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

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**FORM S-8  
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 of Principal Executive Offices)

**Deciphera Pharmaceuticals, LLC 2015 Equity Incentive Plan  
Deciphera Pharmaceuticals, Inc. 2017 Stock Option and Incentive Plan  
Deciphera Pharmaceuticals, Inc. 2017 Employee Stock Purchase Plan**  
(Full Title of the Plans)

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**Michael D. Taylor, Ph.D.**  
**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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*Copies to:*  
**Richard A. Hoffman, Esq.**  
**Edwin M. O'Connor, Esq.**  
**Goodwin Procter LLP**  
**100 Northern Avenue**  
**Boston, MA 02210**  
**(617) 570-1000**

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, 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.

Large accelerated filer  Accelerated filer   
 Non-accelerated filer  (Do not check if a smaller reporting company) 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 7(a)(2)(B) of the Securities Act.

#### CALCULATION OF REGISTRATION FEE

Title of Securities to be Registered	Amount to be Registered <sup>(1)</sup>	Proposed Maximum Offering Price per Share	Proposed Maximum Aggregate Offering Price	Amount of Registration Fee
Common Stock, \$0.01 par value per share	4,092,710 shares <sup>(2)</sup>	\$3.37 <sup>(3)</sup>	\$13,792,433	\$1,718
Common Stock, \$0.01 par value per share	2,655,831 shares <sup>(4)</sup>	\$18.81 <sup>(5)</sup>	\$49,956,182	\$6,220
Common Stock, \$0.01 par value per share	306,750 shares <sup>(6)</sup>	\$18.81 <sup>(5)</sup>	\$5,769,968	\$719
Total	7,055,291 shares		\$69,518,583	\$8,657

- (1) Pursuant to Rule 416 under the Securities Act of 1933, as amended (the "Securities Act"), this Registration Statement shall also cover any additional shares of common stock which become issuable under the above-named plans by reason of any stock dividend, stock split, recapitalization or any other similar transaction effected without the receipt of consideration which results in an increase in the number of our outstanding shares of common stock. Pursuant to Rule 416(c) under the Securities Act, this Registration Statement shall also cover an indeterminate amount of interests to be offered or sold pursuant to the employee benefit plans described herein.
- (2) Represents shares of common stock issuable upon the exercise of outstanding stock option awards under the Deciphera Pharmaceuticals, LLC 2015 Stock Option and Incentive Plan (the "2015 Plan") as of the date of this Registration Statement. No further grants will be made under the 2015 Plan. To the extent outstanding options granted under the 2015 Plan are cancelled, forfeited or otherwise terminated without being exercised and would otherwise have been returned to the share reserve under the 2015 Plan, the number of shares underlying such awards will be available for future grant under the Deciphera Pharmaceuticals, Inc. 2017 Stock Option and Incentive Plan (the "2017 Plan"). See footnote 4 below.
- (3) Estimated solely for the purpose of calculating the registration fee pursuant to Rule 457(h) of the Securities Act, and based on \$3.37 per share, the weighted average exercise price (rounded to the nearest cent) of the outstanding option awards under the 2015 Plan as of the date of this Registration Statement.
- (4) Represents shares of common stock reserved for issuance under the 2017 Plan. To the extent that awards outstanding under the 2017 Plan or under the 2015 Plan as of the date of this Registration Statement are cancelled, forfeited or otherwise terminated without being exercised, the number of shares underlying such awards will be available for future grant under the 2017 Plan.
- (5) Estimated solely for the purpose of calculating the registration fee pursuant to Rule 457(h) of the Securities Act. The offering price per share and aggregate offering price are based upon the average of the high and low prices of the Registrant's common stock on September 29, 2017, as reported on the NASDAQ Global Select Market.
- (6) Represents shares of common stock reserved for future issuance under the Deciphera Pharmaceuticals, Inc. 2017 Employee Stock Purchase Plan.

Proposed sales to take place as soon after the effective date of the Registration Statement as awards are granted, exercised or distributed under the above-named plans.

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**Part I**

**INFORMATION REQUIRED IN THE SECTION 10(a) PROSPECTUS**

**Item 1. Plan Information.**

The documents containing the information specified in this Item 1 will be sent or given to participants as specified by Rule 428(b)(1) under the Securities Act. In accordance with the rules and regulations of the Securities and Exchange Commission (the "Commission") and the instructions to Form S-8, such documents are not being filed with the Commission either as part of this Registration Statement or as prospectuses or prospectus supplements pursuant to Rule 424 under the Securities Act.

**Item 2. Registrant Information and Employee Plan Annual Information.**

The documents containing the information specified in this Item 2 will be sent or given to participants as specified by Rule 428(b)(1) under the Securities Act. In accordance with the rules and regulations of the Commission and the instructions to Form S-8, such documents are not being filed with the Commission either as part of this Registration Statement or as prospectuses or prospectus supplements pursuant to Rule 424 under the Securities Act.

**Part II**

**INFORMATION REQUIRED IN THE REGISTRATION STATEMENT**

**Item 3. Incorporation of Documents by Reference.**

The Registrant hereby incorporates by reference into this Registration Statement the following documents filed with the SEC:

- (a) The prospectus filed by the Registrant with the SEC pursuant to Rule 424(b) under the Securities Act, on September 28, 2017, relating to the Registration Statement on Form S-1, as amended (File No. 333-220299), which contains the Registrant's audited financial statements for the latest fiscal year for which such statements have been filed; and
- (b) The description of the Registrant's common stock contained in the Registrant's Registration Statement on Form 8-A (File No. 001-38219), filed by the Registrant with the SEC under Section 12(b) of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), on September 27, 2017, including any amendments or reports filed for the purpose of updating such description.

All documents that the Registrant subsequently files pursuant to Sections 13(a), 13(c), 14 and 15(d) of the Exchange Act prior to the filing of a post-effective amendment to this Registration Statement which indicates that all of the shares of common stock offered have been sold or which deregisters all of such shares then remaining unsold, shall be deemed to be incorporated by reference in this Registration Statement and to be a part hereof from the date of the filing of such documents.

Any statement contained in a document incorporated or deemed to be incorporated by reference herein shall be deemed to be modified or superseded to the extent that a statement contained herein or in any other subsequently filed document which also is or is deemed to be incorporated by reference herein modifies or supersedes such statement. Any such statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this Registration Statement.

Under no circumstances will any information filed under current items 2.02 or 7.01 of Form 8-K be deemed incorporated herein by reference unless such Form 8-K expressly provides to the contrary.

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**Item 4. Description of Securities.**

Not applicable.

**Item 5. Interests of Named Experts and Counsel.**

Not applicable.

**Item 6. Indemnification of Directors and Officers.**

Section 145 of the Delaware General Corporation Law authorizes a corporation's board of directors to grant, and authorizes a court to award, indemnity to officers, directors, and other corporate agents.

The Registrant's current amended and restated certificate of incorporation contains provisions that limit the liability of its directors for monetary damages to the fullest extent permitted by Delaware law, except liability for: (i) any breach of their duty of loyalty to the Registrant or its stockholders, (ii) any act or omission not in good faith or that involves intentional misconduct or a knowing violation of law, (iii) unlawful payments of dividends or unlawful stock repurchases or redemptions as provided in Section 174 of the Delaware General Corporation Law; or (iv) any transaction from which they derived an improper personal benefit.

The Registrant's current amended and restated bylaws provide that the Registrant will indemnify, to the fullest extent permitted by law, any person who is or was a party or is threatened to be made a party to any action, suit or proceeding by reason of the fact that he is or was one of the Registrant's directors or officers or is or was serving at its request as a director or officer of another corporation, partnership, joint venture, trust, or other enterprise. Additionally, the amended and restated bylaws provide that the Registrant may indemnify to the fullest extent permitted by law any person who is or was a party or is threatened to be made a party to any action, suit, or proceeding by reason of the fact that he is or was one of the Registrant's employees or agents or is or was serving at its request as an employee or agent of another corporation, partnership, joint venture, trust, or other enterprise. The amended and restated bylaws also provide that the Registrant must advance expenses incurred by or on behalf of a director or officer in advance of the final disposition of any action or proceeding, subject to very limited exceptions.

The Registrant has entered into indemnification agreements with each of its directors and executive officers that may be broader than the specific indemnification provisions contained in the Delaware General Corporation Law. These indemnification agreements require the Registrant, among other things, to indemnify its directors and executive officers against liabilities that may arise by reason of their status or service. These indemnification agreements also require the Registrant to advance all expenses incurred by the directors and executive officers in investigating or defending any such action, suit, or proceeding.

The Registrant has obtained insurance policies under which, subject to the limitations of the policies, coverage is provided to its directors and executive officers against loss arising from claims made by reason of breach of fiduciary duty or other wrongful acts as a director or executive officer, including claims relating to public securities matters, and to the Registrant with respect to payments that may be made by the Registrant to these directors and executive officers pursuant to the Registrant's indemnification obligations or otherwise as a matter of law.

**Item 7. Exemption from Registration Claimed.**

Not applicable.

**Item 8. Exhibits.**

See the Exhibit Index on the page immediately preceding the exhibits for a list of exhibits filed as part of this Registration Statement, which Exhibit Index is incorporated herein by reference.

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**Item 9. Undertakings.**

(a) The Registrant hereby undertakes:

- (1) To file, during any period in which offers or sales are being made, a post-effective amendment to this Registration Statement:
  - (i) To include any prospectus required by Section 10(a)(3) of the Securities Act.
  - (ii) To reflect in the prospectus any facts or events arising after the effective date of the Registration Statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the Registration Statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than a 20% change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the effective Registration Statement.
  - (iii) To include any material information with respect to the plan of distribution not previously disclosed in the Registration Statement or any material change to such information in the Registration Statement.

Provided, however, that paragraphs (a)(1)(i) and (a)(1)(ii) of this Item 9 do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the Commission by the Registrant pursuant to Section 13 or Section 15(d) of the Exchange Act (15 U.S.C. 78m or 78o(d)) that are incorporated by reference in the Registration Statement.

- (2) That, for the purpose of determining any liability under the Securities Act, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.
- (3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.

(b) The undersigned Registrant hereby undertakes that, for purposes of determining any liability under the Securities Act, each filing of the Registrant's annual report pursuant to Section 13(a) or Section 15(d) of the Exchange Act (and, where applicable, each filing of an employee benefit plan's annual report pursuant to Section 15(d) of the Exchange Act) that is incorporated by reference in the Registration Statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(h) Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the Registrant pursuant to the foregoing provisions, or otherwise, the Registrant has been advised that in the opinion of the Commission such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the Registrant of expenses incurred or paid by a director, officer or controlling person of the Registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the Registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

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## SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the Registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-8 and has duly caused this Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Waltham, Commonwealth of Massachusetts, on the 6th day of October, 2017.

### DECIPHERA PHARMACEUTICALS, INC.

By: /s/ Michael D. Taylor

Michael D. Taylor, Ph.D.

President and Chief Executive Officer

## POWER OF ATTORNEY AND SIGNATURES

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Michael D. Taylor and Thomas P. Kelly his or her true and lawful attorney-in-fact and agent with full power of substitution, for him or her and in his or her name, place and stead, in any and all capacities, to sign any and all amendments (including post-effective amendments) to this Registration Statement on Form S-8, and to file the same, with all exhibits thereto and all documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorney-in-fact and agent, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming that all said attorneys-in-fact and agents or any of them, or his, her or their substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, this Registration Statement has been signed by the following person in the capacities and on the date indicated.

<u>Name</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Michael D. Taylor</u> Michael D. Taylor, Ph.D.	President, Chief Executive Officer and Director (Principal Executive Officer)	October 6, 2017
<u>/s/ Thomas P. Kelly</u> Thomas P. Kelly	Chief Financial Officer (Principal Financial and Accounting Officer)	October 6, 2017
<u>/s/ Patricia L. Allen</u> Patricia L. Allen	Director	October 6, 2017
<u>/s/ James A. Bristol</u> James A. Bristol, Ph.D.	Director	October 6, 2017

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<u>/s/ Edward J. Benz, Jr.</u> Edward J. Benz, Jr., M.D.	Director	October 6, 2017
<u>John R. Martin</u>	Director	
<u>/s/ Liam Ratcliffe</u> Liam Ratcliffe, M.D., Ph.D.	Director	October 6, 2017
<u>/s/ Michael Ross</u> Michael Ross, Ph.D.	Director	October 6, 2017
<u>/s/Dennis L. Walsh</u> Dennis L. Walsh	Director	October 6, 2017

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## EXHIBIT INDEX

Exhibit No.	Description
3.1	<a href="#"><u>Amended and Restated Certificate of Incorporation of the Registrant (Incorporated by reference to Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed on October 5, 2017).</u></a>
3.2	<a href="#"><u>Amended and Restated Bylaws (Incorporated by reference to Exhibit 3.2 to the Registrant's Current Report on Form 8-K filed on October 5, 2017).</u></a>
4.1	<a href="#"><u>Specimen Common Stock Certificate (Incorporated by reference to Exhibit 4.1 to the Registrant's Registration Statement on Form S-1, as amended (File No. 333-220299)).</u></a>
4.2	<a href="#"><u>Second Amended and Restated Investors' Rights Agreement among Deciphera Pharmaceuticals, LLC and certain of its shareholders, dated May 26, 2017 (Incorporated by reference to Exhibit 4.2 to the Registrant's Registration Statement on Form S-1, as amended (File No. 333-220299)).</u></a>
4.3	<a href="#"><u>Form of Registration Rights Agreement among the Registrant and certain of its stockholders, effective upon completion of the Registrant's initial public offering (Incorporated by reference to Exhibit 4.3 to the Registrant's Registration Statement on Form S-1, as amended (File No. 333-220299)).</u></a>
5.1*	<a href="#"><u>Opinion of Goodwin Procter LLP.</u></a>
23.1*	<a href="#"><u>Consent of PricewaterhouseCoopers LLP, Independent Registered Public Accounting Firm.</u></a>
23.2*	<a href="#"><u>Consent of Goodwin Procter LLP (included in Exhibit 5.1).</u></a>
24.1*	<a href="#"><u>Power of Attorney (included on signature page).</u></a>
99.1	<a href="#"><u>Deciphera Pharmaceuticals, LLC 2015 Stock Option and Incentive Plan and forms of award agreements thereunder (Incorporated by reference to Exhibit 10.1 to the Registrant's Registration Statement on Form S-1, as amended (File No. 333-220299)).</u></a>
99.2	<a href="#"><u>Deciphera Pharmaceuticals, Inc. 2017 Stock Option and Incentive Plan and forms of award agreements thereunder (Incorporated by reference to Exhibit 10.2 to the Registrant's Registration Statement on Form S-1, as amended (File No. 333-220299)).</u></a>
99.3	<a href="#"><u>Deciphera Pharmaceuticals, Inc. 2017 Employee Stock Purchase Plan (Incorporated by reference to Exhibit 10.3 to the Registrant's Registration Statement on Form S-1, as amended (File No. 333-220299)).</u></a>

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\* Filed herewith.





Goodwin Procter LLP  
100 Northern Avenue  
Boston, MA 02210  
goodwinlaw.com  
+1 617 570 1000

October 6, 2017

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

Re: Securities Being Registered under Registration Statement on Form S-8

Ladies and Gentlemen:

We have acted as counsel to you in connection with your filing of a Registration Statement on Form S-8 (the "Registration Statement") pursuant to the Securities Act of 1933, as amended (the "Securities Act"), on or about the date hereof relating to an aggregate of 7,055,291 shares (the "Shares") of Common Stock, \$0.01 par value per share, of Deciphera Pharmaceuticals, Inc., a Delaware corporation (the "Company"), that may be issued pursuant to the Deciphera Pharmaceuticals, LLC 2015 Equity Incentive Plan and the Company's 2017 Stock Option and Incentive Plan and 2017 Employee Stock Purchase Plan (collectively, the "Plans").

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 opinion set forth below, on certificates of officers of the Company.

The opinion set forth below is limited to the Delaware General Corporation Law.

For purposes of the opinion set forth below, we have assumed that a sufficient number of authorized but unissued shares of the Company's Common Stock will be available for issuance when the Shares are issued.

Based on the foregoing, we are of the opinion that the Shares have been duly authorized and, upon issuance and delivery against payment therefor in accordance with the terms of the Plans, will be validly issued, fully paid and nonassessable.

We hereby consent to the inclusion of this opinion as Exhibit 5.1 to 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-8 of Deciphera Pharmaceuticals, Inc. of our report dated August 15, 2017 relating to the balance sheet of Deciphera Pharmaceuticals, Inc. and our report dated June 23, 2017 relating to the financial statements of Deciphera Pharmaceuticals, LLC, which appear in Deciphera Pharmaceuticals, Inc.'s Amendment No. 2 to the Registration Statement on Form S-1 (No. 333-220299).

/s/ PricewaterhouseCoopers LLP

Boston, Massachusetts  
October 6, 2017