

AB testing / Search / Recommendations

Roman Chyla and the ADS Team

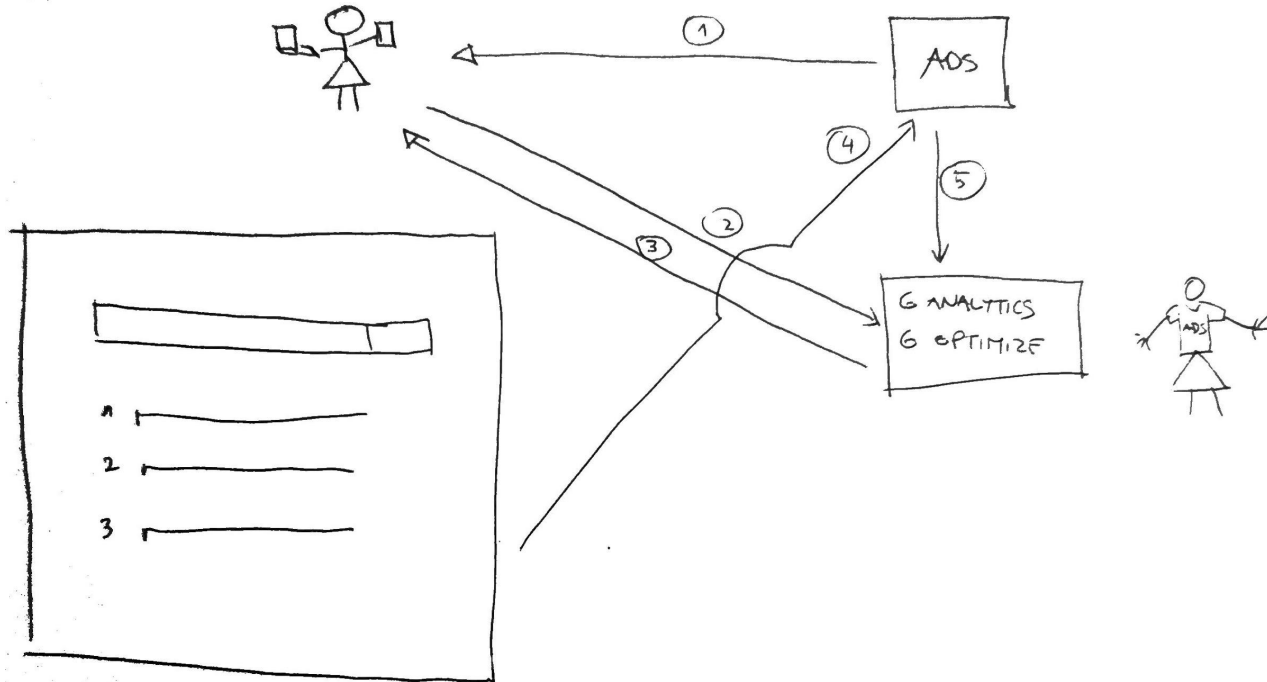
ADS Users Group Meeting, 19-20 Nov. 2020



Overview

- A/B Testing
 - To measure impact of changes on user behaviour
- Recommendations
 - First real-life experiment
- Search Engine
 - Many small updates
 - One big: upgrade of the codebase

A/B Overview



A/B Testing

- Deploy multiple versions to the [client](#) (UI)
 - Users are unaware of participating in an experiment
 - “Experiment with ID: 4Sq1k0daScCOQKa1IBX9AA is on variant: 2”
 - Potentially running multiple experiments simultaneously
- Measuring user behaviour
 - Tracking actions/events
 - Plans for the future: analyze user behaviour across time
 - Step 0: searched
 - Step 1: clicked *ith* result (and spent X seconds reading)
 - Step 2: changed search parameters (unhappy with results, went back/left)
 - The time as a very important but hard to capture dimension

"AbsExportButtonUp" has a 100% probability to be best. [Learn more.](#)

COLLECTED SESSIONS

860,498

DAYS

27

[View full chart](#)



STARTED MANUALLY:

Wed, Jul 15, 2020, 3:49 PM EDT

ENDED:

Mon, Aug 10, 2020, 9:56 PM EDT

Interaction PRIMARY

Based on Google Analytics data as of Mon, Aug 10, 2020, 5:49 PM EDT.

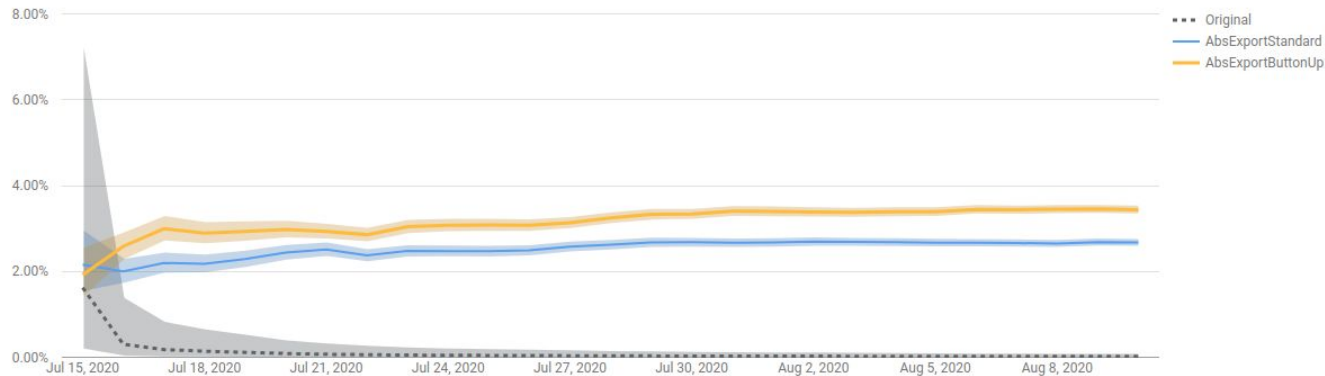
[View in Analytics](#)



	OBSERVED DATA			OPTIMIZE ANALYSIS			
	Experiment Sessions	Experiment Conversions	Calculated Conversion Rate	Probability to be Best	Probability to beat Original	Modeled Conversion Rate	Modeled Improvement
<input checked="" type="checkbox"/> Variant ↑							
<input checked="" type="checkbox"/> Original	43,459	5	0.01%	0%	Baseline	<0.1% <0.1%	Baseline
<input checked="" type="checkbox"/> AbsExportStandard	409,174	10,939	2.67%	0%	100%	2.6% 2.8%	3,406% to 129,737%
<input checked="" type="checkbox"/> AbsExportButtc	407,865	14,027	3.44%	100%	100%	3.3% 3.5%	4,406% to 166,512%

Modeled Conversion Rate

All Last 7 days



Recommendations



QUICK FIELD: [Author](#) [First Author](#) [Abstract](#) [Year](#) [Fulltext](#)

Recommendations

[Search examples](#)

[The completed SDSS-IV extended baryon oscillation spectroscopic survey: growth rate of structure measurement from anisotropic clustering analysis in configuration space between redshift 0.6 and 1.1 for the emission-line galaxy sample](#)

Tamone, Amélie; Raichoor, Anand; Zhao, Cheng ...

[The Completed SDSS-IV extended Baryon Oscillation Spectroscopic Survey: exploring the halo occupation distribution model for emission line galaxies](#)

Avila, S.; Gonzalez-Perez, V.; Mohammad, F. G. ...

[The completed SDSS-IV extended baryon oscillation spectroscopic survey: geometry and growth from the anisotropic void-galaxy correlation function in the luminous red galaxy sample](#)

Nadathur, Seshadri; Woodfinden, Alex; Percival, Will J. ...

[Removing imaging systematics from galaxy clustering measurements with Obiwan: application to the SDSS-IV extended Baryon Oscillation Spectroscopic Survey emission-line galaxy sample](#)

Kong, Hui; Burleigh, Kaylan J.; Ross, Ashley ...

[Beware of commonly used approximations. Part I. Errors in forecasts](#)

Bellomo, Nicola; Bernal, José Luis; Scelfo, Giulio ...

[A brief review on cosmological analysis of galaxy surveys with multiple tracers](#)

Wang, Yuting; Zhao, Gong-Bo;

[Open Cluster Chemical Homogeneity throughout the Milky Way](#)

Poovelil, Vijith Jacob; Zasowski, G.; Hasselquist, S. ...

Recommendations

- Second “real” experiment
 - Based on existing implementation of the search (plus one new operator)
 - `similar(user) AND entdate:[NOW-5DAYS TO *]`
 - `trending(user) AND`
 - Interesting discussion leading up to the experiment
 - Do we have enough users?
 - *Do people even see/care for the area under the search bar?*
 - Can we generate meaningful recommendations?
 - Answers are pretty clear-cut
 - Perhaps not what some hoped for, but it is quite nice to have “hard” data

RUNNING



"similar()" is the leader - End the experiment

Deploy leader

End

Deploy "similar()" which has a 100% probability to be best. [Learn more.](#)

ACTIVE VISITORS

178

COLLECTED SESSIONS

817,465

DAYS

21

[View full chart](#)



STARTED MANUALLY:

Tue, Oct 20, 2020, 6:02 PM EDT

EXPIRATION SCHEDULED:

Mon, Jan 18, 2021, 5:02 PM EST

Interaction PRIMARY

Based on Google Analytics data as of Mon, Nov 9, 2020, 5:16 PM EST. ⓘ

[View in Analytics](#)



	OBSERVED DATA			OPTIMIZE ANALYSIS			
	Experiment Sessions	Experiment Conversions	Calculated Conversion Rate	Probability to be Best	Probability to beat Original	Modeled Conversion Rate	Modeled Improvement
<input checked="" type="checkbox"/> Variant ↑ <input checked="" type="checkbox"/> Original 👤 10 active visitors	33,009	0	0.00%	0%	Baseline	0.0% 0.0%	Baseline
<input checked="" type="checkbox"/> similar() 🟢 👤 81 active visitors	389,779	295	0.08%	100%	100%	<0.1% <0.1%	922,337,203,685,478% to 922,337,203,685,478%
<input checked="" type="checkbox"/> trending() 👤 87 active visitors	388,113	172	0.04%	<1%	100%	<0.1% <0.1%	922,337,203,685,478% to 922,337,203,685,478%

Search (from the last year)

- Significant changes to relevancy computation
 - This was lots of fun
 - Special thanks to Kelly and Alberto
- New algorithm resembles old Classic
 - We don't know if it is good enough!
 - We like it though
 - And users may not actually care (wonderful example of too much ado about nothing)
 - Examples to illustrate the problem [\[1\]](#), [\[1b\]](#), [\[2\]](#), [\[3\]](#)
 - Relevancy in ADS Classic
 - Final score computation in SOLR
 - Picking appropriate weights
 - Avoiding double counting

Current ADS (default behaviour)

The screenshot shows the ADS search interface. At the top, the 'ads' logo is on the left, and navigation links for 'Feedback', 'ORCID', 'About', and 'Account' are on the right. Below the logo is a search bar with the text 'Tidal effects on exoplanets' and a search button. A 'Start New Search' button is to the left of the search bar. Below the search bar, it says 'Your search returned 3 results'. On the right side of the results area, there are buttons for 'Export' and 'Explore', and a 'Date' dropdown menu. On the left side, there is a sidebar with a tree view of 'AUTHORS' and 'COLLECTIONS'. The 'AUTHORS' section includes 'Exoplanets, 2', 'Barnes, R, 1', 'Blackledge, B, 1', 'Branduardi-Raymont, G, 1', and 'Egbert, G, 1'. The 'COLLECTIONS' section includes 'astronomy, 3'. The main results area shows three entries, each with a checkbox, a title, a date, and a list of authors. The first entry is 'Physical Oceanography in the Solar System and Beyond' by Barnes, R. K.; Green, J. A. M.; Blackledge, B. W. and 3 more, dated 2020/02. The second entry is 'Solar System and Exoplanets' by Ezoe, Yuichiro; Branduardi-Raymont, Graziella; Guedel, Manuel and 3 more, dated 2015/09. The third entry is 'Progress with NASA Technology Development for Exoplanet Missions (TDEM)' by Lawson, Peter R.; Exoplanets; technology and 2 more, dated 2014/01. On the right side of the results area, there are two buttons: 'Add papers to library' and 'Create email notification'. Below these buttons is a bar chart showing the number of 'refereed' and 'non refereed' papers. The chart has three bars, all of which are green, indicating they are non-refereed. The first bar has a value of 1.

ads

Feedback ORCID About Account

QUICK FIELD: Author First Author Abstract Year Fulltext All Search Terms

Start New Search

Tidal effects on exoplanets

Your search returned 3 results

Export Explore

Date

AUTHORS

- Exoplanets, 2
- Barnes, R, 1
- Blackledge, B, 1
- Branduardi-Raymont, G, 1
- Egbert, G, 1

more

COLLECTIONS

- astronomy, 3

REFEREED

Show highlights Show abstracts Hide Sidebars

Go To Bottom

1 2020LPICo2195.3049B 2020/02
Physical Oceanography in the Solar System and Beyond
Barnes, R. K.; Green, J. A. M.; Blackledge, B. W. and 3 more

2 2015eheu.conf...35E 2015/09
Solar System and Exoplanets
Ezoe, Yuichiro; Branduardi-Raymont, Graziella; Guedel, Manuel and 3 more

3 2014AAS...22334411L 2014/01
Progress with NASA Technology Development for Exoplanet Missions (TDEM)
Lawson, Peter R.; Exoplanets; technology and 2 more

Add papers to library

Create email notification

Years Citations Reads

refereed non refereed

1

Current ADS (default behaviour II.)

ads Feedback ORCID About Account

QUICK FIELD: [Author](#) [First Author](#) [Abstract](#) [Year](#) [Fulltext](#) [All Search Terms](#)

[← Start New Search](#) × Q

Your search returned **383** results

☰ Date Export Explore

▼ AUTHORS

- ☐ Barnes, R 16
- ☐ Lammer, H 13
- ☐ Winn, J 13
- ☐ Abbot, D 12
- ☐ Correia, A 11

more

▼ COLLECTIONS

- ☐ astronomy 376
- ☐ physics 60
- ☐ general 3

Show highlights Show abstracts Hide Sidebars Go To Bottom

- 2020arXiv201102869L 2020/11
[Accretion of Gas Giants Constrained by the Tidal Barrier](#)
Li, Ya-Ping; Chen, Yi-Xian; Lin, Douglas N. C. *and 1 more*
- 2020A&A...643A..37Y 2020/11
[Hurricanes on tidally locked terrestrial planets: fixed surface temperature experiments](#)
Yan, Mingyu; Yang, Jun
- 2020MNRAS.tmp.2973H 2020/10
[Characterizing the possible interior structures of the nearby Exoplanets Proxima Centauri b and Ross-128 b](#)
Herath, Mahesh; Gunesequera, Saraj; Jayaratne, Chandana

📄 📄 📄 📄 📄

Add papers to library

Create email notification

Years Citations Reads

■ refereed ■ non refereed

60

When OR is the default operator

The screenshot shows the ADS search interface. At the top, the search bar contains the query "Tidal effects on exoplanets" and indicates that 2,139,303 results were returned. The left sidebar shows filters for authors (Wang, Y; Zhang, Y; Wang, J; Liu, Y; Wang, X) and collections (physics, astronomy). The main results list includes three entries:

- 1. KIC 4762887: A near-contact binary or an ellipsoidal variable star? (Li, Xu-Zhi; Liu, Liang)
- 2. Traversable wormholes supported by non-exotic matter in general relativity (Godani, Nisha; Samanta, Gauranga C.)
- 3. Advances in deep space exploration via simulators & deep learning (Bird, James; Petzold, Linda; Lubin, Philip and 1 more)

On the right, there are options to "Add papers to library" and "Create email notification", along with a "Years" chart showing the distribution of refereed and non-refereed papers.

When OR+relevancy is the default

ads Feedback ORCID About Account

QUICK FIELD: Author First Author Abstract Year Fulltext All Search Terms

← Start New Search

Tidal effects on exoplanets

Your search returned 2,139,303 results ← **383 vs 2139303**

Score

Export Explore

The first 6 results exactly the same as ADS default

Show highlights Show abstracts Hide Sidebars [Go To Bottom](#)

Rank	Year	Journal	Title	Author(s)	Cited
1	2017	CeMDA.129..509B	Tidal locking of habitable exoplanets	Barnes, Rory	54
2	2012	ApJ...744L..23C	Pumping the Eccentricity of Exoplanets by Tidal Effect	Correia, Alexandre C. M.; Boué, Gwenaél; Laskar, Jacques	28
3	2018	AsBio..18..967L	Implications of Tides for Life on Exoplanets	Lingam, Manasvi; Loeb, Abraham	22
4	2011	ApJ...738...71S	Equatorial Superrotation on Tidally Locked Exoplanets	Showman, Adam P.; Polvani, Lorenzo M.	196
5	2017	IAUS..328..308P	Tidal effects on stellar activity	Poppenhaeger, K.	3
6	2009	ApJ...698.1357J	Observational Evidence for Tidal Destruction of Exoplanets	Jackson, Brian; Barnes, Rory; Greenberg, Richard	140

Add papers to library

Create email notification

Years Citations Reads

■ refereed ■ non refereed

Year	Refereed Citations	Non-refereed Citations
2009	~100	~100
2010	~100	~100
2011	~1,000,000	~100,000
2012	~100	~100
2013	~100	~100
2014	~100	~100
2015	~100	~100
2016	~100	~100
2017	~100	~100
2018	~100	~100
2019	~100	~100
2020	~100	~100
2021	~100	~100

AUTHORS

- Wang, Y 14.2k
- Zhang, Y 12.4k
- Wang, J 11.4k
- Liu, Y 10.7k
- Wang, X 10.7k

COLLECTIONS

- general 253.2k

REFEREED

- refereed 1.5M
- non-refereed 618.9k

INSTITUTIONS

KEYWORDS

PUBLICATIONS

BIB GROUPS

Hopefully in next few months...

- We gather enough evidence to convince ourselves that the default search scoring can (and must) evolve
 - And then start learning to rank better
- Also need to develop better tools/methodology for analyzing data we are collecting
 - Across users/time periods
 - In-house aggregation; analytical engine