TRADEMARK ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

ETAS ID: TM480437

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	SECURITY INTEREST

CONVEYING PARTY DATA

Name	Formerly	Execution Date	Entity Type
Bionano Genomics, Inc.		06/29/2018	Corporation: DELAWARE

RECEIVING PARTY DATA

Name:	Midcap Financial Trust, as Agent
Street Address:	7255 Woodmont Avenue, Suite 200
City:	Bethesda
State/Country:	MARYLAND
Postal Code:	20814
Entity Type:	Statutory Trust: DELAWARE

PROPERTY NUMBERS Total: 12

Property Type	Number	Word Mark
Registration Number:	4518478	BIONANO GENOMICS
Registration Number:	4544066	IRYS
Registration Number:	4452118	IRYSVIEW
Registration Number:	4502411	IRYSCHIP
Registration Number:	4502412	IRYSPREP
Registration Number:	5045903	BIONANO GENOMICS
Registration Number:	4646747	BIONANO GENOMICS
Registration Number:	5076021	BIONANO GENOMICS
Registration Number:	4708378	IRYSSOLVE
Registration Number:	5439542	BIONANO ACCESS
Registration Number:	5434448	SAPHYR
Registration Number:	5434447	SAPHYR CHIP

CH $315.00 4518478

CORRESPONDENCE DATA

Fax Number: 7036106200

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.

Phone: 7036106100
Email: BoxIP@hoganlovells.com
Correspondent Name: Valerie Brennan of Hogan Lovells US LLP
Address Line 1: 7930 Jones Branch Drive, 9th Floor

Address Line 2:	Attn: Box Intellectual Property
Address Line 4:	McLean, VIRGINIA 22102-3302

ATTORNEY DOCKET NUMBER:	036639.000081
NAME OF SUBMITTER:	Valerie Brennan
SIGNATURE:	/VB/
DATE SIGNED:	07/03/2018

Total Attachments: 25

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INTELLECTUAL PROPERTY SECURITY AGREEMENT

This Intellectual Property Security Agreement is entered into as of the 29th day of June, 2018 by and among **MIDCAP FINANCIAL TRUST**, a Delaware statutory trust (in such capacity, together with its successors and assigns, "Agent") and **BIONANO GENOMICS, INC.** a Delaware corporation (together with any other Person that joins this agreement as a Grantor, each a "Grantor" and collectively, the "Grantors").

RECITALS

A. The Lenders have agreed to make certain advances of money and to extend certain financial accommodation to the Grantors (the "Credit Extensions") in the amounts and manner set forth in that certain Credit and Security Agreement, by and between Agent, the Lenders and the Grantors dated as of the date hereof (as the same may be amended, modified or supplemented from time to time, the "Credit Agreement"; capitalized terms used herein are used as defined in the Credit Agreement). The Lenders are willing to make the Credit Extensions to the Grantors, but only upon the condition, among others, that the Grantors shall grant to Agent, for the ratable benefit of the Lenders, a security interest in certain Copyrights, Trademarks, Patents, and Mask Works (as each term is described below) to secure the obligations of the Grantors under the Credit Agreement.

B. Pursuant to the terms of the Credit Agreement, each Grantor has granted to Agent, for the ratable benefit of the Lenders, a security interest in all of such Grantor's right, title and interest, whether presently existing or hereafter acquired, in, to and under all of the Collateral.

NOW, THEREFORE, for good and valuable consideration, receipt of which is hereby acknowledged, and intending to be legally bound, as collateral security for the prompt and complete payment when due of its obligations under the Credit Agreement, each Grantor hereby represents, warrants, covenants and agrees as follows:

AGREEMENT

To secure its obligations under the Credit Agreement, each Grantor grants and pledges to Agent, for the ratable benefit of the Lenders, a security interest in all of such Grantor's right, title and interest in, to and under its intellectual property (all of which shall collectively be called the "Intellectual Property Collateral"), including, without limitation, the following:

(a) Any and all copyright rights, copyright applications, copyright registrations and like protections in each work or authorship and derivative work thereof, whether published or unpublished and whether or not the same also constitutes a trade secret, now or hereafter existing, created, acquired or held, including without limitation those set forth on Exhibit A attached hereto, as such Exhibit may be amended, modified or supplemented from time to time (collectively, the "Copyrights");

(b) Any and all trade secrets, and any and all intellectual property rights in computer software and computer software products now or hereafter existing, created, acquired or held;

(c) Any and all design rights that may be available to such Grantor now or hereafter existing, created, acquired or held;

(d) Any and all patents, patent applications and like protections including, without limitation, improvements, divisions, continuations, renewals, reissues, extensions and continuations-in-part of the same, including without limitation the patents and patent applications set forth on Exhibit B attached

hereto, as such Exhibit may be amended, modified or supplemented from time to time (collectively, the "Patents");

(e) Any and all trademark and servicemark rights, whether registered or not, applications to register and registrations of the same and like protections, and the entire goodwill of the business of such Grantor connected with and symbolized by such trademarks, including without limitation those set forth on Exhibit C attached hereto, as such Exhibit may be amended, modified or supplemented from time to time, but excluding any Excluded Property (collectively, the "Trademarks");

(f) Any and all mask works or similar rights available for the protection of semiconductor chips, now owned or hereafter acquired, including, without limitation those set forth on Exhibit D attached hereto, as such Exhibit may be amended, modified or supplemented from time to time (collectively, the "Mask Works");

(g) Any and all claims for damages by way of past, present and future infringements of any of the rights included above, with the right, but not the obligation, to sue for and collect such damages for said use or infringement of the intellectual property rights identified above;

(h) All licenses or other rights to use any of the Copyrights, Patents, Trademarks, or Mask Works and all license fees and royalties arising from such use to the extent permitted by such license or rights;

(i) All amendments, extensions, renewals and extensions of any of the Copyrights, Trademarks, Patents, or Mask Works; and

(j) All proceeds and products of the foregoing, including without limitation all payments under insurance or any indemnity or warranty payable in respect of any of the foregoing;

provided, that Intellectual Property Collateral shall not include any Excluded Property.

This security interest is granted in conjunction with the security interest granted to Agent, for the ratable benefit of the Lenders, under the Credit Agreement. The rights and remedies of Agent with respect to the security interest granted hereby are in addition to those set forth in the Credit Agreement and the other Financing Documents, and those which are now or hereafter available to Agent as a matter of law or equity. Each right, power and remedy of Agent provided for herein or in the Credit Agreement or any of the Financing Documents, or now or hereafter existing at law or in equity shall be cumulative and concurrent and shall be in addition to every right, power or remedy provided for herein and the exercise by Agent of any one or more of the rights, powers or remedies provided for in this Intellectual Property Security Agreement, the Credit Agreement or any of the other Financing Documents, or now or hereafter existing at law or in equity, shall not preclude the simultaneous or later exercise by any person, including Agent, of any or all other rights, powers or remedies.

THIS INTELLECTUAL PROPERTY SECURITY AGREEMENT AND ALL DISPUTES AND OTHER MATTERS RELATING HERETO OR THERETO OR ARISING THEREFROM (WHETHER SOUNDING IN CONTRACT LAW, TORT LAW OR OTHERWISE), SHALL BE GOVERNED BY, AND SHALL BE CONSTRUED AND ENFORCED IN ACCORDANCE WITH, THE LAWS OF THE STATE OF NEW YORK, WITHOUT REGARD TO CONFLICTS OF LAWS PRINCIPLES (OTHER THAN SECTION 5-1401 OF THE GENERAL OBLIGATIONS LAW).

EACH GRANTOR AND AGENT HEREBY IRREVOCABLY WAIVE ANY AND ALL RIGHT TO TRIAL BY JURY IN ANY LEGAL ACTION OR PROCEEDING ARISING OUT OF OR

RELATING TO THIS INTELLECTUAL PROPERTY SECURITY AGREEMENT AND AGREES THAT ANY SUCH ACTION OR PROCEEDING SHALL BE TRIED BEFORE A COURT AND NOT BEFORE A JURY. EACH GRANTOR AND AGENT ACKNOWLEDGES THAT THIS WAIVER IS A MATERIAL INDUCEMENT TO ENTER INTO A BUSINESS RELATIONSHIP, THAT EACH HAS RELIED ON THE WAIVER IN ENTERING INTO THIS AGREEMENT, AND THAT EACH WILL CONTINUE TO RELY ON THIS WAIVER IN THEIR RELATED FUTURE DEALINGS. EACH GRANTOR AND AGENT WARRANTS AND REPRESENTS THAT IT HAS HAD THE OPPORTUNITY OF REVIEWING THIS JURY WAIVER WITH LEGAL COUNSEL, AND THAT IT KNOWINGLY AND VOLUNTARILY WAIVES ITS JURY TRIAL RIGHTS.

This Intellectual Property Security Agreement may be signed in any number of counterparts, each of which shall be deemed an original and all of which when taken together shall constitute one and the same instrument. Delivery of an executed counterpart of this Intellectual Property Security Agreement by facsimile or by electronic mail delivery of an electronic version (e.g., .pdf or .tif file) of an executed signature page shall be effective as delivery of an original executed counterpart hereof and shall bind the parties hereto.

The provisions of the Credit Agreement regarding choice of law, jurisdiction, and venue are incorporated herein and shall govern this Intellectual Property Security Agreement. This Intellectual Property Security Agreement shall inure to the benefit of Agent, the Lenders and their respective successors and assigns, and shall be binding upon each Grantor and its successors and assigns.

[Signature page follows.]

IN WITNESS WHEREOF, the parties have caused this Intellectual Property Security Agreement to be duly executed by its officers thereunto duly authorized as of the first date written above.

GRANTOR:

BIONANO GENOMICS, INC.

By: _____
Name: R. Erik Holmlin
Title: Chief Executive Officer

BioNano Genomics, Inc.
9640 Towne Centre Dr., #100,
San Diego, CA 92121
Attention: Erik Holmlin
Telephone: (858) 888- 7637
Fax: (858) 408-3493
Email: eholmlin@bionanogenomics.com

AGENT:

MIDCAP FINANCIAL TRUST

By: Apollo Capital Management, L.P.,
its investment manager

By: Apollo Capital Management GP, LLC,
its general partner

By: _____
Name: Maurice Amsellem
Title: Authorized Signatory

EXHIBIT A

COPYRIGHTS

None.

Exhibit B

TRADEMARKS

Trademark Name	Country	Status	Application No.	Reg Date	Reg No
BIONANO GENOMICS	US	Registered	85/677046	04/22/14	4518478
BIONANO GENOMICS	LB	Registered	9856	11/29/12	146661
BIONANO GENOMICS	WO	Registered	1147820	01/10/13	1147820
IRYS	AU	Pending	1150083		
IRYS	CN	Registered	1150083	01/09/13	1150083
IRYS	EM	Registered	1150083	01/09/13	1150083
IRYS	JP	Pending	1150083		
IRYS	KR	Pending	1150083		
IRYS	US	Registered	85/677024	06/3/14	4544066
IRYS	HK	Published	303501017		
IRYS	TW	Pending	104048282		
IRYS	WO	Registered	1150083	01/09/13	1150083
IRYSVIEW	AU	Published	1151113		
IRYSVIEW	CN	Pending	1151113		
IRYSVIEW	EM	Registered	1151113	01/10/13	1151113
IRYSVIEW	JP	Pending	1151113		
IRYSVIEW	KR	Pending	1151113		
IRYSVIEW	US	Registered	86/677059	12/17/13	4452118
IRYSVIEW	HK	Published	303501026		
IRYSVIEW	TW	Pending	104048283		
IRYSVIEW	WO	Registered	1151113	01/10/13	1151113
IRYSCHIP	AU	Pending	1150576		1150576
IRYSCHIP	CN	Registered	1150576	01/10/13	1150576
IRYSCHIP	EM	Registered	1150576	01/10/13	1150576
IRYSCHIP	JP	Pending	1150576		
IRYSCHIP	KR	Pending	1150576		
IRYSCHIP	US	Registered	86/677063	03/25/14	4502411
IRYSCHIP	HK	Published	303500991		
IRYSCHIP	TW	Pending	104048284		
IRYSCHIP	WO	Registered	1150576	01/10/13	1150576
IRYSPREP	AU	Published	1161517		
IRYSPREP	CN	Registered	1161517	01/10/13	1161517
IRYSPREP	EM	Registered		01/10/13	1161517
IRYSPREP	JP	Pending	1161517		

IRYSPREP	KR	Pending	1161517		
IRYSPREP	US	Registered	85/677075	03/25/14	4502412
IRYSPREP	HK	Published	303501035		
IRYSPREP	TW	Pending	104048286		
IRYSPREP	WO	Registered	1161517	01/10/13	1161517
(IRYS in Chinese Characters)	CN	Registered	12190539	03/21/15	12190539
BIONANO GENOMICS	CN	Pending	1219073		
BIONANO GENOMICS	US	Registered	86/050497	09/20/13	5045903
BIONANO GENOMICS	US	Registered	86/975215	11/25/14	4646747
BIONANO GENOMICS	AU	Pending	1713142		
BIONANO GENOMICS	HK	Published	303501044		
BIONANO GENOMICS	JP	Pending	2015-077618		
BIONANO GENOMICS	KR	Pending	45-2015-0007523		
BIONANO GENOMICS	TW	Pending	104048287		
BIONANO GENOMICS	WO	Registered	1219073	11/22/13	1219073
BIONANO GENOMICS (design)	CN	Pending	1267947		
BIONANO GENOMICS (design)	EM	Published	1267947		
BIONANO GENOMICS (design)	US	Registered	86/361387	11/08/16	5076021
BIONANO GENOMICS (design)	AU	Pending	1717010		
BIONANO GENOMICS (design)	HK	Published	303501053		
BIONANO GENOMICS (design)	JP	Pending	2015-081992		
BIONANO GENOMICS (design)	KR	Pending	45-2015-0008130		
BIONANO GENOMICS (design)	TW	Pending	104048290		
BIONANO GENOMICS (design)	WO	Registered	1267947	02/03/15	1267947
BIONANO GENOMICS	CN	Registered	14408014	05/28/15	14408014
IRYSSOLVE	AU	Published	1253507		
IRYSSOLVE	CN	Pending	1253507		
IRYSSOLVE	EM	Pending	1253507		
IRYSSOLVE	JP	Pending	1253507		
IRYSSOLVE	KR	Pending	1253507		
IRYSSOLVE	US	Registered	86/400672	03/24/15	4708378

IRYSSOLVE	HK	Published	303501008		
IRYSSOLVE	TW	Pending	104048293		
IRYSSOLVE	WO	Registered	1253507	03/11/15	1253507
BIONANO ACCESS	US	Registered	87/375426	04/03/18	5439542
SAPHYR	US	Registered	87/314801	03/27/18	5434448
SAPHYR CHIP	US	Registered	87/314787	03/27/2018	5434447

EXHIBIT C

PATENTS

Title	Country	Filing/Pub/Grant No.	Filing/Pub/Grant Date	Status
Nanonozzle device arrays: their preparation and use for macromolecular analysis	US	12/374141 2009/0305273 9061907	7/19/07 12/10/09 6/23/15	Issued
Nanonozzle device arrays: their preparation and use for macromolecular analysis	US	14/712816 US2015/0323518	5/14/15 11/12/15	Pending
Nanonozzle device arrays: their preparation and use for macromolecular analysis	WO	PCT/US07/16408 WO/2008/079169	7/19/07 7/3/08	Converted (expired)
Nanonozzle device arrays: their preparation and use for macromolecular analysis	AU	2007338862 AU2007338862	7/19/07 5/24/14	Issued
Nanonozzle device arrays: their preparation and use for macromolecular analysis	CA	CA2658122 CA2658122	7/19/2007 9/2/14	Issued
Nanonozzle device arrays: their preparation and use for macromolecular analysis	CN	201310054745.1 CN103203256A ZL201310054745.1	2/20/13 7/17/13 9/23/15	Issued
Nanonozzle device arrays: their preparation and use for macromolecular analysis	EP	EP2007872156 EP2049262	7/19/07 4/22/09	Pending
Nanonozzle device arrays: their preparation and use for macromolecular analysis	JP	2014-089510 2014-158493A	4/23/14 9/4/14	Pending
Nanonozzle device arrays: their preparation and use for macromolecular analysis	SG	2011-05244-6 173398 173398	7/19/07 8/29/11 3/12/15	Issued
Methods of macromolecular analysis using nanochannel arrays	US	12/057,987 2008/0242556 US8,722,327	3/28/08 10/2/08 5/13/14	Issued
Methods of macromolecular analysis using nanochannel arrays	US	14/195,474 2014/0249039	3/3/14 9/4/14	Pending
Methods of macromolecular analysis using nanochannel arrays	WO	PCT/US2008/058671 WO/2008/121828	3/28/08 10/9/08	Converted (expired)
Methods of macromolecular analysis using nanochannel arrays	AU	2008232616 2008232616	3/28/08 2/18/10 11/20/14	Issued
Methods of macromolecular analysis using nanochannel arrays	AU	2014256367	10/30/14	Pending
Methods of macromolecular analysis using nanochannel arrays	CA	2682275	3/28/08	Pending
Methods of macromolecular	CN	ZL2008800017550.70	3/28/2008	Issued

analysis using nanochannel arrays		CN101765462A ZL2008800017550.7	6/30/10 6/5/13	
Methods of macromolecular analysis using nanochannel arrays	CN	201310189106.60 CN 103305402A	5/21/13 9/18/13	Pending
Methods of macromolecular analysis using nanochannel arrays	EP	2008-744609.2 EP2136922 EP2136922	3/28/08 12/30/09 12/5/12	Issued
Methods of macromolecular analysis using nanochannel arrays	UK			Issued
Methods of macromolecular analysis using nanochannel arrays	FR			Issued
Methods of macromolecular analysis using nanochannel arrays	DE			Issued
Methods of macromolecular analysis using nanochannel arrays	SE			Issued
Methods of macromolecular analysis using nanochannel arrays	EP	2013150068.8 EP2604344	1/2/13 6/19/13	Pending
Methods of macromolecular analysis using nanochannel arrays	JP	2010-501259 JP5491378	3/28/08 3/7/14	Issued
Methods of macromolecular analysis using nanochannel arrays	JP	2013-258107 P2014-97058A	2/13/13 5/29/14	Pending
Methods of macromolecular analysis using nanochannel arrays	KR	10-2009-7022447 10-1522741	3/28/08 5/18/25	Issued
Methods of macromolecular analysis using nanochannel arrays	SG	2012-02082-2 179524 179524	3/28/08 4/27/12 9/23/15	Issued
Methods and devices for single molecule whole genomic analysis	US	13/001,697 2011/0171634 US8,628,919	3/22/11 7/14/11 1/14/14	Issued
Methods and devices for single molecule whole genomic analysis	US	13/765,353 US2013/0240357	2/12/13 9/19/13	Pending
Methods and devices for single molecule whole genomic analysis	WO	PCT/US2009/049244 WO/2010/002883	6/30/09 1/7/10	Converted (expired)
Methods and devices for single molecule whole genomic analysis	AU	2009267086	6/30/09	Pending
Methods and devices for single molecule whole genomic analysis	CA	CA2729159	6/30/09	Pending
Methods and devices for single molecule whole genomic analysis	CN	2009-80125335.30 CN 102292451A	6/30/09 12/21/2011	Pending

Methods and devices for single molecule whole genomic analysis	EP	EP09774334.8 EP2318547	6/30/09 5/11/11	Pending
Methods and devices for single molecule whole genomic analysis	EP	EP13179160.0 EP2664677	9/2/13 11/20/13	Pending
Methods and devices for single molecule whole genomic analysis	HK	2012-105208.3 1166108A	6/30/09 10/19/12	Pending
Methods and devices for single molecule whole genomic analysis	JP	2011-516813 5730762	6/30/09 4/17/15	Issued
Methods and devices for single molecule whole genomic analysis	JP	2015-078505 P2015-163073A	4/7/15 9/10/15	Pending
Integrated analysis devices, fabrication methods and analysis techniques	US	12/996,410 2011/0296903	2/6/11 12/8/11	Pending
Integrated nanofluidic analysis devices, fabrication methods and analysis techniques	WO	PCT/US2009/046427 WO/2009/149362	6/5/09 12/10/09	Converted (expired)
Integrated nanofluidic analysis devices, fabrication methods and analysis techniques	AU	2009256064 2009256064	6/5/09 08/13/15	Issued
Integrated nanofluidic analysis devices, fabrication methods and analysis techniques	AU	2015205826	07/20/15	Pending
Integrated nanofluidic analysis devices, fabrication methods and analysis techniques	CA	2727095	6/5/09	Pending
Integrated nanofluidic analysis devices, fabrication methods and analysis techniques	CN	2009-80130482.X CN 102369059A ZL200980130482.X	6/5/09 03/07/12 09/24/14	Issued
Integrated nanofluidic analysis devices, fabrication methods and analysis techniques	CN	CN201410462892.7 CN 104359874A	9/12/12 02/18/15	Pending
Integrated nanofluidic analysis devices, fabrication methods and analysis techniques	EP	2009759520 EP2296813	6/5/09 03/23/11	Pending
Integrated nanofluidic analysis devices, fabrication methods and analysis techniques	HK	11109208.6 1154827A	6/5/09 5/4/12	Pending
Integrated nanofluidic analysis devices, fabrication methods and analysis techniques	HK	15107980.0	8/18/15	Pending
Integrated nanofluidic analysis devices, fabrication methods and analysis techniques	JP	2011-512694	6/5/09	Pending
Integrated nanofluidic analysis devices, fabrication methods and analysis techniques	JP	2014-233087 2015-96854A	11/17/14 5/21/15	Pending

Integrated nanofluidic analysis devices, fabrication methods and analysis techniques	SG	2010-08920-9 167147 167147	6/5/2009 1/28/11 7/31/13	Issued
Integrated nanofluidic analysis devices, fabrication methods and analysis techniques	KR	10-2011-7000192	6/5/09	Pending
Integrated nanofluidic analysis devices, fabrication methods and analysis techniques	KR	10-2016-7001826	1/21/16	Pending
Polynucleotide mapping and sequencing	US	13/129634 2011/0306504 9181578	6/23/2011 12/15/11 11/10/15	Issued
Methods and devices for single molecule whole genomic analysis	US	14/877818	10/7/15	Pending
Polynucleotide mapping and sequencing	WO	PCT/US2009/064996 WO/2010/059731	11/18/09 5/27/2010	Converted (expired)
Polynucleotide mapping and sequencing	AU	209316628	11/18/09 9/8/11	Pending
Polynucleotide mapping and sequencing	CA	2744064	11/18/09	Pending
Polynucleotide mapping and sequencing	CN	2009-80154567.1 CN10229454A ZL200980154567.1	11/18/09 12/21/11 11/26/14	Issued
Polynucleotide mapping and sequencing	CN	201410584764.X 104372080A	10/27/14 2/25/15	Pending
Polynucleotide mapping and sequencing	EP	2009-760398.9 EP2370594 EP2370594	11/18/2009 10/5/11 1/8/14	Issued
Polynucleotide mapping and sequencing	GB	2009-760398.9	11/18/09	Issued
Polynucleotide mapping and sequencing	DE	2009-760398.9	11/18/09	Issued
Polynucleotide mapping and sequencing	HK	12105207.4 1166107A HK1166107	11/18/09 10/19/12 9/25/15	Issued
Polynucleotide mapping and sequencing	CN	15108141.4	8/21/15 1/29/16	Pending
Polynucleotide mapping and sequencing	JP	2011537585 P2012-509083A	11/18/09 4/19/12	Allowed
Polynucleotide mapping and sequencing	JP	2015-227656	11/18/15	Pending
Polynucleotide mapping and sequencing	SG	2011-03550-8 SG171,325 SG171,325	11/18/09 7/28/11 11/29/13	Issued
Devices and methods for dynamic determination of sample spatial orientation and dynamic repositioning	WO	PCT/US2010/035253 WO/2010/135323	5/18/2010 11/25/10	Converted (expired)

Devices and methods for dynamic determination of sample spatial orientation and dynamic repositioning	EP	EP2010725926 EP2433087 EP2433087	5/18/10 3/28/12 1/21/15	Issued
Systems and methods for assessing biomolecule characteristics	WO	PCT/US2011/057115 WO/2012/054735	10/20/11 4/26/12	Converted (expired)
Nanoanalyzer Systems and Methods	US	13/880,365 2014/0030705	4/18/2013 1/30/2014	Pending
Nanoanalyzer Systems and Methods	AU	2011316989	4/18/13	Pending
Systems and methods for assessing biomolecule characteristics	CA	2815359	4/18/13	Pending
Systems and methods for assessing biomolecule characteristics	CN	CN103443290A CN201180060380.2	12/11/2013 6/14/2013	Pending
Systems and methods for assessing biomolecule characteristics	HK	HK 14105511.3 HK 1192287A	6/11/14	Pending
Systems and methods for assessing biomolecule characteristics	EP	EP11777008.1 EP2630258	5/16/13 8/28/13	Pending
Systems and methods for assessing biomolecule characteristics	JP	2013-535092 2013-542730A	4/17/13 11/28/13	Pending
Systems and methods for assessing biomolecule characteristics	KR	10-2013-7012549	5/13/13	Pending
Systems and methods for assessing biomolecule characteristics	SG	10201508373U	10/9/15	Pending
Systems and methods for assessing biomolecule characteristics	RU	2003/117936	4/18/13	Pending
Physical Map Construction of Whole Genome and Pooled Clone Mapping In Nano-Channel Array	US	13/606,819	9/7/12	Pending
Nanochannel arrays and near-field illumination devices for polymer analysis and related methods	US	13/498846 2012/0244635	9/27/10 9/27/12	Pending
Nanochannel arrays and near-field illumination devices for polymer analysis and related methods	WO	PCT/US2010/050362 WO/2011/038327	9/27/10 3/31/11	Converted (expired)
Nanochannel arrays and near-field illumination devices for polymer analysis and related methods	HK	13102315.9 1175215A	2/25/2013 6/28/2013	Pending

Nanochannel arrays and near-field illumination devices for polymer analysis and related methods	CN	2010-80043518.3	9/27/10	Pending
Methods and related devices for single molecule whole genomic analysis	PCT	PCT/US 10/53513 WO2011/050147	10/21/10 4/28/11	Converted (expired)
Methods and related devices for single molecule whole genomic analysis	JP	2012535362 JP2013-507946A	10/21/2010 3/7/13	Pending
Methods for single-molecule analysis	US	14/171,369 US2014/0221218	2/4/2014 8/7/14	Pending
Methods for single-molecule analysis	AU	2014215586	8/5/15	Pending
Methods for single-molecule analysis	CA	2900054	7/31/15	Pending
Methods for single-molecule analysis	CN	201480007595.1 CN105143462A	8/5/15 12/9/15	Pending
Methods for single-molecule analysis	EP	14748636.9 2954069	8/28/15 12/16/15	Pending
Methods for single-molecule analysis	JP	2015-556985	8/5/15	Pending
Methods for single-molecule analysis	US	14/765537 US2015/036706	8/3/15 12/24/15	Pending
Methods for single-molecule analysis	WO	PCT/US2014/014501 WO2014/123822	2/14/14 8/14/14	Pending
Characterization of Molecules in Nanofluidics	WO	PCT/US2014/17226	2/19/14	Pending
Characterization of Molecules in Nanofluidics	US	14/768422	8/17/15	Pending
Characterization of Molecules in Nanofluidics	AU	2014219001	9/15/15	Pending
Characterization of Molecules in Nanofluidics	CA	2901460	8/14/15	Pending
Characterization of Molecules in Nanofluidics	CN	201480009730.6	8/20/15	Pending
Characterization of Molecules in Nanofluidics	EP	14753475.4 2959015	9/18/15 12/30/15	Pending
Characterization of Molecules in Nanofluidics	JP	2015-558929	8/20/15	Pending
System for Nanoanalysis	RU	2013140977 RU142580	8/2/2013 5/27/14	Issued
System for Nanoanalysis	WO	PCT/US2014/049442 WO 2015/017801	8/1/14 2/5/15	Pending
Analysis of Polynucleotides	WO	PCT/US14/41568	6/9/14	Pending
Analysis of Polynucleotides	US	14/897213	12/9/15	Pending
Analysis of Polynucleotides	CN	Filing instructed		
Analysis of Polynucleotides	EP	14811715.3	1/7/16	Pending
Analysis of Polynucleotides	JP	Filing instructed		
Processing of Polynucleotides	US	61/949,464	3/7/14	Pending

Processing of Polynucleotides	WO	PCT/US2015/019027 WO2015/134785	3/5/15	Pending
Improved Methods of Determining Nucleic Acid Structural Information	WO	PCT/US2015/016194 WO2015/126840	2/17/15 8/27/15	Pending
Photocleavage method and apparatus to clean fluidic devices	WO	PCT/US2015/047688	8/31/15	Pending
Isolation of Megabase DNA from Plant and Animal Tissue	US	14/802659 2016/0017316	7/17/15 1/21//16	Pending
Reduction of bias in genomic coverage measurements	US	PCT/US2015/017356 WO 2015/130696	2/24/15 9/3/15	Pending
EMBEDDED NOBLE METAL ELECTRODES IN	US	14952161 9804122	11/25/2015 10/31/2017	Issued
EMBEDDED NOBLE METAL ELECTRODES IN	US	14928596	10/30/2015	Pending
REDUCTION OF BIAS IN GENOMIC COVERAGE MEASUREMENTS	US	15117689	08/09/2016	Pending
PROCESSING OF POLYNUCLEOTIDES	US	15123457	09/02/2016	Pending
METHODS AND DEVICES FOR SINGLE-MOLECULE WHOLE GENOME ANALYSIS	US	15381787	12/16/2016	Pending

Assignee: The Trustees of Princeton University

Nanochannel Arrays and preparation and use for the High Throughput Macromolecular Analysis	US	10/484,293 7,670,770	7/25/2002 3/2/2010	Issued
Nanochannel Arrays and preparation and use for the High Throughput Macromolecular Analysis	US	14/081,322	11/14/13	Pending
Nanochannel Arrays and preparation and use for the High Throughput Macromolecular Analysis	US	14/223,589 US2014/0206555	3/24/2014 7/24/14	Pending
Nanochannel Arrays and preparation and use for the High Throughput Macromolecular Analysis	US	12/261,406 2010/0029508 US8,652,828	10/30/2008 2/4/2010 2/18/2014	Issued
Nanochannel Arrays and preparation and use for the High Throughput Macromolecular Analysis	WO	PCT/US02/23610 WO03/010289	7/25/2002 2/6/2003	Converted
Nanochannel Arrays and preparation and use for the High Throughput	CA	2,454,570	7/25/02	Pending

Macromolecular Analysis				
Nanochannel Arrays and preparation and use for the High Throughput Macromolecular Analysis	EP	EP2002773158.7 EP1417474	7/25/02	Pending
Nanochannel Arrays and preparation and use for the High Throughput Macromolecular Analysis	HK	410897.1	7/25/02	Pending
Nanochannel Arrays and preparation and use for the High Throughput Macromolecular Analysis	IL	159865 IL159865	1/14/2004 1/04/2014	Granted
Nanochannel Arrays and preparation and use for the High Throughput Macromolecular Analysis	IL	204817 IL204817	3/28/2010 12/25/2012	Granted
Nanochannel Arrays and preparation and use for the High Throughput Macromolecular Analysis	IL	IL229805	12/5/13	Pending
Nanochannel Arrays and preparation and use for the High Throughput Macromolecular Analysis	JP	2008225406 JP5175148	7/25/02	Granted
Nanochannel Arrays and their preparation and use for the High Throughput Macromolecular Analysis	JP	2012-222956 JP5236110	4/5/13 10/4/2012	Granted
Nanochannel Arrays and their preparation and use for the High Throughput Macromolecular Analysis	SG	200400310.9 SG102299	7/25/2002 4/28/06	Granted
Nanochannel Arrays and their preparation and use for the High Throughput Macromolecular Analysis	SG	200600539.1 SG169225	7/25/2002 7/15/2011	Granted
Nanochannel Arrays and their preparation and use for the High Throughput Macromolecular Analysis	SG	201103739-7	7/25/02	Pending
Gradient Structures Interfacing Microfluidics and Nanofluidics, Methods of Fabrication and Uses	US	10/414,620 US7,217,562	4/16/2003 5/15/2007	Issued
Gradient Structures Interfacing Microfluidics and Nanofluidics, Methods of Fabrication and Uses	US	11/536,178 US8,333,934	9/28/2006 12/18/12	Issued
Gradient Structures Interfacing Microfluidics and Nanofluidics, Methods of Fabrication and Uses	US	13/675,685 US20140030811	11/13/2012 1/30/14	Pending

Gradient Structures Interfacing Microfluidics and Nanofluidics, Methods of Fabrication and Uses	WO	PCT/US03/11721 WO/2003/106693	4/16/2003 12/24/2003	Converted
Gradient Structures Interfacing Microfluidics and Nanofluidics, Methods of Fabrication and Uses	CA	2,482,566 CA2,482,566	4/16/03 7/20/2010	Granted
Gradient Structures Interfacing Microfluidics and Nanofluidics, Methods of Fabrication and Uses	CA	CA2702194 CA2,702,149	4/16/2003 4/15/2014	Granted
Gradient Structures Interfacing Microfluidics and Nanofluidics, Methods of Fabrication and Uses	EP	2003751748.9 EP03751748	4/16/2003 9/14/2005	Pending
Gradient Structures Interfacing Microfluidics and Nanofluidics, Methods of Fabrication and Uses	EP	2012158025.2 EP2484751	4/16/2003 8/8/12	Pending
Gradient Structures Interfacing Microfluidics and Nanofluidics, Methods of Fabrication and Uses	HK	HK13100728.4 HK1173466A	xxxxx 5/16/2013	Pending
Gradient Structures Interfacing Microfluidics and Nanofluidics, Methods of Fabrication and Uses	IL	164602 IL164602	4/16/2003 3/10/12	Granted
Gradient Structures Interfacing Microfluidics and Nanofluidics, Methods of Fabrication and Uses	IL	214684	11/17/13	Allowed
Gradient Structures Interfacing Microfluidics and Nanofluidics, Methods of Fabrication and Uses	JP	2004-513506 JP4799861	4/16/2003 8/12/11	Granted
Gradient Structures Interfacing Microfluidics and Nanofluidics, Methods of Fabrication and Uses	SG	2004-05974.7 SG107337	4/16/2003 1/30/06	Granted
Optically characterizing	US	09/373,822 US6,790,671	8/13/99 9/14/04	Granted

ANNEX A[1]

INTELLECTUAL PROPERTY SECURITY AGREEMENT SUPPLEMENT

This Intellectual Property Security Agreement Supplement is entered into as of the [__] day of [_____], 20[__] by [_____], a [_____] ("_____"), [_____], a [_____] (each such entity, a "Grantor" and collectively, the "Grantors").

RECITALS

A. Grantors are party to that certain Intellectual Property Security Agreement, by and between Agent and the Grantors, dated as of June 29, 2018 (as the same may have been amended, modified or supplemented from time to time prior to the date hereof, the "Existing IP Security Agreement"; capitalized terms used herein are used as defined in the Existing IP Security Agreement);

B. Grantors wish to amend the Existing IP Security Agreement by supplementing the Intellectual Property Collateral therein with the Intellectual Property listed on the exhibits hereto.

NOW, THEREFORE, for good and valuable consideration, receipt of which is hereby acknowledged, and intending to be legally bound, as collateral security for the prompt and complete payment when due of its obligations under the Credit Agreement, each Grantor hereby represents, warrants, covenants and agrees as follows:

AGREEMENT

To secure its obligations under the Credit Agreement, each Grantor grants and pledges to Agent, for the ratable benefit of the Lenders, a security interest in all of such Grantor's right, title and interest in, to and under its Intellectual Property (as defined in the Credit Agreement), including, without limitation, the following, but excluding any Excluded Property:

(a) Any and all Copyrights, including without limitation those set forth on Exhibit A attached hereto, as such exhibit may be further amended, modified or supplemented from time to time;

(b) Any and all Patents, including without limitation those set forth on Exhibit B attached hereto, as such exhibit may be further amended, modified or supplemented from time to time);

(e) Any and all Trademarks, including without limitation those set forth on Exhibit C attached hereto, as such exhibit may be further amended, modified or supplemented from time to time;

(f) Any and all Mask Works, including, without limitation those set forth on Exhibit D attached hereto, as such Exhibit may be amended, modified or supplemented from time to time;

(g) All proceeds and products of the foregoing, including without limitation all payments under insurance or any indemnity or warranty payable in respect of any of the foregoing.

Grantors hereby agree that the Intellectual Property listed on the exhibits hereto shall become a part of the Intellectual Property Collateral in the Existing IP Security Agreement and shall secure all

[1] Note to draft: Annex A to be used to supplement the IP Security Agreement with new or revised intellectual property after the initial closing, in accordance with the updating requirements under the Credit Agreement

Obligations in accordance with the terms of the Credit Agreement. The exhibits of the Existing IP Security Agreement shall be deemed amended to add the Intellectual Property listed on the exhibits to this IP Security Agreement Supplement. The rights and remedies of the Agent with respect to the security interests granted herein are without prejudice to, and are in addition to those set forth in the Credit Agreement and the Existing IP Security Agreement.

The provisions of the Existing IP Security Agreement regarding choice of law, jurisdiction, venue and jury trial waiver are incorporated herein and shall govern this Intellectual Property Security Agreement Supplement.

[Signature Page Follows]

IN WITNESS WHEREOF, the Grantors have caused this Intellectual Property Security Agreement Supplement to be duly executed by its officers thereunto duly authorized as of the first date written above.

GRANTORS: [_____]

By:_____
Name:_____
Title:_____

EXHIBIT A

Copyrights

Description	Registration/ Application Number	Registration/ Application Date

EXHIBIT B

Patents

Description	Registration/ Application Number	Registration/ Application Date

EXHIBIT C

Trademarks

Description	Registration/ Application Number	Registration/ Application Date

EXHIBIT D

Mask Works

Description	Registration/ Application Number	Registration/ Application Date