TU Berlin -
Computer Graphics

THESIS PROPOSAL

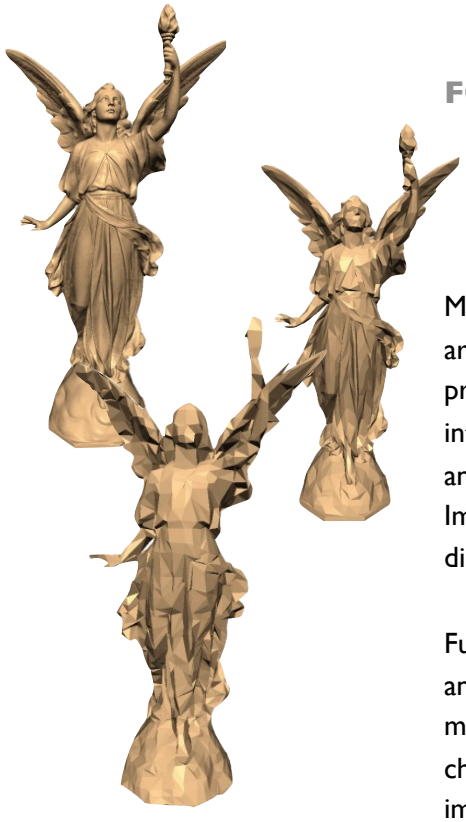
Time: April - June
Credit hours: 16 SWS
Advisor: Prof. Marc Alexa
Supervisor: TBA

DATE

16/02/2012

PENNED BY

Lukas N.P. Egger
mail@lnpe.at



TITEL

„*Refining the TopStoc Approach*“

OUTLINE

1. **Introduction / Motivation**; challenges and peculiarities in production and industry related environments
2. **Overview Mesh-Simplification**; previous work, state of the art, pros and cons of different techniques
   2.1. Classical approaches
   2.2. Non-deterministic algorithms
3. **Math primer**; from intuition to stringent and exact formulation
   3.1. The closed-ball property in more detail
   3.2. What are handles, tunnels, loops?
4. **Adapting TopStoc**; from the idea to production ready code
   4.1. Textures; coping with UV space and tiles / ptex support
   4.2. POV; simple back-face culling
   4.3. Iterative sampling; closing in on k
   4.4. Triangle quality clean-up; simulation friendly output
5. **User-guided processes**; sharing the work
   5.1. Drawing and setting of control points
   5.2. Asset groups and materials
   5.3. Topological control
6. Parallelization and minor speed-ups
7. Benchmarks
8. **Conclusion**

FOCUS

The main contribution of my work will be a summary/evaluation of the additions to be made in order to carry over the original work to a production friendly setup (CGI, games, etc.).

Most crucial are the considerations for texture support, i.e. avoiding artifacts and the graceful handling of small UV tiles. Also notable is the provision of user-guidance for the overall process. Accounting for user-interaction also lends itself to ameliorate problems with topology control and henceforth can be dealt with in the loop.
Impact on the performance of these additions will be measured and discussed as well as means to alleviate slow-downs.

Furthermore one part of the thesis will account for the current research and comparison to other techniques. Accompanied by an introduction to mathematical prerequisites in order to adequately describe topological characteristics, e.g. loops, tunnels, etc. Finally, all this should lead to an usable implementation that facilitates additional work/research in this field.