AI Agent时代下的图书馆学科服务与资源建设

科睿唯安的实践分享

王炜 2025年5月 武汉

学术界的AI：变化无处不在

科研人员和
科研管理人员

图书馆馆员

学生

模拟和建模　　数字化转型　　混合学习　　数字素养

掠夺性出版　　科研诚信　　数据安全　　个性化学习　　在线培训

开放科学　　图书馆 ROI　　数据隐私　　内容生成

AI
在创新和伦理中的平衡

跨学科合作　　知识产权　　文献综述

图书馆的生存危机？

兰开斯特，F.W.

Toward paperless information systems

THE REVIEW

Academic Library Autopsy Report, 2050

By Brian T. Sullivan | January 2, 2011

"Insensible of mortality, and desperately mortal."
—Shakespeare

The academic library has died. Despite early diagnosis, audacious denial in the face of its increasingly severe symptoms led to its deterioration and demise. The academic library died alone, largely neglected and forgotten by a world that once revered it as the heart of the university. On its deathbed, it could be heard mumbling curses against Google and something about a bygone library guru named

信息时代下图书馆的存废之争与革新方向

文艺碎片 2025-04-09 02:18 江西

以后不再需要图书管理员？这个曾令人羡慕的职业正面临威胁

新京报 2024-07-11 20:10

网络时代，图书馆的价值何在？

光明日报 2023-04-21 22:31

计算机普及

互联网兴起

AI

图书馆的生存危机？

- 数字转型
- 电子阅览室
- 多元需求
- **信息与数据服务**

- 资源管理
- 共享空间
- 情报服务
- **信息中介**（版权/质量/安全/公平）

AI对高校图书馆资源建设的影响——来自WOSRA

文献综述：新技术下的图书馆发展趋势

引言

随着数字技术的迅猛发展，图书馆在信息和知识共享、信息素养提升、技术创新、个性化服务和数据融合等方面面临着前所未有的挑战和机遇。本综述旨在探讨近年来图书馆在这些领域的发展趋势，并识别相关的研究热点和空白。

信息和知识共享

- **社交技术促进知识共享**：研究表明，社交技术如WhatsApp和Facebook在知识共享中发挥重要作用，并对图书馆服务创新产生积极影响[Soomro et al., 2024]。
- **知识共享策略的重要性**：在学术图书馆中，知识共享被认为是提升服务创新的重要因素，信息技术和管理创新在这一过程中起到中介作用[Khalil et al., 2024]。

信息素养提升

- **数字素养技能的提升**：非洲的图书馆专业人士在基本数字素养技能上表现良好，但在高级技能上仍需提高[Subaveerapandiyan et al., 2024]。
- **信息素养教育的重要性**：研究显示，将信息素养纳入课程对提升学生的信息技能至关重要，尤其是在快速变化的数字环境中[Hossain & Sormunen, 2023]。

技术创新

- **远程学习中的技术创新**：在英国的高等教育中，数字图书馆服务的创新实践包括异步信息素养教学和Python脚本用于审核课程材料[Cleverley, 2024]。
- **区块链技术在知识共享中的应用**：研究开发了一种基于区块链的参数化模型库，以实现建筑信息建模中的知识共享[Hsu et al., 2023]。

个性化服务

- **个性化学习服务的实施**：通过集成AI学习伙伴系统和Mandala Chart框架，提高大一新生的信息素养自我效能和自我调节学习感知[Hu et al., 2024]。
- **用户导向的服务设计**：强调通过用户反馈和需求分析，设计个性化服务以满足不同用户群体的特定需求[Ganesan & Gunasekaran, 2022]。

数据融合

- **数据整合以提升服务质量**：通过整合大数据和数据挖掘技术，图书馆能够更好地分析用户需求并优化信息素养教育[Chen et al., 2024]。
- **图书馆项目管理中的数据整合**：在欧盟项目中，图书馆通过信息素养技能的应用，成功管理国际项目，并提升了项目管理能力[Wiorogorska, 2024]。

结论

综上所述，图书馆在新技术的推动下，正在积极探索信息和知识共享、信息素养提升、技术创新、个性化服务和数据融合等领域的发展路径。然而，仍有一些研究空白需要填补，例如如何在不同文化背景下实施这些创新技术，以及在资源有限的情况下如何优先发展哪些技术。

信息与知识共享

信息素养提升

技术与服务创新

个性化服务

新技术下的图书馆服务新趋势

信息与知识共享
开放科学
多元文献
从所有者到共享者

技术与服务创新
内部流程提升
外部展示扩大

信息素养提升
科研效率
科研效果

个性化服务与体验
融合更多数据
符合学科特色的多元评估
团队定制化服务

学术世界里的科睿唯安

Highly Cited Researcher

Clarivate™

JOURNAL CITATION REPORTS

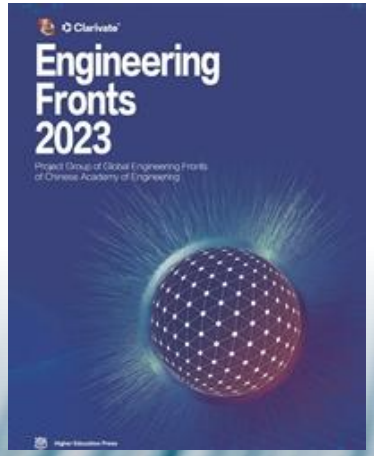
Clarivate

JOURNAL IMPACT FACTOR

2024 Academic Ranking of World Universities

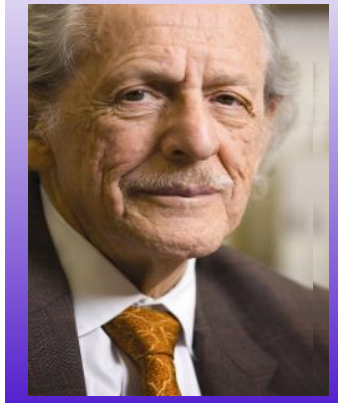
2024

The Academic Ranking of World Universities (ARWU) was first published in June 2003 by the Center for World-Class Universities (CWCU), Graduate School of Education (formerly the Institute of Higher Education) of Shanghai Jiao Tong University, China, and updated on an

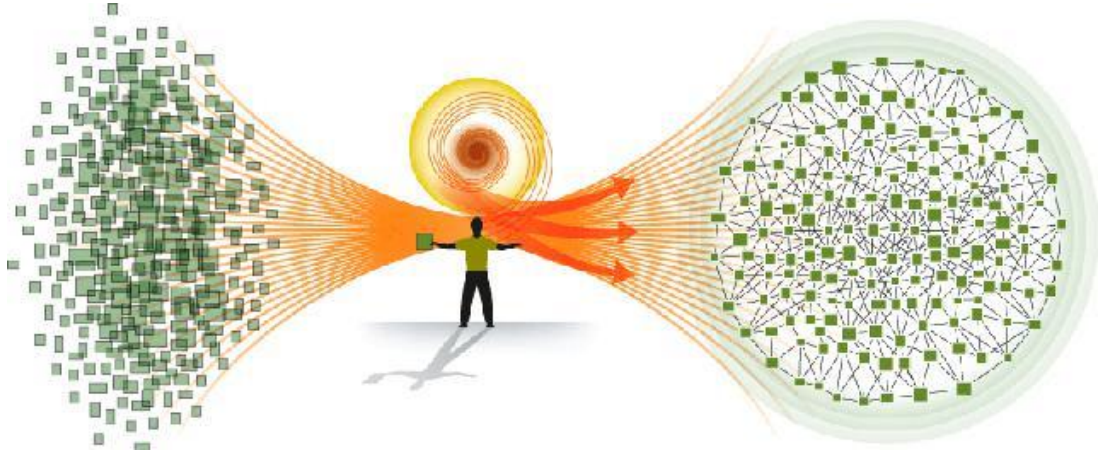


Clarivate™

用文献连接未来与过去



Dr. Eugene Garfield
（1925-2017）
Founder & Chairman Emeritus
ISI, Thomson Scientific



ISI was the founding company of all of Clarivate and is was the heart of what is now SAR. It was THE place where cutting edge and responsible research metrics were developed. It not only led the market – it shaped the market.

Institute for Scientific Information

回到未来

- Citation
- Impact Factor
- Highly Cited Paper
- ESI-Top 1%
- CNCI
- Highly Cited Researchers

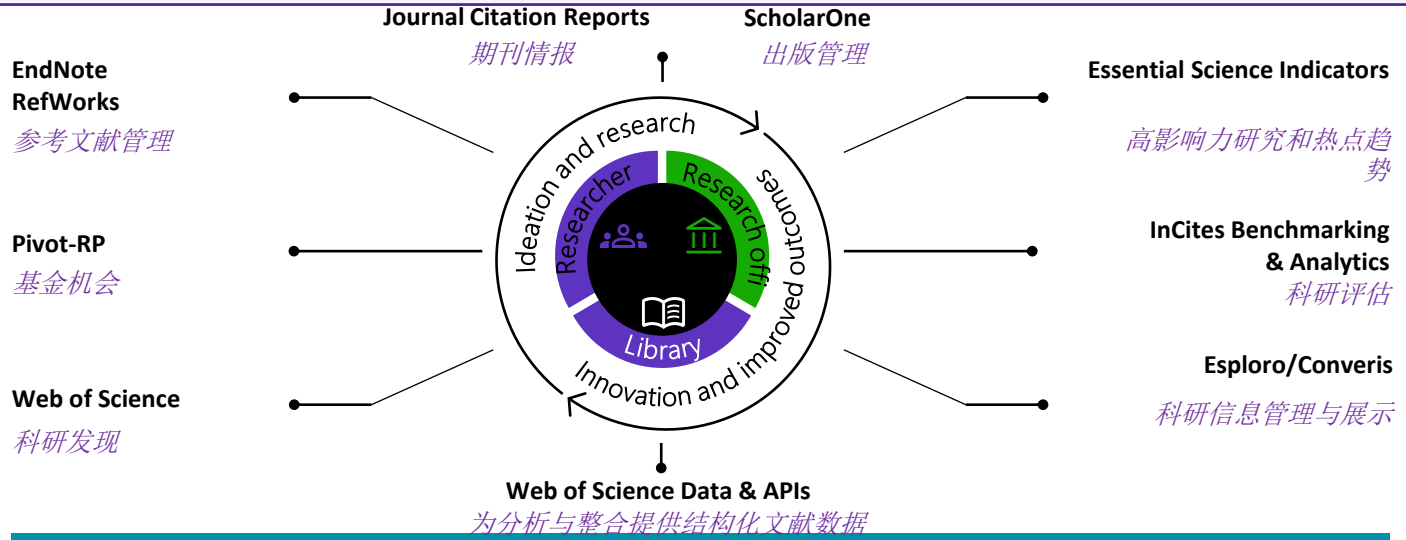
全新的科睿唯安: 我们提供广泛的解决方案去促进卓越科研和优质教学

	研究与分析	集成化内容	工作流
聚焦领域	分析与挖掘学术研究的全景，以及科研信息管理	为机构用性价比最高的方式提供广泛的集成内容	用软件工具去管理学术资源和服务，连接终端终端用户
主要解决方案	Web of Science, InCites, EndNote, RefWorks, pivot, Esploro, Converis, ScholarOne	ProQuest ONE Academic, ProQuest Ebook Central, ProQuest Dissertations & Theses Global, Academic Video Online, ProQuest RIALTO	Alma, Primo, POLARIS, Sierra, Summon, Vega, RapidILL, Leganto

99%
of the world's top 400 universities

26,000+
libraries in 145+ countries

130M+
students and researchers globally rely on our solutions to advance research



Clarivate™

Web of Science Editorial | Institute for Scientific Information (ISI) | RP-News | Consulting

检索增强生成技术（RAG）架构:

自然语言查询

结果

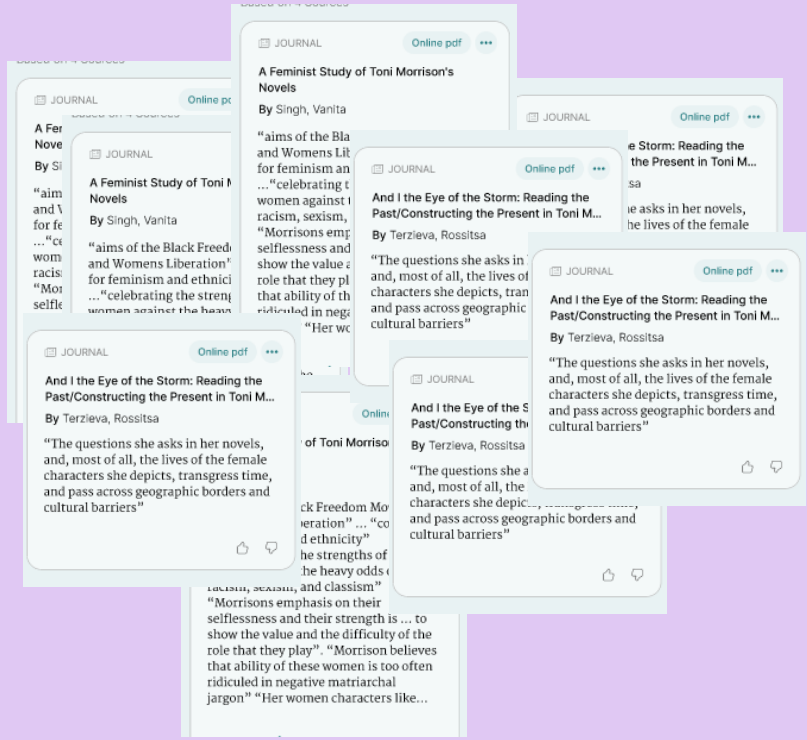
提示词

用户

预训练的大语言模型 (LLM)

概述回答
参考引用
元数据
…

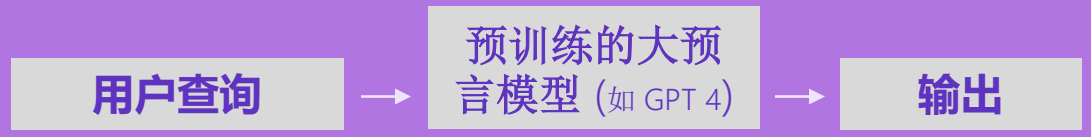
Clarivate 内容:
CDI, WoS, ProQuest One, EBC



通用生成式人工智能

训练数据: "互联网"

- 不具体、不透明
- 但是可以有效地训练大语言模型:
  - 理解模式
  - 创建连贯的文本输出
  - 翻译

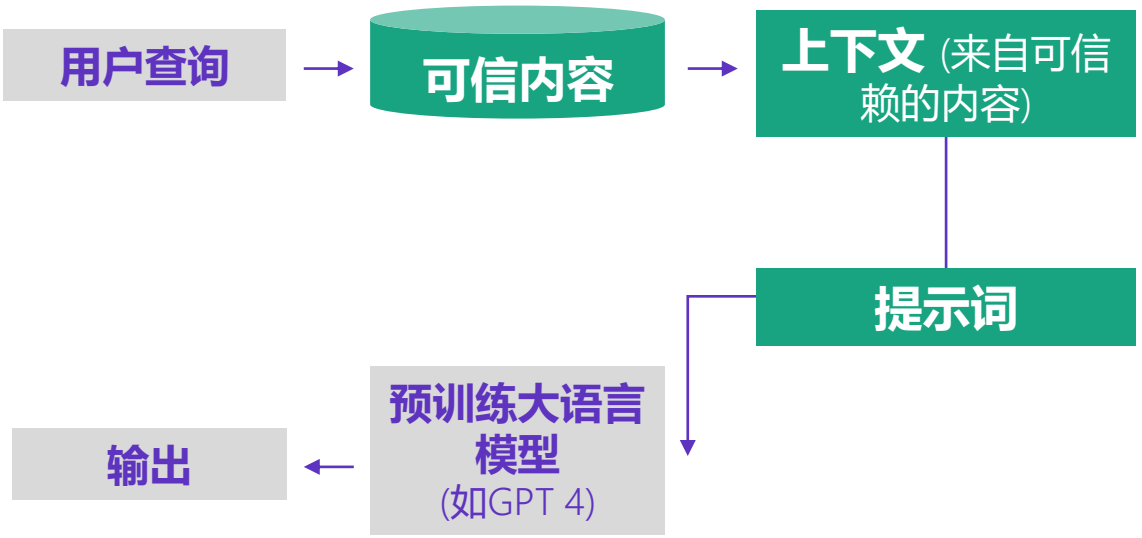


学术AI——将输出建立在可信内容上

基于经过学术审查内容进行输出

- 为输出提供事实和信息
- 最大限度地减少幻觉和其他问题

检索增强生成 (RAG):



Clarivate™

学术AI的下一波浪潮已来

浪潮一

AI/机器学习

- 任务自动化
- 个性化推荐

举例: 引文提取

浪潮二

生成式AI

- AI助手
- 情境化知识
- 引导式工作流

举例：WOS研究助手

浪潮三

AI Agents

- 推理与规划
- 基于目标的行动
- 整合多来源信息
- 自动化多步骤流程执行复杂任务

举例：WOS研究助手文献综述2.0
WOS Research Intelligence

2021 2025

Clarivate™

新技术下的图书馆服务新趋势

信息与知识共享
开放科学
多元文献
从所有者到共享者

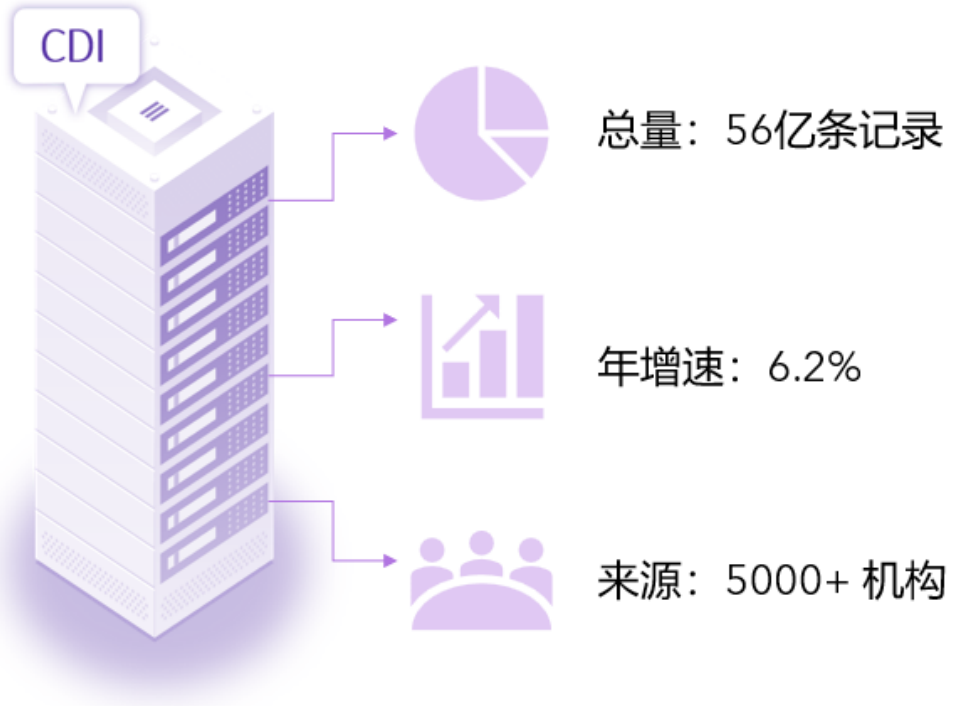
技术与服务创新
内部流程提升
外部展示扩大

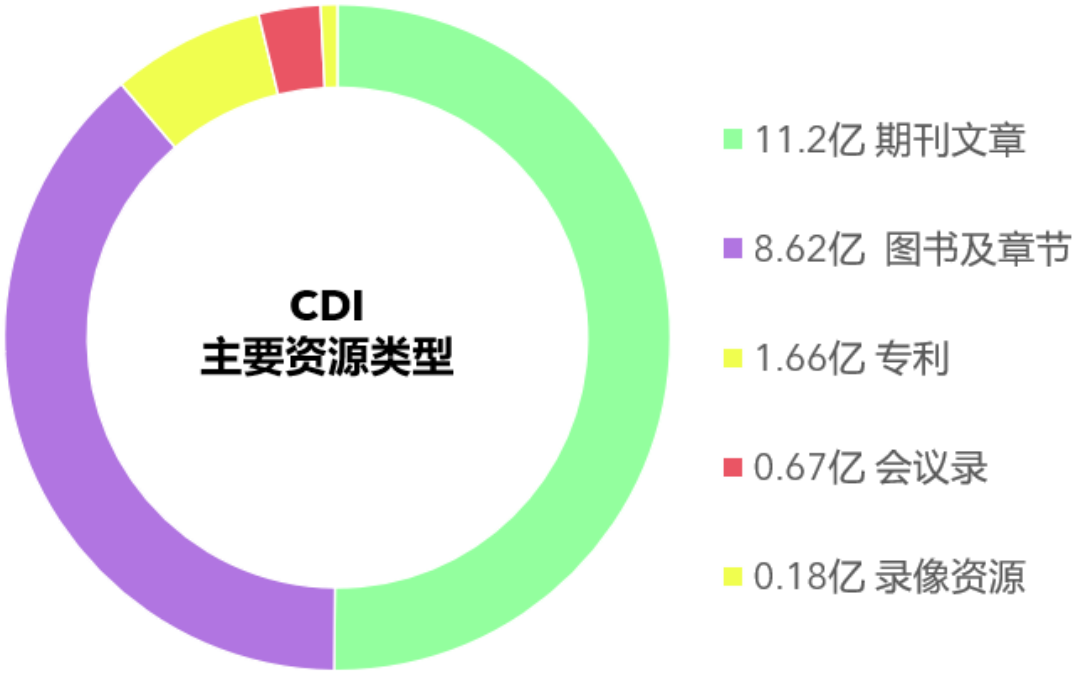
信息素养提升
科研效率
科研效果

个性化服务与体验
融合更多数据
符合学科特色的多元评估
团队定制化服务

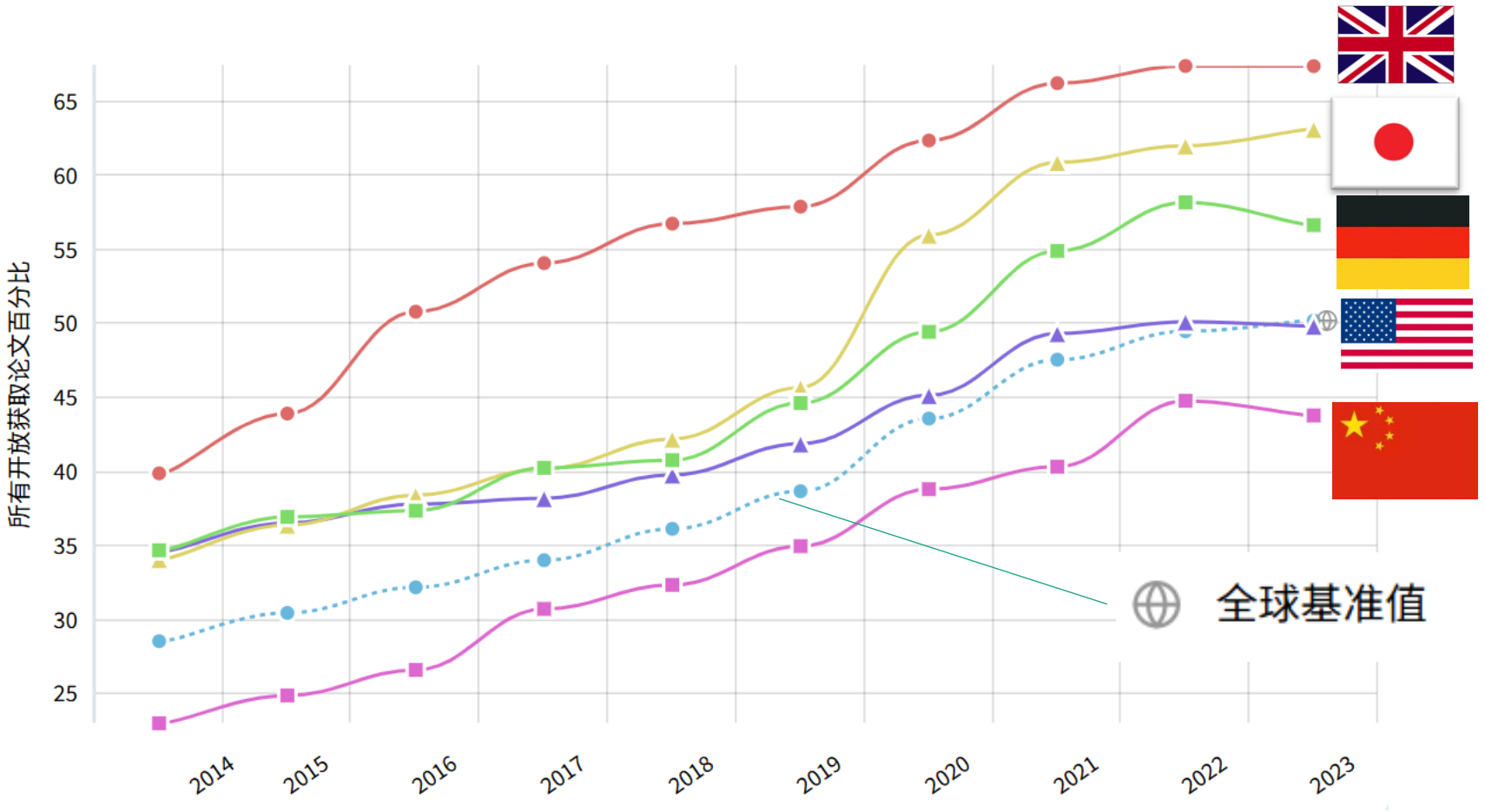
海量增长的全球文献

- CDI 中央索引库





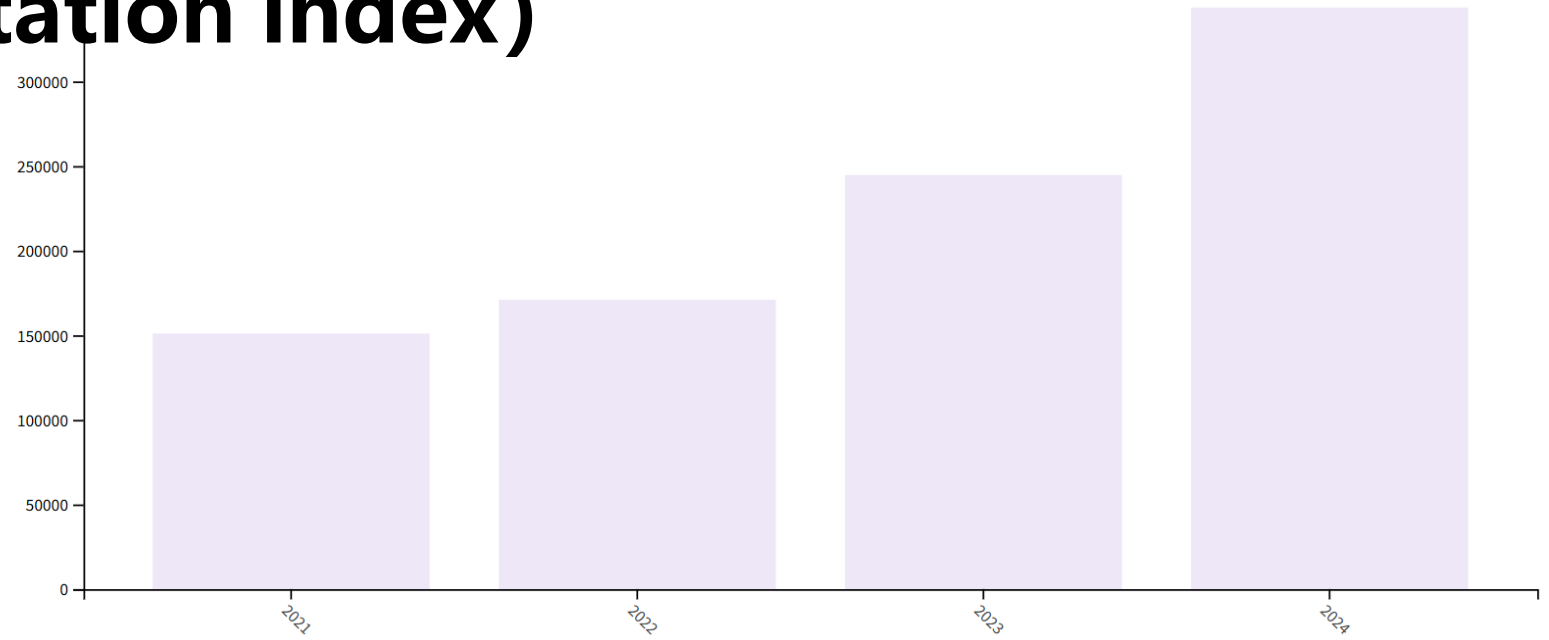
开放获取



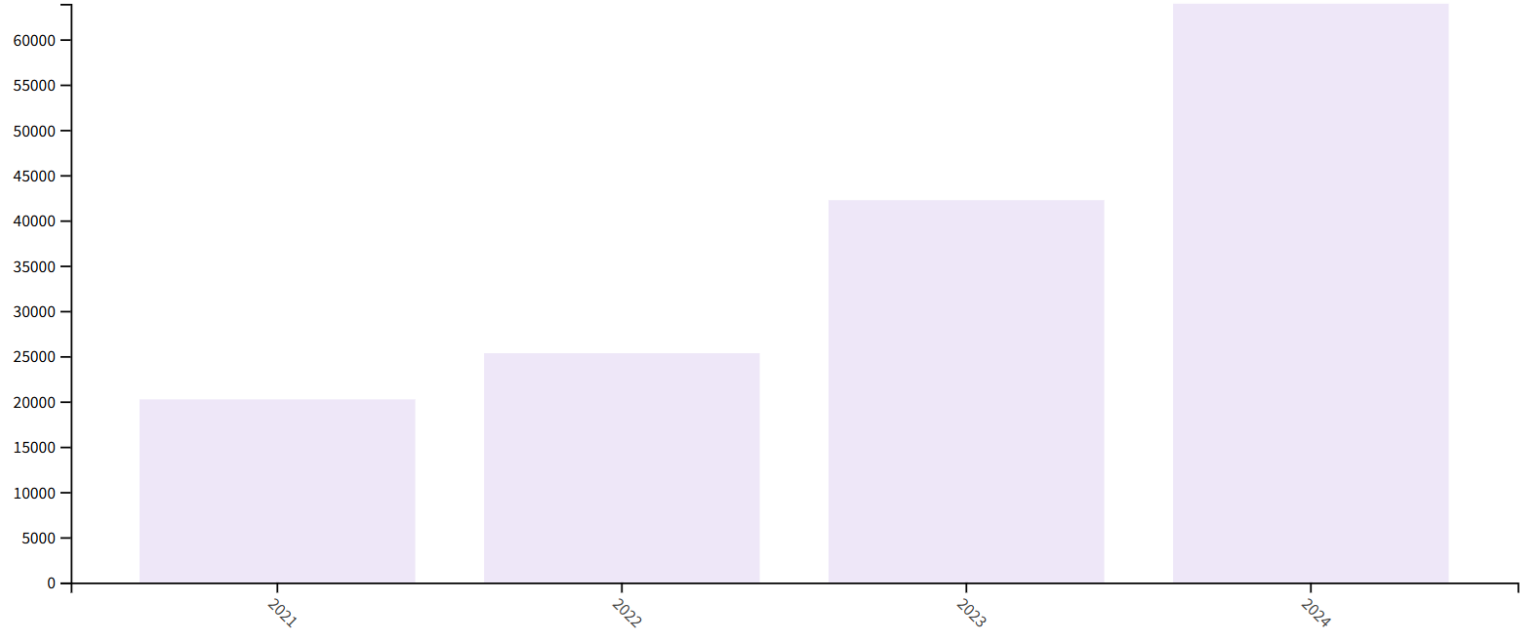
- UKRI
- Plan S
- OSTP
- JST
- NSFC

预印本（Preprint Citation index）

全球Preprint发文数量



中国大陆Preprint发文数量



Clarivate™

多元数据——学位论文（PQDT Citation Index）

1989 博士论文

Reconstitution of Intercompartmental Protein Transport in Yeast Extracts

By

David Baker

B.A. (Harvard University) 1984

DISSERTATION

Submitted in partial satisfaction of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

BIOCHEMISTRY

in the

GRADUATE DIVISION

of the

UNIVERSITY OF CALIFORNIA at BERKELEY

Approved: Randy W. Schekman 11/21/89
Chair Date
Nov. 22, 1989
11/21/89
Peter Walter Nov. 26, 1989

DOCTORAL DEGREE CONFERRED
DECEMBER 19, 1989

蛋白质在细胞内的
运输和定位

引用最高的一篇论文

W526–W531 Nucleic Acids Research, 2004, Vol. 32, Web Server issue
DOI: 10.1093/nar/gkh468

Protein structure prediction and analysis using the Robetta server

David E. Kim, Dylan Chivian and David Baker*

Structural Genomics of Pathogenic Protozoa, Department of Biochemistry, University of Washington, Seattle WA 98195, USA

Received February 14, 2004; Revised and Accepted April 20, 2004

ABSTRACT

The Robetta server (http://robetta.bakerlab.org) provides automated tools for protein structure prediction and analysis. For structure prediction, sequences submitted to the server are parsed into putative domains and structural models are generated using either comparative modeling or *de novo* structure prediction methods. If a confident match to a protein of known structure is found using BLAST, PSI-BLAST, FFAS03 or 3D-Jury, it is used as a template for comparative modeling. If no match is found, structure predictions are made using the *de novo* Rosetta fragment insertion method. Experimental nuclear magnetic resonance (NMR) constraints data can also be submitted with a query sequence for RosettaNMR *de novo* structure determination. Other current capabilities include the prediction of the effects of mutations on protein–protein interactions using computational interface alanine scanning. The Rosetta protein design and protein–protein docking methodologies will soon be available through the server as well.

INTRODUCTION

Robetta is an Internet service that provides automated structure prediction and analysis tools that can be used to infer protein structural information from genomic data. The server uses the first fully automated structure prediction procedure that produces a model for an entire protein sequence in the presence or absence of sequence homology to protein(s) of known structure. Robetta parses input sequences into domains and builds models for domains with sequence homology to proteins of known structure using comparative modeling, and models for domains lacking such homology using the Rosetta *de novo* structure prediction method. Domain predictions and molecular coordinates of models spanning the full-length query are given as results. The server can also utilize nuclear magnetic resonance (NMR) constraints data provided by the user to determine protein structures using the RosettaNMR (1–3) protocol. These tools can be used in conjunction with current structural genomics initiatives to help accelerate structure determination and gain structural insight for targeted open reading frames (ORFs). Additionally, since multidomain proteins are often difficult to crystallize and many are too large for NMR structure determination, domain prediction using Robetta can aid structural genomics efforts by expanding the pool of targets from which structures can be determined. The Structural Genomics of Pathogenic Protozoa (SGPP; http://www.sgpp.org) consortium is currently using an in-house version of Robetta to identify fragments that express and crystallize from ORFs that do not express as a full chain, and to aid structure refinement. Robetta also provides the ability to identify energetically important side-chains involved in the interface of protein–protein complexes using 'computational interface alanine scanning' (4,5). The ultimate goal for Robetta is to provide structural information of sufficient quality to aid research, infer function and assist drug design. Comparative models are already being used to infer function and guide experimental efforts, and the research field as a whole continues to improve as shown in the Critical Assessment of Structure Prediction (CASP-5, and CAFASP-3 for 'Fully Automated') experiments (6,7). Robetta was among the top performers in these assessments.

METHODS USED

Robetta uses a fully automated implementation of the Rosetta software package for protein structure prediction. The Rosetta method is described in detail in references (7–9) and the use of Rosetta in CASP-5 and CAFASP-3 is described in references (6,7).

Domain prediction

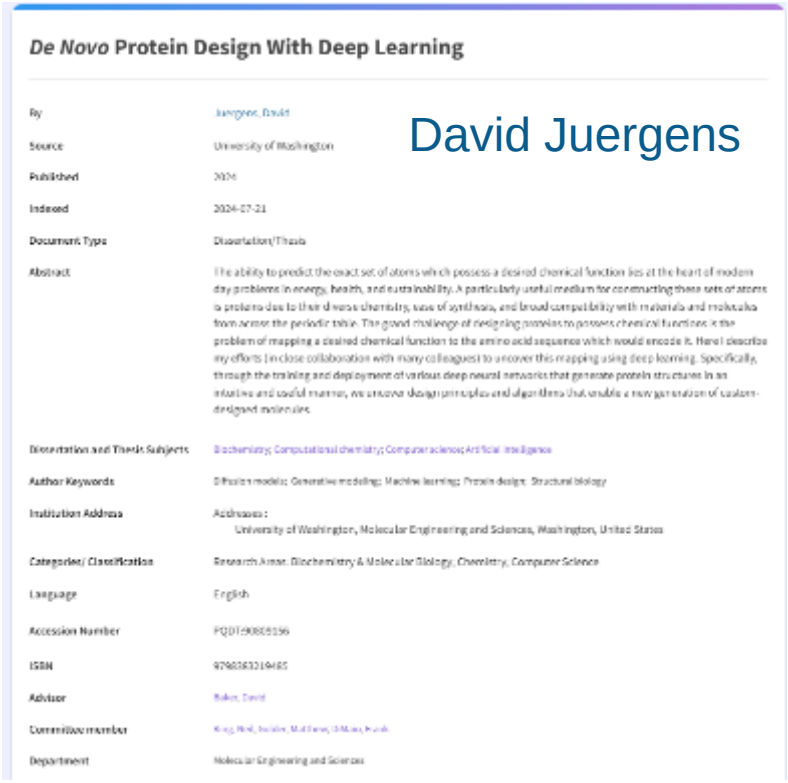
In an attempt to predict structures for full-length protein sequences, Robetta uses a domain prediction method called

*To whom correspondence should be addressed. Tel: +1 206 543 1295; Fax: +1 206 685 1792; Email: dabaker@u.washington.edu

The authors wish it to be known that, in their opinion, the first two authors should be regarded as joint First Authors

蛋白质结构的预测
和分析
Rosetta的基础

作为导师指导的最新
的一篇博士论文



De Novo Protein Design With Deep Learning

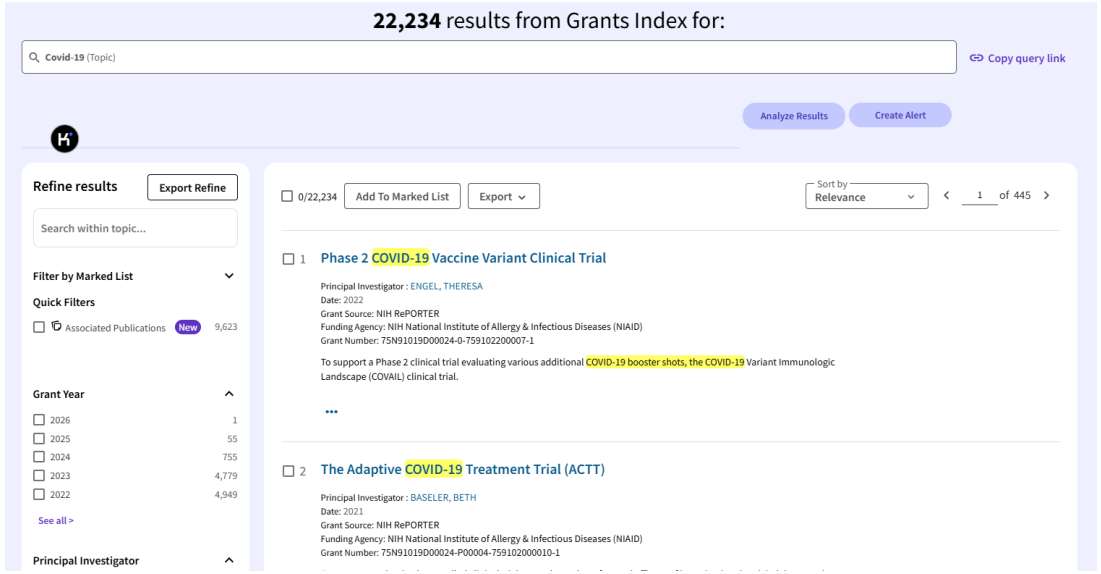
David Juergens

By	Juergens, David
Source	University of Washington
Published	2024
Indexed	2024-07-21
Document Type	Dissertation/Thesis
Abstract	The ability to predict the exact set of atoms which possess a desired chemical function lies at the heart of modern day problems in energy, health, and sustainability. A particularly useful medium for constructing these sets of atoms is proteins due to their diverse chemistry, ease of synthesis, and broad compatibility with materials and molecules from across the periodic table. The grand challenge of designing proteins to possess chemical functions is the problem of mapping a desired chemical function to the amino acid sequence which would encode it. Here I describe my efforts (in close collaboration with many colleagues) to uncover this mapping using deep learning. Specifically, through the training and deployment of various deep neural networks that generate protein structures in an intuitive and useful manner, we uncover design principles and algorithms that enable a new generation of custom-designed molecules.
Dissertation and Thesis Subjects	Biochemistry; Computational chemistry; Computer science; Artificial intelligence
Author Keywords	Diffusion models; Generative modeling; Machine learning; Protein design; Structural biology
Institution Address	Addresses: University of Washington, Molecular Engineering and Sciences, Washington, United States
Categories/ Classification	Research Areas: Biochemistry & Molecular Biology; Chemistry; Computer Science
Language	English
Accession Number	PQDT:90855196
ISBN	9798383219485
Advisor	Baker, David
Committee member	King, Neil; Seelig, Matthew; DiMaio, Frank
Department	Molecular Engineering and Sciences

深度学习在蛋白质
从头设计中的潜力
RFdiffusion

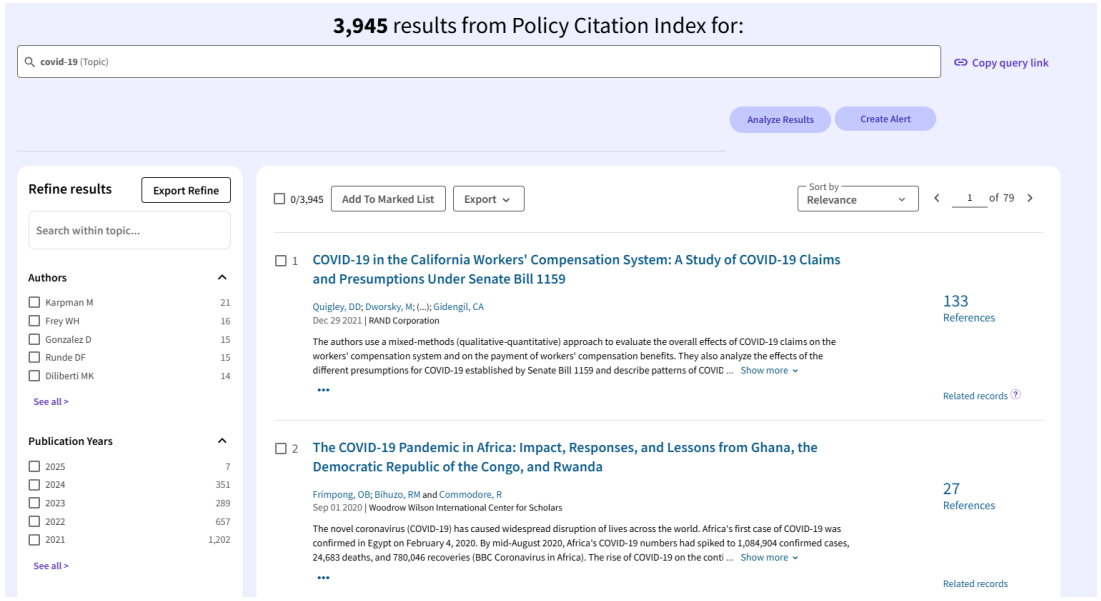
Clarivate™

多元数据——基金与政策文件



Principal Investigator	ENGEL, THERESA [1]
Grant Source	NIH RePORTER
Published	2022
Indexed	2023-12-14
Document Type	Awarded Grant
Grant Description	To support a Phase 2 clinical trial evaluating various additional COVID-19 booster shots, the COVID-19 Variant Immunologic Landscape (COVAIL) clinical trial.
Keywords	**Author Keywords:** 2019-nCoV; COVID-19; COVID-19 booster; COVID-19 vaccine; Clinical Trials; Immunologics; Phase; Phase II Clinical Trials; SARS-CoV-2 variant; Vaccine Research; Variant; booster vaccine
Affiliations	Addresses : [1] LEIDOS BIOMEDICAL RESEARCH, INC.
Grant Details	Funding Agency: NIH National Institute of Allergy & Infectious Diseases (NIAID) Grant Number: 10683817; 75N91019D00; 75N91019D00024-0-759102200007-1 Total Award Amount: $36,854,858.00 USD Grant Start Date: 2022-03-07 Grant End Date: 2024-03-06

Grant Index



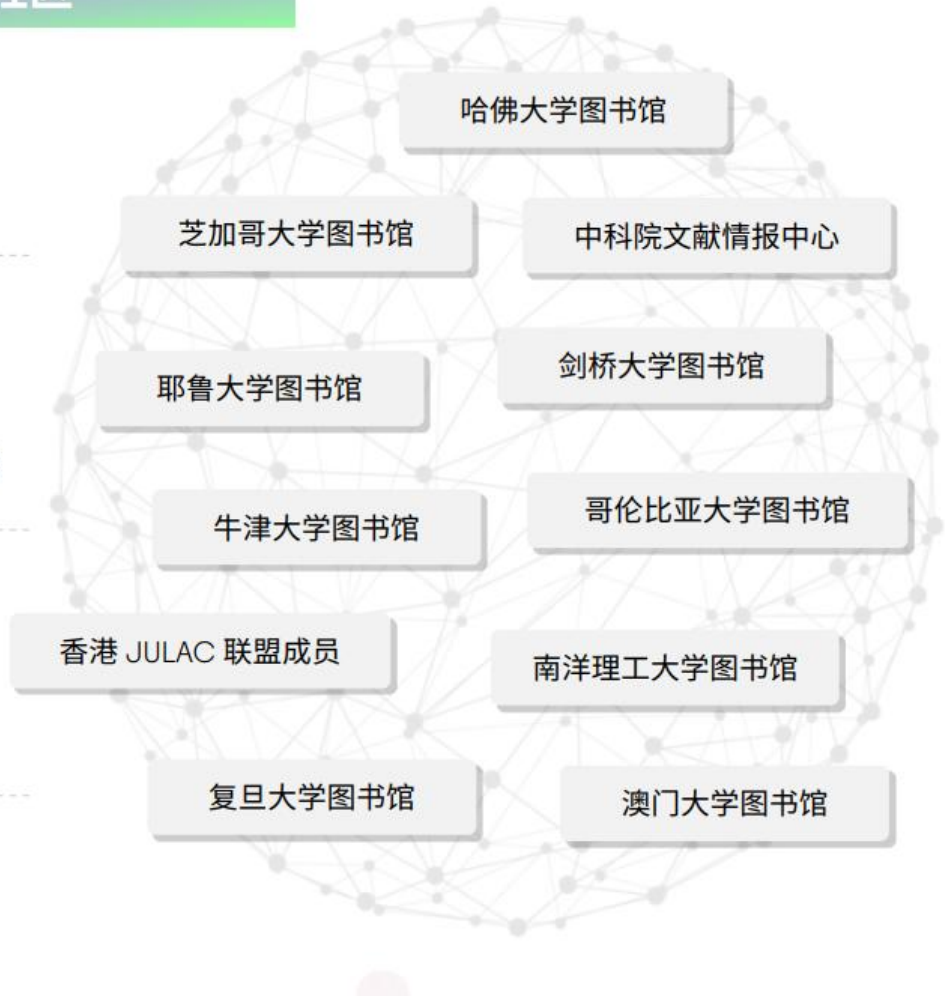
Source	US Government Accountability Office
Published	Feb 07 2022
Indexed	2025-01-15
Document Type	Report
Document Link	https://www.gao.gov/assets/gao-22-105079.pdf
Abstract	COVID-19 continues to have devastating effects on public health, serious economic repercussions, and has disproportionately affected some racial and ethnic groups. Ensuring all racial and ethnic groups have fair access to the COVID-19 vaccine is critical to reducing severe COVID-19 health outcomes and saving lives. The CARES Act includes a provision for GAO to report on its ongoing oversight efforts related to the COVID-19 pandemic. This report describes, among other things, the actions CDC, HRSA, and FEMA have taken through their programs to provide COVID-19 vaccines to underserved and historically marginalized racial and ethnic groups, and the extent to which these programs vaccinated various racial and ethnic groups.
Language	English
Accession Number	PCI:120364093
Publisher	US Government Accountability Office
URL	https://www.gao.gov/
Country/Region	United States

Policy Citation Index

从资源独有到资源共享（Rapido Starter）

Ex Libris全球馆际资源共享社区

- 海量共享馆藏资源
- 知名高校图书馆的服务
- 互惠共享模式

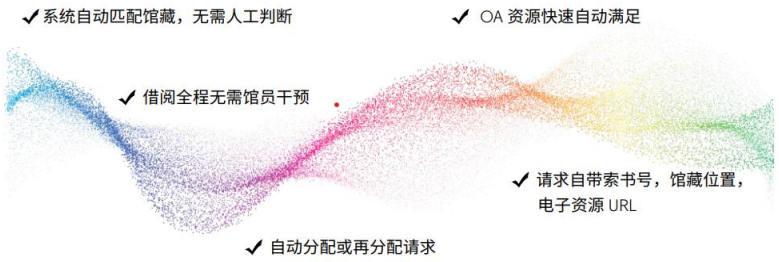


750+
成员馆

95%
请求满足率

12小时
平均获取时间

高度自动化工作流提升共享效率和体验



Clarivate™

新技术下的图书馆服务新趋势

信息与知识共享
开放科学
多元文献
从所有者到共享者

技术与服务创新
内部流程提升
外部展示扩大

信息素养提升
科研效率
科研效果

个性化服务与体验
融合更多数据
符合学科特色的多元评估
团队定制化服务

科研信息流

科研方向

科研发现

Web of Science™

资源发现

Summon

Primo

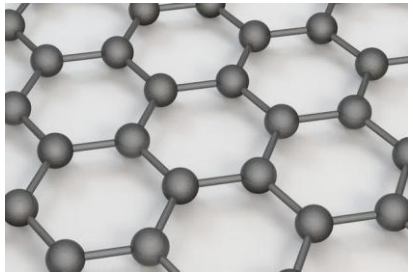
资源使用

ProQuest

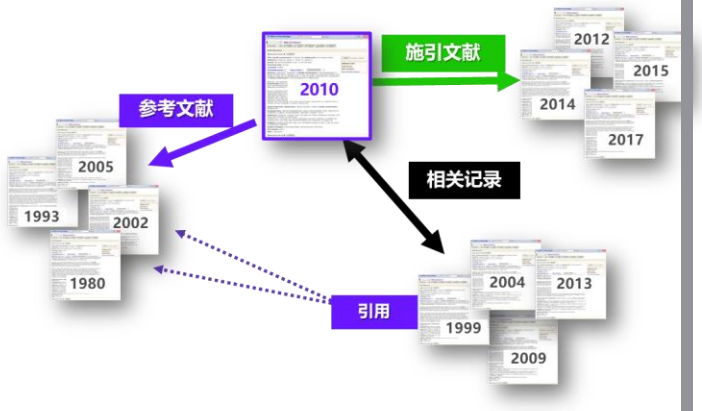
EN

EndNote™

科研效果



石墨烯



科研效率

Clarivate™

科研信息流

科研方向

科研发现

Web of Science™

资源发现

Summon

Primo

资源使用

ProQuest

EN

EndNote™

科研效率


The rise of graphene

Graphene is a rapidly rising star on the horizon of materials science and condensed-matter physics. This strictly two-dimensional material exhibits exceptionally high crystal and electronic quality, and, despite its short history, has already revealed a cornucopia of new physics and potential applications, which are briefly discussed here. Whereas one can be certain of the realness of applications only when commercial products appear, graphene no longer requires any further proof of its importance in terms of fundamental physics. Owing to its unusual electronic spectrum, graphene has led to the emergence of a new paradigm of 'relativistic' condensed-matter physics, where quantum relativistic phenomena, some of which are unobservable in high-energy physics, can now be mimicked and tested in table-top experiments. More generally, graphene represents a conceptually new class of materials that are only one atom thick, and, on this basis, offers new inroads into low-dimensional physics that has never ceased to surprise and continues to provide a fertile ground for applications.

A. K. GEIM AND K. S. NOVOSELOV

Clarivate™

资源发现
Primo Research Assistant

自然语言检索

Library Search | Summon Research Assistant BETA

A-Z List 反馈 帮助

石墨烯在能源存储中的应用研究

来源文献

5个最相关资源，点击记录显示该资源的元数据信息

AI LLM基于5个资源生成的概要

快速切换传统检索模式

源

1 期刊文章
Applications of Graphene Derivatives in All-Solid-State Supercapacitors
Mombeshora, Edwin T 等。 2024

2 期刊文章
专利视角下石墨烯超级电容器发展态势研究
郭景芸 等。 2023

3 期刊文章
石墨烯在能源存储装置中的应用和发展
叶琳 等。 2020

4 电子书
Graphene
Liu, Zhaoping 2014

5 期刊文章
Advances in the Field of Graphene-Based Composites for Energy-Storage Applications
Du, Yining 等。 2023

查看更多结果 来自您的图书馆搜索

概要

概览

石墨烯在能源存储中的应用研究显示出其在多个领域的潜力。石墨烯因其优异的导电性、导热性和机械强度，成为锂离子电池、超级电容器、燃料电池和太阳能电池等能源存储装置的重要材料。研究表明，基于石墨烯的超级电容器能够提高电力系统的运行效率，并促进可再生能源电力电子系统与电网的整合，这对于电动汽车的研发也具有积极影响。[3]

在固态超级电容器的研究中，石墨烯家族材料因其易于合成、可扩展性和高电导率而受到关注。这些材料在电极和电解质中的应用，能够解决传统超级电容器在能量密度和电解质泄漏方面的问题，从而推动能源存储技术的进步。[1] 此外，石墨烯的高比表面积和优异的热导性使其在锂离子电池、钠离子电池和铝离子电池等多种电池技术中展现出良好的应用前景。[5]

在专利研究方面，石墨烯超级电容器的整体发展趋势、申请国和主题词演化等方面的分析，揭示了该领域技术的应用价值和未来发展方向。[2] 石墨烯的经济优势和体积优势使其在不同类型的太阳能电池中也有广泛的应用潜力。[3]

综上所述，石墨烯在能源存储装置中的应用研究正不断推进，展现出良好的发展前景和技术应用价值。

How to cite AI-generated content 复制 重试

推荐的相关研究问题

推荐内容帮助用户进一步探索研究

相关研究问题

- 石墨烯在超级电容器中的性能研究
- 石墨烯基材料在锂离子电池中的应用
- 石墨烯在氢气存储中的潜力分析
- 石墨烯复合材料在电池技术中的进展

1 提出您的下一个研究问题...

All types | 最近5年 | Available online

筛选来源文献

ExLibris
Part of Clarivate

资源使用
ProQuest Research Assistant

PROGRESS ARTICLE

The rise of graphene

Graphene is a rapidly rising star on the horizon of materials science and condensed-matter physics. This strictly two-dimensional material exhibits exceptionally high crystal and electronic quality, and, despite its short history, has already revealed a cornucopia of new physics and potential applications, which are briefly discussed here. Whereas one can be certain of the realness of applications only when commercial products appear, graphene no longer requires any further proof of its importance in terms of fundamental physics. Owing to its unusual electronic spectrum, graphene has led to the emergence of a new paradigm of 'relativistic' condensed-matter physics, where quantum relativistic phenomena, some of which are unobservable in high-energy physics, can now be mimicked and tested in table-top experiments. More generally, graphene represents a conceptually new class of materials that are only one atom thick, and, on this basis, offers new inroads into low-dimensional physics that has never ceased to surprise and continues to provide a fertile ground for applications.

A. K. GEIM AND K. S. NOVOSELOV
Manchester Centre for Mesoscience and Nanotechnology, University of Manchester, Oxford Road, Manchester M13 9PL, UK
*e-mail: geim@man.ac.uk; kostya@graphene.org

Graphene is the name given to a flat monolayer of carbon atoms tightly packed into a two-dimensional (2D) honeycomb lattice, and is a basic building block for graphitic materials of all other dimensionalities (Fig. 1). It can be wrapped up into 0D fullerenes, rolled into 1D nanotubes or stacked into 3D graphite. Theoretically, graphene (or '2D graphite') has been studied for sixty years[1–3], and is widely used for describing properties of various carbon-based materials. Forty years later, it was realized that graphene also provides an excellent condensed-matter analogue of (2+1)-dimensional quantum electrodynamics[4–6], which propelled graphene into a thriving theoretical toy model. On the other hand, although known as an integral part of 3D materials, graphene was presumed not to exist in the free state, being described as an 'academic' material[7] and was believed to be unstable with respect to the formation of curved structures such as soot, fullerenes and nanotubes. Suddenly, the vintage model turned into reality, when free-standing graphene was unexpectedly found three years ago[7,8] — and especially when the follow-up experiments[9,10] confirmed that its charge carriers were indeed massless Dirac fermions. So, the graphene 'gold rush' has begun.

MATERIALS THAT SHOULD NOT EXIST

More than 70 years ago, Landau and Peierls argued that strictly 2D crystals were thermodynamically unstable and could not exist[11,12]. Their theory pointed out that a divergent contribution of thermal fluctuations in low-dimensional crystal lattices should lead to such displacements of atoms that they become comparable to interatomic distances at any finite temperature[13]. The argument was later extended by Mermin[14] and is strongly supported by an omnibus of experimental observations. Indeed, the melting temperature of thin films rapidly decreases with decreasing thickness, and the films become unstable (segregate into islands or decompose) at a thickness of, typically, dozens of atomic layers[15,16]. For this reason, atomic monolayers have so far been known only as an integral part of larger 3D structures, usually grown epitaxially on top of monocrystals with matching crystal lattices[15,16]. Without such a 3D base, 2D materials were presumed not to exist, until 2004, when the common wisdom was flaunted by the experimental discovery of graphene[7] and other free-standing 2D atomic crystals (for example, single-layer boron nitride and half-layer BSCCO)[8]. These crystals could be obtained on top of non-crystalline substrates[8–10], in liquid suspension[17,7] and as suspended membranes[18].

Importantly, the 2D crystals were found not only to be continuous but to exhibit high crystal quality[7–9,17,18]. The latter is most obvious for the case of graphene, in which charge carriers can travel thousands of interatomic distances without scattering[7,10]. With the benefit of hindsight, the existence of such one-atom-thick crystals can be reconciled with theory. Indeed, it can be argued that the obtained 2D crystallites are quenched in a metastable state because they are extracted from 3D materials, whereas their small size (<<1 mm) and strong interatomic bonds ensure that thermal fluctuations cannot lead to the generation of dislocations or other crystal defects even at elevated temperature[12,14]. A complementary viewpoint is that the extracted 2D crystals become intrinsically stable by gentle crumpling in the third dimension[14,19] (for an artist's impression of the crumpling, see the cover of this issue). Such 3D warping (observed on a lateral scale of ~10 nm)[18] leads to a gain in elastic energy but suppresses thermal vibrations (anomalously large in 2D), which above a certain temperature can minimize the total free energy[18].

BRIEF HISTORY OF GRAPHENE

Before reviewing the earlier work on graphene, it is useful to define what 2D crystals are. Obviously, a single atomic plane is a 2D

Research Assistant

Here is the **key takeaway**.

Graphene is a rapidly rising star in materials science, exhibiting exceptional electronic quality and potential applications, while also leading to new insights in condensed matter physics.

Additional topics discussed include:

- Applications of graphene in electronics
- Comparison of graphene with carbon nanotubes
- Isolation and characterization of 2D materials

AI-generated content: quality may vary. Check for accuracy.
Disclaimer

Here are the **findings or conclusions**

The document provides a comprehensive overview of graphene, a two-dimensional material that has garnered significant attention in materials science and condensed matter physics. Its primary purpose is to elucidate the unique properties of graphene, its potential applications, and the fundamental physics it reveals, particularly in the context of relativistic phenomena.

The main findings of the document can be summarized as follows:

1. **Exceptional Properties**: Graphene exhibits remarkable electronic and crystal quality, leading to the emergence of new physics paradigms, particularly in condensed matter physics. Its charge carriers behave like massless Dirac fermions, allowing for the exploration of quantum electrodynamics phenomena in a laboratory setting. (1) (2) (3)
2. **Historical Context**: Initially thought to be unstable and non-existent in a free state, graphene was experimentally isolated in 2004, overturning previous theories about the stability of two-dimensional materials. (4) (5) This discovery has led to a surge in research and interest, often referred to as the "graphene gold

---

Here are the **important concepts**.

1. Graphene: Graphene is a two-dimensional material composed of a single layer of carbon atoms arranged in a honeycomb lattice, known for its exceptional electronic properties and potential applications in various fields. Its significance in the document lies in its role as a groundbreaking material that has led to new paradigms in condensed matter physics and electronics.
2. Dirac Equation: The Dirac equation is a fundamental equation in quantum mechanics that describes the behavior of relativistic particles, and in the context of graphene, it is used to explain the unique properties of its charge carriers. Its significance is highlighted as graphene's charge carriers behave like massless Dirac fermions, leading to novel physical phenomena.

Here are related **research topics**.

1. Graphene raman microscopy: Raman microscopy provides a quick method for assessing graphene thickness, crucial for material characterization.
2. Isolation of 2d crystals: Isolating monolayers of 2D crystals is essential for studying their individual properties and potential applications.
3. Electronic properties of graphene: Understanding the electronic properties of graphene is vital for its application in electronics and nanotechnology.
4. Ballistic transport in graphene: Ballistic transport in graphene at room temperature presents opportunities for high-speed electronic devices.
5. Quantum hall effect in graphene: The observation of the quantum Hall effect in graphene at room temperature expands the understanding of quantum phenomena.

Suggested sources

Looking for more sources on the same subject? Try these suggestions:

- Novel Substrates for Graphene based Electronics
  Jalil, Rashid. The University of Manchester (United Kingdom) ProQuest Dissertations & Theses, 2012. 10030817.
- Two-Dimensional Transition Metal Dichalcogenides and Their Charge Carrier Mobilities in Field-Effect
  Ahmed, Sohail; Yi, Jiabao. **Nano-micro letters** Vol. 9, Iss. 4, (Jan 2017): 50.
- 2D Materials for Magnetic and Optoelectronic Sensing Applications
  Alkhalifa, Saad Fadhil Ramadhan. University of Exeter (United Kingdom) ProQuest Dissertations & Theses, 2018. 13911212.
- Charge Carrier Transport in Field-Effect Transistors with Two-Dimensional Electron Gas Using
  Rodrigues, Isabel Harrysson. Chalmers Tekniska Hogskola (Sweden) ProQuest Dissertations & Theses, 2022. 30214279.
- Study of Novel Electronic Materials by Midinfrared and Terahertz Optical Hall Effect
  Armakavicius, Nerijus. Linkopings Universitet (Sweden) ProQuest Dissertations & Theses, 2017. 31248738.
- Free Charge Carrier Properties in Group III Nitrides and Graphene Studied by THz-to-MIR
  Armakavicius, Nerijus. Linkopings Universitet (Sweden) ProQuest Dissertations & Theses, 2019. 31248268.
- Electronic properties of 2D materials and their junctions
  Dutta, Taposhree; Yadav, Neha; Wu, Yongling; Cheng, Gary J; Liang, Xiu; et
- Electronic Transport Studies of High-quality 2D Heterostructures
  Gao, Yunze. The University of Manchester (United Kingdom) ProQuest

ExLibris
Part of Clarivate

资源使用
ProQuest Research Assistant

ProQuest ONE ACADEMIC

学术期刊	21000	案例研究	23万
行业杂志	4400	行业研究报告	78万
会议论文	250万	多媒体	5.3万
研究手稿	330万	新闻报纸	1900

ProQuest DISSERTATIONS & THESES GLOBAL

6.2M+ 文摘索引记录

3.9M+ 全文

60+ 语言

70+ 国家 / 地区的学位论文

4.1K 收录来自全球大学

4M 研究人员在使用

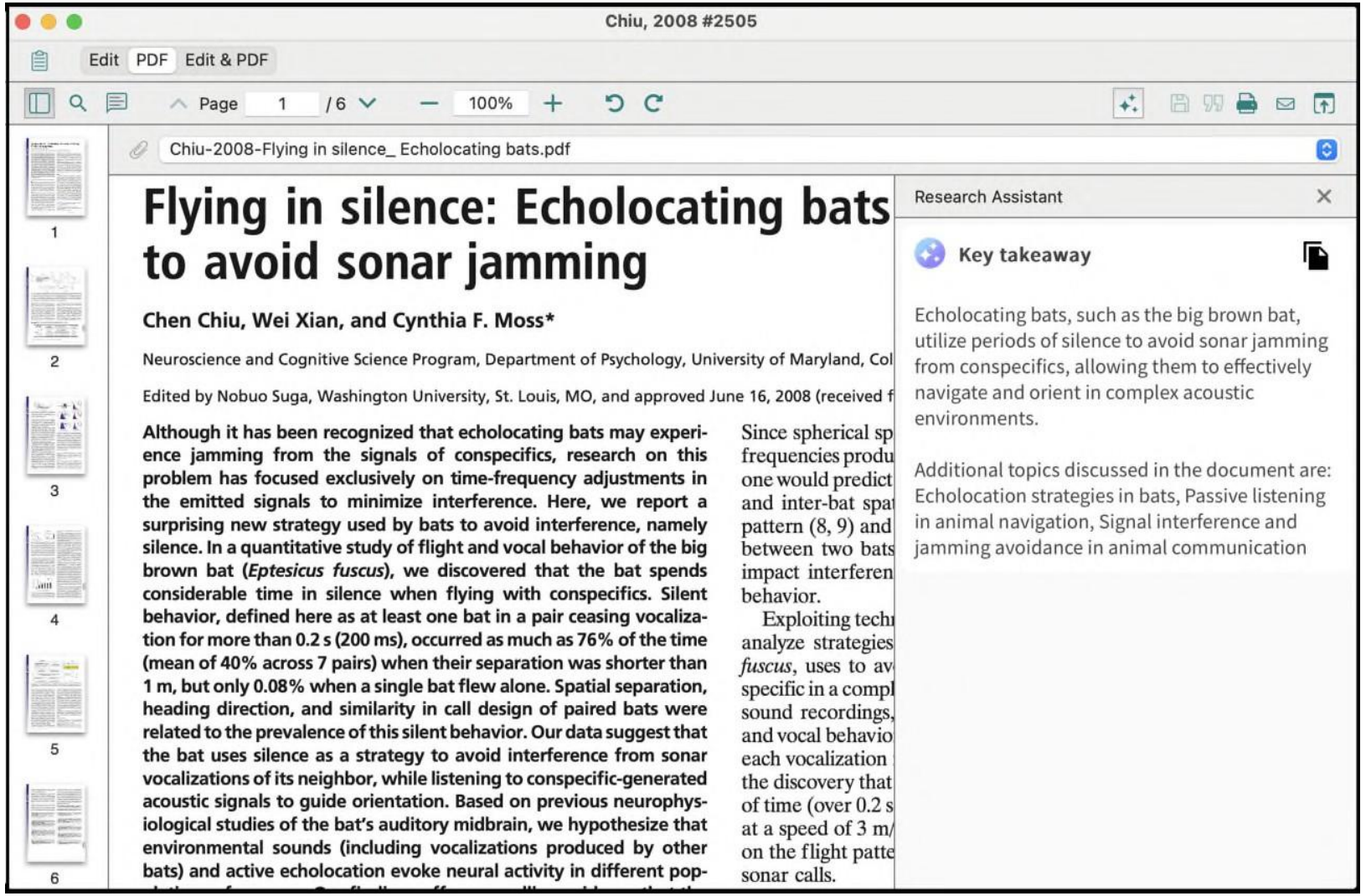
ProQuest Ebook Central

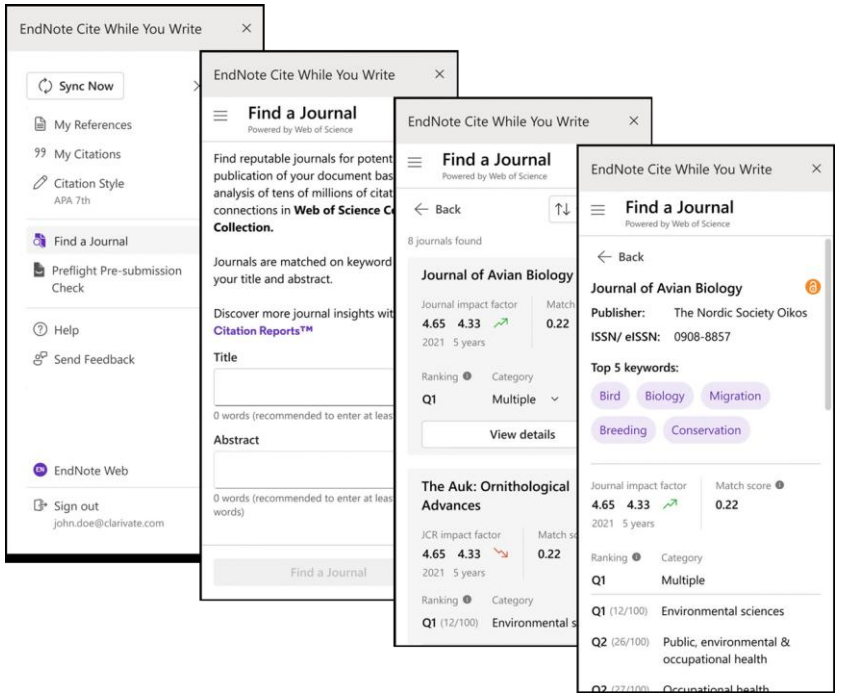
- 超过70万种图书
- 290+ 大学出版社
- 4000多家出版社
- 60+语种

ProQuest Ebooks

ExLibris Part of Clarivate

资源使用
EndNote 2025





即将于 2025 年秋季推出：

- 人工智能研究助理
- 人工智能大纲生成器

ExLibris
Part of Clarivate

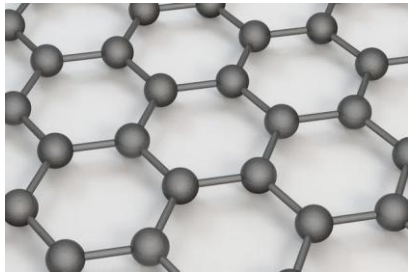
科研信息流

科研方向

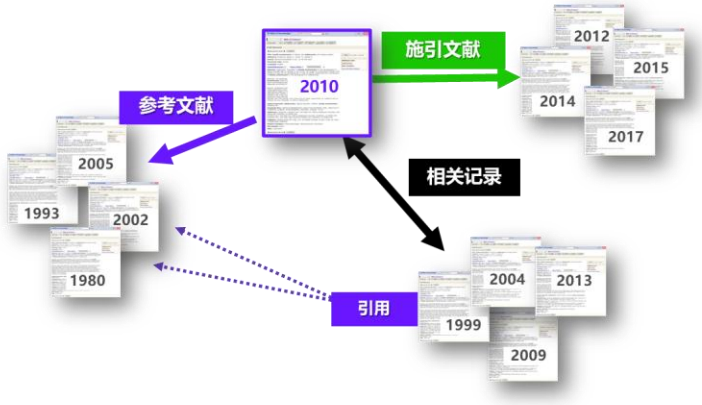
科研发现

Web of Science™

科研效果



石墨烯



资源发现

Summon

Primo

资源使用

ProQuest

EN

EndNote™

Clarivate™

Emerging Topics：全球9600+个研究热点

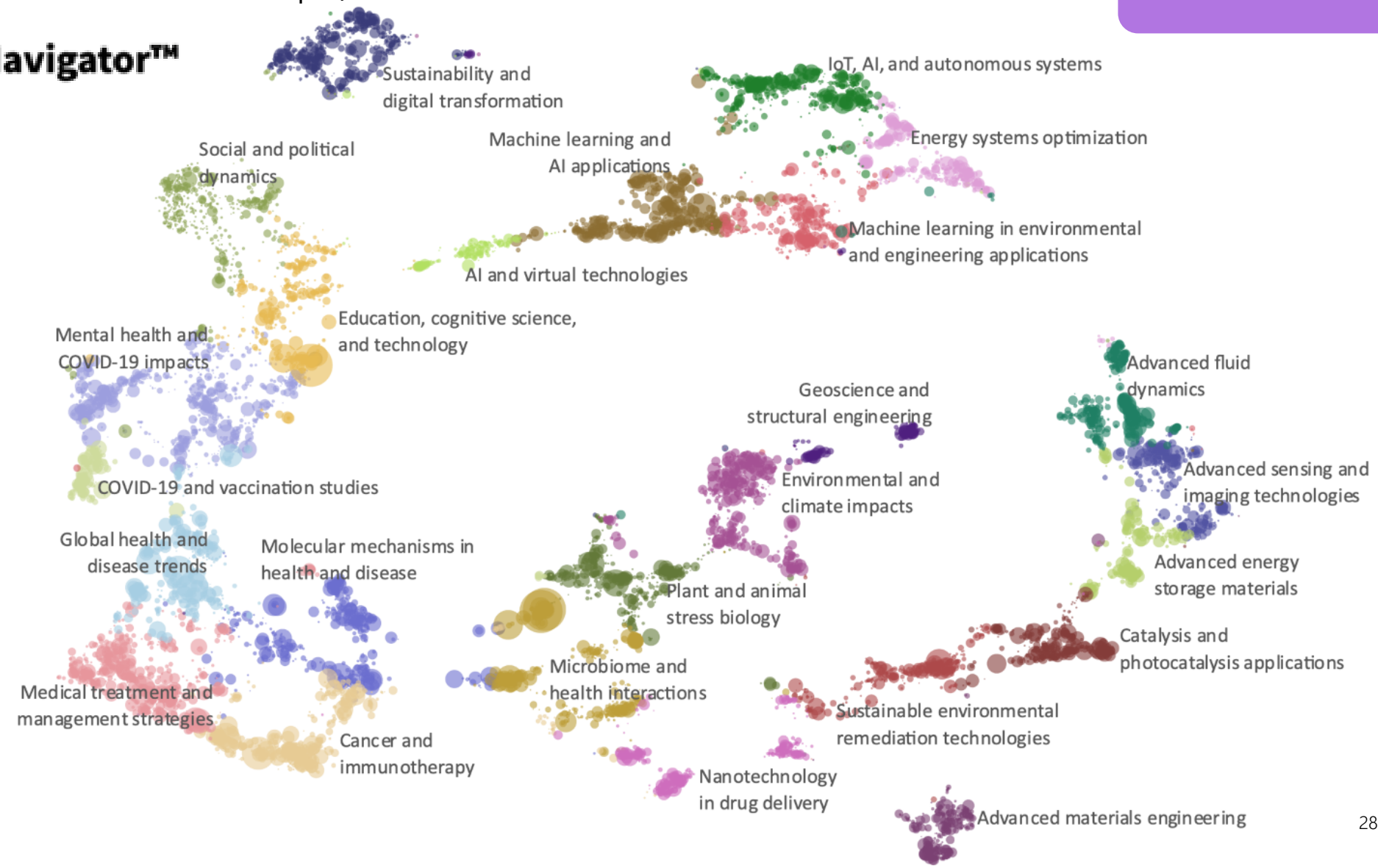
科研方向

当前全球研究格局(Research Landscape)

Research Horizon Navigator™

全球学术研究热点：

- AI和机器学习
- 幸福感和心理健康
- 可持续性和环境
- 社会和文化动态
- 生物医学的进步
- 70%为跨学科



武汉大学参与的关于石墨烯的新兴前沿

科研方向

150 个新兴主题

组织 武汉大学 ×　新兴主题关键词 石墨烯 ×

新兴主题过滤器　清楚

搜索新兴主题

新兴主题类别

搜索类别

- 先进储能材料
- 高级流体动力学
- 先进材料工程
- 先进的传感和成像技术
- AI 和虚拟技术
- 癌症和免疫疗法
- 催化和光催化应用
- COVID-19 和疫苗接种...

完善

主要类别

每页项目数：50

新兴话题	新兴主题类别	主要类别	匹配的论文（总计）	平均合作施引出版年份	跨学科	匹配的核心论文（总计）
中性粒细胞与淋巴细胞比率作为 COVID-19 的预测因子	COVID-19 和疫苗接种研究	免疫学	1 (251)	2022.8	0.75	1 (14)
用于水中光催化和抗菌应用的纳米复合材料	催化和光催化应用	材料科学，多学科	3 (534)	2022.7	0.71	0 (5)
陶瓷纳米结构的绿色合成与应用	催化和光催化应用	材料科学，多学科	1 (508)	2023.2	0.69	0 (24)
农药对健康、环境和去除策略的影响	环境和气候影响	环境科学	1 (571)	2023.4	0.69	0 (20)
热塑性复合材料夹层结构的先进技术	先进材料工程	材料科学，多学科	2 (345)	2023.3	0.68	0 (10)
用于生物医学和包装应用的细菌纤维素复合材料	可持续环境修复技术	高分子科学	1 (234)	2023	0.65	0 (20)
癌症诊断、预后和个性化治疗中的生物标志物	癌症和免疫疗法	肿瘤学	1 (172)	2024.1	0.65	0 (12)
全球地下水系统中的砷污染和去除	环境和气候影响	环境科学	1 (395)	2023	0.64	0 (11)
用于现场分析的电化学生物传感器中的功能纳米材料	先进的传感和成像技术	化学，分析	1 (249)	2023.9	0.63	1 (18)
周围神经再生：修复策略和材料	纳米技术在药物递送中的应用	手术	2 (111)	2023.1	0.62	0 (14)
用于伤口愈合应用的先进止血材料	纳米技术在药物递送中的应用	高分子科学	5 (224)	2023.5	0.62	2 (23)
使用纳米复合材料传感器检测有机化合物	先进的传感和成像技术	食品科学与技术	1 (7)	2025	0.62	0 (5)

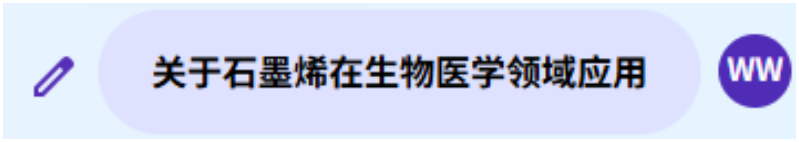
石墨烯在生物医学领域应用

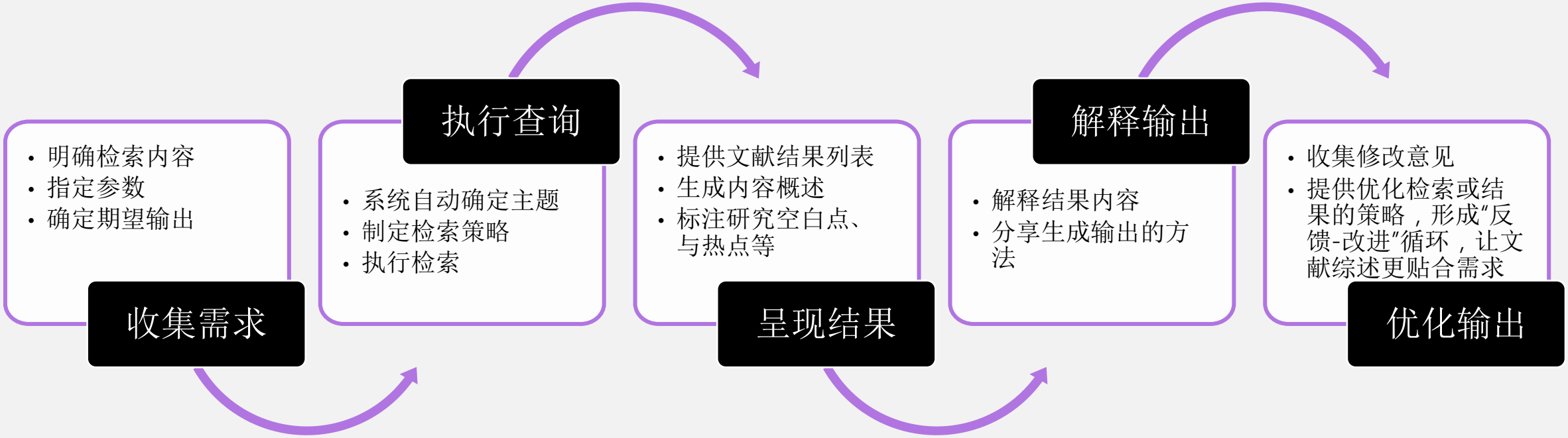
Clarivate™

AI Agent赋能的Web of Science 研究助手

——自动文献综述

科研发现





AI Agent赋能的Web of Science 研究助手

——自动文献综述

科研发现

我已经根据您关于石墨烯在生物医学领域应用的请求，获取了引用次数最高的50篇文章，并进行了文献综述。以下是综述及其引用的完整参考列表。

引言

石墨烯因其优异的物理、化学和生物学特性，在生物医学领域展示了广泛的应用潜力。其二维结构和优异的导电性、化学稳定性以及生物相容性使其成为药物输送、生物传感、组织工程和癌症治疗等领域的理想材料。本文综述了近20年来石墨烯在生物医学领域的研究进展。

共同主题/主要发现

1. **药物输送和靶向治疗**：石墨烯及其衍生物被广泛用于药物和基因的输送系统。这些材料具有高药物负载能力和可调控的释放特性，能够实现在体内的精准药物输送与靶向治疗[Ghosal and Sarkar,
2. **生物传感与成像**：石墨烯的优良导电性质使其在生
力。同时，石墨烯量子点因其独特的光学性质，在
3. **组织工程与再生医学**：石墨烯及其复合材料被用作
细胞生长提供理想的环境[Pattnaik et al., 2016; Yi et a
4. **抗菌和抗癌应用**：石墨烯及其氧化物在抗菌和抗癌治疗中显示出优异的效果。石墨烯能够破坏细菌细胞壁，同时与抗癌药物结合，增强其在癌细胞中的积累和毒性[Gurunathan and Kim, 2016; Shafiee et al., 2022]。

共同主题/主要发现

研究中的空白

1. **生物相容性与毒性**：尽管石墨烯在生物医学领域的应用潜力巨大，但其生物相容性和毒性问题仍需深入研究。进一步的体内研究对于评估石墨烯材料在长期使用中的安全性至关重要[Shareena et
2. **功能化与改性**：为了提高石墨烯在生物医学中的应
质的精准调控[Georgakilas et al., 2016]。
3. **多功能复合材料**：虽然石墨烯复合材料在生物医学
新型的合成技术以实现更高效的复合材料制备[Zindani and Kumar, 2019]。
4. **临床转化研究**：当前大多数研究仍停留在实验室阶段，缺乏大规模的临床试验以验证石墨烯材料在实际应用中的效果和安全性[Ghosal and Sarkar, 2018]。

研究中的空白

↑ Back to tc

结论

石墨烯在生物医学领域的应用前景广阔，其优异的物理化学特性使其成为多种应用的理想候选材料。然而，仍需解决生物相容性、功能化及临床转化等方面的问题，以推动其在实际应用中的发展。

潜在假设

1. 石墨烯的表面功能化可以显著提高其在药物输送系统中的靶向性和效率。
2. 石墨烯量子点的光学特性可用于开发高灵敏度的生物成像技术。
3. 通过改性石墨烯的物理化学性质，可以增强其在组织工程中作为支架材料的
4. 石墨烯与常规抗癌药物的结合可以提高药物的靶向性和治疗效果。
5. 开发新的合成技术可以实现石墨烯复合材料在生物医学中的多功能应用。

潜在假设

参考文献

- Ghosal, K., & Sarkar, K. (2018). Biomedical Applications of Graphene Nanomaterials and Beyond. ACS BIOMATERIALS SCIENCE & ENGINEERING, 4(8), 2653-2703. DOI:10.1021/acsbiomaterials.8b00376.
- Georgakilas, V., Tiwari, J. N., Zboril, R., et al. (2016). Noncovalent Functionalization of Graphene and Graphene Oxide for Energy Materials, Biosensing, Catalytic, and Biomedical Applications. CHEMICAL REVIEWS, 116(9), 5464-5519. DOI:10.1021/acs.chemrev.5b00620.
- Kanjwal, M. A., & Al Ghaferi, A. (2022). Graphene Incorporated Electrospun Nanofiber for Electrochemical Sensing and Biomedical Applications: A Critical Review. SENSORS, 22(22), 861. DOI:10.3390/s22228661.
- Zhang, X. L., Wei, C. B., Yu, D. S., et al. (2019). Shining luminescent graphene quantum dots: Synthesis, physicochemical properties, and biomedical applications. TRAC-TRENDS IN ANALYTICAL CHEMISTRY, 116, 109-121. DOI:10.1016/j.trac.2019.03.011.
- Pattnaik, S., Swain, K., Lin, Z. Q. (2016). Graphene and graphene-based nanocomposites: biomedical applications and biosafety. JOURNAL OF MATERIALS CHEMISTRY B, 4(48), 7813-7831. DOI:10.1039/c6tb02086k.
- Yi, J., Choe, G., Lee, J. Y., et al. (2020). Graphene oxide-incorporated hydrogels for biomedical applications. POLYMER JOURNAL, 52(8), 823-837.

AI Agent赋能的Web of Science 研究助手——WOSRA

科研发现

How are these results generated?

- **主主题**: 石墨烯（Graphene）
- **子主题**: 生物医学应用（Biomedical Applications）
  - 癌症治疗（Cancer Therapy）
  - 药物递送（Drug Delivery）
  - 组织工程（Tissue Engineering）
  - 生物传感器（Biosensors）
  - 生物相容性（Biocompatibility）
  - 影像技术（Imaging Techniques）

请您确认这个搜索策略，如果有任何需要调整的地方，请告诉我。

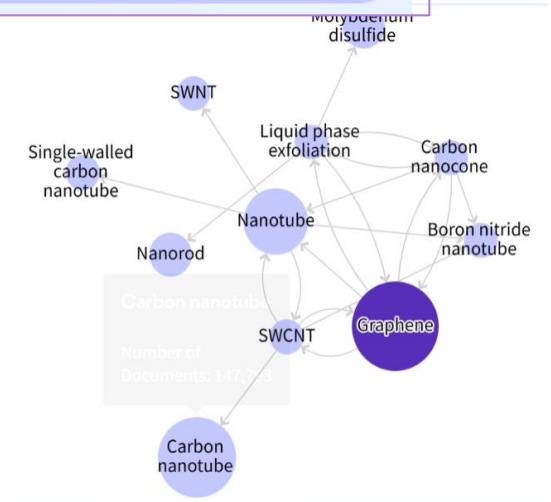
推荐方向

我想了解关于生物医学中石墨烯的开创性论文。

石墨烯在生物医学中的主要应用有哪些?

石墨烯对细胞生物学的影响是什么?

Topic Map
See related and connected concepts



Top authors
See key influencers on this topic

AG **Andre Geim**
University of Manchester
Web of Science Researcher ID: J-7888-2012
Topics (10): Graphene | Heterojunction | Magnetic field | Quantum Hall effect | Electron | Two-dimensional semiconductor | Magnetoresistance | Superc
Researcher analysis ⓘ : Author Summary | Co-author visualization

KN **Kostya S Novoselov**
National University of Singapore
Web of Science Researcher ID: G-9581-2014
Topics (10): Graphene | Heterojunction | Single-layer materials | Two-dimensional semiconductor | Raman spectroscopy | Boron nitride | Graphite oxide
Researcher analysis ⓘ : Author Summary | Co-author visualization

SM **Sergey V Morozov**
Russian Academy of Sciences
Web of Science Researcher ID: H-3171-2014
Topics (10): Graphene | Heterojunction | Boron nitride | Quantum Hall effect | Bilayer graphene | Electron | Electron mobility | Ferromagnetism | Gaas
Researcher analysis ⓘ : Author Summary | Co-author visualization

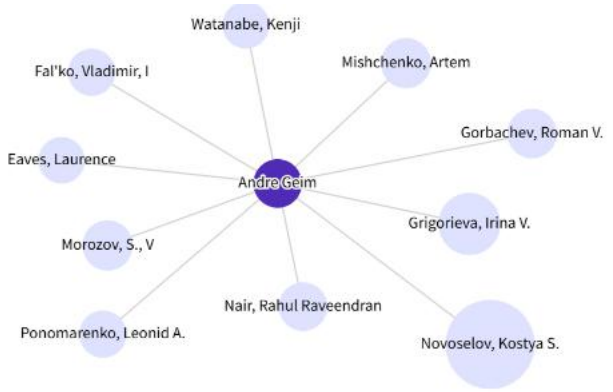
Researcher analysis ⓘ : **Author Summary** | Co-author visualization

Kostya S. Novoselov is a highly cited researcher affiliated with the University of Manchester and the National University of Singapore. Their work spans across physics and materials science, with significant contributions recognized in both fields from 2014 to 2024. Novoselov's research primarily focuses on two-dimensional (2D) materials, particularly graphene, and their applications in various domains such as electronics, photonics, and catalysis.

Novoselov has an impressive publication record, with several highly cited papers. Notable works include studies on the electronic properties of graphene, the development of van der Waals heterostructures, and the exploration of 2D materials for catalytic applications. Their 2004 paper on the electric field effect in atomically thin carbon films is particularly influential, with over 56,000 citations, highlighting its impact on the field of 2D materials.

Research by Novoselov has been supported by major grants from organizations such as the Engineering & Physical Sciences Research Council (EPSRC) and the Japan Society for the Promotion of Science. Collaborations with institutions like the University of Manchester, National University of Singapore, and various international research bodies have further amplified their research impact.

Beyond academia, Novoselov's work has implications for industry and technology, particularly in the development of new materials and devices. Contributions to the understanding and application of 2D materials have positioned Novoselov as a leading figure in the field, influencing both scientific research and practical applications.



科研信息素养

科研方向 → 科研发现 → 资源发现 → 资源使用

Research Horizon Navigator™

Web of Science™ Research Assistant

Primo研究助手

Summon Research Assistant

ProQuest Research Assistant

EndNote™

科研效果

- 选择透明负责任的工具
- 理解算法逻辑与数据源
- 灵活使用Prompt
- 拓展情报服务边界

Clarivate™

科研效率

- 善用工具
- 理解局限性
- 数据融合
- 伦理和使用规范

新技术下的图书馆服务新趋势

信息与知识共享
开放科学
多元文献
从所有者到共享者

技术与服务创新
内部流程提升
外部展示扩大

信息素养提升
科研效率
科研效果

个性化服务与体验
融合更多数据
符合学科特色的多元评估
团队定制化服务

内部流程提高：AI 元数据生成器

——提供电子资源书目扩充服务

- 电子资源直接激活使用
- 电子资源库自动更新
- 高质量元数据，用于资源发现，支持套录编目
- 简化采访流程
- 减少本地资源管理工作量
- 提升资源服务质量

Community Zone
共享社区

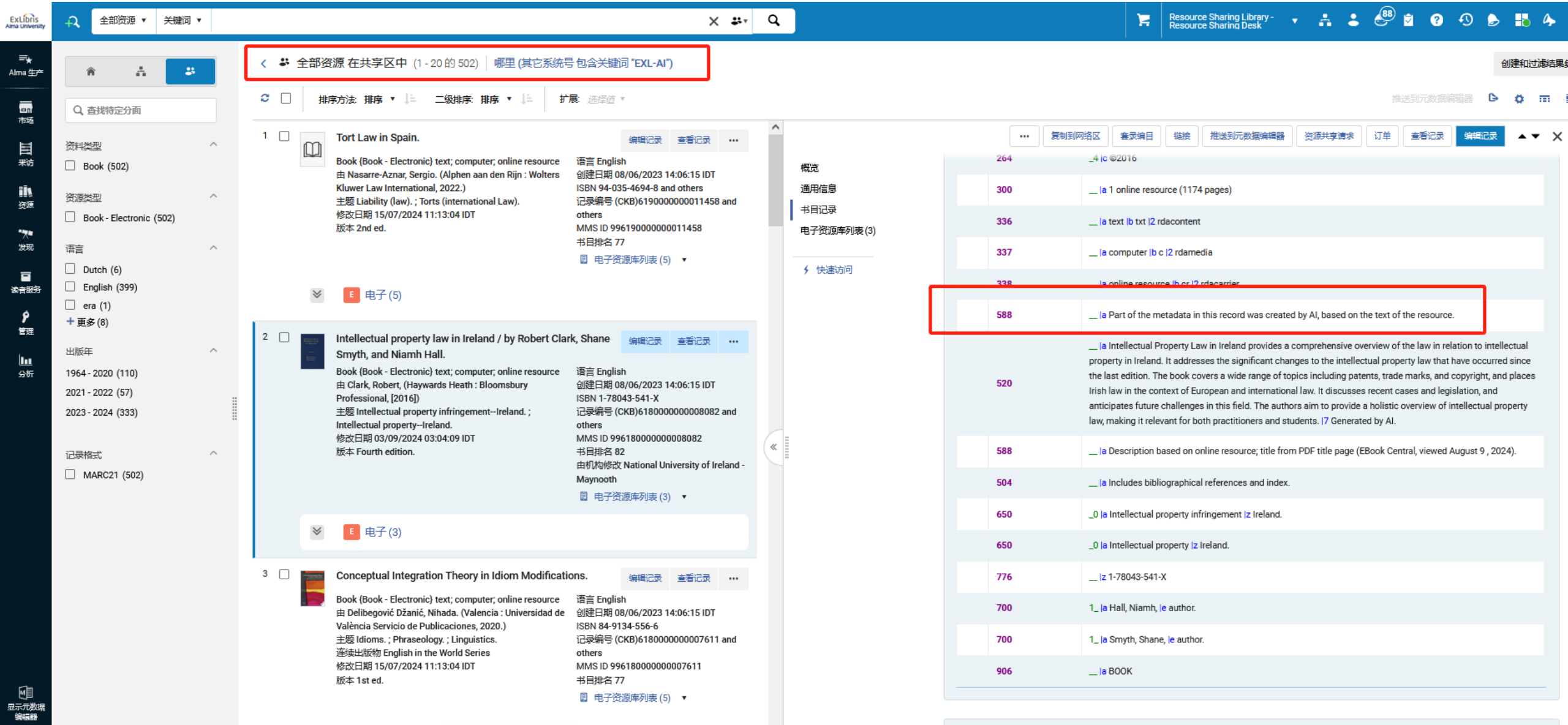
CZ共享社区是Alma独有的一个特色功能，它是一个共享空间，所有的Alma用户都可以在CZ区域共享资源。CZ中可共享的资源包括：

- 电子资源知识库（KB）
- 书目记录 (百万级记录数)
- 规范控制词表（百万级记录数）
- 系统配置文件
- 数据报表模板
- 规范化规则

ExLibris
Part of Clarivate

内部流程提高：AI 元数据生成器

—— AI驱动扩充元数据记录的字段



内部流程提高：
Alma AI 编目助手

利用LLM文本和视觉API来协助馆员编目

验证和过滤结果以提高质量（例如主题词）

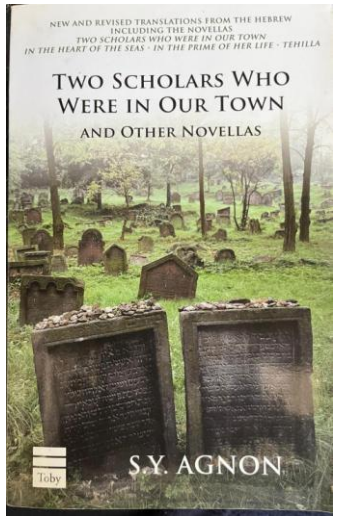
图书馆馆员控制元数据质量

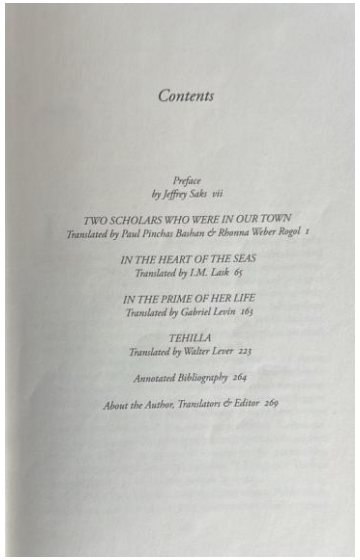
不用图书馆提供的数据对AI进行训练

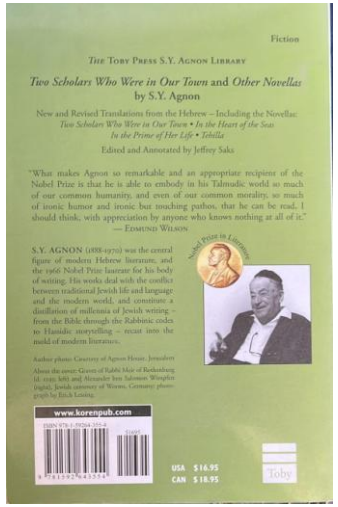
ExLibris
Part of Clarivate

内部流程提高：Alma AI 编目助手

—— 自动创建新书目







拖拽图片到这里

内部流程提高：Alma AI 编目助手

—— 自动创建新书目，所有字段均由AI创建

编目助手创建的元数据带有“AI Generated”.

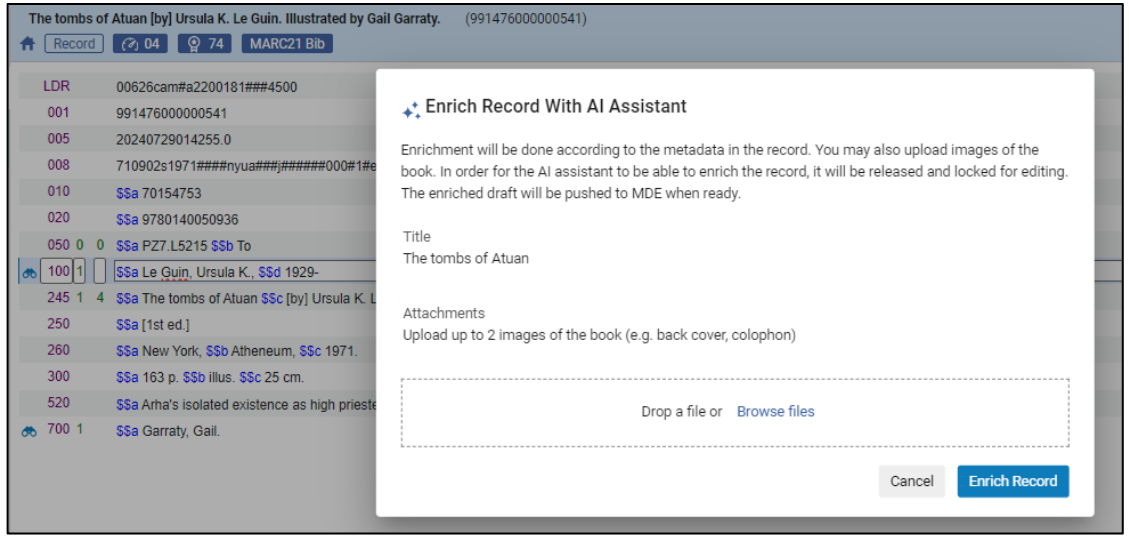
Two scholars who were in our town and other novellas S.Y. Agnon (99247240800521)

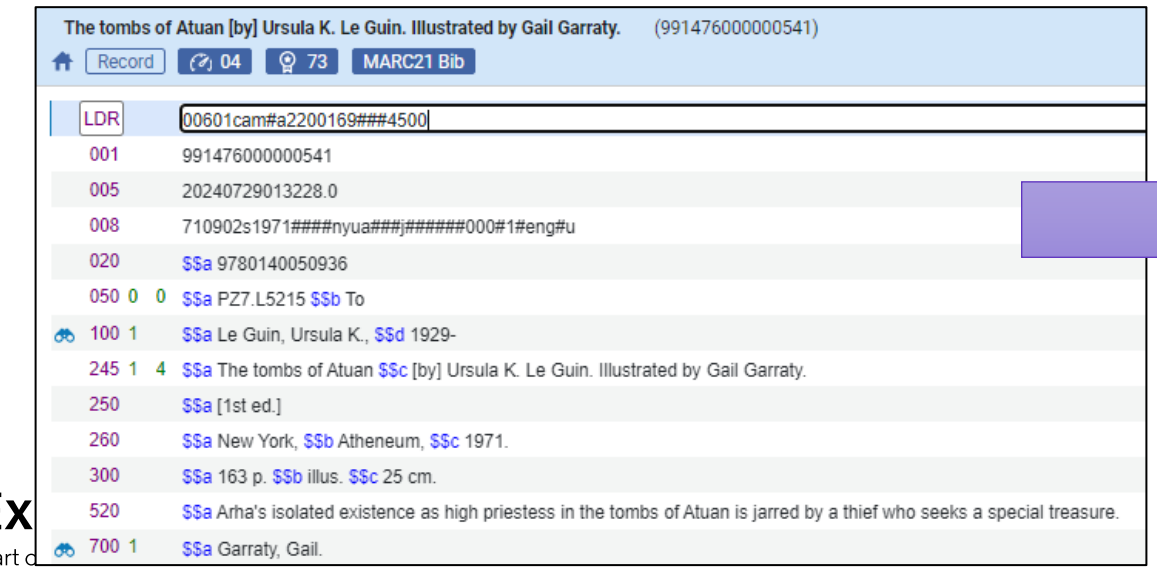
Record | New | AI Generated | 81 | MARC21 Bib

008			230000s2023####xxu##########000#1#eng##
020			$$a 9781592643554
041			$$a eng
100	1		$$a Agnon, S.Y. $$d 1887-1970
245	1	0	$$a Two scholars who were in our town and other novellas $$c S.Y. Agnon
264		1	$$a Jerusalem $$b Toby Press
336			$$a text $$b txt $$2 rdacontent
337			$$a unmediated $$b n $$2 rdamedia
338			$$a volume $$b nc $$2 rdacarrier
490	0		$$a The Toby Press S.Y. Agnon Library
500			$$a New and revised translations from the Hebrew including the novellas: Two Scholars Who Were in Our Town, In the Heart of the Seas, In the Prime of Her Life, Tehilla.
505	0		$$a Preface / Jeffrey Saks -- Two Scholars Who Were in Our Town / Paul Pinchas Bashan & Rhonna Weber Rogol -- In the Heart of the Seas / I.M. Lask -- In the Prime of Her Life / Gabriel Levin -- Tehilla / Walter Lever -- Annotated Bibliography -- About the Author, Translators & Editor
520			$$a Publisher description: "What makes Agnon so remarkable and an appropriate recipient of the Nobel Prize is that he is able to embody in his Talmudic world so much of our common humanity, and even of our common morality, so much of ironic humor and ironic but touching pathos, that he can be read, I should think, with appreciation by anyone who knows nothing at all of it." -- Edmund Wilson S.Y. Agnon (1888-1970) was the central figure of modern Hebrew literature, and the 1966 Nobel Prize laureate for his body of writing. His works deal with the conflict between traditional Jewish life and language and the modern world, and constitute a distillation of millennia of Jewish writing -- from the Bible through the Rabbinic codes to Hassidic storytelling -- recast into the mold of modern literature. $$7 Generated by AI
588			$$a Part of the metadata in this record was created with the help of AI
650		0	$$a Jewish fiction
650		0	$$a Hebrew literature
600	1	0	$$a Agnon, S. Y. $$d 1887-1970 $$v Translations into English
655		7	$$a Novellas $$2 lcgft
700	1		$$a Saks, Jeffrey $$e editor
830		0	$$a The Toby Press S.Y. Agnon Library

内部流程提高：Alma AI 编目助手

—— 扩充已有书目字段



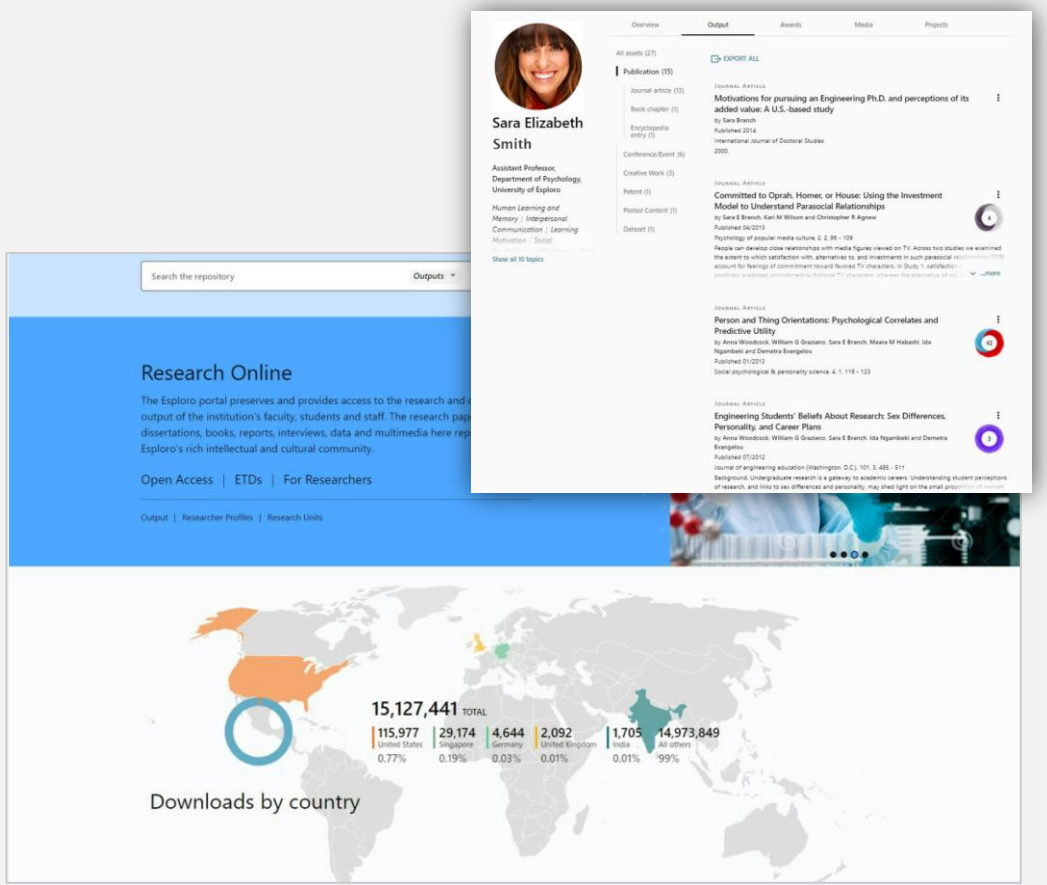


Ex

Part o

外部展示扩大：学者档案宣传Esploro

展示研究和影响力



SEO友好
提升检索可见度

与WOS作者档案无缝连接

通过AI自动更新WOS作者档案，减少研究人员和管理员人工管理

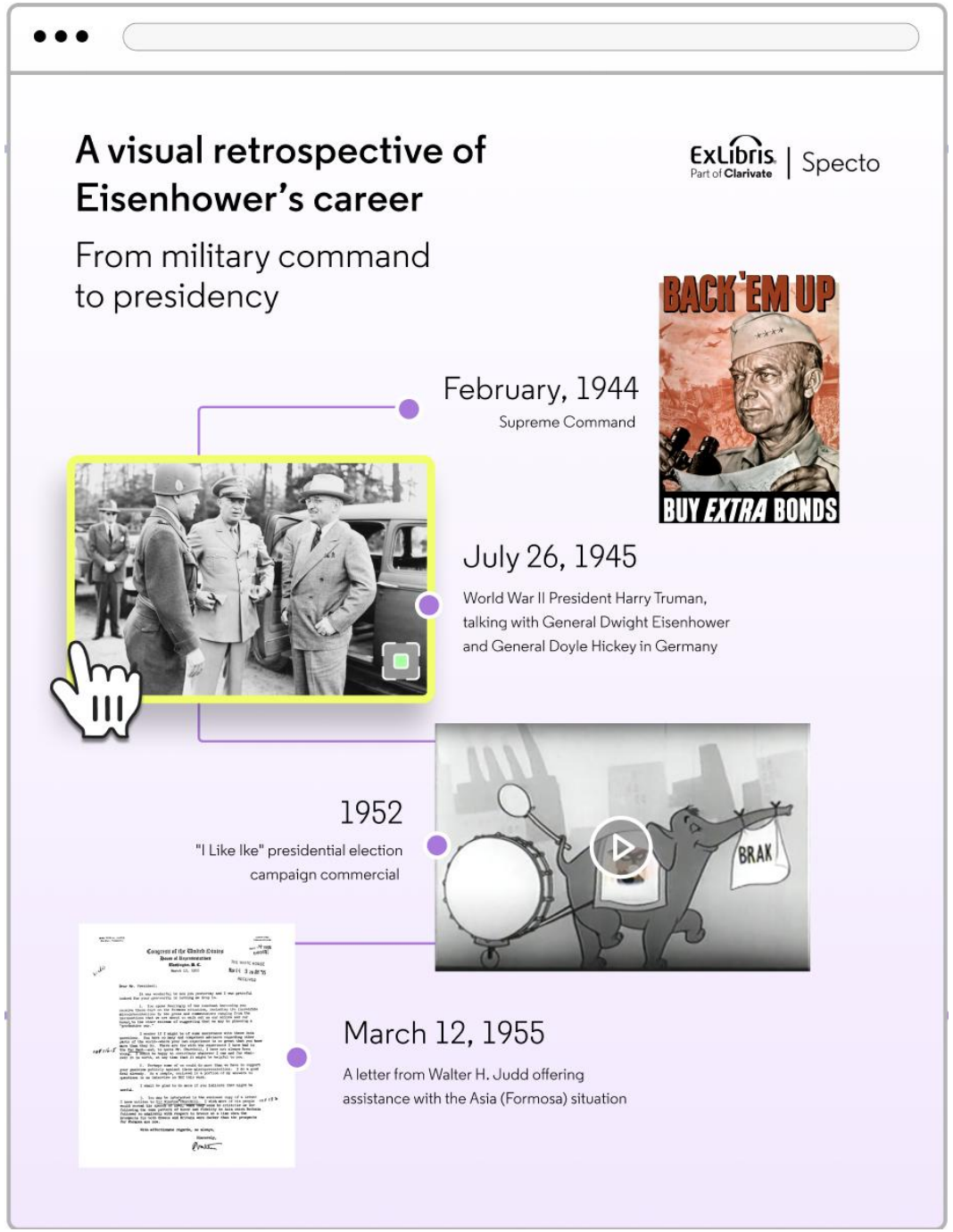
与ESI和InCites无缝集成增强研究人员档案的丰富性

强大的分析功能助力用量和学科分析评估报告

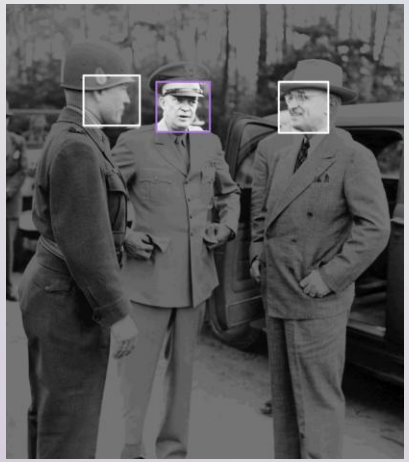
自动识别和标记符合开放获取要求的研究成果，提升研究可见度

外部展示扩大：特藏库保存记忆 Specto

- Wix – Timeline template
- https://napoleon.nli.org.il/eng/
- http://rambam.nli.org.il/
- https://www.acpl.lib.in.us/
- https://www.orionlibrary.org/



Specto示例：图片自动创建元数据



Title:
President Truman with Generals Eisenhower and Hickey during WWII

Date:
- Truman, Harry S., 1884-1972
- Eisenhower, Dwight D. (Dwight David), 1890-1969
- Hickey, Doyle O. (Doyle Overton), 1891-1961
- Presidents--United States--History--20th century
- Generals--United States--History--20th century
- World War, 1939-1945--United States
- Military leadership--United States--History--20th century

Description:
This historical photograph captures a moment from World War II featuring three prominent figures. President Harry S. Truman is seen conversing with General Dwight D. Eisenhower and General Doyle Hickey. The image, set against a backdrop of trees and military vehicles, likely depicts a significant meeting or inspection during the war. Truman, dressed in a suit and hat, exudes a calm and authoritative presence, while Eisenhower and Hickey, in their military uniforms, engage with him attentively. The photograph reflects the close collaboration and leadership crucial to the Allied war effort. This moment underscores the strategic discussions and decisions that shaped the course of the war.

NER 命名实体识别

- **Person:** Harry Truman
- **Person:** Dwight D. Eisenhower
- **Person:** Doyle O. Hickey
- **Period:** World War ||
- **Location:** Germany

Metadata Update元数据更新

Person: Truman, Harry S., 1884-1972

Person: Eisenhower, Dwight D. (Dwight David), 1890-1969

Person: Hickey, Doyle O. (Doyle Overton), 1891-1961

Period: World War, 1939-1945--United States

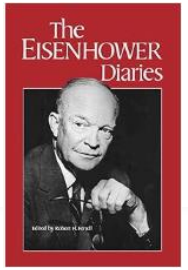
Location: Germany

Geolocation Coordinates: 51°N, 10°E

Linking关联数据

LIBRARY LIBRARY OF CONGRESS

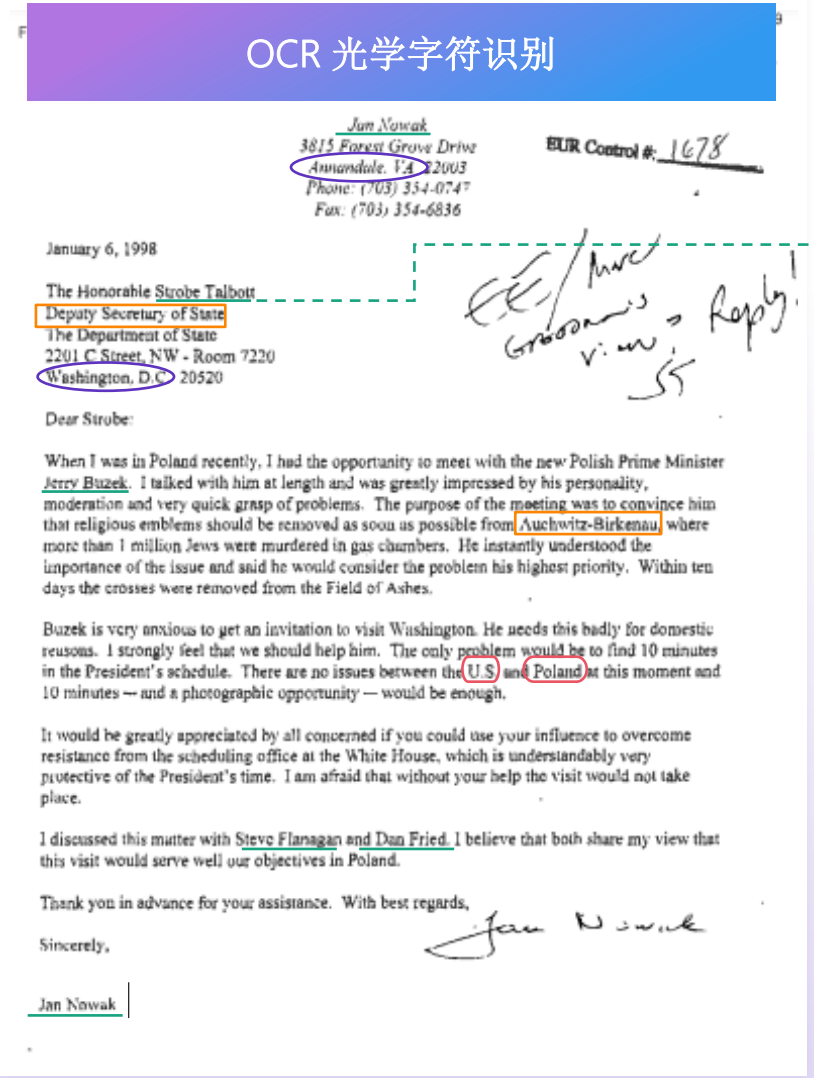
WIKIPEDIA



ExLibris
Part of Clarivate

Specto示例：文档自动创建元数据

OCR 光学字符识别



Jan Nowak
3815 Forest Grove Drive
Annandale, VA 22003
Phone: (703) 354-0747
Fax: (703) 354-6836

EUR Control #: 1678

January 6, 1998

The Honorable Strobe Talbott
Deputy Secretary of State
The Department of State
2201 C Street, NW - Room 7220
Washington, D.C. 20520

Dear Strobe:

When I was in Poland recently, I had the opportunity to meet with the new Polish Prime Minister Jerzy Buzek. I talked with him at length and was greatly impressed by his personality, moderation and very quick grasp of problems. The purpose of the meeting was to convince him that religious emblems should be removed as soon as possible from Auschwitz-Birkenau where more than 1 million Jews were murdered in gas chambers. He instantly understood the importance of the issue and said he would consider the problem his highest priority. Within ten days the crosses were removed from the Field of Ashes.

Buzek is very anxious to get an invitation to visit Washington. He needs this badly for domestic reasons. I strongly feel that we should help him. The only problem would be to find 10 minutes in the President's schedule. There are no issues between the U.S. and Poland at this moment and 10 minutes — and a photographic opportunity — would be enough.

It would be greatly appreciated by all concerned if you could use your influence to overcome resistance from the scheduling office at the White House, which is understandably very protective of the President's time. I am afraid that without your help the visit would not take place.

I discussed this matter with Steve Flanagan and Dan Fried. I believe that both share my view that this visit would serve well our objectives in Poland.

Thank you in advance for your assistance. With best regards,

Sincerely,

Jan Nowak

NER 命名实体识别

Person

- Jan Nowak (Sender)
- Strobe Talbott (Recipient, Deputy Secretary of State)
- Jerzy Buzek (Polish Prime Minister)
- Steve Flanagan (Discussed matter with)
- Dan Fried (Discussed matter with)

Organizations

- The Department of State
- Auschwitz-Birkenau (Contextual reference)

Cities

- Annandale, VA (Address of sender)
- Washington, D.C. (Location of the Department of State)

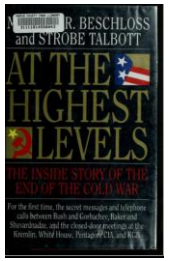
Countries

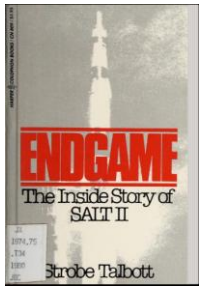
- United States (Country of recipient and referenced for visit)
- Poland (Country of the Polish Prime Minister and context)

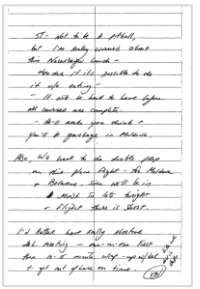
Linking 关联数据

LIBRARY OF CONGRESS

WIKIPEDIA







Ex Libris
Part of Clarivate

新技术下的图书馆服务新趋势

信息与知识共享
开放科学
多元文献
从所有者到共享者

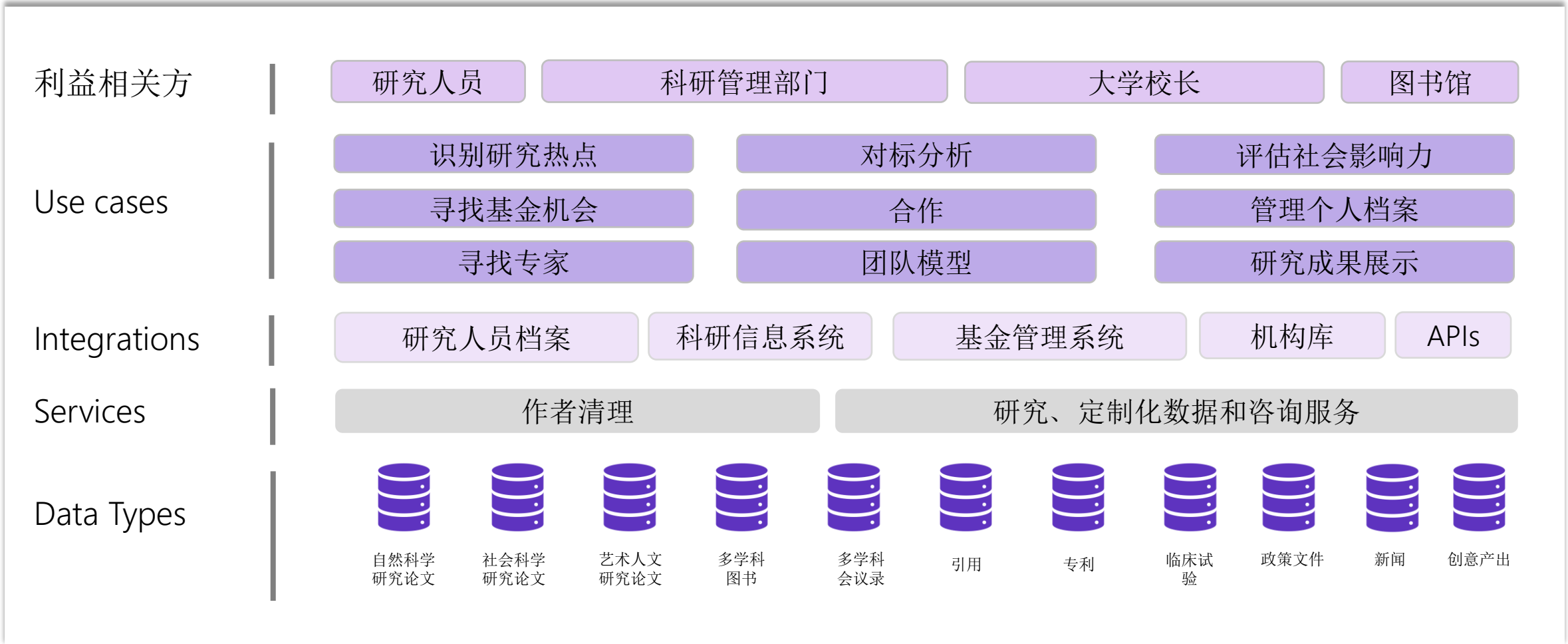
技术与服务创新
内部流程提升
外部展示扩大

信息素养提升
科研效率
科研效果

个性化服务与体验
融合更多数据
符合学科特色的多元评估
团队定制化服务

Web of Science Research Intelligence

AI驱动的全面科研情报平台



Clarivate™

下一代科研分析平台：Web of Science Research Intelligence

统一解决方案

基金、科研人员和对标分析的统一平台

AI驱动

未来证明和可适应性

金标准数据

WOS + 其他出版物、专利、临床试验、政策文件等

社会影响力框架

超越出版物的社会影响力分析

问答式分析

简洁提问，综合回答

动态情境模型

招聘合适人才，获得更多基金

主动推荐

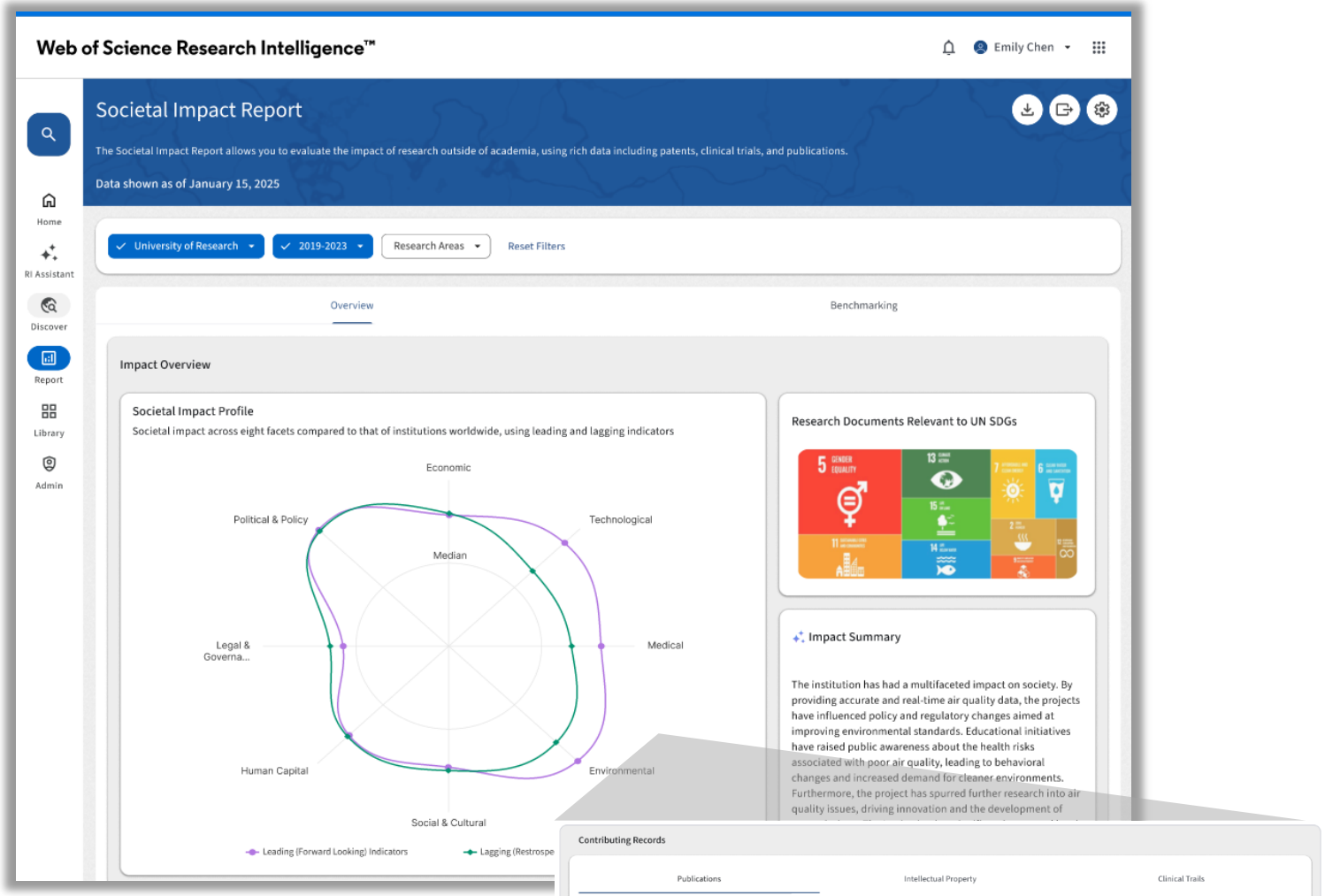
主动推荐合作者、项目

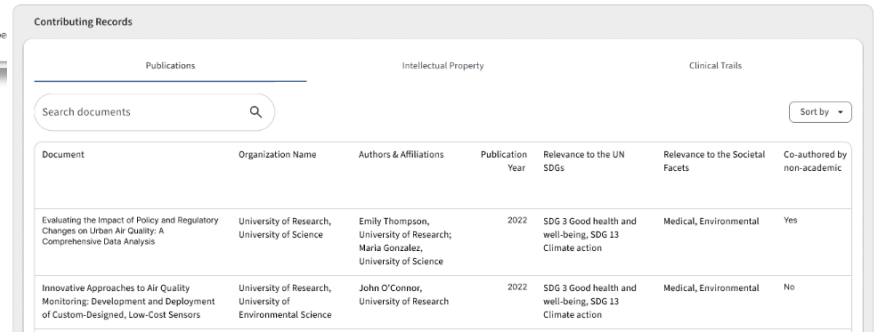
ISI

超过50年的科研评估研究经验

Clarivate™

衡量并展示你的影响力



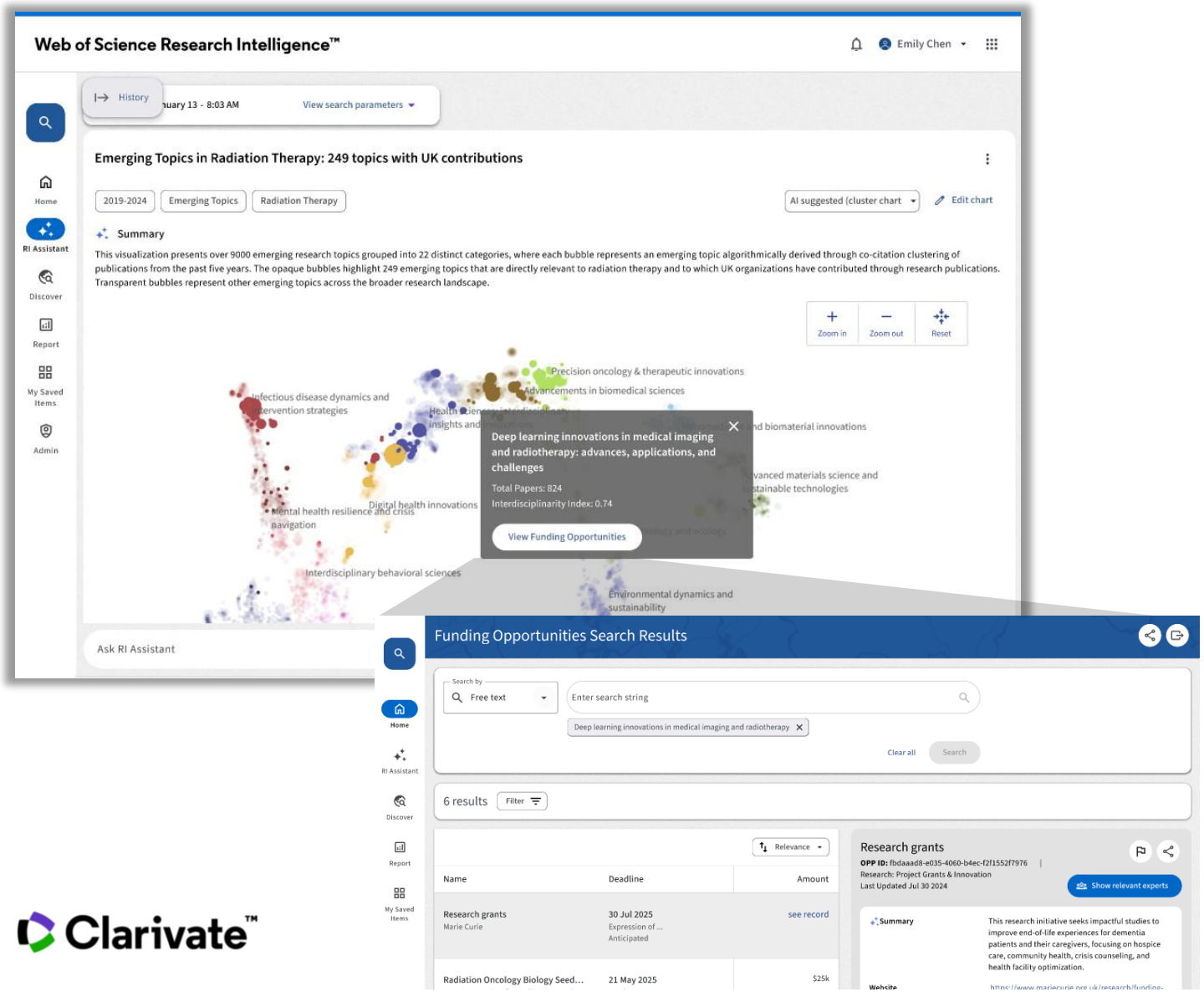


全新的社会影响力模型，用来评估研究更全面的影响

Measuring the full impact of research

Clarivate™

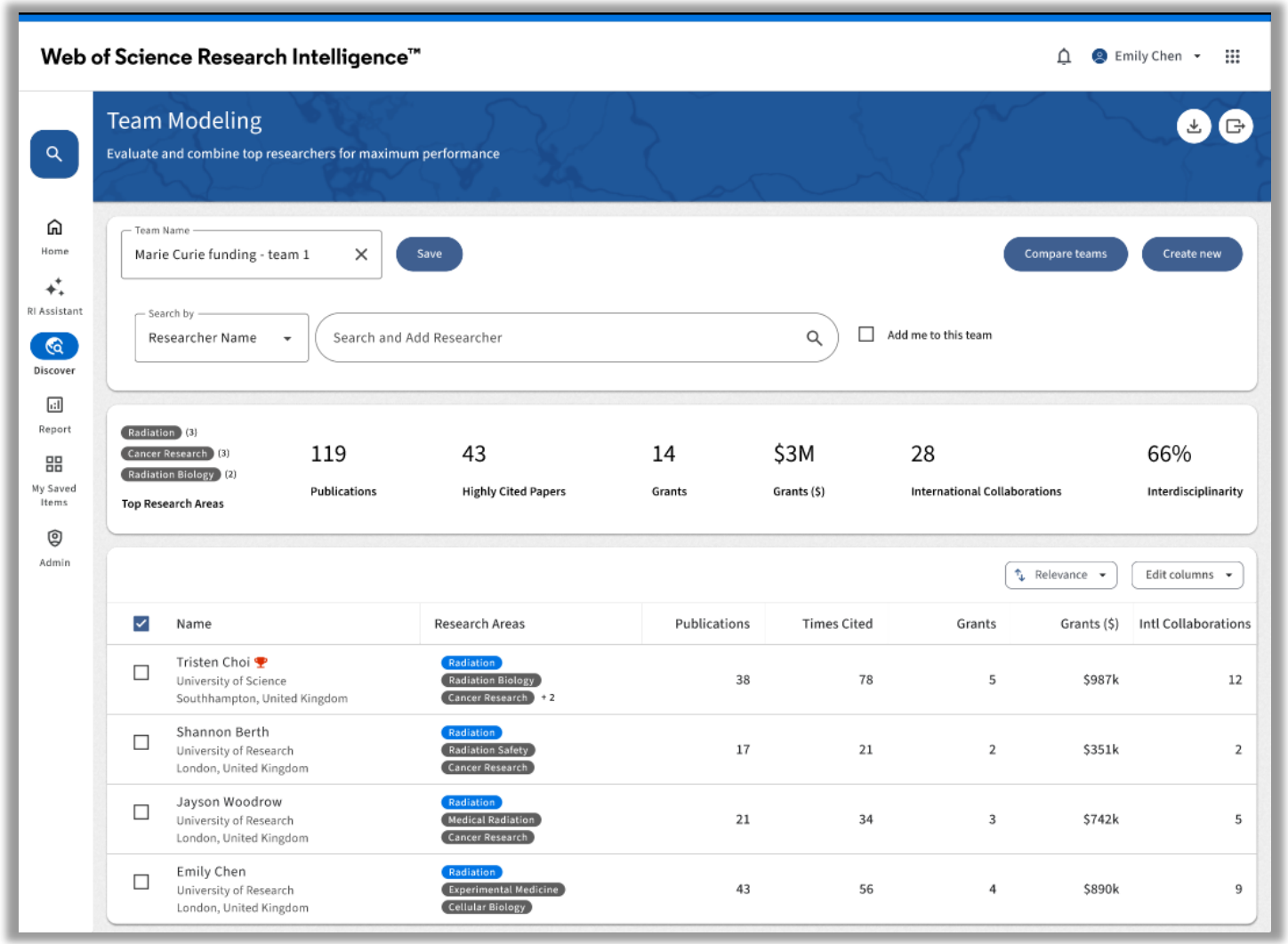
全面数据融合



基金、新兴研究领域和传统的文献数据汇集在一起，揭示科研趋势

Increasing research funding income

打造卓越科研团队



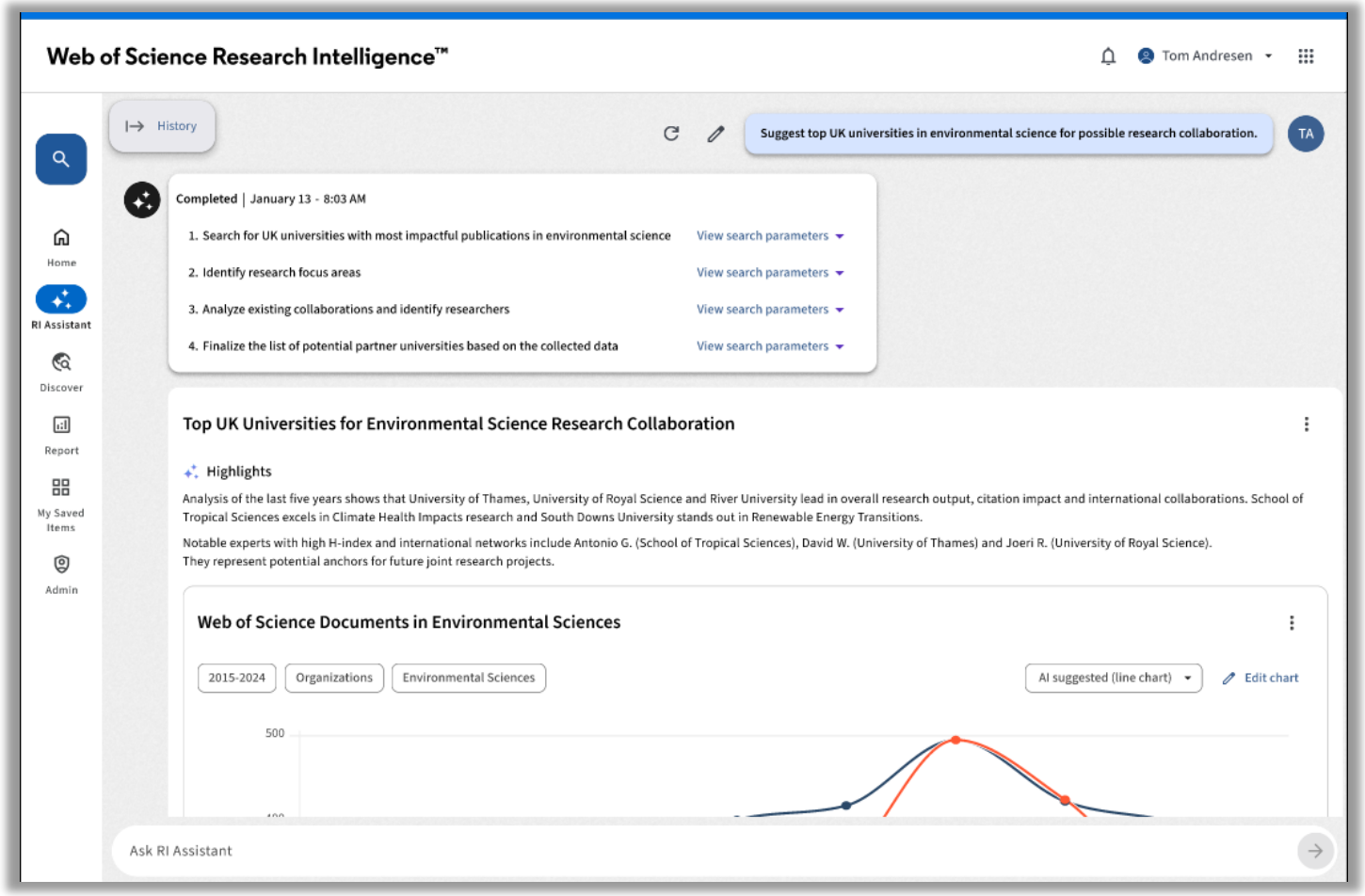
AI驱动的建模功能，可模拟建立团队，协助人才评估、合作与招聘

同时可选择部分数据和指标对外公开展示。

Building stronger research teams

Clarivate™

AI驱动的会话分析



自然语言对话及结果自动解读，配合高级分析功能，不管是新手还是数据分析专家都可以无门槛使用

Clarivate™

新技术下的图书馆服务新趋势

信息与知识共享
Rapido Starter

技术与服务创新
Alma Metadata
Esploro
Specto

信息素养提升
Research Horizon Navigator
WOS Research Assistant
Primo/Summon Research Assistant
ProQuest Research Assistant

个性化服务与体验
Web of Science Research Intelligence

Clarivate学术 AI聚焦于:

研究助理
AI驱动的研究&发现能力

Web of Science
已发布 (2024年9月)

Primo
已发布 (2024年9月)

ProQuest
beta版已发布 (202

Summon
已发布 (2025年3月)

Ebook Central
2025年4月

EndNote
2025年Q2)

分析助理
全新的方式使用数据并洞察研究

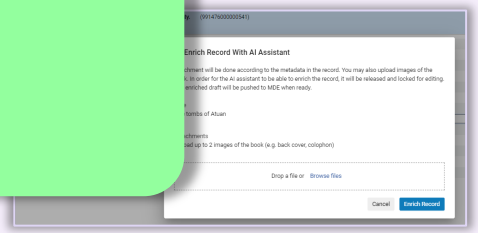
Web of Science Research Intelligence
2025年8月开始开发合作者版

TDM Studio (LLM access)
Beta 版发布于 2024年10月

编目助理
提升效率并优化发现能力

Alma Metadata Assistant
已发布 (2024年11月)

Specto
已启动开发合作者项目，2025年发布



学习助理
助力学习提升学习能力

Alethea
已发布 (2023)

Leganto
beta版将于2025年4月发布

系统使用助理
提升工作效率

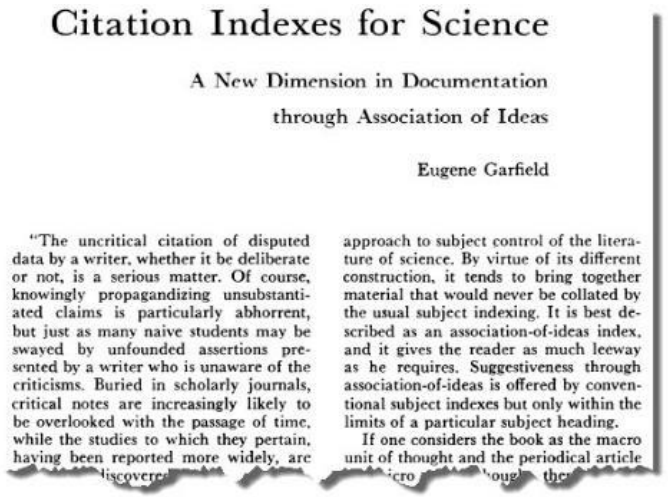
Knowledge Assistant
已发布 (2024年9月)

Clarivate 学术AI平台

关注官方平台，第一时间获取最新资讯！

科睿唯安
微信公众号

The only thing you absolutely need to know is the location of the library.
Albert Einstein



Citation Indexes for Science

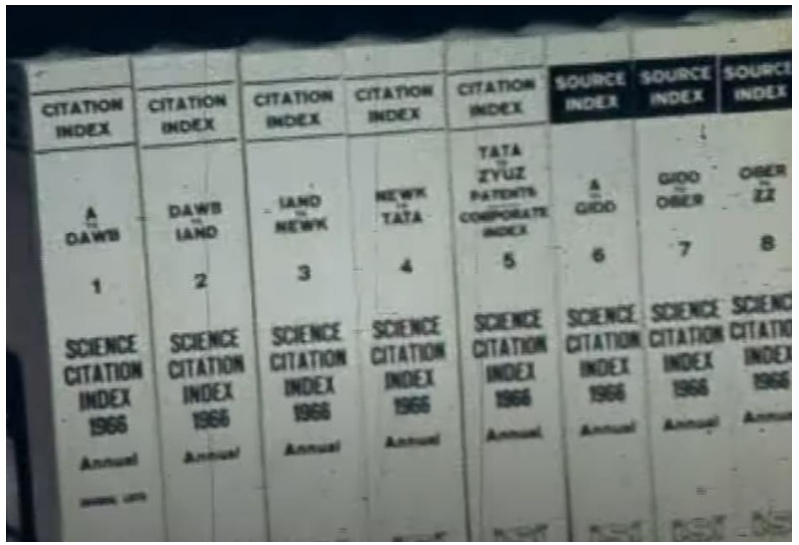
A New Dimension in Documentation through Association of Ideas

Eugene Garfield

"The uncritical citation of disputed data by a writer, whether it be deliberate or not, is a serious matter. Of course, knowingly propagandizing unsubstantiated claims is particularly abhorrent, but just as many naive students may be swayed by unfounded assertions presented by a writer who is unaware of the criticisms. Buried in scholarly journals, critical notes are increasingly likely to be overlooked with the passage of time, while the studies to which they pertain, having been reported more widely, are

approach to subject control of the literature of science. By virtue of its different construction, it tends to bring together material that would never be collated by the usual subject indexing. It is best described as an association-of-ideas index, and it gives the reader as much leeway as he requires. Suggestiveness through association-of-ideas is offered by conventional subject indexes but only within the limits of a particular subject heading.

If one considers the book as the macro unit of thought and the periodical article



Clarivate™

王炜

w.wang@clarivate.com

18500022692

Clarivate™

About Clarivate

Clarivate is the leading global information services provider. We connect people and organizations to intelligence they can trust to transform their perspective, their work and our world. Our subscription and technology-based solutions are coupled with deep domain expertise and cover the areas of Academia & Government, Life Sciences & Healthcare and Intellectual Property. For more information, please visit clarivate.com