The Magic Lens: Refractive Steganography
Supplemental Material

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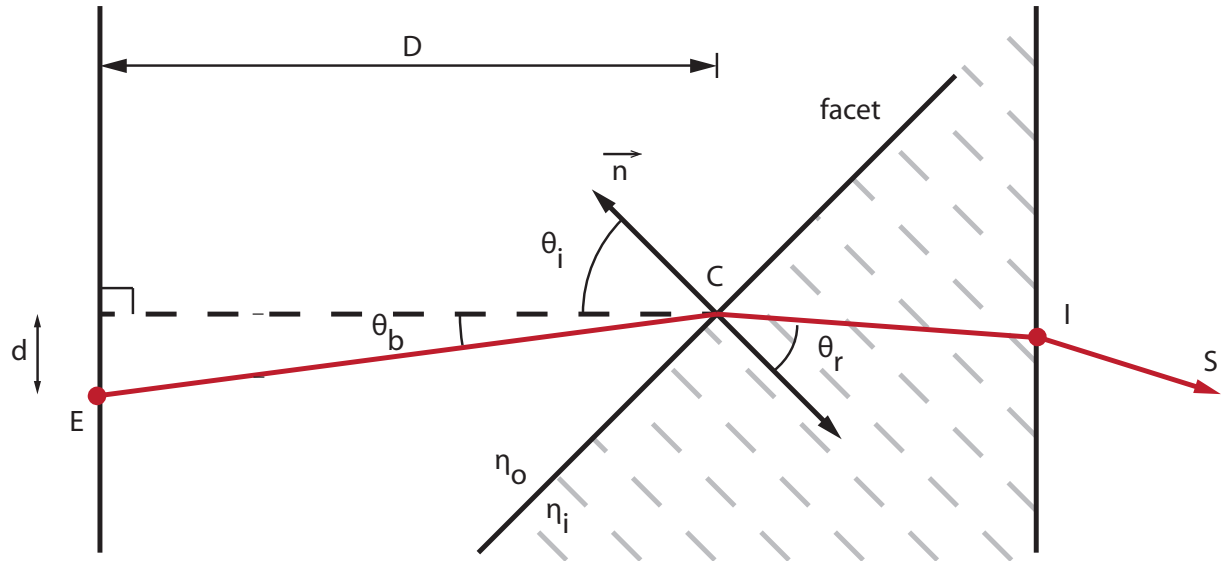

Figure 1: *Facet orientation geometry.*

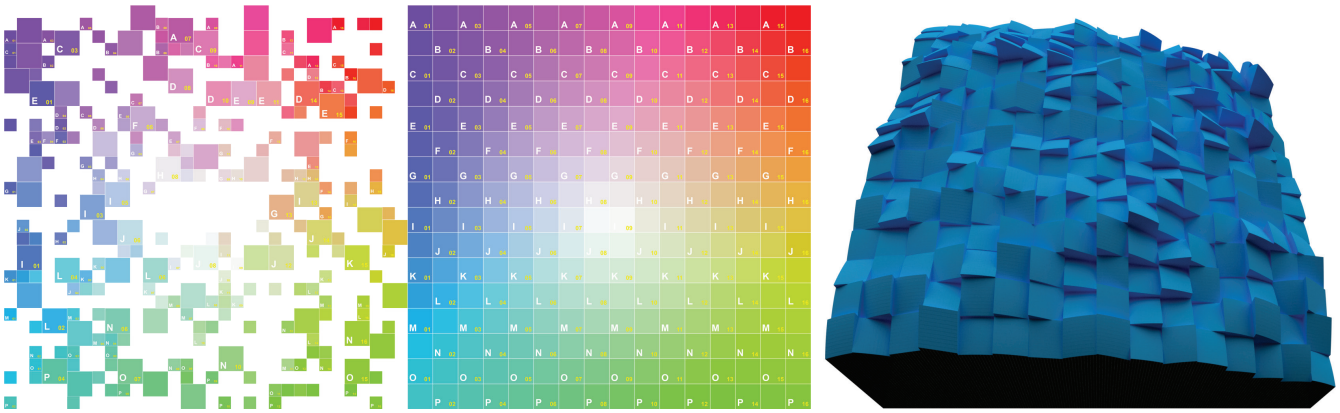

Figure 2: *Bijective lens and targeted regions on the source image represented on the target image with a colored grid.*
(a) *Source image.*
(b) *Target image.*
(c) *Lens (Bijective approach* – 16 × 16 *micro-facets* – 11 × 11 *nano-facets – with HO* – 1 *centimeters from source image* – 49 *centimeters from lens).*

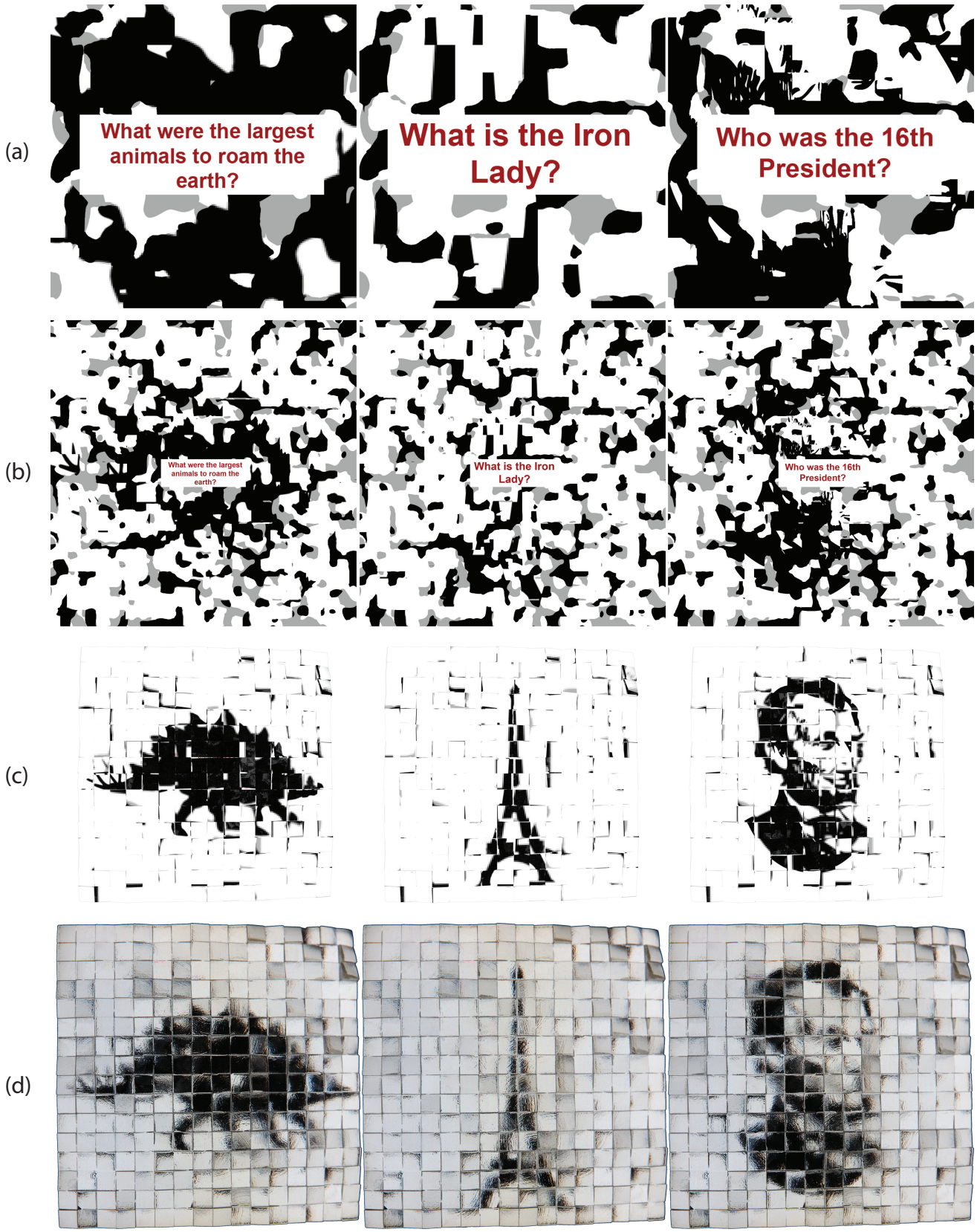

Figure 3: *Questions and answers (part 1)*
(a) *Zoom on the source images question.*
(b) *Source images (Dino image* (c) *Rendering simulations.*
(d) *Photographs of a manufactured lens when placing it over the corresponding source images.*

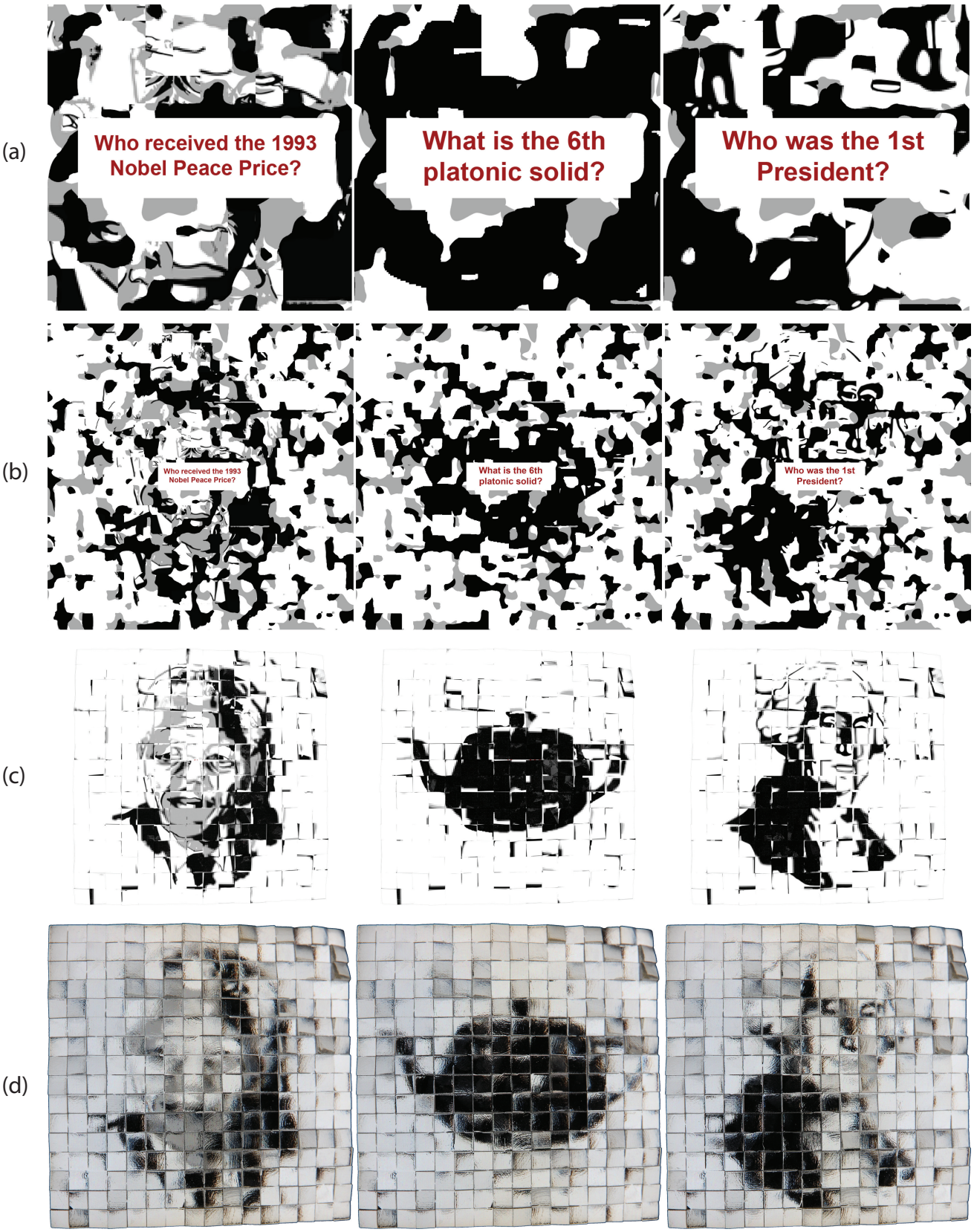

Figure 4: *Questions and answers (part 2)*
(a) *Zoom on the source images question*
(b) *Source images.*
(c) *Rendering simulations.*
(d) *Photographs of a manufactured lens when placing it over the corresponding source images.*

Figure 5: *High resolution morphing of two pairs of paintings.*
(a) *Source images (Sunflowers ©Wikimedia Commons, Starry night ©Wikimedia Commons).*
(b) *Target images (Reaper ©Wikimedia Commons, Postman ©Wikimedia Commons).*
(c) *Lens (Patch-Matching approach* – 128×128 *micro-facets* – 11×11 *nano-facets – with HO – with SA* – 10 *centimeters from source image* – 40 *centimeters from lens).*
(d) *Rendering seen through the lens when placing it over the source image.*

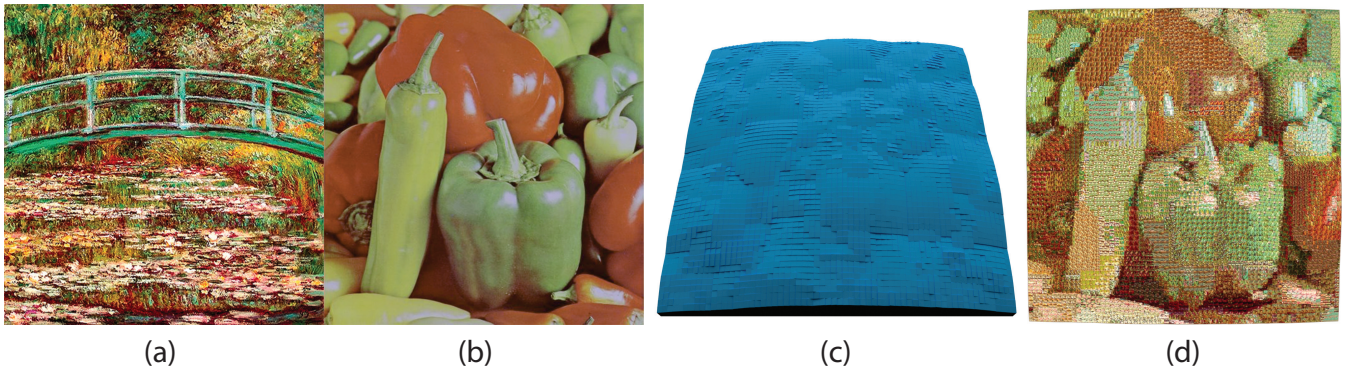

Figure 6: *Low resolution morphing of a painting to a real world image.*
(a) *Source image (Water-Lily Pond ©Wikimedia Commons).*
(b) *Target image.*
(c) *Lens (Patch-Matching approach* – 64×64 *micro-facets* – 11×11 *nano-facets – with HO – with SA* – 10 *centimeters from source image* – 40 *centimeters from lens).*
(d) *Rendering seen through the lens when placing it over the source image.*

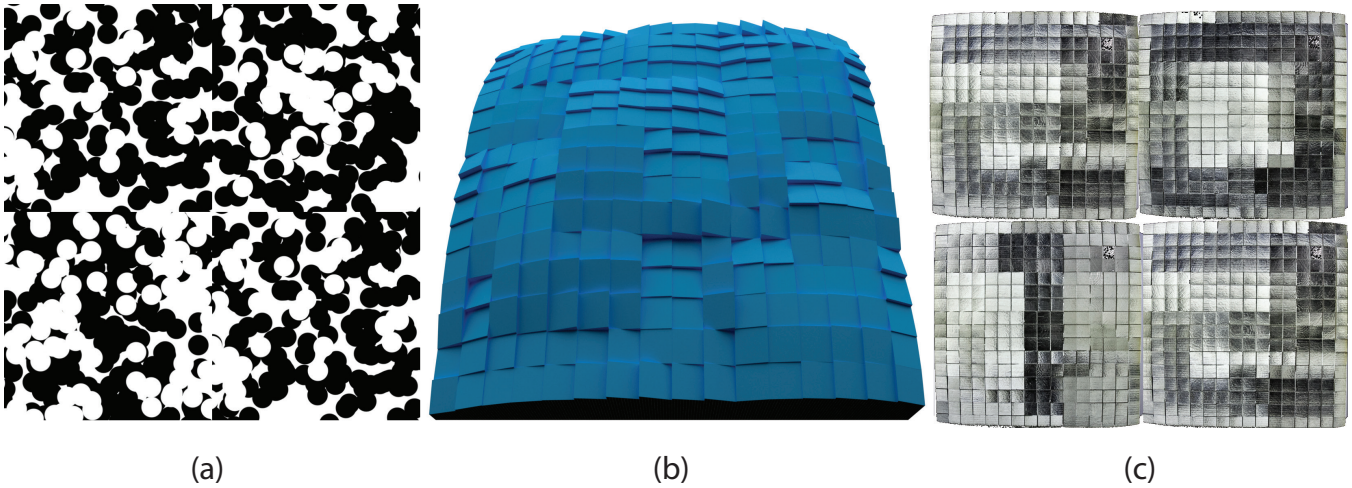

Figure 7: *Low resolution morphing printed lens.*
(a) *Four different source images.*
(b) *Lens (Patch-Matching approach* – 16 × 16 *micro-facets* – 11 × 11 *nano-facets* – *with HO* – *with SA* – 10 *centimeters from source image* – 40 *centimeters from lens).*
(c) *Four photographs of a manufactured lens when placing it over the corresponding source images.*

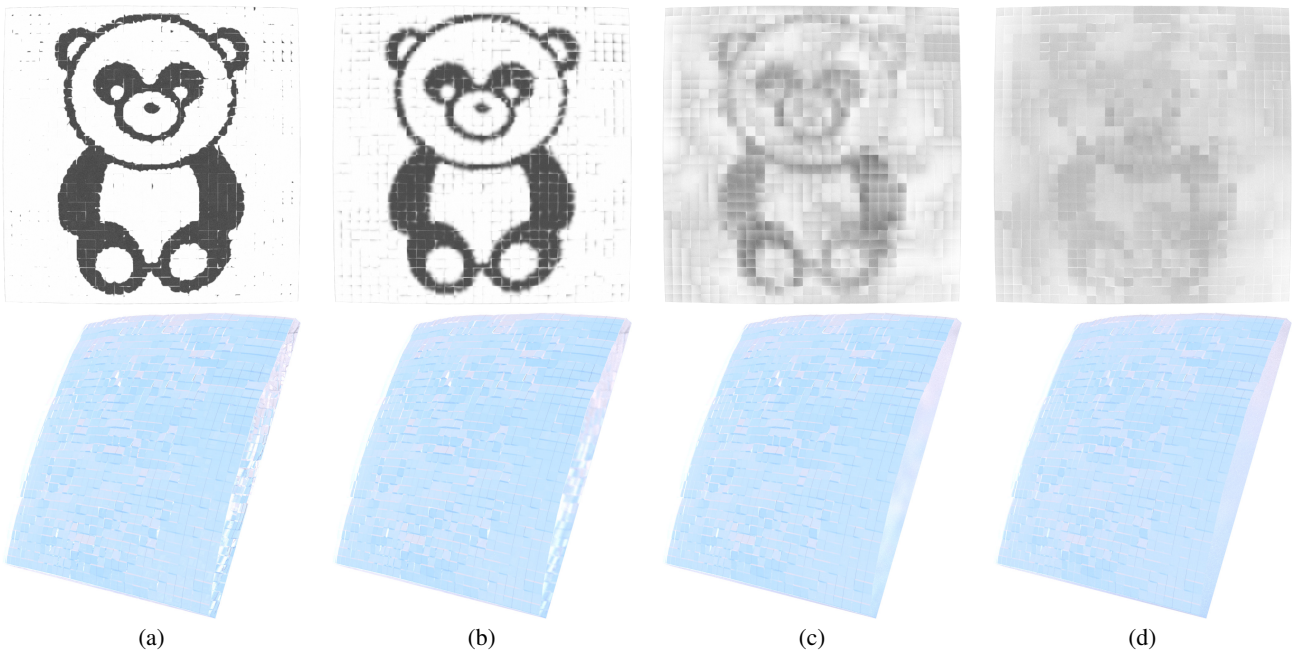

Figure 8: *Evolution of the render quality (top) and the lens aspect (bottom) in function of the material roughness.*
(a) *No roughness.*
(b) 0.01 *roughness.*
(c) 0.05 *roughness.*
(d) 0.10 *roughness.*
*We used the model by Walter et al. [***?***] with the* GGx *Probability Distribution Function (PDF) for the micro-facets. The roughness values reported are the actual* α_g *used for the renderings. (Panda image* ©*Web Design Hot)*