AbdomenAtlas

Radiologists and AI Unite to Map the Abdomen

Wenxuan Li, Alan Yuille, Zongwei Zhou
Johns Hopkins University
wli131@jh.edu


Johns Hopkins University
Johns Hopkins University is a private research university in Baltimore, Maryland. Founded in 1876, Johns Hopkins was the first American university based on the European research institution model. The university was named for its first benefactor, the American entrepreneur and Quaker philanthropist Johns Hopkins.
Wikipedia
Johns Hopkins University, Baltimore, MD 21218
89HH+XQ Baltimore, Maryland
jhu.edu
(410) 516-8000
Acceptance rate
7.3% (2022)
Save to project
39°20'15"N
39°20'10"N
39°20'05"N
39°20'N
39°19'55"N
39°19'45"N
39°19'40"N
39°19'20"N
76°38'10"W
76°38'W
76°37'50"W
76°37'40"W
76°37'30"W
76°37'10"W
76°36'55"W
76°36'40"W
First English Lutheran Church
Homewood Field
RALPH S. O'CONNOR CENTER FOR...
Cathedral Church-Incarnation
MedStar Union Memorial Hospital
Gilman Hall
Wyman Park
Roosevelt Park
Stony Run
Jones Falls
Jones Falls Expy
Saints Philip & James Catholic Church
Atlas


Baltimore
Baltimore is a major city in Maryland with a long history as an important seaport. Fort McHenry, birthplace of the U.S. national anthem, "The Star-Spangled Banner," sits at the mouth of Baltimore's Inner Harbor. Today, this harbor area offers shops, upscale crab shacks and attractions like the Civil War–era warship the USS Constellation and the National Aquarium, showcasing thousands of marine creatures.
Baltimore, MD
baltimorecity.gov
Population
576,498 (2021)
Area code
Area code 410
Congressional districts
2nd, 7th
Save to project
Atlas


NORTH AMERICA
EUROPE
ASIA
AFRICA
SOUTH AMERICA
AUSTRALIA
Atlas


90°N
80°N
70°N
60°N
50°N
40°N
170°W
160°W
150°W
140°W
120°W
110°W
100°W
90°W
80°W
70°W
60°W
50°W
40°W
Prime Meridian
10°W
20°W
Tropic of Cancer
20°N
10°N

Atlas

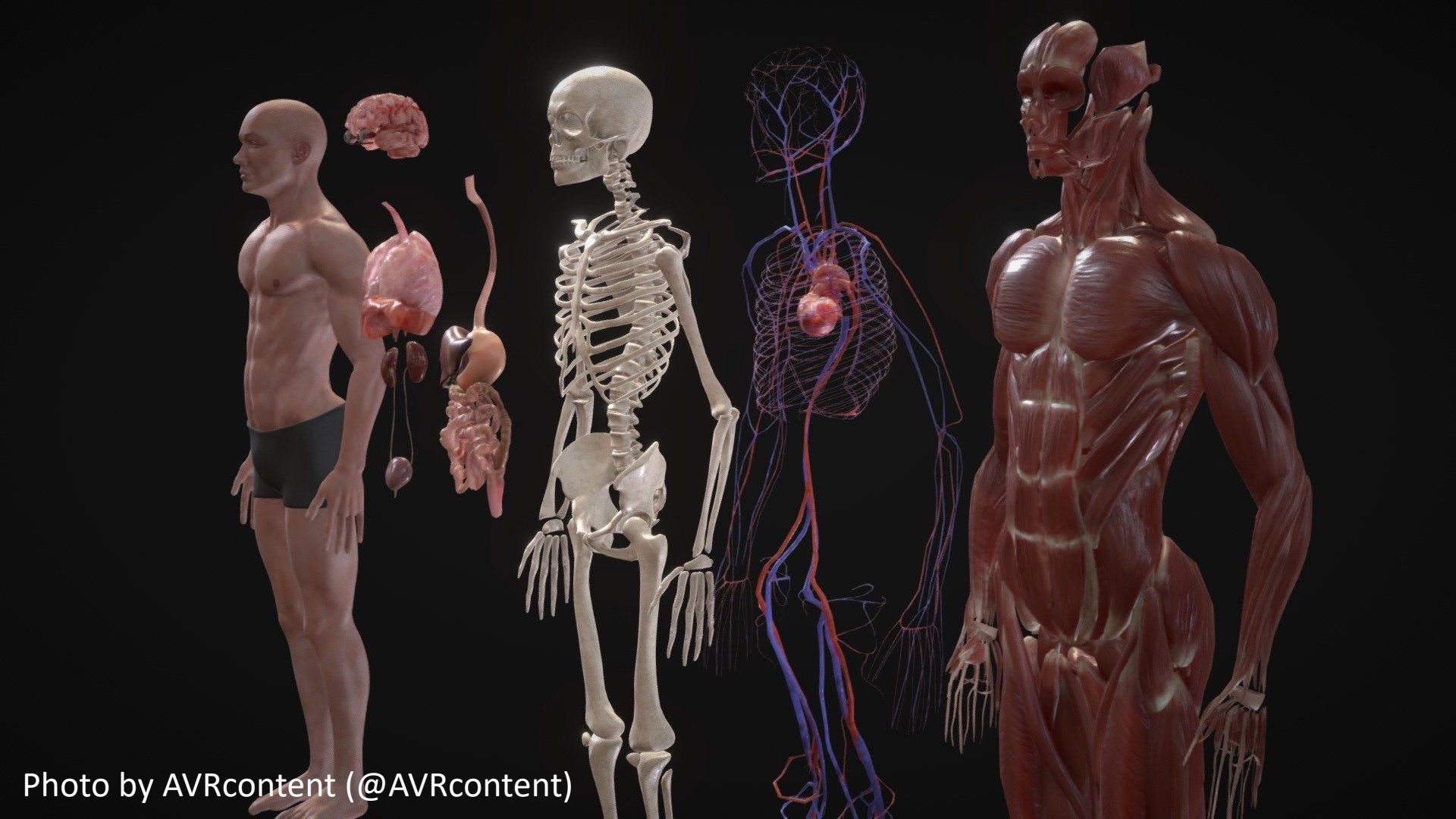
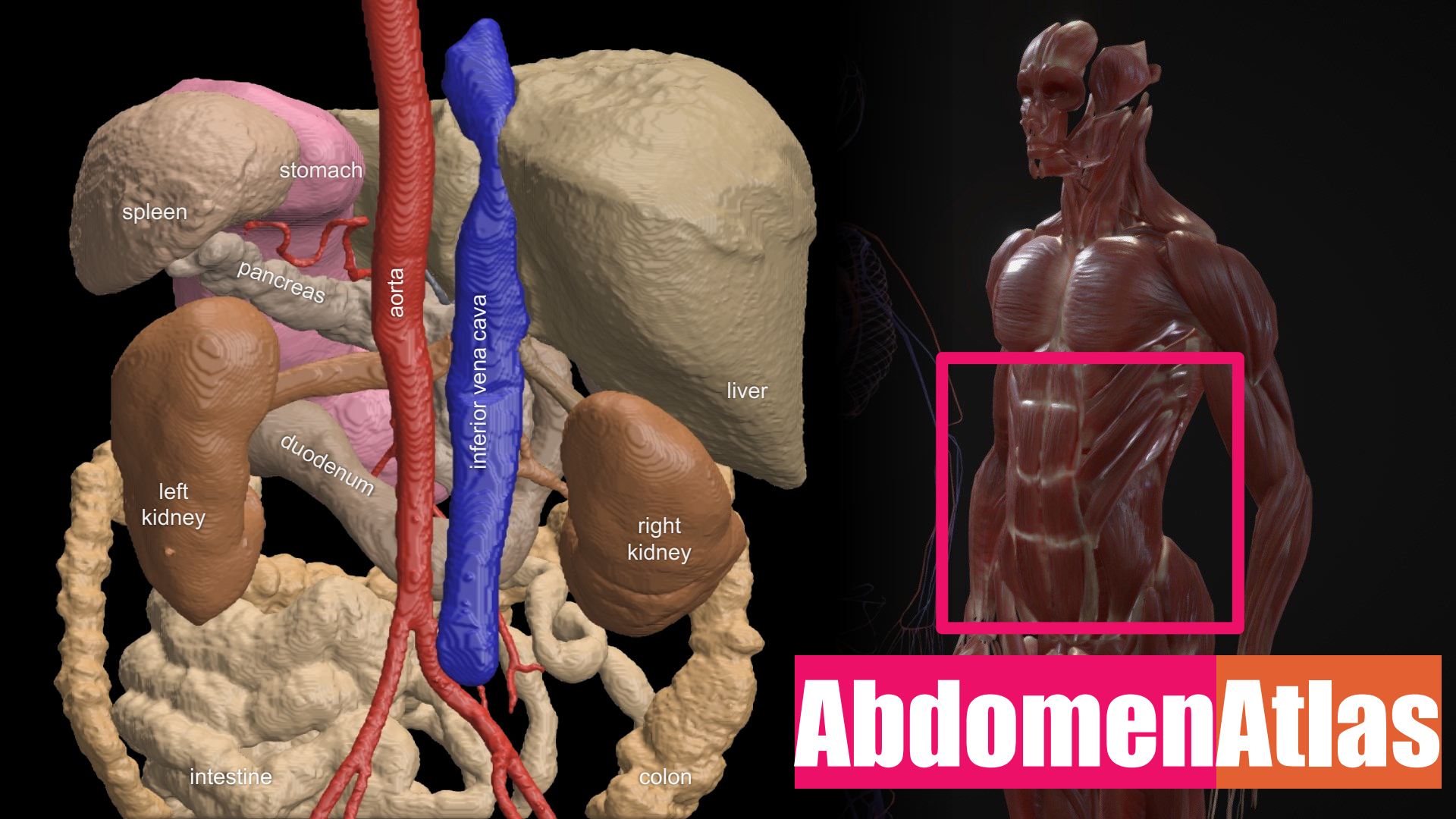
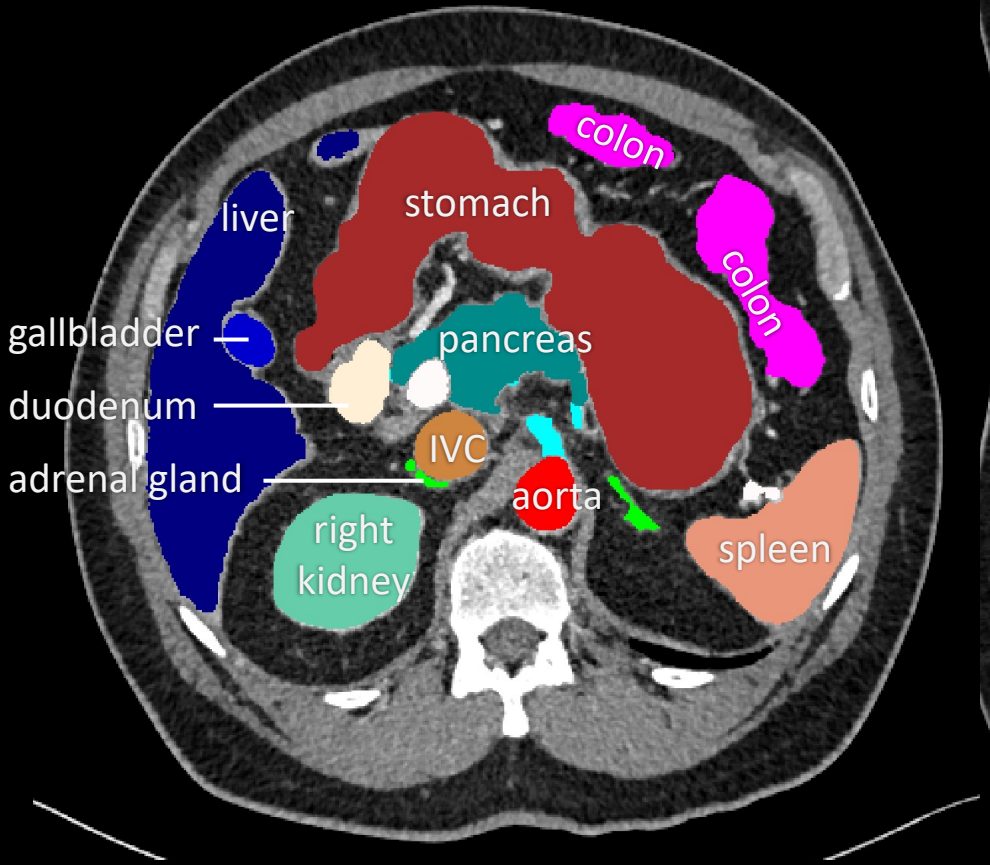
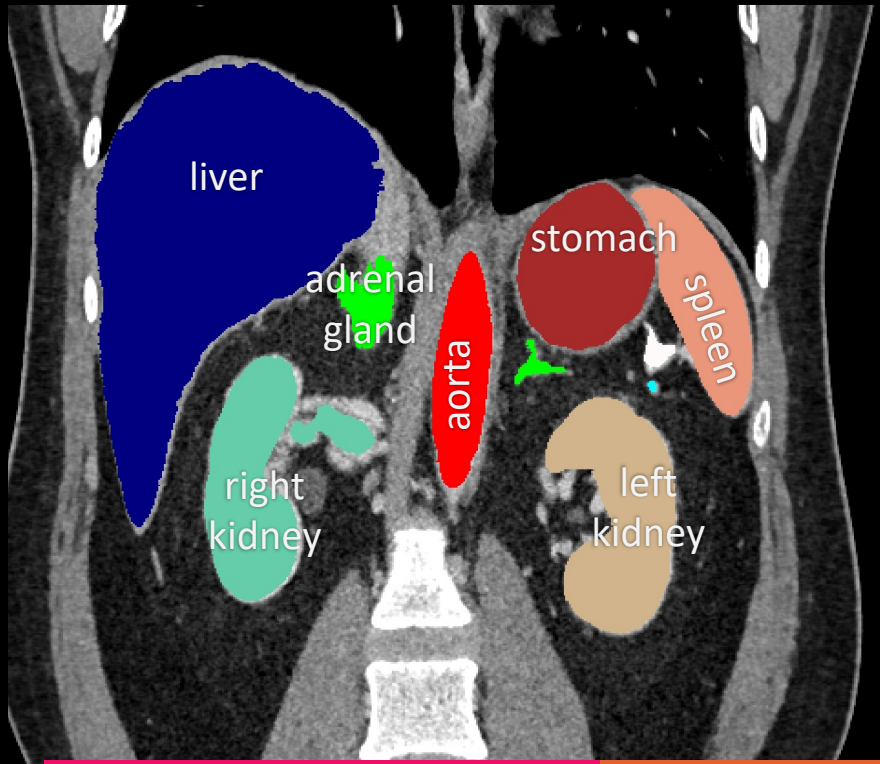


Photo by AVRcontent (@AVRcontent)


stomach
spleen
pancreas
aorta
inferior vena cava
liver
duodenum
left kidney
right kidney
intestine
colon
AbdomenAtlas

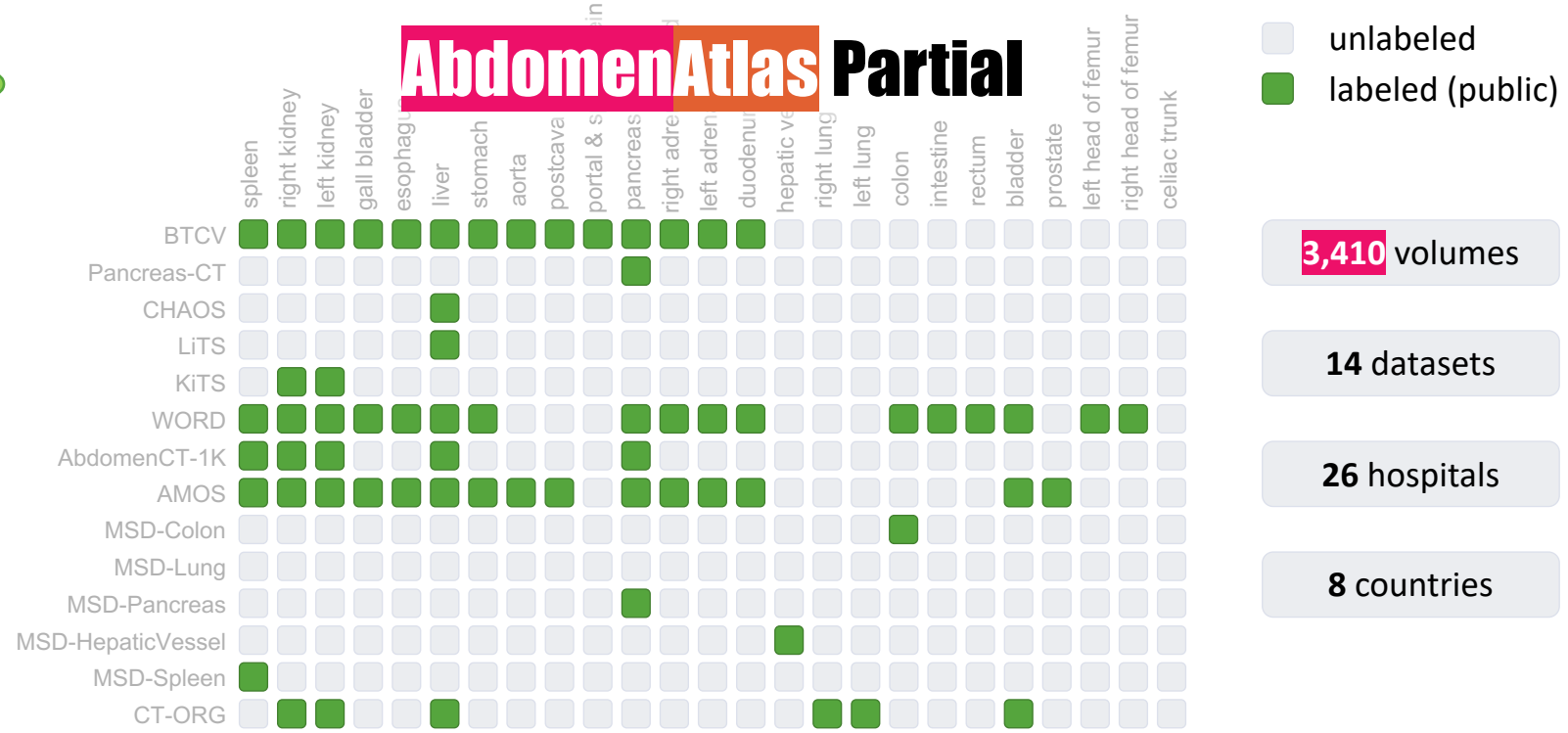




AbdomenAtlas

Example: an abdominal CT scan

CLIP-Driven Universal Model
ICCV 2023
MICCAI 2023
RSNA 2023



CLIP-Driven Universal Model ranks first in [Medical Segmentation Decathlon (MSD)](#).

Wenxuan Li
wli131@jh.edu

Code, Dataset, & Model:
https://github.com/ljwztc/CLIP-Driven-Universal-Model

CLIP-Driven Universal Model
ICCV 2023
MICCAI 2023
RSNA 2023

AbdomenAtlas 1.0
NeurIPS 2023
RSNA 2023

AbdomenAtlas 1.0

unlabeled
labeled (public)
labeled (by us)

3,410 volumes

14 datasets

26 hospitals

8 countries

9 structures

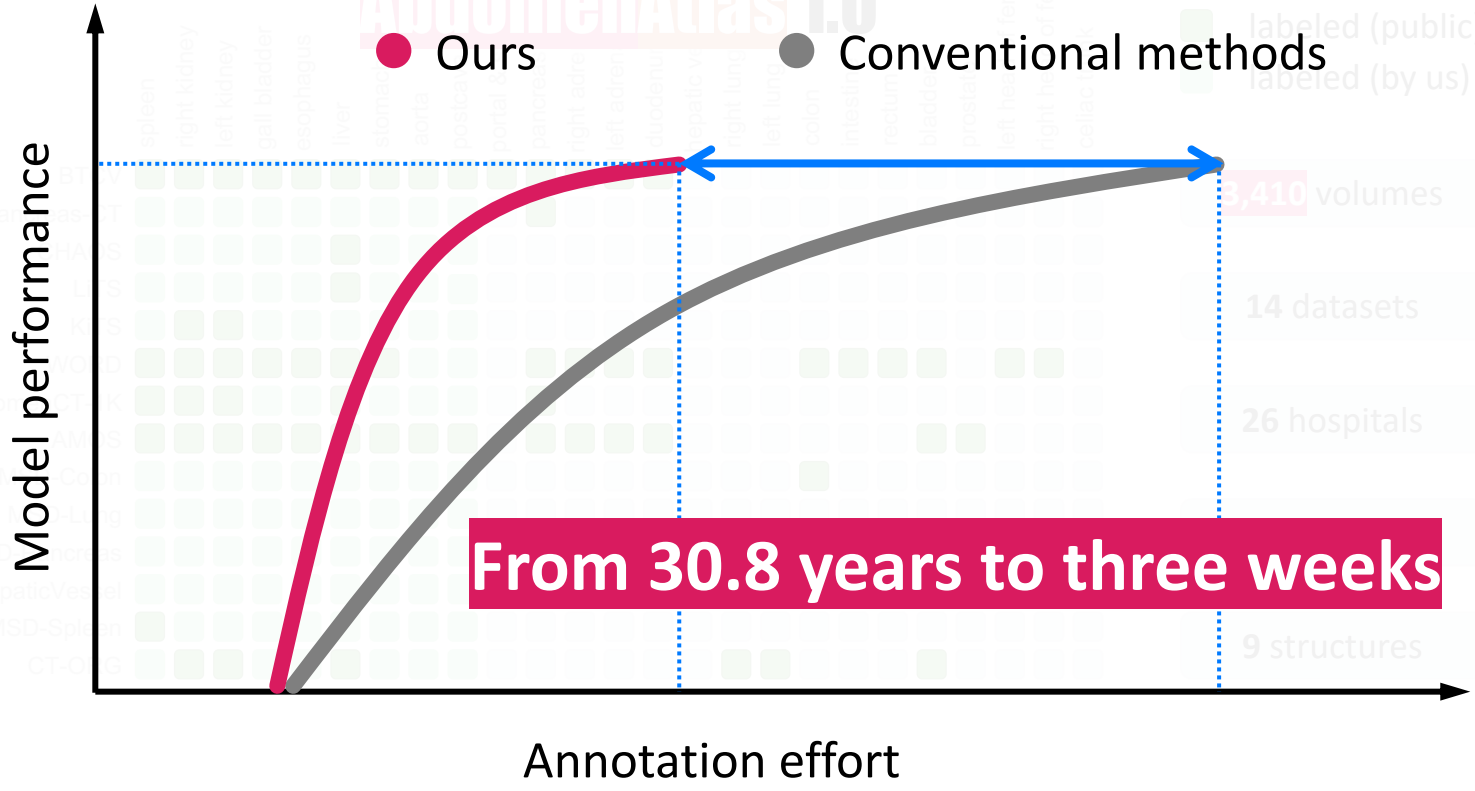
Annotating 8,000 CT Volumes for Multi-Organ Segmentation in Three Weeks.

Wenxuan Li
wli131@jh.edu

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

CLIP-Driven Universal Model
ICCV 2023
MICCAI 2023
RSNA 2023

AbdomenAtlas 1.0
NeurIPS 2023
RSNA 2023

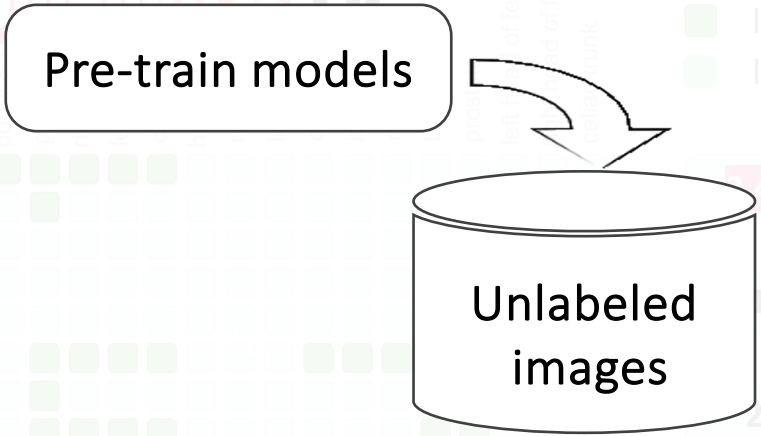


Wenxuan Li
wli131@jh.edu

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

CLIP-Driven Universal Model
ICCV 2023
MICCAI 2023
RSNA 2023

AbdomenAtlas 1.0
NeurIPS 2023
RSNA 2023



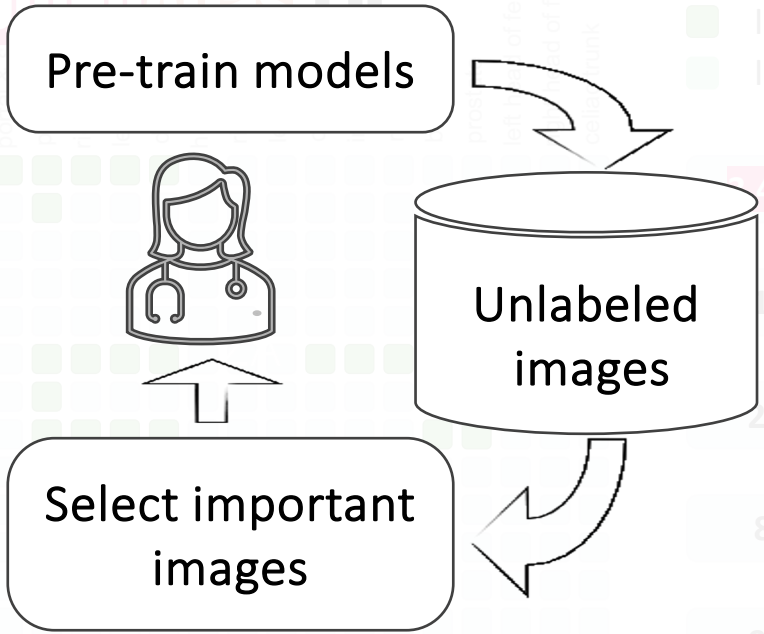
Interactive Segmentation

Wenxuan Li
wli131@jh.edu

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

CLIP-Driven Universal Model
ICCV 2023
MICCAI 2023
RSNA 2023

AbdomenAtlas 1.0
NeurIPS 2023
RSNA 2023



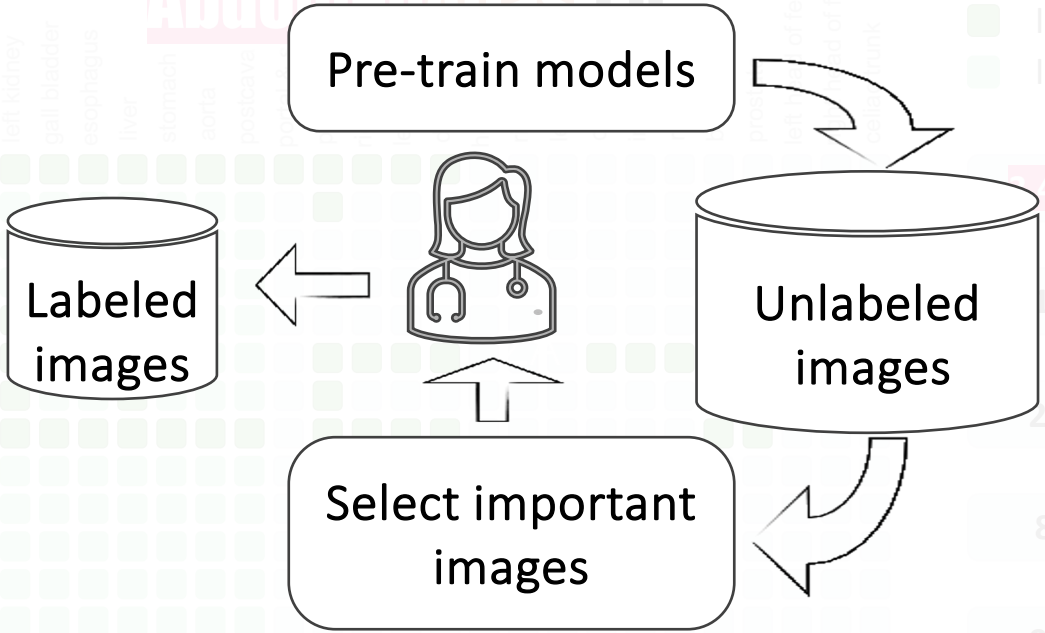
Interactive Segmentation

Wenxuan Li
wli131@jh.edu

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

CLIP-Driven Universal Model
ICCV 2023
MICCAI 2023
RSNA 2023

AbdomenAtlas 1.0
NeurIPS 2023
RSNA 2023



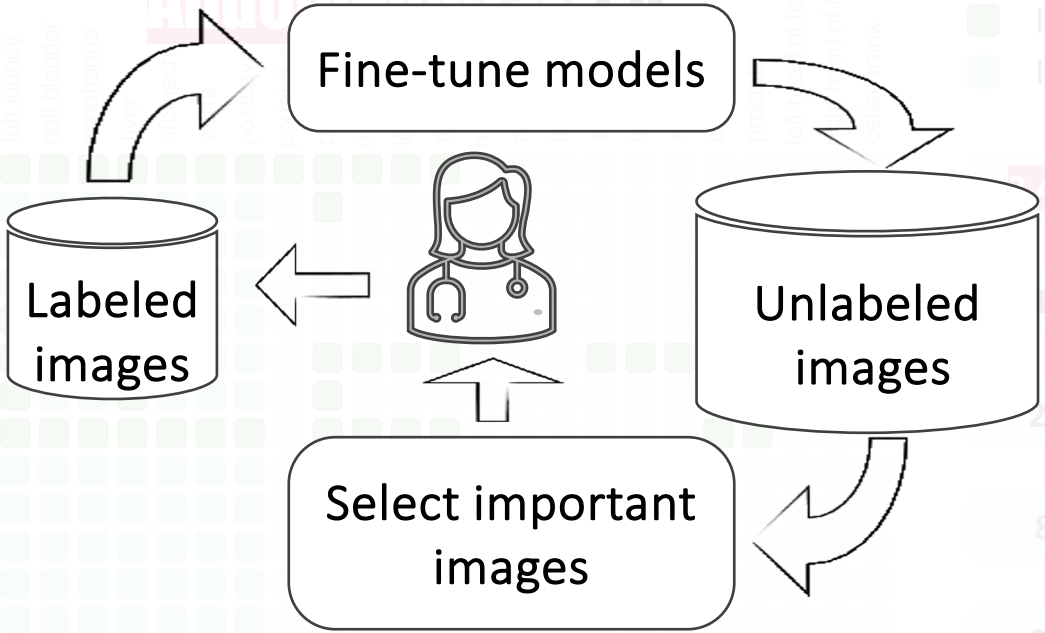
Interactive Segmentation

Wenxuan Li
wli131@jh.edu

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

CLIP-Driven Universal Model
ICCV 2023
MICCAI 2023
RSNA 2023

AbdomenAtlas 1.0
NeurIPS 2023
RSNA 2023



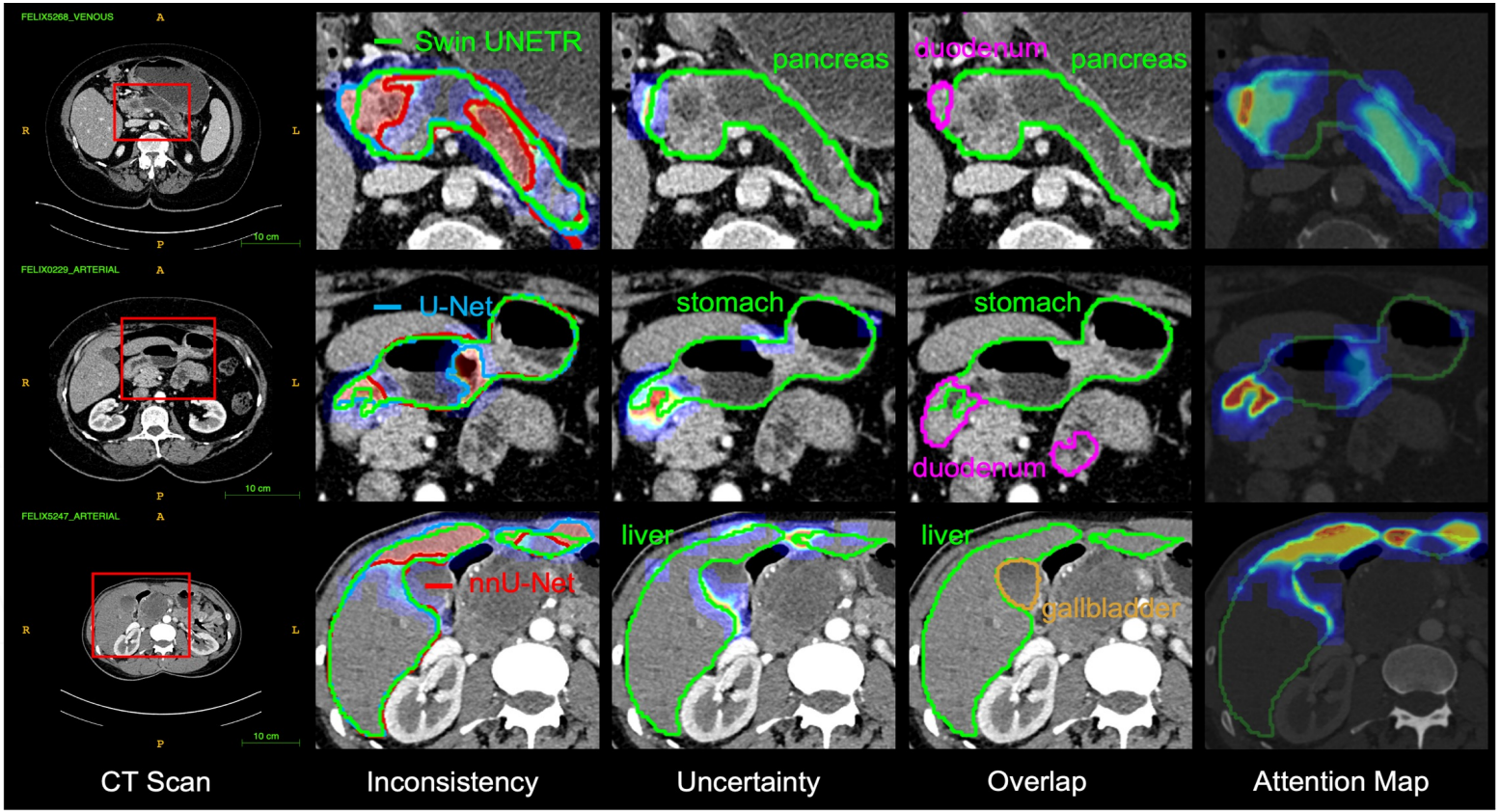
Interactive Segmentation

Wenxuan Li
wli131@jh.edu

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

CLIP-Driven Universal Model
ICCV 2023
MICCAI 2023
RSNA 2023

AbdomenAtlas 1.0
NeurIPS 2023
RSNA 2023

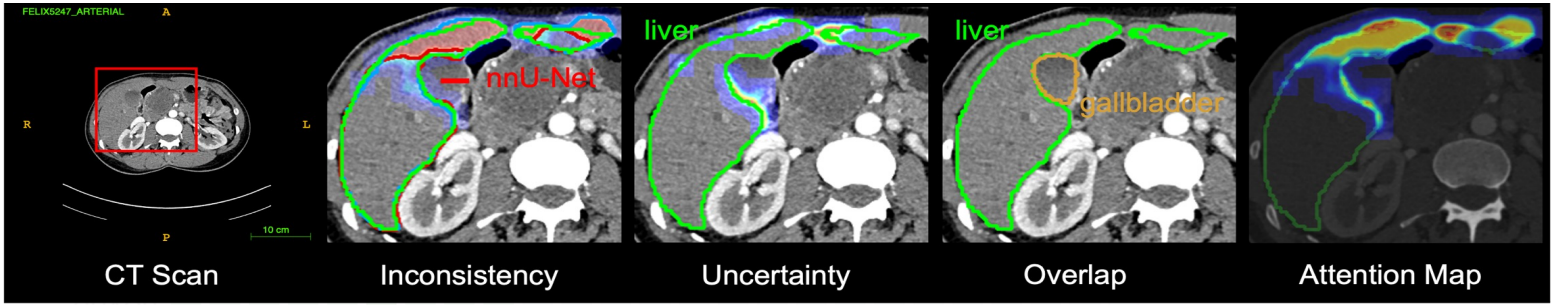


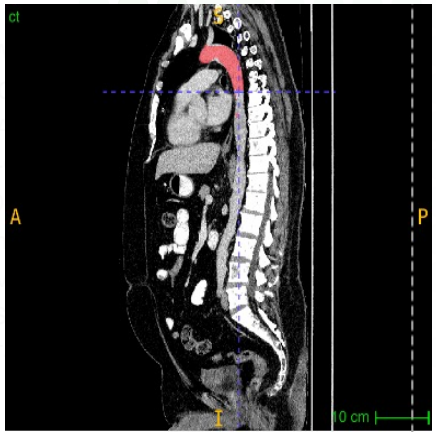
Wenxuan Li
wli131@jh.edu

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

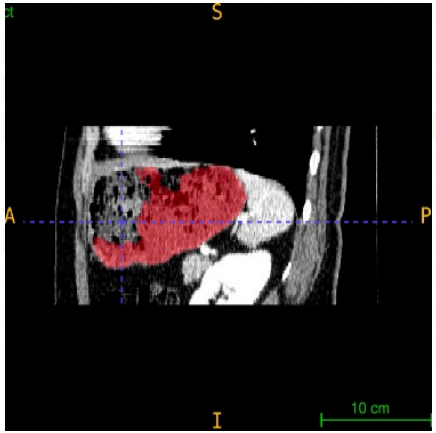
CLIP-Driven Universal Model
ICCV 2023
MICCAI 2023
RSNA 2023

AbdomenAtlas 1.0
NeurIPS 2023
RSNA 2023

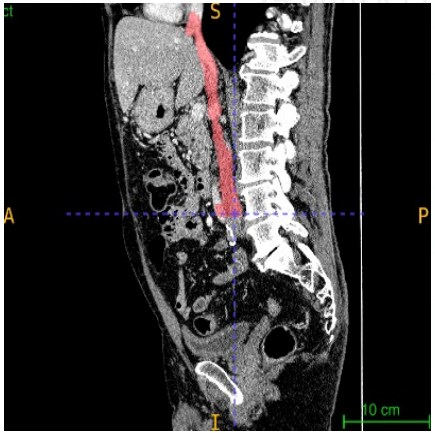




Aorta



Stomach



Postcava

Wenxuan Li
wli131@jh.edu

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

CLIP-Driven Universal Model
ICCV 2023
MICCAI 2023
RSNA 2023

AbdomenAtlas 1.0
NeurIPS 2023
RSNA 2023

AbdomenAtlas 1.0

unlabeled
labeled (public)
labeled (by us)

3,410 volumes

14 datasets

26 hospitals

8 countries

9 structures

Wenxuan Li
wli131@jh.edu

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

AbdomenAtlas 1.0

@ISBI 2024 Challenge

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

Backbone	Author	Institute	Publication	Backbone	Author	Institute	Publication
Swin-Unet	Hu Cao	Huawei	ECCVW	UniSeg	Yiwen Ye	NPU	MICCAI
nnFormer	Hong-Yu Zhou	HKU	TIP	SAT	Ziheng Zhao	SJTU	arXiv
CoTr	Yutong Xie	NPU	MICCAI	Swin UNETR	Ali Hatamizadeh	NVIDIA	MICCAIW
UniverSeg	Victor Ion Butoi	MIT	ICCV	VM-UNet	Jiacheng Ruan	SJTU	arXiv
UNet++	Zongwei Zhou	ASU	TMI	MagicNet	Duowen Chen	ECNU	CVPR
TransUNet	Jieneng Chen	JHU	ICMLW	MedSegDiff	Junde Wu	NUS	AAAI
U-Mamba	Jun Ma	UToronto	arXiv	3D UNeXt	Jeya Maria Jose	JHU	MICCAI
DiNTS	Yufan He	JHU	CVPR	.....			

So far, **31 groups** have confirmed the contribution—we will invite more authors of **famous backbones** for medical segmentation.

Wenxuan Li
wli131@jh.edu

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

CLIP-Driven Universal Model
ICCV 2023
MICCAI 2023
RSNA 2023

AbdomenAtlas 1.0
NeurIPS 2023
RSNA 2023

AbdomenAtlas 1.0

unlabeled
labeled (public)
labeled (by us)

3,410 volumes

14 datasets

26 hospitals

8 countries

9 structures

Wenxuan Li
wli131@jh.edu

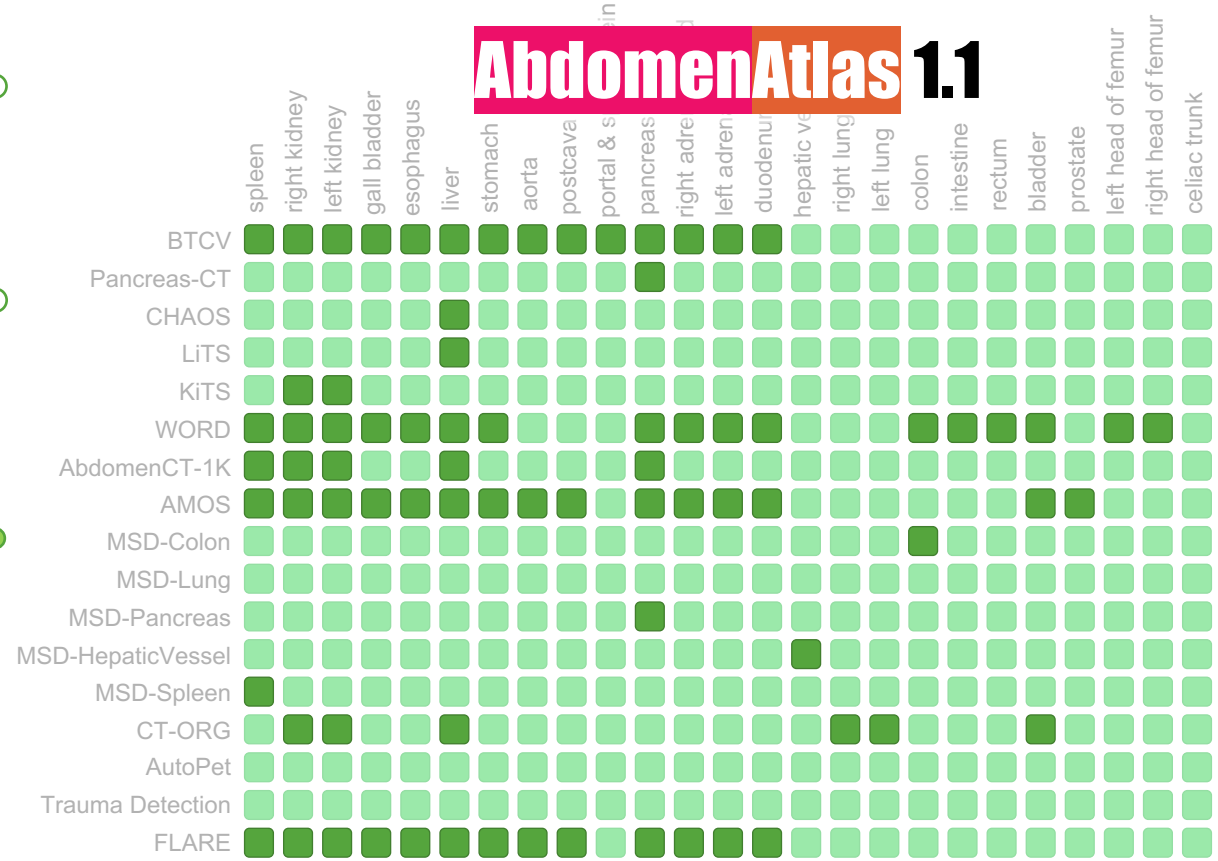
Code, Dataset, & Model:
https://github.com/MrGiovanni/AbdomenAtlas

CLIP-Driven Universal Model
ICCV 2023
MICCAI 2023
RSNA 2023

AbdomenAtlas 1.0
NeurIPS 2023
RSNA 2023

SuPreM
ICLR 2024 (oral)
RSNA 2023

AbdomenAtlas 1.1



unlabeled
labeled (public)
labeled (by us)

9,262 volumes

17 datasets

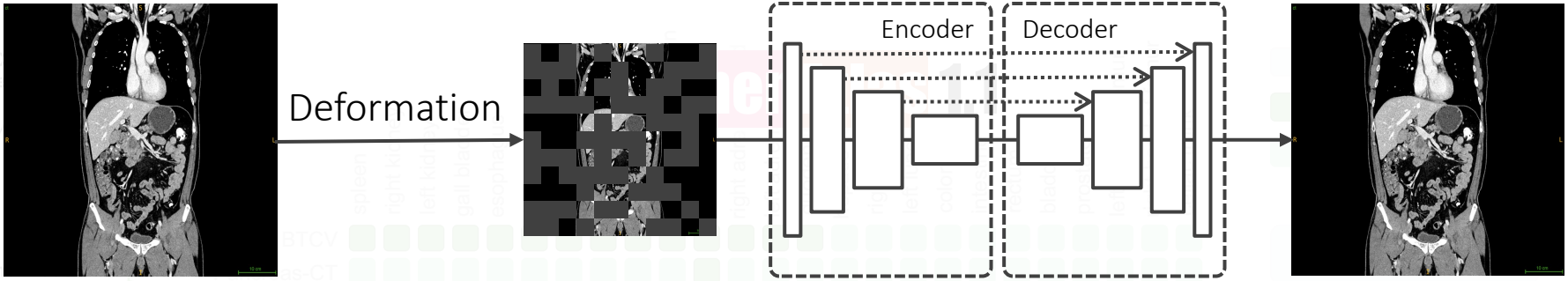
88 hospitals

19 countries

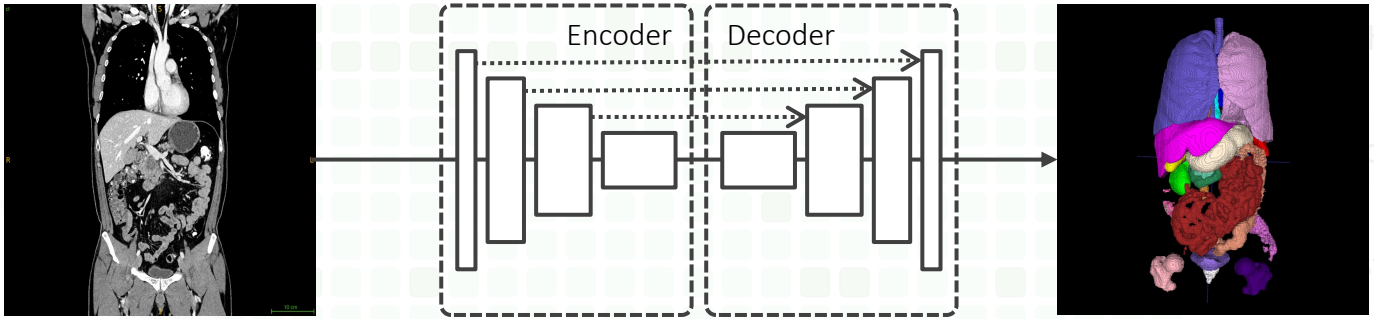
25 structures

Wenxuan Li
wli131@jh.edu

Code, Dataset, & Model:
https://github.com/MrGiovanni/SuPreM



Self-supervised Pre-training

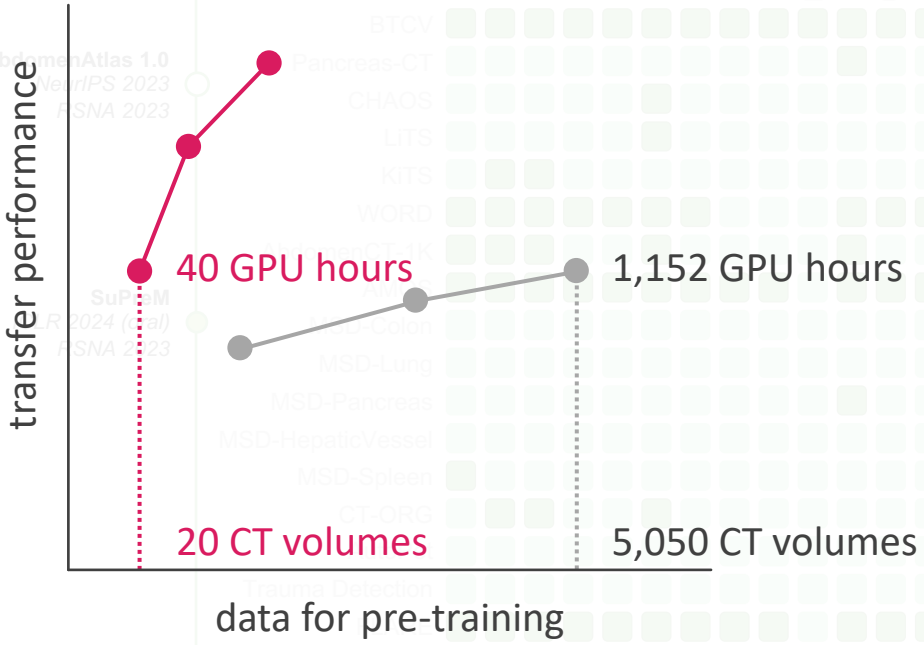


Supervised Pre-training

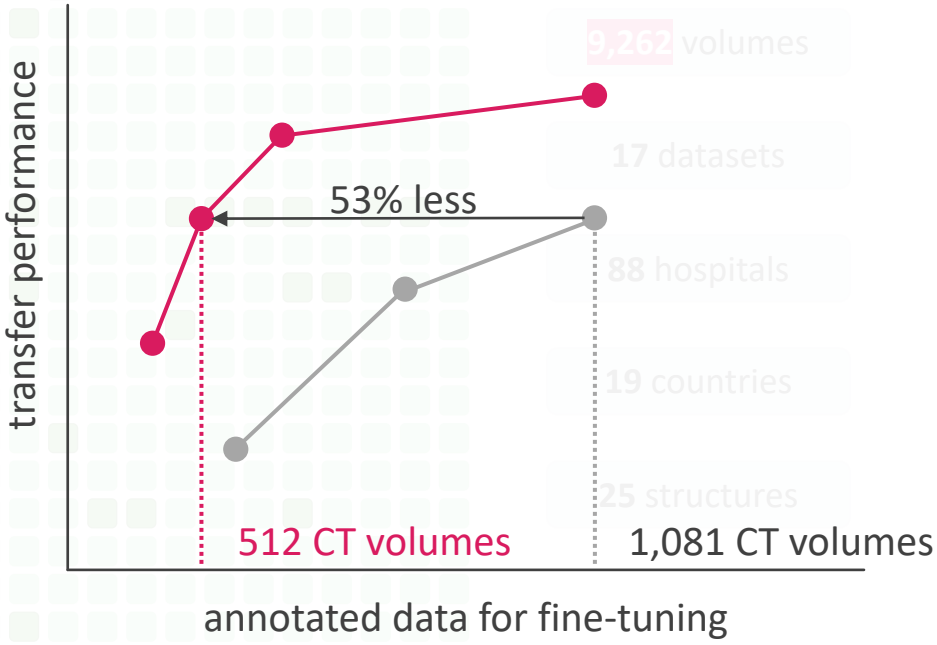
Wenxuan Li
wli131@jh.edu

Code, Dataset, & Model:
https://github.com/MrGiovanni/SuPreM

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



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



Wenxuan Li
wli131@jh.edu

Code, Dataset, & Model:
https://github.com/MrGiovanni/SuPreM

▼Swin UNETR

name	params	pre-trained data	resources	download
Tang et al.	62.19M	5050 CT	Stars 930	weights
Jose Valanaras et al.	62.19M	50000 CT/MRI	Stars 930	weights
Universal Model	62.19M	2100 CT	Stars 463	weights
SuPreM	62.19M	2100 CT	ours	weights

▼U-Net

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

▼SegResNet

name	params	pre-trained data	resources	download
SuPreM	4.70M	2100 CT	ours	weights

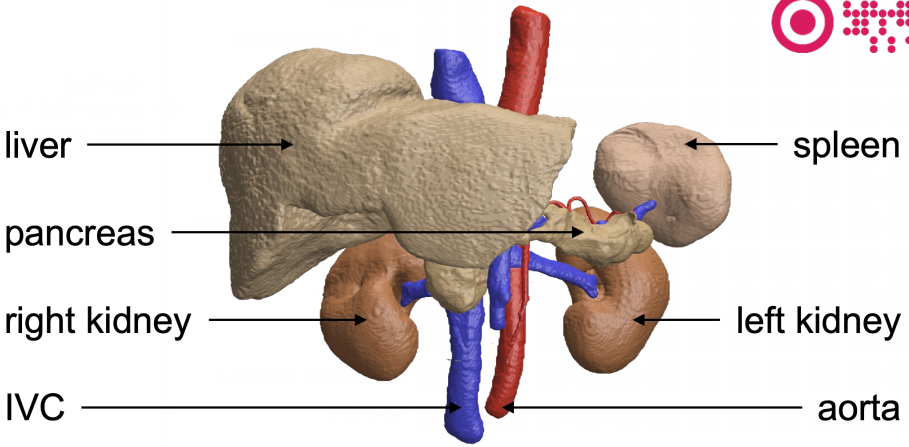
Wenxuan Li
wli131@jh.edu

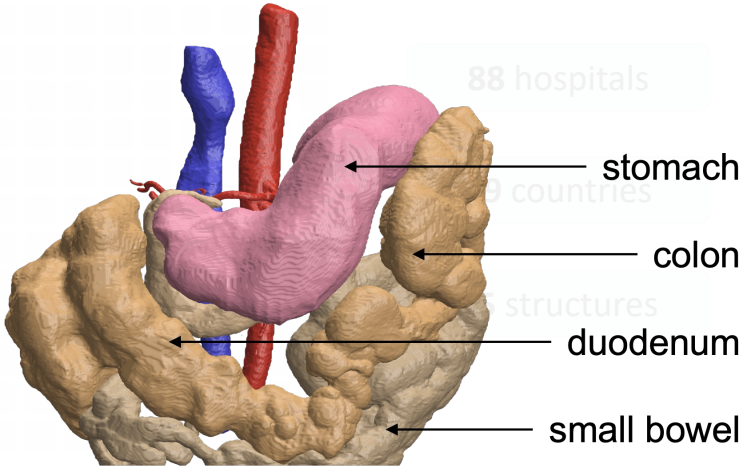
Code, Dataset, & Model:
https://github.com/MrGiovanni/SuPreM

MICCAI 2024 Marrakesh MOROCCO

AbdomenAtlas 1.1

@MICCAI 2024 Challenge





Wenxuan Li
wli131@jh.edu

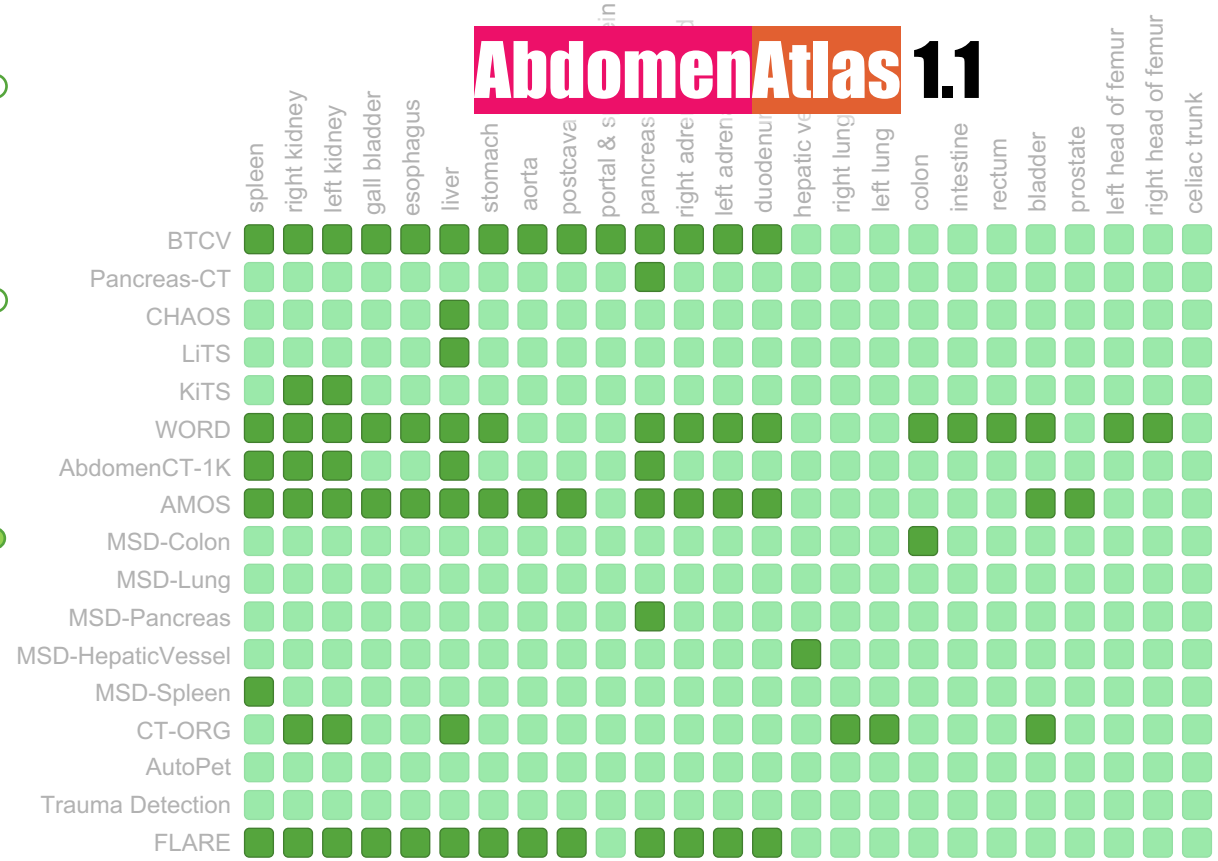
Code, Dataset, & Model:
https://github.com/MrGiovanni/SuPreM

CLIP-Driven Universal Model
ICCV 2023
MICCAI 2023
RSNA 2023

AbdomenAtlas 1.0
NeurIPS 2023
RSNA 2023

SuPreM
ICLR 2024 (oral)
RSNA 2023

AbdomenAtlas 1.1



unlabeled
labeled (public)
labeled (by us)

9,262 volumes

17 datasets

88 hospitals

19 countries

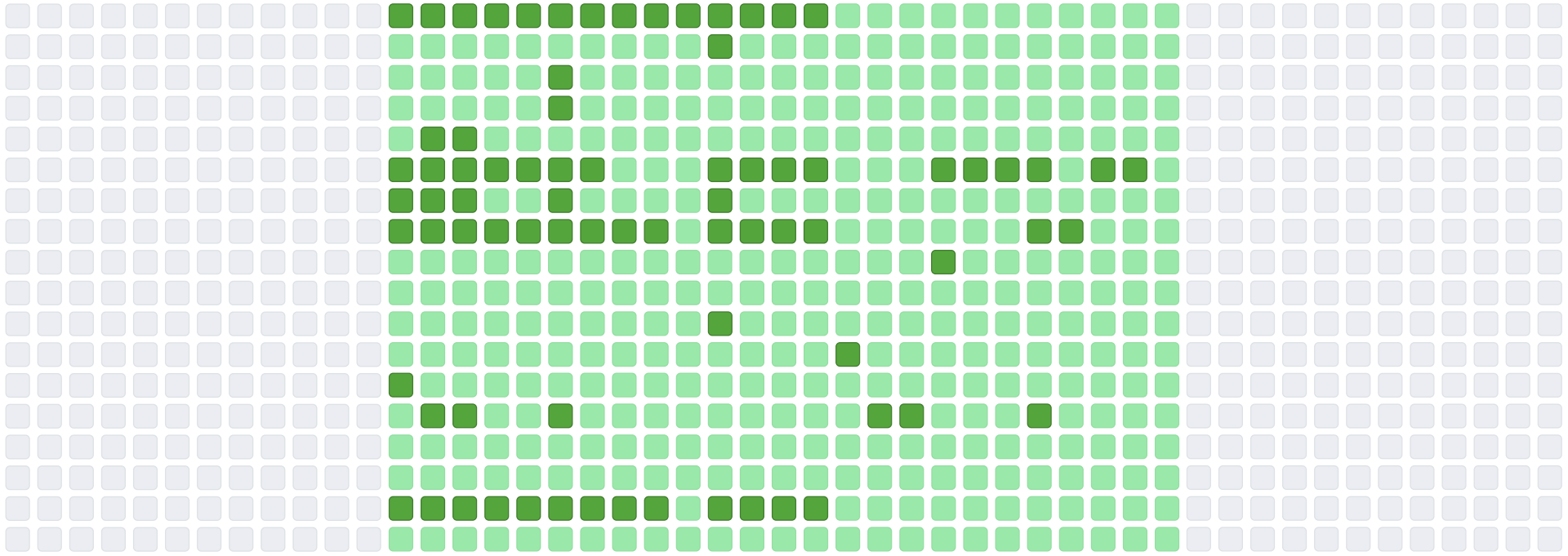
25 structures

Wenxuan Li
wli131@jh.edu

Code, Dataset, & Model:
https://github.com/MrGiovanni/SuPreM

AbdomenAtlas

Subscribe us: **https://groups.google.com/u/2/g/bodymaps**



Wenxuan Li
wli131@jh.edu

Code, Dataset, & Model:
https://github.com/MrGiovanni/SuPreM

AI and Radiologists Unite to Map the Abdomen

Hopkins researchers have leveraged the synergy between medical professionals and artificial intelligence algorithms to create the largest annotated multi-organ dataset to date.

PUBLISHED
February 9, 2024

AUTHOR
Jaimie Patterson

SHARE THIS STORY

Wenxuan Li
wli131@jh.edu

Code, Dataset, & Model:
https://github.com/MrGiovanni/SuPreM

Wenxuan Li
wli131@jh.edu

Code, Dataset, & Model:
https://github.com/MrGiovanni/SuPreM

Wenxuan Li
wli131@jh.edu

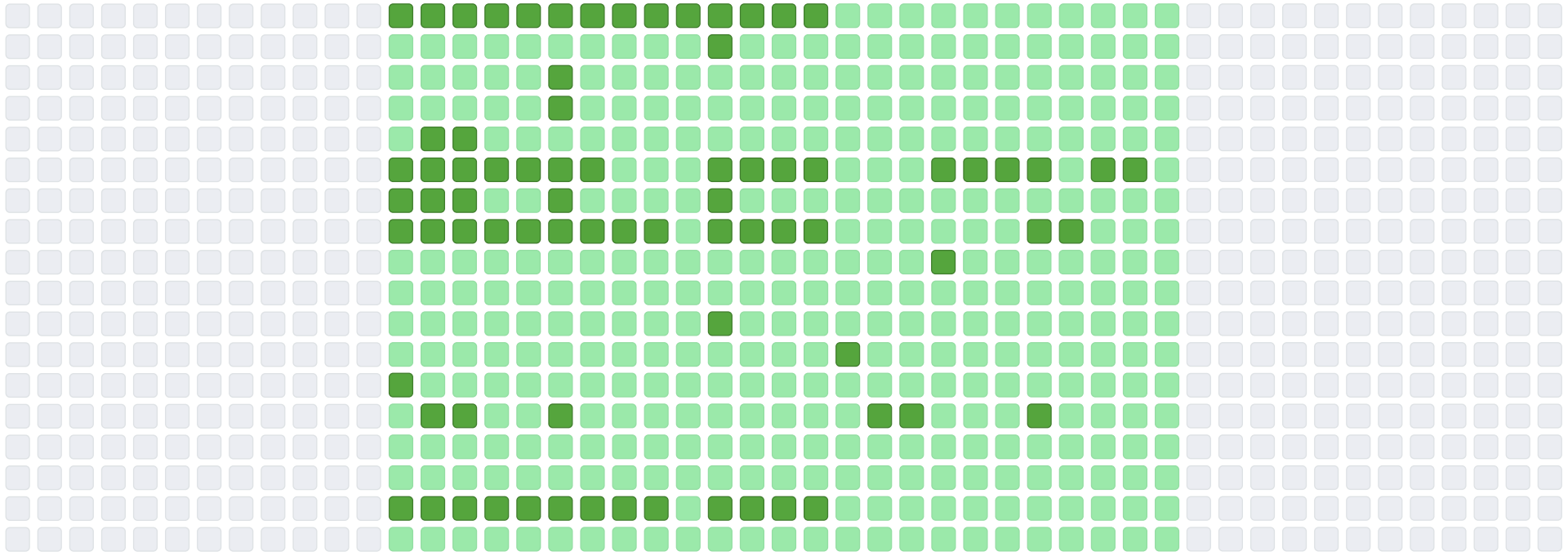
Code, Dataset, & Model:
https://github.com/MrGiovanni/SuPreM

Wenxuan Li
wli131@jh.edu

Code, Dataset, & Model:
https://github.com/MrGiovanni/SuPreM

AbdomenAtlas

Subscribe us: **https://groups.google.com/u/2/g/bodymaps**



Wenxuan Li
wli131@jh.edu

Code, Dataset, & Model:
https://github.com/MrGiovanni/SuPreM

Thank you!

Acknowledgement: Chongyu Qu · Xiaoxi Chen · Linda Chu · Satomi · Kawamoto · Seyoun Park · Christopher Wolfgang · Ammar Javed · Daniel Fadaei · Shahab Shayesteh · Jefferson Graves · Alejandra Blanco · Eva S. Zinreich · Benedict Kinny-Köster · Kenneth Kinzler · Ralph H. Hruban · Bert Vogelstein · Elliot K. Fishman · Tiezheng Zhang · Hualin Qiao · Jessica Han · Jie Liu · Yucheng Tang · Pedro Ricardo Ariel Salvador Bassi · Yijia Shi · Lihua Gao · Wenlan Zhou · Guiqin Zhang · Damin Li · Yixiao Zhang · Jieneng Chen · Jaimie Patterson · Junfei Xiao · Yongyi Lu · Xinyi Li · Huimiao Chen · Yaoyao Liu · Qi Chen · Jianning Li · Yu-Cheng Chou · Angtian Wang · Yixiong Chen · Yuxiang Lai · Jincheng Wang · Huimin Xue · Yining Cao · Haoqi Han · Xiaorui Lin · Yutong Tang · Meihua Li · Yujiu Ma · Jinghui Xu · Jiawei Liu · Zheyuan Zhang