

<b>PATENT ASSIGNMENT COVER SHEET</b>
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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>
MARK I. GARDNER	11/27/2019
H. JIM FULFORD	11/25/2019
JEFFREY SMITH	11/26/2019
LARS LIEBMANN	11/26/2019
DANIEL CHANEMOUGAME	12/04/2019
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	TOKYO ELECTRON LIMITED
<b>Street Address:</b>	AKASAKA BIZ TOWER, 3-1 AKASAKA 5-CHOME, MINATO-KU
<b>City:</b>	TOKYO
<b>State/Country:</b>	JAPAN
<b>Postal Code:</b>	107-6325
<b>PROPERTY NUMBERS Total: 1</b>	
<b>Property Type</b>	<b>Number</b>
<b>Application Number:</b>	16704583
<b>CORRESPONDENCE DATA</b>	
<b>Fax Number:</b>	(703)413-2220
<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>	(703) 413-3000
<b>Email:</b>	ehasan@oblon.com
<b>Correspondent Name:</b>	OBLON, ET AL.
<b>Address Line 1:</b>	1940 DUKE STREET
<b>Address Line 4:</b>	ALEXANDRIA, VIRGINIA 22314
<b>ATTORNEY DOCKET NUMBER:</b>	524627US
<b>NAME OF SUBMITTER:</b>	EMEL HASAN
<b>SIGNATURE:</b>	/Emel Hasan/
<b>DATE SIGNED:</b>	12/05/2019
This document serves as an Oath/Declaration (37 CFR 1.63).	
<b>Total Attachments: 6</b>	

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**DECLARATION (37 CFR 1.63) AND ASSIGNMENT FOR  
NONPROVISIONAL UTILITY OR DESIGN PATENT APPLICATION**

**Title of Invention:** MULTI-DIMENSIONAL PLANES OF LOGIC AND MEMORY FORMATION  
USING SINGLE CRYSTAL SILICON ORIENTATIONS

As a below named inventor, I hereby declare that:

This declaration and assignment is directed to:

The attached application having a docket number and title identified above, or  
United States application number or PCT international application number

\_\_\_\_\_ filed on \_\_\_\_\_

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention  
in the above-identified application.

I have reviewed and understand the contents of the above-identified application,  
including the claims.

I am aware of the duty to disclose to the United States Patent and Trademark Office all  
information known to me to be material to patentability as defined in 37 C.F.R. § 1.56.

I hereby acknowledge that any willful false statement made in this Declaration is  
punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or  
both.

**Assignor(s):** The Assignor(s) is/are the undersigned inventor(s). The inventor(s) named below  
has/have made certain inventions, improvements, and/or discoveries (herein referred to as the  
"Invention") disclosed in the above-identified patent application.

**Assignee:** The Assignee is **Tokyo Electron Limited**, a corporation of Japan having a place of  
business at Tokyo, Japan (herein referred to as the "ASSIGNEE"). The term "ASSIGNEE" used  
herein includes successors, legal representatives, and assigns of the ASSIGNEE. The  
ASSIGNEE desires to acquire the entire worldwide right, title, and interest in and to the  
Invention and in and to any and all patent applications and patents obtained from the Invention.

As an undersigned inventor, I hereby assign to the ASSIGNEE my entire worldwide right,  
title, and interest in and to the Invention, the above-identified United States patent application,  
and any and all other patent applications and patents for the Invention which may be applied for  
or granted therefrom in the United States and in all foreign countries and jurisdictions, including  
all divisions, continuations, reissues, reexaminations, renewals, extensions, counterparts,  
substitutes, and extensions thereof, and all rights of priority resulting from the filing of such  
applications and granting of such patents. In addition, I hereby authorize and request the  
Director of the United States Patent and Trademark Office to issue any United States Patent,  
granted for the invention, to the ASSIGNEE, and I authorize and request foreign patent  
authorities to issue any foreign patent, granted for the Invention, to the ASSIGNEE. The entire  
worldwide right, title, and interest in and to the same to be held and enjoyed by the ASSIGNEE.

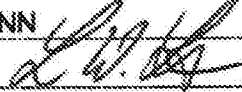
to the full end of the terms for which any and all such patents may be granted, as fully and entirely as would have been held and enjoyed by the undersigned had this Assignment not been made. I agree to execute any and all documents and instruments and perform all lawful acts reasonably related to recording this Assignment or perfecting title to the Invention and all related patents and applications, for the ASSIGNEE, whenever requested by the ASSIGNEE.


As an undersigned inventor, I acknowledge prior and ongoing obligations to sell, assign, and/or transfer my rights in the Invention to the ASSIGNEE. I have not sold, assigned, or otherwise transferred my rights in the Invention to another, and I am under no obligation to sell, assign, or otherwise transfer my rights in the Invention to another. I also hereby grant the ASSIGNEE, the right to insert in this Declaration and Assignment any further identification (including, but not limited to, patent application number and filing date) which may be necessary or desirable for recording this Declaration and Assignment.

(1) Legal name of Inventor: Mark I. GARDNER  
 Inventor's Signature: *Mark I. Gardner* Date: 11/27/2019  
 Residence City/State/Country: Cedar Creek, TX, United States  
 Mailing Address: c/o NanoFab 300 South, 255 Fuller Road, Suite 214, Albany, NY 12203  
 Citizenship: United States

(2) Legal name of Inventor: H. Jim FULFORD  
 Inventor's Signature: *H. Jim Fulford* Date: 11/25/2019  
 Residence City/State/Country: Marianna, FL, United States  
 Mailing Address: c/o NanoFab 300 South, 255 Fuller Road, Suite 214, Albany, NY 12203  
 Citizenship: United States

(3) Legal name of Inventor: Jeffrey SMITH  
 Inventor's Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Residence City/State/Country: Clifton Park, NY, United States  
 Mailing Address: c/o NanoFab 300 South, 255 Fuller Road, Suite 214, Albany, NY 12203  
 Citizenship: United States

(4) Legal name of Inventor: Lars LIEBMANN  
Inventor's Signature:  Date: 11/26/2019  
Residence City/State/Country: Mechanicville, NY, United States  
Mailing Address: c/o NanoFab 300 South, 255 Fuller Road, Suite 214, Albany, NY 12203  
Citizenship: United States

(5) Legal name of Inventor: Daniel CHANEMOUGAME  
Inventor's Signature:  Date: 12/04/2019  
Residence City/State/Country: Niskayuna, NY, United States  
Mailing Address: c/o NanoFab 300 South, 255 Fuller Road, Suite 214, Albany, NY 12203  
Citizenship: United States

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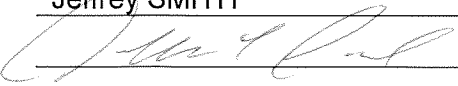
As an undersigned inventor, I hereby assign to the ASSIGNEE my entire worldwide right, title, and interest in and to the Invention, the above-identified United States patent application, and any and all other patent applications and patents for the Invention which may be applied for or granted therefrom in the United States and in all foreign countries and jurisdictions, including all divisions, continuations, reissues, reexaminations, renewals, extensions, counterparts, substitutes, and extensions thereof, and all rights of priority resulting from the filing of such applications and granting of such patents. In addition, I hereby authorize and request the Director of the United States Patent and Trademark Office to issue any United States Patent, granted for the invention, to the ASSIGNEE, and I authorize and request foreign patent authorities to issue any foreign patent, granted for the Invention, to the ASSIGNEE. The entire worldwide right, title, and interest in and to the same to be held and enjoyed by the ASSIGNEE,

to the full end of the terms for which any and all such patents may be granted, as fully and entirely as would have been held and enjoyed by the undersigned had this Assignment not been made. I agree to execute any and all documents and instruments and perform all lawful acts reasonably related to recording this Assignment or perfecting title to the Invention and all related patents and applications, for the ASSIGNEE, whenever requested by the ASSIGNEE.

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 Inventor's Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Residence City/State/Country: Cedar Creek, TX, United States  
 Mailing Address: c/o NanoFab 300 South, 255 Fuller Road, Suite 214, Albany, NY 12203  
 Citizenship: United States

(2) Legal name of Inventor: H. Jim FULFORD  
 Inventor's Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Residence City/State/Country: Marianna, FL, United States  
 Mailing Address: c/o NanoFab 300 South, 255 Fuller Road, Suite 214, Albany, NY 12203  
 Citizenship: United States

(3) Legal name of Inventor: Jeffrey SMITH  
 Inventor's Signature:  Date: 11-26-2019  
 Residence City/State/Country: Clifton Park, NY, United States  
 Mailing Address: c/o NanoFab 300 South, 255 Fuller Road, Suite 214, Albany, NY 12203  
 Citizenship: United States

(4) Legal name of Inventor: Lars LIEBMANN  
Inventor's Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
Residence City/State/Country: Mechanicville, NY, United States  
Mailing Address: c/o NanoFab 300 South, 255 Fuller Road, Suite 214, Albany, NY 12203  
Citizenship: United States

(5) Legal name of Inventor: Daniel CHANEMOUGAME  
Inventor's Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
Residence City/State/Country: Niskayuna, NY, United States  
Mailing Address: c/o NanoFab 300 South, 255 Fuller Road, Suite 214, Albany, NY 12203  
Citizenship: United States