



# Yida

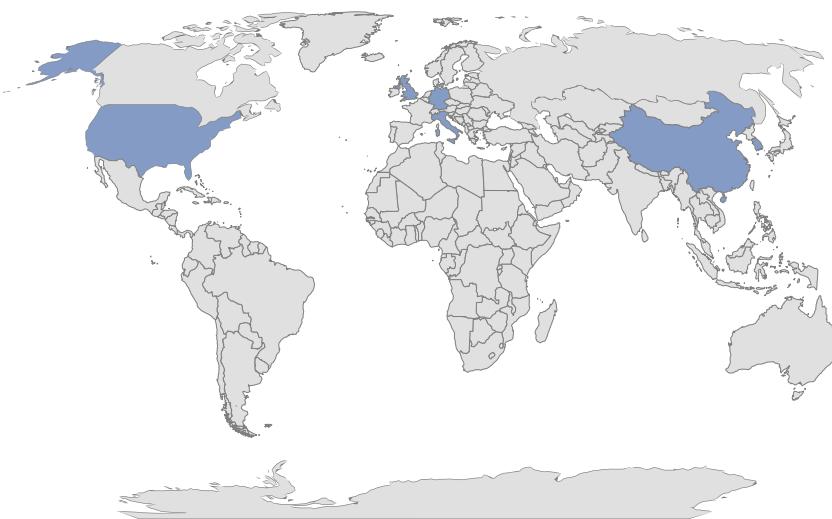
WANG



# Basic Background



Places in which I have been working



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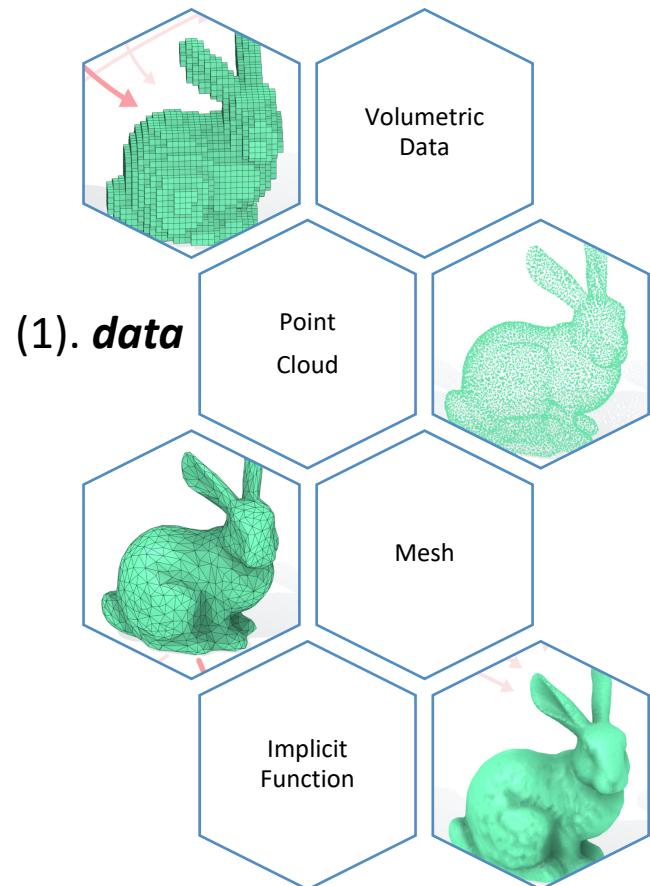
# Overview

1. Academic Experience
2. Computer Science
3. Research Engineering
4. Teaching and Mentoring
5. Technical Collaborators
6. Other Facts



*How to constantly  
making  
**IMPACT?***

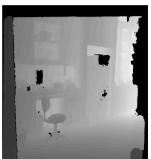
# 1. Academic Background – *in 3D Computer Vision*



## (2). Research

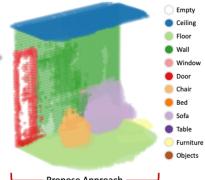
### [1]. ICCV

- Seoul, S Korea
- 3D CV



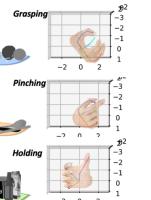
### [2]. 3DV

- Verona, Italy
- 3D CV



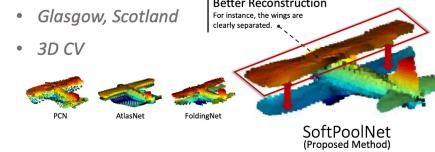
### [3]. IROS

- Macau, China
- Robotics



### [4]. ECCV

- Glasgow, Scotland
- 3D CV



### (1) Google Summer of Codes

- Serving as project developer in 2015 and 2016
- Serving as project mentor in 2019

### (2) Microsoft Open Source Challenge

- Global 2nd prize in (5 winners in total)
- Invited talk in Microsoft Faculty Summit 2016

### (3) Scilab Simulator Design Contest

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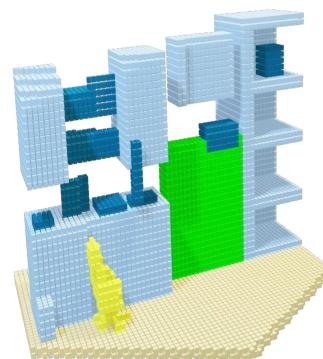
### (4) FACEBOOK Research Intern

- Research intern in Facebook Reality Lab for eye 3D reconstruction

## 2. Computer Science – selected works from conferences

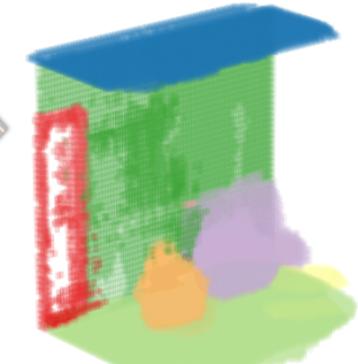
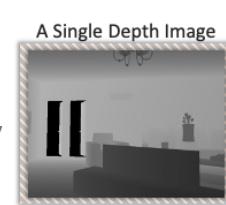
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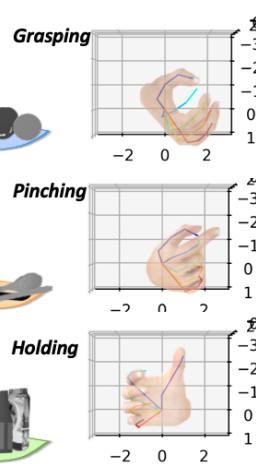
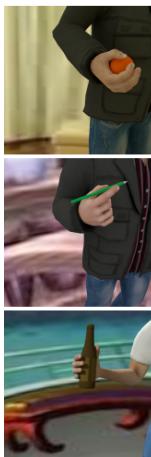


Empty  
Ceiling  
Floor  
Wall  
Window  
Door  
Chair  
Bed  
Sofa  
Table  
Furniture  
Objects

Propose Approach

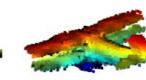
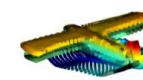
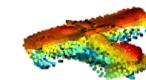
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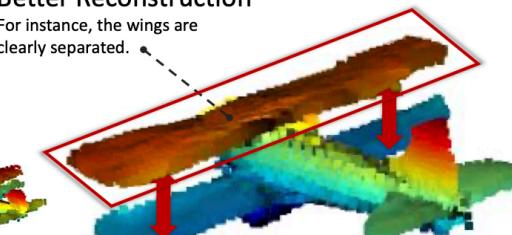


### [4]. ECCV

- Glasgow, Scotland
- 3D CV

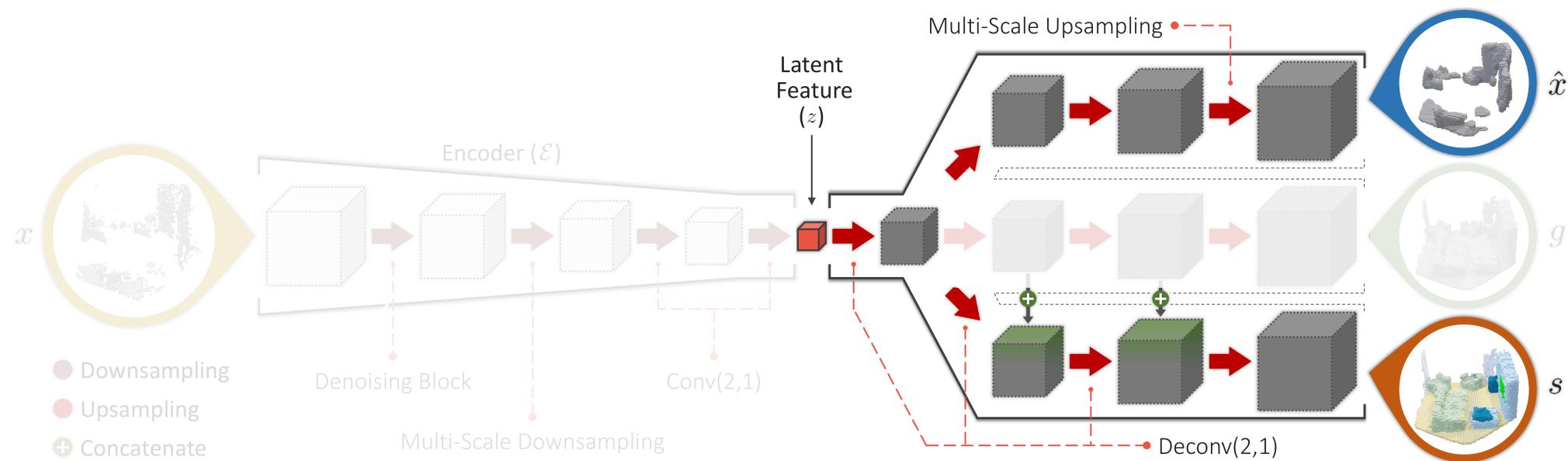


Better Reconstruction  
For instance, the wings are clearly separated.



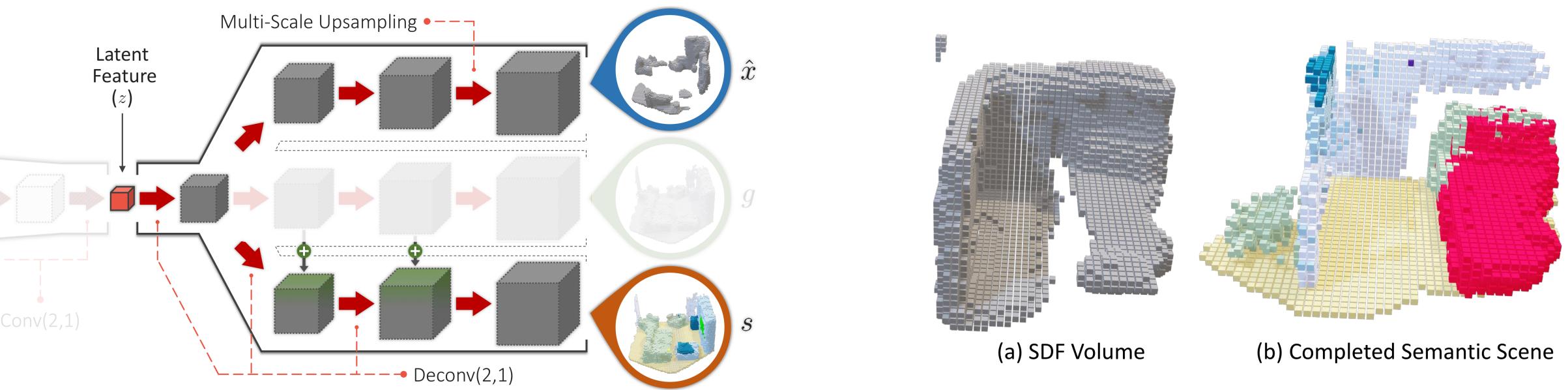
SoftPoolNet  
(Proposed Method)

## 2. Computer Science – selected works from conferences



[1] ForkNet: Multi-branch Volumetric Semantic Completion from a Single Depth Image ICCV 2019

## 2. Computer Science – selected works from conferences

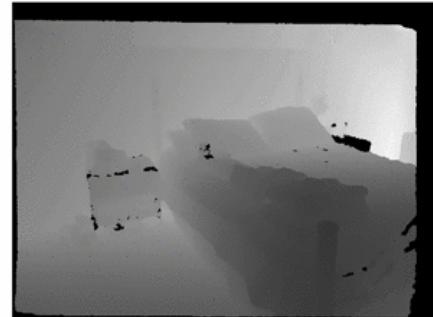


[1] ForkNet: Multi-branch Volumetric Semantic Completion from a Single Depth Image – ICCV 2019

## 2. Computer Science – *selected works from conferences*

**Indoor Scene Semantic Completion**

**ForkNet**



Input: Single depth image



Ground truth

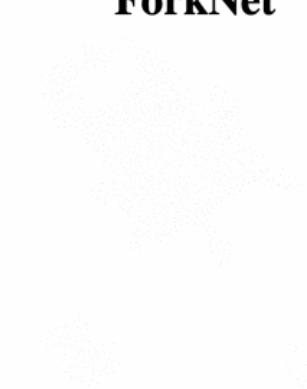
SSCNet

**Object Completion**

**ForkNet**



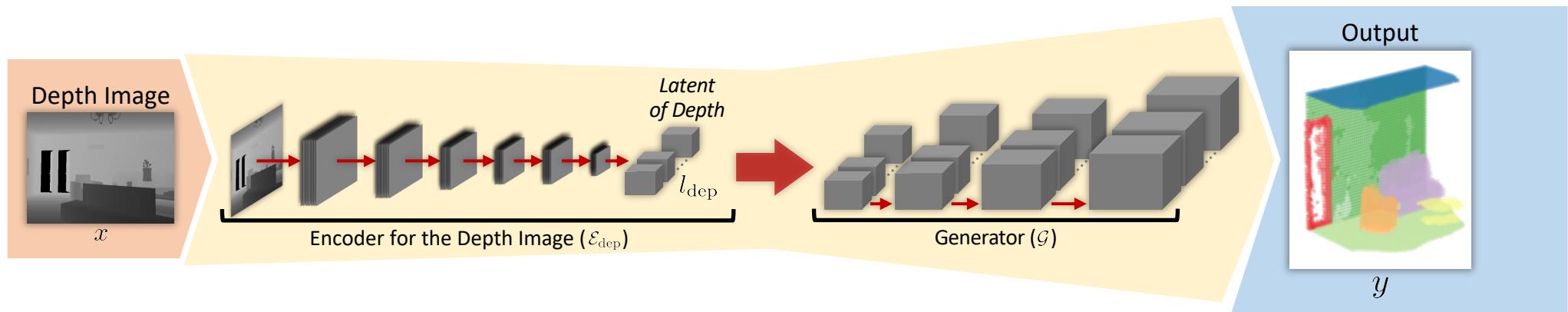
Input: Partial scan



Ground truth

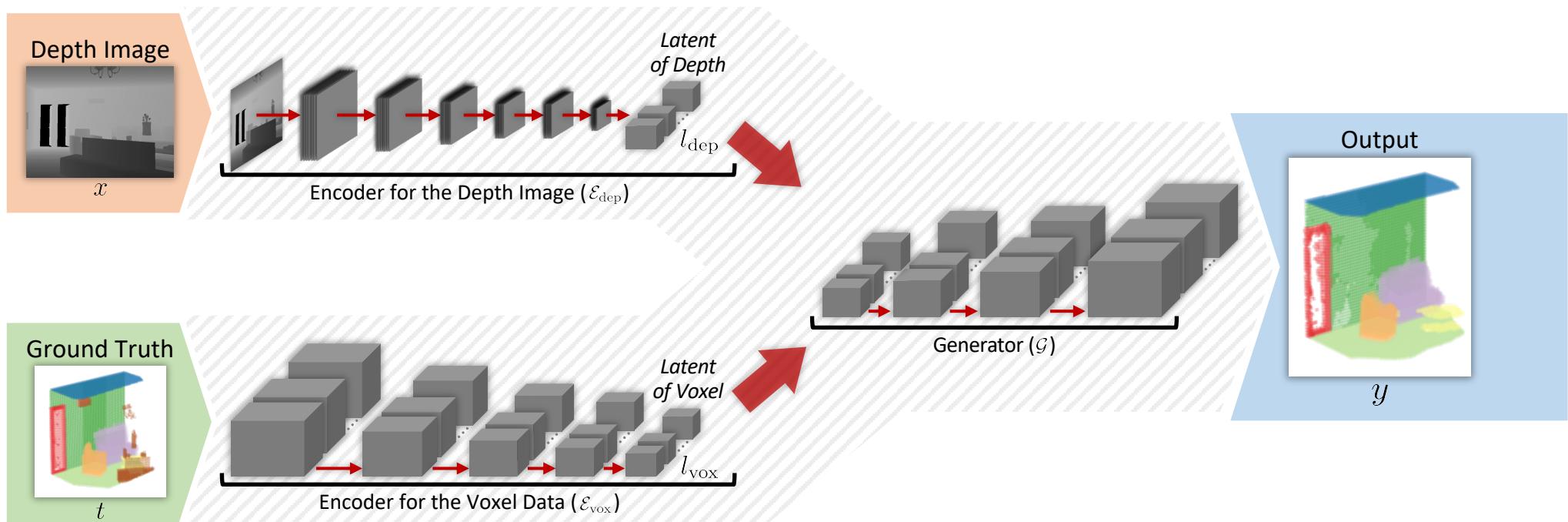
3D-RecGAN

## 2. Computer Science – selected works from conferences



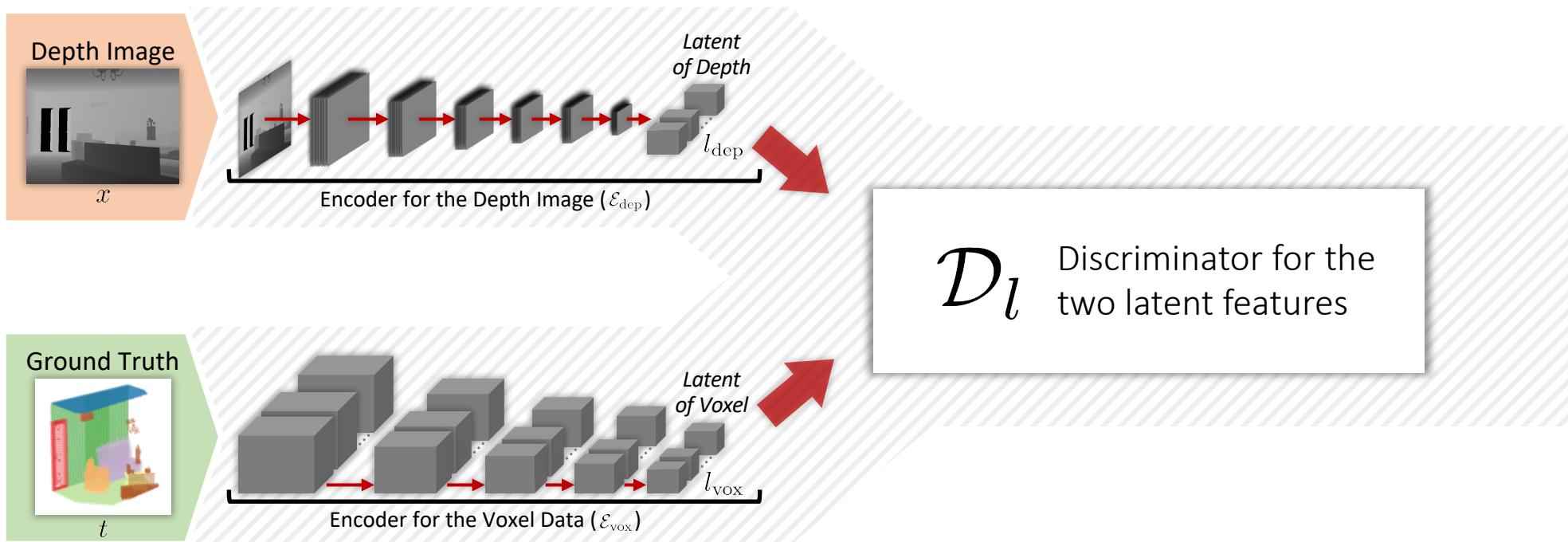
[2] Adversarial Semantic Scene Completion from a Single Depth Image

## 2. Computer Science – selected works from conferences



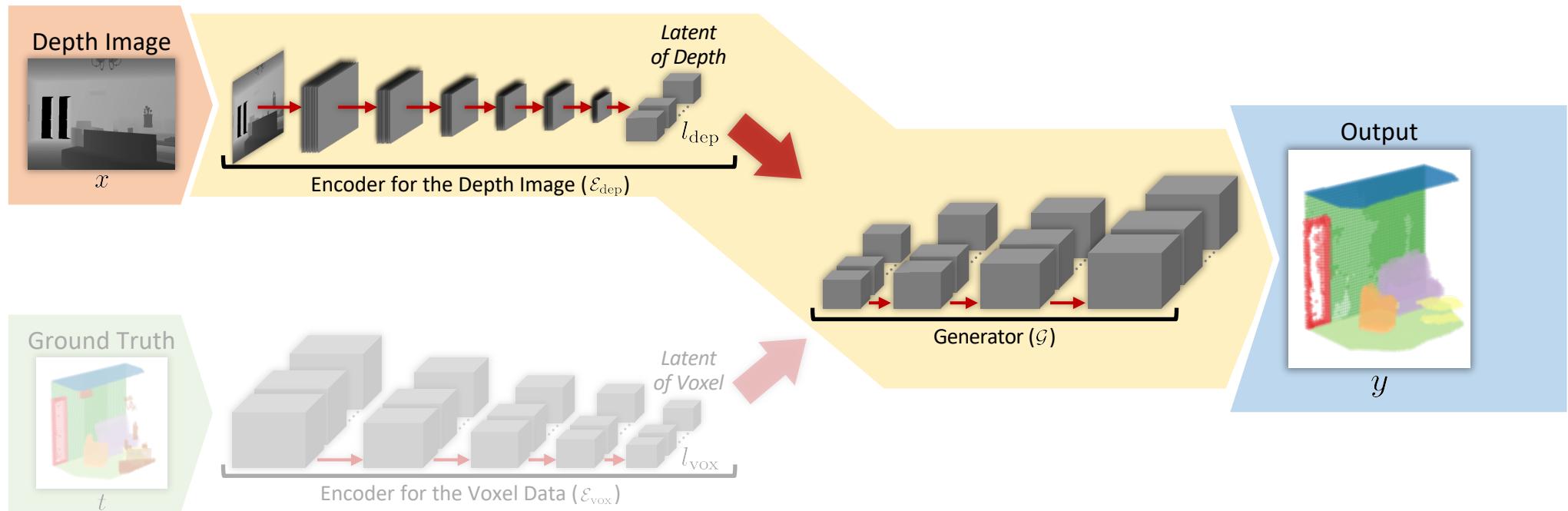
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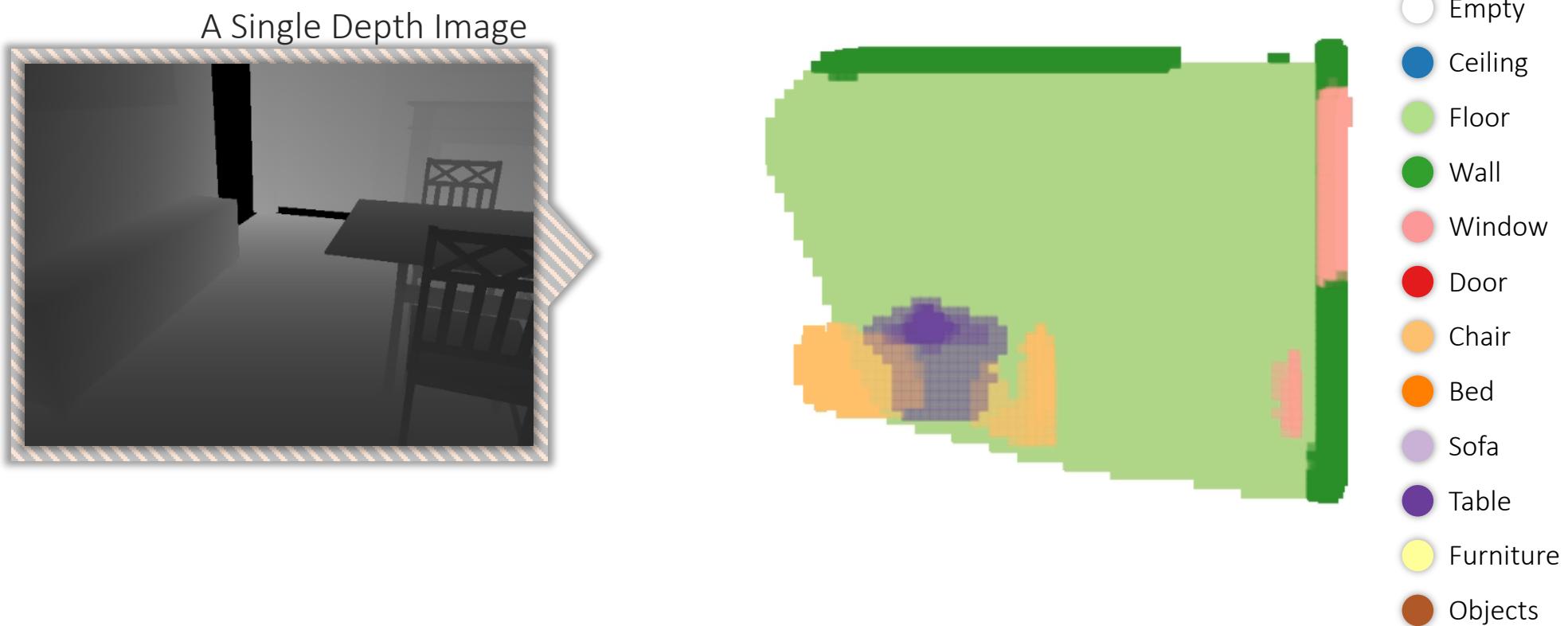
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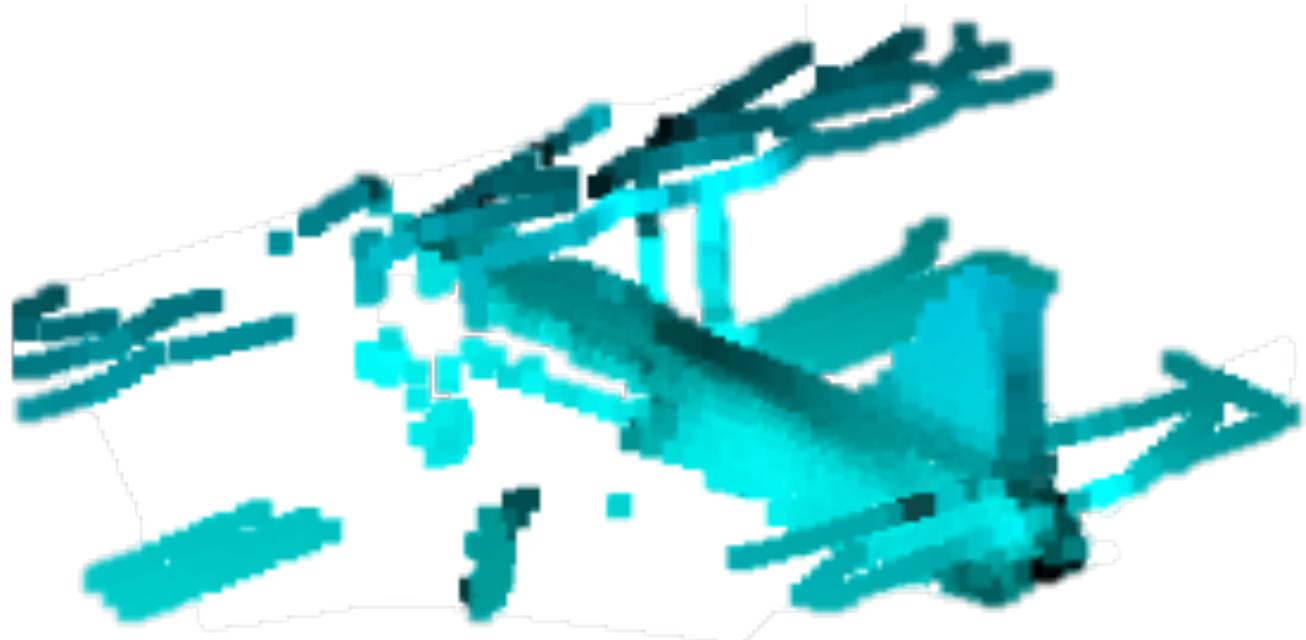
[2] Adversarial Semantic Scene Completion from a Single Depth Image

## 2. Computer Science – *selected works from conferences*

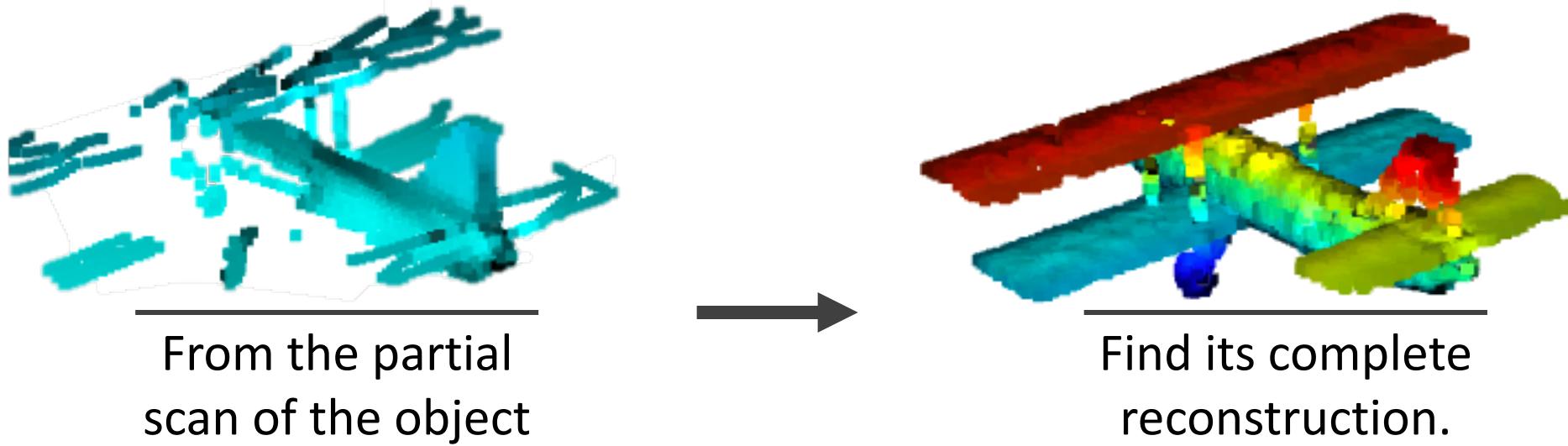


## 2. Computer Science – *selected works from conferences*

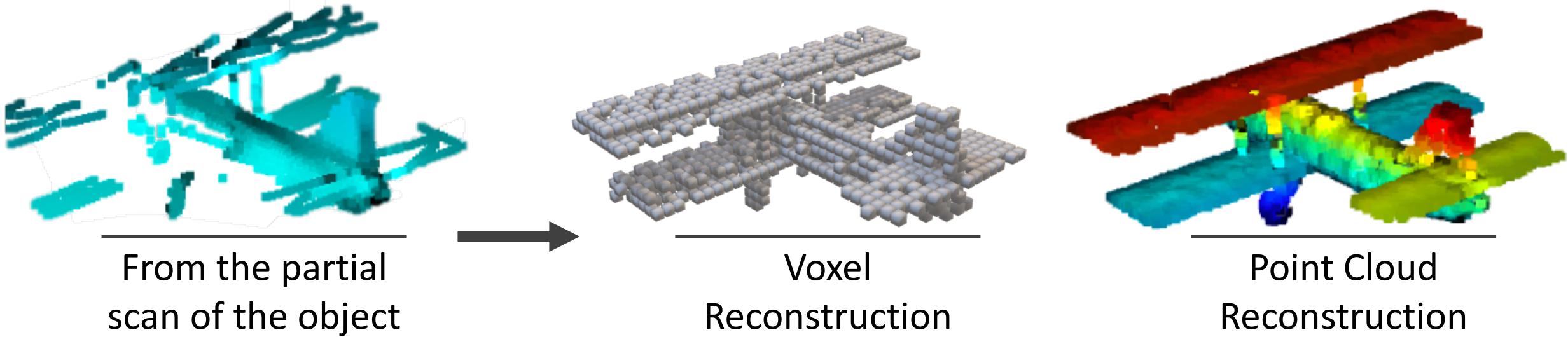
From the partial  
scan of the object



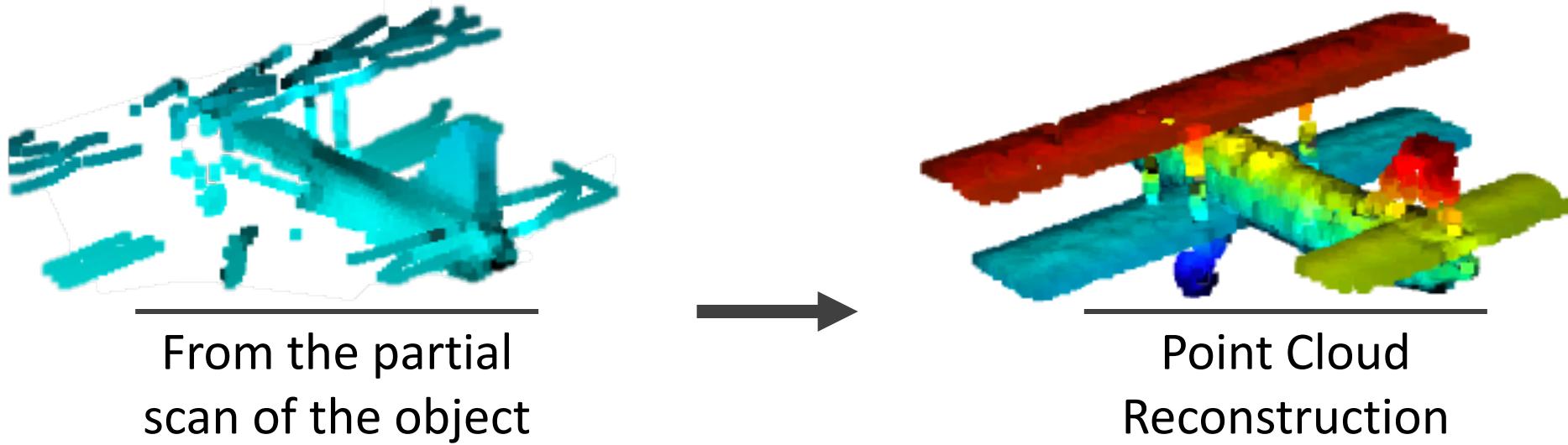
## 2. Computer Science – *selected works from conferences*



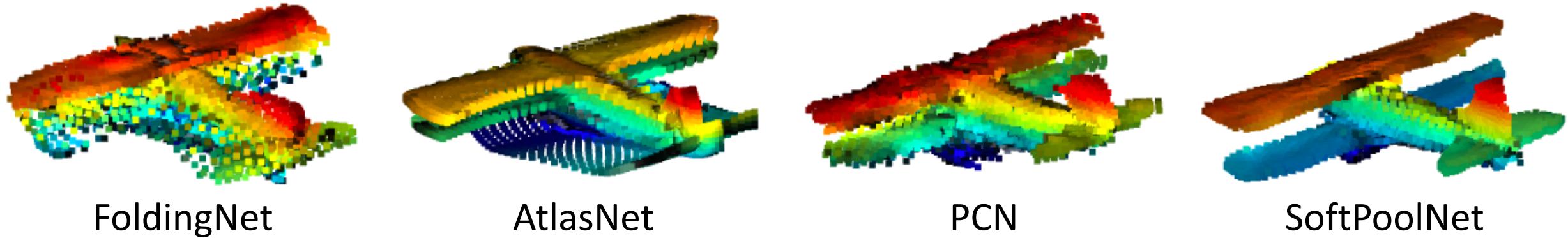
## 2. Computer Science – *selected works from conferences*



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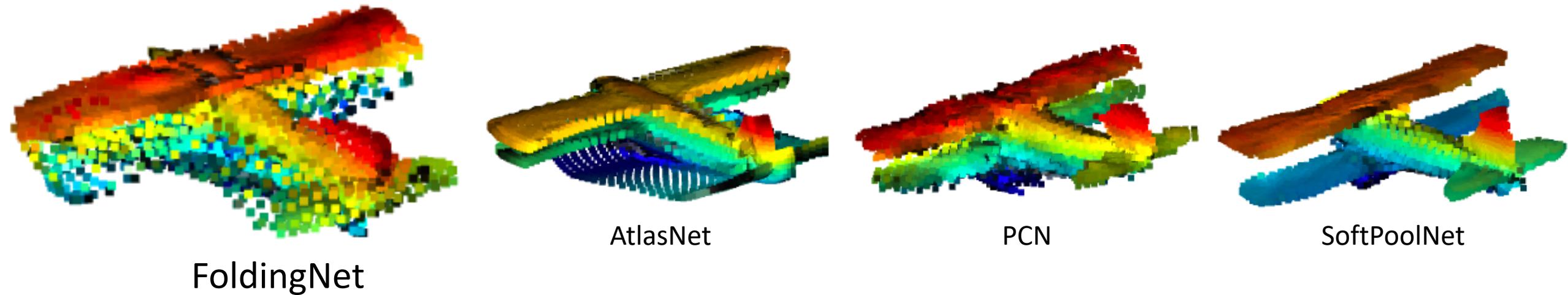


## 2. Computer Science – *selected works from conferences*



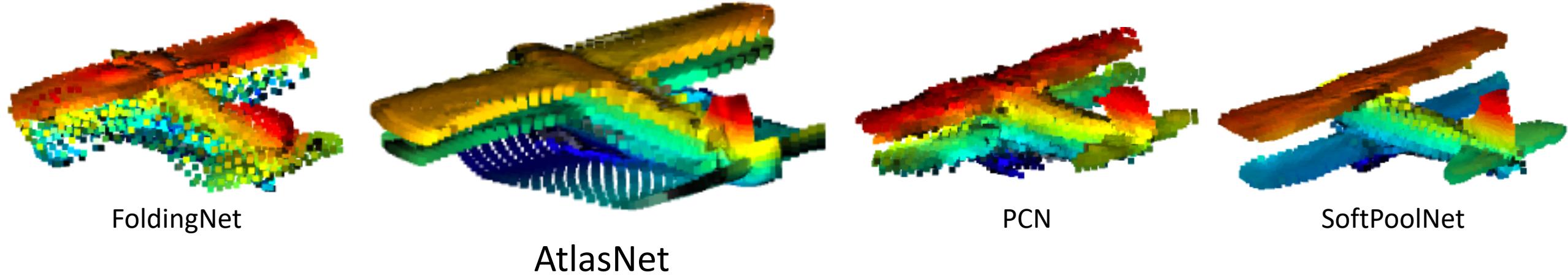
[3] SoftPoolNet: Shape Descriptor for Point Cloud Completion and Classification – ECCV 2020 oral

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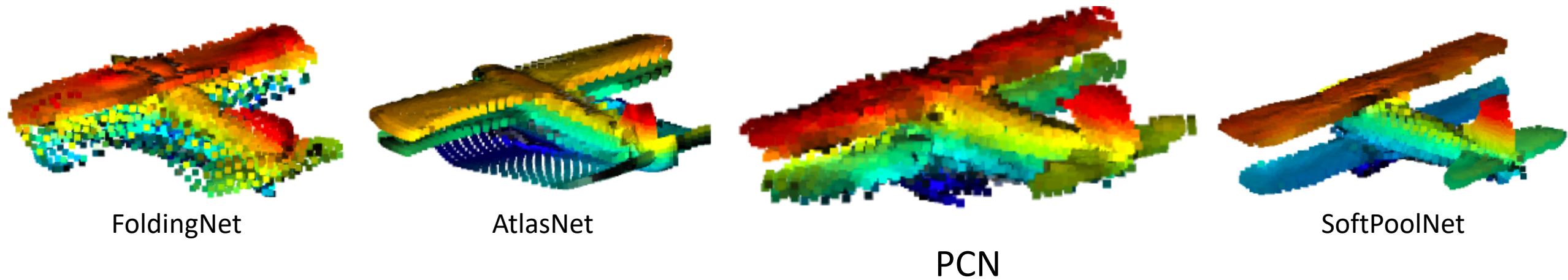
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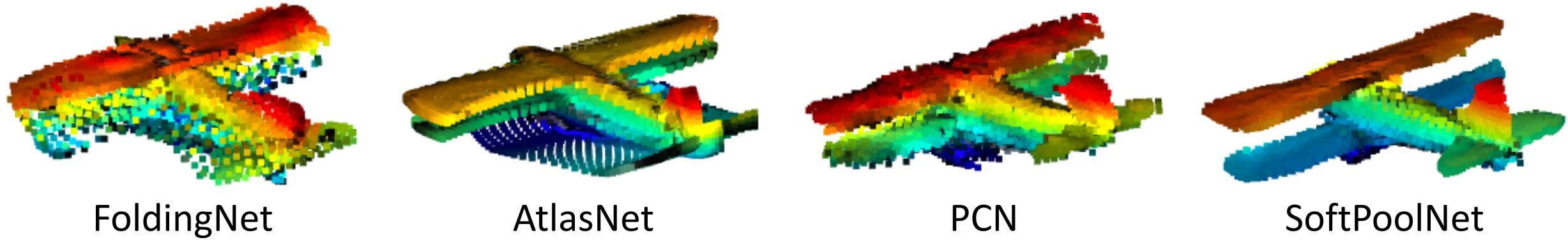
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[3] SoftPoolNet: Shape Descriptor for Point Cloud Completion and Classification – ECCV 2020 oral

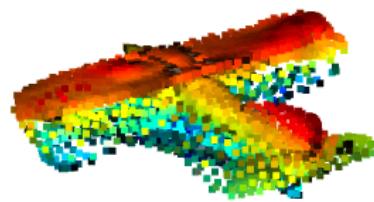
## 2. Computer Science – *selected works from conferences*



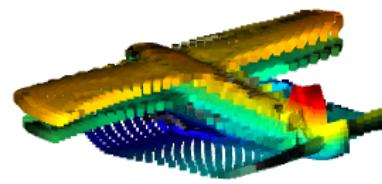
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## Better Reconstruction

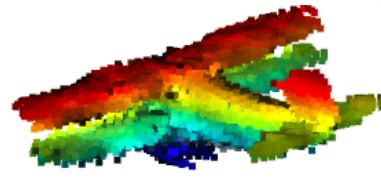
For instance, the wings are clearly separated.



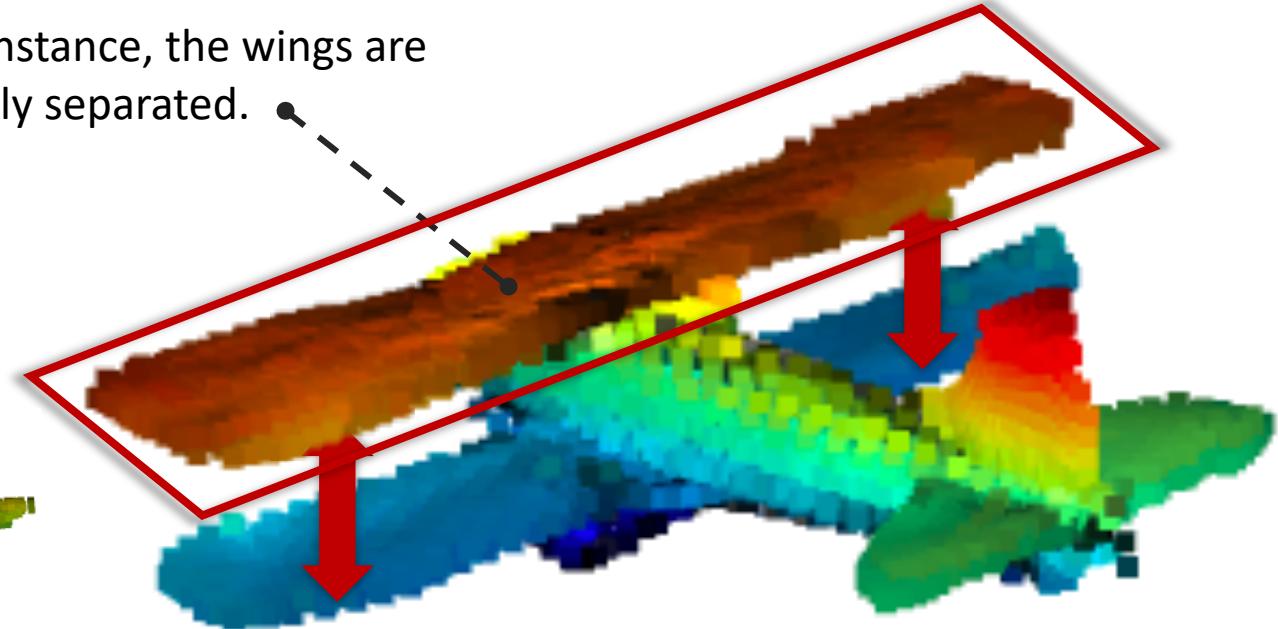
FoldingNet



AtlasNet

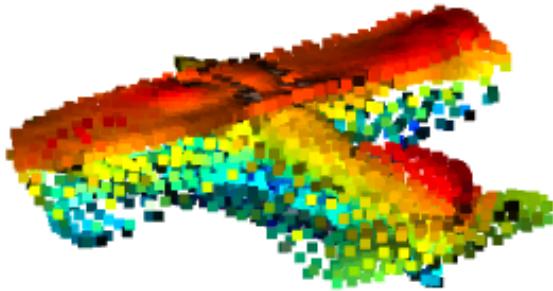


PCN

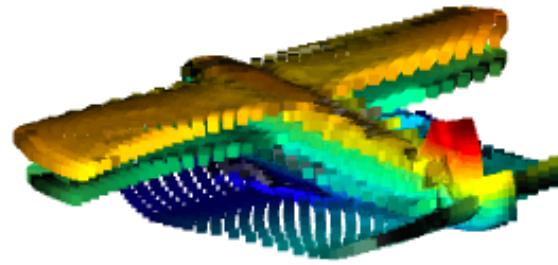


SoftPoolNet  
(Proposed Method)

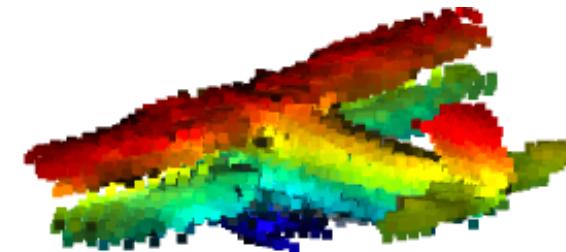
## 2. Computer Science – *selected works from conferences*



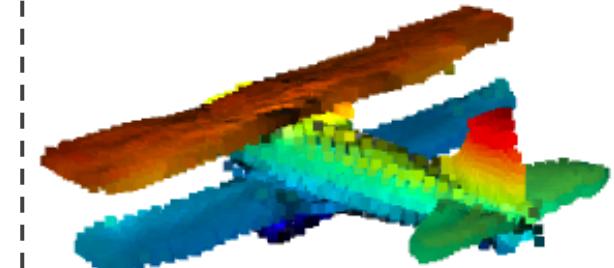
FoldingNet



AtlasNet



PCN



SoftPoolNet

Based on PointNet Features

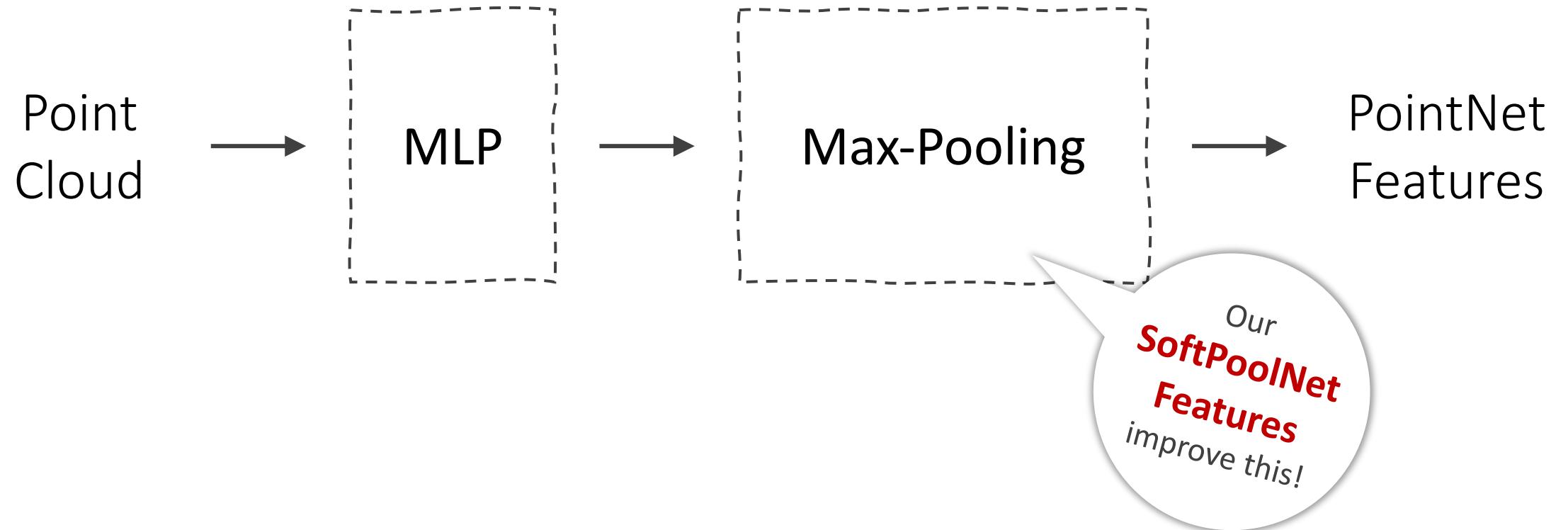
SoftPoolNet  
Features

## 2. Computer Science – *selected works from conferences*

### SoftPoolNet

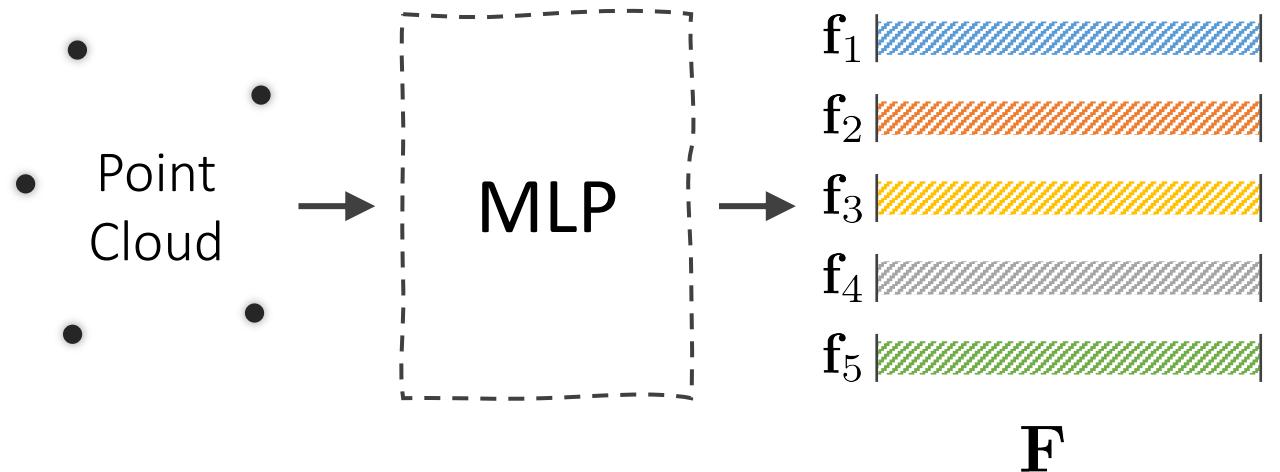
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## 2. Computer Science – selected works from conferences



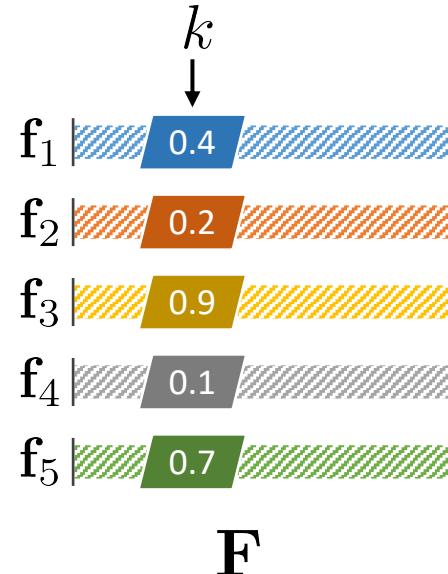
## 2. Computer Science – *selected works from conferences*

Given the results from  
MLP with one feature  
vector per point  
(In this toy example, there are 5 points)



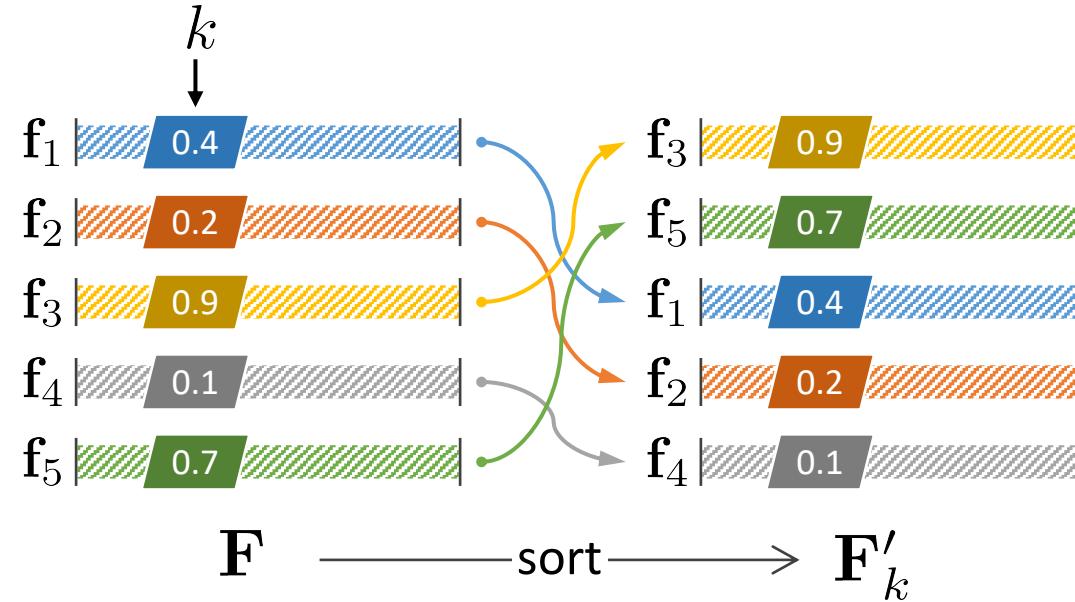
## 2. Computer Science – *selected works from conferences*

We look at the  
 $k$ -th column



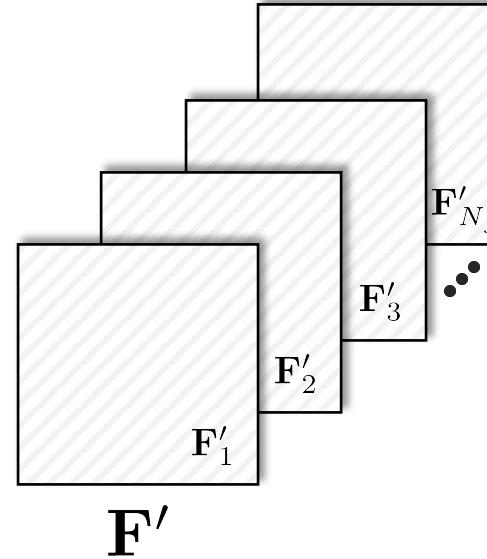
## 2. Computer Science – selected works from conferences

And sort the vectors in a descending order.



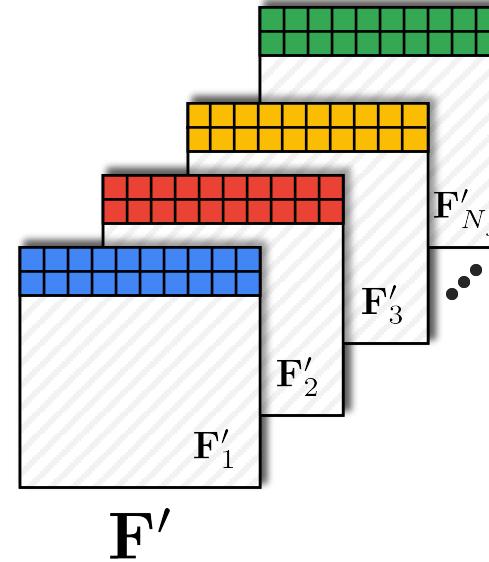
## 2. Computer Science – *selected works from conferences*

We do this for all  
the columns.



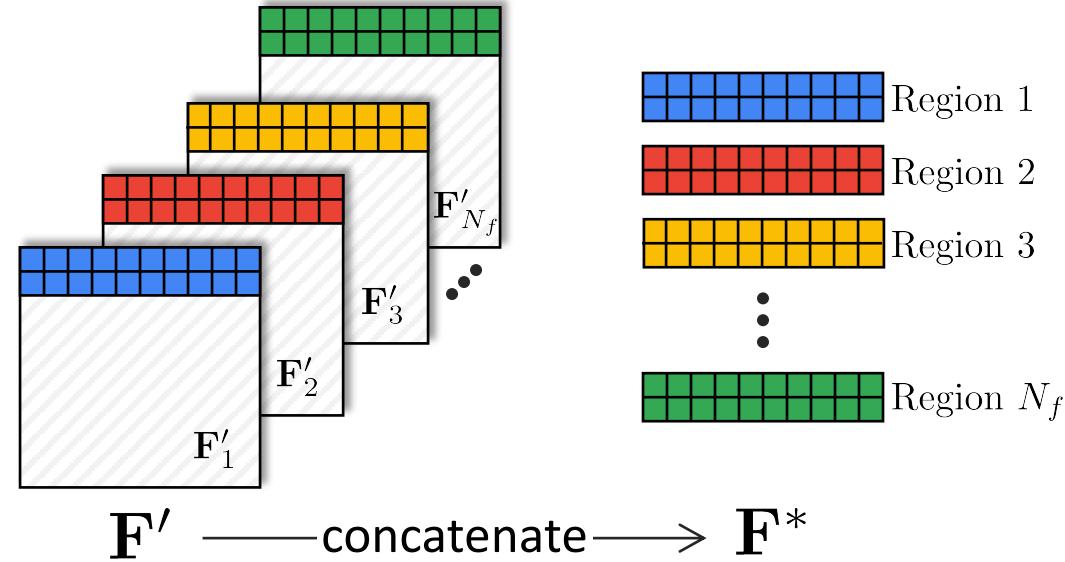
## 2. Computer Science – *selected works from conferences*

The SoftPoolNet features then take the first few rows of each matrix.

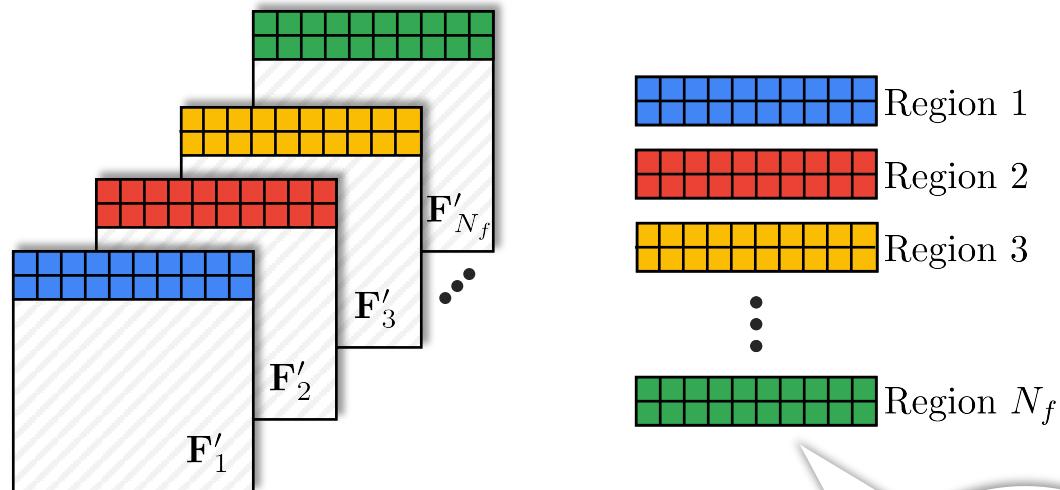


## 2. Computer Science – *selected works from conferences*

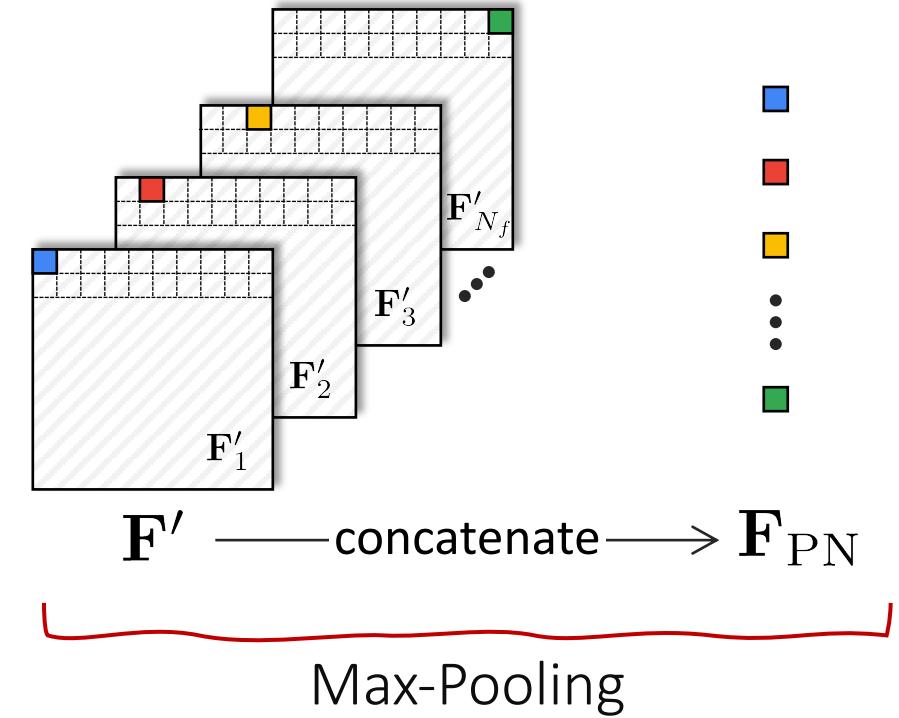
The SoftPoolNet features then take the first few rows of each matrix.



## SoftPoolNet Features

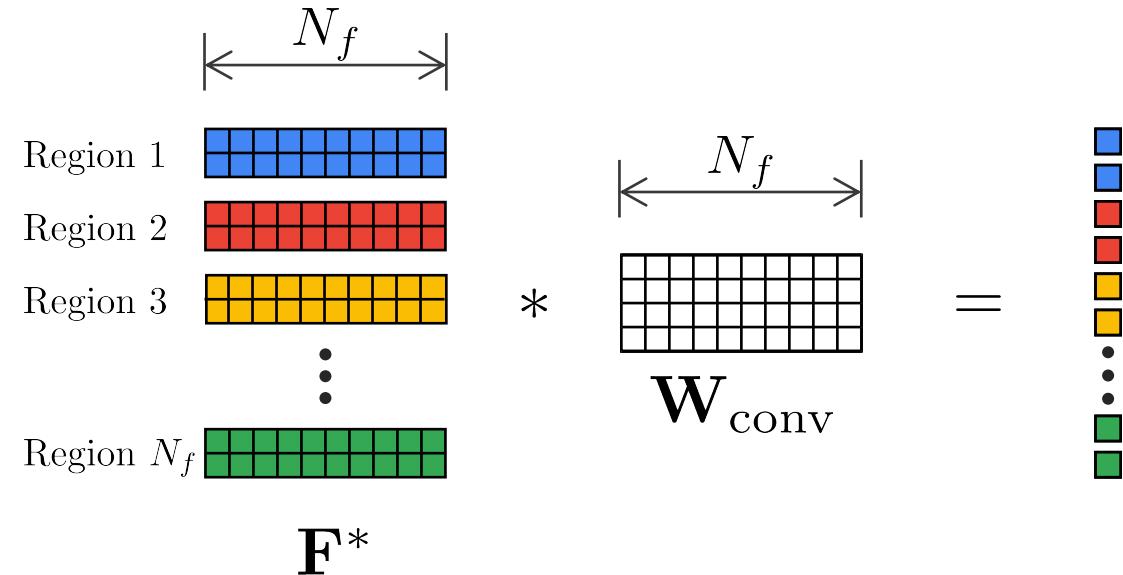


## PointNet Features



## 2. Computer Science – *selected works from conferences*

**Regional Convolutions**  
with kernels having the same  
length as the features



## 2. Computer Science – *selected works from conferences*

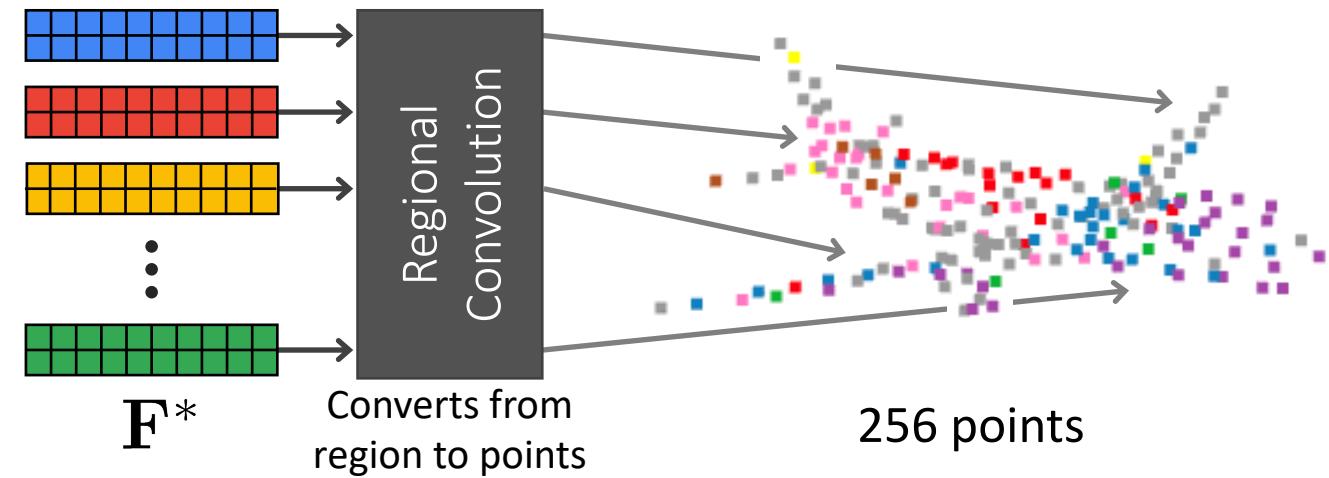
### Regional Convolutions with kernels having the same length as the features

$$\begin{array}{l} \text{Region 1} \\ \text{Region 2} \\ \text{Region 3} \\ \vdots \\ \text{Region } N_f \end{array} \quad \begin{matrix} \mathbf{F}^* \\ * \\ \mathbf{W}_{\text{conv}} \end{matrix} = \begin{array}{c} \mathbf{F}^* \\ \mathbf{W}_{\text{conv}} \\ (x, y, z) \end{array}$$

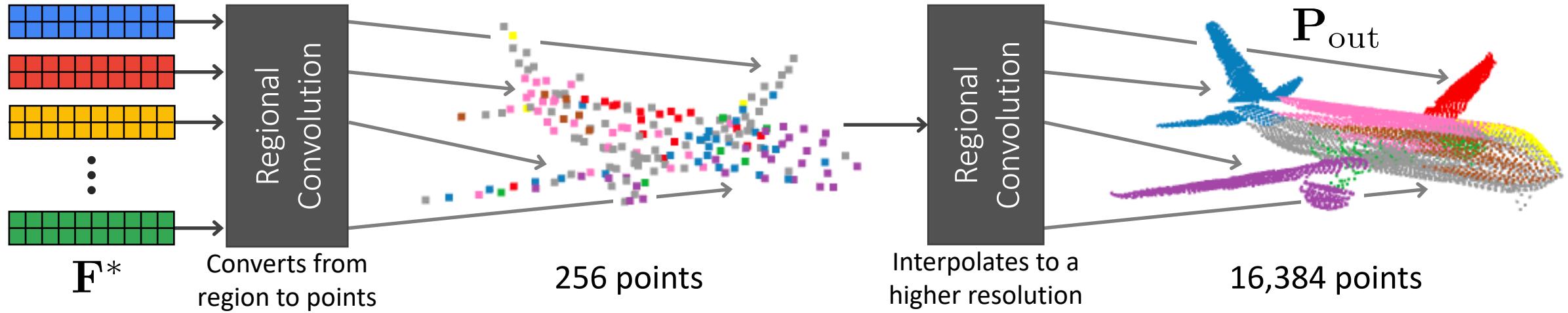
The diagram illustrates the computation of regional convolutions. On the left, five feature maps are shown for different regions: Region 1 (blue), Region 2 (red), Region 3 (yellow), and Region  $N_f$  (green). These are followed by a vertical ellipsis. To the right, a convolution operation is depicted with a kernel matrix  $\mathbf{W}_{\text{conv}}$  (containing blue, red, yellow, and green blocks) being multiplied by the feature map  $\mathbf{F}^*$  (represented by a stack of four grids). The result is a single output vector  $(x, y, z)$  where each element corresponds to a colored block in the kernel.

## 2. Computer Science – *selected works from conferences*

We then use the regional convolution to reconstruct a sparse point cloud.



## 2. Computer Science – selected works from conferences



# 3. Research Engineering – selected works from companies

## (1) Google Summer of Codes

### Deep Learning with Quantization for Semantic Saliency Detection

Semantic saliency detection be implemented based on CNN module. Quantization method described in [Pete's blog for quantization](#) will be added into project [tiny-cnn](#) together with deconvolutional functions. This project will be the dependency of OpenCV afterwards. There is also an IOS APP demo for such tiny deep learning structure.

### Learning-based Super Resolution

Super resolution is the process of up-scaling and improving the details of an image. Currently the super resolution modules within OpenCV are based on methods such as robust regularization and optic flow estimation, while the current state-of-the-art methods are based on deep learning. I propose to add learning-based super resolution methods to OpenCV. This will allow for more accurate and faster (real-time) super resolution.



[GET THE CODE](#)

Organization

OpenCV

Student

Xavier Weber

Mentors

Yida Wang

student

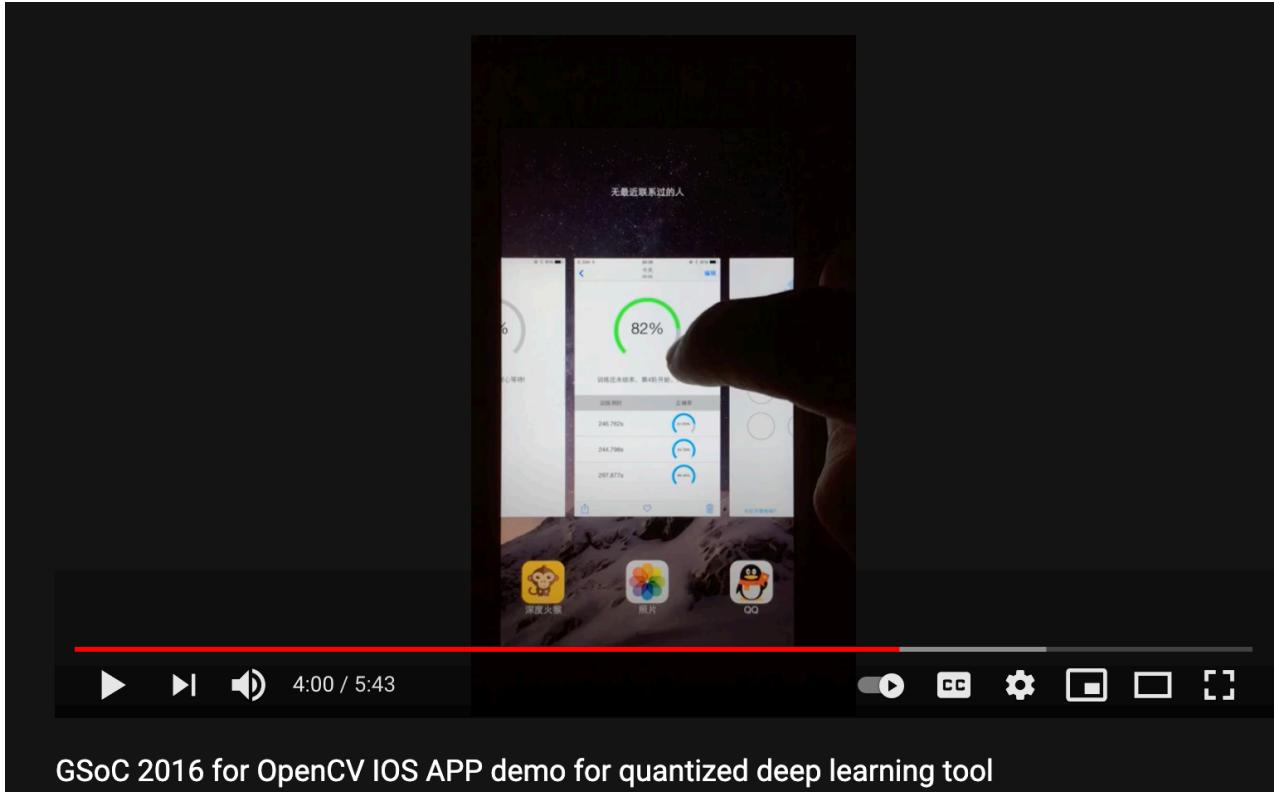


Mentor

<https://summerofcode.withgoogle.com/archive/2016/organizations/6474535423442944/>

# 3. Research Engineering – *selected works from companies*

## (1) Google Summer of Codes



[https://www.youtube.com/watch?v=4qOESDgC1\\_M](https://www.youtube.com/watch?v=4qOESDgC1_M)

### 3. Research Engineering – selected works from companies

#### (2) Microsoft Open Source Challenge

- Global 2nd prize in (4 winners in total)
- Invited talk in Microsoft Faculty Summit 2016

First few works reimplementing papers  
with CNTK



Akond Rahman

North Carolina State University, USA

Grand Prize: \$5,000

Entry: Quantifying Semantic Similarity of Software Projects using Deep Semantic Similarity Model (DSSM)



Varun Agrawal

Georgia Institute of Technology, USA

Second Prize: \$2,500

Entry: OneGroup: Automated Photo Sharing via Facial Recognition using Microsoft Cognitive Services (FKA Project Oxford)

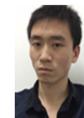


Saeid TizPaz Niari

University of Colorado, Boulder, USA

Second Prize: \$2,500

Entry: CONFidentiality CERTifier: a Modeling and Verification Framework for Program Confidentiality using Z3



Yida Wang

Beijing University of Posts and Telecommunications, China

Second Prize: \$2,500

Entry: CNTK on Mac: 2D Object Restoration and Recognition on 3D Model

#### Microsoft Open Source Challenge

Our recent Challenge offered \$15,000 in prizes as students experienced the power of open source tools from a top research lab.



##### Winners

We are delighted to announce the winners of the Challenge. Interest over the past three months came from all round the world. The judging panel was impressed by all the entries. The following four were chosen to receive prizes. Congratulations to the winners!

Each of the winners used and in some cases added to open source tools from Microsoft Research as well as Project Oxford, which was included in the Challenge. Read more on our Blog >

### 3. Research Engineering – *selected works from companies*

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- Serving as project mentor in 2019

#### (2) Microsoft Open Source Challenge

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#### (3) Scilab Simulator Design Contest

- Global 1st prize in 2013
- AIS system simulation

#### (4) FACEBOOK Research Intern

- Research intern in Facebook Reality Lab for eye 3D reconstruction

# 4. Teaching and Mentoring

- Tutor for courses:
  1. Computer Vision and Deep Learning for Autonomous Driving
  2. Perception and Learning in Robotics and Augmented Reality
  3. Deep Adversarial Training
- Supervisor for master thesis:
  1. Variational Object-aware 3D Hand Pose from a Single RGB Image – [Yafei Gao](#)
  2. 3D Surface Registration Using Shape Completion – [Mahsa Baghaei Heravi](#)
  3. 3D Instances from a single RGB Image – [Peter Mortimer](#)
- Invited Talks:
  - Deploying deep learning models with Microsoft CNTK on MacBook  
at  [Microsoft](#)
  - Oral presentation for SoftPoolNet  
on 

# 5. Technical Collaborators



Federico Tombari  
*from TUM/Google*



Yafei Gao  
*from TUM*



Yanyan Li  
*from TUM*



Nassir Navab  
*from TUM*



Pietro Falco  
*from ABB*



Nikolas Brasch  
*from TUM*



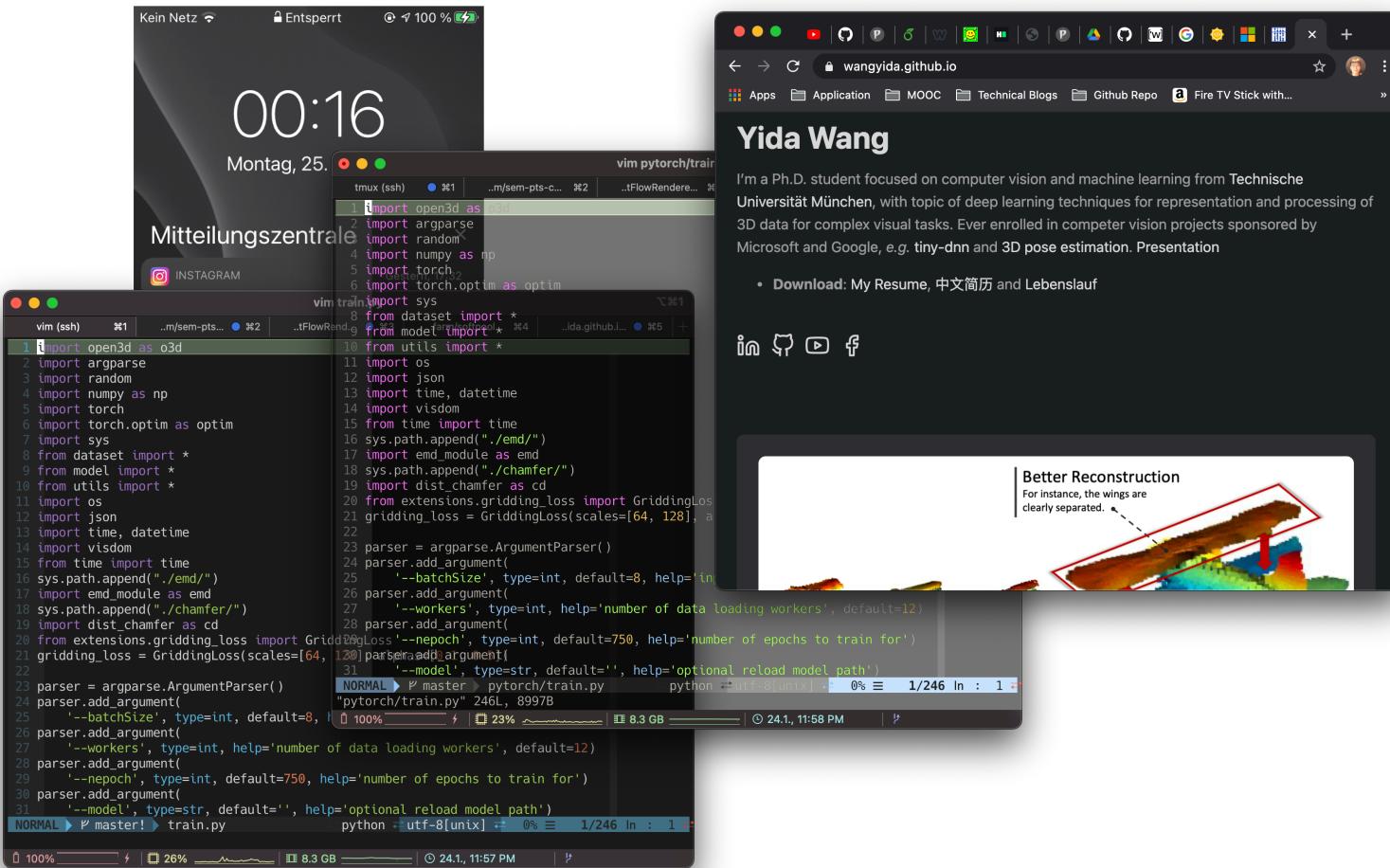
David Joseph Tan  
*from Google*



Yiru Shen  
*from Facebook*

# 6. Other Facts

## (1) I usually prefer to work with theme consistency



iPhone theme

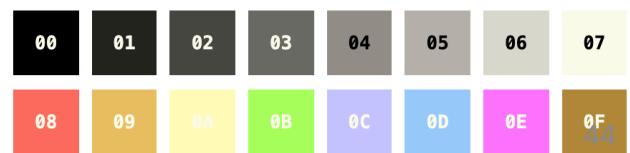
Website theme

Laptop terminal theme

Station terminal theme

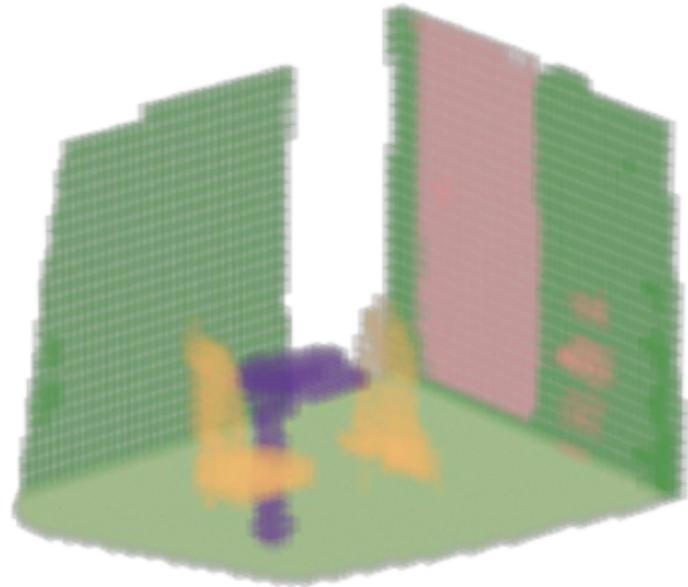
All configured  
with:  
**Base16 IR Black**

Scheme author: Timothée Poisot (<http://timotheepoisot.fr>)

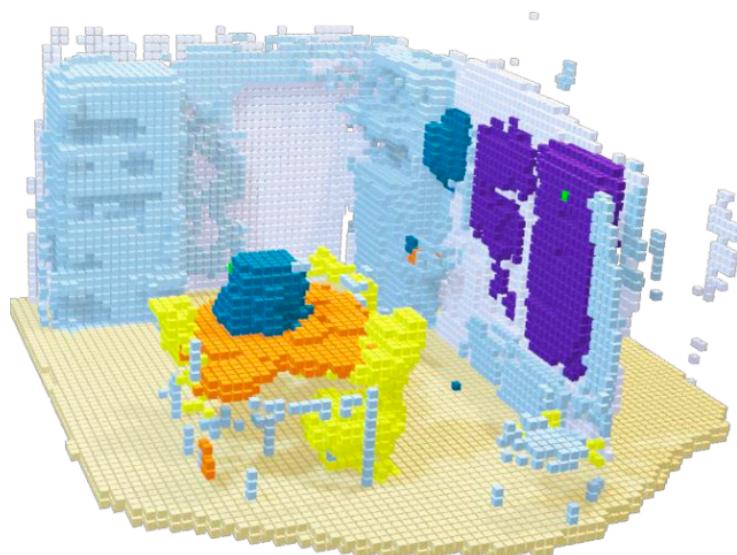


# 6. Other Facts

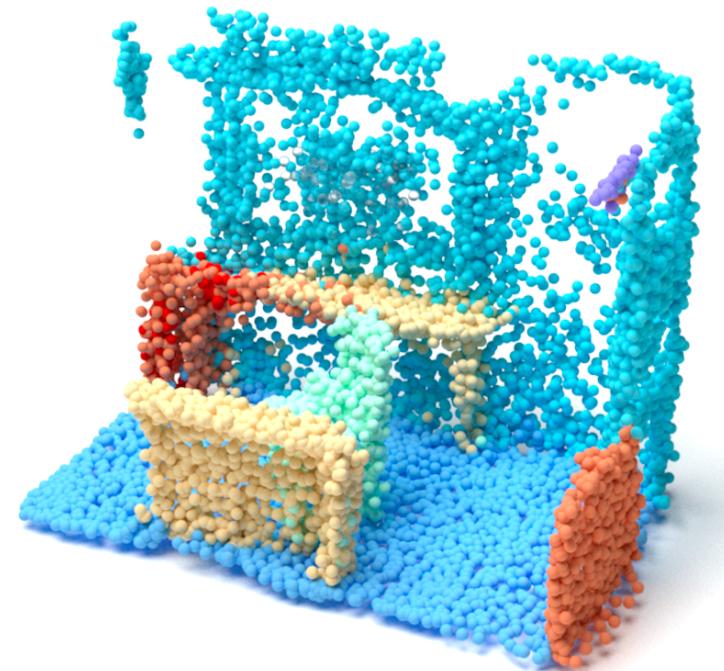
(2) I do like investigating CG rendering



2017 3DV



2019 ICCV



2021 *to be released...*

## 6. Other Facts

### (3) Sports and entertainments of mine

1. I have won a bronze for triathlon, tried for full Marathon for several times
2. Ever won gold and bronze in capital university students track and fields games (400m hurdle)
3. Also learning some German and Japanese in my spare time
4. Help my friend doing some mechanic stuffs in Germany

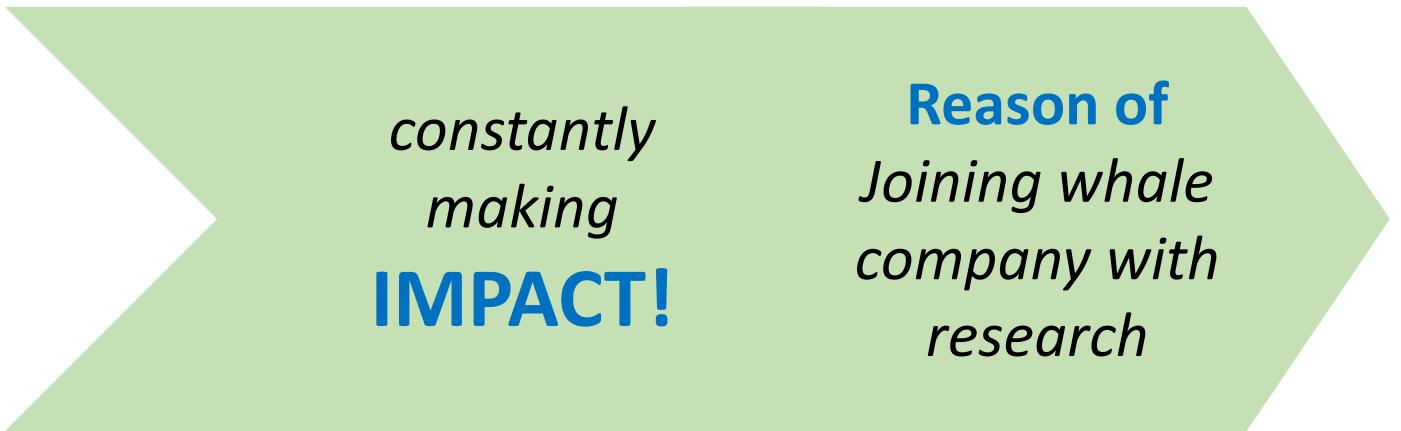
# Back to the Beginning

1. Academic Experience
2. Computer Science
3. Research Engineering
4. Teaching and Mentoring
5. Technical Collaborators
6. Other facts



# Summary

1. Building connection among techs with theories
2. Iteratively updating theories for techs
3. Sharing
4. Engineering for human
5. Teaching and Mentoring





# Thanks!

Jan.26, 2021

