## OMERO and GigaScience for reproducible research

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## Introduction

- GigaScience<sup>1</sup> was set up as a partnership between BGI, the world's largest producer of genomic data, and BioMed Central, the worlds primary Open Access biosciences publisher.
- Their combined aim: to promote and advance Open Access publication, including Data and Software.
- To this end, GigaScience publishes Open Access research articles, technical notes and data notes; GigaDB<sup>2</sup> hosts Open Access datasets, GigaGalaxy<sup>3</sup> hosts Open Source software pipelines.
- More and more imaging data is being submitted e.g. Optical Mapping images to support genome data.
- OMERO is now being implemented to provide instant viewing of

1. Stoev et al.<sup>4</sup> publish genomic data alongside micro-CT imaging to provide 'the most data rich species description'.

There is no community repository for this data

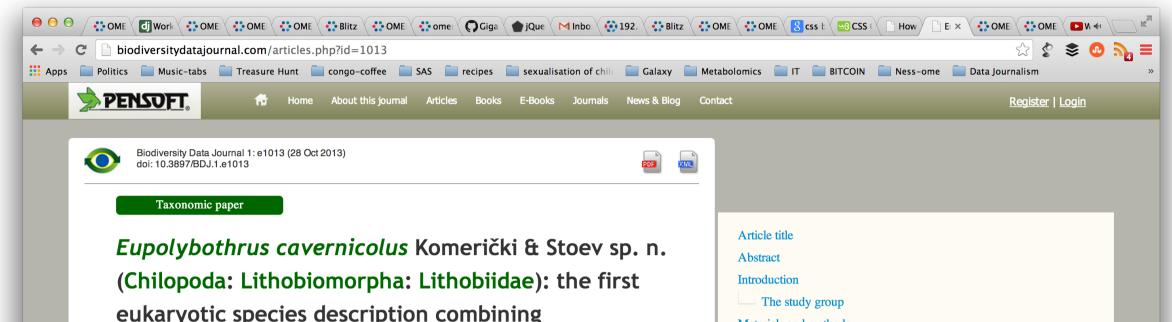
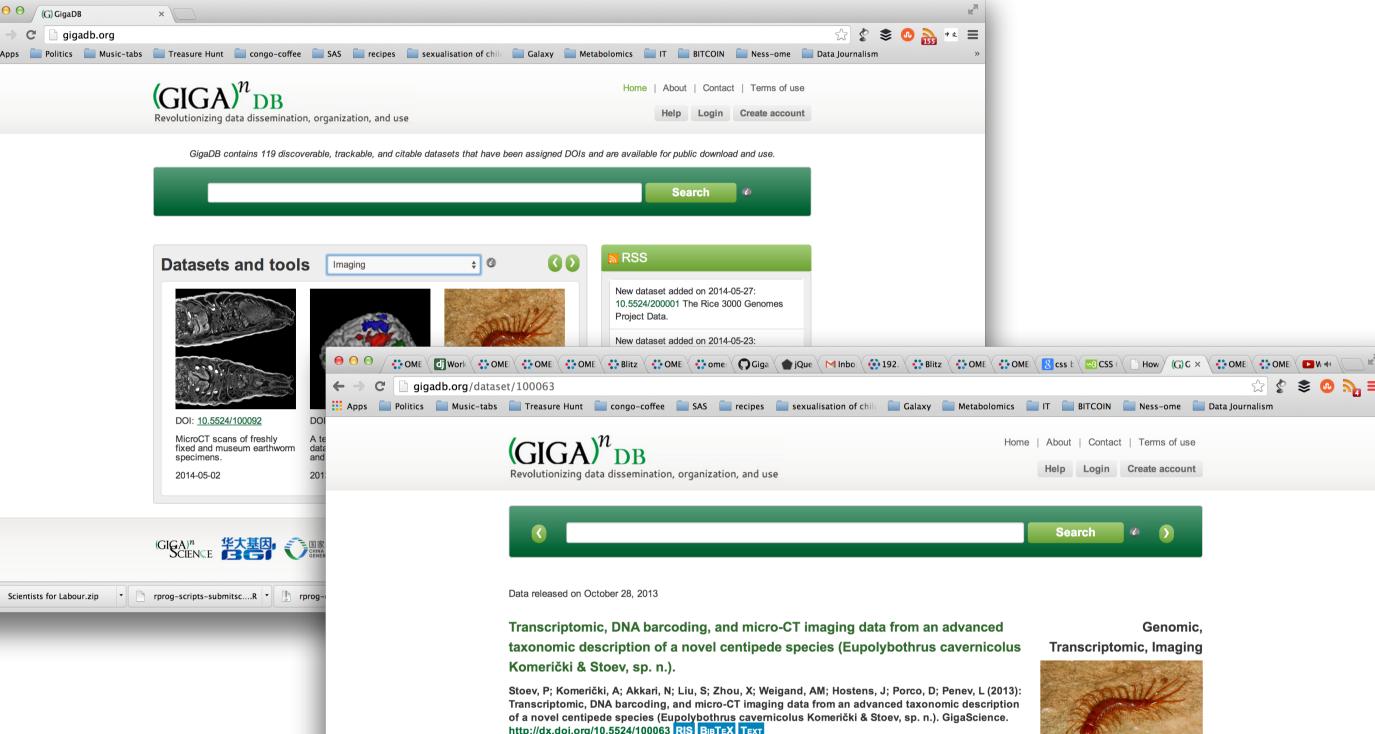


image data, removing the reader's need for special software and allowing improved searching of image meta data.

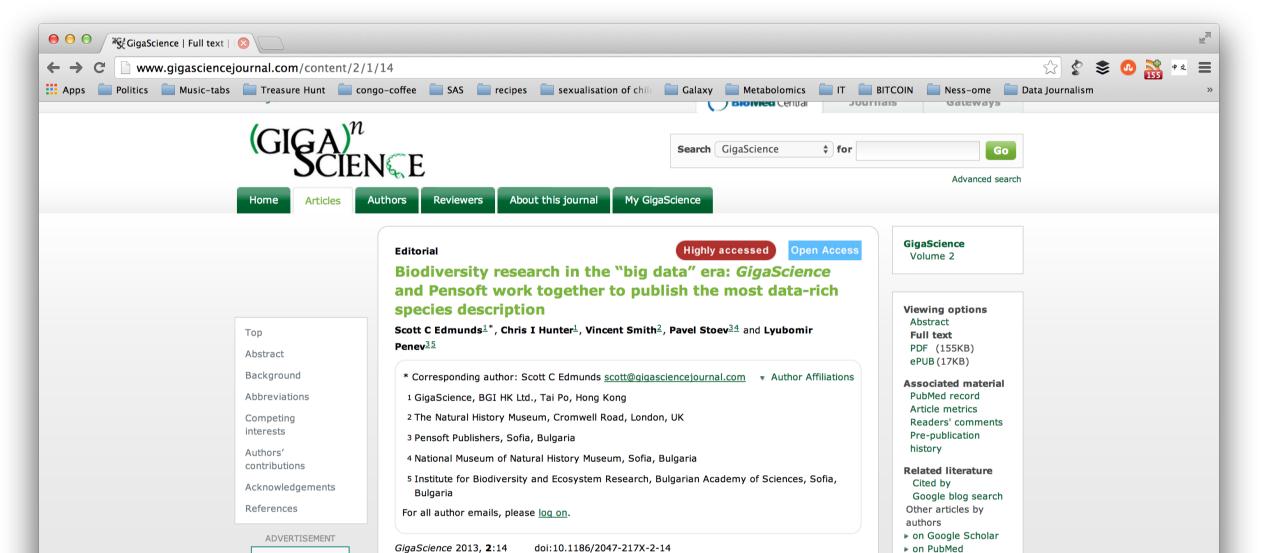
2. Data is hosted in GigaDB, DOI is minted for the data alone so it can be cited and citations tracked<sup>5</sup>. Data is linked to original publication DOI and all accession numbers for species libraries etc.



| curve your species description combining  | Materials and methods  |
|---|--|
| transcriptomic, DNA barcoding and micro-CT imaging  | Collected material and morphological study   |
| data  | — Molecular experiments and sequencing   |
|   | — Micro-CT scanning  |
| <ul> <li>Pavel Stoev, Ana Komerički, Nesrine Akkari, Shanlin Liu, Xin Zhou, Alexander M. Weigand, Jeroen<br/>Hostens, Christopher I. Hunter, Scott C. Edmunds, David Porco, Marzio Zapparoli, Teodor Georgiev, Daniel<br/>Mietchen, David Roberts, Sarah Faulwetter, Vincent Smith, Lyubomir Penev</li> </ul> | Abbreviations  |
|   | Taxon treatments   |
|   | — Eupolybothrus cavernicolus   |
|   | Eupolybothrus leostygis  |
| Abstract  | Identification key to the species of Eupolybothrus<br>(Schizopolybothrus) based on adult males |
| We demonstrate how a classical taxonomic description of a new species can be enhanced by applying new   | Analysis   |
| generation molecular methods, and novel computing and imaging technologies. A cave-dwelling centipede,  | — Molecular delimitations  |
| Eupolybothrus cavernicolus Komerički & Stoev sp. n. (Chilopoda: Lithobiomorpha: Lithobiidae), found in a  | Transcriptome analysis and annotation  |
| remote karst region in Knin, Croatia, is the first eukaryotic species for which, in addition to the traditional   | Discussion   |
| morphological description, we provide a fully sequenced transcriptome, a DNA barcode, detailed anatomical X-ray microtomography (micro-CT) scans, and a movie of the living specimen to document important traits of  | Taxonomic affinities   |
| its ex-situ behaviour. By employing micro-CT scanning in a new species for the first time, we create a high-  | Micro-computed tomography and 'cybertype' notion   |
| resolution morphological and anatomical dataset that allows virtual reconstructions of the specimen   | Data management and release  |
| · · · · · · · · · · · · · · · · · ·   |  |

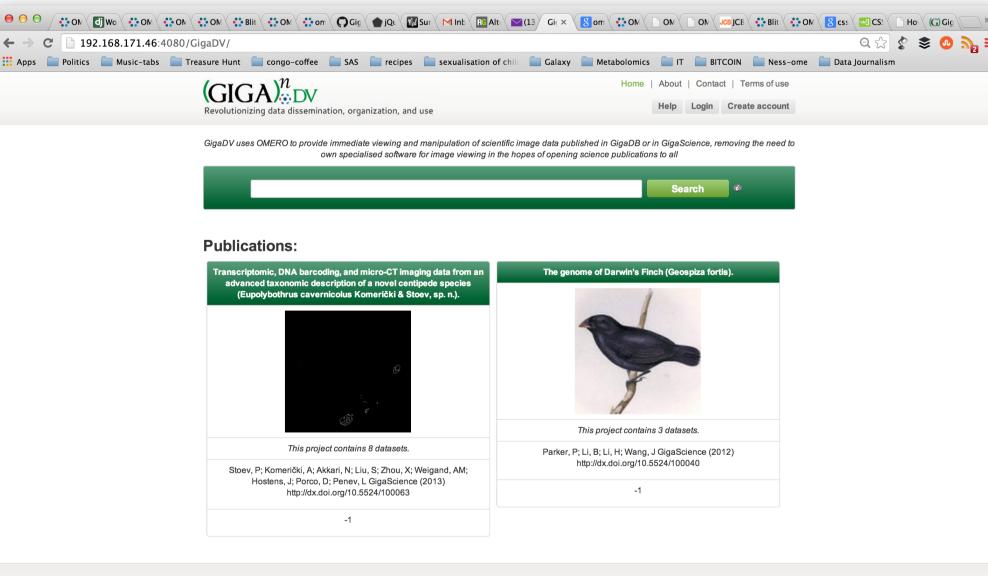
3. GigaScience team offers guidance and collaboration on data curation, meta data standards, searching, citing, publicising.

and subsequent interactive manipulation to test the recently introduced 'cybertype' notion. In addition, the



| http://dx.doi.org/10.5524/100063 RIS BIBTEX TEXT   |           |
|--|-----------|
| The species description of a cave-dwelling centipede, <i>Eupolybothrus cavernicolus Komerički &amp; Stoev sp. n.</i> (Chilopoda: Lithobiomorpha: Lithobiidae), found in a remote karst region in Knin, Croatia. This is the first eukaryotic species for which, in addition to traditional morphological description, a fully sequenced transcriptome, DNA barcode (i.e., mitochondrial Cytochrome C Oxidase Subunit I gene; COI), and detailed anatomical X-ray microtomography (micro-CT) scar illustrates a workflow of producing, storing, publishing and disseminating large data sets associated with a description of a n This dataset consist of the transcriptomic and annotation data as well as the Micro-CT scans, photographs, scanning electro footage of the species. | ew taxon. |
| Contact Submitter  |           |
| Related manuscripts:<br>doi: <u>10.3897/BDJ.1.e1013</u>  |           |
| Accessions (data included in GigaDB):<br>AE: <u>E-MTAB-1859</u><br>ENA: <u>ERP003841</u><br>http: //morphosource.org/index.php/Detail/SpecimenDetail/Show/specimen_id/514<br>http: //www.morphbank.net/Browse/ByImage/?tsn=999021821   |           |
| Accessions (data not in GigaDB):   |           |
|  |           |
|  |           |

4. GigaDV is an OMERO.web implementation designed to provide viewing function to image data stored in GigaDB. The DOI acts as a unique key, linking images to repositories to articles. OMERO.search allows enhanced searching of image meta data



5. Image data is viewable by publication, dataset or image. Reader can manipulate image to alter zoom, contrast, colour channels etc to improve visualisation.

The electronic version of this article is the complete one and can be found online at

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http://www.gigasciencejournal.com/content/2/1/14

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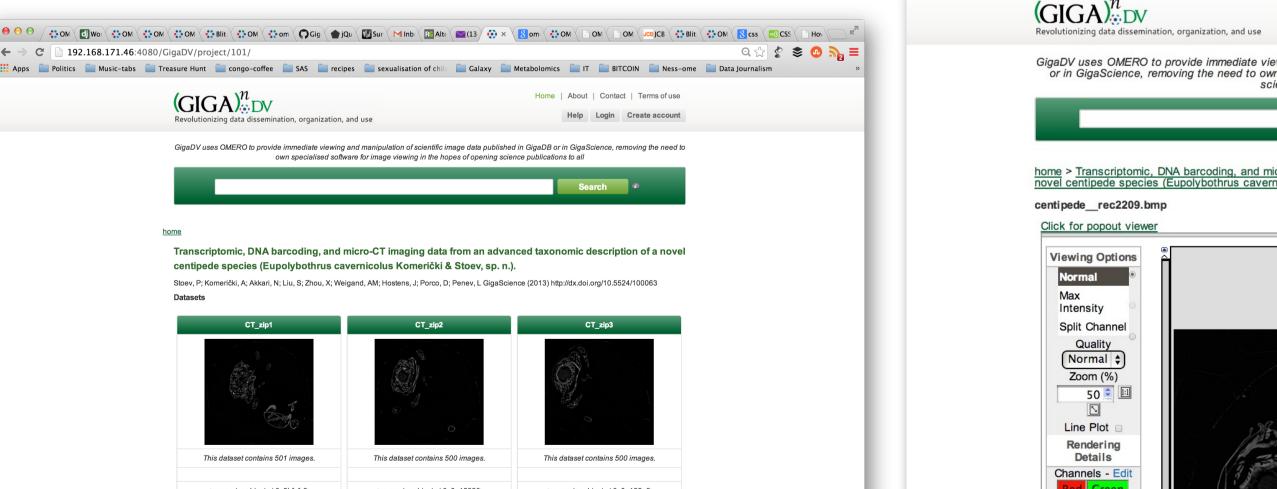
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CT slices can be viewed as layers in one image to allow 3D understanding of data.



Antibodies

Independent

Validated – I am surprised

that nobody

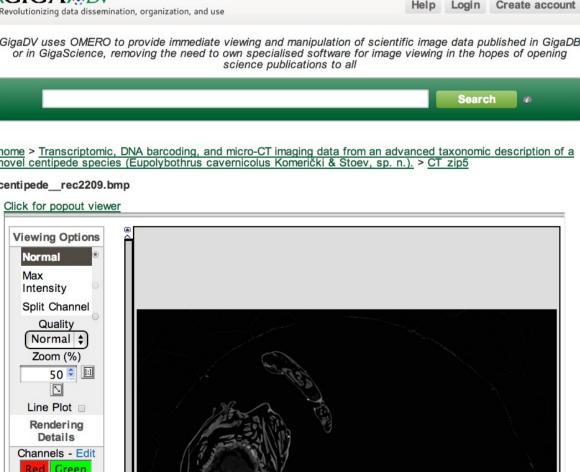
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## Conclusion

- OMERO is a useful tool for enhancing Open Access science publishing.
- It improves searching/tagging of metadata
- BioFormats interface provides access to an ever increasing array of image formats.
- GigaScience data is now more open and easy to access.

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| Home       About       Contact       Terms of use         Help       Login       Create account  |  |
| home > publication > Transcriptomic, DNA barcoding, and micro-CT imaging data from an advanced taxonomic description of a novel centipede species<br>(Eupolybothrus cavernicolus Komerički & Stoev, sp. n.). > dataset<br>CT_zip5  | Timepoints   |
|  | Click for popout viewer<br>(GIGA) <sup>n</sup> 代表語》 (GIRABUR Home   Login   About<br>E Be a fan on Facebook 医 Follow us on Twitter S Follow us on Sina 器 Follow us |
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1. gigasciencejournal.com4. Biodiversity Data Journal 1: e1013 (28 Oct 2013), doi: 10.3897/BDJ.1.e10132. gigadb.org5. <u>http://dx.doi.org/10.5524/100063</u>3. galaxy.cbiit.cuhk.edu.hk5. <u>http://dx.doi.org/10.5524/100063</u>



