

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 (to appear)	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">> Introduced a new large-scale synthetic dataset for face recognition> Work done during the internship at Microsoft Mixed Reality & AI lab
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">> Proposed probabilistic depth candidate sampling and depth consistency weighting> Introduced iterative multi-view matching where a small number of depth candidates are sampled from the current depth probability distribution to update its mean and variance
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">> Estimated and evaluated the aleatoric uncertainty in CNN-based surface normal estimation> Proposed a novel decoder framework where pixel-wise MLPs are trained on a subset of pixels selected based on the estimated uncertainty, in order to solve the bias in training towards large planar surfaces
MICCAI 2020	Deep Multi-View Stereo for Dense 3D Reconstruction from Monocular Endoscopic Video Gwangbin Bae, <i>Ignas Budvytis, Chung-Kwong Yeung, Roberto Cipolla</i> <ul style="list-style-type: none">> Proposed adaptive depth candidate sampling based on a monocular depth estimation network> Introduced a patch embedding network and soft-contrastive loss for fast and accurate multi-view matching

EXPERIENCES

- | | |
|------------------------|--|
| Apr 2022
- Jun 2022 | Research Intern
Microsoft - Mixed Reality & AI Lab <ul style="list-style-type: none">> Created a synthetic dataset for face recognition by rendering digital faces using graphics pipeline |
| Oct 2019
- Oct 2020 | AI Research Intern
NISI HK <ul style="list-style-type: none">> Developed monocular/multi-view depth estimation methods for colonoscopy images> Delivered multiple technical presentations in technology forums and workshops |
| Jul 2017
- Apr 2018 | Machine Learning Developer
Precycler <ul style="list-style-type: none">> 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
- Jul 2017 | Assistant Drill Instructor & Squad Leader
ROK Army - 50th Infantry Division <ul style="list-style-type: none">> Instructed new recruits in basic combat skills including riflmanship and hand grenade> Awarded two Meritorious Service Medals for distinguished performance |
| Jul 2014
- Aug 2014 | Research Intern
King's College London <ul style="list-style-type: none">> 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

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| 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

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| 10 Aug 2022 | Improving monocular 3D reconstruction using surface normal and its uncertainty
<i>Rank Symposium - Neural Rendering in Computer Vision</i> |
| 16 Sep 2022 | <i>Seminar at Pohang University of Science and Technology (POSTECH) - Prof. Tae-Hyun Oh's group</i> |
| 19 Sep 2022 | <i>Seminar at Technical University of Munich (TUM) - Prof. Angela Dai's group</i> |
| 7 Oct 2022 | <i>Seminar at Imperial College London - Prof. Andrew Davison's group</i> |
| 22 Dec 2021 | Estimating and exploiting the aleatoric uncertainty in surface normal estimation
<i>Hanyang University BK21 seminar</i> |

SERVICE

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

SKILLS

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