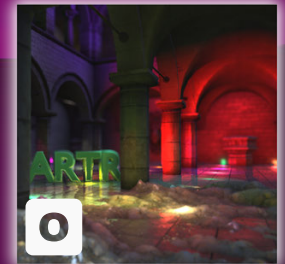
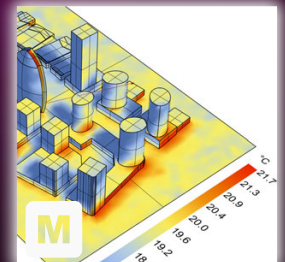
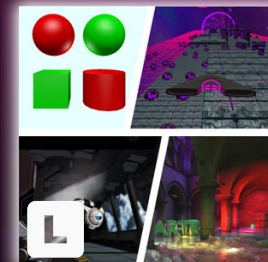
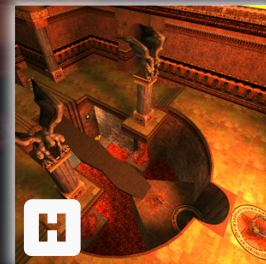
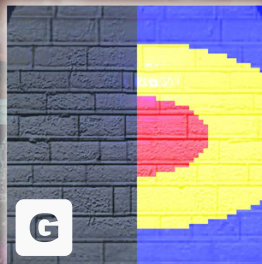
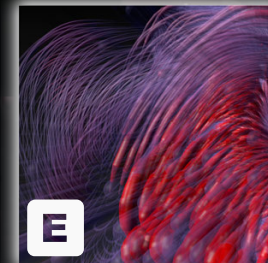
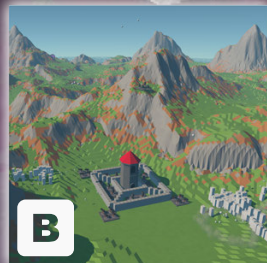


Merry Christmas and Happy New Year 2024

Vulkan™ usage in our papers, projects,
theses, courses, and programming frameworks

A “Cyberpunk” (Christmas Edition)
by Matthias Hürbe



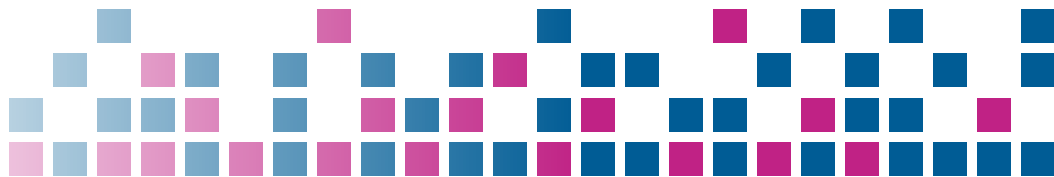
Merry Christmas and Happy New Year 2024

Vulkan usage has been going strong lately at our institute. This Christmas card shows some of our projects, papers, and courses where we have used Khronos' low-level graphics API. To better cope with its verbosity and complexity, we are using several self-developed frameworks, namely [Vulkan Launchpad](#), [Auto-Vk](#), [Auto-Vk-Toolkit](#), and our in-house differentiable rendering framework [Tamashii](#). We're also providing learning resources on [YouTube](#) and [cgSource](#), gave tutorials at [Vulkanised](#) and [CESCG](#), and gave talks at [High-Performance Graphics 2023](#) and [SIGGRAPH 2023 Birds of a Feather](#). We wish you all the best and good luck for 2024—especially if you're going to learn Vulkan next year. But whenever you use Vulkan, think back to our Christmas card and remember that it contains some links that could be useful for beginners and advanced users.



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Card Design: Johannes Untergruggenberger, with help from Matthias Hürbe, Gerald Kimmersdorfer, Elias Kristmann, Hiroyuki Sakai, and Michael Wimmer himself

- A** Demo “[Cyberpunk](#)” by Matthias Hürbe using a custom Vulkan engine in the context of our [Real-Time Rendering course](#)
- B** Game “[Island Siege](#)”, implemented in a custom Vulkan engine by Jonas Macho and Marvin Ott in the context of the [Computer Graphics course](#)
- C** Game “[Focus](#)” by Simon Fraiss, which uses real-time ray tracing for rendering and gameplay, based on our Vulkan framework [Auto-Vk-Toolkit](#)
- D** Temporal anti-aliasing [State-of-the-Art report](#) by Alexander Cech, based on [Auto-Vk-Toolkit](#)
- E** [Interactive line renderer for huge data sets](#) by Matthias Hürbe and Gerald Kimmersdorfer, in [Visualization 2](#), based on [Auto-Vk-Toolkit](#)
- F** [Forward+ renderer](#) by Dominik Forkert and Jörg Christian Reiher, implemented in the context of our [rendering engine course](#)
- G** [Master thesis](#) by Stefan Stappen about Variable Rate Shading techniques, based on [Auto-Vk-Toolkit](#), also published as [short paper](#)
- H** [Master thesis](#) by Lukas Lipp about porting Quake III to Vulkan and using real-time ray tracing to render it
- I** [Master thesis](#) by Lukas Geyer about adaptive sampling in position-based fluids, based on [Auto-Vk-Toolkit](#)
- J** [Master thesis](#) by Wolfgang Rumpler about real-time distortion-correction methods for curved monitors, based on [Auto-Vk-Toolkit](#)
- K** [Paper](#) by Johannes Untergruggenberger et al. about conservative meshlet bounds for skinned meshes, based on [Auto-Vk-Toolkit](#)
- L** [Paper](#) by Johannes Untergruggenberger et al. about how we are transitioning from OpenGL to Vulkan in foundational and advanced courses
- M** [Paper](#) by Christian Freude et al. about thermal radiation simulation, based on our in-house [Tamashii](#) framework
- N** Screenshot of a Vulkan-based assignment in our fundamental course [Foundations of Computer Graphics](#), based on [Vulkan Launchpad](#)
- O** Our advanced graphics course [Algorithms for Real-Time Rendering](#) is meanwhile entirely Vulkan-based and uses [Auto-Vk-Toolkit](#)