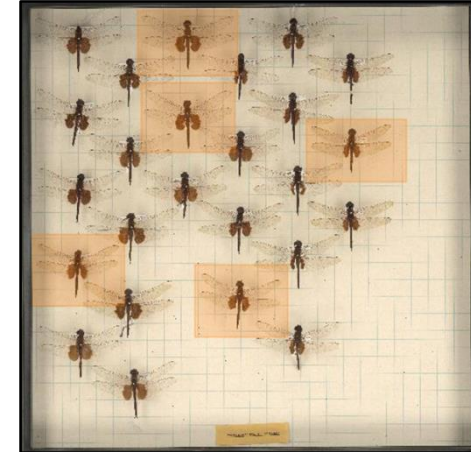
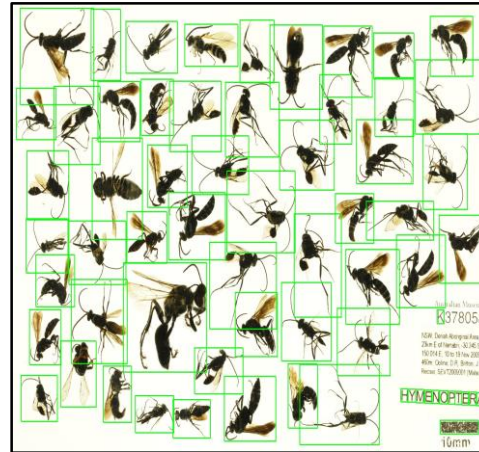




# Drawer digitisation of biological collections and its future



**Digitisation of Biological Collections : Australia, Canberra - April 2015**

**Nicole Fisher**

AUSTRALIAN NATIONAL INSECT COLLECTION  
NATIONAL RESEARCH COLLECTIONS OF AUSTRALIA

[WWW.CSIRO.AU](http://WWW.CSIRO.AU)



*“Existing taxonomic processes have served us well for centuries but are clearly inadequate for the challenge at hand.*

*The taxonomic community must rally around a common vision.....*

*It is time to approach taxonomy as a large scale international science.”*

*Quentin Wheeler, Peter Raven and Edward O. Wilson*



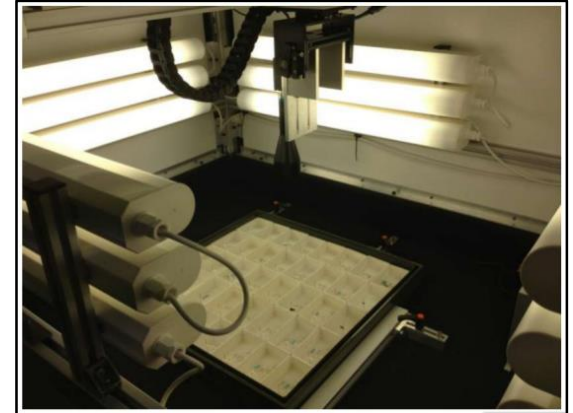
# Outline :

- **Drawer digitisation in Australia**
- **Global achievements & initiatives**
- **Challenges & opportunities**
- **Acknowledgements**

# Drawer digitisation begins

~ 2011 Imaging of insect drawers

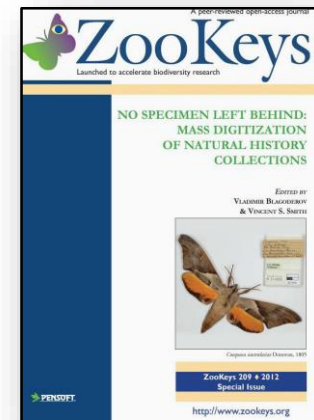
- ANIC – Australian National Insect Collection
- QM - Queensland Museum
- AM - Australia Museum



2012 Zookeys Special Edition : Global Digitisation  
(includes ANIC's whole drawer project in Australia)

2013 Developed international digitisation standard workflows  
(iDigBio's Pinned Things in Trays and Drawers Working Group)

2013 Established with iDigBio  
"International Whole-drawer Digitisation Interest Group"  
[https://www.idigbio.org/wiki/index.php/Drawer\\_Imaging\\_Group](https://www.idigbio.org/wiki/index.php/Drawer_Imaging_Group)



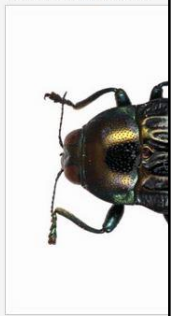


# Collection browser

Specimens images from Australia's Natural History collections

Images from Australian Na  
To view images from all co

South Australian Museu  
South Australian Museum



The collection has Australia-wide and comparative purposes.

Australian Museum Ent  
Australian Museum



Specimen images from Australian National Insect Collection

## Taxonomy

Clear filters

Kingdom: ANIMALIA  
Phylum: ARTHROPODA  
Class: INSECTA  
Order  
BLATTODEA (1)  
DIPTERA (15)  
HEMIPTERA (81)  
HYMENOPTERA (8)  
LEPIDOPTERA (124)  
MANTODEA (1)  
ODONATA (572)  
ORTHOPTERA (503)  
PHASMIDA (31)

1380 ima



Species Locations Collections Mapping & analysis Data sets Blogs Get involved About the Atlas

My profile Logout

Search the Atlas



Home → Australia's species → LIBELLULIDAE

## LIBELLULIDAE

### Common Skimmers

Record a sighting Alerts

#### Name source

Australian Faunal Directory

#### Rank

Family

#### Data links

LSID JSON / WMS / RDF

#### Species presence



Recorded in Australia



Terrestrial Habitats



Terrestrial Aquatic Habitats

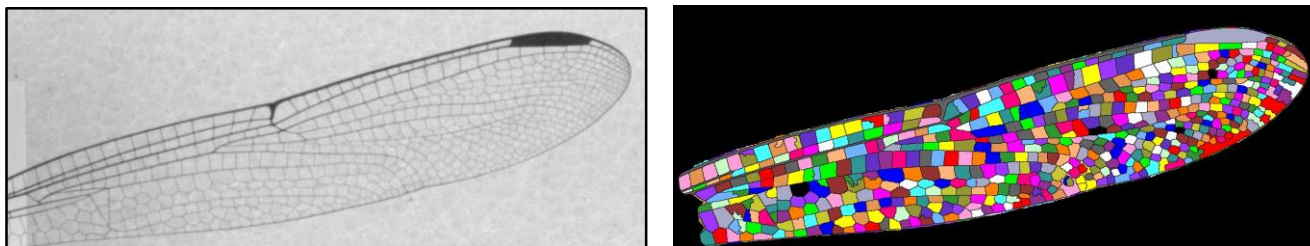
Overview Gallery Names Classification Records Literature Sequences

## Specimen Images

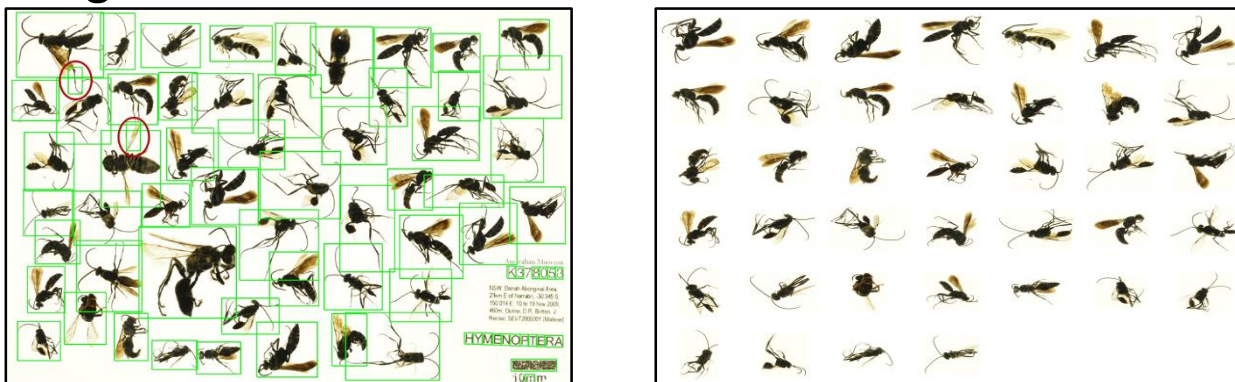


# Extraction work from drawer images

- Image segmentation – insect veins (Changming Sun)



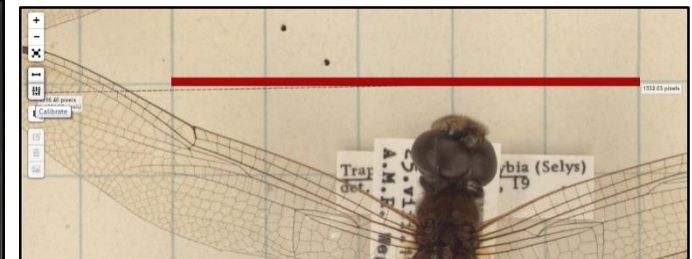
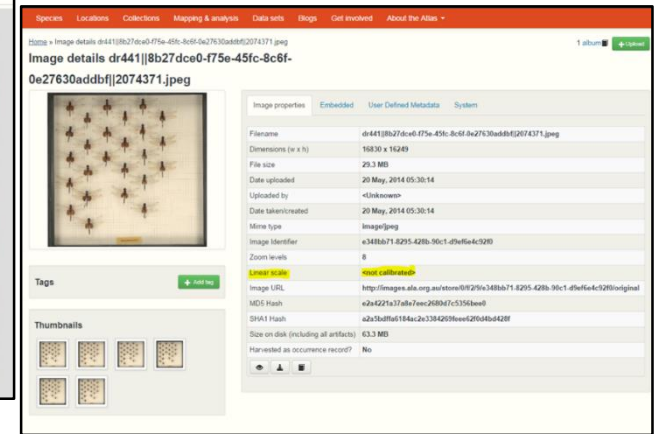
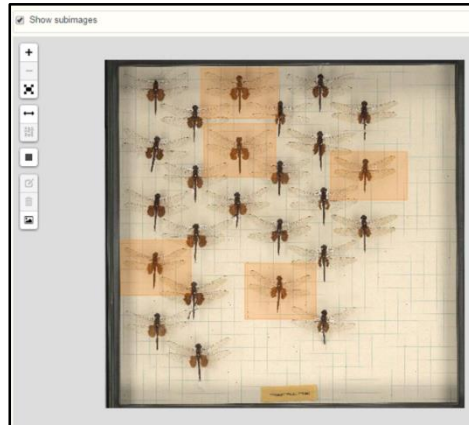
- Insect soups (Paul Flemons & Changming Sun)  
automated algorithms to sort insects based on size



# Drawer segmentation & annotations

- computer visualisation
- mapping & analysis tools
- segmentation specimens out from drawers

✓ Crowdsourcing these activities ?



# Outline :

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# Beyond the Box competition

- Technology that increases the speed and accuracy of digitising a drawer of insect specimens and their associated data
- To solve a problem that is hindering scientific research and innovation – the inability to quickly and accurately digitise specimens and associated data in a drawer of insects



**Digitisation competition - \$1 million**

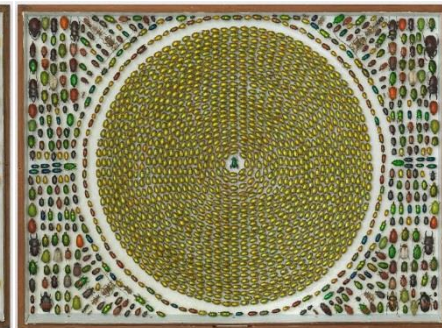
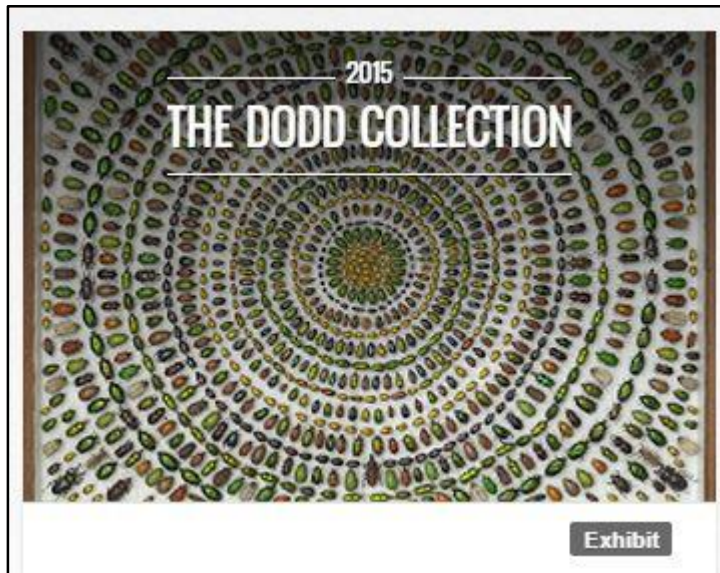
# Google Cultural Institute

Discover exhibits and collections from museums and archives all around the world. Explore cultural treasures in extraordinary detail, from hidden gems to masterpieces.

**New!** Museums, galleries, archives: discover **Google Open Gallery**, powerful free tools to bring your content online.

Google  
**CULTURAL  
INSTITUTE**

Create your own galleries and share favorite finds with friends.

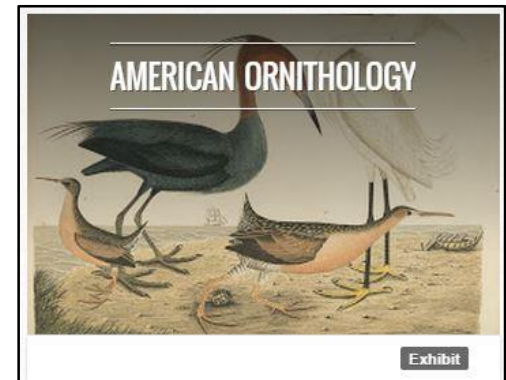


# Google Cultural Institute

Collections 27 of 745 Museum view only Sort View

Australia

- National Museum of Australia**  
Canberra, Australia  
177 Items, 2 Artists  
Art Project, Historic Moments  
173 more
- NATIONAL PORTRAIT GALLERY**  
Canberra, Australia  
99 Items, 4 Artists  
Art Project, Cultural Figures, Historic Moments  
93 more
- Public Record Office Victoria (S...)**  
North Melbourne, Australia  
233 Items  
Historic Moments  
229 more
- QUEENSLAND MUSEUM**  
Brisbane, Australia  
59 Items  
Art Project, Historic Moments  
56 more



- Create your own gallery to compare, view drawers

The screenshot shows a gallery interface with three butterfly cases displayed side-by-side. The first case on the left is titled 'Delias aruna Case' by Alan Parkhurst Dodd, Queensland Museum, and features a dense arrangement of various brown and orange butterflies. The middle case is titled 'Ulysses case' by Alan Parkhurst Dodd, Queensland Museum, and features a collection of bright blue butterflies. The third case on the right is titled 'The Grand Parade' by Frederick Parkhurst Dodd, Queensland Museum, and features a large, intricate circular arrangement of many small butterflies. Below the first case is an 'EDIT' button. The interface includes dashed vertical lines between the cases, suggesting they can be rearranged or compared.

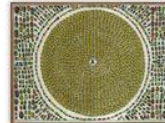
Delias aruna Case  
by Alan Parkhurst Dodd  
Queensland Museum

Ulysses case  
by Alan Parkhurst Dodd  
Queensland Museum

The Grand Parade  
by Frederick Parkhurst Dodd  
Queensland Museum

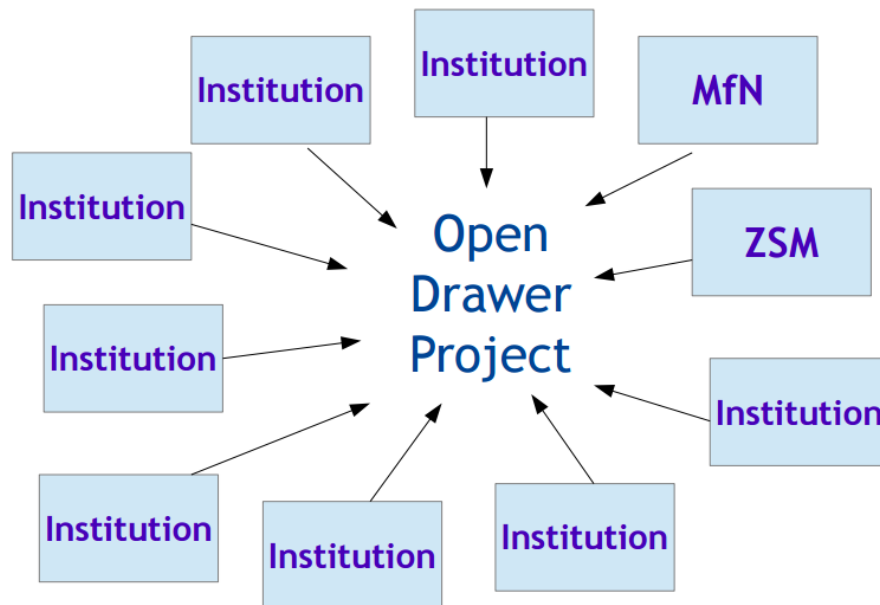
EDIT

**Queensland Museum**  
Brisbane, Australia  
59 Items  
Art Project, Historic Moments



# Open Drawer Project

- annotate
- crowdsource sub imaging of the drawer
- integrate type images associated with the drawer
- searched by taxon = drawers from different collections exposed side by side



## Project partners

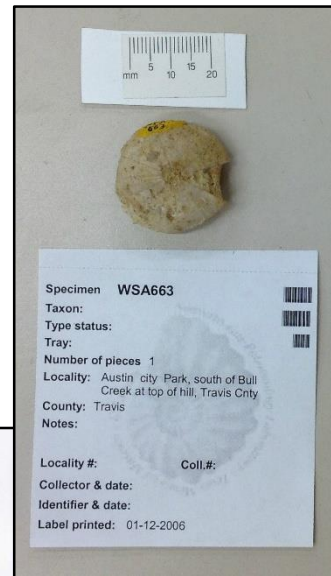
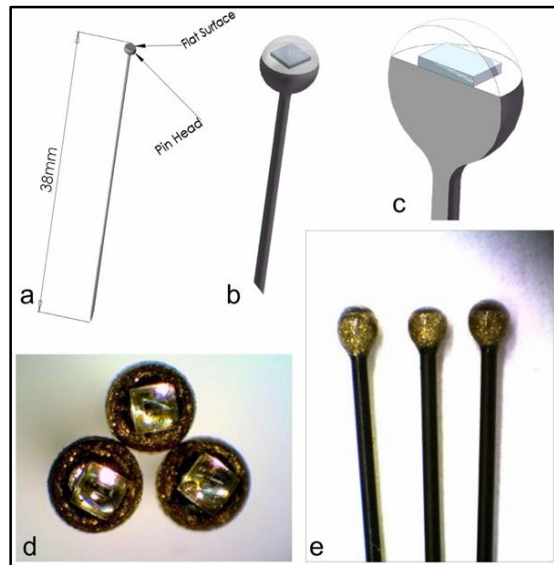
Berlin Museum portal, partners of the ERDF pilot projects  
Botanic Garden and Botanical Museum of the University of Berlin  
University of Kansas, USA  
Natural History Museum in Stockholm, Sweden  
Naturalis Biodiversity Center Leiden, The Netherlands  
Natural History Museum London, UK  
Atlas of Living Australia, Canberra, Australia  
SmartDrive Huntingdon, UK  
FU Berlin  
Konrad Zuse Center for Information Technology (ZIB)  
Leibniz composite Goportis  
Nestor Network of Expertise

museum für  
naturkunde  
berlin



# Registration of drawers & specimens

- GPS located drawers  
.....access the collection from a physical distance using ARCIS
- QR / barcodes
- RFID chips on pins



# Outline :

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# Challenges & opportunities

- Don't have the complete solution in drawer digitisation
- 2 way data feed- link annotations made on whole drawer images to individual specimen AND send that information back to the source data base.
- Strategic approach to digitisation partnerships & stakeholders
- Lack of a workforce/resources to digitise
- Various models for digitisation as we work in a digitised collaborative world
  - outsource it**
  - do it ourselves**
  - volunteers**
  - internships**
  - crowd source it**
  - digitise on demand**
  - OR win a Million \$ competition 😊**



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# Acknowledgements

- CSIRO
- ALA
- iDigBio
  
- Paul Flemons
- Changming Sun
  
- ALA Collection Browser
- Beyond the Box
- Google Cultural Institute
- Open Drawer Project



**Thank you** 谢谢  
xièxie

Nicole Fisher

Australian National Insect Collection (ANIC)  
CSIRO National Research Collections of Australia