

GWANGBIN BAE

PhD candidate | University of Cambridge

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EDUCATION

Oct 2019 - Present	PhD in Computer Vision and Machine Learning University of Cambridge <ul style="list-style-type: none">> Supervised by Prof. Roberto Cipolla (Machine Intelligence Laboratory)> Research interest : 3D reconstruction from monocular image/video
Oct 2018 - Sep 2019	MPhil in Machine Learning and Machine Intelligence University of Cambridge <ul style="list-style-type: none">> Commendation (final mark : 73/100)> Dissertation : Approximate Depth Estimation in Colonoscopy Images
Sep 2012 - Aug 2015	BSc in Physics King's College London <ul style="list-style-type: none">> First class honours (final mark : 84/100)> Third year project : Evaluation of Various Models of Cosmological Inflation Based on the New Planck Result

PUBLICATIONS

WACV 2023	DigiFace-1M : 1 Million Digital Face Images for Face Recognition Gwangbin Bae, <i>Martin de La Gorce, Tadas Baltrušaitis, Charlie Hewitt, Dong Chen, Julien Valentin, Roberto Cipolla, Jingjing Shen</i> <ul style="list-style-type: none">> We introduce a synthetic dataset for face recognition in order to tackle the problems associated with the existing datasets obtained by collecting millions of real face images without explicit consent. This work was done during my internship at Microsoft Mixed Reality & AI lab.
BMVC 2022	IronDepth : Iterative Refinement of Single-View Depth Using Surface Normal and its Uncertainty Gwangbin Bae, <i>Ignas Budvytis, Roberto Cipolla</i> <ul style="list-style-type: none">> We use surface normal to propagate depth between pixels and formulate depth refinement/upsampling as classification of choosing the neighbouring pixel to propagate from.
BMVC 2022	SPARC : Sparse Render-and-Compare for CAD Model Alignment in a Single RGB Image <i>Florian Langer, Gwangbin Bae, Ignas Budvytis, Roberto Cipolla</i> <ul style="list-style-type: none">> SPARC aligns CAD models to the objects in the image by iteratively updating their 9DoF pose. This is done by rendering "sparse" points from the CAD model and comparing their depth/normal to the depth/normal estimated from the image.
CVPR 2022 Oral (top 4%)	Multi-View Depth Estimation by Fusing Single-View Depth Probability with Multi-View Geometry Gwangbin Bae, <i>Ignas Budvytis, Roberto Cipolla</i> <ul style="list-style-type: none">> We estimate single-view depth probability distribution and use it to improve the efficiency and robustness of multi-view depth estimation.
ICCV 2021 Oral (top 3%)	Estimating and Exploiting the Aleatoric Uncertainty in Surface Normal Estimation Gwangbin Bae, <i>Ignas Budvytis, Roberto Cipolla</i> <ul style="list-style-type: none">> We estimate the aleatoric uncertainty in surface normal estimation and use it to improve the quality of prediction on small structures and near object boundaries.

- MICCAI 2020 | **Deep Multi-View Stereo for Dense 3D Reconstruction from Monocular Endoscopic Video**
 Gwangbin Bae, Ignas Budvytis, Chung-Kwong Yeung, Roberto Cipolla
 > We propose a deep multi-view stereo pipeline for endoscopic images.

EXPERIENCES

- Apr 2022 | **Research Intern**
 - Jun 2022 | Microsoft - Mixed Reality & AI Lab
 > Created a synthetic dataset for face recognition by rendering digital faces using graphics pipeline
- Oct 2019 | **AI Research Intern**
 - Oct 2020 | NISI HK
 > Developed monocular/multi-view depth estimation methods for colonoscopy images
 > Delivered multiple technical presentations in technology forums and workshops
- Jul 2017 | **Machine Learning Developer**
 - Apr 2018 | Precycler
 > Designed an autonomous recycling bin that can sort the incoming garbage based on sound
 > Developed garbage classification algorithms based on MFCC analysis and machine learning
- Oct 2015 | **Assistant Drill Instructor & Squad Leader**
 - Jul 2017 | ROK Army - 50th Infantry Division
 > Instructed new recruits in basic combat skills including riflemanship and hand grenade
 > Awarded two Meritorious Service Medals for distinguished performance
- Jul 2014 | **Research Intern**
 - Aug 2014 | King's College London
 > Conducted a research on Quirks (imaginary particles introduced to explain the missing mass problem)
 > Constructed computer simulations to generate Quirks collisions under varying conditions

AWARDS

- 2022 | Rank Symposium on Neural Rendering in Computer Vision - Best student presentation
 2018 | Kwanjeong Educational Foundation Scholarship (30,000 USD)
 2017 | SK National Start-Up Competition - Grand Prize (1st Place)
 2015 | Nikon Prize for a Physics Project
 2014 | Nikon Prize for Laboratory Physics
 2014 | Gordon Rogers Scholarship (3,000 GBP)
 2012 | 25th International Young Physicists' Tournament - Gold Medal (1st Place)
 2011 | 24th International Young Physicists' Tournament - Gold Medal (1st Place)

TALKS

- 10 Aug 2022 | **Improving monocular 3D reconstruction using surface normal and its uncertainty**
Rank Symposium - Neural Rendering in Computer Vision
- 16 Sep 2022 | *Seminar at Pohang University of Science and Technology (POSTECH) - Prof. Tae-Hyun Oh's group*
- 19 Sep 2022 | *Seminar at Technical University of Munich (TUM) - Prof. Angela Dai's group*
- 28 Sep 2022 | *Seminar at Toshiba Europe's Cambridge Research Laboratory*
- 17 Oct 2022 | *Seminar at Imperial College London - Prof. Andrew Davison's group*
- 22 Dec 2021 | **Estimating and exploiting the aleatoric uncertainty in surface normal estimation**
Hanyang University BK21 seminar

SERVICE

Reviewer | WACV 2023, BMVC 2022
Teaching | Lab demonstrator for 3F8 Inference

SKILLS

Technical | Python, PyTorch, MATLAB, C++
Language | Korean (native), English (TOEFL iBT : 120/120)