

Melanin Linearization

Redness = 0.5
 Roughness = 0.2
 Isotropic
 IOR 1.55

OmniHair Melanin Linearization:

$$M = m * m^{2.4}$$

Quadratic Melanin Linearization:

$$M = m * m^{1.0}$$

Quadratic Melanin Linearization:

$$M = m * m^{9.21} \text{ (where } -\ln(0.0001) = 9.21)$$

Cubic Melanin Linearization:

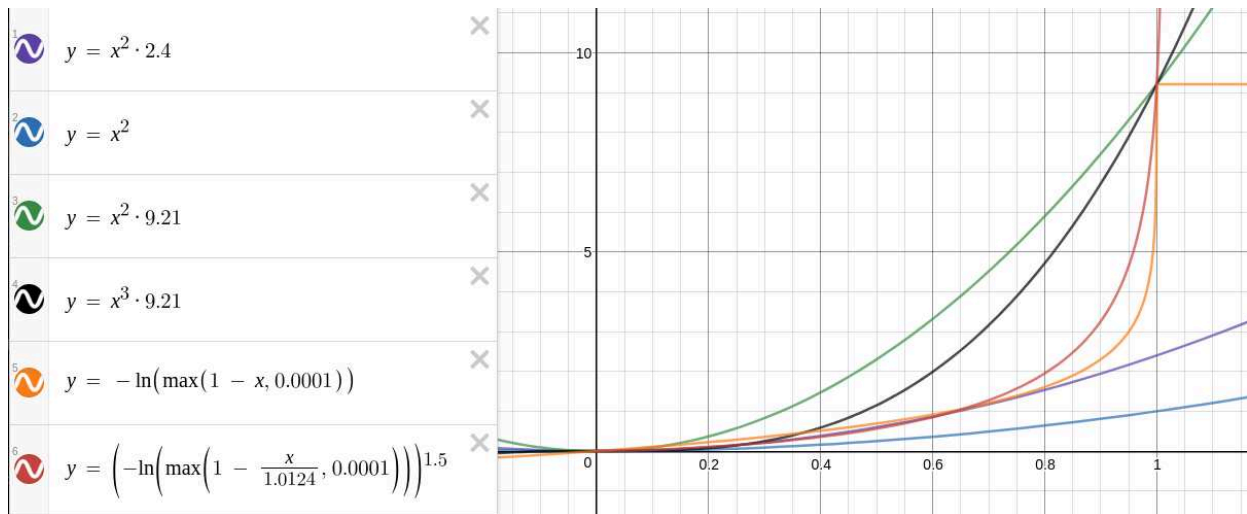
$$M = m * m * m^{9.21}$$

Log Melanin Linearization:




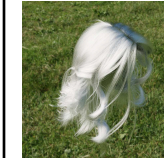






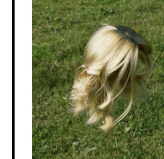





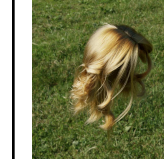




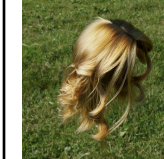
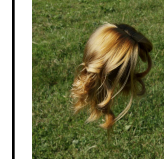




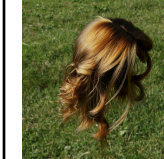
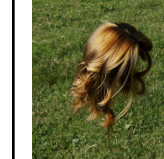
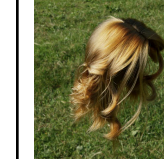
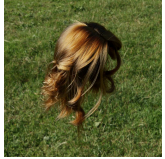



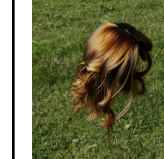
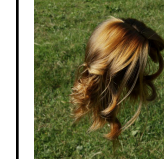
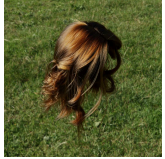


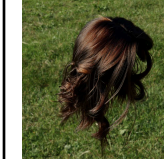
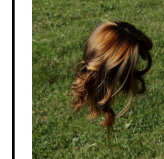
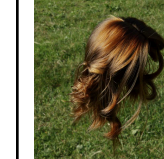



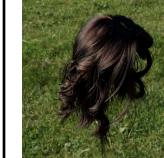


$$M = -\ln(\max(1-m, 0.0001)) \text{ ([Blender Principled Hair BSDF](#))}$$

Eased Log Melanin Linearization:

$$M = (-\ln(\max(1-m/1.0124, 0.0001)))^{1.5}$$



m	OmniHair	Quadratic	Quadratic 9.21	Cubic 9.21	Log	Eased Log
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0.0						
0.1						
0.2						
0.3						
0.4						
0.5						
0.6						
0.7						

0.8						
0.9						
1.0						

Redness vs Melanin

Eased Log linearization




Melanin 0 - 1



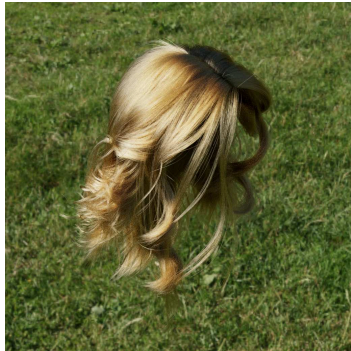


Melanin Redness 0, 0.5, 1.0

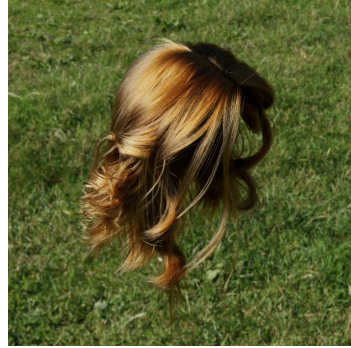
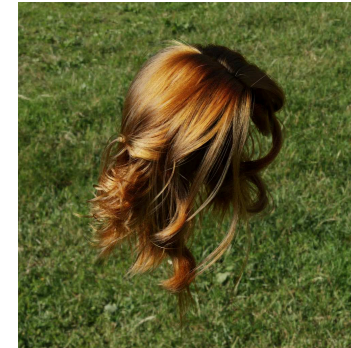
Roughness 0.25


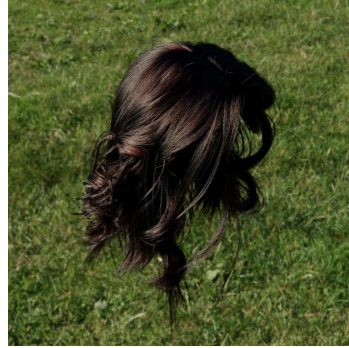
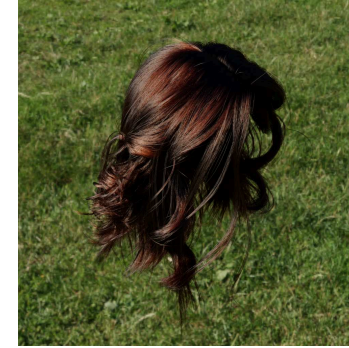
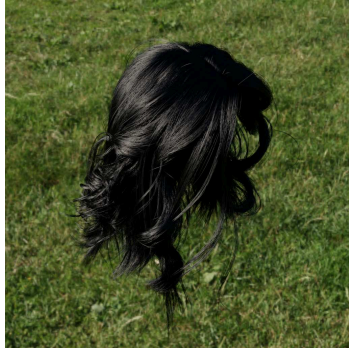
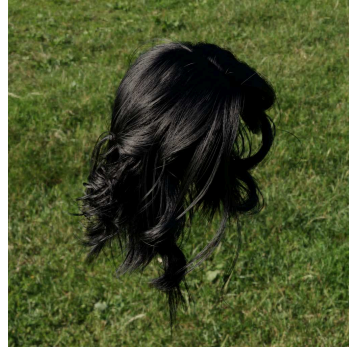
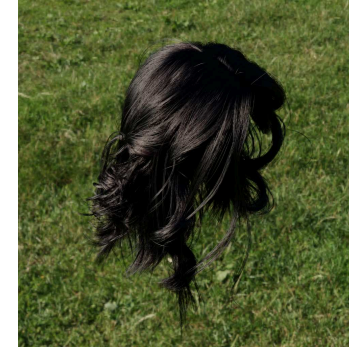
Isotropic

IOR 1.55

m	Redness 0.0	Redness 0.5	Redness 1.0
0.0			

0.1			
0.2			
0.3			
0.4			

0.5			
0.6			
0.7			
0.8			

0.9			
1.0			

Melanin vs. Redness

Log linearization




Melanin 0.3, 0.5, 0.9

Melanin Redness 0 - 1

Roughness 0.25

Isotropic

IOR 1.55

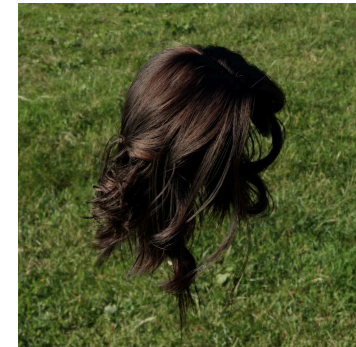
R	Melanin 0.3	Melanin 0.5	Melanin 0.9
0.0			

0.1

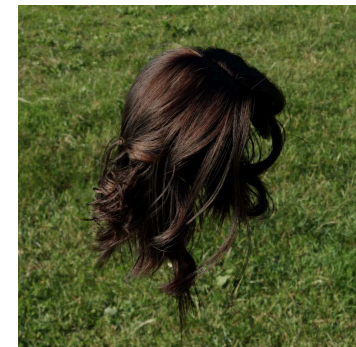
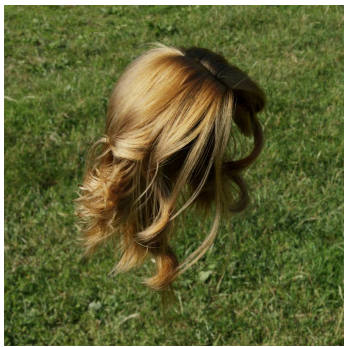


5

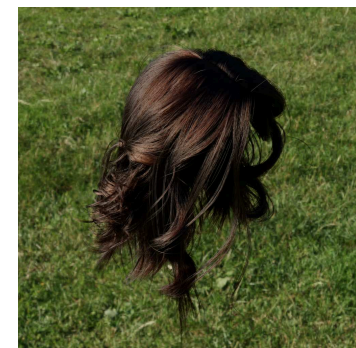
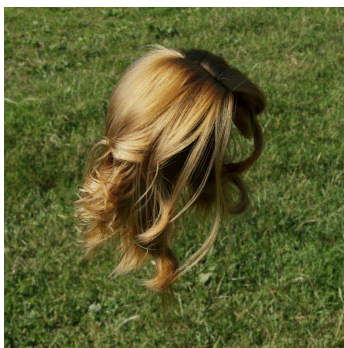
0.2



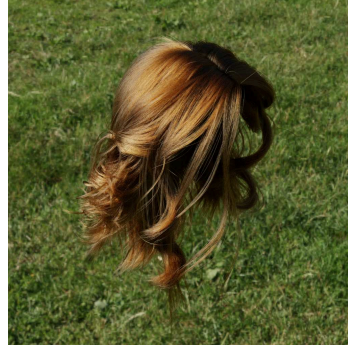
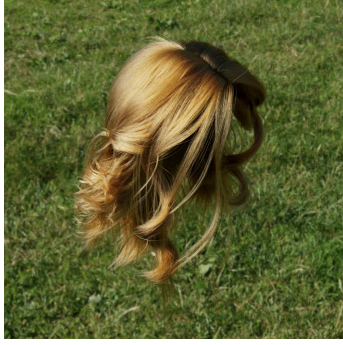
0.3



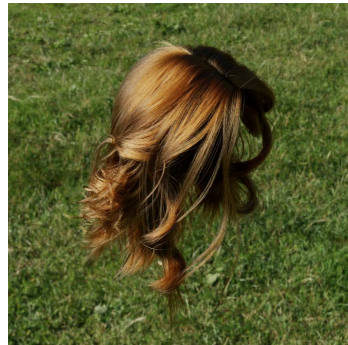
0.4



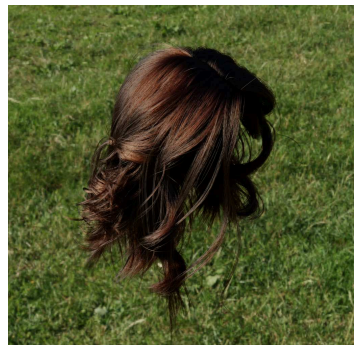
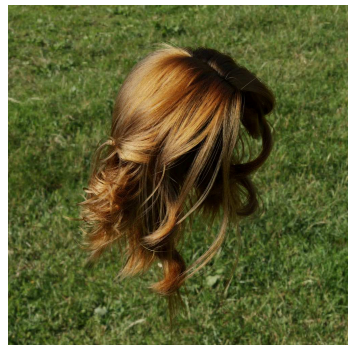
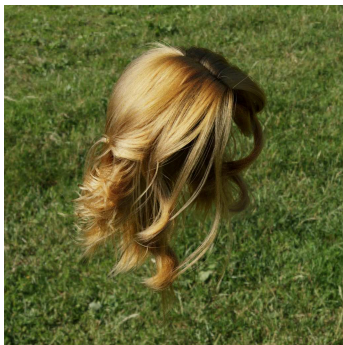
0.5



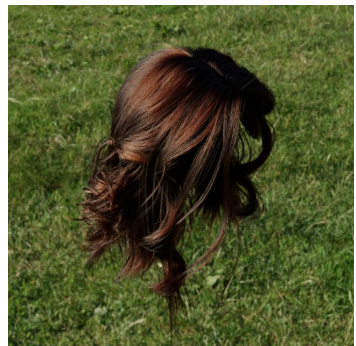
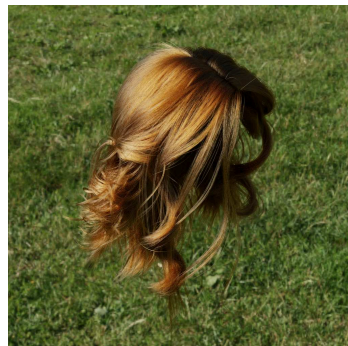
0.6

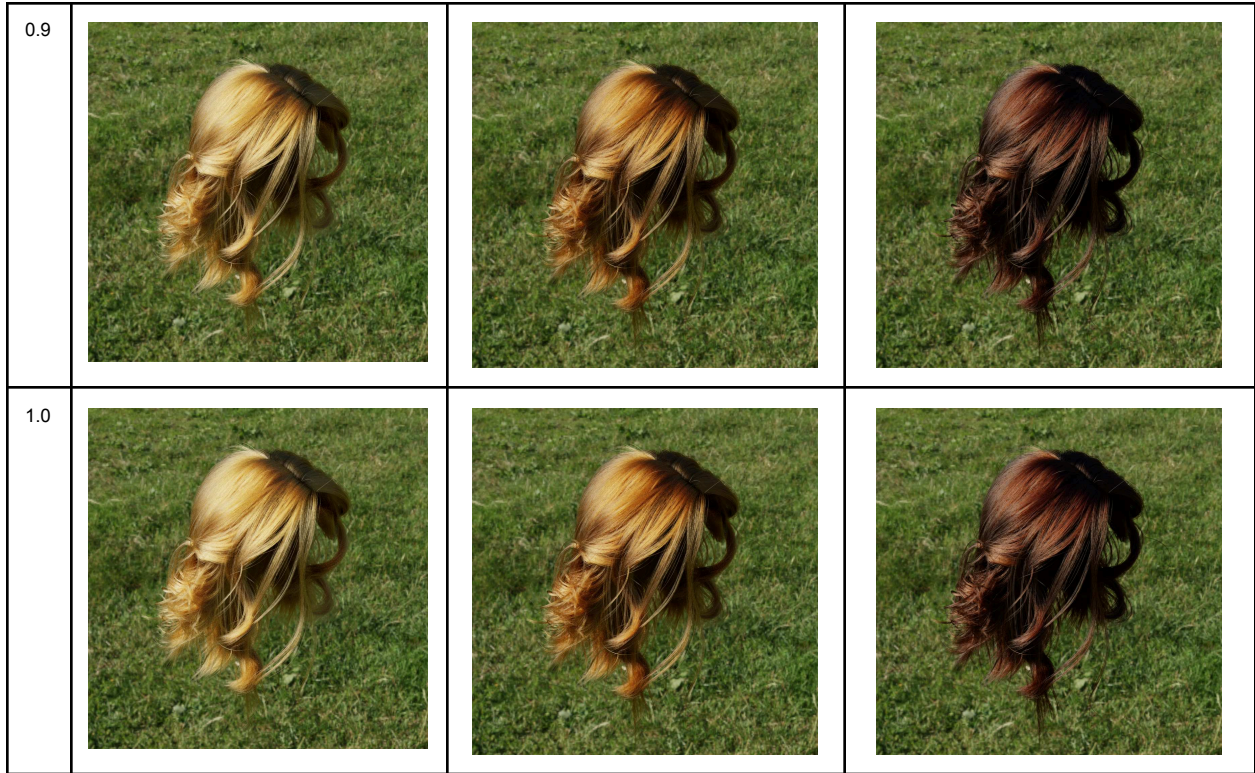


0.7



0.8



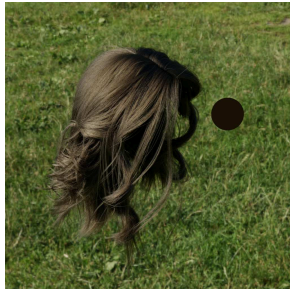




User Color vs Roughness

Roughness 0.35, 0.8

Isotropic

	User Color		
Roughness	(0.266, 0.216, 0.194)	(0.104, 0.076, 0.064)	(0.02, 0.0136, 0.006)
0.35			

0.8			
	(0.84, 0.517, 0.18)	(0.224, 0.058, 0.015)	(0.072, 0.02, 0.005)
0.35			
0.8			
	(0.896, 0.342, 0.791)	(0.060, 0.417, 0.322)	(0.044, 0.121, 0.355)
0.35			

0.8

