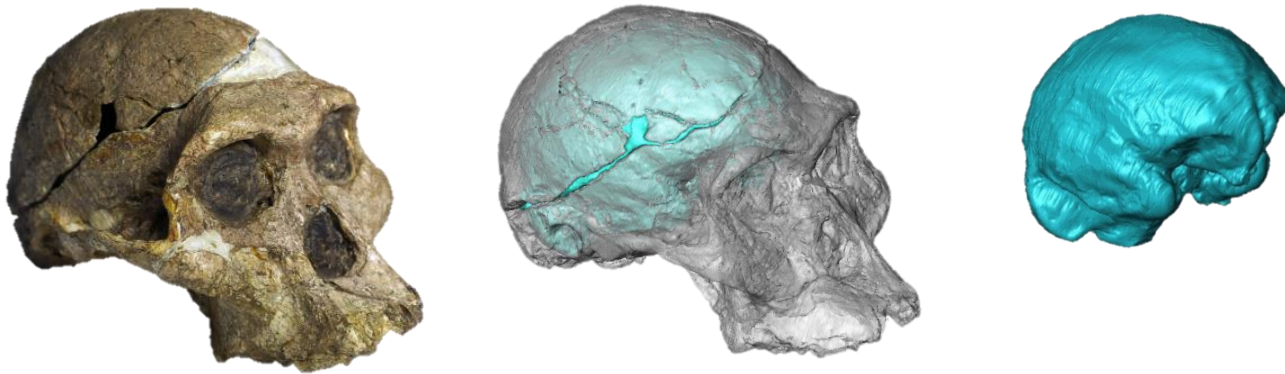


# MAPPING THE BRAIN OF FOSSIL HOMININS: *THE ENDOMAP PROJECT*



Amélie Beaudet, Edwin de Jager, Laurent Risser, Muriel Mescam  
& Caroline Fonta



BABAO conference - 19 September 2021

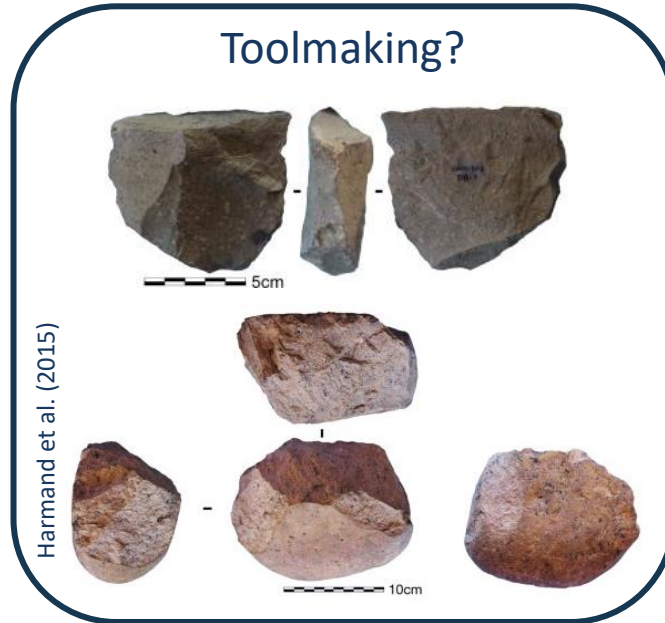
# WHAT DOES IT MEAN TO BE HUMAN?

How to define *Homo*?



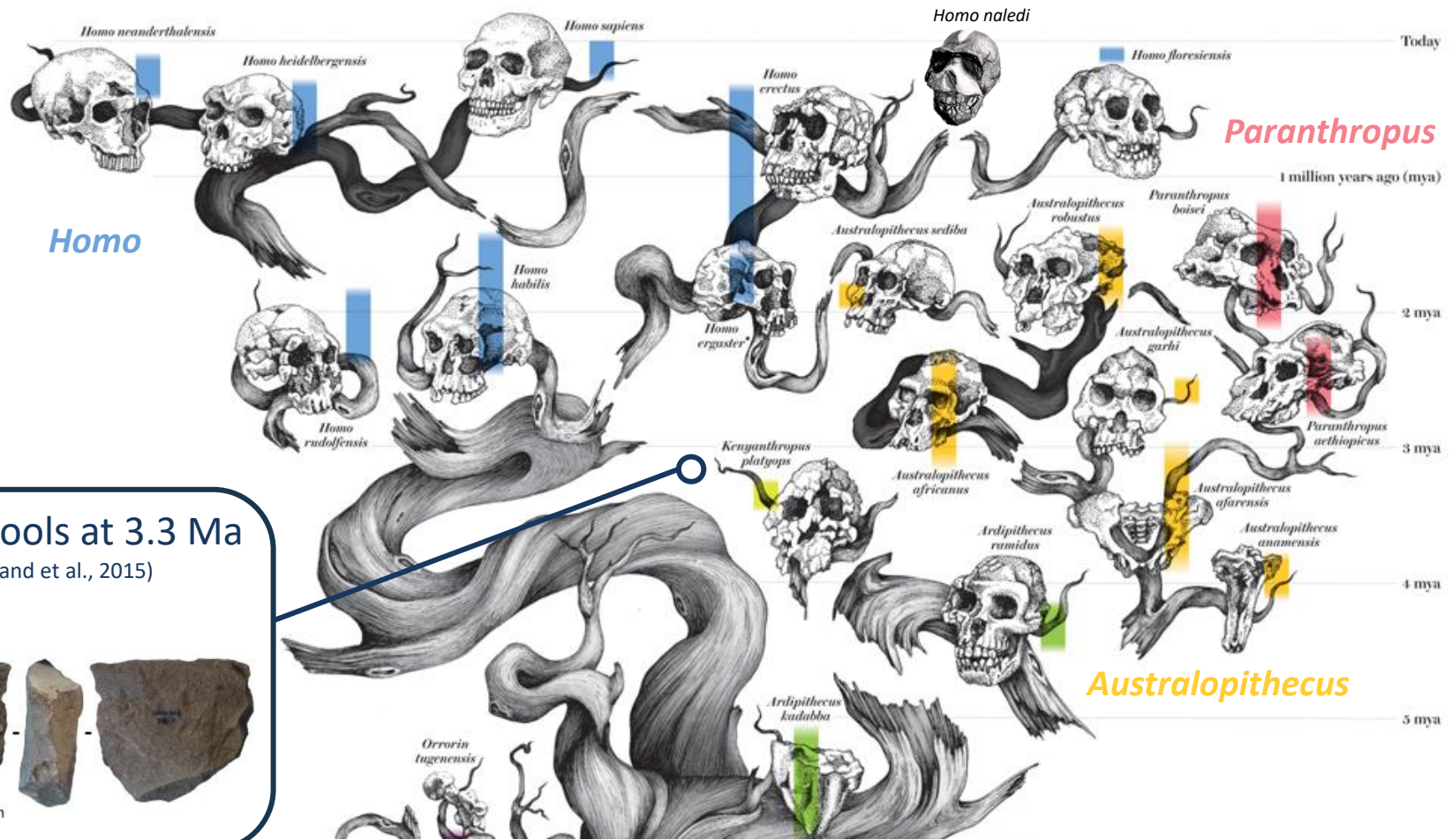
# WHAT DOES IT MEAN TO BE HUMAN?

## How to define *Homo*?



# WHAT DOES IT MEAN TO BE HUMAN?

## Who were the earliest toolmakers?



modified from Katy Wiedemann & Bernard Wood  
Scientific American (2014)

# WHAT DOES IT MEAN TO BE HUMAN?

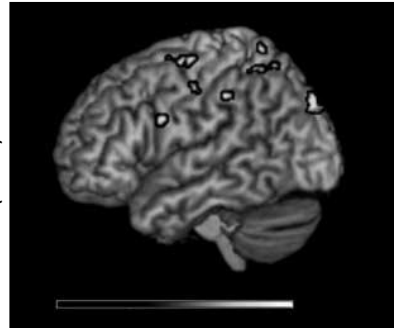
## Evidence from palaeoneurology

### Tools & cognition

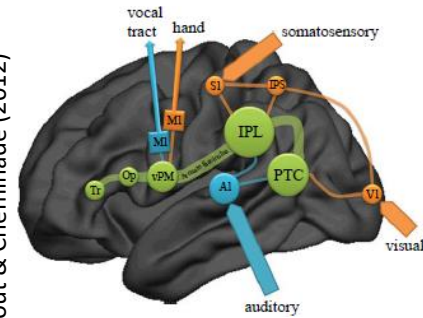
Putt (2017)



Stout et al. (2008)



Stout & Chaminade (2012)

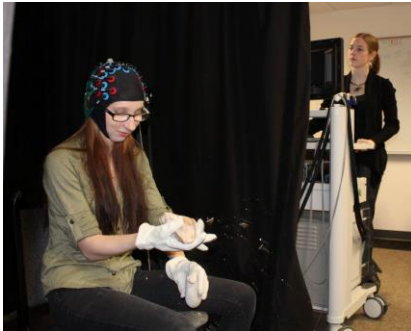


# WHAT DOES IT MEAN TO BE HUMAN?

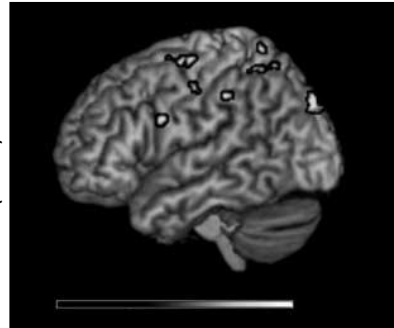
## Evidence from palaeoneurology

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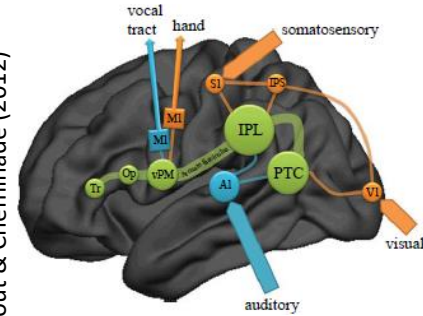
Putt (2017)



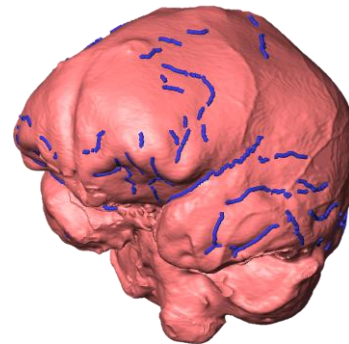
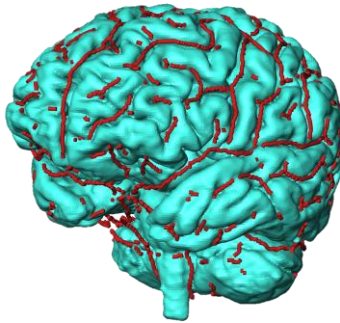
Stout et al. (2008)



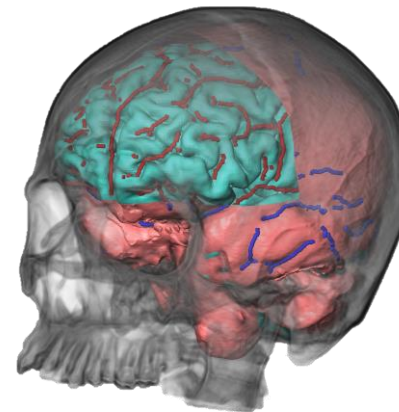
Stout & Chaminade (2012)



Dumoncel et al. (2021)



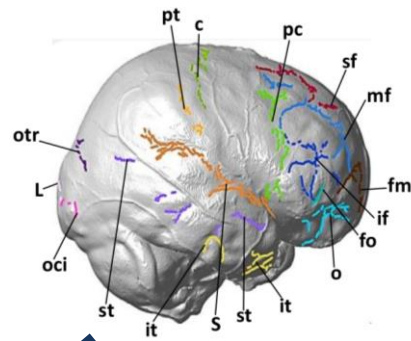
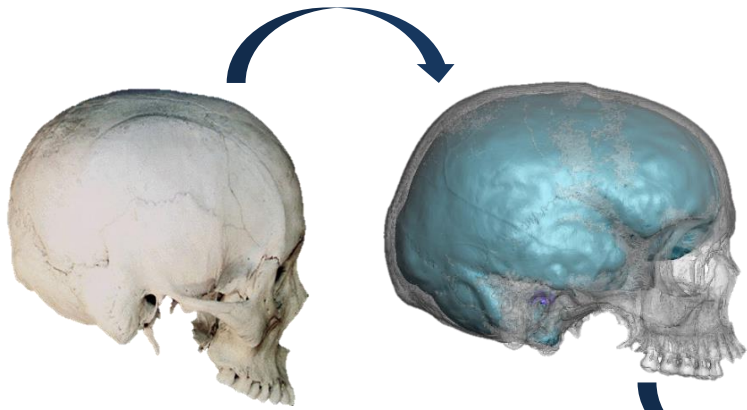
Endocast



# WHAT DOES IT MEAN TO BE HUMAN?

## The EndoMap project

From crania to endocasts



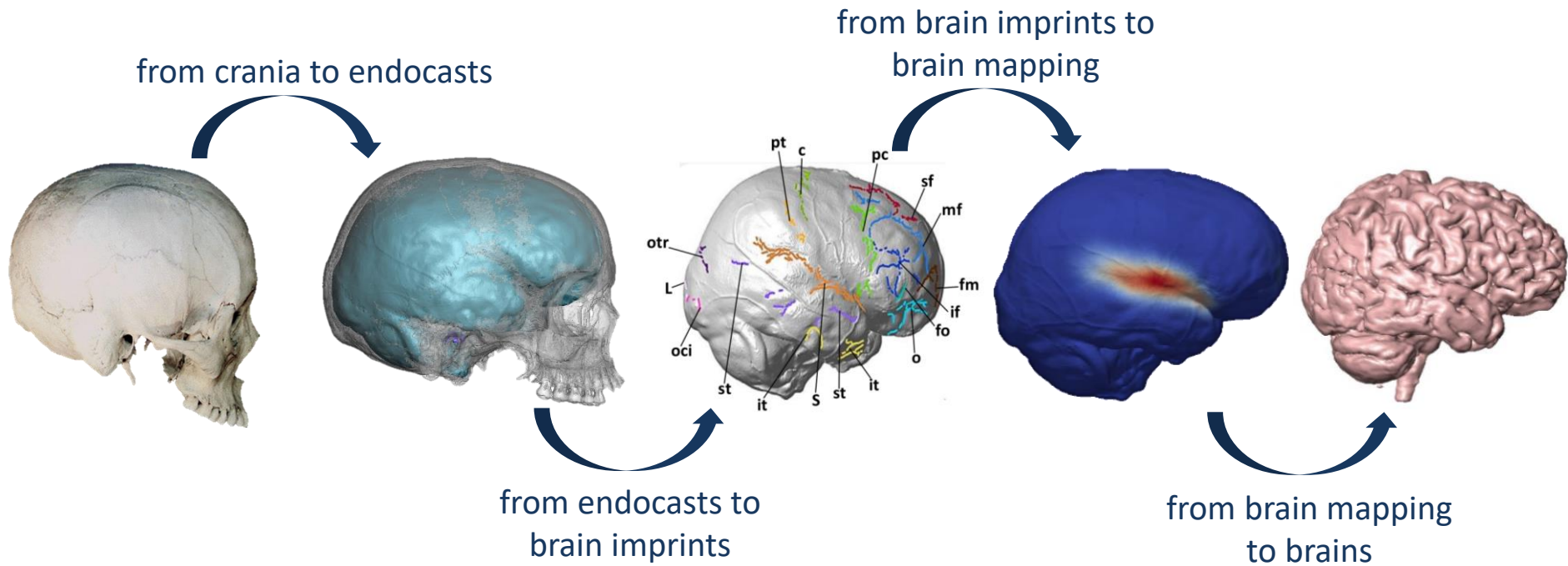
?



From endocasts to  
brain imprints

# WHAT DOES IT MEAN TO BE HUMAN?

## The EndoMap project



France/South Africa collaboration





# « VIRTUAL » PALEOANTHROPOLOGY

## Virtual endocasts



scanning  
(e.g., X-ray microCT)

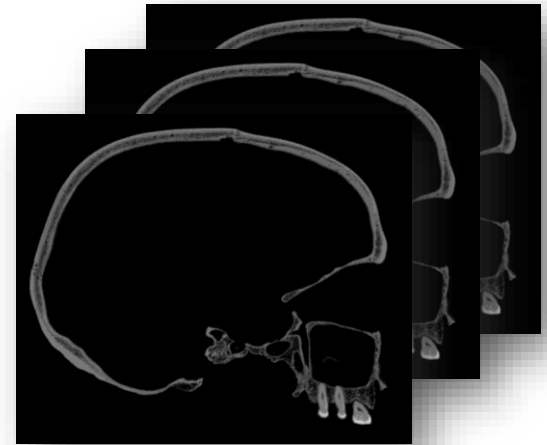
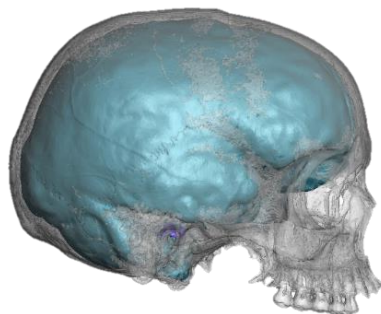
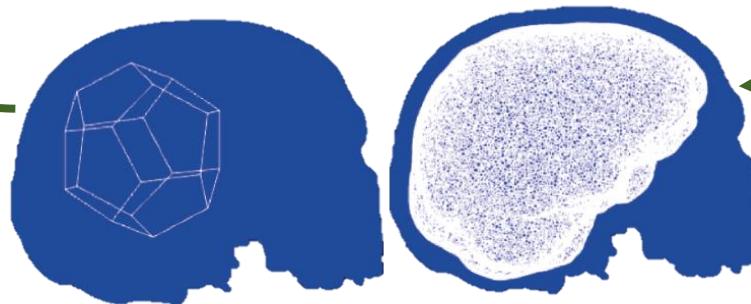


image stack



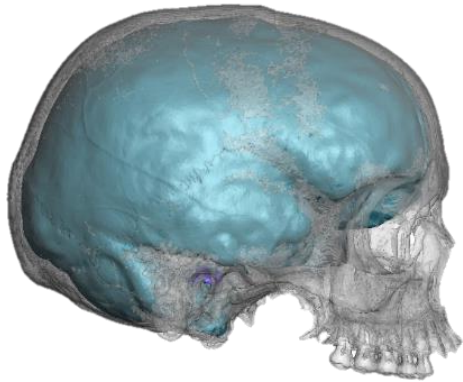
virtual endocast



segmentation (e.g., automatic)

# « VIRTUAL » PALEOANTHROPOLOGY

## How to detect brain imprints



virtual endocast



automatic detection

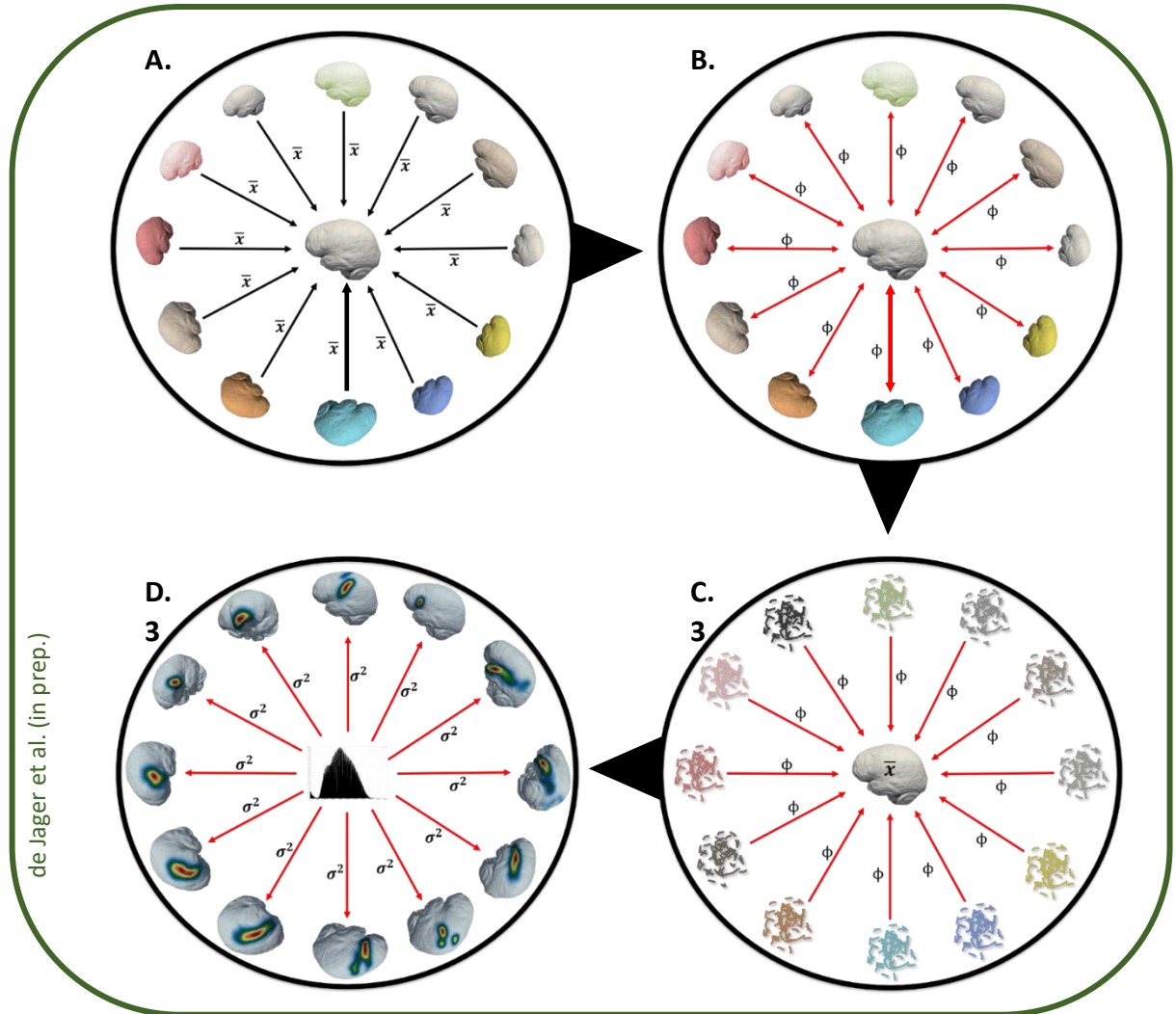
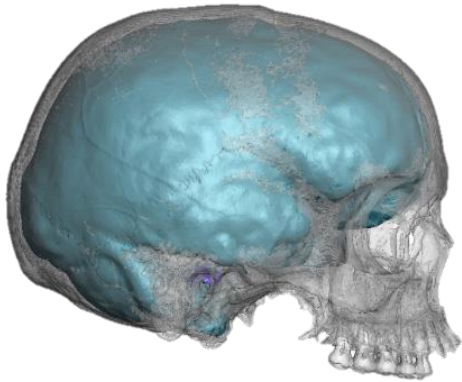


cleaning

Beaudet et al. (2016 & 2019)

# « VIRTUAL » PALEOANTHROPOLOGY

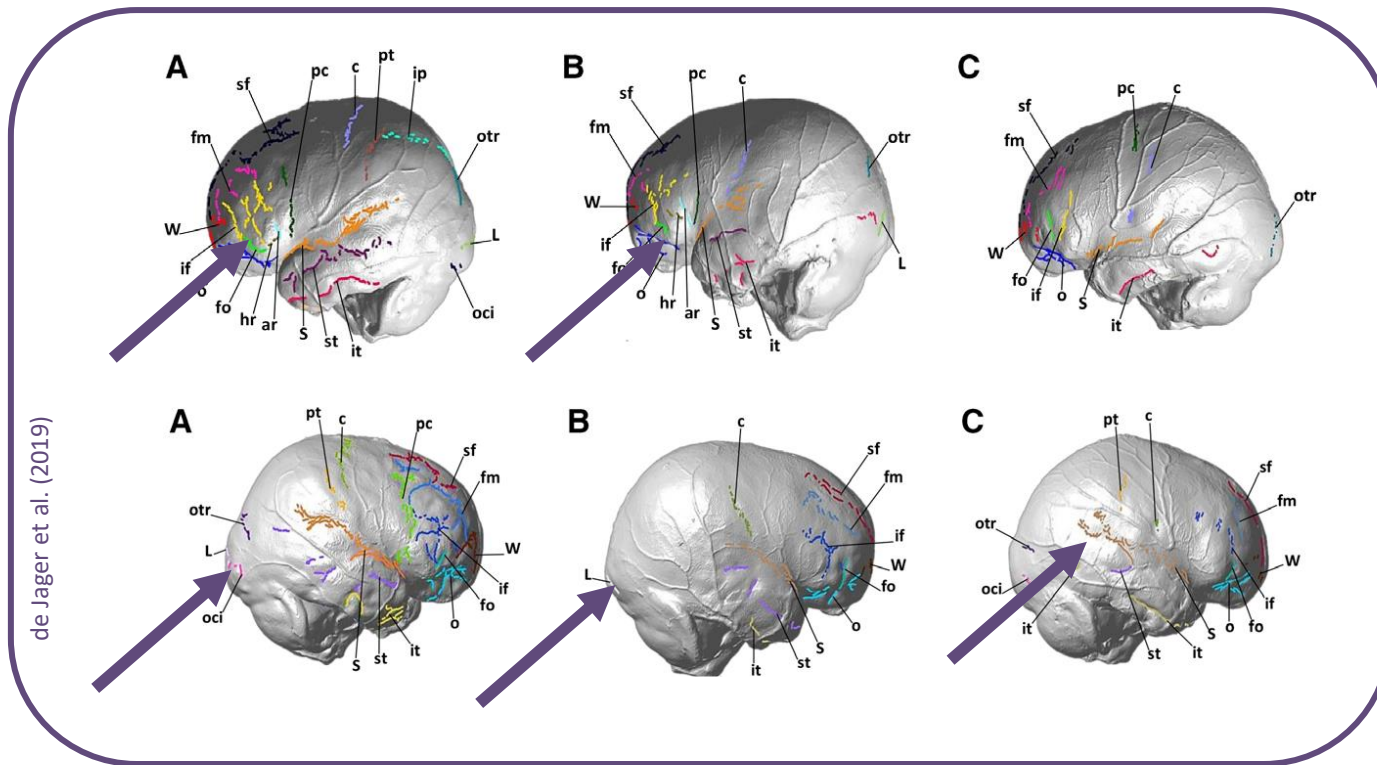
## How to identify brain imprints



de Jager et al. (in prep.)

# AN ATLAS OF EXTANT HUMAN ENDOCASTS

How variable is the sulcal pattern in extant human endocasts?

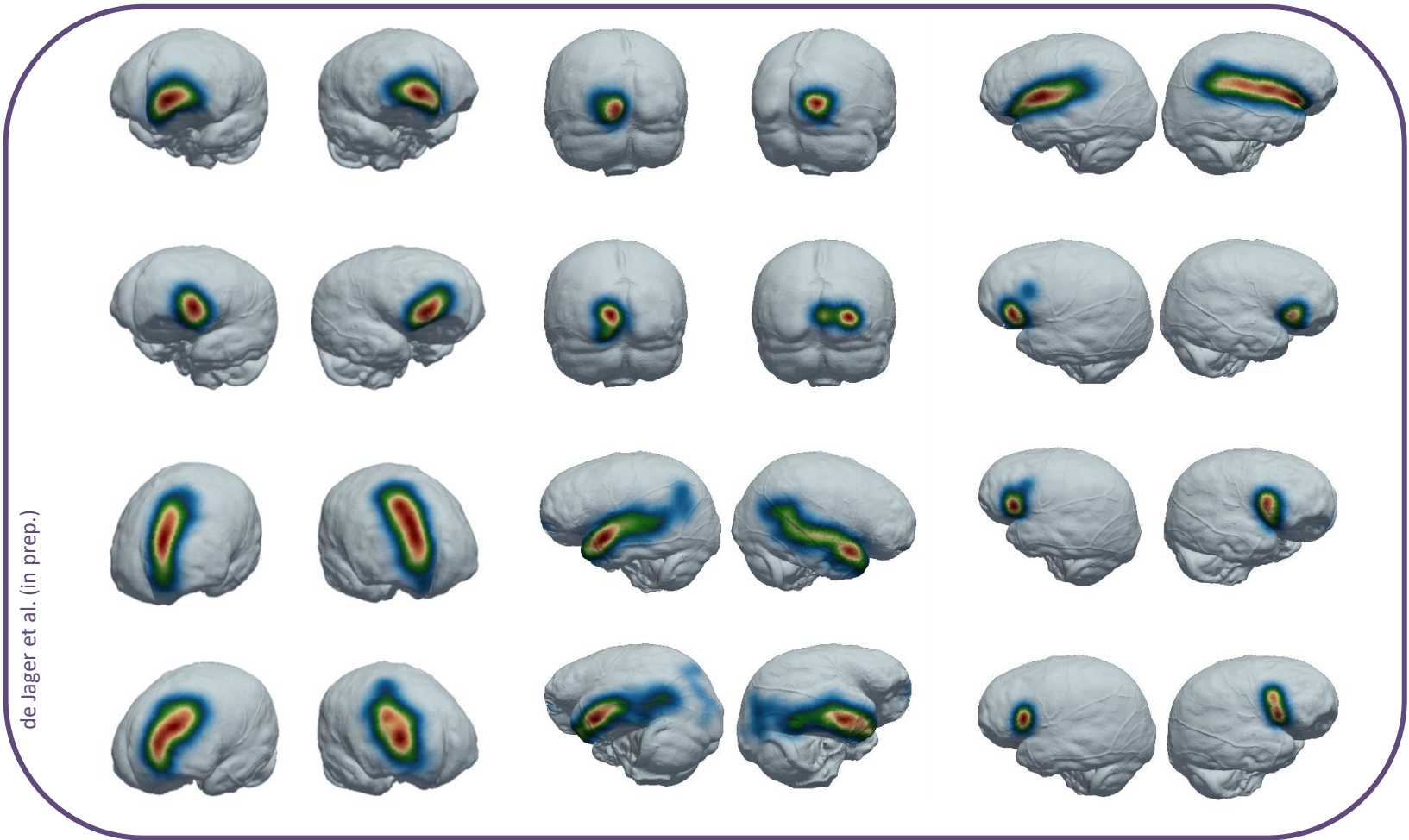


de Jager et al. (2019)

identification of major brain areas

# DENSITY MAPS OF EXTANT HUMAN ENDOCASTS

## How to map brain organization?



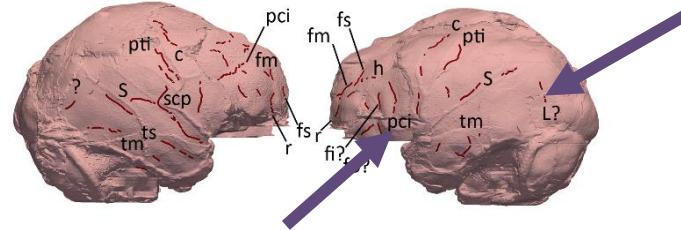
de Jager et al. (in prep.)

major functional areas well-defined

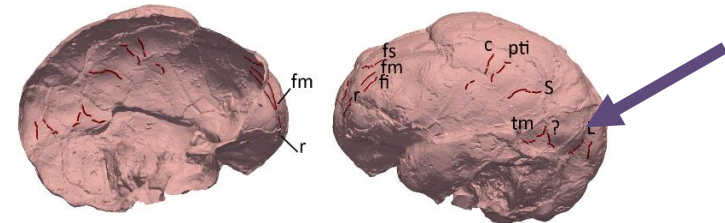
# APPLICATIONS TO THE FOSSIL RECORD

## Were non-*Homo* hominins able to make tools?

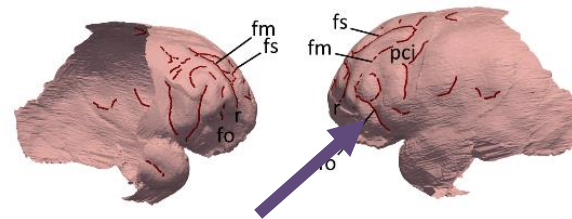
StW 573 (3.7 My)



StW 505 (2-2.6 My)



MH 1 (2 My)



Beaudet et al. (2019)

a primitive brain in *Australopithecus*

# THANK YOU!

## Members of the EndoMap project



Supported by

