



FOR STUDENTS

Research Essay

STUDENTS

The research essay is the heart of your application. It shows reviewers how you think as a scientist: what you did, why it mattered, and what you contributed. Write it for broadly trained scientists, engineers, and mathematicians — not for specialists in your subfield.

Format requirements

Requirement	Rule
Length	No more than 3 pages, including references and bibliographic information
Spacing and font	Single-spaced, 12-point or larger Arial (figure captions and citations may be 10-point Arial)
Margins	One inch on all sides, measured to the text
Header	Your name and your nominating institution on every page; the essay must have a title
Layout	Single or double column; graphs, tables, and figures are permitted, in color if you wish — reviewers see the essay in color; use LaTeX or similar for equations

Requirement	Rule
File	Save and upload as a PDF
Hyperlinks	Do not include hyperlinks — materials hyperlinked to your essay will not be read

What to write about

Focus on **one project** — the one that best shows your ownership, your results, and your scientific thinking (often, but not always, the one you spent the most time on). It may be completed, in progress, or, if you have not yet had a research experience, a proposed project laid out with a problem statement, protocol, methodology, and anticipated results. A discovery-based course project with substantial individual participation is also a possibility.

Whatever the project, your essay should:

- ✔ Open with a short paragraph on why the research matters and what motivated it.
- ✔ Describe the problem, your methodology, and your findings (or anticipated results).
- ✔ Make your personal contribution unmistakable — write “I,” not “we,” and give concrete examples of initiative you took, ideas you contributed, and setbacks you worked through.
- ✔ Discuss the skills you brought to the project and the skills you gained, both technical (instrumentation, software) and scientific (data analysis, critical thinking, collaboration).
- ✔ Close with next steps or new questions the work suggests — evidence that you think beyond the current project.

References and polish

Cite up-to-date, peer-reviewed journal articles in the citation format standard for your discipline; abbreviations are fine to save space. Headings are an excellent way to organize the essay, and equations are appropriate whenever they communicate relationships compactly. Keep figures to the minimum that clarifies your results. Then revise: multiple drafts, feedback from your research mentor, and ideally a reader outside your field. Proofread until it is flawless.

A note on AI: the Foundation's AI guidelines apply fully to the essay. Editing help is acceptable; generated or fabricated content is not, and your institution's own rules govern. See [Using artificial intelligence](#) on the Nomination page.

Advice from Goldwater Scholars

The Foundation asks Scholars what they wish they had known when they applied. On the essay — and the process around it — their advice converges on a few themes, in their own words:

"It would have been helpful to know that there is more of an emphasis in the essay on telling the story of the research, rather than acting as a technical paper in disguise."

Goldwater Scholar

"The Goldwater application process is a marathon — not a sprint!"

Goldwater Scholar

"The importance of having several people review your application materials cannot be overstated."

Goldwater Scholar

"Seek out feedback from both people in your field (i.e., a research adviser), and those who are less familiar with the specifics of your research."

Goldwater Scholar

"At the outset, I almost did not apply because I was not sure if I was competitive enough."

Goldwater Scholar

"Filling out the application forced me to think very carefully about what I have done, what I am doing and what I plan to do."

Goldwater Scholar

Collected by the Foundation from surveys of past Goldwater Scholars. The last two are worth reading together: many Scholars nearly talked themselves out of applying — and found the application itself clarified their path.

Common essay questions, answered

Should I summarize all my research projects?

No. Write about the single project where you had the greatest ownership, the most significant results, and the clearest chance to show you can think like a scientist — even if it is not your most recent work.

I have no independent research yet. Can I still write the essay?

Yes. A course project can be the subject if it is discovery-based with substantial individual participation. If you have neither, you may write a research proposal instead — it must still hit all the elements of a strong essay.

Can I use equations and figures?

Yes, sparingly. Equations should communicate important relationships compactly, with every variable identified. Graphs, tables, and figures should explain or clarify results, with captions that guide the reader. Color figures are welcome: reviewers see your essay in color.

Should I use section headings?

Yes — a few headings organize the essay and help the reviewer follow your train of thought.

How should the essay open and close?

Open by establishing why the work matters and what motivated it; close with next steps or the future work the project inspired.

How do I describe my own contributions?

Use the first person and be specific about what you did: initiative you took, solutions you proposed, ideas you contributed, decisions you made — plus the technical and research skills you developed along the way.

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