# Color augmentations

For swimmer datasets, augmentation must simulate the **real challenges** your model will face:

* **Blue-dominant color cast**
* **Blur and water distortion**
* **Partial occlusion (arm underwater)**
* **Lighting variations (reflections, shadows)**
* **Body orientation (non-upright)**
* **Low contrast (skin vs. water)**

**✅ Recommended Albumentations Parameters for Swimmers**

Here’s a table of **additional parameters** worth experimenting with — grouped by goal:

**🎨 Color + Light Adjustments**

| **Transform** | **Purpose** | **Suggested Params** |
| --- | --- | --- |
| RGBShift | Reduce blue tint | b\_shift\_limit=(-5, -2) |
| HueSaturationValue | Adjust skin tone / water hue | hue\_shift\_limit=5, sat\_shift\_limit=10 |
| RandomBrightnessContrast | Handle underwater light variation | brightness\_limit=0.02–0.05 |
| CLAHE | Improve low-contrast edges | clip\_limit=2.0 |

**💦 Blur + Water Simulation**

| **Transform** | **Purpose** | **Suggested Params** |
| --- | --- | --- |
| MotionBlur | Simulate fast arm/leg motion blur | blur\_limit=3–5 |
| GaussianBlur | Light blur from water surface | blur\_limit=3 |
| GlassBlur | Water ripple distortion | sigma=0.1, max\_delta=1 |
| GaussNoise | Mild sensor or surface shimmer | var\_limit=(5.0, 10.0) |

**🧍 Pose + Body Orientation**

| **Transform** | **Purpose** | **Suggested Params** |
| --- | --- | --- |
| ShiftScaleRotate | Account for flipped/swimming angles | rotate\_limit=10–20 |
| HorizontalFlip | Simulate left/right breathing/swim | p=0.5 |
| Affine | Subtle affine warping of limbs | scale=(0.95, 1.05) |

**🚧 Occlusion / Edge Cases**

| **Transform** | **Purpose** | **Suggested Params** |
| --- | --- | --- |
| Cutout | Simulate partial limb occlusion | num\_holes=1–3, max\_h\_size=0.1 |
| CoarseDropout | Simulate bubbles, foam, etc. | max\_holes=3, max\_height=0.1 |

**🧪 Strategy for Testing**

Start with:

* ✅ RGBShift
* ✅ RandomBrightnessContrast
* ✅ GaussianBlur
* ✅ HorizontalFlip
* ✅ ShiftScaleRotate

Then incrementally add:

* GaussNoise
* CLAHE
* Cutout or GlassBlur if needed

Stings with better results:  
1. Brightness – 1.2

2.RGB b\_shift – [-100]

3.