

# RNDr. Martin Šik

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## CONTACT INFORMATION

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## EDUCATION

**Charles University in Prague - Faculty of Mathematics and Physics**,  
Prague, Czech Republic

**Doctoral degree**, Computer graphics and image analysis,  
expected graduation date: January 2019

- Supervisor: doc. Ing. Jaroslav Krivánek, Ph.D.
- Thesis topic: *Global exploration in Markov chain Monte Carlo methods for light transport simulation*

**Master's degree**, Software systems, September 2012

- Graduated cum laude
- Excellence scholarships granted during the studies
- Specialization: Computer graphics
- Thesis topic: *Guide hair interpolation*  
Analysis and implementation of a procedural hair generator, which communicates with Maya Stubble hair plugin and 3Delight renderer. Also accepted as *rigorous thesis* in 2014.

**Bachelor's degree**, Computer Science, September 2010

- Excellence scholarships granted during the studies
- Specialization: Programming
- Thesis topic: *Particle systems*  
Analysis and implementation of particle systems library, which handles real-time interactions among particles and off-line simulation.

**Gymnázium Nad Alejí Secondary Grammar School**, Prague, Czech Republic

Graduation Exam, May 2007

## PROFESSIONAL EXPERIENCE

**Hewlett-Packard**, Prague, Czech Republic

*Software engineer, web developer*      **September 2008 - February 2012**

- Analysis and implementation of non-web/web applications using .NET, MSSQL and JavaScript.
- Creating web pages using XHTML and CSS.

**Universal Production Partners**, Prague, Czech Republic

*Software engineer,*      **March 2012 - May 2013**  
*specialized at computer graphics*

- Analysis and implementation of programs for movies post-production, visual effects, modeling and animating of 3D scenes.
- Programming in C++ for Microsoft Windows and Mac OS.

**Render Legion a.s.**, Prague, Czech Republic

*Senior developer/researcher,*      **February 2016 - Present**  
*specialized at light transport simulation*

- Working on the Corona renderer core, solving both light transport related and unrelated issues
- Working on the Corona renderer plugin for 3ds Max
- Programming in C++ for Microsoft Windows.

PROJECTS/PAPERS **Survey of Markov Chain Monte Carlo Methods in Light Transport Simulation**

**Martin Šik** and Jaroslav Křivánek. *Accepted to IEEE Transactions on Visualization and Computer Graphics, 2018*

**Robust Light Transport Simulation via Metropolised Bidirectional Estimators**

**Martin Šik**, Hisanari Otsu, Toshiya Hachisuka, and Jaroslav Křivánek. *ACM Trans. Graph., SIGGRAPH Asia 2016.*

A new Markov chain Monte Carlo algorithm for light transport simulation with superior global exploration, which is achieved by utilizing spatial regularization with path reuse, replica exchange and stratified camera subpaths.

**Improving Global Exploration of MCMC Light Transport Simulation**

**Martin Šik** and Jaroslav Křivánek. *ACM SIGGRAPH 2016 Posters.*

Improving global exploration in Markov chain Monte Carlo algorithms by tempering of light transport simulation and applying new replica exchange strategies/moves.

**A Spatial Target Function for Metropolis Photon Tracing**

Adrien Gruson, Mickael Ribardiere, **Martin Šik**, Jiří Vorba, Rémy Cozot, Kadi Bouatouch, and Jaroslav Křivánek, *ACM Trans. Graph. 2016.*

A new algorithm for distributing photons in a scene in order to achieve uniform image error. The photons are distributed using Markov chain Monte Carlo with carefully selected target function.

**Unifying Points, Beams, and Paths in Volumetric Light Transport Simulation**

Jaroslav Křivánek, Iliyan Georgiev, Toshiya Hachisuka, Petr Vévoda, **Martin Šik**, Derek Nowrouzezahrai, and Wojciech Jarosz. *ACM Trans. Graph., SIGGRAPH 2014.*

A new light transport algorithm for scenes with participating media. The algorithm combines bidirectional path-tracing with various biased estimators using generalized multiple importance sampling.

**On-line Learning of Parametric Mixture Models for Light Transport Simulation**

Jiří Vorba, Ondřej Karlík, **Martin Šik**, Tobias Ritschel, and Jaroslav Křivánek, *ACM Trans. Graph., SIGGRAPH 2014.*

A new light transport algorithm that uses several photon passes to train radiance and importance distributions. These distributions are used for guiding light and eye paths during rendering.

**Fast Random Sampling of Triangular Meshes**

**Martin Šik** and Jaroslav Křivánek. *Pacific Graphics, Short Papers, 2013.*

New fast random sampling algorithm used for hair distribution and sampling of complex luminaire. The paper was also presented at **CESCG 2012** conference, where it received an award for the third best paper.

**Stubble, C++, 2011/2012**

I was part of a team responsible for development of a hair modeling plugin for Maya and 3Delight. The project was done in cooperation with **Universal Production Partners**. My role in the team was to create a procedural hair generator and connect our plugin with 3Delight renderer. I was also a lead project designer.

COMPUTER SKILLS **Programming languages** C/C++, C#.NET, Python

**Databases** MySQL, MSSQL

**Frameworks/Libraries** Maya API, Photoshop API, 3ds Max API, RenderMan

API, CUDA, QT, Embree

**Operating systems** Microsoft Windows, GNU/Linux

**Development tools** Visual Studio, QT creator, SVN, Git

**Other** L<sup>A</sup>T<sub>E</sub>X, Mathematica, Matlab

LANGUAGE SKILLS **English** advanced

**German** basic knowledge of the language

**Czech** native speaker

MISCELLANEOUS driving license category B

First Certificate in English (University of Cambridge ESOL Examinations)

PERSONAL QUALITIES Team player, exible, reliable, hard worker, open-minded.

HOBBIES Computer graphics, squash, fitness, jogging, movies, music and travelling.