

Supplementary Material for Stochastic Modeling and Resolution-Free Rendering of Film Grain

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1. Illustration of the dithering effect on film grain

In Figure 1, we show the subjective effect of increased resolution that adding film grain gives, an effect which is known as dithering. This shows that film grain rendering can both increase the artistic value of an image and improve the perceived resolution.

2. Comparison of variable grain shapes

In Figure 2, we compare the results of our film grain rendering with disks or triangles, as it is possible to chose a variety of shapes in our algorithm. We parameterize the triangles by their circumscribed circle, and have chosen the radius of this circumscribed circle so that the area of the disks and the triangles are equal. We have voluntarily used large grain parameters in order to test the algorithm. At these resolutions, the graininess impression is quite similar for both disks and triangles; nevetheless it is a significant advantage to have such flexibility in our algorithm.

3. Influence of the number of iterations N in the Monte Carlo method

Figure 3 shows the influence of the numer N of Monte Carlo iterations. It can be seen that from $N = 1000$ there is no discernable change in the rendering results. At $N = 100$, the quality of the rendering is still quite high.



Input

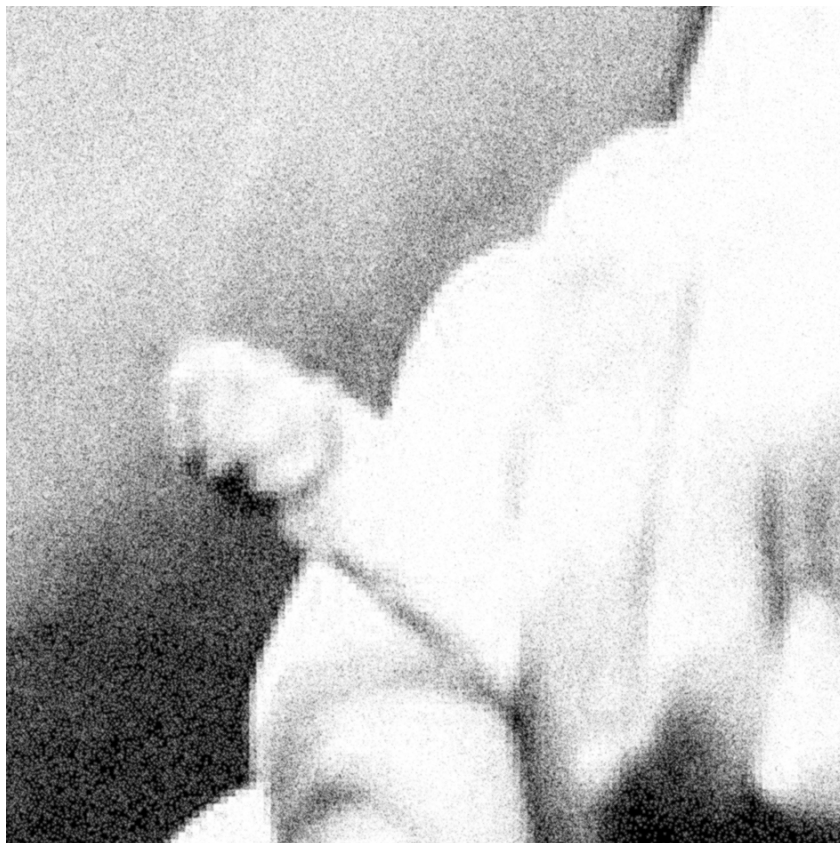
Film grain rendering, zoom : $\times 1$ Film grain rendering, zoom : $\times 8$

Figure 1: **Example of the “dithering” effect of film grain.** We show the subjective impression of increased “resolution” with a low-resolution example. This example shows that the only resolution limitation of our algorithm comes from the pixel grid of the input.

Rendering with disks ($r = 0.1$)

Rendering with triangles

Rendering with disks ($r = 0.2$)

Rendering with triangles

Figure 2: **Rendering results with varying shapes of film grain.** We show film grain with disks of constant radius and triangles. The triangles are parameterized by their circumscribed circle and the radius of the latter is chosen to produce an equal area to the disks, in the interest of fair comparisons. At this resolution, the visual difference is not large, however it is very useful to have this flexibility in our algorithm.

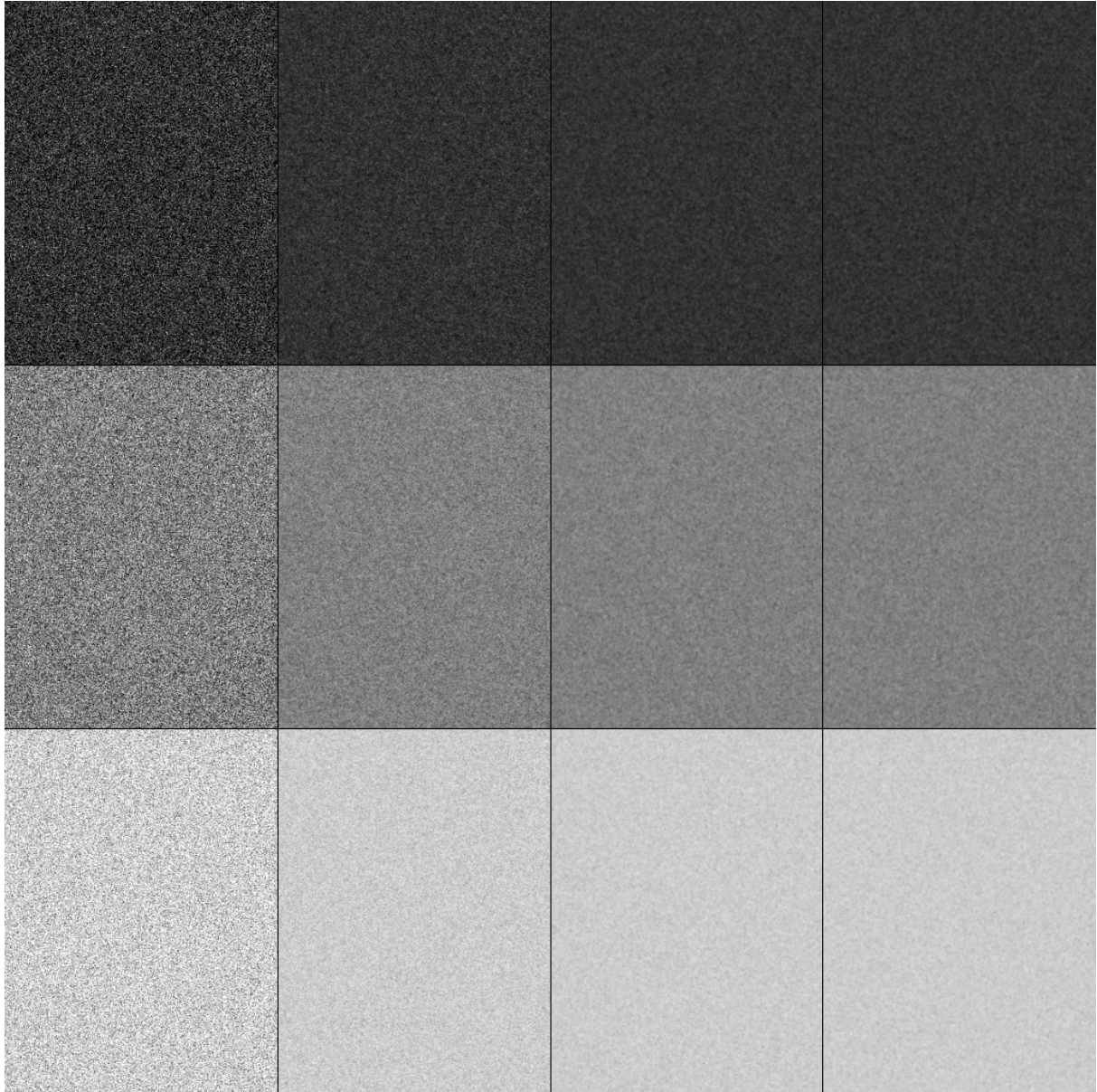


Figure 3: **Comparisons of film grain results with increasing number N of Monte Carlo iterations.** This figure shows the influence of N on the rendering results. From left to right are logarithmically increasing values of N : 10, 100, 1000, 10000. From top to bottom are images of increasing gray-levels: 0.2, 0.5, 0.7