



A GUIDE TO WRITING RESEARCH CONFERENCE/ACADEMIC JOURNAL PAPER ABSTRACTS

THE SECTIONS OF THE PAPER

Most research conference/academic journal-style scientific papers are subdivided into the following sections:

The Details [What to Write]	Where to Write it [Section of Paper]
What did I do in a nutshell?	Abstract
What is the problem?	Introduction
How did I solve the problem?	Methodology/Materialsand Methods
What did I find out?	Results
What does it mean?	Discussion
What are your conclusions	Summary and Conclusions
Who helped me out?	Acknowledgments (optional)
Whose work did I refer to?	References (LiteratureCited)
Extra Information	Appendices (optional)

THE ABSTRACT

1. Function: An Abstract summarizes, the major aspects of the entire paper in the following prescribed sequence:

- The question(s) you investigated (or purpose), (from Introduction)
  - state the purpose very clearly in the first or second sentence.
- The methods used, (from Methodology/Methods and Materials)
  - clearly express the basic design of the study.
  - briefly describe the basic methodology used without going into excessive detail-be sure to indicate the key techniques used.
- The major findings including key quantitative results, or trends (from Results)
  - report those results which answer the questions you were asking
  - identify trends, relative change or differences, etc.
- A brief summary of your interpretations and conclusions. (from Discussion)
  - clearly state the implications of the answers your results gave you.

2. Style: The Abstract is ONLY text. Use the active voice when possible, but much of it may require passive constructions. Write your Abstract using concise, but complete, sentences, Get to the point quickly. Use past tense.

The Abstract SHOULD NOT contain:

- lengthy background information, references to other literature,
- elliptical (i.e., ending with ...) or incomplete sentences,
- abbreviations or terms that may be confusing to readers,
- any sort of illustration, figure, or table, or references to them.

### 3. Writing the Abstract

- **Idea 1: The problem to be investigated.** This should be 1-3 sentences that sum up why this study was conducted.

*For example: "Several studies have suggested that rampart craters on Mars form in regions with high soil volatile contents - namely, water ice."*

- **Idea 2: The purpose of the study.** This should be 1 - 3 sentences that explicitly state what this study investigated and how it differs from similar studies.

*For example: "This study is the first to use data from Mars Odyssey's Gamma Ray Spectrometer to correlate the distributions of water ice and rampart impact craters on Mars. We hypothesized that if rampart craters form due to high volatile content in the soil, then regions with more sub-surface water should show a higher percentage of rampart impact craters."*

- **Idea 3: The methods.** This should be 1 - 3 sentences that summarize the important methods used to investigate the problem.

*For example: "We plotted the distribution of rampart impact craters on Mars and the water ice concentrations obtained by the Mars Odyssey's Gamma Ray Spectrometer, then used statistical tests to determine if there was a correlation."*

- **Idea 4: The major results.** This should be 1 - 3 sentences that summarize the major results - not *all* of the results - just the important ones.

*For example: "We found that regions with high sub-surface water ice concentrations had a higher percentage of rampart impact craters than regions with low sub-surface water ice concentrations. For example, 87% of impact craters in Acidalia Planitia, a very water rich area, were designated rampart craters; however, only 23% of craters in water-poor Syrtis Major were designated rampart."*

- **Idea 5: The interpretations.** This should be 1 - 3 sentences that summarize the author's interpretations of the results

*For example: "These results lend support to the idea that the fluidized ejecta morphology that characterizes rampart craters is caused by a high water ice concentration in the sub-surface."*

- **Idea 6: The implications.** This should be 1 sentence that summarizes the meaning of these interpretations, i.e., why do we care about this.

*For example: "Understanding the factors that influence crater formation and morphology will allow us to better age-date the Martian surface, and mapping the distribution of ancient rampart craters may help us estimate sub-surface volatile concentrations from the Martian past."*

In this example, the resulting Abstract is about 230 words:

*“Several studies have suggested that rampart craters on Mars form in regions with high soil volatile contents - namely, water ice. This study is the first to use data from Mars Odyssey’s Gamma Ray Spectrometer to correlate the distributions of water ice and rampart impact craters on Mars. We hypothesized that if rampart craters form due to high volatile content in the soil, then regions with more sub- surface water should show a higher percentage of rampart impact craters. We plotted the distribution of rampart impact craters on Mars and the water ice concentrations obtained by the Mars Odyssey’s Gamma Ray Spectrometer, then used statistical tests to determine if there was a correlation. We found that regions with high sub-surface water ice concentrations had a higher percentage of rampart impact craters than regions with low sub-surface water ice concentrations. For example, 87% of impact craters in Acidalia Planitia, a very water rich area, were designated rampart craters; however, only 23% of craters in water-poor Syrtis Major were designated rampart. These results lend support to the idea that the fluidized ejecta morphology that characterizes rampart craters is caused by a high water ice concentration in the sub-surface. Understanding the factors that influence crater formation and morphology will allow us to better age-date the Martian surface, and mapping the distribution of ancient rampart craters may help us estimate sub- surface volatile concentrations from the Martian past.”*

### **Please Note**

In Abstracts, bluntness is best. Phrases like “In this study, we examined...”, “We hypothesized...”, or “We found...” are not poetic, but they are clear and succinct. The reader should be left with no doubt about what the purpose of the study was, what methods were used, what the major results were, and why those results are important. The rest of the paper will fill in the details.

The Abstract should NOT contain:

- Lengthy background information - that belongs in the Introduction
- Lengthy methods discussion - that belongs in the Methods/Methodology section
- References to other literature
- Abbreviations or acronyms
- Figures, images, or references to them

### **Abstract Standards for Review**

We use the following criteria to judge Abstracts. Different journals use different standards, but these cover the basics:

#### **Content:**

- Author states *why* the research was conducted
- Author states *how* the research was conducted
- Author states what the major *results* were
- Author states what his/her *conclusions* were

#### **Structure:**

- The Abstract Follows the “Problem - Purpose of This Study - Method - Results - Conclusions” Structure

### **Abstract Section Overall:**

- Succinct: not verbose
- Clear: easy to read and understand
- Balanced: all the major topics are covered
- Focused: no superfluous information is included

### **Some Common Mistakes in an Abstract**

For such a short section, the Abstract is easy to get wrong. Here are some of the major ones to watch out for in your own writing:

**1. No Abstract.** Every paper needs an abstract. Your is no exception!

**2. Abstract Really an Introduction.** An Abstract is not an Introduction - it is a summary of the *whole* paper. Often, authors will write an Abstract that is ten sentences of background information, with no reference to the results or conclusions of the study. Don't panic about including enough background – if a reader wants details, she goes to your introduction.

**3. Missing Information.** Authors frequently forget to include information like: What was the purpose of this study? What were the methods used? What were the major results? What do these results mean? Be sure than your Abstract answers all those questions.

**4. Too Much Information.** Some authors include way too much information on the background, the problem, the methods, or the implications of a study. Usually, 1- 3 sentences for each of the major sections (Introduction - Methods - Results - Conclusions) is enough. The Abstract should be short, snappy, and succinct. When readers want details, they'll read the actual paper.