# Cover Letter

**Atif ANWER**
*Le Creusot, 71200 France*
*☐ +33 66 011 2563*
*✉ atif.anwer@u-bourgogne.fr*
*🌐 atif-anwer.github.io*

**TBD**                                                                                                                          June 1, 2024
*TBD*

Dear Sir/Madam,

I am writing to express my strong interest in the Machine Learning Scientist position at TBD, as advertised. With a Ph.D. in Computer Vision, 14 years of pre-PhD industrial experience, and two years of hands-on post-PhD experience in pose estimation and deep learning, I am excited about the opportunity to apply the skills and knowledge gained to significantly contribute to your team's success.

During my doctoral studies at INSA Rouen, France, my research focused on a generative AI application project, funded by INRIA and Peugeot, and was a pivotal milestone in my career. Currently, I am working in a split contract as a Machine Learning engineer at Apeira Technologies, France, and simultaneously as a post-doctoral researcher at University de Bourgogne, France, involving close collaboration with subject matter experts.

At Apeira Technologies, my responsibilities are to refine the accuracy of existing pose estimation algorithms to generate accurate 2D skeletons for 3D SMPL meshes, facilitating various cyclist performance calculations. As a postdoctoral researcher at the University of Bourgogne, France, I am working on multiple projects in parallel as part of my research work. These include estimating the risk of cardiovascular disease from en-face OCT fundus images using deep learning, and development of an end-to-end software pipeline for detection, segmentation, and analysis of tunneling electron microscopy (TEM) images of nanoparticles.

My proficiency extends beyond theoretical research, encompassing the building of unsupervised and semi-supervised ML/DL systems. I have a proven track record of translating complex concepts into tangible solutions. In addition, I am highly motivated, proficient in communication, and adept at managing time. I am highly adaptable and thrive in dynamic environments where collaboration and creativity are encouraged. I am excited to apply my abilities to initiatives that promote innovative and cutting-edge AI technologies. Additionally, I look forward to the opportunity to engage with experts and mentors in the field as it aligns perfectly with my career goals of moving from academia back to industrial applications of computer vision and deep learning.

I am certain that my robust analytical abilities, communication prowess, and time management capabilities, coupled with my proficiency in collaborating within multidisciplinary teams, will empower me to significantly contribute to projects and promote a culture of innovation and excellence. My resume provides a more detailed account of my qualifications.

Thank you for considering my application. I hope to have the opportunity to discuss how I can contribute to the continued success of TBD.

Yours faithfully,

**Atif ANWER**

# Atif ANWER

Postdoctoral Researcher in Computer Vision and
Deep Learning applications

*Le Creusot, 71200 France*
📱 *+33 66 011 2563*
✉ *atif.anwer@u-bourgogne.fr*
🌐 *atif-anwer.github.io*
⭘ *Atif-Anwer*
in *atifanwer*

## Educational Background

**2019**
**2022**

**PhD Computer Sciences / Electrical & Electronics Engineering *(Dual-Degree)***,
*INSA Rouen Normandie, France & University Teknologi PETRONAS, Malaysia, Funded by*: Agence Nationale de la Recherche (ANR) project ICUB,
*Supervisors*: Prof. Samia Ainouz (INSA), Asst. Prof. Naufal Bin Saad (UTP)
*Thesis*: Specular Highlight Detection and Adversarial Generation of Specularity-Free Images using Multi-Domain Translation Network Trained with Polarimetric Data

**2016**
**2017**

**MSc Electrical & Electronics Engineering**,
*University Teknologi PETRONAS, Perak Malaysia*,
*Supervisor*: Asst. Prof. Syed Saad Azhar Ali
*Thesis*: Real-time underwater 3D scene reconstruction using Kinect v2 time of flight camera

**2001**
**2004**

**B.E. Mechatronics**,
*Major: Robotics, Control Systems and Image processing*,
*National University of Sciences & Technology (NUST), Pakistan*,
*Supervisor*: Dr. Saeed Ur Rahman
*Thesis*: Development and control of Bipedal Autonomous Robot (BART)

## Research Interests

- 3D Human Pose Estimation applications
- Generative AI applications
- 3D Sensing and Robotic Perception
- Semantic Segmentation and Scene Understanding
- Mobile Robot design and development

## Relevance to the Applied position

- Experienced in researching and developing diverse unsupervised and semi-supervised ML/DL systems, addressing both traditional and unconventional computer vision challenges.

- Strong communication, time-management and collaborative skills, and managerial experience facilitating integration with teams.

- Ability to multitask effectively and deliver deep learning projects within demanding timelines.

- Extensive understanding and expertise in mechatronic systems, hardware integration and data acquisition.

## Professional Experience

**2022** **Machine Learning R&D Engineer**, *Apeira Technologies*, Le Creusot, France,
Research and development of deep learning algorithms for human pose estimation and posture correction, to improve cyclist performance in videos.

**2022** **Postdoctoral Researcher**, *Université de Bourgogne*, Dijon, France,
Research and development on estimating risk of cardiovascular disease from en-face OCT fundus images using deep learning. Additionally, development of software pipeline for end-to-end detection, segmentation, and analysis of Tunnelling Electron Microscopy (TEM) images of ZnO nanoparticles.

**2018**
**2020** **Freelance 3D CAD & Graphic Designer**, *Freelancer.com*
Executed multiple 3D CAD modelling and graphic design projects from concept to prototype to completion.

**2015**
**2016** **Co-Founder & CTO**, *Scifacterz*, Islamabad, Pakistan
Robotics Startup venture centred on design and of ''NBE (Non-Biological Entity)" an open-source, low cost, research platform and Home Service Robot

**2004**
**2016** **Manager (Mechatronics)**, Islamabad, Pakistan
Multiple diverse industry roles involving concurrent responsibilities in Mechanical and Electronic Design research, and managerial positions.

## Skills

| | |
|---|---|
| Frameworks, Languages & Tools | Python, TensorFlow, OpenCV, MATLAB, C#, Visual Basic, YOLO (v4, v8), Rerun, Gradio |
| 3D Modelling and Rendering | PTC Creo, Sketchup, Blender |
| Design and Illustration | Adobe Photoshop, Affinity Designer, Figma, Corel Draw |
| Misc | Git, LaTeX, Notion, WordPress, 3D Printing |

## Languages

| | | |
|---|---|---|
| Urdu | Native | |
| English | Fluent | *IELTS (Band 8.0)* |
| French | Medium | *Good Understanding, Medium Speaking* |

## Extra Curricular/Pro-Bono

**2020** **Administrator**, r\ComputerVision subreddit and discord server

**2010**
**2011** **Guest writer (Hardware reviewer)**, *wccftech.com*

**2007**
**2012** **Lead Server Administrator**, *Micronet Broadband Ltd.*, Islamabad, Pakistan

## Select Recent Projects

### Cyclist pose estimation and posture correction (2023 ➡)
Research and development of deep learning algorithms aimed at human pose estimation and posture correction, with a focus on enhancing cyclist performance in videos from hand-held devices. Solely responsible for refining MediaPipe accuracy by transfer-learning of graph-convolutional network (GCN) and utilizing the improved pose estimates to generate accurate SMPL/SMPL-X meshes, facilitating various cycling performance calculations.

### Estimating risk of cardio-vascular diseases from OCT-A images (2023 ➡)
Comprehensive research and development project on estimating the risk of cardiovascular disease from en-face OCT fundus images. Employed a Convolutional Neural Network (CNN) architecture with EfficientNet v2 as the backbone. A journal publication of the research work has been submitted for peer-review.

### Automated analysis of TEM images of nano-particles (2023 ➡)
Creation of a robust software pipeline for end-to-end detection, segmentation, and analysis of Tunnelling Electron Microscopy (TEM) images featuring ZnO nanoparticles. Solely responsible for implementing a custom-trained YOLO v8 network and developing a customized Python user interface for seamless navigation and control of the entire end-to-end pipeline.

### SpecSeg (2021-2022)
Conceived and developed a highly efficient Specular Segmentation (SpecSeg) network, structured on the U-net architecture that can detect pixels strongly affected by specular highlights with a high degree of precision.
(SpecSeg repository ⬤, Huggingface Demo 🖥)

### SHMGAN (2019-2022)
*PhD Research* - Development of a multi-input Generative Adversarial Network (GAN) designed to produce specular-free images from a single RGB input image, eliminating the need for external labels. Specular Highlights Mitigating GAN (SHMGAN) was trained using polarimetric images obtained under uncontrolled lighting conditions and showcased adversarial network design within challenging real-world scenarios.
(SHMGAN repository ⬤)

## Teaching Experience

**2023** **Masters Course (MSc Health AI)**, *Image Processing*, University de Bourgogne, Département IEM (Informatique Electronique Mécanique)
University de Bourgogne, France

**2022** **Undergraduate Course**, *Data Analysis and Digital Tools*, Département Informatique et technologie de l'information, INSA Rouen, France

**2021** **Undergraduate Course**, *Data Analysis and Digital Tools*, Département Informatique et technologie de l'information, INSA Rouen, France

**2021** **Lab Assistant**, *Soyez Acteurs du Web!*, Département Informatique et technologie de l'information, INSA Rouen, France

**2019** **Teaching Assistant**, *Probability & Statistics*, Department of Electrical & Electronics Engineering, UTP, Malaysia
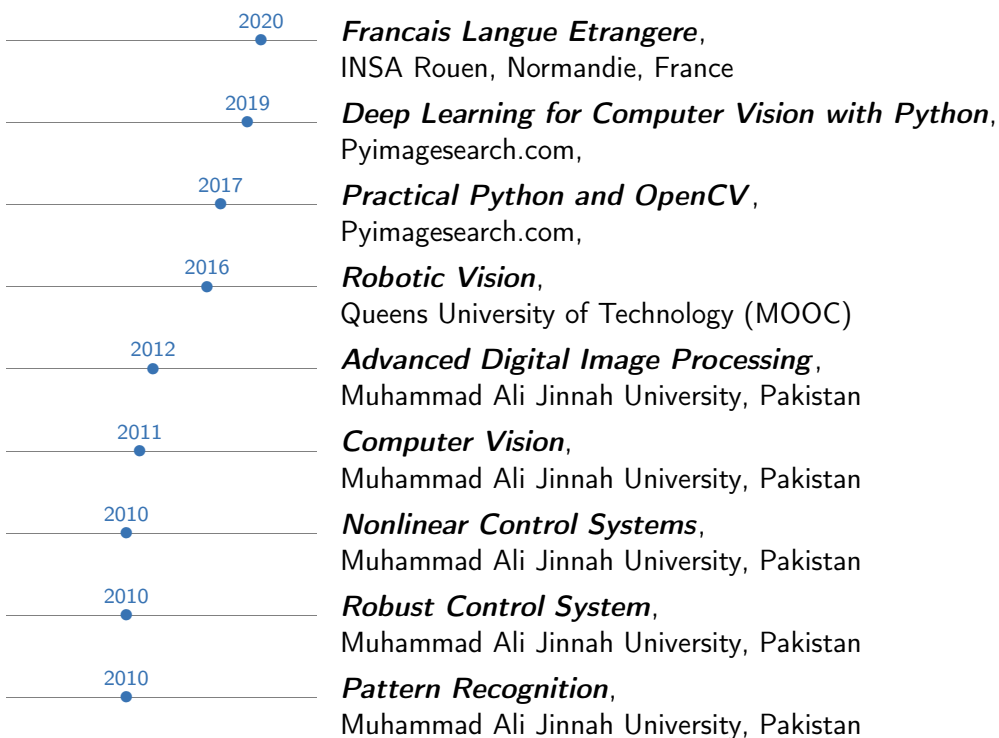
## Publications

A. Anwer, S. Leclerc, Z. Qian, J-T. Pouzens, G. Carnide, D. Roubert, R. Clérgereaux, F. Mériaudeau, P. Fleurat-Lessard, J C. Hierso, and M L. Kahn. Nanomaterials morphology automatic treatment by computer vision and machine learning applied to multivariate analysis: A case of human vs machine comparison. *Angewandte Chemie, International Ed. in English (Under internal review)*, 2024.

C. Germanese, A. Anwer, P. Eid, L. Steinberg, C. Guenancia, P. Gabrielle, C. Creuzot-Garcher, F. Meriaudeau, and L. Arnould. *Artificial intelligence-based prediction of neurocardiovascular risk score from retinal swept-source microvascular imaging: the RASTA dataset. Scientific Reports (Submitted)*, 2024.

A. Anwer, S. Ainouz, N M Saad, S S A. Ali, and F. Meriaudeau. *Joint network for specular highlight detection and adversarial generation of specular-free images trained with polarimetric data. Neurocomputing*, 559:126769, 2023.

C. Germanèse, F. Meriaudeau, P. Eid, R. Tadayoni, D. Ginhac, A. Anwer, S. Laure-Anne, C. Guenancia, C. Creuzot-Garcher, P. Gabrielle, et al. *A Retinal Oct-Angiography and Cardiovascular STAtus (RASTA) Dataset on Swept-Source Microvascular Imaging for Cardiovascular Risk Assessment. Data 2023, MDPI*, 2023.

Atif Anwer, Samia Ainouz, Mohamad Naufal Mohamad Saad, Syed Saad Azhar Ali, and Fabrice Meriaudeau. *SpecSeg network for specular highlight detection and segmentation in real-world images. Sensors*, 22(17):6552, 2022.

Atif Anwer, Syed Saad Azhar Ali, Amjad Khan, and Fabrice Meriaudeau. *Underwater 3D scanning using Kinect v2 time of flight camera*. In *Quality Control by Artificial Vision 2017 (QCAV '17), Thirteenth International Conference on*, volume 10338 (Camera and Sensing). SPIE, 2017.

Atif Anwer, Syed Saad Azhar Ali, Amjad Khan, and Fabrice Meriaudeau. *Underwater 3D Scene Reconstruction Using Kinect v2 Based on Physical Models for Refraction and Time of Flight Correction. IEEE Access*, 5:15960–15970, 2017.

Atif Anwer, Syed Saad Azhar Ali, Amjad Khan, and Fabrice Meriaudeau. *Underwater 3D scanning using Kinect v2 time of flight camera*. In *The International Conference on Quality Control by Artificial Vision 2017*, 2017.

Atif Anwer, Fabrice Mériaudeau, and Syed Hasan Adil. *Customized graphical user interface implementation of Kinect Fusion for underwater application*. In *2017 IEEE 7th International Conference on Underwater System Technology: Theory and Applications (USYS)*, pages 1–6. IEEE, 2017.

Atif Anwer, Syed Saad Azhar Ali, Amjad Khan, and Fabrice Mériaudeau. *Real-time underwater 3D scene reconstruction using commercial depth sensor*. In *2016 IEEE International Conference on Underwater System Technology: Theory and Applications (USYS)*, pages 67–70. IEEE, 2016.

Atif Anwer, Syed Saad Azhar Ali, and Fabrice Mériaudeau. *Underwater online 3D mapping and scene reconstruction using low cost Kinect RGB-D sensor*. In *2016 6th International Conference on Intelligent and Advanced Systems (ICIAS)*, pages 1–6. IEEE, 2016.

Atif Anwer, Asim Baig, and Rab Nawaz. *Calculating real world object dimensions from Kinect RGB-D image using dynamic resolution*. In *2015 12th International Bhurban Conference on Applied Sciences and Technology (IBCAST)*, pages 198–203. IEEE, 2015.

## Achievements

**2019 / 2020**
**Graduate Assistant Scholarship**,
*Universiti Teknologi PETRONAS*, Malaysia

**2016 / 2017**
**Graduate Assistant Scholarship**,
*Universiti Teknologi PETRONAS*, Malaysia

**2016 / 2017**
**1st round favourite**,
*Robot Launch 2014 (Global robotics startup competition)*, RoboHub.org

**2011**
**Winner "Intel More to the Core™ Challenge"**,
*Intel™*, Pakistan

**2010**
**Winner "CPU IQ Blogger Challenge, South Asian region"**,
*Intel™*, Pakistan

**2009**
**Member Technical Evaluation & Judges panel**,
*"RoboSprint 2010"*, Air University, Islamabad

**2003**
**Winner "Best Idea Award"**,
*"1st National Fire Fighting Robot Competition (FFRC)"*, College of EME, NUST,
Pakistan

## Courses & Certificates

**2020**
***Francais Langue Etrangere***,
INSA Rouen, Normandie, France

**2019**
***Deep Learning for Computer Vision with Python***,
Pyimagesearch.com,

**2017**
***Practical Python and OpenCV***,
Pyimagesearch.com,

**2016**
***Robotic Vision***,
Queens University of Technology (MOOC)

**2012**
***Advanced Digital Image Processing***,
Muhammad Ali Jinnah University, Pakistan

**2011**
***Computer Vision***,
Muhammad Ali Jinnah University, Pakistan

**2010**
***Nonlinear Control Systems***,
Muhammad Ali Jinnah University, Pakistan

**2010**
***Robust Control System***,
Muhammad Ali Jinnah University, Pakistan

**2010**
***Pattern Recognition***,
Muhammad Ali Jinnah University, Pakistan

## References

**Fabrice Mériaudeau**
Professor,
ICMUB Institute of Molecular Chemistry
of the University of Burgundy (ICMUB)
University de Bourgogne, France
✉ fabrice.meriaudeau@u-bourgogne.fr
☎ +33 3 85 73 10 96

**Samia Ainouz**
Professor,
Laboratoire d'Informatique, du Traitement
de l'Information et des Systèmes (LITIS)
Lab, INSA Rouen, France
✉ samia.ainouz@insa-rouen.fr
☎ +33 2 32 95 66 27