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Repository Review: NASA PubSpace

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ADVISOR REVIEWS—STANDARD REVIEW

NASA PubSpace

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Composite Score: ★★★ 1/2

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Abstract

PubSpace is a repository of full-text peer-reviewed articles resulting from NASA-funded research going back to 1961. The National Center for Biotechnology Information has integrated PubSpace into PubMed Central, a freely available repository of medical research. Using an established, stable, government-hosted platform for PubSpace seems to make sense. However, the lack of clear branding, an uneven application of phrase searching, and a missing thesaurus of NASA terminology highlights that this integration may not be the best.

Pricing Options

Free. The majority of the articles within NASA PubSpace are freely available. There are a limited number of embargoed articles that will become freely available when the embargo ends.

Product Overview/Description

NASA PubSpace <https://www.ncbi.nlm.nih.gov/pmc/funder/nasa/> is intended to "permanently preserve and provide easy public access to the peer-reviewed papers resulting from NASA-funded research" in accordance with the 2013 policy from the Office of Science and Technology regarding increasing public access to data that results from federally-funded research (PubSpace, 2016). It is intended to be a repository of "original science journal articles" that is open to the public and scientific communities (Brown, 2016).

To create this repository, NASA partnered with the National Library of Medicine which produces PubMed Central a freely-available archive for medical research articles. PubSpace has been integrated directly into PubMed, so that searchers of PubMed will retrieve results from both PubMed and PubSpace. It is possible to search just PubSpace using either the URL above or by filtering a PubMed search by funding source and selecting NASA.

User Interface/Navigation/Searching

The initial screen for PubSpace makes searching seem simple as it provides a clean interface with a single search box similar to Google (see Figure 1). The Search Results page provides a three-column layout: filters on the left, results in the center, and additional filters and details on the right. Branding identifies the results as being from PubMed Central, so that users who follow a search link to this site might not realize results are actually from PubSpace. It is only within the search box that a user can see the application of the filter "nasa funded" (see Figure 2).

Search results provide typical citation data with links to various different reading formats. Abstracts are not available within the search results themselves. Search limiters include publication date, research funder, and text availability. Limiting by research funder allows the inclusion of an additional grantor so that research funded by NASA and the NIH could be identified.

Results include check boxes for researchers to select certain articles. Those selected articles can then be e-mailed, downloaded, copied to a temporary clipboard, or added to a collection. Note that creating a collection requires the setting up of an account. Selecting items does not automatically deliver the full-text of the articles to the user. Instead the user receives the citations from the search results with links to the full-text in the different reading formats.

Searching uses the Boolean operators AND, OR, and NOT and requires that they be uppercase characters. PubSpace uses the asterisk (*) as the truncation wildcard character. Reading through PubMed Help reveals that PubMed does not use adjacency searching. If a user includes quotes around a phrase, and the phrase is not found through automatic term mapping, the quotes are ignored (PubMed, 2016). Automatic term mapping utilizes Medical Subject Headings (MeSH), which are not always useful in a search of NASA-funded publications.

FIGURE 1 PubSpace Home Screen

FIGURE 2 PubSpace Search Results via PubMed Central

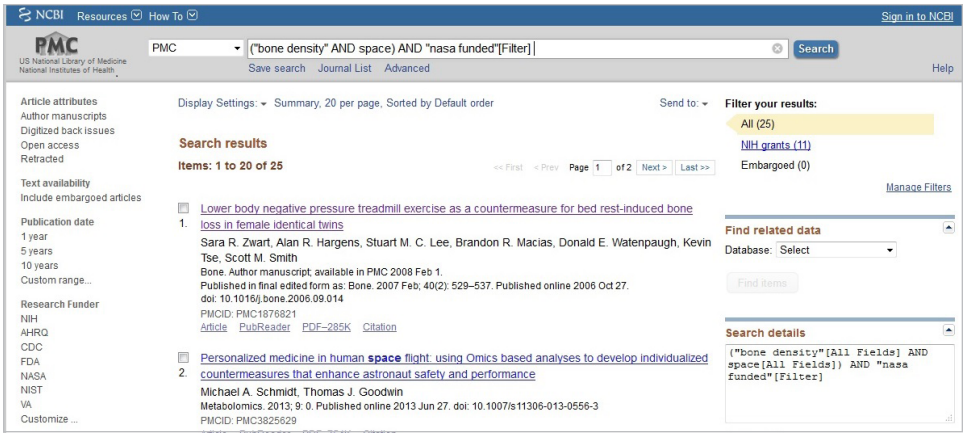
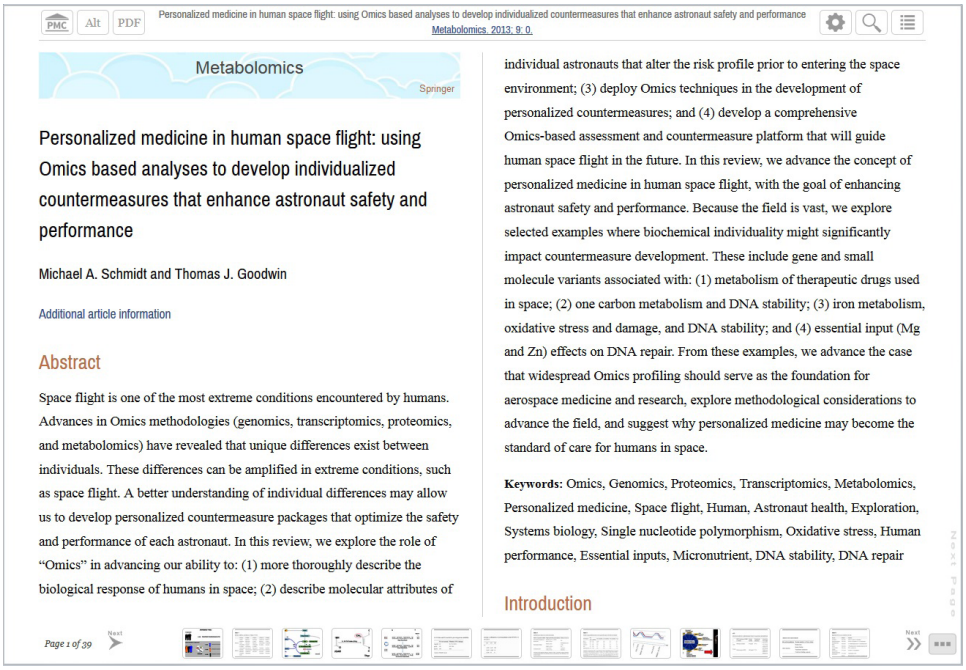


FIGURE 3 PubSpace Article in PubReader Format



The Advanced Search provides the user with the ability to combine prior searches, create new searches, and use field searches. There is an extensive list of fields such as DOI, table captions, grant numbers, references, as well as the standard fields of issue, journal, authors, or title. As search terms are added, an index list is generated with terms close to those input displaying the number of results available for each term. A user can also download his search history from the advanced search page for future reference.

Reading formats include Article, PubReader, PDF, and Citation. The Article format provides the traditional plain-text format with the article on the left and associated links on the right. Mousing over in-text citations or table or figure references, pops the associated information into a small window. The associated links lead to similar articles and publications that cite the current one. PubReader format provides a nicely formatted columnar layout with tables and figures clearly visible on a bar underneath the article for easy reference (see **Figure 3**). PubReader also allows the user to change the font size and select either a single or double column, provides a clickable table of contents, and a search within the article. PDF format provides the article in its published form. Citation yields a formatted citation in AMA, MLA, and APA formats and allows for downloading in RIS, NBIB, or JSON. Experiments with providing ePub format are in beta. The iBooks Reader is recommended for ePub format because there may be formatting problems with other readers.

Navigation through the search results uses standard browser controls. PubMed does not provide a way to scroll from article to article without first returning to the search results. In terms of accessibility, PubMed does a good job in labeling images with alt tags. The PubReader format also provides a very clean interface that makes it easy for a screen reader to distinguish the main text.

Critical Evaluation

The integration of PubSpace into PubMed meets the basic need of providing an online repository for NASA-funded research results. However, it is a bare bones approach that could be improved upon.

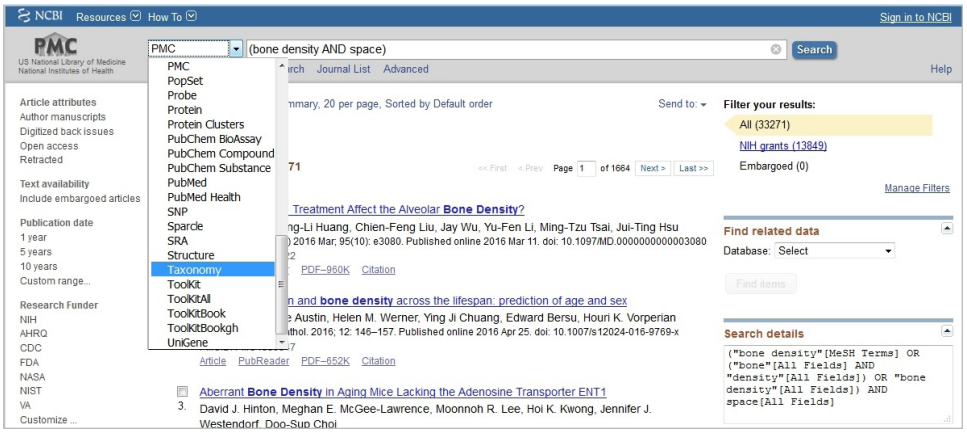


FIGURE 4 PubMed Central Search Options, Lacking PubSpace Indicator

Only the opening search screen makes it clear that the user is searching PubSpace. Every other screen is clearly branded as PubMed Central. Even the search box within the search results does not list PubSpace as a search option (see **Figure 4**). It is only within the filters that a researcher can find a limiter for "NASA" not for "PubSpace." This lack of branding can make it difficult for a user to differentiate what resource he is actually searching.

If a researcher accidentally removes "nasa funded [Filter]" from his initial search query, then he is searching all of PubMed Central. That is confusing for the average user. The automatic application of MeSH terminology to the search is not intuitive. Additionally, while there is a large body of research that pertains to health and physiology under space conditions, there is also a large amount that does not. Furthermore, though the Help pages state that adjacency searching is not used, it appears that there is an uneven application of phrase searching.

For example, the search: "optical illusion AND 'nasa funded'[Filter]" is actually interpreted as:

> ("optical illusions"[MeSH Terms] OR ("optical"[All Fields] AND "illusions"[All Fields]) OR "optical illusions"[All Fields] OR ("optical"[All Fields] AND "illusion"[All Fields]) OR "optical illusion"[All Fields]) AND "nasa funded"[Filter]

While the search: "space debris AND 'nasa funded'[Filter]" is interpreted as:

> (space[All Fields] AND debris[All Fields]) AND "nasa funded"[Filter]

Neither search used quotes, but they were applied in the first example. This is inconsistent and can lead to unpredictable search results.

It is also interesting to note the automatic exclusion of embargoed articles from search results. While the intent may be to direct individuals to only those articles that are freely available, the result is that researchers may miss articles that could be acquired through Interlibrary Loan or other means that are pertinent to their research. It is very easy to miss seeing the embargo filter in the search results that shows the number of articles hidden from view.

A major drawback is the lack of a thesaurus or index regarding NASA terminology. A user would expect to be able to browse or use subject filters regarding subjects such as atmosphere, space, oceanography, or environment, but cannot do so. This means that there is no resource to suggest alternate terms for failed searches. There is also no way to identify terms for further successful searches when an individual finds an article that meets his needs.

The lack of an abstract in the search results is disappointing. Often article titles are not descriptive and an abstract would help. The easiest way to get abstracts to show in the search results is to change the display setting to MEDLINE. This reformats the results as plain text with abstracts utilizing the Medline field identifiers. However, this is not a reader-friendly presentation of data and requires some familiarity with Medline fields. This again indicates that PubMed may not be the best resource to house and provide access to the publications within the scope of NASA-funded research.

An advantage of housing PubSpace within PubMed is the variety of reading formats that are available. This allows the researcher to download or read the articles in the format that works best for him. It provides ways for those who are visually impaired to either increase font size to a readable level or use a screen reader. Another useful feature is the integration of links to related articles and articles that have cited the current article. The thing to be aware of is that these links can lead to articles outside of the NASA-funded filter but within PubMed. For those articles that are not full text, there are links that lead to either the publisher site or an institutional repository.

Like commercial databases, PubMed/PubSpace allows a researcher to create an account. There are several benefits to doing so, including saving searches, being able to define collections, and receiving e-mails based on automated searches. If the e-mails could provide the citations in a standard citation format, it would be even better. However, the value to an individual of receiving automatic notification of new research pertaining to his area is incalculable.

Competitive Products

There are no direct competitors to PubSpace. However, there is another resource where the housing of publications based on NASA-funded research may have made more sense. The NASA Technical Reports Server (TRS) <https://ntrs.nasa.gov/search.jsp> is freely available and includes information from the NASA Scientific and Technical Information (STI) Program.

The NASA TRS tagline is "Providing Access to NASA's Technology, Research, and Science" which seems to fit the directive that established PubSpace (NASA, 2017). A search of NASA TRS demonstrates that there is already some duplication of content with PubSpace covering everything from solar winds to climate change to the effect of space on bone density.

An advantage that NASA TRS has over PubSpace is that abstracts are included within search results. Additionally, there are defined subject terms that fit the information being sought. It is, therefore, possible to find a record and identify terminology that can be used in further research. A user can also scroll from full record to full record, which he

NASA PubSpace Review Scores Composite: ★★★ 1/2

The maximum number of stars in each category is 5.

Content: ★★★★

PubSpace currently provides full-text access to 949 articles resulting from NASA-funded research published from 1961 to the present. Many of these articles are not available through other NASA resources.

User Interface/Searchability: ★★★

Because PubSpace has been integrated into PubMed, the branding of the interface may confuse some searchers. Searching is not intuitive, and the uneven application of MeSH automatic term mapping leads to surprisingly different search results.

Pricing: N/A

Purchase/Contract Options: N/A

Free Text Keywords: NASA | Aeronautics | Space | Government

Primary Category: Government Information

Secondary Categories: Medicine, Nursing & Health; Science, Technology, Computers, Engineering (including Environment)

Type of product being reviewed: Abstracting & Indexing; Publisher or Organization content/repository

Target Audience (Put an X in as many boxes as apply): Undergraduate (including community colleges); Graduate/Faculty/Researcher

Access: Open Access (OA)

cannot do in PubSpace. Phrase searching is available and works consistently. This resource allows the user to not only search, but also to browse information by availability, document type, publication date, and NASA center. This could be expanded with another filter for NASA-funded research.

A disadvantage is that there is a lack of full text. While NASA TRS provides some full text, it is not to the extent available in PubSpace. Additionally, when full-text is available, it is only in PDF format. However, the lack of full text and the lack of reading formats could be overcome.

Purchase & Contract Provisions

PubSpace is freely available to everyone. PubMed launched in 2000 and "is designed to provide permanent access to all of its content" (NCBI, 2011). They are dedicated to ensuring ongoing access to all of the content, including PubSpace.

Authentication

There is no authentication needed.

Contact Information

PubMed Central
National Center for Biotechnology Information
U.S. National Library of Medicine
8600 Rockville, Pike
Bethesda, MD 20894
E-mail: <pubmedcentral@ncbi.nlm.nih.gov>
Product URL: <https://www.ncbi.nlm.nih.gov/pmc/funder/nasa/>
Producer URL: <https://www.ncbi.nlm.nih.gov/pmc/>

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About the Author

Laura Pope Robbins is the Associate Director of Library Access Services at Embry-Riddle Aeronautical University, Prescott Campus. She holds an MBA in Information Systems Management from Dowling College and an MLS from the University of Washington. Her research interests include anime, copyright, usability, and online training. During her free time, she studies bookbinding and Japanese, and hikes with her family. ■