

<b>PATENT ASSIGNMENT COVER SHEET</b>
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 Stylesheet Version v1.2

EPAS ID: PAT6048481

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
Dong Hyuk Woo	02/17/2017
Gregory Michael Thorson	02/17/2017
Andrew Everett Phelps	02/17/2017
Olivier Temam	02/20/2017
Jonathan Ross	03/07/2018
Christopher Aaron Clark	02/17/2017
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	GOOGLE INC.
<b>Street Address:</b>	1600 AMPHITHEATRE PARKWAY
<b>City:</b>	MOUNTAIN VIEW
<b>State/Country:</b>	CALIFORNIA
<b>Postal Code:</b>	94043
<b>PROPERTY NUMBERS Total: 1</b>	
<b>Property Type</b>	<b>Number</b>
<b>Application Number:</b>	16840972
<b>CORRESPONDENCE DATA</b>	
<b>Fax Number:</b>	(877)769-7945
<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>	+1 (202) 626-7730
<b>Email:</b>	apsi@fr.com
<b>Correspondent Name:</b>	ZANE BI
<b>Address Line 1:</b>	FISH & RICHARDSON P.C.
<b>Address Line 2:</b>	P.O.BOX 1022
<b>Address Line 4:</b>	MINNEAPOLIS, MINNESOTA 55440-1022
<b>ATTORNEY DOCKET NUMBER:</b>	16113-8061005
<b>NAME OF SUBMITTER:</b>	LORI L. STEWART
<b>SIGNATURE:</b>	/Lori L. Stewart/
<b>DATE SIGNED:</b>	04/06/2020

**Total Attachments: 6**

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ASSIGNMENT and CONFIRMATION

We, Dong Hyuk Woo, Gregory Michael Thorson, Andrew Everett Phelps, Olivier Temam, Jonathan Ross and Christopher Aaron Clark, each hereby confirm the assignment and transfer to Google Inc., a Delaware corporation having a place of business at 1600 Amphitheatre Parkway, Mountain View, California 94043, and its successors and assigns (collectively, "ASSIGNEE") of all of our individual and joint right, title and interest throughout the world in and to any and all inventions and improvements that are the subject or subjects of a patent application entitled

**PERMUTING IN A MATRIX-VECTOR PROCESSOR**

that names us as inventors, and was filed in United States on April 25, 2017, as application no. 15/496,418. We authorize and request the attorneys filing the application to complete this assignment by inserting the filing date and serial number of the application when known. The foregoing assignment and transfer occurred by operation of one or more agreements relating to our employment by Google Inc. or an affiliate of Google Inc. Should any of us have any remaining interest, we each hereby assign and transfer any right, title or interest we may have in the above-mentioned inventions and improvements anywhere in the world to ASSIGNEE.


This assignment and confirmation includes the foregoing patent application or patent; all legal equivalents thereof in any country and all patents issuing therefrom; all patents, utility models, and design registrations granted for any of said inventions and improvements throughout the world; and the right to claim priority based on the filing date of the foregoing patent application or patent under the International Convention for the Protection of Industrial Property, the Patent Cooperation Treaty, the European Patent Convention, and all other treaties of like purposes. We authorize ASSIGNEE to apply in all countries in our names or in the name of ASSIGNEE for patents, utility models, and design registrations and like rights of exclusion and for inventors' certificates for the assigned inventions and improvements.

The foregoing assignments have been made for good and valuable consideration, the receipt of which is hereby acknowledged, and in accordance with the employment-related agreements existing at the time the above-mentioned inventions and improvements were made.

We hereby represent and covenant that no assignment, agreement or encumbrance has been or will be made or entered into by us that would conflict with the above-mentioned assignment of the inventions and improvements to ASSIGNEE.

We further covenant for ourselves and our respective heirs, legal representatives and assigns to provide to ASSIGNEE promptly upon the request of ASSIGNEE all pertinent facts and documents relating to any of the above-mentioned inventions and improvements, patent applications, patents and legal equivalents, as may be known and accessible to us; to testify as to the same in any interference, litigation, or proceeding relating thereto; and promptly to execute and deliver to ASSIGNEE or its legal representative any and all papers, instruments or affidavits required to apply for, obtain, maintain, issue or enforce any of the above-mentioned applications, inventions and improvements, patents and equivalents thereof which may be necessary or desirable to carry out the purposes thereof.

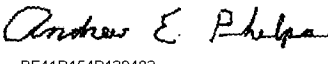
Dated: 2/17/2017

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Dong Hyuk Woo

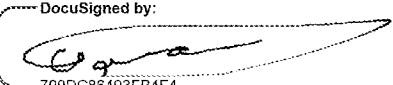
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Gregory Michael Thorson

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Andrew Everett Phelps

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Olivier Temam

Dated: \_\_\_\_\_

Jonathan Ross

Dated: 2/17/2017

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Christopher Aaron Clark

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ASSIGNMENT and CONFIRMATION

I, Jonathan Ross, hereby confirm the sale, assignment and transfer to Google LLC, a Delaware limited liability company having a place of business at 1600 Amphitheatre Parkway, Mountain View, California 94043, and its successors and assigns (collectively, "ASSIGNEE") of all of my right, title and interest throughout the world in and to any and all inventions and improvements that are the subject or subjects of a patent application entitled

**PERMUTING IN A MATRIX-VECTOR PROCESSOR**

that names me as inventor, and was filed in United States on April 25, 2017 as Application No. 15/496,418, and which claims priority to U.S. Provisional Application Serial No. 62/460,394, filed on February 17, 2017, which was previously assigned to Assignee. I authorize and request the attorneys filing the application to complete this assignment by inserting the filing date and serial number of the application when known. The foregoing assignment and transfer occurred by operation of one or more agreements relating to my employment by Google LLC or an affiliate of Google LLC should I have any remaining interest, I hereby assign and transfer any right, title or interest I may have in the above-mentioned inventions and improvements anywhere in the world to ASSIGNEE.

This assignment and confirmation includes the foregoing patent application or patent; all legal equivalents thereof in any country and all patents issuing therefrom; all patents, utility models, and design registrations granted for any of said inventions and improvements throughout the world; and the right to claim priority based on the filing date of the foregoing patent application or patent under the International Convention for the Protection of Industrial Property, the Patent Cooperation Treaty, the European Patent Convention, and all other treaties of like purposes. I authorize ASSIGNEE to apply in all countries in my name or in the name of ASSIGNEE for patents, utility models, and design registrations and like rights of exclusion and for inventors' certificates for the assigned inventions and improvements.

The foregoing assignments have been made for good and valuable consideration, the receipt of which is hereby acknowledged, and in accordance with the employment-related agreements existing at the time the above-mentioned inventions and improvements were made.

I hereby represent and covenant that no assignment, agreement or encumbrance has been or will be made or entered into by me that would conflict with the above-mentioned assignment of the inventions and improvements to ASSIGNEE.

I further covenant for myself and my heirs, legal representatives and assigns to provide to ASSIGNEE promptly upon the request of ASSIGNEE all pertinent facts and documents relating to any of the above-mentioned inventions and improvements, patent applications, patents and legal equivalents, as may be known and accessible to me; to testify as to the same in any interference, litigation, or proceeding relating thereto; and promptly to execute and deliver to ASSIGNEE or its legal representative any and all papers, instruments or affidavits required to apply for, obtain, maintain, issue or enforce any of the above-mentioned applications, inventions and improvements, patents and equivalents thereof which may be necessary or desirable to carry out the purposes thereof.

Dated: 3/7/2018

DocuSigned by:  
*Michael Lee*

Michael 12D303C7414A447... Signatory of Google LLC,  
as attorney-in-fact for Jonathan Ross

## DELEGATION OF AUTHORITY

The undersigned, Kent Walker (the "Grantor"), as Secretary of Google LLC, a Delaware limited liability company (the "Company"), having its principal place of business at 1600 Amphitheatre Parkway, Mountain View, CA 94043, hereby delegates to the person listed below the following authority on a non-exclusive basis, effective October 20, 2017:

Michael Lee

On behalf of the undersigned to sign as an Authorized Signatory:

Any and all written instruments relating to or required in connection with patents or trade secrets domestically and internationally; and all agreements, including but not limited to licenses, settlements, pleadings, joint defense agreements, indemnity letters, engagement letters, conflict waivers, discovery responses, confidentiality agreements, powers of attorney, NDAs, FRE 408 letters, counsel/expert/vendor engagement agreements, counsel sharing agreements, indemnity demands and responses and common interest agreements (collectively, the "Authorized Documents"), relating to any patent-related proceedings, including but not limited to infringement, invalidity and nullity actions, patent office proceedings, protests, and inter partes and ex parte reexamination proceedings, to the extent that the execution and delivery of the Authorized Documents has been approved in accordance with the applicable policies and procedures of the Company.

This Delegation of Authority shall remain effective until the earlier of (i) this Delegation of Authority is revoked in writing by the Grantor or Company, (ii) the Authorized Signatory no longer serves in the same or substantially similar capacity at the Company, as determined by the Company, or (iii) the Authorized Signatory is no longer an employee of the Company.

Upon the occurrence of any of the foregoing events, this Delegation of Authority shall be automatically revoked without any action required by any of the parties hereof or the Company and shall become void and of no further effect.

Signed this 20<sup>th</sup> day of October, 2017.

By: 

Kent Walker, Secretary of Google LLC