Multi-channel Gaussian textures

Research internship, Master 2, 2017.

Host team : IGG (Computer Graphics and Geometry group) at ICube lab

Advisor : Basile Sauvage - `sauvage@unistra.fr`

Starting date : From January 2017

Ending date : 6 months from the starting date

Funding : About 525 euros per month, net salary

Location : Strasbourg area, France

Prerequisites : Computer Graphics, Signal and Image Processing, C++ programming

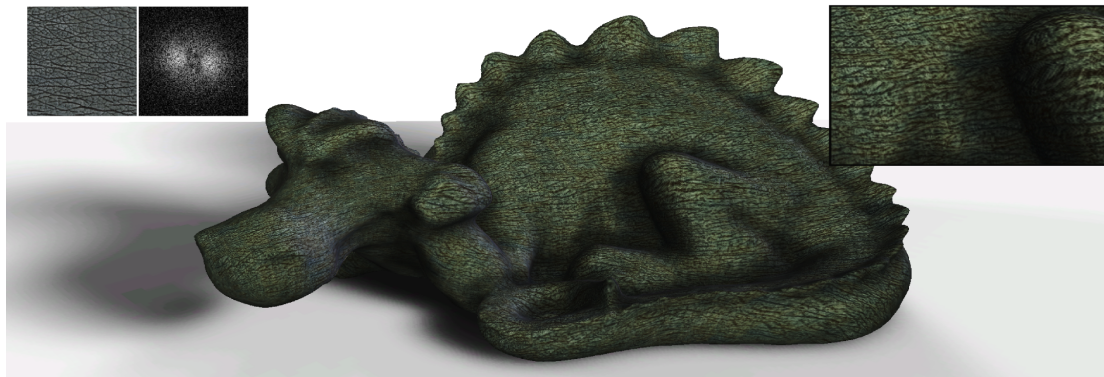**Possible continuation in Doctoral (PhD) thesis :** funded by the HDWorlds ANR project

FIGURE 1 – Procedural synthesis of Gaussian textures [GSV+14].

Context

Textures are ubiquitous in virtual worlds. They provide visual details and improve the appearance of 3D objects without geometry, which consumes more memory and more rendering time. An important challenge consists in semi-automatic synthesizing of large textures, while controlling the result intuitively. Procedural synthesis methods made important progresses in the last few years, especially for Gaussian textures [GLLD12, GSV+14]. They are popular because of their ability to create variety, randomly and on-the-fly. A remaining difficulty is the management of multiple channels, e.g. the color channels.

internship goals

The first goal is to evaluate and compare existing solutions, including color-maps indirection [HNPN14] and phase correlation [GGM11]. The second goal is to extend

these methods to multi-channel textures, i.e. containing a specular map or a normal map for instance.

The implementation will be done in C++ and will be part of the texture analysis and synthesis platform of the IGG group, ASTex. The topic could be continued in a Doctoral thesis (PhD thesis) funded by the HDWorlds ANR project.

Références

[GGM11]   Bruno Galerne, Yann Gousseau, and Jean-Michel Morel. Random phase textures : Theory and synthesis. *IEEE Transactions on Image Processing*, 20(1) :257 − 267, 2011.

[GLLD12] Bruno Galerne, Ares Lagae, Sylvain Lefebvre, and George Drettakis. Gabor noise by example. *ACM Trans. Graph.*, 31(4) :73 :1–73 :9, July 2012.

[GSV⁺14] Guillaume Gilet, Basile Sauvage, Kenneth Vanhoey, Jean-Michel Dischler, and Djamchid Ghazanfarpour. Local random-phase noise for procedural texturing. *Transactions on Graphics*, 33(6) :195 :1–195 :11, November 2014. (Proceedings of Siggraph Asia'14).

[HNPN14] Eric Heitz, Derek Nowrouzezahrai, Pierre Poulin, and Fabrice Neyret. Filtering Non-Linear Transfer Functions on Surfaces. *IEEE Transactions on Visualization and Computer Graphics*, 20(7) :996–1008, July 2014.