



AMERICAN CHEMICAL SOCIETY



ACS作者資源、 AI使用作者指南與最佳實踐

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Using Gen AI in Research

在研究中使用生成式AI

Examples of Using Gen AI in Research (I)

在研究中使用生成式AI的案例（一）

Polymer	Answer
Poly(ethylene glycol)	Poly(ethylene glycol) with a molecular weight of less than 1,000 is highly soluble in water, while those with a molecular weight of more than 10,000 are only slightly soluble.
Polyvinyl pyrrolidone	The water solubility of polyvinyl pyrrolidone (PVP) is generally considered to be very high, with a solubility of up to 20% in water at room temperature.
Polyvinyl alcohol	The water solubility of polyvinyl alcohol (PVA) is generally considered to be very high, with most grades of PVA being completely soluble in cold water.
Polyacrylic acid	The water solubility of polyacrylic acid is very high, with a solubility of up to 90% in water at room temperature.
Polyacrylamide	Generally, anionic polyacrylamide is more soluble in water than cationic polyacrylamide. Anionic polyacrylamide is typically soluble in water up to 1-2%, while cationic polyacrylamide is usually only soluble up to 0.1-0.2%.
N-(2-Hydroxypropyl) methacrylamide	The water solubility of N-(2-Hydroxypropyl) methacrylamide is approximately 0.1 g/L at 25 °C.
Polyethylene	Polyethylene is insoluble in water.
Polyvinylchloride	The water solubility of polyvinyl chloride (PVC) is very low, with only 0.01-0.02 g/100 mL of water at room temperature.
Polyvinyl acetate	The water solubility of polyvinyl acetate is very low, with only 0.1 g/L at 20 °C.
Polyurethane	Polyurethane is not water soluble.

The ChatGPT model makes the correct prediction of the water solubilities of 11 polymers because they have important applications in industry and academy.

範例：ChatGPT模型對11種聚合物的水溶性進行了正確的預測，因為它們在工業和學術界有著重要的應用

[List as bullet points. 100 word-limit per bullet point.] Please summarize 5 key points from the following paragraphs: "Water underpins every aspect of life, and the water industry is the guardian of human society's and environmental water needs. From ancient Rome's aqueducts to modern water networks, the water sector has been playing a critical role in civilization and paving a pathway to a more sustainable and prospective world (Sedlak, 2014). Each nation's critical water infrastructure relies on the smooth operation of water and wastewater systems of different sizes. Water utilities treat and deliver billions of liters of water to homes and industries every day, and wastewater utilities collect and treat the

..... (intent to skip)

pollution in different parts of the world, such a 'water should be free' concept is being challenged, and many opportunities have emerged to overcome such hurdles by developing win-win solutions such as generating 'green' revenues via energy and resource recovery, developing new policies on carbon credits, and transforming empirical practice to data-driven decision making that improves efficiency and reduces cost."

Here are the five key points summarizing the given text:

1. The water industry plays a critical role in society and has adopted the OneWater framework to achieve reliable, sustainable, and resilient water systems.
2. The industry is facing challenges from climate change and needs a paradigm shift towards integrated water management for overall sustainability, energy efficiency, and resource recovery.
3. The water industry is energy and material-intensive and uses a significant amount of

Summarize key points from a lengthy text to facilitate smoother and efficient literature reading and comprehension.

範例：ChatGPT從冗長的文字中總結要點，以方便更流暢、更高效地閱讀和理解文獻

[Imaging you are an environmental data scientist. You are going to conduct a supervised learning research on prediction of daily concentrations of organic carbon aerosols based on collected environmental variables, including CO, NO, NO2, NOx, O3, PM10, SO2, air pressure, relative humidity, temperature, wind direction, wind speed, and rainfall. Add annotations in the code] Please provide a sample Python code that uses linear regression and random forest.

Sure, here's an example Python code that uses linear regression and random forest for predicting daily concentrations of organic carbon aerosols based on environmental variables:

```
python
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.ensemble import RandomForestRegressor
from sklearn.metrics import mean_squared_error

# Load the dataset
data = pd.read_csv('data.csv')

# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(
    data.drop('organic_carbon', axis=1), data['organic_carbon'], test_size=0.3, random_state=42)

# Linear Regression Model
lin_reg = LinearRegression()
```

Assist with sample Python code generation and unfamiliar syntax learning.

範例：使用ChatGPT來幫助生成樣例Python程式碼和學習不熟悉的句法

Using Gen AI in Research: Strengths and Benefits

在研究中使用生成式AI：優勢與好處

Questions on popular subjects could be easily answered

可輕鬆解答
熱門領域的問題

Capable of interpreting chemical symbolism & communicating in ways chemistry students understand

可解釋化學符號，
並使用易懂的語言
幫助學生理解

Response to questions focused on knowledge and understanding with “Describe” and “Discuss” verbs

擅長回答與理解
用到『描述』或『討論』
這類動詞的問題

Improving writing quality, identifying themes, retrieving information & streamlining workflow

提升寫作品質、
辨認主題、檢索資訊、
簡化工作流程

Ability to support coding, debugging & syntax explanation

協助程式設計，
排障調試，及句法解釋

Calculations & writing skills

計算與寫作能力

Examples of Using Gen AI in Research (II)

在研究中使用生成式AI的案例 (二)

Convert compound name into the SMILES chemical representation (6/23=26%)			
Name	SMILES	Name	SMILES
Ethane	C=C	Ethene	C=C
Propane	C(C)C	Propene	C=C
		Propylene	C=C(C)C
Butane	CCCC	But-2-ene	C=C(C)C
Pentane	CCCCC	cis-but-2-ene	C/C=C/C
		trans-but-2-ene	C/C=C/C
Hexane	CCCCCC	2-Methyl-2-butene	C=C(C)C(C)C
Heptane	CCCCCCC	2-Methyl-1-butene	C=C(C)C(C)C
Octane	CCCCCCC	Isoprene	C=C(C)C(C)C
		2-methyl-1,3-butadiene	C=C(C)C(C)=C
Nonane	CCCCCCCCC	Cyclohexane	C1CCCCC1
Decane	CCCCCCCCC	Cyclohexene	C1=CC=CC=C1
Xylene	C1=CC=CC=C1	Benzene	C1=CC=CC=C1
Convert SMILES into the compound name (5/18=28%)			
SMILES	Name	SMILES	Name
CC	Ethane	C=C	Ethene
CCC	Tricarbon	C=CC	Ethylene
	Monoxide	CC=C	Ethene

The conversion of compound names to SMILES chemical representations is a difficult task for ChatGPT. The hit rate is around 27%.

範例：對於ChatGPT來說，將化合物名稱轉換為SMILES化學表示是一項艱巨的任務，正確率在27%左右。

Q	Topic	Student performance		Chatbot performance			
		Score	Point Biserial	Correct	Concept	Strategy	Solution
1	Dimensional analysis	0.62	0.53	Yes	Correct	Correct	Correct
2	Sig. fig. calc.	0.70	0.35	No	Correct	Error	Error
3	Measurement	0.91	0.24	Yes	Correct	Correct	Correct
4	Name ionic comp.	0.78	0.48	Yes	Correct	Correct	Correct
5	Atomic symbols	0.90	0.37	No	REVISED	--	--
6	Name acid	0.63	0.48	No	Correct	Error	--
7	Avogadro's number	0.72	0.38	Yes	Correct	Correct	Correct
8	Limiting reactant	0.58	0.19	No	Correct	Error	--
9	Oxidation numbers	0.78	0.52	Yes	Correct	Correct	Correct
10	Precip. & solubility	0.93	0.39	Yes	Correct	Correct	Correct
11	Aqueous reactions	0.72	0.52	Yes	Correct	Correct	Correct
12	Solution stoich.	0.60	0.41	No	Correct	Error	--
13	Titration	0.74	0.54	Yes	Correct	Correct	Correct
14	Solution concn.	0.83	0.47	No	Correct	REVISED	--
15	Aqueous reactions	0.72	0.32	Yes	Correct	Correct	Correct
16	Heat and work	0.46	0.47	No	Correct	Correct	Error
17	Hess's law	0.85	0.46	No	Correct	Error	--
18	Enthalpy of rxn.	0.86	0.46	Yes	Correct	Correct	Correct
19	Heat, macroscopic	0.72	0.46	Yes	Correct	Correct	Correct
20	H-atom emission	0.58	0.47	Yes	Correct	Correct	Correct
21	Electron config.	0.86	0.39	No	Correct	Correct	Error
22	Energy of a photon	0.47	0.42	No	Correct	Correct	Error
23	Born-Haber cycle	0.65	0.48	No	Correct	Correct	Error
24	Ionization energy	0.67	0.44	No	Correct	Correct	Error
25	Periodic trends	0.73	0.48	No	Correct	Error	--
26	Eff. nuclear charge	0.53	0.42	No	Correct	Error	--
27	Bond polarity	0.80	0.30	Yes	Correct	Correct	Correct
28	Lattice energy	0.60	0.55	No	Correct	Error	--
29	Gas stoichiometry	0.68	0.51	No	Correct	Error	--
30	KMT of gases	0.65	0.26	Yes	Correct	Correct	Correct
31	Ideal gas calculation	0.89	0.37	No	Correct	Correct	REVISED
32	Vapor pressure	0.39	0.33	No	Correct	Correct	Error
33	Phase changes	0.70	0.44	Yes	Correct	Correct	Correct
34	Inter. forces	0.40	0.41	No	Correct	Correct	Error
	Overall Score	0.69	0.42	44.1%	97.0%	66.6%*	68.1%**
	Numeric (N=15)	0.76	0.41	42.8%	93.3%	46.6%*	85.7%**
	Non-Numeric (N=19)	0.65	0.41	45.0%	100%	84.2%*	56.3%**

ChatGPT was used to answer questions from final exams administered in two general chemistry courses. Its success at solving problems was only 44%, a value well below the class average of 69%.

範例：使用ChatGPT回答兩門普通化學期末考試問題目，答題成功率僅44%，遠低於班級平均的69%。

Can microbial electrochemical system degrade PFAS?

Yes, microbial electrochemical systems (MES) have been shown to have the potential to degrade PFAS. MES use microorganisms to catalyze the transfer of electrons between an electrode and an organic substrate, which can lead to the degradation of the substrate. Studies have shown that certain microorganisms can degrade PFAS in MES, although the rate and extent of degradation can vary greatly depending on the specific PFAS and the conditions in which they are present. However, further research is needed to fully understand the mechanisms of PFAS degradation in MES and to optimize the process for practical applications.

Can you give a source of such study?

Sure, here is a source that demonstrates the potential of microbial electrochemical systems in degrading PFAS:

Liu, J., Xing, D., & Liu, J. (2021). Microbial electrochemical systems for the degradation of perfluoroalkyl substances (PFASs). *Chemosphere*, 270, 129011. <https://doi.org/10.1016/j.chemosphere.2020.129011>

This study provides an overview of the current state of research on the use of MES for the degradation of PFAS, including both laboratory-scale studies and pilot-scale demonstrations. The authors also discuss the challenges and opportunities for further development and application of MES for PFAS degradation.

A non-existent DOI, directing to an unrelated article. 不存在的DOI，指向不相關的文章

Fabricated and false information, especially on references and source links.

範例：ChatGPT捏造虛假的資訊，特別是參考文獻和來源連結。

Using Gen AI in Research: Cautions and Concerns

在研究中使用生成式AI：注意事項與擔憂

Low accuracy on specific topics

對於特定主題內容的
準確性較低

Prone to conceptual errors in
chemistry answers and explanations

在化學解答與解釋中
易出現概念性錯誤

Below-average chemistry student and
should not be relied upon totally

AI工具相當於
平均以下的化學學生，
不應被完全依賴

Generate false or fabricated
information

捏造錯誤或虛假的資訊

Removal of human wisdom and
judgment

消除了人類的智慧與判斷
力

Reduction in academic integrity,
decline in skills and abilities

遺失學術誠信，
技能及能力下降

Resources taken from:

上述內容整理自發表在以下**ACS**期刊上的相關文章：

- *Journal of Chemical Information & Modeling*
- *Journal of Chemical Education*
- *Environmental Science & Technology*
- *Precision Chemistry*
- *ACS Nano*

Will AI Kill the Review Article?

人工智慧會終結綜述文章嗎？



Precision Chemistry > Vol 3/Issue 6 > Article

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EDITORIAL | June 5, 2025

Will AI Kill the Review Article?

Juanjuan Jia*, and Jinlong Yang

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Subjects

Materials Materials Processing Materials Science Mathematical Methods Students

Precision Chemistry
Cite this: *Precis. Chem.* 2025, 3, 6, 295–296

<https://doi.org/10.1021/prechem.5c00051>

Published June 5, 2025

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Source: *Precision Chemistry*, 2025, 3, 6, 295–296, <https://pubs.acs.org/doi/10.1021/prechem.5c00051>

Will AI Kill the Review Article? Divergent Perspectives

AI會終結綜述文章嗎？多元觀點交鋒

Optimistic Views 樂觀觀點

- AI may revolutionize research synthesis.
AI可能徹底改變文獻綜述方式。
- Exceeds humans in summarizing & pattern-finding.
在總結與找出規律/模式上超越人類。
- Human-written reviews may decline.
人類撰寫綜述的重要性或降低。

Skeptical Views 質疑觀點

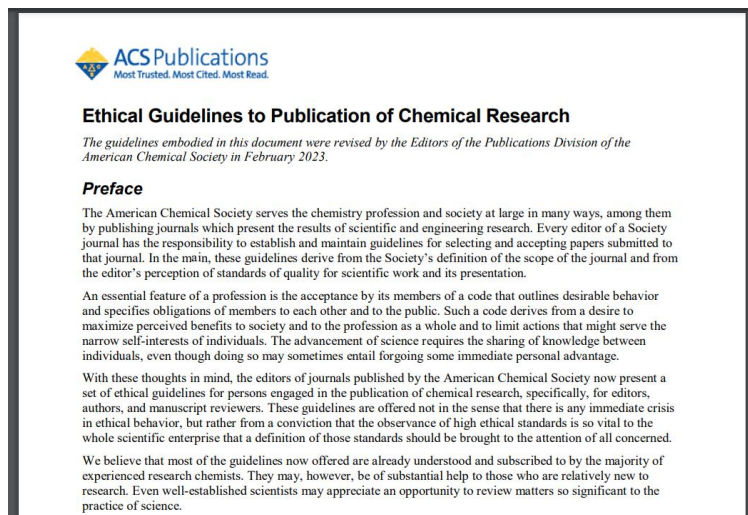
- Reviews are crucial to counter AI's shallow engagement.
綜述能彌補AI對文獻的淺層處理。
- Zero true "understanding" or novel insights.
缺乏真正「理解」與原創見解
- Human narratives have irreplaceable depth.
人類對研究的深度敘事無可取代。
- AI fabricates errors and lacks source discernment.
AI易生成錯誤且無法辨識文獻真偽。
- Risks misleading beginners without expertise.
可能誤導缺乏專業的新手。
- Misses older/less accessible research.
忽略冷門或不易檢索的研究。
- Flood of low-quality AI-generated reviews.
AI催生大量低品質自動化綜述。

ACS Ethical Guidelines & Author Guidelines

ACS出版倫理準則與作者指南

Can AI tools be considered an author or co-author for an article submitted to ACS journals?

向ACS投稿時，AI工具可被視為文章作者或合著者嗎？



12. The co-authors of a paper should be all those persons who have made significant scientific contributions to the work reported and who share responsibility and accountability for the results. Authors should appropriately recognize the contributions of technical staff and data professionals. Other contributions should be indicated in a footnote or an "Acknowledgments" section. An administrative relationship to the investigation does not of itself qualify a person for co-authorship (but occasionally it may be appropriate to acknowledge major administrative assistance). Deceased persons who meet the criterion for inclusion as co-authors should be so included, with a footnote reporting date of death. No fictitious name should be listed as an author or co-author. The author who submits a manuscript for publication accepts the responsibility of having the submitting author share the co-author's asse

Part B. Ethical Obligations of Authors
Ethical Guidelines to Publication of Chemical Research
截圖來源：《化學研究出版倫理准則》
第二部分“作者道德義務”

Author Guidelines



Journal of the American Chemical Society

Important Manuscript Submission Requirements and Notices

Scope of the Journal

Manuscript Types

ACS Publishing Center

Manuscript Preparation

Submit with Fast Format

Document Templates and Format

Acceptable Software, File Designations, and TeX/LaTeX

Cover Letter

Manuscript Text Com

Supporting Informatio

Research Data Policy

Data Requirements

Language and Editing

Preparing Graphics

Figure and Illustration

Preparing for Submission

Prior Publication Polic

Editorial Policies

Providing Potential Reviewer

Manuscript Transfer

Production And Publication

Proofs via ACS Direct Correct

Publication Date and Patent Dates

ASAP Publication

Post-Publication Policies

Sharing Your Published Article

Appendix 1: Preparing for Submission

Ethical Guidelines | OFAC Compliance | Safety Considerations | Conflict of Interest Disclosure | Plagiarism |

Authorship, Author List, and Coauthor Notification | Patent Activities and Intellectual Property | Open Researcher and Contributor ID (ORCID) | Copyright and Permissions | Funder Reporting Requirement | Open Access Compliance |

Appendix 2: Preparing Graphics

Resolution | Size | Color | Types of Graphics | Table of Contents (TOC)/Abstract Graphic | Figures | Charts | Tables | Schemes | Chemical Structures | Cover Art | Web Enhanced Objects (WEO)

Criteria for authorship can be found in Part B of the [Ethical Guidelines to Publication of Chemical Research](#). Artificial intelligence (AI) tools do not qualify for authorship. The use of AI tools for text or image generation should be disclosed in the manuscript within the Acknowledgment section with a description of when and how the tools were used. For more substantial use cases or descriptions of AI tool use, authors should provide full details within the Methods or other appropriate section of the manuscript.

Author Guidelines | Appendix 1: Preparing for Submission | Authorship, Author List, and Coauthor Notification
截圖來源：ACS期刊“作者指南”附錄1：投稿前準備 | 作者身份、作者名單及合著者通知

Can AI tools be considered an author or co-author for an article submitted to ACS journals?

向ACS投稿時，AI工具可被視為文章作者或合著者嗎？

- ChatGPT or other tools do not meet our authorship criteria.
ChatGPT或其他AI工具不符合我們的作者身份標準
- The use of such tools should be disclosed in the manuscript.
若使用了AI工具，應在稿件中據實聲明
- Authors are ultimately accountable for what they submit.
作者應對其所提交的稿件內容負最終責任
- AI-generated text should be cited appropriately.
AI生成的文字應被恰當引用

Best Practices for Using AI When Writing Scientific Manuscripts

將AI工具用於學術論文寫作的最佳實踐



ACS Nano > Vol 17/Issue 5 > Article

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EDITORIAL | February 27, 2023

Best Practices for Using AI When Writing Scientific Manuscripts

Caution, Care, and Consideration: Creative Science Depends on It

Jillian M. Buriak*, Deji Akinwande, Natalie Artzi, C. Jeffrey Brinker, Cynthia Burrows, Warren C. W. Chan, Chunying Chen, Xiaodong Chen, Manish Chhowalla, Lifeng Chi, William Chueh, Cathleen M. Crudden, Dino Di Carlo, Sharon C. Glotzer, Mark C. Hersam, Dean Ho, Tony Y. Hu, Jiaxing Huang, Ali Javey, Prashant V. Kamat, Il-Doo Kim, Nicholas A. Kotov, T. Randall Lee, Young Hee Lee, Yan Li, Luis M. Liz-Marzán, Paul Mulvaney, Prineha Narang, Peter Nordlander, Rahmi Oklu, Wolfgang J. Parak, Andrey L. Rogach, Mathieu Salanne, Paolo Samori, Raymond E. Schaak, Kirk S. Schanze, Tsuyoshi Sekitani, Sara Skrabalak, Ajay K. Sood, Ilja K. Voets, Shu Wang, Shutao Wang, Andrew T. S. Wee, and Jinhua Ye

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Cite this: *ACS Nano* 2023, 17, 5, 4091–4093
<https://doi.org/10.1021/acsnano.3c01544>
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Source: *ACS Nano*, 2023, 17, 5, 4091–4093, <https://pubs.acs.org/doi/10.1021/acsnano.3c01544>

Recommendations for the use of AI language bots for scientific communication

對於使用AI語言機器人進行科學交流的一些建議

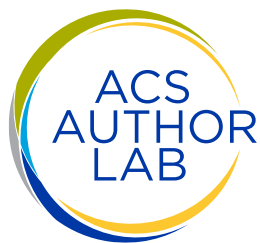
- In the Acknowledgments and experimental sections, your use of an AI bot/ChatGPT to prepare your manuscript.
在致謝和實驗部分中明確說明您使用AI機器人/ChatGPT準備稿件
- Remind your coauthors, and yourself, that the output of the ChatGPT model is merely a very early draft, at best.
提醒合著者與自己，ChatGPT模型的輸出只是最初的草稿
- Do not use text verbatim from ChatGPT.
不要逐字逐句地使用來自ChatGPT的文字
- Any citations recommended by an AI bot/ChatGPT need to be verified with the original literature.
任何由AI機器人/ChatGPT推薦的引用都需要通過原始文獻進行驗證
- Do not include ChatGPT or any other AI-based bot as a co-author.
不要將ChatGPT或任何其它基於AI的機器人列為共同作者
- ChatGPT cannot be held accountable for any statement or ethical breach.
ChatGPT不能對任何陳述或倫理違規負責
- Do not allow ChatGPT to squelch your creativity and deep thinking.
不要讓ChatGPT扼殺您的創造力和深度思考

ACS Resources for Authors

ACS作者資源

Author and Reviewer Resources

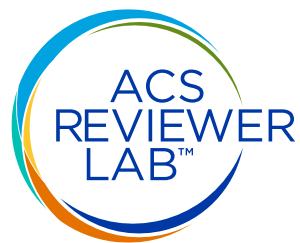
作者與同儕評議資源



ACS Author Lab

- Free course to enhance submitted manuscripts and avoid errors that lead to delays in publication

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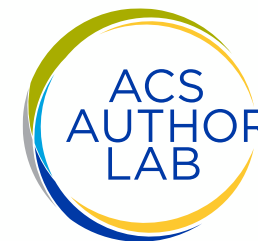
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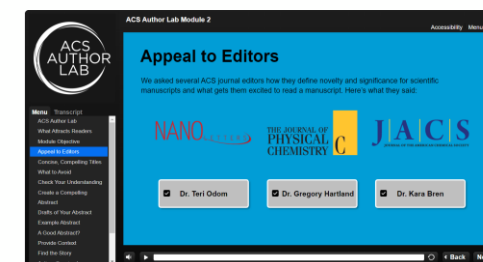
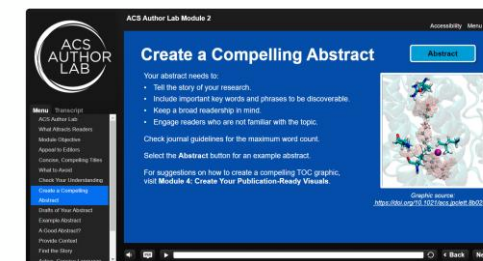
Author and Reviewer Resources

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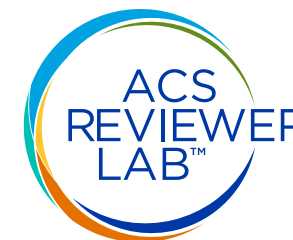
ACS Author Lab是由8個學習模組組成的免費線上學習課程，幫助學習者有效掌握撰寫和發表稿件的重要知識。模組內容包括：

- ▶ Selecting the right journal
- ▶ Showcasing the significance of your work
- ▶ Effectively describing your research
- ▶ Creating publication-ready visuals
- ▶ Finalizing your manuscript and preparing for submission
- ▶ Navigating the revision process
- ▶ Adhering to ethical guidelines
- ▶ An academic writing approach for multilingual authors



Author and Reviewer Resources

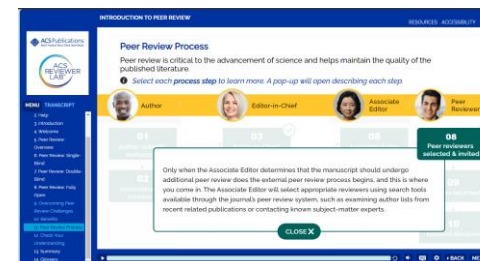
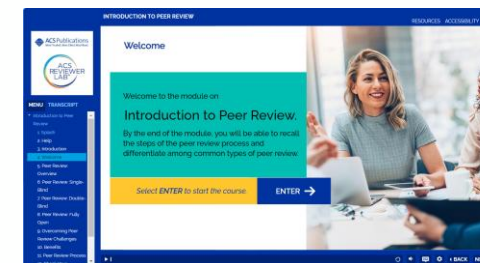
ACS Reviewer Lab



ACS Reviewer Lab是專為科研人員開發的、免費的同行評審線上學習課程，包含6個互動模組，支援中英文雙語。

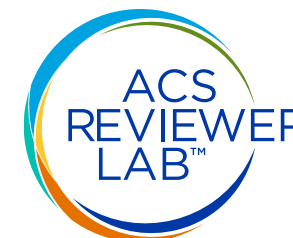
課程涵蓋同儕審查的知識要點和最佳實踐，幫助提升科研學者的評審能力，深入瞭解期刊編輯對高品質文章的要求，以掌握寫作和回應建設性評論的必備知識。

- ▶ Introduction to peer review
- ▶ Ethics in peer review
- ▶ Preparing for review
- ▶ Assessing significance and technical quality
- ▶ Assessing presentation and readiness for publication
- ▶ Writing your review



Author and Reviewer Resources

ACS Reviewer Lab



- Complete all 6 modules to unlock the final assessment. Earn a badge in your ACS Paragon Plus account, visible to ACS journal editors when inviting reviewers.

完成6個模組後將解鎖最終評估，並於您的ACS Paragon Plus帳戶中取得一枚徽章，供ACS期刊編輯於邀請審稿人時在系統中查看。

FINAL ASSESSMENT

The Final Assessment helps you evaluate your knowledge of the material covered throughout the course. Please note that this assessment will remain as 'read only' until you have completed all course material and exercises. Once you have successfully completed the material, and are comfortable with what you have learned, the Final Assessment will then be available for you to complete.

Choose the right answers for each question below.

通過最終測評

電子證書



ACS Paragon Plus

RL ACS Reviewer Lab

加入ACS審稿
專家儲備庫

豐富學者
個人學術名片

ORCID
Connecting research and researchers

ACS Guide to Scholarly Communication

《ACS學術交流指南》

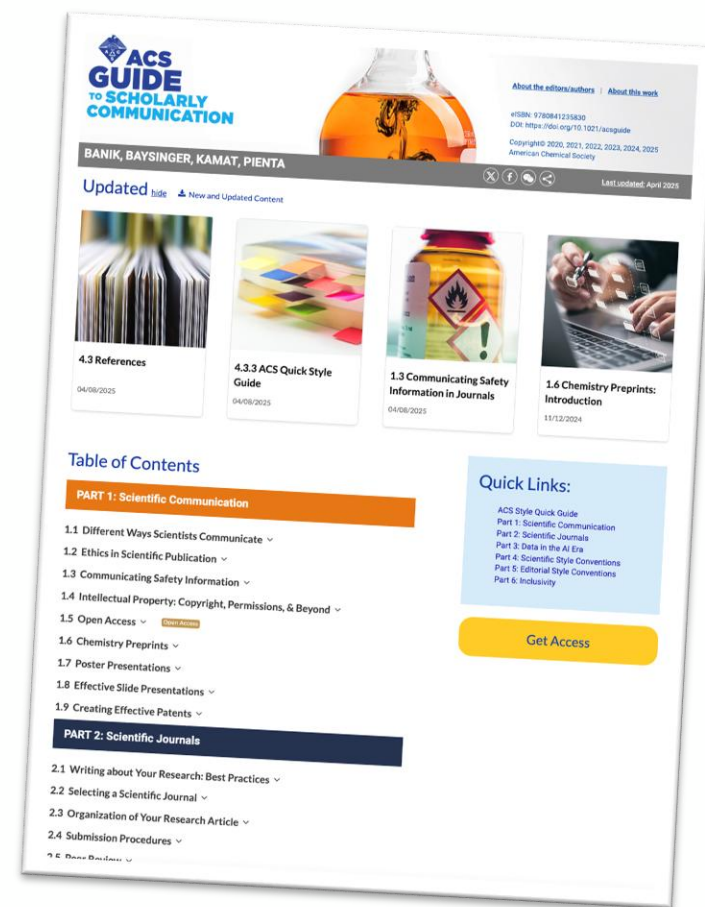
A must-have guide to clear and compelling scientific storytelling

清晰有力的科學敘事必備指南

Comprehensive. Authoritative. Essential. 全面涵蓋 · 權威指引 · 必備典藏

The *ACS Guide to Scholarly Communication* is more than a style guide—it's a comprehensive resource for writing, presenting, and sharing science clearly and professionally.

《ACS學術交流指南》不僅是一本寫作格式指南，更是協助您清晰、專業地撰寫、發表與分享科學研究成果的全面性資源。



Extensive Topical Coverage Across All Forms of Scholarly Communication

廣泛涵蓋各類學術交流主題

- Journal authoring topics
期刊撰稿主題
- Essential styling conventions
基本格式規範
- Various forms of scientific communication beyond published works
期刊論文以外的科學表達途徑
 - ▶ Posters and conference presentations
海報與會議演講報告
- Safety communication
實驗室安全溝通
- Preprints
預印本

And more...

以及其他更多內容.....

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PART 1: Scientific Communication

- 1.1 Different Ways Scientists Communicate ▾
- 1.2 Ethics in Scientific Publication ▾
- 1.3 Communicating Safety Information ▾
- 1.4 Intellectual Property: Copyright, Permissions, & Beyond ▾
- 1.5 Open Access ▾ [Open Access](#)
- 1.6 Chemistry Preprints ▾
- 1.7 Poster Presentations ▾
- 1.8 Effective Slide Presentations ▾
- 1.9 Creating Effective Patents ▾

PART 2: Scientific Journals

- 2.1 Writing about Your Research: Best Practices ▾
- 2.2 Selecting a Scientific Journal ▾
- 2.3 Organization of Your Research Article ▾
- 2.4 Submission Procedures ▾
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PART 3: Data in the AI Era

- 3.0 Data in the AI Era: An Introduction ▾ [Open Access](#)
- 3.1 Data Sharing ▾
- 3.2 Chemical Structures in the AI Era ▾
- 3.3 Digital Chemical Data ▾

PART 4: Scientific Style Conventions

For Students...

對於學生而言.....



- Get clear answers to common questions
掌握常見問題的明確解答
 - ▶ How do I begin an essay?
我該如何開始撰寫一篇論文？ (§ 2.1.3, § 2.1.4)
 - ▶ How do I organize my article?
我的文章該如何組織架構？ (§ 2.3)
 - ▶ How do I present my research in different settings?
在不同場合中，我該如何呈現研究成果？ (§ 1.1, § 1.7, § 1.8)
 - ▶ How can I add pictures, videos, and other cool stuff to my research?
如何在研究中加入圖片、影片及其他多媒體元素？ (§ 4.1, § 4.2)
 - ▶ Why are research ethics important?
為何研究倫理至關重要？ (§ 1.2)
- Learn from clear examples and apply independently
透過清晰範例學習，並獨立應用
- Build skills that go beyond the classroom
培養超越課堂的實用能力

For Instructors... 對於教師而言.....



- A reliable reference to guide students' learning
可靠的教學參考依據，引導學生學習
- Reinforce consistent standards in writing and formatting
協助建立一致的寫作與格式標準

For Librarians...

對於圖書館員而言.....



- A ready-made tool to support information literacy
現成的工具，支援資訊素養教育
- Use it to answer citation and formatting questions
可用以解答引用與格式相關疑問
- Recommend it as a trusted resource for science communication
推薦為科學溝通領域值得信賴的權威資源

Regular Updates to Adapt to the Evolving Research Landscape 研究環境不斷變遷，指南內容同步更新

- The Guide is constantly examined and updated to meet the needs of scientists, educators, and librarians and to adapt to the evolving research landscape.
本指南持續進行審查與更新，以滿足科學家、教育工作者與圖書館員的需求，並緊扣不斷演進的研究環境。
- Users have access to the most current and relevant information, reflecting the latest trends and best practices in scientific research.
讀者可隨時取得最新且切合實際的資訊，掌握科學研究領域的最新趨勢與最佳實務。



The screenshot displays the ACS Guide to Scholarly Communication website. At the top, the title "ACS GUIDE TO SCHOLARLY COMMUNICATION" is visible, along with the authors' names: BANIK, BAYSINGER, KAMAT, PIENTA. The page is dated "Last updated: August 2024". A "Updated" section highlights four new articles, each with a thumbnail image and a title:

- 1.6 Chemistry Preprints: Introduction (11/12/2024)
- 1.6.2 What Is a Preprint? (11/12/2024)
- 1.6.4 Concerns about Preprints (11/12/2024)
- 1.6.6 Citing Preprints in Scholarly Writing (11/12/2024)

Below the updates, a "Table of Contents" section is shown, listing various topics under "PART 1: Scientific Communication", including "1.6 Chemistry Preprints".

Continuously updated to reflect the best practices in scientific communication
持續更新，反映科學溝通的最佳實務

New Publisher Position on Using & Citing AI/Gen AI

New 出版社關於使用與引用AI / 生成式AI的立場聲明

([4.3.1](#), [4.3.3](#), [4.3.6](#))

Identifying the Source Type

Knowing the document type (or source type) is critical to accurately formatting a citation. With so much of the literature now published electronically and available online, determining which citation format to use can be confusing. [Table 4.3.1](#) identifies key characteristics of various source types to allow users to cite documents correctly. The table links detailed examples in

[Citation for a New Content Type.](#)

Artificial Intelligence (AI)/Generative Artificial Intelligence (Generative AI)

Researchers should check publisher guidelines on using and disclosing generative AI in manuscripts. Students should consult instructors on its permitted use and required disclosures in coursework. The following formats are suggested if the author or student chooses to or is required to include AI in their list of references. However, such citations are no substitute for a more detailed disclosure within the work itself, including identification of prompts.

Source type	Example
chatbot	<ul style="list-style-type: none">• <i>ChatGPT-4o</i> (OpenAI)• <i>Gemini</i> (AI Chatbot)
image generator	<ul style="list-style-type: none">• <i>Craiyon v3</i> (AI Image Generator)• <i>Copilot Design</i> (AI Image Generator)

REFERENCES

Deriving a Citation for a New Content Type



Teri Vogel



Susan Cardinal



Donna Wrublewski



Nancy Butkovich



Grace Baysinger

<https://doi.org/10.1021/acsguide.40306>

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2025 Spring Updates

2025年春季更新內容


Explore the 2025 updates and enhancements at
立即探索2025年最新更新與優化內容：

<https://axial.acs.org/publishing/the-acsguide-to-scholarly-communication-read-the-latest-updates-for-effective-communication>

Updates coming October 2025:

預計2025年10月將推出以下更新：

- Open Access 開放取用
- Submission Guidelines 投稿指南
- Post-submission Guidelines 投稿後指引



ACS REFERENCE WORKS

ACS GUIDE TO SCHOLARLY COMMUNICATION

November 2024 & April 2025 updates

1.6 Chemistry Preprints (original chapter published January 2020)
Updates to reflect the evolution of preprints as a means for scholarly communication

- ChemRxiv statistics and growth.
- Top preprint benefit.
- Select preprint server table.
- New coverage on preprint concerns, perceived and real.
- New coverage on manuscript types found in preprints.

4.3 References (original chapter published January 2020, updated March 2022)
Expanded ACS Style Quick Guide (Open Access) now has twice the number of examples and greater variety of citations included.

- Added twice the number of examples.
- Added new citations covering artificial intelligence/generative AI, datasets, software and program code, and social media.

Updated citations: large language models and generative AI chatbots.

- Citing Large Language Models and Generative AI Chatbots section now a part of 4.3.6. ACS Policy regarding transparency, authorship, graphics, journal cover art, and Table of Contents graphics now included.
- The timely section also covers how to write about AI in scholarly research, with examples of citing it in methods, acknowledgments, and supporting information with ten real-world examples.

Simplified formatting guidelines to support students new to citations.

- Article title capitalization rules relaxed.
- Journal titles names allowed in full name or abbreviated format.
- Access dates for URL-based sources no longer required.
- Patent number commas removed for consistency among patent offices.
- DOI hyperlinks now required to improve efficiency.

Clarification for Copyrighted Graphics & Tables Credits

- 4.3.2 on Captions and Credit Line for Graphics now clarifies attribution to help researchers distinguish the differences between public domain images, licensed content, and figures requiring permission.

All pages now clearly reflect the dynamic nature of the content which is updated and expanded at least two times per year. Every content page lists the date of publication as well as date of updates (if applicable).

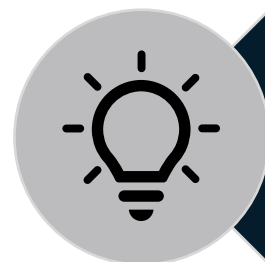
A Wealth of Benefits That Extend Beyond Publication 效益超越出版本身，價值全面延伸

ACS Guide to Scholarly Communication offers readers a range of advantages that go beyond publication. It fosters a deeper understanding of academic training, builds core writing and research skills, and cultivates critical thinking and problem-solving abilities. Moreover, it empowers readers with the confidence to present their ideas and engage audiences—skills highly valued in both academic pursuits and professional careers.

《ACS學術交流指南》為讀者帶來遠超於論文發表的多元裨益。它深化學術交流的認知，建構核心寫作與研究能力，並培養批判性思考與解決問題的實力。更重要的是，它賦予讀者清晰表達觀點、有效吸引聽眾的信心，這些能力無論在學術發展或職業生涯中，皆備受重視。



Deepen the knowledge of
scholarly communication
深化學術溝通知識



Writing and Research Skills
提升寫作與研究技能



Critical thinking & problem
solving
強化批判性思考與問題
解決能力

Sample Reading Assignment on Research Ethics

研究倫理閱讀教學範例

READING ASSIGNMENT

Understanding Research Ethics in Scholarly Communication

STUDENT WORKSHEET

As student researchers, you often learn how to cite sources, but understanding why we do it is just as important. Ethical research goes far beyond avoiding plagiarism. It's about protecting the integrity of science, respecting the work of others, and building your own credibility as a scholar.

This reading assignment is designed to help you explore the bigger picture of research ethics. You'll reflect on your responsibilities not only as a student today, but also as a future contributor to the scientific community.



Challenge 1: Literature Research

Read the suggested articles from the ACS Guide to Scholarly Communication (section 1.2). For each of the following questions, provide an answer and cite the source of your information in ACS style.

- What are three examples of unethical behavior in scientific research that were discussed in the reading?
- Name one specific action you can take to avoid plagiarism when writing your own papers.
- Why is it wrong to leave out or hide data, even if your final conclusion is accurate?
- What problems can happen when someone is listed as an author who didn't contribute to the research?
- What's the difference between a correction and a retraction in a scientific journal article?



Challenge 2: Case Study

Find a real-world example of an ethical issue or conflict in scientific research. Use a reputable source such as:

- News articles or press releases from established outlets
- Editorials from scholarly journals
- Case studies published by academic institutions
- Articles from well-known science or research blogs

In your own words, write a short summary (about 150-200 words) that includes:

- What happened – briefly describe the situation.
- What ethical issue(s) were involved – explain the main concern (e.g., plagiarism, data manipulation, authorship disputes).
- What the consequences were – describe the impact on the researchers, the institution, or the public.

Be sure to cite your source using ACS Style, including a full reference and an in-text citation if applicable.

Suggested Reading

This reading list is designed to provide a solid foundation to help answer these challenges, but we encourage you to search and explore beyond these suggestions.

- 1.2.1 The Need for Ethics in Scholarly Communication
- 1.2.2 A Brief Overview of the Publication Process
- 1.2.3 Ethical Responsibilities of Authors
- 1.2.6 Ethical Responsibilities after Publication
- 1.2.7 Additional Resources



Take it Further: Understanding Copyright

Ethical research isn't just about avoiding plagiarism—it also means respecting the intellectual property of others. Copyright law plays an important role in research ethics, and it's something every student and scientist needs to understand in order to use and share content responsibly.

Read an ACS ebook chapter—**Misconceptions about Copyright and Permissions**, or explore a reputable resource such as the U.S. Copyright Office website or your university library's copyright or fair use guide.



Write a short reflection (about 200-400 words) that includes:

- What you learned – Summarize the key points about copyright and/or fair use.
- Why it matters – Explain how this connects to ethical research and your responsibilities as a student.
- Your takeaways – Share one or two things you'll keep in mind when using or sharing content in your academic work.

Be sure to cite your source using ACS Style.

pubs.acs.org/ACSguide

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Most Trusted. Most Cited. Most Read.



Learn more about this reading assignment and download the worksheet at:
進一步了解此範例內容並下載學習工作表：
<https://axial.acs.org/chemistry-education/building-a-strong-foundation-in-research-ethics-with-the-acsguide>



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