

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

SCHEDULE 13G  
Under the Securities Exchange Act of 1934

(Amendment No. \_\_)\*

**Arrowhead Research Corporation**

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(Name of Issuer)

**Common Stock, \$0.001 par value**

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(Title of Class of Securities)

**042797209**

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(CUSIP Number)

**April 29, 2013**

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(Date of Event Which Requires Filing of this Statement)

Check the appropriate box to designate the rule pursuant to which this Schedule is filed:

- Rule 13d-1(b)  
 Rule 13d-1(c)  
 Rule 13d-1(d)

\*The remainder of this cover page shall be filled out for a reporting person's initial filing on this form with respect to the subject class of securities, and for any subsequent amendment containing information which would alter the disclosures provided in a prior cover page.

The information required in the remainder of this cover page shall not be deemed to be "filed" for the purpose of Section 18 of the Securities Exchange Act of 1934 ("**Act**") or otherwise subject to the liabilities of that section of the Act but shall be subject to all other provisions of the Act (however, see the Notes).

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1. Names of Reporting Persons.  
I.R.S. Identification Nos. of above persons (entities only).

**RA Capital Management, LLC**

2. Check the Appropriate Box if a Member of a Group (See Instructions)
- (a)
- (b)

3. SEC Use Only

4. Citizenship or Place of Organization **Massachusetts**

Number of  
Shares  
Beneficially  
Owned by  
Each Reporting  
Person With

- |                             |                              |
|-----------------------------|------------------------------|
| 5. Sole Voting Power        | <b>0</b>                     |
| 6. Shared Voting Power      | <b>3,127,401<sup>1</sup></b> |
| 7. Sole Dispositive Power   | <b>0</b>                     |
| 8. Shared Dispositive Power | <b>3,127,401<sup>1</sup></b> |

9. Aggregate Amount Beneficially Owned by Each Reporting Person  
**3,127,401<sup>1</sup>**

Check if the Aggregate Amount in Row (9) Excludes

10. Certain Shares (See Instructions)

11. Percent of Class Represented by Amount in Row (9)  
**9.9%<sup>1</sup>**

12. Type of Reporting Person (See Instructions)  
**IA**

<sup>1</sup> The Reporting Persons own 3,114,755 shares of Common Stock and also 6,300 shares of Series B Preferred Stock that are convertible into 3,442,623 shares of Common Stock. The Series B Preferred Shares may not be converted such that the number of shares of common stock held by them and their affiliates after such conversion exceeds 9.99% of the outstanding shares of Common Stock. See Item 4 below.

1. Names of Reporting Persons.  
I.R.S. Identification Nos. of above persons (entities only).

**Peter Kolchinsky**

2. Check the Appropriate Box if a Member of a Group (See Instructions)  
(a)   
(b)

3. SEC Use Only

4. Citizenship or Place of Organization **United States**

Number of  
Shares  
Beneficially  
Owned by  
Each Reporting  
Person With

- |                             |                              |
|-----------------------------|------------------------------|
| 5. Sole Voting Power        | <b>0</b>                     |
| 6. Shared Voting Power      | <b>3,127,401<sup>1</sup></b> |
| 7. Sole Dispositive Power   | <b>0</b>                     |
| 8. Shared Dispositive Power | <b>3,127,401<sup>1</sup></b> |

9. Aggregate Amount Beneficially Owned by Each Reporting Person  
**3,127,401<sup>1</sup>**

Check if the Aggregate Amount in Row (9) Excludes

10. Certain Shares (See Instructions)

11. Percent of Class Represented by Amount in Row (9)  
**9.9%<sup>1</sup>**

12. Type of Reporting Person (See Instructions)  
**IN**

<sup>1</sup> The Reporting Persons own 3,114,755 shares of Common Stock and also 6,300 shares of Series B Preferred Stock that are convertible into 3,442,623 shares of Common Stock. The Series B Preferred Shares may not be converted such that the number of shares of common stock held by them and their affiliates after such conversion exceeds 9.99% of the outstanding shares of Common Stock. See Item 4 below.

1. Names of Reporting Persons.  
I.R.S. Identification Nos. of above persons (entities only).

**RA Capital Healthcare Fund, L.P.**

2. Check the Appropriate Box if a Member of a Group (See Instructions)  
(a)   
(b)

3. SEC Use Only

4. Citizenship or Place of Organization **Delaware**

Number of  
Shares  
Beneficially  
Owned by  
Each Reporting  
Person With

- |                             |                              |
|-----------------------------|------------------------------|
| 5. Sole Voting Power        | <b>0</b>                     |
| 6. Shared Voting Power      | <b>2,501,921<sup>2</sup></b> |
| 7. Sole Dispositive Power   | <b>0</b>                     |
| 8. Shared Dispositive Power | <b>2,501,921<sup>2</sup></b> |

9. Aggregate Amount Beneficially Owned by Each Reporting Person  
**2,501,921<sup>2</sup>**

Check if the Aggregate Amount in Row (9) Excludes

10. Certain Shares (See Instructions)

11. Percent of Class Represented by Amount in Row (9)  
**8.0%<sup>2</sup>**

12. Type of Reporting Person (See Instructions)  
**PN**

<sup>2</sup> The Reporting Person owns 2,491,804 shares of Common Stock and also 5,040 shares of Series B Preferred Stock that are convertible into 2,754,098 shares of Common Stock. The Series B Preferred Shares may not be converted such that the number of shares of common stock held by them and their affiliates after such conversion exceeds 9.99% of the outstanding shares of Common Stock. See Item 4 below.

**Item 1.**

(a) **Name of Issuer:** Arrowhead Research Corporation (the "Issuer").

(b) **Address of the Issuer's Principal Executive Offices:** 225 South Lake Avenue, Suite 1050, Pasadena, CA 91101.

**Item 2.**

(a) **Name of Person Filing:** This joint statement on Schedule 13G is being filed by Peter Kolchinsky, RA Capital Management, LLC, and RA Capital Healthcare Fund, L.P., who are collectively referred to herein as the "Reporting Persons." Mr. Kolchinsky (the "Manager") is the manager of RA Capital Management, LLC ("Capital"), which is the investment adviser and sole general partner of RA Capital Healthcare Fund, L.P. ("Fund") and serves as the investment adviser to a separate discretionary account.

(b) **Address of Principal Business Office:** The principal business office of the Reporting Persons is c/o RA Capital Management, LLC, 20 Park Plaza, Suite 1200, Boston, MA 02116.

(c) **Citizenship:** Capital is a Massachusetts limited liability company. The Fund is a Delaware limited partnership. The Manager is a United States citizen.

(d) **Title and Class of Securities:** Common stock ("Common Stock").

(e) **CUSIP Number:** 042797209.

**Item 3. If this statement is filed pursuant to §§240.13d-1(b) or 240.13d-2(b) or (c), check whether the person filing is a:**

Not applicable.

**Item 4. Ownership:**

As of the date of this filing, the Reporting Persons, in the aggregate, beneficially own 3,114,755 shares of the Common Stock of the Issuer, representing approximately 9.9% of such class of securities. The Reporting Persons also own 6,300 shares of Series B Preferred Stock that are convertible into 3,442,623 shares of Common Stock. The beneficial ownership of each Reporting Person is as follows: (i) Fund beneficially owns 2,491,804 shares of Common Stock representing approximately 8.0% of the class and also 5,040 shares of Series B Preferred Stock that are convertible into 2,754,098 shares of Common Stock and (ii) Capital, as the investment adviser and sole general partner of the Fund and investment adviser to an account owned by a separate investment vehicle which holds shares of the Issuer's Common Stock, and Mr. Kolchinsky as the manager of Capital, each beneficially own 3,114,755 shares of Common Stock of the Issuer representing approximately 9.9% of the class and also 6,300 shares of Series B Preferred Stock that are convertible into 3,442,623 shares of Common Stock. The Series B Preferred Stock referred to above may not be converted such that the number of shares of common stock held by the Reporting Persons after such conversion exceeds 9.99% of the outstanding shares of common stock ("Beneficial Ownership Limitation"). The Preferred Shares are eligible to vote with the common stock of the Company on an as-converted basis, but only to the extent that the Preferred Shares are eligible for conversion without exceeding the Beneficial Ownership Limitation.

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The Fund has the power to vote and dispose of the shares of Common Stock beneficially owned by such entity (as described above). Capital, as the investment adviser and sole general partner of the Fund and as the investment adviser to an account owned by a separate investment vehicle which holds shares of the Issuer's Common Stock, has the authority to vote and dispose of all of the shares of Common Stock reported in this Schedule 13G. The Manager, by virtue of his position as manager of Capital, has the authority to vote and dispose of all of the shares of Common Stock reported in this Schedule 13G.

**Item 5. Ownership of Five Percent or Less of a Class:**

Not applicable.

**Item 6. Ownership of More than Five Percent on Behalf of Another Person:**

Not applicable.

**Item 7. Identification and Classification of the Subsidiary Which Acquired the Security Being Reported on By the Parent Holding Company or Control Person:**

Not applicable.

**Item 8. Identification and Classification of Members of the Group:**

Not applicable.

**Item 9. Notice of Dissolution of Group:**

Not applicable.

**Item 10. Certification:**

By signing below I hereby certify that, to the best of my knowledge and belief, the securities referred to above were not acquired and are not held for the purpose of or with the effect of changing or influencing the control of the issuer of the securities and were not acquired and are not held in connection with or as a participant in any transaction having that purpose or effect.

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*Signature*

After reasonable inquiry and to the best of my knowledge and belief, I certify that the information set forth in this statement is true, complete and correct.

DATE: MAY 09, 2013

RA CAPITAL HEALTHCARE FUND, L.P.

By: RA Capital Management, LLC  
General Partner

By: /s/ Peter Kolchinsky

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Peter Kolchinsky  
Manager

RA CAPITAL MANAGEMENT, LLC

By: /s/ Peter Kolchinsky

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Peter Kolchinsky  
Manager

PETER KOLCHINSKY

/s/ Peter Kolchinsky  
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Exhibit 1

JOINT FILING AGREEMENT

Pursuant to Rule 13d-1(k)(1) under the Securities Exchange Act of 1934, as amended, the undersigned hereby agrees, that only one statement containing the information required by Schedule 13G, and each amendment thereto, need be filed with respect to the ownership by each of the undersigned of shares of Common Stock of Arrowhead Research Corporation and such statement to which this Joint Filing Agreement is attached as Exhibit 1 is filed on behalf of each of the undersigned.

DATE: MAY 09, 2013

RA CAPITAL HEALTHCARE FUND, L.P.

By: RA Capital Management, LLC  
General Partner

By: /s/ Peter Kolchinsky

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Peter Kolchinsky  
Manager

RA CAPITAL MANAGEMENT, LLC

By: /s/ Peter Kolchinsky

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Peter Kolchinsky  
Manager

PETER KOLCHINSKY

/s/ Peter Kolchinsky  
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