



BARRY GOLDWATER

SCHOLARSHIP & EXCELLENCE IN EDUCATION FOUNDATION

Preparing for the
Goldwater Scholarship Application

Writing & Communication Center
Library, room 201A

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Part 1: Writing Career Goals and Professional Aspirations

1. In one or two sentences, describe your career and professional aspirations.
❖ (200 characters including spaces)
2. Indicate which areas of math, science, or engineering you are pursuing in your research career.
3. Specify how your current academic program and overall educational plans will assist you in achieving these goals.
❖ (3000 characters including spaces)

Part 1: Writing Career Goals and Professional Aspirations

Drafting (10 minutes)

1. What do you aspire for in your career? ...in your life?
2. *Get specific –*
 1. Describe an **activity** or **experience** that has been important in shaping your decision to pursue a STEM field.
 2. What do you **want to do** with your STEM education?
➤ **Why** does it matter?
 3. How does your work at S&T **support your goals**?

Part 1.5: The Research Projects

Give the reader a sense of the **overriding** scientific, engineering, or mathematical **question** you were trying to address.

Tell the reader **why** this question is important.

Use the [Goldwater Scholarship Application: Research Projects Sketchpad](#) to organize your thoughts.

Title	Overriding Question	Why is this important?
<i>Engineering Novel Photocatalytic Nanomaterials for Efficient Solar Energy Conversion</i>	How can we design and optimize photocatalytic nanomaterials to improve the efficiency of solar energy conversion processes?	The rising demand for clean, renewable energy sources has made solar energy a critical area of research. However, current solar energy technologies face efficiency limitations, particularly in converting sunlight to usable energy.

Part 1.5: The Research Projects

Describe your involvement in and contributions to the work.

Use “I” when describing your contributions to the work instead of “we” or “our team.” This helps the Goldwater reviewers understand how you contributed to the project

Use the [Goldwater Scholarship Application: Research Projects Sketchpad](#) to organize your thoughts.

Your involvement & contributions.
I led the research efforts to synthesize and characterize new photocatalytic nanomaterials with tailored optical and electronic properties. Specifically, I designed and fabricated nanostructures of titanium dioxide doped with

Part 1.5: The Research Projects

Outputs of projects - **papers** and **presentations** - are of particular interest to those reviewing your materials. These help a reviewer calibrate the significance of the work.

Use the [Goldwater Scholarship Application: Research Projects Sketchpad](#) to organize your thoughts.

Papers & Presentations
Miner, J. (2024). "Transition Metal-Doped TiO ₂ for Enhanced Photocatalytic Solar Energy Conversion," Journal of Renewable Energy Materials, 12(3), 456-467.
Oral Presentation at the American Chemical Society National Meeting, Spring 2024: "Nanomaterial Design for Improved Photocatalytic Efficiency in Solar Applications"
Poster Presentation at the Missouri S&T Undergraduate Research Conference, 2024.

Part 1.5: The Research Projects

Follow the
Scientific Style and
Format Citation Guide
(8th Ed.)

Make an appointment
with your librarian.

CITATION EXAMPLES

Please use the following citation format (layout and punctuation) for published works - Author(s) last name and initials. Date. Article title. Journal title, Volume (issue): page numbers.

Example: Doe M, Smith JD, and Decher JJ. 2017. Energy Dependence of Fusion Evaporation-Residue Cross Sections. Phys. Rev. C. 42(11): 1-10.

Please use the following citation style (layout and format) for papers presented at meetings - Author(s) last name and initials. Title of Paper. Paper/poster session presented at: Name of Conference; Date of Conference (Year, Month, day); Place of Conference (City, Country).

Example: Doe M, Smith JD, and Ray SM. Energy dependence of fusion evaporation-residue cross sections. Poster session presented at: 76th Annual Conference of the American Physical Society; 2016 June 3-5; Houston, TX.

These citation examples were taken from
<http://www.scientificstyleandformat.org/Tools/SSF-Citation-Quick-Guide.html>

Part 2: The Research Essay

The Essay:

The Research Essay provides the Foundation with particularly important insights into your motivation, background, experience, skills, and interest in pursuing a research career. This does not mean that you should simply state that you have these characteristics but that you demonstrate them through your work.

Whether your essay is based on prior research or is a proposal, it is important that your essay clearly describes:

- Your intellectual contribution or expected contribution to the work.
- The skills you brought to the work from prior research or course experiences.
- The skills you have or expect to obtain from participation in the project.

Part 2: The Research Essay

Formatting Guidelines:

- Single-spaced
- 12-point Arial font
- 1-inch margins on all sides
- Page length, including bibliographic information, must not exceed 3 pages.
- **In the header at the top of each page, you must include your name and the name of your academic institution.**
- **The essay must include a title.**
- Format your Research Essay in either one or two columns on a page.
- As appropriate, utilize graphs, tables, and figures in the essay to explain or clarify results.
 - Figures, table captions and bibliographic citations may use 10-point Arial font.
 - Research essays that use mathematical expressions may use LaTeX or other document preparation software to enable proper formatting.
- **Do not include hyperlinks. Materials that are hyperlinked to your research essay will not be read.**
- Save and upload your Research Essay as a PDF file.

Part 2: The Research Essay

Write a short **opening paragraph** that provides a “broader picture” which explains:

- the importance of your research
- your motivation for doing the work

Drafting (5 minutes)

1. Why is your work important?
2. What makes you want to do this work?

Part 2: The Research Essay

Demonstrate that you “think like a scientist.”

- If you are describing a research project that you have conducted, consider discussing additional work that you might do or,
- if you have completed the entire project, describe a new project that might be undertaken.

Explain how the skills you have acquired will set the stage for successful new work.

Drafting (10 minutes)

1. What is the future of your research?
2. What skills make you capable of conducting that research?

Part 2: The Research Essay

When describing the project, describe

- your specific contributions to the work and
- the skills you acquired.
 - *N.B. As reviewers seldom open links to other work, you are encouraged not to incorporate them into your research essay.*

Drafting (15 minutes)

1. What research questions are you asking?
2. Why are those questions important?
3. Describe your specific contributions to the project.
4. Describe the skills you acquired on this project.
5. Describe any papers or presentations that came from the project.

Part 2: The Research Essay

Include a bibliography that uses up-to-date, refereed journal articles.

Use diagrams and figures, as appropriate, but not at the expense of a quality narrative

Follow the
Scientific Style and
Format Citation Guide
(8th Ed.)

Make an appointment
with your librarian.

Researching

1. Meet with your librarian to ensure your sources are up to date.
2. Visit the Writing & Communication Center for help weaving those sources into a narrative.

Part 2: The Research Essay

Use plain English.

- “While the disciplinary reviewers who will be reviewing your essay and application will be broadly familiar with work in your discipline, it is unlikely our reviewers will be experts in your sub-field. Furthermore, if your application needs to undergo a secondary review, the review may be done by an individual from another discipline. Write your research essay and other materials for individuals who are broadly trained in the sciences, engineering, and mathematics, not for subject matter experts.”

Part 2: The Research Essay

Use space judiciously. Balance the various elements of your essay so that no one section dominates the essay.

Where appropriate, you are encouraged to use the word “I” as opposed to “we” or “our team” in your essay to help clarify your specific role in the work. It is important for our reviewers to know what you contributed to the research.

Part 2: The Research Essay

“Finally, while you must write the Research Essay, you can work with your faculty and research mentor(s) to ensure your Research Essay is scientifically accurate, uses appropriate scientific format, and provides an appropriate balance among the various elements that make up the Essay.

Always anticipate the need to write multiple drafts, reviewed by your faculty mentor and, when possible, by a non-expert in the field. Write, rewrite, and then rewrite again your research essay. Reviewers have a limited time to read the essay, so you want to make certain your essay makes your points clearly and succinctly.”

Make it make sense

Visit the Writing & Communication Center

In-person/Online

writingcenter.mst.edu

writing@mst.edu

Dr. Jossalyn Gale, Director
jgale@mst.edu



The **Writing and Communication Center** offers consultations for any project that requires writing, speaking, or otherwise presenting ideas. Walk-ins are welcome from 9am to 8pm on days that we are open; evening hours are by appointment only.

Standard Hours

9 AM - 8 PM, Monday - Friday

Holidays and Weather

The WCC will be closed on university holidays. If campus is closed due to inclement weather, contact your tutor to reschedule or to flip your appointment online.

- Tutoring sessions will be offered **in person** at the WCC (**Library, 201A**)
- Tutoring sessions will be offered **synchronously** and **asynchronously** via Microsoft Teams - you will receive an Outlook Calendar invitation with your link!

Undergraduate Services

The WCC offers undergraduate students individualized support with course assignments, presentations, scholarship applications, and other academic and professional communication.

[Undergrads →](#)

Grad Student Services

The WCC provides graduate students with individualized support for theses and dissertations, scholarly publications, presentations, and other academic and professional communication.

[Grad Students →](#)

Faculty Services

The WCC supports faculty with scholarly writing and publication, course and assignment design, classroom instruction, and the thoughtful integration of generative AI into teaching and writing.

[Faculty Services →](#)