



## Press Release

### TO REPLICATE PHYSICAL OBJECTS FOR VIRTUAL REALITY, JUST TURN ON YOUR SMARTPHONE

**TOKYO, Japan, 29 November 2018** – Capturing and reproducing realistic, real-world objects for any virtual environment is complex and time-consuming. Imagine using a conventional camera with a built-in flash—from any mobile device or off-the-shelf digital camera—to simplify this task. A global team of computer scientists have developed a novel method that replicates physical objects for the virtual and augmented reality space just using a point-and-shoot camera with a flash, without the need for additional, and oftentimes expensive, supporting hardware.

“To faithfully reproduce a real-world object in the VR/AR environment, we need to replicate the 3D geometry and appearance of the object,” says Min H. Kim, associate professor of computer science at KAIST in South Korea and lead author of the research. “Traditionally, this has been either done manually by 3D artists, which is a labor-intensive task, or by using specialized, expensive hardware. Our method is straightforward, cheaper and efficient, and reproduces realistic 3D objects by just taking photos from a single camera with a built-in flash.”

Kim and his collaborators, Diego Gutierrez, professor of computer science at Universidad de Zaragoza in Spain, and KAIST PhD students Giljoo Nam and Joo Ho Lee, will present this new work at SIGGRAPH Asia 2018 in Tokyo 4 December to 7 December. The annual conference features the most respected technical and creative members in the field of computer graphics and interactive techniques, and showcases leading edge research in science, art, gaming and animation, among other sectors.



*Novel, practical method that enables the capture of spatially-varying BRDFs from unstructured flash photographs. Image (a) shows the acquisition setup, while (b) – (d) show results of the reconstructions.*



Existing approaches for the acquisition of physical objects require specialized hardware setups to achieve geometry and appearance modeling of the desired objects. Those setups might include a 3D laser scanner or multiple cameras, or a lighting dome with more than a hundred light sources. In contrast, this new technique only needs a single camera, to produce high-quality outputs.

“Many traditional methods using a single camera can capture only the 3D geometry of objects, but not the complex reflectance of real-world objects, given by the SVBRDF,” notes Kim. SVBRDF, which stands for spatially-varying bidirectional reflectance distribution functions, is key in obtaining an object’s real-world shape and appearance. “Using only 3D geometry cannot reproduce the realistic appearance of the object in the AR/VR environment. Our technique can capture high-quality 3D geometry as well as its material appearance so that the objects can be realistically rendered in any virtual environment.”

The group demonstrated their framework using a digital camera, the Nikon D7000 and the built-in camera of an Android mobile phone, in a series of examples in their paper, “Practical SVBRDF Acquisition of 3D Objects with Unstructured Flash Photography.” The novel algorithm, which does not require any input geometry of the target object, successfully captured the geometry and appearance of 3D objects with basic, flash photography and reproduced consistent results. Examples that were showcased in the work included diverse set of objects that spanned a wide range of geometries and materials, including metal, wood, plastic, ceramic, resin and paper, and comprised of complex shapes like a finely detailed mini-statue of Nefertiti.

In future work, the researchers hope to further simplify the capture process or extending the method to include dynamic geometry or larger scenes, for instance. For the team’s paper and video, visit their [project page](#).

More details on this Technical Papers Session at SIGGRAPH Asia 2018:

Session: [Advanced SVBRDF](#)

Date: 7 December 2018, Friday

Time: 11:00am – 12:45pm

Venue: Hall D5, 5F, D Block

To register for SIGGRAPH Asia, and for more details of the event, visit <http://sa2018.siggraph.org>.

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**Notes to editors:**

- For more information on the Technical Papers Program, click [here](#).
- For media accreditation to SIGGRAPH Asia 2018, please register [here](#).



### **About SIGGRAPH Asia 2018**

The 11th ACM SIGGRAPH Conference and Exhibition on Computer Graphics and Interactive Techniques in Asia (SIGGRAPH Asia 2018) will be held in Tokyo, Japan at the Tokyo International Forum from 4 to 7 December 2018. The annual event held in Asia attracts the most respected technical and creative people from all over the world who are excited by research, science, art, animation, gaming, interactivity, education and emerging technologies.

The four-day conference will include a diverse range of juried programs, such as the Art Gallery, Computer Animation Festival, Courses, Emerging Technologies, Posters, Technical Briefs, Technical Papers and Virtual & Augmented Reality. A three-day exhibition held from 5 to 7 December 2018 will offer a business platform for industry players to market their innovative products and services to the computer graphics and interactive techniques professionals and enthusiasts from Asia and beyond. For more information, please visit <http://sa2018.siggraph.org>. Find us on: [Facebook](#), [Twitter](#), [Instagram](#) and [YouTube](#) with the official event hashtag, #SIGGRAPHAsia.

### **About ACM SIGGRAPH**

The ACM Special Interest Group on Computer Graphics and Interactive Techniques is an interdisciplinary community interested in research, technology, and applications in computer graphics and interactive techniques. Members include researchers, developers, and users from the technical, academic, business, and art communities. ACM SIGGRAPH enriches the computer graphics and interactive techniques community year-round through its conferences, global network of professional and student chapters, publications, and educational activities. For more information, please visit [www.siggraph.org](http://www.siggraph.org).

### **About Koelnmesse**

Koelnmesse Pte Ltd is one of the world's largest trade fair companies. Its more than 80 trade fairs and exhibitions have the broadest international scope in the industry, as 60 percent of the exhibitors and 40 percent of the visitors come from outside Germany. The Koelnmesse events include leading global trade fairs for 25 sectors, such as Imm Cologne, Anuga, IDS, INTERMOT, Interzum Cologne, Photokina, Gamescom, and the International Hardware Fair Cologne. Koelnmesse is ACM SIGGRAPH's event organizer for the last 10 editions of SIGGRAPH Asia. For more information, please visit [www.koelnmesse.com.sg](http://www.koelnmesse.com.sg).

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