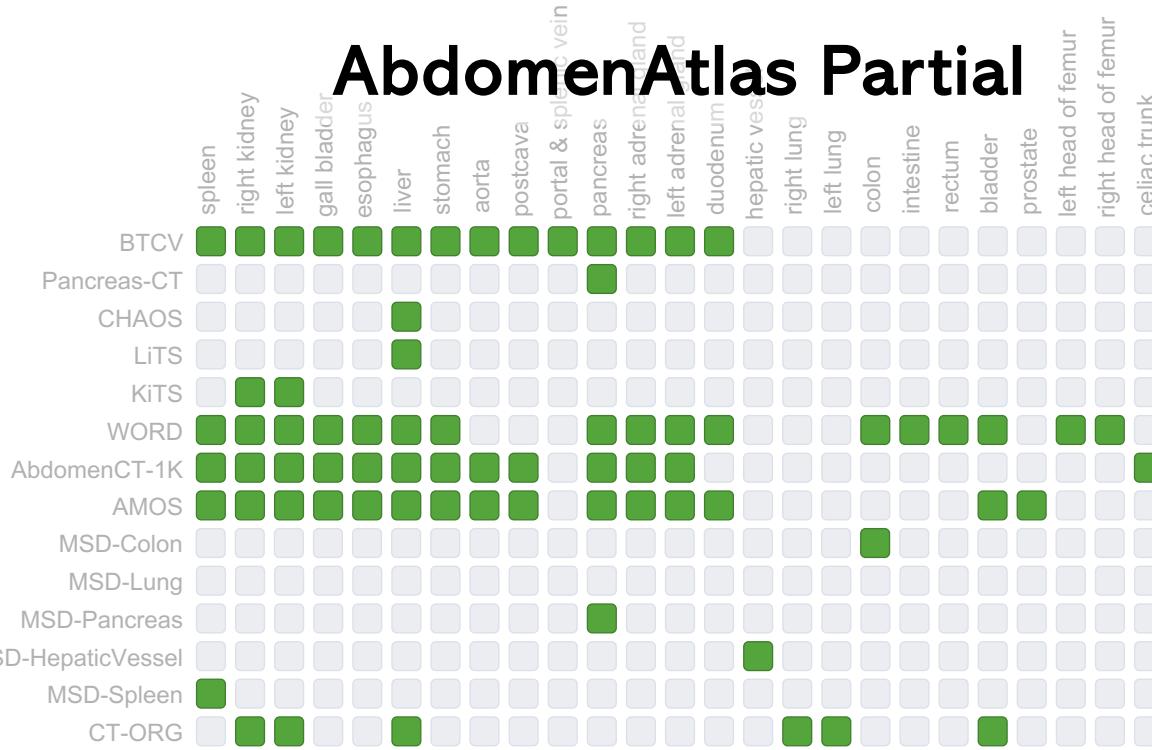


# Transitioning to Fully-Supervised Pre-Training with Large-Scale Radiology ImageNet for Improved AI Transferability in 3D Medical Segmentation

**Wenxuan Li**

Johns Hopkins University

E: [wli131@jh.edu](mailto:wli131@jh.edu)



3,410 CT scans

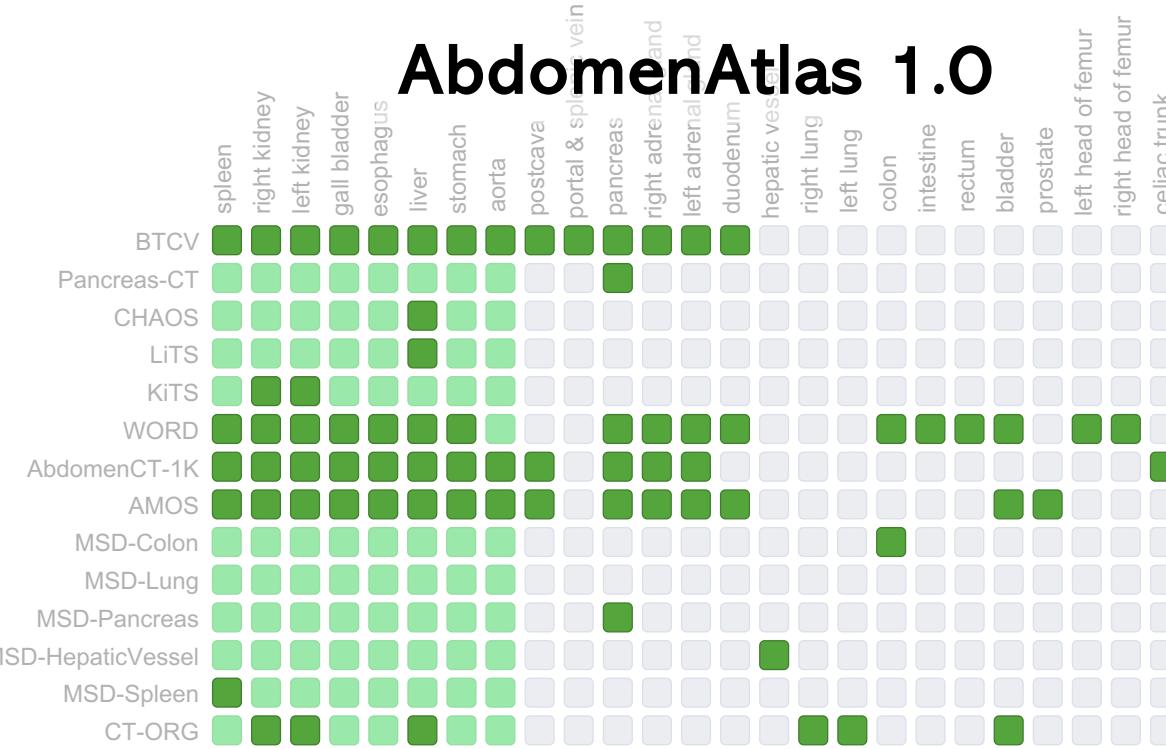
14 datasets

27 hospitals

**CLIP-Driven  
Universal Model**  
*ICCV 2023*  
*MICCAI 2023*  
*RSNA 2023*

**AbdomenAtlas-8K**  
*NeurIPS 2023*  
*RSNA 2023*

# AbdomenAtlas 1.0

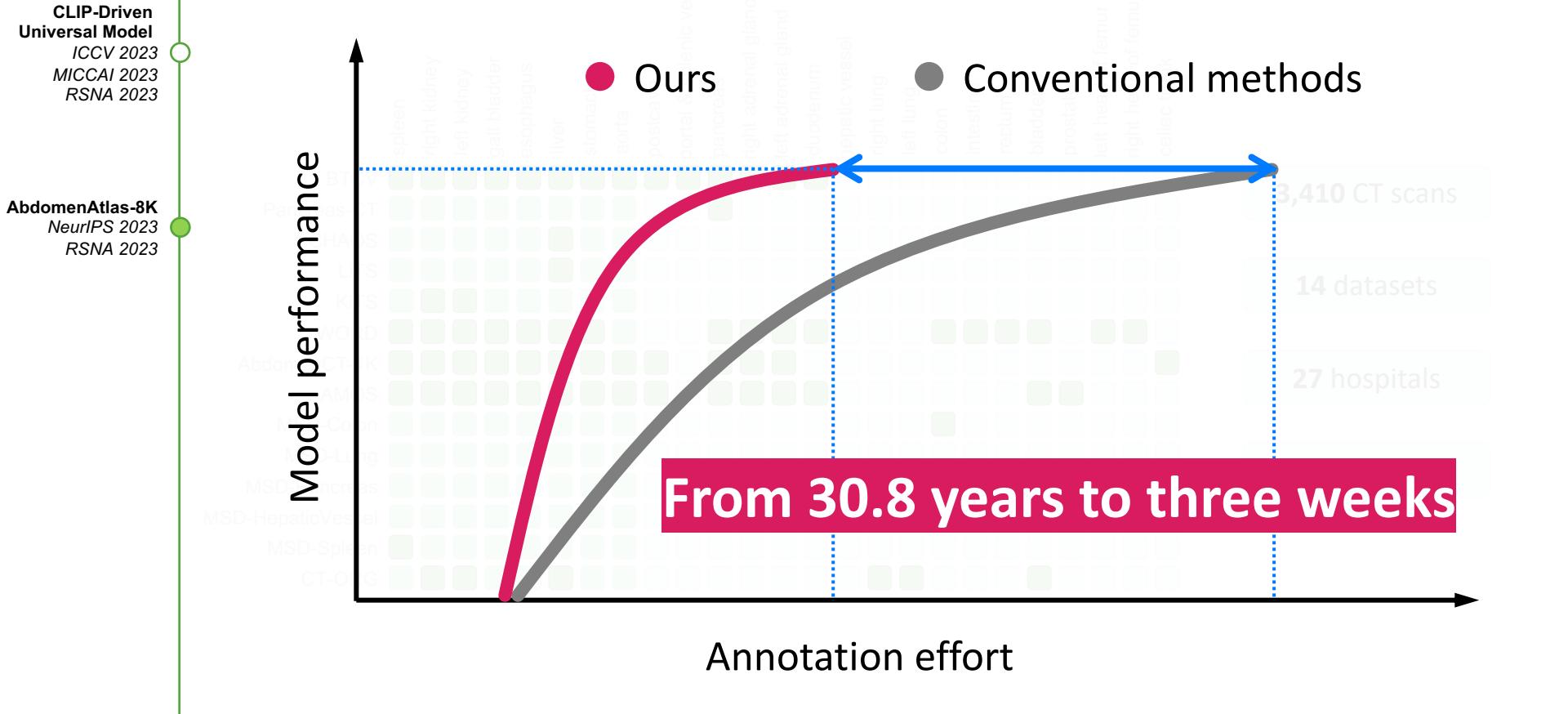


**3,410 CT scans**

**14 datasets**

**27 hospitals**

**8 structures**

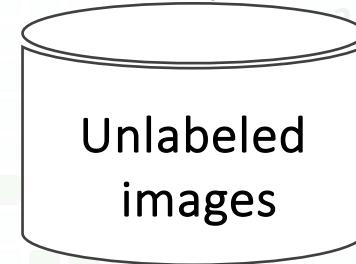


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Pre-train models



410 CT scans

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Interactive Segmentation

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*NeurIPS 2023*  
*RSNA 2023*



Pre-train models



Unlabeled  
images

Select important  
images

Interactive Segmentation

410 CT scans

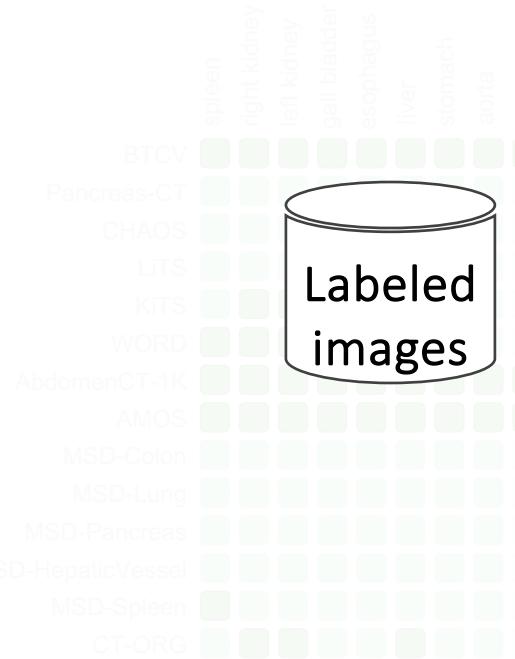
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Pre-train models



Labeled  
images

Unlabeled  
images

Select important  
images

Interactive Segmentation

410 CT scans

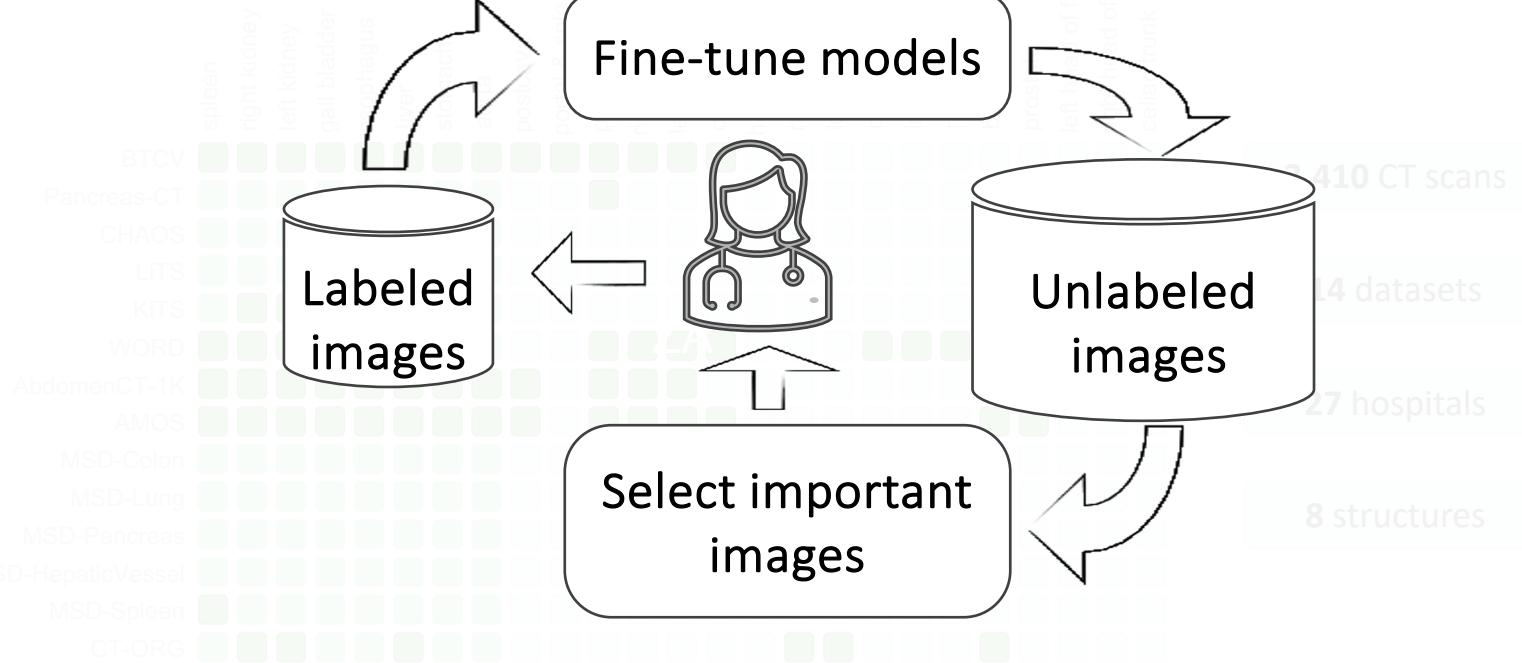
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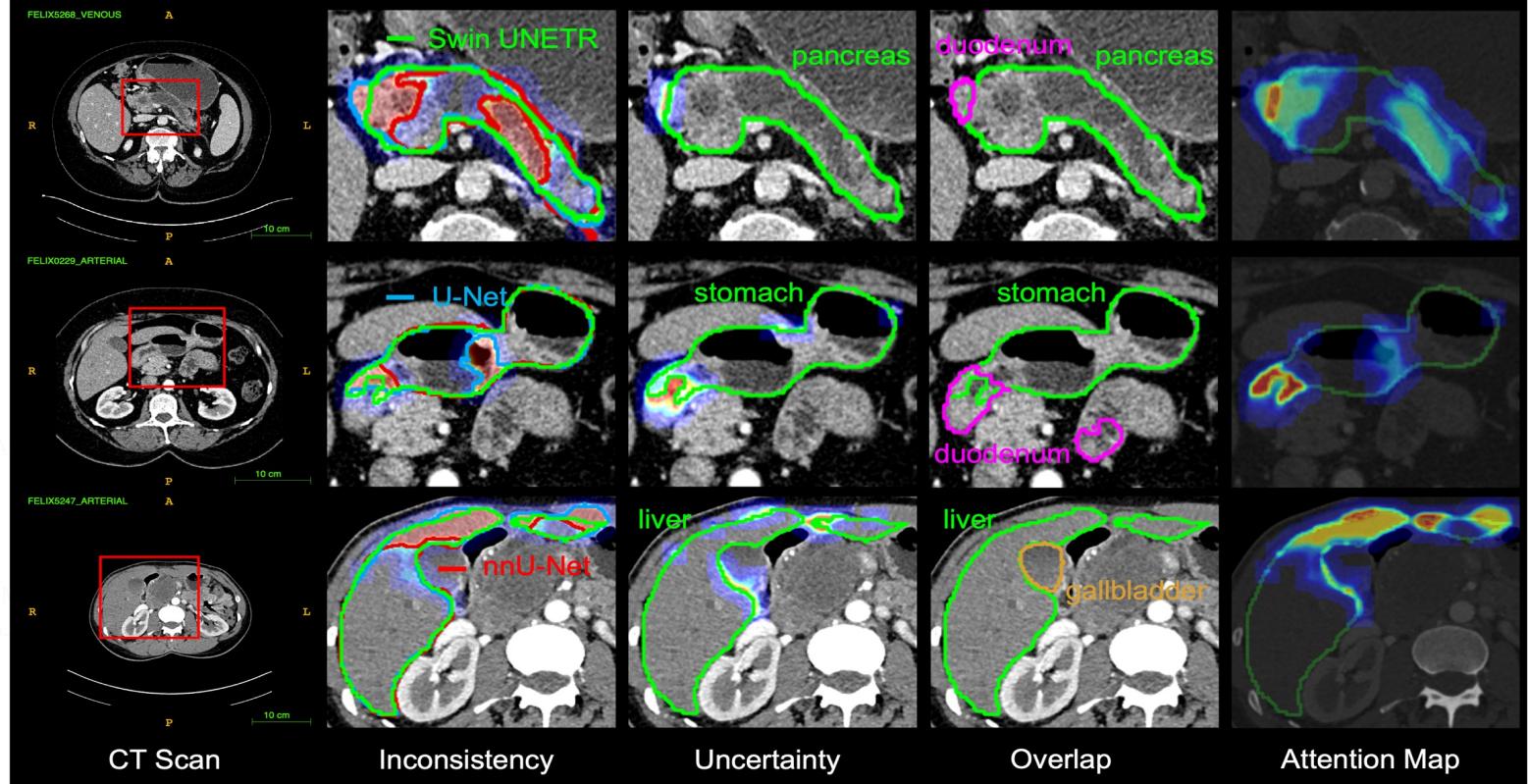
**AbdomenAtlas-8K**  
*NeurIPS 2023*  
*RSNA 2023*



## Interactive Segmentation

**CLIP-Driven  
Universal Model**  
*ICCV 2023  
MICCAI 2023  
RSNA 2023*

**AbdomenAtlas-8K**  
*NeurIPS 2023  
RSNA 2023*

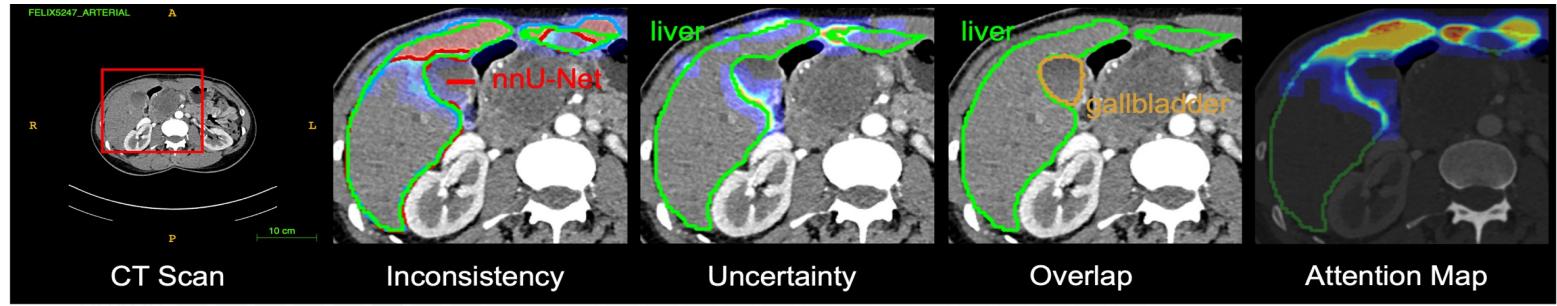


Wenxuan Li  
wli131@jh.edu

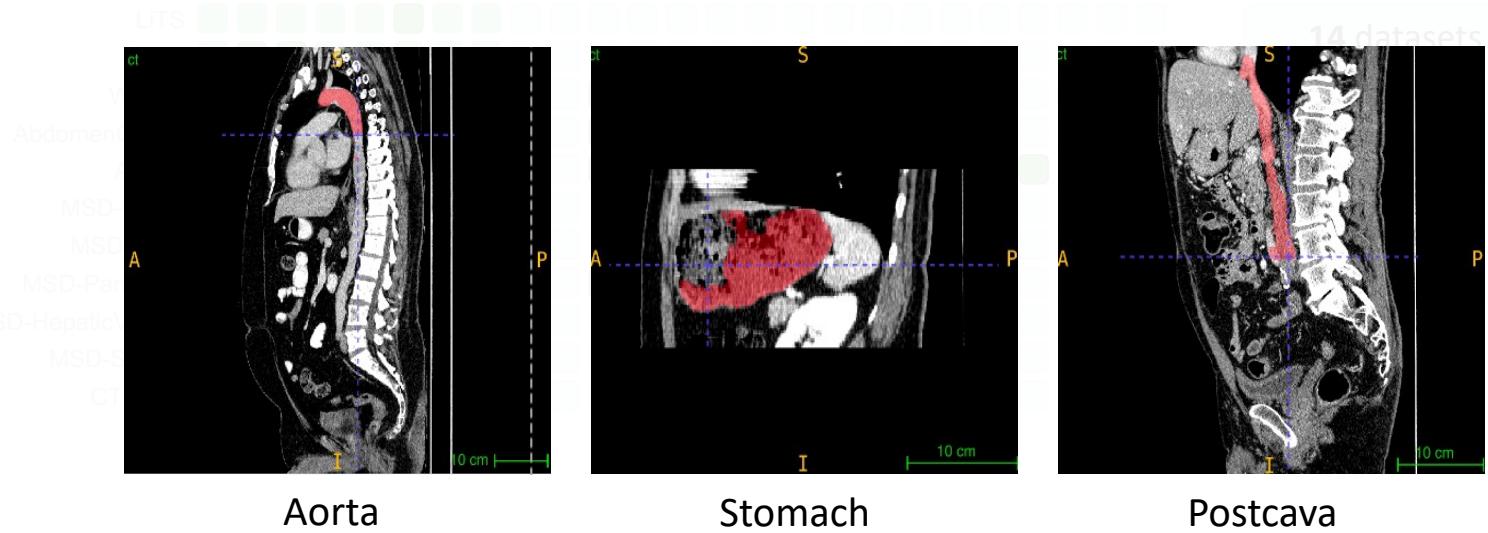
Code, Dataset, & Model:  
<https://github.com/MrGiovanni/AbdomenAtlas>



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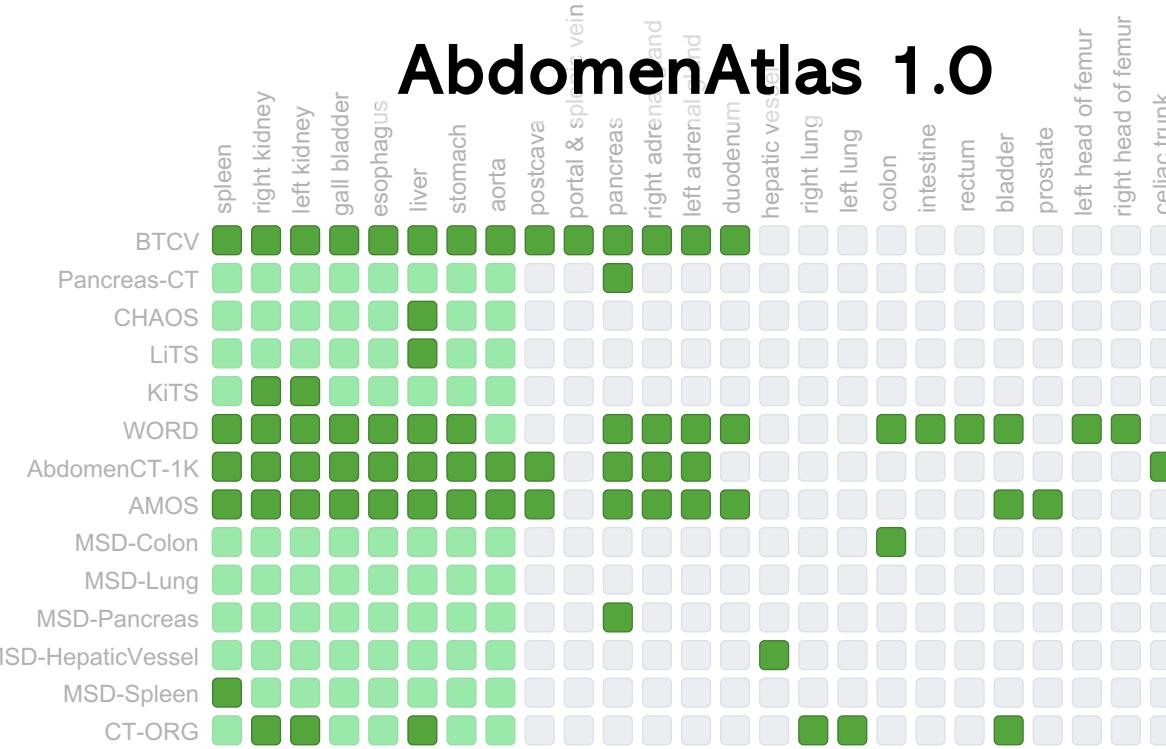
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# AbdomenAtlas 1.0



**3,410 CT scans**

**14 datasets**

**27 hospitals**

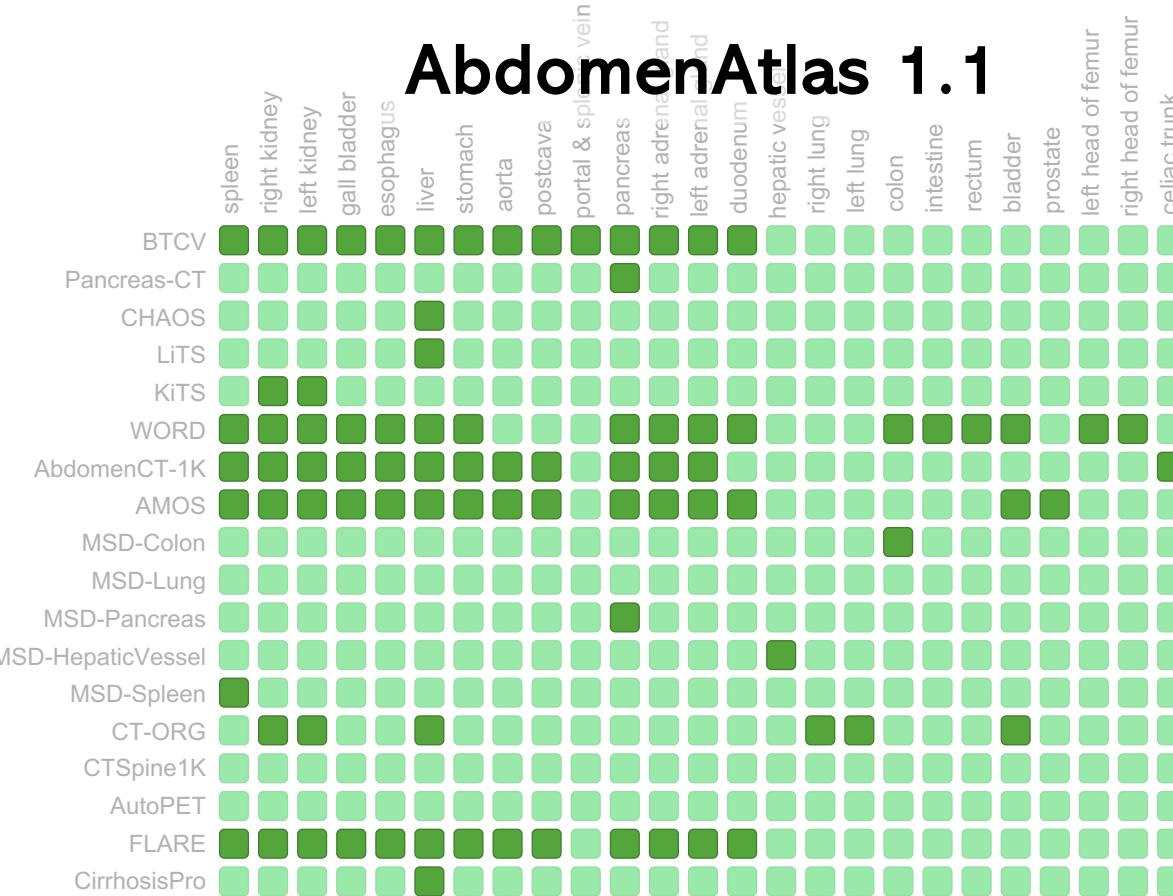
**8 structures**

**CLIP-Driven  
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**AbdomenAtlas-8K**  
*NeurIPS 2023*  
*RSNA 2023*

**SuPreM**  
*RSNA 2023*

# AbdomenAtlas 1.1

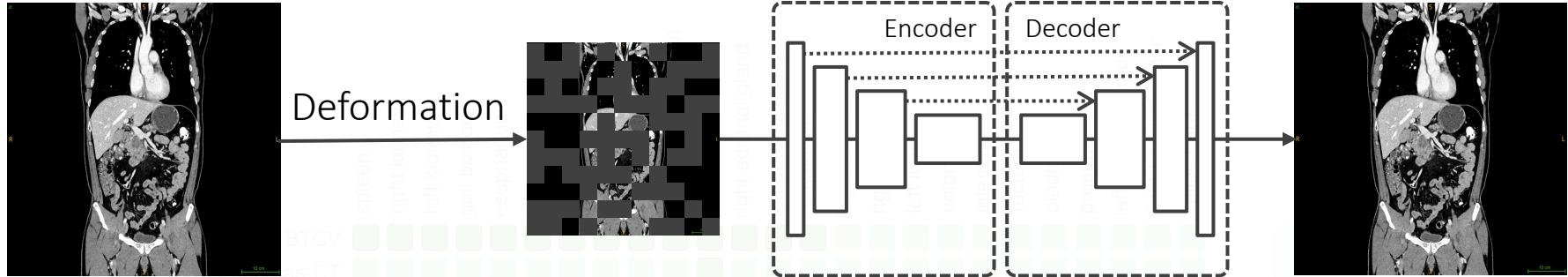


9,262 CT scans

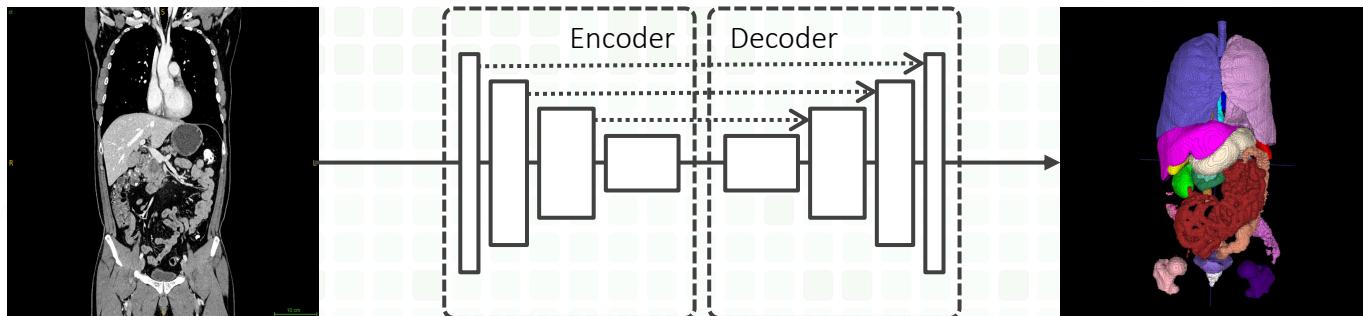
17 datasets

88 hospitals

25 structures

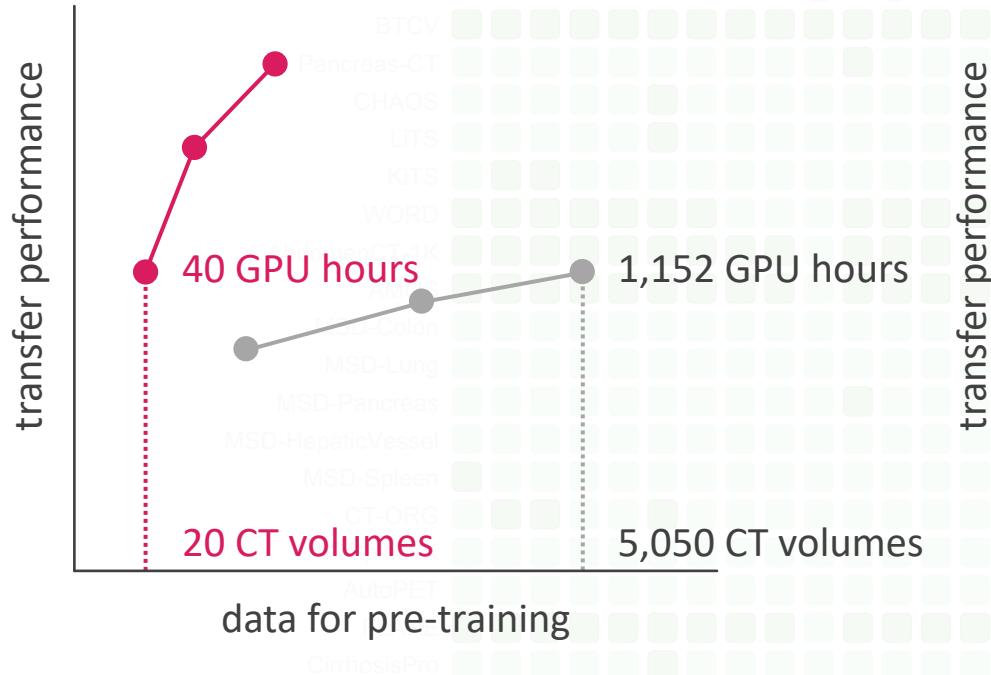


## Self-supervised Pre-training

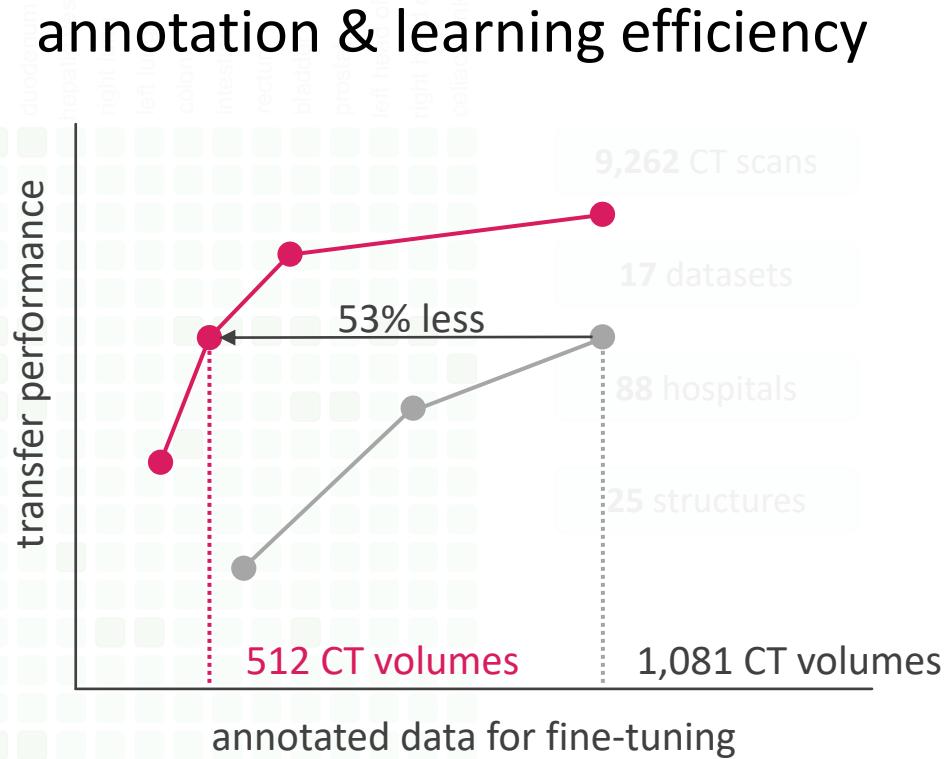


## Supervised Pre-training

## **Supervised > Self-supervised** data & computation efficiency



## **Supervised > Self-supervised** annotation & learning efficiency



### ▼ Swin UNETR

name	params	pre-trained data	resources	download
<a href="#">Tang et al.</a>	62.19M	5050 CT	Stars 930	<a href="#">weights</a>
<a href="#">Jose Valanaras et al.</a>	62.19M	50000 CT/MRI	Stars 930	<a href="#">weights</a>
<a href="#">Universal Model</a>	62.19M	2100 CT	Stars 463	<a href="#">weights</a>
SuPreM	62.19M	2100 CT	ours 🌟	<a href="#">weights</a>

### ▼ U-Net

name	params	pre-trained data	resources	download
<a href="#">Models Genesis</a>	19.08M	623 CT	Stars 719	<a href="#">weights</a>
<a href="#">UniMiSS</a>	tiny	5022 CT&MRI	Stars 46	<a href="#">weights</a>
	small	5022 CT&MRI		<a href="#">weights</a>
<a href="#">Med3D</a>	85.75M	1638 CT	Stars 1.8k	<a href="#">weights</a>
<a href="#">DoDNet</a>	17.29M	920 CT	Stars 163	<a href="#">weights</a>
<a href="#">Universal Model</a>	19.08M	2100 CT	Stars 463	<a href="#">weights</a>
SuPreM	19.08M	2100 CT	ours 🌟	<a href="#">weights</a>

### ▼ SegResNet

name	params	pre-trained data	resources	download
SuPreM	4.70M	2100 CT	ours 🌟	<a href="#">weights</a>





MICCAI

# AbdomenAtlas 1.1

## BodyMaps - ISBI & MICCAI Challenge



IEEE INTERNATIONAL SYMPOSIUM  
ON BIOMEDICAL IMAGING  
**ISBI 2024**  
27-30 MAY, 2024 – ATHENS, GREECE  
MEGARON ATHENS INTERNATIONAL CONFERENCE CENTRE (MAICC)

**Goal:** Improving AI algorithms in performance and efficiency

### Performance

- Out-of-distribution CT scans (scanners, protocols, demography, etc.)
- Hard-to-segment anatomical structures (small organs, tubular structure, etc.)

9,262 CT scans

17 datasets

88 hospitals

25 structures

### Efficiency

- Inference time per CT scan; computational cost

### Setting

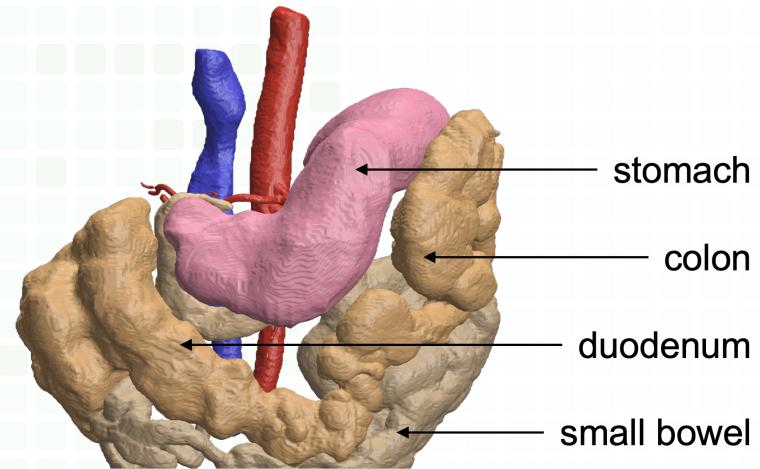
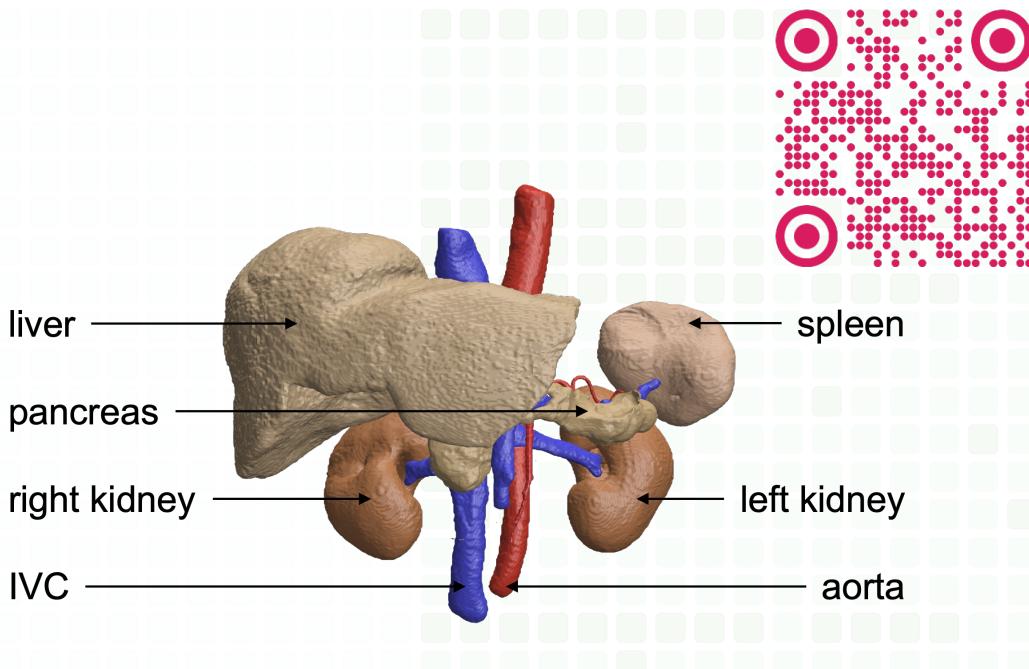
Training AI algorithms on *AbdomenAtlas 1.1*;

evaluating the AI on our proprietary *dataset*.



# AbdomenAtlas 1.1

Subscribe us: <https://groups.google.com/u/2/g/imseg>

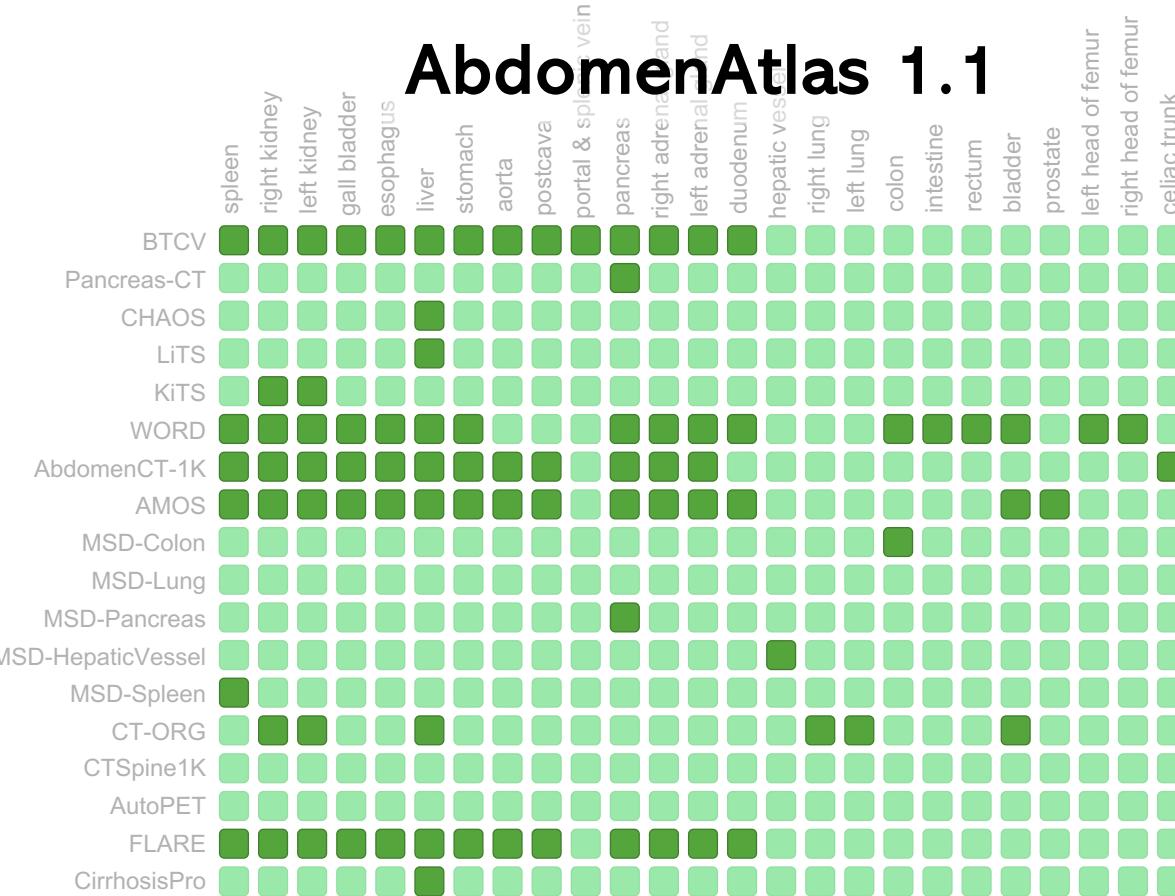


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*RSNA 2023*

**SuPreM**  
*RSNA 2023*

# AbdomenAtlas 1.1



9,262 CT scans

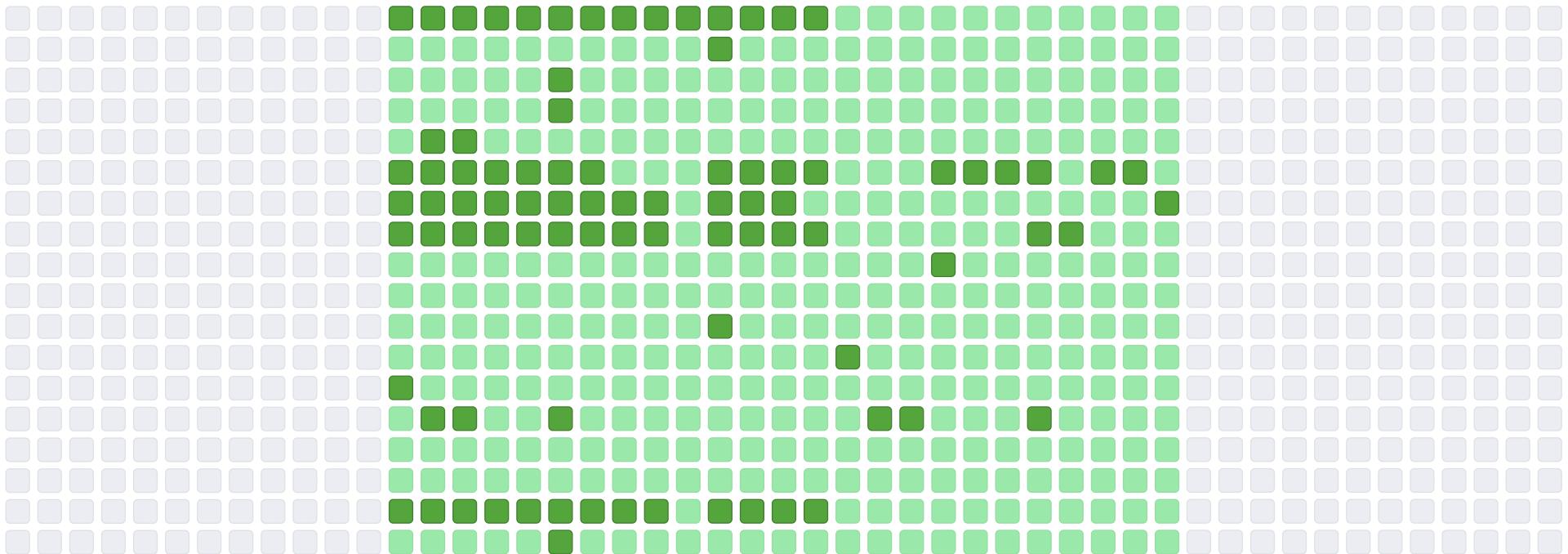
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# THANK YOU

