New metrics and tools for evaluating the impact of NIH-funded research

Council of Councils January 27, 2017

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Mission of the NIH Office of Portfolio Analysis (OPA)

• Coordination of portfolio analysis activities at NIH

- Plan and host seminars, workshops, and symposia
- Create opportunities for crosstalk within the NIH community
 Portfolio Analysis Interest Group and blog (*The Analyst*)
- Training
 - Formal classes, ad hoc sessions, and office hours
 - OPA web site: user manuals, FAQs, etc.

Consultation & other services

- Conduct analyses for NIH senior leadership
- Data acquisition, data cleaning, database management
- Assist NIH staff in the 27 Institutes and Centers (ICs) with analyses
 Has resulted in collaborative development of tools, case studies, etc.
- Developing a science of portfolio analysis
 - Establish and disseminate best practices in analysis and validation
 - Develop new tools / approaches and augment pre-existing ones
 - Build a community of experts: government, academia, private sector



OPA iTools suite to find gaps and new opportunities, flag overlap, and evaluate project outcomes

- Data-driven approaches to characterize research investments and the resulting impact
- Validated and effective methodology
 - OPA offers training in portfolio analysis methodologies, including specific training in the use of OPA iTools, to all NIH staff:

Functionality	Τοοί
Content analysis	IN-SPIRE and Word2vec
Efficient disambiguation	iClean
Effective bibliometrics	iCite
Map translational science	iTrans
Frack patents, licensing, start-up activity	<i>iTech</i> (in dev.)
NextGen portfolio analysis platform	iSearch



A new way to measure the influence of NIH awards on progress in biomedical science



Diversified metrics are needed in research assessment: tracking bench-to-bedside translation





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Tracking translational development with *iTrans* Example: Cancer immunotherapeutic agents









Towards assessment of scientific impact that is multi-faceted, article-level, and open access





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	Journal	Total # of pubs	Influential pubs = I (# in RCR top quintile)	Translating pubs = T (# cited by CT/CG)	I+1
1	PLoS ONE	4792	521	599	1120
2	J. Biol. Chem.	1916	248	99	347
3	Proc. Natl. Acad. Sci. U.S.A.	1752	637	229	866
4	J. Neurosci.	928	282	140	422
5	J. Virol.	703	104	76	180
6	Blood	697	230	274	504
7	J. Immunol.	695	91	106	197
8	J. Am. Chem. Soc.	685	216	1	217
9	Biochemistry	552	37	6	43
10	Biochim. Biophys. Acta	458	106	36	142
11	Neuroimage	432	168	152	320
12	Nature	430	359	161	520
13	Nucleic Acids Res.	427	105	23	128
14	Cancer Res.	369	118	86	204
15	Invest. Ophthalmol. Vis. Sci.	366	76	74	150
16	PLoS Genet.	365	70	28	98
17	Clin. Cancer Res.	351	119	159	278
18	Cell	347	266	54	320
19	Science	341	236	68	304
20	PLoS Pathog.	313	106	49	155
21	J. Clin. Invest.	284	141	94	235

All NIH-funded pubs from the 21 most frequent venues in 2012





iSearch

NextGen portfolio analysis platform

History:

- Developed for analysts in the Office of Portfolio Analysis who needed:
 - Fast and sophisticated search capabilities
 - Integration with new OPA tools for evaluation
 - Large datasets
 - Clean and fully interconnected data
- September 2016: Based on utility, we decided to make a beta version available to NIH staff
- January 2017: Release 1.0 delivered to all NIH staff



iSearch

NextGen portfolio analysis platform

Provides comprehensive, easy-to-use access to a carefully curated, extensively linked datasets

- awards made by other funders, both domestic and international
- publications
- clinical trials
- patents
- approved drugs
- investigators, including mentor/mentee
 relationships, longitudinal studies, etc. (in dev.)



iSearch

• Fast

- Highly tuned document indexes provide subsecond query times over millions of funded and unfunded grants, tens of millions of publications, tens of millions of patents, and hundreds of thousands of clinical trial and drug records
- Easy-to-use
 - Google-like free text queries, NIH-specific search filters, and real-time drill down make data exploration quick and accurate
- Comprehensive
 - >4 million funded and unfunded NIH grant applications from 1975 to now
 - >3 million non-NIH grant records from over 200 funders
 - 26 million publications, 11.6 million patents, 223,000 clinical trials, and 32,000 approved drug records



iSearch

• Flexible

- Numerous combinations of search fields and filters make it possible to find answers to complex questions quickly
- Search grants with approved drugs, find patents by grant number, filter publications by admin IC, limit grants by number of publications, export search results directly to <u>iCite</u> or <u>iTrans</u>.
- Expressive
 - Free text search supports a full range of boolean, phrase, proximity, exact, and wildcard searches over a number of customizable search fields
- Up-to-date
 - The latest IMPACII data is cleaned and linked with publications and patents, updated daily
 - Publications and clinical trials, updated daily
 - Patents, drug approvals and RCR values, updated monthly



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National Institutes of Health Office of Portfolio Analysis

OUR OFFICE

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- CONSULTATIONS
- MEETINGS AND WORKSHOPS
- OPA NEWS



***NEW NIH scientists develop new metric to measure influence of scientific research 🖄

The OPA Tools Lab is located in Building 1, Room B301

For updates on training and other OPA activities, please sign up for our **listserv**

If you you have any question, please contact us



WHO WE ARE

The Office of Portfolio Analysis (OP/ Program Coordination, Planning, an Director (OD).

National Institutes of Health

OPA is an interdisciplinary team decision makers and research emerging areas of

WHAT WE DO

- We teach and support portfolio a
- one consultations
- We innovate and expand NIH-wi data tools
- We actively coordinate portfolic among all portfolio analysis stake a blog (The Analyst), and bi-me

LATEST NEWS

OPA Director George Santangelo ar describing their novel metric, know exciting news...