

# Muhammad Atif Butt

mabutt@cvc.uab.es   GitHub   Google Scholar   LinkedIn

## Research Interests

---

Generative Artificial Intelligence, with focus on controllable T2I generation with diffusion models, including fine-grained color and illumination control, text-guided image editing, privacy-preserving personalization, and building large-scale evaluation benchmarks for generative models and scene understanding.

## Education

---

**Doctor of Philosophy in Computer Science** *Jan 2023 – Present*

*Universitat Autònoma de Barcelona, Spain*

**Topic:** Controllable Text-to-Image Generation with Diffusion Models

**Master of Science in Computer Science** *Sep 2019 – Jul 2022*

*National University of Sciences and Technology (NUST – SEecs), Islamabad, Pakistan*

**Topic:** Multi-lingual Traffic Signboard Text Detection and Recognition in Natural Scene Images

**Bachelor of Science in Computer Science** *Nov 2014 – Nov 2018*

*Mirpur University of Science and Technology, Azad Kashmir, Pakistan*

**Topic:** Human Cognition and Emotions-Inspired Rear-End Collision Avoidance in Autonomous Driving

## Experience

---

**Pre-doctoral Researcher** *Jan 2023 – Present*

*The Learning and Machine Perception (LAMP) Team, Computer Vision Center (CVC), Spain*

- *Personalizing T2I Diffusion Models for Precise Color Generation*
- *Color Evaluation Benchmark for Text-to-Image Generation*
- *Privacy-preserving Personalization in Diffusion Models*

**Research Assistant** *Sep 2021 – Dec 2022*

*IHSAN Lab, Information Technology University (ITU), Pakistan*

- *Adversarial Robustness in Deep Learning Systems*
- *Trustworthy AI for Extended Reality (XR) Applications*
- *Privacy-aware Embedded Machine Learning*
- *Visual Scene (unstructured roads) Understanding in the Autonomous Driving*

**Graduate Researcher** *Oct 2020 – Jul 2022*

*Deep Learning Lab (DLL—National Center of AI), NUST, Pakistan*

- *Scene Text Detection and Recognition in Natural Images*

**Research Associate** *Feb 2019 – Aug 2021*

*CAR Lab – National Center of Robotics and Automation, MUST, Pakistan*

- *Large-scale Dataset Collection and Benchmarking for AVs*
- *Visual 2D Scene Segmentation and Understanding with foundation Models*

## Publications

---

**Publication Metrics:** H-index: 11 | Citations: 600+ | Peer-reviewed: 19+

**Publications in Top venues:** CVPR, ECCV, IJCV, NeurIPS, IEEE-ITS, ACM CSUR

See [Google Scholar](#) for complete list.

### Conference Publications

- [1] **GenColorBench: A Color Evaluation Benchmark for Text-to-Image Generation Models**  
M.A. Butt, A. Gomez-Villa, T. Wu, J. Vazquez-Corral, J. van de Weijer, K. Wang  
*IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2026
- [2] **LumiCtrl: Learning Illuminant Prompts for Lighting Control in Personalized Text-to-Image Models**  
M.A. Butt, K. Wang, J. Vazquez-Corral, J. van de Weijer  
*IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshop on AI for Creative Visual Content Generation, Editing, and Understanding (CVEU)*, 2026
- [3] **Leveraging Semantic Attribute Binding for Free-Lunch Color Control in Diffusion Models**  
H. Laria, A. Gomez-Villa, J. Qin, M.A. Butt, B. Raducanu, J. Vazquez-Corral, J. van de Weijer, K. Wang  
*IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, 2025
- [4] **An h-space Based Adversarial Attack for Protection Against Few-shot Personalization**  
X. Xu, S. Kamath, M.A. Butt, B. Raducanu  
*ACM Multimedia*, 2025
- [5] **ColorPeel: Color Prompt Learning with Diffusion Models via Color and Shape Disentanglement**  
M.A. Butt, K. Wang, J. Vazquez-Corral, J. van de Weijer  
*European Conference on Computer Vision (ECCV)*, 2024
- [6] **Privacy Protection in Personalized DMs via Targeted Cross-Attention Adversarial Attack**  
X. Xu, M.A. Butt, S. Kamath, B. Raducanu  
*Safe Generative AI Workshop, NeurIPS*, 2024
- [7] **Dynamic Prompt Learning: Addressing Cross-Attention Leakage for Text-Based Image Editing**  
K. Wang, F. Yang, S. Yang, M.A. Butt, J. van de Weijer  
*Neural Information Processing Systems (NeurIPS)*, 2023
- [8] **TrafficSign: Multilingual Traffic Signboard Text Detection and Recognition for Urdu and English**  
M.A. Butt, A. Ul-Hasan, F. Shafait  
*15th IAPR International Workshop on Document Analysis Systems (DAS)*, 2022

### Journal Publications

- [1] **R2S100K: Road Region Segmentation Dataset For Semi-Supervised Autonomous Driving in the Wild**  
M.A. Butt, H. Ali, A. Qayyum, W. Sultani, A. Al-Fuqaha, J. Qadir  
*International Journal of Computer Vision (IJCV)*, 2025
- [2] **Secure and Trustworthy Artificial Intelligence-Extended Reality (AI-XR) for Metaverses**  
A. Qayyum, M.A. Butt, H. Ali, M. Usman, O. Halabi, A. Al-Fuqaha, Q.H. Abbasi, M.A. Imran, J. Qadir  
*ACM Computing Surveys*, 2024
- [3] **Consistent Valid Physically-Realizable Adversarial Attack Against Crowd-Flow Prediction Models**  
H. Ali, M.A. Butt, F. Filali, A. Al-Fuqaha, J. Qadir  
*IEEE Transactions on Intelligent Transportation Systems*, 2024
- [4] **Towards Secure Private and Trustworthy Human-Centric Embedded Machine Learning**  
M.A. Butt, A. Qayyum, H. Ali, A. Al-Fuqaha, J. Qadir  
*Computers and Security, Elsevier*, 2023
- [5] **Dental Caries Detection Using a Semi-Supervised Learning Approach**  
A. Qayyum, A. Tahir, M.A. Butt, A. Luke, H. Abbas, J. Qadir, K. Arshad, K. Assaleh, M. Imran, Q. Abbasi

*Scientific Reports, Nature, 2023*

- [6] **CARL-D: A Vision Benchmark and Large-scale Dataset for Vehicle Detection & Scene Segmentation**  
M.A. Butt, F. Riaz  
*Signal Processing: Image Communication, 2022*
- [7] **Face Mask Detection and Social Distance Monitoring System for COVID-19 Pandemic**  
I. Javed, M.A. Butt, S. Khalid, T. Shehryar, R. Amin, A.M. Syed, M. Sadiq  
*Multimedia Tools and Applications, 2022*
- [8] **Pixel Level Segmentation Based Drivable Road Region Detection and Steering Angle Estimation Method for Autonomous Driving on Unstructured Roads**  
M. Rasib, M.A. Butt, F. Riaz, A. Sulaiman, M. Akram  
*IEEE Access, 2021*

### Under Review

- [1] **NumColor: Precise Numeric Color Control in Text-to-Image Generation**  
M.A. Butt, D. Hernández, A. Gomez-Villa, K. Wang, J. Vazquez-Corral, J. van de Weijer
- [2] **Color Names in Vision-Language Models**  
A. Gomez-Villa, P. Hernández-Cámara, M.A. Butt, V. Laparra, J. Malo, J. Vazquez-Corral
- [3] **PRISM: Frequency-Domain Protection Against Zero-Shot Diffusion Personalization**  
X. Xu, S. Kamath, MA Butt, B. Raducanu

### Academic Services

---

**Conference Reviewer:** CVPR, ICLR, ICML, ICCV, AAAI, BMVC, WACV, AISTATS.

**Journal Reviewer:** Computers and Electrical Engineering, Computer and Security, IJCV.

### Awards & Honors

---

**DICE 2018 Award – Engineering Category**

Dec 2018

*For developing EMO, the first cognitive and emotion-enabled autonomous vehicle of Pakistan.*

### Technical Skills

---

**Frameworks:** PyTorch, TensorFlow, TensorFlow Lite, ROS, MATLAB, Flutter

**3D Modeling:** Blender, Unity

### Languages

---

**Native:** Urdu    **Fluent:** English    **Basic:** Spanish

### References

---

- **Dr. Joost Van de Weijer**  
Senior Researcher  
Computer Vision Center, Universitat Autònoma de Barcelona, Spain.  
Email: joost@cvc.uab.es
- **Dr. Junaid Qadir**

Professor

Faculty of Engineering, Qatar University, Doha, Qatar.

**Email:** jqadir@qu.edu.qa

- **Dr. Faisal Shafait**

Professor

Department of Computing, National University of Sciences and Technology, Pakistan.

**Email:** faisal.shafait@seecs.edu.pk