



**HAL**  
open science

## Automated screening of COVID-19 preprints: Can we help authors to improve transparency and reproducibility?

Peter Eckmann, Nico Riedel, Halil Kilicoglu, Gerben ter Riet, Cyril Labbé, Jennifer Byrne, Guillaume Cabanac, Amanda Capes-Davis, Bertrand Favier, Shyam Saladi, et al.

### ► To cite this version:

Peter Eckmann, Nico Riedel, Halil Kilicoglu, Gerben ter Riet, Cyril Labbé, et al.. Automated screening of COVID-19 preprints: Can we help authors to improve transparency and reproducibility?. Interdisciplinary Meta-research & Open Science Conference (AIMOS 2020), Dec 2020, Sydney, Australia. , 2020. hal-03078870

**HAL Id: hal-03078870**

**<https://hal.science/hal-03078870>**

Submitted on 16 Dec 2020

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



# Automated screening of COVID-19 preprints: Can we help authors to improve transparency & reproducibility?

Peter Eckmann<sup>1</sup>, Nico Riedel<sup>2</sup>, Halil Kilicoglu<sup>4</sup>, Cyril Labbé<sup>5</sup>, Gerben ter Riet<sup>6,7</sup>, Jennifer Byrne<sup>8</sup>, Guillaume Cabanac<sup>9</sup>, Amanda Capes-Davis<sup>8,10</sup>, Bertrand Favier<sup>11</sup>, Shyam Saladi<sup>12</sup>, Peter Grabitz<sup>2,3</sup>, Alexandra Bannach-Brown<sup>2</sup>, Robert Schulz<sup>2,3</sup>, Sarah McCann<sup>2,3</sup>, Rene Bernard<sup>2,3</sup>, Anita Bandrowski<sup>1</sup>, Tracey Weissgerber<sup>2,3</sup>  
<sup>1</sup>UC San Diego, La Jolla, CA, USA, <sup>2</sup>Berlin Institute of Health, Germany, <sup>3</sup>Charité, Berlin, Germany, <sup>4</sup>Univ. of Illinois at Urbana-Champaign, IL, USA, <sup>5</sup>Univ. Grenoble Alpes, France, <sup>6</sup>Univ. of Amsterdam, Netherlands, <sup>7</sup>Amsterdam Univ. of Applied Sciences, Netherlands, <sup>8</sup>Univ. of Sydney, Westmead, New South Wales, Australia, <sup>9</sup>Univ. de Toulouse, France, <sup>10</sup>CellBank Australia, <sup>11</sup>Univ. Grenoble Alpes, La Tronche, France, <sup>12</sup>California Institute of Technology, CA, USA

## Background

- Preprints have grown in popularity since COVID-19 emerged
- Rapid publication is useful during a pandemic, but the lack of peer review has concerned many scientists
- Can we evaluate preprints at scale without relying on authors or the knowledge of readers?

## Evaluation

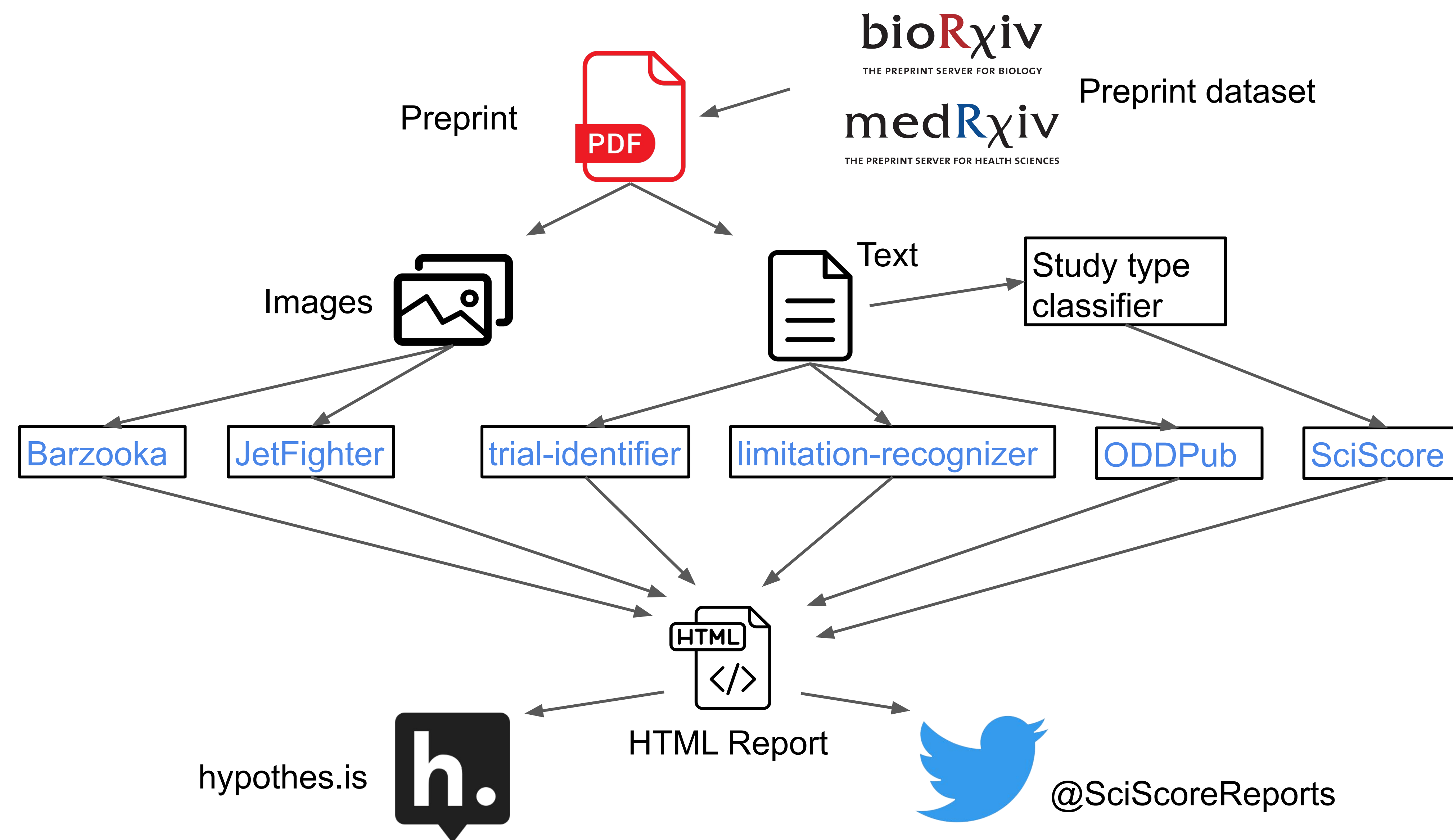
- Goal to automatically evaluate COVID-19 preprints for reproducibility criteria
- Each preprint is downloaded, parsed, and analyzed by a set of tools:
  - **SciScore** screens for rigor criteria defined by NIH and resources used (software tools, cell lines, etc.)
  - **ODDPub** screens for the presence of open data and code
  - **Limitation-recognizer** screens for study limitation statements
  - **Barzooka** screens for bar graphs used for continuous data
  - **JetFighter** screens for rainbow color maps
  - **Seek&Blastn** screens for correctly identified nucleotide sequences
  - **Trial-identifier** screens for and verifies clinical trial numbers

Visit us at

<https://scicrunch.org/ASWG>

<https://twitter.com/SciscoreReports>

## Pipeline overview



## Results

- Study design features
  - 75% of analyzed preprints are secondary analyses, modeling studies, or cell line studies
  - 20% addressed sex as a biological variable, despite known sex differences in COVID-19
  - 6.1% used model organisms, mainly mice
- Transparency
  - 34.4% included self-acknowledged study limitations
  - 14.3% shared open code
  - 13.6% of preprints shared open data
- Data presentation
  - 7.6% used rainbow colormaps, which are not colorblind safe and can create visual artifacts for viewers with normal color vision
  - 7.3% used bar graphs for continuous data, which can lead to misleading figures
- Combined, the automated Tweets have been viewed about 380,000 times
- Current average of ~1,000 views and ~10 link clicks per day
- The account has accumulated a total of
  - 2459 link clicks
  - 98 retweets
  - 42 replies

## Sample report and replies

## Conclusions

- It is feasible to conduct large-scale automated screening of preprints for common quality criteria and provide feedback to study authors and readers before publication
- Reports can publicly raise awareness of factors that affect study quality and reproducibility, while helping authors to present their research in a more transparent and reproducible manner.