## A Quick Guide for Effective Prompting

*Guide written by Ken Reid & Jing Liu, compiled in part from the “*[*An Introduction to Generative AI Tools for Research*](https://midas.umich.edu/generative-ai-tutorial-series/#intro_ai_research)*” tutorial by James Boyko.*

ChatGPT and similar Large Language Models (LLMs) are *pre-prompted* to respond in a specific way (e.g. ‘polite and informative’). We can customize how LLMs respond to us by crafting our instructions and prompts. [Click here to open ChatGPT](https://chatgpt.com/) in your web browser.

**Define Scope and Boundaries**

* Define what information you want or don’t want in LLM responses
  + “Analyze the impact of social media on political polarization, focusing on demographic factors and *excluding technological aspects.*"
  + "Explain the process of photosynthesis in C4 plants, *emphasizing biochemical pathways and excluding evolutionary history*."

**Iterate and Refine**

* Ask follow-up questions for additional information and clarification.
  + E.g., after an initial analysis of bridge design principles, ask: 'Can you elaborate on how different materials affect load-bearing capacity in suspension bridges?'
  + If the LLM's initial summary of a cognitive bias study doesn't mention sample size concerns, refine your prompt with: 'Reanalyze the study, focusing on methodology and potential limitations related to participant selection and sample size.'

**Provide Context**

* Set the Stage: Give the LLM relevant background information, including the research problem, hypothesis, or any crucial data, to enhance accuracy and focus.
  + “The research problem is to understand the impact of remote work on urban economic structures. Analyze this dataset containing information on commercial real estate prices, commuting patterns, and local business revenues in major US cities from 2019 to 2023.”
  + “We're investigating the efficacy of a new treatment for Type 2 Diabetes. Analyze this clinical trial data, considering the hypothesis that the treatment might be more effective in patients with specific genetic markers.”

**Request Justification and Sources**

* Support the Answer: Instruct the LLM to provide evidence alongside its response, including rationale, examples, or cited sources for stronger claims. Request the LLM to cite sources for any substantive claims it makes, ensuring transparency and supporting your research.
  + “Analyze the themes of alienation in modernist literature. Include specific examples from works by authors such as James Joyce, Virginia Woolf, and T.S. Eliot. Cite relevant scholarly articles or critical analyses to support your claims.”

**Request Prompt Advice**

* Seek guidance from the LLM itself on how to phrase your prompts effectively to achieve your desired outcome.
  + “I would like to ask you to summarize the research on the impact of globalization in indigenous cultures. But this is a vast topic. Can you suggest more specific topics within this broad theme to begin your summarization with?”

**Solicit Feedback and Clarification**

* Promote Open Communication: Instruct the LLM to actively request clarification if any aspect of your prompt is unclear, ensuring a smooth interaction.
  + "Before analyzing this document, ask me if I can provide any additional information about the context to help your analysis."
* Confirmation for Accuracy: Request the LLM to confirm its understanding of your query and verify that its response aligns with your expectations.
  + "I asked you to analyze the effects of microplastics on marine ecosystems. Before you provide a detailed report, can you summarize your understanding of the key factors I'm interested in (e.g., bioaccumulation, impact on different trophic levels) and anything else you plan to include?"

**Specify Output Format**

* Clearly specify the desired format for the LLM's output, such as bullet points, markdown, or LaTeX.
  + "Provide a proof for the Fundamental Theorem of Calculus. Structure your response using LaTeX formatting for mathematical notation, and divide it into clear steps with explanations for each."
* Organize for Clarity:
  + "Analyze the strengths and weaknesses of this research paper. Divide the response into sections with headings like 'Methodology,' 'Results,' and 'Conclusion.'”

**Use Academic Personas**

* Assign the LLM a specific role, such as a journal reviewer or a statistical consultant, to tailor its response to your needs.
  + "You are a reviewer for the Journal of the American Chemical Society. Please write a review of my manuscript on a novel catalytic process focusing on the experimental design and the significance of the results in the field of green chemistry."
  + "You are a law professor specializing in digital rights and cyber law. Please write an analysis of this new legislation on data privacy for the Wall Street Journal. Focus on potential constitutional challenges and comparisons with existing international data protection frameworks."