MARC N. BERNSTEIN (SBN 145837)
mbernstein@blgrp.com
WILL B. FITTON (SBN 182818)
wfitton@blgrp.com
THE BUSINESS LITIGATION GROUP, P.C.
150 Spear Street, Suite 800
San Francisco, CA 94105
Telephone: 415.765.6633
Facsimile: 415.283.4804

Attorneys for Plaintiff
UAB "PLANNER5D"

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

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| UAB "PLANNER5D" dba PLANNER 5D,<br><br>Plaintiff,<br><br>v.<br><br>FACEBOOK INC., FACEBOOK TECHNOLOGIES, LLC, THE TRUSTEES OF PRINCETON UNIVERSITY, DOES 1-200, ABC CORPORATIONS 1-20, and XYZ UNIVERSITIES 1-20.<br><br>Defendants. | **Case No.**<br><br>**COMPLAINT FOR COPYRIGHT INFRINGEMENT**<br><br>**DEMAND FOR JURY TRIAL** |

UAB "Planner5D" (Planner 5D) sued Facebook, Inc., Facebook Technologies, LLC (together, Facebook), and The Trustees of Princeton University (Princeton or Princeton University) in a case entitled UAB "Planner5D" v. Facebook et al., Case No. 3:19-cv-03132 WHO (N.D. Cal. June 5, 2019) (the Companion Case). There, the Court dismissed Planner 5D's copyright claims but gave it leave to re-file them in a new lawsuit. (*See* Companion Case ECF Nos. 52 & 59.) Accordingly, for its new Complaint against Facebook and Princeton, Planner 5D now alleges as follows.

## INTRODUCTION

1. Computer vision—the ability of machines to recognize three-dimensional scenes—is one of today's leading research fields. Whoever first masters this technology will forever change humankind's relationship with machines.

2. Scene-recognition technology will soon enable robots to care for home-bound patients, and to boost safety and productivity at offices, airports, hospitals, and factories. It will also revolutionize an array of applications outside of robotics. One product looks after elderly people in their homes, using computer vision to detect changes in their gait or behavior, and to recognize stumbles or falls. Other applications will usher in a new era in virtual reality. Virtual objects will be seamlessly integrated into the user's actual indoor environment, enhancing realism for both industrial and recreational applications. Shipping giant DHL has already equipped its warehouse employees with "smart glasses" that use scene recognition to display where each item picked from the warehouse should be placed on the trolley for delivery. It's been estimated that the computer vision market will reach $48 billion by 2023, and $60 billion by 2025.

3. Yet even as scientists make great strides in this burgeoning research area, they have encountered a roadblock. Teaching machines to recognize three-dimensional settings requires feeding them large volumes of realistic, digitized samples of such places—digitized doors, walls, furniture, and the like, arranged into plausible interiors that are readable by machines. Creating lifelike digital scenes is

extremely time- and labor-intensive, and requires the exercise of substantial human judgment, creativity, and expression. For truly realistic scenes, human modelers must personally craft each three-dimensional object, and human designers must arrange the objects in lifelike configurations. Large collections of these kinds of three-dimensional settings are thus exceedingly rare.

4. Yet such collections are vital to scene-recognition research. In a slide presentation posted online, a senior Princeton computer scientist asked, "What is the main roadblock for 3D scene understanding and research?" His answer: "Data!!" (*See* Thomas Funkhouser, *3D Data for Data-Driven Scene Understanding*, 8-9, https://www.cs.princeton.edu/~funk/VRWorkshop.pdf (last visited March 30, 2020).)

5. Planner 5D owns a collection of over a million hand-crafted, digitized, and realistic three-dimensional objects and scenes, depicting a wide variety of household and office designs. To Planner 5D's knowledge, no other collection in the world numbers even in the tens of thousands. The company created and grew its collection over many years, at a cost of millions of dollars. It began by creating several thousand hand-crafted three-dimensional objects. These were lifelike models of furniture, appliances, plants, people, lighting, or other objects that could occupy the interior or immediate exterior of a structure. Millions of users of the company's design tool then dragged and dropped these virtual objects into floor plans, creating realistic three-dimensional interior designs, or "scenes." Each created design, or scene, is stored on Planner 5D's own servers, for later access and use by Planner 5D and the user who created it. Planner 5D's collection of such scenes has mushroomed over the years to many millions of scenes. Users can designate their scenes for inclusion in Planner 5D's public gallery. From these, Planner 5D carefully selects a subset, numbering in the tens of thousands, to display in the public gallery. This curated public gallery contains the scenes that are visible to all users. The remaining scenes in Planner 5D's collection can be accessed or viewed only by Planner 5D or the users who created them.

6. Computer scientists at Princeton were eager to use Planner 5D's uniquely large, uniquely realistic collection of data. They decided to download the entirety of Planner 5D's then-existing public gallery of scenes, as well as all of Planner 5D's individual objects. Planner 5D will need discovery to determine the precise means by which Princeton did so. But on information and belief, they or others acting at their behest used special software tools, including Princeton's own software, specially engineered for this purpose, to access the digital files underlying Planner 5D's objects and scenes. Without these special tools, users could only see and manipulate on-screen images rendered from these data files. For example, users could see an image of a sofa, and drag and position it onto a floor plan for a living room. But the data files from which these images were rendered were always invisible, and wholly inaccessible, to users.

7. On information and belief, using software developer tools, Princeton or its agents monitored and intercepted communications activity between Planner 5D's software and its European servers. Using information extracted from these intercepted communications, together with data-harvesting software of its own creation, Princeton determined the secret Internet addresses where the tens of thousands of Planner 5D's object and scene files were hidden. Princeton's computer code then crawled the location of each of the tens of thousands of addresses, scraping the files it encountered into its unauthorized collection.

8. In this way, Princeton downloaded over five *gigabytes* of Planner 5D data. It then used this data for its scene-recognition activities. Princeton researchers published multiple articles using the data. The authors confessed the data's provenance: "We use a collection of 3D scene models downloaded from the Planner5D website." (*E.g.*, Yinda Zhang, *et al*, *Physically-Based Rendering for Indoor Scene Understanding Using Convolutional Neural Networks 3* (Proceedings of IEEE Conference on Computer Vision and Pattern Recognition, 2017) https://arxiv.org/pdf/1612.07429v2.pdf.) (last visited March 30, 2020).)

9. Princeton also made the stolen data available to researchers at a Princeton URL. Visitors to this URL would fill out a form and agree to certain terms in order to be approved for access to the dataset. Planner 5D will need discovery to determine exactly how many researchers applied to Princeton for access to the data, how many were accepted, who those researchers are, and whether and how their use of the data was restricted. Princeton labeled the stolen data the "SUNCG dataset."

10. Defendants Facebook, Inc. and its subsidiary, Facebook Technologies, LLC (together, Facebook) were also interested in Planner 5D's objects and scenes. Facebook Technologies runs "Oculus," the well-known virtual-reality brand Facebook acquired in 2014. Scene recognition is a vital component of virtual-reality products and services. As one example, "scene fusion"—the fusing of virtual objects with the user's actual surroundings—relies critically on scene-recognition technology.

11. Eager to tap the enormous commercial potential of scene recognition technology, Facebook assembled its own, internal, computer-vision team. This team then enlisted broader aid in its research.

12. Facebook joined with researchers at Princeton, Stanford, UC Berkeley, Georgia Tech, and other institutions to jointly organize and run an international scene-recognition competition called the SUMO Challenge (**S**cene **U**nderstanding and **MO**deling Challenge). Facebook served as the lead sponsor of the SUMO Challenge. (*See* THE 2019 SCENE UNDERSTANDING AND MODELING CHALLENGE, https://sumochallenge.org/ (last visited March 30, 2020).) The first SUMO Challenge was launched in late August, 2018; another was held in 2019.

13. SUMO Challenge entrants were encouraged to submit scene-recognition papers and algorithms. The SUMO Challenge organizers promised contest winners cash prizes and a speaking slot at a "SUMO Challenge conference." To facilitate contestants' work, beginning no earlier than the inaugural SUMO Challenge in mid-2018, Facebook and the other SUMO Challenge organizers created

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