

## PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1  
Stylesheet Version v1.2

EPAS ID: PAT8259237

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| <b>SUBMISSION TYPE:</b>   | NEW ASSIGNMENT                         |
| <b>NATURE OF CONVEYANCE:</b>  | ASSIGNMENT                             |
| <b>CONVEYING PARTY DATA</b>   |  |
| <b>Name</b>   | <b>Execution Date</b>                  |
| FOTONATION CAYMAN LIMITED   | 05/16/2018                             |
| <b>RECEIVING PARTY DATA</b>   |  |
| <b>Name:</b>  | FOTONATION LIMITED                     |
| <b>Street Address:</b>  | CLIONA, BUILDING ONE                   |
| <b>Internal Address:</b>  | PARKMORE EAST BUSINESS PARK, BALLYBRIT |
| <b>City:</b>  | GALWAY                                 |
| <b>State/Country:</b>   | IRELAND                                |
| <b>Postal Code:</b>   | H91R2E9                                |
| <b>PROPERTY NUMBERS Total: 1</b>  |  |
| <b>Property Type</b>  | <b>Number</b>                          |
| <b>Application Number:</b>  | 18153856                               |
| <b>CORRESPONDENCE DATA</b>  |  |
| <b>Fax Number:</b>  | (949)852-0004                          |
| <i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.</i> |  |
| <b>Phone:</b>   | 9498520000                             |
| <b>Email:</b>   | pair@kppb.com                          |
| <b>Correspondent Name:</b>  | KPPB LLP                               |
| <b>Address Line 1:</b>  | 3780 KILROY AIRPORT WAY                |
| <b>Address Line 2:</b>  | SUITE 320                              |
| <b>Address Line 4:</b>  | LONG BEACH, CALIFORNIA 90806           |
| <b>ATTORNEY DOCKET NUMBER:</b>  | P16-05147.CON3                         |
| <b>NAME OF SUBMITTER:</b>   | EMMU ZHOU                              |
| <b>SIGNATURE:</b>   | /Emmu Zhou/                            |
| <b>DATE SIGNED:</b>   | 11/03/2023                             |
| <b>Total Attachments: 17</b>  |  |
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## RECORDATION FORM COVER SHEET PATENTS ONLY

To the Director of the U.S. Patent and Trademark Office: Please record the attached documents or the new address(es) below.

**1. Name of conveying party(ies)**

FotoNation Cayman Limited

Additional name(s) of conveying party(ies) attached?  Yes  No

**2. Name and address of receiving party(ies)**

Name: FotoNation Limited

Internal Address: Parkmore East Business Park, Ballybrit

Street Address: Cliona, Building One

City: Galway

State: \_\_\_\_\_

Country: IE Zip: H91R2E9

Additional name(s) & address(es) attached?  Yes  No

**3. Nature of conveyance/Execution Date(s):**

Execution Date(s) 05/16/2018

- Assignment  Merger  
 Security Agreement  Change of Name  
 Joint Research Agreement  
 Government Interest Assignment  
 Executive Order 9424, Confirmatory License  
 Other \_\_\_\_\_

**4. Application or patent number(s):**

This document serves as an Oath/Declaration (37 CFR 1.63).

A. Patent Application No.(s)

B. Patent No.(s)

18/153,856

Additional numbers attached?  Yes  No

**5. Name and address to whom correspondence concerning document should be mailed:**

Name: KPPB LLP

Internal Address: Suite 320

Street Address: 3780 Kilroy Airport Way

City: Long Beach

State: CA Zip: 90806

Phone Number: 949.852.0000

Docket Number: P16-05147.CON3

Email Address: pair@kppb.com

**6. Total number of applications and patents involved:** 1

**7. Total fee (37 CFR 1.21(h) & 3.41)** \$ \_\_\_\_\_

- Authorized to be charged to deposit account  
 Enclosed  
 None required (government interest not affecting title)

**8. Payment Information**

Deposit Account Number \_\_\_\_\_

Authorized UserName \_\_\_\_\_

**9. Signature:** /David Kaveh/

10-31-2023

Signature

Date

David Kaveh

Name of Person Signing

Total number of pages including cover sheet, attachments, and documents:

**17**

Documents to be recorded (including cover sheet) should be faxed to (571) 273-0140, or mailed to:  
Mail Stop Assignment Recordation Services, Director of the USPTO, P.O.Box 1450, Alexandria, V.A. 22313-1450

**PATENT**  
**REEL: 065458 FRAME: 0697**

## CONFIRMATION OF ASSIGNMENT

### 1. Definitions

The **Assignor** means **FotoNation Cayman Limited**, a Cayman Islands Corporation with registered number 316259 and having its registered address at Cricket Square, Hutchins Drive, P.O. Box 2681, Grand Cayman, KY1-1111, Cayman Islands, and having its place of business at 3025 Orchard Parkway, San Jose, CA 95134, United States, together with any successors in interest.

The **Assignee** means **FotoNation Limited**, an Irish corporation with registered number 276067, having its registered office at Cliona, Building One, Parkmore East Business Park, Ballybrit, Galway H91R2E9, Ireland.

The **Intellectual Property** means the patents and patent applications found in Exhibit A.

### 2. Declarations acknowledging assignment

The **Assignor** was the assignor of record of **The Intellectual Property** prior to January 1, 2017.

The assignment executed by Paul Davis on October 27, 2017 on behalf of the **Assignor** confirms an early assignment effective as of January 1, 2017 that was effective to and did in fact complete the assignment to the **Assignee** on January 1, 2017 of the entire right, title and interest in and to **The Intellectual Property**, including, but not limited to:

- related applications to **The Intellectual Property**;
- the inventions disclosed in the above applications and related applications;
- all priority rights arising out of **The Intellectual Property** under International Agreements, Treaties and Conventions for the protection of intellectual property in its various forms; and
- the right to sue for infringement of any right arising from the filing of **The Intellectual Property** or any related applications to **The Intellectual Property** that occurred prior to the assignment of January 1, 2017.

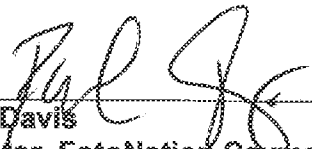
To the extent that any early assignment is deemed ineffective, **Assignor** confirms that they were under obligation to assign, and hereby assigns **The Intellectual Property** and the above described rights to **Assignee**.

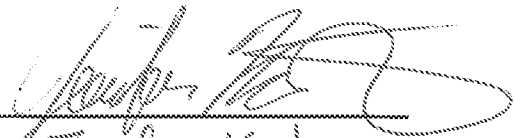
**CONFIRMATION OF ASSIGNMENT**

**3. Authorization to issue patents in name of Assignee**

The assignment executed by Paul Davis on October 27, 2017 on behalf of the Assignor also authorizes and requests the United States Commissioner of Patents and Trademarks, and any officials of foreign countries whose duty it is to issue patents on applications, to issue any patent arising from the assigned rights and/or applications to the Assignee.

IN TESTIMONY WHEREOF, I hereunto set my hand this 16<sup>th</sup> day of May, 2018.

  
\_\_\_\_\_  
Paul Davis  
Director, FotoNation Cayman Limited

Witness:   
\_\_\_\_\_  
Print Name: Jennifer Koshic

**EXHIBIT A**

**TRANSFEROR INTANGIBLES**

| Country Code | Assignee                  | Status   | Application #  | Filing Date | Publication # | Publication Date | Patent #         | Grant Date | Title   |
|--------------|---------------------------|----------|----------------|-------------|---------------|------------------|------------------|------------|---|
| CA           | FotoNation Cayman Limited | Pending  | 2821965        | 12/14/2011  |               |                  |                  |            | System and Methods for Synthesizing High Resolution Images Using Super-Resolution Processes               |
| CA           | FotoNation Cayman Limited | Pending  | 2881131        | 8/21/2013   |               |                  |                  |            | Systems and Methods for Parallax Detection and Correction in Images Captured Using Array Cameras          |
| CN           | FotoNation Cayman Limited | In Force | 200980117890.1 | 5/20/2009   | 102037717     |                  | ZL200980117890.1 | 11/6/2013  | Capturing and Processing of Images Using Monolithic Camera Array with Heterogeneous Imagers               |
| CN           | FotoNation Cayman Limited | In Force | 201310438869.X | 5/20/2009   | 103501416     | 1/8/2014         | ZL201310438869.X | 4/12/2017  | Capturing and Processing of Images Using Monolithic Camera Array with Heterogeneous Imagers               |
| CN           | FotoNation Cayman Limited | In Force | 201280029399.5 | 5/11/2012   | 103765864     | 4/30/2014        | ZL201280029399.5 | 7/4/2017   | Systems and methods for transmitting and receiving array camera image data                                |
| CN           | FotoNation Cayman Limited | Pending  | 201710422675.9 | 5/11/2012   |               |                  |                  |            | Systems and methods for transmitting and receiving array camera image data                                |
| CN           | FotoNation Cayman Limited | Pending  | 201380029203.7 | 5/1/2013    | 104335246     |                  |                  |            | Camera Modules Patterned with pi Filter Groups  |
| CN           | FotoNation Cayman Limited | Pending  | 201380040238.0 | 6/28/2013   | 104508681     |                  |                  |            | Systems and Methods for Detecting Defective Camera Arrays, Optic Arrays and Sensors                       |
| CN           | FotoNation Cayman Limited | In Force | 201380048735.5 | 8/21/2013   | 104662589     | 5/27/2015        | ZL201380048735.5 | 8/4/2017   | Systems and Methods for Parallax Detection and Correction in Images Captured Using Array Cameras          |
| CN           | FotoNation Cayman Limited | Pending  | 201710550511.4 | 8/21/2013   |               |                  |                  |            | Systems and Methods for Parallax Detection and Correction in Images Captured Using Array Cameras          |
| CN           | FotoNation Cayman Limited | In Force | 201280055766.9 | 9/28/2012   | 104081414     | 10/1/2014        | ZL201280055766.9 | 8/1/2017   | Systems and Methods for Encoding and Decoding Light Field Image Files                                     |
| CN           | FotoNation Cayman Limited | Pending  | 201710541440.1 | 9/28/2012   |               |                  |                  |            | Systems and Methods for Encoding and Decoding Light Field Image Files                                     |
| CN           | FotoNation Cayman Limited | Pending  | 201380049828.X | 8/23/2013   | 104685513     |                  |                  |            | Feature Based High Resolution Motion Estimation from Low Resolution Images Captured Using an Array Source |
| CN           | FotoNation Cayman Limited | Pending  | 201580056436.5 | 9/29/2015   |               |                  |                  |            | Systems and Methods for Dynamic Calibration of Array Cameras  |

|    |                            |          |            |            |         |                |  |                |            |  |
|----|----------------------------|----------|------------|------------|---------|----------------|--|----------------|------------|--|
| DE | Limited                    | In Force | 11848308.0 | 12/14/2011 |         |                |  | 2652678        | 9/20/2017  | System and Methods for Synthesizing High Resolution Images Using Super-Resolution Processes      |
| DE | FotoNatio n Cayman Limited | In Force | 11781313.9 | 5/12/2011  | 2569935 | 602011033881.1 |  | 602011033881.1 | 12/28/2016 | Architectures for imager arrays and array cameras  |
| EP | FotoNatio n Cayman Limited | Pending  | 09763194.9 | 5/20/2009  | 2289235 |                |  |                |            | Capturing and Processing of Images Using Monolithic Camera Array with Heterogeneous Imagers      |
| EP | FotoNatio n Cayman Limited | Pending  | 12782935.6 | 5/11/2012  | 2708019 |                |  |                |            | Systems and Methods for Transmitting Array Camera Data   |
| EP | FotoNatio n Cayman Limited | Pending  | 13751714.0 | 2/21/2013  | 2817955 |                |  |                |            | Systems and Methods for the Manipulation of Captured Light Field Image Data                      |
| EP | FotoNatio n Cayman Limited | Pending  | 13810229.8 | 6/28/2013  | 2873028 |                |  |                |            | Systems and Methods for Detecting Defective Camera Arrays, Optic Arrays and Sensors              |
| EP | FotoNatio n Cayman Limited | Pending  | 13830945.5 | 8/21/2013  | 2888720 |                |  |                |            | Systems and Methods for Parallax Detection and Correction in Images Captured Using Array Cameras |
| EP | FotoNatio n Cayman Limited | Pending  | 14763087.5 | 3/17/2014  | 2973476 |                |  |                |            | Systems and Methods for Stereo Imaging with Camera Arrays  |
| EP | FotoNatio n Cayman Limited | Pending  | 14865463.5 | 11/26/2014 | 3075140 |                |  |                |            | Array Camera Configurations Incorporating Multiple Constituent Array Cameras                     |
| EP | FotoNatio n Cayman Limited | Pending  | 14860103.2 | 11/7/2014  | 3066690 |                |  |                |            | Methods of Manufacturing Array Camera Modules Incorporating Independently Aligned Lens Stacks    |
| EP | FotoNatio n Cayman Limited | Pending  | 12835041.0 | 9/28/2012  | 2761534 |                |  |                |            | Systems and Methods for Encoding and Decoding Light Field Image Files                            |
| EP | FotoNatio n Cayman Limited | Pending  | 13841613.6 | 9/30/2013  | 2901671 |                |  |                |            | Generating Images from Light Fields Utilizing Virtual Viewpoints                                 |
| EP | FotoNatio n Cayman Limited | Pending  | 15847754.7 | 9/29/2015  |         |                |  |                |            | Systems and Methods for Dynamic Calibration of Array Cameras                                     |
| FR | FotoNatio n Cayman Limited | In Force | 11848308.0 | 12/14/2011 |         |                |  | 2652678        | 9/20/2017  | System and Methods for Synthesizing High Resolution Images Using Super-Resolution Processes      |
| FR | FotoNatio n Cayman Limited | In Force | 11781313.9 | 5/12/2011  | 2569935 |                |  | 2569935        | 12/28/2016 | Architectures for Imager Arrays and Array Cameras  |
| GB | FotoNatio n Cayman Limited | In Force | 11848308.0 | 12/14/2011 |         |                |  | 2652678        | 9/20/2017  | System and Methods for Synthesizing High Resolution Images Using Super-Resolution Processes      |





|    |                                  |             |                 |            |                 |  |              |            |  |
|----|----------------------------------|-------------|-----------------|------------|-----------------|--|--------------|------------|--|
| KR | FotoNatio<br>n Cayman<br>Limited | In<br>Force | 10-2010-7028308 | 5/20/2009  |                 |  | 10-1588877   | 1/20/2016  | Capturing and Processing of Images Using Monolithic Camera Array with Heterogeneous Imagers                  |
| KR | FotoNatio<br>n Cayman<br>Limited | In<br>Force | 10-2016-7001433 | 5/20/2009  |                 |  | 10-1733443   | 4/28/2017  | Capturing and Processing of Images Using Monolithic Camera Array with Heterogeneous Imagers                  |
| KR | FotoNatio<br>n Cayman<br>Limited | Pendin<br>g | 10-2017-7011490 | 5/20/2009  |                 |  |              |            | Capturing and Processing of Images Using Monolithic Camera Array with Heterogeneous Imagers                  |
| KR | FotoNatio<br>n Cayman<br>Limited | Pendin<br>g | 10-2012-7027121 | 3/17/2011  | 10-2013-0004505 |  |              |            | Fabrication Process for Mastering Image Lens Arrays  |
| KR | FotoNatio<br>n Cayman<br>Limited | Pendin<br>g | 10-2013-7032457 | 5/11/2012  |                 |  |              |            | Systems and Methods for Transmitting Array Camera Data   |
| KR | FotoNatio<br>n Cayman<br>Limited | Pendin<br>g | 10-2015-7002308 | 6/28/2013  |                 |  |              |            | Systems and Methods for Detecting Defective Camera Arrays, Optic Arrays and Sensors                          |
| KR | FotoNatio<br>n Cayman<br>Limited | Pendin<br>g | 10-2015-7006433 | 8/21/2013  |                 |  |              |            | Systems and Methods for Parallax Detection and Correction in Images Captured Using Array Cameras             |
| KR | FotoNatio<br>n Cayman<br>Limited | Pendin<br>g | 10-2012-7032552 | 5/12/2011  |                 |  |              |            | Architectures for Imager Arrays and Array Cameras  |
| KR | FotoNatio<br>n Cayman<br>Limited | Pendin<br>g | 10-2014-7011449 | 9/28/2012  |                 |  |              |            | Systems and Methods for Encoding and Decoding Light Field Image Files  |
| KR | FotoNatio<br>n Cayman<br>Limited | Pendin<br>g | 10-2015-7002415 | 6/14/2013  |                 |  |              |            | Systems and Methods for Manufacturing Camera Modules Using Active Alignment of Lens Stack Arrays and Sensors |
| KR | FotoNatio<br>n Cayman<br>Limited | Pendin<br>g | 2017-7011284    | 9/29/2015  |                 |  |              |            | Systems and Methods for Dynamic Calibration of Array Cameras   |
| SG | FotoNatio<br>n Cayman<br>Limited | In<br>Force | 2010079085      | 5/20/2009  |                 |  | 166239       | 2/28/2011  | Capturing and Processing of Images Using Monolithic Camera Array with Heterogeneous Imagers                  |
| SG | FotoNatio<br>n Cayman<br>Limited | In<br>Force | 2013045703      | 12/14/2011 |                 |  | 191151       | 3/3/2015   | System and Methods for Synthesizing High Resolution Images Using Super-Resolution Processes                  |
| SG | FotoNatio<br>n Cayman<br>Limited | In<br>Force | 2013093141      | 6/25/2012  |                 |  | 2013093141   | 12/2/2014  | Optical Arrangements for Use with an Array Camera  |
| SG | FotoNatio<br>n Cayman<br>Limited | In<br>Force | 11201500910R    | 8/21/2013  |                 |  | 11201500910R | 10/15/2015 | Systems and Methods for Parallax Detection and Correction in Images Captured Using Array Cameras             |
| SG | FotoNatio<br>n Cayman<br>Limited | Pendin<br>g | 10201503516V    | 5/12/2011  |                 |  |              |            | Architectures for Imager Arrays and Array Cameras  |

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|----|---------------------------|----------|------------|------------|--------------|------------|---------|------------|--|
| TW | FotoNation Cayman Limited | ed as ce | 99147177   | 12/31/2010 | 201228382    | 7/1/2012   | 1535292 | 5/21/2016  | Capturing and Processing of Images Using Monolithic Camera Array with Heterogeneous Imagers  |
| US | FotoNation Cayman Limited | In Force | 12/935,504 | 5/20/2009  | 2011-0069189 | 3/24/2011  | 8902321 | 12/2/2014  | Capturing and Processing of Images Using Monolithic Camera Array with Heterogeneous Imagers  |
| US | FotoNation Cayman Limited | In Force | 14/447,477 | 7/30/2014  | 2014-0333787 | 11/13/2014 | 8896719 | 11/25/2014 | Systems and Methods for Parallax Measurement Using Camera Arrays   |
| US | FotoNation Cayman Limited | In Force | 14/447,485 | 7/30/2014  | 2014-0333731 | 11/13/2014 | 9041823 | 5/26/2015  | Incorporating 3 x 3 Camera Configurations Systems and Methods for Performing Post-Capture Refocus Using Images Captured by Camera Arrays |
| US | FotoNation Cayman Limited | In Force | 14/447,494 | 7/30/2014  | 2014-0340539 | 11/20/2014 | 9049390 | 6/2/2015   | Capturing and Processing of Images Captured by Arrays Including Polychromatic Cameras  |
| US | FotoNation Cayman Limited | In Force | 14/447,508 | 7/30/2014  | 2014-0333764 | 11/13/2014 | 9060120 | 6/16/2015  | Systems and Methods for Generating Depth Maps Using Images Captured by Camera Arrays   |
| US | FotoNation Cayman Limited | In Force | 14/459,293 | 8/13/2014  | 2014-0354855 | 12/4/2014  | 9049367 | 6/2/2015   | Systems and Methods for Synthesizing Higher Resolution Images Using Images Captured by Camera Arrays                                     |
| US | FotoNation Cayman Limited | In Force | 14/459,296 | 8/13/2014  | 2014-0354844 | 12/4/2014  | 8885059 | 11/11/2014 | Systems and Methods for Measuring Depth Using Images Captured by Camera Arrays   |
| US | FotoNation Cayman Limited | In Force | 14/475,449 | 9/2/2014   | 2014-0368683 | 12/18/2014 | 9060124 | 6/16/2015  | Capturing and Processing of Images Using Non-Monolithic Camera Arrays  |
| US | FotoNation Cayman Limited | In Force | 14/475,466 | 9/2/2014   | 2014-0368662 | 12/18/2014 | 9049391 | 6/2/2015   | Capturing and Processing of Near-IR Images Including Occlusions Using Camera Arrays  |
| US | FotoNation Cayman Limited | In Force | 14/475,473 | 9/2/2014   | 2014-0368684 | 12/18/2014 | 9060142 | 6/16/2015  | Incorporating Near-IR Light Sources Capturing and Processing of Images Captured by Camera Arrays Including Heterogeneous Optics          |
| US | FotoNation Cayman Limited | In Force | 14/475,477 | 9/2/2014   | 2014-0368685 | 12/18/2014 | 9041829 | 5/26/2015  | Capturing and Processing of High Dynamic Range Images Using Camera Arrays  |
| US | FotoNation Cayman Limited | In Force | 14/497,159 | 9/25/2014  | 2015-0009362 | 1/8/2015   | 9060121 | 6/16/2015  | Capturing and Processing of Images Captured by Camera Arrays Including Cameras Dedicated to Sampling Luma and Chroma                     |
| US | FotoNation Cayman Limited | In Force | 14/497,171 | 9/25/2014  | 2015-0009353 | 1/8/2015   | 9055213 | 6/9/2015   | Systems and Methods for Measuring Depth Using Images Captured by Monolithic Camera Arrays Including at Least One Bayer Camera            |
| US | FotoNation Cayman Limited | In Force | 14/497,180 | 9/25/2014  | 2015-0009354 | 1/8/2015   | 9077893 | 7/7/2015   | Capturing and Processing of Images Captured by Non-Grid Camera Arrays  |
| US | FotoNation Cayman Limited | In Force | 14/704,909 | 5/5/2015   | 2015-0235371 | 8/20/2015  | 9235898 | 1/12/2016  | Systems and Methods for Generating Depth Maps Using Light Focused on an Image Sensor   |

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|----|---------------------------|----------|------------|------------|--------------|-------------|---------|------------|--|
| US | FotoNation Cayman Limited | In Force | 14/988,670 | 1/5/2016   | 20160267665  | 9/15/2016   | 9576369 | 2/21/2017  | Systems and Methods for Generating Depth Maps Using Images Captured by Camera Arrays Incorporating Cameras Having Different Fields of View       |
| US | FotoNation Cayman Limited | In Force | 15/095,930 | 4/11/2016  | 20160227195  | 8/4/2016    | 9485496 | 11/1/2016  | Systems and Methods for Measuring Depth Using Images Captured by a Camera Array Including Cameras Surrounding a Central Camera                   |
| US | FotoNation Cayman Limited | In Force | 15/242,598 | 8/22/2016  | 20170006233  | ument<br>17 | 9712759 | 7/18/2017  | Systems and Methods for Generating Depth Maps Using a Camera Arrays Incorporating Monochrome and Color Cameras                                   |
| US | FotoNation Cayman Limited | Pending  | 15/651,877 | 7/17/2017  |              |             |         |            | Systems and Methods for Generating Depth Maps Using a Camera Arrays Incorporating Monochrome and Color Cameras                                   |
| US | FotoNation Cayman Limited | In Force | 12/967,807 | 12/14/2010 | 2012-0147205 | 6/14/2012   | 878950  | 11/4/2014  | Systems and Methods for Synthesizing High Resolution Images Using Super-Resolution Processes   |
| US | FotoNation Cayman Limited | In Force | 14/519,659 | 10/21/2014 | 2015-0036014 | 2/5/2015    | 9361662 | 6/7/2016   | Systems and Methods for Synthesizing High Resolution Images Using Images Captured by an Array of Independently Controllable Imagers              |
| US | FotoNation Cayman Limited | In Force | 14/520,266 | 10/21/2014 | 2015-0042833 | 2/12/2015   | 9047684 | 6/2/2015   | Systems and Methods for Synthesizing High Resolution Images Using a Set of Geometrically Registered Images                                       |
| US | FotoNation Cayman Limited | In Force | 14/520,269 | 10/21/2014 | 2015-0036015 | 2/5/2015    | 9041824 | 5/26/2015  | Systems and Methods for Dynamic Refocusing of High Resolution Images Generated Using Images Captured by a Plurality of Imagers                   |
| US | FotoNation Cayman Limited | Pending  | 15/170,788 | 6/1/2016   | 20170053382  | 2/23/2017   |         |            | Systems and Methods for Synthesizing High Resolution Images Using Images Captured by an Array of Independently Controllable Imagers              |
| US | FotoNation Cayman Limited | In Force | 12/952,106 | 11/22/2010 | 2011-0122308 | 5/26/2011   | 8514491 | 8/20/2013  | Capturing and Processing of Images Using Monolithic Camera Array with Heterogeneous Imagers  |
| US | FotoNation Cayman Limited | In Force | 13/948,054 | 7/22/2013  | 2013-0308197 | 11/21/2013  | 8861089 | 10/14/2014 | Capturing and Processing of Images Using Monolithic Camera Array with Heterogeneous Imagers  |
| US | FotoNation Cayman Limited | In Force | 14/475,481 | 9/2/2014   | 2014-0368686 | 12/18/2014  | 9264610 | 2/16/2016  | Capturing and Processing of Images Including Occlusions Captured by Heterogeneous Camera Arrays  |
| US | FotoNation Cayman Limited | Pending  | 15/456,931 | 3/13/2017  | 20170187933  | 6/29/2017   |         |            | Capturing and Processing of Images Captured by Camera Arrays Incorporating Cameras with Telephoto and Conventional Lenses To Generate Depth Maps |
| US | FotoNation Cayman Limited | In Force | 12/952,134 | 11/22/2010 | 2011-0080487 | 4/7/2011    | 8866920 | 10/21/2014 | Capturing and Processing of Images Using Monolithic Camera Array with Heterogeneous Imagers  |

|    |                           |          |            |            |              |            |         |            |   |
|----|---------------------------|----------|------------|------------|--------------|------------|---------|------------|---|
| US | FotoNation Cayman Limited | In Force | 14/459,276 | 8/13/2014  | 2014-0354843 | 12/4/2014  | 9049411 | 6/2/2015   | Camera Arrays Incorporating 3 x 3 Imager Configurations   |
| US | FotoNation Cayman Limited | In Force | 14/459,280 | 8/13/2014  | 2014-0347509 | 11/27/2014 | 9124815 | 9/1/2015   | Capturing and Processing of Images Including Occlusions Captured by Arrays of Luma and Chroma Cameras             |
| US | FotoNation Cayman Limited | In Force | 14/459,282 | 8/13/2014  | 2014-0355870 | 12/4/2014  | 9094661 | 7/28/2015  | Systems and Methods for Generating Depth Maps Using A Set of Images Containing A Baseline Image                   |
| US | FotoNation Cayman Limited | In Force | 14/459,283 | 8/13/2014  | 20140354853  |            | 9055233 | 6/9/2015   | Systems and Methods for Synthesizing Higher Resolution Images Using a Set of Images Containing a Baseline Image   |
| US | FotoNation Cayman Limited | In Force | 14/459,286 | 8/13/2014  | 2014-0354854 | 12/4/2014  | 9191580 | 11/17/2015 | Capturing and Processing of Images Including Occlusions Captured by Camera Arrays                                 |
| US | FotoNation Cayman Limited | In Force | 14/459,288 | 8/13/2014  | 2014-0354773 | 12/4/2014  | 9049381 | 6/2/2015   | Systems and Methods for Normalizing Image Data Captured by Camera Arrays  |
| US | FotoNation Cayman Limited | In Force | 14/704,920 | 5/5/2015   | 2015-0234151 | 8/20/2015  | 9188765 | 11/17/2015 | Capturing and Processing of Images Including Occlusions Focused on an Image Sensor by a Lens Stack Array          |
| US | FotoNation Cayman Limited | In Force | 14/943,009 | 11/16/2015 | 20160269650  | 9/15/2016  | 9749547 | 8/29/2017  | Capturing and Processing of Images Using Camera Array Incorporating Bayer Cameras Having Different Fields of View |
| US | FotoNation Cayman Limited | Pending  | 15/687,882 | 8/28/2017  |              |            |         |            | Capturing and Processing of Images Using Camera Array Incorporating Bayer Cameras Having Different Fields of View |
| US | FotoNation Cayman Limited | In Force | 13/050,429 | 3/17/2011  | 2011-0241234 | 10/6/2011  | 8231814 | 7/31/2012  | Fabrication Process for Mastering Image Lens Arrays   |
| US | FotoNation Cayman Limited | In Force | 13/470,252 | 5/11/2012  | 201202877291 | 11/15/2012 | 8305456 | 11/6/2012  | Systems and Methods for Transmitting and Receiving Array Camera Image Data  |
| US | FotoNation Cayman Limited | In Force | 13/668,057 | 11/2/2012  | 2013-0057710 | 3/7/2013   | 8692893 | 4/8/2014   | Systems and Methods for Transmitting and Receiving Array Camera Image Data  |
| US | FotoNation Cayman Limited | In Force | 14/246,948 | 4/7/2014   | 2014-0218546 | 8/7/2014   | 9197821 | 11/24/2015 | Systems and Methods for Transmitting and Receiving Array Camera Image Data  |
| US | FotoNation Cayman Limited | Pending  | 14/936,199 | 11/9/2015  | 20160269626  | 9/15/2016  |         |            | Systems and Methods for Transmitting and Receiving Array Camera Image Data  |
| US | FotoNation Cayman Limited | In Force | 13/106,804 | 5/12/2011  | 2011-0279721 | 11/17/2011 | 8928793 | 1/6/2015   | Imager Array Interfaces   |
| US | FotoNation Cayman Limited | Pending  | 14/880,907 | 10/12/2015 | 20160269627  | 9/15/2016  |         |            | Imager Array Interfaces   |

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|----|----------------------------------|-------------|---------------|----------------|------------------|----------------|---------|----------------|---|
| US | FotoNatio<br>n Cayman<br>Limited | In<br>Force | 13/536,520    | 6/28/2012      | 2013-<br>0003184 | 1/3/2013       | 8804255 | 8/12/2014      | Optical Arrangements for Use with an Array<br>Camera  |
| US | FotoNatio<br>n Cayman<br>Limited | In<br>Force | 14/281,534    | 5/19/2014      | 20140347748      | 9/8/2015       | 9128228 | 9/8/2015       | Optical Arrangements for Use with an Array<br>Camera  |
| US | FotoNatio<br>n Cayman<br>Limited | In<br>Force | 14/705,919    | 5/6/2015       | 2015-<br>0244934 | 8/27/2015      | 9578237 | 2/21/2017      | Array Cameras Incorporating Optics with<br>Modulation Transfer Functions Greater than<br>Sensor Nyquist Frequency for Capture of<br>Images used In Super-Resolution Processing  |
| US | FotoNatio<br>n Cayman<br>Limited | In<br>Force | 14/705,925    | 5/6/2015       | 2015029613<br>7  | 10/15/201<br>5 | 9516222 | 12/6/2016      | Array cameras incorporating monolithic<br>array camera modules with high MTF lens<br>stacks for capture of images used in super-<br>resolution processing   |
| US | FotoNatio<br>n Cayman<br>Limited | In<br>Force | 13/773,284    | 2/21/2013      | 2013021510<br>8  | 8/22/2013      | 9412206 | 8/9/2016       | Systems and Methods for the Manipulation of<br>Captured Light Field Image Data  |
| US | FotoNatio<br>n Cayman<br>Limited | In<br>Force | 14/705,914    | 5/6/2015       | 2015023547<br>6  | 8/20/2015      | 9754422 | 9/5/2017       | Systems and Method for Performing Depth<br>Based Image Editing  |
| US | FotoNatio<br>n Cayman<br>Limited | Pendin<br>g | 15/694,700    | 9/1/2017       |                  |                |         |                | Systems and Method for Performing Depth<br>Based Image Editing  |
| US | FotoNatio<br>n Cayman<br>Limited | In<br>Force | 14/028,278    | 9/16/2013      | 2014-<br>0079336 | 3/20/2014      | 9214013 | 12/15/201<br>5 | Systems and Methods for Correcting User<br>Identified Artifacts in Light Field Images   |
| US | FotoNatio<br>n Cayman<br>Limited | In<br>Force | 14/204,990    | 3/11/2014      |                  |                | 9521416 | 12/13/201<br>6 | Systems and methods for image data<br>compression   |
| US | FotoNatio<br>n Cayman<br>Limited | In<br>Force | 13/875,248    | 5/1/2013       | 2013029376<br>0  | 11/7/2013      | 9210392 | 12/8/2015      | Camera Modules Patterned with PI Filter<br>Groups   |
| US | FotoNatio<br>n Cayman<br>Limited | In<br>Force | 14/952,195    | 11/25/201<br>5 | 2016016514<br>7  | 6/9/2016       | 9706132 | 7/11/2017      | Camera Modules Patterned with PI Filter<br>Groups   |
| US | FotoNatio<br>n Cayman<br>Limited | In<br>Force | ht to<br>.675 | 3/3/2014       |                  |                | 9638883 | 5/2/2017       | Passive alignment of array camera modules<br>constructed from lens stack arrays and<br>sensors based upon alignment information<br>obtained during manufacture of array camera<br>modules using an active alignment process |
| US | FotoNatio<br>n Cayman<br>Limited | In<br>Force | 14/079,510    | 11/13/201<br>3 | 2014-<br>0132810 | 5/15/2014      | 9143711 | 9/22/2015      | Systems and Methods for Array Camera Focal<br>Plane Control   |
| US | FotoNatio<br>n Cayman<br>Limited | In<br>Force | 14/855,715    | 9/16/2015      | 2016024900<br>1  | 8/25/2016      | 9749568 | 8/29/2017      | Systems and Methods for Array Camera Focal<br>Plane Control   |
| US | FotoNatio<br>n Cayman<br>Limited | In<br>Force | 14/200,629    | 3/7/2014       |                  |                | 9445003 | 9/13/2016      | Systems and Methods for Synthesizing High<br>Resolution Images Using Image  |





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|----|---------------------------|----------|------------|------------|-----------------|-----------|---------|------------|---|
| US | FotoNation Cayman Limited | Pending  | 15/287,626 | 10/6/2016  | 2017009946<br>5 | 4/6/2017  |         |            | Extended Color Processing on Pelican Array Cameras  |
| US | FotoNation Cayman Limited | In Force | 14/216,968 | 3/17/2014  | 2014-0267633    | 9/18/2014 | 9438888 | 9/6/2016   | Systems and Methods for Stereo Imaging with Camera Arrays   |
| US | FotoNation Cayman Limited | Pending  | 14/705,885 | 5/6/2015   | 2015024501<br>3 | 8/27/2015 |         |            | Systems and Methods for Estimating Depth Using Stereo Array Cameras   |
| US | FotoNation Cayman Limited | In Force | 14/705,903 | 5/6/2015   | 2015023732<br>9 | 8/20/2015 | 9602805 | 3/21/2017  | Systems and Methods for Estimating Depth using Ad Hoc Stereo Array Cameras  |
| US | FotoNation Cayman Limited | In Force | 14/207,254 | 3/12/2014  | 2014026724<br>3 | 9/18/2014 | 9519972 | 12/13/2016 | Systems and Methods for Synthesizing Images from Image Data Captured by an Array Camera Using Restricted Depth of Field Depth Maps in which Depth Estimation Precision Varies |
| US | FotoNation Cayman Limited | Pending  | 15/376,529 | 12/12/2016 | 2017009424<br>3 | 3/30/2017 |         |            | Systems and Methods for Synthesizing Images from Image Data Captured by an Array Camera Using Restricted Depth of Field Depth Maps in which Depth Estimation Precision Varies |
| US | FotoNation Cayman Limited | In Force | 14/203,308 | 3/10/2014  | 2014-0285675    | 9/25/2014 | 9124831 | 9/1/2015   | System and Methods for Calibration of an Array Camera   |
| US | FotoNation Cayman Limited | In Force | 14/841,694 | 8/31/2015  | 2016016305<br>1 | 6/9/2016  | 9741118 | 8/22/2017  | System and Methods for Calibration of an Array Camera   |
| US | FotoNation Cayman Limited | Pending  | 15/682,064 | 8/21/2017  |                 |           |         |            | System and Methods for Calibration of an Array Camera   |
| US | FotoNation Cayman Limited | In Force | 14/213,697 | 3/14/2014  | 2014-0267829    | 9/18/2014 | 9100586 | 8/4/2015   | Systems and Methods for Photometric Normalization in Array Cameras  |
| US | FotoNation Cayman Limited | Pending  | 14/814,291 | 7/30/2015  | 2016019809<br>6 | 7/7/2016  | 9787911 | 10/10/2017 | Systems and Methods for Photometric Normalization in Array Cameras  |
| US | FotoNation Cayman Limited | In Force | 13/802,507 | 3/13/2013  | 2014-0267890    | 9/18/2014 | 9106784 | 8/11/2015  | Systems and Methods for Controlling Aliasing in Images Captured by an Array Camera for use in Super-Resolution Processing   |
| US | FotoNation Cayman Limited | In Force | 14/814,297 | 7/30/2015  | 2016019573<br>3 | 7/7/2016  | 9733486 | 8/15/2017  | Systems and Methods for Controlling Aliasing in Images Captured by an Array Camera for use in Super-Resolution Processing   |
| US | FotoNation Cayman Limited | In Force | 14/555,279 | 11/26/2014 | 2015-0146029    | 5/28/2015 | 9426361 | 8/23/2016  | Array Camera Configurations Incorporating Multiple Constituent Array Cameras  |
| US | FotoNation Cayman Limited | In Force | 14/555,368 | 11/26/2014 | 2015-0146030    | 5/28/2015 | 9456134 | 9/27/2016  | Array Camera Configurations Incorporating Constituent Array Cameras and Constituent   |



|    | Limited                   |          |            |            |              |            |         |            |  |  | Cameras  |
|----|---------------------------|----------|------------|------------|--------------|------------|---------|------------|--|--|--|
| US | FotoNation Cayman Limited | Pending  | 15/274,830 | 9/23/2016  | 20170078568  | 3/16/2017  |         |            |  |  | Array Camera Configurations Incorporating Constituent Array Cameras and Constituent Cameras  |
| US | FotoNation Cayman Limited | Pending  | 14/500,979 | 9/29/2014  | 20150091900  | 4/2/2015   |         |            |  |  | Systems and Methods for Depth-Assisted Perspective Distortion Correction   |
| US | FotoNation Cayman Limited | In Force | 14/536,537 | 11/7/2014  | 2015-0122411 | 5/7/2015   | 9185276 | 11/10/2015 |  |  | Methods of Manufacturing Array Camera Modules Incorporating Independently Aligned Lens Stacks  |
| US | FotoNation Cayman Limited | In Force | 14/536,552 | 11/7/2014  | 2015-0124151 | 5/7/2015   | 9264592 | 2/16/2016  |  |  | Array Camera Modules Incorporating Independently Aligned Lens Stacks   |
| US | FotoNation Cayman Limited | In Force | 14/536,554 | 11/7/2014  | 2015-0124413 | 5/7/2015   | 9426343 | 8/23/2016  |  |  | Array Cameras Incorporating Independently Aligned Lens Stacks  |
| US | FotoNation Cayman Limited | Pending  | 15/242,405 | 8/19/2016  | 20170070672  | 3/9/2017   |         |            |  |  | Array Cameras incorporating Independently Aligned Lens Stacks  |
| US | FotoNation Cayman Limited | Pending  | 14/547,048 | 11/18/2014 | 20150138346  | 5/21/2015  |         |            |  |  | Systems and Methods for Estimating Depth from Projected Texture using Camera Arrays  |
| US | FotoNation Cayman Limited | In Force | 14/484,154 | 9/11/2014  | 2015-0288861 | 10/8/2015  | 9247117 | 1/26/2016  |  |  | Systems and Methods for Correcting for Warpage of a Sensor Array in an Array Camera Module by Introducing Warpage into a Focal Plane of a Lens Stack Array |
| US | FotoNation Cayman Limited | Pending  | 14/642,637 | 3/9/2015   | 20150254868  | 9/10/2015  |         |            |  |  | System and Methods for Depth Regularization and Semiautomatic Interactive Matting Using RGB-D Images   |
| US | FotoNation Cayman Limited | In Force | 14/593,369 | 1/9/2015   | 20150161798  | 6/11/2015  | 9633442 | 4/25/2017  |  |  | Array cameras including an array camera module augmented with a separate camera  |
| US | FotoNation Cayman Limited | Pending  | 14/724,447 | 5/28/2015  | 20150264337  |            |         |            |  |  | Autofocus System for a Conventional Camera That Uses Depth Information from an Array Camera  |
| US | FotoNation Cayman Limited | In Force | 14/561,925 | 12/5/2014  | 2015-0373261 | 12/24/2015 | 9521319 | 12/13/2016 |  |  | Array Cameras and Array Camera Modules Including Spectral Filters Disposed Outside of a Constituent Image Sensor   |
| US | FotoNation Cayman Limited | Pending  | 14/690,346 | 4/17/2015  | 20160309084  | 10/20/2016 |         |            |  |  | Systems and Methods for Performing High Speed Video Capture and Depth Estimation Using Array Cameras   |
| US | FotoNation Cayman Limited | Pending  | 15/133,186 | 4/19/2016  | 2016-0309134 | 10/20/2016 |         |            |  |  | Multi-Baseline Camera Array System Architecture for Depth Augmentation in VR/AR Applications   |
| US | FotoNation Cayman Limited | Pending  | 15/159,076 | 5/19/2016  | 20170048468  | 2/16/2017  |         |            |  |  | Imager Arrays including an M x N Array of Focal Planes in which Different Types of Focal Planes are Distributed Around a Reference                         |



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|----|---------------------------|----------|-------------------|------------|-------------|------------|---------|--|---|
| US | FotoNation Cayman Limited | Pending  | 15/396,024        | 12/30/2016 | 20170178363 | 6/22/2017  |         |  | Systems and Methods for Decoding Image Files Containing Depth Maps Stored as Metadata                                   |
| US | FotoNation Cayman Limited | Pending  | 14/876,024        | 10/6/2015  | 20160255333 | 9/1/2016   |         |  | Generating Images from Light Fields Utilizing Virtual Viewpoints  |
| US | FotoNation Cayman Limited | Pending  | 14/933,871        | 11/5/2015  | 20160165134 | 6/9/2016   |         |  | Feature Based High Resolution Motion Estimation from Low Resolution Images Captured Using an Array Source               |
| US | FotoNation Cayman Limited | In Force | 15/004,759        | 1/22/2016  | 20160266284 | 9/15/2016  | 9766380 |  | Systems and Methods for Manufacturing Camera Modules Using Active Alignment of Lens Stack Arrays and Sensors            |
| US | FotoNation Cayman Limited | Pending  | 15/707,747        | 9/18/2017  |             |            |         |  | Systems and Methods for Manufacturing Camera Modules Using Active Alignment of Lens Stack Arrays and Sensors            |
| US | FotoNation Cayman Limited | Pending  | 15/515,489        | 9/29/2015  | 20170244960 | 8/24/2017  |         |  | Systems and Methods for Dynamic Calibration of Array Cameras  |
| US | FotoNation Cayman Limited | Pending  | 15/682,295        | 8/21/2017  |             |            |         |  | Systems and Methods for Hybrid Depth Regularization   |
| WO | FotoNation Cayman Limited | Pending  | PCT/US2015/026545 | 4/17/2015  | 2016/167814 | 10/21/2016 |         |  | Systems and Methods for Performing High Speed Video Capture and Depth Estimation Using Array Cameras                    |
| WO | FotoNation Cayman Limited | Pending  | PCT/US2016/028317 | 4/19/2016  | 2016/172125 | 10/27/2016 |         |  | Multi-Baseline Camera Array System Architectures for Depth Augmentation in VR/AR Applications                           |
| WO | FotoNation Cayman Limited | Pending  | PCT/US2017/051637 | 9/14/2017  |             |            |         |  | Optical Systems for Cameras Incorporating Lens Elements Formed Separately and Subsequently Bonded to Low CTE Substrates |