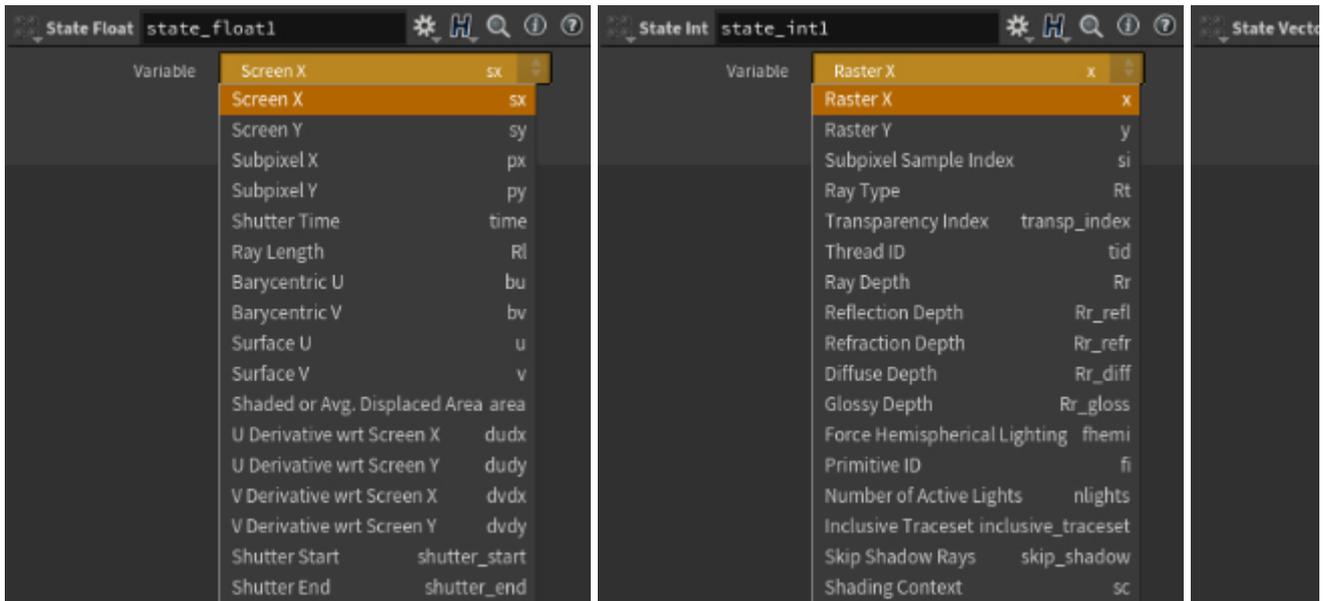


Shading State



The State nodes allow access to ray and geometric properties such as the surface normal, the UV surface parameters, ray depth etc. The nodes are separated into float, int and vector data types.

Float

Name	Variable	Description
Screen XY	sx, sy	XY image-space coordinate, in range [-1,1).
Shutter Time	time	For motion blur, the absolute time at which the current sample is being shaded. A value between shutter-open and shutter-close times.
Ray Length	Rl	For surface shaders, the ray length from the camera or previous bounce to the shading point. For volume shaders, the length of the volume segment being shaded.
Barycentric UV	bu, bv	For triangles, barycentric coordinate within the triangle. For curves, parametric coordinate along the curve length and width respectively.
Surface UV	u, v	UV coordinates typically used as texture coordinates. Same as bu and bv in case no uvlist or uvs parameter was provided.
Shaded Area	area	The differential area covered by the current shading point, typically used for texture filtering. For surface shaders this the area spanned by ray differentials, for displacement shaders it is the average area of triangles surrounding the vertex.
UV Derivatives	dudx, dudy, dvdx, dvdy	UV derivative with respect to the XY pixel coordinates. This contains the rate of change of the UV from the current pixel to the neighboring pixels to the right and top, typically used for texture filtering.
Shutter start and end		Absolute start and end time of the motion blur range.

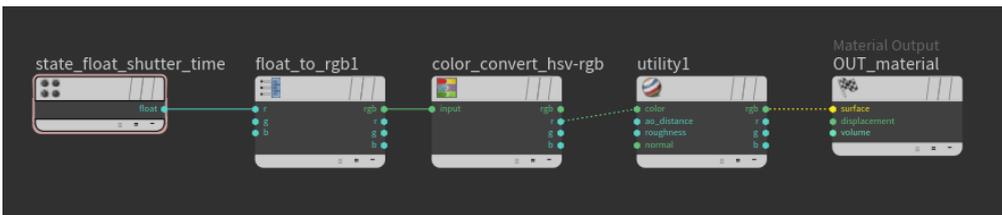
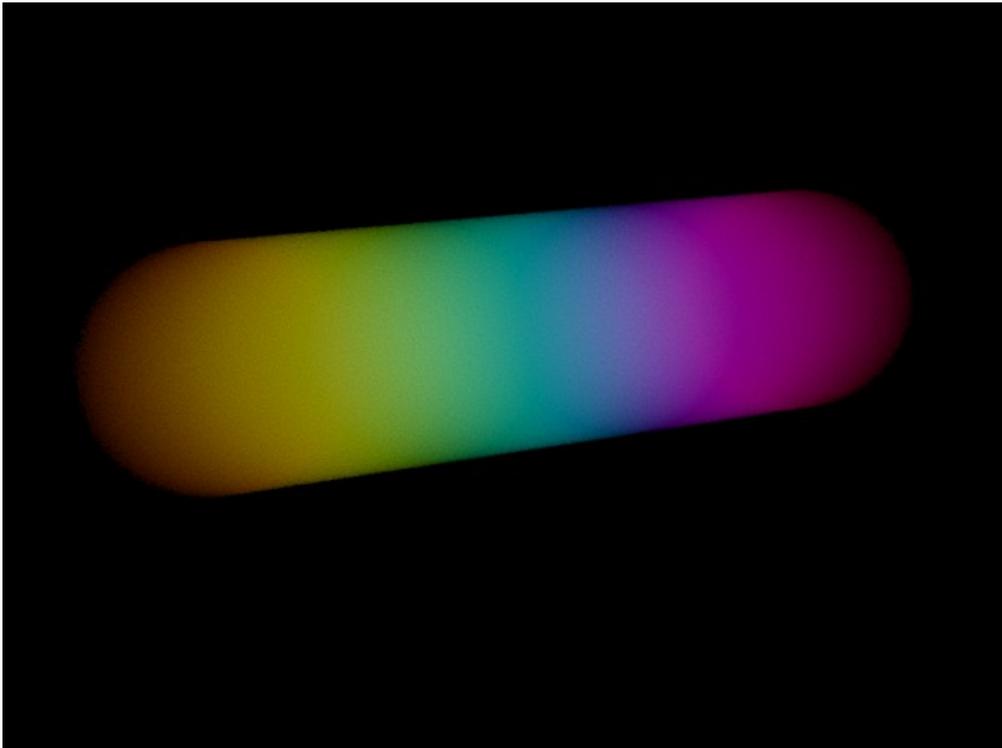
Int

Name	Variable	Description
Raster X / Y	x, y	Raster-space pixel coordinate the camera ray started from.
Subpixel Sample Index	si	AA sample index, in range [0, AA_samples].
Ray Type	Rt	Ray type of the incoming ray.
Transparency Index	transp_index	The number of transparent surfaces shaded before the current shading point.
Thread ID	tid	Unique thread ID.
Bounces	bounces	The number of bounces up to the current shading point.
Diffuse Bounces	bounces_diffuse	The number of diffuse bounces.
Specular Bounces	bounces_specular	The number of specular bounces.
Reflection Bounces	bounces_reflect	Number reflection bounces.
Transmission Bounces	bounces_transmit	The number of transmission bounces.
Volume Bounces	bounces_volume	The number of volume bounces.
Force Hemispherical Lighting	fhemis	Force hemispherical lighting.
Primitive ID	fi	Primitive ID (triangle, curve segment, etc) .
Number of Active Lights	nlights	The number of active lights affecting shading point.
Inclusive Traceset	inclusive_traceset	If a traceset is used, is it inclusive or exclusive?
Skip Shadow Rays	skip_shadow	If true, don't trace shadow rays for lighting.
Shading Context	sc	Type of shading context (surface, displacement, volume, background, importance).

Vector

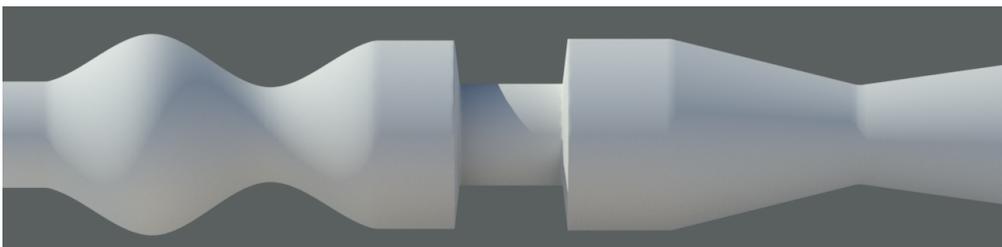
Name	Variable	Description
Ray Origin	Ro	For surfaces, ray origin (camera or previous bounce position). For volumes, the start of the volume segment being shaded.
Ray Direction	Rd	Ray direction from ray origin to shading point. For volumes, the direction of the volume segment being shaded.
Shading Point in Object-Space	Po	Shading position in object-space.
Shading Point in World-Space	P	Shading position in world-space.
Surface Derivative wrt Screen XY	dPdx, dPdy	Surface derivative with respect to XY pixel coordinates.
Shading Normal	N	Shading normal, including smooth normals and bump mapping.
Face-Forward Shading Normal	Nf	Face-forward shading normal.
Geometric Normal	Ng	Normal of the actual geometry, without smoothing or bump.
Face-Forward Geometric Normal	Ngf	Face-forward geometric normal.
Smoothed Normal without Bump	Ns	Smoothed normal (same as N but without bump).
Surface Derivative wrt UV	dPdu, dPdv	Surface derivative with respect to UV coordinates (not normalized). May be used as tangent for anisotropic shading or vector displacement.
Ray Direction Derivative wrt Screen XY	dDdx, dDdy	Ray direction derivative wrt XY pixel coordinates.
Surface Normal Derivative wrt Screen XY	dNdx, dNdy	The derivative of the surface normal with respect to XY pixel coordinates.

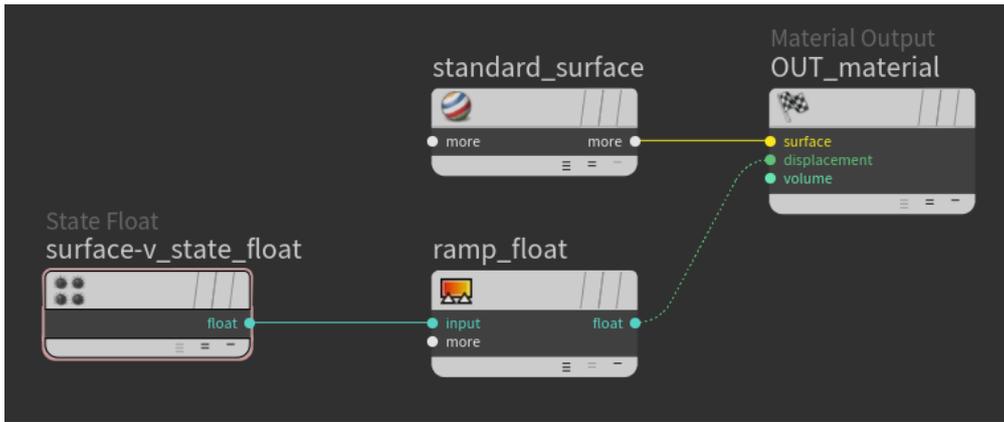
Example 1



Mapping color to the motion blur using Shutter Time

Example 2





Using surface v with a ramp float shader