

# PeerScout: Diversifying peer review with data and machine learning

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csv,conf,v5

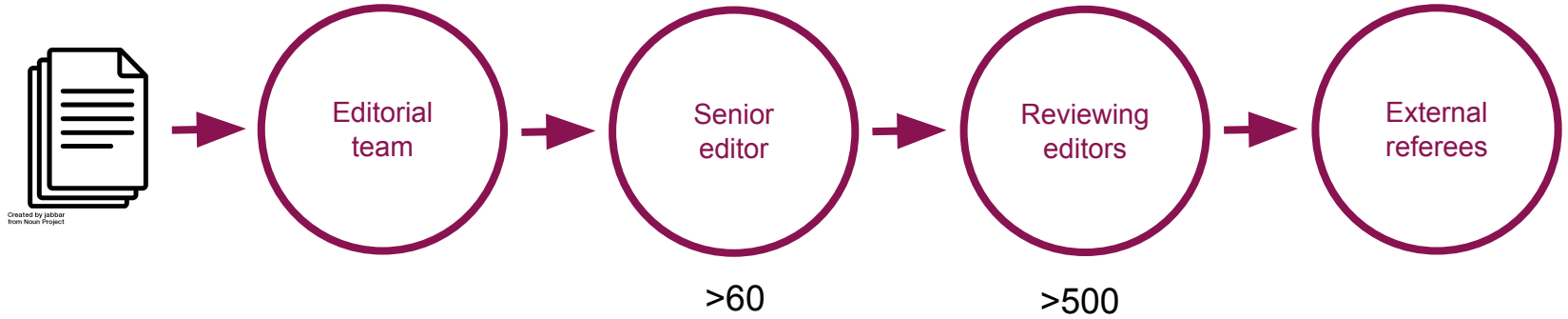


Helping scientists **accelerate discovery**  
by operating a platform for research  
communication that encourages and  
recognises **the most responsible**  
**behaviours in science**

# The science publishing process



## Finding the right editors and referees for a manuscript



“We found a homophilic interaction between the demographics of the gatekeepers and authors in determining the outcome of peer review; **that is, gatekeepers favor manuscripts from authors of the same gender and from the same country.**”

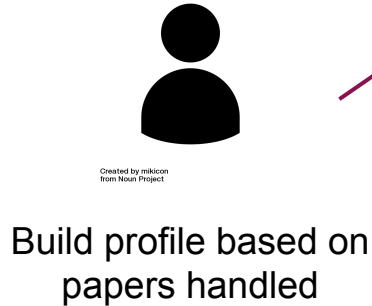
– Murray et al., 2019

Murray, D., Siler, K., Larivière, V., Chan, W. M., Collings, A. M., Raymond, J., & Sugimoto, C. R. (2019). Gender and international diversity improves equity in peer review. *BioRxiv*, 400515.

Also see [Early-career Reviewers: Reflections on focused inclusion in reviews at eLife](#)

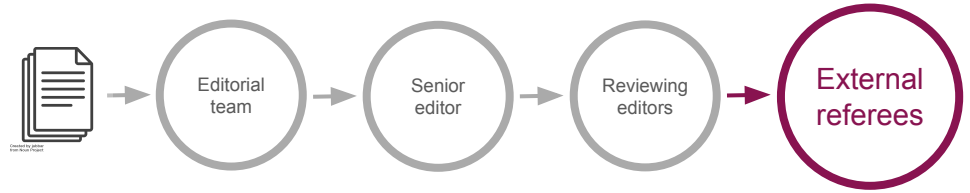


# PeerScout v1: Workflow

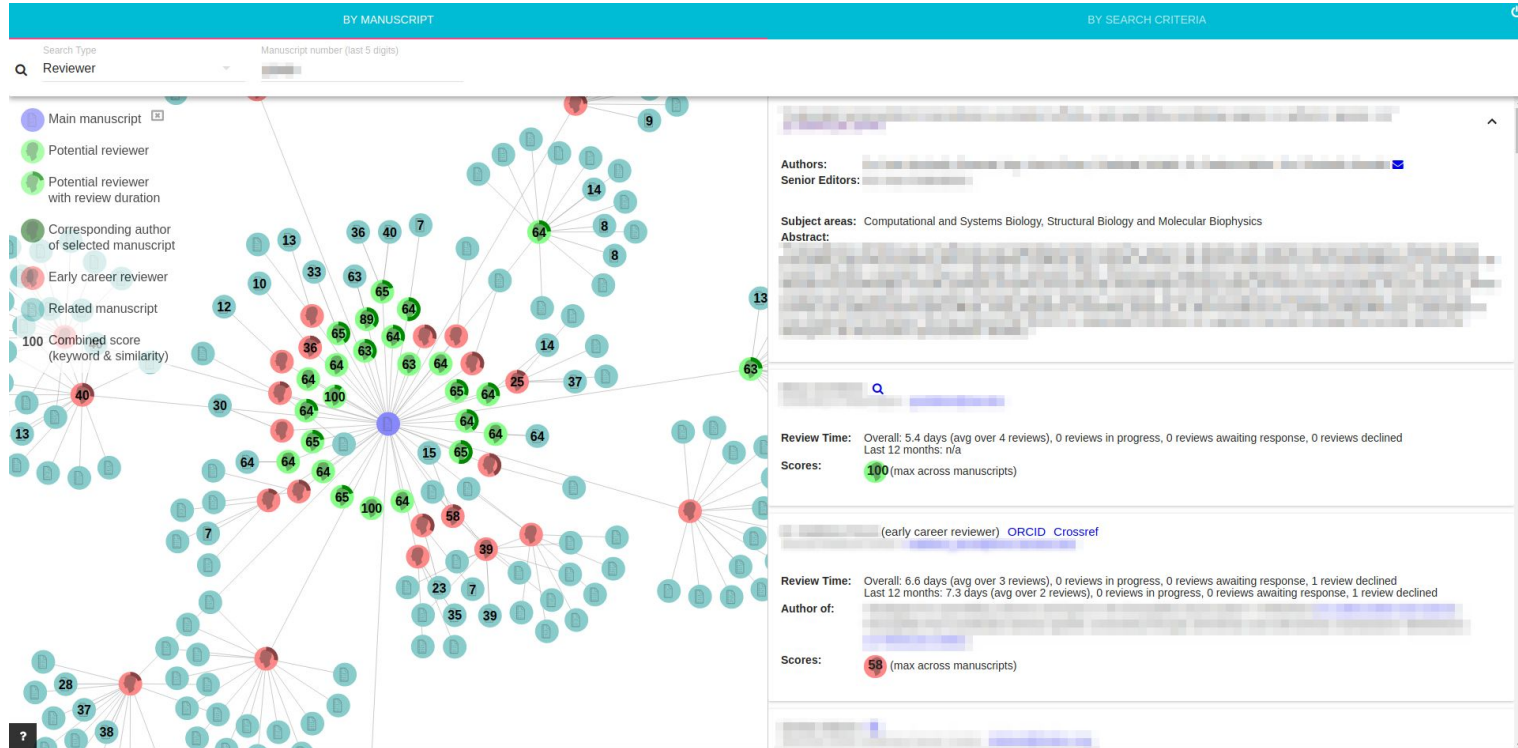


Calculate score based on how much these profiles match

Ranked list for users to choose from



# PeerScout v1: Overview



## PeerScout v1: Suggested reviewers



**Review Time:** Overall: 5.4 days (avg over 4 reviews), 0 reviews in progress, 0 reviews awaiting response, 0 reviews declined  
Last 12 months: n/a

**Scores:** **100** (max across manuscripts)

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(early career reviewer) [ORCID](#) [Crossref](#)

**Review Time:** Overall: 6.6 days (avg over 3 reviews), 0 reviews in progress, 0 reviews awaiting response, 1 review declined  
Last 12 months: 7.3 days (avg over 2 reviews), 0 reviews in progress, 0 reviews awaiting response, 1 review declined

**Author of:**

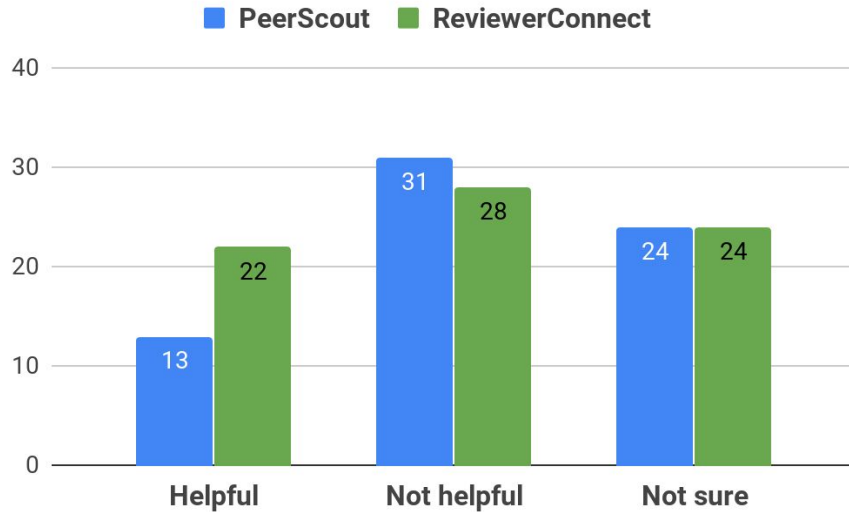


**Scores:** **58** (max across manuscripts)



## PeerScout v1: User feedback

User feedback



“I don’t know / have never heard of this person.”

“Wrong area of expertise.”

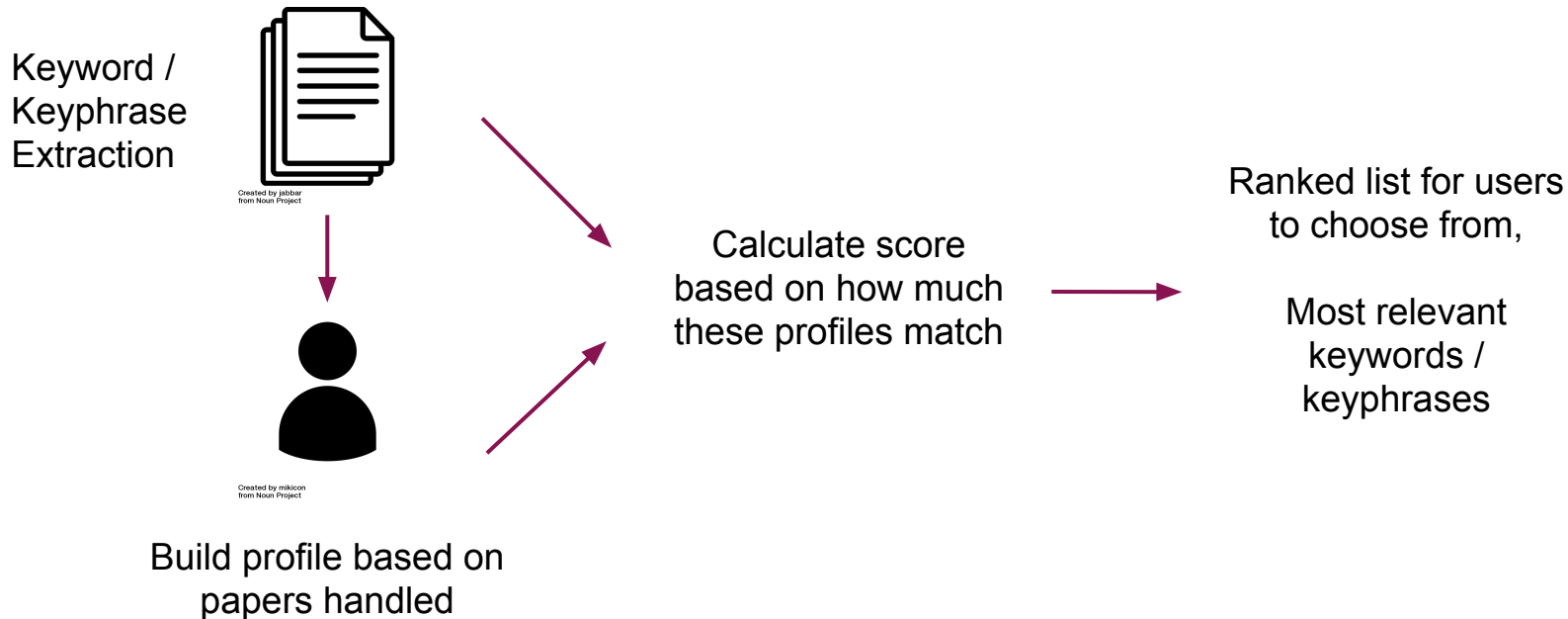
## Lessons learnt from PeerScout v1

We were trying to kill too many birds with one stone: getting editors to use and trust this new AI tool, adding early career reviewers (ECRs) to the reviewing process

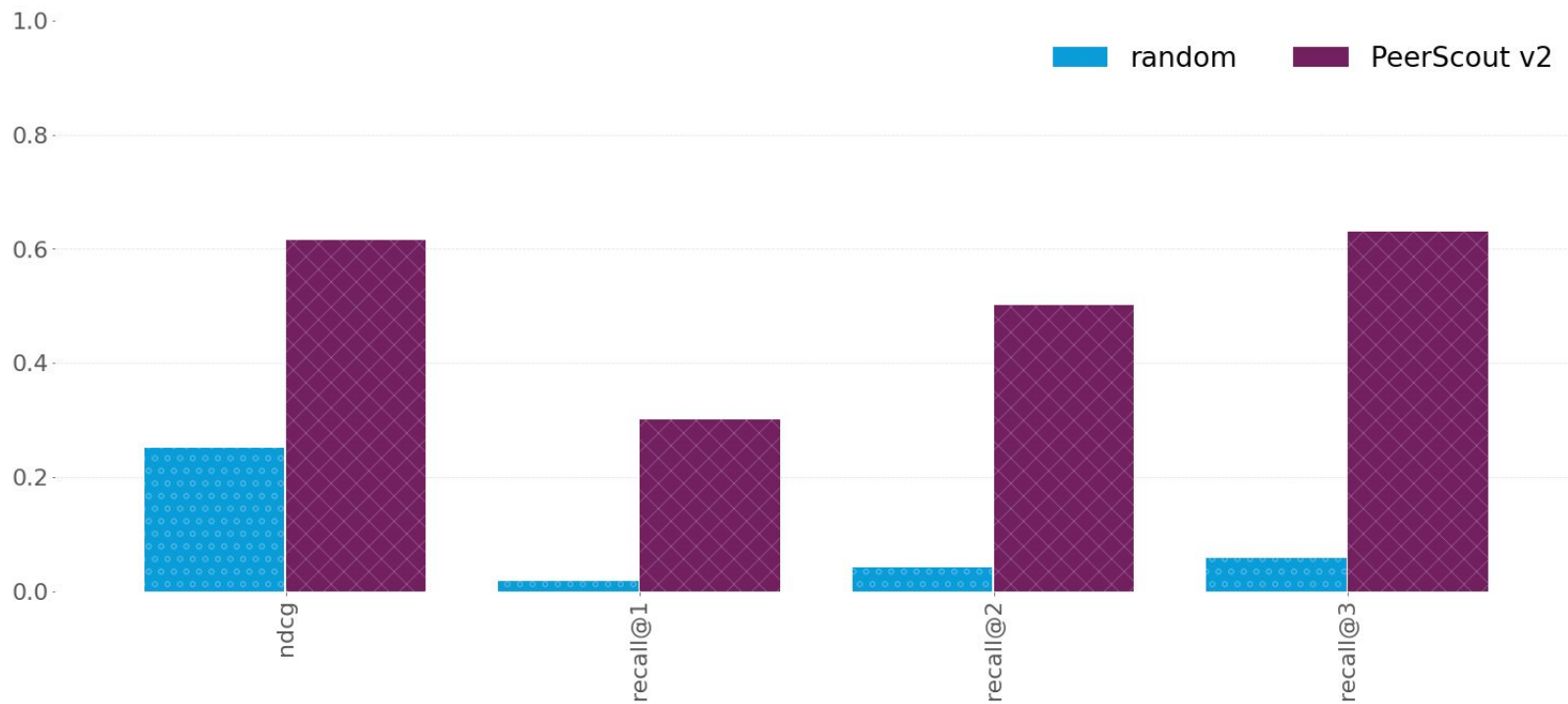
With v2, we need to:

- Find a way to benchmark the performance of PeerScout, on a technical level
- Improve UI and information displayed to gain editors' trust
- Add ECR information and recommendations into the tool but in a way that does not interfere with the above two goals

## PeerScout v2: Workflow



## PeerScout v2: Evaluation



# PeerScout v2: User interface

Manuscript:  (1) ▾

Filter by subject areas:  ▾ AND  ▾

Filter by keywords:  ▾ AND  ▾

Abstract	Latest Stage
[Blurred text]	[Blurred text]

Name	Availability	Subject Areas	Keywords	Research Organisms	Research Interests	Website	Matching Keywords
[Blurred]	[Blurred]	Neuroscience, Human Biology and Medicine	synaptic transmission, synaptic plasticity, ligand-gated ion channels, hippocampus, olfactory bulb, epilepsy, in vitro physiology, activity-dependent gene expression	Mouse	[Blurred]	[Blurred]	synapsis, synaptic, neuron, presynaptic, spine, brain, mouse, dendritic, dendritic spine, synaptic remodeling, active, transgenic, transgenic mouse, filopodia, microglia, fluorescent, healthy, elevated, label, target, duration, process, result, generation, turnover, mature, contact, head
[Blurred]	[Blurred]	Immunology and Inflammation	innate immunity, response to cell death, macrophage biology	Human, Mouse	[Blurred]	[Blurred]	dendritic, mouse, result

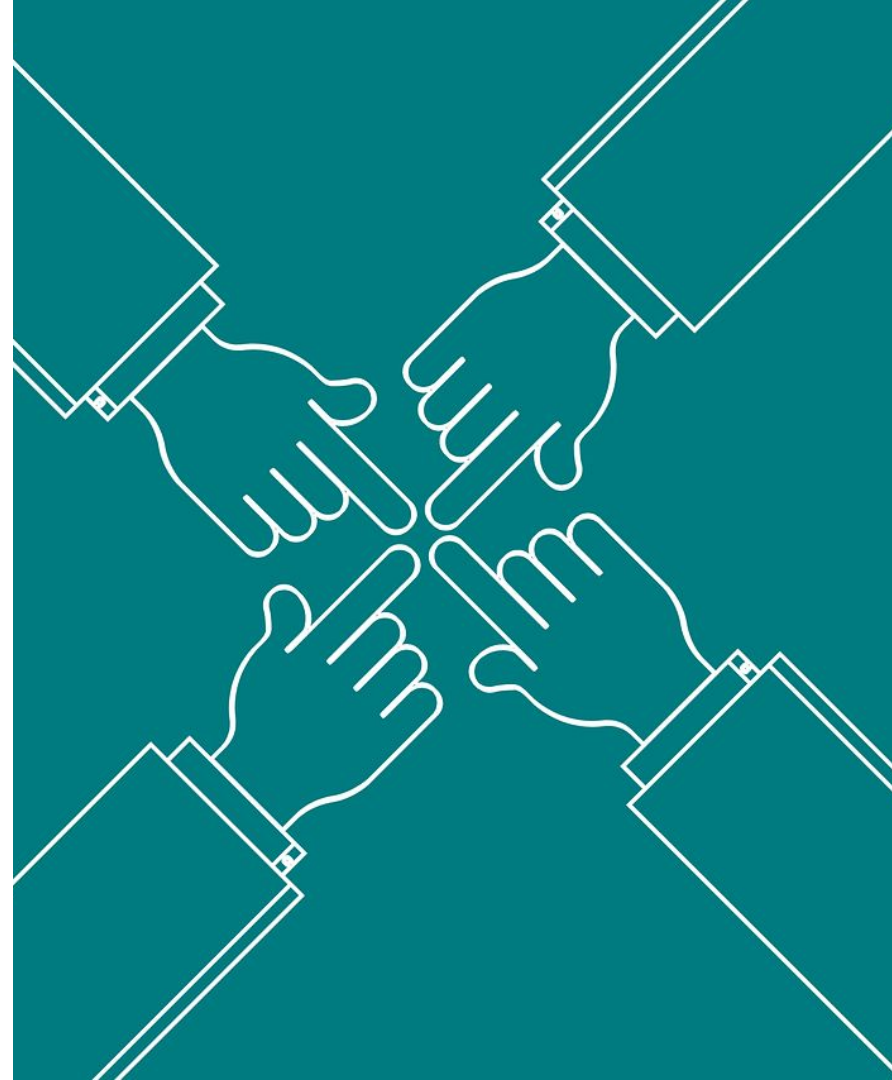
## What we have learnt

- AI/machine learning/big data solutions serve little value if they are not designed to meet user needs
- Working closely with users (our editorial community) allows us to respond and make changes to address their concerns – their support is crucial in this process
- Tackle problems one-by-one to better prioritise and measure performance



## In the future

- Explore **concept extraction** from papers
- **Expand recommendations** to not only past reviewers and ECR lists, but the wider scientific community
- Explore **alternative data sources** to build profiles, e.g. authored papers
- Turn this around: editors to see a list of recommended papers that they can potentially handle?



# Thank you!

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# Supplementary information

# Editor Search



Senior Editor search

[Assignments and times](#)

[Consultations](#)

Filter by Name

[Help](#)

Filter by subject areas:

Subject Area 1

AND

Subject Area 2

Filter by keywords:

Keyword 1

AND

Keyword 2

Name	Availability	Subject Areas	Keywords	Research Organisms	Research Interests	Website	PubMed profile	Most relevant PubMed publications
[Redacted]	[Redacted]	Computational and Systems Biology, Physics of Living Systems	systems biology, gene regulatory networks, immune system, population genetics	Zebrafish	[Redacted]	[Redacted]	<a href="#">PubMed</a>	<a href="#">1</a> <a href="#">2</a> <a href="#">3</a> <a href="#">4</a> <a href="#">5</a>
[Redacted]	[Redacted]	Neuroscience	auditory processing, auditory perception, multisensory integration, sensory coding, adaptation, perceptual learning, in vivo physiology, neuroanatomy, psychophysics	Human, Mouse	[Redacted]	[Redacted]	<a href="#">PubMed</a>	<a href="#">1</a> <a href="#">2</a> <a href="#">3</a> <a href="#">4</a> <a href="#">5</a>
[Redacted]	[Redacted]	Cell Biology	cytoskeletal dynamics, microtubule-binding proteins, microtubule-based motors	Human, Mouse	[Redacted]	[Redacted]	<a href="#">PubMed</a>	<a href="#">1</a> <a href="#">2</a> <a href="#">3</a> <a href="#">4</a> <a href="#">5</a>

# ECR Reviewer Search



Early-Career Reviewer search

Filter by ECR Name

Filter by Nominating/Relevant Editor

[Help](#)

Filter by subject areas:

Subject Area 1

AND

Subject Area 2

Filter by keywords:

Keyword 1

AND

Keyword 2

Name	Institution	Country	Keywords	Nomination Note	Email	Webpage	CV	Last review date	Total number of reviews	Average review duration	Number of times rated as outstanding
[Redacted]	[Redacted]	[Redacted]	microbial ecology, metagenomics	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	evolution, ecological genomics, adaptation, speciation, hybridization	[Redacted]	[Redacted]	[Redacted]	<a href="#">View CV</a>	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	collagen, basement membrane, evolution, non-bilaterian, extracellular matrix, animal phylogenetics	[Redacted]	[Redacted]	[Redacted]	<a href="#">View CV</a>	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	humanization of yeast, functional complementation, orthology, [Redacted]	[Redacted]	[Redacted]	[Redacted]	<a href="#">View CV</a>	May 1, 2019	1	16	0