, etc. Note: The quality of the abstract will be considered in scoring the proposal.***

**Specific Aims** *(no more than one half page)*

 ***This section should briefly state the problem, the current state of understanding, the specific information that stimulates the project, the overall hypothesis or question, the current understanding and its gaps or weaknesses, the overall strategy to be pursued and the specific goals to be accomplished. The last are the "Specific Aims" which should number only two or three, and represent a logical sequence of project objectives. In general, this section should be developed with your Mentor, who will likely help you determine an appropriate set of Specific Aims and Sub-Aims in some detail. This section will be scored as a critical element of the proposal.***

 *(First, a couple of paragraphs setting up the problem, current understanding, approach and any preliminary studies completed by you or your Mentor's group. It is typical to have no references in this section unless they are critical to understanding the argument.)*

 *With these preliminary studies now in hand, we plan to redirect our efforts toward discovering key elements of the pathway linking the SQZ and SQRM in the stress response. Towards these ends, we propose to pursue the following Specific Aims:*

 ***Aim 1A)*** *Discover the targets of the SQZ stress-responsive transcription factor by gene expression analysis, and* ***B)*** *Apply informatics to stratify hits and select the five most promising mediators of stress tolerance signal transduction.*

 ***Aim 2)*** *Screen the five candidate genes, and positive and negative controls by knockdown and overexpression to identify a role in SQZ-mediated stress tolerance by determining activation of the SQRM tolerance effector.*

 ***Aim 3A)*** *Integrate the results to construct a potential pathway of genes that link activation of the SQZ transcription factor to the SQRM effector, and* ***B)*** *Test order of function of the validated candidates and other potential pathway mediators by combining overexpression and knockdown with SQZ induction and SQRM activation assays.*

**Research Plan** *(no more than three pages in total)*

 ***The Research Plan will be divided into the following sections. Although there is considerable latitude about what can go where, it is critical to avoid redundancy between* Significance *and* Innovation*, and to restrict descriptions of the experimental methods to the* Approach*. The Research Plan will be weighted most heavily in evaluating the Proposal.***

**Significance** *(suggest one third page)*

 ***It is typical to use this section to describe the overarching challenge or the gap in understanding, indicate how success of your project would advance the field, and discuss how the new knowledge might have an impact. The concept is to talk about the forest more than the trees here.***

 ***Can add something about the role of the Mentor and the potential significance of the project to the Investigator's development as a researcher.***

**Innovation** *(suggest one third page)*

 ***It is typical to use this section to argue that you are bringing to bear new concepts, pioneering new methods or discovering new pathways or principles. This is where you make claims for novelty, discuss the risk-reward calculus, and argue for the potential for discovery.***

 ***Can describe new capabilities and skills that will be gained by the Investigator by pursuing this project. If your project is a new direction for the Mentor's lab, this fits here too.***

**Approach** *(suggest two pages)*

 ***This is the core of the proposal and can be broken up into the following sub-sections.***

Background

 ***Scholarly review of the relevant primary literature, perhaps featuring relevant work from your Mentor's lab. Should make clear the knowledge gap, conflict, inconsistency or confusion that stimulates your project and that your proposed work addresses. A simple diagram designed by you, not cut and pasted from another source, might be included here to present your model, set up the problem, etc.***

Rationale

 ***Short argument justifying your hypothesis/objective and arguing that your project will provide a good test/opportunity to succeed.***

Preliminary studies

 ***Preliminary data are not required. However, you may describe any published or unpublished work that you have already contributed to or that has been completed by others in the Mentor's group (with proper attribution) that establishes the feasibility of the proposed studies. Preliminary data can be shown as figures where it helps establish your capabilities or the feasibility, but any data already published or whose results can be stated efficiently as text need not be shown. Your Mentor will help select appropriate data to present.***

Experimental plan

 ***A description of the proposed studies, typically presented using the outline laid out in the Specific Aims, should be provided in sufficient detail to allow a non-expert to understand and evaluate the experiments. The logic for each experiment should be provided first, then the methodology. Diagrams should be used as appropriate. For each Aim, a short description of expected results, anticipated pitfalls and alternative approaches should be provided. Input from other members of your Mentor's group and your Mentor will likely help you significantly here.***

**Milestones and Timeline**  *(suggest one quarter page)*

 ***Milestones are typically quantitative metrics that you might use to determine success of the project, but can also be markers of completion of an Aim or sub-Aim. Your Mentor will provide input on realistic goals that correspond to your Aims. This section is often a numbered list of goals with short descriptions of how you will determine success.***

 ***A timeline might be presented as a table of Aims and Sub-Aims and the specific quarters when you intend to invest effort on the related experiments, etc.***

**Bibliography**

 ***This will be a numbered list of up to thirty references, in the order of appearance, with full citations and PubMed links to each paper. The quality of the bibliography, with respect to use of proper primary sources and contemporary literature, will be considered in evaluating the proposal.***

*References must be in PNAS style. Only published or in-press papers and books may be cited in the reference list. Unpublished abstracts of papers presented at meetings or references to "data not shown" are not permitted. References should be cited in numerical order as they appear in text. Because tables and figures will be inserted in the text where first cited, references in these sections should be numbered accordingly. Include the full title for each cited article. All authors (unless there are more than five) should be named in the citation. If there are more than five, list the first author's name followed by et al. Provide inclusive page ranges for journal articles and book chapters. Cite databases in the text or as footnotes.*

*Journal articles are cited as follows:*

*10. Neuhaus J-M, Sitcher L, Meins F, Jr, Boller T (1991) A short C-terminal sequence is necessary and sufficient for the targeting of chitinases to the plant vacuole. Proc Natl Acad Sci USA 88(22):10362-10366.*

*Use MEDLINE/PubMed abbreviations of journal titles or use the full journal title for any journals not indexed in MEDLINE.*

*Articles or chapters in books are cited as follows:*

*14. Hill AVS (1991) in Molecular Evolution of the Major Histocompatibility Complex, eds Klein J, Klein D(Springer, Heidelberg), pp 403-420.*

 ***The following only apply if you are using vertebrate animals, human samples, studying patients, etc. Your Mentor will indicate if this needs to be filled out.***

**Protection of Human Subjects**

 **Inclusion of Women and Minorities**

 **Inclusion of Children**

**Vertebrate Animals**

**Select Agent Research**

**Addendum**

 ***If you are proposing to perform unusual methods for which you will need training, make extensive use of a special resource such as a data or sample bank, visit another institution, gain access to clinical samples from another party, engage a consultant other than your Mentor, or are proposing some other feature that might require independent verification, obtaining a short letter of support or a confirmation by email and including it here will be helpful. Your Mentor may suggest including other supporting material as well, such as a letter of approval for an IRB protocol, a mathematical or statistical proof, etc.***

**Letters of Support**

**Other Supporting Material**