

# *Paradigm*

**2020  
Cover  
Image**



**“Paradigm” by Károly Zsolnai-Fehér, Peter Wonka and Michael Wimmer.**

**Description:** This image shows the “Paradigm” scene from our paper named “Photorealistic Material Editing Through Direct Image Manipulation” paper. In this work, we present a technique that aims to empower novice and intermediate-level users to synthesize high-quality photorealistic materials by only requiring basic image processing knowledge. Our method takes a marked up, non-physical image as an input and finds the closest matching photorealistic material that mimics this input. The entire process takes less than 30 seconds per material, and to demonstrate its usefulness, we have used it to populate this beautiful scene with materials.

Below, we explain three examples shown in this image (noting that the scene contains more synthesized materials). First, the gold material was “transmuted” from silver by editing the color balance of the image, second, the dirt material below was made by using image inpainting, while third, the vividness of the grass material was done through a simple contrast enhancement operation.

For more information, the entirety of the paper and the described technique are available here: <https://users.cg.tuwien.ac.at/zsolnai/gfx/photorealistic-material-editing/>

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The rights to the original version of the scene and its geometry are reserved to Reynante Martinez.

**Acknowledgement:** The geometry of the scene was created by Reynante Martinez.

**Author Bios:**

**Károly Zsolnai-Fehér:** Károly Zsolnai-Fehér is a doctoral researcher at the Vienna University of Technology, in Michael Wimmer’s Computer Graphics Group. His research area covers the intersection of machine learning and computer graphics, e.g., producing efficient algorithms to reproduce light scattering within human skin and AI-assisted material synthesis for real-time applications and animation movies. He worked on physically correct light transport simulations as a research intern at Disney Research and has received with M.Sc. at the Budapest University of Technology in 2013.

**Peter Wonka:** Peter Wonka is an Austrian computer scientist and Professor and Associate Director at the Visual Computing Center at King Abdullah University of Science and Technology, Saudi Arabia. He was previously employed at the Arizona State University as Associate Professor and is a recipient of the National Science Foundation Career Award.

**Michael Wimmer:** Michael Wimmer is currently an Associate Professor at the Institute of Visual Computing and Human-Centered Technology at TU Wien, where he heads the Rendering and Modeling Group. His academic career started with his M.Sc. in 1997 at TU Wien, where he also obtained his Ph.D. in 2001. His research interests are real-time rendering, computer games, real-time visualization of urban environments, point-based rendering, reconstruction of urban models, procedural modeling and shape modeling. He has coauthored over 145 papers in these fields. He also coauthored

the book *Real-Time Shadows*. He regularly serves on program committees of the important conferences in the field, including ACM SIGGRAPH and SIGGRAPH Asia, Eurographics, IEEE VR, Eurographics Symposium on Rendering, ACM I3D, SGP, SMI, HPG, etc. He is currently associate editor of IEEE TVCG, CGF, and Computers & Graphics. He was papers co-chair of EGSR 2008, Pacific Graphics 2012, Eurographics 2015, Eurographics GCH 2018 and VMV 2019.

#### Reference

Photorealistic Material Editing Through Direct Image Manipulation, Károly Zsolnai Fehér, Peter Wonka and Michael Wimmer. Technical Report (2019). <https://users.cg.tuwien.ac.at/zsolnai/gfx/photorealistic-material-editing/>