

SMASH: A Next-Generation API for Programmable Graphics Accelerators

<http://www.cgl.uwaterloo.ca/Projects/rendering/Papers/smash.pdf>

<http://www.cgl.uwaterloo.ca/Projects/rendering/shaders.html>

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SMASH is a testbed for novel low-level graphics API concepts and is meant to be a concrete target for the development of extensions to OpenGL. Specifically, SMASH supports a common programmable shader sub-API that is compatible with either a multi-pass or single-pass implementation of hardware-accelerated shaders.

Arbitrary numbers of shader parameters of various types can be bound to vertices of geometric primitives using a simple immediate-mode mechanism. Run-time specification, manipulation, and compilation of shaders at various levels of resolution is supported, including integrated support for per-vertex and per-fragment shaders.

An open-licensed software implementation of SMASH is available for test and evaluation purposes—specifically, to determine what ranges of useful shaders can be written under various programming models and constraints. We are also developing a hardware accelerator using an FPGA-based prototype to help validate our design.

Implementation of rendering effects using SMASH can be enhanced with metaprogramming toolkits and techniques, up to and including Renderman-like shading languages. We give several example implementations of a two-term separable BRDF approximation to demonstrate metaprogramming in SMASH.

Please visit the above website for detailed information, example shaders, slides for the SIG-GRAPH course presentation, and download of the software.