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**UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION**  
Washington, D.C. 20549

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**FORM S-3**  
**REGISTRATION STATEMENT**  
*UNDER*  
*THE SECURITIES ACT OF 1933*

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**DECIPHERA PHARMACEUTICALS, INC.**  
(Exact name of registrant as specified in its charter)

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**Delaware**  
(State or other jurisdiction of  
incorporation or organization)

**30-1003521**  
(I.R.S. Employer  
Identification Number)

**500 Totten Pond Road  
Waltham, MA 02451  
(781) 209-6400**

(Address, including zip code, and telephone number, including area code, of principal executive offices)

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**Steven L. Hoerter  
President & Chief Executive Officer  
Deciphera Pharmaceuticals, Inc.  
500 Totten Pond Road  
Waltham, MA 02451  
(781) 209-6400**

(Name, address, including zip code, and telephone number, including area code, of agent for service)

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*With copies to:*

**Richard A. Hoffman, Esq.  
Edwin M. O'Connor, Esq.  
Goodwin Procter LLP  
100 Northern Avenue  
Boston, MA 02210  
(617) 570-1000**

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**Approximate date of commencement of proposed sale to the public:** From time to time after this Registration Statement becomes effective.

If the only securities being registered on this form are being offered pursuant to dividend or interest reinvestment plans, please check the following box.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, as amended, other than securities offered only in connection with dividend or interest reinvestment plans, check the following box:

If this form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.  File No. 333-227638

If this form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a registration statement pursuant to General Instruction I.D. or a post-effective amendment thereto that shall become effective upon filing with the Commission pursuant to Rule 462(e) under the Securities Act, check the following box.

If this Form is a post-effective amendment to a registration statement filed pursuant to General Instruction I.D. filed to register additional securities or additional classes of securities pursuant to Rule 413(b) under the Securities Act, check the following box.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See the definitions of “large accelerated filer,” “accelerated filer,” “smaller reporting company” and “emerging growth company” in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer  Accelerated filer   
 Non-accelerated filer  Smaller reporting company   
 Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

#### CALCULATION OF REGISTRATION FEE

Title of Each Class of Securities to be Registered(1)	Proposed Maximum Offering Price Per Unit	Amount of Registration Fee
Common Stock	—	
Preferred Stock	—	
Debt Securities	—	
Warrants	—	
Units	—	
<b>Total(2):</b>	<b>\$59,999,977.00</b>	<b>\$7,272.00(3)</b>

- (1) The Registrant previously registered securities, including common stock, preferred stock, debt securities, warrants and units comprised of same, with an aggregate offering price of \$400,000,000 on a Registration Statement on Form S-3 (File No. 333-227638) filed by the Registrant on October 1, 2018, and declared effective by the Securities and Exchange Commission on October 12, 2018 (the “Registration Statement”). In accordance with Rule 462(b) under the Securities Act, an additional amount of securities, including common stock, preferred stock, warrants, debt securities and units comprised of same having a proposed maximum aggregate offering price of \$59,999,977.00 is hereby registered, representing no more than 20% of the maximum aggregate offering price of securities available for issuance under the Registration Statement. In no event will the maximum aggregate offering price of all securities issued pursuant to this Registration Statement exceed that registered under such registration statements. The securities registered also include such indeterminate number of shares of common stock and preferred stock and amount of debt securities as may be issued upon conversion of or exchange for preferred stock or debt securities that provide for conversion or exchange, upon exercise of warrants or pursuant to the anti-dilution provisions of any such securities.
- (2) Consisting of some or all of the securities listed above, in any combination, including common stock, preferred stock, debt securities, warrants and units.
- (3) The registration fee has been calculated in accordance with Rule 457(o) under the Securities Act.

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## EXPLANATORY NOTE AND INCORPORATION BY REFERENCE

This registration statement is being filed to register an additional \$59,999,977.00 of securities, including common stock, preferred stock, debt securities, warrants and units comprised of same, of Deciphera Pharmaceuticals, Inc., a Delaware corporation, pursuant to Rule 462(b) under the Securities Act of 1933, as amended and General Instruction IV of [Form S-3](#) (the "Prior Registration Statement"). This registration statement incorporates by reference the contents of the registrant's registration statement on Form S-3 (File No. 333-227638), which was declared effective by the Commission on October 12, 2018, including all amendments and exhibits thereto and all information incorporated by reference therein, other than the exhibits filed herewith. The Company is filing this Registration Statement for the sole purpose of increasing the maximum aggregate offering amount of securities registered under the Prior Registration Statement by \$59,999,977.00.

The required opinion and consent is listed on an Exhibit Index attached hereto and filed herewith.

The registrant hereby certifies to the Commission that (i) it has instructed its bank to pay the Commission the filing fee set forth in the cover page of this registration statement by wire transfer of such amount to the Commission's account as soon as practicable (but no later than the close of business on August 15, 2019); (ii) it will not revoke such instruction; and (iii) it has sufficient funds in the relevant account to cover the amount of such filing fee.

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**EXHIBIT INDEX**

<u>Number</u>	<u>Exhibit Title</u>
5.1	<a href="#">Opinion of Goodwin Procter LLP.</a>
23.1	<a href="#">Consent of Independent Registered Public Accounting Firm, PricewaterhouseCoopers LLP.</a>
23.2	<a href="#">Consent of Goodwin Procter LLP (included in Exhibit 5.1 hereto).</a>
24.1*	<a href="#">Power of Attorney.</a>

\* Previously filed





Goodwin Procter LLP  
100 Northern Avenue  
Boston, MA 02210

goodwinlaw.com

+1 617 570 1000

August 14, 2019

Deciphera Pharmaceuticals, Inc.  
500 Totten Pond Road  
Waltham, MA 02451

Re: Securities Being Registered under Registration Statement on Form S-3

Ladies and Gentlemen:

We have acted as counsel to you in connection with your filing of a Registration Statement on Form S-3 ((as amended or supplemented, the "Earlier Registration Statement") and the Registration Statement filed pursuant to Rule 462(b) of the Securities Act of 1933, as amended (the "Securities Act") relating to such Earlier Registration Statement (the "462(b) Registration Statement," and, together with the Earlier Registration Statement, the "Registration Statement"), relating to the offering by Deciphera Pharmaceuticals, Inc. (the "Company"), of up to \$ 59,999,977.00 of any combination of (i) common stock, par value \$0.01 per share (the "Common Stock"), of the Company, (ii) preferred stock, par value \$0.01 per share, of the Company (the "Preferred Stock"), (iii) debt securities of the Company (the "Debt Securities"), (iv) warrants to purchase Common Stock, Preferred Stock, Debt Securities or Units (as defined below) (the "Warrants") and (v) units comprised of Common Stock, Preferred Stock, Debt Securities and Warrants in any combination (the "Units"). The Common Stock, Preferred Stock, Debt Securities, Warrants and Units are sometimes referred to collectively herein as the "Securities." Securities may be issued in an unspecified number (with respect to Common Stock, Preferred Stock, Warrants and Units) or in an unspecified principal amount (with respect to Debt Securities). The Registration Statement provides that the Securities may be offered separately or together, in separate series, in amounts, at prices and on terms to be set forth in one or more prospectus supplements (each a "Prospectus Supplement") to the prospectus contained in the Registration Statement.

We have reviewed such documents and made such examination of law as we have deemed appropriate to give the opinions set forth below. We have relied, without independent verification, on certificates of public officials and, as to matters of fact material to the opinions set forth below, on certificates of officers of the Company.

The opinions set forth below are limited to the Delaware General Corporation Law and the law of New York.

For purposes of the opinions set forth below, without limiting any other exceptions or qualifications set forth herein, we have assumed that (i) each of the Debt Securities, Warrants and Units, and the indentures, warrant agreements, unit agreements and other agreements governing the Securities offered pursuant to the Registration Statement will be governed by the internal law of New York and (ii) after the issuance of any Securities offered pursuant to the Registration Statement, the total number of issued shares of Common Stock or Preferred Stock, as applicable, together with the total number of shares of such stock issuable upon the exercise, exchange, conversion or settlement, as the case may be, of any exercisable, exchangeable or convertible security (including without limitation any Unit), as the case may be, then outstanding, will not exceed the total number of authorized shares of Common Stock or Preferred Stock, as applicable, available for issuance under the Company's certificate of incorporation as then in effect (the "Charter").

For purposes of the opinions set forth below, we refer to the following as the "Future Authorization and Issuance" of Securities:

- with respect to any of the Securities, (a) the authorization by the Company of the amount, terms and issuance of such Securities (the "Authorization") and (b) the issuance of such Securities in accordance with the Authorization therefor upon the receipt by the Company of the consideration (which, in the case of shares of Common Stock or Preferred Stock, is not less than the par value of such shares) to be paid therefor in accordance with the Authorization;

- with respect to Preferred Stock, (a) the establishment of the terms of such Preferred Stock by the Company in conformity with the Charter and applicable law and (b) the execution, acknowledgement and filing with the Delaware Secretary of State, and the effectiveness of, a certificate of designations to the Charter setting forth the terms of such Preferred Stock in accordance with the Charter and applicable law;
- with respect to Debt Securities, (a) the authorization, execution and delivery of the indenture or a supplemental indenture relating to such Securities by the Company and the trustee thereunder and/or (b) the establishment of the terms of such Securities by the Company in conformity with the applicable indenture or supplemental indenture and applicable law and (c) the execution, authentication and issuance of such Securities in accordance with the applicable indenture or supplemental indenture and applicable law; and
- with respect to Warrants or Units, (a) the authorization, execution and delivery by the Company and the other parties thereto of any agreement under which such Securities are to be issued and (b) the establishment of the terms of such Securities and the issuance of such Securities in conformity with those terms, the terms of any applicable agreement and applicable law.

Based upon the foregoing, and subject to the additional qualifications set forth below, we are of the opinion that:

1. Upon the Future Authorization and Issuance of shares of Common Stock, such shares of Common Stock will be validly issued, fully paid and nonassessable.
2. Upon the Future Authorization and Issuance of shares of Preferred Stock, such shares of Preferred Stock will be validly issued, fully paid and nonassessable.
3. Upon the Future Authorization and Issuance of Debt Securities, such Debt Securities will be valid and binding obligations of the Company.
4. Upon the Future Authorization and Issuance of Warrants, such Warrants will be valid and binding obligations of the Company.
5. Upon the Future Authorization and Issuance of Units, such Units will be valid and binding obligations of the Company.

The opinions expressed above are subject to bankruptcy, insolvency, fraudulent transfer, reorganization, moratorium and other similar laws of general application affecting the rights and remedies of creditors and to general principles of equity.

This opinion letter and the opinions it contains shall be interpreted in accordance with the Legal Opinion Principles issued by the Committee on Legal Opinions of the American Bar Association's Business Law Section as published in 53 Business Lawyer 831 (May 1998).

We hereby consent to the inclusion of this opinion as Exhibit 5.1 to the Registration Statement and to the references to our firm under the caption "Legal Matters" in the Registration Statement. In giving our consent, we do not admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations thereunder.

Very truly yours,

/s/ Goodwin Procter LLP

GOODWIN PROCTER LLP

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in this Registration Statement on Form S-3 of our report dated March 14, 2019 relating to the financial statements, which appears in Deciphera Pharmaceuticals, Inc.'s Annual Report on Form 10-K for the year ended December 31, 2018. We also consent to the reference to us under the heading "Experts" in the Registration Statement on Form S-3 (No. 333-227638) incorporated by reference in this Registration Statement.

/s/ PricewaterhouseCoopers LLP  
Boston, Massachusetts  
August 14, 2019