DR. MARKUS STEINBERGER

PERSONAL INFORMATION

Research Area	High Performance Parallel Computing, Computer Graphics, Visualization
Current Position	Assistant Professor Graz University of Technology, Austria
Born	09 March 1986 Leoben, Austria
Nationality	Austria
Marital status	married
Current project page	www.markussteinberger.net

ACHIEVEMENTS

06/2020 **Eurographics 2020 Best Paper Award**
Eurographics is the premier conference for computer graphics in Europe and among the top three conference worldwide. Our paper *Subdivision-Specialized Linear Algebra Kernels for Static and Dynamic Mesh Connectivity on the GPU* was selected as the best paper of 2020 and received the best paper award 2020.

05/2019 **I3D 2019 Best Poster Award**
I3D is the leading conference for real time 3D computer graphics and human interaction, and 2019 marks the 33rd year since the first conference. Our poster *From Ground to Space: Real-time Rendering of Procedural Planets at Arbitrary Altitudes* was select to the best poster of I3D'19.

09/2017 **Best Student Paper Award High Performance Extreme Computing**
IEEE High Performance Extreme Computing is the premier conference in the world on the convergence of High Performance and Embedded Computing. The paper *Autonomous, Independent Management of Dynamic Graphs on GPUs* was select to be the best student paper of HPEC'17.

10/2016 **OCG Heinz Zemanek Preis**
With this award the Austrian Computer Society honors the best Austrian dissertation in the field of Computer Science. My dissertation *Dynamic Resource Scheduling on Graphics Processors* was selected to be the best among all dissertation completed in Austria between 2012 and 2016.

09/2016 **Best Paper Finalist Award High Performance Extreme Computing**
IEEE High Performance Extreme Computing is the premier conference in the world on the convergence of High Performance and Embedded Computing. The paper *How Naïve is Naïve SpMV on the GPU* was select to be among the best five papers of HPEC'16.

11/2014 **Honorary Award from the Austrian federal ministry for Science, Research and Economy**
With this award, the Austrian federal ministry for Science, Research and Economy honors outstanding achievements during their studies.

10/2014 **GI Prize for the best dissertation (PhD thesis) of 2013**
The GI Prize for the best dissertation tries to award the best dissertation within the field of Computer Science completed at any university within

Germany, Austria and Swiss. I am the first Austrian to ever win this Award for my dissertation *Dynamic Resource Scheduling on Graphics Processors*.

08/2014 **Best paper Award High Performance Graphics**
High Performance Graphics is the premiere conference for high performance computations on graphics processors. The paper *Fast ANN for High-Quality Collaborative Filtering*, which I wrote together with my colleagues at NVIDIA was selected to be the best paper of 2014.

07/2014 **Award of Excellence from the Austrian federal ministry for Science, Research and Economy**
The Austrian federal ministry for Science, Research and Economy supports outstanding young Researchers in their international travel activities for two years after completing their PhD.

07/2014 **Promotion sub auspiciis Praesidentis rei publicae**
In Austria, the highest possible honor for achievement is the *promotio sub auspiciis prasidentis rei publicae*. In this ceremony, the head of Austria honors the country's best students by attending their promotion and presenting them with a custom made gold ring.

04/2014 **Honorable Mention Award Human Factors in Computing Systems**
The ACM Human Factors in Computing Systems (CHI) is the premier conference for human computer interaction. Our paper *Show Me the Invisible: Visualizing Hidden Content* was selected to be one of the outstanding papers of 2014 and received an honorable mention paper award.

04/2014 **3rd Best Paper Award Eurographics**
Eurographics is the premier conference for computer graphics in Europe and among the top three conference worldwide. Our paper *Parallel Generation of Architecture on the GPU* was selected to be the third best paper presented at the conference in 2014.

10/2013 **IEEE SciVis Honorable Mention Poser Award**
IEEE SciVis is the premiere conference for scientific visualization. Our poster *Volume Rendering with advanced GPU scheduling strategies* was selected to be one of the best posters of 2013 and received an honorable mention poster award.

10/2011 **IEEE InfoVis Best Paper Award**
IEEE InfoVis is the premiere conference for information visualization. Our paper *Context-Preserving Visual Links* was voted to be the best paper of 2011 and received the best paper award 2011.

08/2011 **Non-Photorealistic Animation and Rendering Best Paper Award**
The symposium on Non-Photorealistic Animation and Rendering (NPAR) has a more than 10 year history of being the premiere symposium for the specialized field of non-photorealistic animation and rendering. Our paper *Stylization-based ray prioritization for guaranteed framerates* was selected to be the best paper in the category Rendering in 2011.

05/2011 **Honorable Mention Award Human Factors in Computing Systems**
The ACM Human Factors in Computing Systems (CHI) is the premier conference for human computer interaction. Our paper *Importance-Driven Compositing Window Management* was selected to be one of the outstanding papers of 2011 and received an honorable mention paper award.

05/2009 **3rd Best CESCG Paper Award**
My first paper *Multiresolution Isosurface Rendering* was selected to be the 3rd best paper of the Central European Seminar on Computer Graphics.

2006 – 2009 **Achievement scholarship from the Faculty of Informatics**
Due to my outstanding study progress I received achievement scholarships from Graz University of Technology in 2006, 2007, 2008 and 2009.

EDUCATION

11/2010 – 10/2013 **PhD studies at Graz University of Technology**
Finished the PhD program in Computer Science with best possible grades within shortest possible time. Advisor: Prof. Dieter Schmalstieg. External Referee: Prof. Jens Krüger (University of Duisburg). Dissertation Title: *Dynamic Resource Scheduling on Graphics Processors*

10/2008 – 06/2010 **Master studies at Graz University of Technology**
Finished the master program in Telematics with best possible grades within minimum study durations. Advisor: Dr. Markus Grabner. Thesis Title: *Highly accurate Multiresolution Isosurface Rendering using compactly supported Spline Wavelets*

10/2005– 10/2008 **Bachelor studies at Graz University of Technology**
Finished the bachelor program in Telematics with best possible grades within minimum study durations. Advisor: Dr. Markus Grabner. Thesis Title: *Isosurface Representation and Rendering, an approach for polynomial isosurface functions*

PROFESSIONAL

04/2017 – now **Assistant Professor,** Graz University of Technology, Austria
Leading the GPU Computing and Visualization Group

11/2015 – 03/2017 **Junior Group Leader,** Max Planck Institute Saarbrücken, Germany
Leading the GPU Scheduling and Parallel Computing Group

11/2013 – 10/2015 **Junior Group Leader / Post Doc,** Graz University of Technology, Austria
Leading the Parallel Computing Group at the Institute for Computer Graphics and Vision, Teaching courses in Computer Graphics and GPU computing

10/2013 – 02/2014 **Internship NVIDIA Corporation,** Santa Clara, California, USA
Researcher in the Mobile Computer Vision Group of Kari Pulli

06/2010 – 10/2013 **University Assistant**, Graz University of Technology, Austria
Research and Teaching at the Institute for Computer Graphics and Vision

10/2007 – 06/2010 **Teaching Assistant**, Graz University of Technology, Austria
Assistant with the Institute for computer Graphics and Vision, Institute for Signal Processing and Speech Communication, Institute for Applied Information Processing and Communications, Institute for Theoretical Computer Science, Institute for Software Technology.

TEACHING

COURSES

2018 – now Graz University of Technology,
Mathematical Principles in Vision and Graphics, Shared Lecturer, 30-40

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	students Teaching mathematical views on mesh processing and geometry
2018 – now	Graz University of Technology, Scientific Methods, Shared Lecturer,40-60 students Introductory course for PhD students
2017 – now	Graz University of Technology, Real-Time Graphics 2, Lecturer, 20-30 students Teaching GPU Computing and GPGPU for Computer Graphics problems
2017 – now	Graz University of Technology, Introduction to Scientific Working, Group Coordinator, 20 (of 300-400) students Seminar group on scientific writing and presentations
2018 – now	Graz University of Technology, Biomedical Visualization / Selected Topics in Computer Graphics, Shared Lecturer, 20 students Master's level course on different visualization techniques
2017 – 2018	FH Salzburg, Physics Based Simulation, Lecturer, 5-12 Students Teaching basic and advanced physics engine design
2016 – 2018	FH Salzburg, Advanced Rendering, Lecturer, 5-12 Students Teaching advanced GPU Compute and Simulations
2017	Graz University of Technology, Real-Time Graphics, Lecturer, 70 students Teaching Real-time Graphics using OpenGL
2013 – 2015	Graz University of Technology, Real-Time Graphics 2, Lecturer, 20 students Teaching GPU Computing and GPGPU for Computer Graphics problems
2013 – 2015	Graz University of Technology, Computer Graphics 2, Shared Lecturer, Exercise Coordinator, 150 students Teaching basic Computer Graphics topics
2013 – 2015	Graz University of Technology, Computer Graphics 1, Shared Lecturer, Exercise Coordinator, 250 students Teaching basic Computer Graphics topics
2012	Graz University of Technology, Virtual Reality, Exercise Coordinator, 20 students
2011	Graz University of Technology, Software Development in Distributed Environments, Exercise Coordinator, 200 students
2009 – 2010	Graz University of Technology, Computer Graphics 2, tutor, 150 students
2009 – 2010	Graz University of Technology, Computer Graphics 1, tutor, 250 students
2009	Graz University of Technology, Real-Time Graphics 1, tutor, 50 students

2009	Graz University of Technology, Virtual Reality, tutor, 20 students
2009	Graz University of Technology, Computational Intelligence, tutor, 180 students
2008	Graz University of Technology, Operating Systems, tutor, 250 students
2007 – 2008	Graz University of Technology, Data structures and Algorithms, tutor, 250 students
2006	Graz University of Technology, Foundations of Computer Science, tutor, 400 students

TEACHING COMMITTEES AND OTHER TEACHING ACTIVITIES

2015 – 2017	Admission Committee Master Studies Visual Computing Saarland University, Germany
2014	Establishing the submission and assignment evaluation system for the Institute for Computer Graphics and Vision at Graz University of Technology, Austria, including Website, Database, Testing Sever, and connection to the TUGOnline account system.

STUDENT SUPERVISION

2019 – now	Mathias Parger, PhD student,
2018 – now	Daniel Mlakar, PhD student, *Mesh Processing using Linear Algebra Primitives*
2018 – now	Martin Winter, PhD student, *GPU Streaming Graph Processing*
2017 – now	Jörg Müller, PhD student, *Dynamics in Object Space Shading*
2016 – now	Jozef Hladky, PhD student, *Delayed Rasterization and Shading*
2014 – 2019	Mark Dokter, PhD student, *Applications of Massively Parallel Geometry Processing*
2014 – 2018	Bernhard Kerbl, PhD student, *Load Balancing for Hardware and Software Rendering on the Graphics Processing Unit*
2013 – now	Michael Kenzel, PhD student, *Software Rendering Pipelines*
ongoing	Patrick Pichler, Master Thesis: *Dynamic Dependency Scheduling*
ongoing	Marcel Pichler, Master Thesis: *Geometry Processing in a Software Pipeline*
ongoing	Markus Prettner, Master Thesis: *Non-linear Rasterization in Software* ongoing
ongoing	Stephan Stiboller, Master Thesis: *Simulation Droplet Machines*
2020	Alexander Weinrauch, Master Thesis: *From on-surface fields to skeletons*
2020	Wolfgang Tatzgern, Master Thesis: *Deep-denoising for Lightcut Rendering*
2019	Benedikt Mayr, Bachelor Thesis: *Representative VPLs for Lightcut Rendering*
2019	Pascal Stadlbauer, Master Thesis: *Streaming Primitive Tessellation for High-Performance Software Rendering Pipelines*
2019	Pascal Stadlbauer, Masters Project: *BigPrint: Cellular Tessellations for Parsimonious Scalable 3D Printing*
2018	Mathias Parger, Master Thesis: *Inverse Kinematics for Virtual Reality*

2018 Sam Pfehr, FH Master Thesis: *Quad Fragment Merging in a Programmable Graphics Pipeline*

2018 Franz Rest, FH Master Thesis: *Optimization of a Lagrangian based fluid simulation using CUDA*

2018 Benjamin Sommer, Master Thesis: *On Bosonic Transport*

2018 Wolfgang Tatzgern, Bachelor Thesis: *Visual Shape Grammar Editor*

2018 Mathias Parger, Masters Project: *Collaborative VR Environment with 3D Human Body Pose Tracking*

2018 Markus Prettner, Bachelor Thesis: *Visual Shape Grammar Editor*

2018 Florian Michelic, Bachelor thesis, *Real-time Rendering of Procedural Planets at Arbitrary Altitudes*

2018 Niklas Terörde, FH Master Thesis, *Efficient GPU-based real time water droplets simulation and rendering on windshields*

2018 Daniel Mlakar, Master Thesis: *High Performance Mesh Subdivision through Sparse Matrix Algebra on the GPU*

2017 Martin Winter, Master thesis: *faimGraph Efficient memory management and algorithmic validation of a dynamic graph framework on GPUs*

2017 Martin Winter, Master Project: *GPU Streaming Graphs*

2016 Andreas Derler, Master Thesis: *Hierarchical Matrix Operations on the GPU*

2016 Ali Rostami, Intern: *Gradient Domain Path Tracing*

2016 Karl Haubenwallner, Master Thesis: *Inverse Procedural Modeling using GA*

2016 Daniel Mlakar, Master Project: *Subdivision Surface Rendering on the GPU*

2016 Martin Sattlecker, Master Thesis: *High Quality Reyes using CUDA*

2016 Samuel Kogler, Stephan Stiboller, Bachelor Thesis: *The Godzilla Simulator*

2015 David Mandl, Master Thesis: *Automatic Surrogate Terminal Generation for Shape Grammars*

2015 Reinhard Enhuber, Bachelor Thesis: *Contour-based Sparse Voxel Octrees*

2015 Martin Sattlecker, Master Project: *Real-time Reyes using CUDA*

2015 Daniel Mlakar, Bachelor Thesis: *Real-time Subdivison Surface Reyes*

2014 Clemens Feuerstein, Bachelor Thesis: *Softshell GPU Taskmanager*

2014 Michael Kerber, Master Thesis: *Softshell Multi-Framerate Rendering*

2014 Lorenz Jäger, Master Thesis: *Real Time High Dynamic Range Video on the GPU*

2014 Mark Dokter, Master Thesis*: Rule-scheduling for Grammar-based Procedural Modeling on the GPU*

2013 Thomas Pietsch, Bachelor Thesis: *OmniKinect non-linear Calibration*

2013 Lorenz Jäger, Master Project: *Real-Time High Dynamic Range Videos*

2013 Sebastian Hrauda, Mathis Hesse, Bachelor Thesis: *Courseware 2.0*

2013 Michael Kerber, Master Project: *Softshell Multi-Framerate Rendering*

2012 Thomas Geymayer, Master Thesis: *Visual Linking on the Desktop*

2012 Michael Kenzel, Master Thesis: *Edge Distance Shadow Maps*

2012 Jörg Müller, Master Project: Solar System Shadows

2012 Michael Kenzel, Master Project: *Efficient Compiling for Megakernel Approaches in CUDA*

2012 Bernhard Kerbl, Master Project: *Queue Sorting for Megakernel Approaches*

2011 Severin Küberl, Bachelor Thesis: *Web-based Drawing*

FUNDING

2017 *Principal Investigator: Fully Programmable GPU Pipelines* funded by the Deutsche Forschungsgemeinschaft DFG as D-A-CH project

2015 *GPU Scheduling and Parallel Computing* Funding for two PhD students granted as part of the Junior Group Leader Position by the Max Planck Society

2011 *Co-Author: Automatic Volume Data Processing on Graphics Processors* funded by the Austrian Science Fond FWF, P23329.

PUBLICATIONS

JOURNAL ARTICLES

J.32 Pascal Stadlbauer, Daniel Mlakar, Hans-Peter Seidel, **Markus Steinberger,** Rhaleb Zayer:
Interactive Modeling of Cellular Structures on Surfaces with Application to Additive Manufacturing
Computer Graphics Forum / Eurographics (EG'20), 2020

J.31 Daniel Mlakar, Martin Winter, Pascal Stadlbauer, Hans-Peter Seidel, **Markus Steinberger,** Rhaleb Zayer:
Subdivision-Specialized Linear Algebra Kernels for Static and Dynamic Mesh Connectivity on the GPU
Eurographics '20 Best Paper Award
Computer Graphics Forum / Eurographics (EG'20), 2020

J.30 Jozef Hladky, Hans-Peter Seidel, **Markus Steinberger**:
The Camera Offset Space: Real-time Potentially Visible Set Computations for Streaming Rendering
ACM Transactions on Graphics (SIGGRAPH Asia'19), 2019

J.29 Jozef Hladky, Hans-Peter Seidel, **Markus Steinberger**:
Tessellated Shading Streaming
Computer Graphics Forum / Eurographics Symposium on Rendering (EGSR'19), 2019

J.28 Mark Dokter, Jozef Hladky, Mathias Parger, Dieter Schmalstieg, Hans-Peter Seidel, **Markus Steinberger**:
Hierarchical Rasterization of Curved Primitives for Vector Graphics Rendering on the GPU
Computer Graphics Forum / Eurographics (EG'19), 2019

J.27 Rhaleb Zayer, Daniel Mlakar, **Markus Steinberger**, Hans-Peter Seidel:
Layered Fields for Natural Tessellations on Surfaces
ACM Transactions on Graphics (SIGGRAPH Asia '18), 2018

J.26 Joerg H. Mueller, Philip Voglreiter, Mark Dokter, Thomas Neff, Mina Makar, **Markus Steinberger**, Dieter Schmalstieg:
Shading Atlas Streaming
ACM Transactions on Graphics (SIGGRAPH Asia '18), 2018

J.25 Michael Kenzel, Bernhard Kerbl, Dieter Schmalstieg, **Markus Steinberger*:***
A High-Performance Software Graphics Pipeline Architecture for the GPU
ACM Transactions on Graphics (SIGGRAPH '18), 2018

J.24 Bernhard Kerbl, Michael Kenzel, Elena Ivanchenko, Dieter Schmalstieg, **Markus Steinberger*:***
Revisiting The Vertex Cache: Understanding and Optimizing Vertex Processing on the modern GPU
Proceedings of the ACM on Computer Graphics Interaction Techniques, 2018

J.23 Michael Kenzel, Bernhard Kerbl, Wolfgang Tatzgern, Elena Ivanchenko, Dieter Schmalstieg, **Markus Steinberger*:***
On-the-fly Vertex Reuse for Massively-Parallel Software Geometry Processing
Proceedings of the ACM on Computer Graphics Interaction Techniques, 2018

J.22 **Markus Steinberger**:
On Dynamic Scheduling for the GPU and its Applications in Computer Graphics and Beyond
IEEE Computer Graphics and Applications, 2018

J.21 Bernhard Kerbl, Michael Kenzel, Joerg H. Mueller, Dieter Schmalstieg, **Markus Steinberger:**
A scalable queue for work distribution on GPUs
ACM SIGPLAN Notices (PPoPP'18), 2018

J.20 Karl Haubenwallner, Hans-Peter Seidel, **Markus Steinberger**:
ShapeGenetics: Using Genetic Algorithms for Procedural Modeling
Computer Graphics Forum / Eurographics (EG'17), 2017

J.19 Rhaleb Zayer, **Markus Steinberger**, Hans-Peter Seidel:
A GPU-adapted Structure for Unstructured Grids
Computer Graphics Forum / Eurographics (EG'17), 2017

J.18 Bernhard Kerbl, Michael Kenzel, Dieter Schmalstieg, Hans-Peter Seidel, **Markus Steinberger**:
Hierarchical Bucket Queuing for Fine-Grained Priority Scheduling on the GPU
Computer Graphics Forum, 2016

J.17 Pedro Boechat, Mark Doktor, Michael Kenzel, Hans-Peter Seidel, Dieter Schmalstieg, **Markus Steinberger**:
Representing and Scheduling Procedural Generation using Operator Graphs
ACM Transactions on Graphics (SIGGRAPH Asia '16), 2016

J.16 Yun-Ta Tsai, **Markus Steinberger**, Dawid Pająk, Kari Pulli:
Fast ANN for High-Quality Collaborative Filtering
Computer Graphics Forum (35), 2016

J.15 Bernhard Kainz, **Markus Steinberger**, Wolfgang Wein, Maria Murgasova, Christina Malamateniou, Kevin Keraudren, Paul Aljabar, Mary Rutherford, Joseph Hajnal, Daniel Rueckert:
Fast Volume Reconstruction from Motion Corrupted Stacks of 2D Slices
IEEE Transactions on Medical Imaging, 2015

J.14 Bernhard Kerbl, Denis Kalkofen, **Markus Steinberger**, Dieter Schmalstieg:
Interactive Disassembly Planning for Complex Objects
Computer Graphics Forum (EG'15), 2015

J.13 **Markus Steinberger**:
An Overview of Dynamic Resource Scheduling on Graphics Processors
it-Information Technology, 2015

J.12 **Markus Steinberger**, Michael Kenzel, Pedro Boechat, Bernhard Kerbl, Mark Dokter, Dieter Schmalstieg:
Whippletree: Task-based Scheduling of Dynamic Workloads on the GPU
ACM Transactions on Graphics (SIGGRAPH Asia '14), 2014

J.11 Felix Heide, **Markus Steinberger**, Yun-Ta Tsai , Nasa Rouf, Dawid Pajak, Dikpal Reddy, Orazio Gallo, Jing Liu, Wolgang Heidrich, Karen Egiazarian, Jan Kautz, Kari Pulli:
FlexISP: A flexible camera image processing framework
ACM Transactions on Graphics (SIGGRAPH Asia '14), 2014

J.10 Rostislav Khlebnikov, Philip Voglreiter, **Markus Steinberger**, Bernhard Kainz, Dieter Schmalstieg:
Parallel Irradiance Caching for Interactive Monte-Carlo Direct Volume Rendering
Computer Graphics Forum (EuroVis'14), 2014

J.09 **Markus Steinberger**, Michael Kenzel, Bernhard Kainz, Peter Wonka, Dieter Schmalstieg:
On-the-fly Generation and Rendering of Infinite Cities on the GPU
in Computer Graphics Forum (EG'14), 2014

J.08 **Markus Steinberger**, Michael Kenzel, Bernhard Kainz, Jörg Müller, Peter Wonka, Dieter Schmalstieg:
Parallel Generation of Architecture on the GPU
EG'14 3rd Best Paper Award
Computer Graphics Forum (EG'14), 2014

J.07 Rostislav Khlebnikov, Bernhard Kainz, **Markus Steinberger**, Dieter Schmalstieg:
Noise-based volume rendering for the visualization of multivariate volumetric data
IEEE Transactions on Visualization and Computer Graphics (VIS'13), 2013

J.06 **Markus Steinberger**, Bernhard Kainz, Bernhard Kerbl, Stefan Hauswiesner, Michael Kenzel, Dieter Schmalstieg:
Softshell: Dynamic Scheduling on GPUs
ACM Transactions on Graphics (SIGGRAPH Asia '12), 2012

J.05 Rostislav Khlebnikov, Bernhard Kainz, **Markus Steinberger**, Marc Streit, Dieter Schmalstieg:
Procedural Texture Synthesis for Zoom-Independent Visualization of Multivariate Data
Computer Graphics Forum (EuroVis'12), 2012

J.04 **Markus Steinberger**, Manuela Waldner, Dieter Schmalstieg:
Interactive Self-Organizing Windows
Computer Graphics Forum (EG'12), 2012

J.03 **Markus Steinberger**, Bernhard Kainz, Stefan Hauswiesner, Rostislav Khlebnikov, Denis Kalkofen, Dieter Schmalstieg:

Ray Prioritization Using Stylization and Visual Saliency
Computers and Graphics, 2012

J.02 **Markus Steinberger**, Manuela Waldner, Marc Streit, Alexander Lex, Dieter Schmalstieg:
Context-Preserving Visual Links
InfoVis '11 Best Paper Award
IEEE Transactions on Visualization and Computer Graphics (InfoVis '11), 17(12), 2011.

J.01 Manuela Waldner, **Markus Steinberger**, Raphael Grasset, Dieter Schmalstieg:
Importance-Driven Compositing Window Management
CHI '11 Honorable Mention Award
in Proceedings of Human Factors in Computing Systems (CHI '11), pp. 959-968, 2011.

CONFERENCE PAPERS

C.26 Johannes Unterguggenberger, Bernhard Kerbl, **Markus Steinberger**, Dieter Schmalstieg, Michael Wimmer:
Fast Multi-View Rendering for Real-Time Applications
Eurographics Symposium on Parallel Graphics and Visualization (EGPGV ‘20), 2020

C.25 Wolfgang Tatzgern, Benedikt Mayr, Berhard Kerbl, **Markus Steinberger**:
Stochastic Substitute Trees for Real-Time Global Illumination
Proceedings of Symposium on Interactive 3D Graphics and Games (I3D ‘20), 2020

C.24 Mathias Parger, Martin Winter, Daniel Mlakar, **Markus Steinberger**:
spECK: Accelerating GPU Sparse Matrix-Matrix Multiplication Through Lightweight Analysis
Proceedings of the 25th Symposium on Principles and Practice of Parallel Programming, 2020

C.23 Dominic Tödling, Martin Winter, **Markus Steinberger**:
Breadth-First Search on Dynamic Graphs using Dynamic Parallelism on the GPU
High Performance Extreme Computing, 2019

C.22 Martin Winter, Daniel Mlakar, Rhaleb Zayer, Hans-Peter Seidel, **Markus Steinberger**:
Adaptive sparse matrix-matrix multiplication on the GPU
Proceedings of the 24th Symposium on Principles and Practice of Parallel Programming, 2019

C.21 Mathias Parger, Joerg H. Mueller, Dieter Schmalstieg, **Markus Steinberger**:
Human Upper-Body Inverse Kinematics for Increased Embodiment in Consumer-Grade Virtual Reality
Symposium on Virtual Reality Software and Technology (VRST ’18), 2018

C.20 Martin Winter, Daniel Mlakar, Rhaleb Zayer, Hans-Peter Seidel, **Markus Steinberger**:
faimGraph: High Performance Management of Fully-Dynamic Graphs under tight Memory Constraints on the GPU
High Performance Computing, Networking, Storage and Analysis (SC’18), 2018

C.19 Bernhard Kerbl, Joerg Mueller, Michael Kenzel, Dieter Schmalstieg, **Markus Steinberger**:
The Broker Queue: A Fast, Linearizable FIFO Queue for Fine-Granular Work Distribution on the GPU
International Conference on Supercomputing (ICS'18)*, 2018*

C.18 Rhaleb Zayer, **Markus Steinberger**, Hans-Peter Seidel:
Sparse Matrix Assembly on the GPU Through Multiplication Patterns
IEEE High Performance Extreme Computing*, 2017*

C.17 Martin Winter, Rhaleb Zayer, **Markus Steinberger**:
Autonomous, Independent Management of Dynamic Graphs on GPUs
HPEC '17 Best Student Paper
IEEE High Performance Extreme Computing*, 2017*

C.16 Bernhard Kerbl, Michael Kenzel, Dieter Schmalstieg, **Markus Steinberger**:
Effective Static Bin Patterns for Sort-Middle Rendering
High Performance Graphics (HPG'17), 2017

C.15 **Markus Steinberger**, Rhaleb Zayer, Hans-Peter Seidel:
Globally homogeneous, locally adaptive sparse matrix-vector multiplication on the GPU
International Conference on Supercomputing (ICS'17)*, 2017*

C.14 Andreas Derler, Rhaleb Zayer, Hans-Peter Seidel, **Markus Steinberger**:
Dynamic scheduling for efficient hierarchical sparse matrix operations on the GPU
International Conference on Supercomputing (ICS'17)*, 2017*

C.13 **Markus Steinberger**, Andreas Derler, Rhaleb Zayer, Hans-Peter Seidel:
How naive is naive SpMV on the GPU?
HPEC '16 Best Paper Nominee
IEEE High Performance Extreme Computing*, 2016*

C.12 Philip Voglreiter, Michael Hofmann, Christoph Ebner, Roberto Blanco Sequeiros, Horst Rupert Portugaller, Jurgen Fütterer, Michael Moche, **Markus Steinberger**, Dieter Schmalstieg:
Visualization-Guided Evaluation of Simulated Minimally Invasive Cancer Treatment
Eurographics Visual Computing for Biology and Medicine, 2016

C.11 Yun-Ta Tsai, **Markus Steinberger**, Dawid Pająk, Kari Pulli:
Fast ANN for High-Quality Collaborative Filtering
HPG '14 Best Paper Award
High Performance Graphics (HPG'14), 2014

C.10 Thomas Geymayer, **Markus Steinberger**, Alexander Lex, Marc Streit, Dieter Schmalstieg:
Show Me the Invisible: Visualizing Hidden Content
CHI '14 Honorable Mention Award
Human Factors in Computing Systems (CHI '14), 2014

C.09 Denis Kalkofen, Eduardo Veas, Stefanie Zollmann, **Markus Steinberger**, Dieter Schmalstieg:
Adaptive Ghosted Views for Augmented Reality
in International Symposium on Mixed and Augmented Reality (ISMAR'13), IEEE, 2013

C.08 Bernhard Kainz, Stefan Hauswiesner, Gerhard Reitmayr, **Markus Steinberger**, Raphael Grasset, Lukas Gruber, Eduardo Veas, Denis Kalkofen, Hartmut Seichter, Dieter Schmalstieg:
OmniKinect: Real-Time Dense Volumetric Data Acquisition and Applications
in Symposium On Virtual Reality Software And Technology (VRST), 2012

C.07 Philip Voglreiter, **Markus Steinberger**, Dieter Schmalstieg, Bernhard Kainz:
Volumetric Real-Time Particle-Based Representation of Large Unstructured Tetrahedral Polygon Meshes
in Proceedings of MICCAI MeshMed'12, 2012

C.06 Rostislav Khlebnikov, Bernhard Kainz, **Markus Steinberger**, Marc Streit, Dieter Schmalstieg:
Procedural texture synthesis for zoom-independent visualization of multivariate data
in Proceedings of EuroVIS'12, 2012

C.05 **Markus Steinberger**, Michael Kenzel, Bernhard Kainz, Dieter Schmalstieg:
ScatterAlloc: Massively Parallel Dynamic Memory Allocation for the GPU
Innovative Parallel Computing (InPar 2012)

C.04 Stefan Hauswiesner, Rostislav Khlebnikov, **Markus Steinberger**, Matthias Straka, Gerhard Reitmayr:
Multi-GPU Image-based Visual Hull Rendering
in Proceedings of the Eurographics Symposium on Parallel Graphics and Visualization, 2012

C.03 Manuela Waldner, Raphael Grasset, **Markus Steinberger**, Dieter Schmalstieg:
Display-Adaptive Window Management for Irregular Surfaces
in Proceedings of Interactive Tabletops and Surfaces (ITS'11), 2011.

C.02 Bernhard Kainz, **Markus Steinberger**, Stefan Hauswiesner, Rostislav Khlebnikov, Dieter Schmalstieg:
Stylization-based ray prioritization for guaranteed frame rates
NPAR '11 Best Paper Award in Rendering
in Proceedings of Non-photorealistic Animation and Rendering (NPAR '11), pp. 44-53, 2011.

C.01 **Markus Steinberger**, Markus Grabner:
Wavelet-based Multiresolution Isosurface Rendering
In Proceedings of Eurographics/IEEE VGTC Symposium on Volume Graphics, 2010.

PATENTS

P.02 Dieter Schmalstieg, **Markus Steinberger**, Philip Voglreiter
Accelerated occlusion computation
US Patent App. 15/867,40, 2019

P.01 Dawid Pajak, Yun-Ta Tsai, **Markus Steinberger**:
Efficient approximate-nearest-neighbor (ANN) search for high-quality collaborative filtering
US Patent App. 14/632,782, 2015

POSTERS

P.04 Florian Michelic, Michael Kenzel, Karl Haubenwallner, **Markus Steinberger**, Bernhard Kerbl:

From Ground to Space: Real-time Rendering of Procedural Planets at Arbitrary Altitudes
I3D 2019 Best Poster Award
Symposium on Interactive 3D Graphics and Games 2011 (I3D), 2019

P.03 Michael Kenzel, Bernhard Kerbl, Dieter Schmalstieg, **Markus Steinberger**:
On Efficient Vertex Processing in Streaming Geometry Pipelines
High Performance Graphics Posters (HPG'17), 2017

P.02 Philip Voglreiter**, Markus Steinberger**, Rostislav Khlebnikov, Bernhard Kainz, Dieter Schmalstieg:
Volume Rendering with advanced GPU scheduling strategies
Vis '13 Honorable Mention Poster Award
IEEE Vis'13 poster, IEEE, 2013

P.01 Bernhard Kainz, **Markus Steinberger**, Stefan Hauswiesner, Rostislav Khlebnikov, Denis Kalkofen, Dieter Schmalstieg:
Using Perceptual Features to Prioritize Ray-based Image Generation
in Proceedings of Symposium on Interactive 3D Graphics and Games 2011 (I3D), 2011.

THESIS

T.03 **Markus Steinberger**:
Dissertation: *Dynamic Resource Scheduling on Graphics Processors*
Supervisor: Dieter Schmalstieg, October, 2013

T.02 **Markus Steinberger**:
Master's Thesis: *Highly accurate Multiresolution Isosurface Rendering using compactly supported Spline Wavelets*
Supervisor: Markus Grabner, April, 2010

T.01 **Markus Steinberger**:
Bachelor Thesis: *Isosurface Representation and Rendering, an approach for polynomial isosurface functions*
Supervisor: Markus Grabner, September, 2008

OTHER

O.06 Joerg H. Mueller, Thomas Neff, Philip Voglreiter, Mina Makar, **Markus Steinberger**, Dieter Schmalstieg:
Shading Atlas Streaming Demonstration
ACM SIGGRAPH 2019 Emerging Technologies, 22, 2019

O.05 Michael Kenzel, Bernhard Kainz, Dieter Schmalstieg, **Markus Steinberger**:
Real-time Procedural Generation of Large Cities
Cover Image for Springer Informatik Spektrum 1/2017

O.04 Michael Kenzel, Bernhard Kerbl, Martin Kenzel, **Markus Steinberger**:
Advanced Rendering Effects
Cover Image for Springer Informatik Spektrum 6/2016

O.03 Michael Kenzel, Bernhard Kerbl, Martin Kenzel, Dieter Schmalstieg, Hans-Peter Seidel, **Markus Steinberger**:
Alternative Rasterizer Pattern within a Software Rendering Pipeline
Cover Image for Springer Informatik Spektrum 2/2016

O.02 **Markus Steinberger**:
Dynamisches Ressourcen Scheduling auf Grafik Prozessoren

Ausgezeichnete
Informatikdissertationen 2013 (German). GI, 2014

O.01 **Markus Steinberger**:
Multiresolution Isosurface Rendering
CESCG '09 3rd Best Paper Award
in Proceedings of Central European Seminar on Computer Graphics (CESCG '09), 2009

COMMUNITIES AND REVIEWING

EDITORIAL

E.02 Associate Editor Computer Graphics Forum

E.01 Guest Editor Computer Graphics Forum Volume 38 Number 8

CHAIRING

CH.03 General Co-Chair High Performance Graphics, 2020

CH.02 Paper Co-Chair High Performance Graphics, 2019

CH.01 Paper Chair CESCG 2019, 2020

PROGRAM COMMITTEE MEMBER

PC.07 CVM 2020

PC.06 ACM VRST, 2020

PC.05 Pacific Graphics 2019-2020

PC.04 Eurographics, 2019

PC.03 IEEE VR Journal Papers, 2019-2020

PC.02 High Performance Graphics, 2015-2019

PC.01 Central European Seminar on Computer Graphics (CESCG), 2012-2015, 2018-2020

JOURNAL REVIEWING (SELECTION)

JR.12 ACM Transaction on Architecture and Code Optimization

JR.12 IEEE Transactions on Parallel and Distributed Systems

JR.11 Elsevier Journal of Systems and Software

JR.10 Elsevier Journal of Computational Physics

JR.09 Elsevier Journal of Parallel and Distributed Computing

JR.08 ACM Transactions on Spatial Algorithms and Systems

JR.07 Springer Journal of Real-Time Image Processing

JR.06 Springer Realtime Image Processing

JR.05 IEEE Electrical Engineering

JR.04 Computer & Graphics

JR.03 Computer Graphics Forum

JR.02 ACM Transaction on Graphics

JR.01 IEEE Transactions on Visualization and Computer Graphics

CONFERENCE REVIEWING (SELECTION

CR.8 IEEE ISMAR

CR.7 ACM SIGGRAPH

CR.6 ACM SIGGRAPH Asia

CR.5 EG Eurographics

CR.4 High Performance Graphics

CR.3 IEEE Virtual Reality

CR.2 IEEE Scientific Visualization

CR.1 IEEE Information Visualization

PUBLIC FUNDING REVIEWER

RP.2 European Research Council (ERC)

RP.1 Austrian Agency for International Mobility

MEMBERSHIPS

Association for Computing Machinery (ACM)

Eurographics Association (EG)

Austrian Computer Society (OCG)

TALKS AND PRESENTATIONS

01/2020 Invited Talk Qualcomm, San Diego, USA
The Camera Offset Space: Real-time Potentially Visible Set Computations for Streaming Rendering

04/2019 Invited Talk CESCG 2019, Smolenice, Slovakia
On the dynamics of GPU execution: Software Rasterization, Geometry Processing, and Dynamic Graphs

06/2018 Invited Lecture Saarland University, Germany
An Introduction to GPU Computing

01/2018 ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP 2018), Vienna, Austria
A scalable queue for work distribution on GPUs

07/2017 Invited Lecture Saarland University, Germany
An Introduction to GPU Computing

05/2017 Invited Talk Johannes Kepler University Linz, Austria
Adaptive GPU Scheduling for Efficient Numerical Computing and Computer Graphics

05/2017 International Conference on Supercomputing 2017, Chicago, USA
Globally Homogeneous, Locally Adaptive Sparse Matrix-Vector Multiplication on the GPU

05/2017 International Conference on Supercomputing 2017, Chicago, USA
Dynamic Scheduling for Efficient Hierarchical Sparse Matrix Operations on the GPU

09/2016 High Performance Extreme Computing 2016, Boston, USA
How naive is naive SpMV on the GPU?

08/2015 Invited Talk NVIDIA, California, USA:
Whippletree: Task-based Scheduling of Dynamic Workloads on the GPU

07/2015 Invited Talk University of Erlangen, Germany,
GPU Resource Management - one step towards a GPU OS

05/2015 Invited Talk MPI Informatics, Saarbrücken, Germany,
Dynamic Resource Scheduling on Graphics Processors

03/2015 Invited Talk GI Meeting Chemnitz, Germany,
GPU Resource Management - one step towards a GPU OS

12/2014 Invited Talk University of Dortmund, Germany,
Dynamic Resource Scheduling on Graphics Processors

05/2014 GI Kolloquium 2014, Dagstuhl, Germany
Dynamic Resource Scheduling on Graphics Processors

04/2014 Eurographics 2014, Strasbourg, France:
On-the-Fly Generation and Rendering of Infinite Cities on the GPU

04/2014 Eurographics 2014, Strasbourg, France:
Parallel Generation of Architecture on the GPU

02/2014 NVIDIA, California, USA:
Fast-ANN for Collaborative Filtering

11/2012 SIGGRAPH Asia 2012, Singapore EXPO, Singapore
Softshell: Dynamic Scheduling on GPUs

05/2012 Eurographics 2012, Cagliari, Italy:
Interactive Self-Organicing Windows

10/2011 Vis Week, InfoVis 2011:
Context-Preserving Visual Links

05/2011 ACM Human Factors in Computing Systems (CHI 2011), Vancouver, Canada:
Importance-Driven Compositing Window Management

05/2010 IEEE/EG International Symposium on Volume Graphics, Norrköping, Sweden:
Wavelet-based Multiresolution Isosurface Rendering

June 2020

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