

<b>PATENT ASSIGNMENT COVER SHEET</b>
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EPAS ID: PAT8002298

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
CHING-EN LEE	10/07/2019
ANGSHUMAN PARASHAR	12/03/2019
JOEL EMER	12/13/2019
STEPHEN W KECKLER	12/13/2019
YAKUN SHAO	06/12/2018
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	NVIDIA CORP.
<b>Street Address:</b>	2788 SAN TOMAS EXPRESSWAY
<b>City:</b>	SANTA CLARA
<b>State/Country:</b>	CALIFORNIA
<b>Postal Code:</b>	95051
<b>PROPERTY NUMBERS Total: 1</b>	
<b>Property Type</b>	<b>Number</b>
<b>Application Number:</b>	15929093
<b>CORRESPONDENCE DATA</b>	
<b>Fax Number:</b>	(360)294-6426
<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>	3607371748
<b>Email:</b>	jane.clark@rowantelssl.com
<b>Correspondent Name:</b>	CHARLES MIRHO
<b>Address Line 1:</b>	431 H STREET
<b>Address Line 4:</b>	CRESCENT CITY, CALIFORNIA 95531
<b>ATTORNEY DOCKET NUMBER:</b>	FSP1335
<b>NAME OF SUBMITTER:</b>	CHARLES MIRHO
<b>SIGNATURE:</b>	/ CHARLES MIRHO /
<b>DATE SIGNED:</b>	06/12/2023
<b>Total Attachments: 6</b>	
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source=FSP1335PROV\_Assignment\_06122018\_signed#page2.tif  
source=FSP1335PROV\_Assignment\_06122018\_signed#page3.tif

**ASSIGNMENT OF PATENT APPLICATION** Attorney Docket No.: FSP1335

Filed: 1/23/2019

Title: A Deep Neural Network Accelerator With Fine-Grained Parallelism Discovery

For good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, I/we, the undersigned,

Ching-En Lee

Yakun Shao

Angshuman Parashar

Joel Emer

Stephen W. Keckler

hereby sell, assign, and transfer to

**Nvidia Corp.**

having a principal place of business at **2788 San Tomas Expressway, Santa Clara, CA, 95051, USA**, ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all foreign countries, in and to any and all inventions or improvements that are disclosed in the application (provisional or non-provisional) for the United States patent which may have a declaration executed by the undersigned prior hereto or concurrently herewith and is entitled

**A Deep Neural Network Accelerator With Fine-Grained Parallelism Discovery**

said patent application also identified as follows (when known): **15/929,093** filed on **1/23/2019**,

and to each and all of the following applications which claim priority to the above-identified application and to which I, the undersigned, contributed material disclosed and/or claimed:

[I/we hereby authorize an attorney or agent for said Assignee to insert below the application number and filing date of said patent application claiming priority, when known.]

and in and to said application (provisional or non-provisional) and all provisional applications, non-provisional applications, utility applications, design applications, divisional applications, continuation applications, continued prosecution applications, continuation-in-part applications, substitute applications, renewal applications, reissue applications, reexaminations, extensions, and all other patent applications that have been or shall be filed in the United States and all foreign countries on any of said inventions or improvements; and in and to all original patents, reissued patents, reexamination certificates, and extensions, that have been or shall be issued in the United States and all foreign countries on said inventions or improvements; and in and to all rights of priority resulting from the filing of said applications;

agree that said Assignee may apply for and receive a patent or patents for said inventions or improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute all provisional applications, non-provisional applications, utility applications, design applications, divisional applications, continuation applications, continued prosecution applications, continuation-in-part applications, substitute applications, renewal applications, reissue applications, reexaminations, extensions, and all other patent applications on any and all said inventions or improvements;

execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and representatives all facts known to the undersigned relating to said inventions or improvements and the history thereof; and generally assist said Assignee, its successors, assigns, or representatives in securing and maintaining proper patent protection for said inventions or improvements and for vesting title to said inventions or improvements, and all applications for patents and all patents on said inventions or improvements, in said Assignee, its successors, assigns, and legal representatives; and

covenant with said Assignee, its successors, assigns, and legal representatives that no assignment, grant, mortgage, license, or other agreement affecting the rights and property herein conveyed has been made to others by the undersigned, and that full right to convey the same as herein expressed is possessed by the undersigned.

**Each Inventor: Please Sign and Date Below:**

Ching-En Lee

Yakun Shao

Angshuman Parashar

Joel Emer

Stephen W. Keckler

DocuSigned by:  
Ching-En Lee, 10/7/2019 Ching-En Lee  
C07DB66BC9A140D...  
Signature Date Printed/Typed Name

\_\_\_\_\_, \_\_\_\_\_ Yakun Shao  
Signature Date Printed/Typed Name

DocuSigned by:  
Angshuman Parashar, 12/3/2019 Angshuman Parashar  
842E971416914A8...  
Signature Date Printed/Typed Name

DocuSigned by:  
Joel Emer, 12/13/2019 Joel Emer  
4F4108C5EB4D4FF...  
Signature Date Printed/Typed Name

DocuSigned by:  
Stephen W. Keckler, 12/13/2019 Stephen W. Keckler  
CC3F1AD2D7F14EC...  
Signature Date Printed/Typed Name

Assignment Document Return Address:

Nvidia Corp.

2788 San Tomas Expressway

Santa Clara, CA, 95051, USA

**ASSIGNMENT OF PATENT  
APPLICATION**

Attorney Docket No.: FSP1335PROV

Filed: Tuesday, June 5, 2018

Title: Exploiting Unstructured Sparsity in CNN Accelerators via Fine-Grained Parallelism Discovery

For good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, I/we, the undersigned,

Alex Lee

Sophia Shao

Angshuman Parashar

Joel Emer

Stephen Keckler

hereby sell, assign, and transfer to

**NVIDIA Corp.**

having a principal place of business at **2701 San Tomas Expressway, Santa Clara, CA, 95050, USA**, ("Assignee"), and its successors, assigns, and legal representatives, the entire right, title, and interest for the United States and all foreign countries, in and to any and all inventions or improvements that are disclosed in the application (provisional or non-provisional) for the United States patent which may have a declaration executed by the undersigned prior hereto or concurrently herewith and is entitled

**Exploiting Unstructured Sparsity in CNN Accelerators via Fine-Grained Parallelism Discovery**

said patent application also identified as follows (when known):

**62/680,978** filed on **Tuesday, June 5, 2018**,

and to each and all of the following applications which claim priority to the above-identified application and to which I, the undersigned, contributed material disclosed and/or claimed:

[I/we hereby authorize an attorney or agent for said Assignee to insert below the application number and filing date of said patent application claiming priority, when known.]

**Application Number 15/929,093 filed on 01/23/2019**

and in and to said application (provisional or non-provisional) and all provisional applications, non-provisional applications, utility applications, design applications, divisional applications, continuation applications, continued prosecution applications, continuation-in-part applications, substitute applications, renewal applications, reissue applications, reexaminations, extensions, and all other patent applications that have been or shall be filed in the United States and all foreign countries on any of said inventions or improvements; and in and to all original patents, reissued patents, reexamination certificates, and extensions, that have been or shall be issued in the United States and all foreign

countries on said inventions or improvements; and in and to all rights of priority resulting from the filing of said applications;

agree that said Assignee may apply for and receive a patent or patents for said inventions or improvements in its own name; and that, when requested, without charge to, but at the expense of, said Assignee, its successors, assigns, and legal representatives, to carry out in good faith the intent and purpose of this Assignment, the undersigned will execute all provisional applications, non-provisional applications, utility applications, design applications, divisional applications, continuation applications, continued prosecution applications, continuation-in-part applications, substitute applications, renewal applications, reissue applications, reexaminations, extensions, and all other patent applications on any and all said inventions or improvements;

execute all rightful oaths, assignments, powers of attorney, and other papers; communicate to said Assignee, its successors, assigns, and representatives all facts known to the undersigned relating to said inventions or improvements and the history thereof; and generally assist said Assignee, its successors, assigns, or representatives in securing and maintaining proper patent protection for said inventions or improvements and for vesting title to said inventions or improvements, and all applications for patents and all patents on said inventions or improvements, in said Assignee, its successors, assigns, and legal representatives; and

covenant with said Assignee, its successors, assigns, and legal representatives that no assignment, grant, mortgage, license, or other agreement affecting the rights and property herein conveyed has been made to others by the undersigned, and that full right to convey the same as herein expressed is possessed by the undersigned.

**Each Inventor: Please Sign and Date Below:**

Alex Lee

Sophia Shao

Angshuman Parashar

Joel Emer

Stephen Keckler

DocuSigned by: <i>Alex Lee</i>	8/3/2018	___ Alex Lee
C07DB68BC9A140D...	_____	_____
Signature	Date	Printed/Typed Name

DocuSigned by: <i>Hakun Sophia Shao</i>	6/12/2018	___ Sophia Shao
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Signature	Date	Printed/Typed Name

DocuSigned by:  
Angshuman Parashar 9/14/2018  
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\_\_\_\_\_  
Signature Date Printed/Typed Name  
\_ Angshuman Parashar

DocuSigned by:  
Joel Emer 9/13/2018  
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Signature Date Printed/Typed Name  
\_ Joel Emer

DocuSigned by:  
Stephen Keckler 6/12/2018  
CC3F1AD2D7F14EC...  
\_\_\_\_\_  
Signature Date Printed/Typed Name  
\_ Stephen Keckler

Assignment Document Return Address:

NVIDIA Corp.  
2701 San Tomas Expressway  
Santa Clara, CA, 95050, USA